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LAND USE FEASIBILITY STUDY FOR NGĀTI TAHU NGĀTI WHAOA (WAIKATO)

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Summary

WSP carried out a high-level land use feasibility study, to assess alternative land use options for land owned by Ngāti Tahu Ngāti Whaoa iwi within the Upper Waikato River catchment, in the Orakei Korako and Ohaaki areas. Ngāti Tahu Ngāti Whaoa has title to roughly 4,500 hectares of land in this catchment, comprised of multiple blocks administered by various trusts and several individual hapu and whanau. This whenua is rich in history and is home to many taonga, including geothermal resources. Existing land uses include dairy, sheep and beef, forestry, geothermal energy, and tourism. The blocks host a diversity of landscapes and there is extensive existing infrastructure which could be accessed to facilitate high productivity land uses. Therefore, there is much potential to develop and diversify these land holdings further.

For this study, WSP investigated the natural resources (water, soils, climate, topography, and land use capability classes) and existing infrastructure available within five selected blocks. Land use options were then assessed against these criteria to determine suitability.

Potential options for land development included a range of horticultural, pastoral and aquaculture operations, as well as potential improvements for the existing land use. A multi-criteria analysis approach was used to outline the opportunities that the different land use options could create for Ngāti Tahu Ngāti Whaoa. This approach ranked the suitability of each land use for the five blocks based on operational, economic, social/cultural, regulatory, and environmental criteria.

Recommendations were outlined specific to each land block. Irrigation was recommended for some blocks to improve the productivity of the existing pastoral land use, as well as retiring some marginal areas into exotic or native forest. Some areas used for cow dairy were suggested to transition to high value sheep dairy. Other areas were identified as suitable to transition to horticultural operations such as potatoes and taewa, and hazelnuts; and others identified as suitable for supporting infrastructure-based enterprises, such as aquaculture, greenhouse crops, or mushroom production facilities, to link with existing geothermal power plants and a proposed solar farming operation.

The next steps for this project will require decisions by Ngāti Tahu Ngāti Whaoa around which land uses to explore in greater depth for each block. This will require a more detailed investigation of the viability of the selected short-listed options, including more detailed soils, microclimate, and hydrological analyses; economic analyses and an investigation of potential markets; identifying specific resource consent requirements; and determining the governance structure and potential partnerships for the business operations.

Note: The information provided in this manuscript has been shortened from the full report provided by WSP to Ngāti Tahu Ngāti Whaoa iwi.

Introduction

Ngāti Tahu Ngāti Whaoa (NTNW) are on a journey to diversify their whenua, to provide enduring kaitiakitanga of the land and resources within the rohe and a sustainable future for their people. The iwi has clear environmental goals to protect, enhance and utilise the natural resources in the rohe – the wai (water), koiora (flora and fauna), whenua (land), mahi ngahere (forestry) and rangi (air).

Water is recognised as a highly valuable resource which will enable and drive land-based businesses. Working in partnership with Mercury Energy, NTNW are seeking to better utilise the winter water allocation in the catchment to support a wider range of land uses within the rohe.

Ngāti Tahu Ngāti Whaoa in partnership with Mercury Energy approached WSP to complete a high-level feasibility study to assesses alternative land use options for five NTNW blocks These blocks host a diversity of landscapes, and there is extensive existing infrastructure which could be accessed to facilitate high energy land uses. Therefore, there is much potential to develop these land holdings further.

NTNW Land Blocks

The five NTNW blocks used in the assessment (Tutukau East, Paeroa South B2B1, Tahorakuri A1 North, Tahorakuri A1 South, and Tauhara North) are located within the Upper Waikato River catchment in the Orakei Korako and Ohaaki areas (Figure 1).

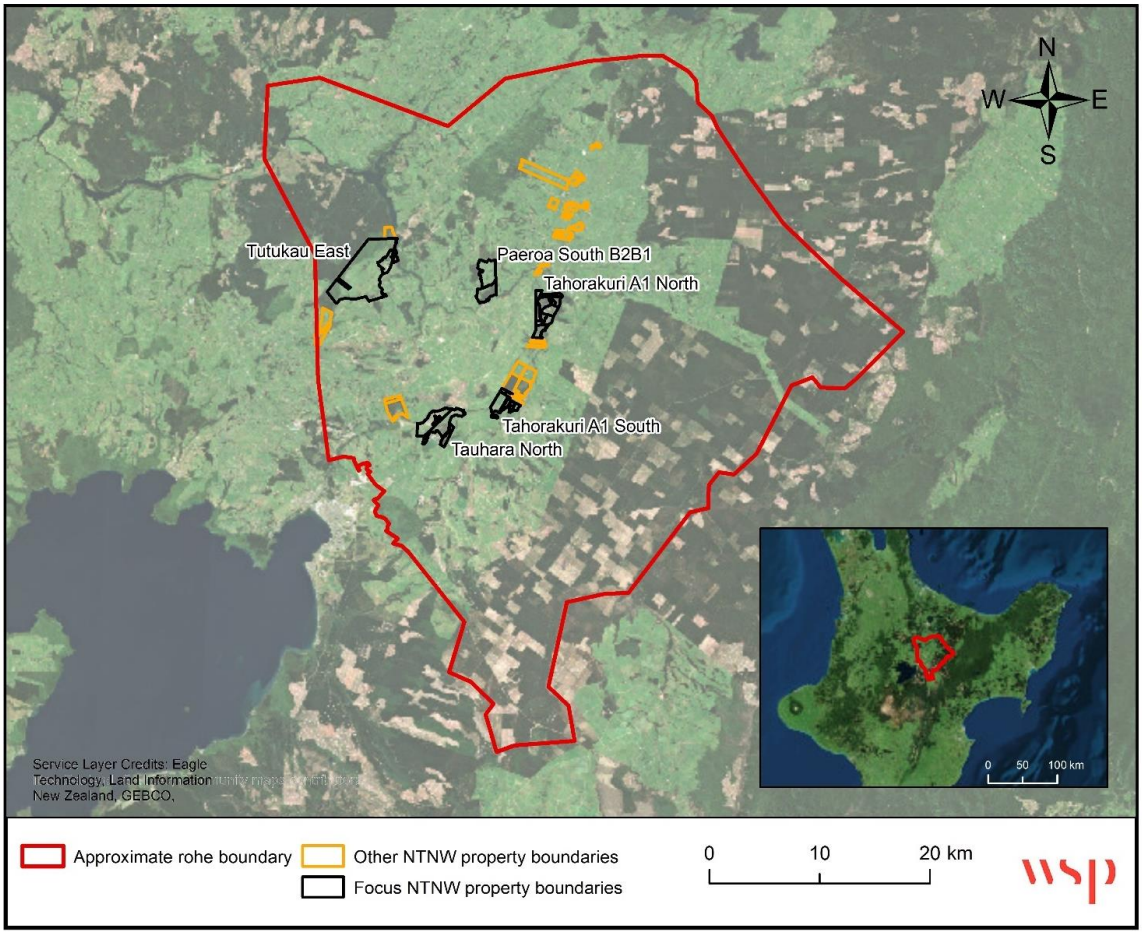

Figure 1. Locations of the NTNW focus properties assessed in this study, other NTNW properties, and the approximate rohe boundary.

The key attributes and infrastructure of the land blocks are detailed below and information was

utilised in the multi-criteria analysis.

Geology and soils	• The NTNW land blocks are located within the Taupō Volcanic Zone. • The top 3-12m of soil consists of pumiceous material from the Taupō eruption around 1,800 years ago, making Pumice the dominant soil order on these blocks. • Free draining Pumice soils have a low to moderate nitrate (N) leaching potential, high profile available water and an unlimited rooting depth making them suitable to support a range of land uses. • Within the blocks there are also areas of Allophanic, Podzol and Gley soils.
Topography	• The majority of the land on the NTNW blocks is between 300-399 masl (metres above sea level). • Most areas are relatively flat, with a slope of 0-20°. Steeper areas of land are present on the Tutukau East and Paeroa South B2B1 blocks.
Land Use Capability	• Multiple Land Use Capability (LUC) classifications are mapped across the blocks, ranging from 3 to 8 (Figure 2). • There are areas of land across the blocks with LUC 3 - 4 that are highly versatile. • Other areas with LUC > 4 are more limited but are moderately suited to pastoral agriculture and forestry. • The majority of soils across the NTNW blocks are prone to erosion.
Climate	• Climate in the Orakei Korako and Ohaaki areas is relatively cooler than other parts of the Waikato and Bay of Plenty regions, and frost occurrence is higher. • Rainfall is relatively high, within the range of 1,100 – 1,600mm/year, with the higher elevation blocks (Tutukau East and Paeroa South B2B1) experiencing more rainfall. • Predominant winds are from the south and south-west direction. • Climate change projections for the Waikato suggest that annual temperatures are likely to increase, with fewer frost days expected, and increased seasonal rainfall for all seasons except spring, which may decrease. However, rainfall intensity, wind and dry periods will likely increase, with more frequent extreme weather events such as tropical cyclones. This is of particular concern for erosion-prone areas. • Diverse microclimates experienced within the blocks will influence the establishment, sustainability, and production of different land uses and will need to be considered further when deciding on land use options.

Infrastructure	• There are three geothermal power plants on the blocks - Nga Awa Purua Power Station and Rotokawa Power Station on Tauhara North, and Ohaaki Power Station on Tahorakuri A1 North. • Dairy and dry stock operations on Tutukau East and Paeroa South B2B1 have farm infrastructure set up (dairy sheds, wool sheds and support buildings, good fencing networks) with reliable water supplies and reticulated water systems. • There are two marae; Ohaaki Marae on Tahorakuri A1 North and Te Toke Marae on Tahorakuri A1 North. There are also houses situated on the Tutukau East and Paeroa South B2B1 blocks. • There is road access to all blocks, which lie between SH1 and SH5.
Regulatory	• A high level regulatory assessment has investigated which consents may be required for a variety of identified potential land uses or commercial activities. To establish a range of sustainable land use activities on the five farm blocks is likely to require a range of both Regional and District Council land use consents. • As more information becomes available regarding the location, scale, and types of proposed activities for each block, a more site-specific indication of resource consent requirements can be provided for NTNW.

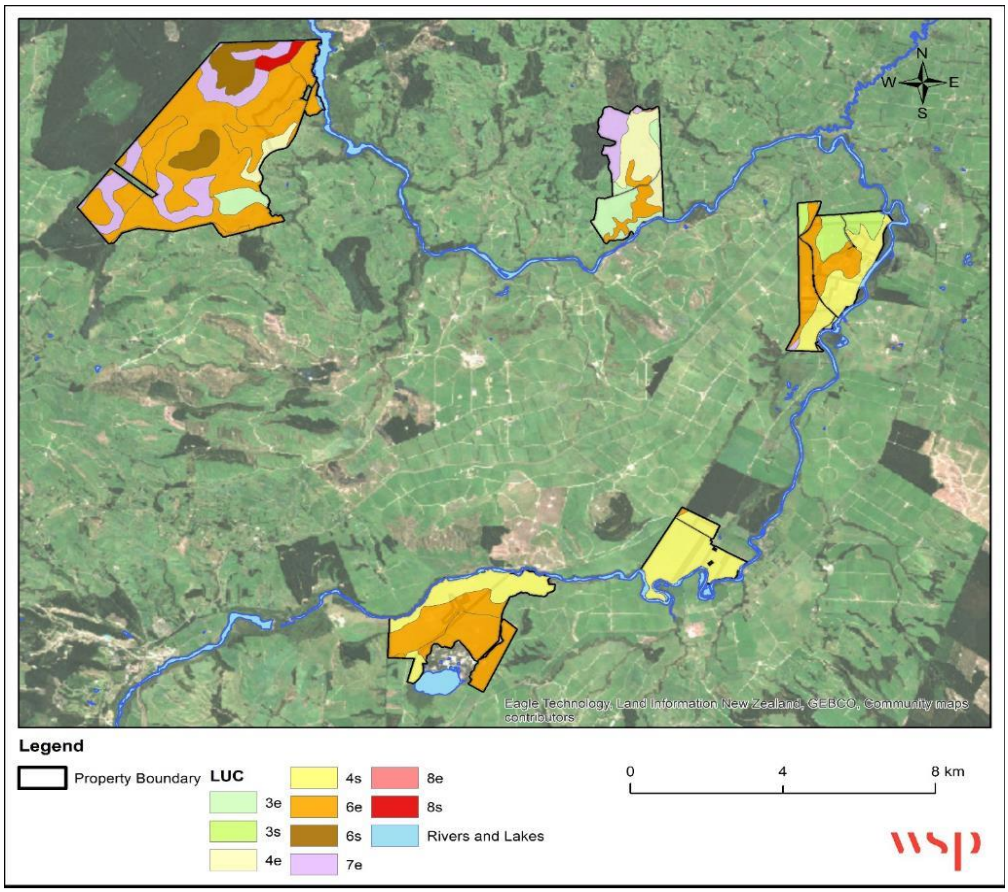

Figure 2: Land use capability classes for the five NTNW blocks.

Approach

A multi-criteria analysis (MCA) covering 11 alternative land-uses was completed on five blocks of NTNW whenua in the Upper Waikato River Catchment. The potential of the alternative land-uses in comparison to current land uses was explored individually for each NTNW land block. The MCA approach ranked the suitability of each land use for each block based on operational, economic, social, regulatory, and environmental criteria. The criteria for the analysis is described in Figure 3.

The 11 alternative land-uses covered a range of horticultural, pastoral, aquaculture and forestry options and are detailed below:

- Aquaculture systems (various species)
- Capsicums (greenhouse)
- Carbon farming
- Chickens (for meat)
- Dairy sheep
- Hazelnuts with truffles
- Lettuces (greenhouse)
- Mānuka
- Mushrooms
- Potatoes and taewa
- Native tree nurseries

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Figure 3: Multi-criteria analysis descriptions used for the analysis of the 11 alternative land-uses.

	GREEN	YELLOW	RED
Establishment requirements	Low establishment cost. Available land suitable for viable operation. Packhouses/cool stores etc. are in the region. Physically building /transitioning is easy.	Moderate establishment costs or limitations.	High costs of establishment. Infrastructure costs, set up costs, seed costs etc. There are no local packhouses/ cool stores etc. Limited available land (e.g., land uses that need a reasonable amount of land to be viable).
Growing / operational requirements	Growing requirements are easily met and the environment is suitable. Simple operation requiring minimal management.	Growing requirements partially met, moderate operational and management requirements.	Unsuitable environment, significant/intensive growing system and a high level of management required.
Suitability of climate	Temperature, frost occurrence, wind, rainfall and sunshine hours are suitable for the land use.	Mostly suitable for the land use, may require some mitigation such as shelterbelts.	Not suitable for the land use e.g., too cold or windy.
Suitability of soils	Soil types meet the land use requirements (fertility, drainage etc.)	Mostly suitable for the land use, moderate limitations that would need to be managed or amended.	Soil types not suitable for the land use.
Suitability of topography	Topography suits the land use.	Mostly suitable for the land use, would require some alteration or restriction to certain areas.	Topography is not suitable for the land use (i.e. too steep).
Water requirements	Can be grown with minimal water input, or if there is ample water/rain/irrigation to supply the land use.	Could grow with moderate or limited water, or if water is mostly needed at establishment only.	Requires a lot of water to be grown.
Labour requirements	Sustainable/full-time employment opportunities, balanced with available local employees. Labour requirements easily met by available workers.	Moderate opportunities in local or regional area, may require outsourcing or bringing in additional (national) labour.	Few employment opportunities, or requiring significant seasonal labour to be brought in.
Education opportunities	Chance to upskill, easy access to training in local areas.	Some upskilling, training centers in regional area.	Lack of knowledge regionally/ nationally.
Partnerships	Local groups/organisations/ growers to potentially partner with.	Just a nationwide industry body or limited local potential partners.	Fragmented industry body, very few or no local producers to partner with.
Returns	Good returns.	Moderate returns.	Minimal returns.
Markets	Low risk - established market with easy access and high consumer demand, or a growing market where demand exceeds supply.	Moderate risk - market is developed with reasonable consumer demand, relatively straightforward market access.	High risk - markets are not developed or are just starting to establish, supply exceeds demand, or established players dominate the market and entry is difficult.
Regulatory and compliance	Minimal regulations, compliance straightforward to achieve.	Moderate regulations and compliance.	High level of regulation with compliance difficult to achieve.
Environmental impact	Little potential impact on environment e.g., low nutrient impact from fertiliser, low carbon footprint	Some impact on the environment.	Large potential impact on the environment, for example from nutrient inputs, carbon emissions, damage to soils or air pollution.

Most desirable · Mid-range · Least desirable · N/A or insufficient data

Results and Recommendations

The results and recommendations for two of the five land blocks is presented below.

Paeroa South B2B1

Paeroa South B2B1 Trust manage three adjacent farms. This study covered the Paeroa South B2B1 block of which Dairy is the main land-use, totalling 512ha. This block is bordered by the Waikato River, bisected by Tutukau Road, and has a 130ha pine plantation beside the river. An area of 300ha of improved grassland supports the Dairy operation which supplies Fonterra. Lucerne is grown adjacent to the river and is made into supplement for the dairy cows.

From the MCA within this block there are opportunities to diversify and optimise the land use (Figures 4 and 5). There is potential to extend the current dairy platform on to some land that is currently in pines south of Tutukau Rd. Less productive pastoral areas could be transitioned to forestry (e.g., carbon farming or mānuka). Sheep milking could also be explored as an alternative land use. Highly productive areas have also been identified that may support ground crops such as potatoes, taewa, and tree crops such as hazelnuts with truffles. Irrigation may also be considered to improve production of pastoral and cropping operations.

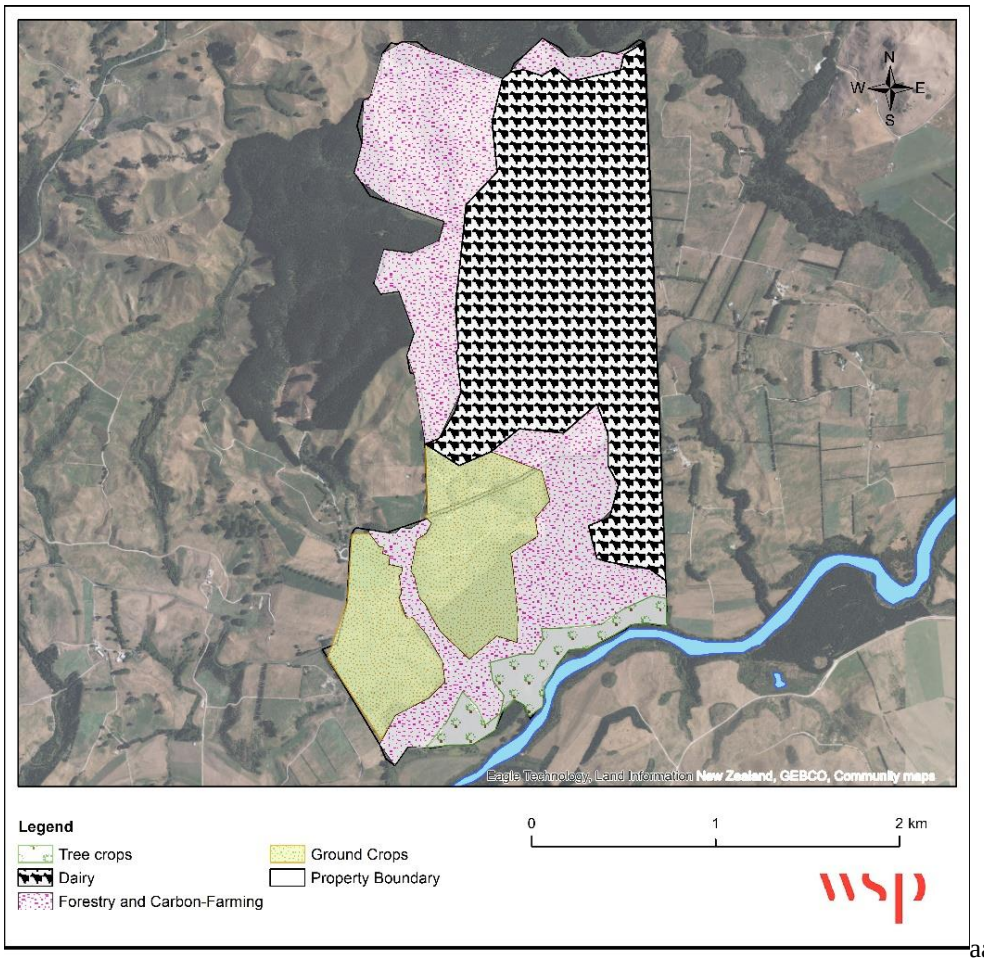

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Figure 4. Suggested land uses for areas of the Paeroa South B2B1 block.

Figure 5. Current and alternative land uses for the Paeroa South B2B1 block – multicriteria analysis.

Tauhara North

The 1004ha Tauhara North block has the Waikato River along its northern boundary and Lake Rotokawa to the south. There are two geothermal power stations on the block, Nga Awa Purua Power Station and Rotokawa Power Station.

Approximately 200 dairy replacements are grazed on the property. A solar energy installation is planned over an area of 40ha, and this will be 100% owned by Tauhara North. The property has sound fencing subdividing the grassland.

From the MCA this block is well-suited to support infrastructure-based enterprises, some of which may work in conjunction with the planned solar farming operation (Figures 6 and 7). Irrigation would likely enable more reliable pastoral production to support dairy and/or dry stock operations on other blocks. There are areas where productive tree crops, forestry and carbon farming, and dry stock operations may be established.

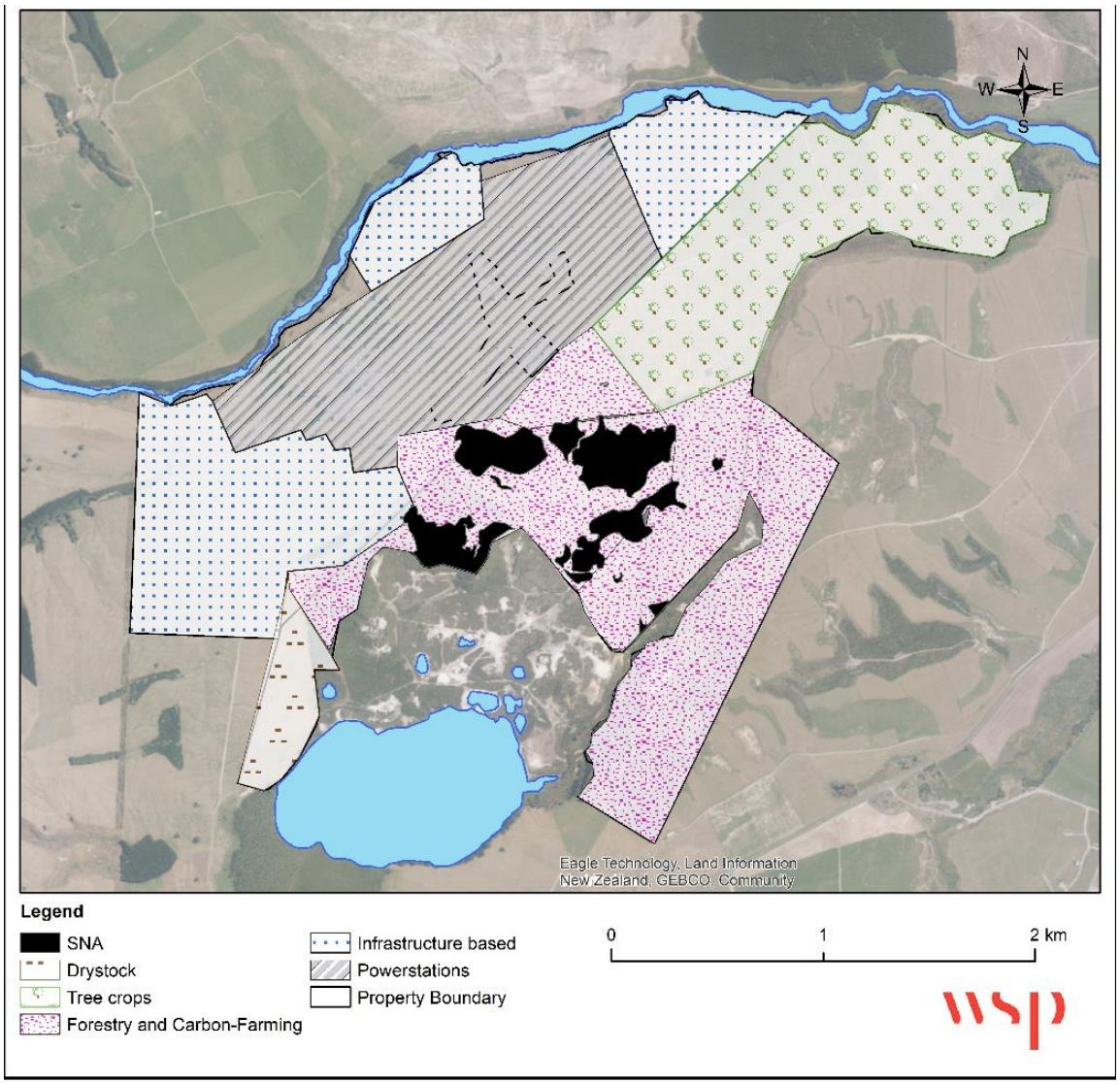

Figure 6. Suggested land uses for areas of the Tauhara North block.

Figure 7. Current and alternative land uses for the Tauhara North block – multicriteria analysis.

Key findings

The key findings from this study are summarised in the table below.

Land use potential	A multi-criteria analysis highlighted the varied opportunities available to NTNW with the land holdings and resources they have at their disposal. Several horticultural, pastoral, aquaculture and forestry options have been identified as possibilities to explore further. Diversification and improvement of the land uses may open a range of possibilities for employment and education and attracting iwi members back to the rohe, forming new business partnerships, spreading business risk, and enhancing the environment in line with NTNW goals.
Water utilisation	Several land use opportunities that will utilise available water allocation have been identified. Tree nurseries and aquaculture are high water users and greenhouse crops, potatoes and mushrooms are moderate water users. Additionally, there is a lot of land that could easily be irrigated which will improve productivity and enable land use change. However, consideration needs to be given to nutrient loss as many of the soils studied have moderate to high nitrate leaching potential.
Potential synergies	Multiple synergies could be created between the different land uses that have been considered in this study. An example is the planting of forest species or tree crops to offset GHG of livestock operations, provide shelter and reduce erosion. Potential synergies could be further explored in the development of a more in-depth business case for the selected land-use options.
Consent requirements	In any land use change decision, it is important to consider consenting requirements. A high-level overview of potential requirements by land use has been given (*not included in this manuscript*).

Way forward

To move this project to the next stage requires decision making by NTNW around which land uses to explore further for each block. This will require embarking on a more detailed analysis of the viability of the short-listed options.

Once the land uses which NTNW are interested in pursuing have been identified, the suggested next key actions to progress this journey are:

- A detailed soils analysis, including sampling, for any identified development sites where the potential land use in the MCA has soil identified as medium.
- An economic analysis to determine the costs of establishment, production and operational costs, and potential market returns
- Quantifying the scale and timing of operations to determine synergistic potential, particularly for labour requirements.
- Determining the organisational governance structure for the developments. This could include any partnerships that would enable success in this development.
- Irrigation proposals will require detailed design and hydrological analysis.
- Microclimates on different areas of the land will need to be explored further and the installation of on-site weather monitoring systems may be considered.
- A more site-specific identification of regulatory and resource consent requirements will need to be undertaken.