

BORCK CREEK STORMWATER CORRIDOR – FINDING SPACE IN A CHANGING WORLD

A. Stevens (Stantec) & D. Arseneau (Tasman District Council)

ABSTRACT (500 WORDS MAXIMUM)

Greenfield growth in Richmond, the largest town in the Tasman District, is concentrated in the Borck Creek catchment which flows from the Bryant and Richmond Ranges onto the flat Waimea Plains and out into Tasman Bay. Borck Creek is a heavily modified watercourse that curves around the current developed border of Richmond and is subject to development pressures along a significant portion of its length. The location of the waterway on the boundary of the current township, within the prime development areas, presents both a challenge and opportunity for stormwater management planning to ensure that safe and effective discharge paths are available for the entire catchment. The project affects dozens of current landowners, but also is able to take advantage of the relatively undeveloped nature of the existing catchment to implement a holistic infrastructure solution for the potential thousands of future residents.

The opportunity and need to develop the Borck Creek catchment was identified by Tasman District Council over twenty years ago. The project sought to achieve a variety of outcomes; encompassing stormwater servicing & flood management, ecological restoration, amenity and recreation values, and active transportation opportunities. The long term nature of the project has meant that aspects of the required outcomes have changed throughout its lifespan to date, which have presented some significant challenges for the management team.

The changes began as a result of an extreme flood event in 2013 which spawned a project to upgrade central Richmond's stormwater network - diverting significant additional flows into the Borck catchment. Updates to rainfall and climate change estimation tools, and future development projections over time have further changed the expected flows, and changes to local and central government policy, along with societal expectations have affected the way environmental and social values are incorporated into the corridor designs.

As with any significant infrastructure project, the Borck Creek corridor is subject to local government budget pressures. The project has benefitted greatly from an ongoing programme management budget and capability. As a result of this budgetary flexibility there have been opportunities to work with developers and contractors to construct parts of the corridor and use the fill for adjacent developments, resulting in significantly reduced costs and improved outcomes for the community.

The Borck Creek project also requires extensive land purchase by Council to implement, and the importance of individual land purchases increases as more sections of the corridor come online and alternative routes for the corridor become limited. This emphasises the importance of a clear, methodical and well-documented analysis approach for establishing corridor width to facilitate Public Works Act processes. In the case of Borck Creek where land requirements are exceeding the widths originally established in the designations ten

years ago, this is particularly important and another aspect where the integration of multiple uses into the corridor needs careful consideration.

This paper aims to share the lessons TDC has learned through the Borck Creek stormwater corridor programme in the hope they are useful and informative for other local government organisations.

KEYWORDS

Development, stormwater, management, planning, flood management, ecological restoration, recreation, amenity, active transport, climate change, land purchase, Public Works Act, designation

PRESENTER PROFILES

Alistair Stevens is a Project Manager with Stantec in Richmond and is managing Stantec's programme of work on the Richmond South and West Stormwater Corridor. Al previously worked as a project manager for Tasman District Council where he served as the project manager for the design and construction of the corridor through the Richmond West Development Area.

David Arseneau is the Senior Infrastructure Planning Advisor – Stormwater and Rivers at Tasman District Council, having recently made the switch to local government after a 15-year career in the consulting industry in Canada and New Zealand.

1 INTRODUCTION

Richmond township is the largest settlement in the Tasman District, situated between the edges of the Waimea Estuary, the Waimea plains, and the foothills of Barnicoat Range. Richmond sits at the Southern edge of Nelson City and forms part of its extended urban area. The settlement had a population of 14,427 at the 2018 Census.

Richmond's surrounding topography varies between steep hillsides, covered mostly in exotic forests, and the low-lying productive floodplains of the Waimea River. The Richmond catchment is defined by a series of streams that flow down the steep slopes of the Barnicoat Range, through the Richmond urban area, onto the floodplains below and into the Waimea Estuary (catchment overview shown in Figure 1).

The stormwater system within the developed area is mostly piped, though remnants of pre-development streams exist in heavily modified form, and in often discontinuous reaches connected by pipes. The major piped stormwater systems convey runoff along Oxford Street, Queen Street, Salisbury Road and Gladstone Road. Stormwater generally flows in a northerly direction from its source to the town centre, and on to the Waimea Estuary.

A challenge for Tasman District Council (TDC) over the past 25 years, like many Councils around New Zealand, has been effective management and accommodation of growth. There is a low appetite for urban intensification and redevelopment among developers when zoned greenfield sites are within walking distance of the town centre, due both to ease of construction and perceived market preferences. Additionally, intensification of the existing urban area places more demand on the already-undersized network, and upgrading pipes and channels in the constrained space is relatively expensive and disruptive. Expansion into greenfield areas is restricted by the Waimea Estuary and Nelson City to the north, and the challenges of the steep hillsides to the east, limiting new greenfield growth areas to the south and west of the township.

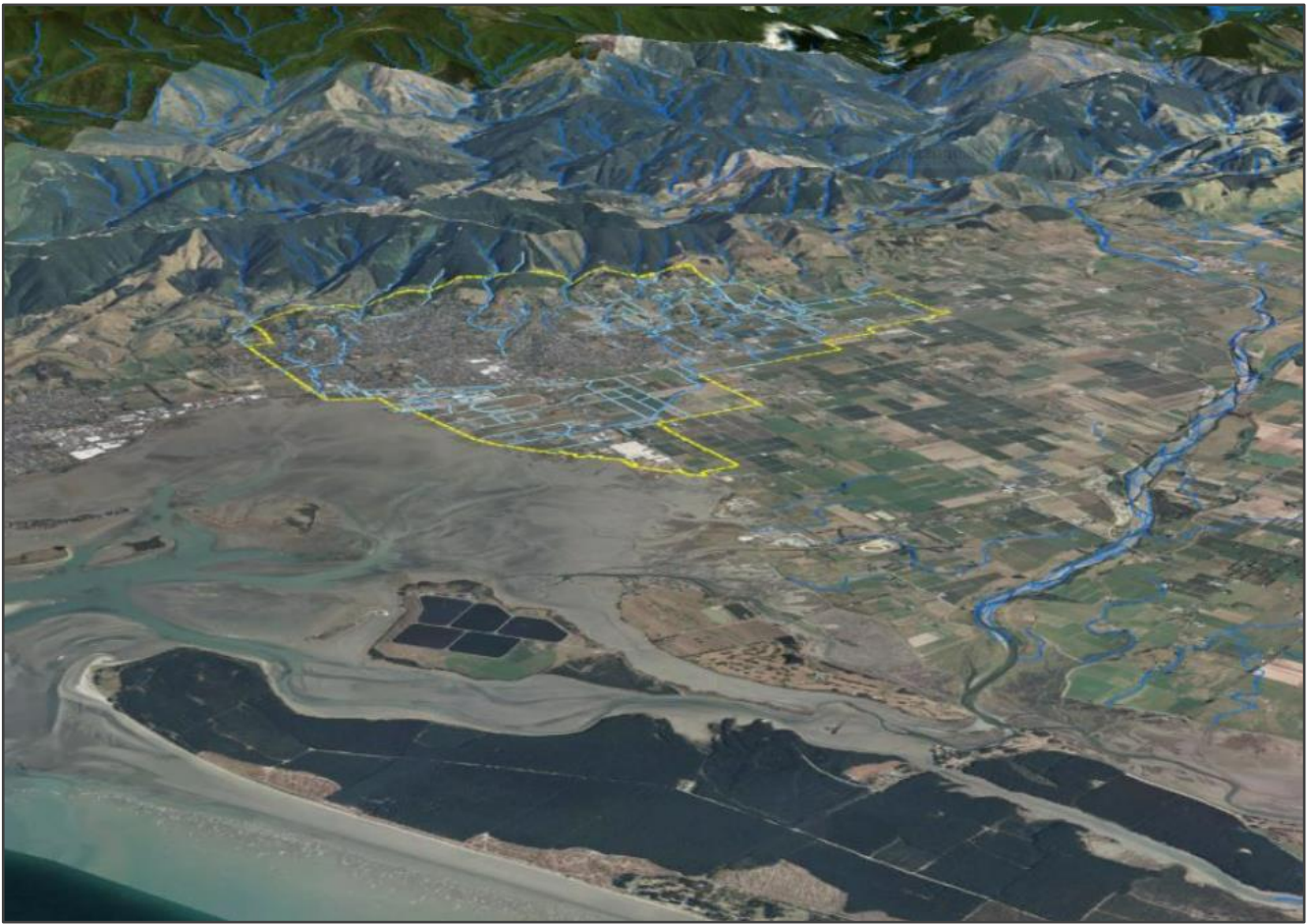


Figure 1. The Richmond Urban Drainage Area (yellow outline) against the backdrop of the Barnicoat Ranges with the Waimea River and floodplains at right, and Moturoa (Rabbit Island) and Waimea Inlet in the foreground. (image from Richmond Catchment Management Plan, TDC 2019).

TDC determined in the 1990s that infrastructure corridors should be planned and protected given the natural expansion of the township to the south and west. The stormwater corridor through these development areas is centered on Borck Creek, a waterway which flows from the foothills in the Southwest, through both the south and western development areas, to the Waimea Estuary. A decade of planning and engineering determining hydrology, hydraulics, corridor values and objectives culminated in a designation over the Richmond Greenway Corridor being approved in 2010. Early stages of implementation kicked off in 2015.

The objective of this new paper is to capture and characterise the evolution of the programme since the early implementation stage against a backdrop of ever-shifting technical, social, environmental, and statutory conditions. The primary theme is that this is a long-term programme, and many determining factors that would remain fixed in a shorter-term infrastructure project have and will continue to significantly change. The ongoing and emerging challenges to programme implementation will be discussed along with TDC's solutions to adapt to the changing conditions, with varying levels of success, yielding a set of "lessons learned" that may prove useful to other Councils embarking on a similar journey.

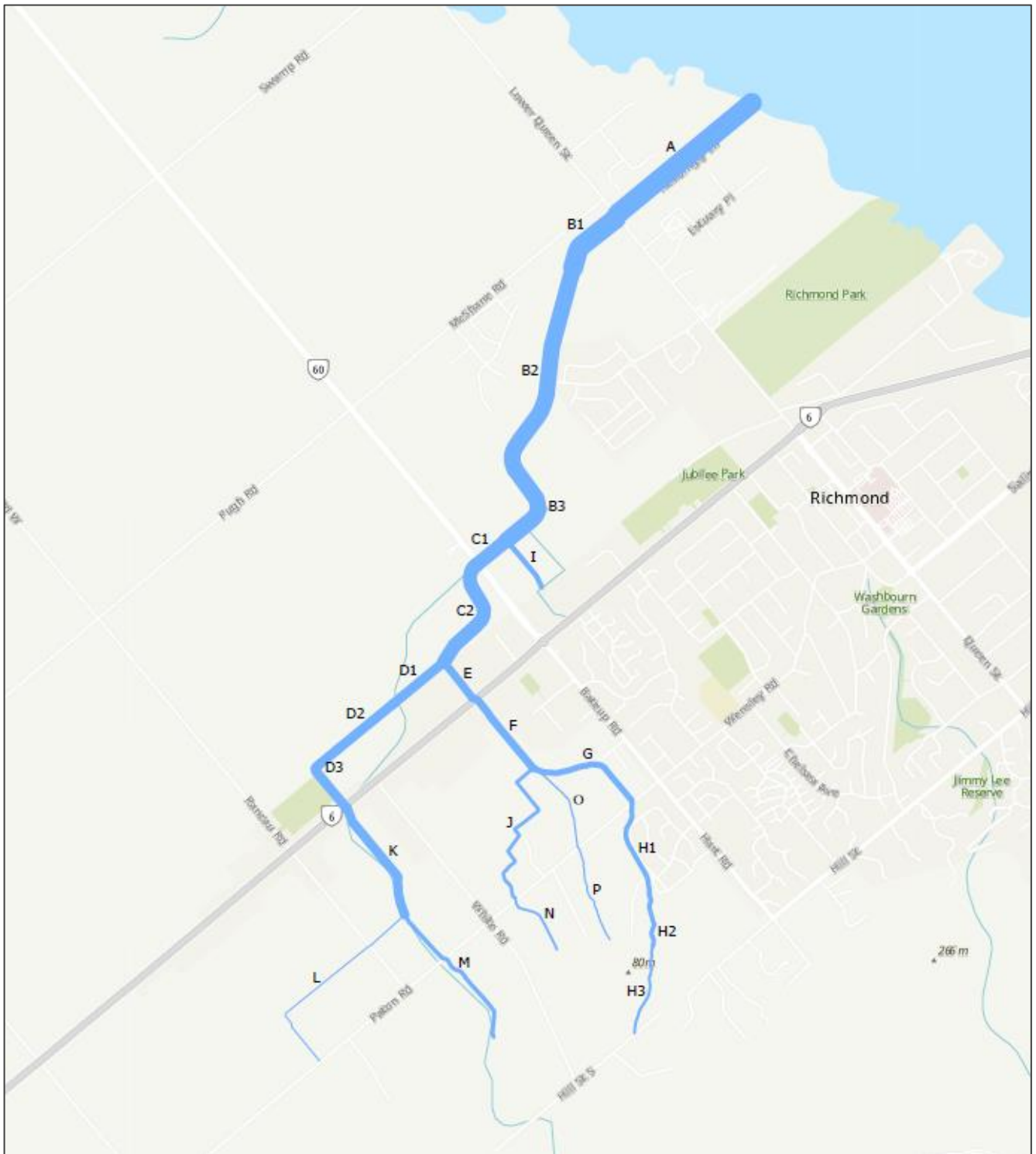


Figure 2. Richmond South and West Stormwater corridor, with letter labels corresponding to the hydraulic design section for each area of the corridor.

2 PROGRAMME BACKGROUND

The Richmond South and West Stormwater Programme has existed under various names and levels of organisation since the late 1990s. Figure 3 presents a summary timeline of the programme from a key defining early project report (an options assessment report) to the current day.

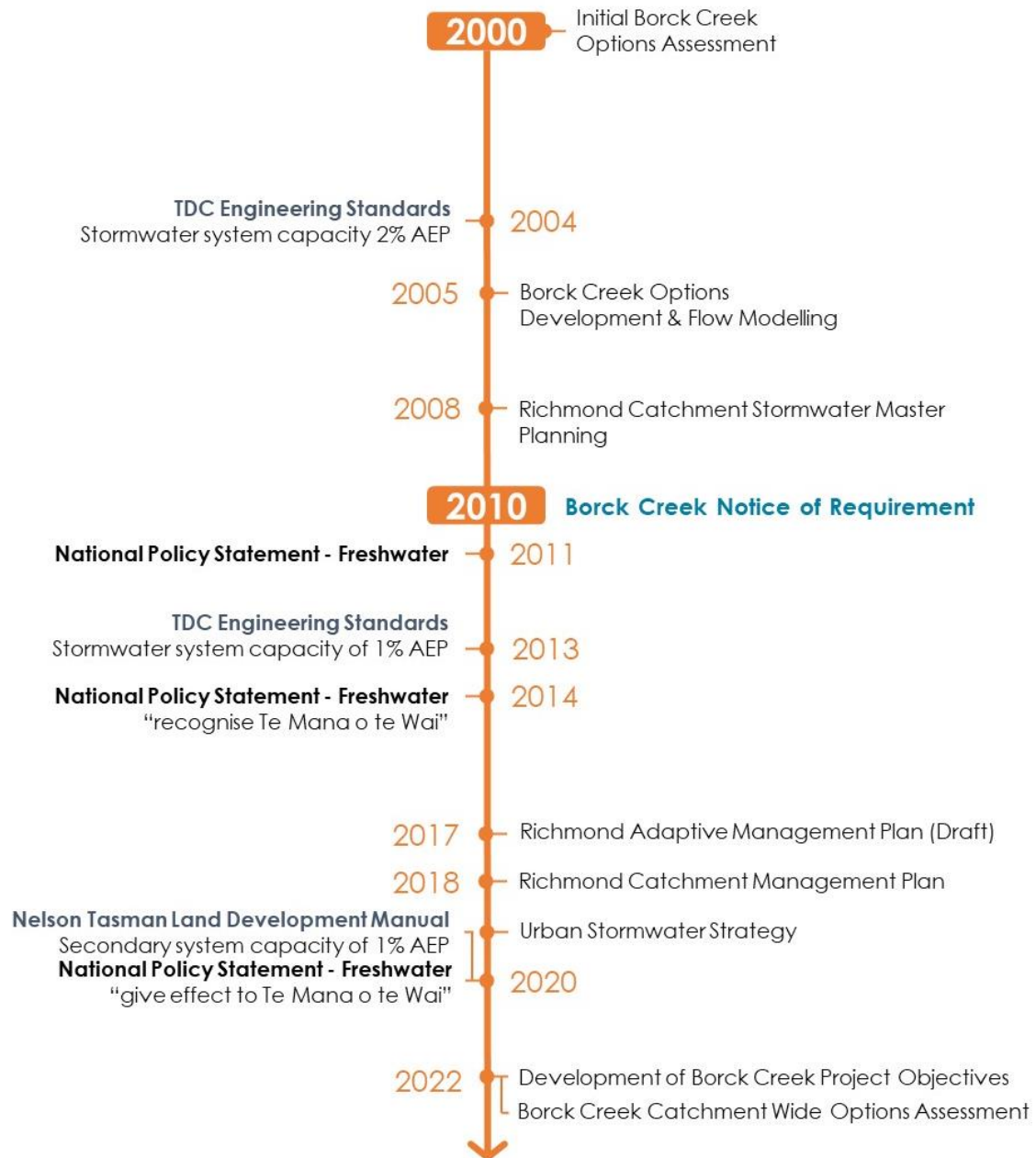


Figure 3. Richmond South and West Stormwater Programme timeline from initial inception to current, noting important changes to policies and standards that have occurred during the programme's life.

A previous paper presented at the 2016 Stormwater Conference, titled "Borck Creek – Strategic Stormwater Planning" (Blythe and Tomkinson), covered in detail the origins of the programme and designation planning processes, as well as the initial stages of implementation in the Richmond West greenfield residential development areas known as Berryfields and The Meadows. That paper remains relevant and useful in providing context and history for the programme, and many of the challenges identified in 2016 persist in 2023. Indeed, some of the challenges and conclusions described in that paper are revisited here and are noted appropriately.

The programme has evolved in a series of step changes over its 20+ year life, with one of the most notable advancements occurring in 2010 with the Borck Creek Notice of Requirement which resulted in a designation being put in place over the required corridor length at that time. Figure 4 illustrates the current designation extents as established in 2010 and codified in the Tasman Resource Management Plan.



Figure 4. Current extents of the Borck Creek Stormwater Corridor, resulting from the 2010 Notice of Requirement.

The notice of requirement set out the objectives for the project at this point as being:

- a) To provide a stormwater drainage network in the Richmond South Development Area (RSDA) and Richmond West Development Area (RWDA) that is capable of

safely containing and efficiently conveying storm flows of Q100 (100-year return periods) to Waimea Inlet;

- b) To provide stormwater detention basins as necessary to detain stormwater runoff from urban development in the RSDA until such time as the downstream stormwater drainage network is fully developed;
- c) To provide for an open stormwater drainage network using existing waterways where possible, combined with an open space and recreational reserve network aligned with the greenway network of the RSDA and RWDA.

Following the Notice of Requirement, a programme of land acquisition was developed based on the philosophy that landowners could not develop their land without selling the designated portion to the Council for drainage purposes. Where landowners were motivated, the council would also carry out land purchases ahead of development to establish the corridor. The construction of the network would be undertaken progressively from the coast to the foothills, as growth demanded. By 2012 some portions of the lower sections of the channel had been purchased in anticipation of upstream growth.

In recent years, between 2015 and today, multiple sections of Borck Creek and Poutama Creek in the Richmond West development area have been upgraded to cater for increased stormwater flows as well as to enhance aquatic habitat with riparian planting, creek meanders and placement of natural features such as wood and rock. Higher up in the catchment, in the Richmond South development area, some sections of the corridor have been implemented in tandem with adjacent residential development, but these sections form isolated pockets within the existing network of channels and drains that remain undersized and in poor ecological condition. Additionally developers in the upper reaches of the network have been required to provide onsite detention until the network downstream has been fully developed. Figure 5 shows the current implementation status of the stormwater corridor sections, indicating areas that have been constructed or where land has been purchased. Figure 6 presents an aerial view of Section B2 under construction, receiving an initial round of riparian plantings.

Since the implementation of some sections of the corridor, the Tasman Region has experienced several large storm events that have served to both demonstrate the benefits of the corridor in managing stormwater-related flood risks and to emphasise the importance of robust and forward-thinking design criteria when establishing infrastructure of this magnitude. Figure 7 and Figure 8 show helicopter-survey photos of the constructed portions of Borck Creek taken during the August 2022 storm event experience in the Nelson-Tasman region. Although peak stream flows during the event likely did not exceed a 10% Annual Exceedance Probability (AEP) event in the Borck Creek catchment, the benefits of the channel were illustrated and no residences were impacted (unlike elsewhere in the historical urban areas of Richmond); it was also notable to see the current crossing of Lower Queen Street (shown in Figure 8), to be upgraded in the future, reach full capacity during the ~10% AEP event while the upstream and downstream upgraded channel corridor had ample capacity remaining.

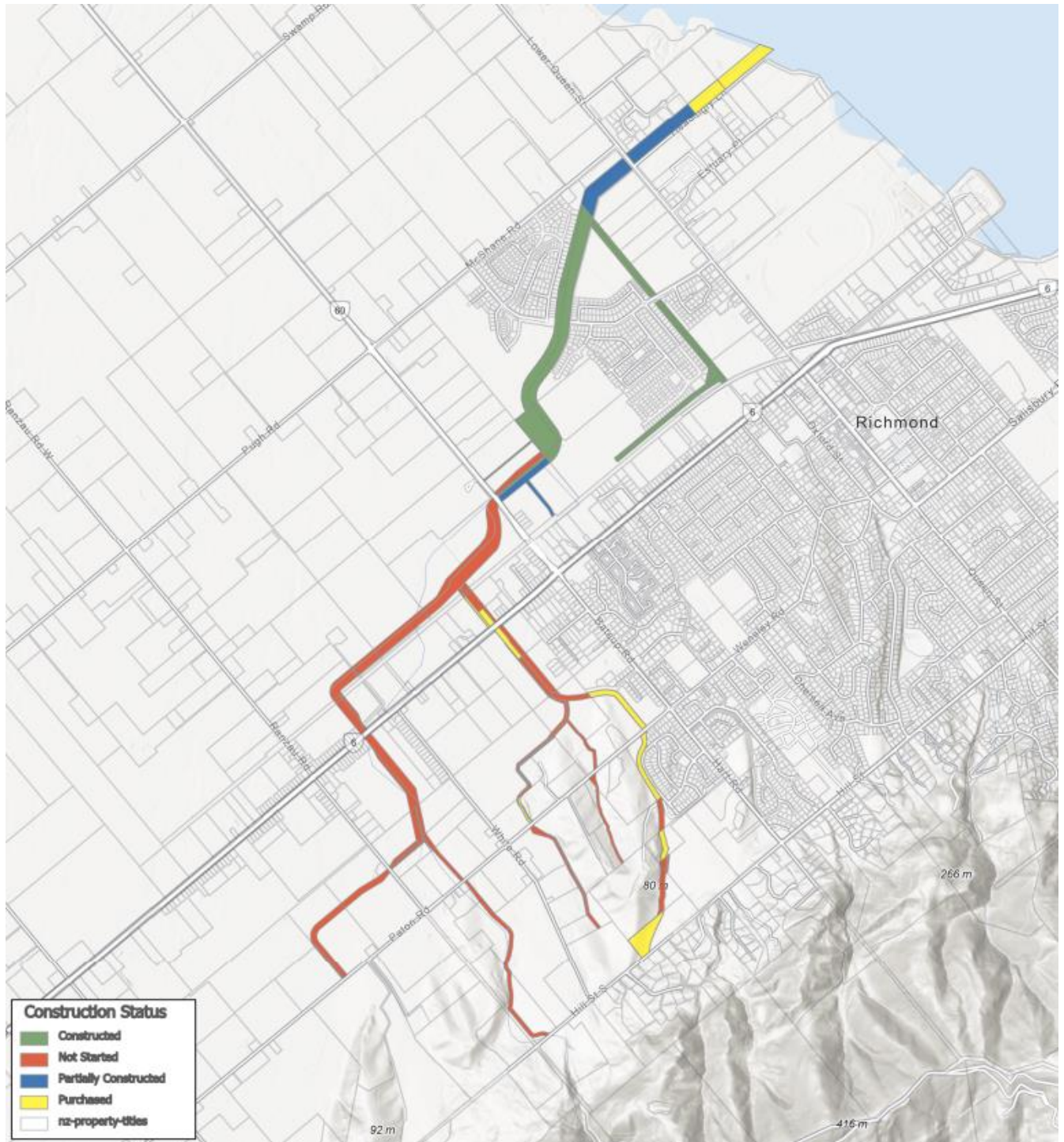


Figure 5. Current (2023) implementation status of stormwater corridor sections.



Figure 6. Borck Creek through the Richmond West development area, Section B2, undergoing plantings and restoration in May 2021.



Figure 7. Borck Creek through the Richmond West greenfield area during the August 2022 storm event, looking upstream in section B2.



Figure 8. Borck Creek at Lower Queen Street and downstream to the estuary during the August 2022 storm event, with upgraded channels on either side of an un-upgraded bridge crossing.

3 CHALLENGES, ISSUES AND SOLUTIONS

The Richmond South and West Stormwater Programme, similar to any significant long-term infrastructure projects, has faced a range of challenges and issues during its planning and early implementation stages. The challenges and issues discussed in this paper have been grouped into four broad categories, listed below and detailed in the following sections:

1. Responding to growth,
2. Changing statutory and policy environment,
3. Changing natural environment, and
4. Land acquisition.

3.1 RESPONDING TO GROWTH

A principal driver of the Richmond South and West Stormwater project is to service development in the greenfield areas on the current periphery of Richmond. Such a large project must have a delivery timeline that is affordable but that also provides the intended benefits at the time they're needed.

Council's initial approach to managing this issue was splitting the project into sections and phasing those over the expected timeframe for the development of the areas to be serviced. This helped to create a relatively even spend profile to manage borrowing or rate increase requirements, but also to provide the necessary utility service to development areas as they were expected to be required.

Council's decision on this delivery structure was to include all costs for each section of channel within that discrete project – Preliminary & Detailed Design, Consenting, Stormwater Conference & Expo 2023

Procurement and Construction. There was also a land acquisition budget separate from the design and construction projects, to enable the required land to be purchased when landowners were willing to sell.

In reality, development has not occurred in the order and at the pace that was projected. This is due to three key factors:

- Market drivers,
- National Policy, in particular the Housing Accords and Special Housing Areas Act 2013, and
- Land fragmentation and Human factors.

Challenge: Market Drivers

Statistics NZ projected that the population of the Nelson urban area (combined Nelson City and Richmond urban areas) was likely to grow by not more than 9.95% in the ten years between 2013 and 2023, meaning it was classified as 'medium growth', falling just below the ten percent threshold defining 'high growth' urban areas. The Nelson urban area exceeded this by some margin, growing by over 14% in the seven years between 2013 and 2020. Individually, the Nelson part of the urban area grew by 10% while the Tasman part (Richmond) grew by 20% as noted in the Nelson-Tasman Future Development Strategy 2021.

Project budgets and construction programmes were based on meeting predicted growth, and with growth occurring at over twice the rate projected the project needed to accelerate accordingly to enable development to progress to meet the market.

The reality of having twice as many new residents looking for housing as was predicted meant developers were pushing hard to open up new land before Council had planned to service it. This put pressure on the project team to design and construct sections of channel well in advance of the programmed timeframes.

Challenge: National Policy Changes

Central government recognized the need for additional land to be made available for housing and responded in part with the Housing Accords and Special Housing Areas Act 2013. This legislation enabled the Minister to declare land be zoned for residential development without following the local council's normal planning processes.

In Richmond this meant a large area of land in Richmond West which had been zoned for mixed business was changed to residential. Demand for this land promptly increased, and an area that had been expected to service business growth for the coming 20 years was then expected to be fully developed in 5 years. Other developers used the legislation to accelerate the planning process on already residentially zoned land, requiring the council to advance servicing and other inputs.

Another unintended consequence was that in the Richmond West Development Area the greenway channel had been planned to function as a buffer between land use zones, with residential on one side and mixed business on the other. As such the project budget in the initial phases was only to widen the stormwater channel to accommodate a Q100 event in a present-day scenario, with the full development of the greenway channel to the Q100 standard inclusive of climate change and future development to be undertaken when required for upstream development.

With the forced zoning change the channel now ran through the centre of a rapidly developing residential area, making the staged approach impractical. Council had to find the funding and resources to construct the full channel on a much shorter timeframe.

Challenge: Land Fragmentation and Human Factors

Much of the land on the periphery of Richmond has been subdivided into lifestyle holdings, as the area is the only space on the edge of the Nelson urban area where such property is available in any meaningful quantity.

As a result of this subdivision, the areas available for development are fragmented and owned by a large number of different people. Each of these owners has their own plans and motivations for their properties, which makes coordinating large-scale cohesive development extremely difficult.

The effect that this has on the delivery of the stormwater programme is that properties are being developed at illogical or inopportune times in the context of the project. The Council has been required to advance designs for sections of channel kilometres upstream of any other constructed section, and years in advance of its programmed timeframe in order to confirm and secure the necessary corridor through a private development.

Conversely, some residents in development areas have no intention to develop their land, resulting in sections of channel unable to be developed in time for upstream sections to come online.

Additionally, some significant parcels in areas of the township that have already been largely developed are in a similar situation, with an owner who has no desire to subdivide their parcel. This affects the project as these areas, while unavailable in practice, are statistically available for development, thereby reducing the impetus on planners and policymakers to make more land available and subsequently increase funding for the servicing of that land.

Council has responded to these changes and factors in several different ways, including managing and amending project budgets and timelines at each opportunity, changing the way in which we manage the disparate project budgets associated with this programme, and actively collaborating with motivated developers to deliver elements of the constructed work cost-effectively and ahead of schedule. These responses are discussed below.

Response: Amending project delivery structure with each Annual and Long Term Plan.

Changes to the timing of funding within the programme that are required to best position the project for the coming year are made at each annual plan. This generally involves bringing forward funding for projects that are needed to respond to changes in the development landscape, or deferring funding where changes have meant that progress has not been made where it was planned.

At each long term plan the programme is reconsidered as a whole and the order and projected cost of each project is reassessed. Generally, this has meant the compression of the programme at each LTP, as development has driven the need to complete the project earlier. However, this approach is not without risk when considering the funding structure of the programme which is spread over many discrete projects in the LTP, which can be clumsy for the delivery of a large programme.

Response: Changing how budgets are managed within the programme.

Reflecting on the need for funding flexibility, a key development that has increased the project team's ability to remain agile has been a change to utilising project budgets as a funding pool rather than discrete buckets. This has allowed the team to redistribute funding to where it's needed most, and to advance designs for future sections ahead of schedule.

Core to this philosophy has been communication between the delivery team and the infrastructure planning team. This has allowed the Council to manage the risk of moving budgets between projects with different funding profiles (rates funding vs development contributions), while enabling project progress in a way that best provides the outcomes needed at the time.

An example of this is the use of budget from the Poutama Stream upgrade in 2021 to progress designs for the Eastern Hills Drain. This enabled the Council to reach an agreement with a contractor to construct the Eastern Hills Drain a year ahead of programme at extremely favourable rates, as the fill was needed by a nearby developer at that time. Had the team waited for the Eastern Hills Drain project to commence as budgeted, that opportunity would have been missed, and the cost to construct the channel could have been significantly more expensive.

Response: Working with developers to deliver outcomes ahead of schedule and under budget.

The third, and probably most significant adaptation the team have made is to work with developers wherever possible to deliver the project. Rather than independently progressing our individual objectives, Council and the developers in the Richmond West Development Area formed a collaborative working relationship.

The core component of this is that the stormwater project would result in a significant surplus of fill, and the adjacent developers had a significant need for fill.

The project team identified that it would cost the project significantly less to make this fill available at the time it is needed by developers rather than progressing projects according to a traditional design-procure-construct model. This meant that at times contractors were engaged (or development agreements entered into) before designs were progressed much beyond concepts, and interim resource consents for bulk earthworks were sought in order to align with development progress.

Some sections of channel ended up having up to four separate construction contracts and multiple iterations of resource consents issued. The end result was that the section of Borck Creek through the Richmond West Development Area was constructed to its full final profile, within the budget and timeframe allocated for the construction of a short-term interim channel. This represented an estimated saving of \$5 Million, and a vast reduction in disruption to the newly constructed neighbourhood. Additionally, an estimated 400 tonnes of CO₂ equivalent was saved by avoiding carting material offsite.

3.2 CHANGING STATUTORY AND POLICY ENVIRONMENT

The Richmond South and West Stormwater Programme sits at the confluence of a number of different areas of policy and legislation, including growth and development, freshwater management and protection, infrastructure planning and consenting, district plan and regional plan updates, active transportation, and not least of all the evolving understanding and relationship with Te Mana o te Wai and our iwi partners. Each of these areas has changed in various ways since the inception of the programme in the late 1990s and the Notice of Requirement in 2010, and these changes have each had their impact on the stormwater programme.

As discussed in Section 3.1, growth in the Tasman Region has progressed at a faster pace than anticipated over the lifetime of the stormwater programme. In addition to this, the latest evolution of the National Policy Statement for Urban Development (issued in 2020) requires Councils to identify and plan for sufficient growth areas in their jurisdictions, and drives planners towards more affordable and socially cohesive high-density residential development and intensification. The impact to the stormwater programme, again as previously discussed, has been an acceleration of anticipated growth that must be serviced by effective stormwater infrastructure, and an escalation in the sheer quantity of growth and impervious areas that need to be accommodated by this infrastructure. These changes are compounded by trends and changes in the natural environment (discussed in Section 3.3) that have resulted in an ongoing programming and design challenge.

In the freshwater space the National Policy Statement for Freshwater Management (NPSFM), first in 2014 and then most notably in 2020, along with the National Environmental Standards for Freshwater in 2020, with their focus on and minimum standards for ecological and water quality, as well as social and cultural connectivity and outcomes, have fundamentally changed the way that stormwater infrastructure is planned, designed, and delivered.

Another significant change brought in by the NPSFM 2020 is the obligation by local government to give effect to Te Mana o te Wai through all of their work. Although Te Mana o te Wai was not a new concept in 2020, the statutory requirement to give effect brought it squarely into focus and meant that elements of the stormwater programme that previously may have been considered best practice or “nice to have” were now mandatory and non-negotiable. For example, the suitability of the new low flow channel for aquatic habitat, although very much in consideration before the NPSFM 2020, became central to the overall corridor assessment and design with knock-on effects to corridor width, land purchase requirements, collaborations with developers, and long-term maintenance requirements.

In anticipation of the NPSFM and in response to the evolution of industry best practices, TDC undertook an overhaul of our stormwater management philosophy and approach starting in 2019 with the development of our Urban Stormwater Strategy, quickly followed by the Richmond Catchment Management Plan. The result was a more comprehensive and holistic approach to stormwater management that went beyond peak flow and flood control to incorporate environmental and social outcomes as well; the strategy is summarised further in Section 4 of this paper. Updates to the Nelson-Tasman Land Development Manual followed in 2020, providing more detail and robustness to our preferred stormwater management approach in the District. The implication to the Richmond South and West stormwater programme was the desire to bring the programme design “up to code” and align it with our new strategy objectives and engineering standards.

Beyond the purely environmental objectives of the NPSFM and Te Mana o te Wai, and supported by the general requirement and desire to fulfil Te Tiriti o Waitangi obligations, is the need to effectively consult and engage with iwi as part of local government work, particularly in the stormwater management and natural environment spaces. Tasman District Council has engaged our eight iwi in Te Tau Ihu during the development of our core Urban Stormwater Strategy and Richmond Catchment Management Plan, both of which have supported and advanced the Richmond South and West Stormwater Programme. However, Council also recognises there is more work to be done in this space, and more and better ways to collaborate, engage, and build trust with our iwi partners on these types of projects.

In addition to changes directly in the freshwater and stormwater spaces, Council’s approach to active transportation and community connectivity have evolved since the

programme inception, including the adoption of the Walking and Cycling Strategy in 2022 which pushes for, among other things, the significant expansion of Tasman's trails and pathways to increase connectivity in our urban and suburban areas. The Borck Creek corridor being constructed by the Richmond South and West Stormwater Programme was identified as a key element of the overall active transportation network in Richmond, providing linkages throughout the expansive greenfield development areas and into the existing urban core. The impact to the stormwater programme has been the inclusion of another non-negotiable aspect of the work with effects on required land acquisition, channel corridor design and developer collaboration.

3.3 CHANGING NATURAL ENVIRONMENT

Systemic changes that impact the Richmond South and West Stormwater Programme have not been limited to growth patterns or statutory instruments, as discussed in the previous sections – the natural environment itself and our understanding of it has been shifting as well, on scales both large and small.

One of the large-scale evolutions that have occurred over the lifetime of the programme is our understanding of climate change and its projected effects on rainfall patterns. It is not clear if the earliest concepts of the Borck Creek corridor incorporated climate change projections into design criteria, but the concept designs completed at the time of the Notice of Requirement in 2009-2010 did to the best knowledge of the day and to the level required by TDC standards and best practice at that time. Since then, improved projections and guidance from both international organizations (e.g., IPCC representative pathway concentration scenarios) and national bodies (e.g., NIWA's continued development of the HIRDS database), have resulted in generally increased long-term rainfall intensity projections for Richmond.

In addition to future projections of rainfall intensities, there have been several extreme storm events in Richmond since 2009 that have directly impacted statistical measures of rainfall exceedance probabilities. The most notable event occurred in April 2013 when one of the most intense storms measured in New Zealand (up to that time) hit the Richmond and Nelson areas, with a peak rainfall intensity of 101 mm/hr recorded at one local TDC gauge. Our understanding of what a 1% annual exceedance probability storm have shifted in alignment with these severe events, as has the importance of accommodating for such events.

On the smaller-scale, changes in the catchment serviced by the Richmond South and West Stormwater Programme have also occurred since the inception of the programme. These include some planned or actual diversions of stormwater from adjacent urban catchments to resolve chronic flooding issues in those areas (e.g., planned diversion from Eastern Hills Creek into the upper sections of the stormwater corridor), and the general increase in development amount and intensity, as discussed previously.

The result of these changes in weather patterns, climate change projections, and catchment development has been a gradual increase in design flow estimates for the stormwater channel, which is a fundamental underlying assumption that largely dictates the required size and extent of the corridor with immensely significant implications for programme cost.

Increasing design flows can to a certain extent be accommodated within a certain corridor footprint, as some amount of conservatism is typically included in any engineering design. However, when coupled with increasing growth demand and other statutory changes, the number of demands on the corridor quickly eroded any factors of safety that were included in the original concepts. This initiated a series of programme-wide studies and assessments, in parallel to larger stormwater-related work occurring in the District such as

the development of a new rain-on-grid stormwater model for the Richmond area, to improve our understanding of the system as a whole and prepare Council for implementation of the corridor. These updated design flows are fed directly into revised concept designs for the corridors and factored into rolling Annual Plan and Long Term Plan budget estimates for delivery of the work.

A summary of how design flows for each section of the corridor have changed between the 2009-2010 Notice of Requirement and the current day is shown in Table 1.

Table 1. Summary of design flow changes between the initial Notice of Requirement in 2009-2010 and the current day.

Section	Description	Design Flow (2009) m³/s	Design Flow (2019) m³/s	Design Flow (2021) m³/s	Design Flow (2023) m³/s	Change (2009 - 2023) m³/s
A	Lower Queen Street to Estuary	71	97	105	105	+34
B	Eastern Hills Drain to Lower Queen Street	61	75	85	85	+24
C	Reed Andrews Drain to Eastern Hills Drain	57	60	71	71	+14
D	State Highway 6 to Reed Andrews Drain	46	46	46	46	0
E	Reed Andrews Drain - SH6 to Borck Creek	26	26	36	36	+10
F	Reed Andrews Drain - Whites Drain to SH6	25	25	35	35	+10
G	Reed Andrews Drain - Paton Road to Whites Drain	19	19	22	22	+3
H	Hill Street to Paton Road	17	17	18	18	+1
I	Eastern Hills Drain	10	10	14	14	+4
J	Whites Drain below Paton Road	6	7	10	10	+4
K	Borck Creek - Upper Borck Creek to SH6	Not Assessed	Not Assessed	44	44	N/A
L	Upper Borck Creek	Not Assessed	Not Assessed	Not Assessed	30	N/A

Section	Description	Design Flow (2009) m ³ /s	Design Flow (2019) m ³ /s	Design Flow (2021) m ³ /s	Design Flow (2023) m ³ /s	Change (2009 - 2023) m ³ /s
M	Borck Creek East	Not Assessed	Not Assessed	14	14	N/A
N	White Drain East - Above Paton Rd	Not Assessed	5	7	7	N/A
O	White Drain East - Paton Rd to Whites Drain	Not Assessed	3	3	3	N/A
P	Upper Whites Drain	Not Assessed	2	3	3	N/A
Q	Upper Borck Creek East	Not Assessed	Not Assessed	Not Assessed	12	N/A

3.4 LAND ACQUISITION

Land acquisition has historically been treated as a separate project within the Richmond Stormwater upgrade programme. The original strategy has relied on the designation obtained in 2010 and subsequent land acquisition by agreement or at subdivision.

Following the establishment of the designation the Council has progressively purchased land as sellers have been willing. There was intent to follow a logical sequence of purchases to facilitate construction of the network in a way that enabled development when and where it was needed; however, once most 'low hanging fruit' had been picked, engagement with more resistant landowners revealed weaknesses and risks in this approach.

It became clear around 2018 that the designation obtained under the Resource Management Act did not secure the Council's ability to acquire the necessary land for the project, it only "saved" the land from being developed in a way that would prevent the designated use from being realised. Compulsory acquisition of land for a public work follows a parallel process under the Public Works Act (PWA) which has similar but separate requirements for demonstrating the fairness and necessity of the take.

The Notice of Requirement did consider the PWA process, but legal advice obtained more recently (and perhaps with the benefit of more recent case law) has indicated that council would be unwise to rely on the Notice of Requirement in a compulsory acquisition scenario.

Accordingly, a full assessment of the remaining parcels to acquire, combined with the changes to the required area was undertaken, and the strategy was revised to focus on ensuring that the network will be able to be acquired in full.

As a result, the project team have invested significant time and resources into ensuring that the objectives for the project are clearly captured and ratified by the council, and options and alternatives have been adequately considered and documented.

The process is still in progress, and compulsory acquisition under the Public Works Act has not yet been attempted, but we believe we are in a strong position to utilize the council's powers under the PWA if necessary.

4 THE REVISED STRATEGY

Council has developed a strategy to address the challenges outlined above, centred on the development and Council-adoption of an updated and refreshed suite of project objectives.

The process of developing and formalising the programme objectives began in 2019 when Council staff and iwi partners developed the Urban Stormwater Strategy. The Strategy provides direction to the analysis, planning and management of stormwater in Tasman District, which was then consolidated in the Richmond Catchment Management Plan for the Richmond Urban Drainage Area. The strategy is anchored on Council's vision to protect and enhance the mauri of wai and to provide for:

- Te Hauora o Te Wai,
- Te Hauora o Te Taiao, and
- Te Hauora o Ngā Tangata.

The Urban Stormwater Strategy sets out five aspirations to define Council's long-term outcomes for stormwater management, listed below:

1. Our urban streams, aquatic habitats and coastal marine environment are healthy and accessible.
2. Stormwater discharges do not degrade the water quality and ecosystem health of our streams and estuaries.
3. Stormwater flooding does not create a hazard to our community or cause damage to properties.
4. We enable water sensitive growth for future generations.
5. We manage stormwater in a holistic, efficient and cost-effective manner.

To reflect the long-term aspirations from the Urban Stormwater Strategy, a set of project specific objectives and associated outcomes were developed for the Richmond South and West Stormwater Programme and adopted by Tasman District Council in August 2022. The objectives are to provide a stormwater network in the southern and western greenfield development areas that:

1. Conveys the 1% AEP event within the stormwater network including effects of future development and climate change.
2. Enhances stream health, ecological diversity, and accessibility.
3. Enables water sensitive growth for future generations.
4. Considers the whole of life costs including future needs, operation and maintenance costs.
5. Integrates public access, amenity, and connectivity along the corridor from the Richmond Foothills to the Waimea Estuary and enables the concept of Ki Uta Ki Tai.

Following confirmation of the objectives, a high-level assessment of options was able to be undertaken. This assessment took the project right back to these principles and reassessed whether the current plan is still the most appropriate to achieve the revised objectives.

The options assessment found that the general route for the corridor was still the most appropriate, and that the general concept of a wide, shallow environmental channel with

ecological and recreational features incorporated was still the preferred option. It also identified two other channel arrangements that could provide most of the benefits, with a reduced land requirement, that may be able to be used in some sections of channel if necessary.

The next step was to undertake concept designs of each hydraulic section along the identified route, based on the preferred channel type.

The project is now at the stage of progressing these concepts to preliminary designs and assessing for each affected property where the most appropriate alignment is in the context of that particular property.

5 LESSONS LEARNED AND CONCLUSIONS

The Richmond South and West Stormwater Programme has grown and evolved over a period of rapid changes to our natural, social, cultural, and statutory environments, and the teams involved in the planning and implementation of the programme have responded with the resources and actions thought best at the time. Looking back at how the programme has evolved, we can identify aspects of the programme that we feel have the most significant impact on overall success, including:

- Adopt a programme management approach for the series of planning and design projects that are related to delivery of the end-use infrastructure, allowing flexibility and agility in delivery. This involves assigning sufficient budget and resources to ongoing, consistent programme management and coordination activities. This is currently being done in an informal manner at Tasman District Council, with intent to create an official programme structure with dedicated resources due to the benefits to overall programme execution.
- Related to the above, establish a clear suite of programme objectives that allow for flexibility and change without compromising the integrity and vision for the programme. The objectives for the Richmond South and West Stormwater Programme were reviewed and adopted by our Council to provide firm governance direction for the programme while allowing staff to adjust to changing circumstances as effectively as possible.
- Plan and implement the land acquisition programme to account for the worst-case scenario of compulsory acquisition under the Public Works Act, regardless of the willingness of landowners during initial stages of work. This is particularly important for network infrastructure projects where a “missing link” can threaten to compromise the entire programme. The Public Works Act acquisition process requires robust and detailed assessments to be undertaken and documented, which requires forward-thinking planning and adequate resources during programme development.
- Accept that general or universal rules and criteria for a large-scale infrastructure programme do not always apply, and that the specifics of a situation should be considered to achieve the best outcome. This can relate to the mechanism of delivery (e.g., Council-led or developer-led), design alternatives, or land acquisition methods (e.g., land swaps) among the many other factors that go into this work.
- Be open to learning from others who have gone through similar work, taking both the good and bad lessons where possible. Tasman District Council staff in particular engaged in conversations with staff from Auckland Council and GHD

regarding the Awakeri Wetlands project which yielded many helpful lessons that have been incorporated into our programme.

In summary, the key themes that rise out of the challenges faced by the Richmond South and West Stormwater Programme and the lessons learned we've tried to distil from our experiences, involve being open and flexible in the face of change or unforeseen circumstances, making that change an integral part of the programme management approach, and finally planning for the worst-case but working to achieve the best.

ACKNOWLEDGEMENTS

Wouter, Dugald, David, Jeff C, Jeff R, Chris, Dwayne, Robert, Matt, Rob, Giles, Jack, Martin, Mike, Russell and the rest of the team at TDC.

Seb, Jamie, Erin, Charlotte, Richard, Avik, Nigel, and the rest of the team at Stantec.

Emma, Simon, Damian and the team at Tonkin + Taylor.

Nicky at Columbus Consulting.

Chris & Stuart at Fletcher Vautier Moore.

Andrew, Graham, Graeme, Truan and their respective development companies, advisors, and contractors. All of the contractors and consultants who worked on various parts of the project.

The team at Auckland Council & GHD who kindly gave us their time on lessons learnt from the Awakeri Wetlands project.

REFERENCES

Nelson City Council and Tasman District Council, Future Development Strategy 2022-2052, September 2022.

Tasman District Council, Richmond Catchment Management Plan, 2019.

Tasman District Council, Urban Stormwater Strategy, 2019.

Borck Creek Notice of Requirement, MWH, 2009

Borck Creek Strategic Stormwater Planning, Chris Blythe & James Tomkinson, 2016

Richmond Stormwater Options Assessment, Stantec, 2022

Richmond Stormwater Summary Report, Stantec, 2023

Technical Memorandum TEM 01 -Stormwater Design Flows, Stantec, 2022