



TE WHARE WĀNANGA O
AWANUIĀRANGI

KAITIAKITANGA
THE IMPACT MADE ON IWI
OF LAKE ROTOITI FROM THE
PROVISION OF MĀORI LAND
FOR THE CONSTRUCTION OF
A WASTEWATER TREATMENT
PLANT.

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*A thesis presented to Te Whare Wānanga o Awanuiārangi in fulfilment of the
requirements for the degree of Doctor of Philosophy,
Te Whare Wānanga o Awanuiārangi*

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ABSTRACT

This thesis sets out to examine kaitiakitanga as a fundamental component of environmental management for iwi including the complexities and dynamics of the practice of kaitiakitanga within modern resource management in particular, the environmental and cultural management of a localised land and lake area in the Rotoiti Rotomā catchment. There are two essential foci: the first is iwi relationships with Crown agencies through the practices of kaitiakitanga and secondly is the relationship between this study and iwi's position on cultural, social, environmental and economic sustainability.

Kaitiakitanga represents a number of concepts that tie together the environmental, spiritual, economic and political aspects of Māori society. It establishes relationships that humans have with the spiritual world, the environment and with each other. It also allows hapū to identify with an area or resource and to strengthen their ties to it.

This thesis explores the Māori and Western world views, as well as their respective resource management attitudes and methods, using substantial literature research and semi structured interviews. The necessity of early iwi participation in a partnership approach with the local government in accordance with the Treaty of Waitangi, as well as the development of concepts and technology solutions that address cultural and spiritual issues, is also scrutinised in this study.

The Haumingi 9B 3B Block and surrounding land and waterways is chosen as a Case Study for its uniqueness to provide Māori owned land in a rural community to construct a wastewater treatment plant and connect to a reticulation scheme within the Rotoiti Rotomā communities. The outcomes of this research are for the benefit of decision makers – both Māori and non-Māori who are faced with similar challenges. A Cook Island Case Study has also been conducted as it is considered that outcomes from the Haumingi 9B 3B research will have direct application across Aotearoa and potentially abroad in areas around the pacific such as the Cook Islands. The pacific relevance is derived from our cultural similarities and shared

environmental issues as well as an understanding that many major upgrade projects receive technical solutions and construction input from New Zealand.

Within the broader context, it was to develop environmental, cultural and economic sustainability for the iwi of Ngāti Pikiao and Ngāti Te Rangiuuora. Consideration was made because of the current ongoing resource management issues between Māori and the Crown. This is with respect to land development versus little recognition of Māori cultural and spiritual values and the ability of the iwi to assert kaitiakitanga and rangatiratanga. This study found that despite Crown agencies' legal acceptance of kaitiakitanga within the RMA, there has been no adequate choice of formally constituted institutions to allow Ngāti Pikiao, as treaty partners to exercise kaitiakitanga and their kaitiaki values. It has had to be created along the way in this project.

While the case study focused on the Haumingi 9B 3B block and its surrounding land and waterways, the conclusions of this thesis are applicable to any resource management conflict between iwi and the crown. The findings from this study should allow iwi to find pragmatic and alternative solutions to the commonly held concerns about current wastewater treatment management and practices and how this affects whenua and wai. Clear policies should be developed by iwi regarding waste management issues with the intent to have them included in their Iwi Management plans. It should also allow Māori to understand the advantages and disadvantages of the investment in reticulated wastewater treatment schemes on iwi and similar communities. There are economic potentials in that the solution developed for these two communities will enable iwi to use their land for housing and other high-value applications such as the reuse of grey water (on the Haumingi 9B 3B block) to grow mānuka for honey – an aspirational commercial investment. Finally, the outcome should help Council to take a more pro-active stance in progressing policy and processes for constructive and effective engagement with iwi. This can happen by developing a collaborative programme that involve hapū and iwi, and leading researchers to test alternative solutions to current wastewater treatment.

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MĀORI GLOSSARY OF TERMS

Ahi kā	Burning –fire, rights to land by occupation. Those who keep the home fires burning	Mana whenua	Customary authority over lands
Ahi kā roa	The permanent burning fires		
Aotearoa	New Zealand, Land of the long white cloud	Manaaki	To offer support, sharing
Aroha	Love	Manaakitanga	Hospitality
Awa	River	Manuhiri	Visitors and guests
Awhi	Embrace, help	Mātauranga Māori	Māori knowledge
Hapū	Sub-tribe, pregnant	Maunga	Mountain
Hui	A meeting or gathering together for a specific reason	Mauri	Life-force
Iwi	Wider tribal group	Mihi	Greeting
Kai moana	Food from the sea	Moana	Sea
Kaitiaki	Guardian	Mokopuna	Granchild/ren
Kaitiakitanga	Guardianship, trusteeship, resource management	Ngā	The (plural)
Kanohi ki te kanohi	Face to face	Noa	Balance
Kanohi kitea	The seen face	Pā	Former marae complex
Koeke/Kaumātua	Elder	Pākehā	Person of European descent
Kaupapa	Purpose	Pakeke	Middle aged person

Kawa	Marae protocol pertaining to a particular iwi	Papakainga	Home base, village
		Papatūānuku	Earth Mother
Kōrero	To speak	Para	Faeces, effluent
Kuia	Female elder	Pepehā	Tribal saying, set form of words
Māori	The indigenous people of Aotearoa	Rāhui	Ban, place a temporary ritual prohibition on an area or place
Marae	Ceremonial courtyard	Rangatahi	Youth
Mahinga kai	Food-gathering places where food is traditionally gathered	Rangatiratanga	Political sovereignty, chieftainship, self- determination
Mana	Prestige	Ranginui	Sky Father
Reo	Language (māori)	Tūpuna	Ancestor
Rohe	District	Waahi tapu or wāhi tapu	Sacred place
Rūnanga	Iwi council	Wai	Water
Take raupatu	Right of conquest	Waiora Wairua	Clean water Spirit, soul
Take Toa	Conquest in battle		
Take tuku	Right of gift	Whakapapa Whakatauki	Genealogy, family tree proverb
Take tūpuna	Right of ancestry		
Take Whenua	Right of occupation through whakapapa		
Tangata	Person	Whānau	Family group, family, off-spring, to be-born
Tāngata	People		

Tangata whenua	People of the land	Whanaunga-tanga	Relationships, kinships
Tangihanga	Funeral, bereavement	Whenua	Earth, placenta
Tikanga	Customs, the correct way of doing things, protocol	Waiora	Clean water
Tangaroa	God of the Sea	Wairua	Spirit, soul
Taonga	A highly prized object, treasure, property	Whakapapa	Genealogy, family tree
Taonga tuku iho	Treasure handed down	Whakatauki	Proverb
Tapu	Sacred	Whānau	Family group, family, off-spring, to be-born

COOK ISLAND GLOSSARY OF TERMS

akono'anga ta'ito	ancient customs
Api	white spotted surgeonfish
Aronga Mana	traditional leaders
'atu o teia 'enua	owners of the land/land
'iti tangata	tribe
kauraro	respect
kōpu tangata	community workers
Kuki Airini	Cook Islands
Mana Tiaki	guardian of our environment
manu'iri	visitors
Mataiapo	leader
ngutuare tangata/ 'anau	family
no'o ki runga i te 'enua	rights of tenure
Oire	village
Pa Ariki	Major landowner
putuputuanga vaine tini e te tane tini	women and men's community projects
Rā'ui	a prohibition set in place by the owner of a piece of land or water reserving it or its produce for his own or some special use
Tangaroa	God of the sea
taokotai	cooperation
tauturu/ 'akaperepere	help and care for
titi ara	blue fin trevally
tu akangateitei/'ō 'ō	respect for tangible and non-tangible
tu inangaro	reciprocity
tuna, pakati	daisy parrotfish
Tupu 'anga	genealogy
vaka tangata oire	community experts

HE MAIMAI AROHA – IN MEMORY

It is with immense sadness that the completion of this thesis was not observed by significant whānau members, namely William Whakataki Emery. Willie was integral to the development and progress of this thesis as he was a major driving force in the implementation of the Rotoiti Rotomā reticulation scheme. His foresight and great aroha for Ngāti Pikiao saw the construction of the Wastewater Treatment Plant on the Haumingi 9B 3B Māori land block where he was Chairman. I am deeply indebted to Willie for the time and patience he put into supporting my efforts to complete this writing and to help me grow as a trustee and a person. The loss of Willie in April this year has left a huge gap for Ngāti Pikiao iwi and Te Arawa waka as a whole due to the significant roles he held for our hapū and iwi on local, regional and national boards as a trustee and Chair. His care and compassion for the health of our whenua and wai, the great aroha he had for the Rotoiti Rugby and Sports Association was unwavering. So too was Willie's resolute commitment to his people and it is here that I have learnt so much. Huge gratitude to both Willie's children, Nikasia and Wiremu and their tamariki, who allowed me to be a large part of their dad's life for the past 11-years.

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CHAPTER 1: RETURNING HOME

Hokia ki ō maunga kia purea koe, e ngā hau o Tawhirimātea

Return to your ancestral mountains, to be cleansed by the winds of Tawhirimātea

1.1 Chapter Introduction

In 2010, I moved my husband and young family to Rotorua to live amongst my own. Living most of my life in the metropolitan area of Auckland city was becoming increasingly difficult as an urban Māori of Te Arawa, Hauraki and Tainui descent. In part due to becoming a minority group amongst the diversity of other ethnic groups, the lack of supply of affordable housing and the failing health of my mother who needed to return home to her hapū of Ngāti Rongomai and Ngāti Pikiao. Although having passed some years earlier, my father was an ardent proponent of retaining Ngāti Pikiao land and a strong supporter of its development. Being well versed in formal English from his former years as a graduate of Hatō Petera Catholic high school in West Auckland and holding a deep knowledge of tikanga o Ngāti Pikiao and Ngāti Rongomai as he was a native speaker of te reo Māori, my father moved confidently in Te Ao Māori and Te Ao Pākeha. This held him in good stead on the Marae and amongst the wider Māori and Pākeha communities away from Rotoiti and Rotoehu where he had had many of his childhood experiences.

I knew that I too would take on similar duties to my fathers as I was highly intrigued by his working affairs over Ngāti Pikiao and Ngāti Rongomai tikanga, te reo, land and welfare.

Once settled in Rotorua I threw myself into learning and understanding good governance duties as a trustee of Marae, land and iwi trusts. With this new knowledge came the responsibility of representing Ngāti Pikiao and Ngāti Rongomai iwi on different boards, one of them being the Rotoiti Rotomā Sewerage Steering Committee (RRSSC). ‘Rotorua Lakes Council (RLC), Bay of Plenty Regional Council (BoPRC), Rotorua District Councillors and iwi representatives mandated by their Marae and iwi in the Rotoiti Rotomā District, Ngāti Pikiao Environmental Society, Te Arawa Lakes Trust (TALT), Ministry of Health (MoH),

and Rotoiti and Rotomā Ratepayers Association representatives make up the committee. There are 28 representatives and observers in total. Mr. Ian Mclean, an experienced and educated supporter for pristine Rotorua Lakes, chairs the group. Ian has been appointed as the Committee's facilitator due to his extensive experience in commercial acumen, relationship management, and group facilitation. This mandated group is responsible for advising and guiding the Rotoiti Rotomā District in the development of wastewater treatment options (Teinakore-Curtis, 2015, p. 77).

1.2 Guided by the ‘Home Fires’ – Te Ahi Kaa

The principles of ahi kā roa and ahi kā are directly related to the principle of tiakitanga protection and guardianship. The people who remain in permanent residence in a particular area maintain the ‘ahi kā roa’: the permanent burning fires. Those who can whakapapa to the area but do not necessarily live there have ‘ahi kā’, burning fires.

(Carter, 2006, pg.73)

The statement accentuated by Carter describes the way in which hapū and iwi members retain their land titles, through continual physical occupation. If the land was abandoned by iwi and hapū, their ability to continually claim their land would diminish and the ‘take whenua’ (land claim) would be overridden by other iwi that ‘moved in’ to occupy and labour on that particular territory (Tutua-Nathan, 1992; Awatere, 2003; Ministry of Justice, 2001, p. 49). I have been fortunate in knowing that my iwi of Ngāti Pikiao, Ngāti Te Rangiuuora and Ngāti Rongomai over the years have continued to physically occupy and labour on the Southern shores of Eastern Lake Rotoiti.

Their ability to maintain ‘ahi kā roa’ over these specific lands, have allowed iwi members like myself to return to live, and participate in iwi and land affairs. This is an ‘iwi driven’ thesis initiated through the dissention of iwi of Lake Rotoiti and Rotomā with RLC regarding the proposed construction project of a Wastewater Treatment plant in Rotomā. The project failed when Ngāti Pikiao and Ngāti Mākino successfully appealed the case in the Environment Court on the grounds of RLC misleading the iwi (Whata, 2016).

1.2.1 Establishing the group

The RRSSC was established in February 2014 as a result of the outcome from the Environment court ruling in 2012 in opposition to RLC construction of a Waste Water Treatment Plant (WWTP) in the Rotomā catchment. No proper consultation had taken place with Ngāti Pikiao and Ngāti Mākino with the discharge of human waste into the waterways and land that both iwi had mana whenua (customary authority) over.

I held a biased position from the outset as an iwi member on this committee. My subjectivity came from a perception that council bodies do not listen to iwi aspirations, rather, they take for granted the assumption that what is good for certain ratepayer groups and for Council will be good for all. The iwi reps' perceptions of RLC was that money was the main motivator for council to move forward on projects for communities, meanwhile whenua (land) and wai (water) were the commodities. Because of this bias, there was an air of scepticism held by the iwi representatives with the council and their proposal to utilise Ngāti Pikiao whenua.

1.3 Background to the Study

The research detailed in this thesis is focused on the development of a WWTP inside the boundaries of Ngāti Te Rangiunuora, a Ngāti Pikiao hapū (subtribe). The Trustees of the Haumingi 9B 3B land block close to Lake Rotoiti had recently signed a deal with RLC to establish a treatment plant on a big chunk of Haumingi land. Te Haumingi is located on the southern banks of Lake Rotoiti (Te Rotoiti-i- kitea-a-Ihenga/Te Roto kite-a-Ihenga-i-ariki-ai-a-Kahumatamomoe) and extends inland, flanked to the north by Waione land blocks and to the south by Haroharo land blocks (Stafford, 1996).



Figure 1-1. Ariel Photograph of Haumingi 9B 3B block (Source: RLC, 2016).

The WWTP will serve the two communities of Rotoiti and Rotomā. The Rotoiti community has a current occupancy rate of 420 homes and Rotomā with 212 homes. Many of the homes physically situated along State Highway 30 are full time either occupancy or holiday homes (RLC, 2016). Both communities are to be reticulated through a piped network; with the first stage beginning from Matahī Rd in Rotomā travelling 22km in length to the WWTP. The next stage will be pipes laid out from Rotoiti to the plant, that which is approximately 11km in length.

The agreement by the landowners to create provision for the construction of a WWTP on the Haumingi 9B 3B block was in part, a response to an Environment Court appeal won by Ngāti Pikiao and Ngāti Mākino in 2012 (Teinakore-Curtis, 2015).

Both iwi groups opposed a Resource Consent application submitted by Rotorua District Council (now known as Rotorua Lakes Council) to build a WWTP in Rotomā, with the effluent to be piped into the Waitahanui catchment. The objection was founded on cultural and spiritual reasons, as well as the negative impacts on kai moana and the lake's mauri (Morgan, 2006). Ngāti Pikiao also brought up issues relating to the Treaty of Waitangi, such as consultation and active protection. They observed the presence of wāhi tapu, particularly the ana (cave) that shelters the kōiwi of Te Haukeka, a notable Ngāti Pikiao ancestor. Furthermore, the iwi criticised the lack of a Cultural Impact Assessment on the possible site,

land disposal area, and receiving environment by an expert of Ngāti Pikiao descent.

Furthermore, there was a dearth of research on the feasibility of alternate sites, as well as the fact that Māori land development was constrained by the wastewater treatment and disposal systems in place (Teinakore-Curtis, 2015).

The main points of the appeal to the Resource Consent application was that it had:

- (a) Failed to adequately provide and recognise the relationship of Ngāti Pikiao with their ancestral lands, waters, sites and taonga.
- (b) Failed to adequately provide for the kaitiakitanga of Ngāti Pikiao.
- (c) Did not take into account the principles of the Treaty of Waitangi.
- (d) Is inconsistent with Part 2 of the RMA.
- (e) Did not promote the sustainable management of natural and physical resources.
- (f) Failed to avoid, remedy or mitigate the adverse effects of the Application on the environment, particularly the adverse effects on Ngāti Pikiao.

Moreover, the Application:

- (a) Is contrary to the objectives and policies of the relevant plans.
 - (b) Failed to assess the effects of the activity on the cultural and spiritual values and interests of Ngāti Pikiao.
- (Ngāti Pikiao Environmental Society, 2011).

1.4 Septic Tank Technology

Perhaps the win for iwi in the Environment Court and the provision of Māori owned land to build a WWTP was timely. With a focus on Septic tank technology that is the current system in Rotoiti and Rotomā, it is old and not designed to remove nutrients from wastewater. This type of technology was never questioned, as it was largely one of the acceptable kinds of technology available (BOPRC, 2006). Rural and small communities readily accepted it. The septic tanks normally have a soakage treatment area made of concrete or fiberglass that holds

the black water (from the toilet) and greywater (from other household use such as kitchens, showers and hand basins). Solid waste is also stored in the soakage area and is cleaned out by the homeowner every 3 to 4 years. Grey water can contain faecal matter and should be kept separate from drinking water (Morgan & Manuel, 2009). In various parts of both Rotoiti and Rotomā, there has been groundwater contamination from septic tank effluent, and in turn has had a direct effect on both Lakes Rotoiti and Rotomā (eBOP, 2007).

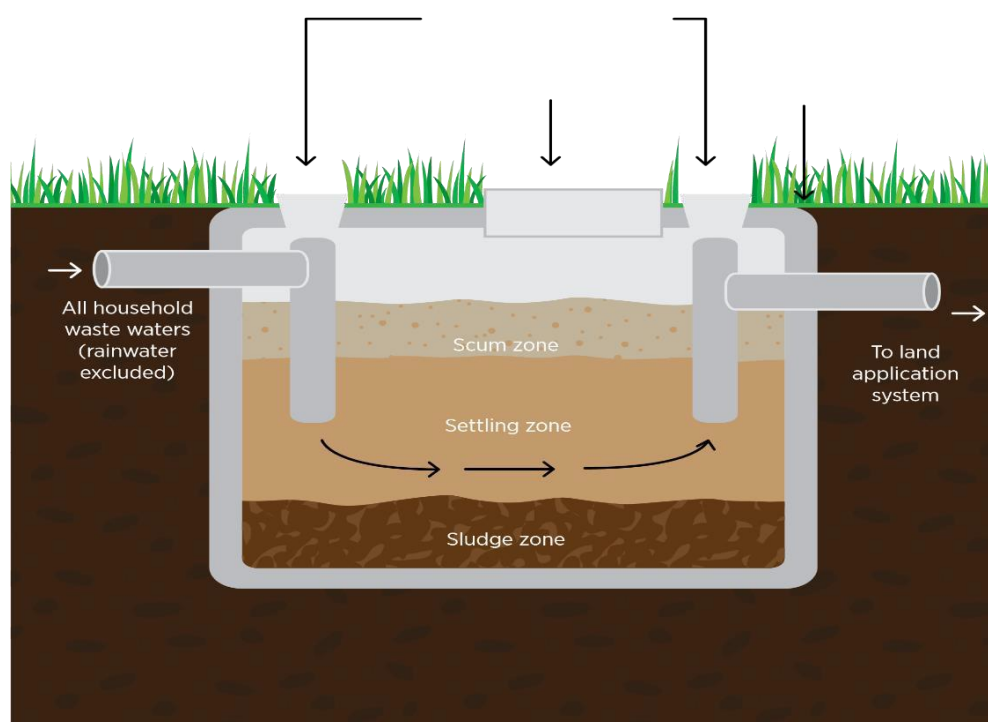


Figure 1-2. Old Septic Tank Technology Diagram (Source: BOPRC, 2009)

1.5 Old Septic Tanks

Often, when these systems fail, it is a consequence of the lack of maintenance by homeowners to adequately maintain and service their septic tanks. Poor installation or even the siting of these systems in inappropriate locations such as areas where there is a high-water table is another factor. Lake Rotoiti is an area that is prevalent for having a high-water table; this is supported by Tahana (2012) in his evidence to the Environment Court that the performance of most of the Rotoiti lakeside onsite wastewater systems have been severely compromised by high lake levels. Some of this has been mitigated by the introduction of the Ohau Weir gates (BOPRC, 2013).

Untreated or partially treated wastewater that has been discharged from these failing systems can create pathogens and nutrients harmful to both humans and the environment. Not only is this culturally offensive to iwi to have faeces (para) seep into areas where they undergo mahinga kai (collecting and harvesting seafood), but there is also a deterioration of freshwater ecosystems due to reduced fresh water quality. Fortunately, nitrogen from existing septic tank use does not currently appear to be adversely affecting Lake Rotomā's water quality (eBOP, RDC, TALT, 2009). However, phosphate from septic tanks may be having a negative effect on water quality. Removing some nitrogen and phosphorus through improved community wastewater treatment will help protect Lake Rotomā and Rotoiti's water quality' (eBOP et al., 2009). It will also protect the land and surrounding environment provided by the owners of the Haumingi 9B 3B block.



Figure 1-3. Top of Septic Tank Tapuaekura Marae, Rotoiti (Source: Research Field work, 2017)

1.5.1 Long Drop and Composting Toilets

Long Drop toilets or a Pit Latrine is a toilet that is still used on some part-time occupied properties in Doctors Point, Rotomā, and a particular property in Rotoiti. On this property, the long drop is simply, a basic pit approximately 1.5 metres deep where the excreta fall. The urine and liquids soak into the ground and the solid materials are then decomposed in the pit. They have the potential to cause adverse environmental effects if not fully sanitised and at a suitable distance from groundwater tables from surface water bodies or ground water bores.

This pit latrine is in the vicinity of an on-site disposal effluent system; a viable alternative and therefore is not a permitted activity (BOPRC 2006; BOPRC 2009) under the BOPRC Onsite Effluent Treatment (OSET) rules. It is a serious health and environmental hazard (BOPRC, 2009). Composting toilets are permitted activities if the users successfully maintain them. They must be diligent in managing the process of composting. Grey water cannot be effectively dealt with by composting toilets and will require the same outcomes as an onsite effluent treatment system. If the user is unable to achieve this, a resource consent will need to be sought by BOPRC (BOPRC, 2006). Both types of wastewater technology are permissible in rural or remote communities provided that these technologies take into account the requirements of the Health Act 1956 and effluent is disposed to land which will not result in adverse human health and environmental effects (BOPRC, 2018).



Figure 1-4. Pit Latrine in makeshift shelter (Source: Research Fieldwork, 2018)



Figure 1-5. Composting Toilet (Source: Research Fieldwork, 2018)

1.5.2 Modern Wastewater Technology

With the advancement of wastewater technology, onsite pre-treatment systems have been developed and successfully trialled to treat effluent ‘at the source’ or on the owner’s property before being filtered to a land disposal area. Two systems that are being utilised for the Rotoiti and Rotomā communities is a Septic Tank Effluent Pumping (STEP) system and a Vermifiltration system (aerobic system) using worms to decompose sewage and organic waste. The benefits of STEP treatment are that the solids are retained in a STEP Tank, liquid effluent only is discharged, eliminating risk of raw sewage breakout, and it has low power demand, which is less than 10 cents per day for a typical 3-bedroom home. There is also a

low operation and maintenance requirement, which is one service per 3 years (Rayan & Teinakore-Curtis, 2018).

A vermifiltration system (Biolytix) will address cultural concerns regarding the transfer of faecal material across properties to a combined Rotomā/Rotoiti WWTP and provides a mean time between service calls (MTBSC) that is at least equivalent to low pressure grinder pump (LPGP) installation. Furthermore, it can provide an effluent quality which, when combined with STEP effluent from Rotomā, can be effectively treated to achieve the required high levels of nitrogen and phosphorous removal (Rayan & Teinakore-Curtis, 2018). Both systems will minimize adverse effects on the water quality of the two lakes. An elaboration of each system will be discussed in further chapters in this thesis.



Figure 1-6. STEP system at InnoFlow Industries (Source: InnoFlow, 2017)



Figure 1-7. STEP systems installed at Jacks Point, Queenstown (Source: InnoFlow, 2017)



Figure 1-8. Biolytix Units, OSET Trial (Source: Research Fieldwork, Rotoiti 2018)



Figure 1-9. Biolytix trial Systems installed, Gisborne Pt, Site (Source: Research Fieldwork, 2018)

1.5.3 Questions asked by the communities

With the installation of pre-treatment systems connected and piped to a WWTP on the Haumingi 9B 3B block, ratepayers in both communities regarding the affordability of the plant and the scheme made frustrated enquiries. Questions have been asked such as “Why can’t I just upgrade my septic tank or clean it out more frequently?” “I have just upgraded my septic tank to an OSET system and I have a resource consent. Why do I have to connect to this system when it will cost me more money?” or “We can only just pay these rates, how am I supposed to afford this new system?” “Why are we not using grinder pumps, aren’t they cheaper?” or “What about these Biolytix? If there’s a trial to reduce cultural offence, isn’t that going to cost us more money?” (pers.comm. Rotoiti and Rotomā ratepayers, April 18, 2016).

Many of the ratepayers in both communities have lived comfortably with these age-old septic tanks with little to no regard to the water quality of both Rotoiti and Rotomā. The ratepayers who have been proactive enough to upgrade their wastewater systems have become aloof to the imposition of RLC’s requirements of a reticulated scheme and BOPRC’s requirement of a current resource consent. However, would the ratepayers continue to live with the environmental degradation of the lakes through seepage of nutrients into it? Alternatively, would STEP and Vermifiltration systems (advanced technology) be more beneficial to these communities to reduce lake quality deterioration?

The proposed scheme has a price tag of \$35.3 million with the majority of the cost covered by Government subsidies (RLC, 2018 p. 15). This will leave ratepayers in both communities to pay \$14,629 (GST exclusive) or \$1500 (GST inclusive) to their annual rates over a 25-year period.

Resentment has set in with some ratepayers who are unable to pay the full amount up front, so will have to pay over a long term with compounding annual interest. Currently, there are 212 dwellings (owner-occupier and leasehold properties) in Rotomā and 440 dwellings in Rotoiti. The intent of the scheme is to address the deteriorating water quality in both Lakes Rotoiti and Rotomā. A quadruple benefit will be to reduce adverse environmental effects, mitigate cultural offence by the non-transference of faecal matter past wāhi tapu and culturally significant sites, benefit human health and support land development with future housing.

By upgrading aging individual septic tanks and ground disposal systems to a modern wastewater treatment plant and land disposal area connected to pre-treatment systems on each homeowner's properties, much of this intent will be achieved.



Figure 1-10. Haumingi 9B 3B proposed WWTP site (Source: Whata, 2016).

1.6 Aim and Research Questions

The intent of this Doctoral thesis study was to develop an understanding of the practices of kaitiakitanga (environmental guardianship) by the local iwi with respect to the proposed reticulated wastewater treatment scheme in Rotoiti and Rotomā communities. Secondly, was to understand the potential economic advantages there are for iwi premised on the first intention. Central to this were the complexities and dynamics of this practice with the following foci:

Is a Wastewater Treatment plant and disposal field aligned with Kaitiaki values and principles relating relating to land use?

What impact will be made on iwi relationships with their engagement with Local Council through the practices of kaitiakitanga?

Moreover, with regards to the reticulation of the wastewater from both communities, the following questions were posed:

1. What would culturally appropriate wastewater solutions look like and how do they fit with the demands of modern times?
2. Can cultural concessions be made when there are not a lot of practical wastewater options to choose from?
3. How could cultural offence be mitigated?
4. What type of strategies and solutions would best fit iwi that also align with the needs of the general community and other affected stakeholders?
5. What is needed to develop options to make this a reality?

A Case Study of the Rotoiti and Rotomā lake communities with the implementation of the reticulation scheme and the Haumingi 9B 3B land block – the whenua where the Wastewater treatment plant is to be constructed will be conducted along with the qualitative interviews with the active Kaitiaki and Rotoiti residents and evaluation of council environmental policies will help to address the following motives:

- The impacts made on the landowners of the construction of a Wastewater Treatment plant as whenua is a taonga

- That Māori have a values base that embeds itself into environmental protection: however, Māori need to be effectively included in environmental practices and management through consultation and decision – making processes.

Two goals emerge from these aims. The first goal was to concentrate on the cultural benefits and challenges for Haumingi landowners in terms of land provision for the WWTP. The second goal was to determine the relationship between the scheme and the iwi's position on cultural, social, environmental, and economic sustainability, which was a follow-up to the first. Kaitiakitanga is a collection of principles that connect Māori society's environmental, spiritual, economic, and political aspects. It establishes human links with the spiritual realm, the environment, and one another. It also enables hapū to identify with a location or resource and strengthen their ties with it (Teinakore-Curtis, 2015).

As a result, this thesis looked on the issues that local iwi and hapū face as a result of changing land usage in Rotoiti and Rotomā. Its goal was to identify the issues surrounding these challenges and frame them in a way that would allow iwi to continue to move towards a sustainable and economically viable environment through kaitiakitanga practise.

1.6.1 The potential outcomes

There are a number of potential outcomes that may be achieved from this research. The outcomes should allow iwi to find pragmatic and alternative solutions to the commonly held concerns about current wastewater treatment management and practices and how this affects whenua and wai. Clear policies should be developed by iwi regarding waste management issues with the intent to have them included in their Iwi Management plans. It should also allow Māori to understand the advantages and disadvantages of the investment in reticulated wastewater treatment schemes on iwi and similar communities. There are economic potentials in that the solution developed for these two communities will enable iwi to use their land for housing and other high-value applications such as the reuse of grey water (on the Haumingi 9B 3B block) to grow mānuka for honey – an aspirational commercial investment. Finally, the outcome should help Council to take a more pro-active stance in progressing policy and processes for constructive and effective engagement with iwi. This can happen by developing a collaborative programme that involve hapū and iwi, and leading researchers to test alternative solutions to current wastewater treatment.

1.6.2 Significance

This study is significant in that both Councils must learn from their previous failure to consult with iwi to achieve a reticulated wastewater treatment scheme that is not culturally offensive.

Ngāti Pikiao via Ngāti Pikiao Environmental Society had successfully lodged an appeal to the Environment Court in 2011 during the resource consenting process phase for Rotorua Lakes Council (RLC – then known as RDC) to Bay of Plenty Regional Council (BoPRC).

1.6.3 The Learning – Ngāti Pikiao and Ngāti Mākino

The Environment Court ruled in favour of Ngāti Pikiao (Main Appellant) and Ngāti Mākino (Supplemental Appellant) in 2012 (subsequent Appellant). The Rotorua District Council (RDC) had already surrendered the resource consent, but the Court made its decision based on all of the evidence. According to Malcolm (2013) of the Rotorua Daily Post, the Rotorua District Council "misled both parties and the Court on several significant grounds," according to the Environment Court. The judge criticised the council's consultation process for the project and ordered \$65,000 in legal costs to Ngāti Pikiao and \$50,000 to Ngāti Mākino against the council (ibid).

1.6.4 Waitaha – Kaituna River Claim

The Kaituna River Claim was an example of an earlier written history from which RDC learned about the cultural sin of para transference from one rohe to the next (Waitangi Tribunal, 1984). Ngāti Pikiao and Waitaha koeke elders had doggedly pursued the abandonment of a 20- kilometre wastewater pipeline from Lake Rotorua to the Kaituna River and Maketū Estuary. On spiritual grounds, the claimants' assertions of mixing tainted water with waters used to gather kaimoana (seafood) were distasteful and highly repulsive to iwi. Although RDC, the Ministry of Works and Development, and the Bay of Plenty Catchment Commission were adamant in their efforts to move nutrients from one waterway to the next, the iwi did not want the proposed pipeline to shift 'the problem' from the lake to the river. This concerted effort by the three Crown agencies to advance the Kaituna Catchment Control Scheme was aided in part by a large subsidy granted to move the project forwards (ibid. p.

21). The Waitangi Tribunal accepted the interconnectedness of the lake and river systems after a lengthy and complex hearing, stating that:

Lake Rotorua does not exist on its own. It is one part of a connected series of waterways that affect each other. The outflow of the lake is through the Ohau channel which leads into Lake Rotoiti, another beautiful body of water... The outflow from Lake Rotoiti is the Kaituna River, a stretch of water that flows for about 50 km from Lake Rotoiti to the sea. It is famous for the trout pools in its upper reaches, the Ōkere Falls not far from Lake Rotoiti and for the rapids and waterfalls to be found as it makes its way to the Maketū Estuary... This estuary is large and distinctive.

(Waitangi Tribunal: WAI 4, pg.5)

The Tribunal also acknowledged that:

[The] Kaituna [River] and Maketū Estuary are one water system starting with Lake Rotorua. All parts, the lakes, the river and estuary should be protected.

(Waitangi Tribunal, 1989: pg.5)

The recommendations made from these hearings was that the intent of the pipeline proposal 'was contrary to the principles of The Treaty of Waitangi. The Tribunal recommended that the development of a pipeline be abandoned, and that research be done on disposal to land in a practical manner as an alternative' (Waitangi Tribunal, 2008: p. 1413).

Both of these highly publicised cases show the characteristics of local Government bodies who continue to exclude Māori participation in local government planning to effectively manage land and waterways that Māori perceive as taonga. This is in spite of tīkanga Māori values having been acknowledged in resource management and local government legislation (Jefferies & Kennedy, 2009a; Kennedy, 2008).

1.6.5 Kaitiakitanga and Kaitiaki

For the Te Arawa iwi, the Rotoiti Lake and whenua are extremely important. Many Te Arawa descendants are descended from the legendary ancestors Rangitihi and Manawakotokoto. Rākeiao, Kawatapuārangi, and Apumoana were the offspring of these

tūpuna (ancestors), and their many descendants finally settled on the banks of Lake Rotoiti. These descendants have been the environmental guardians of this part of Lake Rotoiti for decades. For centuries, the descendants of Pīkiao I, Ngāti Pīkiao and Ngāti Te Rangīunuora, have guarded the kingdom of Tangaroa (an eponymous ancestor of tangata whenua and guardian of the sea). Their understanding of kaitiakitanga is vast and their practice of it has been long standing (Morgan, 2006b).

The notion of kaitiakitanga is defined by Marsden and Henare (1992) as conservation, customs, and traditions, as well as its goal and means through Rāhui. Rāhui is a method of preventing resource depletion and pollution of the environment by prohibiting the use of a supply in order to allow for resource regeneration. The Rāhui was lifted once this process was completed. This, according to Marsden, was a type of farming rotation (Teinakore-Curtis, 2015).

This strategy ensured a constant source of supply. Furthermore, Williams (2006) suggests that 'Rāhui was enforced by humans to assure the resource's sustainability, rather than because of the sanctity of the resource. The concept of kaitiakitanga is further defined by Marsden as first and foremost being kaitiaki - or those who are the guardians, defenders, preservers, and conservators of a natural and environmental resource. All-natural resources derived from mother earth, or Papatūānuku, who recognises Māori and land's traditional relationship in Māori Cosmogony'. We don't exist without Papatūānuku, according to Hutchings (2005).

'It is by nature of being Māori that we seek to protect and enhance her growth and nurturing abilities from any form of degradation. In addition, Marsden and Henare assert that just as the foetus is nurtured in the mother's womb, so too are all life forms nurtured in the womb of Papatūānuku and upon her breast. People are therefore an integral part of the natural order and the recipient of Papatūānuku's bounty. As a person has social obligations to his whānau, he is also obligated to mother earth and her whānau through the promotion of their welfare and well-being' (Teinakore-Curtis, 2015, p. 18).

1.7 Overview of Methods

The purpose of the study was to develop an understanding of the practices of kaitiakitanga and kaitiaki values by the local iwi with respect to the proposed reticulated wastewater treatment scheme in Rotoiti; therefore, it is important the research follow kaupapa Māori research methodologies. Kaupapa Māori research is described by Smith (1990) as a positive, innovative, counter-hegemonic force, which seeks to validate, and legitimate Māori ‘voice’ and ‘ways of knowing’ through a ‘research methodology constructed for Māori within a Māori context. It is at the control and conditions of Māori, which is the aspiration of having control over one’s ownlife, holistic well-being and cultural identity’ (Teinakore-Curtis, 2015, p. 49).

A suitable approach in this study is one that not only addresses the issue, but also safeguards the participants and the confidentiality of the information they submit. Acquiring qualitative data by Māori and Indigenous peoples necessitates an understanding of the suppression and assimilation that indigenous cultures have undergone and continue to face in modern society. To ensure that any qualitative information gathered is effectively understood and protected, an in-depth understanding of Te Reo Māori (Māori language), the Māori Worldview, and tikanga is also essential.

To answer the research questions, this study employs a variety of methodologies. This is because it has the ability to improve research methodologies by recognising the strengths and limitations of each technique and combining them to maximise the realisation of iwi and non-Māori ratepayers' aspirations who will be connected to the Rotoiti and Rotomā reticulation scheme. By strategically integrating both approaches in the same study, the limitations and strengths of each method may be overcome, or in other words, the strength of one method can compensate for the weakness of the other (ibid).

Being an insider within both the iwi and hapū of Ngāti Pikiao, an ethnographic approach was subsequently chosen as a research method using both qualitative and quantitative methods to help me to understand the cultural system set up within this thesis project. Van Maanen quoted an earlier definition in Conklin (1968, pg. 172) regarding ethnography:

The ethnographic method involves a long period of intimate study and residence in a

well-defined community employing a wide range of observational techniques including prolonged face-to-face contact with members of local groups, direct participation in some of the groups' activities, and a greater emphasis on intensive work with informants than on the use of documentary or survey data.

(Van Maanen, 1986, pg.38)

Therefore, the aim was to provide detailed descriptive data associated with the lives and experiences of iwi members and their understanding of kaitiakitanga and kaitiaki values from an iwi perspective. This thesis aimed to discuss this topic in a holistic way, providing context to the focus of this study by exploring existing literature and historical dimensions relating to the practice of kaitiakitanga in Aotearoa New Zealand. It also provided detailed observations from the fieldwork that I undertook as part of the ethnographic method. This was to help understand the relationship between the reticulation scheme and iwi's position on social, environmental, cultural and economic sustainability.

Once the research approach and method of data collection was considered, the research was then designed as a Case Study. This was due to capturing the participants' experiences as Kaitiaki and owners of the whenua where wastewater was going to be treated. Semi-structured interviews and document analysis were used to gather data as part of the qualitative research approach.

1.7.1 Research question one

Is a Wastewater Treatment plant and disposal field aligned with Kaitiaki values and principles relating to land use? The landowners have been the Kaitiaki of the Haumingi 9B 3B land block for centuries. Maintaining mana whenua (customary authority of an iwi or hapū in an identified area) over the whenua allows Ngāti Te Rangiunuora to maintain their identity, cultural practices, tīkanga and traditions without the adverse effects made in the change of the cultural landscape (Morgan, 2014).

A Kaupapa Māori approach was utilised when undertaking qualitative interviews with landowners and iwi who are affected by the construction of the WWTP in Rotoiti. Mane (2009) advocates that Māori researchers need to be connected to their communities where

research will be undertaken and where possible be working from the grass roots of communities. The fundamental requirement is that the research should be linked to positive outcomes for Māori (Sharples as cited in Mane, 2009).

1.7.2 Research question two

What impact will be made on iwi relationships with the whenua and their engagement with Local Council through the practices of kaitiakitanga? Little work has been done previously by Rotorua Lakes Council (RLC formerly known as Rotorua District Council) to involve iwi in policy discussion on wastewater treatment and disposal. However, by nature, Ngāti Pikiao have had a long standing and uninterrupted link with the lakes, ancestral lands, wāhi tapu (sacred areas) and sites of cultural and spiritual significance through kaitiakitanga practices (Morgan, 2014). Robust dialogue will need to be had by Ngāti Pikiao and RLC with a possible inception of an Iwi wastewater treatment policy committee to Council to give iwi reassurance that their voice is being heard.

1.7.3 Research question three

With the implementation of the reticulation scheme, what is the relationship between the scheme and iwi's position on social, environmental, cultural and economic sustainability? Ngāti Te Rangiunuora of Ngāti Pikiao are creating land provision for the development of a WWTP and a disposal field on their land site based on the premise that there will be little to no adverse effects both culturally and environmentally (Whata, 2016). It is essential that iwi understand the impact of this activity in detail when considering the importance of future decisions relating to the scheme such as growth and the continuation of the treatment plant beyond the 50- year lease agreement made between RLC and Haumingi 9B 3B trustees and landowners.

History: A Socio-Historical Map of the Haumingi 9B 3B Block (Haumingi)

**Ko Te Arawa te Waka,
Ko Ngāti Pikiao te iwi,
Ko Ngāti Te Rangiunuora te hapū,
Ko Haumingi te Maunga,**

Ko Te Rotoiti I Kitea a Ihenga te moana,
Ko Te Punawhakareia a Rākeiao te turangawaewae,
Ko Te Rangiunuora te tūpuna.
 Te Arawa is the canoe,
 Ngāti Pīkiao is the tribe,
 Ngāti Te Rangiunuora is the sub-tribe
 Matawhaura is the mountain,
 Te Rotoiti i Kitea a Ihenga is the lake
 Te Punawhakareia a Rākeiao is the Place of Belonging,
 Te Rangiunuora is the ancestor

1.8 A Socio-historical map of a people

A socio-historical map of the Ngāti Te Rangiunuora hapū and its relationship to the Haumingi 9B 3B block is shown below. Through the hapū leader Te Rangiunuora, it discusses Ngāti Pīkiao's settlement on the specific landscape. The kaitiaki obligations for Ngāti Te Rangiunuora hapū members over their whenua from the past to the present are at the heart of this discussion.

1.8.1 Te Rangiunuora and his people



Figure 1-11. Ngāti Pīkiao Whakapapa (Source: Taheke Minute Book 1, 1885)

The illustrious ancestor Te Rangiunuora was the youngest son of Pikiao II, the prominent ancestor of the Ngāti Pikiao iwi. Te Rangiunuora's people originally settled along the shorelines of Tapuaekura Bay, which was outlined by a significant Ngāti Te Rangiunuora descendant, Reimana Poihipi in the Māori Land court claim:

Te Rangiunuora and his children settled down at Tapuaekura, both Te Rangiunuora 1 and 2 lived there. Tapuaekura is the dividing rohe of Rangiunuora's land, commencing at; Te Puapua thence to Te Mapou, Kawatapuārangi, Tokopa, then turns towards the South then goes as on to Pukeomahina, Te Mimiohinerere, thence by the Maungapikopiko stream, Tuawhenua, Omatapura thence by the Maungapikopiko stream to Puketawheo, then by the Eastern side of the Rereotara to the rohe of the Whakapoungakau Block thence to Waihinahina (Paehinahina) then turns towards the North to te Raora-o-Waihinahina thence to the commencement at Te Puapua.
(Tāheke Minute Book 1, 1885, p. 134)

Poihipi further explained that:

Te Rangiunuora had three pā within the Tāheke block: including Tumoana, Tapaniao and Te Mapou which were occupied from the time of Te Rangiunuora until 1840. There were also two pā outside of the Taheke block called Punawhakareia and Te Komuhumuhu.
(Kawharu, Johnson, Wiri, Armstrong & O'Malley, 2005, p. 685)

Over the next decade, Te Rangiunuora's hapū moved across to the various Haumingi land blocks along the South Western shores of Lake Rotoiti where they settled and are ahi kā roa to this day. There are three significant settlement areas for Ngāti Te Rangiunuora along this stretch of Lake Rotoiti; they are Kōmuhumuhu - now referred to as Gisborne Point where Ngāti Te Rangiunuora were victorious in their battle against the Ngāti Maru and Ngāti Paoa iwi of Hauraki (Stafford, 1996, p. 35). Ngāmawhiti Pā; and Te Tuarae, a prominent battleground of the Ngāti Te Rangiunuora hapū (Skerrett-White & Skerrett, 2015, p. 9) where a considerably large-scale battle took place between the triumphant Te Arawa people and the iwi of Te Tai Rāwhiti whom were attempting to pass through Ngāti Te Rangiunuora lands to join the Māori King movement in the Waikato (ibid).

Skerrett-White & Skerrett (p. 10) assert that:

The Te Arawa peoples gathered their own fighting contingent (known as the Te Arawa Flying Column) and set their headquarters at Komuhumuhu. Fighting began at Ngauhu (near Wai-iti stream) and on the second day, a hot battle was fought on the Taurua ridge and lake edge between Komuhumuhu and Wai-iti. About twenty of the invaders were killed including the chief Apanui, who fell at Te Tu-arae, the wooded headland near Emery's house at Taurua. The three days' skirmishing ended in the complete repulse of the invaders.

This symbolic battle asserted the enduring mana of the Ngāti Te Rangiunuora hapū over these lands. Their success in 'Take Toa' (conquest in battle) and 'Take Whenua' (right of occupation through whakapapa) have been critical elements in nurturing Ngāti Te Rangiunuora descendants over time. The transmission of this intergenerational knowledge is renowned amongst the iwi of Ngāti Pīkiao (W. Emery, personal communication, June 10, 2017).



Figure 1-12. Ngāti Te Rangiunuora Cultural Sites of Significance (Source: Whata, 2016)

1.8.2 Haumingi Lands - Mana Atua, Mana Tangata and Mana Whenua

‘The social structure of Māori in their society is based upon whakapapa because people descend from Te Atua, and a person’s individual mana therefore depends on these descent lines’ (Ka’ai, Moorfield, Reilly, & Mosley, 2004, p. 14). Ngāti Pikiao and their hapū of Ngāti Te Rangiunuora see themselves similarly; they structure their hapū and iwi groupings according to the notion of mana (Skerrett-White & Skerrett, 2015). Because the Ngāti Te Rangiunuora hapū strongly identify themselves with the physical aspects of the environment, the domains of the various Atua are able to provide the linkages across resources in order to create a more holistic approach for Māori with the environment. (Love, Tutua-Nathan, Kruger, & Barns, 1993).

According to Waitere and Johnston (2009, p. 18), ‘Mana tangata provides the means through which the mana of individuals and collectives is established, recognised and potentially multiplied’. Therefore, because whakapapa enables Ngāti Te Rangiunuora to locate themselves relative to their turangawaewae (in this case, the Haumingi lands), to their people (tūpuna, hapū and iwi members) and their environment (their physical land and waterways); it is through whakapapa that ‘Mana Tangata’ is realised (Jahnke & Mulholland (eds), 2011).

Mana whenua is derived from the connection to land and the authority to provide, produce and maintain guardianship of resources (Waitere & Johnston, 2009). The tūpuna of the Ngāti Te Rangiunuora hapū have acquired ‘mana whenua through certain customary rights known as ‘take tūpuna’ (right of ancestry), ‘take raupatu’ (right of conquest), ‘take tuku’ (right of gift) and te ahi kā roa’ (Kawharu et al., 2005, p. 739). They have been able to exercise these rights over the Haumingi lands for the past two and a half centuries (Whata, 2016).

1.8.3 Haumingi 9B 3B Land block

The Haumingi 9B 3B land block, which is the site of Te Tuarae Pā, situated behind Taurua Marae and Taurua urupā, is an area that the Ngāti Te Rangiunuora hapū have inextricable links to (Kawharu et al., 2005). Te Tuarae was a Pā Maioro (supplementary fortified pā) that belonged to the illustrious ancestor Taketakehikuroa until later being occupied by another Ngāti Te Rangiunuora Rangatira (chief) Rahui. The occupation over the land for these renowned ancestors and others such as Te Pahau who settled at Ngāmawhiti Pā, was an

assertion of their mana. ‘This was based on their ancestry, possession of the land for many generations, their wāhi tapu on the whenua and in finely built caves, and mahinga kai. This reinforced their status as ahi kā roa for Ngāti Te Rangiuuora hapū’ (Kawharu et al., 2005, p. 740). These ancestral connections are fortified through current practices for the hapū members as Kaitiaki of the land and surrounding environment.

1.8.4 Haumingi 9B 3B Terrain

Haumingi 9B 3B has a very hilly terrain which was once covered by a podocarp forest of native flora and fauna. In the 19th century the land block along with adjacent Haumingi blocks were used as sources of timber for the construction of different churches; one at Tapuaekura and the erection of another church for the Te Roro o te Rangi iwi on Mokoia Island (Skerrett-White & Skerrett, 2015). Later, the remaining land was cleared and converted to farming sheep and cattle, and more recently planted for exotic forestry.



Figure 1-13. View of the Haumingi 9B 3B land block terrain (Source: Opus, 2016)

The land now has a ‘legal status as Haumingi 9B 3B, Block XII, Rotoiti SD Block IX Rotomā 80. The block is Māori freehold title and managed through the Haumingi 9B3 B Ahu Whenua Trust’ (Opus, 2016, p. 8).

1.8.5 Haumingi 9B 3B Land owners as Kaitiaki

For centuries, the Haumingi 9B 3B block's landowners have been able to meet their 'kaitiaki commitments and maintain connections to their ancestral lands, streams, and taonga. They are inextricably linked to the land and natural resources by way of whakapapa' (Kawharu et al., 2005, p. 739). Whakapapa (genealogical ties) connects people to a geographical place, to tūpuna and to Atua (Marsden, 2003; Mead, 2003; Walker, 1990). Therefore, this reinforces their obligations and responsibilities to the land and in turn establishes a sense and a place of belonging (Marsden, 2003).

Tule (2006, p. 7) gives a more definitive explanation of whakapapa by stating that:

Whakapapa contains an extensive narration of birth, of life and of death, ensuring that each individual finds a place to exist, to grow and to stand. Whakapapa is about family, but it is also an all-embracing cultural concept that allows us as Māori to access the past, to acknowledge our deep roots, to select exemplars of affinity and to take pride of place in the moving swirls of time.

Forster (2011, p. 18), asserts that 'whakapapa describes the manner in which all things of the universe are descended from a common source and are interrelated; kaitiakitanga is an extension of whakapapa with regards to the protection and management of the ancestral landscape'. Therefore, the landowners understand that there is an implicit expectation in their Kaitiaki role that 'the resources entrusted to them will be protected and sustained and will be passed on from generation to generation in an enhanced state' (W. Emery, personal communication, August 9, 2018).

The condition of the environment that is passed on for future generations according to Morgan (2006a, p. 132), 'is extremely important and can be referred to in whakatauki (proverbs) that discusses uri whakatupuranga (iwi and hapū descendants)'. Therefore, the landowners have a deep understanding that the provision they have created to construct a WWTP on their whenua is a huge responsibility that they carry, not just for themselves, but also ensuring that the whenua is left in the same state before the WWTP is built or in a more improved state (E. Skerrett, personal communication, May 10, 2019). Any environmental impacts made on the whenua is the priority for the land owners of the

Haumingi 9B 3B block. It is the ‘most important consideration in terms of keeping the ‘mauri’ of the land and waterways intact and in fulfilling their kaitiakitanga responsibilities through identifying the modern tikanga processes and procedures that will allow the land owners to be fully satisfied with the proposed scheme’ (Skerrett-White & Skerrett, 2015, p. 6).

Awatere (2003, p. 7) states that ‘for Māori to assert control over the use of or access to a resource is inferred in the concept of mana. Mana is a spiritual power and authority that kaitiaki have over a natural resource that is delegated to them by Atua’. Kaitiaki must be able to utilise these resources in a sustainable manner.

Tomas (1994, p. 40) supports this by outlining that:

Man being descended from the gods is likewise imbued with mana although that mana can be removed if it’s violated or abused. There are many forms and aspects of mana, of which one is the power to sustain life. Māoridom is very careful to preserve the many forms of mana it holds, and in particular is very careful to ensure that the mana of kaitiaki is preserved. In this respect Māori become one and the same as kaitiaki, becoming the minders of their relations, that is, the other physical elements of the world.

Duker (1994) asserts that the Kaitiaki approach to environmental management is holistic. It is for those who hold the status as mana whenua to exercise kaitiakitanga and to protect the mauri over these natural resources (Ministry of Environment, 2003a; Ka’ai et al., 2004).

The Kaitiaki of the Haumingi 9B 3B land block are there to ensure that they uphold the mana of their iwi and hapū with the use of this resource. It is unacceptable for them to allow the degradation of their land and surrounding waterways with the construction of the WWTP, therefore the landowners must be vigilant in their approach to protecting these resources and asserting their practice of kaitiakitanga over these areas (W. Emery, personal communication, August 17, 2018).

However, Minhinnick (1989, p. 5) asserts that the ‘kaitiaki role is not a process of ownership, but an individual and collective role to safeguard ‘ngā taonga tuku iho’ (treasures that have been handed down) by their ancestors for the present and future generations’.

An esteemed elder and Rangatira of the Ngāti Pikiao iwi, Te Ariki Morehu, gave a moving testimony in the Environment Court 2012 hearing, regarding the previous attempt to build a WWTP on Manawahē Rd, Rotomā. With regard to the responsibilities of being a kaitiaki, he states:

We cannot maintain our kaitiakitanga obligations and practices if others cannot respect and uphold our values. Our efforts to protect our taonga and restore our taonga will be in vain.

For tangata whenua to safeguard the integrity of our tupuna, we are obligated to protect and preserve the areas that bare their names, the same areas where our tūpuna have died protecting in the past.

(T. Morehu, Environment Court, May, 2012, p. 3)

All the more conventionally, a key thought is whakapapa, which ties iwi to the land and the waterways. Through the eyes of an esteemed Ngāti Pikiao koeke, this clearly shows the association of iwi with natural resources, which are considered taonga tuku iho. The connection among iwi and taonga is reflected through a kaitiaki framework, with kaitiakitanga accommodating the ongoing protection of these natural assets so to ensure mauri of all taonga.

Mutu (2002) supports this by stating that, as minders, kaitiaki guarantee that the mauri of taonga such as land and waterways are secured, including the hau kainga which convey the airborne forces exuding from both the land and the ocean. At the point when the attributes of the hau kainga begin to change, as on account of effects from a significant turn of events, iwi are cautioned of the beginning of the consumption in the mauri of their tribal landscapes. A taonga whose mauri turns out to be seriously exhausted presents a significant assignment for the kaitiaki of those specific lands and waterways. To maintain their own mana, iwi as kaitiaki will do whatever it takes to re-establish the mauri of the taonga to the same or even better state. Aside from denying the whānau or hapū of the life supporting potential of the land and ocean, an inability to assert kaitiakitanga may bring about the awkward passing of individuals from the whānau or hapū. Hence, kaitiakitanga is a right, and yet it is also an obligation for tangata whenua.

1.9 Overview of the Thesis

Prior to the proposal of the current reticulation scheme, a poll was taken by RLC for the Rotoiti and Rotomā communities to decide their most preferred option of reticulation. Two hundred and seventy votes were received, all from the Rotomā community who are mainly non-Māori residents. The result was to utilise the first option - to pipe the waste back to Rotorua, a distance of twenty kilometres in length. This came about as the result of poor engagement with both communities. It was not at all ideal and lacked transparency for the way in which the process was undertaken. This was certainly not going to provide scope for growth in either community.

1.10 Chapter Outlines

The thesis has been shaped in a sequential form regarding the journey of an iwi and hapū intrinsically tied across two lake settlements in the Rotorua district – Rotomā and Rotoiti, highlighting their dilemma and opportunities for better decision-making processes and wastewater treatment solutions that align with iwi and hapū cultural values.

As a researcher and tribal member of both the iwi and hapū, I am connected to the outcomes of this research, thus I was engaged in what Linda Smith (1999) describes as “insider/outsider research.” The conclusions drawn in this study address the purpose and aims of the thesis.

1.10.1 Chapter One presents the rationale behind the research

Returning Home - this chapter looks at the reasons for the research, the problem facing the communities of Lake Rotoiti and Lake Rotomā regarding failing septic tanks and alternative wastewater technology and infrastructure. A socio-historical approach of Ngāti Te Rangiunuora, a hapū of Ngāti Pikiao is examined, including the proactive stance they are taking to ‘manaaki’ (protect) and ‘tiaki’ (care for) the residents of both communities as Kaitiaki. These factors create the context that set out the following chapters.

1.10.2 Chapter Two reviews the literature on kaitiakitanga

Kaitiakitanga – this chapter addresses the literature with a particular emphasis on what kaitiakitanga means as a traditional concept and in its contemporary form. Secondly, the discourse around wastewater centres itself around the transference of it from one rohe (area) to the next and what this means in relation to the ethic of kaitiakitanga. Finally, the literature review brings together the concept of kaitiakitanga and its practices as it is highly relevant for wastewater treatment through cultural and environmental sustainability for iwi and hapū of Rotoiti and Rotomā.

1.10.3 Chapter Three examines Kaupapa Māori Research, theory, and Kaupapa Māori Methodology

Kaupapa Māori Research - this chapter examines Kaupapa Māori Research, theory, and Kaupapa Māori Methodology in some detail and discusses ethical issues likely to arise when researching in Māori communities. Qualitative and Quantitative Research Methodology is highlighted as a means to provide an understanding of the best approach to use for this case study. Discussion will also be had on how interviewing is the predominant source of data collection. In addition, as a hapū and iwi member of Ngāti Pikiao ‘an insider’ for the research, an ethnographic approach was chosen as a research method to help me to understand the cultural system set up within this thesis project. The aim is to provide detailed descriptive data associated with the lives and experiences of iwi members and their understanding of kaitiakitanga and Kaitiaki values from an iwi perspective, and regarding the impact of a WWTP. The data analysis will be supported by Taguette, an online qualitative research tool, utilised to aid me as the researcher to tag and colour code the many words, sentences, and paragraphs found in the numerous minutes and legal documents I’d retained for this chapter's document analysis. This tool will assist in identifying and analysing the relevant thoughts and conversations of council, iwi representatives, consultants, and stakeholders involved in the project because qualitative research methods produce rich, thorough research materials that preserve people's viewpoints while also providing numerous settings for comprehending the phenomenon under investigation.

A Multiple Attribute Decision Making (MADM) methodology and method will be used to ascertain the long-term viability and acceptability of the STEP and Biolytix systems (Kalbar,

Karmakar & Asolekar, 2012). Multiple variables, such as costs, environmental performance, safety, ecological dangers, and community perception, are frequently used to determine effective wastewater treatment strategies (Gogate, Kalbar, & Raval, 2017). MADM approaches are well suited to this research because the case study is concerned with picking the most practical pre-treatment wastewater system option from a finite number of specified options.

1.10.4 Chapter Four examines the Haumingi 9B 3B Block project as a Case Study

A Case Study – Chapter Four examines the Haumingi 9B 3B Block project as a Case Study due to providing Māori-owned land in a rural community for the purpose of fostering environmental, cultural, and economic sustainability for iwi and community stakeholders. The Haumingi 9B 3B block is situated within Ngāti Te Rangiunuora, a hapū of the iwi of Ngāti Pikiao. It examines the outcomes of the Kaituna Claim (1984), the dissatisfaction of iwi and their divergent views from those of local authority representatives, and how this current scheme can succeed without repeating history.

Additionally, consideration was given to the ongoing resource management conflict between Māori and the Crown. This relates to the lack of acknowledgement for Māori cultural and spiritual values, as well as the iwi ability to assert kaitiakitanga and rangatiratanga.

1.10.5 Chapter Five examines STEP (Septic Tank Effluent Pumping) system – a financially viable option

Rayan, S. & Teinakore-Curtis, F. (2018). *CA STEP for Iwi: A case study illustrating STEP as a viable and culturally appropriate reticulation method for a predominantly Māori owned community in Lake Rotomā, Rotorua*. In Proceedings Book, Land Treatment Collective Conference, Rotorua Events Centre, Rotorua, March 7-9.

This paper I co-authored with Salma Rayan, Commercial Engineer for Innoflow Technologies Ltd, a highly reputable company that has had over 15 years wastewater experience in the New Zealand commercial and residential areas.

STEP (Septic Tank Effluent Pumping) system - Chapter Five discusses a suitable

reticulation method required to reduce the environmental impact on the lakes, to be in line with iwi cultural values and practices, to meet the Ministry of Health (MoH) time and subsidy requirements and to be financially viable for the current and future generations. This solution was implemented into the Rotomā community. One such solution was found in a STEP system that is supplied by Innoflow Technologies NZ Ltd (Auckland, New Zealand). In combination, this decision was inclusive of cultural, technical and financial considerations of the available technologies.

This paper was nominated for a Hynds award at the Conference as it was the first paper submitted regarding the effects of wastewater on cultural values in a rural Māori community with a technological solution available to meet the needs of iwi and stakeholders.

1.10.6 Chapter Six seeks to understand a culturally viable wastewater pre-treatment solution – a vermifiltration system (Biolytix).

Teinakore-Curtis, F. (2018). *KAITIAKITANGA: WAI? WHENUA? OR A WASTEWATER TREATMENT PLANT?* In Reviewed Proceedings Book Institute of Public Works Engineering Australasia IPWEA Conference; Rotorua Energy Events Centre, Rotorua, June 20-22.

<https://www.ipwea.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=47c75722-4176-f506-1465-6bf4c1a86cd4>

This paper was presented at the IPWEA – Institute of Public Works Engineering Australasia Conference to confirm a worm-based type of pre-treatment that the Rotoiti Community was to have installed on each property.

A culturally viable wastewater pre-treatment solution – this chapter details a process undertaken to understand a culturally viable wastewater pre-treatment solution for the community of Lake Rotoiti, including the outcomes of that process. A higher level of pre-treatment was sought, in this case a vermifiltration system (Biolytix). This was preferred in relation to the transference of para (faeces) past iwi areas of interest (also considering failure) or to iwi areas of interest. Minimising impact from failure events, which could adversely affect wāhi tapu (sacred sites), cultural sites of significance, and areas for mahinga kai (traditional food gathering) was critical for iwi members. Separating the solid waste from

the grey water, allows the water to be treated before being pumped up to the WWTP on the Haumingi 9B 3B Block. This treatment system instigated thinking from wastewater technical engineers across the country to consider the benefits of vermifiltration systems as a primary treatment source before applying UV treatment at the WWTP to create near 'clean drinkable' water.

1.10.7 Chapter Seven examines how Ngāti Pikiao and Ngāti Te Rangiunuora with Rotorua Lakes Council (RLC) and Bay of Plenty Regional Council (BOPRC) assert kaitiakitanga

This chapter examines the journey for both Ngāti Pikiao and Ngāti Te Rangiunuora with RLC and Bay of Plenty Regional Council (BOPRC) in their ability to assert kaitiakitanga within the context of the reticulation scheme. This chapter will involve a thorough and comprehensive review of both the Rotoiti Rotomā Sewage Scheme Committee (RRSSC) and Iwi Wastewater Liaison Group (IWLG) minutes since the inception of the Rotoiti Rotomā Sewage Scheme Committee in February 2014. The purpose for the scrutiny of these transactional records are to draw a systematic and accurate picture of what took place between iwi representatives and RLC to come to an agreed outcome on the scheme. Within these records are accounts of the ethic of kaitiakitanga at work, with not only iwi, but RLC and BOPRC staff members.

1.10.8 Chapter Eight assesses RLC's commitment to the iwi and hapū through their values and principles – towards an Active Protection framework

RLC's values and principles – towards an Active Protection framework in co-management and co-planning with iwi on wastewater management - this chapter will evaluate RLC's commitment to resolving Ngāti Pikiao and Ngāti Te Rangiunuora's cultural concerns through an assessment of their values and principles as an essential component of performing kaitiakitanga. To begin, the researcher seeks to ascertain whether RLC as a local government authority is guided by values and principles. These will be informed by the statutory acknowledgments from the Resource Management Act 1991 and Local Government Act 2002 and their successive reforms. This can also occur through case studies within Te Arawa rohe that involve iwi and council relationships based on their particular values and principles in environmental and freshwater management. Secondly, is to discover

that if indeed council can successfully engage with iwi premised on their values and principles, that council can move toward establishing a Kaitiakitanga – Active protection framework in co-management and co-planning with iwi on wastewater management.

1.10.9 Chapter Nine explores a Ngāti Pikiao and Ngāti Te Rangiunuora perspective

Koeke and Pakeke interviewees as kaitiaki – This chapter seeks to gather iwi perspectives on wastewater and the impact on cultural and kaitiaki values. It will examine the questions that were asked of several koeke and a number of pakeke on land changes over time in the Rotoiti and Rotomā areas, as well as the Haumingi 9B 3B land block. The relationship of the Ngāti Pikiao and Ngāti Te Rangiunuora peoples with these specific land areas, including Lake Rotoiti and Lake Rotomā, has been impacted by changes in water quality and deteriorating health, including changes brought about by the constructed WWTP and disruption of pipeline infrastructure across the two communities.

Although the implications of the data are often indirect, the intent will be to understand through analysis of the data. Whether altering water management and land practises had contributed to the water decline and degradation, and what this means for the koeke and pakeke on the implementation of the reticulation scheme. Because the koeke, in particular, had witnessed the changes first-hand as they grew up along the lakes settlement, being able to assert themselves effectively as kaitiaki with the lake and whenua today as a result of these changes will be explored. The purpose of this chapter is to examine the findings from the qualitative interviews in order to inform Ngāti Pikiao and Ngāti Te Rangiunuora iwi's future actions towards developing a sustainable environment and being able to assert kaitiakitanga.

1.10.10 Chapter Ten explores a Cook Island Māori perspective

Te ‘atu o teia ‘enua – owners of the land/land owner’s perspective - this chapter seeks to understand as ‘atu o teia ‘enua – owners of the land/land owners or iwi taketake (Indigenous people) of the whenua in Rarotonga, how cultural processes and principles within the context of wastewater can be managed in the modern context to meet the challenges of an ever-changing world. The experience highlights a need to develop a more comprehensive framework providing essential knowledge and thinking to guide iwi processes and decision

making in this area. The outcomes of this research are for the benefit of decision makers – both Māori and non-Māori who are faced with similar challenges. It is considered that outcomes from this research will have direct application across Aotearoa and potentially abroad in areas around the Pacific such as the Cook Islands.

The Pacific relevance is derived from our cultural similarities and shared environmental issues as well as an understanding that many major upgrade projects receive technical solutions and construction input from New Zealand.

Clarification of the use of terms

Te ‘atu o teia ‘enua – owners of the land/land owners, Aronga Mana (traditional leaders), Mana Tiaki (Guardians, Protectors of the Environment) and Mataiapo (leader) are the commonly used Cook Island names for people who hold significant titles over the lands and waterways. Cook Islands Māori will be used extensively throughout this chapter to acknowledge the mana of these people and the roles and responsibilities they hold as protectors of their villages and environmental landscapes.

1.10.11 Chapter Eleven – Results and Decisions

Results and Decisions – this chapter presents the results of the research regarding environmental, social, cultural and economic sustainability through the viability of the pre-treatment systems connected to the WWTP, and discusses strategies RLC could improve to support long term growth of the plant and the scheme.

1.10.12 Chapter Twelve – Summary and Conclusions

Summary and Conclusions - this chapter will conclude what Ngāti Pīkiao and Ngāti Te Rangīunuora iwi can do to sustain their relationship with the ecosystem by expressing their kaitiakitanga which in turn will improve environmental sustainability. The research's limitations will be discussed, as well as future research recommendations for Indigenous researchers and local government.

1.11 Chapter Summary

This chapter introduced the intent of this Doctoral study to develop an understanding of the practices of kaitiakitanga (environmental guardianship) by the local iwi with respect to the proposed reticulated wastewater treatment scheme in Rotoiti. Central to this are the complexities and dynamics of this practice with the following foci:

Is a Wastewater Treatment plant and disposal field aligned with Kaitiaki values and principles relating to land use?

What impact was made on iwi relationships with the whenua and their engagement with Local Council through the practices of kaitiakitanga?

This chapter also focused on ‘setting the scene’ by detailing a Socio-historical map of the Ngāti Te Rangiuuora hapū and their relationship with the Haumingi 9B 3B block. It discussed the settlement of Ngāti Pikiao iwi onto the particular landscape through the hapū leader Te Rangiuuora. Central to this discussion are the Kaitiaki responsibilities for the Ngāti Te Rangiuuora hapū members over their whenua from yesteryear through to today.

The next chapter reviews the literature on kaitiakitanga with a particular emphasis on what kaitiakitanga means in both a traditional and contemporary context, such as that within the Resource Management Act (RMA). Secondly, it will discuss wastewater and its transference in relation to kaitiakitanga. Finally, the literature review will bring together the concept and practice of kaitiakitanga as it is highly relevant for wastewater treatment through cultural and environmental sustainability for iwi of Rotoiti and Rotomā.

CHAPTER 2: LITERATURE REVIEW

Me hoki whakamuri kia kitea ai me pēhea ai te haere whakamua

Look to the past to determine the future

2.1 Chapter Introduction

The previous chapter introduced the intent of this Doctoral study to develop an understanding of the practices of kaitiakitanga (environmental guardianship) by the local iwi with respect to the proposed reticulated wastewater treatment scheme in Rotoiti. Secondly, the proposal set out to understand the potential economic advantages there are for iwi premised on the first intention. Central to this are the complexities and dynamics of this practice with the following foci:

Is a Wastewater Treatment plant and disposal field aligned with Kaitiaki values and principles relating to land use?

What impact will be made on iwi relationships with the whenua and their engagement with Local Council through the practices of kaitiakitanga?

This chapter reviews the literature on kaitiakitanga with a particular emphasis on what kaitiakitanga means in both a traditional and contemporary context, such as that within the Resource Management Act (RMA). Secondly, it will discuss wastewater and its transference in relation to kaitiakitanga. Finally, the literature review will bring together the concept of kaitiakitanga and suggest it is highly relevant for wastewater treatment through cultural and environmental sustainability for iwi of Lake Rotoiti and Lake Rotomā.

2.2 The concept of Kaitiakitanga

Section 2(1) of the Resource Management Act (RMA) defines kaitiakitanga as the exercise of guardianship by the tangata whenua of an area in accordance with tikanga (Teinakore-Curtis,

2015). Tomas (1994) asserts the need to have a holistic approach to kaitiakitanga from being tangata whenua. Tomas outlines (p. 40) that: Kaitiakitanga is a concept, which has its roots deeply embedded in the complex code of tikanga-the cultural constructs of the Māori world which embody the way Māori perceive the natural world and their position within it. It includes the rules and practices, which were the means by which Māori regulated the world. Through its inclusion in the RMA, the concept has become divorced from its Māori cultural land spiritual context. It has been redefined in terms of guardianship and stewardship, two terms arising out of feudal England. It has also been reduced from a fundamental principle of Māori society to one factor for consideration among many.

Marsden and Henare (1992) 'define the concept of kaitiakitanga as Conservation, customs and traditions, including its purpose and means through Rāhui. Rāhui is a process where the depletion of a resource and pollution of the environment was protected through prohibition of the utilisation of a supply in order for regeneration of resources'. This is a 'Conservation' Rāhui, according to Mead (2003). It is a form of prohibition that was lifted through karakia after a period of time when natural resources were replenished. This, according to Marsden, was a type of 'farming rotation,' or, as Best (1904) pointed out, a technique to restore the land's productivity. This method provided a consistent source of supplies and ensured long-term sustainability.

Although there were other Rāhui for drowning and a 'no-trespass' Rāhui, the Conservation Rāhui had three main functions. These functions were: (1) to conserve the natural resource that was declining; (2) forbid any practices in the specific environmental area that could avert the restoration of the natural resource; (3) to place Rāhui for a length of time deemed necessary by the local iwi over an area where an accidental drowning or death had occurred (Awatere, 2003). Kennedy (2008) states that kaitiakitanga is recognised in the RMA, but is a principle that incorporates tikanga such as mana, tapu, mauri, taonga, whakapapa and utu that iwi acknowledge in the way they treat their environment.

These tikanga as Williams (2000) assert are values that are tested for being culturally appropriate, correct and adequate. The root word *tiaki* is a commonly known Māori word 'to care'. For iwi and hapū, the deeper understanding of tiaki is to show hospitality and care for others that come into your rohe (region). This is shown through hapū members to be able to shelter and feed manuhiri (visitors) or 'rāwaho (visitors from afar) for the duration of their stay

in the region of the hau kainga (local iwi and hapū of the area). The word *Kai* indicates the person who is doing the action that needs to be performed. Kaitiaki as explained by McCully and Mutu (2003, p. 22) as:

The word Kaitiaki is derived from tiaki, which Williams (1997) translates in sufficiently as ‘guard, keep, watch, and wait for’. The prefix ‘kai’ denotes the doer of the action and according to Williams should be translated as ‘guardian, keeper, someone who watches or waits for’. Kaitiakitanga is the noun derived from kaitiaki and therefore should be translated as ‘guardianship’ or something similar.

Marsden (2003) defines kaitiakitanga as ‘firstly being *Kaitiaki* – or people who are the guardians, protectors, preservers and conservators of a natural and environmental resource’. Kaitiaki as Kennedy (2008) argues were traditionally spiritual guardians who were protectors over the various environmental domains, however, kaitiaki of today are predominantly iwi and hapū members who are now largely responsible for all of these elements and places.

Furthermore, Roberts, M., Norman, W., Minhinnick, N., Wihongi, D., & Kirkwood, C. (1995) argue that ‘kaitiaki is a big word in that whakapapa and tika encompass kaitiaki through the principles of Atua, Mana, Tapu and Mauri. If one knows the word kaitiaki, then one must know the Māori world, for kaitiaki means to literally look after one’s blood and bones’.

2.3 The traditional concept of Kaitiakitanga

Let us then look at the principles that are embedded into Māori practices of kaitiaki and kaitiakitanga. These principles and practices or ‘tikanga’ that Māori have espoused to for centuries, even before their arrival to Aotearoa NZ, has kept structure and order in Māori society up until today. They govern the way in which Māori see the world, live with and look after the flora and fauna. Through these principles, Māori have an innate understanding of the natural ecosystem (Morgan, 2006a).

Atua – ‘Supernatural beings each responsible for, and guardians of particular natural phenomena. They are there to watch over and promote the welfare of all things in all places, to prevent troubles of all kinds and to preserve peace among all things’ (Best, 1978). Two of the

prominent Atua who begat their children who became protectors over the various earthly dominions, are Papatūānuku (Earth Mother) and Ranginui (Sky Father). These illustrious beings, along with their children, are a remembrance in Māori history for their ability to control the relationships among human, animal, reptile, mineral and spiritual worlds (Sinclair, 2011). The Māori of old embraced his obligations of caring for and preserving a strong relationship with the land and waterways through these Atua. To exploit the environment was both inconceivable and unthinkable. Therefore, Māori understood that by upholding the 'mana' of his/her forebears, he/she was in fact acting in accordance with the principles of the spiritual deities;

Mana – 'The word Mana has a range of meanings such as authority, control, influence, prestige, power, psychic force, effectual, binding and authoritative' (Williams, 1957). Marsden (1992) asserts that Mana is seen as 'Spiritual Authority and Power'. He further explains that within Te Ao Māori (a Māori worldview), having Mana gives an individual permission by the Spiritual deities to carry out tasks lawfully and act on their behalf as a human agent in accordance with their will. Barlow (1991) supports this by stating that Mana is an 'enduring, indestructible power of the Gods'. The conference of Mana is for those persons who conform to the sacred rituals and principles of Atua. Barlow further outlines that people of Mana draw their prestige and power from their ancestors (mana tūpuna). This can be transferred from generation to generation, through chiefly lineage and in order for it to be maintained, people have to continue to carry out the principles as granted them by their ancestors.

A further aspect of Mana is 'Mana Whenua'. This, as Barlow claims, is the possession and authority or control over land. Māori, through their inherent right from Papatūānuku (Earth Mother), has the responsibility to care for the land. Finally, there is 'Mana Tangata'. This type of Mana as Barlow explains is the power developed by a person through the skill and prowess that he/she develops, such as that of a warrior who has progressed in the art of weaponry and warfare as afforded to him/her through the laws of Tūmātauenga (Deity of warfare). 'Mana Tangata' as Mead (2003) claims can be socially founded today upon the hapū and iwi, with personal Mana of an individual being able to grow incrementally by having the skill and experience to maintain balance within interpersonal and inter-group relationships. Mead further explains that having humility and knowledge builds mana for a person'.

Tapu – ‘this is inseparable from Mana, from the identity as being Māori and from Māori cultural practices. Tapu is inter-connected with Atua as it enters the realm of being responsible over the different environments (land and waterways) with tapu being placed on the different activities in these environments’ (ibid, p. 38). This includes the way in which Māori carry out their duties in these natural environments. Māori understand that Karakia (prayer) of thanks and gratitude must be performed before undergoing a task such as taking any living thing (trees, animals, birds, reptiles) from Tāne Mahuta (deity of the forests) and taonga species (kākahi, koura, kuku, kōaro and the like) from Tangaroa (deity of the waterways). Karakia pacifies Atua and frees the individual from spiritual contamination or pollution when carrying out the rituals and prayers beforehand (Mead 2003). Marsden explains that because humans derived from deities, therefore, like all living things, they are inherently tapu. He concludes that all living things, humans included, are interwoven into the spiritual fabric of Atua (Marsden 1992).

Mauri – ‘Mauri is an intangible life force. Animate and inanimate forms of life such as flora and fauna owe their life existence to Mauri. If Mauri is strong, then plant life will flourish, if mauri is weak then these forms of life become depleted and weak too’ (Teinakore-Curtis, 2015, p. 38). According to Morgan (2006b), water and other living things have their own Mauri (life force principle), which is critical for hapū and iwi when it comes to the deterioration of natural resources that are vital to them as kaitiaki. Because of its connectedness to all things, if Mauri is degraded or changed in any shape or form, it then negatively influences the integrity of something else within the ecosystem (MfE, 2003). Marsden (2003) describes Mauri as the force that interpenetrates all things to bind and knit them together, it acts as a bonding element creating unity and diversity. Western resource management systems, often value the natural world (trees, plants, Mountains, streams, and rivers), above all else, but only in as much as it is meaningful to human’.

‘Tūpuna Māori (Māori ancestors) would say that these things have value in themselves and that whether humans are here or not, the trees still retain their mana (integrity, prestige), the birds still retain their mauri (a vital and sustainable spirit), and the mountains retain their tapu (sacredness): they remain taonga’.

2.4 Kaitiakitanga and the iwi of Lake Rotoiti

The Rotoiti Lake and whenua ‘is of fundamental importance to the Te Arawa iwi. Many of the Te Arawa people are descendants of the illustrious ancestors Rangitihi and Manawakotokoto. These tūpuna (ancestors) begat Rākeiao and Kawatapuārangi who eventually resided on the shores of Lake Rotoiti’ (Kawharu et al., 2005). With his second wife Keapare, Rākeiao ‘bore children and great grandchildren who are known today as Ngāti Rongomai – a hapū of Rākeiao’ (ibid).

Kawatapuārangi through his uri Pikiao II begat the descendants Ngāti Pikiao who are the ahi kā roa (long burning fires) of Lake Rotoiti. For generations these progenies were the environmental protectors of this stretch of Lake Rotoiti and its lands (ibid). They are the iwi of Ngāti Rongomai (descendants of Rongomainui), of Ngāti Pikiao (the descendants of Pikiao II) and the hapū of Ngāti Te Rangiunuora (the descendants of Te Rangiunuora), Ngāti Hinekura (descendants of Hinekura) and Ngāti Tamateatutahi Ngāti Kawiti (descendants of Tamateatutahi and Kawiti). For centuries, these descendants have protected the territory of Tangaroa (a tangata whenua ancestor and sea guardian) and the surrounding whenua (Whata, 2016). Their knowledge of kaitiakitanga is extensive, and their practice of it has been long standing (Morgan, 2006b; 2014).

Fundamentally, over centuries, the iwi and hapū have protected, preserved and conserved wāhi tapu (sacred sites), cultural sites of significance and the natural resources of the whenua and wai. This has positively influenced the well-being of Ngāti Pikiao (Tipa, Nelson, Emery, Smith, & Phillips, 2010; Whata, 2016). Tipa et al. states that:

Complex associations with the environment and Mahinga Kai have developed over centuries and include social, economic, psychological, spiritual and physical dimensions that are an intrinsic part of health and well-being of whānau members. (p. 22).

Therefore, any temporary or permanent changes to the land and water in their vicinity have involved mandated iwi members to advise how to make changes without the environmental degradation and declination in land and water quality. A Ngāti Pikiao koeke (elder) forum has been created as a vehicle to advise on various iwi and hapū issues, including environmental

concerns (T. Curtis, personal communication, September 14, 2016).

There is monthly hui held throughout the year with many iwi members attending to present their ‘take’ (issues), to seek discussion and approval. Numerous issues presented are within the environmental realm. This is one solution for the iwi and hapū of Ngāti Pikiao to assert their understanding of kaitiaki values and practice of kaitiakitanga (W. Emery, personal communication, August 17, 2016). Over time, an increasing expertise has developed for certain iwi and hapū members in relation to understanding and interpreting the environmental legislative acts such as the Resource Management Act 1991 (hereafter referred to as the RMA) and Te Ture Whenua Māori Act 1993. This has become advantageous for Ngāti Pikiao when dealing with local and regional councils.

Morgan (2001; 2006a) asserts that for Ngāti Te Rangiunuora of Ngāti Pikiao, kaitiakitanga signifies the obligations and responsibilities for the hapū members, including kaumātua and kuia to carry out particular tasks and functions as protectors and custodians of these taonga, areas of hapū and iwi interests and the natural resources that they own. Furthermore, their interpretation of kaitiakitanga is that it entails a responsibility to safeguard and strengthen the hapū's cultural endowment (geographic resources and knowledge) and to pass it on to future generations in the same or better form as it was inherited (Morgan, 2008).

2.5 Kaitiakitanga and the RMA

Within the RMA (1991), there is an inextricable link between kaitiakitanga and stewardship. The definition of kaitiakitanga in this significant piece of environmental legislation has been highly criticized by Māori for introducing new concepts largely unknown to them, in this instance the inclusion of stewardship – where a steward acts on behalf of someone else, which conflicts with Māori owners exercising kaitiakitanga (Marsden, 2003; Forster, 2012; WAI 1200). The definition of stewardship or *stigweard* in the Old English Dictionary (2020) is a person who administers the property, house, finances of another. However, this is not the case for Māori in relation to kaitiakitanga. It is innate in him to closely associate himself to the natural resources and flora and fauna of Aotearoa New Zealand. The Waitangi Tribunal (2011) supports this by stating that the concept of kaitiakitanga is that ‘Māori has an intergenerational obligation that arises by virtue of kin relationship’. A kin relationship can be between people

and natural resources and that this guardianship takes on a spiritual dimension (Jones, 2016). Therefore, one must ask himself the nature of the context of kaitiakitanga and stewardship in the RMA.

Marsden (2003) elaborates on stewardship by claiming it was a foreign concept pre-European contact and has overtones of master-servant relationship. Kaitiakitanga on the other hand suggests that no resources of the land that is used belongs to man, but rather, man belongs to the earth. Man, as well as bird and animal could harvest Papatūānuku's bounty but they did not own them.

According to Miller (2006), a crucial characteristic of kaitiakitanga as a concept is the 'reciprocity' of a natural resource with people. The resource must be able to maintain the kaitiaki (physically, spiritually, and politically), and the kaitiaki must, in turn, be able to ensure the resource's long-term survival. A reciprocal agreement is reached in order to maintain the ecosystem's balance, as well as to protect the kaitiaki from political and spiritual harm (Teinakore-Curtis, 2015). Miller further claims that kaitiakitanga encompasses a number of themes that connect Māori society's physical, environmental, spiritual, economic, and political components. It establishes human links with the spiritual realm, the environment, and one another. It also enables hapū to identify with a location or resource and strengthen their bonds with it (ibid).

2.5.1 RMA - Interpretation

This legislation has provided its interpretation of some of the Māori terms. They have been a critical factor for Māori under the RMA whereby 'kaitiakitanga' refers to the exercise of guardianship by the tangata whenua of an area in accordance with tikanga Māori in relation to natural and physical resources, and includes the ethic of stewardship. 'Mana whenua' refers to customary authority exercised by an iwi or hapū in an identified area, 'Tikanga Māori' refers to Māori customary values and practices, and 'Treaty of Waitangi' has the same meaning as the word Treaty as defined in section 2 of the Treaty of Waitangi Act 1975 (Ministry for the Environment, 2018).

2.5.2 RMA – Matters of National Importance and Other Matters

Some of the principles and features from the RMA, which are ‘Matters of National Importance’, especially for Māori as kaitiaki, derived from different sections in Part 2 of the legislation. Provision and recognition were made for:

- Section 6(e) - Māori and their culture and traditions in respect to their ancestral lands, rivers, locations, wāhi tapu, and other taonga;
- Other topics under Section 7 of the RMA demand that all individuals exercising functions and authorities under it, in relation to regulating the use, development, and protection of natural and physical resources, pay special attention to:
 - Section 7(a) kaitiakitanga;
 - (aa) the ethic of stewardship

Finally, Section 8 of the RMA compels all individuals exercising functions and powers under it to consider the Treaty of Waitangi's principles while regulating the use, development, and protection of natural and physical resources (Te Tiriti o Waitangi).

However, the Waitangi Tribunal in its Ngawha Report criticized the weight given to Māori matters within the RMA:

‘....s6 imposes a mandatory obligation on decision-makers to 'recognise and provide for' matters of 'national importance'. Section 7 has less injunctive force; decision- makers need only have 'particular regard' to 'other' matters (which in turn are presumably of less than national importance). Section 8 in turn merely requires decision-makers to 'take into account' Treaty principles. All of these matters are subordinate to the over-riding importance of achieving the central purpose of sustainable management of resources (s5)’.

(Waitangi Tribunal, 1993, p. 143)

Statements made in this report suggest that the rights and interests of Māori within these sections of the RMA are not prevalent, and for some readers, can be perceived as an afterthought. If Māori are to express their Kaitiaki values through the practice of kaitiakitanga in accordance with the RMA principles, statutory bodies and the like must allow Māori rights to prevail.

2.5.3 RLM (Resource Legislation Amendment) Act 2017

Since the inception of the RMA 1991, the legislation within the last few years has gone through significant reform (Jacobson, Matunga, Ross, & Carter, 2016). A noteworthy ‘shift’ for Māori is the introduction of the Mana Whakahono a Rohe: Iwi Participation Arrangements as a new subpart 2 into Part 5 of the RMA (Ministry for the Environment, 2018). The amendment sets out the purpose of a Mana Whakahono a Rohe which is Subpart 2 section 58(m) – ‘to provide a mechanism for councils and iwi to come to agreement on ways tangata whenua may participate in RMA decision-making, and to assist councils with their statutory obligations to tangata whenua under the RMA’ (ibid, p. 3); and to assist local governments in fulfilling their statutory obligations under this Act, including by implementing sections 6(e), 7(a), and 8.

The key factor to this amendment being meaningful, and furthermore, a success for Māori is to ensure that there are accountabilities for statutory bodies throughout the enduring ‘formal’ engagement process. This engagement process can respectfully evolve over a number of years (W. Emery, personal communication, April 1, 2018). An aspect of this accountability is for the crown agencies to financially resource this process rather than iwi having to commit human and financial resources to this collaborative management process as has been historically documented (Coates, 2009 p. 33). Previously, the RMA framework had failed to adequately address Māori past grievances in exercising their tino rangatiratanga (absolute sovereignty) under the Treaty of Waitangi (Jacobson et al., 2016, p. 332). However, Coates (2009) asserts that there may be huge potential for Māori under this provision, as it will recognise the special status of Māori as tangata whenua (indigenous people of the land) and restore a degree of mana (prestige) back to them from past breaches.

2.6 Kaitiakitanga and Wastewater

Central to the guardianship role held by hapū and iwi has been the protection of the mauri of the people and the environment through kaitiakitanga. It has allowed hapū and iwi to develop reciprocity and responsibility with the whenua (Miller, 2006) through protecting culturally significant food gathering sites by kaitiaki. This would enable food to be available as the whenua and wai are the ‘kai cupboard’ for Māori, which in turn would help the physical and spiritual well-being of hapū and iwi to be maintained. If the mauri of the hapū was degraded

through the contamination of the food and water sources, it led to the inability of hapū to manaaki (provide for) manuhiri (visitors) and create whakamā amongst hapū that could be long lasting (Tiakiwai, Tanner, Skipper, Phillip-Barbara & Greensill, 2004).

We are very careful about how we treat water because we cannot live without water. Our water has to be clean all the time. Let me go back to how we were brought up. We lived by the water; there was a special place where you drew your water from, a special place where you washed your clothes or yourself. Now in those days we had the long drop and as you go around the lakes you will see many of the Māori homes further back, not too close to the lakes. I wonder why that was? It may be because of the long drops. But what our people did when the long drop needed to be removed they would plant fruit trees there, and they were the best fruit trees in the country. So that is the way that our Māori people treated sewage and that is what we are talking about, sewage...

(Morehu, T.A. 2012).

Te Ariki Morehu, a renowned Kaumātua of Ngāti Pikiao and Ngāti Mākino, described a holistic view of how iwi see water and sewerage and their collective responsibility back to the land pragmatically.

Forster (2011, p.97) supports this viewpoint by expressing the following about kaitiakitanga:

The successful application of kaitiakitanga is both a knowledge base and a set of practices. Kaitiakitanga enables Māori to maintain a relationship with the land, waters and natural resources and involves an intimate knowledge of a physical space and the layers of events and relationships that have occurred in that area across time and space. It is about retaining those relationships and connections to natural resources which were forged by tūpuna (ancestors). Therefore, the concept of kaitiakitanga provides a contemporary Māori perspective on environmental management and protection...sustainable development would be a better descriptor as protection is only part of the picture.

Despite the fact that environmental degradation and fragmentation of the ancestral area have been major factors in curtailing kaitiakitanga practise, Māori communities continue to place a high value on keeping a close connection to the local environment (Matunga, 2000). Morgan

(2014, pg.7) discussed the implementation of a reticulation scheme into Rotoiti and its effect on Kaitiaki values:

The scheme introduces a waste system into this cultural landscape which is inconsistent with our customs and cultural or Kaitiaki values. The need to look at all sustainable options that don't lock us in and entrench us into a system that undermines our culture and traditions is important. The imposition of this scheme in our rohe undermines our mana and our rangatiratanga to live on our lands in accordance with our cultural and traditional customs and practices.

This proposal will be permanent. The effect of the contamination by human waste will desecrate and remove the tapū of all areas that it reaches. There is not a single activity that would have a more devastating effect on our mana, our culture and traditions and our relationship with our ancestral rohe.

There is no regard for the mixing of para (faeces) across the lake catchments. The mauri and respect attached to each of the lakes and the hapū that affiliate to them will be significantly affected. The reticulation of sewerage will traverse through and past many of our wāhi tapū (sites of cultural significance). I cannot understate the importance of these wāhi tapū to our iwi. These wāhi tapū are important taonga and provide a spiritual link to our tūpuna and founding rangatira. The desecration of these taonga have significant cultural and spiritual effects on our iwi.

The iwi representatives on the RRRSC, who were appointed by the iwi of Rotoiti and Rotomā to represent the iwi interests, are 'extremely passionate about preserving, protecting, and conserving the lake's natural resources for current and future generations. They recognise that sustainable environmental management and development through the practise of kaitiakitanga is a joint responsibility of iwi, local governments, and other government agencies' (Whata, 2016, p. 8).

2.7 Kaitiakitanga and Economic viability

The installation of a WWTP on Māori-owned land enables Ngāti Pikiao to investigate possible

economic opportunities for the long-term usage of greywater. Some of the proprietors of the Haumingi 9B 3B property have considered the concept of papakainga (E. Skerrett, personal communication, July 8, 2019). It will allow Ngāti Pikiao to relocate their people from the urban suburbs to their turangawaewae (place of standing) or to entice people to return from other parts of New Zealand. It also creates the opportunity for iwi members to find work (ibid). Taking this attitude gives Ngāti Pikiao and its linked land trusts a strong negotiating position with the relevant municipal and regional authorities. It sends a clear message that people want to contribute to shape the direction and destiny of their communities, and that they are potential catalysts of economic success. However, creative land uses that increase economic value should not take precedence over kaitiakitanga – environmental conservation and enhancement (Te Tatau o Te Arawa, 2017).

As a result, better wastewater infrastructure has the potential for economic and environmental benefits (nutrient reduction and its impact on improving lake water quality), health (removing contacts with failed and under-performing septic tanks), and social benefits.

2.8 Kaitiakitanga and the Ngāti Pikiao Economy: Moving toward a sustainable future – the Quadruple bottom line.

Māori have had their economic development endeavours suppressed through colonisation (Petrie, H., 2006). Their ability to move forward economically, socially and culturally was smothered through the numerous legislative acts that severely undermined their development (Forster, 2011, p. 18). It has only been recently since the Treaty of Waitangi Act 1975 that Māori have begun to take control of their future and assert their tino rangatiratanga (self-determination) in these areas of their development. Within a local context, the Ngāti Pikiao iwi were no different; being stifled by local and central Government legislation over the last 100 years has contributed to their economic, cultural, environmental and social losses. It is only recently that they have been able to recuperate some of what they have been deprived of over years.

Their ability to practice kaitiaki values over their lands and waterways diminished as their traditional land tenure and resource use was significantly modified through western norms and

concepts of land ownership (Williams, 2001a). Agricultural and pastoral development maximised productivity and economic gains for the European Settlers which was inconsistent with the principles and practices of iwi as kaitiaki.

Therefore, this paper seeks to understand the challenges that Māori through iwi such as Ngāti Pikiao have faced economically, culturally, environmentally and socially as kaitiaki and how with the building of new infrastructure in their region will move them toward a sustainable future ensuring a quadruple bottom line of economic, cultural, environmental and social improvements.

2.9 Chapter Summary

This chapter reviewed the literature on kaitiakitanga with a particular emphasis on what kaitiakitanga means in both a traditional and contemporary context, such as that within the Resource Management Act (RMA). Secondly, the chapter discussed wastewater and its transference in relation to kaitiakitanga. The literature review brought together the concept of kaitiakitanga and its relevance for wastewater treatment through cultural, environmental and economic sustainability for iwi of Rotoiti and Rotomā.

The next chapter will examine Kaupapa Māori Research and theory and Kaupapa Māori Methodology in detail and discuss the strengths and weaknesses of both Quantitative and Qualitative methodologies. Ethical issues that are likely to arise when researching in Māori and Cook Island communities will also be examined. So too will discussion be had on how interviewing and document analyses are the predominant source of data collection. The chapter will give an overview of the themes that will be developed through analysis of the data.

A Multiple Attribute Decision Making (MADM) methodology and method will be discussed to ascertain the long-term viability and acceptability of the STEP and Biolytix systems (Kalbar, Karmakar & Asolekar, 2012). Multiple variables, such as costs, environmental performance, safety, ecological dangers, and community perception, are frequently used to determine effective wastewater treatment strategies (Gogate, Kalbar, & Raval, 2017). MADM approaches are well suited to this research because the case study is concerned with picking the most practical pre-treatment wastewater system option from a finite number of specified options.

CHAPTER 3: METHODOLOGY

Nāku te rourou, Nāu te rourou Ka ora ai te iwi

With your food basket and my food basket, the people will survive

3.1 Chapter Introduction

The previous chapter reviewed the literature on kaitiakitanga with a particular emphasis on what kaitiakitanga means. Secondly, the chapter discussed wastewater and its transference in relation to kaitiakitanga in both a traditional and contemporary context, such as that within the Resource Management Act (RMA). The literature review brought together the concept of kaitiakitanga and its relevance for wastewater treatment through cultural and environmental sustainability for iwi of Rotoiti and Rotomā.

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3.2 Methodology Overview

This chapter 'introduces the approach, techniques and procedures for this thesis. The research undertaken to support this topic requires a complementary approach of Kaupapa Māori research and qualitative research techniques and processes' (Smith, 2012). Having an appropriate methodology within the context of this research surrounding wastewater and kaitiakitanga, will not only address these important matters, but also protects the knowledge and information shared by the participants and the sanctity of the information that has been imparted to the researcher. 'Acquiring qualitative information by Māori and Indigenous people requires an acknowledgment of the impact of suppression and assimilation that indigenous cultures have faced and continue to face in today's society' (ibid, p. 49). Having a high proficiency level of Te Reo me ōna tikanga (Māori language and customary practices), as is a deep understanding of the Māori Worldview will be required too so that qualitative information imparted to the researcher is effectively understood and protection is ensured.

This chapter covers the Kaupapa Māori methodological approach, which is used in research. Secondly, it seeks to explain my position on the research topic from an ethnographic approach and how this has influenced the work I undertook.

3.3 Kaupapa Māori Research

Kaupapa Māori is defined by Kathy Irwin (1994) as "culturally safe" research that involves the "mentorship" of elders, is culturally relevant and suitable while meeting research rigour, and is conducted by a Māori researcher, not a researcher who happens to be Māori.

Kaupapa Māori research also includes methods like networking, community consultations, and whānau research groups, all of which help to bring the research concerns that are important to Māori into light (Smith, 2012). All of these aspects of the kaupapa Māori approach are negotiated in practise with communities or groups from 'communities of interest.' It means that researchers must share control of the research with the participants in the study.

Cunningham (1999) utilises three frameworks to explain the various methods in which Māori

research can be carried out. 'Study involving Māori, with Māori participants, and where Māori knowledge is sought, although the research techniques and analysis may be mainstream,' says the first 'Māori Centred Research' engages Māori as significant participants and researchers, and uses a Māori analysis to develop Māori knowledge, but is judged by mainstream criteria. In contrast, 'Kaupapa Māori Research' employs exclusively Māori researchers and participants, as well as Māori analysis of Māori knowledge generation and Māori-set research quality requirements.

3.4 Kaupapa Māori Methodology

The research aims in this thesis were examined using a Kaupapa Māori Methodology. This preferred methodology is concerned with 'meaning making' and joint endeavour, in which participants and the researcher co-create understandings during the research process (Paul-Burke, 2011).

Kaupapa Māori is grounded in Māori reality and respects the participants' Mana and Integrity, with Māori issues and needs at the forefront (Cram, 2009; Pihama, Cram and Walker, 2002). Kaupapa Māori was chosen to escape the dual trap of Western epistemologies, which either question whānau knowledge or approach it through a compliance-driven model framework (Walker, Eketone & Gibbs, 2006). It establishes a place to stand and practice research that empowers communities and privileges Māori culture and intellectual traditions and tīkanga (ibid).

3.4.1 Kaupapa Māori analysis

Kaupapa Māori research developed as a part of a broader movement by Māori to question Westernized notions of knowledge, culture and research. Kaupapa Māori research has been used as both a form of resistance and a methodological strategy, wherein research is conceived, developed, and carried out by Māori, and the end outcome is to benefit Māori.

(Walker et al., 2006, p. 331)

'Kaupapa Māori is concerned with the methodological developments and the forms of research method utilized so therefore Kaupapa Māori can be described as both theory and an analysis of

the context of research involving Māori, with the approaches to research expressed as being by Māori and/or for Māori' (Smith, 1996). Furthermore, Ratima (2003) asserts that Kaupapa Māori research utilizes techniques that derive from mātauranga Māori, just as western strategies that are adjusted to guarantee the integrity of Māori ontological and epistemological positions.

There are different characteristics regarding the way in which Māori are researched. There are key differences to Kaupapa Māori Research from other research approaches where Māori are involved as the participants. The chart below shows the various characteristics of research and is a guide for researchers considering research on Māori (Cunningham, 1999).

Characteristics	Research Involving Māori	Māori-Centred Research	Kaupapa Māori Research
Description	Research where Māori are involved as participants or subjects. Research where Māori data is sought and analysed; Research where Māori may be trained in contemporary research methods and mainstream analysis.	Research where Māori are significant participants, and are typically senior members of research teams; Research where a Māori analysis is undertaken and which produces Māori knowledge, albeit measured against mainstream standards for research.	Research where Māori are significant participants, and where the research team is typically all Māori; Research where a Māori analysis is undertaken and which produces Māori knowledge; Research, which primarily meets expectations and quality standards set by Māori.
Examples	Analysis of ethnic differentials in disease rates; genetic study of familial cancer.	Longitudinal social science study of Māori households.	Traditional study of cosmology; study of cultural determinants of environmental management.

Control	Mainstream.	Mainstream.	Māori.
Māori Participation	Minor.	Major.	Major, possibly exclusive.
Methods/tools	Contemporary – mainstream.	Contemporary – mainstream and Māori.	Contemporary – mainstream and Māori.
Analysis	Mainstream.	Māori.	Māori.

Table 1. Chart of various characteristics of research (Source: HRC, 2010, p. 8)

A number of ethical principles that have guided Kaupapa Māori research includes the following as outlined by Kennedy & Cram (2010). These principles promote and guide the researcher when conducting interviews with Māori participants:

Cultural values (Smith, 1999)	Researcher guidelines(Cram, 2001)	Te kaupapa a te whānau – whānau researcher guidelines
1. Aroha ki te Tangata	A respect for people – allow people to define their own space and meet on their own terms	<ul style="list-style-type: none"> • Engage in cultural ‘ritualsof encounter’, guided by whānau • Allow whānau to define their space and meet on their own terms • Whakawhanaungatanga – itis important for whānau to make linkages and connections with each other and with the researcher(s) • Respect the fluidity and diversity of whānau

2. He kanohi Kitea	It is important to meet people face-to-face, and to also, be a face that is known to and seen within a community	<ul style="list-style-type: none"> • It is important for the researcher to be known and be seen by whānau
3. Titiro, Whakarongo, Korero	<p>Looking and listening and then maybe speaking.</p> <p>Develop understanding in order to find a place from which to speak</p>	<ul style="list-style-type: none"> • Allow whānau to set the agenda for the research, including the pace at which it proceeds and decisions about: • What is the whānau story? • What do whānau want to speak to? • What is the role of researchers within the space that whānau claim?
4. Manaaki ki te tangata	Sharing, hosting, being generous	<ul style="list-style-type: none"> • Enable whānau to participate in the research (e.g. budget for whānau travel) • Provide food and refreshments during research encounters • Allow for appropriate koha for whānau • Enable whānau to move in and out of their [research] space
5. Kia tūpato	Be cautious – be politically astute, culturally safe, and reflective about insider/outsider status	<ul style="list-style-type: none"> • Be cautious that our whānau are kept safe – that whānau are left in the same, or a better, space than before they engaged in the research • Allow whānau the time and space to practice their own tikanga (e.g. karakia) • It may be important for the whānau to know of support services that can offer them ongoing support

		for any issues and concerns raised during the research
6. Kaua e takahī te mana o te tangata	Do not trample on the Mana of the people	<ul style="list-style-type: none"> • Upholding the mana of the iwi by ensuring that issues of benefit and accountability were addressed and applied by the researcher (myself) within the cultural context of the whānau • Validating and acknowledging all koeke/ kaumātua, respected whānau, hapū and iwi members involved in the project
7. Kaua e māhaki	Do not flaunt your knowledge	<ul style="list-style-type: none"> • When researching whānau and individuals, be sure to acknowledge the collective ownership of the research journey for them • Ensure that you are acutely aware of the dynamics both politically and ethically when undertaking interviews with whānau. It is about their knowledge being safe guarded, not about how much you know and can take from them.

Table 2. 'Community-up' approach to researching with whānau (Source: Kennedy & Cram, 2010)

These principles were critical in guiding me in the research project when ascertaining Kaitiaki and koeke views regarding wastewater and cultural values and practices. According to Kiro (2000), "it takes one to know one," and Māori research is based on the premise that only an insider can comprehend the nuances of the social phenomenon impacting the research participants.

Therefore, although I was an 'insider' on this project, there were still challenges in relation to getting lengthy responses in the formal interview process. One hapū interviewee was at ease when having a 'loose conversation' with me regarding the progress of the construction of the

WWTP and the reticulation scheme itself. However, once she gave consent for the interview, and I began audiotaping, it became quite clear that there was an ‘adjustment’ in her body language and responses seemed a little more ‘reserved’.

A breakdown of the above principles in relation to this particular study, highlights the need to ensure that being an ‘insider’ researcher, you are consistently mindful of the importance of these principles:

Aroha ki te tangata - I needed to ensure that throughout each part of the interview and ‘formal engagement’ process with the research participants (most of them hapū and iwi members who I have very close whakapapa ties to), that I treated them with much aroha and respect. Bearing in mind that at times during an unstructured interview, some of our koeke would talk for ‘lengthy periods of time’ before getting to the responses that I needed for the interview questions I had developed. Displaying patience and love to my interviewees by allowing them to speak on other ‘kaupapa’ (topics or issues) before arriving at discussion points that were relevant to the project, made me reflect and show gratitude toward the level of historical iwi and hapū knowledge they have that in fact resonated with me as an iwi member.

Titiro, Whakarongo... Kōrero – (Look, listen, then speak). Being able to watch, listen, learn and then speak is an appropriate way to conduct yourself as a researcher. Not only does this show respect to the interviewee(s), but also supports a developing trust in the relationship throughout the research journey. This is best practice for iwi members when engaging with our koeke/ kaumātua and pakeke, as they feel their knowledge and wisdom is being heard and deeply absorbed by the receiver. According to Pipi Cram, Hawke, Hawke, Huriwai, Matakī, Milne, Morgan, Tuhaka & Tuuta (2004, p. 148), researchers should be listening and learning:

- to see the stories, unfold, to hear the voice, the things that are said and unsaid
- to feel the joy and pain, to make meaning
- for successful outcomes to the research
- for integrity and quality research

He Kanohi Kitea – (It is important to meet people face-to-face). Because this principle is about meeting face to face, it was important for me to be “the seen face”, highlighting the importance of “being seen” to strengthen relationships and one’s place of belonging in the community. Cram and Pipi (2000) give the following outline of Kanohi Kitea within a

research context:

Kanohi ki te kanohi is regarded within Māori communities as critical when one has an important “take” or purpose. This form of consultation allows the people in the community to use all their senses as complementary sources of information for assessing and evaluating the advantages and disadvantages of becoming involved.

For me, it was hugely important that I not only be on time to the interviews, be respectful and mindful of the interviewees, but to also have kai available to share, as manaakitanga (care for others) is critical to our iwi. Furthermore, being available to support other kaupapa involving our iwi of Ngāti Pikiao and Ngāti Te Rangiunuora, be it a ringa raupā (helping hand in the kitchen) and other places such as the Marae to manaaki (take care of) our koeke and manuhiri is vital to being a Kanohi Kitea in a holistic sense. Our iwi value this behaviour and conduct of our pakeke and rangatahi alike.

Manaaki ki te tangata – ‘(share and host people, be generous). In practice this was expressed, not only through koha at the time of the hui through sharing of kai, but through the offering of information, and acting as whānau advocate if needed. It was my responsibility to update and inform the community, Marae, whānau and hapū members about the research progress and what the next steps would be as part of the process of completing my thesis’ (ibid). Because there was a shared interest in this project from various iwi members, it was only right to listen and share collective knowledge and wisdom regarding the land and waterways impacted by the scheme.

Kia tūpato – (Be cautious; be politically aware, culturally aware, and aware of insider/outsider status.) Because the interviews were conducted with iwi members, some kawa and tikanga (protocols) had to be followed in order for the study to be acceptable and participants to be willing to participate (Pipi et al., 2004). This involved ensuring that interviewees could make changes and amendments to their interviews, and that they felt safe doing this. Furthermore, I needed to ensure that I had the right processes in my research when engaging whānau and iwi members.

Kaua e takahī te Mana o te tangata – (Do not trample on the Mana of the people). Upholding the mana of the people is the primary concern of this principle. It was expressed by ensuring

that issues of benefit and accountability were addressed and applied by the researcher (myself) within the cultural context of the whānau (Bishop, 1998). ‘This was not only about showing respect for the opinion and thoughts of everyone involved in the interview process and journey, but also about validating and acknowledging each of them as well-respected koeke/ kaumātua, respected whānau, hapū and iwi members’ (ibid).

Kaua e māhaki – (Do not flaunt your knowledge). In practical terms, when researching whānau and individuals, be sure to acknowledge the collective ownership of the research journey. An example of this is when I listen to whānau and koeke/ kaumātua, I need to wait to share knowledge that I have on the reticulation scheme, including the disruption it will make to the various cultural sites of significance for Ngāti Pikiao and Ngāti Te Rangiunuora and be able to provide answers when requested. ‘I need to ensure to ask the right questions and let whānau lead me along the path they chose to share with me. It is about learning from whānau and in turn (with permission) sharing their experiences in such a way that anonymity would be maintained and knowledge passed along to others carefully’.

These seven principles have become the code of conduct that has guided my research. They are what helps me to stay focused on meeting my responsibilities as both a researcher and as an iwi member. Moreover, as Cram (2001) asserts, ‘the researcher must carry the responsibility of ensuring to uplift the mana of Māori on the research journey’.

In addition, I have equally found that ‘As a Māori researcher, one walks alongside the community that is being researched with the responsibility to ensure that Māori research by, with and for Māori is about regaining control over our knowledge and our resources’ (Pipi et al, 2004, p. 151).

3.5 Methods

This section describes the methods I will use in the research. Each research question links to the research method used to answer the research question. The methods chosen will avoid ‘written surveys or lengthy questionnaires so that the approach does not compromise cultural appropriateness. Instead, the focus on oral and visual approaches will be employed which include fieldwork, formal interviews, participant observation and review of both published and grey literature.

3.5.1 Semi – structured Individual interviews

One to one interviews with a number of the koeke/ kaumatua and pakeke of Ngāti Pikiao who live in the Rotoiti Rotomā areas and hapū descendants of Ngāti Te Rangiunuora descent who are shareholders of the Haumingi 9B 3B land block were conducted. The aim was to gather information regarding Kaitiaki values and practices on the whenua (land) of Ngāti Pikiao and Ngāti Te Rangiunuora. It provided a space in which both the koeke/ kaumatua and pakeke were able to meet rae ki te rae (forehead to forehead) with the researcher (myself). I ascertained if they were comfortable with me as the researcher (my skills, attitude and knowledge), comfortable with the kaupapa (research methodology and methods) and the incorporation of tikanga (Ngāti Pikiao and Ngāti Te Rangiunuora) cultural protocols and practices with the research practice.

I am familiar with some of the interviewees as part of the ethnographic approach I took for this research. Being a member on two of the committees for the Rotoiti Rotomā Wastewater project with some of the iwi representatives (who were interviewees), I was able to interview them with some ease. They had intimate knowledge of the project including the Haumingi 9B 3B land block the Wastewater treatment plant was being constructed on and they understood the impact that it will make on their cultural values and practice of kaitiakitanga.

For other interviewees that were not familiar with me, I ensured to have one of the trusted Rotoiti Rotomā Wastewater committee members (koeke/ kaumatua status) to come along with me to the interviews, to put our minds at ease and allow the interviewees to relax.

3.6 Ethnographic Research

Ethnography literally means ‘a description of peoples or cultures’ (Denscombe, 2010). It is a theory grounded in the research strategy developed by early social anthropologists in that it requires the researcher to spend considerable time in the field among the people whose lives and cultures are being studied (Whyte, 1981). Ethnography as asserted by Ritchie, Lewis, McNaughton Nicholls & Ormston (2014), involves understanding the social world or culture, the shared behaviours, beliefs and values of particular groups, typically via immersion in their community. Ethnography pays special attention to how the group being studied sees the world,

interprets it and the way in which they perceive their reality (Malinowski, 1922). According to Denzel & Lincoln (2005), a researcher using an ethnographic approach must establish trust, rapport, and have authentic communication with the research participants so that subtle differences from their voices and body language can be captured (Chilisa, 2012).

An ethnography ‘attempts to be a holistic study, covering as much of a culture of people and their characteristics over time (Fetterman, 2010, p. 29). Typically, it is designed to describe the history of the group being researched, the geography of the location, kinship patterns, symbols, politics, economic systems, educational or socialization systems, and the degree of contact between the target culture and the mainstream culture’(ibid).

3.6.1 Ethnographic Methodology

One of the first conditions of acceptable Ethnographic work certainly is that it should deal with the totality of all social, cultural and psychological aspects of the community, for they are so interwoven that no one can be understood without taking into consideration all the others.

(Malinowski, 1922, p.xvi)

Some of the methods used in the ethnographic research were approaches such as: fieldwork, participant interviews and observations. Being a member of the Iwi Wastewater Liaison Group:

A mandated group established through the outcome of the BOPRC and RLC Resource Consent Hearing allowed me to be a ‘fully immersed participant’ in the group. This group was ‘established to allow tangata whenua to continue active and effective participation in the reticulation scheme throughout its full life and to provide ongoing input into the monitoring and reporting of the performance of the WWTP and LDS’ (BOPRC, RLC, July 2017).

My deep involvement with this group and the social process I observed, gave me a fuller understanding of the phenomenon under study. I was able to develop detailed descriptions of the communicative behaviours and values of the group members. This happened through a prolonged period of being in the field doing fieldwork. Fieldwork for the research was conducted between March 2016 and January 2020 and ‘was organised around three principal

methods of data collection: formal interviews, participant observation and, review of both published and grey literature' (Blum, 2009, p. 717).

3.7 Qualitative Research Methodology

By employing a qualitative case study method, an aspect of the ethnographic approach, it provided a comprehensive study on the experiences, practices and interpretations of the Ngāti Pikiao and Ngāti Te Rangiunuora iwi as kaitiaki on their whenua (land) and surrounding areas.

Denzin and Lincoln (2013, p.6) see qualitative methodology as the following:

Qualitative research is a situated activity that locates the observer in the world. Qualitative research consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings, and memos to the self. At this level qualitative research involves an interpretive and naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meaning people bring to them.

Yin (2014) suggests that a case study approach is ideal when the questions being explored are primarily made out of "how" or "why" questions, the request centres around a current phenomenon, and the researchers have negligible power over the social occasions. 'Searching for the 'why' behind relationships through a case study method, will build on the internal validity of the research (Eisenhardt, 1989). Benbasat, Goldstein and Mead (1987) finds case studies are one of the best producers of theory.

Bogdan and Bilken (2007) add to this by stating that excellent qualitative research questions should be ambiguous so that researchers can narrow their emphasis as they gather and analyse data. According to Creswell and Poth (2018), this methodology allows researchers to look at single or several instances of a real-life enquiry gathered from various data sources such as interviews, impressions, and reports. Sarantakos (2005) goes on to say that qualitative research enables for the development of social capital theory since people's life contexts are formed via

community interactions and shaped by the social norms and culture of the community in which they reside.

Researchers can gather information in a variety of ways, according to Yin (2014, p. 34), including ‘accessing documentation, archival records, interviews, direct observation, participant observation and the study of physical artefacts. Because these varied sources of data are complementary, it is critical to use multiple sources of data to confirm evidence or develop hypothesis’.

According to Creswell and Creswell (2018, p. 187), ‘typically, in good qualitative research, the researchers drew on multiple sources of qualitative data to make interpretations about a research problem’. Interviews with Ngāti Pīkiao and Ngāti Te Rangīunuora iwi members and key informants, document analysis, and field observations are among the data collection methods used in this study.

3.7.1 Multiple Attribute Decision Making (MADM) Methodology and Method

A Multiple Attribute Decision Making (MADM) methodology and method was used to ascertain the long-term viability and acceptability of the STEP and Biolytix systems (Kalbar, Karmakar & Asolekar, 2012). Multiple variables, such as costs, environmental performance, safety, ecological dangers, and community perception, are frequently used to determine effective wastewater treatment strategies (Gogate, Kalbar, & Raval, 2017). MADM approaches are well suited to this research because the case study is concerned with picking the most practical pre-treatment wastewater system option from a finite number of specified options (ibid). Moreover, Kalbar et al. (2012, p. 159) states, the ‘challenge in wastewater management is selection of the best available technology for the particular wastewater treatment objective at a particular site. Many factors, such as capital costs, operation and maintenance (O&M) costs, and land requirements, are involved in the decision-making process’. The STEP and Biolytix systems were subjected to a multi-criteria decision assessment (MCDA) to determine their long-term viability. Further discussion and results of the assessment of these systems are captured in Chapter Eleven of this study.

3.7.2 Using the correct Research Approach

According to Dodd (2008), Quantitative research initiatives follow a strict structure, are concerned with outcomes or outputs, and create numerical and statistical data. The particular strength to this approach is that with a large number of appropriate samples collected, the research outcomes can be generalised to a larger and wider population.

By avoiding building any relationships with individuals, quantitative researchers maintain a neutral attitude, eliminating themselves from any charges of personal bias. As a result, quantitative research is frequently referred to as "objective." (Creswell, 2009). This is supported by Dodd (2008, p. 8), who states:

... despite the philosophical critiques of the standard view of the scientific and positivist paradigm (critiques that argue facts and values cannot be separated, and reject the view that science should only deal with observable phenomena and that theoretical concepts do not correspond with reality), there is a scientific attitude that adds value to any research, whatever the subject.

Quantitative research methods were not used in this study since they were incompatible with the study's objectives. The study's research questions were largely concerned with process and meaning. As a result, qualitative research methods appeared to be more suited to the focus of this research project.

3.8 Ethical Considerations and Issues

Before the research began, the Haumingi 9B 3B Land Trust and the Tapuaekura Rākeiao Marae Trustees Committee gave their permission to conduct the study and conduct participant interviews (see Appendix One and Two for formal resolutions made). The research entailed establishing relationships with the local community. The notion of *kanohi ki te kanohi* meant that prior to conducting my research, I needed to consult the hapū and attend marae meetings (Teinakore-Curtis, 2015).

The implementation of kaupapa Māori ethical principles and adherence to Te Whare Wānanga

o Awanuiārangi's ethical guidelines (e.g., using Information sheets and consent forms – see Appendix Nine, Ten and Eleven for detail) meant that cultural values were respected and integrity was maintained. The School of Graduate Studies and Research Ethics Committee approved permission to conduct this study in 2016 (Teinakore-Curtis, 2015).

The purpose of the study was achieved by using this kaupapa to complete the criteria for a Doctor of Philosophy – Environment Studies at Te Whare Wānanga o Awanuiārangi, and participants in both the Rotoiti and Rotomā communities, as well as the Cook Islands community, were informed. They were also told that some of the findings could be used in conference presentations and academic articles. Advisory Committees and Trusts, such as the Haumingi 9B 3B landowners, as well as Cook Island community participation, will get a brief report of the findings. This will happen once my thesis is finished, so they may utilise it for planning and to keep the knowledge and experience they've gained from showing kaitiaki values and declaring kaitiakitanga.

My whakapapa links were known to all of the participants. Potential conflicts of interest arising from my relationships with participants were reduced by allowing them to provide input on my data analysis. Participants were not compensated for their time. In exchange for participation, koha was presented in the form of refreshments and kai. I asked for permission to use this information for my thesis and also provided them the option to review or correct information once it was transcribed or remove information up to one month following data collection while requesting informed consent from participants. The principles of the Treaty of Waitangi were followed in this research. Māori beliefs and worldviews were incorporated into the research with the help of a kaupapa Māori method. All components of this study were directed by Māori ethical processes.

3.9 Selecting the participants

Ten participants who are active kaitiaki in the Rotoiti/ Rotomā communities and on the Ngāti Pikiao and Ngāti Te Rangiuuora Marae were interviewed for the New Zealand component of this case study. Each participant has strong whakapapa links across a number of the iwi groupings within these rohe. Participants were recruited for the qualitative interview phase of this research study on the basis of kaupapa mana whenua, which is akin to Joan Metge's concept of kaupapa

whānau (1995). The term coined by Metge of kaupapa whānau is a Māori collective formed around a certain kaupapa in which the group is profoundly interested. Kaupapa whānau can be founded on a link to a kaupapa or on genealogy. The term kaupapa mana whenua has been employed in this PhD thesis to designate the participants as iwi members who uphold and protect the mana of their ancestral lands and surrounding areas to which they are spiritually connected. This is normally displayed in specific kaupapa that are relative to the rohe that the participants are inextricably linked to.

In this instance, the kaupapa mana whenua involvement of these iwi members is within iwi environmental projects, such as the Rotoiti Rotomā reticulation scheme and Haumingi 9B 3B project where they are able to express kaitiaki values and exercise kaitiakitanga.

For the Cook Island component of the study, the participants were selected in a similar fashion. Four participants were selected for individual interviews with each one being of Cook Island descent, involved in environmental management issues on the main island of Rarotonga and very knowledgeable about the impact made on the lagoon area from treated wastewater discharge. They too were seen as ‘anau enua’ – family who are inextricably connected to the land.

3.10 A Staged Approach

3.10.1 Research question one

Is a Wastewater Treatment plant and disposal field aligned with Kaitiaki values and principles relating to land use?

The interview is the method chosen to answer the first research question. Cram (1997) describes this as procedural’ empowerment where the research is culturally safe and participants voices are heard.

One of the interview's weaknesses was that it was limited by the subjective character of qualitative data and its provenance, making it difficult to apply traditional reliability and validity standards. Furthermore, the amount of time required for data collection, analysis, and

interpretation was considerable.

I mitigated against this by ensuring that I was prepared for the interview by going into the interview with a non-judgmental approach. I ensured I listened for the main ideas and was able to 'read between the lines' when trying to decipher the rationale of what was being said. I also used prompts with subtlety when needing clarity on a point made by the interviewee (Denscombe, 2010).

3.10.2 Research question two

What impact will be made on iwi relationships with the whenua and their engagement with Local Council through the practices of kaitiakitanga? A semi-structured interview was the method chosen to answer the second research question. I was able to capture the essential principles and cultural values Māori have around wastewater and their engagement with the local council regarding it. This was done by seeking opinion from different cultural experts in our local Rotoiti and Rotomā communities and parts of the Cook Islands community on the main island of Rarotonga.

The Pacific approach had been used to compare their situation around wastewater given they have a similar context to New Zealand Māori and are currently faced with the exact same issues with reticulation. The experts were asked to consider the same challenges and questions that Rotoiti and Rotomā iwi are faced with such as updating their views on wastewater to move with the forces of change and how culturally appropriate solutions could fit with the demands of modern times.

This has been a long-standing issue for the residents of Rarotonga as over the past 10-years, the Muri lagoon on the southern shores of Rarotonga, has deteriorated steadily due to on-going failing wastewater systems (M. Sherman, personal communication, April 9, 2018). Post Covid-19, Muri has again begun to suffer the effects of failing onsite effluent treatment systems with the return of overseas tourists (Godfrey, 2021).

This method was able to tailor the research practises to the needs and aspirations of the participants by using the principles of Kaupapa Māori research within the Cook Island research context, and by genuine engagement with the community as a research partnership, i.e. 'by,

with, and for' Cook Island Māori (Smith, 1999).

Again, I ensured that I was prepared for the interview by going in with a non-judgmental approach. I listened intently for the main ideas and was able to 'read between the lines' when trying to decipher the rationale of what was being said. This was confirmed by the interviewees once I returned their written interviews for them to agree to or amend accordingly. Flexibility and change were employed in this research process to adapt to suit the Māori and Cook Island communities involved and also to embrace the cultural aspects that are a part of each hapū and village.

3.10.3 Research question three

With the implementation of the reticulation scheme, what is the relationship between the scheme and iwi's position on social, environmental, cultural and economic sustainability?

Ngāti Te Rangiuuora of Ngāti Pikiao have created land provision for the development of a WWTP and a disposal field on their land site. This was based on the premise that there will be little to no adverse effects both culturally and environmentally and to ensure that there would be positive outcomes (Whata, 2016). It is essential that iwi understand the impact of this activity in detail when considering the importance of future decisions relating to the Scheme such as growth and the continuation of the treatment plant beyond the 50-year lease agreement (Skerrett – White & Skerrett, 2015) made between RLC and Haumingi 9B 3B trustees and landowners. Therefore, landowners were interviewed to gauge their understanding of the opportunities as major land owners, to provide land for key infrastructure elements as part of community-wide solutions. Also, the opportunities relating to land-use (including higher-value options associated with housing) and growth in the local economy.

Denscombe (2010, p. 162) argues that the limitations of this method are that 'pre-coded questions can be frustrating for respondents and could deter them from answering. They also offer little opportunity for the researcher to check the truthfulness of the answers given by the respondents'. Therefore, I need to ensure that I ask questions which are absolutely vital for the research and be rigorous in weeding out any duplication of questions (ibid).

3.11 Chapter Summary

Chapter Three examined Kaupapa Māori Research and theory and Kaupapa Māori Methodology in detail and discussed the strengths and weaknesses of both Quantitative and Qualitative methodologies. This resulted in the selection of employing a Qualitative method in this case study. A quantitative methodology was discarded because it prevented the researcher from being personally involved in the study. Being an iwi representative on this project, relationships and connections were already established between myself and the informants and participants. Therefore, the researcher's detached viewpoint was deemed unsuitable. Taking such a detached position as a researcher in a Māori cultural environment would have caused severe issues because whanaungatanga (fostering and keeping relationships) is a very important cultural value in this cultural context.

Ethical issues that were likely to arise when researching in Māori and Cook Island communities was also examined. So too was the discussion had on how interviewing and document analyses are the predominant source of data collection. The chapter gave an overview of the themes that will be developed through analysis of the data.

The next chapter examines the Haumingi 9B 3B Block project as a Case Study due to providing Māori-owned land in a rural community for the purpose of fostering environmental, cultural, and economic sustainability for iwi and community stakeholders. The Haumingi 9B 3B block is situated within Ngāti Te Rangiuora, a hapū of the iwi of Ngāti Pikiao. It examines the outcomes of the Kaituna Claim (1984), the dissatisfaction of iwi and their divergent views from those of local authority representatives, and how this current scheme can succeed without repeating history.

Additionally, consideration was given to the ongoing resource management conflict between Māori and the Crown. This relates to the lack of acknowledgement for Māori cultural and spiritual values, as well as the iwi's ability to assert kaitiakitanga and rangatiratanga.

CHAPTER 4: A NGĀTI TE RANGIUNUORA CASE STUDY

Ka raranga ngā hau ki te muri Ka raranga ngā hau ki te mua

Ko te uri tēnei o Te Rangiunuora nō runga mai o Te Hikuwai

No te Tihi o Te Tūārae ki te tipuaki whakairo o Matawhau

Te urunga mai o te rā ka ao ka awatea

Get ready for the southerly, prepare for the northerly.

I am a descendant of Te Rangiunuora within Te Hikuwai.

From the peak of Te Tūārae to the spiritual home, on the crest of Matawhau,
where the Sun rises and the light bursts through.

4.1 Chapter Introduction

Chapter Three examined Kaupapa Māori Research and theory and Kaupapa Māori Methodology in detail and discussed the strengths and weaknesses of both Quantitative and Qualitative methodologies. This examination resulted in the selection of employing a Qualitative method in this case study. Because it precluded the researcher from becoming directly immersed in the study, a quantitative methodology was abandoned. As an iwi representative on this project, I had already developed contacts and connections with the informants and participants. Therefore, the researcher's detached viewpoint was deemed unsuitable. Taking such a detached position as a researcher in a Māori cultural environment would have caused severe issues because whanaungatanga (fostering and keeping relationships) is a significant cultural value in this cultural context.

Ethical issues that were likely to arise while researching Māori and Cook Island communities were also investigated. So too was the discussion had on how interviewing and document analyses are the predominant source of data collection. Finally, the chapter provided an overview of the themes that will be developed through data analysis.

Chapter Four examines the Haumingi 9B 3B Block project as a Case Study due to providing Māori-owned land in a rural community for the purpose of fostering environmental, cultural, and economic sustainability for iwi and community stakeholders. The Haumingi 9B 3B block is situated within Ngāti Te Rangiunuora, a hapū of the iwi of Ngāti Pikiao. Section 4.5 of this chapter further highlights the whakapapa connections between iwi relevant to this study. It examines the outcomes of the Kaituna Claim (1984), the dissatisfaction of iwi and their

divergent views from those of local authority representatives, and how this current scheme can succeed without repeating history.

Additionally, consideration was given to the ongoing resource management conflict between Māori and the Crown. This relates to the lack of acknowledgement for Māori cultural and spiritual values, as well as the iwi's ability to assert kaitiakitanga and rangatiratanga.

4.2 The importance of cultural values to wai and whenua

Indigenous peoples have cultural values that define how they see the world and determine attitudes towards the land, human creativity, and the relationships between living and non-living things (Roberts et al.,1995).

While indigenous peoples' historical and current experiences differ, they share common views on nature and their role in it. A typical starting point is a sense of unity with the environment (Kame'eleihiwa, 1992). 'Any natural resource, location, place, or item (tangible or intangible) of physical, economic, social, cultural, historical, and/or spiritual significance to tangata whenua' is a definition of Māori values (Harmsworth, 1997, p.32).

The definition was purposely left open-ended, according to Harmsworth, so that specific things, attributes, or other significant items could not be bound in meeting it (ibid). The word "intangible" is included in the definition, which allows for language in Māori place names, especially those used by tangata whenua, as well as the retention of metaphysical or cosmological knowledge.

Marsden (1988) asserts, these cultural values are instruments by which Māori view, experience and make sense of the world. Harmsworth and Awatere (2013, p. 28) claim that 'they form the basis for the Māori world view (te ao Māori), and provide the concepts, principles, and lore Māori use to varying degrees in everyday life, and often to form ethics and principles'. They originate from Māori beliefs, which Harmsworth (1997, p. 39) outlines below:

Land, water, and air are essential ingredients of life to be respected, cherished, and

sustained. Everything in the Māori world has a life force, the mauri, and contamination or degradation of natural resources is seen to damage and diminish the life force (te mauri) and affect the well-being of people. Traditional Māori values contain the common Māori belief that all biophysical things and sites, plants, trees, animals, and human beings have a certain amount of tapu, mana, and mauri.

Mead (2003, p. 27) states that ‘the practical application of tikanga Māori is judged, evaluated and understood in terms of the values described; those values have to do with principles or standards of behaviour.’ As discussed by Gallagher (2016, p. 28), these principles are the ‘core values that underpin the totality of tikanga Māori. Whanaungatanga (relationships based primarily on whakapapa, i.e., genealogy); mana (prestige, authority, control, power, influence, status); tapu and noa (rules governing what is sacred, prohibited, or restricted); manaakitanga (generosity, caring for others, and compassion); and utu (reciprocity)’.

Durie (1998) asserts that land is a tūpuna for Māori, a source of tribal identity and whakapapa. As such, it ties human relationships and is necessary for spiritual and economic life. The foundation for hapū and iwi membership is whakapapa. As a result, whakapapa binds the hapū and iwi to one another and the land. Whanaungatanga is derived from whakapapa and refers to the nurturing of kinship bonds. People expect to be supported by their relatives, no matter where they live because whānau relationships involve mutual expectations and responsibilities (Mead, 2003).

4.3 Importance of wai and whenua to Iwi of Lake Rotoiti and Rotomā

When dealing with specific lakes and land areas, the relationships between iwi, hapū, and whānau, who have these relationships with the lakes and whenua in question, are crucial. It is critical to comprehend the distinct cultural context around these distinctive areas while contemplating the effects on Ngāti Pikiao's ancestral landscape. Morgan (2014) asserts that ‘Ngāti Pikiao owns and controls the majority of the land surrounding the Rotoiti, Rotoehu, and Rotomā lakes. As a taonga tuku iho, Ngāti Pikiao has preserved ownership of much of its territory’. Ngāti Pikiao has a deep, unbroken connection to their ancestral grounds, Marae, lakes, wāhi tapu, and culturally and spiritually significant sites.

Dr Kepa Morgan's (BE, MBA, Ph.D., CPEng, FIPENZ), one of the Iwi Technical Engineers on the Rotoiti Rotomā Cultural Impacts Team, is rooted in his cultural identity as being of Ngāti Pikiao and Ngāti Te Rangiunuora descent (Teinakore-Curtis, 2015). 'During his engineering career, Kepa has strengthened his understanding of Pīkīāotanga while also striving for excellence both professionally and academically. He specialises in engineer decision-making, wastewater and wastewater technologies, construction management, resource management, sustainability, and processes and materials informed by indigenous knowledge' (Teinakore-Curtis, 2015, p. 72). His doctoral thesis considered an indigenous perspective to municipal engineering practice. Morgan (2011) iterated the inextricable links and deep connections between ancestral names of Ngāti Te Rangiunuora Marae to the surrounding ancestral landscape that Ngāti Pikiao iwi traversed in the following statement:

Water and land are central to the identity of the Māori people. The water continuum, be it the sacred springs, the inland waterways, the waters of Tangaroa, or mists, is bound in a holistic way to Māori and their beliefs. Marae often takes the name of the water supply that provides sustenance for the hapū. The identity of the Ngāti Te Rangiunuora people is inextricably tied to Te Rotoiti i kitea a Ihenga i Ariki ai a Kahumatamomoe (the small lake seen by Ihenga, the progeny of Kahumatamomoe) and Te Puna Whakareia a Rākeiao (the wellspring that sustained Rākeiao). The full name of the Marae reinforces the genealogical connection to Rākeiao, an important ancestor of the Ngāti Te Rangiunuora (Morgan, 2002b). The ancestral connection is constantly reinforced through traditional practices and oratory and maintains the relationships between the people, the water, the ancestors, and the land
(p. 46).

The above statement re-iterates the customary relationship that Māori has with their whenua and the cultural value and relevance of the ancestral landscape for Māori. Forster (2012, p. 52) asserts that 'it is the responsibility of the hapū and iwi to protect the mauri (life force) of the whenua, and as a result of the loss of biodiversity and environmental degradation of the ancestral terrain, this protective responsibility has grown even more urgent.'

Māori view many waterways as deteriorating as a result of reckless use and development, according to Morgan (2011). Māori have been fighting for more acknowledgment of their

traditional ideas, traditions, and practices over the past two decades. They are afraid that failing to recognise their traditional values, customary rights, and Treaty rights will stifle tribe development and jeopardise many of their cultural and identity foundations.

4.4 Background to the Case Study

It was determined that the first wastewater treatment plant proposed by RLC (also known as Rotorua District Council – RDC) to be constructed on Manawahē Road in Rotomā violated the principles outlined in the Treaty of Waitangi (Ngāti Pikiao Environmental Society, 2013) and thus failed in the Environment Court. Various applicants expressed concerns about the Waste Disposal Proposal on behalf of the appeal lodged by Ngāti Pikiao Environmental Society Incorporated to the Environment Court in 2011. One set of evidence given by Skerrett - White (2012, p. 2) was primarily the ‘inappropriateness of conveying human waste over a very long route the length of which will maximise the risk of inevitable leakage and contamination of not only the lakes but also the many sacred/restricted sites it will lie close to and transverse along the way.’

This was supported further by Tahana's (2012, p. 4) evidence that:

Ngāti Pikiao has special cultural and spiritual relationships with their lands, waters, sites, wāhi tapu, taonga, and other resources; and as such, it expects to prioritise the exercise of kaitiakitanga and active enhancement of these areas for the cultural, social, and economic well-being of Ngāti Pikiao now and into the future. Our ancestral resources (and their mauri) and the activities occurring within Ngāti Pikiao rohe strongly influence the cultural identity and hence the mana of our iwi. The relationships between related hapū, including the tikanga of manaakitanga, and respecting each other's mana and kaitiakitanga are important to maintaining cultural and spiritual balance. Lack of consideration of alternative methods or measures which address cultural and spiritual effects on Ngāti Pikiao and recognise our kaitiaki responsibilities. The proposed location is offensive and fails to provide for effects on Ngāti Pikiao, particularly the potential impact on the Waitahanui Catchment and the transferring of waste from Rotoiti and Rotomā to the Waitahanui.

Kepa Morgan's (2012) evidence as both an iwi member and a technical expert in engineering acknowledged that the proposal discharges the waste to land before entering the water. The discharge of waste directly to water bodies is of grave offence to tangata whenua, including Ngāti Pikiao, particularly given the relationship of iwi and hapū with their ancestral waters and reliance on those waters for sustenance and the exercise of manaakitanga (hosting guests).

Moreover, Morgan highlighted the proposed location of the Wastewater Treatment plant being located at the ridgeline of three different catchments, which would result in the mixing of these waters from the catchments. He emphasised that the proposal takes waste from the Rotoiti, Rotomā, and Rotoehu catchments and releases it into another catchment (Waitahanui), which is Ngāti Mākino's rohe. Mākino, the eponymous ancestor of her uri whakatupuranga of Ngāti Mākino, has mana whenua rights that stretch from the Waitahanui catchment through to Maketū and areas of Matata.

Revered Ngāti Mākino and Ngāti Pikiao elder and leader, Te Ariki Morehu summed this up in his submission to the BOPRC (2011a, p. 1) regarding the Resource Consent application for the Proposed Waste Water Treatment Plant in Rotomā:

Our awa is an awa tupuna. It is named after our eponymous ancestor Waitaha-nui-a-Hei. Hei was the father of Waitaha from whom Ngāti Mākino descend. Hei was one of the rangatira aboard the Te Arawa waka when it voyaged to Aotearoa. We hold the utmost reverence for our awa. This respect for our beautiful awa is as old as the time our ancestors first occupied Aotearoa. Mākino are the kaitiaki of this awa.

He went on to emphasise his revulsion of raw wastewater discharge into the Waitahanui catchment in his testimony to the Environment Court (2012, p. 2):

The discharge of paru – be it by direct discharge or by groundwater - into the Waitahanui catchment is absolutely offensive to Ngāti Mākino and to tikanga Māori. We live by this rule. We expect others to uphold our cultural values in regard to our awa. We do not put our tiko (faeces) or any other form of paru (unclean or offensive matter) into our waterways. It is not acceptable. To accept such a practice would be like accepting it is ok to pour tiko (faeces) onto the body of our tupuna. This kind of practise is what kills the mauri of our taonga. We cannot and will not allow this. It is also unacceptable to “mix”

water. Putting dirty water from one origin into another waterbody is not an accepted practice. It has the same cultural obscenities as putting paru into a river. The matter is worsened when the receiving water is wai-Māori or freshwater.

Pushing effluent from one rohe through to another iwi land and waterways area is a serious offence, not only to Ngāti Mākinō but also to Ngāti Pikiao, whose rohe the waste derives from. Ngāti Pikiao koeke had previously stated in their evidence that they were opposed to the transfer of para (faeces) outside of their catchment area.

Finally, Craig Brown, an accomplished wastewater consultant with a Psychology and Health Ergonomics background, who has extensive knowledge and experience in onsite wastewater treatment systems, gave evidence in support of Ngāti Pikiao with their appeal to the Environment Court (Brown, 2012). Being primarily sought after for his ability to complete more than eighty system designs in New Zealand, which have gained building consents and in many cases resource consents for discharge permits, he asked the Court to consider 'selecting a wastewater system suited to the community's resources, capabilities, preferences, etc. and thus being more likely to obtain 'buy-in' – i.e. genuine commitment from the community to make the project successful' (ibid). The best way to achieve this is to involve the community in assessing its own needs and of impacts of different development options (Shirley, 1982; Buchan, 2003).

The Ngāti Pikiao pakeke and koeke, as well as the technical experts who testified in support of the appeal, provided clear evidence that the construction of the Wastewater Treatment Plant would cause significant disruption to the land and culturally significant sites. Furthermore, given the concentration of wastewater streams from the Rotoiti, Rotomā, and Rotoehu catchments in a single location, the highly permeable nature of the soils, the potential for the plant to exceed design parameters during peak loading, and the unavoidable residuals in the treated wastewater stream, the proposed solution may actually increase nutrient inputs into Lake Rotomā and then pushed down into the Waitahanui catchment. (Morgan, 2012).

'The Rotoiti Rotomā Wastewater Treatment Plant (WWTP) proposal had angered the Ngāti Pikiao iwi, especially koeke (elders). To defile Tangaroa was unthinkable. Where was the respect?' (Teinakore-Curtis, 2015, p. 68).

The proposed WWTP location would not only allow effluent to be piped back into the lake, but the pipes would also be laid along culturally significant sites, in this case, the ana (cave) along Lake Rotoiti, where prominent ancestral kōiwi (bones) lay, such as Te Haukeka – an illustrious ancestor of Ngāti Te Rangiuuora. Because of the harm to fish spawning sites, iwi members would no longer be able to harvest food in those regions or carry on traditional norms around mahinga kai. It would have an impact on our location (Teinakore - Curtis, 2015). ‘This specific area of Rotoiti and Rotomā, recognised in Ngāti Pikiao history through waiata (songs), pūrākau, narratives, and poetry as an important site of spiritual, cultural, and historical value to Ngāti Pikiao, at the stroke of a pen, would become the repository of human waste’ (ibid, p. 69).

RLC had neglected to consider Te Tiriti o Waitangi values, such as aggressively protecting the rights of Ngāti Pikiao to manage their lands and resources according to their tikanga and customs and acknowledging their mana and kaitiakitanga responsibilities. As Whata (2012) stated in his testimony, Ngāti Pikiao had not been recognised as a Treaty partner, nor had their involvement and contribution to the process been respected by Council.

The RLC documentation presented to the Environment Court showed that the primary goal of the reticulation proposal was to reduce nitrogen imports into lakes and so improve lake water quality. Of minor importance was the Council’s recognition of the Treaty of Waitangi principles and how they are expressed in accordance with Ngāti Pikiao customs and traditions.

According to Morgan (2014, p.6), the lands and waterways ‘are taonga tuku iho (treasures handed down from the ancestors), and as such, the current generation are merely kaitiaki for this whenua and wai, and so need to ensure that it is passed onto future generations intact, with the stories, customs, and traditions to preserve our iwitanga/hapūtanga, tikanga, and mana’.

The resources within the Ngāti Pikiao rohe had always been their food basket after the arrival of the Te Arawa Waka, sustaining generations of people who had co-existed and cared for the ecosystem (ibid). These resources support the identity, mana, and kaitiakitanga obligations of iwi, hapū, and whānau.

Therefore, an integrated approach to land management use and changes to address nutrient sources, while also recognising and providing for the values and kaitiakitanga of Ngāti Pikiao iwi, as well as the ancestral and spiritual relationships with the lands, waters, and taonga, would

be required for a long-term sustainable measure.

4.5 Remnants of the Kaituna Claim

With RDC's intention to build a wastewater treatment plant, with the para (effluent) eventually flowing into the lake and down the Waitahanui stream, there were remnants of the Kaituna Claim that occurred for the Ngāti Pikiao iwi in 1984. The claim was made on behalf of Ngāti Pikiao iwi by renowned Māori chiefs and leaders such as Pokiha Hēmana, Sir Charles Bennett, and four others from Maketū, Te Puke, Ōkere Falls, Mourea, and Rotorua (Waitangi Tribunal, WAI4, 1984). The claim was motivated by an inherent bias in New Zealand's environmental planning regulations regarding Māori cultural and spiritual values. This was the first significant claim that seriously questioned the dominant culture's entitlement to use water as a waste disposal method – a tenet of a philosophical system enshrined in the Water and Soil Conservation Act of 1967. (Fraser, 1988).

Given that RDC had a variety of options in front of them, it became an issue of identifying what was the best method of waste disposal. Fraser (p. 6) asserted that the decision-making process was restrictive based on the following reasons:

1. The legislative and planning system concerning water resource use did not take adequate account of Māori spiritual and cultural values;
2. The currently held philosophy of water resource use is outdated and reflects only those values held by the dominant culture.

The claim effectively called into question the government's environmental management practices at regional and national levels. Furthermore, it demonstrated how fortified government organisations fail to recognise and, as a result, implement Māori cultural and spiritual values when deciding on competing water resource usage (Parks, 1998).

These cultural and spiritual values for Ngāti Pikiao were inextricably tied to the land and waterways in the claim. In addition to this understanding, Morgan (2007) asserts that water is a taonga for Māori over which they exercise kaitiakitanga and, in particular, that cross rohe transfer, that is out-of-catchment transfer or disposal of water, is a serious concern.

The whenua and wai regions, as described by Stafford (1996), covered the Ōkere river, although commonly referred to as the Kaituna river from its lake outlet Te Rotoiti (formally known as Te Rotoiti i kitea a Ihenga i Ariki ai a Kahumatamomoe), which flows downstream to Kohangakaeaea (Parihaua), then onto Pakatore, which becomes the Kaituna, and from there to the coast to Te Awarua.

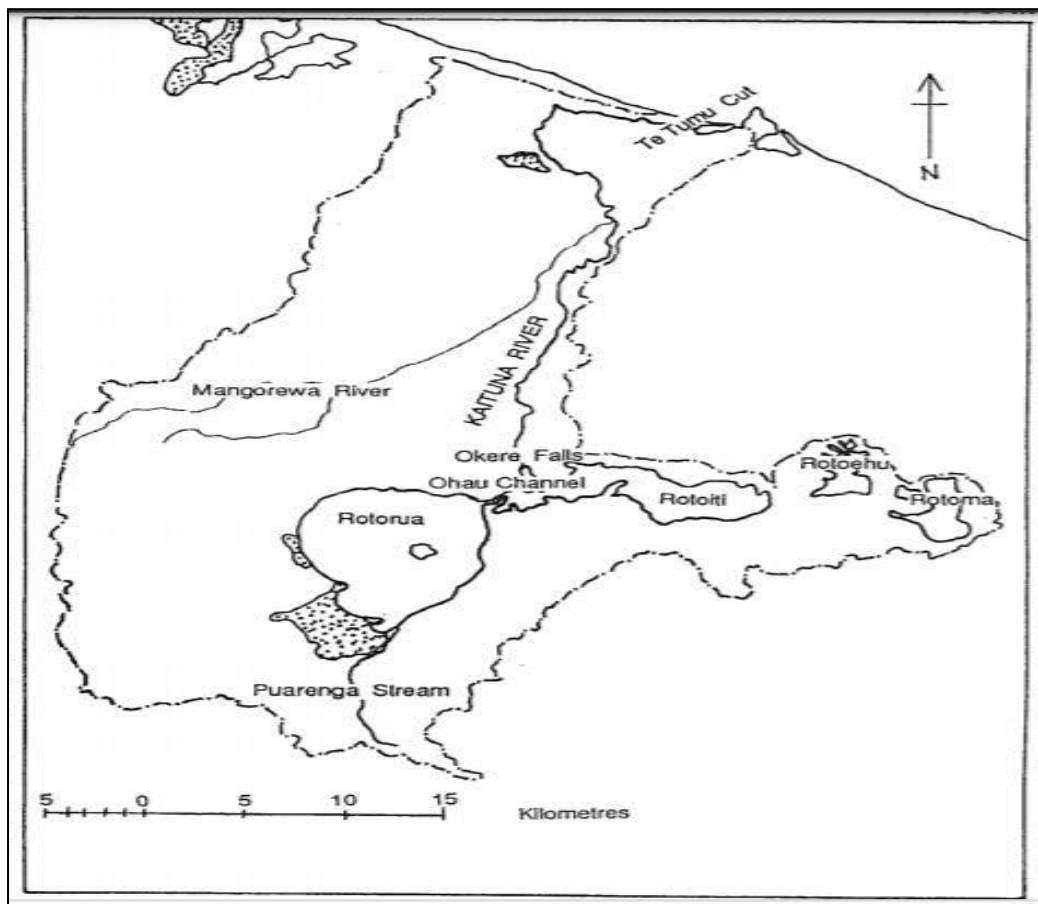


Figure 4-1. Kaituna River map (Source: Fraser, 1988).

The importance of the Kaituna in the greater Rotorua and Rotoiti Lakes environment is reflected in the naming of these locations, which is an expression of kaitiakitanga (Parks, 1998). These traditional rights and values indicate Ngāti Pikiao's historical relationship with the Kaituna river and are recognised by the Treaty of Waitangi in the Kaituna report of 1984. The findings emphasised the significance of cultural and spiritual values and how Ngāti Pikiao had previously displayed kaitiakitanga (ibid).

4.6 Ngāti Pikiao mana whenua rights along the Kaituna

The arrival of the waka Te Arawa from Hawaiki to Maketū in 1400 A.D. marks the beginning of the definitive history of the Rotoiti, Rotoehu, and Rotomā lakes district (Stafford, 1967). Tamatekapua was the commander of this waka, while Ngatoroirangi was the tohunga, or high priest. According to Stafford (1967, p. 18-19), the Te Arawa waka arrived at Te Awahou, the Kaituna river's original inlet at Maketū (Wiri, 2005).

Upon the arrival of the Te Arawa waka at Maketū, the crew members decided to explore and claim the lands inland of Maketū by virtue of take taumaha (right of discovery). Once safely landed and set up, Tamatekapua, captain of the Te Arawa waka begat two sons, Kahumatamomoe and Tuhoromatakakā. Tuhoromatakakā's son, Ihenga (ibid), discovered Lake Rotoiti while traveling inland with his uncle Kahumatamomoe. Rangitihi, Kahumatamomoe's great-grandson and a well-known ancestor became the most celebrated Te Arawa tupuna because he and his children established the Te Arawa people in the Rotorua lakes district. Rangitihi was born at Maketū and then moved inland to Paengaroa, where he built a pā called Pakotore near the Kaituna river, according to Stafford (1967).

Subsequently he built another pā called Matapara at Kaituna. Schuster & Hohepa (2005, p. 11) maintain that:

Because of his prowess in battle Rangitihi gained a fearsome reputation in the Rotorua district. Stafford (1967) notes that on one occasion, while he was leading a war party, he had his head split open by an enemy warrior. However, this did not deter Rangitihi, for he wrapped his head with an 'akatea' vine and continued to do battle with his enemy. From this incident he acquired the name: "Rangitihi upoko whakahirahira, nō Rangitihi te upoko i takaia ki te akatea" – "Rangitihi the hard headed one, Rangitihi whose head was bound with akatea".

Alongside his notable conquests, Rangitihi had eight children to four different wives (Ballara, 2004). Those whom today identify as Te Arawa can trace their descent from one or more of the tamariki of Rangitihi. These children became known as "Nga Pūmanawa e Waru o Te Arawa" or "The eight pulsating hearts of Te Arawa" (O'Malley & Armstrong, 2008).

From his union with Manawakotokoto, Rangitihi begat three children, Rākeiao, Kawatapuārangi and Apumoana. Both Rākeiao and Kawatapuārangi are the eponymous ancestors of Ngāti Pikiao and Ngāti Rongomai today.

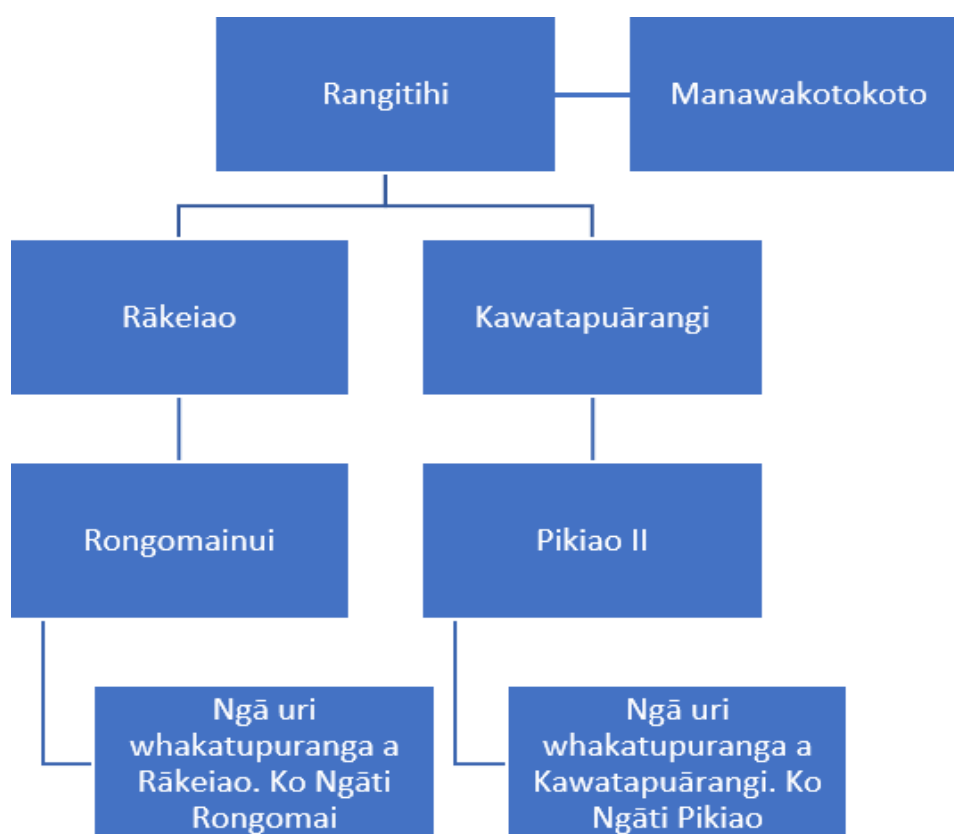


Figure 4-2. Eponymous ancestors of Ngāti Pikiao and Ngāti Rongomai (Source: Taheke Minute Book 1, 1885)

Other closely connected iwi through marriage or blood who are the progeniture of these illustrious ancestors has asserted rangatiratanga over their ancestral lands. This is due to their ability to maintain mana whenua through take tupuna (ancestral right), take raupatu (right of conquest), and ahi kā roa (permanent occupation) over large regions of Rotoiti, Rotoehu, and Rotomā, through the Waitahanui down to the upper and lower catchment of the Kaituna River and out to Maketū.

They comprise the iwi of Ngāti Hinekura, Ngāti Te Rangiuuora, Ngāti Tamateatūtahi Ngāti Kawiti, Ngāti Te Tākinga - Te Tākinga married the daughters of Mākino, whose uri whakatupuranga are Ngāti Mākino (BOPRC, 2014) and Ngāti Tarāwhai. As Whata (2016, p. 26) asserts, their ‘rangatiratanga aligns with the concept of mana whenua and the relationship iwi has with its ancestral lands. Iwi value the ability to maintain their tikanga and cultural and

spiritual values, mana and exercising their ahi kaa and kaitiakitanga responsibilities associated with living close to and within their ancestral rohe’.

Kaitiakitanga and Rangatiratanga are inextricably intertwined. Kaitiakitanga refers to the interplay between people and their surroundings (Crengle, 1993). People's position regarding the natural world, both physically and metaphysically, is determined by this relationship. Kaitiakitanga entails people's responsibility to use resources in ways that respect and conserve them, both literally and spiritually (ibid). On the other hand, Rangatiratanga refers to the authority that iwi has to govern all elements of resource utilisation collectively. This includes the ability to limit who has access to a resource. Rangatiratanga is therefore an essential requirement for kaitiakitanga (Burrows, 1997).

4.7 The Decision of the Waitangi Tribunal

Witness after witness came forward to corroborate the claimants' argument that mixing waters tainted by human waste with waters utilised for harvesting food was spiritually unacceptable to Māori. Water used for food preparation must be kept separate from the water used for any other reason, according to Māori tradition. The report found that:

kaimoana has great significance for Māori. It is unthinkable to entertain guests without seafood ... there is already evidence of serious contamination at the present river mouth, and real anxiety has arisen that shellfish there may not be fit for human consumption ... to pump sewage effluent into the Kaituna River was objectionable on medical, social, spiritual and cultural grounds.

(Waitangi Tribunal, 1984, p. 14)

The Tribunal further noted that on one side, the claimants claimed that dumping the sewage into the river would result in the water being labelled tapu (Grensill, 2010). However, wastewater is currently being poured indirectly into Lake Rotorua, despite the fact that no tapu has been issued on the lake's waters. The Court also suspected, and was proven correct, that Māori people, like Ngāti Pikiao and others, now fish in Lake Rotorua and the Ohau Channel as well as in Rotoiti, which receives the waters of Rotorua. Ngāti Pikiao was able to make the point that Lake Rotorua is under mana whenua of Ngāti Whakaue and other iwi along the

shoreline of Lake Rotorua City. Therefore, it was claimed that tapu is a subject of territorial jurisdiction.

If the pipeline dumps wastewater into the Kaituna River, the river must be proclaimed tapu, and the waters must be restricted to them for all purposes as long as the discharge continues. A tapu like this would damage not only the fish in the water but also any vegetation that came into contact with it at any moment (Morgan, 2008). They mentioned that plants of all kinds with unique worth and importance grow along the river's banks. These are used for medicinal uses, weaving, and dyeing. The Pīkiao people have developed a wide range of workmanship, from flax kits to feather cloaks, using vegetation, some of it uncommon, found in their tribal territory (Waitangi Tribunal, 1984).

Hence, the recommendations from the Tribunal were:

1. that the Crown's policy of building a pipeline to discharge effluent from the Rotorua District Council Waste Water Treatment Plant into the Kaituna River be abandoned as being antithetical to the Treaty of Waitangi's principles;
 2. that research be carried out into the potential of disposing of such effluent by discharging it on land in a suitable and practical manner rather than into Lake Rotorua and;
 3. that the Water and Soil Conservation Act 1967 and associated legislation be revised to allow Regional Water Boards and the Planning Tribunal to adequately incorporate Māori spiritual and cultural values when assessing water rights applications, renewals, and objections
- (ibid, p. 28).

The memories of the Kaituna claim have been prevalent in both pakeke and koeke of Ngāti Pīkiao's minds concerning the current behaviour that RLC has displayed with this Treatment Plant construction project (E. Skerrett, personal communication, Feb 4, 2019). Despite the council's good intentions and rationalisation of procedure, the project has resulted in more antagonism than clarity (Parliamentary Commissioner, 1998). The need to end RLC long-running impasses was overshadowed by mistrust of the council's intentions and indignation that the council would try to make such decisions for iwi such as Ngāti Pīkiao. Within the context of this project and learnings from the past, there is much work to do with RLC and the 'old people' to have an ongoing relationship built on trust and good honesty (W. Emery,

personal communication, May 10, 2019).

4.8 Constructing the Wastewater Treatment Plant at Manawahē Rd – An Issue of sustainability

In addition to the current Rotoiti Rotomā Wastewater Treatment Plant (WWTP) proposal being abhorrent on cultural grounds, the strategy to building the plant should have considered an integrated water management approach to become more sustainable by creating a system thinking process of using drinking water, wastewater and stormwater as a single water resource rather than being managed as three separate elements (Brown, 2012). The Parliamentary Commissioner for the Environment (2002) report cited that the following approaches should be recommended to support sustainable water management:

- Aim to increase the efficiency of water use, thereby reducing the need for new dams, pipelines, and treatment plants;
 - Reduce wastewater by decreasing total potable water supply, reusing greywater and recycling biosolids from wastewater treatment plants and;
 - Reduce stormwater from better site design with a reduction in proportions to impervious surfaces, onsite collection use, and retention of natural streams and waterways
- (p. 2).

Further recommendations for a sustainable water system should include ‘management and planning involving consultation with the whole community of interest including residential uses, industry, tangata whenua, agencies, agriculture and recreational users’ (ibid).

Based on RLC’s behaviour on sustainable practice regarding this failed proposal, the council’s proposed option continues to follow the old, fragmented, and linear strategy deemed unsustainable. According to Brown (2012, p. 4), the ‘nature of the reticulation scheme was such as to remove responsibility from the community for the removal of nutrients. Reticulation is an end-of-pipe solution that encourages a flush-and forget mentality. It minimises the possibility of education and behaviour change and the possibility of beneficial reuse of water and nutrients, aspects where the community had expressed interest’.

4.9 Discontent with state decisions for iwi

Local government and mana whenua worldviews do not always agree, nor do their objectives or definitions of 'success' under the RMA - New Zealand's primary environmental legislation which sets out purposes and principles of the act for functionaries like councils, who are delegated authority to make decisions. Iwi have expressed dissatisfaction with municipalities' performance in relation to Treaty relationships and environmental management under the RMA (Backhurst, Day, Warren, Ericksen, Crawford, Jefferies, Bennett, Berke, Chapman, & Laurian, 2004; Ruckstuhl, Thompson-Fawcett & Rae, 2014). This has not only led to dissatisfaction for iwi such as Ngāti Pikiao and Ngāti Māhino with RMA processes but also with formalised government structures that deny iwi as full treaty partners to exercise kaitiakitanga and their kaitiaki values through partnership, co-management and other practical approaches (Gooder, 2018; Whata, 2012).

Although the RMA is a legal instrument, 'its procedural development, of attempting to meet the needs of both the crown and iwi, has necessitated negotiation and dialogue between disparate groups – Māori, councils and the wider community – in order to consider Māori perspectives on environmental, social, and economic issues' (Ruckstuhl, Thompson-Fawcett & Rae, 2014, p. 24).

Dissatisfaction and disagreements between Ngāti Pikiao and the state have resulted in long-term frustration, as Ngāti Pikiao and other iwi have continually expressed concerns about how waste water is managed in Aotearoa (Waitangi Tribunal 1978, 1984, 1987; Motunui, 1983; Kaituna 1984; Manukau, 1985; Mangonui, 1988). Much of the concern has been the disposal of human effluent, especially where it is discharged to water, and of the need to protect mahinga kai (indigenous freshwater species used as a food source) and wāhi tapu (cultural sacred sites of significance). The importance of whenua (land), wai (water) and waterways to Ngāti Pikiao underpins a broad support for waste management strategies that involve land application.

As a result, both the Waitangi Tribunal in the Kaituna claim and the Environment Court in the Ngāti Pikiao Environmental Society appeal acknowledged how competing objectives and interests complicate the 'delicate balance between the concept of partnership recognised in the Treaty of Waitangi, the Resource Management Act, and the relevant Policy Statements and

Plans, and the need for certainty about intended proposals' (O'Connor, Randal & Duignan, 2017, p. 4).

4.10 The Outcome from the 2011 Appeal with the RRSSC project

In early 2014, Rotorua District Council (also known as Rotorua Lakes Council or RLC) formed a Steering Committee to provide input and manage the process of identifying wastewater treatment alternatives for the Rotoiti Rotomā District. 'The Rotoiti Rotomā Sewerage Scheme Committee – also known as the RRSSC – was made up of delegates from RLC, BoPRC, and Rotorua District Councillors, as well as Iwi representatives designated by their Marae and iwi in the Rotoiti Rotomā District, Ngāti Pikiao Environmental Society, Te Arawa Lakes Trust (TALT), Ministry of Health (MoH), and Rotomā Ratepayers Association representatives' (Teinakore-Curtis, 2015, p. 77).

The committee took into consideration the lessons acquired from Ngāti Pikiao and Ngāti Māhino's prior triumph over RLC. The steering committee hoped that all stakeholders in the impacted districts would "have a voice" at the RLC negotiation table. Each stakeholder group was assigned the duty of informing their respective audiences about the preferred wastewater treatment options (ibid). Iwi delegates were determined to sit at the advisory table as a group. Fundamentally, so that "decisions regarding who should manage taonga and how they should be managed were made in a cooperative approach that prioritised environmental interests while also honouring Māori's role as kaitiaki and accommodating other stakeholders" (Donnelly, 2018). There were a total of 30 representatives and observers. Rakeiao Marae, a Ngāti Rongomai/Ngāti Pikiao iwi Marae on State Highway 30, gave me the task of leading Ngāti Rongomai in managing the conversations and 'politics' of advising on the implementation of the scheme on behalf of the iwi. The committee was chaired by Ian Mclean, an experienced and educated champion for cleaning up the Rotorua Lakes. His expertise in business acumen and relationship management is unrivalled.

RLC also formed a Technical Advisory Group (TAG) to discuss and handle the technical aspects of the various wastewater treatment alternatives presented to the RRSSC.

The group comprised engineer consultants and water quality scientists who work in wastewater treatment plant engineering and water quality (Teinakore-Curtis, 2015). They were in charge

of reporting the best-fit solutions to RDC. Dr Kepa Morgan joined the TAG group due to his engineering competence, including indigenous knowledge perspectives, understanding and experience of the Rotoiti Rotomā region, and his iwi affiliation.

The RRSSC held public engagement meetings in the Rotoiti Rotomā region to examine the options and address community questions and concerns. Iwi representatives were charged with performing and completing a Cultural Impact Assessment (CIA) for RDC and the RRSSC - a CIA performed by Colleen Skerrett – White on the Haumingi 9B 3B block and Wairangi Whata on the Rotoiti and Rotomā reticulation scheme. Due to time constraints, the iwi officials were forced to perform a detailed inspection of the CIA in a short amount of time (ibid).

Because the Iwi reps lacked resources and technical expertise about the establishment, cost, and maintenance of a WWTP in the catchment, it was logical for them to engage an outside iwi technical consultant to help them with these issues. Moreover, the representatives were adamant that they would ‘complete a sound piece of study’ as part of the iwi reps’ effort to silence the council's critics.

After much deliberation, the iwi representatives engaged Taira Wichman, an independent engineer and iwi member of Ngāti Pikiao and Ngāti Te Rangiunuora with more than 20 years of experience in the engineering field, to assist them in resolving the technical challenges around the wastewater choices. In addition, his job entailed assisting iwi and other interested parties in comprehending the implications of each alternative which comprised of:

- The ecosystem;
- The land and environment;
- wāhi tapu (sacred sites such as urupā - cemeteries);
- Cultural sites of significance (physical land sites important to Māori such as ‘The Wishing Tree’ in Rotomā);
- Tikanga practices, i.e., moving para (faeces) from one rohe (region) to another and;
- The effect that it would have on the mauri (life force) of the wai (water) (ibid, p. 78).

The iwi reps, primarily supported by Tait Wichman, wrote a CIA statement for the RRSSC that expressed the iwi's stance after studying all of the evidence available and going on field excursions to various Membrane Bioreactor facilities (MBR) and WWTPs (Morgan, 2014). The following was detailed in the following statement:

Iwi representatives from Ngāti Pikiao, Ngāti Rongomai and Ngāti Tarāwhai wish to inform the RRSSC of their position and preferred option for the proposed Rotoiti Rotomā Sewerage scheme.

The decision on a preferred option has recently gained progress as a result of learning activities undertaken by Iwi, made possible in part by RDC support and the time extension provided by the Ministry of Health. Iwi wishes to thank RDC, the RRSSC Chair, and members of the RRSSC for their patience and understanding, which has allowed them to progress and arrive at an informed and confident decision.

(T. Wichman, attached statement to pers. email comm. Nov 2014)

The iwi delegates also talked about how they did not want the reticulated system to be piped back to Rotorua Township. First, because the pipeline was anticipated to be 20 kilometres long, iwi did not want pipes to cross through wāhi tapu. Second, as kaitiaki of the land, the concept of sewage seeping back into the land and eventually into our lakes was inconceivable to the various iwi. This was also stated in the CIA's position statement:

It is almost fair to say that some iwi are reluctant to accept this option. Some representatives are concerned about the transfer of para between rohe. Moreover, there is a strong opinion by all on the environmental impact of a reticulation-network failure resulting in the leaching of ground-up sewage. Another issue raised is that many do not wish to further contribute to the under-performing discharge field in the Whakarewarewa Forest.

(T. Wichman, attached statement to pers. email comm. Nov 2014)

‘A number of the RRSSC committee members and the stakeholder groups that each represented were still very much in favour of the piped sewage into the Rotorua option. Much of their thinking was based on 'flush and go' whereby once solids were flushed down the toilet, the owner of the property would not have to think about it anymore’ (Teinakore-Curtis, 2015, p. 80).

More discussion on this will be detailed in Chapter Seven, which will involve a thorough and comprehensive review of the Rotoiti Rotomā Sewage Scheme Committee (RRSSC) and Iwi Wastewater Liaison Group (IWLK) minutes since the inception of the Rotoiti Rotomā Sewage

Scheme Committee in February 2014. The purpose of scrutinizing these transactional records is to draw a systematic and accurate picture of what took place between iwi representatives and RLC to agree on the scheme.

4.11 Chapter Summary

This chapter considered the Haumingi 9B 3B Block project as a Case Study for its ability to provide Māori owned land in a rural community to develop environmental, cultural, and economic sustainability. Furthermore, consideration was made because of the current ongoing resource management issues between Māori and the Crown. This concerns land development versus little recognition of Māori cultural and spiritual values and the ability of the iwi to assert kaitiakitanga and rangatiratanga.

The next chapter discusses a suitable reticulation method required to reduce the environmental impact on the lakes, be in line with Iwi cultural values and practices, meet the Ministry of Health (MoH) time and subsidy requirements, and be financially viable for the current and future generations. This solution was to be implemented in the Rotomā community. One such solution was found in a STEP (Septic Tank Effluent Pumping) system that is supplied by InnoFlow Technologies NZ Ltd (Auckland, New Zealand). In combination, this decision was inclusive of cultural, technical, and financial considerations of the available technologies.

CHAPTER 5: STEP FOR IWI

CA STEP for Iwi: A case study illustrating STEP as a viable and culturally appropriate reticulation method for a predominantly Māori owned community in Lake Rotomā, Rotorua

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5.1 Chapter Introduction

The water quality of the Rotorua lakes (Rotorua, New Zealand) has seen significant deterioration over the previous several decades for a variety of reasons, including leaching of nutrients through failed or overloaded disposal fields from lake side communities. This paper describes a portion of the cultural impact and technical assessment related to gaining a Resource Consent to reticulate the lake side community of Lake Rotomā

The region described in this paper has a rich history of Iwi (tribe or confederate of tribes) settlement, and the majority of land within the Rotorua Lakes catchment is Māori owned and leased. 19 hapū (sub tribes) exist within the larger lakes district and 7 hapū reside within the Eastern border of the Lake Rotoiti and Lake Rotomā catchment.

Iwi have had an uninterrupted link with ancestral lands, wāhi tapu (sacred areas) and sites of cultural and spiritual significance in this area. The state of the lakes and water ways and the ability to adhere to kaitiakitanga (guardianship) practices and kawa (protocols) regarding the treatment and disposal of water and wastewater on these ancestral lands correlate directly to the mana (power, status and sense of pride) and rangatiratanga (sovereignty) of the Iwi that reside within.

As such, a suitable reticulation method was required to reduce the environmental impact on the lakes, to be in line with Iwi cultural values and practices and to be financially viable for the current and future generations. One such solution was found in a STEP (Septic Tank Effluent Pumping) system that is supplied by InnoFlow Technologies NZ Ltd (Auckland, New Zealand).

In combination, this decision was inclusive of cultural, technical and financial considerations of the available technologies. The result of such a decision has the potential for increased engagement of local Iwi, a greater potential for compliance and strengthening of local Iwi-council relationships.

Keywords: Wastewater, Reticulation, STEP, Iwi, Lake Rotoiti, Lake Rotomā

5.1.1 Cultural and Historical Background

Lake Rotomā, meaning “lake of exceptionally clear water” is one of 14 lakes within the Te Arawa Region in Rotorua. The lakes serve as a national source of tourism and recreation, and in many cases the lakes provide the main source of potable water for the surrounding houses and commercial enterprise. Moreover, the lakes provide a historical context and are intertwined with the cultural, historical and spiritual identity of the Te Arawa People.



Figure 5-1. Lake Rotomā (Source: www.lake-Rotomā.com, 2017)

The management of the lands and lakes of Rotoiti and Rotomā is an important and integral element of exercising kaitiakitanga by the Te Arawa people. The roto (lakes) and whenua (land) have played a significant role in providing for and sustaining Iwi over many generations. Hapū and iwi (tribe or confederate of tribes) are bound by intergenerational cultural and spiritual obligations to ensure that the lakes and lands are maintained and continue to sustain iwi. Morgan (2014, p. 6) effectively describes the mana and rangatiratanga of these iwi is directly related to their ability to adhere to kawa set.

As shown on the maps below (fig 2 and 3), the land area of Lake Rotoiti and Rotomā was divided between iwi and within iwi, between hapū and within hapū and then further more to the different whānau of Ngāti Pikiao, Ngāti Tamateatutahi and Ngāti Kawiti, Ngāti Mākino, Ngāti Hinekura, Ngāti Te Rangiunuora and Ngāti Rongomai. Rivers, streams and lake areas were also divided in the same manner.

Although each iwi may have certain tīkanga for dealing with water and wastewater within their land area, there are general rules that Iwi share in common regarding the ways in which water and wastewater is separated, treated and disposed. Along the Eastern border of Lake Rotoiti and Rotomā, the seven Iwi that reside within, are bound by the common ancestor Īhenga, the illustrious ancestor from the Te Arawa canoe. Therefore, through their common link, decisions made on wastewater matters can be applied across their commonalities.

Over the past few decades (S.B & S.B, 2016), the lakes water quality has seen significant deterioration for a variety of reasons, including;

- Sewage discharge from septic tank systems serving lakeside communities
- Changes to land use practices
- Large amounts of nutrients stored in the bottom sediments (from historical practices such as the discharge of treated sewage into Lake Rotorua)
- Nutrient enrichment of groundwater aquifers from historical farming practices (which will continue to feed into the lakes over the coming decades).

A representative body of the Te Arawa people, the Te Arawa Lakes Trust was established in 1924 and now operates under the Māori Trust Board Act 1955 (“Welcome to Te Arawa Lakes Trust”, 2012). This trust represents 19 hapū with a region covering the area from Maketū on the eastern seaboard to Tongariro Mountain in the central North Island. Some of the obligations of this trust is to provide a sustainable and responsible oversight and management of Te Arawa's settlement assets which includes its 14 lakes, the Te Arawa Cultural Values Framework and the Rotorua Te Arawa Lakes Strategy Group.

Within this context, the Te Arawa Lakes Programme was set up and is a partnership between Te Arawa Lakes Trust, Rotorua Lakes Council, and Bay of Plenty Regional Council, with funding from the Ministry for the Environment. Under this programme, Rotorua Lakes Council is responsible for the provision and maintenance of sewerage and storm water discharge infrastructure, and for contributing its share of the funding to the Programme (S.B & S.B, 2016).

Reach of the Strategy

The area that the Strategy applies to is the Rotorua lakes catchment. The catchment area includes the rivers, streams, tributaries and land area that feed into the 12 lake catchments. However what happens in these catchments has downstream effects (Kaituna River, Maketū Estuary and Tarawera River). The Strategy acknowledges the concept *Mai i nga maunga ki te moana* - from the mountains to the sea.

The Rotorua lakes catchment includes:

- Lake Ōkāreka
- Lake Ōkaro (Ngakaro)
- Lake Ōkātina (Te Moana-i-kātina-a-Te-Rangikaroro)
- Lake Rerewhakaaitu
- Lake Rotoehu
- Lake Rotoiti (Te Roto-kite-a-Ihenga-i-Ariki-ai-a Kahumatamomoe)
- Lake Rotokakahi⁴
- Lake Rotomā
- Lake Rotomahana
- Lake Rotorua (Te Rotorua-nui-a-Kahumatamomoe)
- Lake Tarawera
- Lake Tikitapu

⁴ Under legal guardianship of the Rotokakahi Control Board.



Figure 5-2. Rotorua Lakes Catchment Strategy (Source: BOPRC, 2017)

5.1.2 The Problem

Along Lake Rotomā, some 240 dwellings reside along the shore. Many of the houses are on older septic tanks of varying ages and structural conditions. It was shown that more than 30% of all nitrogen and phosphorous leaching into Lake Rotomā was coming from failing onsite systems of effluent disposal beds (S.B & S.B, 2016) as shown in the figure below.

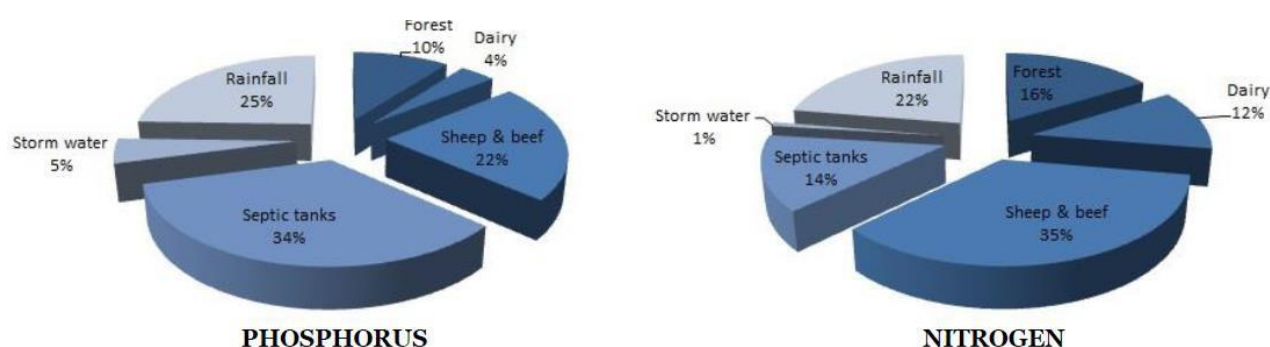


Figure 5-4. Pie Contribution of Nitrogen & Phosphorus Sources Leaching into Lake Rotomā

To address the impacts of failing effluent fields on the lakes, communities in the Lake Rotorua catchments are faced with making decisions to either upgrade onsite systems to higher performing wastewater treatment plants, or alternatively, consider community wastewater reticulation and treatment.

Given the number of neighbouring Iwi in the region and the rich cultural and historical ties in the area, the method of wastewater reticulation and treatment had to be one that addresses both the environmental impacts and the cultural values that provide meaning to the historical Iwi presence in the region.

Moreover, the chosen method had to be financially viable and provide current and future benefits to all Māori and non-Māori stakeholders in the community.

The Iwi of Lake Rotoiti and Rotomā have spent many years trying to get an agreement on a scheme for their community that address the complexities of the problem at hand. It is in the Iwi's point of view (pers comm. Frances Curtis), historical decisions on wastewater reticulation and treatment has been largely void of consideration of their fundamental cultural views and concerns. This comment is a reflection of a lack of examples of where

other Iwi were effective in guiding and influencing decisions made on wastewater reticulation and treatment (pers comm. Frances Curtis).

To the author's knowledge, this is the first time in New Zealand history that an official steering committee appointed Iwi representatives to provide specific cultural expertise and lead the process of gaining Resource Consent (pers comm. Frances Curtis) to reticulate and treat wastewater treatment in the region. Note, a Resource Consent was previously granted (Teinakore-Curtis, 2015) using low pressure grinder systems but was finally retracted at the Environmental Court due to strong presentable opposition by Iwi. This case is not discussed in this paper.

5.1.3 Development of the Proposal

To construct a proposal and gain a new Resource Consent for the reticulation and treatment of wastewater of the Lake shore communities, the Rotomā Rotoiti Sewerage Steering Committee (RRSSC) was formed in February 2014 (Teinakore-Curtis, 2015). The committee was to start the process afresh and lead the development and evaluation of options for wastewater treatment for the lakeside communities with a special emphasis of finding a solution with in the context of the problems described earlier in this paper. The RRSSC membership comprised representatives as follows (ref):

- Seven Ngāti Pikiao marae
- Ngāti Mākino
- Three groups of Māori Land Trusts
- Three ratepayer associations
- Ngāti Pikiao Environmental Society
- Rotorua Lakes Council (Deputy Mayor and water managers)
- Bay of Plenty Regional Council (councillor and staff)
- Ministry of Health (advisory role)

The Iwi representation, as well as Ngāti Pikiao, included Ngāti Mākino and Ngāti Rongomai and included the marae from Tapuaekura a Hatupatu to Tapuaeharuru. Iwi representatives played a significant role in leadership of the RRSSC and provided the

necessary cultural expertise for making decisions on the appropriate reticulation and treatment methods.

Moreover, the RRSSC was also supported by a Technical Advisory Group who provided the RRSSC with technical advice in the identification and selection of the sewerage options for Lake Rotoiti and Lake Rotomā communities.

5.1.4 STEP as a Preferred Solution

Given the number of neighbouring Iwi and hapū that reside in this region, one cultural consideration that was of critical importance in this assessment; was the risk of accidental discharge of sewage from one Iwi rohe (region) to the whenua (land area) of another.

Technologies that reduced the risk of contamination by way of providing pre-treatment scored better from a cultural point of view. Such a solution was found in the implementation of the STEP system, supplied by Innoflow Technologies NZ Ltd (Auckland, New Zealand)

Orenco System Incorporated (OSI, Oregon, United States of America) manufacture STEP tanks (septic tank effluent pump) for wastewater applications. The tanks are assembled according to strict guidelines and testing procedures in Innoflow Technologies NZ Ltd.'s two yards in New Zealand- Auckland & Queenstown before dispatch.

The STEP tanks are injection moulded and are made of fiberglass-reinforced polyester (FRP). All FRP tanks undergo routine structural and watertight testing two times before a tank is on sold - once at OSI before export, and another at Innoflow's yards. As part of proving structural integrity and gaining ASNZ 1546.1 accreditation, representative FRP tanks undergo a course of submerged hydrostatic and vacuum testing which simulated conditions equivalent to ground burial. The FRP tank and fittings were also observed over several hours for proof of water tightness. As such, the OSI FRP tanks (4,000 and 6,000 litres) currently have ASNZ 1546.1 accreditation for structural integrity and are rated for 1.2m soil cover.



Figure 5-5. STEP tanks undergoing water tight and load testing (Source: Innoflow, 2017)

STEP systems are essentially onsite septic tanks fitted with a specialist pumping assembly which pump liquid only to a communal treatment system via an effluent sewer network. By removing the solids from the wastewater prior to transporting it, there are considerable savings in the materials and installation of the network of wastewater collection pipes. The collection pipes can be smaller (e.g. 63 mm diameter) and can be laid in shallow trenches without the requirement for minimum gradients and velocities. Inflow and infiltration can also be eliminated from the collection system meaning the treatment plant can be sized considerably smaller since it doesn't have to cope with large wet weather flows.



Figure 5-6. Schematic of Typical STEP Tank (Source: Innoflow, 2017)

Primary treatment occurs in the STEP tank, with about a 50% removal of Biochemical Oxygen Demand (BOD₅) and Total Suspended Solids (TSS) of incoming raw wastewater. Data from the outlet of STEP tanks at another established community (Jacks Point, Queenstown) showed STEP tanks produced primary treated effluent with an average BOD₅220 mg/L and TSS of 270 mg/L (data provided by Innoflow Technologies NZ Ltd).

Furthermore, in the case of the Jacks Point community, which has had an operating STEP system for 11 years (installed in 2007), there has been no incidences of breakout and the downstream communal wastewater treatment plant does not suffer from inflow and infiltration.

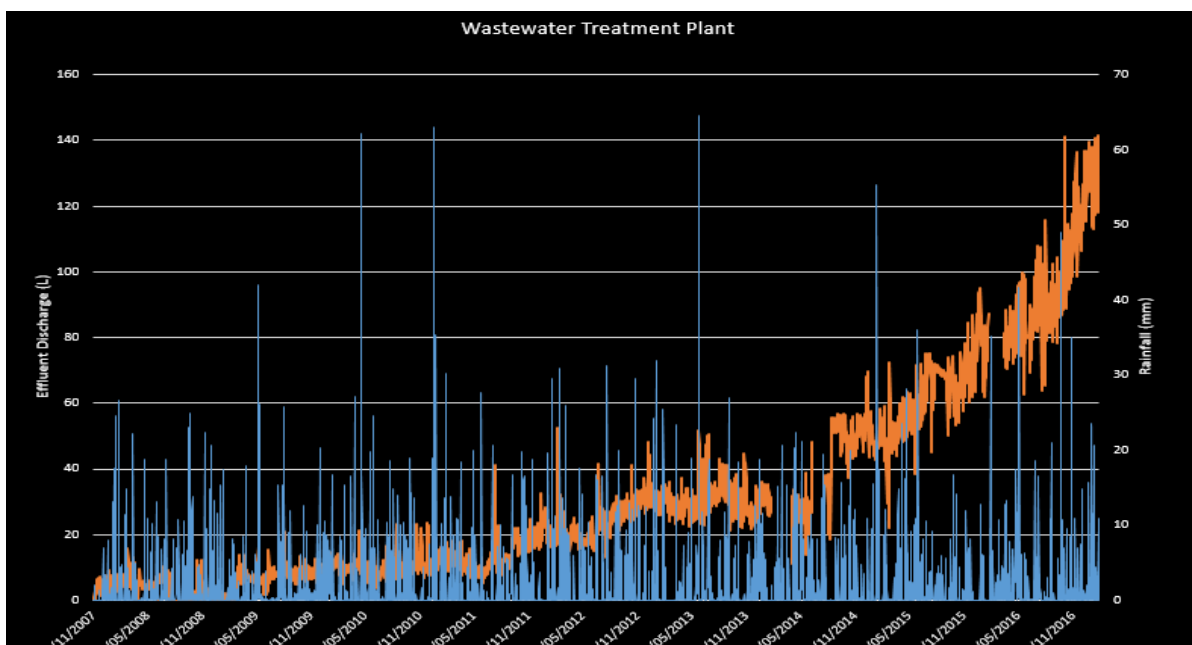


Figure 5-7. Jacks Point Subdivision Wastewater Treatment Plant Effluent Discharge (Orange) vs (Rainfall)
(Source: Innoflow, 2017)

Reduction of TSS is enhanced by the use of an outlet effluent filter in the STEP tank. Anaerobic bacteria grow on the effluent filter and further digest organic material in the septic tank. In a standard STEP tank, a Biotube Effluent Filter with a 1/8th inch (3mm) screen is utilized, but a finer 1/16th inch (1.5mm) screen is also available. After a technical review, the Iwi made a strong preference for the finer 1/16th mesh as it was considered a further step towards reducing solids and overall risk of contamination, and thereby meeting the requirement of enhanced pre-treatment.

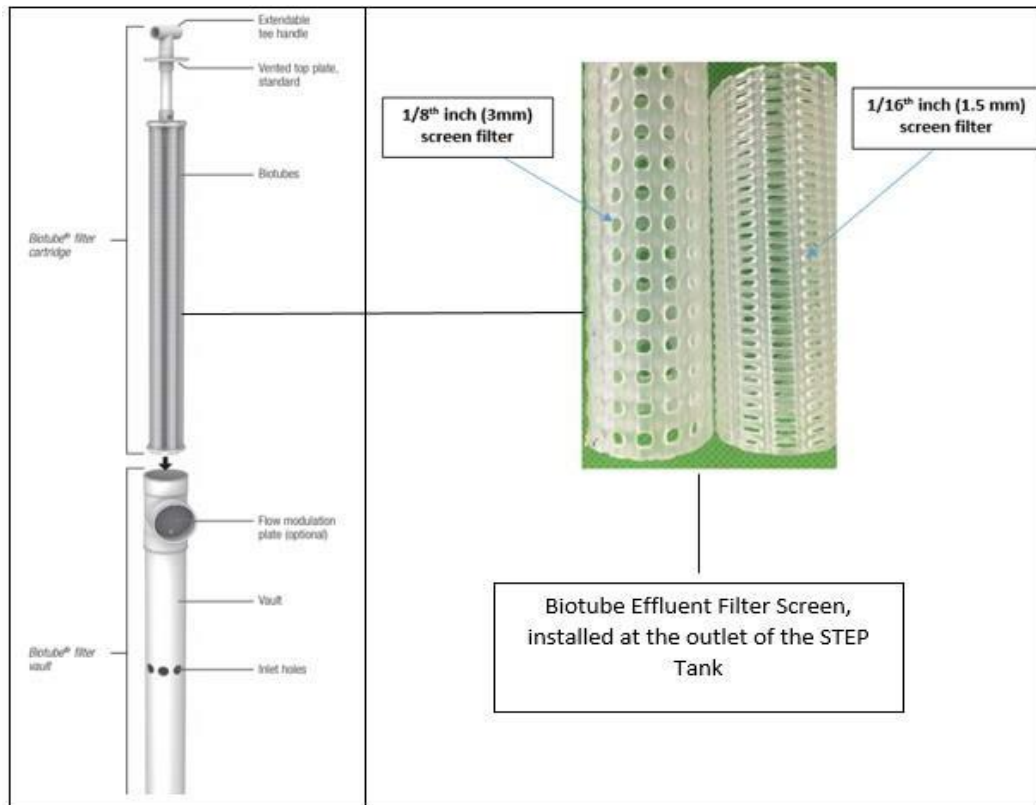


Figure 5-8. Outlet Biotube Effluent Filter and Screen Sizes (Source: Innoflow, 2017)

STEP tanks also offer other operational advantages to the community, and these are summarised below;

- Solids are retained in STEP Tank and liquid effluent only is discharged, eliminating risk of raw sewage breakout
- Since only liquid is pumped through sewer, higher heads can be overcome with STEP pumps and the requirement of intermediate sewer pumping stations and associated costs (approximately \$300,000 was saved because of this)
- Low power demand (less than 10 cents per day for a typical 3-bedroom home)
- Low operation and maintenance requirement (1 x service per 3 years)
- Low weight (300kg dry) and therefore allow for installation in established sites
- Low pump out requirement (1 pump out every 8-12 years)
- 10-year warranty on discharge pump
- >24h emergency storage volume
- Low visual and audible impact

As mentioned previously, the risk of accidental discharge and contamination of raw sewage across neighbouring Iwi land is of deep cultural offence. Solids are retained in the STEP tank and anaerobically digested by bacteria. The discharge pump installed at the outlet of the STEP tank only pumps primary treated liquid. In this way, the risk of raw sewage outbreak is eliminated.

Because only liquid is pumped through the effluent sewer, higher heads could be overcome with the standard effluent discharge pumps. The need to maintain low and high flow and flushing velocities were also removed. As such, the need for intermediary pump stations were removed and it has been indicated that the cost saving was in the order of \$300,000 (allowing for wetwell, pumps on as per Unison requirement, and crash barriers as per New Zealand Transport requirement).

The power consumption in the STEP tanks relate to the operation of the discharge pump. A 40 litre/min, 0.37kw, 0.5 horse power pump (Franklin Electric, 2011) has been specified (model number PF100512) where there is less than 40 meters of total dynamic head for the Lake Rotomā STEP tanks. For a typical three-bedroom home, with five residents producing 180 L/person/day of wastewater (total 900 L/day), the pump is expected to run between 20- 30 minutes per day. At 30 cents per kWh, the power consumption of the pump is expected to be 10 cents per day in this example. Due to the high quality of the pumps, and long expected life span, a 10-year warranty was offered on these pumps as part of the supply contract by Innoflow Technologies NZ Ltd.

Low preventative maintenance requirements were another key consideration in the assessment of the various wastewater treatment reticulation and treatment technologies that were presented to the committee. Due to the passive nature of the STEP tank, the manufacturer recommended a preventative maintenance schedule of one time per three years. This would include general maintenance activities such as cleaning filters and checking the operation of pumps, floats and alarms and checking of sludge levels. Even during the maintenance, the ability to service the system without causing any discharge of overflow of raw wastewater on land was necessary. During a service, a hoist mechanism is used to lift the pumps and filter to ensure any back wash falls back into the tank and not on the surrounding ground.

Considering Lake Rotomā is an established community, many homes and their related infrastructure are set in place. For this reason, a system that is light weight and is able to be practically and efficiently installed in existing sections was important. The (4,000 L) STEP tanks are 3.0m long x 1.8m wide x 2.0m high and are 300kg dry weight when including its internal pumping equipment. Its compact size and weight mean that STEP tanks are able to be lifted and installed with a small excavator.

Based on research (see for example Bounds, 1996), tank capacity and pump out interval are two important considerations when appropriately sizing an on-lot STEP tank.

Assuming correct operation and maintenance, it is expected that for 3 occupants, the expected STEP tank pump out frequency is once between eight to twelve years, with a confidence level of 95% (see graph below).

Additionally, there is over 24 hours of emergency storage (>750 L) between the high-level alarm float and the inlet of the STEP tank, allowing for redundancy storage in cases of power outages.

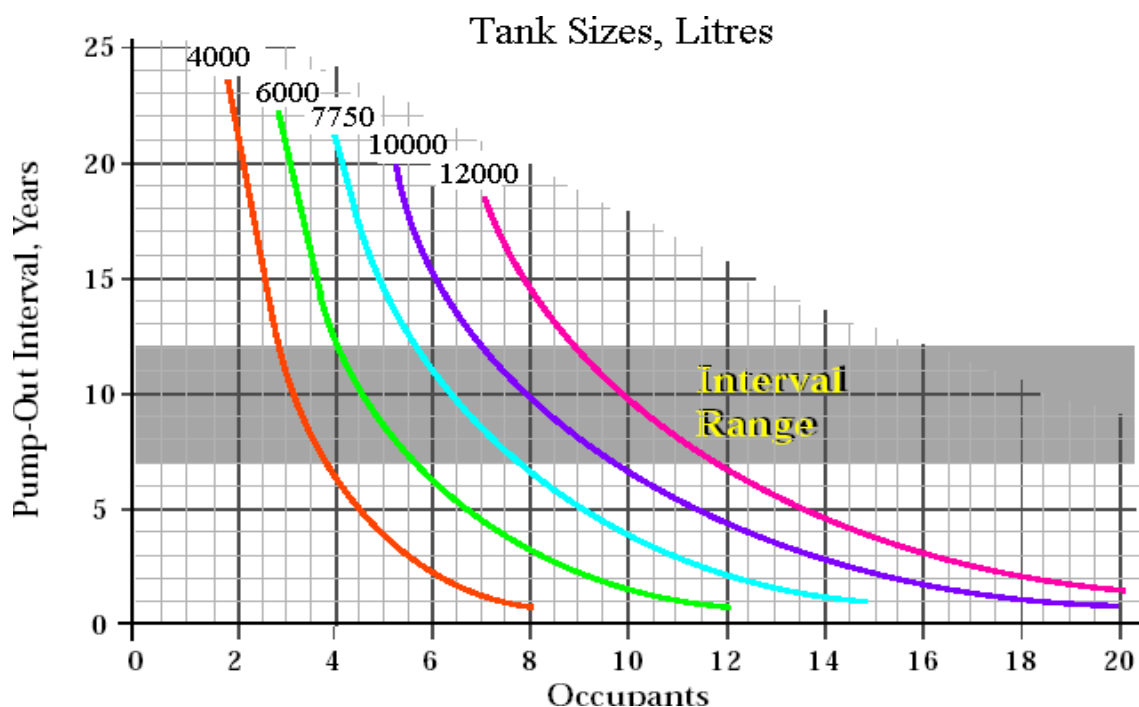


Figure 5-9. Graph Showing Expected Frequency of STEP Tank Pump Out Intervals vs Number of Occupants and Size of Tank (Source: Innoflow, 2017)

For the reasons described above, the implementation of the STEP system into the Lake Rotomā catchment was considered to be a more viable option over a Low-Pressure Grinder Pump (LPGP) system as STEP had inherent qualities in its technology that reduced its risk of wastewater break-out and contamination. As such, the steering committee concluded that STEP was evidently a system that is able to meet some of the cultural concerns for Iwi.

5.1.5 Conclusion and Future Potentials

Wastewater reticulation of the lakeside community at Lake Rotomā was a complex challenge as it required a solution that aimed to enhance lake water quality and meet the cultural requirements of the rich and deep-rooted Iwi presence in the region. As well as this, the solution had to be financially and technically viable.

Such a solution was found in STEP systems, supplied by Innoflow Technologies NZ Ltd. Inherent properties of the STEP system made this solution low risk for effluent breakout in neighbouring Iwi lands. Along with other advantageous operational properties of the system such as low power demand, low maintenance requirement, long equipment warranties and high emergency storage, the STEP system was considered a technically and culturally appropriate solution for the reticulation of the Lake Rotomā community.

The process of preparing and completing the Cultural Impact Assessment by Wairangi Whata (2016) an Iwi Representative of Ngāti Pikiao was long, arduous and detailed. Including Iwi representatives to provide cultural understandings and expertise as part of the assessment enabled Iwi to continue be kaitiaki and practice kaitiakitanga of their regions. Through this process, mana and rangatiratanga could only be enhanced whilst allowing future council-Iwi relationships flourish.

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CHAPTER 6: KAITIAKITANGA: WAI? WHENUA? OR A WASTEWATER TREATMENT PLANT?

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<https://www.ipwea.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=47c75722-4176-f506-1465-6bf4c1a86cd4>

6.1 Chapter Introduction

In a society where ‘flush and go’ toilets allow people to walk away without a second thought of where it ends up, for iwi in Rotoiti and Rotomā, who have spent many years trying to get agreement on a scheme for their community, it has been difficult to accept that the wastewater treatment industry has little in the way of solutions that show concern for cultural values and issues. Cultural consideration often seems to be a brief after thought or a checkbox in the RMA process. Right across the country, it is clearly evident that municipal wastewater treatment has a history of strong debate between local councils and iwi.

This paper considers how the provision of Māori Land for a municipal wastewater treatment facility is validated in a cultural context, reflecting on the underlying cultural values of those holding the responsibility of Kaitiaki. It focuses on the decision by owners of the Haumingi 9B 3B Māori land block in Rotoiti (Ngāti Pikiao/Ngāti Te Rangiunuora Iwi) where, after successfully obtaining a Resource Consent, a wastewater treatment facility and land disposal system will be constructed on their whenua to service the communities of Rotoiti and Rotomā.

Keywords: Wastewater, Reticulation, Iwi, Lake Rotoiti, Lake Rotomā

6.2 Cultural and Historical Background

Before colonisation, the Iwi of Lake Rotoiti and Rotomā had a long-standing uninterrupted link with both the whenua (land) and wai (water). They have been the Kaitiaki (guardians) of these regions for centuries. Central to the guardianship role held by hapū (subtribes) and iwi (tribes) has been the protection of the mauri (life force) of the people and the environment through kaitiakitanga (stewardship). It has allowed hapū and iwi to develop reciprocity and responsibility with the whenua (Miller 2006) through protecting culturally significant food gathering sites by kaitiaki. This would enable food to be available as the whenua and wai are the 'kai cupboard' for Māori. This in turn helps the physical and spiritual well-being of hapū and iwi to be maintained. If the mauri of the hapū is degraded through the contamination of the food and water sources, it will lead to the inability of hapū to manaaki (provide and care for) manuhiri (visitors). It will also create whakamā (collective embarrassment) amongst hapū that could be long lasting (Tiakiwai, Tanner, Skipper, Phillip-Barbara, & Greensill, 2004).

The land area of Lake Rotoiti and Rotomā was divided between iwi and within iwi, between hapū and within hapū to the different whānau of Ngāti Pikiao, Ngāti Tamateatutahi and Ngāti Kawiti, Ngāti Mākino, Ngāti Hinekura, Ngāti Te Rangiunuora and Ngāti Rongomai. Rivers, streams and lake areas were also divided in the same manner.



Figure 6-1. A view of Lake Rotoiti and Matawhaura Maunga (Source: Teinakore-Curtis, 2015)

6.3 The Problem

Many communities in the Bay of Plenty region, and especially the Rotorua lakes catchment, are faced with making decisions to upgrade from septic tanks to higher performing wastewater treatment systems on the basis of Regional Council's mandate requiring protection of sensitive lakes and coastal environments from sewage.

For the iwi of Eastern Rotoiti and Rotomā, who have spent many years trying to get an agreement on a scheme for their community, it has been difficult to accept that the wastewater industry has little in the way of solutions that show understanding and provision towards cultural perspectives, values and concerns.

With the recent provision of land for a wastewater treatment facility and discharge of treated effluent by the Ngāti Te Rangiunuora landowners of the Haumingi 9B 3B block, the question that emerges is, how has this been possible when considering cultural perceptions and values around wastewater and the responsibility of landowners as kaitiaki?

The experience of Eastern Rotoiti and Rotomā iwi, is that relevant cultural matters are not well known in this industry. This comment is a reflection of a lack of examples where other iwi were effective in guiding and influencing solutions, and, a lack of "proven" options that address fundamental cultural views and concerns.

Skerrett-White (2018) asserts that the construction of the plant on the Haumingi 9B 3B block and the scheme itself challenges established cultural views around the management of human waste that impact directly on whānau, the community, the whenua and the environment.

Therefore, how can the fundamental architecture and processes of a municipal wastewater treatment scheme incorporate cultural values, cultural concerns and mitigate against cultural offence? For the Iwi Collective of Eastern Rotoiti and Rotomā they expect that if cultural concerns were taken into account in the industry then there would be readily available, proven and refined options to meet cultural needs.

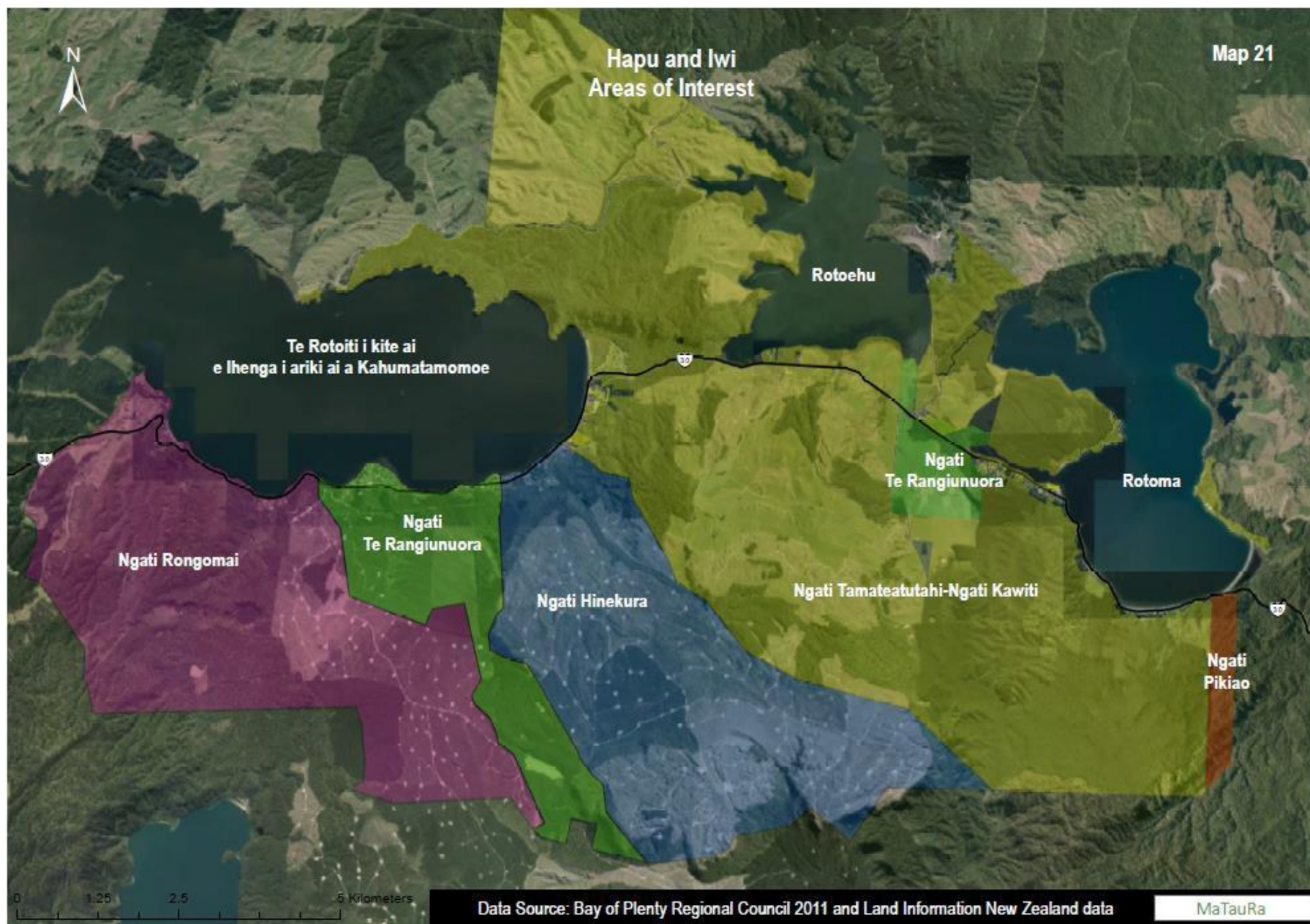


Figure 6-2. Map of Ngāti Pikiao Hapū and Iwi Areas of interest (Source: Whata, 2016).

6.4 Culturally relevant solutions

The Iwi Collective was formalised as part of the Rotoiti Rotomā Sewerage Steering Committee (RRSSC) which was established in December 2013 (Teinakore-Curtis, 2015). The steering committee was mandated to propose a preferred option for the treatment of wastewater in the Eastern Lake Rotoiti and Rotomā communities. The members consist of:

- Seven Ngāti Pikiao marae
- Ngāti Mākino
- Three groups of Māori Land Trusts
- Three ratepayer associations
- Ngāti Pikiao Environmental Society
- Rotorua Lakes Council (Deputy Mayor and water managers)
- Bay of Plenty Regional Council (councillor and staff)
- Ministry of Health (advisory role)

The Iwi Collective undertook an independent assessment of available short-listed options with the assistance of their own engineers and taking into consideration cultural values and aspirations. Along with RRSSC members, they visited wastewater treatment plants (WWTP), which were similar to some of the proposed options being considered, in Tauranga, Tūrangi and Tīrau - speaking with operators at each plant and gaining familiarity with modern WWTP processes.

The Iwi Collective also wanted to ensure that any culturally adverse effects could be avoided, mitigated or able to be effectively remedied with adequate provision in the design and construction of the WWTP and Land Disposal System (LDS), and through ongoing monitoring and contingency measures.

In addition, the Iwi Collective looked into pre-treatment solutions that would reduce the quantity of para (faeces) transported through a reticulation network.

The criteria for culturally acceptable pre-treatment options included:

1. The higher level of the pre-treatment was preferred in relation to the transference of para past iwi areas of interest (also considering failure) or to iwi areas of

interest.

2. Minimising impact from failure events - a reticulated scheme puts pipes, pump stations and other equipment that may fail in areas that are currently void of this - the risk goes from zero to non-zero and increases over time as the equipment deteriorates. Failure events could potentially impact directly on wāhi tapu (sacred sites), cultural sites of significance, and areas for Mahinga kai (traditional food gathering).
3. Requested improved systems such as Biolytix (provides sludge treatment and sludge volume reduction/may require more servicing and maintenance/has more modes of failure to consider/concern around processes and costs associated with remediation of failure events). STEP - provides minimal treatment. These pre-treatment systems were viewed as better than Low Pressure Grinder Pumps (LPGP) that is already widely used in Rotorua Lakes Catchment.
4. Natural processes from a non-submerged environment capable of sustaining a larger variety of organisms to support treatment
5. Sludge treatment – treating the sludge (not just the effluent) and reducing sludge volume was viewed beneficial
6. Non-submerged environment - large variety of organisms digesting faecal material captured in the filter layers (including worms etc.).
7. Consideration towards proven reliability, servicing, maintenance, failure modes (process as well as equipment) and full-life costs
8. Affordability and value for money (includes a comparison of pre-treatment level vs cost)

6.5 The Decision

The implementation of the STEP system into the Lake Rotomā catchment seemed to be a more viable option over an LPGP. The decision to use STEP tanks over an LPGP system as a means to reticulate domestic wastewater to a central wastewater treatment plant was made, in part, as a result of comprehensive consultation and understanding of iwi belief systems. Additional to this, STEP also proved to be a technically sound and financially viable alternative solution to LPGP. Other aspects had been considered by Iwi stakeholders in

relation to relevant cultural values in the context of a reticulated Wastewater Treatment (WWT) scheme. Firstly, consideration for cultural offence relating to the transfer of human waste from one Iwi rohe (region) to the whenua (land area) of another. This is not only in relation to conveyance to the local treatment facility but is also relevant when there are failures in the reticulation network resulting in the accidental discharge of sewage.

Secondly, it was considered that mechanisms were to have a more acceptable risk profile in relation to the potential for direct cultural impacts (including environmental impacts) from failures in the reticulation network – the effect of accidental discharge of sewage. These conveyance mechanisms (pumps and pipes) allow sewage to cross through areas of cultural significance where no infrastructure previously existed. Prior to reticulation there is a zero risk of direct contamination from a network failure – in other words, where there is no network, then there is no risk. With reticulation, there is an elevated, non-zero, risk that needs to be considered and managed effectively. Reducing the potency of the waste stream using pre-treatment is one measure that improves the risk profile. Obviously, a higher level of pre-treatment scores better from a cultural viewpoint. STEP is evidently a system that is able to meet some of the cultural concerns for Iwi.

6.6 Biolytix for Rotoiti

Although Rotomā properties will be connected through the STEP system, properties at East Rotoiti would be connected through Biolytix (or similar) wastewater pre-treatment units. The use of Biolytix units would be dependent on the outcome of a trial of this system that was initiated by the Iwi Collective. The results from the monitoring of these systems would determine if the following trial objectives are successful:

- Provide consistent treated effluent quality all year round on real life installations in the Rotoiti environment.
- Address cultural concerns regarding the transfer of faecal material across properties to a combined Rotomā/Rotoiti WWTP.
- Provide a mean time between service calls (MTBSC) that is at least equivalent to low pressure grinder pump (LPGP) installations.

- Provide an effluent quality which, when combined with LPGP effluent from Rotomā, can be effectively treated to achieve the required high levels of nitrogen and phosphorous removal.
- Achieve the above objectives without causing physical or environmental nuisance, such as odour or noise issues

The trial has been completed and the data has been reviewed by the relevant committees involved in the reticulation project.

The manufacturers of Biolytix claim that Biolytix treatment filtration process is a self-sustaining, aerobic treatment process. Naturally occurring oxygen-breathing bacteria and other larger organisms, including tiger worms, decompose sewage and organic waste. The bacteria and larger organisms are spread throughout the Biolytix filtration media that is a rapidly draining media. The discharge from Biolytix units is clearer than that from LPGP units and the remaining solids are not obvious. However, it still contains bacteria and some nutrients (S.B & S.B, 2016).

The diagram to the right shows the inside of a biopod. Biolytix relies on natural forces to treat the effluent. Riddell (2015) asserts ‘it is a form of biological trickling filter converting human waste through bugs and microorganisms in the media. Worms and other life forms break down the solids and recycle as humus.’ The only external assistance in this process is a small air blower that supplies a gentle breeze to assist the natural air movement and speed the breakdown process. ‘The Biolytix tank creates a natural process to breakdown the human solids and discharging far less solid material to the receiving environment’ (Riddell, *ibid*).



Figure 6-3. Biopod - manufactured by Biolytix NZ (Source: Riddell, 2015)

For the Iwi Collective of Lake Rotoiti, this pre-treatment solution significantly reduces the culturally offensive nature of the wastewater as faecal matter is separated and the wastewater has passed through humus layers within the Biolytix tank.

For the Iwi Collective of Lake Rotoiti, this pre-treatment solution significantly reduces the culturally offensive nature of the wastewater as faecal matter is separated and the wastewater has passed through humus layers within the Biolytix tank.

Within the context of wastewater, Section 5 of the Resource Management Act 1991 requires an overall broad judgement of whether a solution will promote sustainable management of natural and physical resources. The intention is that all resources are to be managed in a sustainable way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing, and for their health and safety, while sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations. This is to be achieved while safeguarding the life supporting capacity (mauri) of air, water, soil and ecosystems, and avoiding, remedying and mitigating any adverse effects of activities on the environment (Morgan, 2014). The enabling well-beings found in section 5(2) should be considered to be of equal importance.

6.7 The Conclusion and Future Potentials

With the completion of a Cultural Impact Assessment regarding the East Rotoiti Rotomā Sewerage Scheme, Whata (2016) refers to iwi cultural sites of significance and wāhi tapu (cemeteries) as areas that iwi are extremely passionate about preserving, protecting and conserving for iwi's future generations. A major emphasis has been placed on the wai and whenua as the 'kai cupboard' for iwi. Being kaitiaki (guardians), iwi's kaitiakitanga (guardianship) obligations and practices will be unable to be maintained if iwi's values are not respected and upheld. Therefore, the transfer of para - past iwi's areas of interest or to iwi's areas of interest is a cultural offence that will not be accepted, so too is the discharge of effluent into the waterways. The higher the pre-treatment the better as this will minimise the impact from failure events such as landslips, earthquakes, excavations and poor-quality materials. Overall, a pre-treatment scheme is required that should closely align with iwi's cultural values.

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CHAPTER 7: CONCILIATING IWI OBJECTIONS

Ko Matawhaura kai runga, Ko Koro-ki-te-Wao kai raro

Ko Ngāti Pikiao kai waenganui

The steep mountain Matawhaura above, the tide of Koro-ki-te-Wao below,
Ngāti Pikiao the people in between.

7.1 Chapter Introduction

Chapter Six detailed a process undertaken to understand a culturally viable wastewater pre-treatment solution for the community of Lake Rotoiti, including the outcomes of that process. A higher level of pre-treatment was sought, in this case a vermifiltration system (Biolytix). This was preferred in relation to the transference of para (faeces) past iwi areas of interest (also considering failure) or to iwi areas of interest. Minimising impact from failure events, which could adversely affect wāhi tapu (sacred sites), cultural sites of significance, and areas for mahinga kai (traditional food gathering) was critical for iwi members.

This chapter discusses the journey for both Ngāti Pikiao and Ngāti Te Rangiunuora with Rotorua Lakes Council (RLC) and Bay of Plenty Regional Council (BOPRC) in their ability to assert kaitiakitanga within the context of the reticulation scheme. The chapter will involve a thorough and comprehensive review of both the Rotoiti Rotomā Sewage Scheme Committee (RRSSC) and Iwi Wastewater Liaison Group (IWLG) minutes and document analysis of Government legislation since the inception of the Rotoiti Rotomā Sewage Scheme Committee in February 2014. The purpose for the scrutiny of these transactional records and legislative documents are to draw a systematic and accurate picture of what took place between iwi representatives and RLC to come to an agreed outcome on the scheme. Within these records are accounts of the ethic of kaitiakitanga at work, with not only iwi, but also RLC as a local Government authority.

7.2 The strength of Document Analysis

Yin (2014) states that ‘document review or analysis is another source of qualitative data which is applicable for case study inquiries. Document analysis as ‘asystematic procedure for reviewing or evaluating documents— both printed and electronic (computer-based and Internet-transmitted) material’. The analysis is frequently utilised due to the numerous ways it may help and boost research. It can be employed in a variety of research domains, either as the major method of data collecting or as a supplement to other approaches. Document analysis is a valuable and effective tool for most investigations since it can provide additional study data (ibid).

Within the context of this research project, ‘they can give background information and comprehensive data coverage, making them useful for contextualising one's research within their subject or field. Documents can also hold data that is no longer visible, give information that informants have forgotten, and chronicle change and progress’ (Yin, 2014, p. 33). It has the ability to indicate questions that need to be answered or situations that need to be observed, making it a useful tool for ensuring that one’s research is critical and thorough. ‘These qualitative documents can be found in various forms, such as public documents (e.g., newspapers, minutes of meetings, official reports) or private documents (personal journals and diaries, letters, e-mails)’ (Creswell & Creswell, 2018, p. 187).

7.2.1 Using Taguette as a Qualitative research tool

Taguette, an online qualitative research tool, was utilised to aid me as the researcher to tag and colour code the many words, sentences, and paragraphs found in the numerous minutes and legal documents I’d retained for this chapter's document analysis. This tool assisted in identifying and analysing the relevant thoughts and conversations of council, iwi representatives, consultants, and stakeholders involved in the project because qualitative research methods produce rich, thorough research materials that preserve people's viewpoints while also providing numerous settings for comprehending the phenomenon under investigation. It also enabled me to maintain a high level of anonymity of the participants throughout the process.

7.3 Regional and National funding available for the scheme

With the total cost of both the plant and the reticulation in Rotoiti and Rotomā approaching \$34.5 million, it was unavoidable that financial assistance be sought to mitigate the incurred expenses on the ratepayers in both communities. As a result, the RLC, BOPRC, Ministry of Health (MoH), and Ministry for the Environment (MfE) collaborated to offer subsidies for the scheme's implementation:

Reticulation Scheme Subsidies		\$
Ministry of Health (MoH)		4,460,000
BOPRC		8,619,159
Ministry for the Environment (MfE)		11,647,053
RLC		1,152,000
Total Subsidies		25,878,212

Table 3. Subsidies available for Reticulation Scheme (Source: Rotoiti Rotomā – Report on Community Consultation, April, 2017).

The issue with reticulating the Rotomā community was that the ratepayers were time-bound by installing a wastewater system on each property, or they would forfeit the MoH subsidy (Rotoiti Rotomā Sewerage Scheme Committee, 2017, March).

The Steering Committee, which represented iwi and numerous stakeholder groups, was able to reach a considerable number of compromises in order to ensure that each group's interests were acknowledged and met. By the middle of 2017, the STEP system had been approved for installation in the Rotomā community, with over 130 Rotomā properties signing up to have the Septic Tank Effluent Pre-treatment (STEP) system installed on their properties by the end of 2018. Thus, sixty-one of the properties had had their systems installed (Rotoiti Rotomā Sewerage Scheme Committee, 2018, December). The preferred solution proposed by the iwi representatives was the Vermifiltration (Biolytix) wastewater treatment system. Ian Mclean, Chair of the RRSSC, expounded on this in his report, stating:

Biolytix units (or similar) were included after considerable work was carried out by iwi. Led by RRSSC iwi committee members, the cultural implications and risks of the options still before the RRSSC were assessed. The result was incorporated into the recommendation of the RRSSC.

Important detail of the option to be filled in includes the exact siting of the treatment plant, the nature of the land application system, and the precise boundaries between parts of the scheme. Now that the key recommendation has been made, work on these can be completed. The significant difference is the use of Biolytic units for part of the scheme if a trial is successful

(I. Mclean, attached report, pers. email. comm, 11 Dec, 2014).

After long deliberations, the RRSSC committee members decided that a Biolytic trial would take place as vermifiltration was the preferred option for iwi in the Rotoiti community. The rationale behind holding the trial was to ensure that the following criteria (Wastewater Specialists, 2018, p.2) was met:

- Provide consistent treated effluent quality all year round on real life installations in the Rotoiti environment.
- Address community concerns regarding the transfer of faecal material across properties to a combined Rotomā/Rotoiti WWTP.
- Provide a mean time between service calls (MTBSC) that is at least equivalent to low pressure grinder pump (LPGP) installations.
- Provide an effluent quality which, when combined with LPGP effluent from Rotomā, can be effectively treated to achieve the required high levels of nitrogen and phosphorous removal.
- Achieve the above objectives without causing physical or environmental nuisance, such as odour or noise issues.

It was resolved that:

If the proposed trial is satisfactory, houses at Rotoiti utilise on-site Biolytic (or similar) units connected to the reticulation system and treatment plant. If the trial results are not satisfactory, then LPG pumps be used for Lake Rotoiti as well

(Rotoiti Rotomā Sewerage Scheme Committee, 2014, November).

For the committee's iwi delegates, this was a watershed event. It was not only their responsibility and commitment to the Haumingi 9B 3B whenua's landowners and/or

affiliated parties to ensure that a culturally appropriate wastewater treatment option was made available for their whenua, but also their inherent responsibilities as kaitiaki - the guardians, protectors, preservers and conservators of their natural and environmental resources (Hutchings, 2005).

7.4 Kaitiaki of the reticulation scheme

Being kaitiaki of both the Haumingi 9B 3B land block and the neighbouring regions of Ngāti Pikiao and Ngāti Te Rangiunuora affected by the reticulation scheme, they are responsible for the sustainable use and management of the environment and natural resources. This obligation is about ensuring that actions do not jeopardise the mauri, or life-sustaining capability, of the air, land, water, and biodiversity. It is about asking the question, "How will this activity affect those who come after us?" - mā tātou, ā, mō ngā uri ā muri ake nei (for us and our children after us) (Marlborough District Council, 2007).

As previously stated in Chapter four, many of the iwi representatives on the advisory committee of the Rotoiti Rotomā Sewerage Scheme were charged as kaitiaki on environmental management and cultural matters for the scheme on behalf of their iwi (Rotoiti Rotomā Sewerage Scheme Committee, 2014, August). Fundamentally so that "decisions about who should manage taonga and how they should be managed could be made in a cooperative manner that prioritises environmental concerns while also honouring Māori's role as kaitiaki while considering other stakeholders" (Donnelly, 2018).

7.5 Objectors to the scheme

Several of the Haumingi 9B 3B land block owners and beneficiaries who were not part of the advising at the Advisory Committee table did not receive the opportunity to convey their significant concerns about the construction of a wastewater treatment plant on their ancestral grounds (P. Hammond, personal communication, Feb 9, 2018). The opponents of the idea of the scheme argued that the process for constructing a plant on Haumingi 9B 3B was:

defective since the Haumingi 9B 3B trustees did not consult with "us." We were really upset with the voting process at one of the meetings we attended. Our trustees, as beneficiaries of the whenua, made a decision and persuaded landowners to make a decision (Rotoiti Rotomā Sewerage Scheme Committee, Meeting of RRSSC and Objectors, March 2017, p .3).

Eight community stakeholders from the Rotoehu community were also ‘in opposition of the scheme as they had a number of objections, for several reasons, including wanting to see pre-treatment from Rotomā before entering the Rotoehu catchment’ (Rotoiti Rotomā Sewerage Scheme Committee, 2017, March, p. 4)

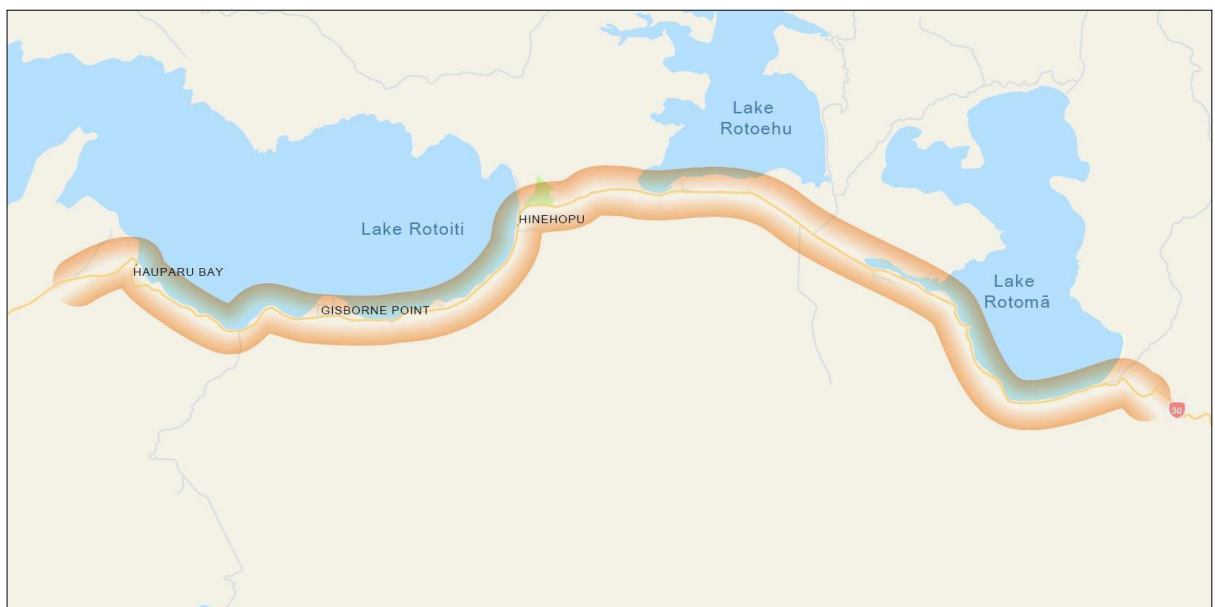


Figure 7-1. Rotoiti Rotomā Reticulation Map, (Source: Rotorua Lakes Council, 2018)

The iwi objectors, also known as the iwi submitters (both terms are used interchangeably) were concerned not just about the cultural offence of piping raw sewage to their whenua, but there were a number of other concerning matters such as including the Lake Rotoehu community, ‘who were not being reticulated as part of the project’ (RRSSC and Objectors, March 2017). An Advisory Committee stakeholder advocating for the reticulation of the Rotoehu community put a resolution forward at a RRSSC meeting (April, 2017, p. 2) stating that:

the Lake Rotoehu communities (Kennedy Bay and Otautu Bay) could potentially connect to the Rotomā Rotoiti Sewerage Scheme in the future. Rotorua Lakes Council

has scoped a number of options. A recent survey of the 90 properties comprising the communities of Kennedy and Otautu Bays, lake Rotoehu, resulted in a 74.4% support in favour of sewerage reticulation in this area. The next step is to undertake detailed consultation on options, subject to funding.

Gaining unanimous support from iwi representatives and other committee members, it was up to the Rotorua Lakes Council to decide upon a matter of course if and when this would happen. Subsequently, it was affirmed by the Advisory Committee Chair at the East Rotoiti Rotoehu Rotomā Wastewater treatment plant and land disposal Notice of Requirement (NOR) Hearing that RLC has since resolved on 7 June 2017 (subject to confirmation of the Annual Plan on 29 June 2017):

That in regard to the submissions received by residents at Kennedy and Otautu Bays, Council agrees to signal its commitment to waste water management infrastructure as a core service for the district and therefore supports a full waste water reticulation and treatment scheme serving all the communities of Lake Rotoehu including Kennedy and Otautu Bays subject to securing the required funding for such a scheme (RLC, June 2017, p. 7).

Moreover, a Rotorua Lakes Council (2021b, p. 3) community update letter was sent to the relevant communities. It stated a formal decision had been made to 'supply and install the same (Biolytix BF2) system for Rotoehu/Ngāmotu but subject to further money from the Ministry for the Environment provided to that effect.'

Because the iwi submitters were also in favour of Lake Rotoehu reticulation, they emphasised this in their formal objections, which included the health of the lakes submitted to RLC. This happened following the Resource Consent application, which was expressly for 'consents under Section 88 under the RMA Act 1991, and the NOR for a Designation under section 168A of the Act to authorise the construction, operation, and maintenance of the proposed East Rotoiti Rotoehu Rotomā Communities' Wastewater Treatment Plant and Land Disposal System' (RLC, August 2017). Some of the submitters' primary concerns were:

- Health of the lakes – also need to consider Rotoehu

- If we are doing something, we do it for everyone
- Not against having a treatment plant on our whenua, just want to get it right first time
- Health of the people - need to consider health of the land that the para is coming to
- Raw sewage from another area coming to this whenua is offensive to the people here
- Prefer Biolytix or pre-treatment, not raw sewage
- Thinking of our ancestors and what they did before us,
- we need to argue the facts and fight the decision and make sure we get it right.
- As beneficiaries and landowners to this whenua, it feels like we are being dictated to by Rotomā
- If we lose the funding, a financial loss now may not be the greatest loss
(Rotoiti Rotomā Sewerage Scheme Committee, Meeting of RRSSC and Objectors, March 2017, p. 3).

7.6 Conciliating iwi objections

Rather than submitting the foregoing items to the Environment Court, a hearing on the NOR and resource consent applications under the Resource Management Act 1991 was held to hear both the applicants' and submitters' evidence and reports. The panel who facilitated the entire Hearing acknowledged that the applicant (RLC) offered a number of restrictions (some on an augier basis) in closing submissions, including a pledge to pre-treat wastewater prior to reticulation in order to address concerns about the transfer of para from one rohe to another. This requirement was approved on an augier basis because the panel would not have been allowed to enforce it otherwise. After extensive discussion and deliberation, the panel recommended and also accepted the conditions relating to:

- Wastewater Quality - to reflect issues raised by representatives of the Trust and submitting Beneficial Owners around emerging contaminants;
- Mana Whenua and Tangata Whenua Roles - in order to ensure that appropriate recognition is given to the respective kaitiaki roles of Mana Whenua and Tangata

Whenua (noting a similar condition has been recommended for the NOR);

- Cultural Management Plans - to reflect the issues raised by representatives of the Trust and submitting Beneficial Owners, and to ensure that the cultural effects of the Project are appropriately managed; and
 - Iwi Wastewater Liaison Group - to address issues raised by Mana Whenua and avoid duplication of the respective functions of the Rotomā/Rotoiti Sewerage Steering Committee and the Rotoehu Sewerage Steering Committee, both of which the panel understand are intended to continue to represent the wider communities using the Project's wastewater services (noting a similar condition has been recommended for the NOR)
- (RLC, June 2017, p. 18 & 19).

For the iwi submitters, this was a 'win-win' situation as RLC had made a clear and unequivocal commitment to agree to 'pre-treat the wastewater prior to reticulation in order to meet cultural concerns over the transfer of para from one rohe to another' (ibid). The "Augier" requirement was broad enough to cover the undertaking, which meant that the applicant cannot later claim that there was no authority to enforce compliance with the undertaking (Environment guide, 2021).

7.7 Iwi Wastewater Liaison Group Established from the NOR Hearing

During the Resource Consent process, iwi further expressed their desire to have continual input into the Scheme. The conditions of the resource consent established a (statutory) mechanism for the iwi representatives to continue being active in liaison and monitoring of the wastewater project for the duration of the resource consent (Bradley, 2012). These precise conditions were devised in collaboration with iwi and hapū of Ngāti Pikiao and Ngāti Te Rangiunuora and submitted as suggested conditions. As a result, conditions for Consent Number RM16-0384 included the formation of an IWLG to be established within six months of granting subject resource consent.

7.7.1 Iwi Wastewater Liaison Group Purpose

The purpose of the IWLГ was to allow iwi to have continued active and effective participation in the Scheme throughout its full life. As outlined in the Terms of Reference, it would provide for:

- Discussion and exchange of information in order to create and maintain channels of communication between local authorities and iwi regarding any issues or developments arising from the operation and discharge of treated effluent to land and any effects this may have on associated waterways.
- Ongoing input into the monitoring and reporting of the performance of the Wastewater Treatment Plant, Land Disposal System, and associated reticulation network.
- Working collaboratively to develop appropriate environmental and cultural monitoring associated with the Rotoiti-Rotomā Sewerage Scheme.

(Emery, 2018, p. 1)

Another critical step was that Bay of Plenty Regional Council was to ensure effective engagement and consultation with the IWLГ whenever Resource Consent conditions were being reviewed. It was also anticipated ‘that the terms of reference for the IWLГ would include the Rotoehu Sewerage Scheme once it becomes operational’ (ibid).

The IWLГ was made up of a number of different iwi representatives across the scheme as well as the statutory authorities:

7.7.2 Membership

Bay of Plenty Regional Council	1 x Representative
Rotorua Lakes Council	1 x Representative
Iwi	
Haumingi 9B3B Trust	1 x Representative
Haumingi 9B3B Submitters	1 x Representative
Ngāti Pīkiao Iwi Trust	1 x Representative

Ngāti Rongomai Iwi Trust	1 x Representative
Ngāti Mākino Iwi Authority	1 x Representative
Ngāti Pīkiao Environmental Society	1 x Representative



Figure 7-2. Members of the Rotoiti Rotomā Sewerage Scheme Iwi Wastewater Liaison Group (IWLG). (Source: Rotorua Lakes Council, 2018).

As expressed in the Terms of Reference, the following steps would occur regarding the appointment of local authority representatives, including the process of an election after 3- years from the group’s establishment (Emery, 2018, p. 2):

- Local Authority representatives were to be appointed by the respective Councils and may be replaced as required.
- The chairperson would be appointed by a majority of the IWLG.
- The term of representation would be three years.
- The process for election of new representatives at the completion of the three-year term would be determined by the Iwi Wastewater Liaison Group within twelve months of its establishment.

7.7.3 Functions

The IWLG meetings held a number of functions. The meetings held were to provide a forum for (Emery, 2018, p.3):

- Reporting on the operations, including progress and notice of any changes to work

schedules and/or general compliance with resource consents.

- Explaining technical matters to the members of the IWLG.
- Collating comments to be provided to the consent holder on any of the management plans set out in the conditions of the resource consent.
- Reporting on and discussing environmental and cultural issues arising from the operations of the WWTP, LDS and associated reticulation network.
- Collating comments to be provided on any of the management plans set out in the conditions of the resource consent within the required timeframe.
- Discussing compliance/non-compliance with conditions of consent and for the consent holder to explain actions taken or to be taken to comply with conditions.
- Providing input into environmental and cultural monitoring.

7.8 Cultural Impacts Team established from the CIA

The Cultural Impacts Team was established in 2017 following the results of the Cultural Impact Assessment completed by Whata (2016). The rationale for this was that, while the RRSSC had fair representation of iwi and hapū members (also known as the iwi collective) across the two communities, the consultation process had been difficult for iwi and hapū at times. Based on the restricted options available, the iwi collective made a concerted effort to research and choose a culturally acceptable option. The iwi collective was led by two highly qualified iwi engineers of Ngāti Pikiao descent, who were not only crucial in the Collective's decision-making process, but also able to withstand the technical expertise and queries posed by the council engineering team of consultants.

7.8.1 Cultural Impacts Team Background

The background for the need to form a Cultural Impacts Team (CIT) was explained in Whata's Assessment on cultural impacts (p. 7):

The Collective requires assurance that, where practicable, all aspects of the scheme align with cultural values so it is essential that tangata whenua are embedded in all activities throughout the full lifecycle of the Scheme. This includes planning, design,

implementation, management and critical future decision making.

Whata went on to say that the iwi collective supported the findings, in that the Assessment:

captures many of the relevant cultural issues and potential impacts surrounding the proposed scheme. We are equally optimistic with RLC's consideration of the cultural impacts, both potential and expected, and their willingness to work with iwi for a mutually beneficial outcome (ibid).

The Ngāti Pikiao Environmental Society Incorporated and Rotorua Lakes Council produced a legally binding agreement in October 2017 to enable the development of the CIT, based on some of the findings of the two Cultural Impact Assessments, and the requirements of the Resource Consent. This indicated the council's willingness to accept responsibility for the scheme's current and future cultural implications, demonstrating their kaitiakitanga ethic. The main purpose of the agreement for forming the CIT is mentioned below.

7.8.2 Cultural Impacts Team's Primary Objective

Enable the scheme implementation through the appropriate addressing of cultural matters/issues of importance to Iwi and to attain all scheduled CI deliverables within a transparent framework to enable the RLC to appropriately meet its obligations in the use, development and protection of natural and physical resources in accordance with the principles of the Treaty of Waitangi.

Ngāti Pikiao Environmental Society Incorporated and Rotorua Lakes Council (2017, p. 19)

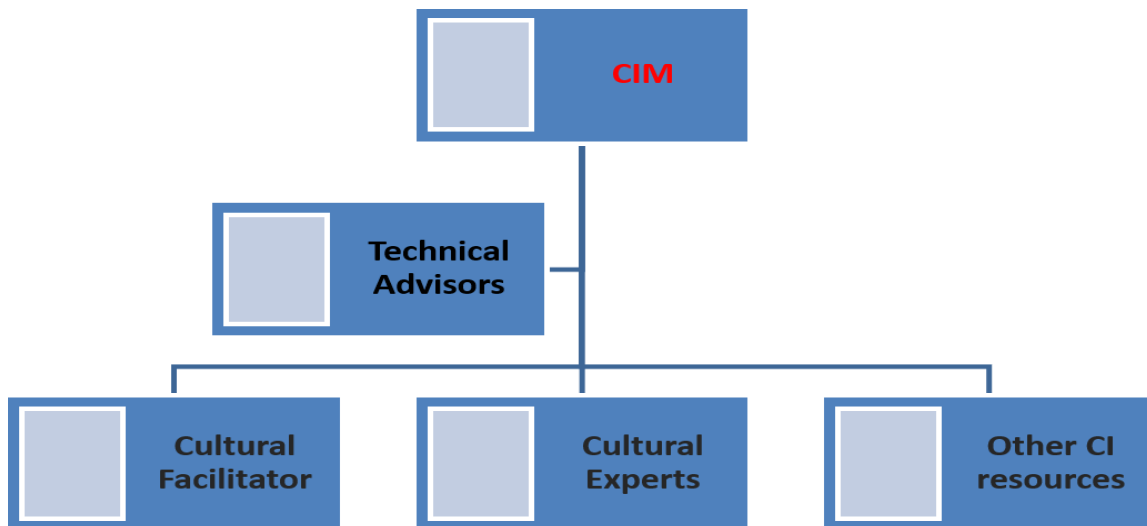


Figure 7-3. The Cultural Impact Team (Objectives and Functions) (Source: Ngāti Pikiao Environmental Society Incorporated and Rotorua Lakes Council Agreement, 2017)

7.8.3 Cultural Impacts Manager

The Cultural Impacts Manager's role was to be a part of RLC's project team for the Scheme, managing all areas of the Scheme's cultural impacts such as (ibid, p. 8):

- Being the main point of contact for RLC and project partners when it comes to cultural implications of the Scheme.
- Manages the logistical and transactional aspects of the scope of services provided by the Technical Advisors (see to paragraph 5.3), cultural experts, and any other outside expertise engaged for purposes directly related to the management of the Scheme's cultural impacts.
- Oversees the logistical and transactional aspects of the scope of services provided by two Cultural Facilitators who are responsible for the thorough cultural interaction and investigations for the WWTP and the reticulation network sections of the Scheme.

Because the position necessitated a high level of project management, iwi and council engagement, and relationship management, the right person had to be sought. Throughout the project, the CI Manager did an outstanding job, and the project was a huge success. The Scheme's Cultural Facilitator, who had extensive experience in environmental studies and resource management, worked alongside her.

7.8.4 Cultural Impacts Team Members

Other members included:

- Two experienced Iwi Engineers
- One other Cultural Facilitator for the WWTP
- Two site Cultural Monitors
- Cultural Experts
- PhD Student – Sustainability research

Each member of the CIT has been crucial in the scheme's and WWTP's implementation, as well as the ongoing monitoring of cultural and environmental effects. They have not only asserted their kaitiaki authority over their ancestral lands and waterways throughout the project, but they have also applied mātauranga and tikanga Māori to all elements of it.

Scenarios involving the CIT expertise with the council on the WWTP were:

- That RLC make accessible to CIT iwi engineers for evaluation the extent of the catchments and quantity/quality/flows of wastewater covered by the WWTP, as submitted by RLC to the WWTP engineer design consultants.
- The WWTP's design allows for the construction of new homes within existing settlements. Outside of these settlements, clarification of what provisions have been made for potential/planned future growth on the many Trust lands is asked.
- Hose pipe connection to allow for the irrigation of projected gardens using WWTP effluent water is to be discussed in detail.
- A cost estimate to be provided to the CIT iwi engineers once the WWTP engineer design consultants have completed the treatment plant design.
- Plans and drawings should be made available to CIT technical engineer so he may work with WWTP engineer design consultants to generate a visual of the plant, including its size and location on the entire site.
- Iwi engineer to work with the WWTP engineer design consultants on the treatment plant and footprint visualization in three dimensions, including road maps the design process is to take into account the CIA's findings.

(Emery, 2017, p. 1).

7.9 Heads of Agreement – Haumingi 9B 3B Ahu Whenua Trust and Rotorua Lakes Council

The next step was for the Ahu Whenua Trust to work with the Council to draft a Heads of Agreement (HoA) after the iwi objectors (specific landowners and beneficiaries of the Haumingi 9B 3B land block) had their concerns properly heard and addressed during and after the Resource Consent Hearing.

It served as a timely reminder to everyone participating in the project, including council employees and mana whenua, that the environmental impact was the most important concern for landowners when it came to protecting the 'mauri' of the land and waterways (Skerrett – White & Skerrett, 2015). Modern tikanga/processes and procedures that will allow landowners to be entirely satisfied with the proposed scheme had to be identified in order to fulfil their kaitiakitanga responsibilities (ibid).

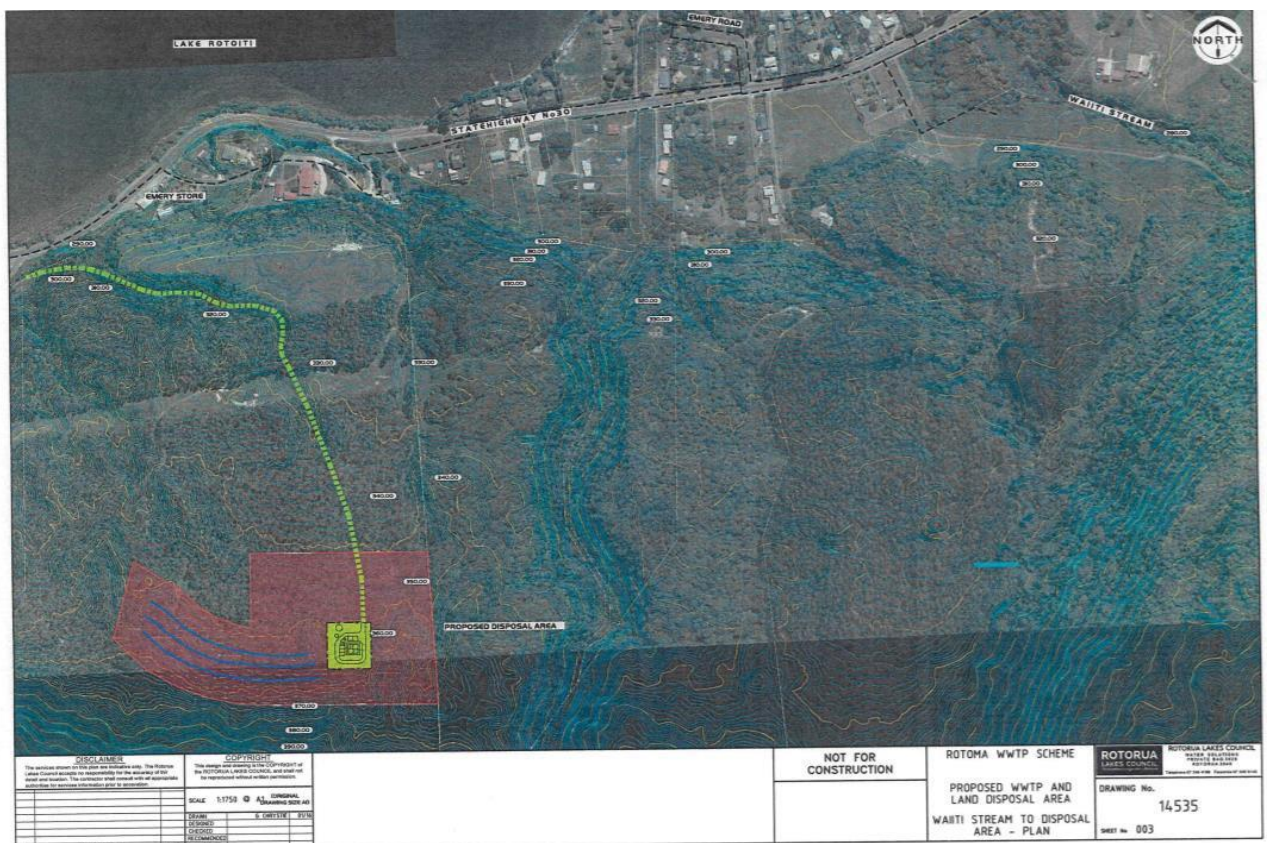


Figure 7-4. Haumingi 9B 3B WWTP Plant and Land Disposal Area. (Source: Haumingi 9B 3B Ahu Whenua Trust and Rotorua Lakes Council, 2017).

7.9.1 Creating a 50-year Easement

The HoA was approved in principle by trustees of the Ahu Whenua Trust and representatives of the council (Haumingi 9B 3B Ahu Whenua Trust and Rotorua Lakes Council, 2017, pgs. 1&2), to:

- (a) the Council acquiring the necessary easements over the Owner's Land to enable the Council to install and operate a Wastewater Plant on the Owner's Land with the terms and conditions of such easements to be negotiated between the parties; and
- (b) Subject to various conditions to be satisfied, the Exchange Land to be vested in the Owner under section 106 of the Public Works Act 1981 in exchange for the grant of the easements.

With regard to an easement, Land Information New Zealand (LINZ) website (n.d.) states:

- An easement is a right agreed between a landowner and another party to use land for a particular purpose, and can be registered against the property's title.
- The land subject to the easement is the 'burdened land' (previously known as the 'servient tenement'). An easement may be:
 - for the benefit of the owner of other land, when it is said to be 'appurtenant to' or attached to the 'benefited land' (previously known as the 'dominant tenement') or
 - an easement 'in gross', meaning it is for the benefit of a specific person or corporation.

As a result, on behalf of the beneficiaries, the trustees invoked their right to hold an easement over the land for the specific purpose of serving the communities with the WWTP. The Trust was awarded compensation under section 106 of the Public Works Act 1981, which would help the Trust achieve its aspiration of future papakainga housing (W. Emery, personal communication, Nov 05, 2017).

The easement was 'locked in' for 50 years based on the terms and conditions in Schedule C of the HoA under 'Easements' (Haumingi 9B 3B Ahu Whenua Trust and Rotorua Lakes Council, 2017)

7.9.2 Function of the Ahu Whenua Trust under the Agreement

Following the conclusion of the Resource Consent Hearing, the Ahu Whenua Trust asserted kaitiakitanga over the territory in accordance with the terms of the agreement. This was accomplished through the Trust and Council's subsequent meetings, which required Council to consider:

- The location and proportions of the WWTP gated area, as well as the LDS, should be modified to reflect the most recent designs
- The Trust has requested that the security fencing surrounding the WWTP be landscaped in order to diminish the visual impact
- Services to be provided, as well as the usage of the access road, will be agreed and confirmed
- The SH30 rest area will serve as the starting point for the access road
- The urupā's access road/track is being designed and will be depicted on the designs
- The Trust may build dwellings on the property between the WWTP leased area and the urupā; access to the WWTP access road, water, and power will be negotiated and included in the lease agreement. For the road and services, easements will be required.
- The Trust and RLC will meet to discuss the WWTP road and urupā access requirements (Emery, 2017, p. 1).

With the HoA in place, this project, in which the Ahu Whenua Trust and Council were involved, highlighted to iwi the opportunities around providing their land to be part of the solution. This included returning good value for their land, having access to a potentially valuable resource of water and nutrients, being able to better direct the future of their communities and developing stronger bonds and more effective and constructive relationships within the wider community and with local and regional authorities. This is, in essence, a fundamental expression of the ethic of kaitiakitanga.

7.10 Chapter Summary

This chapter discussed the journey for both Ngāti Pikiao and Ngāti Te Rangiunuora with Rotorua Lakes Council (RLC) and Bay of Plenty Regional Council (BOPRC) in their ability to assert kaitiakitanga within the context of the reticulation scheme. It involved a thorough and comprehensive review of both the Rotoiti Rotomā Sewage Scheme Committee (RRSSC) and Iwi Wastewater Liaison Group (IWLG) minutes since the inception of the Rotoiti Rotomā Sewage Scheme Committee in February 2014. The purpose for the scrutiny of these transactional records was to draw a systematic and accurate picture of what took place between iwi representatives and RLC to come to an agreed outcome on the scheme. Within these records were accounts of the ethic of kaitiakitanga at work, with not only iwi, but RLC and BOPRC staff members.

Chapter Eight seeks to evaluate RLC's commitment to resolving Ngāti Pikiao and Ngāti Te Rangiunuora's cultural concerns through an assessment of their values and principles as an essential component of performing kaitiakitanga. To begin, the researcher looks to ascertain whether RLC as a local government authority is guided by values and principles. These will be informed by the statutory acknowledgments from the Resource Management Act 1991 and Local Government Act 2002 and their successive reforms. This can also occur through case studies within Te Arawa rohe that involve iwi and council relationships based on their particular values and principles in environmental and freshwater management. Secondly, is to discover that if indeed council can successfully engage with iwi premised on their values and principles, that council can move toward establishing a Kaitiakitanga – Active protection framework in co-management and co-planning with iwi on wastewater management.

CHAPTER 8: TOWARDS A KAITIAKITANGA FRAMEWORK

**Kia kaha ra tātau te whai hua hei whakakaha te whanaungatanga
o wā tātau iwi ki ngā kaunihera o te motu**

Today we can honour the past, empower the present, and strengthen our future...

We believe in “Tātau, Tātau - We Together”

(Tahana, 2015)

8.1 Chapter Introduction

Chapter Seven discussed the journey for both Ngāti Pikiao and Ngāti Te Rangiunuora with Rotorua Lakes Council (RLC) and Bay of Plenty Regional Council (BOPRC) in their ability to assert kaitiakitanga within the context of the reticulation scheme. It involved a thorough and comprehensive review of both the Rotoiti Rotomā Sewage Scheme Committee (RRSSC) and Iwi Wastewater Liaison Group (IWLG) minutes since the inception of the Rotoiti Rotomā Sewage Scheme Committee in February 2014. The purpose for the scrutiny of these transactional records was to draw a systematic and accurate picture of what took place between iwi representatives and RLC to come to an agreed outcome on the scheme. Within these records were accounts of the ethic of kaitiakitanga at work, with not only iwi, but RLC and BOPRC staff members.

This chapter seeks to evaluate RLC's commitment to resolving Ngāti Pikiao and Ngāti Te Rangiunuora's cultural concerns through an assessment of their values and principles as an essential component of performing kaitiakitanga. To begin, the researcher looks to ascertain whether RLC as a local government authority is guided by values and principles. These will be informed by the statutory acknowledgments from the Resource Management Act 1991 and Local Government Act 2002 and their successive reforms. This can also occur through three case studies within Te Arawa rohe that involve iwi and council relationships based on their particular values and principles in environmental and freshwater management. Secondly, is to discover that if indeed council can successfully engage with iwi premised on their values and principles, that council can move toward

establishing a Kaitiakitanga – Active protection framework in co-management and co-planning with iwi on wastewater management.

8.2 Outline of Chapter Eight regarding Statutory Acknowledgements and Case Studies

There are many direct quotes that have been compiled and used to support the thinking behind the development of a Council – Iwi kaitiakitanga framework of Co-management and Co-planning on wastewater, due to the nature of this chapter, where Statutory Acknowledgements have been detailed in length alongside council – iwi case studies – especially principles and values of each particular case. Furthermore, the researcher might study what is previously known in order to create a framework that will be tested. Throughout the text, direct quotes and statements of fewer than 40 words have been appropriately referenced.

8.3 Rotorua Lakes Council Values and Principles – Towards a Kaitiakitanga Framework

With RLC's commitment to addressing the cultural concerns for Ngāti Pikiao and Ngāti Te Rangiunuora about the transfer of para from one rohe to another, by pre-treating the wastewater prior to reticulation; an examination of their values and principles needs to be conducted as a necessary part of kaitiakitanga to see if these are expressed in the council's everyday environmental management matters. First, we must seek to understand what these values and principles are within this context, and second, to discern how they are conveyed in their engagement with iwi in order for council and iwi to move toward establishing a Kaitiakitanga active protection framework in co-management and co-planning with iwi on wastewater management.

When the Local Government Act 2002 came into force, it clarified the relationship between local authorities and Māori under the Treaty and imposed specific requirements on local authorities in respect of how they incorporate Māori in decision-making (Local Councils, 2011). Further to this, Government reviewed sections of the RMA to which is now enacted

under the Resource Management Amendment Act 2005 (Ministry for the Environment, 2021). The 2005 Amendment Act clarifies the duties for local governments to incorporate iwi in their resource management planning and policy making (Te Puni Kōkiri, 2006).

The objective for these modifications was to better reflect the interests of iwi in council plans and policies (ibid). The Government also noted that, in order for these and existing RMA laws to be effectively enforced, Māori capacity and capability must be built, and the Government must provide advice on Council-Māori engagement (Bargh, 2016). The devolvement of these Acts by Government to the local Government authorities needed to ensure that ‘local and regional government have clear statutory guidelines outlining their treaty obligations, and how these obligations are to be met when making decisions about land and resources’ (Matunga, 1989, p. 9).

Moreover, according to Matunga ‘[t]he Crown can’t divest itself of Treaty obligations or confer an inconsistent jurisdiction on others. The Crown should provide for its treaty promises when vesting responsibilities in local authorities’ (ibid, p. 9). As those statutory regimes may offer Māori a role in resource management, but they may not go far enough to give Māori rangatiratanga over resources the effect stipulated by Article Two of the Treaty (Matunga, 2000). Therefore, within the context of the above discussion regarding the legislation and reforms, Councils have statutory responsibilities to engage with Māori and to recognise the Treaty of Waitangi (Local Government New Zealand, 2007a).

8.3.1 Resource Management Act 1991

The RMA promotes the sustainable management of natural and physical resources in a way that enables communities to provide for their environmental, social, economic and cultural well-being. The RMA contains specific provisions for consulting and working with tangata whenua. Local authorities are required to consult with iwi authorities when preparing or changing regional policy statements, regional plans and district plans, and engage tangata whenua in other resource management decisions in order to fulfil their Treaty responsibilities (Local Government New Zealand, 2007a, p. 4; NZ Productivity Commission, 2013).

As stated previously in Chapter Two regarding the RMA, provision and recognition were made for:

- Section 6(e) - Māori and their culture and traditions in respect to their ancestral lands, rivers, locations, wāhi tapu, and other taonga;
- Other topics under Section 7 of the RMA demand that all individuals exercising functions and authorities under it, in relation to regulating the use, development, and protection of natural and physical resources, pay special attention to:
 - Section 7(a) kaitiakitanga;
 - (aa) the ethic of stewardship

Wāhi tapu is not clearly defined in the RMA and was a Section 7 subject until 2003. The introduction of this provision in Section 6 enhances it for Māori, because according to Harmsworth (2005, p. 29), the 'RMA's (1991) definition of historical heritage includes sites of significance to Māori, including wāhi tapu. The RMA's use and meaning of the term kaitiakitanga does not sufficiently define this environmental concept, and the relationship between regional and district councils is unclear'. Therefore, it has been argued that in order for kaitiakitanga to be effective, councils must have a relationship with this process (Beverley, 1998; Love, 2003). For most councils, they define kaitiakitanga in their council policy statements (Harmsworth, 2005). This has been clearly expressed in BOPRC's Regional Natural Resources Plan (2017) (formerly known as the Regional Water and Land Plan 2008) which states in Policy 8 and 9 (p. 7):

To recognise that kaitiakitanga involves both:

- (a) The use and development of land, water and geothermal resources by tangata whenua, and
- (b) The protection of taonga, waahi tapu, significant sites, traditional use sites, and other natural and physical resources of importance to tangata whenua.

To have particular regard to kaitiakitanga, including customary use and management practices relating to water, land and geothermal resources, including mahinga kai whenua and mahinga kai awa, waahi tapu and taonga rāanga, in accordance with tikanga Māori, and the mana and responsibilities of Ngā Tāngata Pūkenga, where this is consistent with the Act (RMA).

The key to success in exercising the ethic of kaitiakitanga will be the amount of participation between the local government authorities and iwi and hapū, the interaction between stakeholders and iwi and hapū, and the level of awareness of cultural concerns and indigenous viewpoints (Harmsworth, 2005). This concerns how they work through the environmental management issues to lead to successful outcomes for Māori and all communities as they still seem to be a major problem in New Zealand (ibid). For iwi, the barriers to involvement and participation are for the most part, the systems and processes; sometimes it is a lack of understanding between both parties; and at other times, it's clear that it's a matter of resources, capacity, and capability.

8.3.2 Local Government Act 2002

The Local Government Act 2002 recognises and respects the Crown's obligations under the Treaty of Waitangi by imposing some specific requirements on councils (Local Councils, 2011). These include councils providing for Māori participation in decision-making, and mandating councils to develop community outcomes (including Māori outcomes) and monitor progress toward the achievement of these (Jefferies & Kennedy, 2009b).

The Royal Commission on Auckland Governance (Human Rights Commission, 2010) states that the Local Government Act 2002 specifically requires local authorities to:

- ensure they provide opportunities for Māori to contribute to decision-making processes (section 14(1)(d))
- establish and maintain processes to provide opportunities for Māori to contribute to decision-making processes (section 81(1)(a))
- consider ways in which they can foster the development of Māori capacity to contribute to decision-making processes (section 81(1)(b))
- provide relevant information to Māori (section 81(1)(c)) where an option involves a significant decision in relation to land or a body of water, take into account the relationship of Māori and their culture and traditions with their ancestral land, water, sites, wāhi tapu, valued flora and fauna, and other taonga (section 77(1)(c)) (p. 20).

Māori have sought meaningful cooperation with local government as they have long acknowledged the significance they hold as resource managers (Hayward, 2011). According to Bargh (2018), beyond council taking into account Māori's "culture and traditions with their ancestral land, water, places, wāhi tapu (sacred sites), prized flora and fauna, and other taonga," they must have robust systems in place for consultation with Māori.

New Zealand has made a special commitment to Māori participation in council decision-making. This commitment extends beyond the legal provisions of the Local Government Act 2002 to include deeper historical, cultural, and constitutional understandings derived from the Treaty of Waitangi (Local Councils, 2011).

Local Government New Zealand (LGNZ) had reviewed the original Local Government Act 1974 to recommend a key change to the Act 'to make local decisions and undertake activities in order to promote the social, economic, cultural and environmental wellbeing of communities, now and for the future. This would then increase the involvement of the community, including iwi which in turn would help fulfil their aspirations' (Harmsworth, 2005,p. 31).

The three main goals that LGNZ considered should be prioritised for the new legislation were:

- Establish an enabling framework;
- clarify the relationship between local government and the Treaty;
- and establish an effective cooperation between local government and central government.

Moreover, LGNZ suggested that local governments adopt detailed policies to improve partnership with communities and tangata whenua. A Treaty approach was suggested to increase engagement with hapū and iwi by providing commitment, explicit instruction, and a reporting/audit role. The new legislation would promote coordination among local government authorities (such as the local district council), the central government, hapū and iwi.

As a result of the reforms, it is clear that the Crown acknowledges Māori environmental

values and has made major arrangements for Māori participation in the management of New Zealand's natural and environmental resources (Harmsworth, 2005).

8.3.3 Local Government and their Statutory Obligations

There are two sorts of local government authorities in New Zealand: regional councils and territorial authorities (city / district councils) (Cheyne & Tawhai, 2007; Tawhai, 2010). Each council has its own objectives and engagement approach to 'enable' Māori, a community of interest, to incorporate cultural viewpoints, including as cultural issues and values, into planning and policy. This is supported by Hayward (2011, p. 197) who states that:

Māori are a 'community of interest' by virtue of the guarantees the Crown made to Māori in the Treaty of Waitangi in 1840. These guarantees distinguish Māori from other communities of interest in local politics and establish a permanent obligation on the Crown to ensure that Māori communities have representation in local government . . . the Treaty established Māori as a community of interest in New Zealand with rights over and above those rights enjoyed by all British subjects (or New Zealand citizens in a contemporary context.) . . . It is appropriate, therefore, that electoral boundaries recognize Māori as a community of interest, and ensure representation for those communities in local government.

Māori, as treaty partners play a critical role ensuring environmental well-being; as a socially, economically, and politically marginalised community they should be included in local government policymaking processes, regardless of how culturally sensitive the process is. According to Harmsworth (2005, p. 7), 'Legislation governing resource management has largely fuelled a desire for participation by Māori. Therefore, Council methods and models must encourage all community and stakeholder participation while without appearing to give special treatment to any one group.'

For Rotorua Lakes Council (RLC), it stated its statutory responsibility by 'having a long-standing tradition of working closely with Te Arawa and its hapū as the Confederated Iwi of Rotorua district' (Rotorua Lakes Council, 2015b). A variety of mechanisms have been developed within the Council to facilitate district consultation, involvement, and communication, as well as to include iwi in council decision-making processes. These

mechanisms offer a variety of services linked to Te Arawa iwi in order for them to engage in these critical processes. According to Rotorua Lakes Council (2015a, p. 4), 'The Local Government Act (LGA) incorporates multiple allusions to Māori and the Treaty of Waitangi (Section 4 Part 1), Parts 2, 6, and Schedules 5 and 11', furthermore, a strong emphasis has been placed on the Resource Management Act (RMA) of 1991 and the Local Government Act of 2002 both requiring the council to consult with and involve hapū and iwi in decision-making processes.

As a local government authority, RLC also has a statutory requirement to provide essential/core services to the various communities other than iwi within the Rotorua district. These core services include the development and replacement of infrastructure assets such as wastewater systems, piping, council buildings, parks and recreation areas and the like. Thus, 'when making decisions under the Local Government Act 2002 (LGA02), Councils must consider a variety of factors, including the perspectives of residents affected by the decision, the costs and benefits of the proposed action, the extent of Council's resources, the interests of current and future communities, prudent stewardship, and the efficient and effective use of resources' (Rotorua Lakes Council Strategy, Policy & Finance Committee, 2020a, July p. 10).

The next section of this chapter sets out three different Case Studies where Rotorua Lakes Council has developed joint management, partnership, and Steering Committees with Te Arawa iwi based on a shared vision and understanding to help find solutions to ongoing wastewater and water issues in the Rotorua Lakes District. Council and iwi values were examined in each case as the Māori dimension must be taken into account when formulating resource management decisions and practises. From these case studies, we will explore whether council and iwi can move toward a Kaitiakitanga – Active protection framework through effective co-planning and co-management of wastewater management matters.

8.3.4 Case Study One - Local Government and the Te Arawa Partnership Model

In 1993, the Rotorua District Council created a Te Arawa Standing Committee to provide Te Arawa input on local concerns. However, after many years of Te Arawa concerns about the efficacy of the Te Arawa Standing Committee, an Environment Court judgement in 2012 exposed severe inadequacies in the Council - Te Arawa relationship, prompting the Council

to reconsider arrangements (Rotorua Lakes, n.d.; Tahana, 2015). The Council therefore began to consider other methods of meeting its duties under the Local Government Act of 2002.

A Te Arawa Working Group was engaged by the Council to propose alternatives for consideration. ‘Māori wards were discussed again in October 2014 (as part of a review of representation arrangements, the Rotorua District Council reviewed the topic of Māori wards in 2011 and opted against implementing them) but the Council decided against them, largely because the Te Arawa Partnership model was being canvassed on at the time’ (Bargh, 2016, p.151). In December 2014, the Council accepted the Te Arawa Partnership Board in principle at a meeting, and an agreement was finally signed and the Partnership Board was elected in December 2015 (Rotorua Lakes, n.d).

8.3.5 Value of the Te Arawa Partnership Model

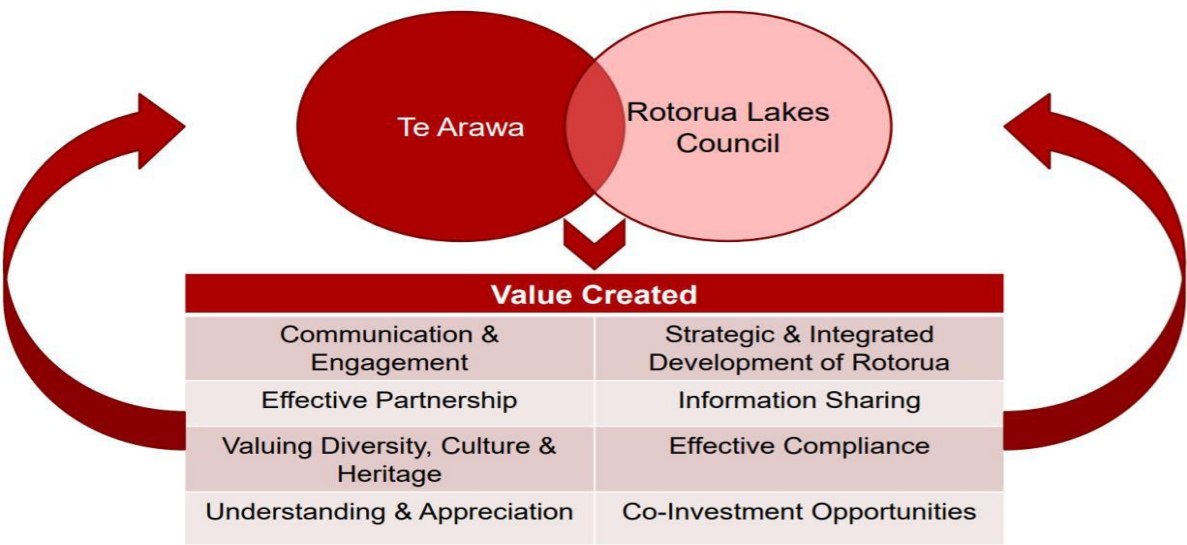


Figure 8-1. Value of the Partnership (Source: Tahana, 2015).

According to Tahana (2015, p. 21), from the detail in figure 8-1, for the value of the partnership to be sustainable, there would need to be ‘full engagement between RLC and Te Arawa, with the collective views of Te Arawa being part of RLC’s decision making processes. Input into policy and planning would occur across all areas involving whenua and wai, including strategic and integrated planning to take advantage of existing and future economic opportunities.’ The expectations of the partnership would support the monitoring of RLC’s delivery of obligations to Māori, and moreover, would keep both RLC and Te

Arawa informed of progress (Te Tatau o Te Arawa & Rotorua Lakes Council, 2015). Within the spirit of the partnership it ‘would provide an opportunity for Te Arawa and the council to embark on a genuine and enduring partnership. It would also give effect to the council's legislative responsibilities to include Māori in decision-making.’ (Rotorua Daily Post, 2014).

The Te Arawa Partnership Board elected 14 members: one from each of the following iwi and land trusts:

- one seat for koeke (an elder);
- six seats for Te Arawa hapū;
- two seats for Ngāti Whakaue;
- two seats to represent Māori Land Trust and Incorporations in the area;
- one seat for a pan-Te Arawa entity;
- and two seats for rangatahi (youth).

(Rotorua Lakes Council, 2015a)

Formally named ‘Te Tatau o Te Arawa Charitable Trust ("Te Tatau") (Te Tatau o Te Arawa & Rotorua Lakes Council, 2015), it was represented under the council Partnership Agreement by the Te Arawa Partnership Board. The Board was to act in the interests of Te Arawa whānui and all members of Te Tatau (including, but not limited to, Te Pūkenga Koeke o Te Arawa, Te Arawa Marae, Te Arawa hapū and iwi; Pan-Te Arawa entities; Māori Land Trusts and Incorporations and Mātā waka groups, and individual members of Te Arawa) within the Rotorua district’ (Rotorua Lakes Council, 2018a). The Partnership Agreement comprised the following goals:

- to provide a framework for the parties to work together towards improving Rotorua;
- to provide mechanisms and resources that assist Te Arawa to participate in Council policy, planning and other decision-making processes
- to facilitate the sharing of information to build better understanding that enhance collaboration and strategic thinking about Rotorua's future
- to assist Council with its decision-making and other processes; exercise of functions; and exercise of powers by meeting five objectives

(Te Tatau o Te Arawa & Rotorua Lakes Council, 2015, p .4)

Te Tatau o Te Arawa embedded its five key objectives into the Agreement on how they were going to represent the iwi Māori within the Te Arawa rohe:

- Strengthening Te Arawa participation in decision making;
- Building Te Arawa capability and capacity to participate in decision making;
- via strategic and integrated development, identifying opportunities to work collaboratively for the betterment of Rotorua;
- Improving communication and information sharing;
- Improving Council's delivery of its obligations to Māori

(Rotorua Lakes Council, 2018a)

From this relationship, the Council laid out its values on how they were to conduct themselves within the partnership:

- Inspire: we take pride in what we do and how we make a positive difference in our community
- Help: we're always approachable and supportive and go the extra mile
- Innovate: we're empowered to be solutions focused and always look for continuous improvement
- Respect: we treat every person as we would like to be treated
- Engage: we communicate and work together with the Rotorua community, including hapū and iwi, to achieve the best outcome

(Te Tatau o Te Arawa & Rotorua Lakes Council, 2015, p. 6).

The political mechanism by which this change had occurred with the introduction of the Te Arawa partnership model, for example, was critical and must involve Māori from the start. First, the most crucial step was 'for the Crown to recognise the shortcomings of its current legislation on local Māori representation and to fulfil its role of active protection by continuing to involve Māori in participating in decision making and allowing them to build capacity and capability to enable this' (Hayward, 2011, p. 190).

Second, in this case, the partnership had fulfilled several of the crown obligations 'by creating a legal agreement that would see mana whenua, the Crown's Treaty partner, take part both morally and legally in legal binding interactions on resource management issues' (Bennett, Matunga, Stey, Borell, Dionisio, & Hapuku, 2021). Finally, the expression of the

council's values within the partnership, particularly the fifth value 'Engage: we communicate and worktogether with the Rotorua community, including hapū and iwi, to achieve the best outcome' showed a strong commitment from 'council to creating an enduring relationship with iwi' (Rotorua Daily Post, 2015).

8.3.6 Vision 2030 - The Rotorua Way – Tatau Tatau – We Together

Koinei tō tātau kāinga. Ko tātau ōna tāngata.

Nā tātau tonu i ora ai te ahurea Māori me ōna āhuatanga katoa.

He iwi auaha tātau e tuku nei i tā tātau e ako nei.

E kōkiri nei tātau i te angitū, i te hihiri me ngā rerekētanga maha.

E kaha tautoko nei tā tau i whakapūmautanga o te taiao.

Mō te katoa a Rotorua - Tatau tatau

This is our home, we are its people.

We're the heart of Te Arawa and a centre for Māori culture and expression.

We're innovative and we share what we learn.

We're driving opportunity, enterprise and diversity.

We're supporting a legacy of sustainability for our environment.

Rotorua is a place for everyone.

(Rotorua Lakes Council, n.d.).

Between the end of 2013 and early 2014, RLC had 'adopted the Rotorua Vision 2030, including a commitment to developing a new partnership with Te Arawa, hence the formation of the Te Arawa Partnership model and inception of Te Tatau o Te Arawa in 2015' (Te Tatau o Te Arawa & Rotorua Lakes Council, 2015, p .17). Vision 2030 - The Rotorua Way, a high-level strategic vision, principles and values which was created by both RLC and supported by Te Tatau was there to help forge a path ahead for the Rotorua district and inform everything Rotorua Lakes Council would do in collaboration with the community to achieve a positive future. 'The Rotorua Way would provide the direction for the next few years, guiding RLC long-term, annual and spatial plans and decision-making around key projects and initiatives. These future-focused plans, key projects and initiatives were how RLC would deliver Vision 2030' (RotoruaLakes Council, n.d.).

As part of RLC's commitment to moving Rotorua Vision 2030 forward (Rotorua Lakes

Council, 2021c), the formalised agreement with Te Tatau o Te Arawa mandated both entities ‘to (a) achieve a Te Arawa 2030 Vision (b) support the council to grow its capacity and capability to effectively and meaningfully engage with Te Arawa hapū and iwi and (c) realise opportunities (that arise from time to time) that both parties agree are mutually beneficial’ (ibid, p. 12).

8.3.7 Towards Kaitiakitanga – an Active Protection framework

The Te Arawa Partnership model had been a compelling case for better local Government relationships with iwi (Tahana, 2015). With its adoption, the relationship between RLC and Te Arawa iwi had strengthened in order to not only provide a better future for Rotorua (ibid), but to uphold the principles of partnership and active protection embedded in the Local Government Act or LGA (2002, amendment 2014) and the RMA (1991) and its successive amendments (Local Councils, 2011), where local authorities would foster the development of Māori capacity to contribute to strong decision-making processes (Lowry & Simon-Kumar, 2017).

‘Active Protection’ according to Hayward (2011, p. 198) states:

The Crown’s enduring duty to Māori with regard to Article 2 rights has been described by the Waitangi Tribunal and the courts as a duty of ‘active protection’ of Māori people in their use of their lands and, waters, including Māori property interests to the fullest extent reasonably practicable . . . It is derived from the Crown’s Article 2 guarantee of tino rangatiratanga over properties (taonga)’.

Moreover, as asserted by the Waitangi Tribunal (2008) in the He Maunga Rongo, its report on the central North Island, the Treaty's essential relationship with regards to active protection, requires the Crown to preserve both the environment and Māori exercising rangatiratanga (chiefly authority) over taonga (Kennedy, 2017). A further Waitangi Tribunal Report 2005 from the Wai 262 claim endorsed the view by the High Court that councils are the Crown. In this passage from Judge Joe Williams (Waitangi Tribunal 2011b) states:

it is the responsibility of successors to the Crown, which in the context of local government includes the council, to accept responsibility for delivering on the second article of the Treaty. The Crown is a metaphor for the Government of New Zealand, here delegated by Parliament to the council, which is answerable to the whole community for giving effect to the Treaty vision in the manner expressed in the RMA. The due application of that statute will assist to “avert the evil consequences which must result from the absence of the necessary Laws and institutions” needed to secure justice to all New Zealanders ... Thus, the Crown’s Treaty duties remain and must be fulfilled, and it must make its statutory delegates accountable for fulfilling them too (p. 270).

Therefore, given that local government exercises Crown-derived authority, it follows that the principle of active Crown protection should apply to local government decision-making as well (Kennedy, 2017). Having these initiatives in place to assist in the development of Māori ability to participate in council procedures was an encouraging sign; something that local governments should be continually thinking and planning for to increase Māori contributions to decision making (Bay of Plenty Regional Council, 2011b).

8.4 Case Study Two – Te Arawa Lakes Strategy

Te Arawa lakes are a collection of 14 lakes in Rotorua, New Zealand's Central North Island. Te Arawa and their ancestral lakes have a long and symbiotic relationship, with the lakes historically serving as a source of mahinga kai as well as a route of transportation in the area. To Te Arawa, the lakes are taonga, and they are the foundation of their identity, cultural integrity, tikanga, and kawa ("Te Arawa Lakes Settlement Act," 2006).

However, due to land use changes, sewage input, and groundwater discharge, nutrient loads to the lake have increased considerably in recent decades (The Rotorua Lakes Strategy Co-Management Project Team, 2001). Algal concentrations and blooms have resulted from these nutrient levels, putting the lakes' quality in jeopardy (ibid). Because of the decline in quality and strong Māori links, the ownership and management of the lakes has been hotly debated. As a result, a variety of agreements and partnerships were formed to ensure that the lakes were managed in the most efficient and equitable manner possible.

8.4.1 Background to Te Arawa Lakes Trust identity with the lakes

Te Arawa Lakes Trust (formerly Te Arawa Māori Trust Board) and the Crown signed a Deed of Settlement in December 2004 for Te Arawa Historical claims and remaining annuity problems across the 14 lakes. The settlement included a Redress package that included (Te Arawa Lakes Settlement Act, 2006, p. 31):

- the Crown's acknowledgement and apology to Te Arawa,
- the Cultural Redress, which recognised Te Arawa's traditional, historical, cultural, and
- spiritual ties to the settlement's lakes, including the transfer of 13 lakebeds; guaranteed and
- the Financial Redress; and
- the Annuity Redress.

Regarding lakebed and water ownership, the Te Arawa Lakes Settlement Act (2006, p.32) declared that the fee simple estate in each Te Arawa Lake bed is vested in trust in the Te Arawa Lakes Trust." However, "under the Land Act 1948, the Crown retains possession of the Crown stratum as Crown land.

The Settlement Act (p.33) outlined '...the Crown does not confer on the Trustees any rights or duties to the water in the Te Arawa Lakes or the aquatic life except with connection to the plants attached to the lake beds.'

This was further asserted by Sir Toby Curtis – Te Arawa Lakes Trust Chair in a documentary directed by Ngāhuia Wade, where he declared:

We own the water in our concept of ownership. My flesh tells me, my blood tells me, my skin tells me, it doesn't have to talk...we know we own that water. In 2006, the Deed of Settlement was signed by Te Arawa and the Crown. We believed that it was a process that would acknowledge Te Arawa's ownership of the lakes, but instead we now have ownership of the beds. How can you own a lake without water?
(Wade, 2012).

8.4.2 Council Partnership with Te Arawa Māori Trust Board under the 2000 Te Arawa Lakes Strategy

The Lakes Strategy Working Group (LSWG) was founded in 1998 by the Chairman of the Te Arawa Māori Trust Board, the Chairman of the Bay of Plenty Regional Council (BOPRC), and the Mayor of Rotorua District Council (RDC) prior to the Te Arawa Lakes settlement. Although their approaches were not coordinated, these parties were all involved in the administration of the lakes (Rotorua Lakes, n.d.). Both the RDC and the BOPRC are legally responsible for lake management, with the BOPRC's mission being to promote the sustainable management of these resources for future generations (ibid).

BOPRC is also in charge of soil conservation and river control in the lakes' catchments, as well as monitoring the influence of human activities on the environment, which may include enacting legislation to restrict resource use as needed (ibid).

The Rotorua Lakes Council (RLC - also known as RDC) is in charge of the lakes' statutory responsibilities, which include wastewater and sewage disposal, as well as residential water supply. The BOPRC and the RLC have direct legislative duties to Te Arawa under the Resource Management Act 1991 (RMA); under section 5, they must ensure that Māori interests and values are integrated into management decisions.

8.4.3 Vision of the Te Arawa Lakes Strategy

The Te Arawa Lakes strategy outlined RDC, EBOP and Te Arawa Māori Trust Board's intention to work together to create a common vision for the Rotorua district's lakes, with a focus on directing community energy and resources into activities that achieve the vision, which was:

The lakes of the Rotorua district and their catchments are preserved and protected for the use and enjoyment of present and future generations, while recognising and providing for the traditional relationship of Te Arawa with their ancestral lakes.

(Strategy for the Lakes of the Rotorua District, 2000, p. 3).

Protection, Use, Enjoyment, and Management were the key areas that the fourteen major goals within the strategy came under, honouring Te Arawa's traditional relationship with their ancestral lakes (ibid).

The strategy centred on identifying issues, potential solutions, costs and benefits, selecting the best solution, implementing accountability monitoring and reporting mechanisms, and ensuring periodic reviews of each solution's success.

Under the Management area, one of the strategy's key objectives was to establish a co-management framework with Te Arawa that provided the best integrated management as well as meaningful and binding working links with the iwi and hapū and their ancestral lakes (Harper – Hinton, 2015).

8.4.4 Guiding Principles of the Vision and Strategy for the Lakes of the Rotorua District 2013

In 2013, a refreshed strategy was adopted for the Lakes of Rotorua District (Rotorua Lakes, 2013). Within the document were the following principles which gave guidance to the Te Arawa Lakes Strategy group's approach to the management of the lakes' catchment. This was part of a collaborative and participatory process in developing and implementing the Strategy:

- Focused on outcomes – a clear purpose
- Transparent and fully accountable – a clear process for delivery and identified lines of responsibility
- Grounded in best knowledge (including mātauranga and science) and open to full a range of solutions
- Kaitiaki of the lakes' catchment – managing the lakes for future generations
- Seeking to provide certainty for the future – ensuring stakeholders and landowners are involved in planning for their future
- Partnership driven – engaging with agents of change by drawing on their skills, knowledge and energy. We will nurture existing relationships and build new ones

- Agile – flexible in our approach and delivery. Able to adapt to changing science, economics, technology and behaviours
(Rotorua Lakes, 2013, p. 15):

Goal four of the revised strategy stated the lakes' watershed was to be managed via Te Arawa Lakes values of Wai, Waiariki, Waiora, Wairua, and Waiata, as outlined in Te Tūāpapa o ngā Wai o Te Arawa - Te Arawa Cultural Values Framework, established and endorsed by Te Arawa Lakes Trust (2015).

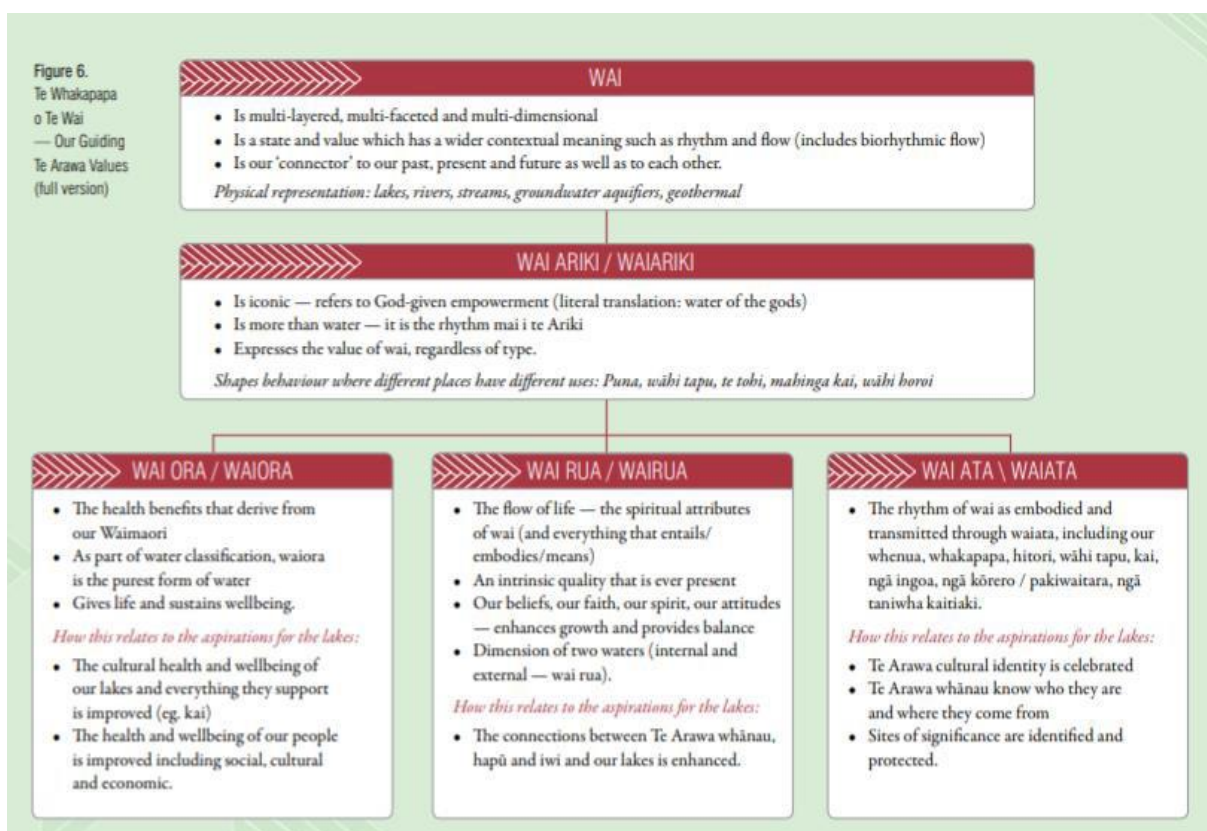


Figure 8-2. Te Arawa Cultural Values. (Source: Te Tūāpapa o ngā Wai o Te Arawa – Te Arawa Cultural Values Framework Te Arawa Lakes Trust, 2015).

In figure 8-2, the relationship between Te Arawa and ngā wai o Te Arawa is described in Te Whakapapa o te Wai. The values linked with this relationship are then discussed, as well as how they relate to the health of the lakes. This link necessitates the upholding of these ideals, as well as the interwoven mauri of the lakes and people (Rotorua Lakes Council, 2018b).

8.5 Case Study Three - The scheme RRSSC scheme and council development of kaitiaki values

With RLC's strengthened partnership with Te Tatau, they attempted a further partnership with Ngāti Pikiao iwi and other relevant stakeholders through the establishment of the RRSSC in early 2014. Fundamentally, it was to 'restart the process and lead the development and evaluation of wastewater treatment options for the lakeside settlements, following the rejection of the proposal to build a WWTP and Land Disposal System (LDS) on Manawahē Road, Rotomā' (Opus, 2016 p. 9).

Because this was a huge undertaking for RLC, as the larger RRSSC representation comprised:

- seven Ngāti Pikiao marae
- Ngāti Mākino
- three groups of Māori Land Trusts
- three ratepayer associations
- Ngāti Pikiao Environmental Association
- Rotorua Lakes Council (Deputy Mayor and water managers)
- Bay of Plenty Regional Council (councillor and staff)
- Ministry of Health (advisory role)

The Council had a lot of ground to cover in terms of building and maintaining a solid and honest relationship with iwi that was founded on mutual understandings and shared convictions regarding the scheme's execution and the WWTP (T. Wichman, personal communication, August 26, 2021). Although it had been widely communicated that the 'Rotorua and Rotomā communities had led the development of the Scheme, with Rotorua Lakes Council and Bay of Plenty Regional Council representatives working together to involve, collaborate with, and empower the community' (Opus, 2016 p. 50), Ngāti Pikiao held the view that the activities and committees created in the current scheme had been the result not only of the Environment Court (2013) outcomes, but the drive and tenacity by iwi to 'do the heavy lifting' to get the right decisions made (W. Emery, personal communication, May 06, 2020). This was noteworthy as the Iwi representatives on the committee played a

significant role in leadership of the RRSSC (Opus, 2016) and the subsequent committees that followed.

From the TAP agreement, the tenets of the Council values, in conjunction with 'Ngā Mātāpono' – (Partnership Principles), to some degree ran parallel to the way in which RLC attempted to conduct themselves in their relationship with iwi via the RRSSC. The principles (Te Tatau o Te Arawa & Rotorua Lakes Council, 2015, p. 5) set out below, were to:

- work together in good faith to safeguard and promote the mutual interests of the parties in improving outcomes for the hapū and iwi of Te Arawa, and people of the Rotorua district generally;
- act in ways that enhance the mana of both parties;
- create and foster a high trust relationship and environment that allows the parties to work together while growing within their own tikanga (customs, obligations and conditions) and pursuing their own interests and priorities;
- work towards solutions with rationality & honesty of purpose;
- resolve any differences simply, effectively and in a manner that supports a long term, intergenerational partnership;
- seek opportunities to share skills, knowledge & information;
- acknowledge the shared interests of the parties in the development and promulgation of strategy, policy and legislation/by-laws that affects Te Arawa hapū and iwi, Māori and the Rotorua community; and
- acknowledge Council's interest in the development and promulgation of strategy, policy and legislation on behalf of Rotorua ratepayers and residents and in managing the allocation of public financial resources.

Thus, by involving iwi and hapū such as Ngāti Pikiao and Ngāti Te Rangiunuora in decision-making, and resourcing them to be a critical component of a project traditionally conducted in-house by local or central government, exemplified a strong emerging connection between iwi and local government (MacDonald, & Anaru, 2020). Moreover, having a partnership engagement model based on strong values and principles is an effective and authentic way to engage with Ngāti Pikiao and Ngāti Te Rangiunuora. Incorporating tikanga (activities and processes associated with ensuring one's own and community's cultural safety), kaitiakitanga, and general indigenous knowledge on contemporary issues such as the

environmental matters confronting RLC and Ngāti Pikiao and Ngāti Te Rangiunuora with the scheme, helps to provide for positive environmental outcomes (ibid).

8.5.1 Council expression of being kaitiaki

The word 'kaitiaki' comes from the verb 'tiaki,' which means to guard, protect, keep, to foster, to protect, to shelter, to keep watch over. Its prefix 'kai' denotes the agent of the act. The words kai-tiaki signify guardian, keeper, preserver, conservator, protector (Royal, 2003, p. 67). Marsden (2003) defines kaitiakitanga as first and foremost being Kaitiaki — people who are the guardians, protectors, preservers, and conservators of natural and environmental resources. The overhanging question posed within the context of Rotorua Lakes Council's engagement with iwi on its various projects, including Ngāti Pikiao and Ngāti Te Rangiunuora with the reticulation scheme is 'can a Kaitiakitanga – Active Protection framework be developed for RLC' as part of co-planning and co-management with iwi on wastewater management?

8.5.2 Tikanga Māori, Mātauranga Māori and Māori principles and values

Research has been conducted by various environmental organisations to develop council – iwi effective collaboration tools using Tikanga Māori-based frameworks (Harmsworth et al., 2016). Tikanga are a collection of custom and protocol-based actions that are used to induce "proper" (tika) behaviour. The Māori relationship with freshwater is founded on tikanga Māori. Mead (2003) defines tikanga Māori as "a collection of beliefs associated with practises or procedures to be followed in running a group's or individual's affairs." Tikanga is defined by Sir Mason Durie (1998) as the values, standards, principles, or norms to which the Māori community typically subscribed for the decision of suitable action. These would include preferred methods of protecting natural resources, exercising guardianship, determining responsibilities and obligations, and safeguarding the interests of future generations in an environmental setting.

Tikanga refers to engagement processes in these situations. The foundation of any treaty partner collaboration is the formation of meaningful ties between the iwi and central and local authorities. These connections should be maintained and reinforced over time, and they should be applied to other projects outside of just a single one on its own (Harmsworth,

Awatere & Robb, 2016). Early in the collaborative process with iwi and hapū (i.e. when engagement begins as part of building a relationship), tikanga-based frameworks (Awatere & Harmsworth, 2014) are built to govern collaborative processes, conduct, and obligations. Working with Māori utilising a tikanga strategy and process was documented by Robb, Harmsworth, and Awatere (2015) and Harmsworth, Awatere, and Pauling (2013).

8.5.3 Mātauranga Māori as part of Tikanga Māori

All tikanga Māori are firmly embedded in Mātauranga Māori, which might be seen as Māori philosophy as well as Māori knowledge. While Mātauranga Māori might be carried in the minds, tikanga Māori puts that knowledge into practice and adds the aspects of correctness and ritual support. People then see tikanga in action. They do it, feel it, understand it, accept it and feel empowered through the experience. Tikanga Māori might be described... as the practical face of Māori knowledge.

(Mead, 2003, p.7)

To understand and comprehend the unique te ao Māori worldview and perspective, it is vital to recognise and realise the role that Māori play in contemporary collaborative freshwater management and policy. This viewpoint is largely based on traditional Mātauranga Māori principles and values, which help to influence contemporary viewpoints and thinking (Robb et al., 2015).

According to Wakefield (2008, p. 25), 'Mātauranga Māori recognizes the interrelatedness and inter-generation lineage of all living things that are imbued with an infinite life force, mauri. It also provides a contextual framework for articulating the spiritual principles and values in a Māori collection of knowledge which gives emphasis to localized indigenous knowledge and interpretation of their oral histories, traditions and events'.

The creation of knowledge, according to Aranga (2002, p. 26), is 'the meeting of senses with the outside environment. The foundation and source of all life and knowledge is Mātauranga Māori's concern. This necessitates an understanding of the creation tales in order to comprehend the universe's formation and existence, as well as the extent to which changes have occurred in the way Māori presently view the world in comparison to their forefathers'. Royal (2003) also asserts that another major contemporary application of Mātauranga Māori

is to analyse and study features of our modern world in order to address particular difficulties and concerns.

Because Māori have traditionally possessed the necessary ecological knowledge, values, and principles for sustainable management, Mātauranga Māori as suggested by Awatere et al (2013) would be difficult to apply broad parts at local scales, such as restrictions for harvesting from mahinga kai or access to wāhi tapu and taonga (Harmsworth et al., 2013; Robb, 2014). However, if specific aspects and methods are followed, Mātauranga Māori can be effectively included into planning (Awatere et al., 2013; Awatere & Harmsworth 2014).

A serious endeavour to recognise kaitiakitanga in planning will take into account iwi and hapū worldviews as well as local government sustainability aims.

8.5.4 Council and Iwi values to develop a Kaitiakitanga – Active Protection

Framework in co-planning and co-management with iwi on wastewater management

Every hapū was politically autonomous and self-determined in traditional Māori society. Because of the established sequence of leadership roles, the hapū's social fabric and political organisation were extremely structured and ordered (Wakefield, 2008).

To 'protect the potency of all taonga tuku iho and the inter-relationships between Atua, whenua, and tangata, a balance of whanaungatanga, kaitiakitanga, manaakitanga, and other tikanga principles like as tapu, noa, and utu was maintained' (ibid, pg. 20). As a result, there was a shared obligation to ensure the hapū's existence by properly managing all of the taonga tuku iho that had been passed down through the centuries.

Within a contemporary context of environmental resource management, iwi tikanga based values have been a significant driver in the health of taonga in the waterways and surrounding environment. For the Rotoiti Rotomā wastewater sewerage scheme, Ngāti Pikiao and Ngāti Te Rangiunuora iwi and hapū members had embedded their iwi values (see Figure 8-2) through the completed Cultural Impact Assessments (Whata, 2016; Skerrett – White & Skerrett, 2015) to guide iwi, the two councils and other statutory bodies in their engagement. As mana whenua, their values needed to be understood and acted upon as the implementation of the full scheme and the disruption to the receiving environment (Ministry

for the Environment, 2020) would impact significant areas such as:

- wāhi tapu (sacred sites such as urupā – cemeteries)
- ancestral lands
- significant ecological areas
- discharges to the sea, rivers, streams, lakes, wetlands, aquifers and air
- sites and places of significance to mana whenua
- historic heritage overlay sites of Māori interest and significance
- treaty settlement land
- Māori land

(Whata, 2016, p. 32)

Understanding the problem (see Figure 8-3), which initially to council was the reduction in nutrients and its impact on improving lake water quality, and health - removing interactions with failed and under-performing septic tanks, to iwi's discontent of the transference of para (faeces) across various mana whenua wai and whenua because of its impact on iwi ability to undergo mahinga kai, needed to be understood and worked through.

Many iwi members believed that little was being done to understand their concerns, and that there was widespread opposition to changing the current waste management practices in favour of more sustainable and alternative solutions that include land treatment or result in less use and water degradation, and therefore valuing mahinga kai resources (W. Emery, personal communication, June 10, 2017).

Building honest and transparent relationships between council – iwi and community stakeholders – iwi was a high priority for Māori, as although many iwi representatives had been positive, and some had applauded the council involvement processes and the examination of different ideas, this did not always imply a favoured or preferred outcome (T. Wichman, personal communication, August 20, 2016).

8.5.5 Māori cultural values

With regards to Māori culture and Māori cultural values, Warriner (2007, p. 559) suggests that 'Māori culture is unique to New Zealand and sets New Zealanders apart from other

westerners and indigenous communities overseas. Embedded within Māori culture are traditional values that represent a Māori worldview that is based on strong whānau, hapū and iwi (family, sub- tribe and tribe) affiliations connected to ancestral land. Thus, the Māori worldview is centred on whakapapa (genealogy) and whanaungatanga’.

From this statement, it is certain that a council – iwi framework must be built on shared values regarding wastewater and how it should be made managed, and that because Māori cultural values are intricately linked to their ancestral lands and whakapapa, they be embedded into the way in which council and iwi engage and ultimately make decisions.

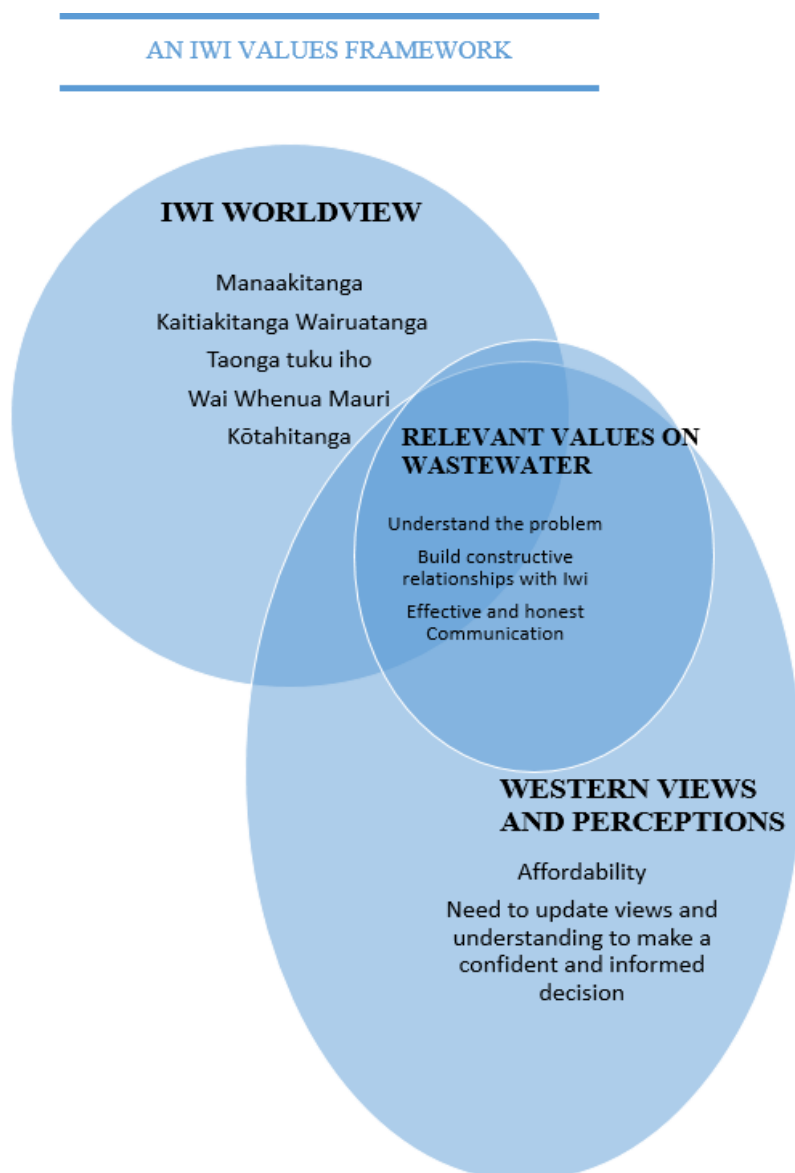


Figure 8-3. Iwi Values Framework for Rotoiti Rotomā Sewerage Scheme.
(Source: Teinakore-Curtis, Emery, Whata, 2019).

Council and Iwi Values in developing a Kaitiakitanga – Active Protection Framework in co-planning and co-management of wastewater matters

Rotorua Lakes Council Values (Te Tatau o Te Arawa & Rotorua Lakes Council, 2015)	Ngāti Pikiao Iwi Values – wastewater (Whata, 2016)	Ngāti Te Rangiunuora Iwi Values - wastewater (Skerrett – White & Skerrett, 2015)	Ngāti Mākinō Iwi Values (Ngāti Mākinō Iwi Authority, n.d.).
Inspire we take pride in what we do and how we make a positive difference in our community	Tapu and noa everything that exits from within the body is deemed tapu, therefore a process of whakanoa needs to take place wherever sewage passes through and over existing wāhi tapu and waterways before reaching its final destination	Mana Atua Ngāti Te Rangiunuora hapū identify strongly with the physical elements of our environment, our land, mountains, streams and lakes. The domains of the Atua (gods) provide the linkages across resources giving this holistic approach to our total environment	Kia Mākinō – Upholding our kawa and tikanga in all dealings amongst ourselves and others
Help we're always approachable and supportive and go the extra mile	Wairuatanga relationships between associated hapū, including the tikanga of manaakitanga and respecting each other's mana and kaitiakitanga is important to maintaining cultural and spiritual balance	Mana Whenua Ngāti Te Rangiunuora hapū exercise Mana Whenua over our resources through Take Toa (conquest) and Take Whenua (right of occupation through whakapapa), both essential elements, to provide for the sustenance of our people. This establishes our 'ancestral connection' to our land, sea & foreshores, water-bodies, flora and fauna and of course all living creatures within our rohe.	Wairuatanga – Connectedness to/of physical and spiritual elements
Innovate we're empowered to be solutions focused and always look for continuous improvement	Kaitiakitanga food resources are the foundation for our tribal, hapū and whānau identity, mana and associated kaitiakitanga responsibilities	Te Kaitiakitanga (Guardianship) Preserve, protect, use and practice kaitiakitanga in accordance with tikanga and kawa of Ngāti Te Rangiunuora	Mana whenua / Mana Moana / Mana Tāngata – Develop arrangements that foster a sense of ukaipo, of importance, belonging and contribution
Respect we treat every person as we would like to be treated	Kotahitanga reflects the unity within all the rohe in order to have unity. Iwi to identify issues and concerns collectively and provide	Te Oranga Ngāti Te Rangiunuora is committed to providing support for any initiatives that will provide for	Kotahitanga – To maintain and promote unity of purpose

	desired outcomes that align with respective whānau, hapū and iwi expectations	the good health and well-being of our people	
Engage we communicate and work together with the Rotorua community, including hapū and iwi, to achieve the best outcome	Whakawhanaungatanga Iwi maintain good relationships and assist each hapū and iwi by respecting their tikanga and the potential decisions made by them		Whānaungatanga – To maintain and build relationships and connections that enhance the wellbeing of Ngāti Mākinō
	Manaakitanga Iwi support local authorities and other stakeholders. Processes should not undermine the cultural protocols and beliefs of all involved		Manaakitanga ki te Taiao – To enhance the mana of our environment
	Rangatiratanga aligns with the concept of mana whenua and the relationship tangata whenua has with its ancestral lands. Tangata whenua value the ability to maintain their tikanga and cultural and spiritual values, mana and exercising their ahi kā and kaitiakitanga responsibilities associated with living close to and within their ancestral rohe	Rangatiratanga Mana Whenua is maintained through ‘Rangatiratanga’ (recognized authority to manage resources). Rangatiratanga can be held collectively by iwi, hapū and whānau or individually depending upon the type of resource involved and the context in which it is used.	Tino Rangatiratanga – To promote self-determining and self-empowering behaviour

Table 4. Council and Iwi Values in developing a Kaitiakitanga – Active Protection Framework in co-planning and co-management of wastewater matters

8.5.6 Council – Iwi co-management in wastewater matters

Co-management of natural resources is a strategy that acknowledges indigenous interests in the environment as well as varied perspectives on the world (Te Aho, 2010). Carlsson & Berkes (2005, p. 66) states that ‘co-management is a demonstration and implementation of management strategies and actions on the ground through a variety of responsibilities and practical mechanisms such as restoration. It is action-oriented, determining how something will occur and be executed based on institutional and organisational frameworks’.

By exhibiting co-governance through decision-making and clear or agreed-upon roles and actions, co-management explains how a desired goal or outcome will be achieved, as well as the practical steps required to go from a current state to a future goal or vision (ibid).

Moreover, it is ‘actions and responsibilities implemented jointly by both parties. Co-management involves deciding how a desired goal, objective, or outcome is best achieved such as catchment, wetland, and farm plans, consents, riparian planting, river clean-ups and restoration. Iwi/hapū groups work together with partner agencies’ (Harmsworth et al., 2016, p.6).

With regard to both co-management and joint management models, Sir Mason Durie (1998), considered a future beyond Treaty of Waitangi claims. Instead of continuing to exclude many Māori from the nation's wealth, he saw the opportunity for joint management of environmental resources as a method of creating partnerships to assist positive Māori development and embracing a "politics of inclusion." The objective, according to Durie, was to "create a spirit of cooperation and mutual regard, rather than perpetuate conflict and collision” (p. 56).

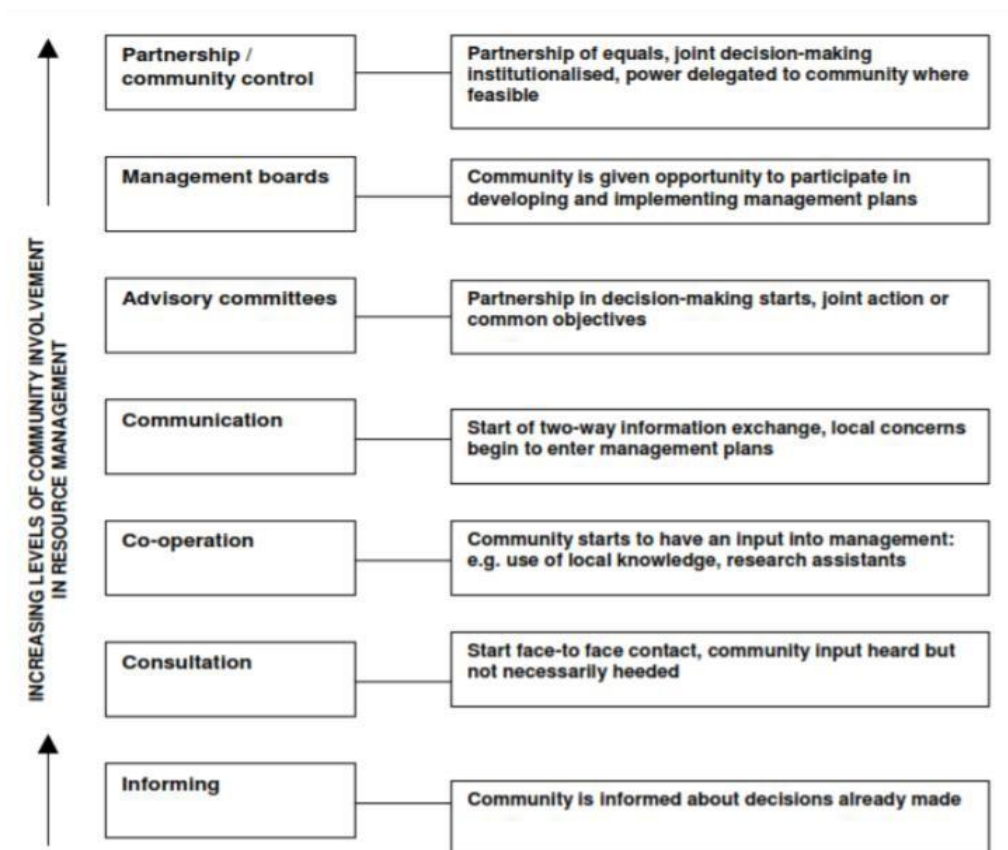


Figure 8-4. Co-management arrangements and the varying levels of community involvement in resource management (Source: Local Government New Zealand, 2007b).

As shown in Figure 8-3 above, co-management agreements can be applied to a variety of processes. From informing the community to cooperation and community ownership of common-pool resources, the state through its local government authorities continues to transfer power. This can range from minimal engagement or participation to a considerably more involved and powerful position wielded through partnerships or community-controlled processes (Local Government New Zealand, 2007b).

According to Robb et al. (2015, p. 17):

Co-management can be diverse and dynamic but is pre-empted by the need for decision-making. When it comes to the practical steps to move from a current state to a future state defined by a vision/aspirations/goals and objectives there are numerous phases and options to progress this within a co-management/decision-making framework and then measure progress towards stated goals. For example, a vision or broad goal could be to achieve: ‘a healthy freshwater ecosystem or waterway’ or ‘restore the mauri of a river or lake’, or ‘restore a wetland’. The goals and objectives to

achieve this are based on values such as, what is valued by the community, by iwi/hapū, by council, by stakeholders? Part of the decision-making process under co-management strategies is to identify and implement specific actions to achieve objectives and goals, e.g. enhancing ecosystems, habitats, restoring valued species, such as plants/tuna/native fish/birds. For example, specific actions to restore native fish populations can include improving habitat extent and condition, removing barriers to native fish passage (e.g. installing fish passes), and management of pest fish species such as pest fish reduction and/or mammal management through regular trapping.

For the Rotoiti Rotomā sewerage project, co-management between council and iwi on the scheme and the wastewater treatment plant should be defined by their values, vision and set goals to not only restore a freshwater ecosystem in the lakes, but to restore valued plant species through the reuse of treated water from the treatment plant on the Haumingi 9B 3B land block. In order to develop a council – iwi values-based framework, co-management (Carlsson and Berkes, 2005; Memon & Kirk, 2012), and co-planning (Duff, Delfau & Durette, 2010; Awatere, Harmsworth, Rolleston & Pauling, 2012) need to be elaborated on, as the success of these processes rely on enduring relationships between council and iwi alongside adequate resourcing for all partners (Sinner & Harmsworth, 2015).

8.5.7 Council – Iwi co-planning in wastewater matters

Robb et al. (2015, p. 6) asserts that ‘co-planning is an advanced stage of a co-management and co-planning process of a collaborative cycle, and requires excellent relationships to be formed and recognition, understanding, and incorporation of mātauranga Māori and tikanga Māori as a basis for bi-cultural planning under the Treaty of Waitangi. The term ‘co -’ can refer to a cooperative environment in which a collaborative process can take place, however the meanings are interchangeable, and ‘co -’ is usually short for collaborative.’

The effectiveness of collaborative planning processes is dependent on long-term connections between local government (district and regional councils) and iwi, as well as proper resourcing for all collaborators (ibid; Sinner & Harmsworth, 2015). It's also a long-term process dependent on strong connections and trust, which necessitates a long-term horizon such as a ten to twenty- year period in order to accurately assess advantages and outcomes (Robb et al., 2015).

Moreover, Harmsworth et al. (2016, p. 6) suggests that co – planning is about ‘Planning to gether under co - governance agreements. Co - planning is a shared process where iwi, hapū, tangata whenua interests and values, and the use and understanding of mātauranga Māori, are incorporated into local or regional planning, including the development of policies, goals, and objectives in council, regional and district plans, and/or urban design’.

Therefore, if a Kaitiakitanga – Active protection framework in co-management and co-planning with iwi on wastewater management is to be developed premised on the values held by council and iwi tikanga based values, co-management and co-planning should be embedded throughout that recognises and understands Mātauranga Māori and tikanga Māori.

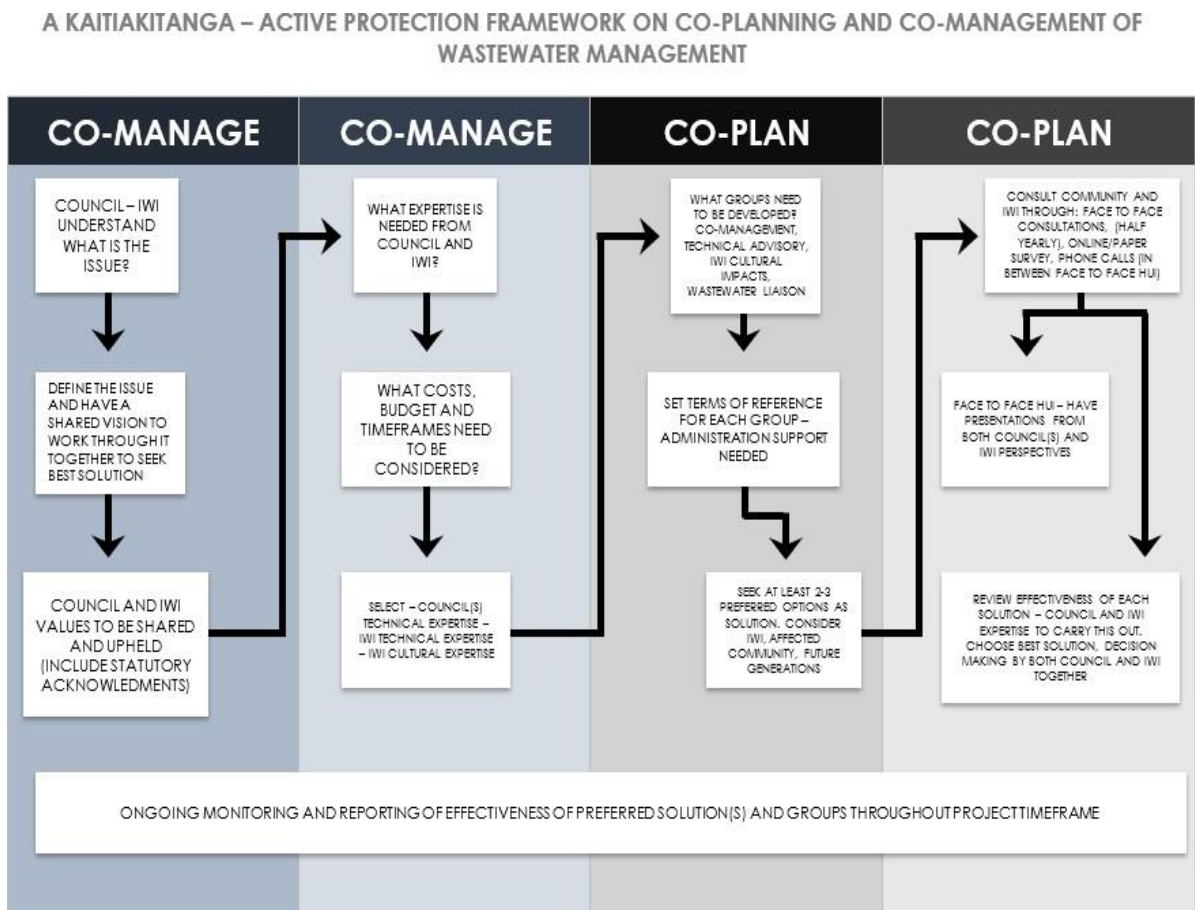


Figure 8-5. A Kaitiakitanga – Active Protection Framework on Co-planning and Co-management of Wastewater Management. (Source: Teinakore-Curtis, 2021).

For the framework to be truly effective (Figure 8-5), the following considerations need to be made:

Communication

- When it comes to environmental management and wastewater management challenges, ongoing communication between Council and Iwi representatives must be honest and straightforward, as these long-term partnerships are vital to building high-trust. These types of undertakings might last anywhere from ten to twenty years.
- Building strong ties with municipal personnel on long-term initiatives takes time for many iwi members. This has happened on the RRSSC scheme, where many solid relationships with municipal leaders and staff have been developed and maintained. To maintain strong relationships with iwi, council personnel and officials should implement not only the provisions set out in the LGA 2002, but also the Treaty of Waitangi principles.
- On methods and outcomes, clear decision-making between Council and Iwi is required. When there is a shared vision, tikanga-based principles, and stated goals, this can happen.

Resources and costs

- Iwi members are typically tasked by their koeke (elders) to participate in environmental resource management and wastewater management projects with little to no operating budget and resourcing alongside council representatives and staff. They frequently go through the process of completing these projects because they are there to 'uphold the mana' of their respective hapū and iwi, and are devoted to having a say in the decision-making process for their iwi collective. As a result, council workers and representatives should consider this into projects, as iwi would do well in building capacity in these areas, as well as council officials and representatives doing well in understanding tikanga Māori, Treaty of Waitangi based workshops and understanding of iwi procedures.

Cultural Impact Assessments and Cultural Management Plans

- Cultural Impact Assessments (CIA) and Cultural Management Plans (CMP) should be produced and utilised in conjunction with Iwi Management Plans (IMP), which are adopted by most councils as a road map for cultural understanding and awareness. CIAs, CMPs, and IMPs are frequently given limited time and resource to complete and in place as a valuable document to inform thinking and execution

at various stages of a big council and iwi led project, while technical specialists for technical evaluations come at a considerable cost.

Finally, the partnership between council and iwi would be reinforced if environmental resource management and wastewater management initiatives took into account both mātauranga Māori and science equally. Cultural factors and considerations should not be treated as an afterthought, as if they do not carry the same weight as results and outcomes from western research. These collaborative processes can be successful by attaining much of the above in order to truly carry out co-management and co-planning in environmental and wastewater management.

8.6 Chapter Summary

This chapter sought to evaluate RLC's commitment to resolving Ngāti Pikiao and Ngāti Te Rangiunuora's cultural concerns through an assessment of their values and principles as an essential component of performing kaitiakitanga. To begin, the researcher sought to ascertain whether RLC as a local government authority is guided by values and principles. These were informed by the statutory acknowledgments from the Resource Management Act 1991 and Local Government Act 2002 and their successive reforms. They also occurred through three case studies within Te Arawa rohe that involved iwi and council relationships based on their particular values and principles in environmental and freshwater management. Secondly, was to discover that if indeed council successfully engaged with iwi premised on their values and principles, that council could move toward establishing a Kaitiakitanga – Active protection framework in co-planning and co-management with iwi on wastewater management.

The next chapter will examine the questions that were asked of several koeke and a number of pakeke on land changes over time in the Rotoiti and Rotomā areas, as well as the Haumingi 9B3B land block. The relationship of the Ngāti Pikiao and Ngāti Te Rangiunuora peoples with these specific land areas, including Lake Rotoiti and Lake Rotomā, has been impacted by changes in water quality and deteriorating health, including changes brought about by the constructed WWTP and disruption of pipeline infrastructure across the two communities. Although the implications of the data are often indirect, the intent will be to

understand through the data gathering whether altering water management and land practises had contributed to the water decline and degradation, and what this means for the koeke and pakeke on the implementation of the reticulation scheme. Because the koeke, in particular, had witnessed the changes first-hand as they grew up along the lakes settlement, being able to assert themselves effectively as kaitiaki with the lake and whenua today as a result of these changes will be explored. The purpose of this chapter is to examine the findings from the qualitative interviews in order to inform Ngāti Pīkiao and Ngāti Te Rangiunuora iwi's future actions towards developing a sustainable environment.

CHAPTER 9: AN IWI AND HAPŪ PERSPECTIVE

THE VOICES OF NGĀTI PIKIAO AND NGĀTI TE RANGIUNUORA

An Iwi and Hapū Perspective

Ka raranga te hau ki te uru ka raranga te hau ki te tonga

Kia mākenakena ki uta, kia mātaratara ki tai Whakapūpuke ai ngā ngaru ki te ngarue

Ko ngā pōtiki a Hinehopu E heru ana ki te Mataarae-i-o-rehu e

Get ready for the westerly, prepare for the southerly. The icy chill spreads inland, and the icy cold wind extends to the shore. The waves well up and move back and forth. Tis the children of Hinehopu that flow towards Te Mataarae-i-o-rehu harbour.

9.1 Chapter Introduction

The last chapter evaluated RLC's commitment to resolving Ngāti Pikiao and Ngāti Te Rangiunuora's cultural concerns through an assessment of their values and principles as an essential component of performing kaitiakitanga. To begin, the researcher sought to ascertain whether RLC as a local government authority is guided by values and principles. These were informed by the statutory acknowledgments from the Resource Management Act 1991 and Local Government Act 2002 and their successive reforms. They also occurred through three case studies within Te Arawa rohe that involved iwi and council relationships based on their particular values and principles in environmental and freshwater management. Secondly, was to discover that if indeed council successfully engaged with iwi premised on their values and principles, that council could move toward establishing a Kaitiakitanga – Active protection framework in co-planning and co-management with iwi on wastewater management.

This chapter will examine the questions that were asked of several koeke and a number of pakeke on land changes over time in the Rotoiti and Rotomā areas, as well as the Haumingi 9B 3B land block. The relationship of the Ngāti Pikiao and Ngāti Te Rangiunuora peoples with these specific land areas, including Lake Rotoiti and Lake Rotomā, has been impacted

by changes in water quality and deteriorating health, including changes brought about by the constructed WWTP and disruption of pipeline infrastructure across the two communities.

Although the implications of the data are often indirect, the intent will be to understand through the data gathering whether altering water management and land practises had contributed to the water decline and degradation, and what this means for the koeke and pakeke on the implementation of the reticulation scheme. Because the koeke, in particular, had witnessed the changes first-hand as they grew up along the lakes settlement, being able to assert themselves effectively as kaitiaki with the lake and whenua today as a result of these changes will be explored. The purpose of this chapter is to examine the findings from the qualitative interviews in order to inform Ngāti Pikiao and Ngāti Te Rangiunuora iwi's future actions towards developing a sustainable environment.

9.2 Ngāti Pikiao Ownership

Ngāti Pikiao owns and passively controls most of the lands surrounding lakes Rotoiti, Rotoehu and Rotomā. Ngāti Pikiao has retained ownership of much of its land as a taonga tuku iho. Ngāti Pikiao has a strong uninterrupted link with our ancestral lands, marae, lakes, wāhi tapu and our areas of cultural and spiritual importance. Ngāti Pikiao has maintained ahi kā and kaitiaki responsibilities, and continued to live within our ancestral rohe in accordance with our customs and traditions. The lands are taonga tuku iho (treasures handed down from the ancestors) and as such, the current generation are merely kaitiaki for these lands and lakes to ensure that it is passed onto future generations intact, with the stories, customs and traditions to preserve our iwitanga/hapūtanga, tikanga and mana.

(Morgan, 2014, p.6)

The relationship of iwi, hapū, and whānau of Ngāti Pikiao and Ngāti Te Rangiunuora who have these relationships with the afflicted areas is crucial because they are kaitiaki of their ancestral lands and specific lakes. It is critical to comprehend the distinct cultural context around these lakes while contemplating the effects on their ancestral landscape.

9.2.1 Kaua e takahī te mana o te tangata

The following responses adhere to the principle 'Kaua e takahī te mana o te tangata', with entire interviews by each participant being recorded for this chapter. Maintaining the mana of the iwi occurred by making sure that the researcher (me) addressed and applied concerns of benefit and accountability, since it was crucial for each interviewee that their thoughts and feelings were adequately captured.

9.3 The Questions

Skerrett-White (2018) asserts that the plant's development on the Haumingi 9B3B block, as well as the scheme itself, violates long-held traditional beliefs about human waste management, which has a direct influence on whānau, community, whenua, and the environment. As a result, can the basic architecture and operations of a municipal wastewater treatment plan accommodate cultural values, concerns, and minimise cultural offence? Also, can cultural concessions be made when there are not a lot of practical wastewater options to choose from?

Ten participants, the majority of whom grew up in the Rotoiti and Rotomā communities were interviewed to ascertain their views on the physical changes of the land and waterways throughout their childhood, including through the disruption of the implementation of the reticulation scheme and the treatment plant.

They are either land owners in the Haumingi 9B 3B block, or members of the Steering Committee, Iwi Wastewater Liaison group and/or Cultural Impacts team established from the project; the age ranging from 49 years old (pakeke) to 81 years (koeke). Their views from a kaitiaki lens were thought provoking and challenging. Not only challenging towards the local council, but also of themselves and each other as true kaitiaki. All this while attempting to provide economic and social opportunities for whānau without fully conceding culturally to a wastewater system proposed by Council, that, in their eyes, could adversely impact the health of their land and lakes, and ability to mahinga kai to manaaki other hapū and iwi.

9.3.1 Question – Land Use

What was the land area like around you when you were growing up? Did you participate in any events on this land space during that time?

Iwi Participant Two It was all farmland up on Haumingi when I was growing up, it was all Native. We could go up there as much as we wanted. Because I remember, we've got a farm, right in the middle of the bush. There's one big paddock, the other one's got pines. Also, because it was our grandmother's land, her and her two sisters were big shareholders, but there are a number of people in that land block you know, they were all hard workers.

Iwi Participant Three We used to stay up here a lot with mum's grandparents at the big house, with koro and kuia and I was fascinated by her moko kauae. Koro was a farmer and he'd put us in his truck and take us with him to Haumingi and we'd jump off, then he'd leave and we'd have to wait for him to come back. Haumingi used to be a farm and there used to be a water tower, and we'd play on it where there was a lot of pumice back in the 60's. Mum and dad used to do a lot of trout fishing and fly fishing on the lake when I was 10 or 12 years of age.

Iwi Participant Five Haumingi 9B 3B, really being up at the block that was my only time we went there, coz we'd go up to the back where the water towers were. And we used to slide down the hill on our paper bags or whatever we could just slide down the hill, I was almost a bit of a younger generation. Where my older sisters would have gone up on the farm with Koro. He died when I was about three. I remember sheep being on it at some stage. But we only used to play on it, slide down the hill. We wouldn't really go up there. Our kuia and her sisters used to go up to the block to collect grass clippings. That's how they made money and sell it to the farmers.

Iwi Participant Seven

I can't respond to these questions not having grown up at

Rotoiti and not having spent much time there. I whakapapa to all of the hapū, marae and whenua – land blocks, and I am a landowner in particular whenua. My main involvements have been in school boy rugby and at the kura with Rerehou (taku tama), and in the Scheme in these past 5 years.

Iwi Participant Eight

The Koro and Kuia and the family, they were breaking in all that land from native bush and scrub. Growing up, most of the native bush was fallen and all the trees taken off. They milled all the good timber and the ones that had no value, they just burnt it off. Once they burnt it off they hand sowed the grass. Haumingi 9B 3B, Aratokotoko, and Haumingi number 8. Haumingi 9B 3B was round about 250 acres. Haumingi 8's about the same size, all neighbouring blocks. Aratokotoko is right at the front... and most of it was already developed into farmland. It was in the 50s. Our uncles used to sow the grass seed by just walking the whole block.

There was Jack Lawless and others. Koro Sam brought them all over cause they were all related. Bill Fitzell came from Te Awamutu. Tui Emery, John Daily. They worked that land and turned it into dry stock. Koro built up a dairy unit as well, on, the same whenua, in Gisborne Point...that was all farmland, towards the football field [Rotoiti Sports Club]. He leased all of his lands. The kuia, her sisters are all owners, besides Colleen's Koro Charlie Sarjent. All major owners who more or less leased to themselves. There was the Hart's Mill. Everyone had work. They were milling and falling the native trees at the same time.

Iwi Participant Nine

Growing up, it was a farm and a farmhouse close down by Gisborne Point there on your left-hand side. That was wherethe old wool shed was. It was all attached to that block. Aratokotoko we were all part of one inclusive. When they

were running the farm, they had an agreement for the lease of the whole block. Gisborne Point was part of it. They had paddocks in there. They moved the wool shed from my sister's place. Because we grew up there, we spent a lot of time on the farm helping.

Iwi Participant Ten

First few years it was all metal roads and then it was tar sealed in the late 50's. Then everybody got electricity. Every Marae had table tennis teams and tennis courts, Tapuaekura, Uruika, Punawhakareia and Ruato had inter Marae and they'd go into Rotorua. All round Rotoiti and in town but the top end didn't have table tennis. They had good tennis players so that's always been popular down the top end [Tapuaeharuru Marae]. I can't recall them playing table tennis. There was rugby and don't think there was any netball, they played in town, but there was Rotoiti Rugby, and families, someone from the family would go hunting every weekend for meat, for pigs because our people couldn't afford meat. I used to go shooting rabbits and pork and deer. Otherwise people used to go to the butcher shop to buy brisket and pork bones. It was cheap.

9.4 Response to land Use

Whether in multiple land ownership, land incorporations, or land trusts, the land in both Rotoiti and Rotomā communities is still predominantly Māori owned. For iwi, communal living and practises were extremely essential, whether it was enjoying the land and waterways as a playground or a place to congregate and hunt for kai.

Catchment	% Māori and or Passively Controlled	% Non-Māori Land including Crown Land Public works i.e. Road, Conservation Estate
Rotomā	80% of 2900 ha	20% or 580 ha
Rotoehu	96% of 4710 ha	4% or 188 ha
Total	92% of 12,234 ha	8% or 979 ha

Table 5 . Ngāti Pikiao Whenua or passively controlled. (Source: Morgan, 2014).

Table 5 details Ngāti Pikiao land ownership across the communities, and because Ngāti Pikiao passively controls 89% of the combined area, it is in the best interests of whānau, hapū and iwi members to ensure that their kaitiaki roles are carried out and fulfilled for future generations. Morgan (2014, p. 7) supports this by stating ‘These lands and the activities occurring in and around them are of utmost importance in defining Ngāti Pikiao, shaping our customs and traditions and our relationship with our rohe as well as other iwi/hapū. These lands and lakes are our turangawaewae. This is the only place for us as a people, as an iwi and as hapū to maintain our identity, practice and retain our culture, tikanga and traditions’.

9.4.1 Question - Land Change

Have there been any changes to the area as you have gotten older that are significant? If so, have the changes affected your whānau and hapū? How?

Iwi Participant One

Shifting the soil around on the land block, it was muddy. My son and them do is they're not going to go through the Aratokotoko way to go pig hunting. They used to go up behind the wharekai up that road is not as good as it used to be. It's been through just wear and tear. Down at the lake, I don't want raw sewerage to go in there, cos we get our kai from the lake. They still go and do rama koura... you know it's all part of when we have events on the Marae.

My brother with the tau [koura], Tony Hammond, Johnny Lawless we're they're the only ones that still do the tau [koura]

around here. Kuia Kataraina started it, the pole and that is still down there [at the edge of the lake]. That's our mahinga kai... but you gotta pull the fern, you can't cut it you gotta replace it with the ones in the lake. You have to use a copper line so it lasts. If anything from that land block gets into the lake like tiko, we would not be able to do mahinga kai. They've already got catfish in the lake, mainly from Mourea down to Ōkere [areas on the other side of Lake Rotoiti] and that's no-good cos our lake is not the same from that. We don't want to add to those problems.

Iwi Participant Two

We're worried about the lake and its health. We didn't want any crap being pushed into it. We have quite a few puna that run under our Marae from the Haumingi block. We wanted to safeguard, if there was any crap that comes from up there [Haumingi], that leaked into that, then it'll come down into those puna and then go straight into the lake and we wanted to stop that.

Iwi Participant Three

Up at the block economic changes happened. It was hard to keep the farm going so koro turned part of the block into forestry for 25-years before harvesting and they've got an urupā up there now. That's the only change I'm aware of to that land. The Aratokotoko block next door had the slaughter house. Where the big house was, there used to be a big farm barn and pigs. I remember we used to get on the truck to go down to Te Teko to get watermelon to bring back for the pigs. We had a lot of interaction at the big house with all the cousins, we used to have big family gatherings at Taurua [Marae] which koro ran.

Iwi Participant Four

You've done work around a values-based system. Forget that we call it cultural ways because one of the core deals for my grandmother was all based on values. What you do and don't do, she used to get offended when she'd go to soda springs [Waitangi 3 block hot springs] and see people closeby, skimpily, drinking, not using everything else that goes. Those to her are the things

- that had value. She didn't understand why they desecrate the places that they were gifted. When I listened to her, it was very intelligent. [the] conversations they were thoughtful. But I never really went back that way to the block and the lake, I listened more to my grandmother. From her perspective, she'd not be swimming in someone else's poos and wees. Neither would they [whānau] go out and do rama koura [catching crayfish].
- Iwi Participant Five We had a problem with the lake because it bloomed 15 years ago, the whole lake turned green. We had to do something about it to deal with in our generation. I don't know how well our children will be able to deal with it. We were close as a generation because we played on the land and the Marae when our tupuna were still alive. We had a different connection, I can't really explain it coz I don't see it often today. I do think there is a disconnection as to what's going on at the Marae now with us, before, we used to have Christmas, we got to each Marae? Everyone played with everyone, it was more communal. The young ones don't have that awareness to know, they're trying to get that all from us. But we haven't got the old people here anymore, to gauge that and to feel it. We're the older generation now, we're actually it. But there are none of those old ones, they've gone. Even the older ones alive today are a bit kuare. We're kaitiaki and hearing their korero about being brought up with the land.
- Iwi Participant Six I was 17, joined the army, got posted in Auckland and spent 16 years there. We used to come back to Rotoiti alot. I saw the changes. The areas we played in as kids, have houses up there now. I can't remember when that happened, because we used to play up there all the time, where Pini lives. We were at the back of that place all the time, because the track that went up to Rotoiti 15. We never went up to Rotoiti 15. Over time, a lot of houses that people lived in, don't they don't live in now. They look condemned. There have been housing developments on a

small scale. There's a Papakainga, but there's only one or two homes. Arapeta is living in one. It is the only house there. The biggest change I've seen recently is whenua kura [land block]. The Kametas have all those transportable homes. I think that's part of their housing shortage and affordability issue, which is quite prominent up there. you'd see one or two homes, now there's quite a few of them. I think they've got more at the back. A housing and affordability issue.

Iwi Participant Seven

My initial reaction to a WWTP being built on Haumingi 9B3B was one of horror. I didn't understand how the trustees—cousins and Aunty—could contemplate, let alone agree to all of the wastewater from homes in Rotomā, Rotoehu, and Rotoiti being piped up on to the whenua, treated there, and then disposed on to the whenua. I wondered how this could work, or be a positive, my thoughts being immediately of failure and the impact of this on the urupā, marae, homes and the lake located directly in front of the then proposed wastewater treatment plant.

Iwi Participant Eight

It was the only decision they had because the land was, wasn't economic. It wasn't paying its way. They had to develop it into farmland. That's similar to all the blocks in Rotoiti, Rotomā. The Rotomā was the biggest farm block. The Waitangi blocks, the Tamanu blocks. So, for those uncles and koros and kuia to come back and see what we've done after all their hard work of cleaning up and developing them into farms and we've gone and put it back all into trees [forestry], we had to make sure it was economic. Rotomā and Rotoiti the same. They were developed the same way and gone back to pine trees. Those were the changes that I saw made over time.

Iwi Participant Nine

Alot of the blocks, like the ones down by the Rotoiti sports club are Haumingi blocks and are under different titles. Some families were put in these Haumingi blocks and whānau put in others. All under Ngāti Te Rangiunuora, being one hapū. We're

all part of that hapū, but not all of the same blocks. It just showed that our old people thought about the future where they couldn't give everything to everybody. When you look, it wasn't nice to be in those types of areas [in blocks down by the lake], because Maoris didn't like to build there, because of their paru. They built away from them. Now you've got these people and their sewage systems. That's how a lot of pākehā got those lands [by the lakes]. Gisborne Point, is named that because people who bought down along the shore were from Gisborne. Those are the changes I've seen over time.

Iwi Participant Ten

The hills that are at the back behind Emery shop I used to run up there to train and it was all grass, then there was all scrub and rubbish up at Haumingi 9B 3B. It was all scrub up there, it was shocking, I couldn't run up there like how I used to and Philip [son] when he grew up he started running up there yeah you kind of you get to the top of the hill and it was all scrub and rubbish.

9.5 Response to Land Change

Due to changes on the land throughout time, the landowners of the Haumingi 9B 3B block have had to convert a portion of the land area to forestry and pine to make it economically viable, along with the recent construction of a wastewater treatment plant. Although kaitiakitanga for Māori landholders was about protecting their Māori farms in order to benefit tomorrow's generations (Smith, 2020), with these changes came concerns about the impact on iwi in Rotoiti and Rotomā's health and well-being. Because, while the goal as kaitiaki is to safeguard the natural environment's mana and mauri for their uri whakatupuranga (descendants), the need to survive has resulted in cumulative repercussions on the health of the underground puna which then joins the main waterbodies to the lake.

9.5.1 Question - Construction of a Wastewater Treatment Plant 1

Could you see the construction of a Wastewater Treatment Plant working for you and your whānau? How?

Iwi Participant One

I don't know. If it is going to be smell? It's the odour I'm worried about. Because having our Marae there and having our cemetery up the top there. It's the tapu stuff, its closer to the urupā than to the Marae. I wish Rotomā [Māori LandIncorporation] had allowed the plant to go through the bush back there on their block then it wouldn't have affected anybody. I still want my septic tank, cos I only put it in about 5 years ago. It cost me a bit of money. My sister in law and brother told me it was leaking onto their section down below the hill, so I had to change it. The other septic tank had been there since I was born.

Iwi Participant Two

I was one of them that objected to start with as a landowner. Four of us signed although others signed too, they were the silent ones. They couldn't go to the Hearing, so there was only the four of us. I didn't want all the crap to go up to our whenua. We were told from the Trust that this was going to happen and we thought 'No' we are not going to let it happen. We'd told council that too, we told them what was there and that we were not going to let that happen. We didn't mind the liquid going up there but not raw sewerage. We had to safeguard, we had to make sure that they [Council] did their job properly. We have the urupā up there behind the Marae, but they [Council] made sure in their agreement that they were going to make it safe, they were going to make sure it was all fixed, so that the urupā would be cordoned off.

Iwi Participant Three

There is a 50-year lease on the plant that I'm aware of with a right of renewal but that's debatable, I'm not privy to the details of the lease. It was drawn out with the owners communicating and giving their opinions. My fear was having it piped right

round the edge of the lake, the danger... the safety of having it there and thinking about the earthquakes like what happened in Christchurch, and that pipes all tipped over into the streams. What was safe was the old septic tank system. But in order to meet the demands of today and in the future, they had to construct something on the land, and be prepared to agree to give up the land for the benefit of everyone, for the whole country, the health and safety. We went to a site in Piopio. That interesting to see because it's all piped to a central system, treated with ultra violet light and the various processes it goes through. A Biolytix with the lid its radius is too large, and the impact of that, which it has pipes, it has drip lines, so you can't drive over the top of them, so it renders the land useless.

Iwi Participant Four

I think the reticulation being the removal of household waste, treated at home, and you understand the challenge that we went through at Haumingi. We're asking to build a wastewater treatment plant at the back of a Marae. And if it wasn't for her [grandmother] brother and sister supporting it in a particular meeting, they can answer to her, I thought, alright. You'll put your waste in the back of our Marae. We talked about discharge, It's not going to filter out immediately, it will predominantly go right into our groundwater into our lake and puna. Then we have biological treatment, which is the big treatment pond up at the block, you have a filtration process, that is the technology that is only getting better. So, in terms of consumption of the waste product, in terms of minimizing the toxicity and the composition of the household waste going to this ground? You've got all of these barriers, that help to basically take something that is from a cultural perspective offensive, and turn to something as benign.

Iwi Participant Five

I knew that they [council] were looking for whenua, for appropriate whenua to put it on. Once we identified that, and went through the process, we've been totally involved in how it's going to look. Before we went any further we made sure that the

infiltration system, when it goes through the whenua, and out the bottom, there's proper monitoring. We will be involved in the monitoring side. If there's anything detrimental that happens to the wai we're right there. They haven't talked about saturation. I've tried to ask them [council], over a period of time, 10 to 20 years, where it becomes totally saturated. But actually, our younger generation, there's nothing happening. They're not employed. A few of them went up to the WWTP and got employment on the scheme. So it did work for some of us. Use it as an opportunity for our rangatahi.

Iwi Participant Six

The benefits of having a wastewater treatment plant allows development, With the size of the plant which has been built you can develop around Rotoiti which is doable. That's one of the advantages of the scheme. To the homeowners that have to pay to connect. There's a lot of our whānau who are not gonna be able to afford that. Not sure how we're gonna support our whānau to connect because of the cost, increase in rates. I think something that Taira said at the start was we should have done a cost benefit analysis coz of the amount of money we've invested into this project. I know about the previous scheme that the council tried to implement and where we took them to the Environment Court. The judge made a statement, when he was reading the findings of the hearing. He couldn't understand why we were putting in a reticulated treatment scheme. Because the amount of effluent... it was really minimal flow (leaching) into the lake.

Iwi Participant Seven

I didn't understand how the trustees could agree to all of the wastewater from homes in Rotomā, Rotoehu and Rotoiti being piped up on to the whenua, treated there, and then disposed of. My thoughts being immediately of failure and the impact of this on the urupā, marae, homes and the lake located directly in front of the proposed wastewater treatment plant. Distrust resurfaced amongst the whānau with the offer to the RLC of the Haumingi

9B3B whenua as the WWTP site, the offer made by the chairman of the Trust at that time – their dad, uncle, cousin, and nephew. This was seen by a large number of whānau – Ngāti Te Rangiunuora, and Haumingi 9B3B landowners and beneficiaries – as a non-consultative and collusive decision that impacted mana whenua and mana moana kaitiakitanga. It was a decision fraught with disagreement, which created friction, caused rifts, and set the scene for a challenging journey. Whānau couldn't see it working as they would have to give up their hunting ground, childhood playground, the whenua farmed by their fathers, Uncles and koroua to become the site where 'tiko' from the whole community would be collected, treated and processed, disposed on to the land to filter down through the pumice soils, and eventually seep back into Lake Rotoiti. The impacts would be to the whenua and the moana – the traditional food baskets of the generations of our tūpuna down to our tamariki mokopuna of today, and tomorrow.

During this period a Ngāti Pikiao Cultural Impacts Team was established. The resource consent was granted with the submission received from the Ngāti Te Rangiunuora whānau expressing their opposition and reservations about the Scheme and the building of the wastewater treatment plant on their whenua. An agreement between the Ngāti Te Rangiunuora submitters and RLC was reached, the Agreement for Cultural Management of the RRSSC written collaboratively between RLC and the Cultural Impacts Team then signed off by Ngāti Pikiao Council of Elders, the Ngāti Pikiao Environmental Society, and of the Haumingi 9B3B whenua as the WWTP site the RLC.

It was through this process that my whakaaro around the Scheme and the building of the WWTP on Haumingi 9B3B changed with the realisation that as kaitiaki of ngā whenua, ngā moana, me ngā awa it is better to be a part of the solution rather than be provided with a solution and told how it will work. This would

have likely happened; the Council would have gone ahead and found their own solution which we might not necessarily have agreed with.

Iwi Participant Eight

There's money and economics that's better than farming. Today's about environmental stuff. Iwi has done the right thing. They'd be turning in their [Koro and Kuia] grave if they came back and saw it was all back in the trees. By centralising the, the sewerage... we could have brought it back to Rotorua. The issue about Rotorua is whether that was doable for us... Cost-wise, and whether this one, the way we've done it on our own land, whether it's gonna be cheaper? It's knowing the differences between cost... and environmental issues. If Haumingi 9B3B didn't meet the environmental criteria, would never have happened. Whether it went through Rotorua or it's done at home [Rotoiti], it's about having healthy lakes and looking after the health of our people. The research, has proven that site was suitable to have a plant of our own. With the urupā, it's only been there the last three, four years, it's only a new urupā.

Iwi Participant Nine

I think our chairman of our Haumingi 9B 3B trust is thinking about everybody involved in Rotoiti. He's making sure the council did sewage systems for our Marae and sports club that he has a lot of aroha for. We're trying to get the best deal for the future of our owners in that block, and we've helped everyone else. I don't think they've [landowners] been informed enough about the construction. There are a couple of hundred owners. A lot don't live in the area, so they can't go to AGMs. A big problem is putting out pānui to let them know. Then whether they understand what the pānui says. It's mainly the ones that are around this area that really do the mahi to try and get the best for the whenua. I can only talk on what's been told to me by those that are close to the construction. At first it wasn't, because council wasn't letting our people, who were supposed to be part

of that, help with the construction, because they know everything. That's the issue with council all the time, is their consultation is not very good.

Iwi Participant Ten

I think we will have benefited by sending it back to Rotorua [sewerage], but the reason why they wanted it up there so it'll cater for the pakeha in Rotomā, it's not being built for the good of the people in Rotoiti, we're having trouble with where we are at Rakeiao [Marae off SHWY 30]. If they're building it for the people they'd be going from Maraе to Maraе. The one thing that the council keep saying is around the lake quality with the plant, it will help the health of the lake so of course any filtration scheme will help with health or anything, but it's what you do with the crap that comes out of it. Where do you put it?

9.6 Response to Construction of a Wastewater Treatment Plant 1

Although some participants expressed the opinion that the communities would have benefited from the sewerage being piped back to Rotorua or keeping their old septic tank, the health of the lake was paramount for the primary purpose of being a food source and there was also the significance of the concept of tapu and noa, which involves mixing clean water that goes into the body with tainted water which was culturally abhorrent to Māori. These waterbodies were, and still are used by several of the iwi who are mana whenua of that section of Lake Rotoiti and Rotomā. Morgan (2014) summarises this by saying:

Each lake had its own set procedures and protocols which all were required to adhere to. In Lake Rotoiti for instance, the stretch of lake-shore from Koro-ki-te- Wao to Te Tawa was the established territory of the Ngāti Tamateatutahi. These people took koura from the area and from that area only and never any other part of the lake. The Ngāti Rongomai had their own lake-shore territory which extended from Hingarāe (Ruato) to Tapuaekura; no more and no less. In a similar way was the whole lake-shore divided and shared amongst all the hapū of Ngāti Pīkiao – Ngāti Te Tākinga, Ngāti Kawiti, Ngāti Hinekura and Ngāti Te Rangiuuora.

Therefore, by constructing a wastewater treatment plant with pre-treatment at the source (on each owner-occupier's property), before being pumped to the plant, it would significantly reduce the culturally offensive nature of the wastewater as faecal matter is separated and the wastewater has passed through the humus layers in the tank (Morgan, 2014).

9.6.1 Question - Construction of a Wastewater Treatment Plant 2

What culturally appropriate solutions would you want to see with the construction of a Wastewater Treatment Plant?

Iwi Participant One I listen to my nephew and my son Hone on what is the best system. I know the one they are wanting to choose is the one that is not going to leach back into the lake. It's not right to have the paru in there... cos you can't get any kai out of there. I also think about how much I can afford. I'm wondering how am I going to pay for it? Especially if I'm a pensioner. They keep coming up with these new things and it costs. And what about our whānau who own their own homes that have been handed down to them and who have to work to pay the bills and put food on their tables, if they lose their jobs then what? That's even after they have it put up on our own land too.

Iwi Participant Two We are the Kaitiaki of the whenua and the waterways because that is where the crap is going to go and that is why we nominated Hone and Wiremu to go on that steering committee to make sure that everything we put in the contract was going to happen, right up to the lease. The agreement is for 50- years. We did it for our own whānau and the community, for the people who live here as well as the ones that are coming to live here too. We put extra numbers on it, to cater for them, but in 20-years' time it might even be bigger, so that's something Wiremu and others have to look at. We know the kind of systems we are having will help to treat the sewerage before it

- goes up to the block, which is what I don't mind. I don't mind having our septic tanks too but this will be different once we get hooked up.
- Iwi Participant Three Not the Biolytix because the impact it will have on the environment, may be a negative impact, even though I'm not an engineer. The various meetings we've attended around this. Where the plant is, we've debated it. They've given us all the plans, the visuals, but it's all part of the legal process and they have to adhere to what's in the lease agreement. We've talked about key issues for the land owners such as the land that the waste would be safe that its treated for pathogens before its discharged on the land, the health issues... airborne and water borne bacteria are all going to be contained and there is a monitoring programme which I'm happy about.
- Iwi Participant Four Pre-treatment is a concept. And it's not a unique concept, but it is a concept. And with the products that you use as pre-treatment products, they adjust their products, engineered products. And the concept around pre-treatment is like going to a hybrid car and going to an electric car and going to hydrogen generation solar generation for electricity. This is a coal fired plant. It's a concept where your starting to implement, solutions that keep closer and closer to it constantly, the concept of pre-treatment is about the highest, doing something up front addressing a problem immediately. And getting the highest level of pre-treatment. You get bang for your buck. But the key thing is, without reticulated infrastructure, you do not have an option.
- Iwi Participant Five As long as there's pre-treatment before reticulation away from the property, because we can handle most of the para on the property. After a period of 7 to 8 years you can just get that emptied. I'm quite happy as long as it's pre-treatment prior to leaving the property because I don't want what happened in Christchurch. In the end, they had OSET systems. There was

Iwi Participant Six

shite everywhere. I'm okay with the STEP system and the grey water. As long as there's no para, it's okay to have it treated at the plant, and it's infiltrated from there. I'm worried of the vermicast, that kind of system, the visual look of it. Okay, that is huge. All I'm seeing is Rotoiti being filled up with these, they're visually offensive. Culturally, you can get it right, you know, it benefits the environment. So, it's a win win situation environmentally, this is what's culturally acceptable for us, but in terms of environmental health its huge. We need to say to our rangatahi, Congratulations, you guys. We took part in this.

Culturally, I think with the STEP system, if there were to be a huge failure, out at Ngāti Pikiao at Rotoiti that affected Rotoiti and Rotomā like an earthquake or something huge like that, and we just had one similar to Edgecumbe, it was quite big on the Richter scale. Where it's yeah, there was a lot of movement on the ground. I'd think that the STEP system at Rotomā would possibly create more damage to the whenua and the wai, than what we are proposing to have at Rotoiti, and that is because the level of treatment out of a STEP system where the performance of the STEP system compared to Biolytix. The level of treatment in Biolytix is a lot higher than the added step. So, STEP, I think you have a lot more nasties and STEP even after it's gone through that treatment process... compared to Biolytix, which still has nasties. But most of the nasties that we are concerned about like the faecal matter, it stays on site. So, it's still at the source. I believe, if we did have a massive natural disaster, you still have the ability to use your Biolytix system. continuously. Compared to STEP, once the system's full, that's it you can't use it. Oh, okay. So I know with Biolytix, you can put a connection in there where it does can disperse the waste, the waste content flows. So, you can have your own disposal field. Yes... and little drip line or something like that. So, STEP, once the tank's full. And even the holding tanks, pump stations, once those are like that, you can't put any more wastewater into it, because then it'll probably

overflow up on the way. Whereas Biolytix you can, and that was something that I think that was an important issue that came up when we were at the early stages of the steering committee.

Iwi Participant Seven

Thanks to the recommendations of the two Cultural Impacts Assessments and the expert advice from the Haumingi 9B3B Technical Advisor, the culturally appropriate solutions have been implemented in the design and build of the WWTP. The quality of wastewater arriving at the wastewater treatment plant of an acceptable quality due to the onsite pre-treatment, also the location and footprint of the WWTP designed to minimise impact on the whenua. We've had technically robust state of the art equipment and systems for further treatment of wastewater which meets cultural values expectations. Capacity for future papakainga developments on Haumingi 9B3B, and also other whenua from Matahī Rd at Rotomā to Curtis Rd Tapuaekura. Then, the access road to the WWTP options as planned were culturally inappropriate due to route of the pipes and the proximity of wastewater in the pipes to the papakainga and urupā and this was changed.

Iwi Participant Eight

As long as the pre-treatment system does what it's supposed to do? The reports tell us it's going to take most of the parū out before it even gets to the plant. If there's leaks which there's always the factor of risk. I think it just has to be dealt with on the day. Council may, we'll have to work through the resource consents anyway, they'll have to address all those issues. But then again, who pays for that? Because, if you compared STEPS with Biolytix, that Biolytix should be the better system for us. And it's only because you have those worms. The worms that take care of most of that stuff. The percentage of risk is much lower. I'm relying on the best systems to work for us. Even though for Rotomā. STEPS is the only system for Rotomā. Because there was a timeframe to making sure that Rotomā was gonna be on this whole journey with us. The subsidy [MoH

subsidy had a timeframe]. If it wasn't for that timeframe and we were to wait until, we decided on the Biolytix for Rotoiti, and it wouldn't have happened for Rotomā.

Iwi Participant Nine

At the moment they're doing the tendering process on the pre-treated systems. There's only two. One is Biolytix and the other is STEP. The issue with STEP we have is the filtration system and that you have to empty it every so often. It needs maintenance, which means council will be charging us again. The other system, Biolytix, you have a worming farm system inside the tank where uh the waste water leaves, but the worms are supposed to eat away at the by-product left behind. I think those people [Iwi Engineers] were the ones that let us know what was going on and the options we had. So, it was just luckily um there was people around to tell us

Iwi Participant Ten

I think any system is better than the old system that we had it was really a nil system. You just dug a hole in the ground, put your s**t in there and it found its way to the water. But that wasn't the real crap. The real crap was 60 years. This council put raw effluent, our s***t that went straight into the lake! And for years, the old people tried to say you don't mix s**t with things that you go into your face. And that's why when we were growing up the mothers weren't allowed to have tiko [human faeces] from a nappy being seen inside the house in the kitchen anyway other than in the bathroom. Or the wash house because they knew that tiko wouldn't be allowed to be thrown into the rubbish bin in the kitchen, they'd [koeke] go jumping mad!

And the other thing when we're growing up was the old people had their little platform on the lake, like a little table and did their washing. They had tub loads of washing and most people washed on a Saturday morning, all day washing on this little platform but they made sure that all the sh*t from the nappies was gotten rid of before it came to the lake.

Whatever they did it wasn't put into the water because the water

went into your body and therefore human s**t must not be associated to come into your body. So, everything with nappies, children nappies, the tiko had to be removed or cleaned before going to the lake. So as kids we grew up knowing that we mustn't s**t in the lake.

9.7 Response to Construction of a Wastewater Treatment Plant 2

Although there was some disagreement as to which onsite wastewater system (STEP or Biolytix) provided the best quality and level of pre-treatment before being pumped to the plant, the main outcome that gave iwi members some confidence was their ability to learn from the devastating Christchurch earthquake of 2011, which destroyed every component of the wastewater reticulation system. Treatment plants and pumping stations around Christchurch and the Waimakariri area, as well as pipe networks throughout the city's wastewater system, were all seriously damaged (Zare, Wilkinson & Potangaroa, 2011).

As kaitiaki, their ability to create decision-making processes based on these learnings demonstrated their skill to not only plan effectively for the future, but also to attempt to futureproof the system and plant to deal with these types of natural disasters, such as double-sleeved pipes to reduce breakage, pre-treating at the source rather than raw sewerage moving through pipes, and property owners still being able to use their toilets post-earthquake as the pre-treatment system allows for this.

9.7.1 Question - Construction of a Wastewater Treatment Plant 3

How would you like to see the re-use of the grey water from the Treatment Plant?

Iwi Participant One

The treatment plant is supposed to be there for 50-years. And I can see that they've put the road up to the plant on the Aratokotoko block, but it should be on our block, and now they're thinking of putting a papakainga up by the plant a bit later on, but why would you want to do that? Put it beside the sewerage? But they could grow trees around it from that water.

They have the one in Rotorua it's not far from Ngapuna, and they've got trees growing around there.

Iwi Participant Two

We didn't want all the raw effluent to go up onto our block, we asked them that when the plant is put in we want the council to come up and drink the water, to prove to us that it's safe and drinkable. Also, they said grass, that people will want that, that is what we want too. We asked if our locals could be employed and have jobs up there to do that, it's good to see that they are our own who are also working up there.

Iwi Participant Three

We've discussed other issues whether we could use the waste for cropping. If it hasn't got any pathogens in it then we could reuse it for compost, plant growth, or for manuka cos I'm all for saving the bees. Further out where you've still got forest, pines you could do a nursery, or you could grow flowers for commercial use, for export, for cropping we could have tomatoes, further down the track or using the water for hemp for herbal medicines. We can develop Haumingi 9B 3B into a papakainga and the access road developed up there will benefit us as owners. The reuse of the water could it won't be getting back into the soils. The springs below Taurua Marae is going to be monitored by a water scientist to see what is going to come out of the plant. Another monitoring part is up at the Wai-iti stream that they will be monitoring. The Geotech scientists that have looked at land cos it's going through pumice [up at the plant] which has sand and goes through a bedrock. So as long as all the monitoring is going...the safety issues for the whenua. The geo tech has cut into the land, they've not just ploughed into the bottom of it.

Iwi Participant Four

In 20 years' time, all of us could stick our hands up and wish we had money. That's what this is, someone had a vision. The owners had the pleasure to join in the partnership, your left-hand and right-hand relation, set your land for something that really brings the ideas together like the Waste Water Treatment Plant

that is visionary, it's a dream, people like Willie and us won't be around to see. So you're fortunate that you had a mechanism such as the plant and the forestry, you had a vision to build a community, but much in the same way, my grandmother had then having infrastructure is an important element if you want to retain people living on your land, to support your Marae and community, to retain Maori leadership. Rather than talking about water re-use it's about the vision for the block from the owners, that's the important thing, everything else comes from that economically.

Iwi Participant Five

I have actually written that the plant has to be planted with manuka when it comes to re-using the grey water, to bring in bees. Start to run bees and creating honey, because it provides opportunity and employment for our people. Its hands on being on the whenua every day. Looking at the whenua and making sure that it's still alright. We need employment. We need our own people doing the monitoring, and the beehive and looking after the bees etc.

Iwi Participant Six

I think it's a fantastic opportunity for the landowners. I think there's huge opportunities to reuse that treated water. It could have still gone back into the ground, gone through another treat natural treatment process and ended up in the waterway. There's potentially financial opportunities for the landowners. Growing crops that you could sell. One of the ideas was to grow flowers for our honey. We're talking also what they do in Taupo. They reuse treated water to grow crops for farms, like hay, I think that's what it was. And there's money in it.

Iwi Participant Seven

I think utilisation in the cultivation and harvesting of crops or trees on Haumingi 9B3B as an economic initiative for whānau, hapū and iwi.

Iwi Participant Eight

With greywater, the first option that it goes into the disposal field, and maybe some more research during that period of time. It should be done on the water and whether we can use it on

crops or whatever. But at least with the disposal fields we know that it's gonna be contained in that area. If it ever does get to our fresh water lake or streams it's 100% pure again. Then when it goes in from the plant into the ground it... we should be monitoring that right from day one. If that water can be used again then that's fine. Because they were saying part of the five and a half hectares, we'll be able to grow grass and hay etc. But we're not convinced whether that's the right thing. that was coming from out of the council. Whether we wanted to fence that area off, the total area and use it for growing hay or whatever [for] hay or crops. By using that water. And I don't think we should rush into that.

Iwi Participant Nine

We have forestry, and why don't we feed our forestry that same water? We have asked council to help us with being able to make small shrubs and trees and use that water as well. If there's excess, my understanding is it's going into the ground and then it's just going to work its way back to our groundwater. But we have an agreement that says they have to treat this water till it's almost drinking state. So... it's pretty hard to say, because I personally wouldn't want to [drink it].

Iwi Participant Ten

It's like economic development time, for our people. There's not enough evidence to say that, putting it straight back into the lake, it will not have problems. That's what they [Council] said about when, when they sent it up to Waka [Whakarewarewa forest]. But, thinking positive is the way to go. It can help and have far more positive growth when it's applied on the land or in the water, but we don't know until we do it. I've still got no faith that is 100% what I don't know are there other chemical structures within the water that can affect the land in another way? We don't know until you do it. Like if you're doing an experiment, you have certain acres there with this water growing certain plants and using the current water which we've got which is useless and then you can compare the both whether that

goes worse, all that goes better than this. But don't send it back into the lake. And when it does go back into the lake which we agreed to that [with Council]. Then we monitor it every six months for three years. Then after three years monitoring every six months, it could affect the water then it doesn't go back [into the lake].

9.8 Response to Construction of a Wastewater Treatment Plant 3

According to Maimon, Tal, Friedler & Gross (2010, p. 3213), 'greywater is defined as all domestic sewage, with the exception of wastewater generated by toilets and bidets. Grey water is mainly comprised of effluents from showers, wash basins, and laundry. Kitchen effluents are often referred to as part of the blackwater (water that contains toilet discharges)'. Wastewater solutions have a strong bearing on the economic potential of our communities, thus, the iwi participants saw an opportunity to use this to their advantage by advocating the reuse of the treated greywater to grow manuka. As Iwi Participant three stated 'you could do a nursery, or you could grow flowers for commercial use, for export, for cropping we could have tomatoes. further down the track or using the water for hemp for herbal medicines'. As a result, 'greywater reuse can help to relieve demand on dwindling water resources. It can relieve pressure on central sewage conveyance and treatment facilities (which are already overburdened in many cases) and provide a reliable water supply for year-round gardening, even during droughts' (ibid, p. 3213).

The economic opportunity of employment for rangatahi adds to this mentality. 'Our younger generation, there's nothing going...' said Iwi Participant five. 'They are unemployed. I know a handful of them who were unemployed and then went up to the wastewater treatment facility and got jobs there. For the purpose of construction as a whole. They're currently enrolled in the programme.' The economic prospects were seriously considered and implemented through the lease agreement between the landowners and Council, whether it was through reusing the water for planting or monitoring, or by 'reusing for gardens or... cultivating grass' (Iwi Participant eight). Further to this, an RLC land Architect and members of the Cultural Advisory team developed a Planting Plan on the land block along the parameters of the plant, based on the landowners' goals (see Appendix Ten for detailed Planting Plan). It was

complemented with pest management, weeding, and planting schedules, as well as plant health monitoring procedures (Rotorua Lakes Council, 2019).

9.8.1 Question - Developing an OSET System

With the eventual development of an OSET system, would there be potential cultural impacts on the land? Would there be potential cultural impacts on the waterways?

Iwi Participant One We don't want to be like the Rotorua plant and have the paru seeping back into the lake, into the water. If people hold onto their land down here without selling it, because people need to build on it, then I know that they will take care of the lake, and we shouldn't have the same problems like in Rotorua even if we have these new systems on our sections

Iwi Participant Two We told the council that we didn't want the pipes to go on the lake side of the road, we wanted them on the other side of the road away from the lake in case if anything happens to those pipes. With the plant, they wanted to build it close to the front, down where the Marae. We wanted it away, from the urupā and the Marae because of mixing that with our cultural activities and we're there to protect the whenua. We didn't want the sewerage to back into town cos that was what was going to happen if we didn't agree to the plant, so we had to sit down and think about it. If it goes past Rangiteaorere and Ngāti Uenukukopako [other iwi areas] then we'll be worse off and we've got no right to go past them, that's just a big 'No – no' for us. Another reason why we agreed to the plant. It's a good opportunity for our young ones for employment. They'll look at the plant after 50-years and they'll review it but Hone and Wiremu will be there to keep an eye on it, they're monitoring it for us. We'll have to give it a couple of years after the plant being built, and we could build papa kainga up there, not just for the koeke but for some of the whānau down here in Rotoiti who don't have proper whare.

Iwi Participant Three

Not happy about the OSET system, you have to pay for it which is about \$20 to 30k per property, a huge cost. You maintain it and pay for it, expensive to install and to run. Whereas with the STEP system, the council will take care of it, you pay an annual fee. Not the Biolytix, the vermiculture, with the matting inside with all the worms, it will only last for a couple of years and then it will have to be replaced which is disgusting, you'll end up doing to environment and the lake, so not happy with Biolytix with all the meetings we had still not impressed. But I'm all for the STEP system, in favour of the modernised version of the STEP, the grey water is all taken away. I'm accepting of it being piped up to the plant because it will get full treatment when it gets to the plant, the only proviso is that the pump system that is pushing the fluids along the lines has to be well maintained with no break downs. They have to be top quality and double sleeved pipes. There should be a contingency. With affordability of the system, at a recent Rotomā meeting I put it to council that if you've got a rates system that you need to have separate sub accounts so that it doesn't cripple the ratepayers. But we need a culturally acceptable system and piping which far outweighs the economics which is the affordability of the system. But we're all going to have to wear those costs as ratepayers so the government and council will have to look at that. Because we're also looking at the health of the land, the lake, the health of the whenua, the health of the ngahere that's really important.

Note: Twelve months after this interview, **the participant was no longer in support of the scheme**, and wanted this made clear to the researcher and have recorded since the interview. Strong and valid questions were asked by the participant to the council:

1. Through making enquiries with the RLC I found that we could have two pipes lines on our Taumanu A property as we have two dwellings - this means we

could be up for \$30K in expenses.

2. RLC did not communicate with us that the above ground "**odour filter**", with what could be five lots of "underground" valves, has been put in place outside our property, close to our boundary, and a bus stop. The proximity to our homes, health and safety, offensive smells, lack of communication with the land owners which leaves something to be desired.
3. Where are the "**other odour filters**" being placed along the pipeline, and what impact will this have on our whānau?
4. Are there breaches in the agreement?
5. How many of our extended whānau were in the know about the odour filter, and failed to inform us - especially as our immediate whānau had already **rejected a pump station** beside our bach.
6. Have to look at wider picture i.e. Generator station outside Waitangi No.1, construction further up SHW 30 just past Taumanu, and what we have not been told.

Iwi Participant Four

What is a septic tank? A lot of the properties are so fundamentally septic. You're putting untreated human waste, and waste with very little barriers between the lake and the discharge field. So, when you put your discharge field from your septic tank into the ground, and the tide goes out [from the lake], all your septic discharge goes out, well, that doesn't go out for over a period of a month to allow for treatment because it goes out with the tide, twice a day. So that is an easy way of understanding how septic tank discharge goes from your property or your discharge field 20 meters away from the lake edge. There are very little mechanisms to prevent that. So, you're not going to go swimming in someone else's poos and wees. That's why with pre-treatment it is a very important part. Because it's a filtration process. It's at the source of the problem [on the property]. It saves you spending \$10 million on a wastewater treatment plant that the council has to do that. So,

when you look at the conceptual model for how to solve a particular problem, dealing with the problem immediately. So as soon as it flushes down the drain, it goes through a process. So, you're doing it immediately, it is an incredible response. That's what we're looking at here, is tidying all that up. From a social model, you can also do the same way as someone sees where you start to say people take responsibility to choose better products. If it's easier on your pre-treatment system then it's easier on the environment, try not to treat water like it's just appears. Try to reduce the amount of water that you will return to waste. So perhaps that's pre-treatment, where you have a system that is more sensitive to a fully reticulated scheme. Maybe it helps change attitudes. These attitudes are essential were just fortunate we are in a country where water seems to be plentiful.

Iwi Participant Five

My younger cousins, and I totally understand about the use of the whenua, because we do have to safeguard our whenua, it's pristine land of the most beautiful, then you have to weigh up all what are we going to do then? We're saving one, but we're killing off the other. Being up near the urupā it was unacceptable [treatment plant], but I think we're probably perhaps haven't really sat down to see what we're working with, we were in a sort of a catch 22 situation? Well, we either sit here and do nothing. Do we help out the land which can help out our Father and mother [Ranginui and Papatūānuku].

There was a point that was brought up around pig hunting, you know, the whenua, that that was no longer allowable. What will happen to that is just part of their cultural wellbeing. But they're still allowed to hunt. There's a roadway on the right-hand side that goes up around the back of the block. It belongs to the hunting club. So, they still have access.

Iwi Participant Six

We would have been better off culturally in terms of, well definitely the quality of the water would have got progressively

worse over time, if we did nothing and culturally, that's not good for Māori. Because, you know, we were especially, we use our waterways for sustenance. It's manaaki of the hapū. Culturally, it's for Mahinga kai... because the transfer of para was a key cultural issue, having a culturally accepted solution was right for us. However, given what we know now, I think we could have done it [the scheme] in another way that would cost less to follow and could possibly be more culturally appropriate. We could've had clusters [of OSET systems rather than reticulation] because you're definitely minimizing the risk on our cultural sites, because you don't have pipes going through, you know, traveling along state highway 30. The pipes are sort of contained within that area. I don't know if that would have been cost effective. But that was another exercise that could have been done. Yeah. I don't think we were presented with enough options [from the Steering Committee]. I think in terms of kaitiakitanga, we did the best we could, given the circumstances. I think if we were in the early stages of the scheme where we actually helped moulded and framed it. Yeah, [we] would have been a lot better. I think so. I think we're just naturally, kaitiakitanga is just something natural that we do.

Iwi Participant Seven

We are a lakes and thermal activity region here in the Waiariki-Bay of Plenty. Sewage management in the history of the Rotorua County Council – Rotorua District Council – Rotorua Lakes Council has not been able to effectively manage and respond to population growth and development in the region, the sewage requirements and management of such that go with these, and the significance of our lakes and thermal activity environment. The laying of sewers, septic tanks, the construction of the Treatment Plant and its sewage treatment processes, grinder pumps, historical discharge to the Puarenga Stream and Lake Rotorua, and in recent years discharge to the Whakarewarewa Forest have been standard methods for

effluent/wastewater management in their times. Council's usually go with the status quo and are not always innovative, although this is debatable as the history of wastewater treatment is an innovation nē? So, whilst making criticisms, or judgements about the Council and its past and present mahi, I understand that stepping outside of the box and at the same time satisfying the thousands of often dissatisfied ratepayers and our different worlds and ways and ideas and opinions is a challenge. It's positive to see the BoPRC policy requirements for OSET in the Rotorua catchment – including Rotoiti, Rotoehu, Rotomā 'home'. It's interesting however to see that Biolytix– the system to be installed at Rotoiti is not identified as a potential aerated system for the catchment in the list of 6. So, whilst OSET systems are a positive, the 6 systems would all need to be evaluated for their culturally responsive capacity before being accepted as systems for any particular sewerage scheme. So yes, there could be cultural impacts on the land, however as I'm not familiar with the specs and performances of the systems I can't comment further. We do know what our Ngāti Pikiao cultural, environmental and technical expectations and these would need to be included in a robust evaluation process with Ngāti Pikiao participating in that process. Given the above, the Council has therefore stepped outside of the box with Biolytix. We as iwi can acknowledge and support this, and do our best to see that the installation of Biolytix at Rotoiti as a success. And perhaps this comes down to our individual true exercising of kaitiakitanga in our own management of the wastewater we create in our homes. Are we thinking about our use of water and the products used in our homes that go into our sewage pipes, into the reticulation line that runs alongside the lakes and awa, our marae, our places of significance, up on to the WWTP on our whenua Haumingi 9B3B, eventually ends up on the whenua, and then seeps down into our lake where we fish, gather koura, and swim? How am I being a kaitiaki of my precious

environment. It's not just the Council's job.

Iwi Participant Eight

What we've been told is that this is a project of some significance. Uh, and because of the Biolytix and... STEPS, and as we've seen some of those plants [MBR Plants] in Tūrangi and Tīrau, you look at that water and you think, I could drink that, but who knows who has enough guts to do that? Not after you see all the stuff all mixed up...it's all brown and paru [prior to full treatment] and... so I think there's still, there's a lot of research or monitoring that we should be doing? In trying to make sure that water can be drinkable... Reused for gardens or... growing grass. So, I don't think the journey ends once, I mean, we can be satisfied once the Biolytix it's all running...

Iwi Participant Nine

But if you look at our lakes and we have fish, we have birds that do their business in there. And then kids, when they swim in there, they love to drink it anyway. So at least I hope it to be at that stage [drinkable after being treated]. I think while we went to pre-treated systems is because again it's offensive to have raw sewage go anywhere. So, pre-treatment was the best option we could see, because if we have a break in any of the piping network, where's that water going? Straight into our lake that we're trying to protect, which council have told us that's why they're doing this. I'd rather see waste water leach into the lake and us try and fix it, than raw sewage going straight to the plant. I'm not sure whether the [reticulation] network is going to be up to task. They say, it's fail-proof, but nothing is. There're no guarantees on any of what they've [Council] said. Again it's about what they've started the scheme for, is to keep our lakes clean. And by keeping them clean we'll be able to go and get food from them. And that's the most important thing for us, is being able to use that resource.

Iwi Participant Ten

You know, it hasn't been imposed on them [landowners] to you

know, they've voluntarily given over their whenua [for the plant], you know, but in this, there's lots of history around this space. How long has it [Haumingi 9B 3B] been there doing nothing? You put something on it. It is now doing something? Normally, when that happens, you have to pay before you can use it. But this is Maori contribution to the community. And I think it's great. So, they can't say we don't want to participate. We want to participate. But we don't want the b****s**t being thrown into our face [by Council]. But like I said before, don't send it back into the lake. And when it does go back into the lake. Then we monitor it every six months for three years and if after three years monitoring every six months, it could affect the water then it doesn't go back, because we don't want it to impact our sustenance, our kai from the lake.

9.9 Response to Developing an OSET System

The importance of asserting kaitiakitanga is obvious from the replies of Iwi participants. 'I suppose kaitiakitanga is just something natural that we do' (Iwi Participant six), and 'maybe this comes down to our individual true exercising of kaitiakitanga in our personal management of the wastewater we make in our houses' (Iwi Participant seven).

Many of them value having culturally acceptable pre-treatment methods, including secondary ultra violet (UV) treatment at the treatment plant to reduce untreated wastewater seeping back into the waterways. Taking responsibility as kaitiaki, which includes holding mana whenua (authority connected with possession and occupancy of tribal land) status over this portion of Lake Rotoiti, demonstrates the Iwi participants' kaitiakitanga practice by conserving the mauri of significant resources (Ministry for the Environment, 2003a). The following phrase encapsulates this perfectly:

Māori saw themselves as users of the land rather than its owners. While their use must equate with ownership for the purposes of English law, they saw themselves not as

owning the land but as being owned by it. They were born out of it, for the land was Papatuanuku the mother earth who conceived the ancestors of Māori people. Similarly, whenua or land meant also the placenta, and the people were the tangata whenua, which term captured the view that they came from earth's womb. As users of the earth's resources rather than its owners, they were required to propitiate the earth's protective deities. This coincidentally placed a constraint on greed (New Zealand Waitangi Tribunal 1997).

Affordability of the system is a key sustainability concern for iwi as well as other stakeholders in both communities. Increased rates, an understanding of customers' payment capacity, effective communication, and expanding public awareness of the benefits of a WWTP and the reticulation network are all interconnected.

In their interviews, some of the participants mentioned the stress of not being able to pay for the system. 'But I'm also thinking about how much I can afford...I'm wondering how am I going to pay for it? I'd rather keep what I've got now, especially if I'm a pensioner' (Iwi Participant one).

'To the individual homeowners that have to pay to connect. Yeah, that's a lot of our whānau who are not gonna be able to afford that. Literally, I don't even know how we're gonna support our whānau to connect because of the cost, increase in rates' (Iwi Participant six).

'With affordability of the system, at a recent Rotomā meeting I put it to council that if you've got a rates system that you need to have separate sub accounts so that it doesn't cripple the ratepayers' (Iwi Participant three).

Rotorua Lakes Council (2021b, July) recently calculated the nett cost estimates for each property based on 770 properties throughout the two communities:

Estimated Rotomā net cost per property	Subsidised \$16,241 (GST excl.)
Estimated Rotoiti net cost per property	Subsidised \$14,692 (GST excl.)
Estimated Rotomā capital cost Targeted Rate p.a. (over 25 yrs)	\$1,531 (GST incl.)
Estimated Rotoiti capital cost Targeted Rate p.a. (over 25 yrs)	\$1,385 (GST incl.)
Installation of OSET systems (if no reticulation was implemented)	Approximately \$25,000 per property

Table 6 . Estimated costs for Rotoiti and Rotomā properties. (Source: Rotorua Lakes Council, 2021b, July).

The ability of the ratepayers to manage the expense of the reticulation network must be carefully considered. The koeke - the elderly – may be unable to pay for the upkeep of both the system and the reticulation scheme if they are on a fixed income. These substantial, long-term expenses will be borne by whānau with poor or fixed incomes, necessitating the development of a variety of alternatives.

9.10 Chapter Summary

This chapter examined the questions that were asked of several koeke and a number of pakeke on land changes over time in the Rotoiti and Rotomā areas, as well as the Haumingi 9B 3B land block. The relationship of the Ngāti Pikia and Ngāti Te Rangiunua peoples with these specific land areas, including Lake Rotoiti and Lake Rotomā, has been impacted by changes in water quality and deteriorating health, including changes brought about by the constructed WWTP and disruption of pipeline infrastructure across the two communities.

Although the implications of the data are often indirect, it was clear from the data gathering that altering water management and land practises had contributed to the water decline and degradation, and there was apprehension that this may continue after the reticulation project was implemented. The koeke, in particular, had witnessed the changes first-hand and had explicitly conveyed their incapacity to adequately assert themselves as kaitiaki with the lake and whenua today as a result of these changes. The purpose of this chapter was to examine

the findings in order to inform Ngāti Pikiao and Ngāti Te Rangiunuora iwi's future actions towards developing a sustainable environment.

Chapter Eleven seeks to understand as ‘atu o teia ‘enua – owner of the land/land owners or iwi taketake (Indigenous people) of the whenua in Rarotonga, how cultural processes and principles within the context of wastewater can be managed in the modern context to meet the challenges of an ever-changing world. The experience highlights a need to develop a more comprehensive framework providing essential knowledge and thinking to guide iwi processes and decision making in this area. The outcomes of this research are for the benefit of decision makers - both Māori and non-Māori - who are faced with similar challenges. It is considered that outcomes from this research will have direct application across Aotearoa and potentially abroad in areas around the Pacific such as the Cook Islands. The Pacific relevance is derived from our cultural similarities and shared environmental issues as well as an understanding that many major upgrade projects receive technical solutions and construction input from New Zealand.

CHAPTER 10: A COOK ISLAND PERSPECTIVE

E ara rakau ē! E ara rakau ē! E ara inano ē! E kopukopu te tini o Kupolu.

E matakitakika re koe! Oō!

A pathway for the canoe! A pathway for the canoe!

A path of sweet-scented flowers! The entire family of birds of Kupolu.

Honour thee (Rata) above all mortals! Oō!

10.1 Chapter Introduction

The last chapter examined the questions that were asked of several koeke and a number of pakeke on land changes over time in the Rotoiti and Rotomā areas, as well as the Haumingi 9B3B land block. The relationship of the Ngāti Pikiao and Ngāti Te Rangiuuora peoples with these specific land areas, including Lake Rotoiti and Lake Rotomā, has been impacted by changes in water quality and deteriorating health, including changes brought about by the constructed WWTP and disruption of pipeline infrastructure across the two communities.

Although the implications of the data are often indirect, it was clear from the data gathering that altering water management and land practises had contributed to the water decline and degradation, and there was apprehension that this may continue after the reticulation project was implemented. The koeke, in particular, had witnessed the changes first-hand and had explicitly conveyed their incapacity to adequately assert themselves as kaitiaki with the lake and whenua today as a result of these changes. The purpose of chapter ten was to examine the findings in order to inform Ngāti Pikiao and Ngāti Te Rangiuuora iwi's future actions towards developing a sustainable environment, and asserting kaitiakitanga.

This chapter seeks to understand as Mana Tiaki - Mana Tiaki simply means being a guardian of something, and in this case being a guardian of our environment (Te Ipukarea Society, n.d.) and 'atu o teia 'enua – owners of the land/land owners or iwi taketake (Indigenous people) of the whenua in Rarotonga, how cultural processes and principles within the context of wastewater can be managed in the modern context to meet the challenges of an ever-

changing world. The experience highlights a need to develop a more comprehensive framework providing essential knowledge and thinking to guide iwi processes and decision making in this area. The outcomes of this research are for the benefit of decision makers - both Māori and non-Māori - who are faced with similar challenges. It is considered that outcomes from this research will have direct application across Aotearoa and potentially abroad in areas around the Pacific such as the Cook Islands. This is due to the resumption of international tourism, where areas such as Muri in Rarotonga have started to feel the consequences of failed onsite wastewater treatment facilities (Godfrey, 2021), and they are now looking for alternatives to restore a healthy ecosystem.

The Pacific relevance is derived from our cultural similarities and shared environmental issues as well as an understanding that many major upgrade projects receive technical solutions and construction input from New Zealand.

10.2 The Cook Islands – A self-governing nation

The Cook Islands are a self-governing island nation in the South Pacific Ocean which comprises 13 inhabited and 2 uninhabited islands. The islands have a combined land area equivalent to that of a medium-sized city, yet they are spread out over a sea area nearly as huge as Greenland, at 770,000 square miles (2,000,000 square kilometres). Avarua, on the island of Rarotonga, is the administrative centre. 91.4 square miles (236.7 square km). In 2021, the population was 17,565 (Britannica, n.d.).

10.3 Cook Islands Geological area

All of the Cook Islands have a volcanic origin. Their geology is such that 'the volcanic island of Rarotonga rises 658 metres above sea level; there are four raised coral islands with volcanic cores (Mangaia, Mauke, Mitiaro, and Atiu); a close atoll with a volcanic core (Aitutaki); and eight atolls. Rarotonga's coastal fringes are made up of sediments that have been deposited both on the land and under the sea, when global sea-levels were higher than they are today' (Dakers & Evans, 2007). Fans of heavily weathered volcanic alluvium have

produced foothill terraces, and the island is surrounded by a thin strip of beach deposits and coral detritus. Between the terraces and the coastal strip, a low-lying band of swamp exists, (although modern developments have modified it considerably in places) underlain partially by coral sand and partly by sand gravels (Nath, Mudaliar & Parakoti, 2006).

Rarotonga's central region is mountainous with a hilly terrain, with Te Manga, the highest peak, rising to 658 metres. The majority of the island's population lives in the coastal lowlands, which also house most of the island's hotels and businesses. Storms hit Rarotonga every now and then, mainly throughout the period of November through to March, and they may be extremely severe, with strong winds and tidal waves inundating the lowlands (Island Friends, 2004). Corals are highly sensitive to changes in salinity, and cannot tolerate low salinity. Hence, when freshwater runoff from the land reaches the 'lagoon' it poses a major threat to the coral reef environment. Water quality in the lagoon is monitored to a limited extent, and a Cook Islands urgent environmental issues report highlights the dangers of land-based pollutants penetrating this delicate ecosystem (ibid).



Figure 10-1. Map of Rarotonga showing the 12 watershed areas. Source: Land Information New Zealand (LINZ) 2020.

10.4 Cook Island's Natural Resources and GDP

According to the Ministry of Finance and Economic Management (2021), restaurants and lodging, which are primarily reliant on tourism, were heavily impacted by the covid-19 pandemic. Normally they would contribute 16 percent of the Cook Islands' national income, but were down 96 %, including travel agencies (down 68 percent), restaurants (down 56 percent) and transport services (down 49 percent). These severely hit industries reduced domestic GDP by 22.7 percent. The industrial sector functioned as a cushion for the Cook Islands economy during the crisis in 2020. According to preliminary findings, mining and manufacturing rose by 10.9 percent in the second half of 2020 compared to the first. During this time, the construction industry rose by 43.7 percent.

Agriculture and fishing which are the two most important industries accounted for 11%, with the export of fish items at 59%, pearls at 20% and paw paws at 4%. Furthermore, 70% of Cook Islanders are involved in some form of agricultural activity which is mainly subsistence farming according to a CSIRO report compiled by Hajkowicz & Okotai (2005).

The Cook Islands' economy is reliant on tourism, which contributed 40% of the country's GDP in 2004/2005. The Cook Island Government is aware that only with sanitation services that safeguard both the general populace's health and the coral lagoons' ecological sustainability could a sustainable tourism sector be attained (ibid, p.7). At 1.32–7.41% of the Cook Islands gross domestic product (GDP), these costs are a considerable burden on the local economy and people's day-to-day living expenses. To recover at least some of these costs, effective watershed management will necessitate a collaborative effort between government, business, and the community on (Dakers & Evans, 2007, p.2):

- Soil erosion and stream sedimentation
- Herbicide and pesticide run-off
- Fertiliser run-off
- Livestock and animal waste
- Septic tank leakage
- Mosquito outbreaks from stream blockage and poor waste disposal
- Liquid and solid waste disposal.

The other non-financial impacts claimed in the report is potential biodiversity loss or harm, as well as the loss of recreational or cultural assets, as well as damage to scenic attractiveness and tourism (SOPAC, 2007), and human health impacts.

10.5 The Pacific Island Nations and wastewater

Sewage difficulties are a challenge that the Cook Islands, like other Pacific Islands, face on a regular basis. Sewage has been identified as a major cause of pollution in practically every Pacific country, harming the marine, coastal, and freshwater habitats (Majuro, 2001). Their challenges in dealing with the issue stem from issues like distance and isolation, a lack of fresh water, cultural sensitivities, and financial concerns (SPREP, 2021).

According to the report compiled in Majuro (2001, p. 25), this ‘significant issue brought Pacific nations together in 2001 to work with regional organisations like South Pacific Applied Geoscience Commission (SOPAC) and the South Pacific Regional Environmental Programme (SPREP), as well as worldwide initiatives like the Global Program of Action, to improve and enhance the situation, and to complete a Pacific Wastewater Policy Statement and the Pacific Wastewater Framework for Action’.

Another large focus of the 2001 conference was for the National Pacific Island Countries (PIC) governments to give wastewater and sanitation concerns top priority in order to provide adequate attention and resources to these sectors in their national development plans. Sanitation, public health, and the environment are only used in the Pacific Wastewater Framework for Action to describe the challenges of *sanitation*, *public health*, and the *environment* that are directly related to wastewater (ibid). Wastewater encompasses any combination of discharge (liquor/effluent, sludge/biosolids) into the environment, with or without treatment, such as run-off induced by rain.

The Pacific Wastewater Policy Statement established a framework of principles and policies to steer the future growth and cooperation of the Pacific nations. The Pacific Wastewater Framework for Action consisted of a list of proposed national and regional initiatives to meet the goals outlined in the Pacific Wastewater Policy Statement, as well as the Global Programme of Action (GPA) Strategic Action Plan and Guidance Document on Wastewater.

Guided by the five principles within the Policy statement (Majuro, 2001, p. 36):

1. National wastewater management policies and regulations will be appropriate and acceptable to the people and the cultures of the Pacific Islands;
2. Appropriate institutions, infrastructure and information will support sustainable wastewater management;
3. Better access to funding will improve the service delivery and develop the private sector;
4. participation in wastewater management and sanitation, will ensure equitable benefit with recognition of socio-cultural sensitivities;
5. Viable and sustainable levels of skilled and knowledgeable people within the wastewater sector and communities will improve wastewater management

The Pacific Island Countries stakeholders' intent was to have these principles and draft policy statements endorsed by the appropriate Pacific Island Governing bodies on wastewater, embed the principles into their regional and local level plans and establish national wastewater focal groups (p. 6 & 7). With the creation of the policy framework, the Cook Islands Government has begun to focus on an integrated systematic approach to sustainable development and management of their ecosystem and allocation and monitoring of their water resources (SOPAC, 2007).

10.6 The Cook Islands and wastewater

According to the Cook Islands Sanitation three-year plan (2013 – 2016) (Ministry of Infrastructure and Planning, 2013), the majority of Cook Islands households now have septic tanks and onsite wastewater disposal systems, and some homes have advanced package treatment plants. A number of commercial and public sector buildings include off-the-shelf package treatment plants or custom treatment systems that discharge to onsite land-based disposal areas (Burke, 2011), which may include irrigation systems feeding onsite garden and shrubbery areas. At Tepuka in Rarotonga, there is a single modest, shared community treatment system that handles wastewater from nearby residences and a local school. The drivers of these changes have been the increased understanding and risk of poor sanitation

practices across the island, alongside high-density housing and motel infrastructure along the coastal areas and on-going environmental concerns.

There is currently insufficient testing that specifically and consistently quantifies the effects of nutrient flows into the lagoon for the main island of Rarotonga, where visitor demand is greatest. If the demand on the lagoon as an effluent drain becomes too great, a wastewater treatment plant may be required (Conner & Madden, 2017). The cost of such a plant is difficult to estimate. Annual costs for a modest wastewater treatment facility, on the other hand, may be in the range of \$0.5 million per year (ibid).

Muri, a burgeoning tourism industry located at the southern end of the main island of Rarotonga, had failed to properly dispose of the trash left behind by visitors (Evans, 2019). The majority of Rarotonga residents use septic tanks, which treat human waste to a basic level underground before draining out through a septic drainage field or soak hole (ibid).

For the majority of the coastal properties, the groundwater table is 1 to 4 metres below ground level, and the soak holes are in highly permeable coral sands. The shallow lagoon on the island is where this groundwater emerges (Daker & Evans, 2007). More than 90% of the establishments along Muri's shore had non-compliant, subpar systems, which proved catastrophically inadequate for the year's high tourist numbers (RNZ, 2015). Many of the systems began to seep nutrients into the lagoon, causing damage to the lagoon's marine life and driving the spread of unattractive algae. As the problem grew the ongoing problem of algae, a National Disaster was declared in Muri in 2015 (Godfrey, 2021).



Figure 10-2. Dark patches of algae spreading in Muri lagoon. (Source: RNZI/Varo Media, August 3, 2021)

According to Evans (2019), tourism accounts for about 70% of the Cook Islands' economy and provides crucial job opportunities to combat out-migration. However, as it is, the industry is wreaking havoc on Rarotonga's finely balanced island ecosystem and contributing to residents' disconnection from traditional ways of life.

10.7 Mei Te Vai Ki Te Vai Wastewater Project

In 2017, the Mei Te Vai Ki Te Vai Wastewater Project was launched, and professional consultants were hired. This was a targeted response to the ongoing environmental issues in Muri Lagoon, with nutrients from on-site wastewater treatment systems being the main cause of these problems (Mei Te Vai Ki Te Vai, n.d.). Through a series of workshops, the Muri community and important stakeholders were engaged with a broad list of potential early interventions to assist enhanced water quality at Muri Lagoon. A literature evaluation of Muri environmental research was completed and published including a summary of environmental impact assessment requirements for obtaining permits for sediment removal along Vai Te Renga Stream. An environmental monitoring programme began, with interim findings used to develop wastewater infrastructure concepts for Muri.

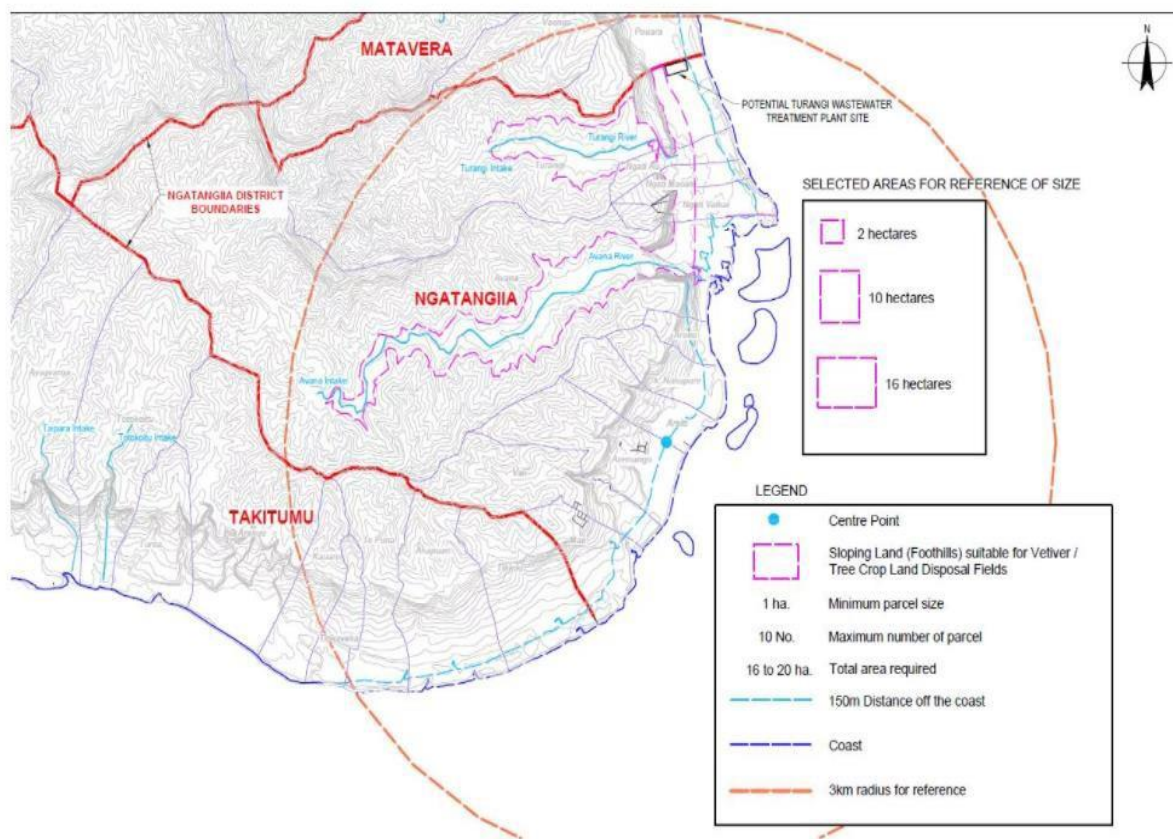


Figure 10-3. Area of potentially suitable land for Muri wastewater treatment infrastructure. Source: Mei Te Vai Ki Te Vai, (n.d.).

The University of New South Wales’ (UNSW) 2018 Water Research Laboratory report whose team of technical engineers and environmental experts were ‘engaged to lead a comprehensive coastal and oceanographic data collection program and to undertake a range of coastal processes modelling’ (2018, January 16) stated, ‘there will be two possibilities for disposing of treated wastewater; using land for the final treatment stage or dumping treated wastewater into the ocean through an outfall beyond the reef. The Cook Islands Government will choose one of these choices to move forward with Muri’s comprehensive design. This choice is also applicable to the rest of the island’ (ibid).

In 2020, the Ministry of Finance and Economic Management (MFEM) determined that a reticulated system with tertiary treatment and land-based disposal was the preferred option. In a statement made by the MFEM Financial Secretary (Mei Te Vai Ki Te Vai, n.d.), he pointed out that:

“Doing nothing is simply not an option, as this would lead to a continued decline in Muri Lagoon’s health. A centralised public wastewater system is necessary to save Muri Lagoon for future generations. We expect a similar system will also be needed in other coastal areas around Rarotonga at some point in future, to prevent the same problems from happening.”

He went on to remark:

“If suitable land is not identified, an ocean outfall will then be the only viable option. This last resort would be necessary to save the way of life and economic benefits provided by our beautiful lagoons. We appeal to landowners to help us progress the land-based option by coming forward to offer land.”

Morgan, Reid, Mcmillan, Kingi, White, Young, Snow & Laurensen (2021) discussed Muri Lagoon as a case study. Kepa Morgan’s company, Mahi Maioro Professionals (2019) conducted a wastewater investigation on the lagoon and acknowledged that the ocean outfall being considered as an option ‘was a practical and cost-effective solution to the chronic water quality challenges in Muri Lagoon, but it overlooked the cultural ramifications of dumping wastewater into a key food source for the Aronga Mana (traditional leaders) in the area. The outfall also overlooked the dangers and unknowns of dumping micropollutants and emerging toxins into a culturally significant ecosystem’ (Morgan et al., 2021, p. 205).

Residents in Ngatangiia have demanded that the precarious situation of Muri lagoon, which is clogged with algae, be addressed quickly (Samoglou, 2021). The group is urging elected leaders and authorities to ‘make rehabilitation of the lagoon - known as Rarotonga’s “crown jewel” – a national priority, as there has been years of inaction by the Government on this major issue. Among the demands made by the organisation is that the National Environment Service(NES) stop issuing development licences for “any wetlands or immediate shoreline regions” in order to protect the area from future development (ibid). This is part of Ngatangiia locals’ active participation in efforts to save Muri lagoon so that it does not perish.

10.7.1 Cook Islanders as Mana Tiaki (Guardians, Protectors of the Environment) - 'atu o teia 'enua – owners of the land/land owners

In the past, many Mana Tiaki and 'atu o teia 'enua used the lagoon as a playground and a kai cupboard. The people of Rarotonga had a kai basket that comprised a lot of kai moana such as titi ara (blue fin trevally), tuna, pakati (daisy parrotfish), and Api (white spotted surgeonfish). They were well aware, however, that they could only take their 'fair share' of kai moana and that any extra kai had to be returned to Tangaroa to be replenished (Teinakore-Curtis, 2015). The water quality in the lagoon has deteriorated over time, according to the land owners, and the moana has steadily lost several of its fish species, owing in part to the effects of wastewater pollution.

10.8 The Questions

Following the line of questions constructed for the koeke and pakeke in the Rotoiti and Rotomā communities, questions were posed to four of the 'atu o teia 'enua, land/land owners who are also employed in NGO's and a Cook Island Health Authority on the island based on their recollections of the lagoon and land quality in the past ten to fifteen years to what they see today. Each participant has long standing environmental interests across Rarotonga. They were also asked questions based on the impacts of wastewater and septic tank use on the whenua and wai and the potential of culturally appropriate wastewater systems for the area of Muri.

The interviews I conducted with the following participants took a mauri kuki airini (cook island principle) approach using the 'principles of kauraro (respect), tu inangaro (reciprocity), ngutuare tangata or anau (family), vaka tangata oire (community experts), putuputuanga vainetini e te tane tini (women and men's community projects), taokotai (cooperation), and kōpu tangata (community workers)' (Te Ava & Page, 2020, p. 6). The following statements were made, not only as landowners, but also as Mana Tiaki across Rarotonga:

10.8.1 Question One

This enquiry was posed to find out what the landowners remembered about their experiences with the lagoon and the marine areas. The people of the 'enua have long had a particular bond with the lagoon, marine and coral reef area that continues to this day through Tupu 'anga (genealogy), no'o ki runga i te 'enua (rights of tenure), akono'anga ta'ito (ancient customs), and tu akangateitei or 'ō 'ō (respect for tangible and non-tangible). The question was aimed to get this generation of land owners to think about how their relationship with the lagoon has changed over time.

What was the lagoon water and land quality like when you were young in comparison to today?

CI Participant One

When we were growing up the lagoon and the marine was clean, and we could go playing and fishing in it for hours. There was an abundance of different fish types that we could take home to eat for the 'anau... We saw changes over time, but we didn't have as many people on the island then. But today we have been through an Algae phase and we have an outflow pipe that goes across to Muri and out down there right now but nothing will change as yet because they will talk. It happened about two years ago with the algae bloom? Because we've been keeping an eye out for all of this as it was on our news back home. The algae bloom was no good for us with our fishing. But that's not the problem that some people are talking about, they say it is the seaweed, not the algae that has impacted our basin area and lagoon.

CI Participant Two

Everything that we did in the past was very focused but it was easy to fish and have our needs met. It was really important for the elders to do a lot of their work down at the basin or having to go out and do fishing. We didn't do it a lot only when we had big events happening. And the things that are even more specific are that we are tied to our lagoon. The lagoon is not

just a catchment, it is a food source so anything that we do on land directly impacts all of that that it washes off. There are various activities that are taking place now of where it is unregulated and it is a space where not much attention has been paid to it until something happens for the people that they are up in arms about it. Some of those activities is where there are so many people in the one space on the island fishing and moving around in the lagoon and it depletes our fishing stocks. They stop coming into the areas that we were used to using when we were young.

CI Participant Three

The lagoons used to be the cleanest before all the tourism started up with all the high density which hasn't helped us.

CI Participant Four

We could do a lot in the lagoon and across the island, but we tried to stay in the areas that were for our village only. This kept the fish plentiful, because we only took enough for just ourselves and the others in the village. The algae bloom is a problem now that we have, it's been on the news, it's a global problem but it's a seasonal one here, and that's what we have to try and deal with. But algae was here even when I was young, we used to see it back then, we just knew not to go fishing in that area. But there is more of it today. The conditions for the algae bloom to grow was ideal. But the issue is really the seaweed, people look at the aesthetics and think it's the algae but the real problem is the seaweed. The algae takes in the nutrients which is good whereas the seaweed causes the problem. We have to look at how to use the seaweed for other purposes so it doesn't stay as an issue.

10.9 Cook Island Health

Not only has the health of the ecosystem been gravely impacted over time, the current state of the lagoon and marine areas have been adversely affected by the algae and seaweed. This in turn has severely limited the Aronga Mana's ability to fish for their village as part of their mahinga kai (collecting and harvesting seafood) practice. According to Collier, Death, Hamilton & Quinn (2014, p. 1), 'mahinga kai sites, both current and historical, are in lowland settings where freshwater environments are often in a degraded state and values are correspondingly compromised'.

10.9.1 Question Two

This question tries to explain how kai is the binding agent that holds the 'anau and kōpu tangata together. It gives people a sense of belonging and community, and it acknowledges their expertise and values as they collected kai moana and used the lagoon not only as their kai cupboard, but also their outdoor play area. In addition to this is the thinking behind Rā'ui – for the Cook Islands, it is a form of traditional resource management (Durbin, 2018), which may play a role in the sustainable management of critical marine species in Rarotonga, given the rising pressures on the lagoon and marine resource species (Miller, 2008).

The current Rā'ui on Rarotonga can be seen as a multi-species fishery with a cyclic harvesting method. Rā'ui, as Buse and Taringa (1998, p. 385) assert, is defined in the Cook Islands Māori dictionary as:

1. A sign, usu, leaves on a branch set in place by the owner of a piece of land or waterr serving it or its produce for his own or some special use; a prohibition.
2. Erect a rā'ui restricting the picking of fruit etc.
3. The owner hung up a rā'ui reserving the dry coconut leaves on his land.

Have there been any changes to the area as you have gotten older that are significant? If so, have the changes affected your 'anau (family) and 'iti tangata (tribe)?

Iwi Participant One

Yeap it's if there is a certain perception then people think that oh we can't go swimming in the lagoon? We can't get any food out of that locality normally because back when I was young they put a rā'ui on it for that point in time until they could get it cleared. So we have a rā'ui system that is not led by the Government, it is led by the traditional leaders they run things so they govern, they can open it when they feel the village needs it open, we use most of the time now as long as only the villagers within that area are there fishing then the leaders are fine with it, but it's when you have everyone coming into that area who don't belong to that village then the leaders will do that, that's our rā'ui system. The Government own the land, but Aronga Mana own most of the sea. We use that area to feed our family according to which village area we are but it's hard when we have issues around the water, that's when these problems happen.

Iwi Participant Two

As I was saying earlier, you will probably get a sense of what it means now. You will probably understand the problems of why they are occurring. Let's just fast forward to today. To kind of give you a window of how we did it in the past. In the past we never thought about the changes that needed to occur. But when you got older, you could see that things need to change. You will probably get a sense of talking to different people of how we do it now and you will probably understand the problems and why they are occurring. We want to create a wastewater treatment system that will basically reduce the impact on the environment. That needs to happen. The reason for that is quite simple and that it is the type of island that we are. We are very much tied to the ocean. These are the changes that are occurring which is directly related to tourism and high densities. It is part of the current wastewater treatment management program... it is the best feature on the island of Rarotonga. If we can manage this then our families will be

better off.

Iwi Participant Three

Over time we've seen the changes. We've realized that it's being attributed to the pollution you know, or the impact of things like effluent you know, nutrients going backwards and we need a system so that there's no leaching from septic tanks that can fill the waterways and we're hoping to get more help to minimize that and then our people are able to still do things like you know, fish... it's in the basin area, it's like this Muri basin that's causing the problems. So, what they want, it's all the activities, too much activity in the area. Far too much, and development is just increasing all hotels now on their strip... the main concern is for the regulators, such as ourselves and public health is to make sure the installation of septic tanks is actually installed properly at the start. So, at the moment, a program was set up I think, the last five years for new sanitation sewerage systems, just for them to find out why we need to look at another system. Most of our septic tanks get taken to the landfill for second treatment, and then it is put back into the environment. The Cook Islands and Aitutaki was the first place to set up the second treatment plant back in 2003 from NZ Aid fund.

Iwi Participant Four

Because of the algae that is appearing more often in the lagoon, it is beginning to strangle it and more people are noticing. People don't want to swim in or fish near those areas in the Muri basin. As a steering group member that I am on with a community group and officials we've set up an Environmental Impact Assessment report to be completed so we can review what our next steps are with the community and the sanitation of certain areas of the island. The project that I am on as part of my work is to attempt to reduce pollutants reaching the lagoon by improving the treatment of household waste. This means that we are delivering on a sanitation programme for Aitutaki and Rarotonga which involves upgrading sanitation

systems on over 400 properties along Muri and hopefully moving around the island. If the sanitation programme is successful, it will help all our families as we all need to use the water for recreation and for some of us it's part of our livelihoods.

10.10 Cook Island guardianship

Being a guardian of the waterways is extremely important for the landowners of the Cook Islands. They 'stress their governance systems must recognise and safeguard ocean rights in aculturally acceptable manner that builds on and is consistent with Pacific peoples' shared cultural values and the collective beliefs that they hold. The Pacific people accept that the Ocean is a living thing, and that they are her guardians, in light of the acknowledgement of the Ocean's rights' (United Nations, 2021, September 15).

On the 19th and 20th of November 2018, Henry Puna, Prime Minister of the Cook Islands, presented a declaration titled "A feasibility assessment on Pacific Ocean rights" for a conference in Auckland, New Zealand. Those in attendance agreed on a shared vision for the future and committed to sharing their ideas and improving their understanding of Ocean kinship. The statement regarding the theme of the conference is outlined below:

[The] ocean is our provider, our sustainer, our life force. She provides for us and nourishes us. Yet we mistreat our ocean with pollution, overfishing and the impacts of climate change such as ocean acidification, coral bleaching and more severe and frequent cyclones. (...) And so, we must consider the rights of the ocean. For just as those who have been treated unfairly have found it necessary to fight for and claim their rights, so too has the ocean been treated with injustice and disrespect. And so now we find it necessary to fight for the rights of the ocean.

(David, 2019, p. 13).

The metaphor used in the Cook Island Prime Minister's statement alongside the assertion made by the United Nations on the Pacific Island's acceptance of the ocean as a living being runs parallel to how Māori treat the land and waterways in Aotearoa New Zealand.

According to Hutchings (2005 p. 20), ‘all-natural resources originated from mother earth or Papatūānuku, who recognises Māori and land's traditional relationship in Māori Cosmogony. We don't exist without Papatūānuku, we aim to safeguard and strengthen her growth and nurturing powers from any type of degradation because we are Māori’.

Similarly, it is how Māori also see Tangaroa, he Atua o te moana (eponymous ancestor of tangata whenua and guardian of the sea), in Māori stories of creation where ‘Tangaroa, god of the sea, had a son called Punga. Punga then had two children: Ikatere, who became the ancestor of the fish of the sea, and Tūtewehiwehi, who became the ancestor of the fish and amphibious lizards of inland waterways.’ (Royal, 2007 as cited in Foster, 2019, p. 5). These protectors of the ocean and land areas through their waterways and sacred springs are bound in a holistic way to Māori, the Pacific Island nations and their beliefs. Therefore, if there is contamination of food and water sources, through the declining water quality, it can lead to the inability of the people of each village or the Aronga Mana to tauturu/ ‘akaperepere (help and care for) manu’iri (visitors).

10.10.1 Question Three

The goal of this question was to find out if, and to what extent the allocation of a land block area for the construction of a Waste Water Treatment Plant in the vicinity of the lagoon will have an influence on the 'atu o teia 'enua and the Aronga Mana. Being Mana Tiaki of the 'enua, the rationale was to encourage this generation of land owners to recall changes that may impact their relationship with the land and water.

Following the environmental assessments to discover the origin of the water quality issues in the Muri lagoon under the Mei Te Vai Ki Te Vai project, it was clear that more research was required to inform the design and location of the impending wastewater treatment facility, including support of the Cook Islands Government's choice on the most appropriate disposal option (Mei Te Vai Ki Te Vai, n.d.). In late 2019 Pa Ariki – a major landowner offered 14 hectares of land up in the valley behind Turangi (Brown, 2019) as a land disposal option. This could possibly eliminate the need to have a sewage outfall pipe, however confirmation was yet to be sought for a location for the proposed wastewater treatment plant (ibid).

Could you see the construction of a Wastewater Treatment Plant working for you and your 'anau? How?

CI Participant One

Well, the community is suffering with what is happening already to the lagoon. At last night's community meeting we looked at what we should work on for our 'anau at Ngatangiia first, about these pollution issues that keep arising, and the next one which I think in June is to come back with the outcomes. Yeah it was a good meeting last night. But we know that septic tanks are not the only cause of the pollution, but we do know that it is significant. We talked about the sediment build up too, so if we can minimise the impact by a treatment plant being built then we will have to wait and see... because it all costs money, and there is already money going into clean water for drinking, washing dishes and laundry. The authorities need to plan for all of that, because who will pay for it?

CI Participant Two

When you get to high densities on the island, septic tanks like the ones I spoke about earlier no longer apply. You need to go to the next system of treating the same thing. The recommendations that we put forward to the working committee and also to the project funders of the Sanitation programme was for a certain type of system to be in place. Now, sometimes the aspirations don't match the real results. This is the case that we have. There are certain systems that have been passed by the Health Department which does some treatment but not the fundamental one which affects our waterways which is to reduce the nutrients into our waste streams. In fact, none of them do which is unfortunate because a lot of energy and resources and money has been spent to get us to the stage. It's the right system however the end product shows that it probably is not the right system or it is the right system but an intermediary process needs to happen. So that's where we're at as far as I can see. If what we need is reticulation which is what

is being discussed at the various levels, then the extra costs and resources should not be placed on the property owners, especially if they have already put a lot of money towards the systems under this programme that is running currently.

CI Participant Three

The project we have here on the island is that the landowners pay a thousand dollars and the other thousand comes from government... it's all the area in Muri. Then they moved it to another part of the area to the other parts of the island, that's a sanitation upgrade program that's in Muri at the moment WATSAN run it. At the moment they want to change to reticulation because of the nutrient numbers and it will take about 25 years before the nutrients head back into the lagoon. So it doesn't matter about what we do now its prevention because it's going to happen down the track. At the moment we have about six options it's about increasing getting sedimentation out of the lagoon, the basin, setting up the reticulation system, offsite drainage for wastewater, looking at the algae removal seabed itself and the other two major ones of something that we can deal with it is the regulation on phosphate products coming in for chemicals and wash powder because the government is working in with the European union they set up a whole agency to work on just that lagoon.

CI Participant Four

With the sanitation programme that our project workers are leading is that property owners were given financial support to upgrade their septic systems. They were asked to contribute \$1000 towards the \$10,000 to \$20,000 cost of installing the new system... the rest of the money was provided by our teamat WATSAN. Because this is a large-scale pilot programme, we are looking at about more than 238 home owners in the Muri and Avana area to upgrade their sanitation systems. I think that this will go towards to help majorly with all our families on the island if we can clean up the lagoon with these upgraded systems. There are other issues there that contribute to the

lagoon pollution but this is a good start. Reticulation is something that is there too but if we are successful with this project, it will take care of our environmental concerns and be part of the pollution prevention that has been set out as some of our objectives.

10.11 Cook Islanders as Mana Tiaki

According to Puna (n.d.), for Cook Islanders, one of the most essential principles is guardianship, or the preservation of their traditions, way of life, and islands. This is referred to as mana tiaki, which suggests a sacred purpose. ‘Our forefathers worked out how to fish, hunt, and farm long ago, as well as how to give their resources space to breathe, recover, and multiply. They realised that the land and the sea, too, require rest and equilibrium’ (ibid).

Asserting Mana Tiaki values, one of the participants responded to various options being considered to clean up the lagoon and marine areas, including installing a reticulation system, offsite wastewater drainage, algae removal on the seabed itself, and phosphate product regulations for chemicals and wash powder. Another spoke on the pollution caused by septic tanks, and how, due to time and financial constraints, the responsibility for any upgrades should not be shifted to the property owners. Although they did not explicitly articulate Mana Tiaki in their responses, it was clear that these values were being asserted through the solutions they discussed around reinstating a healthy ecosystem.

Mana Tiaki as a collective thought and action was reinforced by Selina Napa, Minister of Parliament (MP) for Titikaveka, a village area of Rarotonga, at a recent community outreach project clean up event (Musselle, 2021, October 1) whereby she stated:

“We the people are the Mana Tiaki, custodians of our environment, and as a community we need to do our part as guardians of the natural environment and live up to our Mana Tiaki Values”. Titikaveka is the most beautiful village in Rarotonga. Let us continue to help each other keep particular areas clean that are oblivious to the public eye and show respect for our environment. We have the best lagoon, best beaches, and a lush environment. A handful of people cannot do it; it needs the collaborative effort of the

whole Oire Teimurimotia (Teimurimotia village)’.

10.11.1 Question Four

As discussed in the Methods chapter of this thesis, there are questions we should ask ourselves such as 1. How do we update our views on wastewater to move with the forces of change?

2. What would culturally appropriate solutions look like and how do they fit with the demands of modern times?

This has been a long-standing issue for the residents of Rarotonga as over the past 10-years, the Muri lagoon on the southern shores of Rarotonga, has deteriorated steadily due to on-going failing wastewater systems (M. Sherman, personal communication, April 9, 2018). Post Covid- 19, Muri has again begun to suffer the effects of failing onsite effluent treatment systems with the return of overseas tourists (Godfrey, 2021).

What culturally appropriate solutions would you want to see with the construction of a Wastewater Treatment Plant?

CI Participant One

Right now, with our lagoon, there's too many people in the water, and when the fish come in to eat there are too many people and the fish won't come in to eat, they won't come into the shore when this happens and it becomes detrimental to the people who are from here... who live on the island. Okay, yeah, I mean everyone knows the issue but you can't stop it, but only our traditional leaders and also the Ariki, when they say something and agree to it then it happens. But for now, we are looking at systems that will help the environment. If you are talking about wastewater systems that will help the environment, then that's what is being discussed in the meetings that we are holding in the village. Because we know that the tourist numbers are not going to go down. The Government is wanting an extra flight to come in to our airport each day so we know the numbers are only going to go up so we have to think about that too. In Arorangi they have a reticulation system that goes back up into the land, but we need it to happen around the other parts of the island too. but at the moment with the problems happening at the basin area, you can do the prevention stuff like riparian on the rivers taking it to the harbour but the reticulation system is the one they are actually pushing, but it's with the land mostly for the landowners... they need to agree which land to use or it'll be the Outfall in the ocean.

CI Participant Two

When you look at our Department of Health, they have approved some of the wastewater systems which does some treatment but not the fundamental one which affects our waterways which is to reduce the nutrients into our waste streams. The problem that I foresee in that if you are a property owner and are forced to buy the substantial system or accept the offer Govt is pledging to install a system, and if it still doesn't work then someone has to be made accountable for it. I think after several internal meetings for several internal results

as the case may be there as a general understanding now that it's not doing what it's supposed to do. If everybody is saying or everybody in the scientific community that are looking more closely saying, look the strength of it is still high and what we trying to do here is contributing to that and maybe we need to look at what we've adopted to see if there are areas for improvement. So, I think the mindset is now on that road. This is a good thing because if we just carried on doing what we were doing before I think we would have ended up in a place whereby everyone has got the same system but it's not doing what it's supposed to do which is to help keep the nutrients out of the lagoon. And I think just taking this pause and just reflecting upon it and maybe have a look at other avenues where we can enhance the current system that we have got in place is good. It will probably put us on a better pathway. It has cost us a lot to get here unnecessary so in my opinion but that is what it is and I think fundamentally we are still a young nation and in making more mistakes but we're learning very quickly from it.

CI Participant Three

That's one of the biggest things as the commercial side like this one with the septic and it's downward in Muri that's just an upgrade for residential houses not for commercial but at the moment for commercial houses they've been given two years to upgrade. So they've been given warnings that they've only got this length of time to get themselves upgraded they're obligated to do that. They have to pay for those costs but a lot of them are saying that they don't have the money at the moment so they've been given two years but for the smaller ones of smaller commercial houses they are the same. But it's more than just the residential homes versus the commercial properties... it's looking at systems that are going to stop the leaching into the water. We haven't gotten that far yet around what we want that to look like because it may be about affordability and the Govt keep making changes. Our community is getting tired

talking about it because it has been going on with the Govt for a long time, they start a project and then it stops part way through. But the people keep saying the same thing... they just want the problem fixed. But I think the current programme that WATSAN is running needs to think about that. They have something like \$18 million to do this so they should be thinking about that too.

CI Participant Four

There's a lot of issues here but we have a number of programmes happening at once to address the wastewater and sanitation issues on the island. I mean there's a whole lot of things that you have to do I mean, we have technical groups doing data gathering down at Muri, they are from overseas, so we have to let them do their jobs they're going through what we went through. So, they're working with us mostly is dealing with the same things but now we have to back off and wait for them to do the data recording. We are also looking at dredging a channel in the lagoon because we are trying to increase current flow in Muri lagoon, and remove one of the fishing traps that was seen as an obstruction to current flow in there. And there are discussions to incorporate the management of a new wastewater project called the Sanitation Upgrade Programme... and... the ridge to reef programme which is about enhancing the ecosystem on parts of Rarotonga. I think that is as far as we can go, because we have so many programmes happening, looking at a culturally accepted wastewater system... we would have to wait to see what the data says and what the technical experts say and then hear what the Aronga Mana want.

10.12 Cook Island assertion of kaitiakitanga

Although clear answers given by the participants that they had not yet 'arrived' at a culturally acceptable solution, as their lens' was focused on affordability of the system and

monitoring of the environment, their mātauranga Kuki Airini (Cook Island knowledge) of the ecosystem and surrounding landscapes, including the issues of the impact of tourist numbers on these areas was clearly evident.

Instead of working alongside the local people who are striving to exert kaitiakitanga over their lagoon, marine areas, coral reef, and land regions, there appears to be a large focus on what the external consultants determine from data acquired and reports written. At a local level, 'atu o te 'enua and Aronga Mana input into these areas' health at times has been limited. This is due to assumptions made by the government and their abandonment of projects part way through completion, which has hampered the strong progress made by projects like WATSAN (Water, Waste and Sanitation).

The Manavaroa Mataiapo (leader), Philip Nicholas maintained a position (Etches, 2019) that there should be “no ocean outflow” from the Mei Te Vai Ki Te Vai wastewater project. This was further supported in a review carried out by a Cook Island Marine Biologist Dr Teina Rongo, who examined the risks of research carried out by non-local experts (Rongo, 2019, p. 4) on the Mei Te Vai Ki Te Vai Muri Wastewater Concept Design Report: Hybrid Outfall (GHD, 2018a). Relevant research with emphasis on the ocean outfall option was examined, including the work completed through the WATSAN project and the general sanitation on the island of Rarotonga. Dr Rongo noted in his recommendations that ‘managing their sanitation issues should have been a local approach by locals, ‘assisted’ by a consultant for capacity building based on local knowledge and a positive local drive to a solution’ (Rongo, 2019, p.15).

10.12.1 Question Five and Six

A key project aim is to capture the essential principles and cultural values Māori have around wastewater. This will be done by seeking opinion from a variety of cultural experts from around Aotearoa and the Cook Islands as they too are currently examining wastewater treatment solutions. Cultural experts from Rarotonga will need to consider what culturally appropriate solutions look like and how they fit with the demands of modern times.

With the development of an OSET system would there potentially be cultural impacts on

the land? Would there be potential cultural impacts on the waterways?

CI Participant One

Well the situation you are in, in your community in NZ, we are exactly the same. You know, we feel like that too. We know that we want better onsite systems to help solve the problems on our coastal areas and in our lagoon. Some of our traditional leaders in the Muri district have already said at community meetings that they will oppose there being an ocean outfall. I support them too because when you think about high nutrients or effluent that will go there... the harm it will do to our fish and marine. Even one of our own, one of our environmentalist experts on the island, is against it too because of the negative effects that it can have on our marine ecosystems. You know, we need good engineers, once they know what's right for our landscape. Yeah, because it has to be about our climate, the resilience of it, you know, how long it's going to last. It's all of it. You know, those are the things that we're constantly talking about. In how it's going to... really how it's going to impact our people. We're not saying too much, we're worried about what's going on. You know, when people talk, they are the people they actually don't own the land. We are not too worried about what they say but we are really worried about what's going to happen with our next generation.

CI Participant Two

We need to think about a system that connects up to a reticulation network that is going to protect our marine areas and our lagoon because that is what is important to all of us right now, but that is only one part of the solution. I say that because projecting a little bit forward then the situation that WATSAN has that is at our most prominent tourism site, down at Muri is through the media and other forms as the algae problem from my best sources they say that it might not be related just to

the waste stream itself. Because we have open waterways that are coming down and because we haven't been monitoring those waterways very closely, you could be looking at a twofold problem so it's inconclusive to say that it's just related to the wastewater. I think the local authorities are kind of coming to grips with that solution. Meanwhile while that is all taking place my group and I are also positioning ourselves to not only for that particular scenario but other projects where we are wanting to manage that better.

CI Participant Three

We have to think about what type of system that we want to have put into the other parts of the island that is going to be part of the reticulation because if there is the change to reticulation the nutrient numbers will take about 25 years before they head back into the lagoon. But some of this will be about what the experts are doing with their testing and the data. At the moment we have about six options it's about increasing... getting sedimentation out of the lagoon, the basin, setting up the reticulation system, offsite drainage for wastewater, looking at the algae removal seabed itself and the other two major ones of something that we can deal with it is the regulation on phosphate products coming in for chemicals and wash powder because the government is working in with the European union they set up a whole agency to work on just that lagoon. Those are the guys the best people to talk to, one of the engineers who lives on the island who is running it all, anything to do with reticulation these guys know what it is about. They have experts all over Europe because it started with the seaweed and then over here it started with an impact assessment. We gave suggestions to do this, and

CI Participant Four

now the government has jumped on board and there are about three different agencies that are all working together.

Although we're going through our programme of upgrading and installing new systems in to the areas of Muri, while upgrading all existing septic tanks would reduce the amount of nutrients entering the lagoon's vulnerable regions, this would not be enough to solve the problem. Reticulation is the next part of the process, but it is about finding the land for the reticulation system to be successful. The idea of having culturally acceptable systems would need to have the right system that will fit our environment. We want a system that is not going to make an impact on our waterways and land areas. Because we want clean water. We need the confidence and understanding of the Aronga Mana and the village leaders to get this going, as what they agree to will help to push the thinking of our Government agencies to move on a reticulation scheme with the right type of systems to go with it.

10.13 Cook Island Environmental and Cultural Sustainability

The long-term impact of not having the 'right' system including the reticulation scheme and land -disposal, was highlighted by the participants. Focusing on the legacy they would leave their mokopuna as well as seeking the guidance of the mataiapo or rangatira (leaders) to help make the right decisions was important for them. This focus was not only on addressing cultural sustainability of a healthy ecosystem, but sustainability in environmental resource management. As it is becoming more urgent that the loss of endangered plant and animal species, the degradation of cultural sites, need to be seriously considered in future decision- making (Hajkowicz & Okotai, 2005).

These beliefs and values systems held by the participants were endorsed by Cook Islands Environmental Manager, Jacqueline Evans in her statement on the health of Muri lagoon and marine areas (Godfrey, 2021, August 3) "We depend on healthy coral reefs not just for tourism but also for coastal protection and as a food cupboard, especially when times are rough."

Vermifiltration, the culturally accepted solution for the Rotoiti community, was recently presented to a key infrastructure group in Rarotonga by the Director of Ecogent Vermifiltration systems, Peter Riddell (see Appendix Four for further detail on this issue). His presentation examined the benefits of the system, whereby once treatment occurs, the water could be reused for irrigation of crops which would reduce the strain on demand for water by the hotels on the island. This cost-effective and culturally accepted wastewater solution had previously been stymied as an option in Muri and Ngatangia by earlier political commitments to more expensive solutions approved and paid for with help from the New Zealand government (ibid).

10.14 Chapter summary

One of the aspirations of this project is to pose the question of a national discussion for iwi leading to the formation of a representative body to help our people with infrastructure decisions. This initiative would provide iwi and their decision makers with the necessary support, provide informative views and create some consistency and efficiency to decision making processes.

Perhaps the question here is if a Cook Islands representative body comprised of detailed local cultural and environmental expertise, as well as government, should be considered to formally contribute to decision-making decisions during the co-planning and co-management phases of involvement. These would be huge cost-cutting benefits rather than an afterthought after hasty judgments on wastewater solutions have been made at exorbitant costs.

This chapter sought to understand as Mana Tiaki - guardians of our environment (Te Ipukarea Society, n.d.) and 'atu o teia 'enua – owners of the land/land owners in Rarotonga, how cultural processes and principles within the context of wastewater could be managed in

the modern context to meet the challenges of an ever-changing world. The experience highlighted a need to develop a more comprehensive framework providing essential knowledge and thinking to guide iwi processes and decision making in this area. The outcomes of this research are for the benefit of decision makers - both Māori and non-Māori - who are faced with similar challenges. The outcomes from this research will have direct application across Aotearoa and abroad in areas around the pacific such as the Cook Islands. The pacific relevance was derived from our cultural similarities and shared environmental issues as well as an understanding that many major upgrade projects receive technical solutions and construction input from New Zealand.

Chapter Eleven presents the results of the research and discusses and analyses how iwi can best engage with statutory bodies into the future, and finally, will summarise and create recommendations moving forward.

CHAPTER 11: RESULTS AND DECISIONS

Ka mau tonu ngā tāonga tapu o ngā mātua tūpuna

Koinei ngā tāonga I tuku iho nā te Atua ‘

Hold fast to the treasures of our ancestors

For they are the treasures that have been handed down to us by God’

11.1 Chapter Introduction

The last chapter sought to understand as Mana Tiaki - guardians of our environment (Te Ipukarea Society, n.d.) and ‘atu o teia ‘enua – owners of the land/land owners in Rarotonga, how cultural processes and principles within the context of wastewater could be managed in the modern context to meet the challenges of an ever-changing world. The experience highlighted a need to develop a more comprehensive framework providing essential knowledge and thinking to guide iwi processes and decision making in this area. The outcomes from this research will have direct application across Aotearoa and abroad in areas around the pacific such as the Cook Islands.

The pacific relevance was derived from Māori and Cook Island cultural similarities and shared environmental issues as well as an understanding that many major upgrade projects receive technical solutions and construction input from New Zealand.

Because this was chosen as a Case Study for its uniqueness to provide Māori owned land in a rural community to construct a wastewater treatment plant and connect to a reticulation scheme within the Rotoiti Rotomā communities, within the broader context, it was to develop environmental, cultural and economic sustainability for the iwi of Ngāti Pikiao and Ngāti Te Rangiunuora. Iwi’s position has always been to provide a culturally preferred option (onsite system reticulated to a WWTP) with key benefits that align with their cultural, environmental and economic perspectives for the community (T. Wichman, personal communication, August 05, 2019).

Therefore, this chapter presents the themes of the research regarding environmental, social

cultural and economic sustainability through the viability of the pre-treatment systems connected to the WWTP and discusses strategies RLC can improve to support long term viability of the plant and the scheme. how iwi can best engage with statutory bodies into the future, will summarise and create recommendations moving forward.

11.2 Pre-treatment options that are environmentally, culturally and economically viable

Various factors must be considered when choosing a pre-treatment method that is not only environmentally sound for the receiving area, but also culturally acceptable to iwi as part of their assertion of kaitiakitanga. The other two factors of sustainability were also evaluated, in addition to environmental and cultural feasibility. Many sustainability elements and indicators were considered and implemented for the pre-treatment system selection, including minimisation of environmental impacts and health dangers, economic efficiency, public participation, and acceptability (Gogate, Kalbar, & Raval, 2017).

Acceptability takes into account factors such as wastewater treatment technology and odour-related and other residuals, which although is not a public health risk, is a major concern to the community. Both of which are important considerations in the selection of the wastewater treatment system options. An environmental advantage considered was the pre-treatment scheme could offset failure events at the treatment plant i.e. less contaminants go to the plant therefore potential for less contaminants applied to the land, including cultural benefits of lower impact on the environment and sites of cultural significance of leaching resulting from pipe network failure (T. Wichman, personal communication, July 01, 2017).

11.3 A Multiple Attribute Decision Making (MADM) Methodology and Method

As discussed in Chapter three, a Multiple Attribute Decision Making (MADM) methodology and method was used in this case (Kalbar, Karmakar & Asolekar, 2012). Multiple variables, such as costs, environmental performance, safety, ecological dangers, and community

perception, are frequently used to determine effective wastewater treatment strategies (Gogate, Kalbar, & Raval, 2017). MADM approaches are well suited to this research because the case study is concerned with picking the most practical pre-treatment wastewater system option from a finite number of specified options (ibid). Moreover, Kalbar et al. (2012, p. 159) states, the ‘challenge in wastewater management is selection of the best available technology for the particular wastewater treatment objective at a particular site. Many factors, such as capital costs, operation and maintenance (O&M) costs, and land requirements, are involved in the decision-making process’.

11.4 Multi Criterion Decision Assessment and Criterion Weighting

The STEP and Biolytix systems were subjected to a multi-criteria decision assessment (MCDA) to determine their long-term viability and cultural acceptability (Pohekar and Ramachandran 2004, as cited in Upadhyaya & Moore, 2012). Four main criteria (environmental, social, cultural and economic) were used, with nine criterion indicators. According to Gogate et al. (2017), regional and local social priorities are captured using criteria- weightings, which are then turned into a decision-making approach. This scoring system used a simple weighted sum model of MCDA, which has proven to be successful in studies that have used this method (Upadhyaya & Moore, 2012).

Due to the study's limited scope, a thorough examination of weighting methodologies was not possible. The major goal here was to develop a set of sustainability indicators and explain how they could be used to assess the sustainability of both pre-treatment systems.

11.5 A Scoring Model for Environmental, Social, Cultural, and Economical factors of the pre-treatment systems for the scheme

Given our understanding of what we know from the entire examination of this project, including the scoring model has been developed in environmental, cultural and economic dimensions to measure the effectiveness of both the STEP system and the Biolytix system. To establish a measurement system, sustainability criteria and indicators are often used.

Sustainability criteria are requirements or standards that must be met in order to provide sustainable services and goods in a certain context (Ling, Germain, Murphy & Saroj, 2021).

11.5.1 Scoring Model Indicators

The term "indicators" refers to a set of numbers the exact measurements or value assignments used to show evaluation completion factors, as well as long-term viability presented a thorough analysis and comparison of the wastewater pre-treatment systems based on a list of indicators from prior research on the elements of the environment, social, cultural, and economic (ibid).

The development of this scoring tool that considers the long-term viability of the four dimensions overlaps in several areas, for example, under the Cultural Dimension criterion and indicator - Potential safe reuse of reclaimed water, which can also pose a health risk if the water is contaminated by microbes. Surface and ground water, aquatic and other ecosystems, ecosystem services, and soils are all affected under the Environmental Dimension and indicator, and can also constitute a health concern (Social Dimension) if wastewater treatment is not of high quality before returning to the receiving ecosystem.

11.5.2 Ranking the Scores

On each dimension, the STEP and Biolytix systems are rated on a scale of 1 to 5, with the higher the rating, the greater the system's ability to meet the needs of the environment and end users (property owner/occupier). The criterion indicators were quantified using a specific method. Land acquisition, acceptability, local development and public participation, and water reuse (Wondim & Dzwauro, 2018) and the like were all rated on a cardinal scale (1–5) based on the researcher's field visits, expertise sought, Steering Committee and Cultural Impact hui with municipal authorities and iwi representatives, and native Rotoiti and Rotomā knowledge.

Score	Explanation of the Result
1	Not possible to assess Because a lack of information has been provided throughout this project, it hasnot been possible to assess
2	Unsustainable The pre-treatment system has not met the Dimension Indicator
3	Sustainability – Low The pre-treatment system has partially met the Dimension Indicator
4	Sustainability – Medium The pre-treatment system has mostly met the Dimension Indicator
5	Sustainability – High The pre-treatment system has met the Dimension Indicator

Table 7. Scoring system used to rank the effectiveness of the STEP and Biolytix systems

CRITERION	CRITERION INDICATOR	STEP SYSTEM SCORE	BIOLYTIX SYSTEM SCORE
Environmental Dimension			
E1. Surface and ground water, aquatic and other ecosystems, ecosystem services, and soils are all affected.	The quality of treated wastewater, sludges, and any odorous gases will be determined by the treatment standard, plant management, the receiving ecosystem's sensitivity, and the proximity of surrounding neighbours. RMA Consent requirements must be achieved	3	3
E2. Resilience and Flexibility to natural hazards	Natural hazards such as earthquakes and earth slips	4	4
E3. Possibilities for ecological restoration	Because the wastewater is highly treated, there is opportunity for rehabilitation of wetlands	4	4
Social Dimension			
S1. Public Health Risk	Both communities are provided with safe, hygienic circumstances, such as drinking water, wastewater treatment and discharge, solid waste management, and so on.	4	4
S2. Public Awareness	The value of the WWTP's and Pre-treatment systems advantages may be improved, and action can be continued through ongoing consultation and engagement with iwi, community ratepayers and stakeholders	4	3
S3. Public Acceptance	Demonstrates the benefits of the WWTP and the pre-treatment systems to the community, are valued by the local populace	3	3

Cultural Dimension			
C1. Protection of Mauri of the waterways	High level of pre-treatment with on-site system and WWTP, resilient pipes (double-sleeved) and pump stations (ongoing monitoring – 6 months) to mitigate leaching into lakes	3	4
C2. Cultural sites of significance and wāhi tapu are protected	High level of pre-treatment with on-site system and resilient pipes (double-sleeved to prevent breakage) and pump stations (ongoing monitoring – 6 months)	3	4
C3. Potential safe reuse of water	High level of pre-treatment with on-site system and at WWTP can support reuse of reclaimed water towards irrigation and for non-potable water purposes i.e. growing manuka, kanuka, harakeke and other plant species on the land block	3	4
Economic Dimension			
EC1. Affordability	Long term affordability of the onsite pre-treatment system by permanent home owners and holiday home owners – offset by Government subsidies	2	2
EC2. Operation and Maintenance costs	Off-site costs are the responsibility of the city/district council. The property owner is responsible for the on-site charges (rates). In this case, the capital and annual running costs are equitably distributed across the population serviced in the two communities. Water metering is user-pays	2	2
EC3. Capacity for future growth	This is determined by the total system design capacity. Future development has been accommodated by modern technology of this particular WWTP	4	4

Table 8. A Scoring Model for the environmental, social, cultural, and economical dimensions of a STEP system and Biolytix System. (Source: adapted from Ministry for the Environment, 2003b).

11.5.3 Results of the Environmental and Cultural Dimensions

Surface and ground water, aquatic and other ecosystems, ecosystem services, and soils are all impacted in E1, and C3 Potential safe water reuse, is being monitored on a 6-monthly basis for the first year and then on an annual basis, with results being reported to the Iwi Wastewater Liaison Group (IWLG) as required by the Resource Consent. This is the Council's obligation, which was reported on in July 2020 (Rotorua Lakes Council, 2020b).

The objectives of the reporting (p. 4) are to 'ensure the treatment plant and discharge does not cause adverse environmental or health effects through: (a) appropriate design and operation of the treatment plant with upper limits on the level of contaminants in the discharge; (b) appropriate design of the discharge arrangement that will return the treated water to the environment at a suitable and agreed location by subsurface soakage trenches that are 60-75m above the water table; (c) monitoring the discharge water and receiving environment with triggers for mitigating action if required'.

The scoring model above has given between a 3 and 4 for both systems as part of their treatment on each property, as no groundwater was found in bores around the treatment plant and Urupā (ibid), which is a 'positive impact from the pre-treatment systems, including there being no increasing trend in aquifer nutrient concentrations to date, which indicates that the nutrients being discharged have not reached the aquifer, and so there has been no load of nutrients to the lake' (p. 9). This being that to date there are no elevated levels of nutrients above normal background levels.

Potentially, there could also be positive impacts for E3 Possibilities for ecological restoration through wetlands to occur, but this will need on-going monitoring. According to the above scores, it is evident that pre-treatment of wastewater prior to reticulation is recommended, and some kinds of pre-treatment are superior to others. The preferred pre-treatment solutions are best suited for reducing or eliminating cultural indicators (Cultural Impacts Team and PDP, 2017).

The iwi engineers' technical contributions and cultural understandings of the systems, the iwi representatives' advocacy based on their insightful feedback at the many iwi and steering committee hui, and a detailed Cultural Impacts Team and PDP (Pattle Delamore Partners)

(2017) Cultural Risk Analysis and Mitigation Approach report has created the scores between 3 and 4 for both systems. This has also occurred for E2 Resilience and flexibility to natural hazards, C1 Protection of mauri of the waterways and C2 Cultural sites of significance and wāhi tapu are protected. This valuable input contributed to the high results, but will need to be monitored in the future. The Cultural Risk Analysis and Mitigation Approach report was prepared and presented at the Steering Committee and IWLG hui.

11.5.4 Results of the Social and Economic Dimensions

Based on community input and surveys conducted in both communities over the past 5 to 6 years, the social dimensions of S1 Public Health Risk, S2 Public Awareness, and S3 Public Acceptance obtained high ratings in the scoring model. Although there was some scepticism and anguish during the first round of consultation periods, the results show that wastewater treatment practises are widely accepted in the community, particularly when it comes to lake health and quality. In terms of S2 public awareness of the WWTP's and pre-treatment system benefits, could be increased from a 3 to 4, and steps should be done at the WWTP to eliminate the odour, as this becomes a public perception and concern (Cossio, McConville, Mattsson, Mercado & Norman, 2020).

The Economic Dimensions for EC1 Affordability and EC2 Operation and Maintenance costs received a score of 2, indicating that customers' payment capacity is not well known and that although the municipality has provided MoH, BOPRC, RLC and MfE subsidies for the scheme, it does not have very effective strategies in place to increase customer affordability. Efforts should be made to gain a better knowledge of the genuine affordability level.

EC3 Capacity for future growth has scored highly on the scoring model with a 4 due to future development. RLC designed it's WWTP infrastructure to accommodate potential growth of at least another 200 homes across the communities. Part of this is because there is widespread consensus amongst iwi and the community that population or business growth is beneficial to the local economy. Iwi representatives and surrounding land trusts had asserted their need to build future papakainga for their koeke and whānau returning home (Rotorua Lakes Council, 2015, September).

11.5.5 Conclusion

Overall, the scoring model based on the pre-treatment systems (and the WWTP) was rated as having a modest to high level of long-term viability and sustainability. Prioritized initiatives for further development include ongoing effluent and groundwater monitoring, strengthening the sewer network (pipes and pump stations), reuse of water, possibilities for wetland restoration as well as the affordability of the wastewater treatment plant and reticulation scheme.

11.5.6 Chapter Summary

Because this was chosen as a Case Study for its uniqueness to provide Māori owned land in a rural community to construct a wastewater treatment plant and connect to a reticulation scheme within the Rotoiti Rotomā communities, within the broader context, it was to develop environmental, cultural and economic sustainability for the iwi of Ngāti Pikiao and Ngāti Te Rangiunuora. Iwi's position had always been to provide a culturally preferred option (onsite system reticulated to a WWTP) with key benefits that align with their cultural, environmental and economic perspectives for the community (T. Wichman, personal communication, August 05, 2019).

Therefore, this chapter presented the themes of the research regarding environmental, social, cultural and economic sustainability through the viability of the pre-treatment systems connected to the WWTP, and discussed strategies RLC could improve to support long term growth of the plant and the scheme.

The next chapter will conclude what Ngāti Pikiao and Ngāti Te Rangiunuora iwi can do to sustain their relationship with the ecosystem by expressing their kaitiakitanga which in turn will improve environmental sustainability. The research's limitations will be discussed, as well as future research recommendations for Indigenous researchers and local government.

CHAPTER 12: SUMMARY AND CONCLUSION

Kei te ora te wai, kai te ora te whenua, kai te ora te tāngata

The water is healthy, the land and the people are nourished

12.1 Chapter Introduction

The last chapter highlighted the Case Study for its uniqueness to provide Māori owned land in a rural community to construct a wastewater treatment plant and connect to a reticulation scheme within the Rotoiti Rotomā communities, within the broader context, it was to develop environmental, cultural and economic sustainability for the iwi of Ngāti Pikiao and Ngāti Te Rangiunuora. Iwi's position had always been to provide a culturally preferred option (onsite system reticulated to a WWTP) with key benefits that align with their cultural, environmental and economic perspectives for the community (T. Wichman, personal communication, August 05, 2019).

It also presented the themes of the research regarding environmental, social, cultural and economic sustainability through the viability of the pre-treatment systems connected to the WWTP, and discussed strategies RLC could improve to support long term growth of the plant and the scheme.

This chapter will conclude what Ngāti Pikiao and Ngāti Te Rangiunuora iwi can do to sustain their relationship with the ecosystem by expressing their kaitiakitanga which in turn will improve environmental sustainability. Learnings have been taken from the Cook Island Case Study to support the way in which kaitiakitanga and kaitiaki values can be exercised in the Rotoiti Rotomā context. The research's limitations will be discussed, as well as future research recommendations for Indigenous researchers and local government.

12.2 Using a Kaupapa Māori Methodological Approach

For this thesis, I used a Kaupapa Māori methodological approach in two ways. Kaupapa Māori is built on a foundation of decolonizing and transformative features that aim to establish the research's liberatory objective. The fact that Kaupapa Māori also legitimises and accepts Indigenous languages and cultural practises indicated its suitability for this Case Study. One of the most important contributions of this study, in my opinion, was the use of real Indigenous research theory and methodology.

12.3 Research Limitation

Time and resources have limited this project. I would have liked to have a larger range of iwi participate in order to get a better understanding of the impacts of the land and waterways and kaitiakitanga from iwi. Participants were chosen for this study based on criteria that were specific to the Rotorua and Rotomā regions and their lakes. They are active members either on iwi trust boards, land trusts or lake action groups that proactively seek solutions to the ecosystem and cultural sustainability in the Rotorua, Rotoiti, and Rotomā lakes (Teinakore-Curtis, 2015). It would have been desirable to hear from iwi participants along the entire catchment of Lake Rotoiti's waters, from Lake Rotomā through to the Maketū region of the Kaituna catchment (ibid). This would enable for a better understanding of the differences in environmental resource management at the local, regional, and national levels, as well as the values that tikanga Māori and mātauranga Māori may contribute to each level. Both the water and the people have local geographies, but the consequences of this thesis might be far-reaching, as iwi concerns about resource depletion have been heard across the country.

The traditional kōrero presented in this thesis is only a small sample of the magnitude and depth of cultural knowledge, kaitiakitanga ethics, morality, and practises that Māori society offers as sustainability teachings. In hindsight, I could have done a more in-depth analysis of Ngāti Pikiao, Ngāti Te Rangiuuora and Ngāti Rongomai to comment on the good effects of the RRSSC, Iwi Cultural Impacts team's and IWLG formation and progression. The iwi representatives' work with some council members and staff has produced a positive road forwards for both the local council and iwi. The inclusion of a section encouraging hapū and iwi to prepare and/or update Iwi Management plans and a Cultural Management Plan for the

scheme might have been emphasised as a constructive way for hapū and iwi to participate in co-planning and co-management procedures better.

12.4 Research Findings

With regards to the reticulation of the wastewater from both communities, the following questions were posed as part of the detail within the project:

1. What would culturally appropriate wastewater solutions look like and how do they fit with the demands of modern times?
2. Can cultural concessions be made when there are not a lot of practical wastewater options to choose from?
3. How could cultural offence be mitigated?
4. What type of strategies and solutions would best fit iwi that also align with the needs of the general community and other affected stakeholders?
5. What is needed to develop options to make this a reality?

As Linda Smith (1999) characterises myself as a "insider/outsider researcher," it has been obvious during the long period of this investigation that key cultural factors are not well understood in the wastewater industry. This is due to a lack of examples of other iwi successfully guiding and influencing solutions, as well as a lack of proven wastewater solutions that address fundamental cultural values and concerns.

Other community stakeholders, despite having only limited representation on the RRSSC, appeared to have more influence in the selection of a preferred option, whereas cultural matters seemed to end up in the 'too hard basket' because it had never been done before, or it was too expensive. Another source of frustration was that cultural issues were not generally regarded important in the wastewater industry, which explained why no solutions were accessible. If these issues were taken into account in the industry, there would be readily available, tested, and refined alternatives. These underlying cultural concerns and opinions are shared by iwi all around the country.

The technical skills and cultural understandings of the iwi engineers assisted the essential

architecture of the scheme's installed equipment, notably the Biolytix pre-treatment system. They insisted on increased sturdiness, such as thicker pipes for the project, emergency storage at pump stations, and higher levels of quality control on materials. From production and construction/design through peer-reviewed failure detection processes in the main pipeline and other important equipment, to the position and alignment of the main pipeline, their ethos was that excellent engineering starts with outstanding materials. This would cover failures like earthquakes, construction accidents, slips, and one-time events like excavations. Poor quality materials, such as pipes, welding, fittings, and workmanship, were also a part of their contribution to WWTP and pre-treatment design and implementation, which prioritised cultural issues at each stage of the process.

Therefore 'design and construction of the wastewater system, and the long-term robustness of the final solution are critical to achieving the engineering outcome that is best aligned to the specific cultural, environmental, social, and economic needs of iwi and the community' (Cultural Impacts Team and PDP, 2017, p. 5).

The discussion below on the findings of the pre-treatment system to achieve cultural and environmental sustainability highlighted that:

1. Because there were no options of proven systems to choose between, a one-year trial of the Biolytix system was conducted from the end of 2016 to early 2018 (see further discussion in Chapter Seven). This was due to Council having to consider options that were robust and proven.
2. Transfer of para - past iwi areas of interest or to iwi areas of interest. For iwi, the higher the pre-treatment the better.
3. Minimise impact from failure events - a reticulated scheme puts pipes and pump stations and other equipment in areas that are currently void of this, the risk profile goes from zero to non-zero and increases over time. The impact can potentially be on wāhi tapu, cultural sites of significance and areas for mahinga kai. One of the iwi engineers discussed a concept of 'safe to fail'. By safe to fail, it means that if the pre-treatment system does fail, the impact on the waterways won't be as catastrophic as it might be with less well treated effluent (Rotoiti Rotomā Sewerage Scheme Committee, 2017, August).
4. Request for improved systems such as Biolytix (focused on sludge removal, maintenance and susceptibility to failure) and STEP treatment (other than gravity)

with a better filter were finally considered by Council and agreed upon after lengthy consultation and debate.

5. Sludge treatment – a high level of sludge treatment to avoid unacceptable human health risk due to microbial contamination. This supports reuse of the water for irrigation of crops and plants, which was discussed in Chapter Nine – 9.7. See Appendix Seven for agreed Planting Plan between Council and the Cultural Impacts Advisors.
6. Non-submerged environment - large variety of organisms digesting faecal material captured in the filter layers which includes worms etc. This was a major component in the Biolytix system that was favourable for iwi in relation to pathogen mitigation. More detail on this is discussed earlier in Chapter Six.

Overall, by reducing the potency of the waste stream using pre-treatment is one measure that improves the risk profile. Obviously, a higher level of pre-treatment scores better from a cultural viewpoint. STEP is evidently a system that is able to meet some of the cultural concerns for Iwi.

Finally, there is the matter of social and economic sustainability. Access to electricity and water has greatly enhanced as a result of the reticulation project, which was included in the Council's WWTP construction and design and was strongly campaigned for by the iwi representatives on the Steering Committee and landowners of Haumingi 9B 3B. It now presents the necessary infrastructure for the foundations of housing and economic growth in the community. Specifically, it has the potential to maximise land use with existing residential properties and to create higher-value land use for our Māori land trusts and incorporations within the boundary of the scheme (Rotoiti Rotomā Sewerage Steering Committee Iwi Representatives, 2017). This should also inform the Council's Spatial Plan which is to provide a picture of where the district is heading and highlight significant and key areas for growth and change (RLC, n.d.).

Iwi have land interests in the Rotoiti, Rotoehu, and Rotomā areas. Given that the scheme's primary objective is to improve the lake's water quality, it's critical that all residents of Lake Rotoehu, including Otautu and Kennedy Bays (as discussed in Chapter Seven) are able to join the scheme. 'Their membership in the scheme will only benefit them in terms of up-front and ongoing expenditures. Many of the properties included in the proposed Rotoiti

Rotomā scheme are located in the Lake Rotoehu catchment. The Council's Long-Term Plan will need to be revised to include Rotoehu in order for this to happen' (Rotoiti Rotomā Sewerage Steering Committee Iwi Representatives, 2017, p. 3).

12.5 Opportunities for Future Research

By comparing their interviews, it was discovered that iwi members in Rotoiti and Rotomā, as well as landowners in Rarotonga, were eager to restore the lagoon and lakes by removing nutrient seepage that had adversely affected water quality. However, one area for future research that was not covered in this thesis was how Rarotonga landowners prioritised economic considerations over cultural considerations when upgrading their wastewater systems or their ability to implement reticulation, as opposed to iwi who prioritised cultural considerations in their goal to have a scheme.

Much of this, in my view, stems from the fact that, while the Cook Islands government is investing in critical infrastructure, such as large water and sanitation projects, through NZ Aid grants (IMF, 2020) or developing private-public partnerships (MOUs), the grants and subsidies are not reaching Cook Island taxpaying residents quickly enough to help them pay for these increased costs. New Zealanders, on the other hand, benefit from government subsidies created by MfE, MoH, BOPRC, and District Council policies and grants to mitigate otherwise growing wastewater expenses. In other words, the cost of wastewater in a Cook Islands home is substantially different from that of a New Zealand home, which is a disadvantage. Other Indigenous researchers may be able to use this as a starting point for additional research.

12.6 Reflections – Keeping it Real

Being a kaitiaki, for myself and other iwi members on this project has taken at least 8-years of dedication and perseverance to ensure that the Rotoiti Rotomā wastewater reticulation project, which is a unique engineering challenge due to the cultural context in which it is being implemented, is completed. The Biolytix pre-treatment units are yet to be put in the

Rotoiti community, despite the fact that the majority of the scheme, including the STEP system for Rotomā, has been completed and executed. This is an example of the length of time it took to implement the entire scheme.

Numerous hui (with a minimum 2-hour duration) have been held from 2014 to 2021 for the RRSSC, Iwi Cultural Impacts Team, and Iwi Wastewater Liaison Group - see Appendix Eight for a comprehensive timeline of these hui held in one year, including agreements and significant discussions had within each mandated group. It excludes the large number of community consultation meetings, pre-treatment system and onsite WWTP field days and iwi hui held on weekends to keep Marae, Māori land trusts and Incorporations and hapū members informed. This is only a small sampling of the sweat equity and whānau sacrifice required to see a project involving Māori land and waterways come to fruition, which for kaitiaki, entails completely honouring the iwi's mana.

It is not for the faint of heart to preserve one's physical health while building one's kaitiaki position in a long-standing initiative such as this. Many of the iwi representatives on this project were carrying out these all-consuming tasks in addition to their full-time occupations. This is the resilience and steadfast devotion required to truly hold kaitiaki principles and demonstrate kaitiakitanga in its purest form. It provides an opportunity for hapū members to apply their kaitiaki responsibilities and knowledge to assist their marae, hapū, and iwi in achieving cultural and environmental aspirations. As a result, it must be carried out with the utmost sincerity and conviction.

12.7 Conclusion – Making it Real

This thesis isn't the final word on the subject; rather, it's another step toward asserting kaitiakitanga for the Rotoiti and Rotomā iwi. Relevant iwi members on the project have examined, criticised, and scrutinized these chapters for accuracy, and have provided recommendations to help the work evolve (see Appendix Five and Six as examples). An enduring tribute to Ngāti Pikiao and Ngāti Te Rangiunuora's kaitiaki beliefs and values.

Furthermore, the places, names, and histories appear to fit together like pieces of a jigsaw puzzle as I listen to our koeke and pakeke transmit wisdom and knowledge from these quiet

and tranquil lakes of Rotoiti and Rotomā. When we talk about names and places, we remember and respect them more. As our tūpuna did, we must maintain our ties to the whenua as Māori. We must safeguard our resources and ensure their abundance for future generations. Rangiheuea (2006) summarises it as follows:

The lakes are important to the Te Arawa tribe for the provision of food and other material resources. They are transport routes and central to the personal identities of each sub tribe of Te Arawa. They are places of spiritual and traditional customs and practices and connect to the whakapapa (genealogy) of each individual of the many constituent hapū.
(Rangiheuea, 2006, p.92).

With this in mind, I am confident that if iwi continue to safeguard and care for our wai and whenua as a resource, our wai and whenua will allow itself to be used for our survival.

CHAPTER 13: REFERENCES

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13.1 Legislation and case law

Local Government Act 2002

Public Works Act 1981

Resource Management Act 1991

Te Arawa Lakes Settlement Act 2006

13.2 Appendices

13.2.1 Appendix One - Copy of letter of support 1

Haumingi 9B 3B Trustees/Owners Hui Held at Taurua Marae On Sunday 21st August at 10am	
Present:	Trustees/Owners: Willie Emery (Chairman), Leo Fitzell, Keita Emery Bert Sergeant, Matekino Lawless (for Jack Lawless Trust), Robyn Skerrett, Len Sergeant, Kevin Hiha, Chris Rangirangi, Hone Cassidy, Mike King (Forestry Manager), Colleen White-Skerrett, Theresa Skerrett, Hariata Kereopa, Atawhai Stacey, Aroha Blackburn, Anthony Blackburn, Kahira Rangirangi, Taituha Malcolm, Hiakita Kameta, Poihipi Hamilton, Hone Cassidy, Hamiora Emery In attendance: Ian Mclean, Glenn Snelgrove, Frances Teinakore-Curtis, Wairangi Whata
Apologies:	John Lawless, Tania Curtis, Pat Cassidy, Puti Hammond, Hori Emery, Taira Wichman (Owner/Engineer/Technical Advisor for Haumingi 9B 3B, Hilda Waimarama Groot, Gail Nuri, Peter and Mark Skerrett, Maryanne Fitzell RLC: Andy Bell, Greg Manzano (Engineers) Moved: Burt/Keita
Mihimihi:	Burt Sergeant
Karakia:	Leo Fitzell
Feedback given on Forestry on Haumingi 9B 3B Land block	Mike King – There are two encumbrances on the land block. They are: <ol style="list-style-type: none"> 1. Investor (Forestry) 2. Carbon Lessee – The Haumingi 9B 3B Trust sells the carbon to the Carbon Lessee. Both of these parties are comfortable either way with how

	<p>the Owners will use the land. The construction of the WWTP will not negatively impact the area. There are no problems from land use perspective.</p> <p>Willie - Long term access – There are two routes onto the block, one from State Highway 30 and the other from the top of the block from Rotoiti 15 block.</p>
CIA Presentation	<p>Colleen White – Skerrett</p> <p>At the last hui the Scope of the CIA report was presented to the owners. Issues were brought up by the owners. The issues are outlined below:</p> <p><u>Location</u></p> <p>Proximity to Housing</p> <p>Proximity to Marae and Urupā</p> <p><u>Access</u></p> <p>Restriction of access to traditional and recreational hunting grounds</p> <p><u>Odour</u></p> <p>Proximity to Marae and Housing</p> <p><u>Environmental Impact</u></p> <p>Leaching to water aquifer that provides drinking water</p> <p>Leaching into water table and runoff to Lake water</p> <p><u>Affordability</u></p> <p>Recognise that affordability is a key part of the decision-making process around the preferred option.</p> <p>The acceptance of an MBR plant by Iwi was based solely on the potential for a low-cost MBR plant as presented by Apex Environmental.</p> <p><u>Aesthetic Value – Landscape</u></p>

	<p><u>Risk Management</u></p> <p>Recommendations have been placed into the full CIA report that is being presented today.</p> <p>Induction protocols – Induction has been given to all Contractors that have been onto the block to do work (Teresa/Colleen)</p>
Floor open for discussion/questions	<p>Colleen – The report and recommendations need to be in the Lease Agreement between the Haumingi 9B 3B Trust and Rotorua Lakes Council (RLC).</p> <p>Willie – The trustees have an MOU with the Council. The Marae/Rotoiti Clubrooms are exempt from connection and payment. The assets we have/potentially have are:</p> <ul style="list-style-type: none"> - Forestry which makes good yield - Growing Mānuka (little return) - Potential Papakainga <p>Willie introduced the reps/iwi reps from the Rotoiti Rotomā Sewerage Steering Committee (RRSSC) who are present today: Ian Mclean (RRSSC Chair), Glenn Snelgrove (Rotomā Ratepayers Association Chair), Wairangi Whata, Frances Teinakore-Curtis, Willie Emery, Robyn Skerrett, Colleen White-Skerrett (Iwi Reps)</p> <p>Colleen discussed the Biolytix trial that will happen at Ruato Bay.</p> <p>Ian – The Biolytix trial will begin once the quotations are sent into RLC by the company who will be undertaking the project. The trial will last a year. The results from the trial will come through in early 2018.</p> <p>Willie –If the Biolytix (pre-treatment) trial is successful then Rotoiti will be put on Biolytix and Rotomā on LPGP (Grinder) pumps.</p> <p>Wi Rangirangi – Who decided on building that WWTP up thereby the urupā? My brother is buried up there. I don't want any sewerage up there where my brother is.</p> <p>Willie explained how he understood his feelings towards the areabut the urupā will not be impacted by the WWTP.</p>

Colleen agreed with Willie stating that the area where the WWTP is well away from the urupā.

Colleen – explained the reports that have been done so far on the land block

-Geotech report

- Archaeological report

This was supported by Willie.

Hone Cassidy – How far away is it from the urupā? 1km?

Willie – 300 metres from the urupā. Mike King will manage the process of where the WWTP will go by felling the young trees that have been planted in that area.

Anthony Blackburn – Will there be consideration made to water reuse such as using the grey water to flush toilets/laundry? This is how water was reused in Australia.

Willie – A really good point made. Something that will definitely be looked at.

Atawhai Stacey – Is this the first time a WWTP has been put on Māori land? Because we live in Reporoa and that is something that will happen with us.

Willie – Yes, it is. Hopefully this will be a template for other communities to use.

Further discussion was had and it was established that Maketū has one on their Māori land block.

Chris - Will the Papakainga that will be built, will it be exempt from water and power?

Willie – That is something that we will be in discussions with RLCover.

Hone – Has the CIA gone past a lawyer?

Colleen – The CIA is not for the lawyer, only the lease, and that has already happened.

Willie – The Trustees have signed a Heads of Agreement with RLC. This document was given to the lawyer to look at.

Hone – Where will the access road go?

Wairangi – The access road will go up this side by the Aratokotoko block, however it will be a separate access from Aratokotoko.

Anthony – Will there be a water pipe connection by RLC up to the plant?

Willie – Yes there will be water pipe connection to the plant that RLC will create.

Hone – Where I work as a fitter/turner, nothing is full proof. So when we are talking about earthquake prone pipes and WWTP – what guarantee do we have?

Leo Fitzell gave an explanation on the different types of piping available such as High-Density Polyethylene piping (HDPE) used as Leo works in Wastewater treatment for RLC and understands the types of piping that will be resilient to earthquakes and the types of joinery used on the pipes

Wairangi – explained the learnings that the Iwi reps had from the engineers who are working on the Christchurch aftermath as they workshopped with the Iwi reps last year. They discussed the resilience of the piping such as double sleeving etc. to minimise the pipes breaking etc. It will be good for you to have input into how you want to see that happen.

Len Sergeant – Will RLC pay for the access road? Is that all part of the agreement that was had by us and RLC at the last hui we had? Because RLC went from using 10ha of our land to 4.5 to 5ha of our land and therefore our Trust rental was cut in half too. So what does this mean with the access road and the rental? If the road is created, will that increase the rental?

Willie – Yes, the access road will be paid by RLC. That is also a good point about the road and the rental. This will definitely be noted.

Ian – All of this will be reflected in the final agreement as an easement which differs slightly to a lease between the Trustees and RLC.

Atawhai Stacey – How long is the lease?

Len – 25 + 25-year lease

Willie – Yes, no more than 50 years for the lifetime of the lease as given by Māori land court.

Robyn Skerrett – We will need to put a resolution together to agree on the lease.

After much discussion and re-wording of the resolution.

The motion was put that:

That the owners of Haumingi 9B 3B give approval to the Trustees to negotiate the final agreement for the easement required for the proposed Project’.

Moved: Colleen

Seconded: Robyn

All in favour: Ae

Carried

The motion was put that:

‘That Colleen White- Skerrett’s CIA Report as reported be Accepted’.

Moved: Colleen


Seconded: Burt

All in favour: Ae

Carried

Frances presented her PhD proposal regarding the construction of a Wastewater Treatment plant and disposal field on the Haumingi Block. The question being is it aligned with Kaitiaki values and principles relating to land use? She has asked for support from the landowners for her PhD. Questions were asked and discussion had regarding the landowners being able to have a copy of the PhD once it is complete. Frances will be at the next hui to give updates on the progress of it.

<p>Closing of Haumingi 9B 3B Owners Hui and acknowledgements</p> <p>Karakia</p>	<p>The motion was put:</p> <p><i>'That the owners of Haumingi 9B 3B give approval for Frances Teinakore-Curtis's PhD to be written with ongoing reports to be given to the land trust when required'.</i></p> <p>Moved: Willie Seconded: Leo</p> <p>All in favour: Ae Carried</p> <p>Anthony – I'd like to thank the Trust for the education grant that I received for the Maturanga Māori degree that I am completing at TWWOA. My koro is Theo Tait and my mum is Atawhai Huiaroa Stacey.</p> <p>Willie – Thank you for that feedback and we're happy that we can accommodate and our pūtea is being invested well.</p> <p>Willie acknowledged the owners' attendance, support and the valid questions given regarding the construction of the plant.</p> <p>Leo Fitzell</p> <p>Hui closed 11.36am</p>
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X 
 Willie Emery
 Chairman

13.2.2 Appendix Two - Copy of letter of support 2

**MINUTES OF THE TRUSTEES MEETING FOR
RAKEIAO MAORI RESERVATION
HELD AT RAKEIAO MARAE ON
SUNDAY 8th OCTOBER 2017 AT 9:30AM**

Karakia	Te Rongo Curtis
Present:	Violetta Shaw, Te Rongo Curtis, Steven Curtis, Maxine Davies, Willie Emery, Tewi Curtis(Late), Frances Teinakore-Curtis
Apologies:	Horiana Curtis, Colleen McMurphy-Pilkington, Philip Curtis
In-Attendance:	Toby Curtis

Item	Description	Action
Minutes of the previous meeting:	Minutes dated Sunday 13 th August to be accepted. Moved: Maxine Seconded: Violetta	
Matters Arising:	Violetta is able to buy the pillows that were discussed 2 meetings ago. She will go ahead and do this. Marae Booking – The wedding to be held 26 th to 30 th December may be cancelled.	
Financial Report:	<p>Mowing of Lawns Brenda and Don would like to have a fuel card set up to be able to mow the Marae lawns. Steven to look through application and sign and fill in etc. where necessary.</p> <p>DIA Feasibility Study A hard copy is now available. Am now awaiting the details from Aladina (APA Architects). He will have them in the next two weeks. He took photos of the Marae and will put together costs etc. for the Wharekai.</p> <p>Genesis Energy Did not receive our last three energy bills from Genesis Energy. Again, this will need to be followed up to see what the issue is.</p> <p>Application to Rotoiti 15 for Capital Works Grant Application has been sent out for the Capital Works Grant (\$50,000). Steven to sign as well as the Projects Manager (Horiana). A letter of support will need to be drafted up and signed by the Marae Trustees as well as a declaration from The Marae Chair to be signed. Applications close June 2018, and approval/decline given by July 2018.</p> <p>BDO Audited Accounts BDO were especially busy over the last couple of months. However, they have committed to having the Accounts audited by October 20th.</p> <p>Food Equipment Ltd</p>	

	<p>We have had an issue with this company concerning an 'outstanding' invoice that we have not paid (dated 25/8/16 – amount \$126.50). After looking through our records, there was only one that I could find belonging to them that we have paid (Dated 18/10/16 – amount \$569.50). I have scanned and emailed the particular paid invoice to them to reconcile against their records.</p> <p>All outstanding bills to be paid until next Marae meeting.</p> <p>Moved: Violetta Seconded: Steven</p>	
Maintenance	<p>Tewi – The big weed eater is stuffed. There was no use even fixing it, too expensive. Brenda and Don to hold onto the smaller one. The trailer needs an overhaul (Don organizing this). The Marae ride on Mower also needs fixing.</p>	

Item	Description	Action
Correspondence:	None	
General Business:	<p>Te Arawa Fisheries Iwi Partnership Grant to go towards Wharekai</p> <p>Willie spoke to this as he is the Ngāti Pikiao representative on Te Arawa Fisheries. Our last application for a grant was in the 2011/12 financial year. The Marae can put in another application but it may not be approved as all Ngāti Pikiao Marae need to be able to have accessed the grant before Tapuaekura Rakeiao Marae applies again. Willie will work with Frances to put together an application to First Sovereign Trust. He has already spoken to Lyn Preston (Admin Officer at First Sovereign). She will meet when she has completed a couple of urgent commitments.</p>	

	<p>Marae Hireage – Violetta feels as though the Marae is being taken for granted by whānau when they use it. She is still waiting on a koha from whānau that used it for a noho before Pikiāo Ahurei. Marae not left in the same state that it was hired out for.</p> <p>Labour weekend booking – Violetta has made the booking for \$14.50 per head. They are the Taranaki Maori Rugby League team. Violetta would like a motion put that all groups are to pay before they use.</p> <p>Motion: All groups hiring Tapuaekura Rakeiao Marae to pay beforehand.</p> <p>Moved: Violetta Seconded: Frances</p> <p>Discussion of removal of Trustees</p> <p>Steven thanked Willie for physically coming to the hui after the letter he sent out to the Trustees for removal if they had not attended (or not put in apologies) for three or more consecutive Marae Trustees hui. Willie explained he was there to represent his whānau and would like to stay on as a Trustee. He had been very ill in the past and had been hospitalized. Uncle Toby supported Willie and explained that it is better to discuss removal 'kanohi ki te kanohi'. He also used the example of Reitu's tangi with not many whānau being available initially to support it.</p> <p>Marae Committee endorsement for PhD</p> <p>Frances presented her PhD proposal regarding the construction of a Wastewater Treatment plant and disposal field on the Haumingi Block. Willie supports this as the Chair for the Haumingi 9B 3B Block. She has asked for support from the Marae Committee for her PhD. Once complete, Frances will provide a copy of the PhD thesis for the trustees. She will also be available to give updates on the progress of it. The motion was put:</p> <p><i>'That the Tapuaekura Rakeiao Marae Committee give approval for Frances Teinakore-Curtis's PhD to be written with ongoing updates to be given when required'.</i></p> <p>Moved: Willie Seconded: Horiana</p> <p>Next meeting: Marae AGM and bi-monthly meeting to be held on Sunday 10th December 2017. Bi-monthly hui to begin at 9:00am with Marae AGM to begin straight after.</p> <p>Karakia Whakamutunga – Uncle Toby</p> <p>Meeting closed: 11:10am</p>	
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Chairman:



Date: 08.10.17

13.2.3 Appendix Three – Letter of endorsement 1



20th March 2018

Attention: Te Whare Wānanga o Awanuiārangī PhD Ethics Committee

LETTER OF SUPPORT

My name is Salma Rayan, and I work for InnoFlow Technologies NZ Ltd as a wastewater engineer. I am the co-author of the paper written titled "A STEP for Iwi: A case study illustrating STEP as a viable and culturally appropriate reticulation method for a predominantly Maori owned lake side community at Lake Rotomā, Rotorua". This paper was written and reviewed with input from Frances Curtis.

Both Frances and I presented the main concepts of this paper at the Land Treatment Collective Conference at the Rotorua Events Centre in March 2018.

As Frances has been a vital contributor to this paper, I hereby fully consent and support her use of this paper as reference as part of her PhD thesis.

Please feel free to contact me on the details below for any further information.

Yours sincerely

INNOFLOW Technologies NZ Ltd

A handwritten signature in blue ink that reads "Salma Rayan". The signature is written in a cursive style with a large, flowing 'S' and 'R'.

Salma Rayan

Commercial Engineer

Phone: 027 474 9124

Email: salma@innoflow.co.nz

13.2.4 Appendix Four – Letter of endorsement 2

Peter Riddell <peter@ecogent.co.nz>
Re: EWBNZ Conference
To Frances Curtis <francis.curtis@xtra.co.nz>

9/10/2021 09:32

Tena koe Francis,

It was nice to hear from you. The whānau are all well thank you and I hope you and yours are also in these difficult times.

Your paper reads well and I completely endorse it. It is a good testament to better cultural and environmental outcomes that can be attained with dialogue and perseverance.

I wonder if the proposed Three Waters reorganization will contribute to improvements nationwide. My concern is that it will try to force fit standard solutions without due consideration to local issues.

Thank you for the article about Muri lagoon. A similar frustrating situation trying to assist to make change. We hosted two groups to Omaha to look at the subsurface irrigation and environmental outcomes and to Warkworth to inspect the polishing membrane filters but despite the enthusiasm there has been no change in the government stance. Nor has there been much progress so there is still opportunity for improved outcomes.

Nāku noa

Peter Riddell

Peter Riddell
Ecogent Ltd
Phone: 0800 237 283
Email: peter@ecogent.co.nz
Web: www.ecogent.co.nz



13.2.5 Appendix Five - Letter of support 1

On 25 August 2021 at 22:38 WAI WHATA <waiwhata@yahoo.co.nz> wrote:

Kia Ora Frances

Thanks for giving me the time to read through the chapter on Ngāti Te Ranginuora – Case Study on the reticulation scheme.

This is fantastic. I really enjoyed the read and the articulation of issues and timelines surrounding the scheme. I just had a couple of comments - I've put them in track changes in the document itself. They're just regarding Ngāti Mākino's evidence from the environment court that can be added into a section of your chapter and provide support to your analysis.

Wairangi

Wairangi Whata

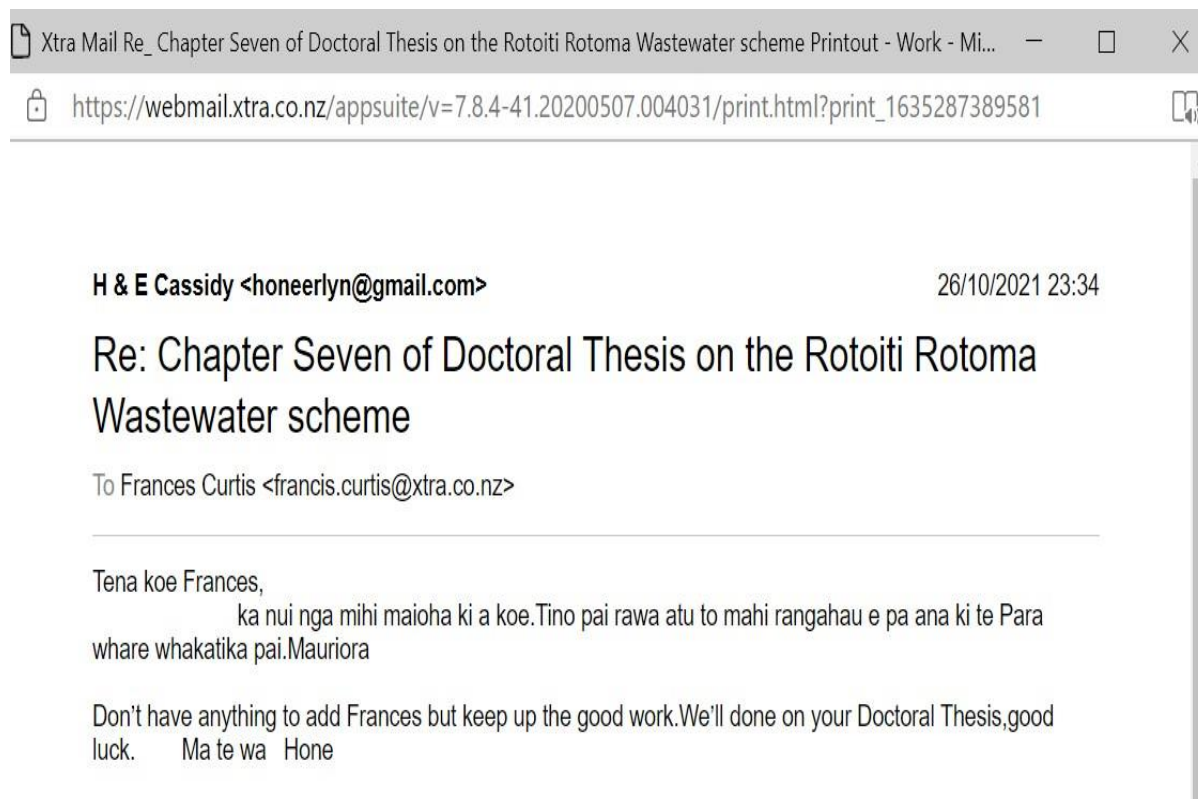
Ngāti Pūkiao Cultural Facilitator

Rotoiti Rotomā Sewerage Scheme

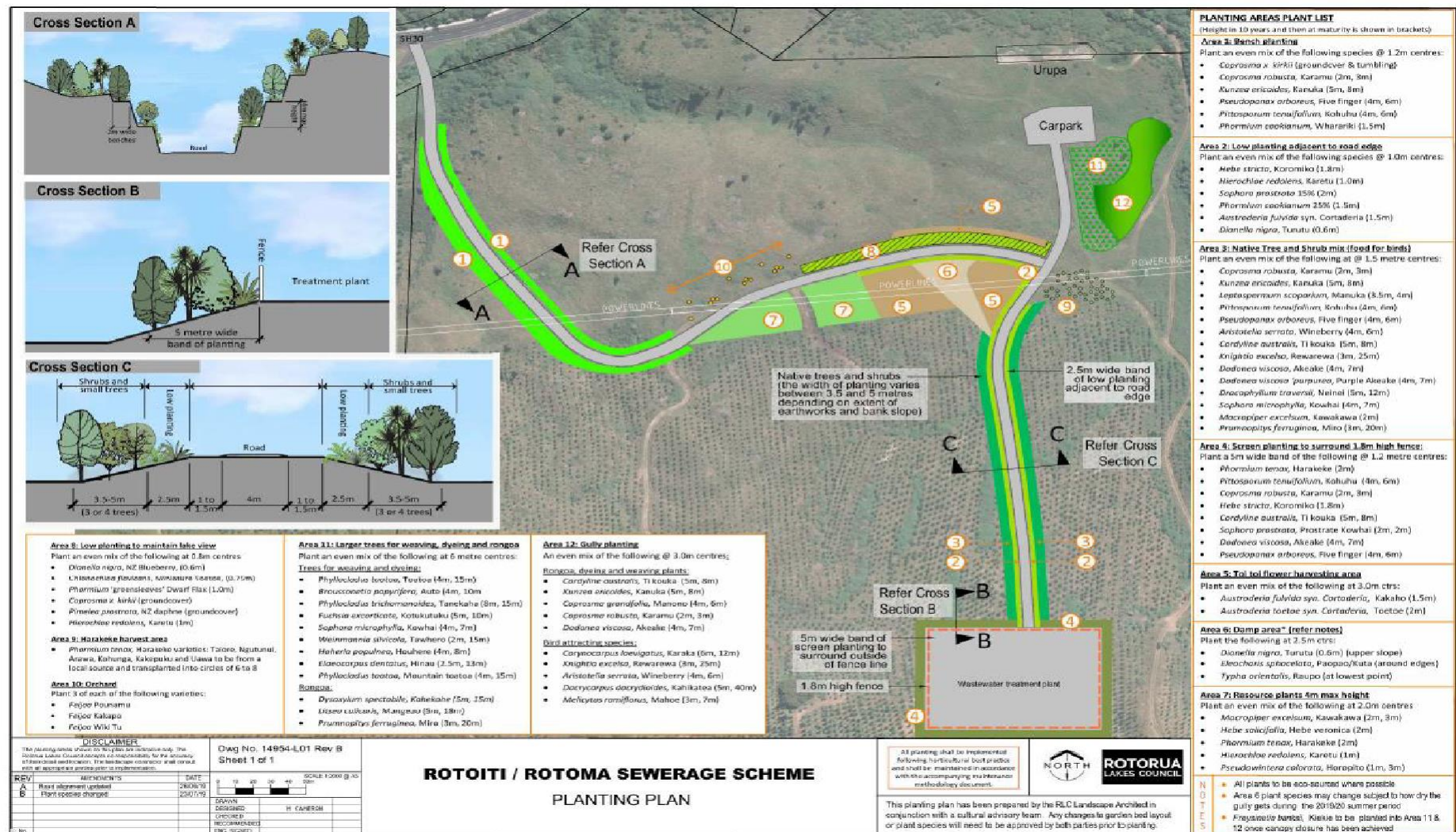
P: (07) 351 8049 | M: [0212954744](tel:0212954744)

E: wairangi.whata@rotorualc.nz

13.2.6 Appendix Six - Email of support 2



13.2.7 Appendix Seven – Rotorua Lakes Council Planting Plan



13.2.8 Appendix Eight – RRSSC, IWLG and Cultural Impacts Team Hui Timeline 2014 - 2021

HUI NO.	GROUP	DATE	TIME AND VENUE	KAUPAPA
1.	RLC, BOPRC and Iwi Ngāti Pikiao members	10 March 2014	10am @ Rotomā FireStation	Establishment of the RRSSC since the outcome of Environment Court Hearing
2.	RRSSC and TAG	14 April 2014	10am @ Rotorua Energy Events Centre	Introduction of TAG (Technical Advisory Group) introducing: Jim Bradley (Interim Chair), Dr Kepa Morgan, Professor David Hamilton, Greg Manzano, Andy Bruere plus other experts as required.
3.	RRSSC	9 June 2014	10am @ Rotomā FireStation	Finalising RRSSC members, discussion on scheme – public health concerns, TAG report tabled. Dates discussed to do onsite WWTP visits in Turangi, Tīrau and Hauraki area.
4.	RRSSC	26 July 2014	10am @ Punawhaka reiaMarae	Discussion on options of where to pump effluent to – back to Rotorua or somewhere in Rotoiti/Rotomā?
5.	RRSSC	27 July 2014	10am @ Rotomā FireStation	Project timeline for scheme (end date 2017). Discussion of costs and options
6.	RRSSC	3 August 2014	10am @ Rotoiti Sports Club	Detail around options of wastewater systems and land suitability for WWTP

7.	RRSSC	9 August 2014	10am @ Rotomā FireStation	More detail around options – discussions on Biolytix (untested and unproven technology), this will address cultural concerns. Decentralised wastewater system clusters discussed. Rotoehu community discussion on being included
8.	RRSSC	18 August 2014	10am @ Taurua Marae	Discussion of result of community consultation (via survey) on their preference from options. Discussion of CIA to be conducted, cultural concerns, Govt subsidies for scheme, costs, health concerns
9.	RRSSC	15 September 2014	10am @ RLC	Cultural concerns leading discussion in this hui
10.	Haumingi 9B 3B Negotiators and RLC	22 September 2015	4:10pm @ RLC	Valuation of Haumingi 9B 3B block and other relevant matters
11.	Resource Consent Hearing Panel, Objectors/ Submitters to Scheme, RLC, BOPRC, RRSSC, BOPDHB, hapū members	16 & 17 July 2017	10am @ Taurua Marae	Objectors Hearing to Resource Consent - giving evidence, testimonies from relevant iwi members, Ngāti Pikiao Environmental Society, BOPDHB and RRSSC members
12.	RRSSC	16 August 2017	Report sent via RRSSC hui 10am @ RLC	Resource Consent has been granted
13.	Cultural Impacts Team and RLC Inaugural meeting	15 May 2017	2pm @ RLC	Finalise DRAFT Heads of Agreement (HoA), Memorandum of Agreement (MoA), role and function of the Cultural Impacts Team, the Budget, process to support and guide the work of the Cultural Impacts Team.

14.	RRSS Iwi Reps	15 March 2018	10am @ GHA	Update on Biolytix models and Vermifiltration (Biolytix) Trial
15.	Rotoiti Rotomā IWLG Inaugural Meeting	24 April 2018	4:30pm @ RLC	Discussion on why group was formed - result from Resource Consent (NOR) Hearing, Terms of Reference (TOR), discussion on Site security of WWTP, Biolytix meeting update

13.2.9 Appendix Nine – Copy of PhD Ethics Approval Letter



Te Whare Wānanga o Awanuiārangi

EC2016/01/055
ECR2016/01/055

18/11/2016

Francis Teinakore-Curtis
420 Te Ngae Road
Owhata
ROTORUA 3010

Tēna koe,

Re: Ethics Research Application EC2016.01.055

At a meeting on 17.11.16, the Ethics Research Committee of Te Whare Wānanga o Awanuiārangi considered your application. We are happy to advise that your submission has been approved.

Ethics Research Committee wishes you well in your research and recommend that you to contact your supervisor.

Ngā mihi nui

A handwritten signature in blue ink, appearing to read 'A.P. Nathan Matthews'.

A.P Nathan Matthews
Chairman
Ethics Committee
Te Whare Wānanga o Awanuiārangi

Private Bag 1006
Francis st
Whakatane 3158
Aotearoa

Waea / Telephone : (07) 307-1467
Waea Whakaahua / Fax : (07) 307-1475
Ipurangi / Email : ssc@wananga.ac.nz
PaeTukutuku/Website : www.wananga.ac.nz

13.2.10 Appendix Ten – Copy of Consent Form



*School of Indigenous Graduate Studies
Rongo-o-Awa
Domain Rd
Whakatāne*

Project Title

**KAITIAKITANGA – The impact made on Iwi of Lake Rotoiti from the provision of
Māori land for the construction of a Wastewater Treatment Plant.**

EC2016/01/055

CONSENT FORM

THIS CONSENT FORM WILL BE HELD FOR A PERIOD OF FIVE (5) YEARS

**I have read the Information Sheet and have had the details of study explained to me.
My questions have been answered to my satisfaction, and I understand that I may ask
further questions at any time.**

I agree/do not agree to the interview being audio taped.

**I agree to participate in this study under conditions set out in the Information Sheet,
but may withdraw my consent at any given time.**

Signature:

Date: _____

Full name – printed:

13.2.11 Appendix Eleven – Copy of Confidentiality Agreement



Project Title

**KAITIAKITANGA – The impact made on Iwi of Lake Rotoiti from the provision of
Māori land for the construction of a Wastewater Treatment Plant.**

EC2016/01/055

CONFIDENTIALITY AGREEMENT

THIS CONSENT FORM WILL BE HELD FOR A PERIOD OF FIVE (5) YEARS

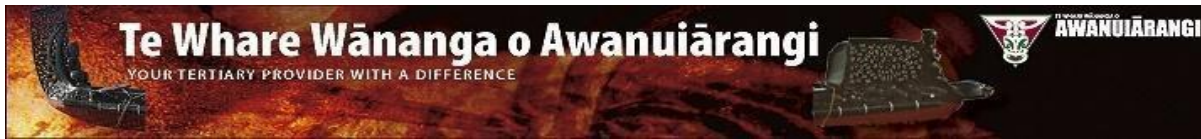
I _____ (Full Name – printed)
agree to keep confidential all information concerning the project

Signature:

Date:

Full name – printed:

13.2.12 Appendix Twelve – Copy of Interviewee Information Sheet



School of Indigenous Graduate
Studies

Te Whare Wānanga o
Awanuiārangi
Private Bag 1006
Rongo-o-Awa,
Domain Road
Whakatane

Project Title

**KAITIAKITANGA – The impact made on Iwi of Lake Rotoiti from the provision of
Māori land for the construction of a Wastewater Treatment Plant.
EC2016/01/055**

INFORMATION SHEET

E aku iti e aku rahi nei te reo o te kōpara e karanga whānui atu kia koutou I runga I te kaupapa o tēnei wā, nā reira ka nui te mihi.

I am a Postgraduate student enrolled in a Doctor of Philosophy Environment Studies with Te Whare Wānanga o Awanuiārangi, Whakatane. As part of this degree I will be examining the impacts the Rotoiti wastewater treatment plant has on the whenua and the ecosystem and how the practice of Kaitiakitanga of local iwi is affected. The School of Indigenous Graduate Studies requires that ethics approval is gained before the commencement of involving human participants.

The purpose of the research is to determine if the provision of the Haumingi land block area for the construction of a Waste water Treatment Plant is impacting the hapū and iwi and if so, to what extent, and to document this in the form of a report. I am the sole researcher on this project and will be guided by my Supervisor Dr Paul Kayes.

For my thesis I aim to interview a number of different koeke and pakeke who have grown up around this particular land area and are witnessing the changes and to answer questions and give reflections based on these developments. You will be involved in an interview that will last no longer than one hour. There is a possibility of a follow up interview if further clarification is needed, but this will not occur unless you agree to this. Information that is collected will remain strictly confidential and in the final report you will not be identified unless you state otherwise.

I will be using a Dictaphone (with your permission) to document the interview which will be transcribed and the information that I will use in my thesis **can be given to you post the interview**, if you wish. Only my Supervisor and I will have access to interview recordings and notes. All material gathered will be confidential and kept in a secure location. You have the right to refuse to answer any questions, and there is no obligation to participate, any individual can ask to be withdrawn without any question prior to the interview occurring. If you are involved in an interview but would still like to withdraw from the research then please contact me before 18th November 2017.

The interview responses will form the discussion and findings section of my Thesis and will be incorporated into my document to be submitted to the School of Indigenous Graduate Studies at Te Whare Wānanga o Awanuiārangi.

If you have any questions and want further clarification regarding your involvement in this study, please feel free to contact me or my Supervisor using the channels below:

Researcher: Frances Teinakore-Curtis

Email: francis.curtis@xtra.co.nz

Cell: (021) 2756925

Ph: (07) 345 8266

Supervisor: Dr Paul Kayes

Email: paul.kayes@wananga.ac.nz

Cell: (021) 403101

Ph: (07) 306 3289

Ethics Committee Approval Statement

This project has been reviewed and approved by Te Whare Wānanga o Awanuiārangi Ethics Committee, **EC2016/01/055**. If you have any concerns about the conduct of this research, please contact the Ethics Committee administrator as below:

Contact Details for Ethics Committee administrator:

Shonelle.Iopata@wananga.ac.nz

Postal address:

Private Bag 1006

Whakatāne

Courier address:

Cnr of Domain Rd and Francis St

Whakatāne

13.2.13 Appendix Thirteen – Copy of Interviewee Questions

Questions at Semi-structured Interviews

Land use and land change

What was the land area like around you when you were growing up?

Did you participate in any events on this land space during that time?

Have there been any changes to the area as you have gotten older that are significant?

If so, have the changes affected your whānau and hapū? How?

Construction of a Wastewater Treatment Plant

Could you see the construction of a Wastewater Treatment Plant working for you and your whānau? How?

What culturally appropriate solutions would you want to see with the construction of a Wastewater Treatment Plant?

How would you like to see the re-use of the grey water from the Treatment Plant?

Developing an OSET System

With the eventual development of an OSET system, would there be potential cultural impacts on the land?

Would there be potential cultural impacts on the waterways?