The interface of Māori geothermal development in Rotorua: Low Enthalpy Case Studies.

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ABSTRACT

Several Te Arawa communities, under the umbrella of Tiaki Te Taiao, are collaborating to prepare resource management plans with special focus on geothermal development. This presentation is a case study of those Māori community aspirations for geothermal heat and energy, while holding to ancestral knowledge of geothermal taonga. In particular the Tiaki Te Taiao ropū are focused on the opportunities of low enthalpy heat systems. Low enthalpy heat offers amazing opportunities of renewable energy without the major infrastructure investments of super-critical heat – a vital pathway for climate resilience through local heat and energy supply.

The communities in this case study include Ngāti Rangiteaorere, Ngāti Wāhiao, Ngāti Rangitihi, Horohoro / Waipupumahana, Ngāti Whakaue, and Tarewa. Each hapū group has distinct and interconnected knowledge, varied issues for development, and different levels of scientific ~~i~~ knowledge.

An issue for Māori land owners, informed by mātauranga and science, is ~~that~~ the proposition; while geothermal surface features may be seen as distinct, for Māori geothermal fields are below-surface inter-connected taonga. Wells drilled by one set of owners can impact the surface features and development interests of adjoining owners, both physically and metaphysically.

There are a number of matters of policy to consider: the matter of below-surface interconnected geothermal fields and private property rights; access to investment funds for Māori geothermal development; policy focused on super-critical energy rather than low enthalpy systems; regional council designations of geothermal sites – e.g., Ngāti Rangitihi's Waimangu field is designated as protected, hence restricting renewable energy development opportunities.

There are multiple matters to be grappled with for plans: documentation of mātauranga Māori and the responsibilities as kaitiaki of the geothermal system, access to relevant expertise and scientific information, engaging with relevant communities and, working with the Regional Council.

A. INTRODUCTION

We have chosen three of the six case studies; Horohoro/Waipumahana, Ngāti Wāhiao and Ngāti Rangitihi to highlight our collective plan of action.

1. Horohoro/Waipumahana

Ngati Waihakari trace their descent from Wahiao.

Wahiao
Tukiterangi
Mahuika – Whariki
Waihakari

Te Whatinui
Hakaraia
Rakapa (Nane)
Haira
Kirimaoa

Their traditional lands include Wapupumahana block.

Ko Haparangi te Maunga
Ko Waipupumahana te whenua
Ko Waipupumahana nga waiariki
Ko Ngati Waihakari te hapu
Ko Ngati Wahiao te iwi
Ko Korowhakatipua te taniwha

Up until the mid 1900's, their sacred [main] spring, Korowhakatipua was used for recreational bathing and for medicinal purposes. An adjacent puna was used for a variety of purposes, including cleaning cow sheds and for cooking a singeing pigs.

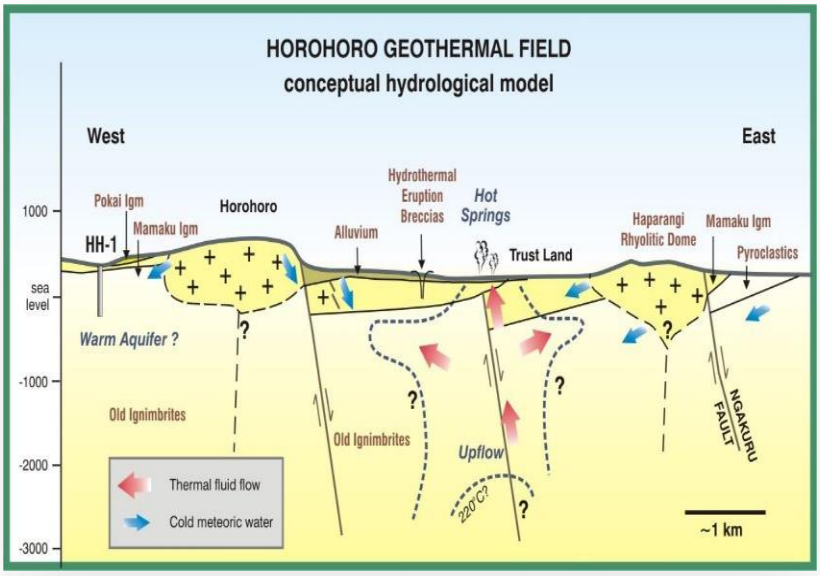
The geophysical structure of the Horohoro system is shown by the following diagram. According to MBIE 'The Horohoro system is classified for development. It is situated near the north-eastern boundary of the Waikato region, close to the road from Atiamuri to Rotorua. Some geoscientific surveys have been carried out and several shallow wells drilled to a maximum of 593m (Risk 2000b).

Despite a promising geophysical anomaly and signs of past activity, drilling encountered only modest temperature (80 °C) and it appears the system is waning. SKM/WRC (2002) gave the median capacity as 5 MW over a 30-year project life.

Because of the probable small size and possible low temperature, it is assumed that no more than 5 MW would be developed, not before 2040, and at relatively high cost.

The gas content at Horohoro is unknown, but because of the possible lower temperatures may be higher per MWh than the average for the TVZ. Emission intensity is therefore assumed to be "medium" '.

Low-enthalpy geothermal resources such as Horohoro are a significant but currently under-utilized energy source. The resource, tentatively characterized by temperatures below 100°C, have been confirmed at Horohoro, where there is currently a commercial glasshouse. Horohoro offers further potential for direct-heat applications like freshwater aquaculture, and industrial processes. Even if the resource is not proven suitable for large-scale electricity generation, its low-enthalpy resources can contribute to energy conservation.



2. Ngāti Wāhiao

The identity of Ngāti Wāhiao is formed not only by ancestry but celestial connections.

A sacred connection of different layers that shapes our lives living here in the shadow of our land in the Whakarewarewa Valley.

Ngāti Wāhiao resides permanently in Whakarewarewa.

Historically, Ngāti Wāhiao travelled across the lands of Te Arawa starting from; Owhatuira to the Green Lake at Tarawera, to Rotomahana, Parekarangi, Tumunui to Peka. They traversed the whole of Horohoro including the peak of Pukeroa ki Ohinemutu and eventually arrived here at Puhunga (also known as Whakarewarewa).

The three Koromātua hapū of Ngāti Wāhiao are Ngāti Tukiterangi, Ngāti Huarere and Ngāti Hinganoa.

Our iwi would adapt and adjust to the different aspects of living in each environment.

The 3 Koromātua hapu of Ngāti Wāhiao lived on the plateau that encompassed the unpredictable nature of geothermal activity.

This unique environment was absorbed into the daily life of the hapū which resided here.

Surrounded by various different pools each pool, steam vent and mud pool had a specific quality that was preceeded by tikanga, which inevitably lent Ngāti Wāhiao an ‘ancestral warrant’ that reshaped our way of life each day. This was important as manawhenua within Ngā hapū o Te Arawa.

Ngāti Wāhiao continues to reside in this shifting environment of Whakarewarewa since 1840 (He Papanekeneke)

The locality is intransient with kawa and tikanga. We do not alter or compromise our protocols to suit manuhiri or tourists. Rather everyone is required to fit within our structures and operations to ensure no disruption, safety and common respect balanced with tikanga. This includes when we have ‘pōhiri’, ‘whakatau’ and our tangihanga.

For the most part, we cannot change the environment but redirect the movement of

people as a guideline to ensure everyone's well-being and uphold our manaakitanga to sustain the integrity of Tuhourangi / Wahiao ki Whakarewarewa.

Our unique living situation has been passed down from generation to generation … now to our youngest tamariki, our mokopuna.

We are proud to have a Kōhanga reo on site (Ngā mōkai ā Koko) to ensure our tribal history and the significance of our unique geothermal environment is captured in the only language appropriate Ko Te Reo Māori since our tūpuna and kaumātua. A succession plan engraved from our natural environment.

This is shared amongst our domestic or international visitors, including our own whānau in Whakarewarewa, no one is exempt from observing our history under our tikanga with our waterways and geothermal connections.

From the time when the Duke and Duchess of York - as part of their Royal New Zealand Tour visited Whakarewarewa in 1901, followed years later by her Majesty, the Late Queen Elizabeth II with HRH Duke of Edinburgh Prince Phillip and many other distinguished visitors, All were subject to the directive and guidance of our tikanga. We who hold that knowledge of the land are connected to our freshwater and geothermal resources; what is on top of the earth and what is below the earth…from here the village to Te Puia / NZ MACI of Whakarewarewa.

The Government, Crown and the Council are no exception to this directive.

Ngāti Wāhiao holds understanding of the surface layer of the land. This being the vast number of pools and waters that flow into the lake. We observe the high and low drop of the waters from the reports provided via the reports by GNS who visit the papakāinga regularly.

The management of the tours and activities in the village are subject to the status of the pools at any given time.

There are separate pools for specific purposes, the drying of berries like the 'hinau and 'tawa berries from our forests at Kakapiko, Tutukau. including the cooking of a morning or evening meals, redirecting the water for bathing, flax harakeke for Piupiu, and channelling heat into homes.

In the past specific pools were designated for washing, there were pools for healing our unwritten doctrine, lastly pools for embalming our beloved dead. Wai tūpāpaku

The passing down of the resources (taonga) once held by our tupuna to the many descendants, has transformed into a robust structure utilised by our people.

Our tūpuna would be surprised how we have transformed their traditions from earlier times to this modern world without compromising our kawa.

We are the rightful owners of this knowledge not the government, Crown or Rotorua Lakes council. The springs are used by the people of Whakarewarewa through individual, whānau, hapū and iwi access.

Access is apportioned to the people for multiple purposes throughout the village. One example is the baths, where water from the geothermal is drawn and the temperature of the bath is cooled by the water located from the reservoirs around the village. Once the bathing is complete, the used bath water is released back into the Puarenga stream. What mother nature gives; we give back.

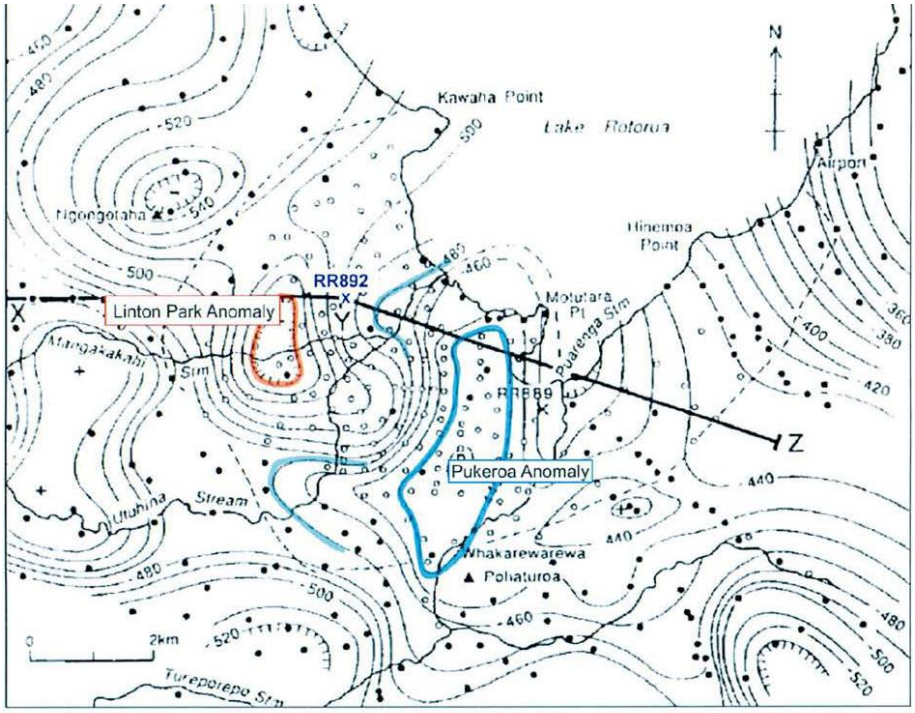


Figure 7. Residual gravity anomaly map of Rotorua City area from Hunt (1992) Contour interval is 10 μN/kg. Anomalies discussed in the text are highlighted.

The road that traverses the boundary and into the village is controlled by Rotorua City Council, however on either side of the road it is within the control of Ngāti Wāhiao. This creates an issue with intrusion upon the land and geothermal pools by people who trespass from outside without our consent and abuse our protocols. Our concern is not just about ownership over our resources, but about who manages these resources under the Resource Management Act 1991 (RMA) and other legislation.

For the past 14 years - Ngāti Wāhiao participated in an alternative dispute resolution procedure concerning mana over the whenua at Whakarewarewa. The Arbitration convened by Whakarewarewa Joint Trust culminated in a decision issued on 29 October 2024 by the Waitangi Tribunal Panel. In these proceedings, Ngāti Wāhiao demonstrated manawhenua over the lands in Whakarewarewa through whakapapa, take tūpuna and unbroken ahi kaa since the time of Wāhiao our tūpuna.

It was our ancestor Wāhiao himself who named the thermal valley “Whakarewarewa” and our iwi have been responsible for naming the features of the pools and geysers around the Whakarewarewa Valley. This is an expression of our connection and mana to this whenua. Whakarewarewa is our ūkaipō or heartland and we have resisted selling in the past in contrast to other iwi counterparts.

Despite a decision from the Native Land Court in 1881 awarding most of the Whakarewarewa lands to Ngāti Whakaue, and increasing encroachment from the Crown, Ngāti Wāhiao have continued to maintain care of our whenua.

a. This includes the development of the hot pools for heating, cooking and healing purposes; the Komiti (organisation) of the day, welcoming of dignitaries, maintenance and executing the knowledge and the development of the tourist industry.

b. The development of the tourist sector has not only been for economic reasons, but it is also an expression of our tino rangātiratanga. The guiding aspect of the venture relies heavily on our traditional knowledge passed down through the generations a clear demonstration of our unbroken manawhenua.

Ngāti Wāhiao maintains that the existing Resource Management regime for geothermal resources is NOT compliant with the Treaty/Te Tiriti o Waitangi and its principles. Our participatory rights in decision-making processes are severely curtailed by the weak provisions in the RMA. This 'IMPACTS' on our ability to have a voice at the 'decision-making table' as well as a 'LACK' of access to exercise our rights because of the lack of funding available.

a). Our proprietary rights over our geothermal taonga are also not properly recognised due to the "narrow lens" of the RMA. The 'first come first served principle...' in the RMA law has excluded Ngāti Wāhiao from access to our own resources and the ability to undertake further investment in the development of our resources our taonga.

Ngāti Wāhiao are highly concerned with the proposed reforms to the Resource Management Regime including the Fast-Track Approvals and Government Bill. The consenting opportunities offered to geothermal developers in this proposed reform coupled with the dismantling of the Environmental Legal Assistance Fund will alienate Ngāti Wāhiao further from our geothermal resource as well as access to try and protect it.

a). The reforms need to be re-balanced to comply with the Treaty/Te Tiriti o Waitangi in a way that recognises [i] our proprietary rights to access, [ii] development of our geothermal resources, and [iii] what resources have been lost, need to be adequately compensated to Ngāti Wāhiao by the Crown.

b). ANY regime of management of the geothermal resource of Whakarewarewa needs to have the consent, recognition and inclusion of Ngāti Wāhiao.

Within Te Mana o te wai, Ngāti Wāhiao identified their interests under kaitiakitanga, Manaakitanga and Tino Rangatirātanga

3. **<u>Ngati Rangitihi.</u>**

The specific area of Waimangu Volcanic Valley, including its surface features and tourism operations, falls under the jurisdiction of the Bay of Plenty Regional Council. However, Waimangu is considered to be part of a larger Waimangu-Rotomahana-Tarawera geothermal system, which spans both the Bay of Plenty and Waikato regions.

Bay of Plenty Regional Council [unilaterally] classified Waimangu as a protected geothermal system due to its numerous significant surface features and vulnerability to extractive use. Protected systems are managed to prioritiase the protection of geothermal features with outstanding natural, cultural, and ecological values.

This classification as a Group 1 system, is - according to Bay of Plenty Regional Council, 'with its numerous surface features of national and international importance this system was the site of the Pink and White Terraces which were buried as a result of the 1886 Tarawera eruption.'

Bay of Plenty Regional Council continues, 'Today the surface features in the Waimangu-Rotomahana-Tarawera system are dominated by large crater lakes, boiling springs discharging near-neutral pH chloride waters of 85-100°C, geysers, fumaroles and hot ground. The surface features in the Waimangu Valley did not appear until about 5 years after the 1886 eruption, while those at Rotomahana evolved as the new lake filled. The largest features are focused in Echo Crater (Waimangu Geyser and Frying Pan Lake) and Inferno Crater. These and the adjacent Raupō Pond Crater have been the focus of several hydrothermal eruptions or disturbances since the early 1900's. The latest was in 2016. The vegetation in the area has all established naturally post the 1886 eruption.

The historic surface activity in or near Echo and Inferno craters is dominated by spectacular geyser associated with the Waimangu Geyser ('black or inky water') that played between 1901 and 1904 ejecting hot water and rock up to 400 m high. A hydrothermal eruption lasting three days within Echo crater in April 1917 created Frying Pan Lake.

Of particular note is the expression by the Council that as one of the larger systems within the Bay of Plenty region the Waimangu-Rotomahana-Tarawera system extends southwards towards Waiotapu, Waikite and Reporoa geothermal systems which are located within the Waikato region. [with the exception of Reporoa [classified as a research system] the others are classified as protected fields]

B. CONCLUSIONS

Ngati Waihakari.

Low-enthalpy geothermal resources such as Horohoro are a significant but currently under-utilized energy source. The resource, tentatively characterized by temperatures below 100°C, have been confirmed at Horohoro, where there is currently a commercial glasshouse. Horohoro offers further potential for direct-heat applications like freshwater aquaculture, and industrial processes. Even if the resource is not proven suitable for large-scale electricity generation, its low-enthalpy resources can contribute to energy conservation.

Ngati Wahiao

It was recorded by our Ariki Mita Taupopoki of Tuhourangi /Ngāti Wāhiao that our tūpuna Wāhiao left an indelible mark with his people - a 'Tohu" from the Kokowai oil, he said this was to identify his descendants significant of their encounters, travels and connections throughout the whenua.

Mita Taupopoki said all the taonga upon the whenua were regarded as the 'tuakana' by our tūpuna. When you cross the Puarenga Stream into Whakarewarewa you are in the realm of Ngati Wāhiao when you exit the village you are whoever you want to be. Ngāti Wāhiao are defined by their connections to the whenua, especially to the fresh water Māori and the geothermal.

As the saying goes 'ahakoa e kitea e kore e kitea' [1]

Ngāti Wāhiao are here and we are not invisible. If the question is asked who owns the water and the geothermal. the answer is simple. If the taonga traverses through our tribal lands and peripheral boundaries. then Ngāti Wāhiao owns the water and the geothermal pathways.

The Government, the Crown and Rotorua City Council do NOT reside in the shadows of our whakapapa they are merely invited to observe the footprints left by our forefathers that we now occupy.

Ngati Rangitihi

The interconnectedness of the Waimangu-Rotomahana-Tarawera, Waiotapu, Waikite and Reporoa is well known to Ngāti Rangitihi and is reflected in its Treaty Settlement Area of Interest [AOI]

By unilaterally giving the fields a Group 1 classification [except Reporoa], the Regional Council removed opportunities for Ngāti Rangitihi, and their Iwi neighbour, Tuhourangi, from utilising the fields for low enthalpy activities that would not, or minimally interfere with, their 'natural, cultural, and ecological values'. Ngāti Rangitihi would like all the

[1] Transl. Although you may see, you really dont see what is there.

fields to be classified as Group 6 Research Systems [2]. This would require an expensive Plan Change. Given the unilateral nature of the original designation Ngati Rangitihi considers this should be undertaken and paid for by the Bay of Plenty Regional Council; and should include extensive consultation with local iwi.

ACKNOWLEDGEMENTS

Collaboration and support from all six Iwi has provided us the opportunities to support them to advance their several initiatives. We look forward to seeing them implement their individual geothermal system management plans for the benefit or their uri.

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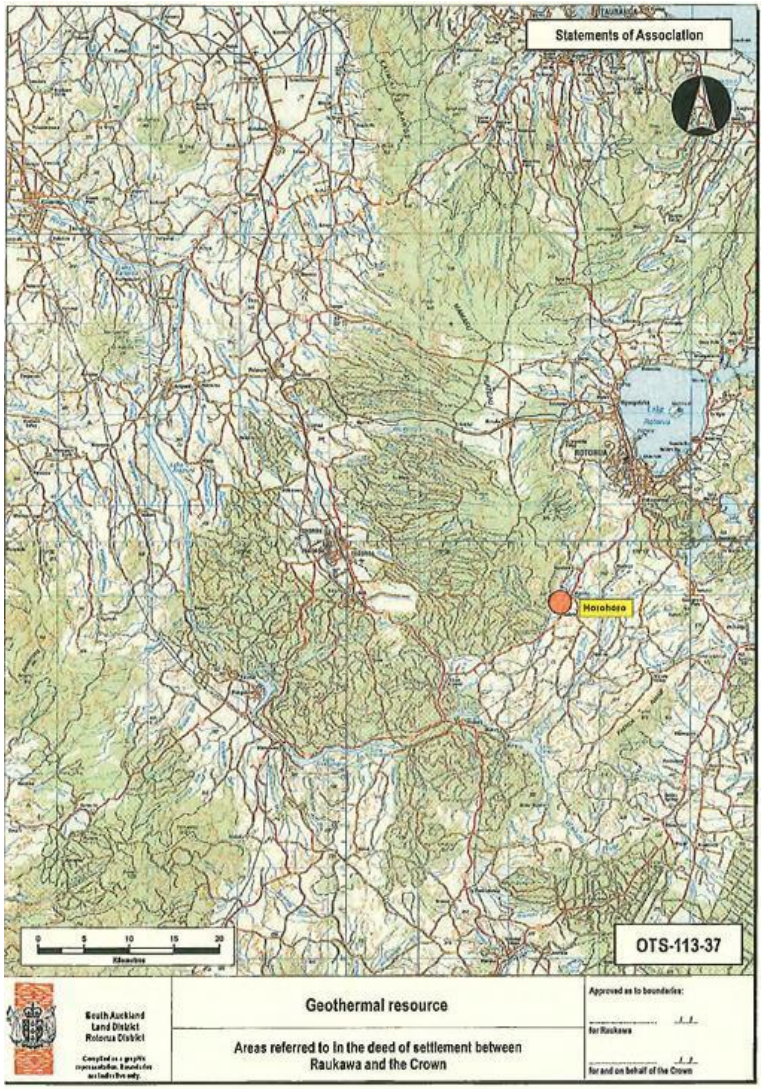
- Metaphysical definition

Metaphysical Māori" refers to Te Ao Māori (the Māori worldview), which understands the physical and spiritual realms as interconnected, with all things possessing a spiritual life force (mauri) and a spiritual component (wairua). This holistic understanding permeates Māori culture, guiding concepts like\ tapu(sacredness), mana (authority/prestige), and the importance of ancestral connections to the gods (atua).

- Rangitihi Rohe Map

[2] Plan Change 11 only refers to the Group 2 Rotorua Geothermal System.

Horohoro


Statements of Association
Horohoro
OTS-113-37
South Auckland Land District
Rotorua District
Geothermal resource
Areas referred to in the deed of settlement between Raukawa and the Crown
Approved as to boundaries:
for Raukawa
for and on behalf of the Crown