

CURIOUS MINDS

HE HIHIRI I TE MAHARA



PARTICIPATORY SCIENCE PLATFORM

TARANAKI UPDATE 2023

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IGNITING CURIOSITY AND INNOVATION THROUGH COLLABORATIVE RESEARCH PROJECTS THAT BUILD OUR REGION'S COLLECTIVE KNOWLEDGE AND DRIVE MEANINGFUL CHANGE, WHILE FOSTERING A VIBRANT COMMUNITY OF LIFE-LONG LEARNERS.

INTRODUCTION

Curious Minds Taranaki is a Participatory Science Platform (PSP) delivered locally by Te Puna Umanga Venture Taranaki in collaboration with Taranaki Regional Council and funded by the Ministry of Business, Innovation and Employment (MBIE). Grants of up to \$20,000 are available for projects that are locally relevant, educationally valuable and scientifically robust. Any type of community group can apply including students, schools, kura, community-based organisations, businesses or Māori organisations and collectives.

We are all curious about the world around us, and even more so when it involves our own backyard.

Since 2015, Curious Minds Taranaki and Te Puna Umanga Venture Taranaki have been helping to make science more accessible to everyone, turning your questions into research action.

The Curious Minds Participatory Science Platform (PSP) is a powerful partnership model empowering communities to address local issues and broaden scientific research that directly impacts their lives.

It shows anyone can get involved with science and technology, as it brings together diverse groups such as schools, hapū, community organisations, and scientists to work collaboratively

on projects, building capability and enthusiasm for science around the region.

Here in Taranaki, Curious Minds PSP plays an important role in supporting regional strategic objectives, including building our innovation ecosystem and innovating new solutions to problems that affect our key local sectors like energy, food, and the environment. It also lays a strong foundation of Science Technology Engineering Mathematics (STEM) education, fostering innovative minds and encouraging important career pathways for our young people that will help to enable the future prosperity of Taranaki.

This update captures the exciting research being carried out throughout Taranaki that is helping to drive meaningful change for the region.

AT A GLANCE



72
PROJECTS FUNDED

\$1,252,442

FUNDING DISTRIBUTED

\$1,293,384

IN-KIND AND CO-FUNDING



47/94

OF TARANAKI SCHOOL'S
PARTICIPATED



26

RESEARCH FIELDS
INVESTIGATED



STRONG KAUPAPA MĀORI
ENGAGEMENT



MORE THAN

4,700

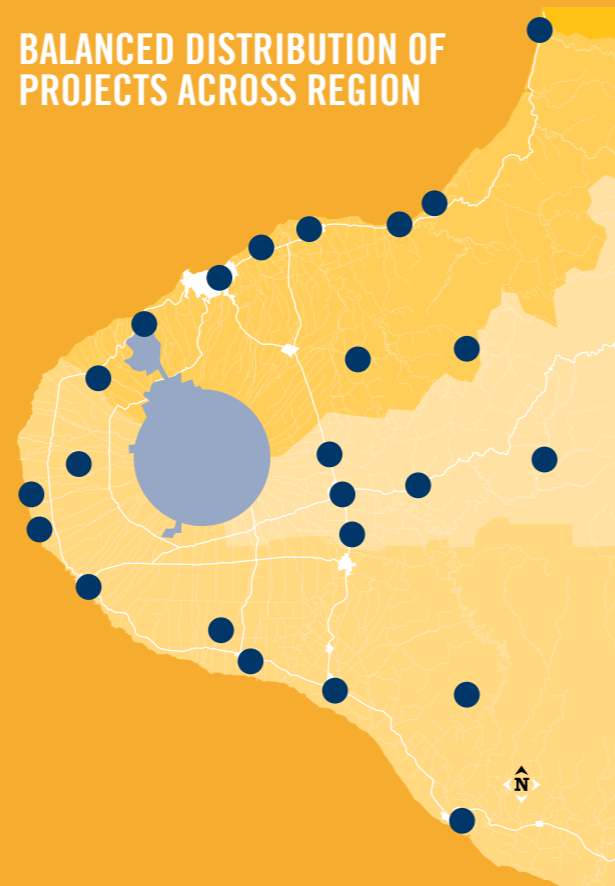
PARTICIPANTS

INCLUDING MORE THAN

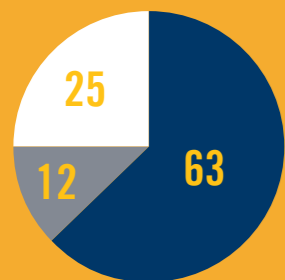
2,700

YOUTH AND
250 EXPERTS

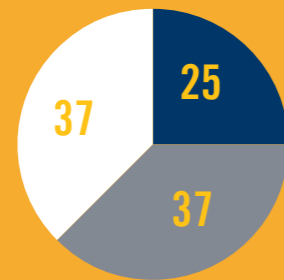
BALANCED DISTRIBUTION OF PROJECTS ACROSS REGION



PARTICIPANT LOCATIONS THROUGHOUT REGION %



■ New Plymouth District
■ Stratford District
■ South Taranaki District



■ City
■ Town
■ Rural

COMPLETED PROJECTS FOR 2022 TO 2023



8 C

TRAILCAM02

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DID CURIOSITY KILL THE POSSUM?

When it comes to creating a Predator Free New Zealand, efficiency is key. With so many different trap designs it's hard to know exactly which will give the best results for your target pest.

For East Taranaki Environment Collective (Etec), possums are a major focus in their efforts to protect Everett Park Scenic Reserve. Despite the major threat that these pests pose to the flora and fauna of Aotearoa, very little research has been carried out to see which trap design might be the most effective for controlling their population.

Etec enlisted the help of Norfolk School students to test four trap designs throughout their area to compare their ability to attract and kill possums. Students and teachers worked with the Etec team to set up 16 traps, along with trail cameras to monitor interactions. Throughout the process, students were able to learn about trap design, best practice for setting, and developed their data analysis skills.

After twenty days, students analysed the footage to see how possums behaved with each trap design. Some didn't do so well, with possums spotted casually hanging from their frame, while other traps were just ignored. Others were much more attractive, enticing several possums during the monitoring.

By comparing their analysis with the number of possums killed by each design, the students were able to recommend the best trap for Etec to use. By a very clear margin, the students chose the Steve Allan trap as the most effective for possum reduction.



SHARK SPY TARANAKI – DIVING DEEPER

The New Zealand Marine Studies Centre (NZMSC) conducted an earlier Shark Spy project in 2021 which provided valuable information on some of the estimated 14 shark species in Taranaki waters. The project brought together several schools and community groups to collect baited underwater video (BUV) that was deployed in partnership with Chaddy’s Charters.

Building on this project, ‘Shark Spy Taranaki: Diving Deeper’ sought to empower Taranaki communities to carry out their own underwater monitoring. Dr Rob Lewis of the NZMSC visited schools to teach about shark ecology, biology, and how Shark Spy could enrich our understanding of the marine environment. Several groups of students accompanied Dr Lewis on field trips to collect BUV footage, learning how to set up and deploy the gear, as well as ecological surveying techniques.

Along with BUV footage, Shark Spy was collecting data on shark sightings from local fishers and divers. Excitingly, there are indications that some species are significantly increasing in number, with many fishers asking ‘what is going on with the spiny dogfish?’. This anecdotal data can be used by researchers to identify changes in an environment that could otherwise be missed by short-term scientific studies.

Moving forward, two BUV systems are now being regularly used by Highlands Intermediate and Ngāti Mutunga. These groups are communicating new shark sightings to NZMSC and are using the gear to significantly improve their marine monitoring capabilities. By establishing a strong relationship between national experts and local communities, *Shark Spy: Diving Deeper* shows the power of citizen science in enriching our understanding of the natural world.



MAI TE AWA KI TE MOANA

For the people of Ōhawe, there has long been concerns about the health of the takutai moana (foreshore and seabed), resulting in community tensions over illegal harvesting. Ōkahu-Inuawai me ētehi atu hapū has brought together an impressive team of mātauranga Māori professionals, science experts, and community groups to develop a coastal monitoring methodology that fits the needs of the people using it.

In the spirit of Curious Minds Taranaki, the original plans for the project rapidly evolved after the first wānanga (discussions) with hapū and community members. Realising the need for a methodology that reflected the specific needs of those who would be using it, the Project Leads established bespoke systems for capturing and analysing data. They used audio-visual recordings from the National Library of New Zealand to collate oral histories from kaumatua to establish a tūpuna (ancestors) baseline of where taonga species should be found. From there, the researchers developed an online tool to enable members of the community to survey the takutai on-site. These surveys and the resources to use them were made available to hapū members on a newly established website.

For the Project Leads, the results have been both uplifting and concerning for those involved. The engagement with hapū and community has given a boost to efforts to monitor and protect the coast. However, unfortunately these efforts have also brought to light the grim reality of the health of the takutai moana.

Taonga species, such as pāua, kina, and red moki are now completely absent due to high sediment and contamination from the Waingongoro awa (river). But with new knowledge comes the capacity to make change, and Ōkahu-Inuawai me ētehi atu hapū are now moving on to the next phase of restoration – bringing their taonga species back to the reefs.





HE ORANGA TAIAO, HE ORANGA TĀNGATA: A FASHIONABLE FIGHT

The environmental impact of the fashion industry is immense, with textile manufacturing responsible for 10% of the world’s carbon emissions and 30% of the world’s wastewater.

‘He Oranga Tāngata, He Oranga Taiao,’ set out to explore how a collaboration between mātauranga Māori and Western science could offer an innovative and sustainable alternative to modern fashion practices.

Project Lead, Keri Wanoa of Whiri Design, alongside a group of students from Te Wharekura o Te Pihipihinga Kākano Mai i Rangīātea, worked with Māori art experts to learn traditional Māori dyeing techniques. Native plants, lichens, and other materials were collected from the local ngahere (bush) and processed to produce dyes. These dyes were then applied to various fabrics to test for colour vibrancy and fastness.

With their new understanding of Māori dyeing practices, the students visited the AgResearch Research Centre in Lincoln to learn more about modern textile manufacturing. Through consultation with AgResearch Scientist Steve McNeil, the group

was able to develop a process for testing the viability of using traditional dyes in modern machines. The results were mixed, while most of the dyes extracted from plant matter produced successful results, kōkōwai (red ochre) was too risky to use in the machines.

The results of ‘He Oranga Taiao, He Oranga Tāngata’ offer an exciting glimpse into how indigenous knowledge may contribute to a more sustainable approach to fashion. Along with these insights comes a greater understanding of mātauranga Māori and an opportunity for rangatahi to be part of bringing a stronger Māori presence in the worlds of science and fashion.

“I enjoyed being with rangatahi and feeling their energy and curiosity to how their tūpuna gathered the resources for dyeing and mordant process.”

Whaea Mako Jones, Taranaki Māori Textile Specialist

TEMPOFIT

Normally it’s hard to get kids to stop running, but when it comes to cross-country, a lot of kids don’t seem to be that enthusiastic. In their 2021 project, TempoFit launched a pilot programme, ‘Run Revolution’ to get intermediate-aged school students excited about participating in running and other athletic activities.

Run Revolution is a programme delivered over five weeks that builds student running fitness through a series of lessons, circuits, and games with an emphasis on skill development and fun. This includes regular ‘party runs’ involving music, obstacles, sausage sizzles, and speed zones that slowly build students up to running their choice of either a three or a five-kilometre run in the final session.

Students attitudes towards exercise and running at the beginning and end of the programme were surveyed, along with comparing the change in their jumping, sprinting, and resting heart rate.

The project found that on average, the programme improved attitudes towards running and general exercise with all participating students, perhaps unsurprisingly, preferring it to cross-country. Most students found their athletic ability improved, as did their confidence in their own athleticism. However, the project leads are careful to note that not all students benefited from the programme, which emphasised the need to use multiple approaches to get students involved in exercise.



For TempoFit, this project demonstrated the potential of their Run Revolution programme to create a positive environment for students participating in running and exercise. The data collected will be used to improve the programme, with the ultimate goal to make it available to students across Aotearoa New Zealand.

“I like doing the party runs and doing sprints because that got me to push my limit”

Participating student





ONGOING PROJECTS 2022 TO 2023

SOIL YOUR UNDIES

What do cotton undies have to do with soil health? Well, besides creating a great name for a project, it has given EnviroSchools Taranaki a novel way to teach students about the macro and microinvertebrates in topsoil. With greater attention being paid to the necessity of soil quality to productive and sustainable farming, an understanding of the science behind it can inspire students to consider new and exciting career paths.

Over the course of a year, students were introduced to the science of soil and the organisms that inhabit it, taking samples from different sites to be sent away for testing. Further experimentation was carried out by burying cotton underwear, comparing the degradation of the material over time with the soil composition. Burying underwear itself has some sensitivities, but students were able to design their own undie-shaped pieces of cotton fabric to be buried at a local farm.

In addition to this experimentation, each school was provided with a terrarium containing dung beetles and the requisite cow poo to feed them. While dung beetles aren't native to New Zealand, some researchers are investigating how they could be introduced to our pastures to boost the quality of the soil through the turnover of waste.

The Project Leads found that the use of underwear was a great way to get students interested in soil health. Since the completion of Soil Your Undies, EnviroSchools Taranaki has used the lessons and data gathered over the course of the project to successfully apply to the LA Alexander Trust for funding, to develop two new programmes for primary and secondary school students.

“Whether we’ve inspired the next scientist, another land user proactively working alongside nature or someone who is inspired to mix up the way we look at industry here in Taranaki – we think we’ve won.”

EnviroSchools Taranaki

VIRTUAL REALITY FOR DEMENTIA 2

Alzheimer's Taranaki carried out a previous Curious Minds Taranaki project in 2020, that revealed the power of virtual reality to trigger complex and detailed memories for people living with dementia.

This follow-on project, led by Dr Linda Jones, will further explore the effects of these VR triggered memories and see if there are benefits on mood, language, memory, and social cognition for both people living with dementia, and for a cohort of older adults not living with dementia.

Joining the project will be a group of digital technology students from Francis Douglas Memorial College. Their task will be to develop a protocol to help the less technologically savvy volunteers to use virtual reality devices.



KEEPING YOU SAFE

Taranaki Retreat will explore how physical support environments impact the wellbeing and recovery of those experiencing emotional distress.

The project will investigate how the physiological and emotional stress of those supported by the Taranaki Retreat changes over the course of their engagement. It will also explore people's experiences of accessing different environments (such as emergency services) for support with acute emotional distress.

It aims to provide information that will be of value to the Taranaki Retreat and other services supporting people in distress.

NGĀ MOTU WHĀNUI MANUMOANA

In a previous Curious Minds Taranaki project, Taranaki Mouna Project partnered with local iwi and community groups to establish an extensive trapping programme to reduce the number of rats living on the islands of Ngā Motu. While their efforts were successful, they were unable to establish whether there had been any impact on the number of seabirds nesting on the islands.

This new Curious Minds project will partner a group of coastal Taranaki schools and hapū to use drones to count birds, including at night with thermal imaging cameras. The aim is to get accurate counts of bird populations with minimal human interaction.

IS THE WORLD CHANGING BELOW THE WAVES?

MAIN Trust are concerned by observations made by divers and iwi about changes happening in Taranaki reefs and marine reserves.

They're investigating how the Ngā Motu and Parininihi Marine Reserves have changed in the nearly twenty years since both were established. An impressive group of local and national experts will use data loggers, underwater cameras, and in-person observations to establish the current health of the Taranaki marine environment.

With this research will come an exciting collection of 360-degree video, which will be combined with VR technology to bring the marine world to the surface for schools and community groups.

PARA KUIHI

Canada Geese are a major pest species in South Taranaki, competing with native wildlife for food and contaminating freshwater with their waste. Efforts to control them have been limited by the ability to find their nests, and local interest in culling them. Te Kaahui o Rauru is hoping to tackle both problems through community collaboration and culinary coercion.

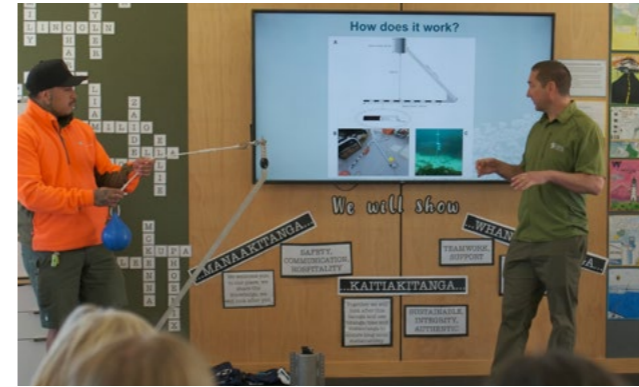
The process of finding and addling (shaking) Canada Geese eggs has been typically done on foot, a time consuming and physically demanding task. This project will investigate the use of drones to identify the nests of Canada Geese quickly and effectively over a large area.

Additionally, the project will engage with South Taranaki communities to encourage the hunting of Canada Geese for food. This will include an event where members of the public can learn how to process culled geese for meat, and how to turn this environmentally harmful pest into a nutritious meal.

INAHA ME KAPUNI HAERENGA O TE MARAMATANGA

The health of the Inaha and Kapuni awa (rivers) has been an ongoing concern for Ngāti Manuhiakai. Tangata whenua have observed a decline in taonga species and overall health, sparking an investigation that combines mātauranga Māori with Western science to establish the current state of these culturally important waterways.

Project Leads will establish a baseline understanding of what the rivers used to be like through interviews with kaumātua. They will then compare the taonga species that have historically existed in the area with eDNA, a relatively new technology that allows researchers to identify which species of organisms currently live in an area. This new knowledge will be used by future restoration projects to bring the Inaha and Kapuni awa back to their former glory.



WILD ABOUT AI

The role of Artificial Intelligence (AI) in our daily lives has taken a big jump in the past year, but Wildlife. ai have already been using it for years to enhance conservation efforts.

For many conservation groups, being able to quickly and easily identify different species of organisms is critical to assessing the health of ecosystems. While we have the tools to capture data on what is living and where, we are still limited in our ability to analyse that data effectively. Online citizen science platforms such as Zooniverse have harnessed the brain power of internet scientists to analyse images, audio recordings, and video. Through this collective effort, members of the public have helped scientists to monitor wildlife populations and even identify supernovas.

Wild About AI uses marine conservation to teach students about artificial intelligence and machine learning. Over the course of a term, students are meeting experts from the Department of Conservation, examining underwater footage from the Ngā Motu Marine Reserve, and using this new knowledge to build their own machine learning models.

WAI ENERGY

Sustainable electricity generation is critical to the health of our planet. Taranaki Catchment Communities (TCC) want to find out whether hydroelectric energy could be a solution to improving resilience for rural communities while also reducing their impact on the environment.

While most hydroelectric energy is generated using large dams which disrupt ecosystems, TCC are looking at a new technology called 'vortex hydro' which can produce electricity without needing to impede the flow of water at all.

While vortex hydro has some exciting applications, it is not yet known whether it would be an environmentally friendly option in a Taranaki setting. Taranaki Catchment Communities, alongside school students, local farmers, and hapū, will be carrying out a feasibility study in the Oeo catchment. They will be looking at how it affects fish and other invertebrates, while also determining whether electricity can be continually generated under a range of weather conditions.



PREVIOUS PROJECTS

2015

- Kiwi Presence in Egmont National Park - Taranaki Kiwi Trust
- Project Ultra - Pekapeka in Purangi - East Taranaki Environment Trust
- Project Hotspot - Ngā Motu Marine Reserve Society
- Waitara Kaimoana Survey - Otaraua Hapū & Waitara Alive
- Reef Life Project - South Taranaki Underwater Club
- Te Moeone - Growing for the Future - Ngāti Tawhirikura Hapū

2016

- Maru Wai Matara - Te Whenua Tomuri Trust
- Project Hotspot - Ngā Motu Marine Reserve Society
- Project Reef Life - South Taranaki Underwater Club
- CAPOW! Curious About Processing Organic Waste - Stratford and Matapu Schools
- Full STEaM Ahead! - Opunake School
- REV IT - New Plymouth Boys' High School
- Stone v.s. Metal - The Motunui Panels Revealed - Puke Ariki

2017

- Toko School Distillation Investigation - Toko School
- A Pesky Problem - Te Namu Hakirara - Woodleigh School
- South Taranaki Project Earth: Ready Rehearsed Resilient - Hāwera High School
- Pest Trapping in the Makahu Valley - Makahu School
- Dotterel Defenders - Taranaki Conservationists
- Tracking Fur Babies in Taranaki - Wild for Taranaki
- Ko Nga Kowhitiwhiti - BTW Compay Ltd, Otaraua Hapū
- Inanga Ora Ki Te Awa O Waitara - Otaraua Hapū, Waitara Alive
- Bug ALERT! - East Taranaki Environment Trust
- Project Wi-Finding - Massey University
- Schoolyard Blues - Massey University

2018

- Soil Fertility and Health Trials - Midhirst School
- CatMap - MAIN Trust NZ
- Finding Little Blue - Ngā Motu marine Reserve Society
- Project Litter - Tapuae Trash Trackers - Highlands Intermediate School
- Ngā Kaitiaki o Ngā Motu (Guardians of the Islands) - Te Atiawa Iwi Charitable Trust
- Bug ALERT! 2 - East Taranaki Environment Trust
- Kimihia Kermit - Te Rūnanga o Ngāti Mutunga
- Trashformers - Upcycle Taranaki
- Wi-DemystiFied - Massey University

2019

- Our Mountain, Our Volcano - Cynthia Werner
- Ngāmatapouri School Waitōtara River Monitoring Project - Ngāmatapouri School
- Te Āhua o ngā Kūrei - Te Rūnanga o Ngāti Mutunga
- Healthy Living Soil - Organic Farm NZ Taranaki/Whanganui
- I Whio that I could live here - Te Korowai o Ngāruahine Trust
- Pūrangi Pekapeka - East Taranaki Environment Trust
- Fish food and fringes - MAIN Trust NZ
- Seachange Surveys - Wild for Taranaki
- Sustainable energy generation for use in electric vehicles - New Plymouth Girls' High School

2020

- Ground Breaking Mushrooms - Bishop's Action Foundation
- Exploring a Place for Virtual Reality in Dementia - Alzheimers Taranaki
- Sound Lures - Auroa School
- Papa Pokepoke - Ngāti Mutunga
- Seachange Surveys 2 - Wild for Taranaki
- He Oranga Tāngata, He Oranga Taiao: A Fashionable Fight - Whiri Design
- Our Green Opunake Journey - Opunake Kindergarten and Sustainable Taranaki

2021

- Pests, Threats and Our Birds - East Taranaki Environment Trust
- Regen Farming Foundations - Regenerative Solutions
- RoboGrow - Inglewood High School
- TempoFit Running in Schools - Tempofit
- Shark Spy Taranaki - University of Otago
- Tarakihi Taioara - Te Kāhui o Taranaki
- Wētā Watcher - Wildlife.ai
- Soil Your Undies Taranaki - Toimata Foundation/ EnviroSchools
- Call of Litter Duty - Litter Action NZ
- Kororā Kōrero - Ngā Motu Marine Reserve Society

2022

- Did Curiosity Kill the Possum - East Taranaki Environment Collective
- Coastal Awa Restoration Project Ōhawe - Ōkahu-Inuawai me ētehi atu hapū
- Ngā Motu whānui manumoana - Taranaki Mounga Project
- VR for Dementia 2 - Alzheimers Taranaki
- Keeping You Safe - Taranaki Retreat
- Shark Spy 2: Diving Deeper - University of Otago
- Para Kūihi - Te Kaahui o Rauru

2023

- Wai Energy - Taranaki Catchment Communities
- Inaha me Kapuni haerenga o te maramatanga - Ngāti Manuhiakai
- Haurapa Kiwi 2: Tuning Up the Frequency - Taranaki Kiwi Trust
- Wild About AI - Wildlife.AI

HAURAPA KIWI 2.0 — TUNING UP THE FREQUENCY YES

In an earlier project, Taranaki Kiwi Trust showed that it was possible to track kiwi using drones. Unfortunately, the application of this discovery was limited by the interference of the drone's control frequency with the tracker. Haurapa Kiwi 2.0 is the next phase of the project, which brings in specialist radio frequency experts to figure out a solution.

The project team will be joined by students from Head Office, the Taranaki Gifted and Talented programme, to provide their unique perspective to solving this problem.

If this project is successful, it could mean major changes in the way we monitor our most endangered species.

Te Puna Umanga Venture Taranaki is a catalyst for future prosperity in Taranaki with strategic focus areas in energy transition, food and fibre, destination development and visitor futures, and hi tech innovation. Venture Taranaki (VT) seeks to inspire and nurture growth, connect communities, empower individuals, and ignite innovation to sustain and stabilise through lasting development, investment, and opportunity for our region. VT is a Council Controlled Organisation of the New Plymouth District Council, is governed by an independent Board of Trustees, and guided by Te Tiriti o Waitangi.



venture
TARANAKI
Te Puna Umanga



NPDC

TARANAKI

like no other