

A Framework for Māori Engagement by the Engineering Profession in Aotearoa New Zealand: A Three Waters Case Study

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ABSTRACT

Meaningful and effective Māori engagement in engineering infrastructure projects is essential to their success, especially within New Zealand's water infrastructure sector. This sector currently faces significant deterioration of both above and below ground water assets across the domains of stormwater, wastewater, and drinking water, known as the three waters. As a response, the previous Labour government proposed a reform bill to revitalise the national three waters network, including a plan of shared governance between councils and iwi. Given the relationship of Māori with water, Te Mana o te Wai principles, and their rights outlined in the Treaty of Waitangi, effective engagement is crucial. A literature review was accompanied by interviews with practitioner engineers and an iwi representative. These were conducted to identify best-practice approaches and expectations of mana whenua for engagement by the engineering profession. The findings of this research highlight the need for proactive measures to address challenges within this topic, with a framework developed to recommend appropriate processes for quality engagement. Gaining Te Ao Māori knowledge, ensuring strong relationship building, and engaging at a strategic planning level are what underpin the guidance developed for practising engineers. This paper considers the critical challenges within New Zealand's water systems and the imperative for Māori engagement to ensure the best outcomes, creating equitable and sustainable three waters infrastructure.

1. INTRODUCTION

1.1. Challenges facing water systems in Aotearoa New Zealand

Aotearoa New Zealand is facing significant challenges regarding the management of water infrastructure systems (Te Waihangā, New Zealand Infrastructure Commission, 2021). The National Performance Review of 2019/2020 found that networks of three waters assets (drinking water, wastewater, and stormwater) were not assessed, and those that were had a high percentage of pipelines regionally in poor/very poor condition (Water New Zealand, 2020). In the 2022 review, the same result prevailed. In response to these challenges, the Water Services Reform was produced by the Labour Government with specific legislation proposing to allow cities and regions to better manage and fund water infrastructure development (Finance and Expenditure Committee, N.Z., 2022).

Following the general election of 14th October 2023, the incoming government has pledged to repeal the Water Services Reform legislation. Nevertheless, water management will still require improvement, and existing legislation still requires Māori engagement in a range of resource management issues.

1.2. Māori as treaty partners with interests and rights in water

Māori are treaty partners with interests and rights in water (Professor Jacinta Ruru, 2021). As a result, the proposed reform specifies Mana Whenua engagement as part of the reform framework (Finance and Expenditure Committee, N.Z., 2022). This sparked controversy amongst sectors of the wider society, and across some media platforms (Milne, 2022). However, a Pākehā system should not be privileged over a tikanga Māori one. Māori involvement in the management of water infrastructure is of great importance, therefore, there is a particular need for water engineers to understand the most appropriate and effective means of engagement with Māori.

1.3. Aims and objectives

The aim of this study is to present a framework for Māori engagement to support engineers, using the Water Services (Three Waters) reform as a case study. This was achieved through the following objectives:

- Identify current best-practice engagement approaches in New Zealand, between Māori and engineers/practitioners.
- Document 1) engineering/practitioner approaches to Māori engagement; and 2) the expectations of mana

whenua regarding approaches to appropriate engagement from engineers and practitioners.

- Develop appropriate guidance for engineers regarding Māori engagement, including an understanding of its importance and best-practice approaches.

2. METHODS

2.1. Literature review

A literature review was conducted to identify current Indigenous engagement approaches across New Zealand. Requirements for Māori engagement detailed in various official documents were investigated, as well as Te Mana o te Wai principles and the conception of Taumata Arowai. Finally, the water health challenges facing New Zealand, the imperative for water reforms, and the proposed solutions under 2020-2023 Labour government were discussed.

2.2. Interviews

Semi-structured interviews conducted to identify the most appropriate engagement mechanisms, by interviewing 1) Five practitioner engineers, who are leading in the three waters space and active in Māori engagement across technical and/or advisory roles; and 2) A Ngāi Tahu representative, on the board of Te Kura Taka Pini (the Ngāi Tahu freshwater group). Participants' views and knowledge were documented on Māori engagement in engineering, and challenges facing three waters assets in New Zealand. Participants are anonymous, but summary information, including if they were of Māori heritage, is presented in Table 1.

Table 1: Relevant information to the roles of each participant

Interview Participants	Relevant Information
Participant 1	Civil Engineer, involved in Māori advisory and Water NZ, Māori heritage
Participant 2	Water Resources Engineer
Participant 3	Environmental Engineer, Māori heritage
Participant 4	Natural Resources Engineer, Māori heritage
Participant 5	Chemical and Materials Water Engineer, Māori heritage
Participant 6	Ngāi Tahu freshwater group (Kura Taka Pini) representative, Māori heritage

Hour-long interviews were conducted either in person or online via Microsoft Teams. Visual tools were used to display key themes and common concepts.

A set of prepared questions were used in the interviews. The engineering consultants involved in Māori engagement and water infrastructure were asked the following questions shown in Table 2.

Table 2: Interview questions for engineering consultants

No.	Questions for Participants 1-5
1a	In your area of concern, what is typically involved in the process of consultation/engagement between the engineering profession and Māori? How do you prepare for and approach the consultation? What steps do you follow/what guidelines exist for you to use? What variation occurs within this process? What is the cause of variation e.g. scale, location, cost,... of the project?
1b	What challenges are there in engagement between the engineering profession and Māori?
1c	What experiences have you had/roles have you played in the three waters reforms as a practising engineer?
1d	If you have been involved in the three waters reforms, what engagement with Māori have you had or facilitated?
1e	What are the direct benefits of successful iwi engagement to major engineering projects (such as three waters infrastructure)?
1f	What do you see as top priorities for the three waters reforms?
1g	In your work in the Te Mana o te Wai space, had you had a role in educating colleagues and/or the wider profession about engagement or Te Ao Māori?
1h	What is the role of institutions (such as the universities and professional bodies e.g. Water New Zealand) in ensuring engineers are appropriately knowledgeable and prepared to work with mana whenua in water governance? How could this be improved?

Alternatively, the Ngāi Tahu Kura Taka Pini representative was asked the following set of questions, as displayed in Table 3.

Table 3: Interview questions for Ngāi Tahu representative

No.	Questions for Participant 6
2a	As mana whenua, please provide an overview of your historical engagement with entities such as Christchurch City Council and Environment Canterbury prior to the proposed three waters reforms.
2b	When did you become aware of the proposed three waters reforms, how were you approached initially, and by whom? Did the initial approaches and overall engagement

	process conform to your expectations around tikanga? If not, how could this have been improved?
2c	What is your perspective on iwi inclusion in governance and decision-making in this context? What are the shortcomings and how could these be improved?
2d	How have your approaches to/values on water management (e.g. Te Mana o te Wai) influenced your local/regional three waters reforms engagement?
2e	With Ngāi Tahu/Ngāi Tūāhuriri involvement in governance, how might that impact infrastructure asset management processes?
2f	What do engineers need to know/understand about mana whenua co-governance in the three waters context?
2g	What is the role of institutions (such as the universities and professional bodies e.g. Water New Zealand) in ensuring engineers are appropriately knowledgeable and prepared to work with mana whenua in water governance? How could this be improved?

2.3. Development of framework

A framework of culturally informed concepts, from the literature review and interviews, was then developed. Recommendations for high quality engagement were formed, including considerations regarding institutional involvement and systemic change.

3. BACKGROUND AND REVIEW

3.1. Requirements for Māori engagement

The Resource Management Act 1991 (RMA) includes references to tikanga, mana whenua, and kaitiakitanga in various sections (Resource Management Act 1991, 2023). It mandates that anyone with responsibilities under this act must consider the principles of Te Tiriti o Waitangi (Treaty of Waitangi) when they are involved in the management of natural resources. Under the RMA, Regional Policy Statements are required to include Māori engagement strategy, up to interpretation by regional councils. The Local government Act 2002 requires local authorities to maintain and provide opportunity for Māori to contribute to decision making processes, which thus clarifies the need for local authority to engage with mana whenua (Local Government Act 2002, 2019).

3.2. Te Mana o te Wai and Freshwater Management

Te Mana o te Wai means ‘the authority of water itself’ and is a concept that encompasses the prioritisation of water health (Waikato Regional Council, 2022). Te Mana o te Wai can be applied to freshwater management directly and establishes a vision for water management

structure (Ministry for the Environment, 2023). Iwi already use and promote the Te Mana o te Wai structure by protecting and managing freshwater in their takiwā, and local governments are now adopting the structure of Te Mana o te Wai for water management.

The National Freshwater Policy Statement 2020 (NPS-FM) sets objectives and policies related to water quality, allocation of water, ecosystem health and the role of tangata whenua in freshwater management. (Environment Foundation, 2021). Under guidance of Mana Whakahaere (governance), Kaitiakitanga (guardianship for the environment), and Manaakitanga (care and respect), the NPS-FM requires that councils have long-term strategic plans for freshwater and mandates that engagement must occur with tangata whenua. However, the NPS-FM lacks the same legislative authority as the RMA, addressing the RMA’s shortcomings where engagement requirements are less explicit.

3.3. Taumata Arowai

Taumata Arowai is the water services regulator for Aotearoa New Zealand. It is underpinned by Te Tiriti o Waitangi, (Taumata Arowai, 2023), giving effect to Te Mana o te Wai in its service. Taumata Arowai is led by an independent Board alongside a Māori Advisory Group, Te Puna. Its role in regulating the water services sector involves collaborative work with other Crown entities, councils, water suppliers, and hapū and iwi Māori. Partnership and engagement with iwi Māori as treaty partners is prevalent throughout the establishment and operation of the entity. Te Puna provides a pathway for engagement in relating iwi Māori objectives and values to Taumata Arowai (Taumata Arowai, 2023). Advice is provided to the Board regarding mātauranga Māori and tikanga Māori, as well as guidance in implementing Te Mana o te Wai. Te Puna has been involved from the beginning of Taumata Arowai and influences the integration of Māori perspectives into strategic long-term visions for the entity and its plans (Taumata Arowai, 2022).

3.4. Water Services Reform

The Three Waters Reform was created after the New Zealand Government made an inquiry into the Havelock North drinking water contamination incident of 2016, establishing the Three Waters Review (Chambers T. W., 2022). Many other contamination incidents in New Zealand have also been reported, with the inquiry estimating that up to 100,000 people may become ill from consuming unsafe drinking water each year (Hansen, 2019). Throughout the country, council wastewater systems were also found to degrade the quality of freshwater and coastal water, with sewage overflows and contamination occurring. These issues led to the proposal

of the Water Services Reform by the previous Labour government, to address the need for water infrastructure improvement. This reform included establishment of new regulatory frameworks for drinking water and water delivery services, as well as merging water services control from 67 city and district councils into ten Government entities (Water Services Legislation Bill, 2023). The implementation of ten entities would provide strategic long-term investment opportunities to combat the financial pressure on water infrastructure in New Zealand (DIA, 2023). Greater regional investment allocations also improve distribution of water service funds to meet the needs of more communities (DIA, 2023).

The Water Services Reform bill also proposed shared governance between mana whenua and council members with regional representation. Shared governance acknowledges the Crown's obligations under Te Tiriti o Waitangi and recognises the previous success of Māori shared governance in environmental management. (Chambers T. W., 2022). Shared governance between mana whenua and the Crown typically leads to better decision making in situations where Māori communities are able to draw on their experiences, knowledge, and expertise (Jones, 2023). Māori have significant cultural ties to water, with Te Mana o te Wai principles that influence and enhance the decision making and health of freshwater and communities in Aotearoa New Zealand (Hikuroa, 2022). However, with the October 2023 election of the National Party into government, there will be a different pathway for a three waters reform. The need for reform remains, with affordable and safe drinking standards needing to be met.

4. FINDINGS

4.1. Key themes

To display the key themes gathered in the interviews, visual tools were used to portray the common concepts reiterated across participant answers. These are displayed below in Figures 1 - 5, corresponding to each question asked.



Figure 1: Typical components of engagement between the engineering profession and Māori

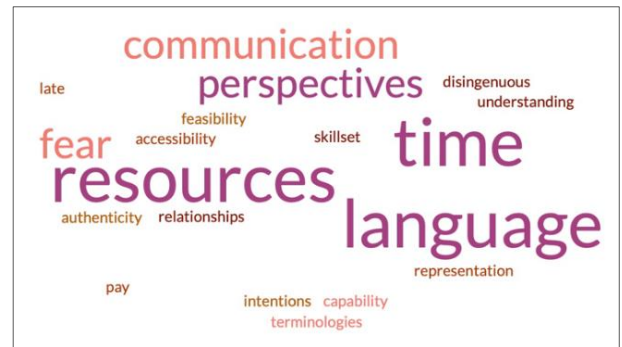


Figure 2: Challenges in engagement between the engineering profession and Māori

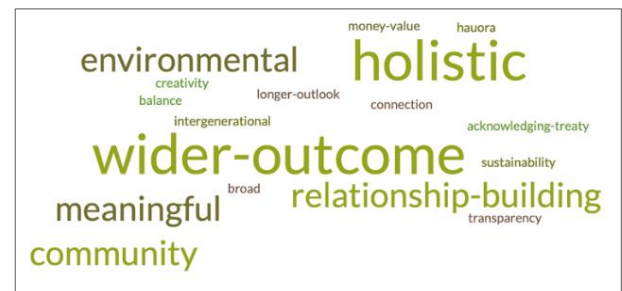


Figure 3: Direct benefits of successful iwi engagement to major engineering projects



Figure 4: Perceived top priorities of the three waters infrastructure reform

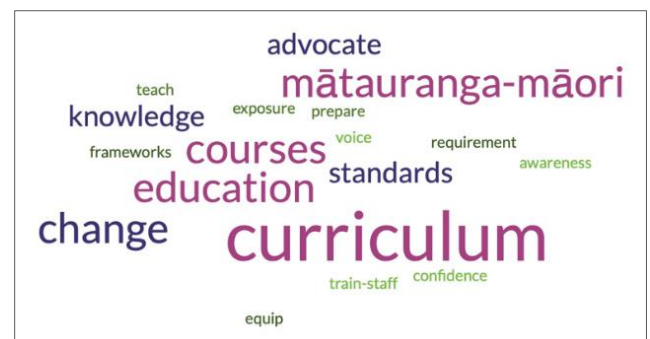


Figure 5: How institutions should ensure engineers are appropriately prepared to work with mana whenua

4.2. Discussion

To further understand what is involved in appropriate Māori engagement by the engineering profession, the concepts revealed throughout the interviews are discussed in greater depth.

Q1a - In your area of concern, what is typically involved in the process of consultation / engagement between the engineering profession and Māori?

Engagement conduct between the engineering profession and Māori is context dependent, with numerous sources of variation across projects. These variations centre around tūrangawaewae (sense of place) and what that means in a Te Ao Māori context. There is a significant variation of landscapes across Aotearoa New Zealand, hence iwi and hapū have differing views on their own takiwā (place). Although this precludes a 'typical' process of engagement, the importance and necessity of building relationships is at the core of Māori engagement across all projects.

Planners, rather than engineers, are commonly engaged in the engagement process, often seen as a mere "tick-box activity" by the participants. This may stem from the specific requirements for planners, while engineers tend to have fewer such obligations. This results in a gap in community understanding, design, and engineering expertise, leading to a potential lack of technical engagement with mana whenua.

Q1b- What challenges are there in engagement between the engineering profession and Māori?

In the engineering profession, it is common practice for engineers to communicate solely within their industry. This results in challenges when engaging with mana whenua during engagement processes, due to the discrepancies between language and communication styles. When interacting with mana whenua, it is imperative that technical advice and knowledge are conveyed in a manner accessible to all, including those without an engineering background. This language inclusivity is important to receive constructive feedback and have meaningful discussions. Without a shared understanding between both parties, effective engagement becomes unattainable.

For engagement to be truly successful, engineers must not only be motivated to engage but also do so with authenticity. There is also a prominent lack of knowledge regarding Te Ao Māori, mātauranga Māori, and tikanga Māori throughout the engineering profession, thus limiting the understanding of Māori values during project engagement. This reduces the respect and incorporation of Māori objectives into design. Moreover, fear of conducting tikanga incorrectly, mispronouncing te reo Māori, and making mistakes, is colloquially referred to as 'Pākehā paralysis', and hinders engagement attempts. Limited time and resources also restrict Māori

engagement. There's too often insufficient budget to compensate iwi representatives, resulting in limited availability of mana whenua for engagement. To ensure the project's legitimacy and benefit from deep iwi engagement and Māori knowledge, iwi involvement should be financially supported rather than voluntary.

Q1e- What are the direct benefits of successful iwi engagement to major engineering projects such as 3 waters infrastructure?

A major benefit of successful iwi engagement is the wider outcome which projects achieve. The translation of mātauranga Māori into a holistic, systems-based approach serves the community and environment, with longer-outlooks for sustainability and future generations. This provides greater meaning to the design and fundamentals behind the project. Whakawhanaungatanga (relationship building) is developed through successful iwi engagement and is important for long-term relations between the community and the practitioners. The social and technical context of how engineers conduct their work can be understood, and the engineers/practitioners can improve understanding of the spiritual and cultural views of Māori.

Another direct benefit is the cost savings for clients through utilisation of historical and local Māori knowledge of their takiwā to inform projects, leading to improved sustainability and resilience in designs. Incorporating an iwi's vision into concept designs minimises community pushback and hence any need for re-design. Consideration of any environmental, conservation, and resilience concerns saves distress of the community, and thus money for the client. Regarding water health in New Zealand, successful iwi engagement would likely see a strong incorporation of Te Mana o te Wai in water infrastructure development.

Q1f- What do you see as top priorities for the three waters reforms?

Considering the outcome of the October election, the proposed Water Services Reform is unlikely to be actioned. However, the government will still need to provide a management framework on water infrastructure improvements for the near future. The need for safe, affordable drinking water will remain, no matter the exact name used for the reform. Interview participants emphasised the need for affordable, accessible, and equitable water supply across all communities of Aotearoa New Zealand. This would ensure safe access regardless of one's socioeconomic status. Safeguarding both the wellbeing of water and people's health is a top priority within Te Mana o te Wai's hierarchy of obligations (Waikato Regional Council, 2022). Therefore, it is vital to incorporate this principle into the reform. Greater government investment prioritisation is essential for funding the necessary water infrastructure, while effective asset management and

collaboration with tangata whenua is also key. Incorporating Māori perspectives into infrastructure planning is desired for holistic, systems-based solutions that lead to sustainable and resilient outcomes with long-term outlooks.

Q1g - What is the role of institutions in ensuring engineers are appropriately knowledgeable and prepared to work with mana whenua in water governance?

Curriculum inclusion of Te Tiriti o Waitangi, Te Ao Māori, and mana whenua engagement knowledge was a prominent theme for the participants. While it can be acknowledged that tertiary educators are increasing the inclusion of these topics into study, there is a long way to go in ensuring students are sufficiently exposed to this information. Many engineering consulting firms, including those of our interview participants, are making significant efforts to educate employees and provide Te Ao Māori education. This is important considering many employees have completed their qualifications overseas or were not exposed to the importance of this knowledge during university study.

5. CONCLUSION

5.1. Recommendations

Quality engagement

To improve the quality of engagement, it should take place in the strategic planning stage. This occurs during the establishment of the project's strategic vision, prior to the development of concept design. It is also important to collaborate and empower Māori on a strategic level, as opposed to merely consulting or informing. Leader to leader engagement is crucial, to ensure the time and wisdom provided by the iwi is respected. This shows that perspectives are taken seriously, and action can be taken to fulfill the expressed objectives.

Building relationships is key to successful engagement. Effort put in by the engineering profession into following tikanga Māori is important to achieve this. The interview participants emphasised that for most Māori, it is very appreciated for formalities like karakia and mihi to be given by those engaging, with an incorrect attempt significantly better than no attempt at all. It would be appreciated for background research and practice to be conducted, consequently reducing fear and the forementioned 'Pākehā paralysis' that many engineering practitioners may have. Furthermore, in establishing relationships, introductions should express 'where you come from' and 'who you are', as opposed to only 'what you do'. Connections between parties stem from these personal conversations, leading to successful engagement and outcomes that benefit all. Once relationships have been established this will also open a door to better engagement with that rūnanga in the future.

The language barrier is a significant challenge to engagement. To facilitate this, the use of common engineering language such as acronyms and technical jargon or terminologies must be consciously minimised in these conversations. This competency should be encouraged to be a standard skill for practicing engineers.

Institutional involvement

To support engineers in learning appropriate Māori engagement processes, institutional involvement should be increased. A greater inclusion of Te Ao Māori and Māori engagement, underpinned by Te Tiriti o Waitangi, should be developed into engineering curriculums in Aotearoa. Contextual education of these principles should be a requirement for all engineering students, ensuring they are sufficiently exposed to the necessity of engagement so it can be used in their future practice. Tangata whenua values should be educated in these courses, incorporating the concept of poutama (staircase) to build on knowledge throughout the degree progression. Emphasis on communication techniques should also be educated, as technical language must be translated to avoid disrespect by a communication barrier. This could be incorporated into curriculum communication requirements, which currently include client reports, technical writing, and teamwork.

Mātauranga Māori principles and values should also be continually developed at a professional level. Courses, seminars/webinars, and other training modules could be greater funded and supported by organisations that employ engineers and other practitioners that may partake in Indigenous engagement. Further Te Ao Māori knowledge requirements could also be enforced, such as for those becoming Chartered Professional Engineers or those with offshore degrees. Credible progression of these ideas throughout the career is valuable to ensure respectful and appropriate engagement is conducted, and Te Ao Māori concepts are incorporated into engineering practice and designs.

Systemic change

The Washington Accord governs New Zealand engineering colleges, setting student progression requirements (International Engineering Alliance, 2014). However, it lacks consideration for Indigenous values and thus there are no requirements for curriculum inclusion of Te Ao Māori in New Zealand. Creating a New Zealand-specific accord could mandate inclusion of Te Ao Māori and mātauranga Māori in curriculum. The RMA is also subject to potential changes post the October 2023 election. Despite its absence in the National Party's water reform, iwi engagement and shared water asset governance in Aotearoa should be required.

5.2. Framework for Māori engagement

To provide a digestible and realistic guide for engineers to comprehend the key, appropriate approaches to Māori engagement, the following framework components have been developed.

The three key pou (pillars) to successful engagement are portrayed in Figure 6, detailing what an engineer must consider in their approach.

A flowchart diagram is also presented in Figure 7 to aid an engineer with the basic considerations to make when approaching strategic level engagement with mana whenua. The guide includes key preparation methods and approaches of engagement to consider.

A list of further resources has been collated to assist with further understanding of Māori engagement and views for engineering and other industries.

- **Māori Engagement Framework**; Waikato Regional Council
- **Hononga ki te Iwi // our Māori engagement framework**; Waka Kotahi NZ Transport Agency
- **The 5 Wai's (Not Why's) of Māori Engagement**; Atawhai Tibble
- **National Policy Statement for Freshwater Management 2020**; Ministry for the Environment
- **Engaging with Māori A guide for staff of the Bay of Plenty Regional Council**; Bay of Plenty Regional Council
- **Cabinet Paper 19: Te Tiriti o Waitangi Guidance**; Department of the Prime Minister and Cabinet

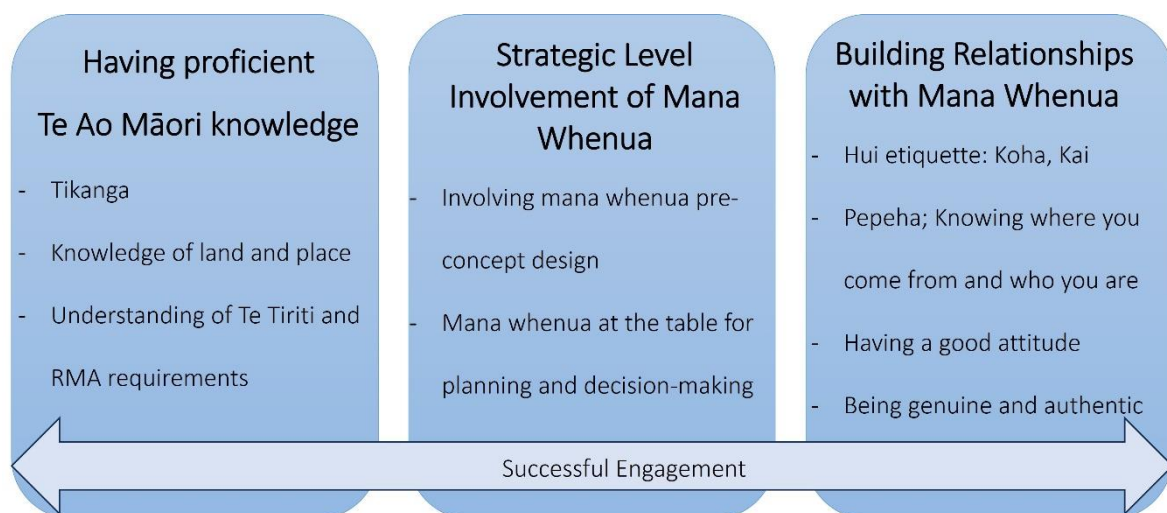


Figure 6: Three key pou to successful engagement

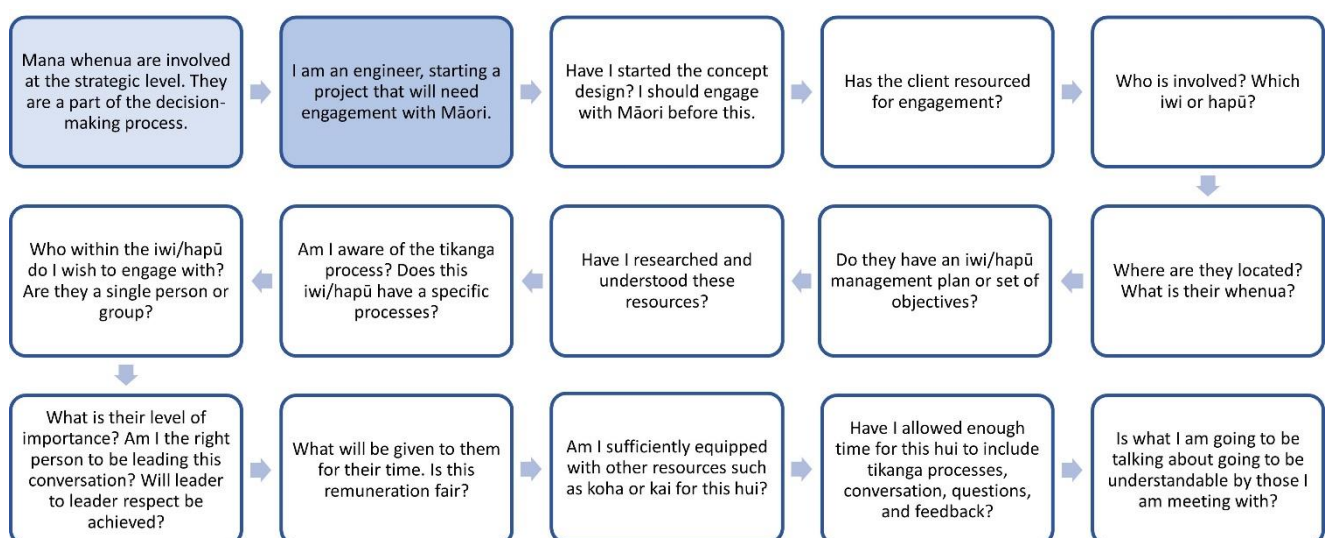


Figure 7: Flowchart to guide engineers with key considerations for preparation and implementation of Māori engagement

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