APPENDIX NINE

Waikato-Tainui Iwi Project Assessments

Contents

Waikato-Tainui 1 Priority: Very high	Enabling manawhenua to engage in river restoration – Waikato-Tainui
Project summary	This project was identified as a very high priority by iwi present at the four iwi priorities waananga throughout Waikato-Tainui. The project will see the development of a comprehensive hands-on training package that will provide iwi with the necessary skills to engage in river restoration.
Vision for the project	Waikato-Tainui are knowledgeable, participating and leading aspects of river restoration, thus enabling mana whenua to be reconnected with the tuupuna awa, which is an integral part of our identity.
Location	This project is located within the Waikato River catchment and tributaries within the Waikato-Tainui rohe
Brief description of site	The Waikato-Tainui area of the Waikato River is from Karapiro to Te Puuaha and the Waipaa River from the Puuniu junction down to Ngaaruawaahia.
Key threats/impacts	Loss of maatauranga. Loss of connection and identity. Iwi become disconnected from the awa. Iwi become bystanders to the restoration of our tuupuna awa.
Project goal/s (SMART)	Within 10 years of the project commencing, the iwi are more engaged, knowledgeable, connected and active in regards to protecting and restoring our tuupuna awa and our associated traditional practices. 40 training courses (4 per year) have been completed over 10 years.
Works required	Works could be implemented by iwi, hapuu, marae, or whaanau level. Co-funding contributions from other interested partners to complete this project would be welcomed. Prior to any works taking place, a full concept plan and costings should be developed for the project. The costs provided below are estimates only. **Develop a training package to enable manawhenua to engage in river restoration ($150,000)** Iwi (Waikato-Tainui Education Team, Waikato Raupatu River Trust and/or the Waikato-Tainui College for Research and Development) work with Wintec or other industry training providers to develop a NZQA recognised restoration training package that could include but is not limited to the following components: • Grow Safe certification • Health and safety

	• Fencing skills • Plant identification • Planting skills • Site preparation • Plant release • Plant propagation • Chainsaw • 4 wheel drive • Quad bike/ATV etc **Delivery of river training package ($3,000,000)** The delivery of the hands-on enabling of mana whenua to engage in restoration programmes should occur (in partnership with the training provider) annually across four locations within the tribe, i.e. Whatawhata, Te Puuaha, Huntly/Ngaaruawaahia and Hamilton/Karapiro. This will build critical mass of skilled tribal members to work in the river restoration space. Assume 4 sites, 10 years at $75,000 per site (includes but not limited to marae costs, waananga costs, assessors, course fees). **Resources to support the programme ($480,000)** Creation of restoration kits for whaanau that complete the programme, i.e. planting spade, health and safety gear (wet weather gear, safety boots), etc. Assume 4 sites, 10 years at $12,000 per site per year. **Project management/staffing/incidentals (30%)** Project manager/management over 10 years would be required to manage the project, including organising the development of the training package and extensive coordination to arrange delivery of the package across the different areas of the tribe and the different levels (33 hapuu, 68 marae, 65,000+ tribal members). This would be a comprehensive task.
Risks to project success	Lack of funding.
Land tenure – likelihood of adoption and adoption circumstances	N/A
Knowledge gaps and response	No known knowledge gaps.
Project duration (years)	10

Costs

Work description	Cost ($)
Develop education package	150,000
Delivery of education programme at various locations within the tribe	3,000,000
Resources	480,000
Project management/staffing/incidentals (30%)	1,095,000
Total	**4,725,000**

Waikato-Tainui 2 Priority: Very high	Waikato-Tainui river education programme
Project summary	This project was identified as a very high priority by iwi present at the four iwi priorities waananga throughout Waikato-Tainui. The project will see the development of a comprehensive Waikato River education package based on Waikato-Tainui maatauranga, tikanga and kawa to be delivered throughout Waikato-Tainui.
Vision for the project	Waikato-Tainui are knowledgeable and reconnected with the tuupuna awa, which is an integral part of our identity.
Location	This project is located within the Waikato River catchment and tributaries within the Waikato-Tainui rohe
Brief description of site	The Waikato-Tainui area of the Waikato River is from Karapiro to Te Puuaha and the Waipaa River from the Puuniu junction down to Ngaaruawaahia.
Key threats/impacts	Loss of maatauranga. Loss of connection and identity.
Project goal/s (SMART)	Within 10 years of the project commencing, iwi are more engaged, knowledgeable, connected and active in regards to protecting and restoring our tuupuna awa and our associated traditional practices.
Works required	Works could be implemented by iwi, hapuu, marae and whaanau. Co-funding contributions from other interested partners to complete this project would be welcomed. Prior to any works taking place, a full concept plan and costings should be developed for the project. The costs provided below are estimates only. **Develop river education curriculum ($200,000)** Iwi (Waikato-Tainui Iwi Authority or the Waikato-Tainui College for Research and Development) work with marae and hapuu to develop a comprehensive river education package based on Waikato-Tainui maatauranga, tikanga and kawa. The education package should be tiered so that it can be delivered at different levels and in different locations within the tribe. Example: • Kohanga based river programme • Rangatahi based river programme • Pakeke river education package • Kaumatua/kuia river waananga series The river education package could include but is not limited to the following components:

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environmental (e.g. environmental management plan, restoration education/case studies, co-management framework, taonga species restoration)
cultural (e.g. reo, waiata, karakia waananga, maatauranga based – traditional intergenerational knowledge transfer methods)
historical (e.g. learn the koorero associated with the sites along the river)
spiritual (e.g. learn and reconnect and practice our spiritual traditions such as whakarite, whakanoa and traditional healing practices associated with the awa).

Delivery of river education ($4,000,000)
The delivery of the education programmes could take various forms, e.g. waananga, tira hoe, integration into the curriculum, school holiday programmes. $100,000 per tier (x4) per year x 10 years ($4,000,000).
Development of resources to support the programme ($500,000)
Creation of resources to suit kohanga, rangatahi, pakeke and kaumatua/kuia learning. Could include bilingual rangatahi computer aps, books/comics, CDs, videos, history books, maatauranga/science books, etc.
Project management/staffing/incidentals (25%)
Project manager/management over 10 years would be required to manage the project, including organising the development of the curriculum and massive coordination to arrange delivery of the package across the different areas of the tribe and the different levels (33 hapuu, 68 marae, 65,000 tribal members). This would be a comprehensive task.
</td></tr>
<tr><td>Knowledge gaps and response</td><td>No known knowledge gaps.</td></tr>
<tr><td>Project duration (years)</td><td>10</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Develop education package</td><td>200,000</td></tr>
<tr><td>Delivery of education programme across 4 tiers and at various locations within the tribe</td><td>4,000,000</td></tr>
<tr><td>Resources</td><td>500,000</td></tr>
<tr><td>Project management/staffing/incidentals (25%)</td><td>1,100,000</td></tr>
<tr><td>Total</td><td>5,800,000</td></tr>
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Waikato-Tainui 3 Priority: Very high	Waikato-Tainui river champions
Project summary	This project was identified as a very high priority by iwi at waananga. It was considered that by celebrating and acknowledging river champions (iwi members who have achieved great things on the ground, e.g with planting projects, protecting taonga species, creating enhancement opportunities or education of whanau, etc.), awareness would grow about the inspirational work that is happening for the good of the awa and inspire future river iwi champions. This project will fund an annual Iwi River Champions Awards dinner to be held at a suitable venue and award carved paddles/tohu to four successful river champions. The four tohu could be spread out over the geographical areas of Waikato-Tainui (i.e. Mercer to Te Puuaha; Ngaaruawaahia to Mercer; Puuniu to Ngaaruawaahia; and Ngaaruawaahia to Cambridge) or could be over categories, e.g. rangatahi award, mana o te awa award, mana whakahaere award, etc.
Vision for the project	Greater awareness of inspiring successful river iwi champions and their mahi on, in and around the river. The next generation of river champions are inspired to achieve even greater things.
Location	This project is located within the Waikato River catchment and tributaries within the Waikato-Tainui rohe
Brief description of site	The Waikato-Tainui area of the Waikato River is from Karapiro to Te Puuaha and the Waipaa River from the Puuniu junction down to Ngaaruawaahia.
Key threats/impacts	Lack of awareness. Lack of inspiration. No new talent interested in becoming involved with river restoration.
Project goal/s (SMART)	Within 10 years, 10 river iwi champion dinners have been held. Within 10 years, new river champions have been inspired. Within 10 years, the profile of river iwi and the success stories regarding the restoration of the tuupuna awa is high.
Works required	Works could be implemented by iwi, hapuu, marae, whaanau or in partnership with an organisation. Co-funding contributions from other interested partners to complete this project would be welcomed. **Iwi river champions awards dinner ($100,000)** $10,000 per annual dinner x 10 years = $100,000. 120 guests, food and beverages. **Tohu for river champions ($32,000)** 4 x carved paddle per year at $800 per paddle is $3200 x 10 years = $32,000. **Project management/staffing/incidentals (20%)**

<table>
<tr><td></td><td>A project manager would coordinate the dinner at an appropriate venue, organise call for nominations, create a small selection committee to consider/review the nominations and select the winners based on winning criteria, coordinate with carvers to create paddles/tohu.

20% of overall costs is $2800.</td></tr>
<tr><td>Risks to project success</td><td>None</td></tr>
<tr><td>Project duration (years)</td><td>10 years</td></tr>
<tr><td>Up-front cost – total for implementation phase/project duration</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Awards dinner</td><td>100,000</td></tr>
<tr><td>Tohu for winners</td><td>32,000</td></tr>
<tr><td>Project management/staffing/incidentals (20%)</td><td>28,000</td></tr>
<tr><td>Total</td><td>160,000</td></tr>
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Waikato-Tainui 4 **Priority: High**	**Mana o te awa – water quality monitoring – Waikato-Tainui**
Project summary	The restoration of water quality and exercising kaitiakitanga for mana o te wai were identified as high priorities by hapuu, marae and whaanau from Karapiro ki Ngaaruawaahia. This project will equip ngaa marae and/or a collective marae trust that undertakes an environmental role on behalf of those marae to utilise a Waikato-Tainui maatauranga Maaori Waikato River health sampling app. Waikato-Tainui will conduct water quality testing and use the app to actively monitor water quality and the health and wellbeing of the Waikato River. The areas for water testing will be identified by hapuu, marae, whaanau or Waikato-Tainui as being locations that are historically, culturally, ecologically or spiritually significant to them.
Vision for the project	A Waikato-Tainui maatauranga Maaori Waikato River health sampling app has been developed to be used during in-field sampling, to collate Stream Health Monitoring and Assessments Kit (SHMAK) and water quality field kit sampling data for a central Waikato-Tainui data system. Up to 40 SHMAK and 40 water quality field kits will be purchased for hapuu, marae and whaanau from within the four identified areas, Karapiro ki Ngaaruawaahia, Puuniu junction ki Ngaaruawaahia, Ngaaruawaahia ki Mercer and Mercer ki Te Puuaha. They will undertake an active kaitiakitanga role in monitoring the health and wellbeing of the Waikato-River and restoring customary practices that supports the transfer of knowledge to future generations. SHMAK and specialised sampling equipment will test pH levels, water clarity, conductivity, total dissolved solids, dissolved oxygen and turbidity.

Location	 Project area includes the Waikato River and all tributaries between Lake Karapiro and Port Waikato, including the Waipaa River from Puuniu River junction through to Ngaaruawaahia. Exact sampling site locations are to be determined by whaanau, hapuu and/or marae within the mapped area above in locations as being historically, culturally, ecologically or spiritually significant (the identified area is indicative only).
Brief description of site	Monitoring the health and wellbeing of the tuupuna awa is important because the Waikato River and her significant traditional waterways are the life force of Waikato-Tainui hapuu, marae and whaanau. Waikato-Tainui's primary interest in the project is to promote and protect unfettered access of tribal members to exercise mana whakahaere and traditional cultural practices as kaitiaki.
Key threats/impacts	Waikato-Tainui lose the ability to participate, implement and undertake cultural monitoring using water quality assessments and testing of their tuupuna awa. Tikanga and kawa to do with fresh water use and sustainability is lost and forgotten. Hapuu, marae and whaanau of Waikato-Tainui become disconnected from their traditional waterways. Loss of historical water quality data for future generations. Further degradation of water quality remains unmonitored.
Project goal/s (SMART)	Within 10 years, hapuu, marae, whaanau and/or marae Cluster Trust Environmental units of Waikato-Tainui have utilised their freshwater maatauranga Maaori smartphone app to collate water quality data from key identified and GPS locations to contribute to Waikato-Tainui exercising kaitiakitanga and mana whakahaere through quantitative data.

	Waananga have been held with Waikato-Tainui members at (or near) the completed or identified restoration sites or traditional waterways close to marae, for the transfer of knowledge and tools to marae and track the effects of the restoration projects.
Works required (quantity and description)	Sampling works could be implemented and led by hapuu, marae, whaanau and/or Waikato-Tainui. Co-funding contributions from other interested partners for hapuu, marae, whaanau and/or Waikato-Tainui to complete this project would be welcomed. This project could be undertaken in parts or as a whole. Develop iwi expertise in monitoring the health and wellbeing of the Tuupuna awa. **SHMAK (Stream health monitoring and assessment kits)** Each marae and marae cluster's environmental unit from Mercer through to Port Waikato along the Waikato River are equipped with a SHMAK, and given training and SHMAK PAK software for logging and recording data. Estimate cost per kit $500. Estimated cost for 40 units $20,000. **Water quality testing field kit** Each marae and marae cluster's environmental units from Mercer through to Port Waikato along the Waikato River are equipped with water quality field kits. Marae, including collective marae trusts or management committees, e.g. Huakina Development Trust, are equipped with a basic in-field fresh water monitoring kit and trained to undertake an active role of kaitiakitanga in monitoring the health and wellbeing of the tuupuna awa. Water quality field kit, including but not limited to: - pH meter - $84 - clarity tube - $224 - conductivity meter - $184 - total dissolved solids meter - $265 - dissolved oxygen meter - $1273 - turbidity meter - $2500 - stereo microscope - $390 - digital camera - $450 from TradeMe - collapsible work bench from Bunnings - $80 - plastic sample bottles 50ml with lid - $105/100 pack - dip nets 500 micron mesh homemade - $100 ea - sieves - $50 ea/mesh size - petri dishes - $5/pack 20 - water bottles - used secondhand drink bottles

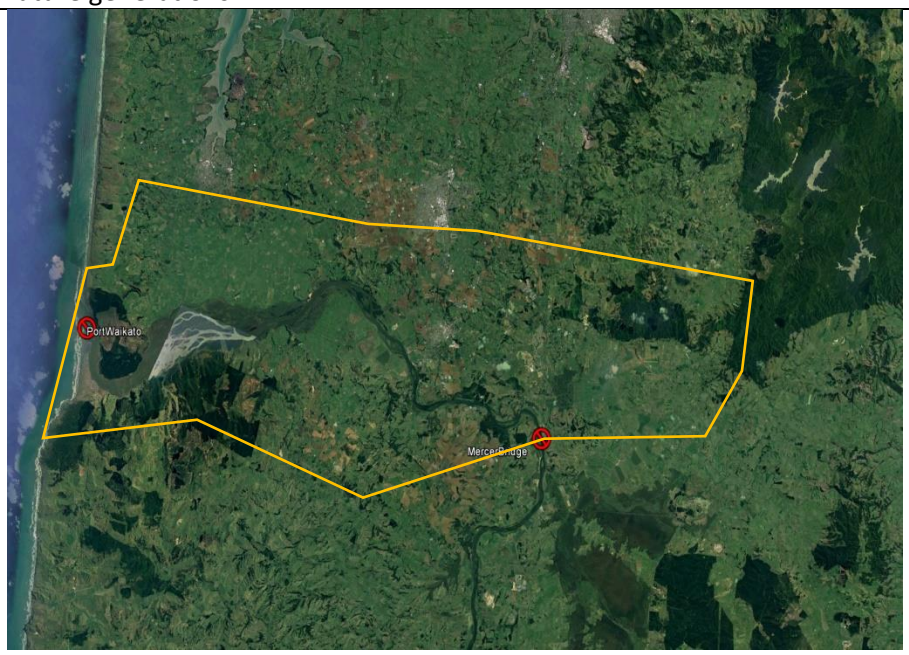
	- gloves - $30/box 100 pairs (S M and L) - safety glasses - $25 ea - magnifying glasses - $7 ea - dissecting kit - $30 ea - lab coats - $40 ea - cleaning equipment (buckets, basins, detergent) - $50 - power inverter 12v to 240v - $200 (prices ex www.crescendo.co.nz excl GST) Estimate cost per kit: $8072 Estimated costs for 40 units $322,880 **Capacity development waananga** 40 x marae based waananga will be held annually to deliver training and refresher training over the 10 years: • SHMAK training • data collection and storage • water quality field kit use Estimate cost: $5000 Estimated costs for 40 waananga $200,000 **Develop Waikato-Tainui maatauranga Maaori freshwater sampling app** Estimate $10,000 **Project management/staffing/incidentals (20%)** Estimate 20% total project $120,576
Risks to project success	Lack of experienced practitioners
Knowledge gaps and response	True costs of development of Waikato-Tainui maatauranga Maaori freshwater sampling app are not known. Development may require more funding, and this will be confirmed during investigation. Exact sampling site locations yet to be determined by whaanau, hapuu and/or marae from within Karapiro and Ngaaruawaahia.
Project duration (years)	10 years

Costs

Work description	Cost ($)
Smartphone app development	50,000
SHMK Kits x 40	20,000
Water quality field kits x 40	322,880
Capacity building and training waananga x 40	200,000
Waikato-Tainui maatauranga Maaori freshwater sampling app	10,000
Project management/staffing/incidentals (20%)	120,576
Total	**723,456**

Work description	Cost ($)
Estimated cost for 1 x SHMK and basic field kit, including 1 x training waananga (excludes app development)	13,572

Waikato-Tainui – Te Puuaha (Mercer ki Te Puuaha o Waikato)

Waikato-Tainui Te Puuaha 1 **Priority: Very high**	**Tuatahi – tuna habitat ponds – Mercer ki Te Puuaha o Waikato**
Project summary	The restoration of tuna abundance was identified as a very high priority by hapuu, marae and whaanau from Te Puuaha o Waikato This project will see the creation of 15 tuna habitat ponds between Mercer and Port Waikato, in areas identified by hapuu, marae, whaanau and iwi as being historically, culturally, ecologically or spiritually significant to them.
Vision for the project	Tuna (freshwater eels) are plentiful at the sites. Whaanau are able to exercise their mana whakahaere through restoring, protecting, enhancing and harvesting tuna. Customary practices and knowledge is transferred on to future generations.
Location	 Project area includes the Waikato River and all tributaries between Mercer through to Port Waikato. Exact locations of the 15 individual tuna ponds will be identified by whaanau, hapuu and ngaa marae.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically or spiritually significant, e.g. traditional tuna feeding sites, traditional mahinga kai sites and wetland type areas prone to flooding. This project is significant because tuna is a very significant mahinga kai taonga species for Waikato-Tainui. Hapuu, marae and whaanau from Te Puuaha o Waikato have witnessed a steady decline in tuna abundance in the Te Puuaha o Waikato rohe.

	For Waikato-Tainui, the restoration of taonga species and the ability to provide these taonga as food for manuwhiri (visitors) is a critical marker of the tribe's mana and status. It also confirms hapuu, marae and whaanau proficiency in manaaki tangata or the practice of generosity and reciprocity. The abundance of food and other resources that were traditionally available to Waikato-Tainui within its tribal rohe are well known by other tribes throughout the motu.
Key threats/impacts	Tuna population will continue to decline. Hapuu, marae and whaanau will become less engaged with the practices of kaitiakitanga and mahinga kai. Ensure that competitive pest species, e.g. carp, are prevented from accessing identified tuna habitat.
Project goal/s (SMART)	Within 10 years, up to 15 tuna ponds have been constructed, fenced and planted, and pest plant releasing programmes have been completed. Tuna waananga have been held with iwi members at (or near) the ponds, transferring knowledge and tools to marae. Tuna from the ponds are being served at significant tribal events, like Poukai, thus contributing to restoring the relationship of the marae with the Waikato River.
Works required	Works are intended to be implemented by whaanau, hapuu and ngaa marae within Ngaaruawaahia through to Mercer. Co-funding contributions will be sourced and welcomed from interested collaborative partners. This project is intended to be undertaken as 15 individual projects but may be undertaken as multiple ponds per project sites where appropriate. Ponds should not be created within existing wetlands where there is significant native flora and fauna. **Cultural practices to ensure cultural safety.** Cultural safety, $200 per hour or $1600 for 8 hours. Estimated cost for up to 120 hours $24,000. **Earthworks** Excavate marginal low lying areas to create shallow ponds/wetlands. • Ponds should be constructed up to a maximum of 5000m2 and approximately 2m deep. Ponds should be no deeper than 3m to avoid deoxygenation of bottom layers and associated fish deaths. • Ponds are lined with suitable soils so they are capable of holding water with minimum leakage. • Good quality water is maintained in the constructed ponds. • Ponds are constructed in traditional mahinga kai area/sites identified by hapuu, marae and whaanau.

	Installing an instream structure (log) that will be secured in place.  **Note: Resource consent may be required.** Costs include excavator transport and are based on ponds being 5000m^2 x 2m deep and a 12 tonne excavator moving 150m^3 per hour ($10,000) and returning for one day to reshape the site once excavations have settled ($1800). Cost per pond $11,800. Estimated cost across 15 pond $177,000. **Fencing** Ponds should be fenced with a 7-wire post and batten fence to exclude cattle. Cost per pond: 400m x $20/m = $8000 Estimated fencing cost across 15 ponds $120,000 **Planting** Dense native planting should be carried out around the pond to create overhanging habitat for eels. Species should consist of hardy native species that would have naturally existed within the wetland environment (e.g. carex secta, cabbage tree, flax). Native planting 0.3ha per pond $11,865. Additional weed control for 3 years at each pond $2520. Planting and releasing cost per pond $14,385. Estimated planting cost across 15 ponds $215,775. **Resource consent**

	It is anticipated that most ponds will require a resource consent. Costs will vary depending on whether one consent application is lodged for multiple ponds or whether resource consents are applied for separately. A generous cost estimate of $5000 per pond has been used. Estimated resource consent costs across 15 ponds $75,000.  **Capacity development** • Tuna waananga Provide training for tribal members to learn about tuna restoration. Tuna waananga (10) plus tuna tool kits. Cost per waananga $6000. Estimated cost $60,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with whaanau, marae, hapuu or iwi (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works, confirm consents (if required), project manage parts of the work as required. Project management/staffing is estimated to be up to 30% of the project cost. Estimated project management cost per pond $12,956. Estimated project management cost across 15 ponds $224,333.
Risks to project success	Lack of access to sites. Resource consents not granted. Lack of experienced practitioners result in incompleted works. Ongoing maintenance to control weed infestation is not undertaken. Commercial eel fishermen fish out completed pond.

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<tr><td>Land tenure – likelihood of adoption and adoption circumstances</td><td>Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Mercer and Port Waikato.
Very high likelihood of adoption.</td></tr>
<tr><td>Knowledge gaps and response</td><td>It is unknown whether consents or authorisations are required.
Exact location of tuna ponds is to be determined by whaanau, hapuu and /or marae.
Size of each pond, including area to be fenced and restored, will differ from site to site.</td></tr>
<tr><td>Project duration (years)</td><td>3 years per pond/site, includes construction, planting and weeding programme.
10 year project duration.</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Earthworks</td><td>177,000</td></tr>
<tr><td>Fencing</td><td>120,000</td></tr>
<tr><td>Planting</td><td>215,775</td></tr>
<tr><td>Resource consents</td><td>75,000</td></tr>
<tr><td>Capacity building</td><td>60,000</td></tr>
<tr><td>Project management/staffing/incidentals (30%)</td><td>194,332</td></tr>
<tr><td>Total</td><td>842,108</td></tr>
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<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Total estimate cost per individual pond (excludes capacity development and tertiary scholarships)</td><td>56,141</td></tr>
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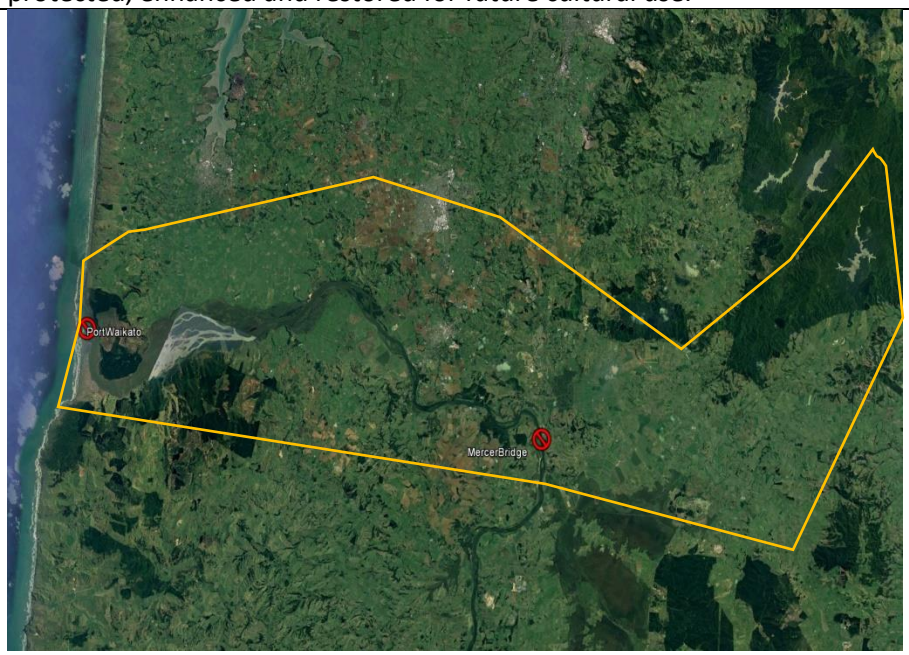
Waikato-Tainui Te Puuaha 2 **Priority: Very high**	**Tuarua – 10ha wetland creation, restoration and protection – Mercer ki Te Puuaha o Waikato**
Project summary	Wetland creation, restoration and protection were identified as very high priority by hapuu, marae and whaanau from Te Puuaha o Waikato. This project will see the restoration of 10ha of wetlands between Mercer and Port Waikato in areas identified by hapuu, marae, whaanau or iwi as being historically, culturally, ecologically or spiritually significant to them.
Vision for the project	Wetlands are well established at the sites. Whaanau are able to exercise their mana whakahaere through restoring, protecting, enhancing and harvesting native flora and fauna, including paru, for cultural purposes. Customary practices and knowledge is transferred on to future generations. Ensure the location of the paru within the wetlands have been recorded, protected, enhanced and restored for future cultural use.
Location	 Project area includes the Waikato River and all tributaries between Mercer and Port Waikato. Exact locations of the 10ha of wetland restoration will be identified by whaanau, hapuu and ngaa marae within the mapped area above in sites that are historically, culturally, ecologically or spiritually significant to them.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically or spiritually significant, e.g. traditional mahinga kai sites. Waikato-Tainui's primary interest in the project is to protect unfettered access of tribal members to exercise mana whakahaere and undertake traditional mahinga kai practices.

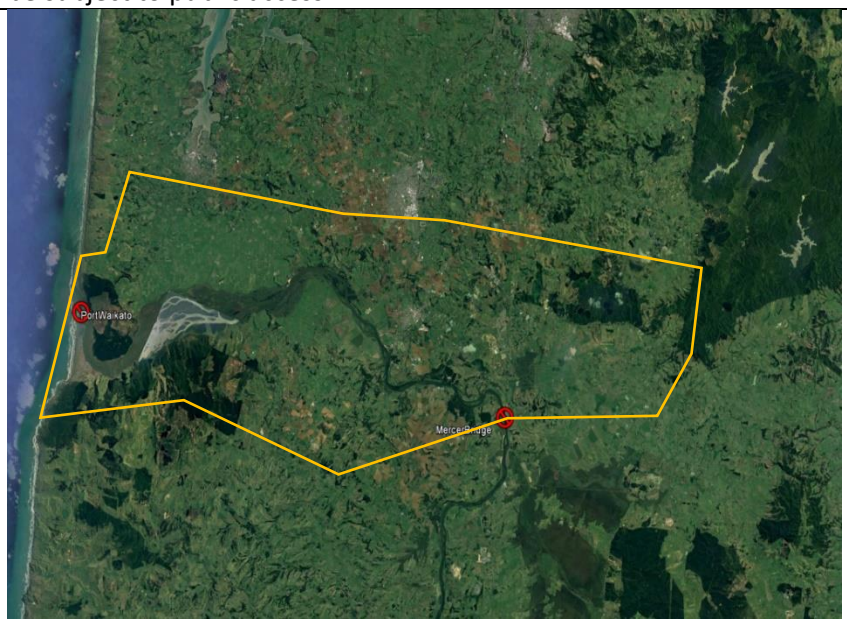
	This includes a broader aspiration regarding the restoration and recovery of wetland taonga species as it is related to the overall health and wellbeing of the Waikato River as captured under the Waikato-Tainui Raupatu River Settlement legislation (2010). Tuna is an important cultural fishery for the peoples of Te Puuaha (Port Waikato) especially, and considered to be an important indicator of river health. Stopping the encroachment of non tangata whenua fishers into areas traditionally used by members of Waikato-Tainui is one part of this overall aspiration.
Key threats/impacts	Hapuu, marae and whaanau become disconnected from traditional gathering sites. Further loss of key historic whitebait spawning site due to pest plant infestation. Culturally important purakau, tikanga and kawa become less known. Areas become more degraded (unrestricted stock access).
Project goal/s (SMART)	Within 10 years, up to 10ha of wetlands have been constructed, restored, fenced and planted, and pest plant releasing programmes have been completed. Waananga have been held with iwi members at (or near) the restoration sites or at close marae, for the transfer of knowledge and tools to marae.
Works required.	Works could be implemented at the whaanau, hapuu and/or marae level. This project could be undertaken as a whole, or in components. **Cultural health and safety** Cultural health and safety in accordance with Waikato-Tainui marae tikanga and kawa, where required from project commencement through to project completion. Based on $200 per hour. Estimate cost per 8 hours $1600. Estimated cost for up to 80 hours $16,000. **Riparian fencing** Carry out riparian fencing with a minimum 5m setback from the edge of the wetland and plant riparian margins with native species. Fenced with a 7-wire post and baton fence to exclude cattle. Estimated fencing cost per hectare site: 400m x $20/m = $8000. Estimated fencing cost for 1 site at 10ha: 1270m x $20/m = $25,400. Estimated fencing cost for 10 x individual sites of 1ha = $80,000. **Wetland planting** Carry out planting of native wetland species within the internal areas of the wetland where required, with plant spacing of 1.5m (4444 plants per hectare). Estimated cost per hectare $39,552.

	Estimated cost for 10ha $395,520. **Resource consent** Resource consents may be required. Estimated cost per consent $5000. Estimated cost for 10 individual consents $50,000. **Capacity development** Provide training for tribal members to learn about riparian fencing and planting (includes site visit to champion site). Provide training for tribal members to learn about wetland restoration. Wetland waananga (x 10). Estimate cost $50,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost per hectare $17,746 (excludes tertiary scholarships). Estimated cost 10ha $207,456.
Risks to project success	Lack of funding. Access to sites is restricted. Resource consents not granted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Mercer and Port Waikato. Very high likelihood of adoption.
Knowledge gaps and response	It is unknown whether consents or authorisations are required.
Project duration (years)	10 year project

Costs

Work description	Costs ($)
Cultural practices in accordance with Waikato-Tainui marae tikanga and kawa throughout project where required	16,000
Capacity building – wetland waananga	50,000
Riparian fencing 10 x 1ha sites	80,000
Wetland planting (10ha)	395,520
Resource consent x 10	50,000
Project management/staffing/incidentals (30%)	177,456
Total	**768,976**

Work description	Costs ($)
Estimated cost of 1ha site for wetland restoration project fully completed (excludes tertiary scholarship)	**76,898**

Waikato-Tainui Te Puuaha 3 **Priority: Very high**	**Tuarua – identification, restoration and protection of waahi tapu and sites of significance – STAGE 1 Mercer ki Te Puuaha o Waikato**
Project summary	Enhancement, restoration and protection of waahi tapu and sites of significance were identified as very high priorities by hapuu, marae, whaanau and Waikato-Tainui. This project is stage 1 of a 2-stage process and will identify the locations and tribal history of each waahi tapu and site of significance from within the area of Mercer through to Port Waikato. Stage 2 will consist of physical restoration and protection works – please refer to PAF for full details of works *(Te Puuaha – Restoration and protection of waahi tapu and sites of significance STAGE 2 – Mercer ki Te Puuaha o Waikato).*
Vision for the project	Waahi tapu and sites of significance have been identified, protected and the historical koorero recorded and archived with Waikato-Tainui and whaanau, hapuu and/or marae. Note: only approved historical koorero will be subject to public access.
Location	 Project area between Mercer car bridge over the Waikato River and the Waikato River mouth at Port Waikato.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically and spiritually significant, e.g. waahi tapu, urupaa, sites of significance, burial sites for hapuu, marae, whaanau and iwi afterbirth, sites of historic events and traditional historic walkways between hapuu, marae, whaanau and iwi. This project is significant to ensure hapuu, marae, whaanau and/or iwi koorero and purakau of their waahi tapu and sites of significance.

Key threats/impacts	Waahi tapu and sites of significance become disconnected from hapuu, marae, whaanau and the Waikato River. Waahi tapu remain isolated uncared for and become more degraded and infested with weeds. Culturally important purakau, tikanga and kawa become less known. Culturally unsafe for this waahi tapu to be left unprotected.
Project goal/s (SMART)	• Within 3 years, waananga have been held with hapuu, marae, whaanau and/or iwi. One-on-one interviews of kaumatua and key knowledge holders have been held and recordings archived. • Hapuu, marae, whaanau and/or iwi have identified the locations of all waahi tapu and sites of significance within the areas of Mercer through to Port Waikato. • A waahi tapu and sites of significance register, including GIS mapping, is complete and entered into Waikato-Tainui's archiving data system. • Opportunities for iwi capacity development in GIS mapping has been implemented.
Works required	**Waananga** 10 waananga held with hapuu, marae and whaanau to identify waahi tapu, sites of significance and key knowledge holders, i.e. kaumatua/kuia (as appropriate), and collate relevant information from literature sources and present back findings. • Venue, kai and koha per day $1500 • Cultural safety, $200 per hour or $1600 per day • Facilitator $200 per hour or $1600 per day • Travel expenses for participants $40 per person, $600 per waananga Estimated cost per waananga = up to $3700 Estimated waananga cost = $37,000 **Interviews** Interview knowledge holders i.e. kaumatua/kuia (as appropriate), and collate relevant information from literature sources. Assume: • Up to 20 kaumatua/kuia interviews at $500 per interview = $10,000 • Film interviews at $700 per day x 14 days $9800 • Editing of interviews at $700 per day x 14 days $9800 • Interviewer/literature reviewer at $800 per day x 21 days $16,800 • Estimated interviewing cost $46,400 **Mapping and photographing waahi tapu sites** Access site/s, map and photograph all significant and waahi tupuna/tapu sites. Enter information into digital database and maps. Assume: • Access and photograph sites at $800 per day x 21 days $16,800 • GIS mapping services at $200 per hour to input maps and develop register x 28 days $44,800

	Estimated Interviewing cost $61,600 **Capacity development** Hold 2 x GIS mapping waananga with hapuu, marae and whaanau from Mercer through to Port Waikato, identify and support (2) taiohi to undertake a scholarship to study and formally upskill in GIS/cultural mapping of waahi tapu/historical or related studies. • GIS mapping waananga x 2 $10,000, • Scholarship x 2 taiohi/student $20,000 • Estimated capacity development costs $30,000 **Vegetation clearance to access sites of significance** Some of the known waahi tapu and site of significance areas need to be cleared of scrub and weeds to allow access for hapuu, marae and whaanau to assess the sites. • Contractor costs to clear weeds from known sites of significance at $700 per day x 28 days • Estimated clearing cost $19,600 **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with whaanau, marae, hapuu, or iwi (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works, project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost $58,380 **Project delivery** Works need to be implemented by hapuu, marae and whaanau. This project could be undertaken as a whole, or in components.
Risks to project success	Lack of funding. Access to sites is restricted. Resource consents not granted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Mercer and Port Waikato. Very high likelihood of adoption.
Knowledge gaps and response	Exact location to be identified by key knowledge holders i.e. kaumatua, kuia.
Project duration (years)	3 year project

Costs

Work description	Cost ($)
Waananga with Waikato-Tainui kaumatua	37,000
Interview with key knowledge holders	46,400
Mapping and photography	61,600
GIS mapping capacity development	30,000
Clear and remove vegetation	19,600
Project management/staffing/incidentals (30%)	58,380
Total	**252,980**

Waikato-Tainui Te Puuaha 4 **Priority: Very high**	**Tuarua – Restoring and protecting waahi tapu and sites of significance – STAGE 2 – Mercer ki Te Puuaha o Waikato**
Project summary	Enhancement, restoration and protection of waahi tapu and sites of significance were identified as very high priorities by hapuu, marae, whaanau and Waikato-Tainui. This project is stage 2 and the final stage to physically restore and protect the waahi tapu and sites of significance identified by hapuu, marae, whaanau and/or iwi during stage 1. *(Tuarua – Identification, restoration and protection of waahi tapu and sites of significance STAGE 1 – Mercer ki Te Puuaha)*
Vision for the project	Identified waahi tapu and sites of significance have been restored and protected with full stock exclusion fencing and appropriate planting of native species. Locations of waahi tapu and sites of significance will be marked by traditional carved Pou, iPou or new technology (e.g. augmented reality technology) that can be adapted to traditional Maaori symbolism. Note: Only approved historical koorero will be subject to public access.
Location	 Project area includes the Waikato River and all tributaries between Mercer and Te Puuaha. Exact locations of waahi tapu will be identified by whaanau, hapuu and ngaa marae.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically and spiritually significant, e.g. waahi tapu, urupaa, sites of significance, burial sites for afterbirth, sites of historic events, traditional historic walkways between hapuu, marae, whaanau and iwi. This project is significant to ensure hapuu, marae, whaanau and/or iwi koorero and purakau of their waahi tapu and sites of significance.

Key threats/impacts	Waahi tapu and sites of significance become disconnected from hapuu, marae, whaanau and the Waikato River. Waahi tapu remain isolated and uncared for and become more degraded and infested with weeds. Culturally important purakau, tikanga and kawa become less known. Culturally unsafe for waahi tapu to be left unprotected.
Project goal/s (SMART)	• Within 10 years, all identified waahi tapu and sites of significance access, fencing and planting have been completed. • Ongoing weed management has been undertaken by landowners, hapuu, marae, whaanau and/or iwi. • Signage and/or carved iPou have been developed to tell the history of the waahi tapu or sites of significance.
Works required	**Proposed development would include:** Conduct site visit with kaumatua to locate waahi tapu or site of significance. Facilitate cultural practices and ensure cultural safety as per their tikanga and kawa. Fence off and plant native species around each waahi tapu or site of significance. **Cultural practices to ensure cultural safety.** Cultural safety $200 per hour or $1600 per day. **Site fencing** Perimeter fenced with a 7-wire post and baton fence to exclude cattle. Estimated fencing cost per 1000m^2 site: 130m x $20/m = $2600. Estimated fencing cost across 1ha: 400m x $20/m = $8000. **Site prep, planting and maintenance** Weedy site prep per hectare $2000. Plant spacing of 1.5m and 4444 stems per hectare. $3.50 per plant. Planting cost $1.50 per plant. 5 x releasing events $3 per plant. Estimated cost per 1000m^2 $3955. Estimated cost per hectare $39,552. **Maaori cultural symbolism** Waahi tapu and sites of significance will be recognised through the development and fabrication of cultural symbolism, to be installed on site and appropriately marking the location. The total number of carved pou or iPou will be determined by the number of waahi tapu and sites of significance identified by hapuu, marae, whaanau and/or Waikato-Tainui. Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install iPou (or other design, e.g. carved pou, or kohatu).

	• **Carved pou** *Collate information for carved pou* Collate information for the sites identified by hapuu, marae, whaanau and/or Waikato-Tainui. Estimated cost per carved pou $1000. *Fabricate and install carved pou onto the sites* (6m length x 0.6m diameter) Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install pou. Estimated fabrication and installation costs per carved pou $35,000. Timber to be carved into pou (6m length x 0.6m diameter) Cost is highly dependent on availability and species. It is encouraged to shop around. Totara is best suited for fine detailed carving – $15,000 including transport from South Island. H5 treated pine is not suited for fine detailed carving – $1200 including transportation. • **iPou** The project will allow everyone with a mobile device to engage and have an educational and informative cultural experience that is measurable and immediate. It is multi focused, including messaging to river iwi and their beneficiaries, other iwi, local and government agencies, environmental partners and stakeholders, public, visitors and international guests.  *Collate information for iPou* Collate information for the sites identified by hapuu, marae, whaanau and/or Waikato-Tainui. Estimated cost per iPou $1000 *Fabricate and install 1 iPou onto the sites* Engage appropriate whakairo expert (or other design artist as

	appropriate) to fabricate and install iPou (or other design, e.g. carved pou or kohatu). Estimated cost per iPou $10,000. *Technology/Information loaded and installed into each iPou* Engage iPou developer to install information collated through interviews and literature review into the fabricated pou. Upload/install the technology. Estimated cost per iPou $2000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost $156,098. **Project delivery** Works need to be implemented by hapuu, marae and whaanau. This project could be undertaken as a whole, or in components.
Risks to project success	Lack of funding. Access to sites is restricted. Resource consents not granted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Mercer and Te Puuaha. Very high likelihood of adoption.
Knowledge gaps and response	Exact location, to be identified by key knowledge holders, i.e. kaumatua and kuia.
Project duration (years)	3 year project

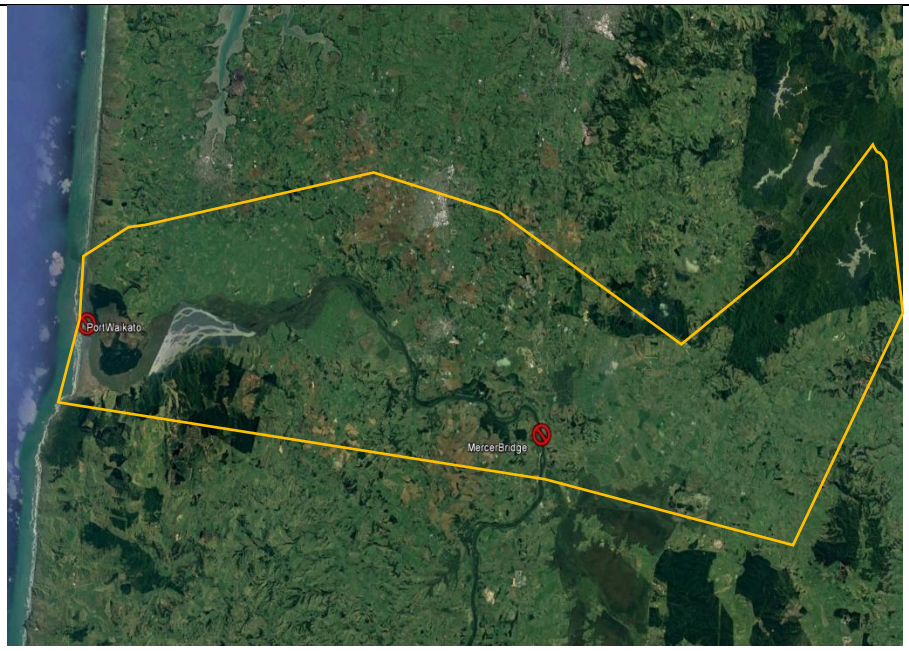
Costs

Individual costing estimates for 1 x 1000m^2 site with **either** 1 x carved totara pou, 1 x carved pine pou or 1 x iPou fabricated and installed onsite; and 20 x 1000m^2 site and cultural practices, including 5 x carved totara Pou and 10 x iPou.

Work description	**Cost ($)**
Costs are based on 1 x 1000m^2 site	
Cultural practices to ensure cultural safety 8 hours	1600
1000m^2 site fencing	2600
Site prep, planting, maintenance	3955
1 x carved Pou fabrication and installation	35,000
Collate information for carved pou	1000
Totara timber 6m length x 0.6m diameter	15,000
1 x iPou fabrication and installation	10,000
Collate information for iPou	1000
Load information into iPou software	2000
Project management totara carved pou/or	17,747
Project management pine carved pou/or	13,607
Project management for iPou	6,347
Total estimated cost for 1 x totara carved pou	**76,902**
Total estimated cost for 1 x iPou	**27,502**

The cost estimate below includes site prep, planting, weed maintenance and fencing for up to 20 restored waahi tapu or significant sites between Mercer ki Te Puuaha, with up to 15 x fabricated pou installed onsite.

Work description	**Cost ($)**
Task costs are based on 20 x 1,000m^2 site	
Cultural practices to ensure cultural safety 160 hours	32,000
Site fencing	39,000
Site prep, planting, maintenance	59,325
5 x carved pou fabrication and installation	175,000
Collate information for carved pou x 10	10,000
5 x totara timber 6m length x 0.6m diameter	75,000
10 x iPou fabrication and installation	100,000
Collate information for iPou x 10	10,000
Load information into iPou software x 10	20,000
Project management/staffing/incidentals (30%)	156,098
Total estimated cost for 20 x 1,000m^2 sites	**676,423**

Waikato-Tainui Te Puuaha 5 Priority: High	Tuarua – 30 puna restoration – Mercer ki Te Puuaha o Waikato
Project summary	The restoration of traditional puna was identified as a high priority by hapuu, marae and whaanau from Te Puuaha o Waikato. This project will see the restoration of up to 30 puna between Mercer and Port Waikato. Puna will be restored in areas identified by hapuu, marae, whaanau or Waikato-Tainui as being historically, culturally, ecologically or spiritually significant to them.
Vision for the project	Up to 30 puna are well established and restored at identified sites. Whaanau are able to exercise their mana whakahaere through restoring, protecting and enhancing their traditional puna. Customary practices and knowledge is transferred onto future generations. Ensure locations of puna have been recorded, protected, enhanced and restored for future cultural use.
Location	 Project area includes the Waikato River and all tributaries between Mercer and Port Waikato. The 30 puna restoration sites will be identified by whaanau, hapuu and ngaa marae within the mapped area above, in locations deemed as being historically, culturally, ecologically or spiritually significant.
Brief description of site	Restoration of puna is important because traditional puna were used for drinking water of marae and whaanau whare and sustainable land use. Historically, marae and whaanau kainga were built next to waterways or puna. Waikato-Tainui's primary interest in the project is to protect unfettered access of tribal members to exercise mana whakahaere and undertake traditional cultural practices.

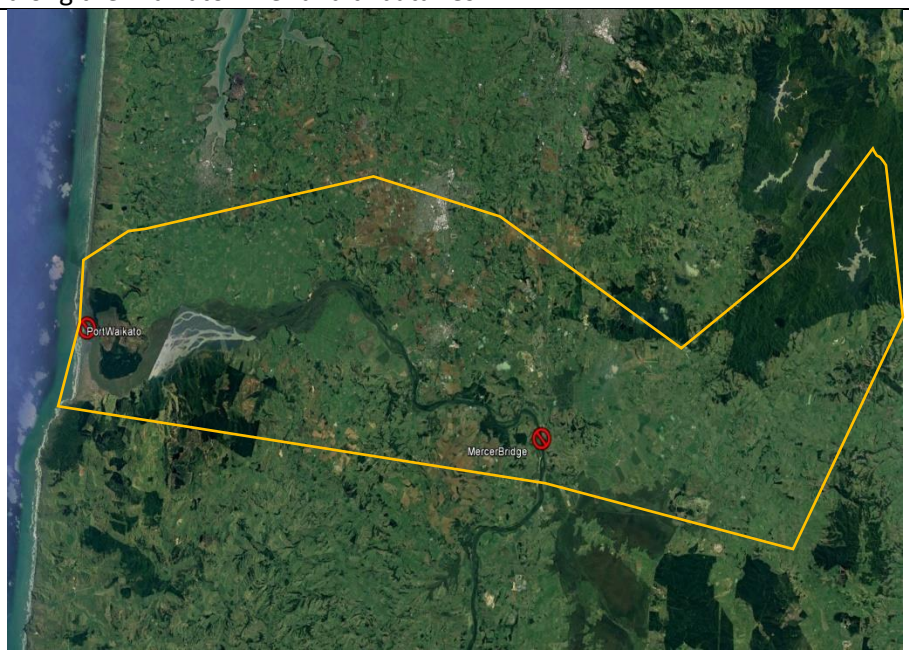
Key threats/impacts	Hapuu, marae, whaanau become disconnected from traditional puna sites. Further loss of key historic knowledge of each site, pest plant infestation. Culturally important purakau, tikanga and kawa become less known. Areas become more degraded (unrestricted stock access). Traditional puna are depleted due to surrounding activities, e.g. farming.
Project goal/s (SMART)	Within 10 years, up to 30 puna have been restored, enhanced, fenced and planted (including pest plant releasing programmes). Waananga have been held with Waikato-Tainui members at (or near) the restoration sites or at close marae, for the transfer of knowledge and tools to marae.
Works required	Works could be implemented and led by hapuu, marae, whaanau and/or Waikato-Tainui. Co-funding contributions from other interested partners for hapuu, marae, whaanau and/or Waikato-Tainui to complete this project would be welcomed. This project could be undertaken in parts or as, a whole. **Cultural health and safety** Cultural health and safety, in accordance with Waikato-Tainui marae tikanga and kawa, where required from project commencement through to project completion – $200 per hour. Estimate cost per 4 hours $800. Estimated cost for up to 120 hours $24,000. **Restoration fencing and planting** *Estimated cost per puna* Carry out approximately 130m of fencing to protect an approximately 1000m^2 area around each puna. Estimated cost for 130m of 7-wire post and batten fence $2600. Estimated prep, planting and maintenance costs for 1000m^2 $3955. *Estimated cost per puna run off stream/tributary* Carry out approximately 100m of fencing puna run off streams and seep/wet areas, with riparian fencing set back a minimum of 5m from the edge of the streambank, seep/wet areas. Plant riparian margins with native species. Estimated fencing cost for 200m $4000. Estimated prep, planting and maintenance cost for 1000m^2 $3955. Where the puna was historically a known whitebait spawning ground, riparian planting is to be carried out using appropriate native plant species, planted at 0.75m plant spacing.

	Capacity development Provide training for tribal members to learn about riparian fencing and planting. Fencing waananga (x5). Planting waananga (x5). Estimated cost per waananga $5000. Total estimated waananga cost $50,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works, project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost per puna $4353. Estimated cost for 30 puna $185,790.
Risks to project success	Lack of funding. Access to sites is restricted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and Waikato-Tainui, between Mercer and Port Waikato. Very high likelihood of adoption.
Knowledge gaps and response	Exact puna location to be determined by whaanau, hapuu and /or marae. Size of puna areas to be fenced and restored differ from site to site. Length of fencing required for puna, including run off streams and wet seep areas.
Project duration (years)	Individual projects expected to be 3-5 years in duration. 10 year project.

Costs

Work description	Cost ($)
Cultural practices in accordance with Waikato-Tainui marae tikanga and kawa throughout project where required	24,000
Fencing off puna for protection (30 puna)	78,000
Puna riparian planting (30 puna)	118,650
Puna stream fencing (30 puna)	120,000
Puna stream riparian planting (5m setback on both banks)	118,650
Capacity building Fencing and planting wananga	50,000
Project management/staffing/incidentals (30%)	152,790
Total	**662,090**

Estimated cost for 1 x puna restoration project fully completed (excludes tertiary scholarship and waananga)	**22,070**

Waikato-Tainui Te Puuaha 6 Priority: High	Tuatoru – 10km riparian and taonga species habitat restoration – Mercer ki Te Puuaha o Waikato
Project summary	The restoration of riparian margins, including the restoration and protection of ngaa taonga species, has been identified as a high priority by hapuu, marae and whaanau from Te Puuaha o Waikato. This project will see the restoration of 10km of riparian margins between Mercer and Port Waikato. Areas will be identified by hapuu, marae, whaanau or iwi as being historically, culturally, ecologically or spiritually significant to them.
Vision for the project	Riparian margins and their ecosystems are well established at the sites. Whaanau are able to exercise their mana whakahaere through restoring, protecting, and enhancing the wellbeing of traditional mahinga kai sites along the Waikato River and tributaries.
Location	 Project area includes the Waikato River and all tributaries between Mercer and Port Waikato. The 10km of riparian restoration sites will be identified by whaanau, hapuu and ngaa marae within the mapped area above in locations that are historically, culturally, ecologically or spiritually significant.
Brief description of site	Sections of the Waikato River, streams, and tributaries are well known to hapuu, marae, whaanau and Waikato-Tainui. They are historically, culturally, ecologically or spiritually significant, e.g. the return of taonga species currently absent or in decline. Waikato-Tainui's primary interest in the project is to provide and protect unfettered access to riparian margins for tribal members to exercise mana whakahaere and undertake traditional mahinga kai practices.

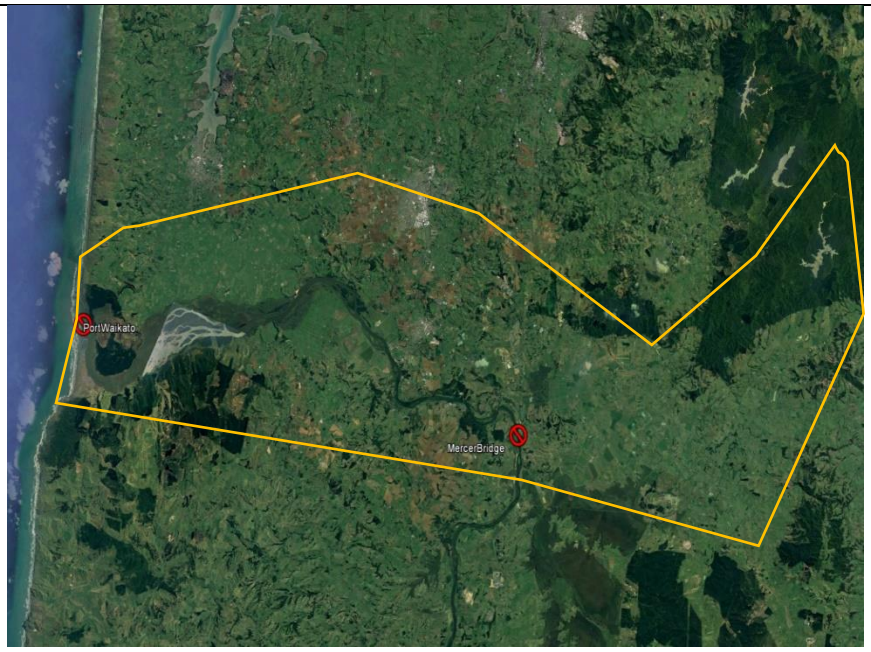
Key threats/impacts	Taonga species remain absent or in decline in traditional sites where they were once plentiful. Hapuu, marae, whaanau become disconnected from the Waikato River and traditional mahinga kai sites due to poor habitat. Culturally important purakau, tikanga and kawa become less known. Cattle and other browsing species are destroying traditional sites within the riparian margins of the Waikato River and associated wetlands.
Project goal/s (SMART)	Within 10 years, up to 10km of riparian margins suitable for taonga species habitat have been restored, enhanced, fenced and planted, including pest plant releasing programmes. Capacity development waananga have been held with iwi members at or near the restoration sites or at marae, for the transfer of knowledge and tools to marae.
Works required	Works could be implemented and led at marae or whaanau level. Co-funding contributions from other interested partners to hapuu, marae, whaanau and/or Waikato-Tainui to complete this project would be welcomed. This project could be undertaken in parts or as a whole. **Cultural practices to ensure cultural safety** Cultural safety, $200 per hour or $1600 per day. Estimated cost for up to 80 hours $16,000. **Riparian fencing** Carry out riparian fencing with a minimum 5m setback from the edge of the stream and/or river banks. Fencing will consist of a 7-wire post and batten at $20 per metre. Estimated cost per 1000m site $20,000. Estimated cost for 10km $200,000. **Wetland planting** Carry out planting of native wetland species within the internal areas of the wetland where required, with plant spacing of 1.5m. (4444 plants per hectare) and 5 x plant releasing events. Estimated planting cost per 5000m^2 $18,776. Estimated planting cost for 5ha $187,760. **Installation of structures for fish habitat** Carry out approximately 10km of securing in-stream wood structures throughout the identified restoration streams (comprising 4- 6 structures over a 2km length for fish habitat where practicable). Estimate cost per 1km $10,413. Estimated cost for 10km $104,130. It is envisaged that whaanau, hapuu and/or marae with the assistance from Waikato Regional Council work collaboratively in terms of site location investigation, design and installation of woody debris structures.

	This component could be undertaken in conjunction with Waikato Regional Council's river management work. **Capacity development** Provide training for tribal members to learn about riparian fencing and planting. Fencing waananga (x5). Planting waananga (x5). Estimated cost for 10 waananga at $5000 each = $50,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works, project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost per 1km length $16,737 (excludes tertiary scholarships). Estimated cost for a 10km site $197,367.
Risks to project success	Lack of funding. Access to sites is restricted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and Waikato-Tainui, between Mercer and Port Waikato. Very high likelihood of adoption.
Knowledge gaps and response	Exact locations of each restoration site need to be determined.
Project duration (years)	10 year project

Costs

Work description	Cost ($)
Cultural practices in accordance with Waikato-Tainui tikanga and kawa throughout each individual project where required	16,000
Riparian fencing (10km)	200,000
Riparian planting (5ha)	187,760
Installation of structures for fish habitat	104,130
Capacity building – fencing and planting waananga	50,000
Project management/staffing/incidentals (30%)	162,567
Total	**704,457**

Estimated cost to restore 1000m length of riparian margin with a 5m setback (excludes tertiary scholarship).	**72,526**

Waikato-Tainui Te Puuaha 7 Priority: High	Tuatoru – 20 watercress restoration projects – Mercer ki Te Puuaha o Waikato
Project summary	The restoration of traditional watercress sites was identified as a high priority by whaanau, hapuu and ngaa marae between Mercer and Te Puuaha This project will see the creation of 20 restored watercress sites between Mercer and Te Puuaha, in areas identified by hapuu, marae, whaanau and iwi as being historically, culturally, ecologically significant to them.
Vision for the project	Watercress is plentiful within the restored, traditional gathering locations.
Location	 Project area between Mercer and the Waikato River mouth at Port Waikato.
Brief description of site	Historically, watercress was in abundance and readily available for hapuu, marae and whaanau throughout the Waikato catchment. Now, with the intensification of land use, watercress is either no longer present or the land has been modified for dairy and dry stock. Waatakirihi, or watercress (also called koowhitiwhiti, *Nasturtium officinale* and *N. microphyllum*), is a highly prized food source for Waikato-Tainui and Maaori generally. An aquatic or boggy ground plant associated with drains, small creeks, wetland streams, and the calmer edges of rivers, waatakirihi is a vigorous plant, provided there is a good level of water quality (i.e. lack of sedimentation). It is a member of the mustard family and is highly regarded for its medicinal properties as well as its taste in many cultures across the world. As avid botanists and

<table>
<tr><td></td><td>gardeners, tangata whenua were quick to identify its properties, and it now forms a major component of many traditional dishes. Harvest sites are highly coveted and sometimes known only to whanau (family/families).

(Dixon, L. 2017 – the importance of watakirihi – te reo o te repo – the voice of the wetland)</td></tr>
<tr><td>Key threats/impacts</td><td>New plants do not establish, and traditional watercress sites remain barren.
Hapuu, marae and whaanau will become less engaged with the practices of kaitiakitanga of their watercress sites.</td></tr>
<tr><td>Project goal/s (SMART)</td><td>Within 2 years, watercress is flourishing in up to 20 project sites within the Mercer ki Te Puuaha catchment.</td></tr>
<tr><td>Works required</td><td>Works could be implemented at iwi, hapuu, marae or whaanau level. This project could be undertaken as a whole, or in components.

It is intended to restore traditional hapuu, marae, whaanau and iwi watercress sites.

Watercress restoration ($100,000)
20 sites at $5000 per site = $100,000.
Includes project management/staffing/incidentals of 25% ($20,000).
Project manager to carry out landowner liaison, provide reporting information, negotiate agreements, inspect works, pick up and seed watercress.</td></tr>
<tr><td>Risks to project success</td><td>Lack of access to sites.
Lack of experienced practitioners results in incompleted works.
Ongoing maintenance to control weed infestation is not undertaken.</td></tr>
<tr><td>Land tenure – likelihood of adoption and adoption circumstances</td><td>Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Mercer and Te Puuaha.
Very high likelihood of adoption.</td></tr>
<tr><td>Knowledge gaps and response</td><td>It is unknown whether consents or authorisations are required.</td></tr>
<tr><td>Project duration (years)</td><td>1-2 year projects</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>20 watercress restoration projects</td><td>80,000</td></tr>
<tr><td>Project management/staffing/incidentals (25%)</td><td>20,000</td></tr>
<tr><td>Total</td><td>100,000</td></tr>
</table>
</td></tr>
</table>

Waikato-Tainui Ngaaruawaahia ki Mercer 1 **Priority: Very high**	**Tuatahi – 10ha wetland creation, restoration and protection – Ngaaruawaahia ki Mercer**
Project summary	Wetland creation, restoration and protection were identified as extremely high priorities by hapuu, marae and whaanau from Ngaaruawaahia through to Mercer. This project will see the restoration of 10ha of wetlands between Ngaaruawaahia and Mercer, in areas identified by hapuu, marae, whaanau or iwi as being historically, culturally, ecologically or spiritually significant to them.
Vision for the project	Wetlands are well established at the sites. Whaanau are able to exercise their mana whakahaere through restoring, protecting, enhancing and harvesting native flora and fauna, including paru, for cultural purposes. Customary practices and knowledge is transferred on to future generations. Ensure the location of the paru within the wetlands have been recorded, protected, enhanced and restored for future cultural use.
Location	 Project area includes the Waikato River and all tributaries between Ngaaruawaahia and Mercer. The 10ha of wetland restoration sites will be identified by whaanau, hapuu and ngaa marae within the mapped area above, in locations that are historically, culturally, ecologically or spiritually significant.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically or spiritually significant, e.g. traditional mahinga kai sites.

	Waikato-Tainui's primary interest in the project is to protect unfettered access of tribal members to exercise mana whakahaere and undertake traditional mahinga kai practices. This includes a broader aspiration regarding the restoration and recovery of wetland taonga species as it is related to the overall health and wellbeing of the Waikato River as captured under the Waikato-Tainui Raupatu River Settlement legislation (2010). Tuna is an important cultural fishery for the peoples of Ngaaruawaahia ki Mercer especially, and is considered to be an important indicator of river health. Stopping the encroachment of non tangata whenua fishers into areas traditionally used by members of Waikato-Tainui is one part of this overall aspiration.
Key threats/impacts	Hapuu, marae, whaanau become disconnected from traditional gathering sites. Further loss of key historic whitebait spawning site due to pest plant infestation. Culturally important purakau, tikanga and kawa become less known. Areas become more degraded (unrestricted stock access).
Project goal/s (SMART)	Within 10 years, up to 10ha of wetlands have been constructed, restored, fenced and planted, including pest plant releasing programmes. Waananga have been held with iwi members at (or near) the restoration sites or close marae, for the transfer of knowledge and tools to marae.
Works required	Works could be implemented at whaanau, hapuu and/or marae level. This project could be undertaken as a whole, or in components. **Cultural health and safety** Cultural health and safety in accordance with Waikato-Tainui marae tikanga and kawa, where required, from project commencement through to project completion. Based on $200 per hour. Estimate cost per 8 hours $1600. Estimated cost for up to 80 hours $16,000. **Riparian fencing** Carry out riparian fencing with a minimum 5m setback from the edge of the wetland and plant riparian margins with native species. Fenced with a 7-wire post and batten fence to exclude cattle. Estimated fencing cost per hectare site: 400m x $20/m = $8000 Estimated fencing cost for 1 site at 10ha: 1270m x $20/m = $25,400 Estimated fencing cost for 10 individual sites of 1ha each $80,000. **Wetland planting** Carry out planting of native wetland species within the internal areas of the

	wetland, where required, with plant spacing of 1.5m. (4444 plants per hectare). Estimated cost per hectare $39,552. Estimated cost for 10ha $395,520. **Resource consent** Resource consents may be required. Estimated cost per consent $5000. Estimated cost for 10 individual consents $50,000. **Capacity development** Provide training for tribal members to learn about riparian fencing and planting (includes site visit to champion site). Provide training for tribal members to learn about wetland restoration. Wetland waananga (x 10). Estimated cost $50,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works, project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost per 1ha $17,746 (excludes tertiary scholarships). Estimated cost 10ha $207,456.
Risks to project success	Lack of funding. Access to sites is restricted. Resource consents not granted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Ngaaruawaahia and Mercer. Very high likelihood of adoption.
Knowledge gaps and response	It is unknown whether consents or authorisations are required.
Project duration (years)	10 year project

Costs

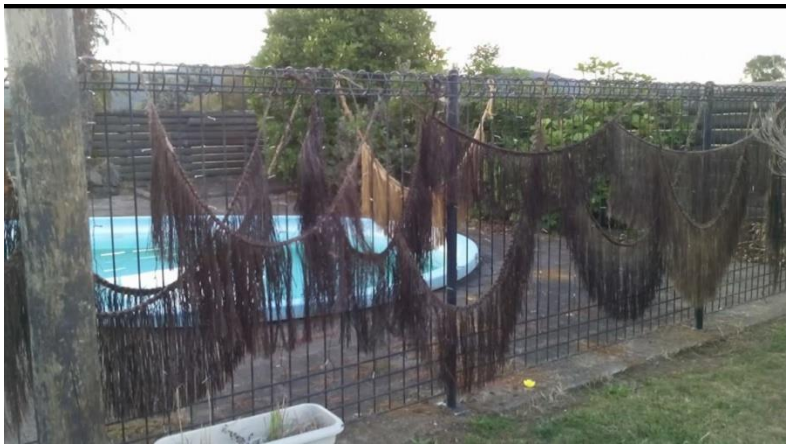
Work description	Costs ($)
Cultural practices in accordance with Waikato-Tainui marae tikanga and kawa throughout project, where required	16,000
Capacity building – wetland waananga	50,000
Riparian fencing 10 x 1ha sites	80,000
Wetland planting (10ha)	395,520
Resource consent x 10	50,000
Project management/staffing/incidentals (30%)	177,456
Total	**768,976**

Work description	Costs ($)
Estimated cost of 1ha site for wetland restoration project fully completed (excludes tertiary scholarship)	**76,898**

Waikato-Tainui Ngaaruawaahia ki Mercer 2 **Priority: Very High**	**Tuatahi – Restoring access to the Waikato River through waka taua – Turangawaewae**
Project summary	Ngaa Waka Taua o Te Kingiitanga  Restoring and protecting Waikato-Tainui's access to traditional kaitiaki customs of waka taua on the Waikato River, and restoring access to historic cultural practices that reconnect hapuu, marae, whaanau and iwi to the physical and spiritual tie between Waikato-Tainui and the Waikato River. This project will ensure the safe storage of the historic taonga through the construction of a shed that will house our taonga and ensure the intergenerational knowledge and waka taua maatauranga Maaori, waka taua tikanga and kawa and the tikanga and kawa on our tuupuna awa, the Waikato River.
Vision for the project	A secure waka taua facility is erected and safely stores waka taua. Whaanau are able to exercise their mana whakahaere through restoring, protecting, enhancing the wellbeing of traditional waka taua ceremonies, while restoring and protecting their relationship with the Waikato River.
Location	Turangawaewae Marae. Turangawaewae Marae is located in the town of Ngaaruawaahia in the Waikato region of the North Island of New Zealand. A very significant

	marae, it is the headquarters for the Maaori King Movement (Te Kiingitanga) and the official residence and reception centre of the head of the Kiingitanga, currently the Maaori King, Tuheitia Paki.
Brief description of site	**Waikato-Tainui's vision:** Re-establishment of a new Waikato-Tainui waka taua shed to restore, protect and continue to pass on the ancient knowledge of traditional waka taua construction, the carving of tribal history; the restoration of historic whakapapa, of key tribal connections, including restoring the art of traditional waka building and weaving traditional kaakahu (cloaks).  This shed will ensure safe storage of ngaa taonga tuku iho waka taua, providing safe space for intergenerational knowledge to be transfered from kaumatua to ngaa pakeke and ngaa mokopuna – passing on the important lessons of tikanga and kawa, reconnecting and strengthening our ties to our waka taua and our tuupuna awa, including our history as a River People.

Re-establishment of paa harakeke, planting of specialty flax for cultural weaving of taonga for waka taua and kaihoe (waka taua paddlers).



Restore the traditional waka taua landing site and ramp on the true right bank of the Waikato River. This will allow safe boarding and disembarking of the waka taua along the history-rich banks of Turangawaewae Marae. The large ramp will reduce the risk of damage to the waka taua and ensure they are safely launched and retrieved the during significant tribal events, including:

1. the annual Ngaaruawaahia Regatta
2. the annual Koroneihana
3. indigenous ariki and royal visits of the commonwealth
4. Kiingitanga events

The safe launching and retrieval boat ramp will be constructed for 20-40m waka taua.

This project will provide safe access and a safe platform for kaumatua, koroua to mihi and kuia to karanga to the royal flotilla in accordance to Waikato-Tainui tikanga and kawa. Pakeke and rangatahi will witness and re-engage with traditional waka taua ceremonies during annual Poukai, Regatta and special Kingiitanga events. People will be reconnected with their heritage.

To achieve these objectives, Waka Taua Council's strategy is to restore, enhance and protect their waahi tapu and sites of significance for the purpose of promoting their cultural, spiritual, historic and traditional practices, reconnecting Waikato-Tainui's relationship with waka taua tikanga and kawa on the Waikato River.

The Turangawaewae Regatta is an annual event where the gates of Turangawaewae Marae are opened to welcome and unite all people to celebrate in a variety of cultural activities on the banks of the Waikato River.

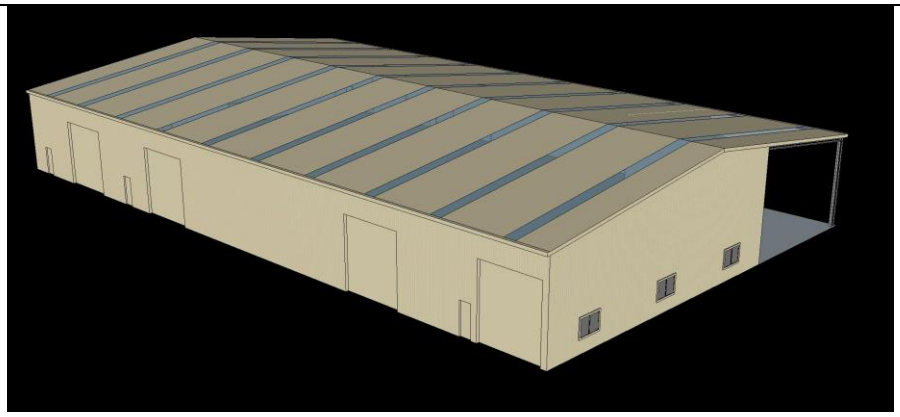
Over the years there have been many different attractions held during the event, including kapa haka performances, waka kopapa and waka ama racing, wood chopping and sawing competitions, rowing, water skiing, power boat racing, horse swimming races across the river, various different bands/entertainers and, more recently, waka tours and marae tours.

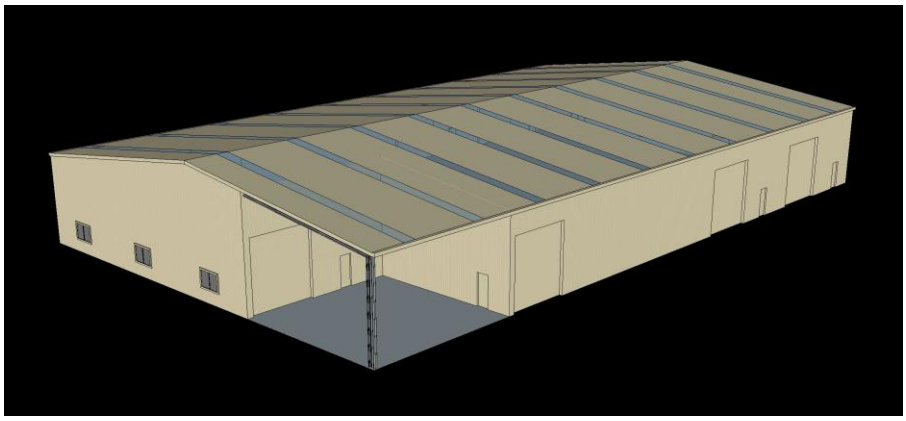
The Turangawaewae Regatta is a drug and alcohol free event that opens with a dawn flag raising ceremony conducted by Waikato-Tainui kaumatua by the Waikato River.

Kiingi Tuheitia holds a special poowhiri for his guests only on the marae grounds, whilst at the same time a whakatau or ceremony is held on the stage by the river, removing all that is tapu and allowing everyone to become one and enjoy the event.

	Throughout the day there are many different activities on and off the Waikato River, ending with a closing karakia or prayer on the stage. The star of the event has to be the parade of the waka taua or great Maaori war canoes. This experience alone is absolutely breathtaking. *The sound of the Putatara (conch) as the waka taua sweep majestically into view,* *The Karanga by the kuia* *The change by the Kaea (Fugleman)* *The answering response by the crews,* *The rise and fall of the 'eyes' of the canoe* *The flashing white tip of the paddle blades,* *The salute,* *The straining of the muscles as the canoes are turned,* *The return pass the dais,* *The fierce Haka Taparahi by the crews on the barge* This is what gives the event its uniqueness of character, and a pride in the heritage handed down to us by our tupuna or ancestors. This is the cultural wonder of the Turangawaewae Regatta.
Key threats/impacts	Hapuu, marae, whaanau, iwi become disconnected from the Waikato River and culturally important traditional knowledge of waka taua maatauranga Maaori and tikanga and kawa become less known. Waka taua become more degraded and unsafe for traditional ceremonies on the Waikato River. Waikato-Tainui are unable to hold special ceremonial waka taua powhiri on the Waikato River for royal guests of the Kiingiitanga, including indigenous ariki and royal visits of the commonwealth. Knowledge of tikanga and kawa for waka taua on the Waikato River is lost, and the relationship between. Tikanga and kawa of Waikato-Tainui traditional knowledge of waka taua construction is lost. Tikanga and kawa of Waikato-Tainui traditional knowledge of ceremonial karakia associated with waka taua construction and use becomes forgotten. Tikanga and kawa of safe keeping and maintaining waka taua becomes lost. Tikanga and kawa of traditional weaving of flax kaakahu for Waka Taua and the kai hoe (paddlers) is not lost.

Project goal/s (SMART)	Within 5 years, a waka taua facility has been constructed and utilised to protect the safety of the Kiingitanga waka taua. Waka taua waananga are able to be facilitated at the facility. Traditional weaving waananga are able to be facilitated to ensure the historic cultural knowledge of weaving is maintained. Plant up to 1ha of select specialty flax for the different types of weaving required for waka taua and kaihoe within Turangawaewae Marae boundary.
Works required	This project assessment form (PAF) is intended to be a template PAF for whaanau, hapuu and/or marae wishing to culturally and appropriately store and protect their waka taua. Identify the exact location of waka taua shed – this is intended to be done by the Waka Taua Council or their representative due to the sensitive nature of tapu associated with waka taua. Steelspan has provided a rough quote of the full construction of the waka taua facility. 





Waka taua facility
Dimensions: 30m x 50m, 10 bay
Specification: Supply only, of one 10-bay STEELSPAN Gable shed 50m (5.0m bays) x 30m, with a height of 6.0m at the side rising to 7.975 at the apex, 10˚, fully enclosed. Kitset includes all framing, Zincalume roof and cladding with all fixings as required, plans and producer statements for consent purposes.
If required we will help with the council consent building permit application.
Roof/Cladding:
Corrugated roof and wall cladding is Zincalume.
Doors:
8 Zincalume 4.5m H x 4.2m W roller doors.
8 Zincalume heavy duty personnel access door.
7 windows 1m H x 1.5m W.
Extras included in quoted price:
Zincalume barge, corner and front barge flashings.
Zincalume 175mm box gutter with external gutter brackets and PVC 100mm downpipe system.
White reflective paper and safety netting to roof.
1 full length clear light sheet per bay.
2 internal walls.

KITSET investment amount

	Steelspan Gable as stated above. Delivered to site. Clear site access must be provided for delivery vehicles, and the unloading is the customer's responsibility. A Hiab delivery would be additional to this price but we are happy to discuss and arrange should it be required. Note: This price does not include any fire rating of walls or fire Report. $268,757.35 Subtotal $268,757.35 GST $40,313.60 Total $309,070.95 **Optional extras not in quoted price excluding G.S.T amount** To upgrade this Steelspan building to Colorsteel $27,604.09. An estimate for construction of this building – this is to be confirmed by Builder – $107,500.00 An estimate for concrete floor – this is to be confirmed by a local concrete contractor – $150,000.00. Re-establishment of traditional paa harakeke site of up to 1ha of specialty flax will be planted in the vicinity of the waka taua facility. **Cultural practices and health and safety** Cultural health and safety in accordance with Waikato-Tainui marae tikanga and kawa, where required, from project commencement through to project completion. Estimate cost $2000. The opening and unveiling of the facility. Estimate cost $5000. **Project management/staffing/incidentals (15%)** Project manager to carry out knowledge holder interviews, work with whaanau, marae, hapuu or iwi (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works, project manage parts of the work as required. Project management/staffing is estimated to be up to 15% of the project cost. Estimated project management cost $65,673
Risks to project success	Resource consent not gained.
Land tenure – likelihood of adoption and adoption circumstances	There are no issues with land tenure.
Knowledge gaps and response	Need to identify the traditional types of flax suited for the different types of weaving required for waka taua
Project duration (years)	5 year project.

Costs	

Work description	**Cost ($)**
Cultural practices and health and safety, ensuring Waikato-Tainui tikanga and kawa and cultural safety is maintained throughout entire project. Including the unveiling of the completed facility.	7000
Waananga cost for paa harakeke research	$4000
Steelspan buildings, shed 30m x 50m fully constructed onsite, includes resource consent	594,175
Waka taua storage cradle x 14 (2 per waka taua)	14,000
Paa harakeke (1ha)	37,555
Project management/staffing/incidentals (15%)	65,673
Total	**722,400**

Waikato-Tainui Ngaaruawaahia ki Mercer 3 **Priority: Very high**	**Tuatahi – Restoring access to Waikato River and waka taua – Waahi Paa**
Project summary	The restoration project restores Waahi Paa's traditional access to the Waikato River and was identified as a very high priority by hapuu, marae and whaanau from within the area of Ngaaruawaahia through to Mercer. Restoring and protecting Waahi Paa's access to their culturally and spiritually significant site, and reconnecting and strengthening their relationship with the Waikato River through the restoration of the traditional waka activities and traditional cultural ceremonies undertaken at the identified location. The project will also provide recreational facilities, including toilet and cold water shower for the wider Huntly community and foreign travellers walking the Te Awaroa Trail.
Vision for the project	Safe access for embarking and disembarking of waka, including waka taua, can be undertaken safely and efficiently, the traditional boat ramp has been restored, bank stabilisation has been completed and a waka shed has been constructed onsite at the original waka storage to include smaller waka.
Location	The project site is located on the true left bank of the Waikato River, directly east of Waahi Paa, in Harris Street, Huntly.  Map shows indicative boundaries of project site.

Brief description of site	**Site description** The landing area is currently dilapidated and unsafe. This project will provide safe access and a safe platform for kaumatua, koroua to mihi and kuia to karanga to the royal flotilla in accordance to Waahi Paa and Waikato-Tainui tikanga and kawa. Pakeke and rangatahi will witness and re-engage with traditional waka taua ceremonies during Waahi Paa's annual Poukai; reconnecting the people with their Waikato River and waka taua heritage. This area was known to Waahi Paa as a traditional landing, launching and retrieval site for various waka, including waka taua (large traditional war canoe), and the historic boat ramp was also a a traditional recreation and swimming spot for Waahi Paa. Lake Waahi is located to the west of the project site and discharges to the Waikato River on the northern boundary of the project site, through the Waahi Stream – Ngaa Tapuwae o Te Wherowhero. The Waahi Stream was diverted to its current channel. It used to cross the land further south where the indicative location is for the underpass.
Key threats/impacts	Hapuu, marae, whaanau become disconnected from the Waikato River and traditional waka practices including waka taua. Culturally important purakau, tikanga and kawa regarding waka activities become less known. Area becomes more degraded. Whaanau crossing the road to gain access to restored project site. In the event of a tragedy, eg losing a whaanau member, this will affect the site's mauri.
Project goal/s (SMART)	• Within 5 years, all identified works have been completed and whaanau, hapuu and marae are reconnecting with the Waikato River and waka activities. • Ongoing weed management has been undertaken by hapuu, marae, whaanau and/or iwi. • Carved pou and/or iPou have been develop to tell the history of the waahi tapu or sites of significance.
Works required	Note: Any engineers and geotechnical reports will be sorted and costed during the project application stage.

	Project works  Restore the traditional waka taua landing site to allow safe disembarkment and boarding, and develop flat areas for recreation, build walkways around the reserve and improve river bank stability. Estimated cost for boat ramp $120,000. Estimated cost for waka landing site $30,000.  Restore the traditional storage location for Waikato-Tainui waka taua, construct a shed to store and protect waka taua and undertake whakairo repairs, and reconnect the traditional waka channel to the Waikato-River. Estimated costs for waka taua shed $100,000. Estimated costs of opening traditional waka channel $20,000. Estimated costs of recontouring project area for planting $24,000.

Restoration planting of recontoured area of approximately 5110m^2 of Waikato River bank within the project boundary, while ensuring unrestricted movements of waka taua within the traditional channel.
Site prep $2000 per hectare of weedy site.
Plant spacing based on 1.5m and 4444 stems per hectare.
Plant costs $3.50 per plant.
Planting cost $1.50 per plant.
5 x releasing events $3.00 per plant.
Estimated costs per 1000m^2 $3955.
Estimated cost for the 5110m^2 $20,211.

Develop public recreation facilities, including environmentally friendly vault toilet with cold water shower and park furniture.
Estimated costs $80,000.

Construct an underpass under Harris Street for safe pedestrian access to and from Waahi Paa and the project site. *(It is intended for WDC and/or WRC to assist with the design and funding of this component of the project.)*
Cost TBC.

Maaori cultural symbolism
Waahi tapu and sites of significance will be recognised through the development and fabrication of cultural symbolism to be installed on site at appropriately marked locations.

The total number of carved pou or iPou, will be determined by the number of waahi tapu and sites of significance identified by hapuu, marae, whaanau and/or Waikato-Tainui. Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install Ipou (or other design e.g. carved pou, or kohatu).

Carved Pou
Collate information for carved Pou
Collate information for the sites identified by hapuu, marae, whaanau and/or Waikato-Tainui
Estimated cost per carved pou $1000.

Fabricate and install carved pou onto the sites (6m length x 0.6m diameter)
Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install pou.
Estimated fabrication and installation costs per carved pou $35,000.

Timber to be carved into pou (6m length x 0.6m diameter).
Cost is highly dependent on availability and species of timber, and it is encouraged to shop around, e.g. totara is best suited for fine detailed carving – $15,000 including transport from South Island.

	iPou The project will allow everyone with a mobile device to engage and have an educational and informative cultural experience that is measurable and immediate. It is multi focused, with messaging for river iwi and their beneficiaries, other iwi, local and government agencies, environmental partners and stakeholders, public, visitors and international guests.  *Collate information for iPou* Collate information for the sites identified by hapuu, marae, whaanau and/or Waikato-Tainui. Estimated cost per iPou $1000. *Fabricate and install 1 iPou onto the sites* Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install iPou (or other design e.g. carved pou, or kohatu). Estimated cost per iPou $10,000. *Technology/information loaded and installed into each iPou* Engage iPou developer to install information collated through interviews and literature review into the fabricated pou. Upload/install the technology. Estimated cost per iPou $2000. All project boundaries are indicative only. A concept plan has been developed for this area by the Waahi Whaanui Trust Environment manager. **Project management/staffing/incidentals (30%)** A project manager would be required to manage this project. The project manager would be required to work closely with Waahi Paa and Waikato Regional Council. Project management/staffing is estimated to be 30% of the project cost.
Risks to project success	Lack of funding.

<table>
<tr><td></td><td>Access to sites is restricted.
Resource consents not granted.
Lack of experienced practitioners results in incompleted works.
Ongoing maintenance to control weed infestation is not undertaken.</td></tr>
<tr><td>Land tenure – likelihood of adoption and adoption circumstances</td><td>There should be no issues with land tenure. Land is under Maaori title</td></tr>
<tr><td>Project duration (years)</td><td>5 year project</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Resource consent procurement</td><td>TBC</td></tr>
<tr><td>Engineer reports and design</td><td>TBC</td></tr>
<tr><td>Landscape design</td><td>TBC</td></tr>
<tr><td>Cultural practices to ensure cultural safety</td><td>2,000</td></tr>
<tr><td>Traditional boat ramp and waka landing site</td><td>150,000</td></tr>
<tr><td>Waka taua shed and reopening traditional channel</td><td>144,000</td></tr>
<tr><td>Restoration and bank stabilisation planting</td><td>20,211</td></tr>
<tr><td>Park furniture and vaulted toilet</td><td>80,000</td></tr>
<tr><td>Construct underpass</td><td>TBC</td></tr>
<tr><td>1 x carved pou fabrication and installation</td><td>35,000</td></tr>
<tr><td>Collate information for carved pou</td><td>1,000</td></tr>
<tr><td>Totara timber 6m length x 0.6m diameter</td><td>15,000</td></tr>
<tr><td>1 x iPou fabrication and installation</td><td>10,000</td></tr>
<tr><td>Collate information for iPou</td><td>1,000</td></tr>
<tr><td>Load information into iPou software</td><td>2,000</td></tr>
<tr><td>30% Project management totara carved pou</td><td>133,563</td></tr>
<tr><td>30% Project management for iPou</td><td>122,763</td></tr>
<tr><td>Total with 6m carved totara pou</td><td>578,774</td></tr>
<tr><td>Total with iPou</td><td>531,974</td></tr>
</table>
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Waikato-Tainui Ngaaruawaahia ki Mercer 4 Priority: Very high	Tuatahi – Identification, restoration and protection of waahi tapu and sites of significance – STAGE 1 Ngaaruawaahia ki Mercer.
Project summary	Enhancement, restoration and protection of waahi tapu and sites of significance were identified as very high priorities by hapuu, marae, whaanau and Waikato-Tainui. This project is stage 1 of a 2-stage process, and will identify the locations and tribal history of each waahi tapu and site of significance from within the area of Ngaaruawaahia through to Mercer. Stage 2 will consist of physical restoration and protection works for Waahi Paa and between Ngaaruawahia and Mercer – please refer to PAF for full details of works: *Restoring and protecting Waahi Paa's waahi tapu – STAGE 2 – Ngaaruawaahia ki Mercer* and *Restoring and protecting waahi tapu and sites of significance – STAGE 2 – Ngaaruawaahia ki Mercer.*
Vision for the project	Waahi tapu and sites of significance have been identified, protected and the historical koorero recorded and archived with Waikato-Tainui and whaanau, hapuu and/or marae. Note: only approved historical koorero will be subject to public access.
Location	 Project area includes the Waikato River and all tributaries between Ngaaruawaahia and Mercer. Exact locations of waahi tapu will be identified by whaanau, hapuu and ngaa marae.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically and spiritually significant, e.g. waahi tapu, urupaa, sites of significance, burial sites for hapuu, marae, whaanau and iwi afterbirth, sites of historic events, and traditional historic walkways between hapuu, marae, whaanau and iwi.

	This project is significant to ensure hapuu, marae, whaanau and/or iwi korero and purakau of their waahi tapu and sites of significance.
Key threats/impacts	Waahi tapu and sites of significance become disconnected from hapuu, marae, whaanau and the Waikato River. Waahi tapu remain isolated, uncared for and become more degraded and infested with weeds. Culturally important purakau, tikanga and kawa become less known. Culturally unsafe for waahi tapu to be left unprotected.
Project goal/s (SMART)	• Within 3 years, waananga have been held with hapuu, marae, whaanau and/or iwi. One on one interviews have been held with kaumatua and key knowledge holders, with recordings archived. • Hapuu, marae, whaanau and/or iwi have identified the locations of all waahi tapu and sites of significance within the areas of Ngaaruawaahia and Mercer. • Waahi tapu and sites of significance register, including GIS mapping, is complete and entered into Waikato-Tainui's archiving data system. • Opportunities for iwi capacity development in GIS mapping has been implemented.
Works required	**Waananga** 10 waananga held with hapuu, marae and whaanau to identify waahi tapu, sites of significance and key knowledge holders, i.e. kaumatua/kuia (as appropriate), and collate relevant information from literature sources and present back findings. • Venue, kai and koha per day $1500. • Cultural safety, $200 per hour or $1600 per day. • Facilitator $200 per hour or $1600 per day. • Travel expenses for participants $40 per person per waananga $600. Estimated cost per waananga up to $3700. Estimated waananga cost $37,000. **Interviews** Interview knowledge holders, i.e. kaumatua/kuia (as appropriate), and collate relevant information from literature sources. Assume: • up to 20 kaumatua/kuia interviews x $500 per interview = $10,000 • film interviews at $700 per day x 14 days = $9800 • editing of interviews at $700 per day x 14 days = $9800 • interviewer/literature reviewer at $800 per day x 21 days = $16,800. Estimated interviewing cost $46,400. **Mapping and photographing waahi tapu sites** Access site/s, map and photograph all significant and waahi tupuna/tapu sites. Enter information into digital database and maps. Assume: • access and photograph sites at $800 per day x 21 days = $16,800

	• GIS mapping services at $200 per hour to input maps and develop register x 28 days = $44,800 Estimated interviewing cost $61,600. **Capacity development** Hold 2 x GIS mapping waananga with hapuu, marae and whaanau from Ngaaruawaahia ki Mercer, and identify and support (x2) taiohi to undertake a scholarship to study and formally upskill in GIS/cultural mapping of waahi tapu/historical or related studies. • GIS mapping waananga x 2 $10,000, • Scholarship x 2 taiohi/student $20,000 Estimated capacity development costs $30,000. **Vegetation clearance to access sites of significance** Some of the known waahi tapu and site of significance areas need to be cleared of scrub and weeds to allow access for hapuu, marae and whaanau to assess the sites. • Contractor costs to clear weeds from known sites of significance at $700 per day x 28 days. Estimated clearing cost $19,600. **Project delivery** Works need to be implemented by hapuu, marae and whaanau. This project could be undertaken as a whole, or in components. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost $58,380.
Risks to project success	Lack of funding. Access to sites is restricted. Resource consents not granted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Ngaaruawaahia and Mercer. Very high likelihood of adoption.
Knowledge gaps and response	Exact location to be identified by key knowledge holders, i.e. kaumatua, kuia.
Project duration (years)	3 year project.

Costs	**Work description**	**Cost ($)**
	Waananga with Waikato-Tainui kaumatua	37,000
	Interview with key knowledge holders	46,400
	Mapping and photography	61,600
	GIS mapping capacity development	30,000
	Clear and remove vegetation	19,600
	Project management/staffing/incidentals (30%)	58,380
	Total	**252,980**

Waikato-Tainui Ngaaruawaahia ki Mercer 5 **Priority: Very high**	**Tuarua – Restoring and protecting Waahi Paa's waahi tapu – STAGE 2 – Ngaaruawaahia ki Mercer**
Project summary	Enhancement, restoration and protection of waahi tapu and sites of significance were identified as very high priorities by hapuu, marae, whaanau and Waikato-Tainui. This project is part of stage 2, the final stage, to physically restore and protect the Waahi tapu and sites of significance identified by hapuu, marae, whaanau and/or iwi during stage 1 *(Tuarua – Identification, restoration and protection of waahi tapu and sites of significance STAGE 1 – Ngaaruawaahia ki Mercer.)*
Vision for the project	The historical urupaa adjacent to Waahi Paa has been identified, restored and protected by fencing off the area then planting with appropriate species for minimal soil disturbance. Waahi Paa has erected a cultural symbolism pou to mark the location and the history of the identified urupaa.
Location	 The area highlighted in the above image is the suspected location of the urupaa, directly south of the Genesis Energy main entrance on a parcel of land between Genesis and Waahi Stream.
Brief description of site	The site is over grown with predominately willow from the road verge to Waahi Stream. The site is located on the true left bank of the Waahi Stream. The suspected site is approximately 1.6ha of low lying land sloping from the Heatherington Road down to the Waahi Stream. This project is significant to ensure Waahi Paa's and Waikato-Tainui's koorero and purakau of their waahi tapu and sites of significance are protected, identified and registered into the tribal data base.

Key threats/impacts	Waahi Paa remains disconnected from the waahi tapu on the banks of the Waahi Stream near it's confluence with the Waikato River. Culturally important purakau, tikanga and kawa become less known and forgotten. Area becomes more degraded. Culturally unsafe for waahi tapu to be left unprotected.
Project goal/s (SMART)	• Within 3 years, the Waahi Paa waahi tapu will be fenced and planted with appropriate species. • Ongoing weed management has been undertaken by Waahi Paa and/or Waikato-Tainui. • Signage and/or carved iPou have been developed to tell the history of the waahi tapu.
Works required	**Proposed development would include:** Conduct a site visit with kaumatua to locate waahi tapu or site of significance. Facilitate cultural practices and ensure cultural safety as per their tikanga and kawa. Fence off and plant native species around each waahi tapu or site of significance. **Cultural practices to ensure cultural safety.** Cultural safety $200 per hour or $1600 per day. **Site fencing** Perimeter fenced with a 7-wire post and baton fence to exclude cattle. Estimated cost $17/m x 640m = $10,880. **Site prep, planting and maintenance** The planted area will be a 5m margin around the outside perimeter of the urupaa, based on an estimated area of 3200m^2. Site prep $2000 per hectare of weedy site. Plant spacing based on 1.5m and 4444 stems per hectare. Plant costs $3.50 per plant. Planting cost $1.50 per plant. 5 x releasing events $3.00 per plant. Estimated cost per 1000m^2 $3955. Estimated cost for 3200m^2 $12,656. **Maaori cultural symbolism** Waahi tapu and sites of significance will recognised through the development and fabrication of cultural symbolism. They will be installed to appropriately mark each location. The total number of carved pou or iPou will be determined by the number of waahi tapu and sites of significance identified by hapuu, marae, whaanau and/or Waikato-Tainui. Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install Ipou (or other design, e.g. carved pou, or kohatu).

Carved Pou

Collate information for carved Pou

Collate information for the sites identified by hapuu, marae, whaanau and/or Waikato-Tainui.

Estimated cost per carved pou $1000.

Fabricate and install carved pou onto the sites (6m length x 0.6m diameter)

Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install pou.

Estimated fabrication and installation costs per carved pou $6000.

Timber to be carved into pou (2-3m length x 0.6m diameter)

Cost is highly dependent on availability and species. It is encouraged to shop around.

Totara is best suited for detailed carving.

Estimated cost per pou $5000.

iPou

The project will allow everyone with a mobile device to engage and have an educational and informative cultural experience that is measurable and immediate. It is multi focused, with messaging for river iwi and their beneficiaries, other iwi, local and government agencies, environmental partners and stakeholders, public, visitors and international guests.

Collate information for iPou

Collate information for the sites identified by hapuu, marae, whaanau and/or Waikato-Tainui.

Estimated cost per iPou $1000.

Fabricate and install 1 iPou onto the sites

Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install iPou (or other design, e.g. carved

	pou, or kohatu). Estimated cost per iPou $10,000. *Technology/information loaded and installed into each iPou* Engage iPou developer to install information collated through interviews and literature review into the fabricated pou. Upload/install the technology. Estimated cost per iPou $2000. **Project delivery** Works need to be implemented by Waahi Paa. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works, project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost $9922.
Risks to project success	Lack of funding. Access to sites is restricted. Resource consents not granted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken. Unable to identify the location of the urupaa.
Land tenure – likelihood of adoption and adoption circumstances	There should be no issues with land tenure.
Knowledge gaps and response	Exact location to be identified by key knowledge holders, i.e. kaumatua, kuia.
Project duration (years)	3 year project

Costs

Work description	Cost ($)
Task costs are based on 1 x 1,920m^2 site	
Cultural practices to ensure cultural safety 8 hours	1600
640m site fencing	10,880
Site prep, planting, maintenance	7594
1 x carved pou fabrication and installation	6000
Collate information for carved pou	1000
Totara timber 6m length x 0.6m diameter	5000
1 x iPou fabrication and installation	10,000
Collate information for iPou	1000
Load information into iPou software	2000
Project management totara carved pou (30%)	9622
Project management for iPou (30%)	9922
Total estimated cost for 1 x totara carved pou	**41,696**
Total estimated cost for 1 x iPou	**42,996**

Waikato-Tainui Ngaaruawaahia ki Mercer 6 **Priority: Very high**	**Tuarua – Restoring and protecting waahi tapu and sites of significance – STAGE 2 – Ngaaruawaahia ki Mercer**
Project summary	Enhancement, restoration and protection of waahi tapu and sites of significance were identified as very high priorities by hapuu, marae, whaanau and Waikato-Tainui. This project is stage 2 and the final stage to physically restore and protect the Waahi tapu and sites of significance identified by hapuu, marae, whaanau and/or iwi during stage 1 *(Tuarua – Identification, restoration and protection of waahi tapu and sites of significance STAGE 1 – Ngaaruawaahia ki Mercer).*
Vision for the project	Identified waahi tapu and sites of significance have been restored and protected with full stock exclusion fencing and appropriate planting of native species. Locations of waahi tapu and sites of significance will be marked by traditional carved pou, iPou or new technology (e.g. augmented reality technology) that can be adapted to traditional Maaori symbolism. Note: Only approved historical koorero will be subject to public access.
Location	 Project area includes the Waikato River and all tributaries between Ngaaruawaahia and Mercer. Exact locations of waahi tapu will be identified by whaanau, hapuu and ngaa marae.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically and spiritually significant, e.g. waahi tapu, urupaa, sites of significance, burial sites for afterbirth, sites of historic events and traditional historic walkways between hapuu, marae, whaanau and iwi. This project is significant to ensure hapuu, marae, whaanau and/or iwi koorero and purakau of their waahi tapu and sites of significance.

Key threats/impacts	Waahi tapu and sites of significance become disconnected from hapuu, marae, whaanau and the Waikato River. Waahi tapu remain isolated uncared for and become more degraded and infested with weeds. Culturally important purakau, tikanga and kawa become less known. Culturally unsafe for waahi tapu to be left unprotected.
Project goal/s (SMART)	• Within 10 years, all identified waahi tapu and sites of significance access, fencing and planting have been completed. • Ongoing weed management has been undertaken by landowners, hapuu, marae, whaanau and/or iwi. • Signage and/or carved iPou have been developed to tell the history of waahi tapu or sites of significance.
Works required	**Proposed development would include:** Conduct a site visit with kaumatua to locate waahi tapu or site of significance. Facilitate cultural practices and ensure cultural safety as per their tikanga and kawa. Fence off and plant native species around each waahi tapu or site of significance. **Cultural practices to ensure cultural safety.** Cultural safety $200 per hour or $1600 per day. **Site fencing** Perimeter fenced with a 7-wire post and baton fence to exclude cattle. Estimated fencing cost per 1000m^2 site: 130m x $20/m = $2600. Estimated fencing cost across 1ha: 400m x $20/m = $8000. **Site prep, planting and maintenance** Site prep $2000 per hectare of weedy site. Plant spacing based on 1.5m and 4444 stems per hectare. Plant costs $3.50 per plant. Planting cost $1.50 per plant. 5 x releasing events $3.00 per plant. Estimated cost per 1000m^2 $3955. Estimated cost per hectare $39,552. **Maaori cultural symbolism** Waahi tapu and sites of significance will recognised through the development and fabrication of cultural symbolism to be installed on site in the appropriate location. The total number of carved pou or iPou will be determined by the number of waahi tapu and sites of significance identified by hapuu, marae, whaanau and/or Waikato-Tainui. Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install iPou (or other design, e.g. carved pou, or kohatu).

- **Carved pou**

Collate information for carved pou
Collate information for the sites identified by hapuu, marae, whaanau and/or Waikato-Tainui.
Estimated cost per carved pou $1000.

Fabricate and install carved pou onto the sites (6m length x 0.6m diameter)
Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install pou.
Estimated fabrication and installation costs per carved pou $35,000.

Timber to be carved into pou (6m length x 0.6m diameter)
Cost is highly dependent on availability and species of timber. It is encouraged to shop around.
e.g. totora is best suited for fine detailed carving – $15,000 including transport from South Island.
H5 treated pine is not suited for fine detailed carving – $1200 including transportation.

- **iPou**

The project will allow everyone with a mobile device to engage and have an educational and informative cultural experience that is measurable and immediate. It is multi focused, with messaging to river iwi and their beneficiaries, other iwi, local and government agencies, environmental partners and stakeholders, public, visitors and international guests.

Collate information for iPou
Collate information for the sites identified by hapuu, marae, whaanau and/or Waikato-Tainui.
Estimated cost per iPou $1000.

Fabricate and install 1 iPou onto the sites
Engage appropriate whakairo expert (or other design artist as

	appropriate) to fabricate and install iPou (or other design, e.g. carved pou, or kohatu). Estimated cost per iPou $10,000. *Technology/information loaded and installed into each iPou* Engage iPou developer to install information collated through interviews and literature review into the fabricated pou. Upload/install the technology. Estimated cost per iPou $2000. **Project delivery** Works need to be implemented by hapuu, marae and whaanau. This project could be undertaken as a whole, or in components. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost $156,098.
Risks to project success	Lack of funding. Access to sites is restricted. Resource consents not granted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Ngaaruawaahia and Mercer. Very high likelihood of adoption.
Knowledge gaps and response	Exact location to be identified by key knowledge holders, i.e. kaumatua and kuia.
Project duration (years)	3 year project

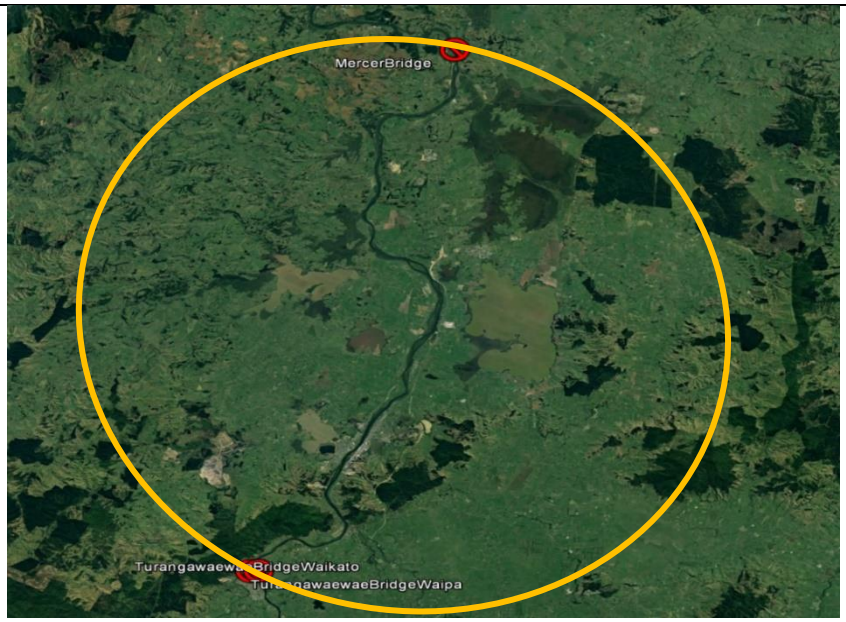
Costs

Individual costing estimates for 1 x 1000m^2 site with either 1 x carved totara pou, 1 x carved pine pou or 1 x iPou fabricated and installed onsite.

Work description	**Cost ($)**
Task costs are based on 1 x 1000m^2 site	
Cultural practices to ensure cultural safety 8 hours	1600
1,000m^2 site fencing	2600
Site prep, planting, maintenance	3955
1 x carved pou fabrication and installation	35,000
Collate information for carved pou	1000
Totara timber 6m length x 0.6m diameter	15,000
1 x iPou fabrication and installation	10,000
Collate information for iPou	1000
Load information into iPou software	2,000
Project management totara carved pou/or	17,747
Project management pine carved pou/or	13,607
Project management for iPou	6347
Total estimated cost for 1 x totara carved pou	**76,902**
Total estimated cost for 1 x iPou	**27,502**

The cost estimate below includes site prep, planting, weed maintenance and fencing for up to 20 x 1000m^2 sites, cultural practices, and 5 x carved totara pou and 10 x iPou, fabricated and installed onsite.

Work description	**Cost ($)**
Task costs are based on 20 x 1000m^2 site	
Cultural practices to ensure cultural safety 160 hours	32,000
Site fencing	39,000
Site prep, planting, maintenance	59,325
5 x carved pou fabrication and installation	175,000
Collate information for carved pou x 10	10,000
5 x totara timber 6m length x 0.6m diameter	75,000
10 x iPou fabrication and installation	100,000
Collate information for iPou x 10	10,000
Load information into iPou software x 10	20,000
Project management/staffing/incidentals (30%)	156,098
Total estimated cost for 20 x 1000m^2 sites	**676,423**

Waikato-Tainui Ngaaruawaahia ki Mercer 7 Priority: High	Tuarua – 30 puna restoration – Ngaaruawaahia ki Mercer
Project summary	The restoration of traditional puna was identified as a high priority by hapuu, marae and whaanau from Ngaaruawaahia and Mercer. This project will see the restoration of up to 300 puna between Ngaaruawaahia and Mercer. Puna will be restored in areas identified by hapuu, marae, whaanau or Waikato-Tainui as being historically, culturally, ecologically or spiritually significant.
Vision for the project	Up to 30 puna are well established and restored at identified sites. Whaanau are able to exercise their mana whakahaere through restoring, protecting, enhancing their traditional puna. Customary practices and knowledge is transferred on to future generations. Ensure the locations of puna have been recorded, protected, enhanced and restored for future cultural use.
Location	 Project area between Ngaaruawaahia and Mercer. The 30 puna restoration sites will be identified by whaanau, hapuu and ngaa marae within the mapped area above in locations that are historically, culturally, ecologically or spiritually significant.
Brief description of site	Restoration of puna is important because traditional puna were used for drinking water and sustainable land use by marae and whanau. Historically, marae and whaanau kainga were build next to waterways or puna. Waikato-Tainui's primary interest in the project is to protect unfettered access of tribal members to exercise mana whakahaere and undertake traditional cultural practices.

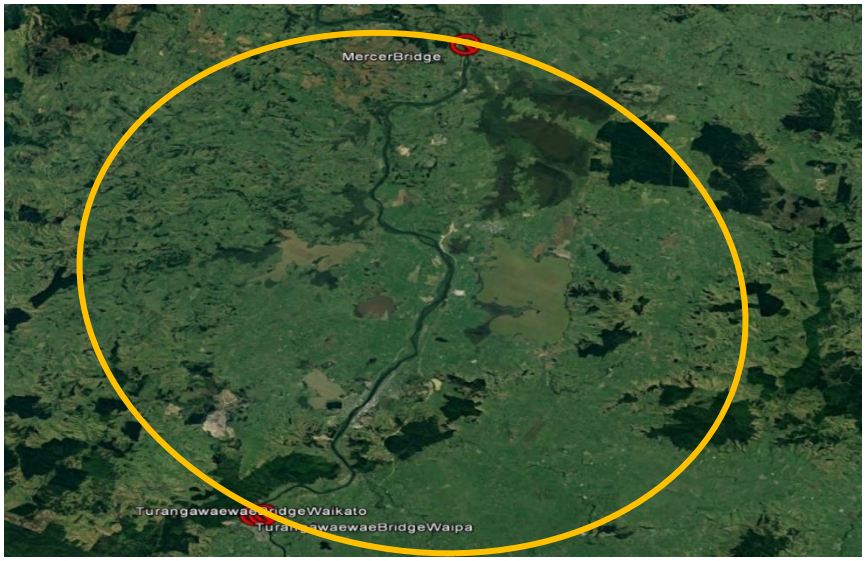
Key threats/impacts	Hapuu, marae, whaanau become disconnected from traditional puna sites. Further loss of key historic knowledge of each site, and pest plant infestation. Culturally important purakau, tikanga and kawa become less known. Areas become more degraded (unrestricted stock access). Traditional puna are depleted due to surrounding activities, e.g. farming.
Project goal/s (SMART)	Within 10 years, up to 30 puna are restored, enhanced, fenced and planted, and pest plant releasing programmes have been completed. Waananga have been held with Waikato-Tainui members at (or near) the restoration sites or at close marae, for the transfer of knowledge and tools to marae.
Works required	Works could be implemented and led by hapuu, marae, whaanau and/or Waikato-Tainui. Co-funding contributions from other interested partners for hapuu, marae, whaanau and/or Waikato-Tainui to complete this project would be welcomed. This project could be undertaken in parts or as a whole. **Cultural health and safety** Cultural health and safety in accordance with Waikato-Tainui marae tikanga and kawa, where required, from project commencement through to project completion. Based on $200 per hour. Estimate cost per 4 hours $800. Estimated cost for up to 120 hours $24,000. **Restoration fencing and planting** *Estimated cost per puna* Carry out approximately 130m of fencing to protect an approximately 1000m^2 area around each puna. Estimated cost for 130m of 7-wire post and batten fence $2600. Estimated prep, planting and maintenance costs for 1000m^2 $3955. *Estimated cost per puna run off stream/tributary* Carry out approximately 100m of fencing puna run off streams and puna seep/wet areas. Setback a minimum of 5m from the edge of the streambank and seep/wet areas. Plant riparian margins with native species. Estimated fencing cost for 200m $4000. Estimated prep, planting and maintenance cost for 1000m^2 $3955.

	Where a puna is historically known to be a whitebait spawning ground, riparian planting is to be carried out using appropriate native plant species planted at 0.75m spacing. **Capacity development** Provide training for tribal members to learn about riparian fencing and planting. Fencing waananga (x5) Planting waananga (x5) Estimated cost per waananga $5000. Estimate waananga cost $50,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost per puna $4353. Estimated cost for 30 puna $185,790.
Risks to project success	Lack of funding. Access to sites is restricted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and Waikato-Tainui between Ngaaruawaahia and Mercer. Very high likelihood of adoption.
Knowledge gaps and response	Exact puna location to be determined by whaanau, hapuu and /or marae. Size of puna areas to be fenced and restored differ from site to site. Length of fencing required for puna including run off streams and wet seep areas.
Project duration (years)	Individual projects can expect 3-5 years duration. 10 year project.

Costs

Work description	Cost ($)
Cultural practices in accordance with Waikato-Tainui marae tikanga and kawa throughout project where required	24,000
Fencing off puna for protection (30 puna)	78,000
Puna riparian planting (30 puna)	118,650
Puna stream fencing (30 puna)	120,000
Puna stream riparian planting (5m setback on both banks)	118,650
Capacity building Fencing and planting waananga	50,000
Project management/staffing/incidentals (30%)	152,790
Total	**662,090**

Estimated cost for 1 x puna restoration project fully completed (excludes tertiary scholarship and waananga)	**22,070**

Waikato-Tainui Ngaaruawaahia ki Mercer 8 Priority: High	Tuatoru – Tuna habitat ponds – Ngaaruawaahia ki Mercer
Project summary	The restoration of tuna abundance was identified as a high priority by whaanau, hapuu and ngaa marae between Ngaaruawaahia and Mercer; also, by Waahi Whaanui Trust and Ngaa Muka Development Trust. This project will see the creation of 15 tuna habitat ponds between Ngaaruawaahia and Mercer in areas identified by hapuu, marae, whaanau and iwi as being historically, culturally, ecologically or spiritually significant.
Vision for the project	Tuna (freshwater eels) are plentiful. Whaanau are able to exercise their mana whakahaere through restoring, protecting, enhancing and harvesting tuna. Customary practices and knowledge is transferred on to future generations.
Location	 Project area includes the Waikato River and all tributaries between Ngaaruawaahia and Mercer. The 15 individual tuna ponds will be identified by whaanau, hapuu and ngaa marae within the mapped area above in locations that are historically, culturally, ecologically or spiritually significant.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically or spiritually significant, e.g. traditional tuna feeding sites, traditional mahinga kai sites and wetland type areas prone to flooding. This project is significant because tuna is a significant mahinga kai taonga species for Waikato-Tainui, Waahi Whaanui Trust and Ngaa Muka Development Trust.

	Hapuu, marae and whaanau from within Waahi Whaanui Trust and Ngaa Muka Development Trust have witnessed a steady decline in tuna abundance over time. For Waahi Whaanui Trust and Ngaa Muka Development Trust, the restoration of taonga species and the ability to again provide these taonga as food for manuwhiri (visitors) is a critical marker of the hapuu, marae and whaanau's mana and status. It also confirms hapuu, marae and whaanau proficiency in manaaki taangata or the practice of generosity and reciprocity. The abundance of food and other resources that were traditionally available to Waikato-Tainui within its tribal rohe are well known by other tribes throughout the motu.
Key threats/impacts	Tuna population will continue to decline and become less abundant. Hapuu, marae and whaanau will become less engaged with the practices of kaitiakitanga and mahinga kai. Ensure that competitive pest species, e.g. carp, are prevented from accessing identified tuna habitat.
Project goal/s (SMART)	Within 10 years, up to 15 tuna habitat ponds are created within the Ngaaruawaahia to Mercer areas to provide an increase in habitat availability for tuna. Tuna waananga have been held with iwi members at (or near) the ponds to transfer knowledge and tools to marae. Tuna from the ponds are being served at significant tribal events, like Poukai, thus contributing to restoring the relationship of the marae with the Waikato River.
Works required	Works are intended to be implemented by whaanau, hapuu and ngaa marae from Ngaaruawaahia through to Mercer. Co-funding contributions will be sourced and welcomed from interested collaborative partners. This project is intended to be undertaken as 15 individual projects but may be undertaken as multiple ponds per project sites where appropriate. Ponds should not be created within an existing wetland where there is significant native flora and fauna. **Cultural practices to ensure cultural safety.** Cultural safety, $200 per hour or $1600 per 8 hours. Estimated cost for up to 80 hours $24,000. **Earthworks** Excavate marginal low lying areas to create shallow ponds/wetlands. • Ponds should be constructed to a maximum of 5000m^2 and approximately 2m deep. They should be no deeper than 3m to

	avoid deoxygenation of bottom layers and associated fish deaths. • Ponds are lined with suitable soils so they are capable of holding water with minimum leakage • Good quality water is maintained in the constructed ponds • Ponds are constructed in traditional mahinga kai area/sites identified by hapuu, marae and whaanau. Installing an instream structure (log) that will be secured in place.  **Note: Resource consent may be required** Costs include excavator transport and are based on ponds being 5000m^2 x 2m deep and a 12 tonne excavator moving 150m^3 per hour ($10,000), returning for one day to reshape the site once excavations have settled ($1800). Cost per pond $11,800. Estimated cost across 15 ponds $177,000. **Fencing** Ponds should be fenced with a 7-wire post and batten fence to exclude cattle. Cost per pond: 400m x $20/m = $8000 Estimated fencing cost across 15 ponds $120,000 **Planting** Dense native planting should be carried out around the pond to create overhanging habitat for eels. Species should consist of hardy native

	species that would have naturally existed within the wetland environment (e.g. carex secta, cabbage tree, flax). • Native planting 0.3ha per pond $11,865 • Additional weed control for 3 years at each pond $2520 Planting and releasing cost per pond = $14,385 Estimated planting cost across 15 ponds = $215,775 **Resource consent** It is anticipated that most ponds will require resource consent. Costs will vary depending on whether one consent application is lodged for multiple ponds or whether resource consents are applied for separately. A generous cost estimate of $5000 per pond has been used. Estimated consents cost for 15 ponds $75,000.  **Capacity development** • Tuna waananga Provide training for tribal members to learn about tuna restoration. Tuna waananga (10) plus tuna tool kits. Cost per waananga $6000. Estimated total cost $60,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with whaanau, marae, hapuu, or iwi (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works, confirm consents (if required) and project manage parts of the work as required. Project management/staffing is estimated to be up to 30% of the project cost.

<table>
<tr><td></td><td>Estimated project management cost per pond $12,956.
Estimated project management cost across 15 ponds $224,333.</td></tr>
<tr><td>Risks to project success</td><td>Lack of access to sites.
Resource consents not granted.
Lack of experienced practitioners result in incompleted works.
Ongoing maintenance to control weed infestation is not undertaken.
Commercial eel fishermn fishing out completed pond.</td></tr>
<tr><td>Land tenure – likelihood of adoption and adoption circumstances</td><td>Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Ngaaruawaahia and Mercer.
Very high likelihood of adoption.</td></tr>
<tr><td>Knowledge gaps and response</td><td>It is unknown whether consents or authorisations are required.
Exact locations of tuna ponds are to be determined by whaanau, hapuu and /or marae.
Size of each pond, including area to be fenced and restored, will differ from site to site.</td></tr>
<tr><td>Project duration (years)</td><td>3 years per pond/site, includes construction, planting and weeding programme.
10 year project.</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Earthworks</td><td>177,000</td></tr>
<tr><td>Fencing (6km)</td><td>120,000</td></tr>
<tr><td>Planting</td><td>215,775</td></tr>
<tr><td>Resource consents</td><td>75,000</td></tr>
<tr><td>Capacity building</td><td>60,000</td></tr>
<tr><td>Project management/staffing/incidentals (30%)</td><td>194,332</td></tr>
<tr><td>Total</td><td>842,108</td></tr>
</table>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Total estimate cost per individual pond (excludes capacity development and tertiary scholarships)</td><td>56,141</td></tr>
</table>
</td></tr>
</table>

Waikato-Tainui Ngaaruawaahia ki Mercer 9 Priority: Very High	Tuatoru – 10km riparian and taonga species restoration habitat – Ngaaruawaahia ki Mercer
Project summary	The restoration of riparian margins, including the restoration and protection of ngaa taonga species, has been identified as a very high priority by hapuu, marae and whaanau from Ngaaruawaahia to Mercer. This project will see the restoration of 10km of riparian margins between Ngaaruawaahia and Mercer. Areas will be identified by hapuu, marae, whaanau or iwi as being historically, culturally, ecologically or spiritually significant.
Vision for the project	Riparian margins and the ecosystems within the margins are well established at the sites. Whaanau are able to exercise their mana whakahaere through restoring, protecting and enhancing the wellbeing of traditional mahinga kai sites along the Waikato River and tributaries.
Location	 Project area includes the Waikato River and all tributaries between Ngaaruawaahia and Mercer. The 10km of riparian restoration sites will be identified by whaanau, hapuu and ngaa marae within the mapped area above in locations that are historically, culturally, ecologically or spiritually significant.
Brief description of site	Sections of the Waikato River, streams and tributaries that are historically, culturally, ecologically or spiritually significant (e.g. traditional mahinga kai sites) are well known to hapuu, marae, whaanau and Waikato-Tainui. Waikato-Tainui's primary interest in the project is to provide and protect unfettered access to riparian margins for tribal members to exercise mana whakahaere and undertake traditional mahinga kai practices.

	This includes the broader aspiration of the restoration and recovery of wetland taonga species associated with healthy riparian margins.
Key threats/impacts	Taonga species remain absent or in decline from traditional sites where they were once plentiful. Hapuu, marae and whaanau become disconnected from the Waikato River and traditional mahinga kai sites due to poor habitat. Culturally important purakau, tikanga and kawa become less known. Cattle and other browsing species destroy traditional sites within the riparian margins of the Waikato River and associated wetlands.
Project goal/s (SMART)	Within 10 years, up to 10km of riparian margins suitable for taonga species habita, have been restored, enhanced, fenced, planted, and pest plant releasing programmes have been completed. Capacity development waananga have been held with iwi members at or near the restoration sites or at marae, for the transfer of knowledge and tools to marae.
Works required	Works could be implemented and led at marae or whaanau level. Co-funding contributions from other interested partners to hapuu, marae, whaanau and/or Waikato-Tainui to complete this project would be welcomed. This project could be undertaken in parts or as a whole. **Cultural practices to ensure cultural safety.** Cultural safety $200 per hour or $1600 per 8 hours. Estimated cost for up to 80 hours $16,000. **Riparian fencing** Carry out riparian fencing with a minimum 5m setback from the edge of the stream and/or river banks. Fencing will consist of a 7-wire post and batten at $20 per metre. Estimated cost per 1000m site $20,000. Estimated cost for 10km $200,000. **Wetland planting** Carry out planting of native wetland species within the internal areas of the wetland where required, with plant spacing of 1.5m (4444 plants per hectare) and 5 x plant releasing events. Estimated planting cost per 5000m^2 $18,776. Estimated planting cost for 5ha $187,760. **Installation of structures for fish habitat** Carry out approximately 10km of securing in-stream wood structures throughout the identified restoration streams (4-6 structures over a 2km length for fish habitat where practicable). Estimate cost per 1km $10,413.

	Estimated cost for 10km $104,130. It is envisaged that whaanau, hapuu and/or marae with assistance from Waikato Regional Council work collaboratively in terms of site location investigation, design and installation of woody debris structures. This component could be undertaken in conjunction with Waikato Regional Council's river management work. **Capacity development** Provide training for tribal members to learn about riparian fencing and planting $5000 per waananga. Fencing waananga (x5). Planting waananga (x5). Estimated cost for 10 waananga $50,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost per 1km length $16,737 (excludes tertiary scholarships). Estimated cost 10km site $197,367.
Risks to project success	Lack of funding. Access to sites is restricted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and Waikato-Tainui between Ngaaruawaahia and Mercer. Very high likelihood of adoption.
Knowledge gaps and response	Exact location of each restoration site needs to be determined.
Project duration (years)	10 year project.

Costs

Work description	Cost ($)
Cultural practices in accordance with Waikato-Tainui tikanga and kawa throughout each individual projects where required	16,000
Riparian fencing (10km)	200,000
Riparian planting (5ha)	187,760
Installation of structures for fish habitat	104,130
Capacity building – fencing and planting waananga	50,000
Project management/staffing/incidentals (30%)	167,367
Total	**725,257**

Estimated cost to restore 1000m length of riparian margin with a 5m setback (excludes tertiary scholarship)	**72,526**

Waikato-Tainui Ngaaruawaahia ki Mercer 10 **Priority: High**	**Tuatoru – 20 watercress restoration projects – Ngaaruawaahia ki Mercer**
Project summary	The restoration of traditional watercress sites was identified as a high priority by whaanau, hapuu and ngaa marae between Ngaaruawaahia and Mercer. This project will see the creation of 20 restored watercress sites between Ngaaruawaahia and Mercer in areas identified by hapuu, marae, whaanau and iwi as being historically, culturally, ecologically significant.
Vision for the project	Watercress is plentiful within the restored, traditional gathering locations.
Location	 Project area between Ngaaruawaahia and Mercer.
Brief description of site	Historically, watercress was in abundance and readily available for hapuu, marae and whaanau throughout the Waikato catchment. Now, with the intensification of land use, watercress is either no longer present or the land has been modified for dairy and dry stock. Waatakirihi, or watercress (also called koowhitiwhiti, *Nasturtium officinale* and *N. microphyllum*), is a highly prized food source for Waikato-Tainui and Maaori generally. An aquatic or boggy ground plant associated with drains, small creeks, wetland streams and the calmer edges of rivers, waatakirihi is a vigorous plant, provided there is a good level of water quality (i.e. lack of sedimentation). It is a member of the mustard family, and is highly regarded for its medicinal properties and its taste in many cultures across the world. As avid botanists and gardeners, tangata whenua were quick to identify its properties, and it now forms a major component of many

<table>
<tr><td></td><td>traditional dishes. Harvest sites are highly coveted and sometimes known only to whaanau (family/families).

(Dixon, L. 2017 – the importance of watakirihi – te reo o te repo – the voice of the wetland)</td></tr>
<tr><td>Key threats/impacts</td><td>New plants do not establish and traditional watercress sites remain barren.

Hapuu, marae and whaanau will become less engaged with the practices of kaitiakitanga of their watercress sites.</td></tr>
<tr><td>Project goal/s (SMART)</td><td>Within 2 years, watercress is flourishing in up to 20 project sites within the Ngaaruawaahia and Mercer catchment.</td></tr>
<tr><td>Works required</td><td>Works could be implemented at iwi, hapuu, marae or whaanau level. This project could be undertaken as a whole, or in components.

It is intended to restore traditional hapuu, marae, whaanau and iwi watercress sites.

Watercress restoration ($100,000)
20 sites at $5000 per site $100,000.
Includes project management of 25% ($20,000). Project manager to carry out landowner liaison, provide reporting information, negotiate agreements, inspect works, and pick up and seed watercress.</td></tr>
<tr><td>Risks to project success</td><td>Lack of access to sites.
Lack of experienced practitioners results in incompleted works.
Ongoing maintenance to control weed infestation is not undertaken.</td></tr>
<tr><td>Land tenure – likelihood of adoption and adoption circumstances</td><td>Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Ngaaruawaahia and Mercer.
Very high likelihood of adoption.</td></tr>
<tr><td>Knowledge gaps and response</td><td>It is unknown whether consents or authorisations are required</td></tr>
<tr><td>Project duration (years)</td><td>1-2 year projects.</td></tr>
<tr><td>Costs</td><td><table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>20 watercress restoration projects</td><td>80,000</td></tr>
<tr><td>Project management/staffing/incidentals (20%)</td><td>20,000</td></tr>
<tr><td>Total</td><td>100,000</td></tr>
</table></td></tr>
</table>

Waikato-Tainui Karapiro ki Ngaaruawaahia 1 **Priority: Very high**	**Tuatahi – 10km riparian and taonga species habitat restoration project – Karapiro ki Ngaaruawaahia**
Project summary	The restoration of riparian margins, including the restoration and protection of ngaa taonga species, has been identified as a very high priority by hapuu, marae and whaanau from Karapiro through to Ngaaruawaahia. This project will see the restoration of 10km of riparian margins between Karapiro and Ngaaruawaahia. Areas will be identified by hapuu, marae, whaanau or iwi as being historically, culturally, ecologically or spiritually significant.
Vision for the project	Riparian margins and the ecosystems within the margins are well established at the sites. Whaanau are able to exercise their mana whakahaere through restoring, protecting and enhancing the wellbeing of traditional mahinga kai sites along the Waikato River and tributaries.
Location	 Project area includes the Waikato River and all tributaries between Lake Karapiro and Ngaaruawaahia. The 10km of riparian restoration sites will be identified by whaanau, hapuu and ngaa marae within the mapped area above in locations that are historically, culturally, ecologically or spiritually significant.
Brief description of site	Sections of the Waikato River, streams and tributaries that are historically, culturally, ecologically or spiritually significant (e.g. traditional mahinga kai sites) are well known to hapuu, marae, whaanau and Waikato-Tainui.

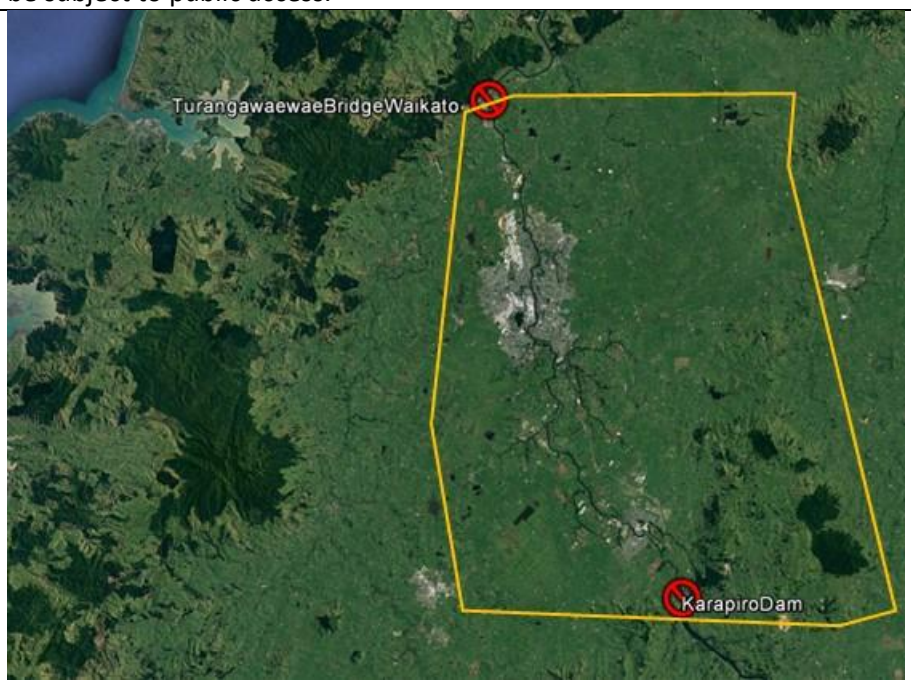
	Waikato-Tainui's primary interest in the project is to provide and protect unfettered access to riparian margins for tribal members to exercise mana whakahaere and undertake traditional mahinga kai practices. This includes the broader aspiration of the restoration and recovery of wetland taonga species associated with healthy riparian margins.
Key threats/impacts	Taonga species remain absent or in decline from traditional sites where they were once plentiful. Hapuu, marae, whaanau become disconnected from the Waikato River and traditional mahinga kai sites due to poor habitat. Culturally important purakau, tikanga and kawa become less known. Cattle and other browsing species destroy traditional sites within the riparian margins of the Waikato River and associated wetlands.
Project goal/s (SMART)	Within 10 years, up to 10km of riparian margins suitable for taonga species habitat have been restored, enhanced, fenced and planted, and pest plant releasing programmes completed. Capacity development waananga have been held with iwi members at or near the restoration sites or marae, for the transfer of knowledge and tools to marae.
Works required	Works could be implemented and led at marae or whaanau level. Co-funding contributions from other interested partners to hapuu, marae, whaanau and/or Waikato-Tainui to complete this project would be welcomed. This project could be undertaken in parts or as a whole. **Cultural practices to ensure cultural safety** Cultural safety, $200 per hour or $1600 per 8 hours. Estimated cost for up to 80 hours $16,000. **Riparian fencing** Carry out riparian fencing with a minimum 5m setback from the edge of the stream and/or river banks. Fencing will consist of a 7 wire post and batten at $20 per metre. Estimated cost per 1000m site $20,000. Estimated cost for 10km $200,000. **Wetland planting** Carry out planting of native wetland species within the internal areas of the wetland where required, with plant spacing of 1.5m (4444 plants per hectare) and 5 x plant releasing events. Estimated planting cost per 5000m^2 $18,776. Estimated planting cost for 5ha $187,760. **Installation of structures for fish habitat** Carry out approximately 10km of securing in-stream wood structures throughout the identified restoration streams (4-6 structures over a 2km length for fish habitat where practicable).

	Estimate cost per 1km $10,413. Estimated cost for 10km $104,130. It is envisaged that whaanau, hapuu and/or marae with assistance from Waikato Regional Council work collaboratively in terms of site location investigation, design and installation of woody debris structures. This component could be undertaken in conjunction with Waikato Regional Council's river management work. **Capacity development** Provide training for tribal members to learn about riparian fencing and planting. Fencing waananga (x5). Planting waananga (x5). Estimated cost for 10 waananga at $5000 each $50,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost per 1km length $16,737 (excludes tertiary scholarships). Estimated cost 10km site $197,367.
Risks to project success	Lack of funding. Access to sites is restricted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and Waikato-Tainui between Karapiro and Ngaaruawaahia. Very high likelihood of adoption.
Knowledge gaps and response	Exact location of each restoration site needs to be determined.
Project duration (years)	10 year project.

Costs

Work description	Cost ($)
Cultural practices in accordance with Waikato-Tainui tikanga and kawa throughout each individual project where required	16,000
Riparian fencing (10km)	200,000
Riparian planting (5ha)	187,760
Installation of structures for fish habitat	104,130
Capacity building – fencing and planting waananga	50,000
Project management/staffing/incidentals (30%)	167,367
Total	**725,257**

Estimated cost to restore 1000 m length of riparian margin with a 5m setback (excludes tertiary scholarship)	**72,526**

Waikato-Tainui Karapiro ki Ngaaruawaahia 2 **Priority: Very high**	**Tuatahi – Identification, restoration and protection of waahi tapu and sites of significance – STAGE 1 Karapiro ki Ngaaruawaahia.**
Project summary	Enhancement, restoration and protection of waahi tapu and sites of significance were identified as very high priorities by hapuu, marae, whaanau and Waikato-Tainui. This project is stage 1 of a 2-stage process. Stage 1 includes identifying the locations and tribal history of each waahi tapu and sites of significance from within the area of Lake Karapiro through to Ngaaruawaahia. Stage 2 will consist of physical restoration and protection works (please refer to PAF for full details of works: *Restoration and protection of waahi tapu and sites of significance – STAGE 2 – Lake Karapiro ki Ngaaruawaahia.)*
Vision for the project	Waahi tapu and sites of significance have been identified, protected and the historical koorero recorded and archived with Waikato-Tainui and whaanau, hapuu and/or marae. Note: Only approved historical koorero will be subject to public access.
Location	 Project area includes the Waikato River and all tributaries between Lake Karapiro and Ngaaruawaahia. Exact locations of waahi tapu will be identified by whaanau, hapuu and ngaa marae.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically and spiritually significant, e.g. waahi tapu, urupaa, sites of significance, burial sites for hapuu, marae, whaanau and iwi afterbirth, sites of historic events, and traditional historic walkways between hapuu, marae, whaanau and iwi.

	This project is significant to ensure hapuu, marae, whaanau and/or iwi koorero and purakau of their waahi tapu and sites of significance.
Key threats/impacts	Waahi tapu and sites of significance become disconnected from hapuu, marae, whaanau and the Waikato River. Waahi tapu remain isolated, uncared for, and become more degraded and infested with weeds. Culturally important purakau, tikanga and kawa become less known. Culturally unsafe for waahi tapu to be left unprotected.
Project goal/s (SMART)	• Within 3 years, waananga have been held with hapuu, marae, whaanau and/or iwi. One on one interviews have been held with kaumatua and key knowledge holders, and the recordings archived. • Hapuu, marae, whaanau and/or iwi have identified the locations of all waahi tapu and sites of significance between Lake Karapiro and Ngaaruawaahia. • Waahi tapu and sites of significance register, including GIS mapping, is complete and entered into Waikato-Tainui's archiving data system. • Opportunities for iwi capacity development in GIS mapping has been implemented.
Works required	**Waananga** 10 waananga held with hapuu, marae and whaanau to identify waahi tapu, sites of significance and key knowledge holders (i.e. kaumatua/kuia, as appropriate), and collate relevant information from literature sources. All findings to be presented. • Venue, kai and koha per day $1500. • Cultural safety $200 per hour or $1600 or per day. • Facilitator $200 per hour or $1600 per day. • Travel expenses for participants $40 per person, $600 per waananga. Estimated cost per waananga up to $3700. Estimated total waananga cost $37,000 **Interviews** Interview knowledge holders (i.e. kaumatua/kuia, as appropriate), and collate relevant information from literature sources. Assume: • up to 20 kaumatua/kuia interviews at $500 per interview $10,000 • film interviews at $700 per day x 14 days = $9800 • editing of interviews at $700 per day x 14 days = $9800 • interviewer/literature reviewer at $800 per day x 21 days = $16,800. Estimated interviewing cost $46,400. **Mapping and photographing waahi tapu sites** Access, map and photograph all significant and waahi tupuna/tapu sites. Enter information into digital database and maps. Assume: • access and photograph sites at $800 per day x 21 days = $16,800 • GIS mapping services at $200 per hour to input maps and develop register x 28 days = $44,800

	Estimated interviewing cost $61,600. **Capacity development** Hold 2 x GIS mapping waananga with hapuu, marae and whaanau from Lake Karapiro to Ngaaruawaahia, identify and support (x2) taiohi to undertake a scholarship to study and formally upskill in GIS/Cultural mapping of waahi tapu/historical or related studies. • GIS mapping waananga x 2 $10,000. • Scholarship x 2 taiohi/student $20,000. Estimated capacity development costs $30,000. **Vegetation clearance to access sites of significance** Some of the known waahi tapu and sites of significance areas need to be cleared of scrub and weeds to allow access for hapuu, marae and whanau. Contractor costs to clear weeds at site $700 per day x 28 days. Estimated clearing cost $19,600. **Project delivery** Works need to be implemented by hapuu, marae and whaanau. This project could be undertaken as a whole, or in components. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost $58,380.
Risks to project success	Lack of funding. Access to sites is restricted. Resource consents not granted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Lake Karapiro and Ngaaruawaahia. Very high likelihood of adoption.
Knowledge gaps and response	Exact locations to be identified by key knowledge holders, i.e. kaumatua and kuia.
Project duration (years)	3 year project.

Costs

Work description	Cost ($)
Waananga with Waikato-Tainui kaumatua	37,000
Interview with key knowledge holders	46,400
Mapping and photography	61,600
GIS mapping capacity development	30,000
Clear and remove vegetation	19,600
Project management/staffing/incidentals (30%)	58,380
Total	**252,980**

Waikato-Tainui Karapiro ki Ngaaruawaahia 3 **Priority: Very high**	**Tuarua – Restoring and protecting waahi tapu and sites of significance – STAGE 2 – Karapiro ki Ngaaruawaahia**
Project summary	Enhancement, restoration and protection of waahi tapu and sites of significance were identified as very high priorities by hapuu, marae, whaanau and Waikato-Tainui. This project is stage 2, the final stage to physically restore and protect the Waahi tapu and sites of significance identified by hapuu, marae, whaanau and/or iwi during stage 1 *(Identification, restoration and protection of waahi tapu and sites of significance – STAGE 1 – Lake Karapiro ki Ngaaruawaahia).*
Vision for the project	Identified waahi tapu and sites of significance have been restored and protected with full stock exclusion fencing and appropriate planting of native species. Locations of waahi tapu and sites of significance will be marked by traditional carved pou, iPou or new technology (e.g. augmented reality technology) that can be adapted to traditional Maaori symbolism. Note: Only approved historical koorero will be subject to public access.
Location	 Project area includes the Waikato River and all tributaries between Lake Karapiro and Ngaaruawaahia. Exact locations of waahi tapu will be identified by whaanau, hapuu and ngaa marae.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically and spiritually significant, e.g. waahi tapu, urupaa, sites of significance, burial sites for afterbirth, sites of historic events and traditional historic walkways between hapuu, marae, whaanau and iwi. This project is significant to ensure hapuu, marae, whaanau and/or iwi koorero and purakau of their waahi tapu and sites of significance.

Key threats/impacts	Waahi tapu and sites of significance become disconnected from hapuu, marae, whaanau and the Waikato River. Waahi tapu remain isolated uncared for and become more degraded and infested with weeds. Culturally important purakau, tikanga and kawa become less known. Culturally unsafe for waahi tapu to be left unprotected.
Project goal/s (SMART)	• Within 10 years, all identified waahi tapu and sites of significance access, fencing and planting have been completed. • Ongoing weed management has been undertaken by landowners, hapuu, marae, whaanau and/or iwi. • Signage and/or carved iPou have been developed to tell the history of waahi tapu or sites of significance.
Works required	**Proposed development to include:** A site visit with kaumatua to locate waahi tapu or site of significance. Facilitate cultural practices and ensure cultural safety as per their tikanga and kawa. Fence off and plant native species around each waahi tapu or site of significance. **Cultural practices to ensure cultural safety** Cultural safety $200 per hour or $1600 per day. **Site fencing** Perimeter fenced with a 7-wire post and baton fence to exclude cattle. Estimated fencing cost per 1000m^2 site: 130m x $20/m = $2600. Estimated fencing cost across 1 x 1ha: 400m x $20/m = $8000. **Site prep, planting and maintenance** Site prep $2000 per hectare of weedy site. Plant spacing based on 1.5m and 4444 stems per hectare. Plant costs $3.50 per plant. Planting cost $1.50 per plant. 5 x releasing events $3.00 per plant. Estimated cost per 1000m^2 $3955. Estimated cost per hectare $39,552. **Maaori cultural symbolism** Waahi tapu and sites of significance will be recognised through the development and fabrication of cultural symbolism, which will be installed to appropriately mark the locations. The total number of carved pou or iPou will be determined by the number of waahi tapu and sites of significance identified by hapuu, marae, whaanau and/or Waikato-Tainui. Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install iPou (or other design, e.g. carved pou, or kohatu). **Carved Pou** *Collate information for carved Pou*

	Collate information for the sites identified by hapuu, marae, whaanau and/or Waikato-Tainui. Estimated cost per carved pou $1000. *Fabricate and install carved pou onto the sites* (6m length x 0.6m diameter) Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install pou. Estimated fabrication and installation costs per carved pou $35,000. *Timber to be carved into pou* (6m length x 0.6m diameter) Cost is highly dependent on availability and species. It is encouraged to shop around. Totara is best suited for fine detailed carving – $15,000 including transport from South Island. H5 treated pine is not suited for fine detailed carving – $1200 including transportation. **iPou** The project will allow everyone with a mobile device to engage and have an educational and informative cultural experience that is measurable and immediate. It is multi focused, with messaging for river iwi and their beneficiaries, other iwi, local and government agencies, environmental partners and stakeholders, public, visitors and international guests.  *Collate information for iPou* Collate information for the sites identified by hapuu, marae, whaanau and/or Waikato-Tainui. Estimated cost per iPou $1000. *Fabricate and install 1 iPou onto the sites* Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install iPou (or other design, e.g. carved pou, or kohatu).

	Estimated cost per iPou $10,000. *Technology/information loaded and installed into each iPou* Engage iPou developer to install information collated through interviews and literature review into the fabricated pou. Upload/install the technology. Estimated cost per iPou $2000 **Project delivery** Works need to be implemented by hapuu, marae and whaanau. This project could be undertaken as a whole, or in components. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost $156,098
Risks to project success	Lack of funding. Access to sites is restricted. Resource consents not granted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Lake Karapiro and Ngaaruawaahia. Very high likelihood of adoption.
Knowledge gaps and response	Exact location, to be identified by key knowledge holders i.e. kaumatua, kuia.
Project duration (years)	3 year project per identified waahi tapu or significant site.

Costs

Individual costing estimates for 1 x 1000m^2 site with either 1 x carved totara pou, 1 x carved pine pou or 1 x iPou fabricated and installed onsite.

Work description	**Cost ($)**
Task costs are based on 1 x 1000m^2 site	
Cultural practices to ensure cultural safety 8 hours	1600
1000m^2 site fencing	2600
Site prep, planting, maintenance	3955
1 x carved pou fabrication and installation	35,000
Collate information for carved pou	1000
Totara timber 6m length x 0.6m diameter	15,000
1 x iPou fabrication and installation	10,000
Collate information for iPou	1000
Load information into iPou software	2000
Project management totara carved pou	17,747
Project management pine carved pou	13,607
Project management for iPou	6347
Total estimated cost for 1 x totara carved pou	**76,902**
Total estimated cost for 1 x iPou	**27,502**

The cost estimate below includes site prep, planting, weed maintenance and fencing for up to 20 x 1000m^2 sites, cultural practices, and 5 x carved totara pou and 10 x iPou fabricated and installed onsite.

Work description	**Cost ($)**
Task costs are based on 20 x 1000m^2 site	
Cultural practices to ensure cultural safety 160 hours	32,000
Site fencing	39,000
Site prep, planting, maintenance	59,325
5 x carved pou fabrication and installation	175,000
Collate information for carved pou x 10	10,000
5 x totara timber 6m length x 0.6m diameter	75,000
10 x iPou fabrication and installation	100,000
Collate information for iPou x 10	10,000
Load information into iPou software x 10	20,000
Project management/staffing/incidentals (30%)	156,098
Total estimated cost for 20 x 1,000m^2 sites	**676,423**

Waikato-Tainui Karapiro ki Ngaaruawaahia 4 **Priority: Very high**	**Tuarua – 10ha wetland creation, restoration and protection – Karapiro ki Ngaaruawaahia**
Project summary	Wetland creation, restoration and protection were identified as very high priorities by hapuu, marae and whaanau from Lake Karapiro through to Ngaaruawaahia. This project will see the restoration of 10ha of wetlands between Karapiro and Ngaaruawaahia in areas identified by hapuu, marae, whaanau or iwi as being historically, culturally, ecologically or spiritually significant.
Vision for the project	Wetlands are well established at the sites. Whaanau are able to exercise their mana whakahaere through restoring, protecting, enhancing and harvesting native flora and fauna, including paru, for cultural purposes. Customary practices and knowledge is transferred on to future generations. Ensure the location of paru within the wetlands have been recorded, protected, enhanced and restored for future cultural use.
Location	 Project area is between Lake Karapiro and Ngaaruawaahia. The 10ha of wetland restoration sites will be identified by whaanau, hapuu and ngaa marae within the mapped area above in locations that are historically, culturally, ecologically or spiritually significant.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically or spiritually significant, e.g. traditional mahinga kai sites. Waikato-Tainui's primary interest in the project is to protect unfettered access of tribal members to exercise mana whakahaere and undertake traditional mahinga kai practices.

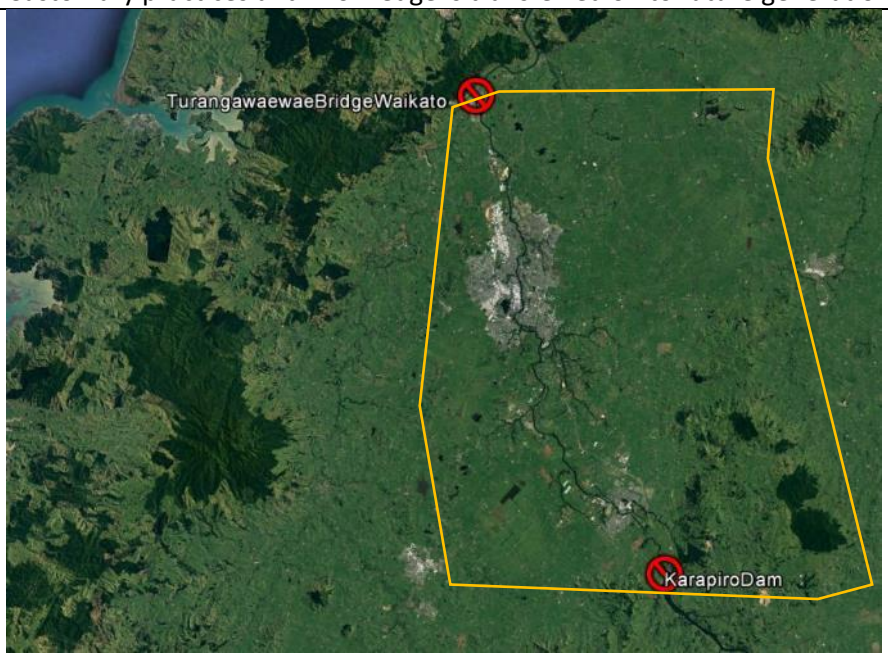
	This includes the broader aspiration of the restoration and recovery of wetland taonga species, which is related to the overall health and wellbeing of the Waikato River as captured under Waikato Raupatu River Settlement legislation (2010). Tuna is an important cultural fishery for the peoples of Karapiro ki Ngaaruawaahia especially, and is considered to be an important indicator of river health. Stopping the encroachment of non tangata whenua fishers into areas traditionally used by members of Waikato-Tainui is one part of this overall aspiration.
Key threats/impacts	Hapuu, marae, whaanau become disconnected from traditional gathering sites. Further loss of key historic whitebait spawning site due to pest plant infestation. Culturally important purakau, tikanga and kawa become less known. Areas become more degraded (unrestricted stock access).
Project goal/s (SMART)	Within 10 years, up to 10ha of wetlands have been constructed, restored, fenced and planted, and pest plant releasing programmes have been completed. Waananga have been held with iwi members at (or near) the restoration sites or close marae, for the transfer of knowledge and tools to marae.
Works required	Works could be implemented at whaanau, hapuu and/or marae level. This project could be undertaken as a whole, or in components. **Cultural health and safety** Cultural health and safety in accordance with Waikato-Tainui marae tikanga and kawa, where required from project commencement through to project completion. Based on $200 per hour. Estimate cost for 8 hours $1600. Estimated cost for up to 80 hours $16,000. **Riparian fencing** Carry out riparian fencing with a minimum 5m setback from the edge of the wetland and plant riparian margins with native species. Fence with a 7-wire post and batten fence to exclude cattle. Estimated fencing cost per hectare site: 400m x $20/m = $8000. Estimated fencing cost for 1 site at 10ha: 1270m x $20/m = $25,400. Estimated fencing cost for 10 x individual sites at 1ha each $80,000. **Wetland planting** Carry out planting of native wetland species within the internal areas of the wetland where required, with plant spacing of 15m (4444 plants per hectare). Estimated cost per hectare $39,552. Estimated cost for 10ha $395,520.

	Resource consent Resource consents may be required. Estimated cost per consent $5000. Estimated cost for 10 individual consents $50,000. **Capacity development** Provide training for tribal members to learn about riparian fencing and planting (includes site visit to champion site). Provide training for tribal members to learn about wetland restoration. Wetland waananga (x 10). Estimate cost $50,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost per 1ha $17,746 (excludes tertiary scholarships) Estimated cost 10ha $207,456
Risks to project success	Lack of funding. Access to sites is restricted. Resource consents not granted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Lake Karapiro and Ngaaruawaahia. Very high likelihood of adoption.
Knowledge gaps and response	It is unknown whether consents or authorisations are required.
Project duration (years)	10 year project.

Costs

Work description	Costs ($)
Cultural practices in accordance with Waikato-Tainui marae tikanga and kawa throughout project where required	16,000
Capacity building – wetland waananga	50,000
Riparian fencing 10 x 1ha sites	80,000
Wetland planting (10ha)	395,520
Resource consent x 10	50,000
Project management/staffing/incidentals (30%)	177,456
Total	**768,976**

Work description	Costs ($)
Estimated cost of 1ha site for wetland restoration project fully completed (excludes tertiary scholarship)	**76,898**

Waikato-Tainui Karapiro ki Ngaaruawaahia 5 **Priority: Very High**	**Tuarua – Tuna habitat ponds – Karapiro ki Ngaaruawaahia**
Project summary	The restoration of tuna abundance was identified as a very high priority by whaanau, hapuu and ngaa marae between Lake Karapiro and Ngaaruawaahia. This project will see the creation of 15 tuna habitat ponds between Lake Karapiro and Ngaaruawaahia in areas identified by hapuu, marae, whaanau or iwi as being historically, culturally, ecologically or spiritually significant.
Vision for the project	Tuna (freshwater eels) are plentiful. Whaanau are able to exercise their mana whakahaere through restoring, protecting, enhancing and harvesting tuna. Customary practices and knowledge is transferred on to future generations.
Location	 Project area between Lake Karapiro and Ngaaruawaahia. The 15 individual tuna pond sites will be identified by whaanau, hapuu and ngaa marae within the mapped area above in locations that are historically, culturally, ecologically or spiritually significant.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically or spiritually significant, e.g. traditional tuna feeding sites, traditional mahinga kai sites and wetland type areas prone to flooding. This project is significant because tuna is a very significant mahinga kai taonga species for Waikato-Tainui. Hapuu, marae and whaanau from Lake Karapiro to Ngaaruawaahia have witnessed a steady decline in tuna abundance over time.

	For hapuu, marae and whanau, the restoration of taonga species and the ability to again provide these taonga as food for manuwhiri (visitors) is a critical marker of mana and status. It also confirms hapuu, marae and whaanau proficiency in manaaki tangata or the practice of generosity and reciprocity. The abundance of food and other resources that were traditionally available to Waikato-Tainui within its tribal rohe are well known by other tribes throughout the motu.
Key threats/impacts	Tuna populations will continue to decline and become less abundant. Hapuu, marae and whaanau will become less engaged with the practices of kaitiakitanga and mahinga kai. Ensure that competitive pest species, e.g. carp, are prevented from accessing identified tuna habitat.
Project goal/s (SMART)	Within 10 years, up to 15 tuna habitat ponds are created within the Karapiro to Ngaaruawaahia area to provide an increase in habitat availability for tuna. Tuna waananga have been held with iwi members at (or near) the ponds to transfer knowledge and tools to marae. Tuna from the ponds are being served at significant tribal events, like Poukai, thus contributing to restoring the relationship of the marae with the Waikato River.
Works required	Works are intended to be implemented by whaanau, hapuu and ngaa marae within Ngaaruawaahia through to Mercer. Co-funding contributions will be sourced and welcomed from interested collaborative partners. This project is intended to be undertaken as 15 individual projects, but may be undertaken as multiple ponds per project where appropriate. A pond should not be created within an existing wetland where there is significant native flora and fauna. **Cultural practices to ensure cultural safety.** Cultural safety $200 per hour or $1600 per 8 hours. Estimated cost for up to 80 hours $24,000. **Earthworks** Excavate marginal low lying areas to create shallow ponds/wetlands. • Ponds should be constructed up to a maximum of 5000m^2 and approximately 2m deep. Ponds should be no deeper than 3m to avoid deoxygenation of bottom layers and associated fish deaths. • Ponds are lined with suitable soils so they are capable of holding water with minimum leakage. • Good quality water is maintained in the constructed ponds. • Ponds are constructed in traditional mahinga kai area/sites identified by hapuu, marae and whaanau.

Installing an in-stream structure (log) that will be secured in place.

Note: Resource consent may be required.

Costs include excavator transport and are based on ponds being 5000m^2 x 2m deep, and a 12 tonne excavator moving 150m^3 per hour ($10,000), returning for one day to reshape the site once excavations have settled ($1800).

Cost per pond $11,800.
Estimated cost across 15 ponds $177,000.

Fencing
Ponds should be fenced with a 7-wire post and batten fence to exclude cattle.

Cost per pond 400m x $20/m = $8000.
Estimated fencing cost across 15 ponds $120,000.

Planting
Dense native planting should be carried out around the pond to create overhanging habitat for eels. Species should consist of hardy native species that would have naturally existed within the wetland environment (e.g. carex secta, cabbage tree and flax).
Native planting 0.3ha per pond $11,865.
Additional weed control for 3 years at each pond $2520.

Planting and releasing cost per pond $14,385.
Estimated planting cost across 15 ponds $215,775.

Resource consent

	It is anticipated that most ponds will require resource consent. Costs will vary depending on whether one consent application is lodged for multiple ponds or whether resource consents are applied for separately. A generous cost estimate of $5000 per pond has been used. Estimated consents cost across 15 ponds is $75,000.  **Capacity development** • Tuna waananga Provide training for tribal members to learn about tuna restoration. Tuna waananga (x 10) plus tuna tool kits. Cost per waananga $6000. Estimated total cost $60,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works, confirm consents (if required) and project manage parts of the work as required. Project management/staffing is estimated to be up to 30% of the project cost. Estimated project management cost per pond $12,956. Estimated project management cost across 15 ponds $224,333.
Risks to project success	Lack of access to sites. Resource consents not granted. Lack of experienced practitioners result in incompleted works. Ongoing maintenance to control weed infestation is not undertaken. Commercial eel fishermen fish out completed pond.
Land tenure – likelihood of adoption	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Karapiro and Ngaaruawaahia.

<table>
<tr><td>and adoption circumstances</td><td>Very high likelihood of adoption.</td></tr>
<tr><td>Knowledge gaps and response</td><td>It is unknown whether consents or authorisations are required.
Exact location of tuna ponds to be determined by whaanau, hapuu and/or marae.
Size of each pond, including area to be fenced and restored, will differ from site to site.</td></tr>
<tr><td>Project duration (years)</td><td>3 years per pond/site, includes construction, planting and weeding programme.
10 year project.</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Earthworks</td><td>177,000</td></tr>
<tr><td>Fencing</td><td>120,000</td></tr>
<tr><td>Planting</td><td>215,775</td></tr>
<tr><td>Resource consents</td><td>75,000</td></tr>
<tr><td>Capacity building</td><td>60,000</td></tr>
<tr><td>Project management/staffing/incidentals (30%)</td><td>194,332</td></tr>
<tr><td>Total</td><td>842,108</td></tr>
</table>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Total estimate cost per individual pond (excludes capacity development and tertiary scholarships)</td><td>56,141</td></tr>
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</table>

Waikato-Tainui Karapiro ki Ngaaruawaahia 6 **Priority: High**	**Tuatoru – 20 watercress restoration projects – Karapiro ki Ngaaruawaahia**
Project summary	The restoration of traditional watercress sites was identified as a high priority by whaanau, hapuu and ngaa marae between Karapiro and Ngaaruawaahia. This project will see the creation of 20 restored watercress sites between Ngaaruawaahia and Mercer in areas identified by hapuu, marae, whaanau and iwi as being historically, culturally, ecologically significant.
Vision for the project	Watercress is plentiful within the restored, traditional gathering locations.
Location	 Project area between Lake Karapiro and Ngaaruawaahia.
Brief description of site	Historically, watercress was in abundance and readily available for hapuu, marae and whaanau throughout the Waikato catchment. Now, with the intensification of land use, watercress is either no longer present or the land has been modified for dairy and dry stock. Waatakirihi, or watercress (also called koowhitiwhiti, *Nasturtium officinale* and *N. microphyllum*), is a highly prized food source for Waikato-Tainui and Maaori generally. An aquatic or boggy ground plant associated with drains, small creeks, wetland streams and the calmer edges of rivers, waatakirihi is a vigorous plant provided there is a good level of water quality (i.e. lack of sedimentation). It is a member of the mustard family and is highly regarded for its medicinal properties and its taste in many cultures across the world. As avid

<table>
<tr><td></td><td>botanists and gardeners, tangata whenua were quick to identify its properties, and it now forms a major component of many traditional dishes. Harvest sites are highly coveted and sometimes known only to whaanau (family/families).

(Dixon, L. 2017 – The importance of watakirihi – Te reo o te repo – The voice of the wetland)</td></tr>
<tr><td>Key threats/impacts</td><td>New plants do not establish and traditional watercress sites remain barren.
Hapuu, marae and whaanau will become less engaged with the practices of kaitiakitanga of their watercress sites.</td></tr>
<tr><td>Project goal/s (SMART)</td><td>Within 2 years, watercress is flourishing in up to 20 project sites within the Karapiro and Ngaaruawaahia area.</td></tr>
<tr><td>Works required</td><td>Works could be implemented at iwi, hapuu, marae or whaanau level. This project could be undertaken as a whole, or in components.

It is intended to restore traditional hapuu, marae, whaanau and iwi watercress sites.

Watercress restoration ($100,000)
20 sites at $5000 per site $100,000.
Includes project management of 25% ($20,000). Project manager to carry out landowner liaison, provide reporting information, negotiate agreements, inspect works and pick up and seed watercress.</td></tr>
<tr><td>Risks to project success</td><td>Lack of access to sites.
Lack of experienced practitioners results in incompleted works.
Ongoing maintenance to control weed infestation is not undertaken.</td></tr>
<tr><td>Land tenure – likelihood of adoption and adoption circumstances</td><td>Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Karapiro and Ngaaruawaahia.
Very high likelihood of adoption.</td></tr>
<tr><td>Knowledge gaps and response</td><td>It is unknown whether consents or authorisations are required.</td></tr>
<tr><td>Project duration (years)</td><td>1-2 year projects.</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>20 watercress restoration projects</td><td>80,000</td></tr>
<tr><td>Project management/staffing/incidentals (25%)</td><td>20,000</td></tr>
<tr><td>Total</td><td>100,000</td></tr>
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</td></tr>
</table>

Waikato-Tainui Karapiro ki Ngaaruawaahia 7 Priority: High	Tuatoru – 30 puna restoration – Karapiro ki Ngaaruawaahia
Project summary	The restoration of traditional puna was identified as a high priority by hapuu, marae and whaanau from Lake Karapiro to Ngaaruawaahia. This project will see the restoration of up to 30 puna between Lake Karapiro and Ngaaruawaahia. Puna will be restored in areas identified by hapuu, marae, whaanau or Waikato-Tainui as being historically, culturally, ecologically or spiritually significant.
Vision for the project	Up to 30 puna are well established and restored at identified sites. Whaanau are able to exercise their mana whakahaere through restoring, protecting and enhancing their traditional puna. Customary practices and knowledge is transferred on to future generations. Ensure the locations of puna have been recorded, protected, enhanced and restored for future cultural use.
Location	 Project area between Lake Karapiro and Ngaaruawaahia. The 30 puna restoration sites will be identified by whaanau, hapuu and ngaa marae within the mapped area above in locations that are historically, culturally, ecologically or spiritually significant.
Brief description of site	Restoration of puna is important because traditional puna were used for drinking water and sustainable land use by marae and whaanau whare. Historically, marae and whaanau kainga were build next to waterways or puna. Waikato-Tainui's primary interest in the project is to protect unfettered access of tribal members to exercise mana whakahaere and undertake traditional cultural practices.

Key threats/issues	Hapuu, marae and whaanau become disconnected from traditional puna sites. Further loss of key historic knowledge of each site, and pest plant infestation. Culturally important purakau, tikanga and kawa become less known. Areas become more degraded (unrestricted stock access). Traditional puna are depleted due to surrounding activities, e.g. farming.
Project goal/s (SMART)	Within 10 years, up to 30 puna have been restored, enhanced, fenced and planted, and pest plant releasing programmes have been completed. Waananga have been held with Waikato-Tainui members at (or near) the restoration sites or close marae, for the transfer of knowledge and tools to marae.
Works required	Works could be implemented and led by hapuu, marae, whaanau and/or Waikato-Tainui. Co-funding contributions from other interested partners for hapuu, marae, whaanau and/or Waikato-Tainui to complete this project would be welcomed. This project could be undertaken in parts or as, a whole. **Cultural health and safety** Cultural health and safety in accordance with Waikato-Tainui marae tikanga and kawa, where required, from project commencement through to project completion. Based on $200 per hour. Estimate cost $800 per 4 hours. Estimated cost for up to 120 hours $24,000. **Restoration fencing and planting** *Estimated cost per puna* Carry out approximately 130m of fencing to protect approximately 1000m^2 area around each puna. Estimated cost for 130m of 7-wire post and batten fence $2600. Estimated prep, planting and maintenance costs for 1000m^2 $3955. *Estimated cost per puna run off streams/tributary* Carry out approximately 100m of fencing puna run off streams, puna seep/wet areas with a minimum 5m setback from the edge of the streambank and seep/wet areas. Plant riparian margins with native species. Estimated fencing cost for 200m $4000. Estimated prep, planting and maintenance cost for 1000m^2 $3955. Where a puna is historically known to be a whitebait spawning ground, riparian planting is to be carried out using appropriate native plant species at 0.75m spacing.

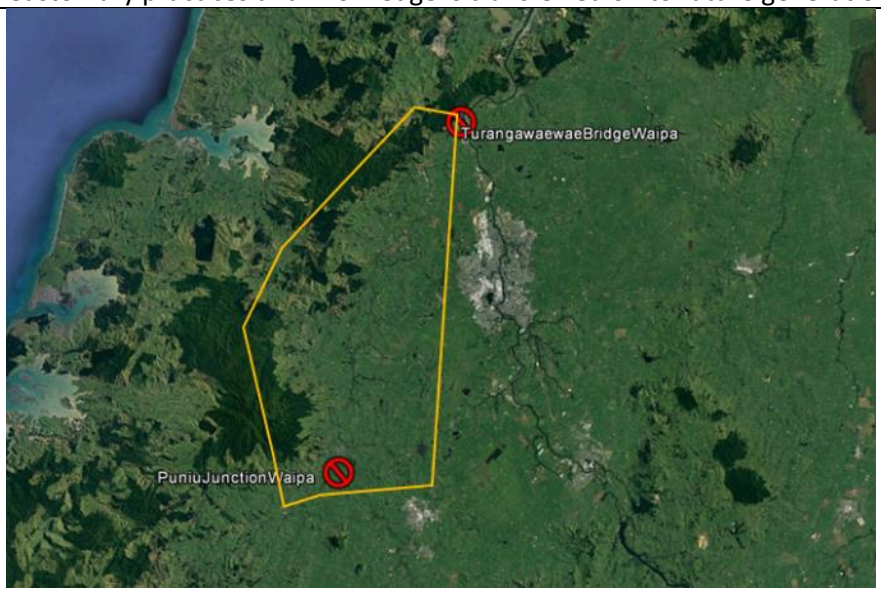
<table>
<tr><td></td><td>Capacity development
Provide training for tribal members to learn about riparian fencing and planting.
Fencing waananga (x5).
Planting waananga (x5).
Estimated cost per waananga $5000.
Estimate total waananga cost $50,000.

Project management/staffing/incidentals (30%)
Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost.
Estimated cost per puna $4353.
Estimated cost for 30 puna $185,790</td></tr>
<tr><td>Risks to project success</td><td>Lack of funding.
Access to sites is restricted.
Lack of experienced practitioners results in incompleted works.
Ongoing maintenance to control weed infestation is not undertaken.</td></tr>
<tr><td>Land tenure – likelihood of adoption and adoption circumstances</td><td>Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and Waikato-Tainui between Karapiro and Ngaaruawaahia.
Very high likelihood of adoption.</td></tr>
<tr><td>Knowledge gaps and response</td><td>Exact puna location to be determined by whaanau, hapuu and /or marae.

Size of puna areas to be fenced and restored differ from site to site.
Length of fencing required for puna, including run off streams and wet seep areas.</td></tr>
<tr><td>Project duration (years)</td><td>Individual projects expected to take 3-5 years.
10 year project.</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Cultural practices in accordance with Waikato-Tainui marae tikanga and kawa throughout project where required</td><td>24,000</td></tr>
<tr><td>Fencing off puna for protection (30 puna)</td><td>78,000</td></tr>
<tr><td>Puna riparian planting (30 puna)</td><td>118,650</td></tr>
<tr><td>Puna stream fencing (30 puna)</td><td>120,000</td></tr>
<tr><td>Puna stream riparian planting (5m setback on both banks)</td><td>118,650</td></tr>
<tr><td>Capacity building
Fencing and planting waananga</td><td>50,000</td></tr>
<tr><td>Project management/staffing/incidentals (30%)</td><td>152,790</td></tr>
<tr><td>Total</td><td>662,090</td></tr>
</table>
</td></tr>
</table>

	Estimated cost for 1 x puna restoration project fully completed (excludes tertiary scholarship and waananga)	**22,070**	

Waikato-Tainui - Puuniu ki Ngaaruawaahia

Waikato-Tainui Puuniu ki Ngaaruawaahia 1 **Priority: High**	**Tuatahi – Tuna habitat ponds – Puuniu ki Ngaaruawaahia**
Project summary	The restoration of tuna abundance was identified as a high priority by whaanau, hapuu and ngaa marae along the Waipaa River catchment between Puuniu River junction and the Ngaaruawaahia. This project will see the creation of 15 tuna habitat ponds between Puuniu River junction and Ngaaruawaahia in areas identified by hapuu, marae, whaanau and iwi as being historically, culturally, ecologically or spiritually significant.
Vision for the project	Tuna (freshwater eels) are plentiful. Whaanau are able to exercise their mana whakahaere through restoring, protecting, enhancing and harvesting tuna. Customary practices and knowledge is transferred on to future generations.
Location	 Project area between the Puuniu River junction and Ngaaruawaahia on the Waipaa River catchment. Exact locations of the 15 individual tuna ponds will be identified by whaanau, hapuu and ngaa marae.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically or spiritually significant, e.g. traditional tuna feeding sites, traditional mahinga kai sites and wetland type areas prone to flooding. This project is significant because tuna is a very significant mahinga kai taonga species for whaanau, hapuu and ngaa marae between Puuniu River junction and Ngaaruawaahia. Hapuu, marae and whaanau between Puuniu River junction and Ngaaruawaahia have witnessed a steady decline in tuna abundance over time.

	For whaanau, hapuu and ngaa marae between Puuniu River junction and Ngaaruawaahia, the restoration of taonga species and the ability to again provide these taonga as food for manuwhiri (visitors) is a critical marker of mana and status. It also confirms hapuu, marae and whaanau proficiency in manaaki tangata or the practice of generosity and reciprocity. The abundance of food and other resources that were traditionally available to Waikato-Tainui within its tribal rohe are well known by other tribes throughout the motu.
Key threats/impacts	Tuna populations will continue to decline and become less abundant. Hapuu, marae and whaanau will become less engaged with the practices of kaitiakitanga and mahinga kai. Ensure that competitive pest species, e.g. carp, are prevented from accessing identified tuna habitat.
Project goal/s (SMART)	Within 10 years, up to 15 tuna habitat ponds are created within the Puuniu to Ngaaruawaahia area to provide an increase in habitat availability for tuna. Tuna waananga have been held with iwi members at (or near) the ponds to trnasfer knowledge and tools to marae. Tuna from the ponds are being served at significant tribal events, like Poukai, thus contributing to restoring the relationship of the marae with the Waikato River.
Works required	Works are intended to be implemented by whaanau, hapuu and ngaa marae within Ngaaruawaahia through to Mercer. Co-funding contributions will be sourced and welcomed from interested collaborative partners. This project is intended to be undertaken as 15 individual projects, but may be undertaken as multiple ponds per project where appropriate. A pond should not be created within an existing wetland where there is significant native flora and fauna. **Cultural practices to ensure cultural safety.** Cultural safety, $200 per or $1600 per 8 hours. Estimated cost for up to 80 hours $24,000. **Earthworks** Excavate marginal low lying areas to create shallow ponds/wetlands. • Construct ponds up to a maximum of 5000m^2 and approximately 2m deep. Ponds should be no deeper than 3m to avoid deoxygenation of bottom layers and associated fish deaths. • Ponds are lined with suitable soils so they are capable of holding water with minimum leakage. • Good quality water is maintained in the constructed ponds. • Ponds are constructed in traditional mahinga kai area/sites identified by hapuu, marae and whaanau.

	Installing an in-stream structure (log) that will be secured in place.  **Note: Resource consent may be required** Costs include excavator transport and are based on ponds being 5000m^2 x 2m deep, and a 12 tonne excavator moving 150m^3 per hour ($10,000), returning for one day to reshape the site once excavations have settled ($1800). Cost per pond $11,800. Estimated cost across 15 ponds $177,000. **Fencing** Ponds should be fenced with a 7-wire post and batten fence to exclude cattle. Cost per pond: 400m x $20/m = $8000. Estimated fencing cost across 15 ponds $120,000. **Planting** Dense native planting should be carried out around the pond to create overhanging habitat for eels. Species should consist of hardy native species that would have naturally existed within the wetland environment (e.g. carex secta, cabbage tree, flax). Native planting 0.3ha per pond $11,865. Additional weed control for 3 years at each pond $2520 Planting and releasing cost per pond $14,385. Estimated planting cost across 15 ponds $215,775. **Resource consent**

	It is anticipated that most ponds will require resource consent. Costs will vary depending on whether one consent application is lodged for multiple ponds or whether resource consents are applied for separately. A generous cost estimate of $5000 per pond has been used. Estimated consents cost across 15 ponds = $75,000  **Capacity development** • Tuna waananga Provide training for tribal members to learn about tuna restoration. Tuna waananga (10) plus tuna tool kits. Cost per waananga $6000. Estimated total cost $60,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works, confirm consents (if required) and project manage parts of the work as required. Project management/staffing is estimated to be up to 30% of the project cost. Estimated project management cost per pond $12,956. Estimated project management cost across 15 ponds $224,333.
Risks to project success	Lack of access to sites. Resource consents not granted. Lack of experienced practitioners result in incompleted works. Ongoing maintenance to control weed infestation is not undertaken. Commercial eel fishermen fish out completed pond.

<table>
<tr><td>Land tenure – likelihood of adoption and adoption circumstances</td><td>Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Puuniu River junction and Ngaaruawaahia.
Very high likelihood of adoption.</td></tr>
<tr><td>Knowledge gaps and response</td><td>It is unknown whether consents or authorisations are required.
Exact location of tuna ponds is to be determined by whaanau, hapuu and /or marae.
Size of each pond, including area to be fenced and restored, will differ from site to site.</td></tr>
<tr><td>Project duration (years)</td><td>3 years per pond/site, includes construction, planting and weeding programme.
10 year project.</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Earthworks</td><td>177,000</td></tr>
<tr><td>Fencing</td><td>120,000</td></tr>
<tr><td>Planting</td><td>215,775</td></tr>
<tr><td>Resource consents</td><td>75,000</td></tr>
<tr><td>Capacity building</td><td>60,000</td></tr>
<tr><td>Project management/staffing/incidentals (30%)</td><td>194,332</td></tr>
<tr><td>Total</td><td>842,108</td></tr>
</table>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Total estimate cost per individual pond (excludes capacity development and tertiary scholarships)</td><td>56,141</td></tr>
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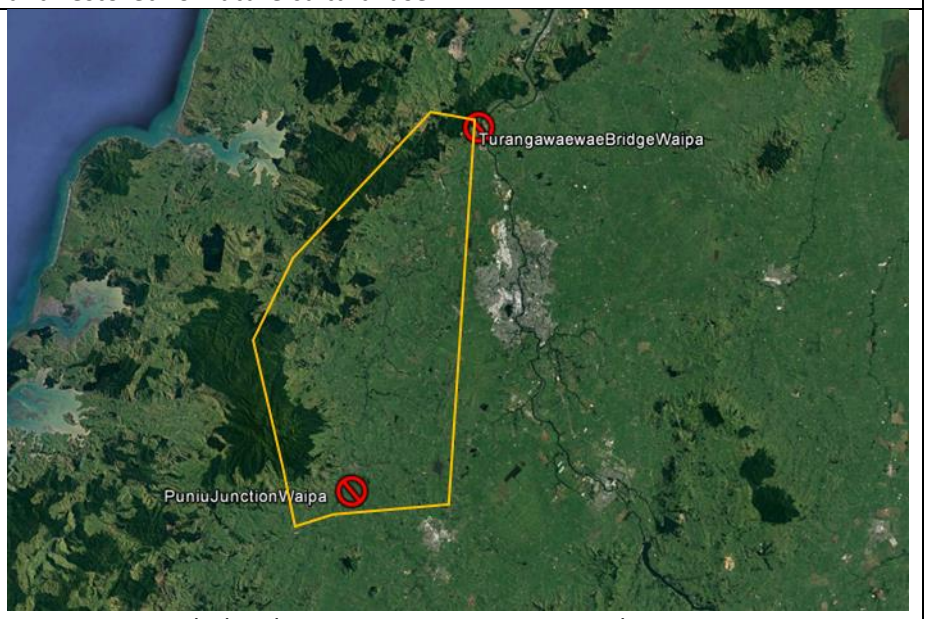
</td></tr>
</table>

Waikato-Tainui Puuniu ki Ngaaruawaahia 2 Priority: High	Tuatahi – 30 puna restoration – Puuniu ki Ngaaruawaahia
Project summary	The restoration of traditional puna was identified as a high priority by whaanau, hapuu and ngaa marae along the Waipaa River catchment from the Puuniu junction on the Waipaa River and Ngaaruawaahia. This project will see the restoration of up to 30 puna between Puuniu junction and Ngaaruawaahia. Puna will be restored in areas identified by hapuu, marae, whaanau and/or Waikato-Tainui as being historically, culturally, ecologically or spiritually significant.
Vision for the project	Up to 30 puna are well established and restored at identified sites. Whaanau are able to exercise their mana whakahaere through restoring, protecting and enhancing their traditional puna. Customary practices and knowledge is transferred on to future generations. Ensure the locations of puna have been recorded, protected, enhanced and restored for future cultural use.
Location	 Project area includes the Puuniu River junction on the Waipaa River to Ngaaruawaahia. The 30 puna restoration sites will be identified by whaanau, hapuu and ngaa marae within the mapped area above in locations that are historically, culturally, ecologically or spiritually significant.
Brief description of site	Restoration of puna is important because traditional puna were used for drinking water and sustainable land use by marae and whaanau whare. Historically, marae and whaanau kainga were build next to waterways or puna. Waikato-Tainui's primary interest in the project is to protect unfettered access of tribal members to exercise mana whakahaere and undertake traditional cultural practices.

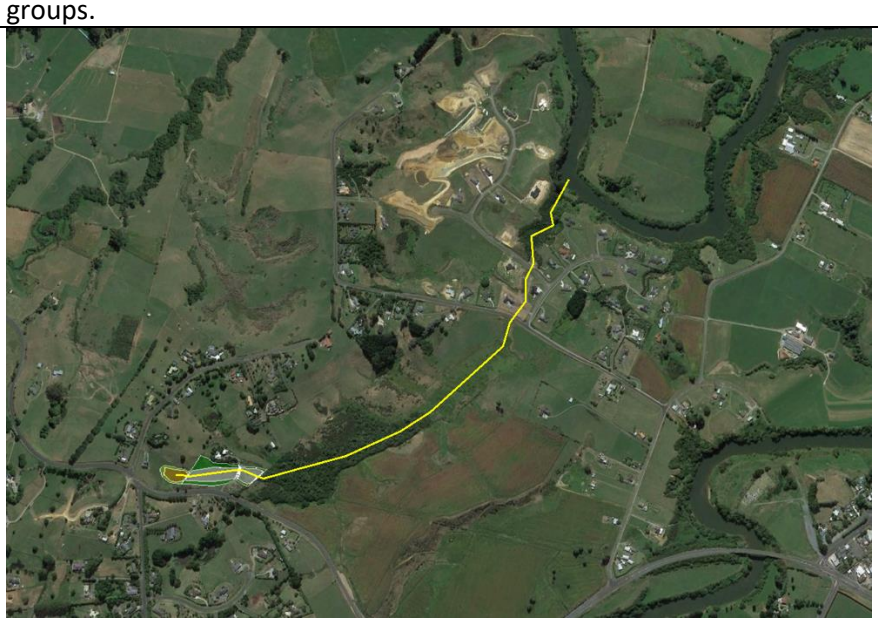
Key threats/impacts	Hapuu, marae, whaanau become disconnected from traditional puna sites. Further loss of key historic knowledge of each site, and pest plant infestation, Culturally important purakau, tikanga and kawa become less known. Areas become more degraded (unrestricted stock access). Traditional puna are depleted due to surrounding activities, e.g. farming.
Project goal/s (SMART)	Within 10 years, up to 30 puna have been restored, enhanced, fenced and planted, and pest plant releasing programmes have been completed. Waananga have been held with Waikato-Tainui members at (or near) the restoration sites or close marae, for the transfer of knowledge and tools to marae.
Works required	Works could be implemented and led by hapuu, marae, whaanau and/or Waikato-Tainui. Co-funding contributions from other interested partners for hapuu, marae, whaanau and/or Waikato-Tainui to complete this project would be welcomed. This project could be undertaken in parts or as, a whole. **Cultural health and safety** Cultural health and safety in accordance with Waikato-Tainui marae tikanga and kawa, where required, from project commencement through to project completion. Based on $200 per hour. Estimate cost $800 per 4 hours. Estimated cost for up to 120 hours $24,000. **Restoration fencing and planting** *Estimated cost per puna* Carry out approximately 130m of fencing to protect an approximately 1000m^2 area around each puna. Estimated cost for 130m of 7-wire post and batten fence $2600. Estimated prep, planting and maintenance costs for 1000m^2 $3955. *Estimated cost per puna run off stream/tributary* Carry out approximately 100m of fencing of puna run off streams, puna seep/wet areas with riparian fencing with a minimum 5m setback from the edge of the streambank, seep/wet areas. Plant riparian margins with native species. Estimated fencing cost for 200m $4000. Estimated prep, planting and maintenance cost for 1000m^2 $3955. Where a puna is historically known to be a whitebait spawning ground, riparian planting is to be carried out using appropriate native plant species and planted at 0.75m spacing. **Capacity development**

	Provide training for tribal members to learn about riparian fencing and planting. Fencing waananga (x5). Planting waananga (x5). Estimated cost per waananga $5000. Estimate waananga cost $50,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost per puna $4353. Estimated cost for 30 puna $185,790.
Risks to project success	Lack of funding. Access to sites is restricted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and Waikato-Tainui between Puuniu River junction and Ngaaruawaahia Very high likelihood of adoption.
Knowledge gaps and response	Exact puna location to be determined by whaanau, hapuu and /or marae. Size of puna areas to be fenced and restored differ from site to site. Length of fencing required for puna, including run off streams and wet seep areas.
Project duration (years)	Individual projects are expected to take 3-5 years. 10 year project.

Costs

Work description	Cost ($)
Cultural practices in accordance with Waikato-Tainui marae tikanga and kawa throughout project where required	24,000
Fencing off puna for protection (30 puna)	78,000
Puna riparian planting (30 puna)	118,650
Puna stream fencing (30 puna)	120,000
Puna stream riparian planting (5m setback on both banks)	118,650
Capacity building Fencing and planting waananga	50,000
Project management/staffing/incidentals (30%)	152,790
Total	**662,090**

Estimated cost for 1 x puna restoration project fully completed (excludes tertiary scholarship and waananga)	**22,070**

Waikato-Tainui Puuniu ki Ngaaruawaahia 3 **Priority: Very high**	**Tuatahi – Tuna educational ponds – Whatawhata**
Project summary	This project is a very high priority for iwi. The project will restore tuna to a traditional mahinga kai site through the construction of up to three tuna ponds to increase, support, promote quality tuna habitat and provide iwi tuna capacity development and educational opportunities.
Vision for the project	Tuna (freshwater eels) are plentiful at the sites. Whaanau are able to exercise their mana whakahaere through restoring, protecting, enhancing and harvesting tuna. Customary practices and knowledge is transferred on to future generations through continued ongoing capacity development waananga with hapuu, marae, whanau and iwi educational groups.
Location	 The site is located at 1372A and B State Highway 23, Whatawhata 3285. Diagram shows the downstream passage to Waipaa River from the tuna restoration ponds.
Brief description of site	The site for 3 tuna ponds has been identified at the above address. Currently all 3 areas are wetland type areas that are prone to flooding. The land requires pest plant management for woolly nightshade and vegetation clearance. The identified area is currently fully fenced with no stock. This project is significant because tuna is a very significant mahinga kai taonga species for Waikato-Tainui and Ngaati Maahaanga. Hapuu, marae and whaanau have witnessed a steady decline in tuna abundance over time.

	This site offers educational opportunities to deliver ongoing tuna waananga for educational purposes and continued monitoring of tuna pond research because of it close proximity to Hamilton and good site access.
Key threats/impacts	• Tuna population will continue to decline and become less abundant. • Hapuu, marae and whaanau will become less engaged with the practices of kaitiakitanga and mahinga kai.
Project goal/s (SMART)	Within 5 years, 3 tuna habitat ponds have been created. Tuna ponds are utilised as an educational, tuna waananga site for future capacity development of hapuu, marae, whaanau and iwi educational groups. Tuna for the ponds may be served at Poukai, thus contributing to restoring the relationship of the marae with the Waipaa River.
Works required	Works could be implemented at iwi, hapuu, marae or whaanau level. Co-funding contributions from landowner and other interested partners to iwi, hapuu or whaanau to complete this project would be welcomed. This project could be undertaken in parts or as a whole. **Earthworks** Excavate marginal low lying wetland areas to create 3 shallow ponds. • Pond 1. Approximately 2000m^2 and 1.5m to 2m deep. Includes 1000m^2 of native riparian planting. • Pond 2. Approximately 4500m^2 and 1.5m to 2m deep. Includes 3500m^2 of native riparian planting. • Pond 3. Approximately 2000m^2 and 1.5m to 2m deep. Includes 800m^2 of native riparian planting. • Ponds are no deeper than 2m deep to avoid deoxygenation of bottom layers and associated fish deaths. • Ponds are lined with suitable soils so they are capable of holding water with minimum leakage. • Ponds are located where eels are able to access them (e.g. flow into watercourses where there are no barriers to eel passage).

Note: Resource consent may be required

Costs include excavator transport and are based on all 3 ponds being 8500m^2 x 2m deep, and a 12 tonne excavator moving 150m^3 per hour ($10,000), returning for one day to reshape the site once excavations have settled ($1800).

3 ponds = $20,060.

Fencing
Ponds should be fenced with a 7-wire post and baton fence to exclude cattle.

Total fencing required for all 3 ponds 800m x $20/m = $16,000
Estimated toal cost of fencing $16,000.

Planting
Dense native planting should be carried out around the pond to create overhanging habitat for eels. Species should consist of hardy native species that would have naturally existed within the wetland environment (e.g. carex secta, cabbage tree, flax).

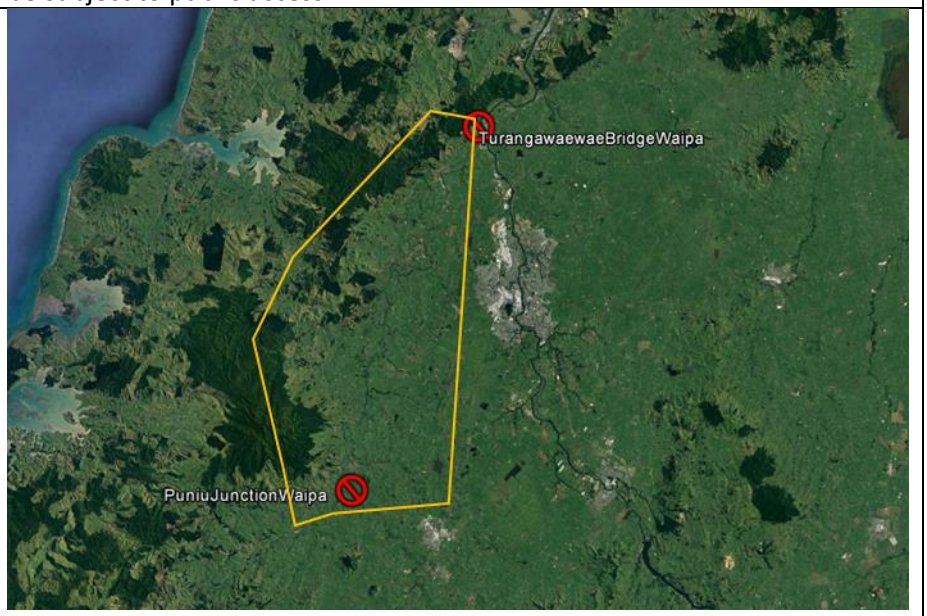
- Site prep $2120 (5300m^2 weedy site)
- Planting at 1.5m spacing (4444 stems/ha)
- Plant costs $3.50 per plant
- Planting cost $1.50
- 5 x releasing events $3 per plant

Estimated cost for riparian planting $18,843

Resource consent

	It is anticipated that most ponds will require resource consent. Costs will vary depending on whether one consent application is lodged for multiple ponds or whether resource consents are applied for separately. A generous cost estimate of $5000 per pond has been used. Estimated cost for 3 ponds $15,000.  **Capacity development** Provide training for tribal members to learn about tuna restoration. • 2 x tuna waananga plus tuna took kits $12,000 • 1 x capacity building waananga on fencing (onsite) $4000 • 1 x capacity building waananga on riparian planting $4000 Estimated cost for capacity building $20,000 **Project management/staffing/incidentals (25%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau, iwi and iwi educational groups (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be up to 25% of the project cost. Estimated cost across 3 ponds $32,389.
Risks to project success	Lack of funding. Access to sites is restricted. Resource consents not granted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	No issues with land tenure. Full landowner support including in-kind contributions towards project.

<table>
<tr><td>Knowledge gaps and response</td><td>It’s unknown if resource consents are required.</td></tr>
<tr><td>Project duration (years)</td><td>3 years</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>Earthworks</td><td>20,060</td></tr>
<tr><td>Fencing</td><td>16,000</td></tr>
<tr><td>Planting</td><td>18,843</td></tr>
<tr><td>Resource consents</td><td>15,000</td></tr>
<tr><td>Capacity building</td><td>20,000</td></tr>
<tr><td>Project management/staffing/incidentals (25%)</td><td>22,476</td></tr>
<tr><td>Total</td><td>112,379</td></tr>
</table>
</td></tr>
</table>

Waikato-Tainui Puuniu ki Ngaaruawaahia 4 **Priority: Very high**	**Tuatahi – Identification, restoration and protection of waahi tapu and sites of significance – STAGE 1 Puuniu River ki Ngaaruawaahia.**
Project summary	Enhancement, restoration and protection of waahi tapu and sites of significance were identified as very high priorities by hapuu, marae, whaanau and Waikato-Tainui. This project is stage 1 of a 2-stage process. This stage identifies the locations and tribal history of each waahi tapu and site of significance from within the area of Puuniu River through to Ngaaruawaahia. Stage 2 will consist of physical restoration and protection works. Please refer to PAF for full details of works *(Restoration and protection of waahi tapu and sites of significance – STAGE 2 – Puuniu River junction ki Ngaaruawaahia).*
Vision for the project	Waahi tapu and sites of significance have been identified and protected, and historical koorero recorded and archived with Waikato-Tainui and whaanau, hapuu and/or marae. Note: Only approved historical koorero will be subject to public access.
Location	 Project area includes the Waipaa River and all tributaries between Puuniu junction and Ngaaruawaahia. Exact locations of waahi tapu will be identified by whaanau, hapuu and ngaa marae.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically and spiritually significant, e.g. waahi tapu, urupaa, sites of significance, burial sites for hapuu, marae, whaanau and iwi afterbirth, sites of historic events and traditional historic walkways between hapuu, marae, whaanau and iwi. This project is significant to ensure hapuu, marae, whaanau and/or iwi koorero and purakau of their waahi tapu and sites of significance.

Key threats/impacts	Waahi tapu and sites of significance become disconnected from hapuu, marae, whaanau and the Waikato River. Waahi tapu remain isolated, uncared for and become more degraded and infested with weeds. Culturally important purakau, tikanga and kawa become less known. Culturally unsafe for waahi tapu to be left unprotected.
Project goal/s (SMART)	• Within 3 years, waananga have been held with hapuu, marae, whaanau and/or iwi. One on one interviews have been held with kaumatua and key knowledge holders, with recordings archived. • Hapuu, marae, whaanau and/or iwi have identified the locations of all waahi tapu and sites of significance within the areas of Puuniu junction and Ngaaruawaahia • Waahi tapu and sites of significance register, including GIS mapping, is complete and entered into Waikato-Tainui's archiving data system. • Opportunities for iwi capacity development in GIS mapping has been implemented.
Works required	**Waananga** 10 waananga held with hapuu, marae and whaanau to identify waahi tapu, sites of significance and key knowledge holders, i.e. kaumatua/kuia (as appropriate), and collate relevant information from literature sources. All findings are presented back. • Venue, kai and koha per day $1500 • Cultural safety, per hour$200 or per day $1600 • Facilitator $200 per hour and $1600 per day • Travel expenses for participants $40 per person and $600 per waananga Estimated cost per waananga $3700. Estimated total waananga cost $37,000. **Interviews** Interview knowledge holders, i.e. kaumatua/kuia (as appropriate), and collate relevant information from literature sources. Assume: • Up to 20 kaumatua/kuia interviews at $500 per interview – $10,000 • Film interviews at $700 per day x 14 days = $9800 • Editing of interviews at $700 per day x 14 days = $9800 • Interviewer/literature reviewer at $800 per day x 21 days = $16,800 Estimated interviewing cost $46,400. **Mapping and photographing waahi tapu sites** Access, map and photograph all significant and waahi tupuna/tapu sites. Enter information into digital database and maps. Assume: • Access and photograph sites at $800 per day x 21 days = $16,800 • GIS mapping services at $200 per hour to input maps and develop

	register x 28 days $44,800 Estimated interviewing cost $61,600. **Capacity development** Hold 2 x GIS mapping waananga with hapuu, marae and whaanau from Puuniu junction to Ngaaruawaahia, and identify and support (x2) taiohi to undertake a scholarship to study and formally upskill in GIS/cultural mapping of waahi tapu/historical or related studies. • GIS mapping waananga x 2 $10,000, • Scholarship x 2 taiohi/student $20,000 Estimated capacity development costs $30,000. **Vegetation clearance to access sites of significance** Some of the known waahi tapu and site of significance areas need to be cleared of scrub and weeds to allow access for hapuu, marae and whaanau to assess the sites. • Contractor costs to clear weeds from known sites of significance at $700 per day x 28 days Estimated clearing cost $19,600. **Project delivery** Works need to be implemented by hapuu, marae and whaanau. This project could be undertaken as a whole, or in components. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost $58,380.
Risks to project success	Lack of funding. Access to sites is restricted. Resource consents not granted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Puuniu junction and Ngaaruawaahia. Very high likelihood of adoption.
Knowledge gaps and response	Exact location to be identified by key knowledge holders, i.e. kaumatua, kuia.
Project duration (years)	3 year project

Costs

Work description	Cost ($)
Waananga with Waikato-Tainui kaumatua	37,000
Interview with key knowledge holders	46,400
Mapping and photography	61,600
GIS mapping capacity development	30,000
Clear and remove vegetation	19,600
Project management/staffing/incidentals (30%)	58,380
Total	**252,980**

Waikato-Tainui Puuniu ki Ngaaruawaahia 5 **Priority: Very high**	**Tuarua – Restoring and protecting waahi tapu and sites of significance – STAGE 2 – Puuniu ki Ngaaruawaahia**
Project summary	Enhancement, restoration and protection of waahi tapu and sites of significance were identified as very high priorities by hapuu, marae, whaanau and Waikato-Tainui. This project is stage 2, the final stage, to physically restore and protect the waahi tapu and sites of significance identified by hapuu, marae, whaanau and/or iwi during stage 1. *(Tuarua - Identification, restoration and protection of waahi tapu and sites of significance – STAGE 1 – Puuniu River junction ki Ngaaruawaahia)*
Vision for the project	Identified waahi tapu and sites of significance have been restored and protected with full stock exclusion fencing and appropriate planting of native species. Locations of waahi tapu and sites of significance will be marked by traditional carved pou, iPou or new technology (e.g. augmented reality technology) that can be adapted to traditional Maaori symbolism. Note: Only approved historical koorero will be subject to public access.
Location	 Project area includes the Waikato River and all tributaries between Puuniu River junction and Ngaaruawaahia. Exact locations of waahi tapu will be identified by whaanau, hapuu and ngaa marae.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically and spiritually significant, e.g. waahi tapu, urupaa, sites of significance, burial sites for afterbirth, sites of historic events and traditional historic walkways between hapuu, marae, whaanau and iwi. This project is significant to ensure hapuu, marae, whaanau and/or iwi koorero and purakau of their waahi tapu and sites of significance.

Key threats/impacts	Waahi tapu and sites of significance become disconnected from hapuu, marae, whaanau and the Waikato River. Waahi tapu remain isolated, uncared for and become more degraded and infested with weeds. Culturally important purakau, tikanga and kawa become less known. Culturally unsafe for this waahi tapu to be left unprotected.
Project goal/s (SMART)	• Within 10 years, all identified waahi tapu and sites of significance access, fencing and planting have been completed. • Ongoing weed management has been undertaken by landowners, hapuu, marae, whaanau and/or iwi. • Signage and/or carved iPou have been developed to tell the history of the waahi tapu or sites of significance.
Works required	**Proposed development would include:** A site visit with kaumatua to locate waahi tapu or site of significance. Facilitate cultural practices and ensure cultural safety as per their tikanga and kawa. Fence off and plant native species around each waahi tapu or site of significance. **Cultural practices to ensure cultural safety.** Cultural safety $200 per hour or $1600 per day. **Site fencing** Perimeter fenced with a 7-wire post and baton fence to exclude cattle. Estimated fencing cost per 1000m^2 site: 130m x $20/m = $2600. Estimated fencing cost across 1 x 1ha: 400m x $20/m = $8000. **Site prep, planting and maintenance** Site prep $2000 per hectare of weedy site. Plant spacing 1.5m (4444 stems per hectare) Plant costs $3.50 per plant Planting cost $1.50 per plant. 5 x releasing events $3.00 per plant. Estimated cost per 1000m^2 $3955. Estimated cost per hectare $39,552. **Maaori cultural symbolism** Waahi tapu and sites of significance will be recognised through the development and fabrication of cultural symbolism to be installed on site, appropriately marking the location. The total number of carved pou or iPou, will be determined by the number of waahi tapu and sites of significance identified by hapuu, marae, whaanau and/or Waikato-Tainui. Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install iPou (or other design, e.g. carved pou, or kohatu). • **Carved Pou** *Collate information for carved Pou*

	Collate information for the sites identified by hapuu, marae, whaanau and/or Waikato-Tainui. Estimated cost per carved pou $1000. *Fabricate and install carved pou onto the sites* (6m length x 0.6m diameter) Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install pou. Estimated fabrication and installation costs per carved pou $35,000. *Timber to be carved into pou* (6m length x 0.6m diameter) Cost is highly dependent on availability and species. It is encouraged to shop around. Totara is best suited for fine detailed carving – $15,000 including transport from South Island. H5 treated pine is not suited for fine detailed carving – $1200 including transportation. • **iPou** The project will allow everyone with a mobile device to engage and have an educational and informative cultural experience that is measurable and immediate. It is multi focused, with messaging for river iwi and their beneficiaries, other iwi, local and government agencies, environmental partners and stakeholders, public, visitors and international guests.  *Collate information for iPou* Collate information for the sites identified by hapuu, marae, whaanau and/or Waikato-Tainui Estimated cost per iPou $1000. *Fabricate and install 1 iPou onto the sites* Engage appropriate whakairo expert (or other design artist as appropriate) to fabricate and install iPou (or other design, e.g. carved

	pou, or kohatu). Estimated cost per iPou $10,000. *Technology/information loaded and installed into each iPou* Engage iPou developer to install information collated through interviews and literature review into the fabricated pou. Upload/Install the technology. Estimated cost per iPou $2000. **Project delivery** Works need to be implemented by hapuu, marae and whaanau. This project could be undertaken as a whole, or in components. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost $156,098.
Risks to project success	Lack of funding. Access to sites is restricted. Resource consents not granted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Puuniu River junction and Ngaaruawaahia. Very high likelihood of adoption.
Knowledge gaps and response	Exact location to be identified by key knowledge holders, i.e. kaumatua or kuia.
Project duration (years)	3 year project per identified waahi tapu or significant site.

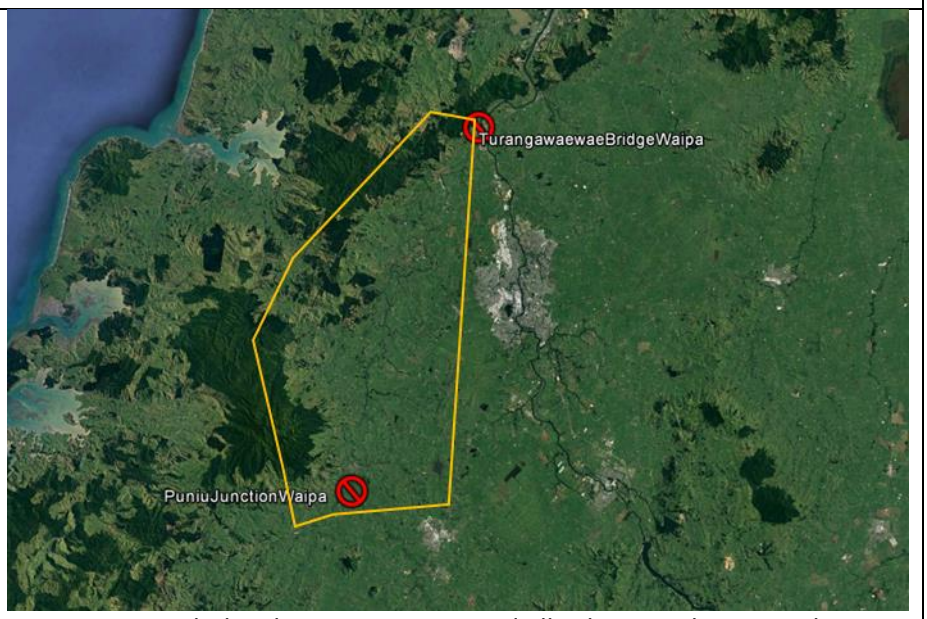
Costs

Individual costing estimates for 1 x 1000m^2 site with either 1 x carved totara pou, 1 x carved pine pou or 1 x iPou fabricated and installed onsite.

Work description	**Cost ($)**
Task costs are based on 1 x 1000m^2 site	
Cultural practices to ensure cultural safety 8 hours	1600
1000m^2 site fencing	2600
Site prep, planting, maintenance	3955
1 x carved pou fabrication and installation	35,000
Collate information for carved Pou	1000
Totara timber 6m length x 0.6m diameter	15,000
1 x iPou fabrication and installation	10,000
Collate information for iPou	1000
Load information into iPou software	2000
Project management totara carved pou	17,747
Project management pine carved pou	13,607
Project management for iPou	6347
Total estimated cost for 1 x totara carved Pou	**76,902**
Total estimated cost for 1 x iPou	**27,502**

The cost estimate below includes site prep, planting, weed maintenance and fencing for up to 20 x 1000m^2 sites, cultural practices, and 5 x carved totara pou, and 10 x iPou, fabricated and installed onsite.

Work description	**Cost ($)**
Task costs are based on 20 x 1000m^2 site	
Cultural practices to ensure cultural safety 160 hours	32,000
Site fencing	39,000
Site prep, planting, maintenance	59,325
5 x carved pou fabrication and installation	175,000
Collate information for carved pou x 10	10,000
5 x totara timber 6m length x 0.6m diameter	75,000
10 x iPou fabrication and installation	100,000
Collate information for iPou x 10	10,000
Load information into iPou software x 10	20,000
Project management/staffing/incidentals (30%)	156,098
Total estimated cost for 20 x 1000m^2 sites	**676,423**

Waikato-Tainui Puuniu ki Ngaaruawaahia 6 Priority: Very high	Tuarua – 10ha wetland creation, restoration and protection – Puuniu ki Ngaaruawaahia
Project summary	Wetland creation, restoration and protection were identified as very high priorities by hapuu, marae and whaanau from Puuniu junction on the Waipaa River through to Ngaaruawaahia. This project will see the restoration of 10ha of wetlands between Puuniu junction and Ngaaruawaahia, in areas identified by hapuu, marae, whaanau or iwi as being historically, culturally, ecologically or spiritually significant.
Vision for the project	Wetlands are well established at the sites. Whaanau are able to exercise their mana whakahaere through restoring, protecting, enhancing and harvesting native flora and fauna, including paru, for cultural purposes. Customary practices and knowledge is transferred on to future generations. Ensure locations of paru within the wetlands have been recorded, protected, enhanced and restored for future cultural use.
Location	 Project area includes the Waipaa River and all tributaries between the Puuniu River junction and Ngaaruawaahia. The 10ha of wetland restoration sites will be identified by whaanau, hapuu and ngaa marae within the mapped area above in locations that are historically, culturally, ecologically or spiritually significant.
Brief description of site	The sites will be areas known to whaanau that are historically, culturally, ecologically or spiritually significant, e.g. traditional mahinga kai sites.

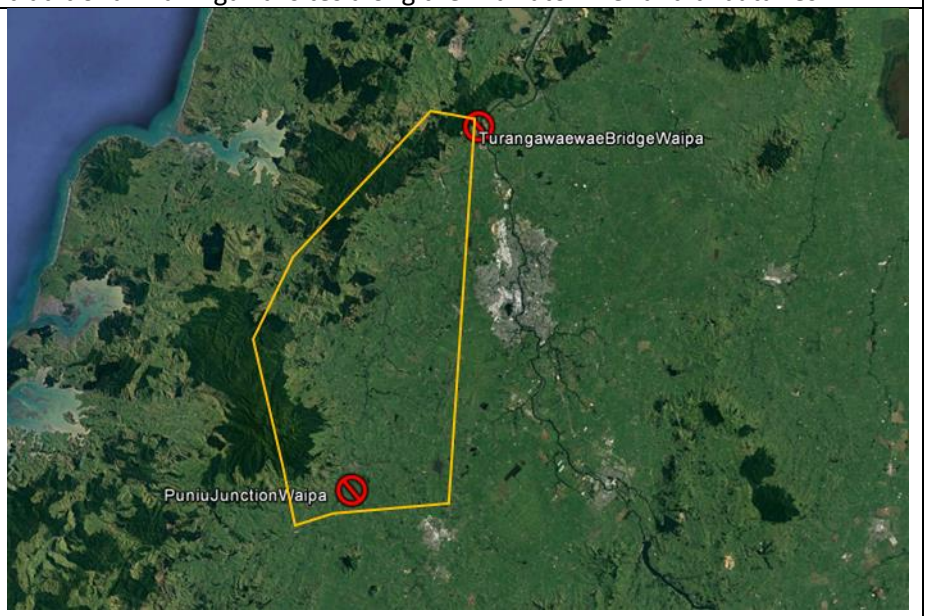
	Waikato-Tainui's primary interest in the project is to protect unfettered access of tribal members to exercise mana whakahaere and undertake traditional mahinga kai practices. The project also includes the restoration and recovery of wetland taonga species as that is related to the overall health and wellbeing of the Waikato River as captured under the Waikato Raupatu River Settlement legislation (2010). Tuna is an important cultural fishery for the peoples of Puuniu ki Ngaaruawaahia especially, and is considered to be an important indicator of river health. Stopping the encroachment of non tangata whenua fishers into areas traditionally used by members of Waikato-Tainui is one part of this overall aspiration.
Key threats/impacts	Hapuu, marae, whaanau become disconnected from traditional gathering sites. Further loss of key historic whitebait spawning site due to pest plant infestation. Culturally important purakau, tikanga and kawa become less known. Areas become more degraded (unrestricted stock access).
Project goal/s (SMART)	Within 10 years, up to 10ha of wetlands have been constructed, restored, fenced and planted, and pest plant releasing programmes have been completed. Waananga have been held with iwi members at (or near) the restoration sites or close marae, for the transfer of knowledge and tools to marae.
Works required	Works could be implemented at whaanau, hapuu and/or marae level. This project could be undertaken as a whole, or in components. **Cultural health and safety** Cultural health and safety in accordance with Waikato-Tainui marae tikanga and kawa, where required, from project commencement through to project completion. Based on $200 per hour. Estimate cost $1600 per 8 hours. Estimated cost for up to 80 hours $16,000. **Riparian fencing** Carry out riparian fencing with a minimum 5m setback from the edge of the wetland and plant riparian margins with native species. Fenced with a 7-wire post and baton fence to exclude cattle. Estimated fencing cost per hectare site: 400m x $20/m = $8000. Estimated fencing cost for 1 site at 10ha: 1270m x $20/m = $25,400. Estimated fencing cost for 10 x individual sites at 1ha each = $80,000. **Wetland planting** Carry out planting of native wetland species within the internal areas of the wetland where required, with plant spacing of 1.5m (4444 plants per hectare).

	Estimated cost per hectare $39,552. Estimated cost for 10ha $395,520. **Resource consent** Resource consents may be required. Estimated cost per consent $5000. Estimated cost for 10 individual consents $50,000. **Capacity development** Provide training for tribal members to learn about riparian fencing and planting (includes site visit to champion site). Provide training for tribal members to learn about wetland restoration. Wetland waananga (x 10). Estimate cost $50,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost per 1ha $17,746 (excludes tertiary scholarships). Estimated cost 10ha $207,456.
Risks to project success	Lack of funding. Access to sites is restricted. Resource consents not granted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Puuniu River junction and Ngaaruawaahia. Very high likelihood of adoption.
Knowledge gaps and response	It is unknown whether consents or authorisations are required.
Project duration (years)	10 year project.

Costs

Work description	Costs ($)
Cultural practices in accordance with Waikato-Tainui marae tikanga and kawa throughout project where required	16,000
Capacity building – wetland waananga	50,000
Riparian fencing 10 x 1ha sites	80,000
Wetland planting (10ha)	395,520
Resource consent x 10	50,000
Project management/staffing/incidentals (30%)	177,456
Total	**768,976**

Work description	**Costs ($)**
Estimated cost of 1ha site for wetland restoration project fully completed. (excludes tertiary scholarship)	**76,898**

Waikato-Tainui Puuniu ki Ngaaruawaahia 7 Priority: High	Tuarua – 10km riparian and taonga species habitat restoration – Puuniu ki Ngaaruawaahia
Project summary	The restoration of riparian margins, including the restoration and protection of ngaa taonga species, have been identified as a high priority by hapuu, marae and whaanau from the Puuniu junction through to Ngaaruawaahia. This project will see the restoration of 10km of riparian margins between the Puuniu junction and Ngaaruawaahia. Areas will be identified by hapuu, marae, whaanau or iwi as being historically, culturally, ecologically or spiritually significant.
Vision for the project	Riparian margins and the ecosystems within the margins are well established at the sites. Whaanau are able to exercise their mana whakahaere through restoring, protecting and enhancing the wellbeing of traditional mahinga kai sites along the Waikato River and tributaries.
Location	 Project area includes the Waikato River and all tributaries between the Puuniu junction and Ngaaruawaahia. The 10km of riparian restoration sites will be identified by whaanau, hapuu and ngaa marae within the mapped area above in locations that are historically, culturally, ecologically or spiritually significant.
Brief description of site	Sections of the Waikato River, streams, and tributaries are historically, culturally, ecologically or spiritually significant, e.g. traditional mahinga kai sites, and well known to hapuu, marae, whaanau and Waikato-Tainui. Waikato-Tainui's primary interest in the project is to provide and protect unfettered access to riparian margins for tribal members to exercise mana whakahaere and undertake traditional mahinga kai practices. This includes the broader aspiration of the restoration and recovery of wetland taonga species associated with healthy riparian margins.

Key threats/impacts	Taonga species remain absent or in decline from traditional sites where they were once plentiful. Hapuu, marae, whaanau become disconnected from the Waikato River and traditional mahinga kai sites due to poor habitat. Culturally important purakau, tikanga and kawa become less known. Cattle and other browsing species are destroying traditional sites within the riparian margins of the Waikato River and associated wetlands.
Project goal/s (SMART)	Within 10 years, up to 10km of riparian margins suitable for taonga species habitat have been restored, enhanced, fenced and planted, and pest plant releasing programmes completed. Capacity development waananga have been held with iwi members at or near the restoration sites or marae, for the transfer of knowledge and tools to marae.
Works required	Works could be implemented and led at marae or whaanau level. Co-funding contributions from other interested partners to hapuu, marae, whaanau and/or Waikato-Tainui to complete this project would be welcomed. This project could be undertaken in parts or as a whole. **Cultural practices to ensure cultural safety.** Cultural safety, $200 per hour or $1600 per day. Estimated cost for up to 80 hours $16,000 **Riparian fencing** Carry out riparian fencing with a minimum 5m setback from the edge of the stream and/or river banks. Fencing will consist of a 7-wire post and batten at $20 per metre. Estimated cost per 1000m site $20,000. Estimated cost for 10km $200,000 . **Wetland planting** Carry out planting of native wetland species within the internal areas of the wetland where required, with a plant spacing of 1.5m (4444 plants per hectare) and 5 x plant releasing events. Estimated planting cost per 5000m^2 $18,776. Estimated planting cost for 5ha $187,760. **Installation of structures for fish habitat** Carry out approximately 10km of securing in-stream wood structures throughout the identified restoration streams (4-6 structures over a 2km length for fish habitat where practicable). Estimate cost per 1km $10,413. Estimated cost for 10km $104,130.

	It is envisaged that whaanau, hapuu and/or marae, with assistance from Waikato Regional Council, work collaboratively in terms of site location investigation, design and installation of woody debris structures. This component could be undertaken in conjunction with Waikato Regional Council's river management work. **Capacity development** Provide training for tribal members to learn about riparian fencing and planting. Fencing waananga (x5). Planting waananga (x5). Estimated cost for 10 waananga at $5000 each, $50,000. **Project management/staffing/incidentals (30%)** Project manager to carry out knowledge holder interviews, work with hapuu, marae, whaanau and/or Waikato-Tainui (as appropriate), landowner liaison, provide information, negotiate agreements, inspect works and project manage parts of the work as required. Project management/staffing is estimated to be 30% of the project cost. Estimated cost per 1km length $16,737 (excludes tertiary scholarships). Estimated cost 10km site $197,367.
Risks to project success	Lack of funding. Access to sites is restricted. Lack of experienced practitioners results in incompleted works. Ongoing maintenance to control weed infestation is not undertaken.
Land tenure – likelihood of adoption and adoption circumstances	Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and Waikato-Tainui, between the Puuniu junction and Ngaaruawaahia. Very high likelihood of adoption.
Knowledge gaps and response	Exact locations of each restoration site need to be determined.
Project duration (years)	10 year project.

Costs

Work description	Cost ($)
Cultural practices in accordance with Waikato-Tainui tikanga and kawa throughout each individual projects where required.	16,000
Riparian fencing (10km)	200,000
Riparian planting (5ha)	187,760
Installation of structures for fish habitat	104,130
Capacity building – fencing and planting waananga	50,000
Project management/staffing/incidentals (30%)	167,367
Total	**725,257**

Estimated cost to restore 1000m length of riparian margin with a 5m setback (excludes tertiary scholarship)	**72,526**

Waikato-Tainui Puuniu ki Ngaaruawaahia 8 Priority: High	Tuatoru – 20 watercress restoration projects – Puuniu ki Turangawaewae
Project summary	The restoration of traditional watercress sites was identified as a high priority by whaanau, hapuu and ngaa marae between Puuniu River junction and Ngaaruawaahia. This project will see the creation of 20 restored watercress sites between Puuniu and Ngaaruawaahia in areas identified by hapuu, marae, whaanau and iwi as being historically, culturally, ecologically significant.
Vision for the project	Watercress is plentiful within the restored, traditional gathering locations.
Location	 Project area between the Puuniu River junction and Ngaaruawaahia.
Brief description of site	Historically, watercress was in abundance and readily available for hapuu, marae and whaanau throughout the Waikato catchment. Now, with the intensification of land use, watercress is either no longer present or the land has been modified for dairy and dry stock. Waatakirihi, or watercress (also called koowhitiwhiti, *Nasturtium officinale* and *N. microphyllum*) is a highly prized food source for Waikato-Tainui and Maaori generally. An aquatic or boggy ground plant associated with drains, small creeks, wetland streams and the calmer edges of rivers, waatakirihi is a vigorous plant provided there is a good level of water quality (i.e. lack of sedimentation). It is a member of the mustard family and is highly regarded for its medicinal properties as well as its taste in many cultures across the world. As avid botanists and gardeners, tangata whenua were quick to identify its properties and it now forms a major component of many traditional

<table>
<tr><td></td><td>dishes. Harvest sites are highly coveted and sometimes known only to whaanau (family/families).

(Dixon, L. 2017 – the importance of watakirihi – Te reo o te repo – The voice of the wetland)</td></tr>
<tr><td>Key threats/impacts</td><td>New plants do not establish and traditional watercress site remains barren.

Hapuu, marae and whaanau will become less engaged with the practices of kaitiakitanga of their watercress sites.</td></tr>
<tr><td>Project goal/s (SMART)</td><td>Within 2 years, watercress is flourishing in up to 20 project sites within the Puuniu ki Ngaaruawaahia catchment.</td></tr>
<tr><td>Works required</td><td>Works could be implemented at iwi, hapuu, marae or whaanau level. This project could be undertaken as a whole, or in components.

It is intended to restore traditional hapuu, marae, whaanau and iwi watercress sites.

Watercress restoration ($100,000)
20 sites at $5000 per site $100,000.
Includes project management of 20% ($20,000). Project manager to carry out landowner liaison, provide reporting information, negotiate agreements, inspect works, and pick up and seed watercress.</td></tr>
<tr><td>Risks to project success</td><td>Lack of access to sites.
Lack of experienced practitioners results in incompleted works.
Ongoing maintenance to control weed infestation is not undertaken.</td></tr>
<tr><td>Land tenure – likelihood of adoption and adoption circumstances</td><td>Mixed land ownership, public and private (by agreement), but predominantly land owned by whaanau, hapuu, ngaa marae and iwi between Puuniu and Ngaaruawaahia.
Very high likelihood of adoption.</td></tr>
<tr><td>Knowledge gaps and response</td><td>It is unknown whether consents or authorisations are required.</td></tr>
<tr><td>Project duration (years)</td><td>1-2 year projects.</td></tr>
<tr><td>Costs</td><td>
<table>
<tr><th>Work description</th><th>Cost ($)</th></tr>
<tr><td>20 watercress restoration projects</td><td>80,000</td></tr>
<tr><td>Project management/staffing/incidentals (25%)</td><td>20,000</td></tr>
<tr><td>Total</td><td>100,000</td></tr>
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