CULTURAL ALLIANCES ON SH20A

INCORPORATING MANA WHENUA ASPIRATIONS INTO THE REDEVELOPMENT OF AN ACCELERATED PROJECT

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ABSTRACT

The NZ Transport Agency's SH20A to Airport project is one of four Government accelerated transport projects for the Auckland Region, which aims to improve access to Auckland Airport and enable better transport connections to regional ports and industries. The project involves upgrading an existing 5km stretch of SH20A north of the Airport to motorway standards, constructing a grade-separated intersection at Kirkbride Road by trenching the motorway, and enabling alternative modes of transport via shared paths and cycle ways.

The project takes place within three separate creek catchments, draining to the culturally significant Manukau Harbour, that contain significant areas of commercial and industrial land uses that lack sufficient stormwater treatment capabilities. As such, ensuring that the environmental and cultural values of the harbour were maintained during and after construction of the project became primary objectives of the *Manukau Harbour Crossing – Kirkbride Alliance* team. Furthermore, the flat topography of the area and the underlying peat presented significant design challenges that limited working design solutions.

To achieve the project stormwater objectives, the project team invited mana whenua with kaitiaki over the Harbour to engage with the design teams to identify their concerns and preferences. What started with a typical approach to iwi engagement, evolved into a genuine and on-going collaboration that fostered deeper understandings of different perspectives on the importance of the values placed on water and the receiving environment. Biweekly hui allowed a two-way free-flow of information that led to countless design iterations, allowing mana whenua to understand the engineering challenges facing the project while prompting the design team to develop as near a natural solution as possible.

Most importantly, this engagement process has opened dialogue and strengthened relationships between the Alliance and mana whenua of Tāmaki Makaurau over time, enabling a more cooperative working relationship over the lifetime of the project.

KEYWORDS

Consultation, Natural, Treatment, Design, Values

1 INTRODUCTION

Approximately 2,000,000 visitors arrive in New Zealand each year via Auckland International Airport (Statistics New Zealand, 2016. International Visitor Arrivals to New Zealand: January 2016), and about 41,000 vehicles per day travel up and down State Highway 20A (SH20A), carrying freight, commuters, students, and residents through Mangere, Auckland. This corridor has numerous identities: a first impression of a new experience for tourists; a vital economic link between the warehousing sectors in Otahuhu, Wiri, and the Airport; a daily school run/walk/bike ride; a last glimpse of home before travels abroad; and a homecoming greeting for nearly one-quarter of New Zealanders. Locals old enough will also remember driving down dusty farm roads surrounded by pasture in all directions; however, with the development of Auckland Airport now truly taking off, the importance of SH20A as a key social and economic link grows in tandem with the region.

With this growth comes increased tourism, freight movements, and vehicles on the road. As such, the NZ Transport Agency are upgrading SH20A to motorway standards and improving trip reliability and traffic safety through a grade separation at the Kirkbride Road intersection via the "SH20A to Airport Project" (the Project). The grade separation involves constructing a 300m long, 32m wide, 8m deep trench parallel to the existing SH20A alignment beneath Kirkbride Road, which will retain its current grade and location. SH20A will then be 'realigned' through the trench, with on- and off-ramps constructed to maintain its connection to Kirkbride Road.

Undertaking the design, construction, and consenting of the project is the Manukau Harbour Crossing – Kirkbride Alliance (the Alliance), comprised of the NZ Transport Agency, Beca, Fletchers, and Higgins. In addition to addressing existing Levels of Service and road safety, the Project aims to provide added social, environmental, and cultural value to the project area in Mangere through extensive landscaping, urban design, local road upgrades, multi-modal transport facilities, and the treatment of stormwater.

The purpose of this paper is to provide insight into how the Alliance worked openly and closely with mana whenua to address cultural concerns with regards to the generation and treatment of stormwater runoff from within the project area. Below we describe how the methods designed to treat stormwater within the project area have evolved from conception to consenting through on-going, open, and honest consultation with mana whenua with kaitiaki over the Manukau Harbour catchments.

2 PROJECT ENVIRONMENT

2.1 MANGERE, AUCKLAND

SH20A is the primary transport and freight link from Auckland to the Auckland International Airport. The highway bisects the township of Mangere, a large residential suburb of single-family detached houses built during the 1960s and 1970s. The residential areas within the vicinity of the project include multiple schools, sports fields, churches, and the Mangere Community Centre. More recent development to the south and west of the residential areas included the Airport Oaks industrial development, a logistics hub comprised primarily of warehouses and shipping yards. Additional industrial and utility activities along the Manukau Harbour coastline include quarrying, wastewater treatment, and horticulture.

Given the mixed uses of the area, the composition of traffic includes a wide range – from children walking to school to fully loaded truck and trailer units making deliveries to the airport. As such, it was important during the design phase of the project to incorporate elements that would achieve positive outcomes serving both the economic and social objectives of the project, including wide shared paths, cycle lanes, and extensive landscaping. The area also presented geophysical design challenges, particularly around the ability to treat and convey stormwater runoff. The road alignment passes over a 15m thick layer of saturated peat, with a groundwater table located at less than 1m below ground level in some places. Ponding during rain events in the area is common, and soil in the area can saturated year-round.

2.2 MANUKAU HARBOUR

SH20A and its surrounding catchments drain to the Manukau Harbour via three creeks: the Tararata Creek, the Oruarangi Creek, and the Tautauroa Creek. The harbour itself is located on the west coast of Auckland, south of the Auckland Isthmus and north of the more rural areas of Pukekohe and Waiuku. It is a large (365km^2), shallow, estuarine system occupying a drowned river valley. More than one-third of the harbour bed is exposed during low-tide.

Figure 2.1. Aerial photograph providing indicative sub-catchment boundaries of the project area. Each of the three stream sub-catchments is outlined in a different colour. Where the stream network is piped, lines are shown as dashed.

The Manukau Harbour is the receiving environment for a varied land catchment area of approximately 879km^2. This land catchment includes steep wooded terrain in the Waitakere Ranges on the northwest, agricultural and horticultural land uses in the south, residential urban areas to the north on the Auckland Isthmus and to the east around Manukau City, and the commercial, industrial, and logistics centres in Mangere, Onehunga, Otahuhu, and Wiri. In addition the land uses within the catchment, stormwater and other historical discharges to the harbour have occurred from such infrastructure services as the roading network, rail lines, the Mangere Wastewater Treatment Plant, the Auckland International Airport, and the Wiri Oil Depot.

2.2.1 ORUARANGI CATCHMENT

The area of the Project site draining to the Oruarangi Creek currently covers approximately 51,000m^2, from the southern extent at the boundary with Auckland Airport to the intersection of SH20A and Kirkbride Road. The Oruarangi Creek sub-catchment drains to the public stormwater network via an inlet at Montgomerie Road, and stormwater is conveyed approximately 1km to this discharge point into the Oruarangi Creek.

Figure 2.2. Oruarangi Creek looking downstream from the confluence with Villa Maria Stream. Evidence of flooding and scour can be seen along the true left bank.

Land use within the 536ha Oruarangi Creek Catchment comprises the commercial/industrial estate at Airport Oaks, pastoral and horticultural farmland, the Villa Maria Vineyard, and the Ihumatao Papakāinga near the Creek's mouth. Stormwater from the Airport Oaks Development is conveyed through stormwater attenuation pond systems prior to discharging into the Oruarangi Creek; however, there are no public stormwater treatment assets within the catchment treating road run-off.

The existing catchment is completely piped upstream of the outfall to the Oruarangi Creek. A confluence is located here with the Villa Maria Creek, which discharges tannin stained water from the peat soils. The Oruarangi Creek remains open, winding through a mixture of industrial, papakāinga, and rural land uses before discharging to Manukau Harbour. The riparian margins are populated by a mixture of indigenous plant species reintroduced as part of restoration projects led by local mana whenua and Watercare Ltd.

Water quality in Oruarangi Creek is influenced from industrial land uses within the Airport Oaks development, agricultural land uses, and road networks to a lesser extent. This has resulted in elevated levels of zinc, copper, total petroleum hydrocarbon (TPH), gross pollutants, sediment, and other contaminants. The creek is also tidal approximately 2km upstream of the mouth, and is subject to contaminant influx from incoming Manukau

Harbour tides. Sedimentation is prevalent within the creek and has resulted in a visible discolouration of the water.

Flooding and erosion are not an identified issue for most of the creek. The upper reaches have wide riparian margins and relatively steep banks. The mid-reach is alluvial, wide, and is bordered by with mudflats/salt marshes exposed during low tide. At the creek mouth, a volcanic tuff constricts flow into a narrower width. The true left bank, just below the Ihumatao Papakainga, is the site of an urupa that had been subject to historical erosion issues.

Historically, the natural connections of the creek to the Manukau Harbour were blocked by the oxidation ponds along the coastline. Water within the Oruarangi Creek had to be pumped across the ponds prior to discharging to the harbour. Between 1998 and 2005, Watercare Services Limited removed the oxidation ponds and reopened the channel, allowing the creek to drain naturally and recommence its inter-tidal characteristics. As such, fish life within the creek has historically been limited to small numbers of short fin eels and the pest species *Gambusia affinis*.

Various restoration projects have since been undertaken by mana whenua and Watercare, including riparian planting efforts, coastal walkways, and rehabilitating kaimoana habitats within the intertidal areas of the harbour. The creek now has good fish passage along its length, but aquatic fish habitat upstream of the intertidal reach is not known to be of high quality.

2.2.2 TARARATA CREEK

The area of the Project site draining to the Tararata Creek covers approximately 176,000m^2 and includes Kirkbride Road and the State Highway north of the Kirkbride Road intersection. Stormwater within this catchment drains to the public stormwater network via numerous inlets, and ultimately discharges into the creek via the outlets north of Moyle Park.

Figure 2.3. Tararata Creek looking downstream, shown here with a gross pollutant trap.

The Tararata Creek Catchment is approximately 668.6ha in area, and primarily consists of residential neighbourhoods constructed after 1959. Much of the stormwater within the catchment is conveyed via underground stormwater infrastructure to the creek, which is largely channelized upstream of SH20. Water quality investigations undertaken by the former Manukau City Council in 2000 identified the Tararata Creek as having an overall 'poor' water quality conditions, citing relatively high contaminant loads of sediment, TPH, and zinc. The indicative source of zinc within the catchments has been identified as corrugated iron roofs on buildings within the catchment.

The creek discharges into an area of the Mangere Inlet which has been identified as a Coastal Protection Area and Area of Conservation Value under the Auckland Regional Plan: Coastal, and a Significant Ecological Area under the PAUP. These areas are identified as providing an extensive intertidal feeding ground for South Island Pied Oystercatchers and a range of other coastal bird species.

2.2.3 TAUTAUROA CREEK

The area of the Project site draining to the Tautauroa Creek currently covers approximately 1.15ha, and is limited to a short span of the road north of the Auckland Airport boundary. This sub-catchment drains across an overland flow path approximately 600m in length to the Tautauroa Creek and then into the Pukaki Creek. The Tautauroa Creek Catchment is still largely rural, though current and planned urban development will change this characteristic over time.

As the works within the Tautauroa Creek catchment are limited to road repaving and did not result in any significant changes to the existing stormwater network within that catchment, consultation regarding stormwater focused primarily on the Oruarangi Creek and Tararata Creek receiving environments.

3 DRAINAGE DESIGN

Prior to consultation, the design team faced a number of geophysical challenges. The team was tasked with providing stormwater treatment to pervious surfaces and all new and redeveloped impervious surface areas within the project area. This included the SH20A trench, the on- and off-ramps at Kirkbride Road, shared paths along within the SH20A corridor and local roads, and all existing road surfaces on the state highway and local roads. Altogether approximately 13.2ha of impervious surfaces and 11.43ha of pervious surfaces.

The project area is located along the crest of three intersecting stormwater catchments at about 15m above sea level, and with a gradient of <1% to the sea, the area is noticeably flat. Further to this, the underlying peat soils are saturated throughout the year, with the groundwater table less than 1m below the surface in some areas.

The design team proposed piping stormwater runoff into three wetlands spaced evenly along the alignment, and a large media filter cartridge chamber as shown in Figure 3.1 below. The design and sizing of the pipes and treatment devices were undertaken in accordance with Auckland Council Technical Publication 10 (TP10) – *Stormwater Management Devices: Design Guidelines Manual 2003*. Also taken into consideration were the Proposed Unitary Plan stormwater management provisions, which required detention (95^{th} percentile, 24hr rainfall event) and retention (10mm, 24hr rainfall event) of run-off within the Oruarangi Catchment. To provide for additional detention and

retention that could not be achieved by the single wetland, an underground infiltration chamber was proposed prior upstream of the wetland.

Figure 3.1. Original design proposing 3 stormwater wetlands and media filter cartridges (to treat stormwater pumped from the trench sump). White arrows indicate overland and piped flows into each device, yellow arrows indicate downstream flow into the public network.

The proposed road upgrades would add an additional 20,000m^2 of impervious road surface. As downstream flooding was not a significant issue for the stormwater catchments, the design objectives were primarily related to treatment of contaminants and the reduction of ponding on the state highway during flood events.

4 MANA WHENUA CONSULTATION

The proposed stormwater design and discharge weres subject to the statutory requirements of the Resource Management Act 1991, the Auckland Regional Plan: Air, Land, and Water, and the Proposed Auckland Unitary Plan (PAUP). Although the PAUP is still proposed and has not yet become fully operative, rules in that plan regarding stormwater discharges have immediate legal effect, meaning resource consent was required in accordance with s15 of the RMA due to rules in both plans.

In addition to the stormwater rules in the PAUP that require a discharge consent, general information requirements for discharge applications include that a Cultural Impact Assessment is required where an activity may have an adverse effect on mana whenua values. To understand whether or not these values are affected, consultation with mana whenua is needed. Typically this process involves resource consent applicants providing information on the project to iwi and requesting that a Cultural Impact Assessment is written or confirmation that such an assessment would not be required. A processing planner from Council would then take into account the concerns raised within the Cultural Impact Assessment as part of their overall assessment and decision on the application.

Large scale infrastructure projects within Auckland typically have mana whenua consultation processes already established, using existing relationships and regular consultation forums. Representatives from Auckland's 16+ iwi meet monthly at day-long hui to discuss the wide range of infrastructure projects being undertaken by the various government agencies. Due to the nature of the this project with respect to the proposed urban design and stormwater discharge implications, additional hui were convened every two weeks over the course of 3 months with selected mana whenua representatives who had indicated special interest in the SH20A project.

Representatives from 7 mana whenua groups provided input into the SH20A design, including Te Ahiwaru, Ngāti Tamaoho, Te Kawerau a Maki, Ngāti Whātua o Ōrākei, Te Akitai Waiohua, Ngāti Te Ata Waiohua, and Ngāti Paoa. While requirements within the PAUP include the provision of a Cultural Impact Assessment where mana whenua values are affected, the approach taken by the Alliance and the mana whenua groups throughout this consultation process was to work in collaboration to avoid and mitigate the adverse effects to mana whenua values, by incorporating their cultural aspirations into the stormwater design as far as practicable.

5 CULTURAL SENSITIVITY

To understand the motivation for mana whenua to engage on infrastructure projects, and to effectively engage with kaitiaki (guardians) of the area to address concerns, it is critical to understand the history of an area, its cultural heritage, and the ties between the people and the land. From consultation with Te Kawerau a Maki, we understand that oral history describes their ancestors and other iwi as having settled within the greater Auckland area within the 10th Century, with further waka arriving during the 14th Century. Through this prolonged social and cultural connection with the land, water, and natural environment, the mana whenua of the project area are duty-bound to practice kaitiakitanga (guardianship and management of cultural and natural resources). As the kaitiaki of these resources, mana whenua seek to enhance, restore, and maintain the sociocultural and natural environments of their areas of interest.

Known history, corroborated by previous archaeological investigations of the area and consultation with mana whenua, has shown that Mangere and the shores of the Manukau Harbour has been continuously occupied and significantly shaped by human settlement for more than 800 years, including the Papakainga at Ihumatao (see Figure 6.1 below).

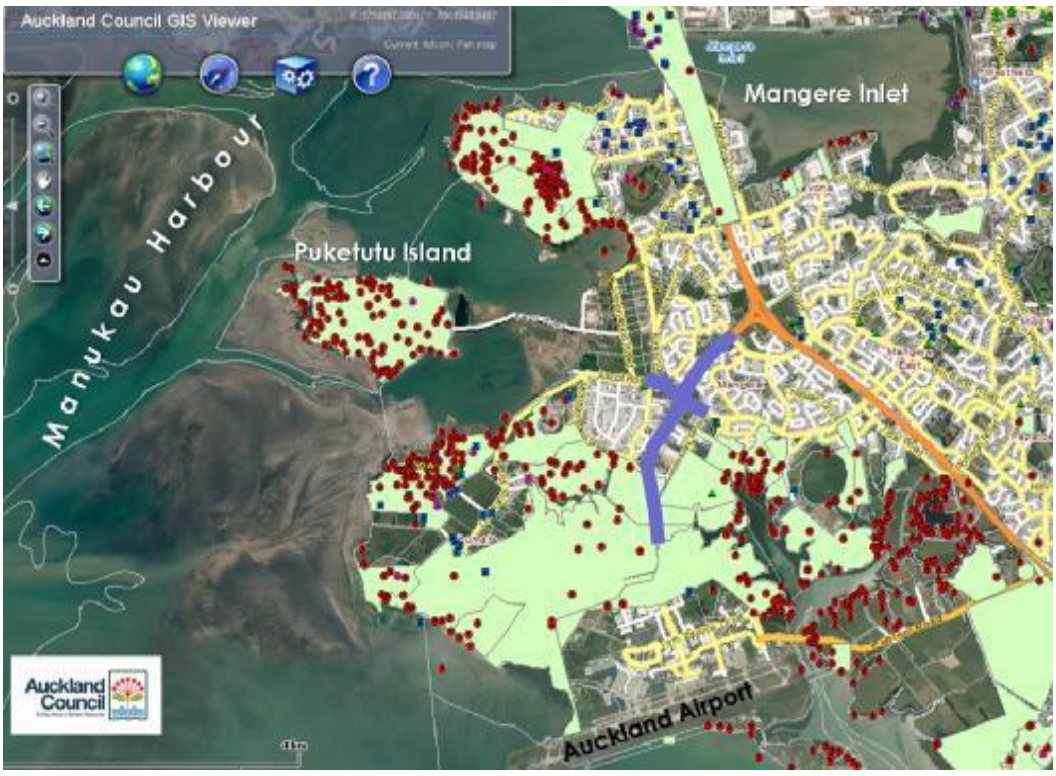
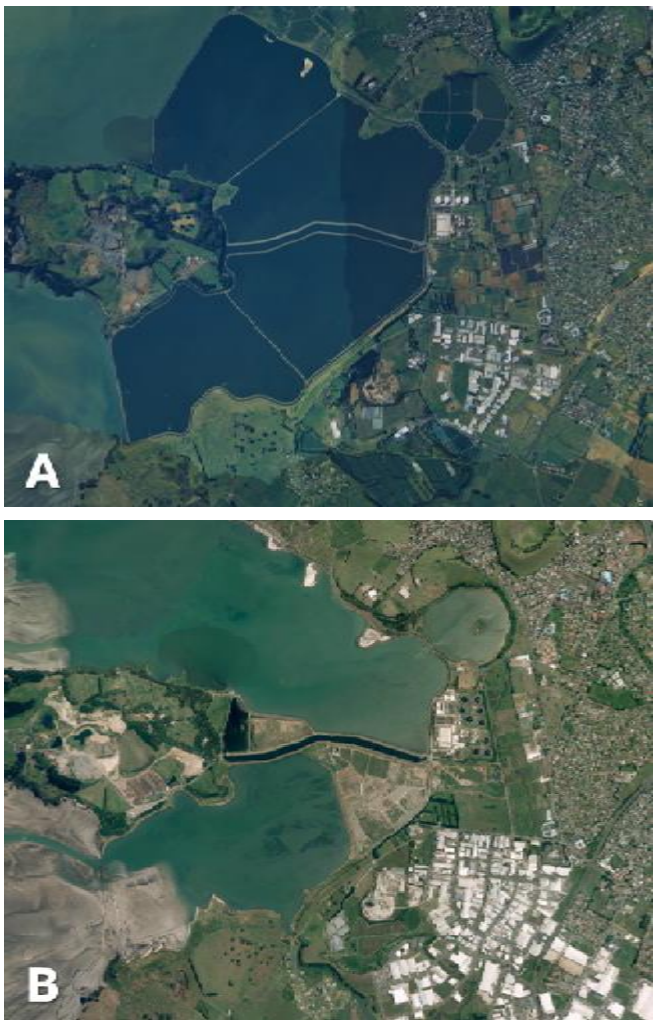


Figure 5.1. Excerpt from Auckland Council GIS Viewer, showing known archaeological sites in red (Cultural Heritage Inventory) and the extent of areas subject to archaeological investigations (shaded in pale green). The project site is highlighted in violet.

However, the areas occupied by iwi were confiscated during the New Zealand Wars in the mid-1860s, and European farmers had begun introducing Scottish and English farming practices to raise sheep and cattle. From the 20th century, development along the Manukau Harbour and in Mangere in particular had begun to take on a more industrial character, including the quarrying of the volcanic cones of Maungataketake and Puketutu which had been used as defensive pā sites. With the opening of the Southern Motorway to Wiri in 1955, commercial land uses and city infrastructure works had reshaped the built form of Mangere. These are considered to have contributed to a stable decline in the ecological health and mauri of the Manukau Harbour (Manukau Harbour Treay Claim).

These changes also included the construction of the Mangere Wastewater Treatment Plant Oxidation Ponds, which covered nearly 500ha of fishing grounds and shellfish beds along the eastern shores of the harbour (see Figure 6.2 below). Constructed in the 1960s, the oxidation ponds physically prevented the natural flow of water between the harbour and the Oruarangi Creek, drastically reducing capabilities to harvest kaimoana. Further to these significant losses, the benefits of wastewater treatment were not immediate for the local iwi communities in Mangere, who were amongst the last in Auckland to be connected to wastewater infrastructure in the 1980s.



Between 2001 and 2005, the oxidation ponds were deconstructed, allowing the Oruarangi Creek to once again flow freely into the Manukau. Following on from this, mana whenua and Watercare Ltd had begun a range of rehabilitation projects along the shores of the harbour and the streams that feed into it with the aim of enhancing the harbour's health and mauri. Restoration projects included riparian and coastal planting to improve aquatic and marine habitat, coastal walkways and bridges to enable adequate coastal access for members of the public, and input into the Ihumatao Catchments Integrated Catchment Management Plan.

Figure 5.2. (Left) Aerial photographs from Auckland Council GIS showing the extent of the oxidation ponds in 1996 (A) and the harbour in 2010 (B) after their removal.

In 2013, a major setback to the restoration of the Oruarangi Stream occurred when approximately 1,000L of violet dye spilled into the stormwater network from a bulk container within the logistics hub of Airport Oaks (see Figure 6.3 below).

The spill resulted in the deaths of all eel and fish within the stream, and nearly half of the mud snails. It was unknown at the time of the spill as to whether or not the dye would result in the bioaccumulation in kaimoana of toxicants harmful to human health, and a rāhui (moratorium) was placed on all fishing and shellfish gathering. This major pollution incident had not just resulted in the immediate decline in stream and harbour health, but

also evoked strong feelings of anger, mistrust, and frustration within the kaitiaki who had already experienced 160 years of on-going environmental discrimination.

Figure 5.3. ***Left:*** *Oruarangi Creek dyed purple. Photo taken from the creek mouth pedestrian bridge.* ***Right:*** *Dead eel dyed purple. (Photo credit: Auckland Council).*

6 DESIGN EVOLUTION THROUGH CONSULTATION

6.1 FIRST ITERATION

Prior to consultation, the Alliance design and environmental teams anticipated that the project would benefit from better understanding the concerns of mana whenua – especially with the project being a significant piece of infrastructure with direct effects on the Manukau Harbour through stormwater discharge. The Alliance's philosophy of being a good neighbour during construction and leaving behind an asset that would be attractive and beneficial to the local community was paramount to the considerations made during the design phase of the project. The consultation would help frame the scope of considerations from a mana whenua perspective. Further to this, we saw the project as being a win for the environment and health of the Manukau Harbour, as no existing forms of stormwater treatment had existed for the local road network.

During the initial hui both the Urban Design and Stormwater Design teams met with kaitiaki representatives from 7 different iwi to present the draft designs for the project with the purpose of obtaining feedback on the overall design philosophy and confirmation on whether or not a Cultural Impact Assessment would be required. This presentation included those elements of the original stormwater design described in Section 4.1 above, and also served as a first introduction of the designers to mana whenua. Regardless of the good intentions of the Alliance, we were not fully sensitive to the extensive history of grievances experienced by the local mana whenua.

During the hui, these grievances were described in detail and we informed of how the proposed design did not provide nearly enough confidence to the mana whenua that the stormwater run-off could be satisfactorily treated. TP10 Standards and removal of 75% TSS was simply not good enough, and on top of their negative historical experiences around the health of the Manukau Harbour, they were extremely concerned at the *status quo* of oils and heavy metals from increasing volumes of traffic in the catchment flowing into the harbour without any form of treatment. Further to this, the reliance of our original design on a single treatment device per sub-catchment was seen as a liability. Concerns were raised over the efficiency of the proposed devices over time and during times where maintenance budgets were stretched thin.

The recent industrial dye spill incident was also discussed at the first hui, and the situation of a traffic accident within the proposed SH20A trench was raised. With trust levels low, the kaitiaki were unconvinced that the proposed 1,200m^3 trench sump and low-flow pumping system, or any Spill Contingency Plan, would be sufficient to deal immediately with a large spill of eco-toxic liquids. A hypothetical 'worst-case' scenario was presented as an example – should two full oil tankers crash in a head-on collision, spilling both tank loads onto the road, during a 1:100 year ARI flood event, could our proposed trench sump handle the spill without discharging pollutants to the harbour?

Lastly, it was requested that a naturalistic drainage and treatment system be provided that mimicked ecological processes as far as possible. Mechanical devices, such as stormwater filters, were seen by the Mana Whenua Group as less resilient due to demanding maintenance requirements and capacity/efficiency constraints during flood events. Softer engineering, using wetlands and swales for example, would enhance the proposed landscape designs and provide secondary benefits to the local ecology, providing habitat and food sources for insects, birds, and eel. These would additionally allow for passive monitoring should the wetlands and swales require maintenance.

6.2 DESIGN RESPONSE

To address the concerns raised during the first hui, the stormwater design team first undertook feasibility investigations to determine whether the identified issues could be practicably resolved given the geophysical and financial constraints of the project. Because the overall drainage design had not yet been finalised and had some room for modifications where tangible benefits could be realised, the findings were able to effect positive changes.

The most significant changes to the design incorporated the 'treatment train' and 'naturalistic' concepts. The 'treatment train' allowed for all stormwater run-off to pass through at least two forms of treatment prior to discharging into the public stormwater network. Where possible, pipelines were replaced by swales that led to the three original stormwater wetlands. A fourth stormwater wetland was also designed to be adjacent to the SH20A trench to replace the proposed stormwater filters and treat stormwater collected within the trench sump.

From an 'engineering perspective', the design exceeded the treatment requirements of TP10 and the PAUP, and may have been just as effective with the original design layout; however, with primary and secondary treatment devices connected in a train, effects of first-flush run-off overloading a primary device would be mitigated by additional treatment by the secondary device. Given the long history of pollutants entering the Manukau Harbour, exceeding the existing standards was considered by mana whenua to be essential in protecting the harbour's health. Further to this, using natural systems enabled and empowered mana whenua to undertake their duties as kaitiaki. Knowing when the maintenance of a wetland or swale is required is as simple as having a look, whereas underground mechanical devices require specialised equipment and health and safety certifications.

Where natural systems could not be practicably employed, the Alliance proposed to retain mechanical treatment devices. Local road runoff, for example, will be treated using media filter cartridges and catchpit inserts due to the extremely limited area of land within roadside berms. The reasons for excluding natural systems in these instances were then clearly explained in an options assessment, including the physical limitations for each particular site and cost/benefit discussions where appropriate. It was then

recognised by all parties at subsequent hui that using proprietary devices to treat runoff was preferable to the *status quo* of no treatment at all.

Modifications to the trench sump were also made to allay anxieties around the potential for a significant spill occurring within the SH20A trench. Due to other, non-related design complications, the sump storage volume had to be increased from 1,120m^3 to 1,800m^3. Additional design features were also put forward by the Alliance, including the use of a hydrocarbon sensor to automatically cease pump operation, the ability to control pump operation remotely and in conjunction with CCTV security cameras mounted above the SH20A trench, and the installation an oil-water separator within the sump. These latter modifications provided further assurance that in the case of an emergency, the failure of one system would be backed by a secondary system, decreasing the potential for another significant spill event into the harbour.

The final design, which was consented and is currently under construction, accommodates some level of stormwater treatment for every drop of water that would land on the State Highway or on the Local Road Network within the project area – a positive outcome for iwi, the Alliance, and the environment.

Figure 6.1. Consented design with 4 stormwater wetlands and media filter cartridges (to treat stormwater pumped from the local roads). Green arrows indicate roadside swales, white arrows indicate overland flows, yellow arrows indicate downstream flow into the public network.

7 CONCLUSION

Through consultation, members from the Alliance and mana whenua developed a robust stormwater treatment design that satisfied the project and iwi objectives set out at the start of the process. This design was ultimately consented under the RMA and will be completed by mid-2017. However, the most significant outcomes were not the efficiency of the design or the resource consent. The most significant outcomes that came out of this process were the strong relationships and trust that were formed between the Alliance design team and the mana whenua who provided input during consultation. The process was able to provide invaluable insights to each person from very different perspectives and world views, enough to build a strong foundation from which future project consultation can commence.

ACKNOWLEDGEMENTS

Right from the start, Maryanne Rapata Tuwha of Makaurau Marae, relentlessly and passionately defended the environmental, social, and cultural values of the whenua of Ihumatao and the Manukau Harbour. Her authenticity and honesty set the tone for all future hui held thereafter, and she held the Alliance accountable for promises made during consultation.

Maryanne sadly passed on during the consultation process; but her passion and desire to improve the health of the harbour through this project was carried through by Lucie Rutherfurd, Environmental Technical Officer for Ngati Tamaoho Trust. Her dedication, combined with thorough knowledge of stormwater management, contributed considerably to the extremely positive outcomes of both the design and consultation processes of the project.

We would also like to acknowledge the efforts of the Alliance stormwater design team, in particular Agnieska Houldsworth (Synergine Group), Ron Melton (Beca), and Richard Noble (Beca). Their tireless efforts were invaluable to ensuring that the 'Best Practicable Option' truly considered environmental, economic, social, *and* cultural values.

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