If calling, please ask for Democratic Services

Te Awa Kairangi/Hutt River Valley Subcommittee

Tuesday 22 October 2024, 2.00pm

Council Chamber, Hutt City Council, 30 Laings Road, Lower Hutt

Quorum: *Two Regional Councillors, one Hutt City Council member and One Upper Hutt City Council member*

Members

Ros Connelly, Councillor (Chair)	Greater Wellington Regional Council
Quentin Duthie, Councillor (Deputy Chair)	Greater Wellington Regional Council
Simon Edwards, Councillor	Hutt City Council
Wayne Guppy, Mayor	Upper Hutt City Council
Bill Hammond, Councillor	Upper Hutt City Council
Ken Laban, Councillor	Greater Wellington Regional Council
David Lee, Councillor	Greater Wellington Regional Council
Tui Lewis, Deputy Mayor	Hutt City Council
Caleb Ware	Te Rūnanga o Toa Rangatira Inc
Benjamin Wynyard-Terry	Port Nicholson Settlement Block Trust

Recommendations in reports are not to be construed as Council policy until adopted by Council

Te Awa Kairangi / Hutt River Valley Subcommittee (A subcommittee of the Environment Committee)

1 Purposes

1.1 Oversee development, implementation and review of floodplain management plans (FMPs) for the Te Awa Kairangi / Hutt River floodplain

1.2 Consider potential arrangements for a catchment-based governance approach for the Hutt Valley, and recommend to Council (as appropriate).

2 Specific responsibilities

2.1 Oversee the development and review of FMPs for the Te Awa Kairangi / Hutt River floodplain, for consideration of those FMPs by the Environment Committee.

2.2 Oversee the public involvement process during development or review of FMPs for the Te Awa Kairangi / Hutt River floodplain.

2.3 Review and monitor periodically the effectiveness of implementation and delivery of:

- a Riverlink
- b FMPs for the Te Awa Kairangi / Hutt River floodplain.

3 Members

3.1 Four Councillors.

3.2 Six members, appointed by Council, as follows:

- a Two elected members of Hutt City Council, nominated by that council
- b Two elected members of Upper Hutt City Council, nominated by that council
- c Two members, appointed for each person's skills, attributes, or knowledge that will assist the work of the Subcommittee, being:
  - i One member, nominated by the Port Nicholson Block Settlement Trust
  - ii One member, nominated by the Toa Rangatira Trust.

3.3 Such other members, appointed by the Environment Committee (on the Subcommittee's nomination) for each person's skills, attributes, or knowledge that will assist the work of the Subcommittee.

4 Chair

Council appoints the Chair from the four Councillor members**.**

5 Quorum

Two Councillors, one Hutt City Council member, and one Upper Hutt City Council member.

6 Voting entitlement

6.1 All members have equal speaking and voting rights.

6.2 The Chair has a deliberative vote; and, in the case of an equality of votes, has a casting vote.

7 Servicing and Standing Orders

7.1 The Subcommittee is serviced by Greater Wellington.

7.2 Council's Standing Orders apply to the Subcommittee, with no provision for alternate members.

8 Remuneration and expenses

8.1 Elected members' remuneration and expenses are met by the council they represent.

8.2 Non-elected members (who are not otherwise remunerated) may claim Greater Wellington's standard daily meeting attendance allowances and expenses.

9 Meeting frequency and dissolution

9.1 The Subcommittee meets as required.

9.2 The Subcommittee may recommend its dissolution to the Environment Committee.

Te Awa Kairangi / Hutt River Valley Subcommittee

Tuesday, 22 October 2024, 2.00pm

Council Chamber, Hutt City Council, 30 Laings Road, Lower Hutt

Public Business

Please note these minutes remain unconfirmed until the Te Awa Kairangi / Hutt River Valley Subcommittee meeting on 22 October 2024.

Report 24.418

Public minutes of the Te Awa Kairangi / Hutt River Valley Subcommittee meeting on Tuesday 6 August 2024

Council Chamber, Hutt City Council
30 Laings Road, Lower Hutt at 2.00pm.

Members Present

Councillor Connelly (Chair)	Greater Wellington Regional Council
Councillor Duthie (Deputy Chair)	Greater Wellington Regional Council
Councillor Edwards	Hutt City Council
Mayor Guppy	Upper Hutt City Council
Councillor Hammond	Upper Hutt City Council
Councillor Lee	Greater Wellington Regional Council
Deputy Mayor Lewis (from 2.03pm)	Hutt City Council
Caleb Ware (from 2.04pm)	Te Rūnanga o Toa Rangatira Inc

Caleb Ware participated at the meeting remotely via Microsoft Teams and counted for the purpose of quorum in accordance with clause 25B of Schedule 7 to the Local Government Act 2002.

Karakia timatanga

The Subcommittee Chair opened the meeting with a karakia timatanga.

Public Business

1 Apologies

There were no apologies

2 Declarations of conflicts of interest

There were no declarations of conflicts of interest.

3 Public participation

Taitā Kindergarten (Maria and tamariki) spoke to the Subcommittee on their planting of a tōtara tree on Te Awa Kairangi. They also acknowledged the support from Council in providing public transport access and the tōtara tree for planting.

Stephen Pattinson spoke to agenda item 7 Pinehaven Flood Management Plan Implementation – Project Update Report – Report 24.365, reinstating water level recording on Pinehaven Stream.

Deputy Mayor Tui Lewis arrived at the meeting at 2.03pm during the presentation of the first public participant.

Caleb Ware joined the meeting at 2.04pm during the presentation of the first public participant.

The Chair advised the meeting that the agenda item 8 Te Awa Kairangi Hutt River Valley Annual Asset Management Condition Report – Report 24.360 has been withdrawn from the agenda and that officers will present a revised report to the Subcommittee at a future meeting.

4 Confirmation of the Public minutes of the Te Awa Kairangi / Hutt River Valley Subcommittee meeting of 6 June 2024 - Report 24.307

Moved: Mayor Guppy / Cr Hammond

That the Subcommittee confirms the Public minutes of the Te Awa Kairangi / Hutt River Valley Subcommittee meeting of 6 June 2024 – Report 24.307.

The motion was **carried**

Noted: The Subcommittee requested that action items noted in the minutes be reported back to the Subcommittee as a report in future meetings.

5 Hutt Valley Flood Risk Management Update – Report 24.353 [For Information]

Tina Love, Team Leader Infrastructure Projects and Jacky Cox, Manager Infrastructure, Assets and Support, spoke to the report.

Noted: The Subcommittee requested that staff check the RiverLink consent to confirm if it has a condition to provide for fish passage.

6 RiverLink Project Update – Report 24.352 [For Information]

Wayne O'Donnell, Programme Manager, Greater Wellington Sponsor and Matt Trlin Programme Director NZ Transport Agency, spoke to the report.

Noted: The Subcommittee requested staff to provide the waste management plan, statistics on the recycling of demolition material, and the use of demolition material.

7 Pinehaven Flood Management Plan Implementation – Project Update Report – Report 24.365

Tina Love, Team Leader, Infrastructure Projects Greater Wellington, Gunther Wild, Principal Advisor, Upper Hutt City Council and Lyndie McMillan, Project Director, Major Projects, Wellington Water, spoke to the report and presentation.

Moved: Mayor Guppy / Deputy Mayor Lewis

That the Subcommittee:

1 Endorses a review of the three remaining phases of the Pinehaven Flood Management Plan (FMP) with delivery agent Wellington Water Limited to interrogate the significant cost escalation and explore alternative options to mitigate flood risk and achieve the objectives of the Pinehaven FMP.

2 Notes that the outcome of the review of the three remaining phases of the Pinehaven FMP will be reported back to a future Subcommittee meeting.

The motion was **carried**.

Noted: The Subcommittee requested that, as part of the review, that the terms of reference for the project include regular reporting to the Subcommittee on the progress and challenges in delivering the Pinehaven Floodplain Management Plan implementation.

Noted: The Subcommittee requested information on the removal and potential reinstatement of the water flow meter on the Pinehaven Stream.

Noted: The Subcommittee requested that a joint workshop be arranged and, if required, an additional meeting be scheduled.

8 Te Awa Kairangi Hutt River and Pinehaven Stream Annual Floodplain Management Implementation Report – Report 24.354 [For Information]

Tina Love, Team Leader, Infrastructure Projects, Andy Brown, Team Leader Knowledge- Water, spoke to the report.

Karakia whakamutunga

The Subcommittee chair closed the meeting with a karakia whakamutunga.

The public meeting closed at 3.43pm

Councillor R Connelly

Chair

Date:

Te Awa Kairangi/ Hutt River Valley Subcommittee
22 October 2024
Report 24.428

For Information

UPDATE ON THE PROGRESS OF ACTION ITEMS FROM PREVIOUS TE AWA KAIRANGI/HUTT RIVER VALLEY SUBCOMMITTEE MEETINGS – OCTOBER 2024

Te take mō te pūrongo
Purpose

1. To update the Te Awa Kairangi/Hutt River Valley Subcommittee (the Subcommittee) on the progress of action items arising from previous Subcommittee meetings.

Te horopaki
Context

2. Items raised at Subcommittee meetings that require actions from staff are listed in the table of actions from previous Subcommittee meetings (**Attachment 1** – Action items from previous Te Awa Kairangi / Hutt River Valley Subcommittee meetings – October 2024). All action items include an outline of the current status and a brief comment.

Ngā hua ahumoni
Financial implications

3. There are no financial implications arising from this report, but any implications arising from specific action items will be discussed in the brief comment in **Attachment 1**.

Ngā tūāoma e whai ake nei
Next steps

4. Completed items will be removed from the action items table for the next report.
5. Items not completed will be added to the table following this Committee meeting and circulated to the relevant business group(s) and functions for action.

Ngā āpitihanga
Attachment

Number	Title
1	Action items from previous Te Awa Kairangi / Hutt River Valley Subcommittee meetings – October 2024
2	Mawaihaikona Stream information
3	Te Awa Kairangi – Demolition and Property Removal: Recycling and Repurposing

Ngā kaiwaitohu
Signatory

Approver	Lian Butcher – Kaiwhakahaere Matua, Taiao – Group Manager Environment

He whakarāpopoto i ngā huritaonga **Summary of considerations**
Fit with Council's roles or with Committee's terms of reference The action items are of an administrative nature and support the functioning of the Subcommittee.
Contribution to Annual Plan / Long Term Plan / Other key strategies and policies Action items contribute to Council's or Greater Wellington's related strategies, policies and plans to the extent identified in **Attachment 1**.
Internal consultation There was no additional internal consultation in preparing this report and updating the action items.
Risks and impacts - legal / health and safety etc. There are no known risks or impacts.

Attachment 1 to Report 24.428

Action items from previous Te Awa Kairangi/Hutt River Valley Subcommittee meetings

Date	Action item	Status and comment
6 June 2024	**Public Participation 1** **Noted:** The Subcommittee requested officers to provide the maps of the genesis of the Mawaihakona Stream.	**Status:** Completed **Comment**: Have been out searching for the source and mapping around Heretaunga/Trentham – will be following the awa from another spot on Barton Road TMP. Have sourced a map of the area from 1929! Maps and supporting documentation provided as Attachment 2 - Mawaihaikona Stream Public Participation 1 response
6 June 2024	**Public Participation 2** **Noted:**	
	The Subcommittee requested a future report on the effect of river reshaping on the Belmont wetland.	**Status:** Completed **Comment:** Te Wai Takamori o Te Awa Kairangi designers are currently working through revising the proposed river channel alignment to retain the Belmont wetland and planting area. This change needs to be worked through in plan, cross-section and 3D surface; TUFLOW model re-run to check impacts on conveyance at design flow. The subcommittee will be advised on the outcome of the design in a future Project Update Report, when this work in completed.

Attachment 1 to Report 24.428

Action items from previous Te Awa Kairangi/Hutt River Valley Subcommittee meetings

	The Subcommittee requested that officers consider whether individual trees could be dug up and replanted as part of the RiverLink works.	**Status:** Completed **Comment:** Te Wai Takamori o Te Awa Kairangi project team will look at whether it is viable to relocate plants affected by berm works as part of the project, noting that this was not feasible for demolition areas.
6 June 2024	**Public Participation 3** **Noted:** The Subcommittee requested that officers circulate Stephen Pattinson's presentation to members.	**Status:** Completed **Comment:** This was circulated to members by email on 10 June 2024.
6 August 2024	**Confirmation of the Public minutes of the Te Awa Kairangi / Hutt River Valley Subcommittee meeting of 6 June 2024 - Report 24.307** **Noted:** The Subcommittee requested that action items noted be reported back to the Subcommittee as a report in future meetings.	**Status:** Completed **Comment:** Progress on action items will now be reported back to the Subcommittee.
6 August 2024	**Hutt Valley Flood Risk Management Update – Report 24.353** **Noted:** The Subcommittee requested that staff check the RiverLink consent to confirm if it has a condition to provide for fish passage.	**Status:** Completed **Comment:** Under the Riverlink consent, fish passage is required for the upgrade of the culvert conveying Tirohanga Intersection Stream (Outlet 38).

Attachment 1 to Report 24.428

Action items from previous Te Awa Kairangi/Hutt River Valley Subcommittee meetings

6 August 2024	**RiverLink Project Update – Report 24.352** **Noted:** The Subcommittee requested staff to provide the waste management plan, statistics on the recycling of demolition material, and the use of demolition material.	**Status:** Completed **Comment:** Refer to Attachment 3 to Report 24.428: Te Awa Kairangi Waste Forum Demolition and Relocation.pdf
6 August 2024	**Pinehaven Flood Management Plan Implementation – Project Update Report – Report 24.365** **Noted:** The Subcommittee requested that, as part of the review, that the terms of reference for the project include regular reporting to the Subcommittee on the progress and challenges in delivering the Pinehaven Floodplain Management Plan implementation.	**Status:** Ongoing **Comment:** Review paper deferred to 2025. Workshop scheduled for 19 November 2024. Terms of Reference includes responsibility of Steering Group to report progress to Te Awa Kairangi (Section 5.6)
6 August 2024	**Pinehaven Flood Management Plan Implementation – Project Update Report – Report 24.365** **Noted:** The Subcommittee requested information on the removal and potential reinstatement of the water flow meter on the Pinehaven Stream.	**Status:** Ongoing **Comment:** Greater Wellington has reviewed internally and are seeking to reinstall the flow gauge ahead of the proposed modelling project. This is currently being scoped. Installation is subject to resource availability and funding.

Attachment 1 to Report 24.428

Action items from previous Te Awa Kairangi/Hutt River Valley Subcommittee meetings

6 August 2024	**Pinehaven Flood Management Plan Implementation – Project Update Report – Report 24.365** **Noted:** The Subcommittee requests that a joint workshop be arranged and, if required, an additional meeting be scheduled.	**Status:** Completed **Comment:** Workshop scheduled for 19 November.

Te Awa Kairangi / Hutt River Valley Subcommittee

Response to Public Participation Action Item 1 from 6 June 2024
Noted: The Subcommittee requested officers provide the maps of the genesis of Mawaihaikona Stream

Response:
Page 185 (Section 15.4) in a GWRC "Hutt Hydrology" report from 1994 has the following paragraphs:

15.4 Mawaihaikona Stream

The Mawaihaikona Stream is predominantly spring fed by return flow from the aquifer system. As a consequence, it has a poorly defined catchment boundary. The Mawaihaikona Stream separates into two tributaries (Mawaihaikona No. 1 and Mawaihaikona No. 2) both entering the Hutt River at different confluences.

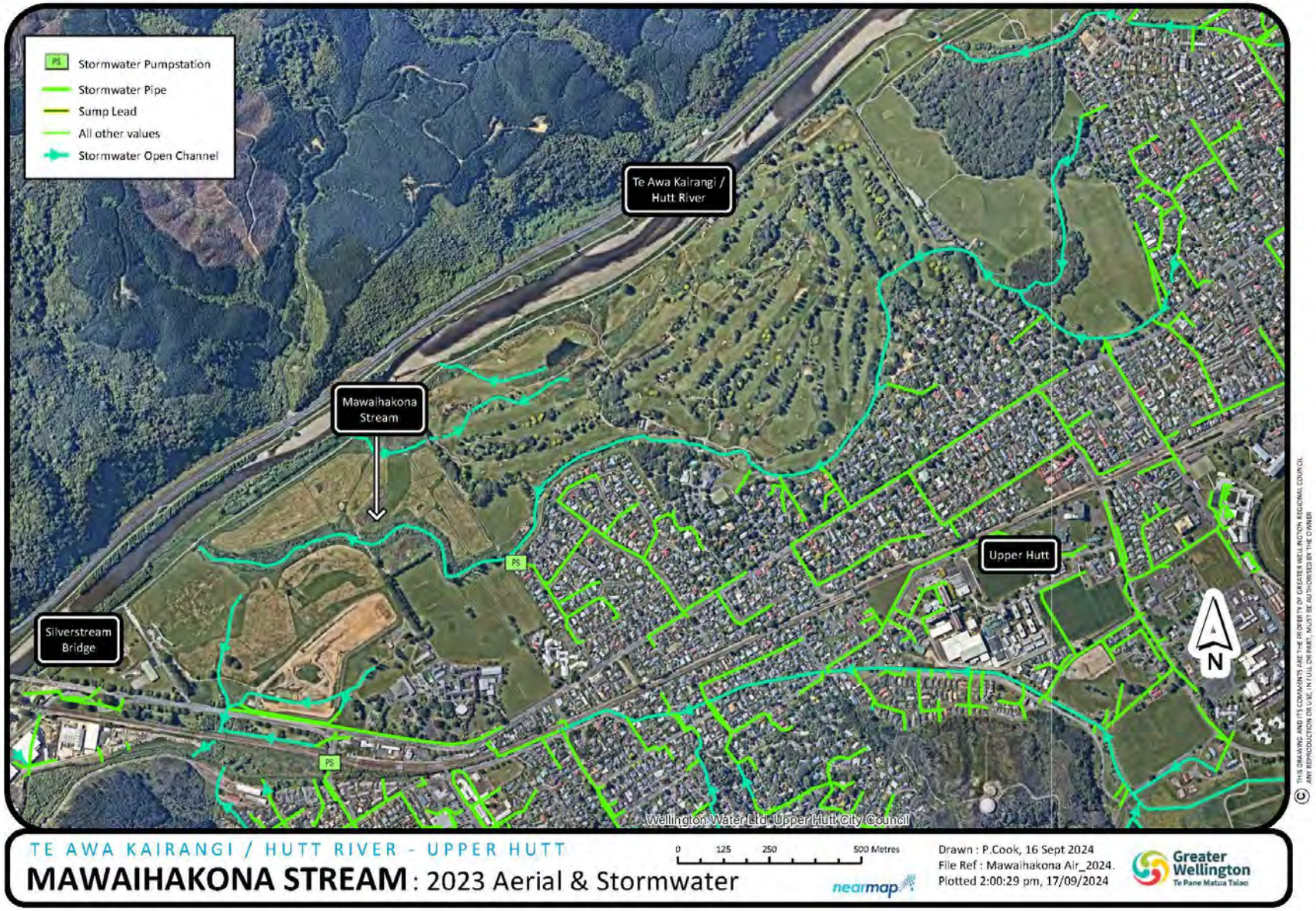
Mawaihaikona Stream No. 1 begins in the suburb of Heretaunga and flow across the Heretaunga Golf Course before joining the Hutt River. Mawaihaikona Stream No. 2 begins in the suburb of Trentham and flows across Trentham Memorial Park before joining the Hutt River.

The Mawaihaikona No. 1 and No. 2 Streams have been gauged as part of concurrent gaugings to determine Hutt River flow loss to groundwater. While the flow gauging results have been used to quantify the Mawaihaikona No. 1 and No. 2 Streams contribution to the Hutt River, they are also used to estimate outflows from the Upper Hutt Groundwater Zone due to the streams spring fed nature. Table 15.5 contains all Mawaihaikona Stream flow gaugings measured up to 1 July 1994.

We investigated the Council, National Library and Upper Hutt City Archives. The best we can bring to the table are some 1943 aerials (below) acquired from Retrolens. Also below are samples of old topo/cadastral maps we have on the Counci's GIS system and a 1929 map of Upper Hutt which seems to show the two streams emerging from Bartons Bush.

Attachment 2 to Report 24.428

Attachment 2 to Report 24.428



Attachment 2 to Report 24.428

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Attachment 2 to Report 24.428

YEAR 1919

Attachment 2 to Report 24.428

YEAR 1939

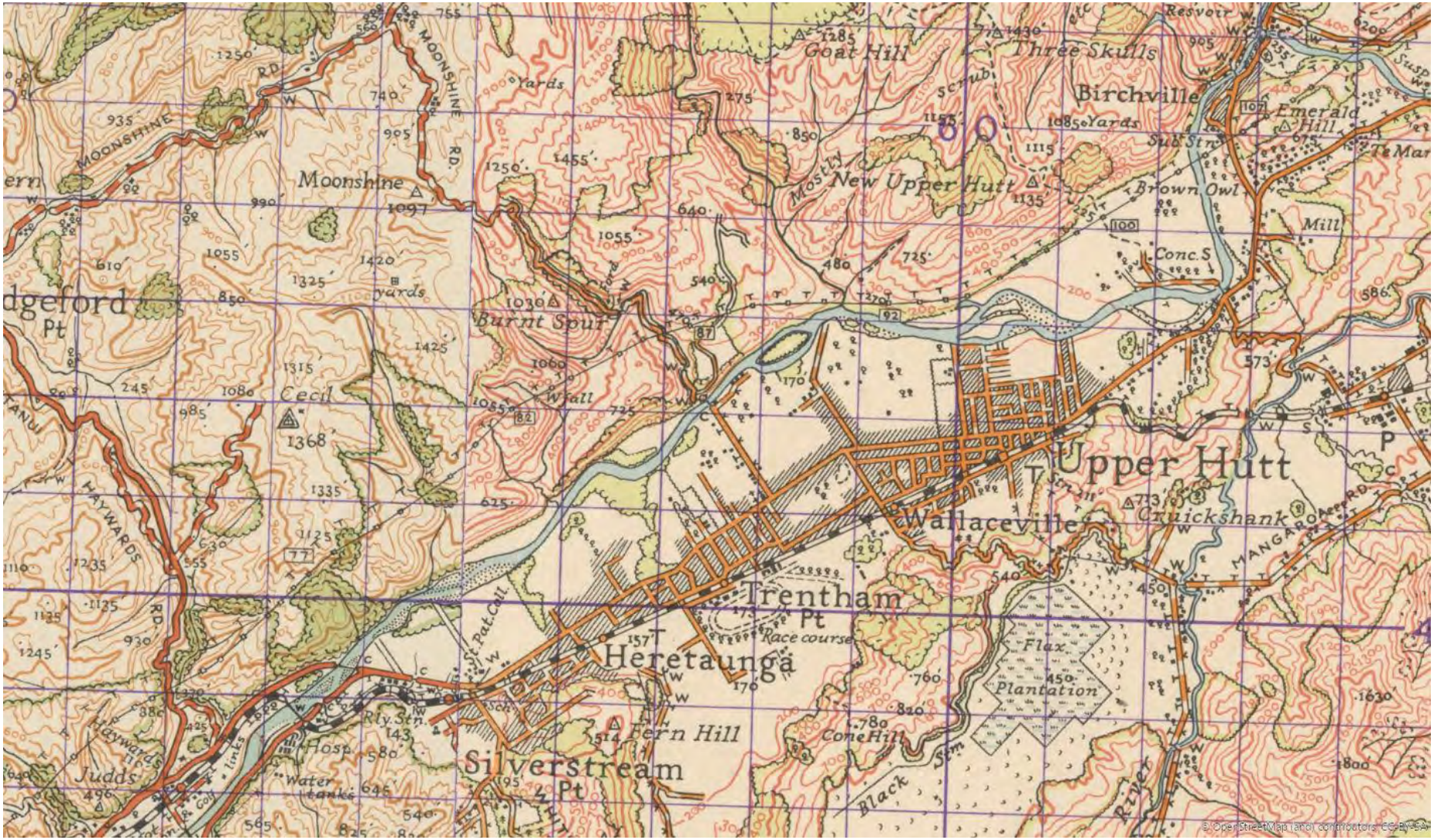
Attachment 2 to Report 24.428

YEAR 1969

Attachment 2 to Report 24.428

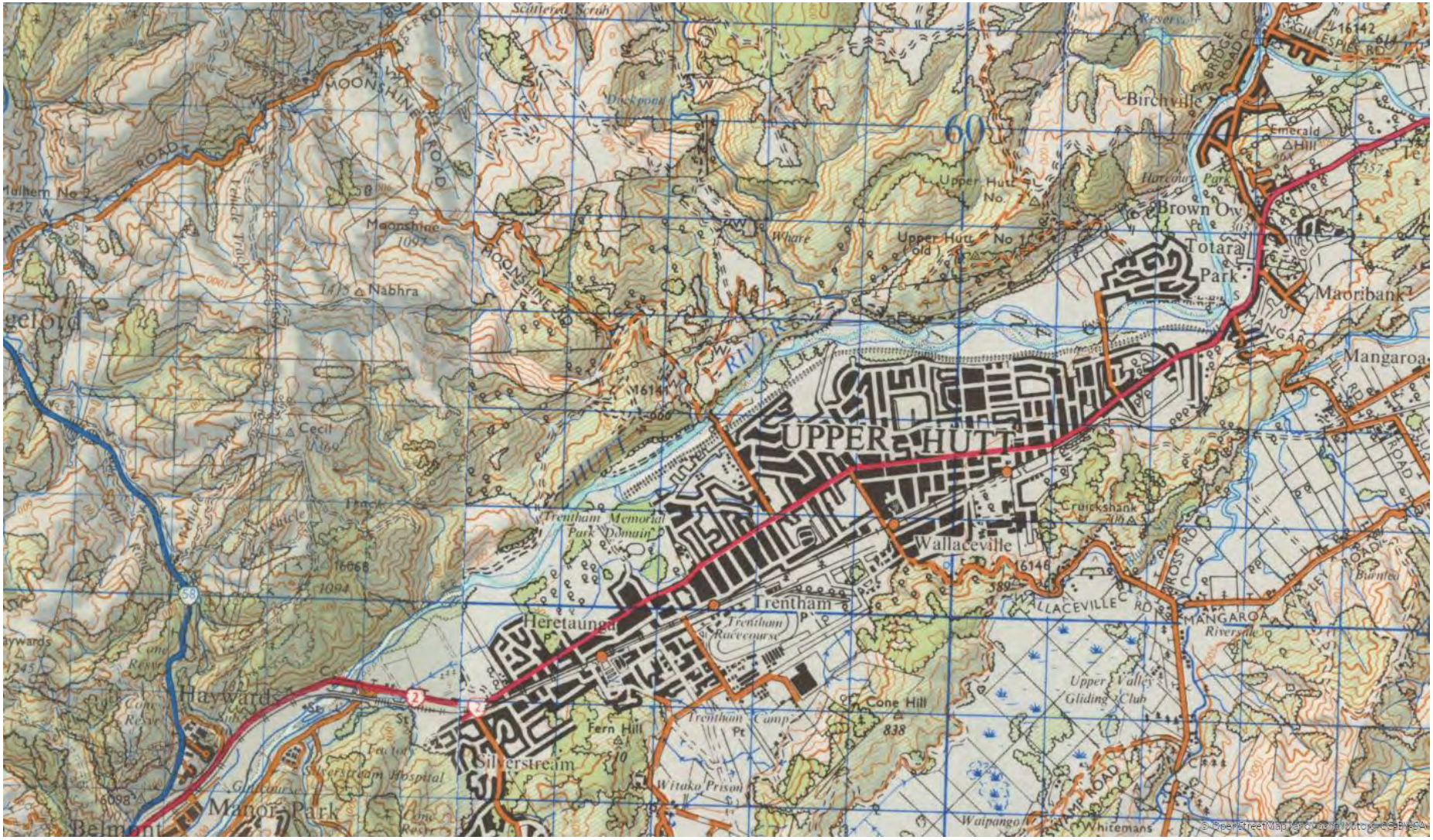
YEAR 1929

Attachment 2 to Report 24.428



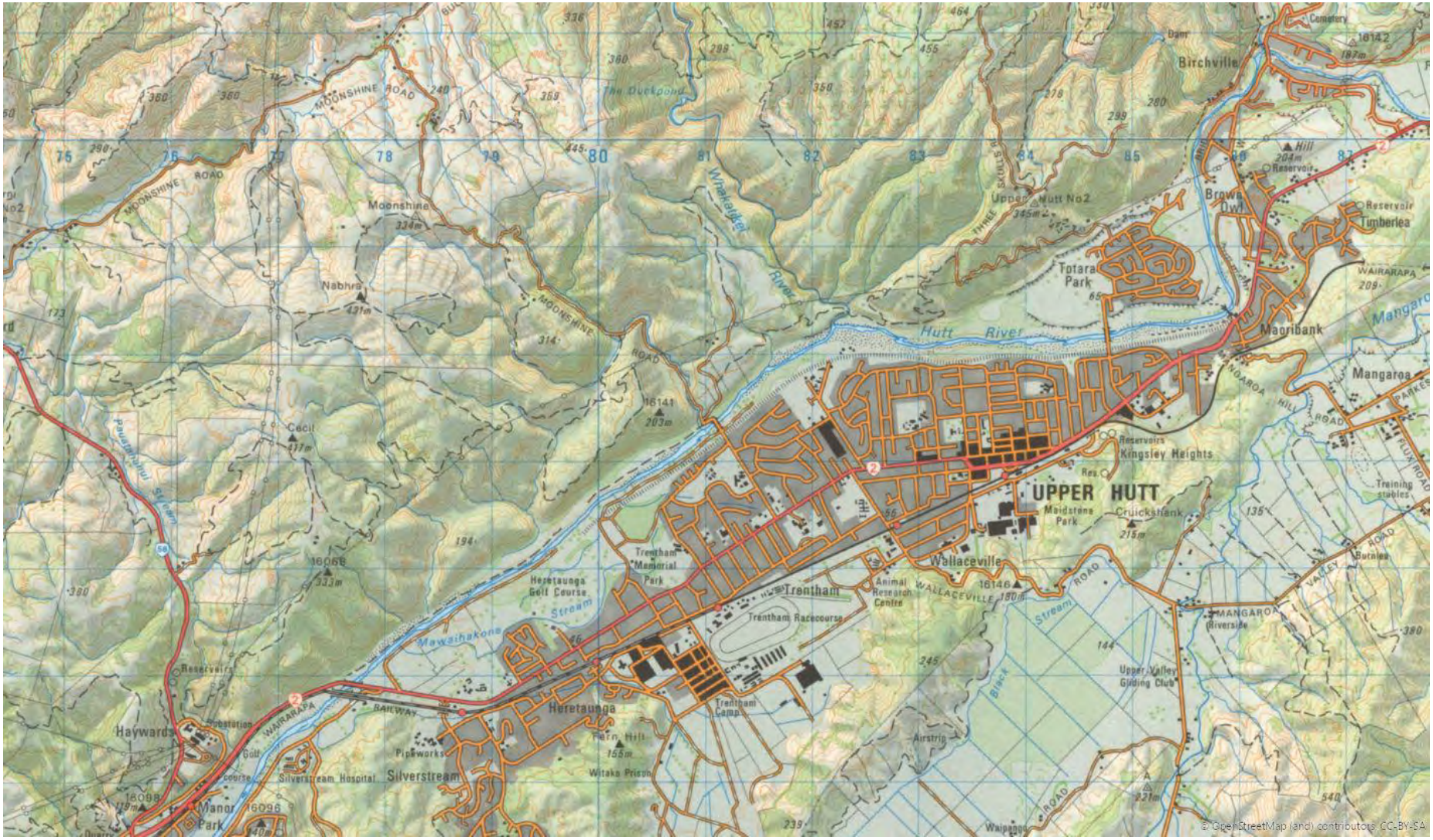
YEAR 1959

Attachment 2 to Report 24.428



YEAR 1979

Attachment 2 to Report 24.428



YEAR 1989

Attachment 3 to Report 24.428

Te Awa Kairangi
our land | our river | our future

DEMOLITION & PROPERTY REMOVAL

Recycling and repurposing

SCOPING AND PROCUREMENT

Kim Longman, Senior Project Manager

Greater Wellington

Objectives – Te Wai Takamori o Te Awa Kairangi

- To reorient the city to face and connect with Te Awa Kairangi and respond to climate change by:

Ora Tangata:	**Ora Taiao:**	**Ora Wairua:**
Iwi Mana Whenua and Māori people capability is uplifted	Te Awa Kairangi and natural environment is healthier	Iwi identity is prominent and Programme is mana-enhancing for all
Providing resilient transport choices allowing all people and businesses to safely and reliably move to, from and within our city centre. Improving flood protection for the Lower Hutt city centre and areas south of the city to enable better resilience for people and property. Stimulating and supporting urban regeneration and economic development. Encourage growth and the regeneration of Lower Hutt city centre and promote commercial and residential development.		

Property Removal Project Objectives

- Removal of 76 buildings comprising 120 residential and commercial units on Pharazyn, Marsden, Mills and Rutherford streets and Block Road.
- The relocation of buildings as a mechanism for achieving sustainability objectives.
- Recycling needed to be measured and embedded into the methodology.

Broader Outcomes

- Iwi and Māori Social Procurement, Skills, and Training
- Community Objectives
- Best Value Solutions
- Enduring Relationships
- Sustainability

Setting expectations from the project

Tender respondents approach to meeting the Broader Outcomes;

- A waste minimisation plan that focused on maximising resource recovery.
- Recent projects where they have achieved recycling initiatives
- Carbon emissions reductions

Relocation of Homes

- 11 properties were purchased by a House Moving company.
- One property donated to a local charity
- Helped rehome 20 stray cats.
- One building reused as a site office.

HOW CERES IMPLEMENTED THE REQUIREMENTS

Chirag Sehgal, Project Manager
CERES

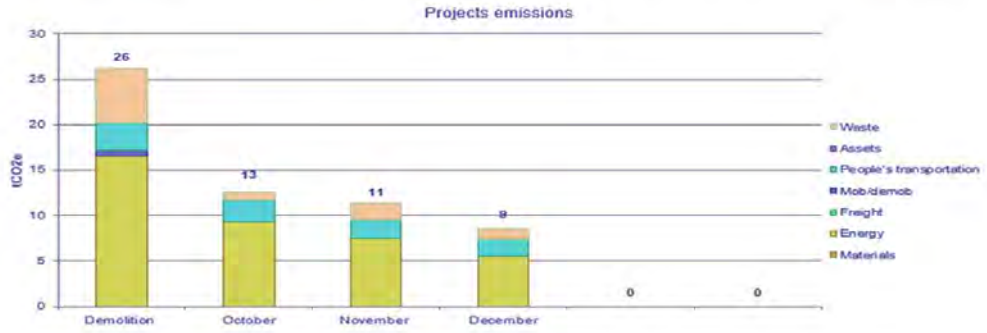
Attachment 3 to Report 24.428

Carbon

Comparison sheet (1/2)

	Demolition	October	November	December			
Materials	0	0	0	0			tCO2e
Energy	17	9	7	6			tCO2e
Freight	0	0	0	0			tCO2e
Mob/demob	1	0	0	0			tCO2e
People's transportation	3	2	2	2			tCO2e
Assets	0	0	0	0			tCO2e
Waste	6	1	2	1			tCO2e
Total	**26**	**13**	**11**	**9**	**0**	**0**	tCO2e

Working days	22	23	22	17			days
Workforce	17	13	12	13			Full-time equivalent
Project value	1,221,066	297,150	225,180	589,503			€
Functional unit 1	value	value	value	value			unit
Functional unit 2	value	value	value	value			unit



Broader Outcomes

- **Carbon Emissions:**
- During the tender phase, CERES projected carbon emissions of 200 tonnes for this project. We've successfully reduced this figure to just 59 tonnes. Originally, we estimated 36 grammes of CO2 emissions per Dollar of contract value.
- We've lowered this to 25.30 grammes per NZD based on the payments claimed.
- Ceres also utilized a wood crusher to ensure the loads are reduced to the landfill.

Waste Management

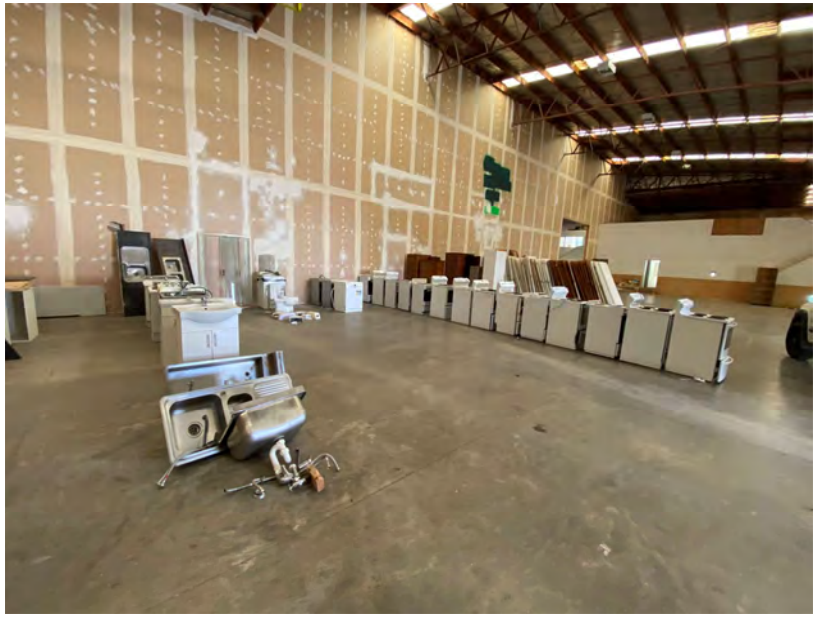
- 50 Tons of native flooring, weatherboards, beams and decking- James Henry, number one recyclers and JW framing.
- Timber sent to Whanganui prison for de-nailing and returned back to James Henry
- Roof sheets, play-ground- ARC.
- Salvage day was a success and roughly 5 Tons and Approx 200 people attended the event.
- Other community salvage has been done- Doors, windows, roller door, storage shed, polystyrene for garage insulations etc.
- 4,028 Tons concrete recycled- CentrePort and Manor park Crushed and reused.
- 127.77 Tons of steel recycled- Macaulays and Sims.

Attachment 3 to Report 24.428

Weather board salvaged by James Henry

Attachment 3 to Report 24.428

Community Salvage Day

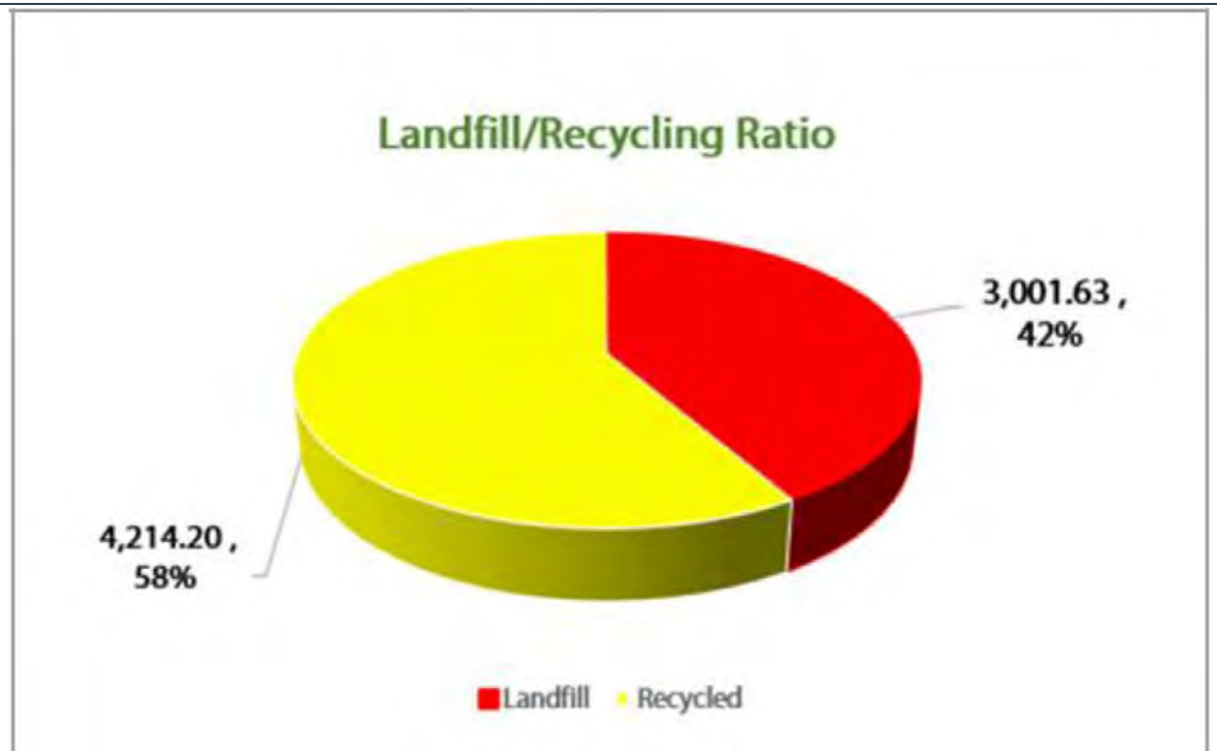


Attachment 3 to Report 24.428

Waste Management Monitoring

Attachment 3 to Report 24.428

Waste Management Monitoring



Challenges

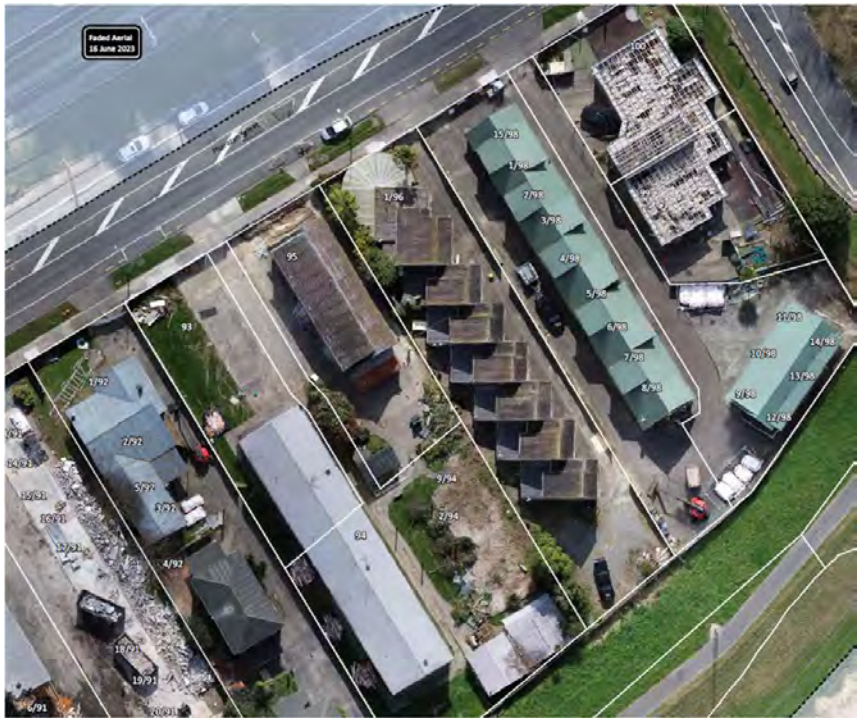
- Unknown contaminated materials
- Polystyrene
- Stockpiles left from relocation
- Vandalism

Attachment 3 to Report 24.428

Key Takeaways

- Importance of embedding the recycling objectives early.
- Engaging with the community provided the opportunity for direct recycling.
- Respecting the history of the area and working alongside the community.
- Not every repurposing opportunity is as simple as it seems.
- Location of recycling centres impacts opportunities e.g. treated timber, gib/plasterboard.

Attachment 3 to Report 24.428



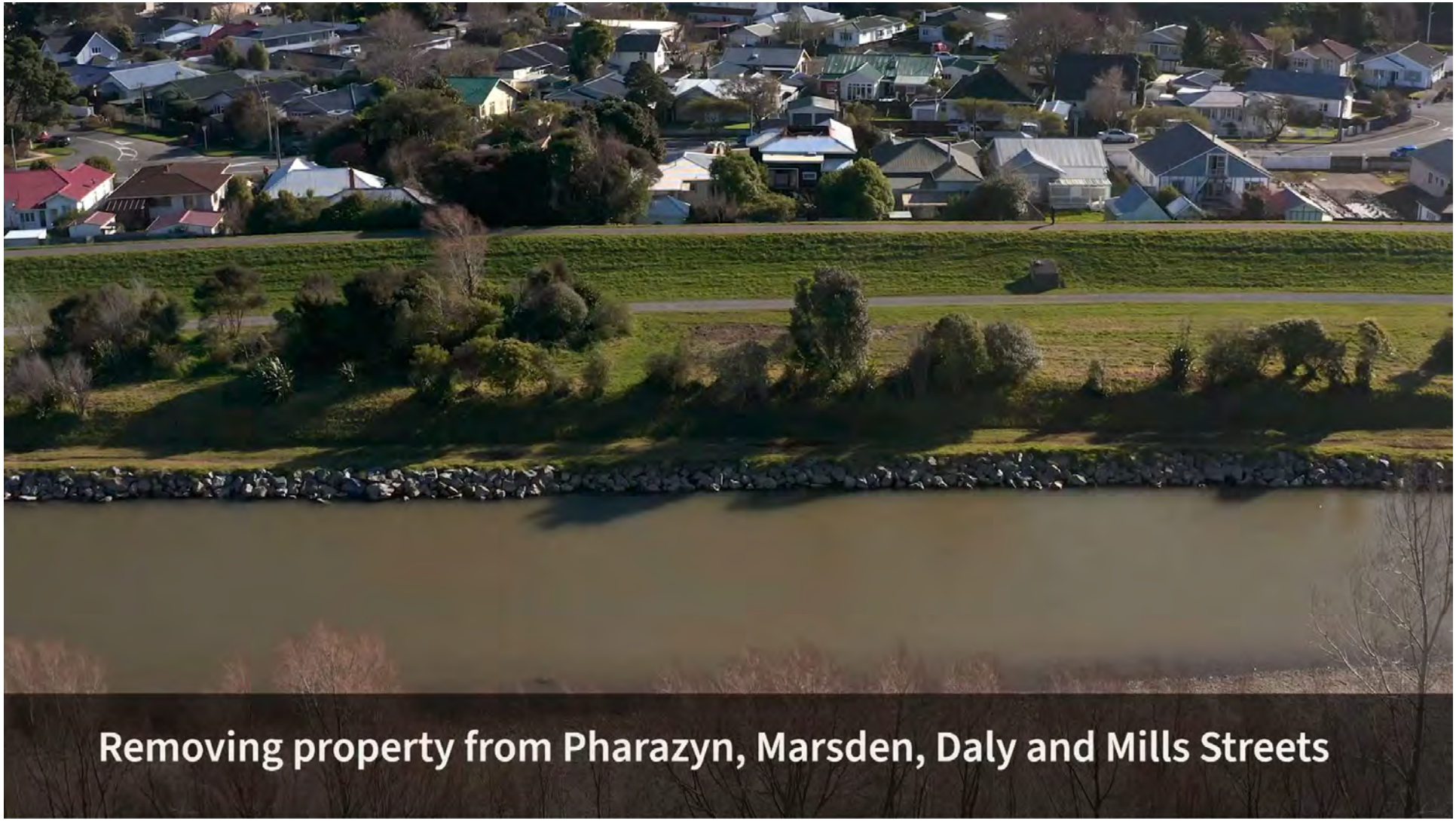
Attachment 3 to Report 24.428

Attachment 3 to Report 24.428

What we'll be doing next

- Below ground demolition looks to provide a cleanfill site for the next stage.
  - We will continue to recycle and repurpose available materials
- Opportunities:
  - Salvage of plants and trees.
  - Additional concrete recycling
  - Wooden fencing reuse

Attachment 3 to Report 24.428



Te Awa Kairangi / Hutt River Valley Subcommittee
22 October 2024
Report 24.550

For Information

USE OF WILLOWS AND NATIVE PLANTS FOR EROSION CONTROL PURPOSES ON TE AWA KAIRANGI / HUTT RIVER

Te take mō te pūrongo
Purpose

1. To outline the use, establishment and maintenance of willows on Te Awa Kairangi / Hutt River, and describe how Greater Wellington Regional Council (Greater Wellington) is approaching the renewed focus on nature-based approaches and use of native plant species for erosion control focussed on Te Wai Takamori o Te Awa Kairangi (RiverLink).

Te horopaki
Context

2. Willow trees (*Salix* spp.) play a critical role in and are a predominant feature of flood protection and erosion control schemes throughout New Zealand. Willows planted within a vegetative buffer zone adjacent to the river channel complement hard engineering erosion protection measures such as rock groynes and revetments and maintain channel alignment. For decades, willows have provided an effective defence against erosion through their ability to buffer flood flows, keeping fast flowing water in the river channel, and to rapidly stabilise bank edges.

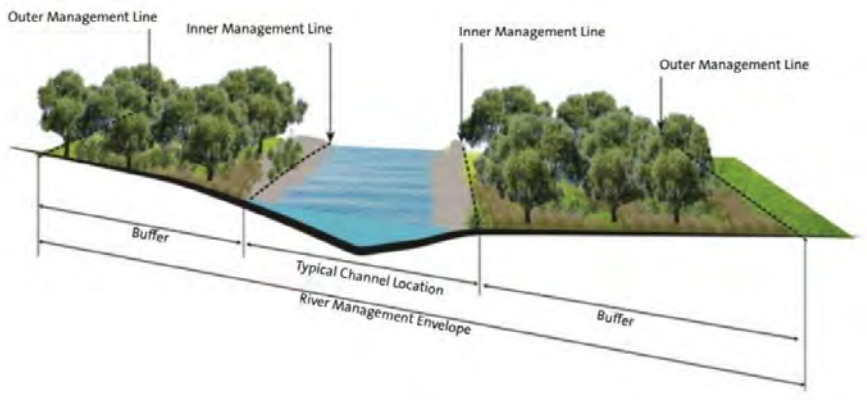


Figure 1: Schematic showing the vegetative buffer zone adjacent to the river channel (taken from the Te Kaūru Floodplain Management Plan, 2019)

3. The Hutt River Floodplain Management Plan (2001) has design standards and policies supporting bank edge and berm protection measures that minimise the adverse effects of physical works and take opportunities to enhance the environment to compensate for unavoidable negative effects (Policy 10). It also has Environmental Strategy policies to protect and enhance the visual quality of the river and its margins (Policy 39).
4. The desire for sustainable flood protection and erosion control, and the unique biodiversity benefits of native plants are motivating a renewed focus on nature-based approaches, and the incorporation of natives into buffer zones for erosion protection.
5. This supports a national effort to address both the climate and biodiversity crises. Native ecosystems remove and store carbon, increase resilience to climate change impacts and support thriving biodiversity and well-being.

Greater Wellington River Management

6. Effective erosion protection requires careful consideration of risk. Options include implementing hard engineering structures like rock groynes and revetments to directly control erosion, and soft engineering such as utilising a nature-based approach through the planting of vegetation to stabilise river edges and create a vegetated buffer zone.
7. Key factors in determining the most appropriate erosion protection approach include:
    a Risk and scheme performance at the selected site.
    b Hydrological and geomorphological conditions such as flow velocity, and the shape and form of the riverbed.
    c Environmental factors like ecological objectives for the surrounding ecosystem.
    d Socio-cultural considerations such as the cultural significance of the river to mana whenua and local communities.
    e Cost implications including ongoing maintenance, site accessibility and upkeep.
8. These factors are evaluated to determine the most effective approach, which may involve a combination of hard and soft engineering options to achieve the desired balance across each factor.

Vegetation and riverbank stability

9. Vegetated buffer zones planted along riparian margins are viewed as a sacrificial edge to stabilise banks and protect against erosion. Historically, exotic species have been favoured in buffer zones due to their fast root establishment and soil binding abilities.
10. Willows also exhibit more vigorous root systems when compared to native plant species. Greater Wellington, like many regional councils around New Zealand, has a long history of using different exotic species to stabilise the banks of rivers.

Currently, the most widely planted species for riverbank stabilisation is *Salix matsudana x alba* 'Moutere', a less-invasive willow, well-suited to the rugged, rocky conditions.

11. With a growing emphasis on the ecological benefits of native plants, Greater Wellington is shifting towards a strategy of succession planting for riverbank stabilisation, moving to vegetative buffers including native plants where possible. While willows do offer a nature-based approach when compared to hard engineering structures, prioritising native planting can further enhance ecological and cultural benefits.

12. Te Wai Takamori o Te Awa Kairangi (RiverLink), with its focus on bioengineering measures for river management, provides an opportunity for implementation of an enhanced nature-based approach using native planting at scale.

Willow Planting

13. Willow planting is generally carried out between June and September. Four planting methods are commonly used:

    a By hand, using a crowbar – Willow stakes are cuttings 1 to 1.5m long and approximately 2.5cm in diameter. Stakes or poles (i.e. large cuttings more than 3m long) are usually cut from existing buffer zones.

    b 'Rip planting' using an excavator or planting tine – The tine is dragged through the riverbed at up to 1m depth and the stakes/poles or rooted stock planted behind the moving tine. This is most used where large areas of planting are required.

    c 'Trench planting' using a digger – Willow poles are planted in a trench dug and backfilled by the excavator. This method is used where willows are planted in very dry areas or immediately adjacent to fast flowing water.

    d Planting using a mechanical auger to prepare holes for stakes or poles.

Installation of Willow Structures

14. Vegetative willow structures include:

    a Layered willows – Willow layering involves felling willows growing at the river edge (or bending and snapping using a digger) so that they lie obliquely towards the river in a downstream direction. The intent is to allow the willows to sucker from branches on the ground once they are covered in silt and gravel. The tree is wired to its stump to prevent it breaking off in a flood. Layering is normally completed in the August to December period following completion of planting work.

    b Tree groynes or 'clumps', which project out from the bank – Tree groynes perform the same purpose as layered willows but are constructed where there are no available trees at the bank edge. In this case, large willow trees are cut from a nearby source and placed in a shallow trench that has been excavated at the desired location. The trees are bundled together with wire rope and securely fixed to driven railway irons and/or buried concrete block

weights. The base of the trees are covered with gravel to encourage root growth, and willow poles are planted between the groynes.

c Tethered willows placed along a bank edge – Tethered willows are like tree groynes but are placed parallel to the bank edge to be protected, rather than projecting out into the river channel. Again, they may be held in place with wire ropes and concrete blocks. Willow poles are planted behind the tethered willows to facilitate the establishment of the buffer zone.

Te tātaritanga
Analysis

Why Native Planting?

15. Greater Wellington is prioritising enhanced nature-based approaches using natives. Increasing native planting offers numerous benefits for the environment, while having strong support from mana whenua and the community.

16. Advantages include:

a Flood and Erosion Resilience – Incorporating vegetated buffers with native plants can provide flood and erosion resilience opportunities while providing ecological benefits.

b Enhanced Biodiversity – increasing indigenous biodiversity through a more diverse community of native plants that supports native fauna.

c Cultural Connection - Mana whenua have a strong connection with Te Awa Kairangi/Hutt River. Encouraging native plant species along the river holds profound cultural significance, going beyond ecological benefits.

d Improving Natural Character – the presence of native vegetation can reinforce a sense of natural character.

17. This provides a more integrated approach that enables both biodiversity and flood risk management outcomes, strengthening partnerships between Greater Wellington, mana whenua, and communities to improve ecological outcomes.

Native Planting: Overcoming the Challenges

18. Embracing native planting through the upper reaches of Te Wai Takamori o Te Awa Kairangi (RiverLink) between the Kennedy Good and Melling Bridges will require a slow and gradual transition. This transition will come with considerable challenges that need to be factored in, including:

a Establishment of native plants - Native plants can be slower to establish, requiring careful site preparation and ongoing maintenance.

i While willows are favoured for their rapid root growth and ability to quickly control erosion, native plants take longer to provide similar benefits.

ii Native plants can struggle in the growing material typically found on river edges.

b Inflated cost - The initial investment for planting and establishment (including maintenance) can be higher compared to willows, notably, eco-sourcing seeds and the prolonged propagation period.

c Inundation Tolerance – The ability to be submerged under water for periods of time, comparatively to willows.

d Knowledge gaps – A lack of comprehensive data on the long-term performance of native plant species in this environment.

19. Greater Wellington is pioneering a gradual shift from willows to native plants as a vegetated buffer zone, an unprecedented approach at this scale. While trialling native plants alongside rivers has been conducted elsewhere in New Zealand, including in Wellington, this project offers a unique opportunity to gather valuable insights on a large scale, with extensive focus in the design and methodology stage.

A Staged Approach: Trialling Native Plants

20. The shift to a more biodiverse ecosystem is a gradual process, and Greater Wellington recognises that willows, or willow structures, will always be a necessary feature of buffer zones, particularly immediately adjacent to the river channel where the erosive forces are strongest. Native plants can then be introduced (sometimes at the same time as willow installation https://www.gw.govt.nz/assets/Documents/2021/12/CAMA.FLDP.2020.J001105-River-berm-planting-guide-1.7.pdf (2021) provides information on different native planting techniques.

21. To support the eventual inclusion of native plants, a trial bioengineering design has been developed for Te Wai Takamori o Te Awa Kairangi (RiverLink) shown in **Attachment 1 –** Bioengineering Trial Design. This included the installation of biodegradable and nature-based infrastructure (debris fences) to strengthen the river berm, supporting favourable conditions for future planting.

22. In 2021, a site in the upper reach of Te Wai Takamori o Te Awa Kairangi (RiverLink) was selected to trial the bioengineering design refer to **Attachment 2 –** Bioengineering Trial Native Planting Plan.

23. The process involved:

a Bed recontouring to fill the erosion bay with river gravel.

b Excavating trenches into the formed gravel beach and installing bundles of willows tethered together, anchored to concrete blocks and secured to timber posts.

c Partially burying the tethered willows, leaving them partly exposed to encourage growth.

d Digging willow poles into the gravel beach behind the tethered willows.

e Installing debris fences to protect the young willows. Typically, debris fences are constructed from railway iron and wire rope. For this trial, the debris fences have been constructed of natural materials, timber poles and hessian rope, with the intention that they naturally rot and degrade rather than needing mechanical removal.

24. As the willows grew, and the site was inundated during flood events, the slower velocities within the willow planting (buffer zone) resulted in the deposition of sediment and silt. This provided growing material for future native plantings.

25. By winter 2024, the willows had reached two to three metres tall, sediment had accumulated to depths of at least 400mm in most places, and the debris fences were still in place. This marked the beginning of the native planting phase.

26. The planting area was divided into three sections, each incorporating various design elements to assess success in these conditions. These design elements included:

    a Diverse Plant Mixes – Incorporation of a variety of native plant species with varying growth habits, sizes, and tolerances.

    b Plant Support Structures - Utilising biodegradable wool bags, plant guards, matting, and root pegs to aid establishment.

    c Strategic Location and Layout - Testing different planting patterns and species arrangements to optimise results.

27. Greater Wellington will begin quarterly monitoring inspections to evaluate the effectiveness of the design and overall success of the native planting, in October 2024. Early maintenance inspections have reported a 90% survival rate despite several inundation events through August and September 2024.

28. The findings from this trial will contribute to the development of a comprehensive Transitional Native Planting Plan, a dynamic document designed to support the entire process for Te Wai Takamori o Te Awa Kairangi (RiverLink) and provide the foundation for successful transition to natives along Te Awa Kairangi/Hutt River where possible. This plan will provide guidance on selecting appropriate native species based on site conditions and outline best practices for planting and establishment. It will also recommend maintenance schedules and monitoring protocols to track the success of the plantings and inform adaptive management strategies.

Integrated River Management: Beyond Planting

29. The success of enhanced nature-based approaches depends on more than developing a detailed native planting plan. It also requires a comprehensive approach to river management and maintenance, encompassing various crucial actions. These include:

    a Monitoring for plant losses and erosion extent.

    b Defined triggers to support intervention and maintenance.

    c Bed recontouring once intervention trigger levels have been reached to reinstate planting and re-establishment of the bioengineering.

    d Gravel Extraction to maintain riverbed and berm levels.

30. These actions are essential for creating a healthy and diverse river, capable of supporting the establishment and long-term success of native planting. Actively managing the river enhances its mauri (life force) and promotes a thriving

environment where native plants and wildlife can flourish. This contributes to a more resilient and sustainable approach to flood protection.

31. This information will be developed further in the Transitional Native Planting Plan.

Ngā hua ahumoni
Financial implications

32. Greater Wellington acknowledges the financial commitment associated with shifting to nature-based approaches using natives. Increased initial costs are expected with the use of native plants, but these could be potentially offset by reduced long-term maintenance once the native plants are established. More analysis will be required before this can be confirmed, and it may be that the maintenance costs for natives are the same as for willows but are spent differently. For Te Wai Takamori o Te Awa Kairangi (RiverLink), these cost considerations have been incorporated into current budget projections for both construction, and operation and maintenance.

33. Capture of actual construction and, operation and maintenance costs through the trial and beyond are a must to ensure that whole of life costs are clearly understood. These will provide a basis for informed future decision making to progress nature-based approaches using native plants on Te Awa Kairangi/Hutt River.

Ngā Take e hāngai ana te iwi Māori
Implications for Māori

34. Greater Wellington is required to manage land and water within a range of statutory requirements, including giving effect to Te Mana o Te Wai and considering Te Tiriti o Waitangi in the development and implementation of the Council's strategies, plans, programmes and initiatives.

35. Our partnership with mana whenua within Council's Long-term Plan 2024-34 recognises and supports mana whenua as kaitiaki (guardians) of their broad whenua, freshwater and moana interests in their ancestral lands. We continue to work with our mana whenua partners in new ways at all levels of our organisation including governance, management and operations.

36. Ngāti Toa Rangitira and Taranaki Whānui ki Te Upoko o Te Ika are members of the Te Wai Takamori o Te Awa Kairangi (RiverLink) Board.

37. During the design collaboration phase of Te Wai Takamori o Te Awa Kairangi (RiverLink), mana whenua representatives voiced the desire to 're-cloak' the awa with indigenous plant species. Tangata whenua also value native plant species for traditional uses and believe the "…presence of native vegetation can reinforce that sense of natural character"[1].

38. Native species along the awa allow for the reintroduction of plants that once flourished along Te Awa Kairangi, further increasing the mana of the river and

[1] Rethink. Te Awa Kairangi. Isthmus

supporting Ora Tangata, Ora Taiao and Ora Wairua, the three cultural objectives for Te Wai Takamori o Te Awa Kairangi (RiverLink).

Te huritao ki te huringa o te āhuarangi
Consideration of climate change

39. Enhanced nature-based solution, using native plants, boosts climate resilience by strengthening the riverbank during extreme weather events. This approach also contributes to a healthy ecosystem, supporting diverse habitats for native birds and fish, while storing carbon.

Te whakatūtakitaki
Engagement

40. Greater Wellington engages stakeholders in river management through planning, input on specific issues, and opportunities for review and feedback. This ensures diverse perspectives are considered in the management of Te Awa Kairangi /Hutt River.

Ngā tūāoma e whai ake nei
Next steps

41. Officers will present **Attachment 3** at the Subcommittee meeting on 22 October 2024.

Ngā āpitihanga
Attachments

Number	Title
1	Bioengineering Trial Design
2	Bioengineering Trial Native Planting Plan
3	Presentation

Ngā kaiwaitohu
Signatories

Writers	Matt Richardson – Consultant Jacky Cox – Manager Infrastructure, Assets and Support
Approvers	Tracy Berghan – Manager RiverLink Myfanwy Hill – Manager Environment Operations Jack Mace – Hautū Whakatutuki – Director Delivery Lian Butcher – Kaiwhakahaere Matua Taiao – Group Manager Environment

He whakarāpopoto i ngā huritaonga **Summary of considerations**
Fit with Council's roles or with Committee's terms of reference The Subcommittee's specific responsibilities include *"reviewing periodically the effectiveness of implementation and delivery of Floodplain Management Plans for the Te Awa Kairangi/Hutt River floodplain"*. River management, and the function of buffer zones on Te Awa Kairangi / Hutt River, are a key component of the Te Awa Kairangi / Hutt River floodplain management plan.
Contribution to Annual Plan / Long Term Plan / Other key strategies and policies The river management activities and Te Wai Takamori o Te Awa Kairangi (RiverLink) deliver on Greater Wellington's strategic priority area of te tū pakari a te rohe/regional resilience, and support delivery of Greater Wellington's strategic priority area of te oranga o te wai māori me te rerenga rauropi/freshwater quality and biodiversity.
Internal consultation Te Wai Takamori o Te Awa Kairangi (RiverLink), and Knowledge and Insights teams who both have key roles in the shift to enhanced nature-based approaches using native species.
Risks and impacts - legal / health and safety etc. There may be a financial impact with the shift to enhanced nature-based approaches using native species that is not yet fully understood. The Te Wai Takamori o Te Awa Kairangi (RiverLink) trial at Belmont will provide valuable data to increase understanding of costs and reduce this risk.

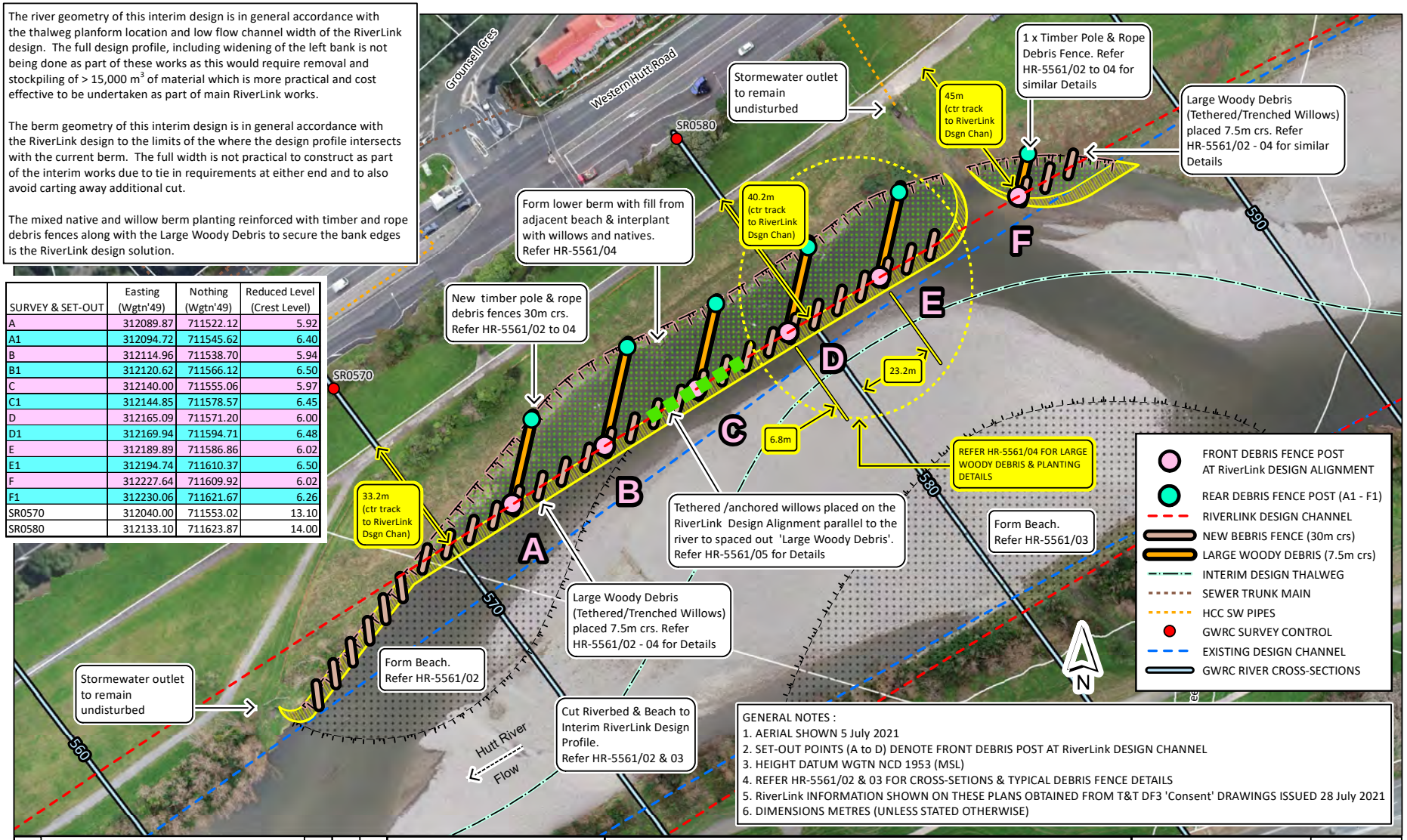
Attachment 1 to Report 24.550

The river geometry of this interim design is in general accordance with the thalweg planform location and low flow channel width of the RiverLink design. The full design profile, including widening of the left bank is not being done as part of these works as this would require removal and stockpiling of > 15,000 m^3 of material which is more practical and cost effective to be undertaken as part of main RiverLink works.

The berm geometry of this interim design is in general accordance with the RiverLink design to the limits of the where the design profile intersects with the current berm. The full width is not practical to construct as part of the interim works due to tie in requirements at either end and to also avoid carting away additional cut.

The mixed native and willow berm planting reinforced with timber and rope debris fences along with the Large Woody Debris to secure the bank edges is the RiverLink design solution.

SURVEY & SET-OUT	Easting (Wgtn'49)	Nothing (Wgtn'49)	Reduced Level (Crest Level)
A	312089.87	711522.12	5.92
A1	312094.72	711545.62	6.40
B	312114.96	711538.70	5.94
B1	312120.62	711566.12	6.50
C	312140.00	711555.06	5.97
C1	312144.85	711578.57	6.45
D	312165.09	711571.20	6.00
D1	312169.94	711594.71	6.48
E	312189.89	711586.86	6.02
E1	312194.74	711610.37	6.50
F	312227.64	711609.92	6.02
F1	312230.06	711621.67	6.26
SR0570	312040.00	711553.02	13.10
SR0580	312133.10	711623.87	14.00



GENERAL NOTES :
1. AERIAL SHOWN 5 July 2021
2. SET-OUT POINTS (A to D) DENOTE FRONT DEBRIS POST AT RiverLink DESIGN CHANNEL
3. HEIGHT DATUM WGTN NCD 1953 (MSL)
4. REFER HR-5561/02 & 03 FOR CROSS-SETIONS & TYPICAL DEBRIS FENCE DETAILS
5. RiverLink INFORMATION SHOWN ON THESE PLANS OBTAINED FROM T&T DF3 'Consent' DRAWINGS ISSUED 28 July 2021
6. DIMENSIONS METRES (UNLESS STATED OTHERWISE)

	AMENDMENT	DWN	CHK	DATE
A	TETHERED ANCHORED WILLOWS ADDED TO SPACED OUT			
	'LARGE WOODY DEBRIS' ON DESIGN ALIGNMENT	P.C.		7/10

CATCHMENT MANAGEMENT
FLOOD PROTECTION

DESIGN	K. CHRISTENSEN	1/9/21
DRAWN	P.COOK	1/9/21
RECOM'ND	K. CHRISTENSEN	1/9/21
APPROVED	G. CAMPBELL 16/9/21	

HUTT RIVER

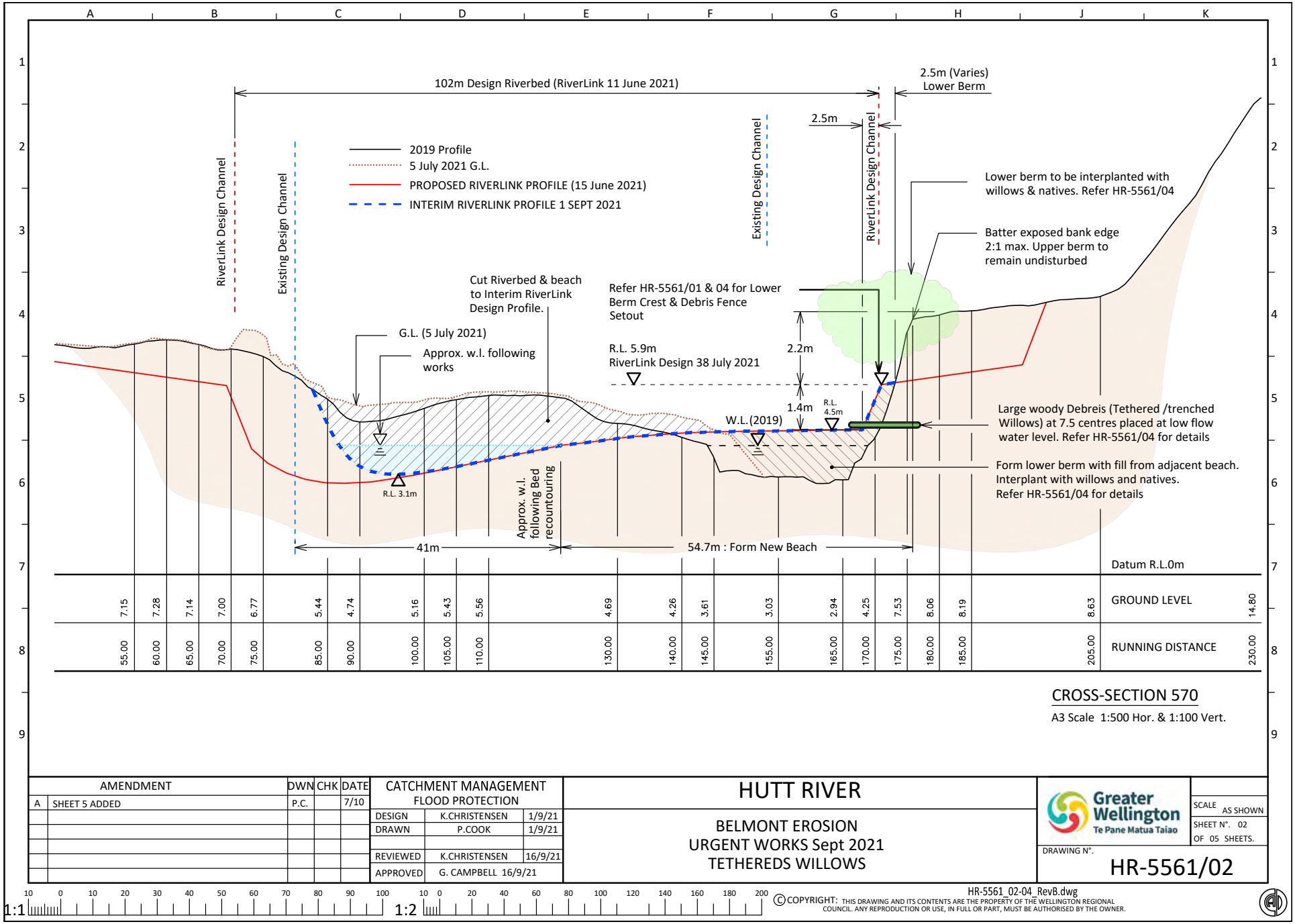
BELMONT EROSION
URGENT WORKS Sept 2021
SITE PLAN

Greater Wellington
Te Pane Matua Taiao

FILE
A3 SCALE 1 : 1,000
SHEET No. 01
OF 05 SHEETS

DRAWING No.
HR-5561/01

File ref : HR-5561-01



CROSS-SECTION 570

A3 Scale 1:500 Hor. & 1:100 Vert.

AMENDMENT		DWN	CHK	DATE
A	SHEET 5 ADDED	P.C.		7/10

CATCHMENT MANAGEMENT FLOOD PROTECTION		
DESIGN	K.CHRISTENSEN	1/9/21
DRAWN	P.COOK	1/9/21
REVIEWED	K.CHRISTENSEN	16/9/21
APPROVED	G. CAMPBELL	16/9/21

HUTT RIVER

BELMONT EROSION
URGENT WORKS Sept 2021
TETHEREDS WILLOWS

Greater Wellington Te Pane Matua Taiao

SCALE AS SHOWN
SHEET N°. 02
OF 05 SHEETS.

DRAWING N°.
HR-5561/02

1:1 1:2

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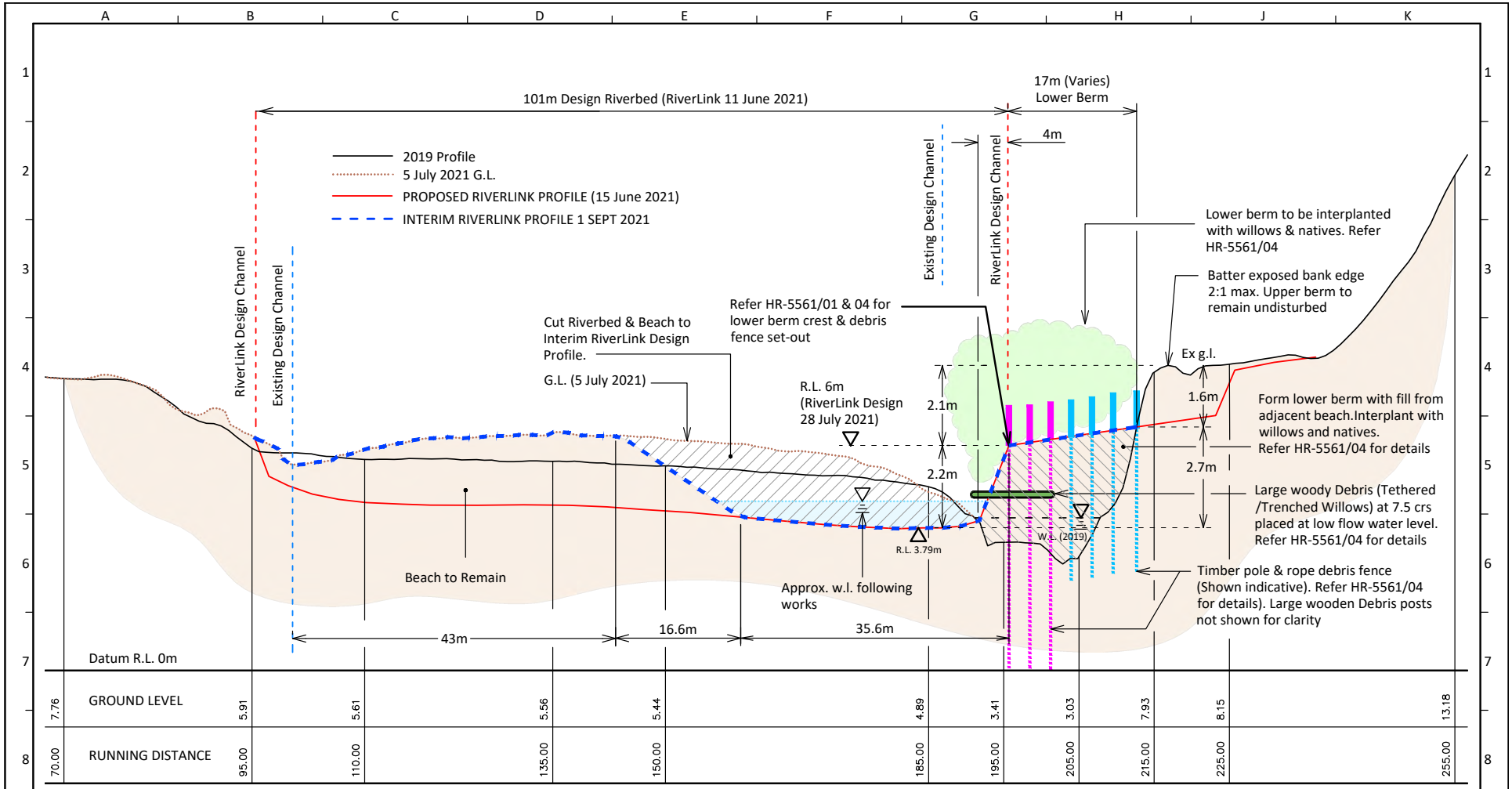


CROSS-SECTION 580

A3 Scale 1:500 Hor. & 1:100 Vert.

AMENDMENT		DWN	CHK	DATE
A	SHEET 5 ADDED	P.C.		7/10

CATCHMENT MANAGEMENT FLOOD PROTECTION		
DESIGN	K.CHRISTENSEN	1/9/21
DRAWN	P.COOK	1/9/21
REVIEWED	K.CHRISTENSEN	16/9/21
APPROVED	G. CAMPBELL	16/9/21

HUTT RIVER

BELMONT EROSION
URGENT WORKS Sept 2021
GWRC RIVER CROSS-SECTION 580

Greater Wellington Te Pane Matua Taiao

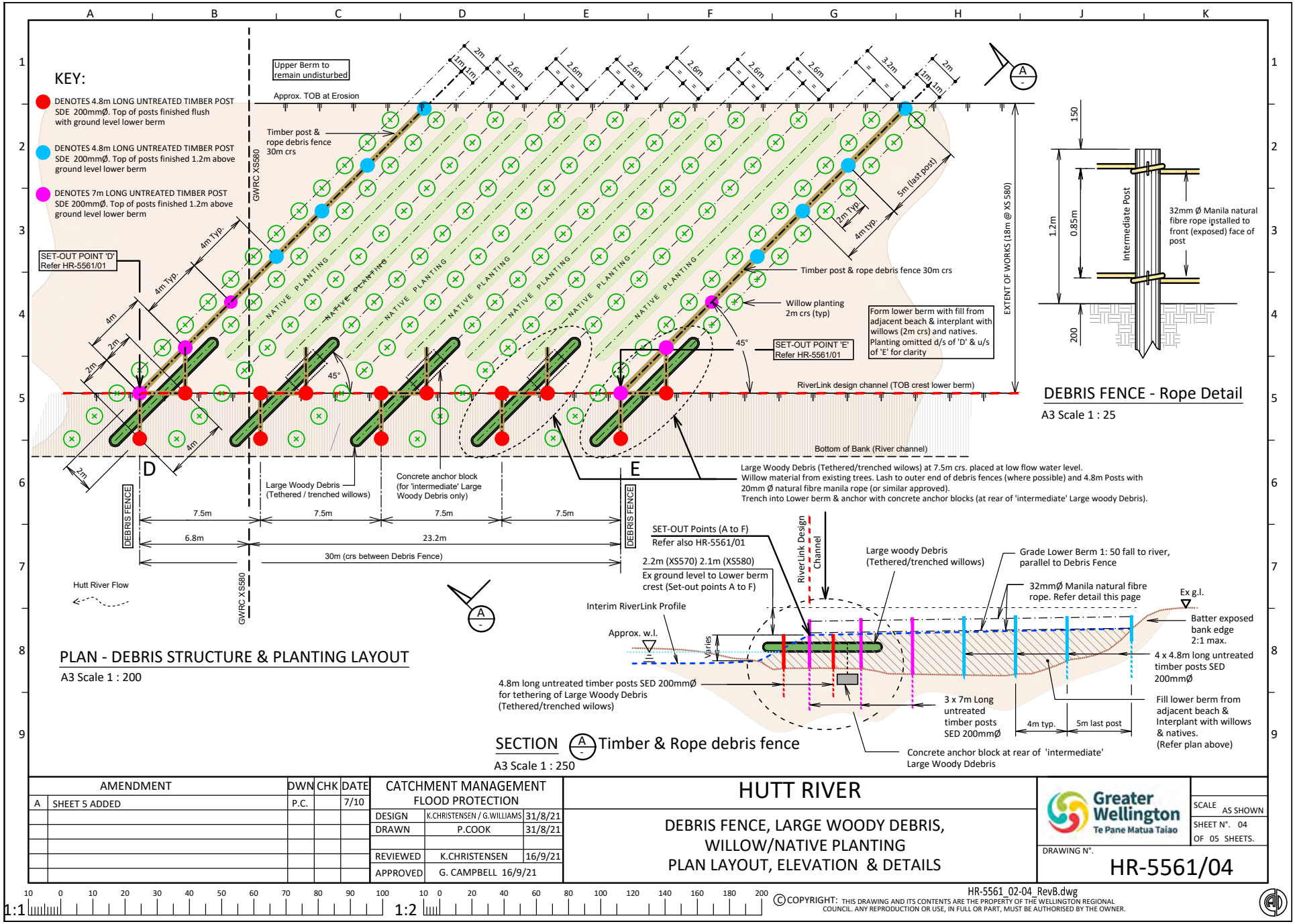
SCALE AS SHOWN
SHEET N°. 03
OF 05 SHEETS.

DRAWING N°.
HR-5561/03

1:1 1:2

HR-5561_02-04_RevB.dwg

Attachment 1 to Report 24.550



DEBRIS FENCE - Rope Detail

A3 Scale 1 : 25

PLAN - DEBRIS STRUCTURE & PLANTING LAYOUT

A3 Scale 1 : 200

SECTION (A) Timber & Rope debris fence

A3 Scale 1 : 250

AMENDMENT		DWN	CHK	DATE
A	SHEET 5 ADDED	P.C.		7/10

CATCHMENT MANAGEMENT FLOOD PROTECTION		
DESIGN	K.CHRISTENSEN / G.WILLIAMS	31/8/21
DRAWN	P.COOK	31/8/21
REVIEWED	K.CHRISTENSEN	16/9/21
APPROVED	G. CAMPBELL 16/9/21	

HUTT RIVER

DEBRIS FENCE, LARGE WOODY DEBRIS, WILLOW/NATIVE PLANTING
PLAN LAYOUT, ELEVATION & DETAILS

Greater Wellington Te Pane Matua Taiao

SCALE AS SHOWN
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OF 05 SHEETS.
DRAWING N°.
HR-5561/04

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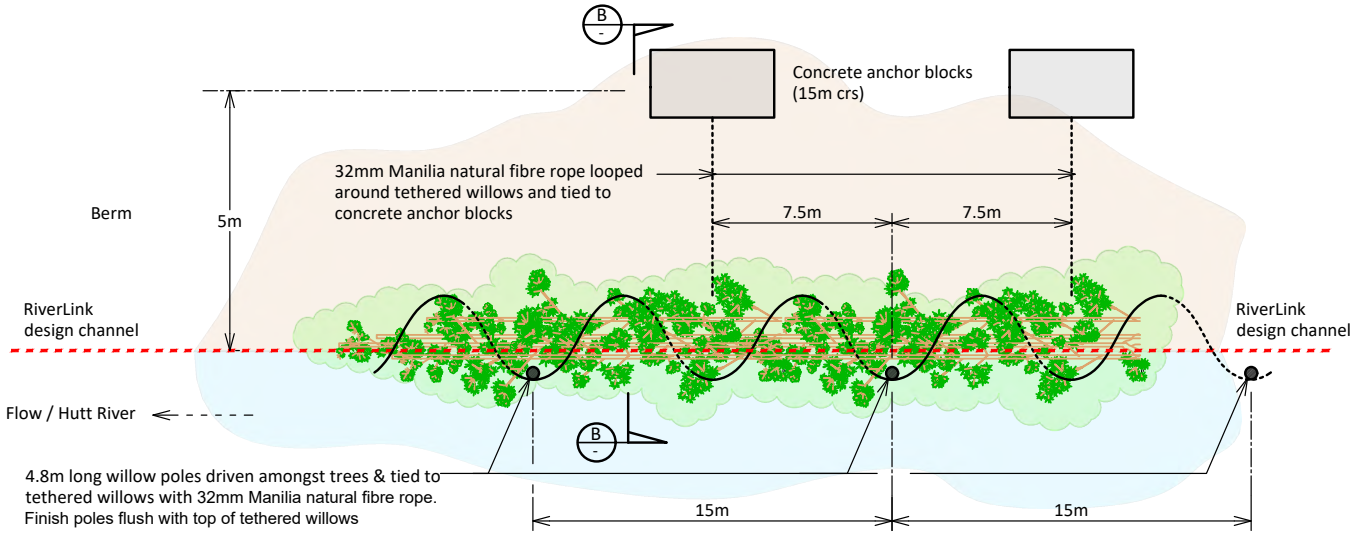
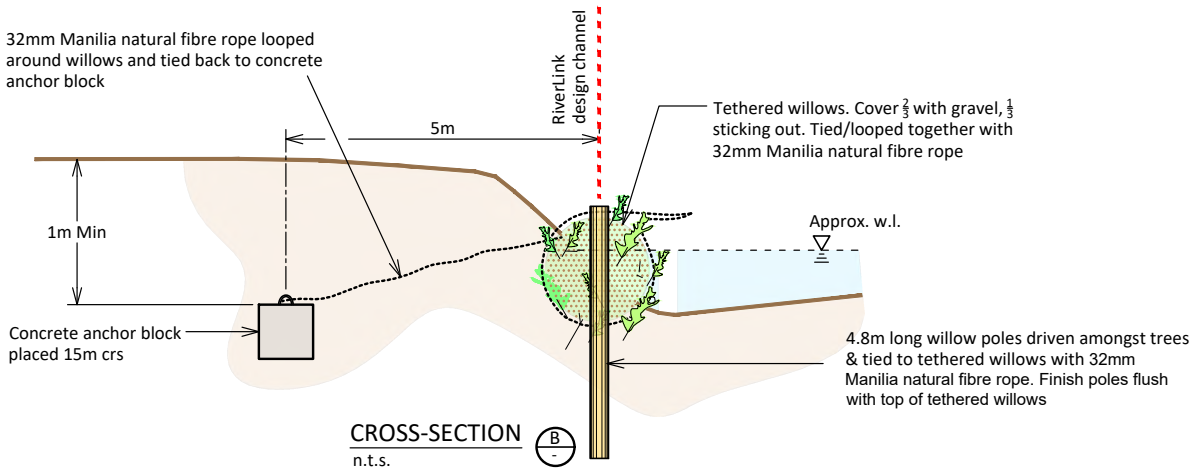


PLAN
n.t.s.



CROSS-SECTION
n.t.s.

AMENDMENT		DWN	CHK	DATE
A	SHEET 5 ADDED	P.C.		7/10

CATCHMENT MANAGEMENT FLOOD PROTECTION		
DESIGN	M.Jensen	6/10/21
DRAWN	P.COOK	7/10/21
REVIEWED		
APPROVED		

HUTT RIVER

DEBRIS FENCE, LARGE WOODY DEBRIS,
WILLOW/NATIVE PLANTING
FRONT EDGE TETHERED / ANCHORED WILLOWS

Greater Wellington
Te Pane Matua Taiao

SCALE AS SHOWN
SHEET N°. 05
OF 05 SHEETS.

DRAWING N°.
HR-5561/05

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HR-5561_02-04_RevB.dwg

Attachment 1 to Report 24.550

The river geometry of this interim design is in general accordance with the thalweg planform location and low flow channel width of the RiverLink design. The full design profile, including widening of the left bank is not being done as part of these works as this would require removal and stockpiling of > 15,000 m^3 of material which is more practical and cost effective to be undertaken as part of main RiverLink works.

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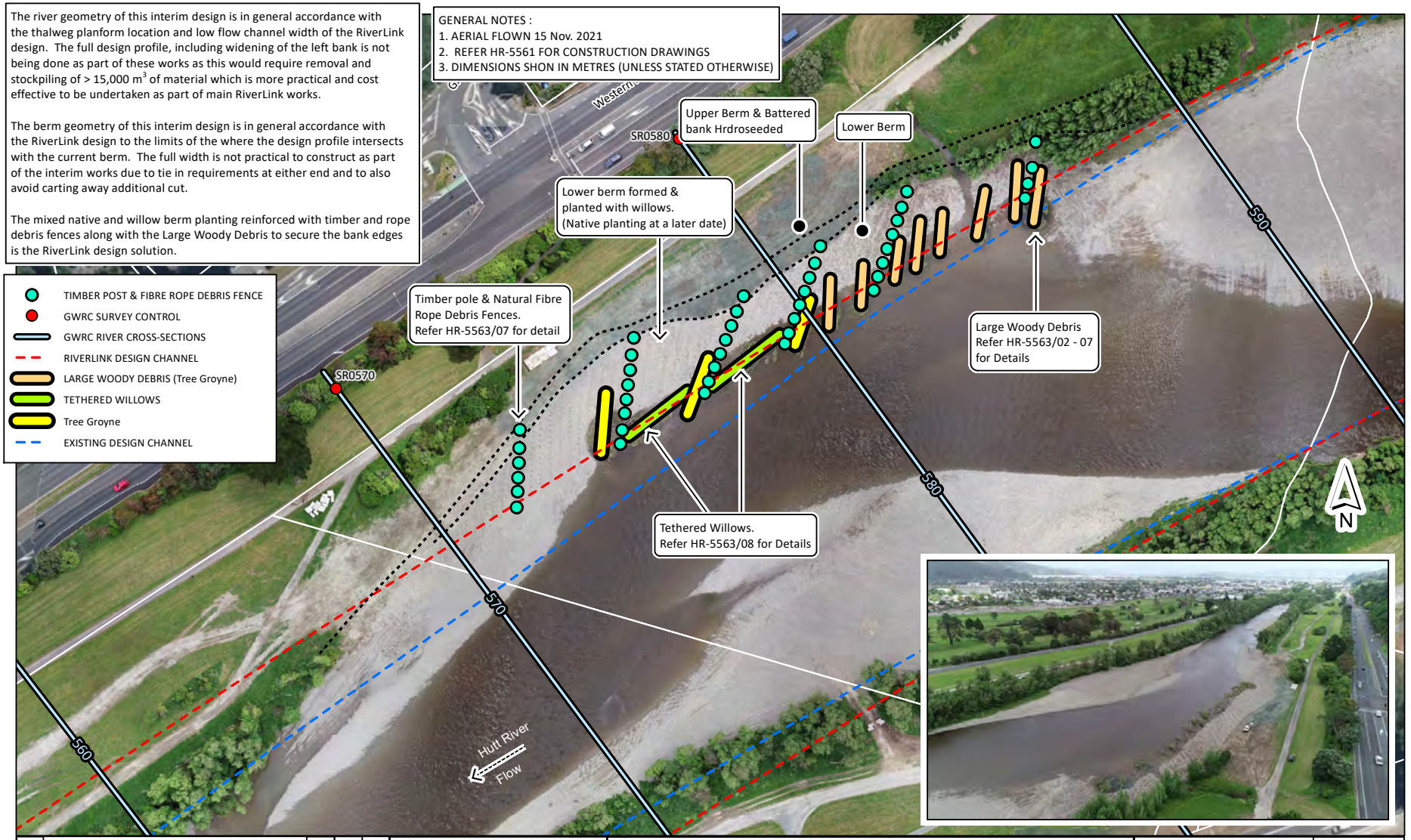
The mixed native and willow berm planting reinforced with timber and rope debris fences along with the Large Woody Debris to secure the bank edges is the RiverLink design solution.

GENERAL NOTES :
1. AERIAL FLOWN 15 Nov. 2021
2. REFER HR-5561 FOR CONSTRUCTION DRAWINGS
3. DIMENSIONS SHON IN METRES (UNLESS STATED OTHERWISE)



	AMENDMENT	DWN	CHK	DATE

CATCHMENT MANAGEMENT
FLOOD PROTECTION

DESIGN	K.CHRISTENSEN / G.WILLIAMS	1/9/21
DRAWN	P.COOK	18/11/21

HUTT RIVER

BELMONT EROSION
MITIGATION TO RiverLink INTERIM DESIGN
SITE PLAN - AS BUILT Nov 2021

Greater Wellington
Te Pane Matua Taiao

FILE
A3 SCALE 1 : 1,000
SHEET No. 01
OF 09 SHEETS

DRAWING No.
HR-5563/01

File ref : HR-5563-01_AB

Attachment 1 to Report 24.550

	AMENDMENT	DWN	CHK	DATE

CATCHMENT MANAGEMENT
FLOOD PROTECTION

DESIGN	K. CHRISTENSEN / G.WILLIAMS	1/9/21
DRAWN	P.COOK	18/11/21
RECOM'ND		
APPROVED		

HUTT RIVER

BELMONT EROSION
MITIGATION TO RiverLink INTERIM DESIGN
AS BUILT Nov 2021 - PLAN (Sheet 01 OF 3)

Greater Wellington
Te Pane Matua Taiao

FILE
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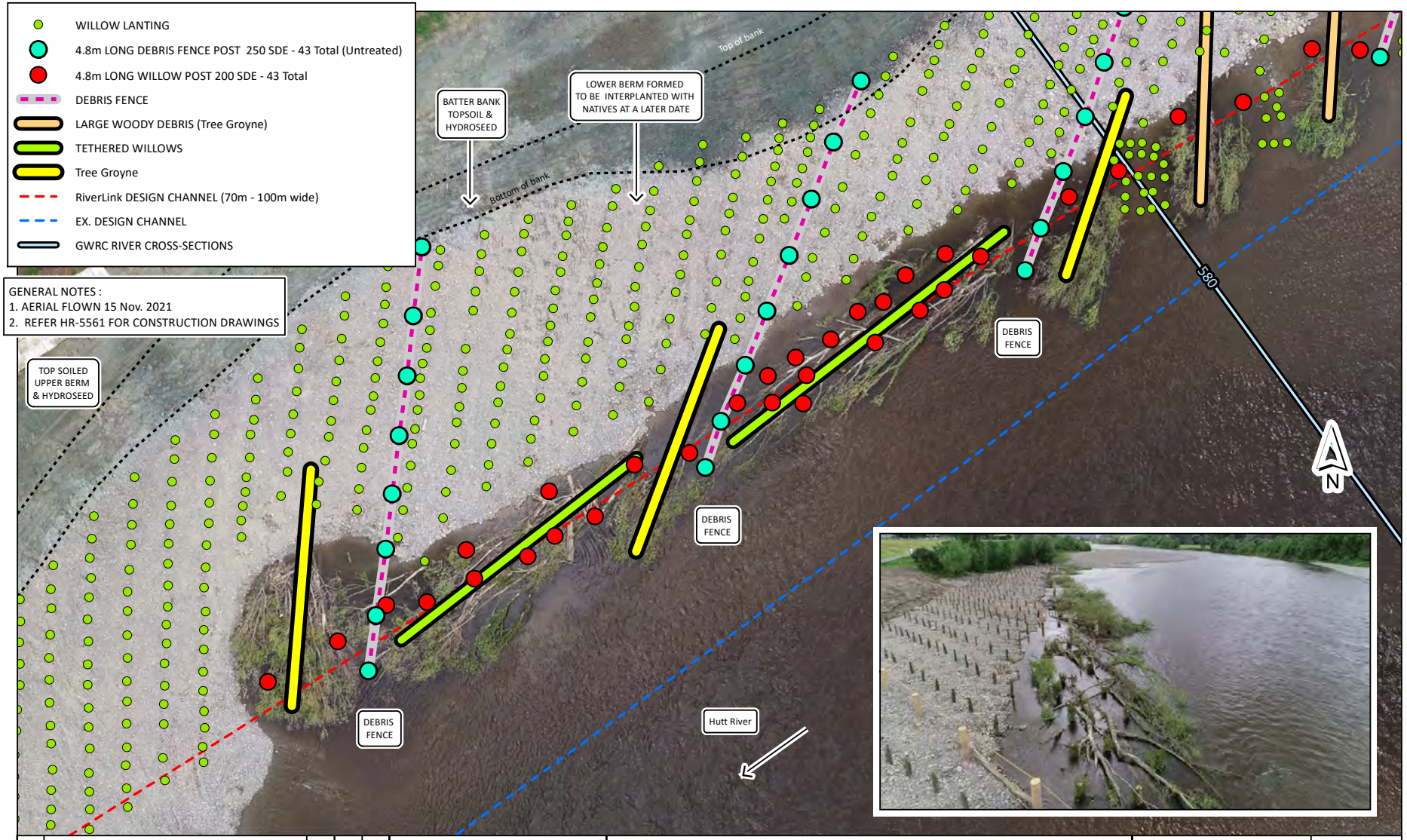
OF 09 SHEETS

DRAWING No.
HR-5563/02

File ref : HR-5563-02_AB

Attachment 1 to Report 24.550



	AMENDMENT	DWN	CHK	DATE

CATCHMENT MANAGEMENT FLOOD PROTECTION		
DESIGN	K. CHRISTENSEN / G.WILLIAMS	1/9/21
DRAWN	P.COOK	18/11/21
RECOM'ND		
APPROVED		

HUTT RIVER

BELMONT EROSION
MITIGATION TO RiverLink INTERIM DESIGN
AS BUILT Nov 2021 - PLAN (Sheet 02 OF 3)

Greater Wellington Te Pane Matua Taiao

FILE
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OF 09 SHEETS

DRAWING No. HR-5563/03

File ref : HR-5563-03_AB

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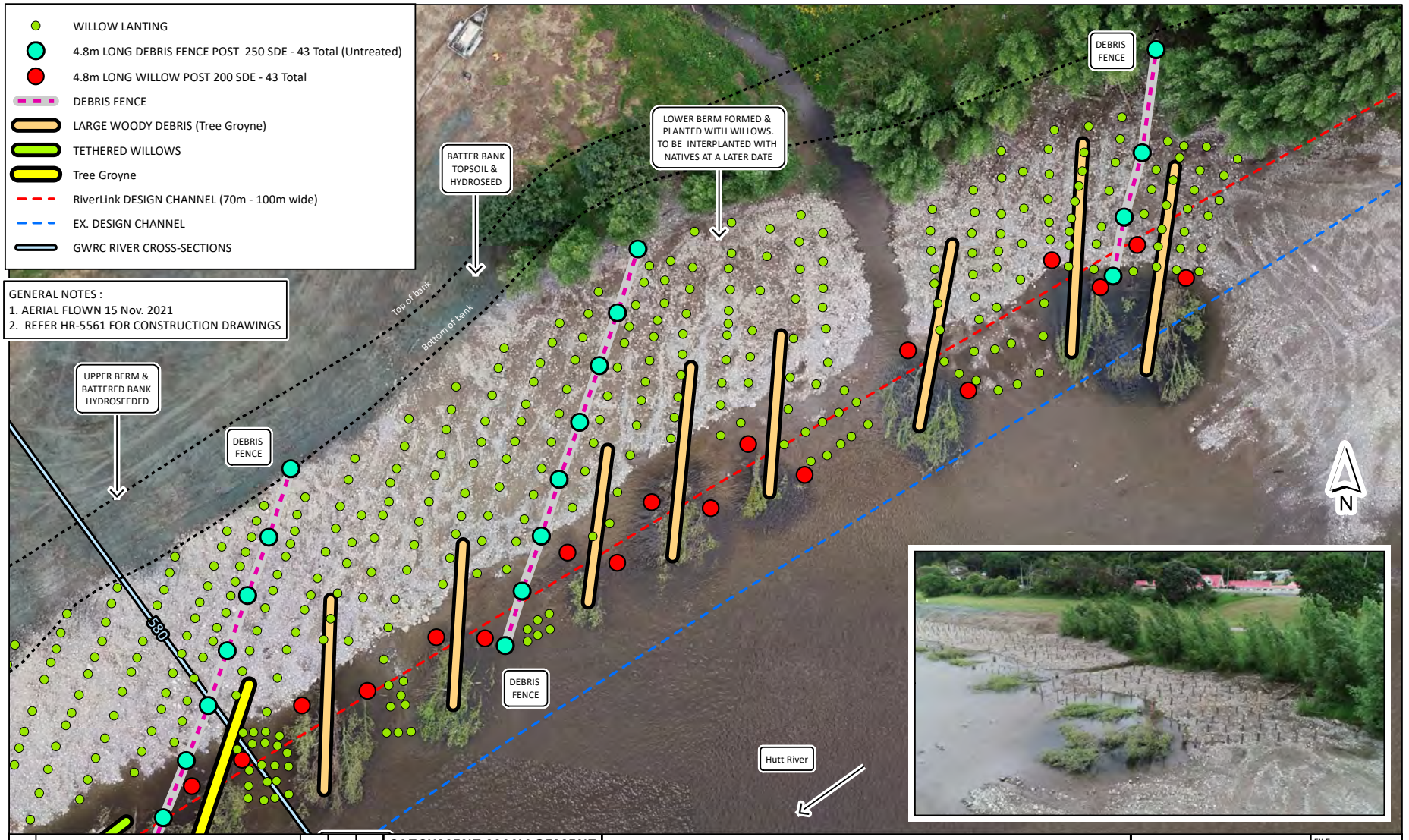


AMENDMENT	DWN	CHK	DATE

CATCHMENT MANAGEMENT
FLOOD PROTECTION

DESIGN	K.CHRISTENSEN / G.WILLIAMS	1/9/21
DRAWN	P.COOK	18/11/21
RECOM'ND		
APPROVED		

HUTT RIVER

BELMONT EROSION
MITIGATION TO RiverLink INTERIM DESIGN
AS BUILT Nov 2021 - PLAN (Sheet 03 OF 3)

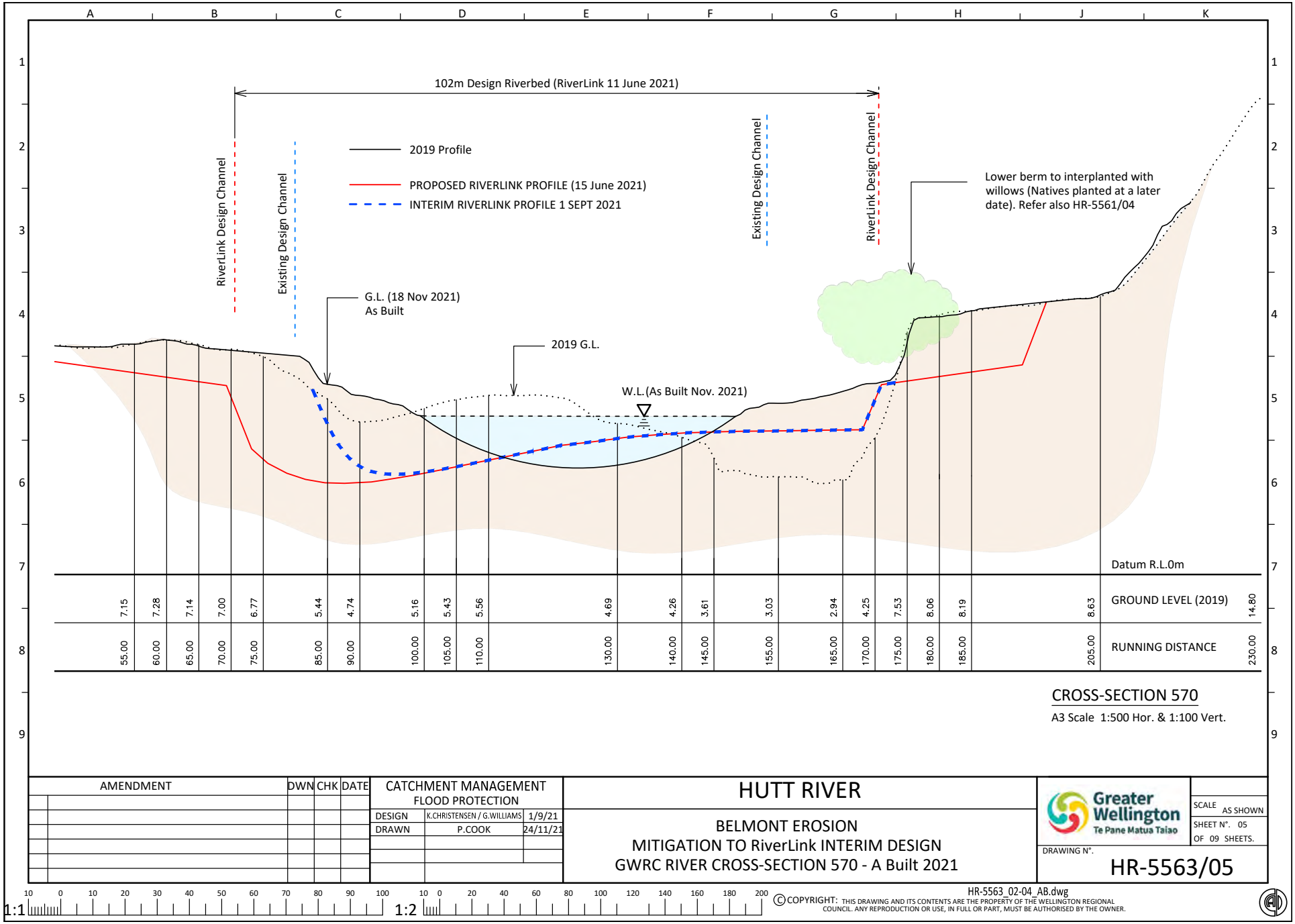
Greater Wellington
Te Pane Matua Taiao

FILE
A3 SCALE 1 : 250
SHEET No. 04
OF 09 SHEETS

DRAWING No.
HR-5563/04

File ref : HR-5563-04_AB

Attachment 1 to Report 24.550



CROSS-SECTION 570

A3 Scale 1:500 Hor. & 1:100 Vert.

AMENDMENT	DWN	CHK	DATE

CATCHMENT MANAGEMENT FLOOD PROTECTION		
DESIGN	K.CHRISTENSEN / G.WILLIAMS	1/9/21
DRAWN	P.COOK	24/11/21

HUTT RIVER

BELMONT EROSION
MITIGATION TO RiverLink INTERIM DESIGN
GWRC RIVER CROSS-SECTION 570 - A Built 2021

Greater Wellington Te Pane Matua Taiao

SCALE AS SHOWN
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OF 09 SHEETS.

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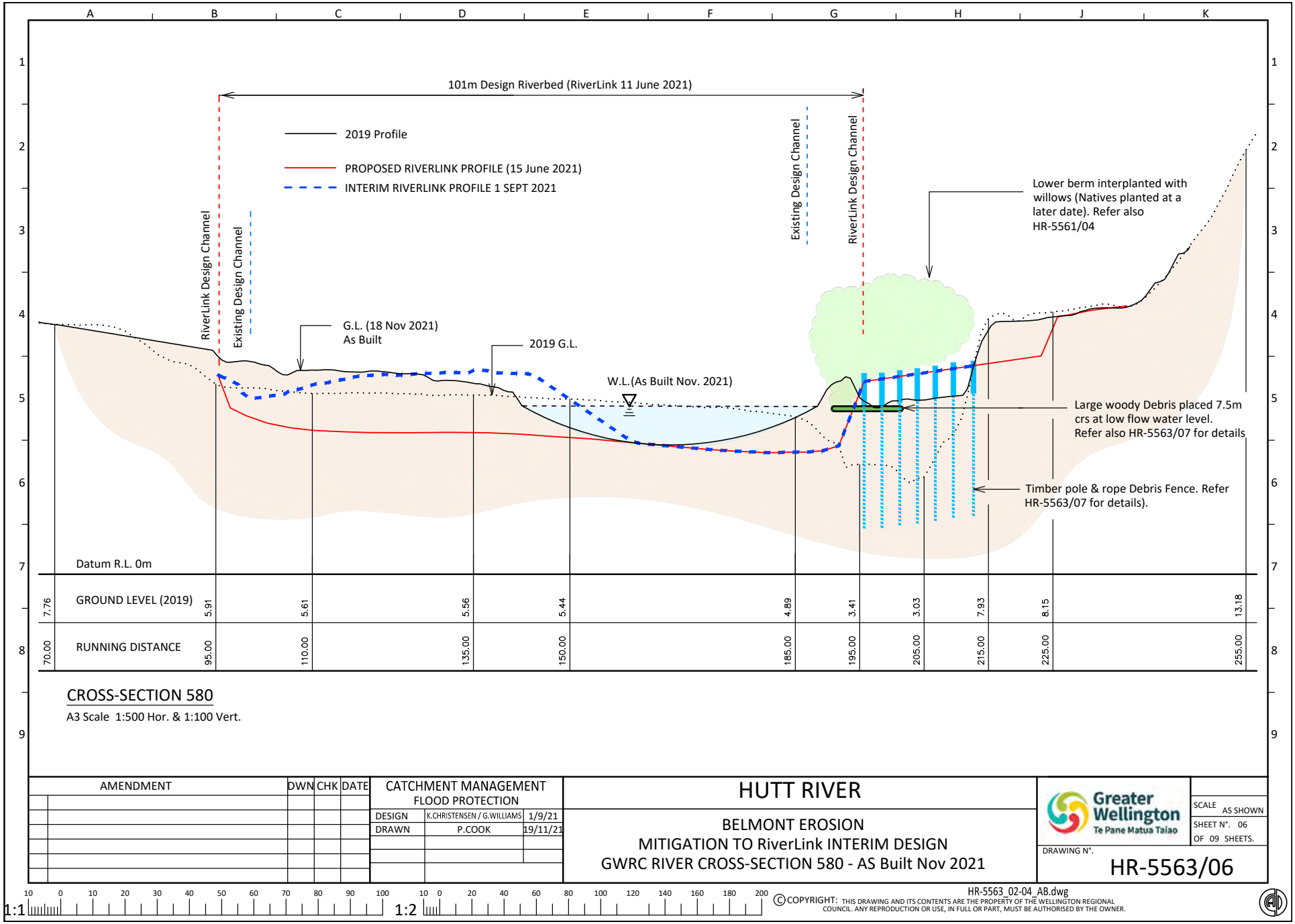


CROSS-SECTION 580

A3 Scale 1:500 Hor. & 1:100 Vert.

AMENDMENT	DWN	CHK	DATE

CATCHMENT MANAGEMENT FLOOD PROTECTION		
DESIGN	K.CHRISTENSEN / G.WILLIAMS	1/9/21
DRAWN	P.COOK	19/11/21

HUTT RIVER

BELMONT EROSION
MITIGATION TO RiverLink INTERIM DESIGN
GWRC RIVER CROSS-SECTION 580 - AS Built Nov 2021

Greater Wellington Te Pane Matua Taiao

SCALE AS SHOWN
SHEET N°. 06
OF 09 SHEETS.

DRAWING N°. HR-5563/06

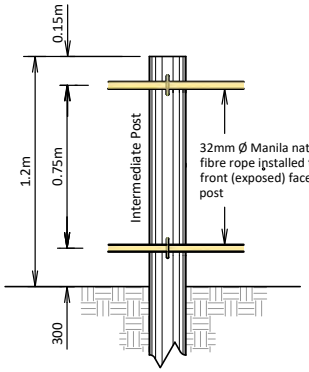
1:1 1:2

HR-5563_02-04_AB.dwg

Attachment 1 to Report 24.550

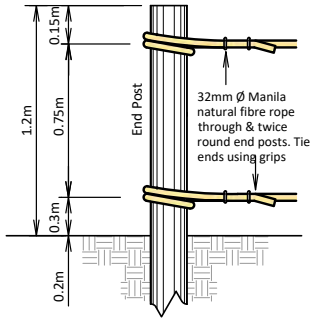
LARGE WOODY DEBRIS TETHERED TO CONCRETE ANCHOR BLOCKS

DEBRIS FENCE & LARGE WOODY DEBRIS INTERPLANTED WITH WILLOWS
NATIVE PLANTING BETWEEN WILLOW ROWS AT A LATER DATE (REFER HR-5561/04)



INTERMEDIATE POST

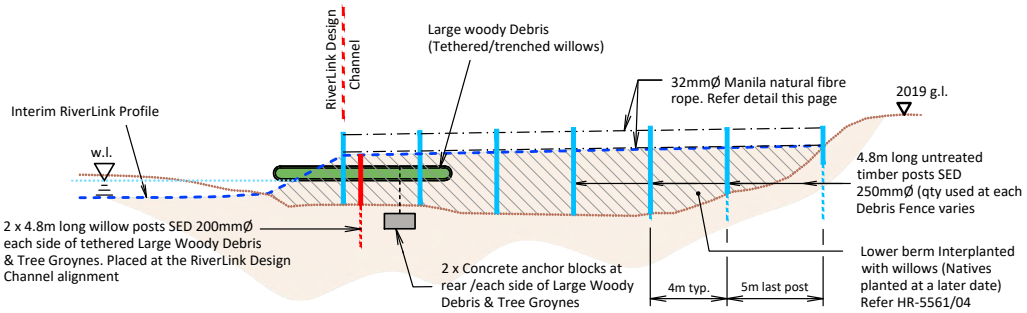
LARGE WOODY DEBRIS TETHERED TO WILLOW POLES



END POST

DEBRIS FENCE - Rope Detail

A3 Scale 1 : 25



DETAIL : Typical Debris fence / Large Woody Debris

A3 Scale 1 : 250

AMENDMENT	DWN	CHK	DATE

CATCHMENT MANAGEMENT
FLOOD PROTECTION

DESIGN	K.CHRISTENSEN / G.WILLIAMS	31/8/21
DRAWN	P.COOK	18/11/21

HUTT RIVER

BELMONT EROSION
MITIGATION TO RiverLink INTERIM DESIGN
DEBRIS FENCE, LARGE WOODY DEBRIS - AS BUILT Nov. 2021

Greater Wellington Te Pane Matua Taiao

SCALE AS SHOWN
SHEET N°. 07
OF 09 SHEETS.

DRAWING N°.
HR-5563/07

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Attachment 1 to Report 24.550

2 x 4.8m long willow posts SED 200mmØ each side of Tree Groynes & tied to willows with 28mm Manilia natural fibre rope. Poles flush with top of tethered willows. 2 x Concrete anchor blocks at rear /each side of Large Woody Debris & Tree Groynes. Refer also Detail on Dwg HR-5563/08

Concrete anchor block

28mm Manilia natural fibre rope looped around tethered willows and tied to concrete anchor blocks

Concrete anchor block

5m

RiverLink design channel

4.8m long willow poles driven amongst trees (staggered 4m crs) & tied to tethered willows with 28mm Manilia natural fibre rope. Poles flush with top of tethered willows

TREE GROYNE

TREE GROYNE

TREE GROYNE

15m (Tree length)

TETHERED WILLOWS

15m (Tree length)

TETHERED WILLOWS

RiverLink design channel

Hutt River Flow

Flow / Hutt River

PLAN

n.t.s.

RiverLink design channel

5m

1m

Tethered willows. Cover $\frac{2}{3}$ with gravel, $\frac{1}{3}$ sticking out. Tied/looped together with 28mm Manilia natural fibre rope

Approx. w.l.

Concrete anchor block

32mm Manilia natural fibre rope looped around willows and tied back to concrete anchor block

4.8m long willow poles SD 200 driven amongst trees (staggered 4m crs) & tied to tethered willows with 28mm Manilia natural fibre rope. Poles flush with top of tethered willows

CROSS-SECTION B -

n.t.s.

AMENDMENT	DWN	CHK	DATE

CATCHMENT MANAGEMENT
FLOOD PROTECTION

DESIGN	M.Jensen	6/10/21
DRAWN	P.COOK	24/11/21
REVIEWED		
APPROVED		

HUTT RIVER

BELMONT EROSION
MITIGATION TO RiverLink INTERIM DESIGN
TREE GROYNES & TETHERED WILLOWS - AS BUILT Nov 2021

Greater Wellington Te Pane Matua Taiao

SCALE AS SHOWN
SHEET N°. 08
OF 09 SHEETS.

DRAWING N°.
HR-5563/08

1:1 1:2

HR-5563_02-04_AB.dwg

CHANNEL RE-SHAPING & CONSTRUCTION OF LOWER BERM:

- Carried out in October under 'emergency works' during Covid Level 3 lockdown & winter river flows.
- Sufficient material moved & reshaped to ensure formation of lower berm & small bund located in front of the RiverLink Design Channel Resulting in no compliance issues & all construction being carried out in the dry

LARGE WOODY DEBRIS.

- 4.8m Long Willows Posts & Willow trees cut from existing stock
- Significant excavation of re-shaped Lower Berm to construct Large Woody Debris at 7.5m crs
- Tethering of willows with 28mm Natural Fibre rope
- Change to Design (HR-5561 /01 to 05) includes Tethered Willows & 3 x Tree Groynes located at the Downstream end

DEBRIS FENCE POSTS:

- Posts & Fibre Rope supplies not available at start of work due to Auckland Covid level 3 lockdown & limited shipping
- Attempts to drive posts via modified plate compactor (as shown) were unsuccessful. This was due to the (pointed) end of the post coming into contact with buried concrete demolition & large rocks. It was decided to dig out, erect posts & backfill (as shown below). Post depth below ground level 3m to 3.5m to Finished level 1.2m above Lower Berm level

DEBRIS FENCE ROPE:

- 32mm Natural Fibre rope was used
- Rope double lapped at end posts & tied off with 2 x Galv. Grips
- Rope nailed to intermediate posts & fixed in place with a galv. saddle front (exposed) face of post

AMENDMENT	DWN	CHK	DATE

CATCHMENT MANAGEMENT FLOOD PROTECTION		
DESIGN	K.CHRISTENSEN / G.WILLIAMS	6/10/21
DRAWN	P.COOK	24/11/21
REVIEWED		
APPROVED		

HUTT RIVER

BELMONT EROSION
MITIGATION TO RiverLink INTERIM DESIGN
CONSTRUCTION NOTES - AS BUILT Nov 2021

Greater Wellington Te Pane Matua Taiao

SCALE AS SHOWN
SHEET N°. 09
OF 09 SHEETS.

DRAWING N°.
HR-5563/09

1:1 1:2

HR-5563_02-04_AB.dwg

Greater Wellington Regional Council

TE AWA KAIRANGI

Belmont Flexible Edge Trial Planting Plan

Matt Richardson

August

2024

CONCERTO CONSULTING

Contents

CONCERTO CONSULTING

Preface

This trial planting plan is intended to provide a practical guideline for the planting of native vegetation amongst establishing willows, alongside a gravel river - Te Awa Kairangi. Information provided in this report has been sourced from projects delivered around New Zealand, specialist knowledge and experience from ecological restoration experts, as well as best horticultural and riparian planting practices.
It is understood this trial is viewed as experimental.

Introduction

Te Wai o Takamori Te Awa Kairangi is a transformational project for Te Awa Kairangi - Lower Hutt. It includes crucial flood protection and river restoration work, improvements to public transport, a new State Highway 2 Melling Interchange, and urban revitalisation of the Lower Hutt city centre. The project is a partnership between iwi Taranaki Whānui ki Te Upoko o Te Ika and Ngāti Toa Rangatira, Greater Wellington Regional Council (GW), Hutt City Council and NZ Transport Agency - Waka Kotahi.

GW has a specific focus on enhancing flood protection. Alongside stopbank upgrades and river channel construction, the design and implementation of soft edge bioengineering solutions will play a pivotal role in berm stabilisation while improving the ecosystem along the upper reaches of Te Awa Kairangi.

The use of a vegetation buffer is a common approach on the banks of riparian margins to minimise sediment levels, improve water clarity, and stabilise bank edges. Native vegetation is widely used on smaller streams and waterways but will struggle to establish on large river corridors when used as front-line edge protection. It is understood natives cannot be a standalone solution due to their inability to mature, establish, and provide short-term flood protection. As a result, exotics are used as a bioengineering function, providing support below ground. The overarching objective for Te Awa Kairangi is the successful transition from willows into native vegetation, providing flood protection while encouraging biodiversity. However, the key deliverables of this trial are planting natives and measuring success to inform future river planting design.

This report will detail the native planting design, outlining the approaches used to measure native vegetation survival in this harsh environment. Particular interest will be given to what species thrive and which planting layout design and support structures perform best, as recorded during the maintenance and monitoring period.

Background

Willows were introduced to New Zealand in the 1840s, bred specifically for erosion control and slope stabilisation. They were selected due to their quick rooting coverage and ability to bind soil together.[1] As the 20th century progressed, the demand for using native vegetation for the stabilisation of waterways and river edge protection grew. Te Awa Kairangi Project endeavours to achieve this through a holistic bioengineering design, where "7.7ha of exotic willow planting with an indigenous understory that will transition to native riparian vegetation in the long-term", will be installed along the upper reaches of the river.

The upper reach refers to the length of river from the Kennedy-Good Bridge down to the Transpower Station, just north of the Mills Street Stopbank. Figure 1 outlines the bioengineering trial planting site where in 2021, the trial plot was constructed and planted out with willows (*Salix matsudana x alba* 'Moutere'). The trial plot sits below the entrance to Belmont on State Highway 2, it can be accessed from the west end of Kennedy-Good bridge by heading south along the Hutt River Walking Trail. The trial site was selected due to the presence of erosion in the lower berm in early 2021. This created an opportunity to measure the success of Te Awa Kairangi bioengineering design in a representative section of the river.

Figure 1: The location of the Belmont Trial Site and access point.

[1] Phillips, C. 2006- Use of Plants for Ground Bioengineering and Erosion & Sediment Control in New Zealand, p.6.

Scope

The 2021 River Channel Design Report notes "the complete conversion from willows to natives within a vegetative buffer along a river reach has not been undertaken before and has to be understood as experimental".[2] It is understood native planting alongside Te Awa Kairangi, a river with gravel beaches, comes with near insurmountable challenges including:

- A lack of quality growing material.
- The inability to retain growing material due to flooding.
- The time required for native vegetation to anchor in the ground.
- The inability of native vegetation to provide short-term flood protection.
- Extreme weather events including drought and flooding.

These challenges outline why either hard structures are installed, or exotic vegetation planted. However, viewing the river from an engineering perspective alone fails to respect the taonga and mana of the natural waterway, and the benefits it can bring to native flora and fauna if cared for effectively.

WHY TRANSITION TO NATIVE PLANTING

Willows are not endemic to New Zealand, have a comparatively short lifespan, and compared to a variety of native plants, they provide little habitat and food for wildlife. This helps ratify the transitional approach, allowing willows to provide erosion protection before introducing native planting.

During the design collaboration phase, Mana whenua representatives voiced the desire to "re-cloak" the river with indigenous plant species. Tangata whenua also value native plant species for traditional uses and believe the "…presence of native vegetation can reinforce that sense of natural character."[3] Native species along the waterway allow for the reintroduction of plants that once flourished along Te Awa Kairangi, further increasing the mana of the river.

As plants regenerate in the trial plot, the ecosystem rebuilds itself naturally. The installation of native vegetation is supporting and accelerating this natural process, providing environmental benefits such as indigenous biodiversity and creating a habitat for wildlife.

TRIAL OBJECTIVES

The key objective is to provide flood protection accompanied with biodiversity improvements. However, this process will also determine what won't work and what techniques, species, and design options should be avoided.

Key trial objectives are to:

1. Measure the survival and growth of native plant species.
    a. What species are thriving?
    b. What species have survived/perished?
2. Compare planting layout designs.
    a. Have plants fared better in one or the other planting area?
    b. Measure the success of plant placement and spacing.
3. Assess the different planting techniques, ancillaries, and support structures.
4. Understand how native species respond to adverse weather conditions.
5. Inform future design through a robust trial process.

As councils, community groups, and private organisations continue to explore success with native vegetation alongside large waterways, particularly without the need for exotic species, Te Awa Kairangi project provides a unique opportunity to gather this information.

[2] Williams, G. & Christensen, W. 2021: River Channel Design Report- Consent stage- River Channel Refinements, p.5.
[3] Rethink. Te Awa Kairangi. Isthmus

DELIVERABLES

The native planting trial will be broken into three phases, with each phase providing key information towards achieving the project objectives.

1. Planning phase
    a. Belmont Flexible Edge Trial Implementation Plan.
        i. Planting design methodology.
        ii. Species selection.
        iii. Programme of works.
        iv. Maintenance plan.
        v. Monitoring template.
2. Implementation phase
    b. Installation Summary Report.
        i. Quality management.
        ii. Base monitoring data (plant size, root ball quality, plant condition).
        iii. Species planted.
        iv. Site conditions.
        v. Growing material depth and condition.
        vi. Prevailing weather conditions.
        vii. As-builts.
3. Monitoring and Maintenance phase
    c. Reporting
        i. Survival rates.
        ii. Plant vigour.
        iii. Erosion.
        iv. Weather events.
        v. Maintenance requirements and remedial action.
        vi. Monitoring data (against base data).

The monitoring reports will measure progress, ensuring information collected supports the key objectives.

OUTCOMES

The information collated throughout the trial monitoring period will help devise a Bioengineering Transitional Planting Plan for the remaining Te Awa Kairangi Project. This plan will combine bioengineering with river design, maintenance and hydrological information, to help detail how these components will interact and affect one another. The bioengineering detail required for the next plan shapes the direction of this trial, where success looks like a robust and thorough trial conducted with data accurately recorded. Success does not necessarily mean plant survival or healthy growth, while this is extremely helpful, it is important to note plant failure can be just as informative in educating against future mistakes.

Short Term Success

Quarterly inspections will be undertaken after plant installation to help monitor the survival, growth, and condition of the plants. These inspections will detail:

- Condition and growth of plants.
    - What species have survived and why?
    - What species have failed and why?
- Plant measurements and quantitative data.
- Installation methodologies and the success or failure of support structures (plant guards, wool planter bags, or root ball pegs)
- Flood events or extreme weather that may have influenced the survival of the plants.

Acceptable success criteria for soft edge bioengineering planting design will be defined through the monitoring period of this trial.

Long Term Success

Thick and dense natural regeneration alongside planted natives, will precede the ability of native plants to stabilise the river edge. This trial plot will begin dispersing seed and connecting with other planting blocks installed nearby, creating an interconnected native river corridor, healthy and populated with terrestrial species and bird life.

Positive outcomes may include:

- Canopy closure.
- Weed suppression and a healthy understory.
- Self-seeded native vegetation along the river.
- Presence of avifauna, which further promotes seed dispersal.
- Native plants supporting flood protection, mimicking the established willows.
- Supporting the values of our Mana whenua partners and 're-cloaking' Te Awa Kairangi River with native vegetation.

This trial may also be used to gather data for GW, to support other bioengineering endeavours:

- Measure the survival and growth rates of native plants when planted amongst willows in sediment filled gravel beds.
- Root establishment of different native species.
- Ability to filter sediment and support erosion control.
- Maintenance programmes to support native vegetation against weed species.

GW may also consider monitoring responses and feedback from the community, Mana whenua, and key stakeholders throughout the physical works and monitoring period.

Note: Native plants will require a considerable period of time before they provide the flood resilience infrastructure the river needs for willows to become obsolete. Even though the native plants may be alive and thriving, monitoring will be required to determine when and if they reach an acceptable level of structural support.
The overarching objective of this soft edge bioengineering approach may be to fully transition into native vegetation; however, it is not yet understood if this is possible. Maintenance of the river and its vegetation will always be required, and the native transition forever sought after, but it is yet to be determined if this can, or ever will be achievable.

QUALITY ASSURANCE

The following is a summary of quality information, detailing prerequisites, guidelines, and requirements for the native transitional planting trial.

Table 1: Quality Assurance Guide

Requirement	Detail	Sign off
Presence of growing material	1. The level of sediment built up must reach a minimum depth of 300mm, providing sufficient material for the plants to be planted into. 2. Growing material will be tested to ensure suitability. Amelioration will be required if the material is of poor quality. Note- plants may be installed where growing material has not met the above criteria, but must be recorded during installation to support trial data.	GW Manager Environmental Operations
Quality of established willows	The willows must be alive and a minimum of 3m tall, to slow down and redirect flood waters while minimising effects on freshly planted native vegetation.	GW Manager Environmental Operations
Willow establishment period	24-36 months between willow and native planting installation, allowing time for sufficient root growth.	GW Manager Environmental Operations
Site preparation	Site preparation will be required, including pest animal and plant weed control.	GW Manager Environmental Operations Designer
Plant quality	Plants will be inspected prior to planting. • Plants must be eco-sourced • Plants are healthy and vigorous • Correct species are used • Plants are of good balanced form • Plants are hardened off • Plants are not root bound • Adequate hole size • Plant hole is scarified and or cultivated • Foliage trimmed if required • Roots loosened/trimmed as required	GW Manager Environmental Operations
Plant layout	Ensure the layout of plant species best suits the environment and ground conditions.	GW Manager Environmental Operations Designer
Practical Completion Report	A report will be written detailing the installation of the plants as per the design detailed in this report.	GW Manager Environmental Operations
Defect rectification	Any defects found during the practical completion inspection will be rectified by the contractor.	GW Manager Environmental Operations Designer

Design

The construction of the trial plot started with the excavation and rebuilding of the lower berm in early 2021. The bioengineering design includes multiple components to protect the vegetation from erosion, these are listed below:

Figure 2. The river meander before and after the lower berm construction.

1. Tethered willows have been installed at the front edge of the lower berm, designed as the first level of protection when the river level rises. The rock in the lower berm was excavated before the trenched willows were installed. The rock was then replaced, forming the finished layer and leaving the willows semi exposed at the water's edge to grow.
    a. Trenched willows were in 8m long 'bunches', at least 1.5m in diameter and placed at 7.5m centres. Individual willow branches were at least 200mm in diameter and a minimum of 3m long.
    b. These bunches were tied together with biodegradable, manila rope, and were secured to untreated timber poles, dug 3-3.5m into the ground before being anchored to concrete blocks buried below the surface.
2. Debris fences were then installed throughout the trial plot at 3m centres. Note, at the time of construction the flow path ran up against the trial plot.
3. The lower berm was then planted with willow poles. Poles were a minimum of 3m long, embedded to a depth of at least 2m, at a maximum of 2m centres.

1

Figure 3. The area complete with willow poles installed.

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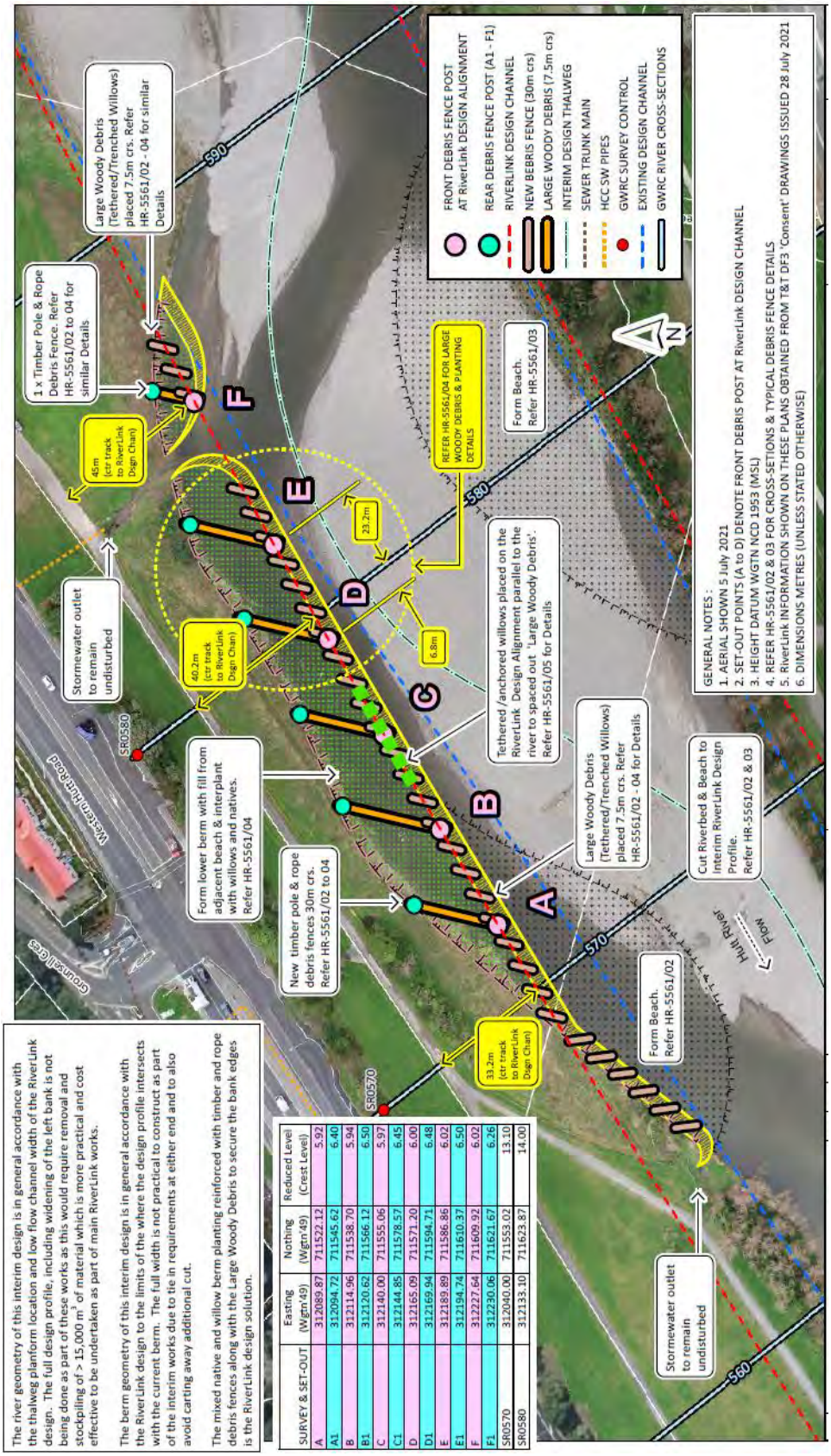

The river geometry of this interim design is in general accordance with the thalweg planform location and low flow channel width of the RiverLink design. The full design profile, including widening of the left bank is not being done as part of these works as this would require removal and stockpiling of > 15,000 m^3 of material which is more practical and cost effective to be undertaken as part of main RiverLink works.

The berm geometry of this interim design is in general accordance with the RiverLink design to the limits of the where the design profile intersects with the current berm. The full width is not practical to construct as part of the interim works due to tie in requirements at either end and to also avoid carting away additional cut.

The mixed native and willow berm planting reinforced with timber and rope debris fences along with the Large Woody Debris to secure the bank edges is the RiverLink design solution.

SURVEY & SET-OUT	Easting (Wgtn'49)	Nothing (Wgtn'49)	Reduced Level (Crest Level)
A	312089.87	711522.12	5.92
A1	312094.72	711545.62	6.40
B	312114.96	711538.70	5.94
B1	312120.62	711566.12	6.50
C	312140.00	711555.06	5.97
C1	312144.85	711578.57	6.45
D	312165.09	711571.20	6.00
D1	312169.94	711594.71	6.48
E	312189.89	711586.86	6.02
E1	312194.74	711610.37	6.50
F	312227.64	711609.92	6.02
F1	312230.06	711621.67	6.26
SR0570	312040.00	711553.02	13.10
SR0580	312133.10	711623.87	14.00

Figure 4. As-built of the Belmont Trial Plot, illustrating the bioengineering techniques installed prior to planting.

PLANT SPECIES LIST

A list of suitable plants has been created using plants from the 'reliable pioneers' plant list from GW's native planting and flood protection guidelines.[4] Additional species have also been included to provide a more diverse, robust species list. Enrichment tree species will be planted in the trial plot at a later date, with species selection to be confirmed through the monitoring period. This report foes do not detail the installation of enrichment species.
Refer to Appendix One for the plant species schedule.

PLANT SUPPORT STRUCTURES

Three support structures will be trialled through the planting area. These structures are designed to support and enhance plant growth with each plant being monitored to measure the effectiveness of each structure. Despite the presence of sediment through large areas of the trial plot, it is assumed additional support structures will benefit the growth and survival of the native vegetation. A cost benefit analysis will measure the effectiveness of these support structures to determine future use.

FuturFiber Wool Wonton Planting Bag

This wool bag substitutes as a biodegradable plant pot, supporting plant growth in rugged areas where there is minimal soil. A small amount of soil will be added to each bag, the bag will then be tied up and placed in the hole. The wool material improves moisture retention and supports the plant through its transition period.

Biodegradable Plant Guards with Wool Mat

Biodegradable plant guards are designed to protect the plant and enhance growth, before breaking down into the soil. The guard will protect the plant from possible pest damage (hares and rabbits) turbulent winds and spray drift, all while providing warmer, preferable growing conditions. Biodegradable guards have been chosen over plastic and are expected to remain in place during small-scale flood events.
The wool mat will help supress weeds and encourage a warmer soil temperature.

Root Pegs

Biodegradable pegs will be used anchor root balls into the ground, combating pests or flood waters uplifting the plant from the hole. Due to the semi-compacted sediment in the planting area, two pegs will be driven into the root ball, one on each side of the planting hole, making sure to minimise damage to the roots.

Figure 5. Left: Wool Wonton Planting Bag. Right: Biodegradable Guard + Wool Mat

[4] Integrating native planting and flood protection: an operational guide for Greater Wellington, 2021, P. 23

PLANTING LAYOUT/DESIGN

The trial plot will be divided into three slanted planting areas, detailing three plant designs. Only during flood events will the water rise and flow through the lower berm therefore, it is assumed the force will be consistent through each planting area, due to the straight meander pattern adjacent to the trial plot.

The early design from Isthmus detailed in the Urban and Landscape Design Framework, sets a solid foundation for practical implementation and further detailed design.[5] The trial will expand on Isthmus' design, focusing on practical implementation by detailing additional design options and planting methodologies.

While hardier native plants will see an increased presence closer to the river, a range of other successional pioneer species will be planted to ensure a diverse range of native species are trialled.

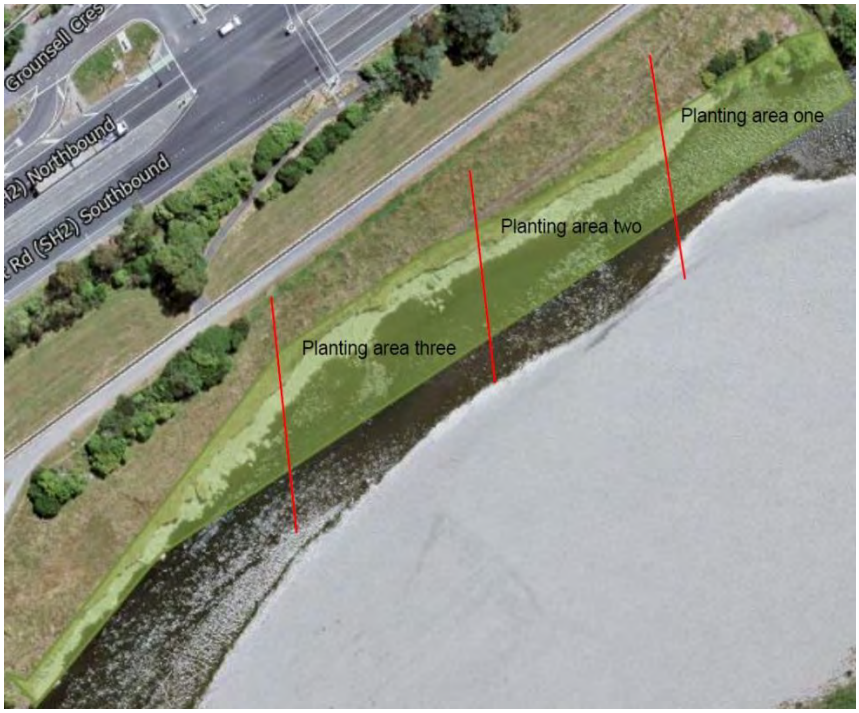

Figure 6. An aerial of the planting trial plot outlining the three planting sections.

[5] Te Awa Kairangi, Te Momi Maraenuku Ki Motutawa, Riverlink, Urban & Landscape Design Framework, 2021.

Planting Area One - 150m^2

Native plants will be installed in clusters, planting five to six of the same plants together, mimicking the way seeds germinate close to one another and harnessing the benefits of native species growing alongside one another.

Figure 7 shows an example planting plot from GW's Native Planting Operational Guide.[6] This approach details the thinning out of willows to create 'light wells', encouraging natural regeneration. This allows a sheltered environment with ample light, while surrounding willows are still present to provide a stabilised bioengineering function.

This approach is often adopted to encourage natural regeneration, however for this trial, plants will be installed where willows are thinned out, alongside self-seeded species, to accelerate the ability in measuring the success of the approach.

Willows will continue to be thinned out over the maintenance period to encourage regeneration and allow further native transitional planting.

Figure 7. An example planting area where sections of willows can be thinned out to support natural regeneration and native planting.

Plant selection and spacing

The default plant spacing is 1m x 1m.

The area will contain six 25m2 clusters, with three on the river edge, and three closer to the toe of the upper berm.

Clusters 1, 2, 3, and 6 will be made up on a hardy five species mix, comprising *Phormium tenax*, *Austroderia toetoe*, *Veronica stricta*, *Coprosma robusta* and *Coprosma propinqua*.[7] Clusters 4 and 5 and will be a generic mix of successional and understory native plants, as detailed in Appendix One.

Multiple species listed in the hardy species mix are regenerating in the trial planting area, as shown by the *Coprosma robusta,* in Figure 8.

Plant support structures

Biodegradable plant guards, wool planter bags and root ball pegs will be used throughout the clusters to measure effectiveness of each support structure, refer to Figure 9 below for detail.

Figure 8. A naturally regenerated *Coprosma robusta* (karamu) thriving in the Planting Trial Plot.

[6] Integrating native planting and flood protection: an operational guide for Greater Wellington, 2021, P. 12.
[7] *Coriaria arborea* was originally included but was unavailable due to the late procurement of plants.

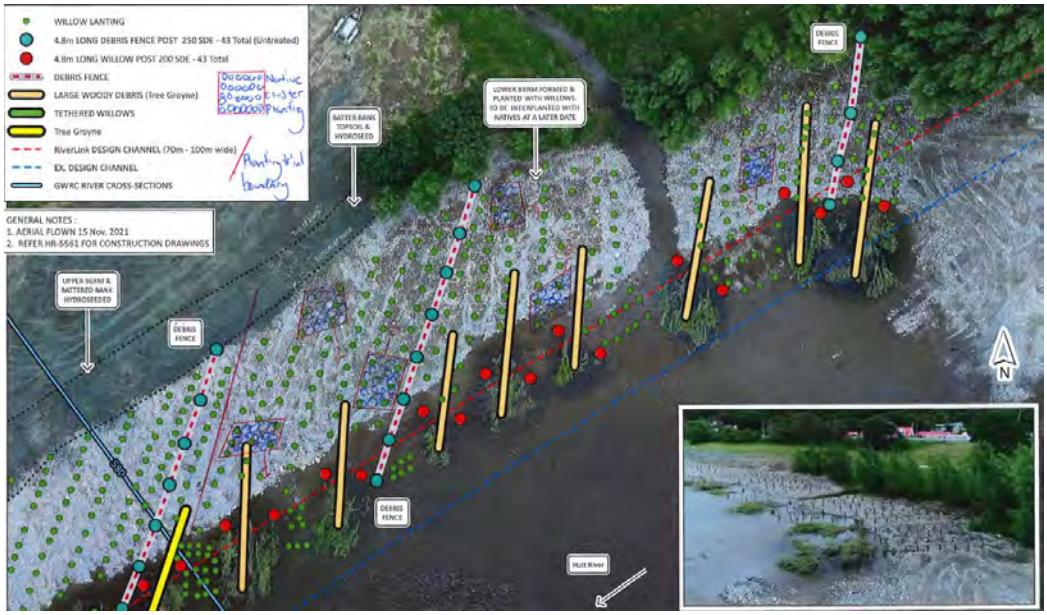

Figure 9. Planting Area One- cluster planting. Clusters are numbered 1 through 6, from left to right.

1. *No supporting structure.*
2. *No supporting structures.*
3. *Wool bags only.*
4. *Wool bags and biodegradable plant guards with wool mat.*
5. *Wool bags only.*
6. *Wool bags, biodegradable plant guards with wool mat and root pegs.*

Outcome

The intention is for willows to be thinned out as the native plants grow, to ensure they receive the light they require. As the willows are removed, additional natives can be planted, and it can be assumed self-seeded species will also continue to regenerate. This technique allows consistent structural support throughout the planting area, as the native clusters are able to establish while the intense root system of the willows continue their primary erosion control function. Close monitoring of how the natives progress while competing with their exotic growing companions will be required.

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Planting Area Two - 260m²

Native planting will be planted in two blocks, from the toe of the upper berm down to the trenched willows, as described in the proposed bioengineering design submitted in the consenting phase.

Planting Area Two is 45m wide, which allows two blocks of native planting to be installed, 6-7m in width, with established willow rows remaining in between and on either side of the natives.

Figure 10. An example planting area where sections of willows have been removed and replaced with blocks of native plants.

Plant selection and spacing

Plants will be installed at 1m spacing, ensuring there is ample space for high water levels to flow and dissipate through the native blocks if required.
Refer to Appendix One for the full planting list.

Plant support structures

One block will use root pegs, and one block will not. Biodegradable plant guards and wool planter bags will be used throughout the two blocks to measure the effectiveness of each structure.

- Two rows will be planted with wool bags.
- Two rows will be planted with biodegradable plant guards + wool mat.
- Two rows will be planted with wool bags and biodegradable plant guards + wool mat.
- Remaining rows will be planted with no additional support.

The rows planted with supporting structures will be determined onsite and tracked through the as-built process.

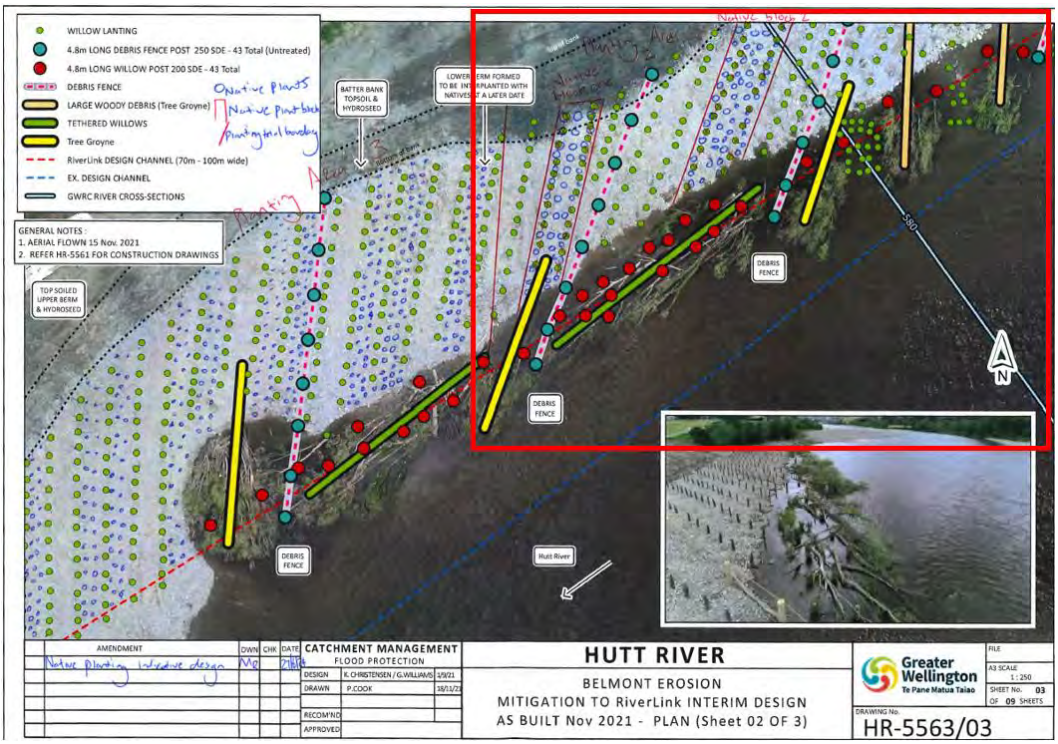


Figure 11. Planting Area Two- the red outlined rows of willows will be removed and replaced with native blocks.

Outcome

Block planting is common in restoration projects where overgrown vegetation is cleared or ripped and replaced with native plants. While the willows are not overgrown or nearing the end of their life, we will use this approach to see how the native plants manage the conditions when planted in rows. The willow rows will remain between the native blocks, delivering the structural function and providing shelter and protection.

Planting Area Three - 950m^2

Planting Area Three will see native plants installed in rows between the willows, where possible. Large sections of Planting Area Three contain less sediment buildup when compared to Planting Area One and Two. This allows the trial to monitor what may happen if native plants are installed before a reasonable amount of sediment has built up amongst the willows.
As the native vegetation grows, the willows can be thinned out to increase the light and space required for native establishment.
This approach includes the consented approach by Isthmus, detailed below in Figure 13.

Plant selection and spacing

The plant spacing in this planting area will be range from 1m spacings, to 1.5m spacings, to accommodate the lack of sediment in sections. The wider spacing will also evaluate the native plant's ability to allow water to dissipate through during flooding.

This planting area will require the trimming and thinning out of willows as native bush establishes. Considering the spacing between willow rows, it is assumed there will be adequate time for natives to establish before light begins to hinder growth. Gorse is also present, which is a strong indicator of light levels, as gorse requires sufficient light to germinate and survive. Native species more tolerant of shade have however been included, alongside a mixture of successional and understory plants. As the natives mature, this will provide structural support to the berm as the planting area progresses towards a healthy native climax community.

Planting Area Three will be planted over two installation periods. The first planting instalment will be in late early August 2024, with the second planting period in mid to late October 2024. While the latter date is outside of the preferred planting season in Wellington, the trial would like to compare the survival rates across the two planting dates.

Large infrastructure projects interface multiple construction disciplines, programming large workstreams for completion throughout the calendar year, and preferred seasonal planting opportunities are not always possible.
We can assume planting in mid-summer would result in extensive casualties, however, planting at the start of spring will provide additional data and inform GW on whether plant survival can be at acceptable levels, when planted this late in the year.

The July programme will see installation between every second willow row, leaving the alternate rows free for infill planting in October. The spacings will alternate between each row as well, for the July and October planting period. This allows plants installed during both planting periods to explore the different spacing options, please refer to Figure 12 for detail.

Plant support structures

Plant support structures will be used throughout Planting Area Three, with a specific focus on the wool bags at the southern end of the planting area. In reflection of the dense planting installation, the remaining support structures will be spread out evenly through the trial plot. No root pegs will be used in this planting area.

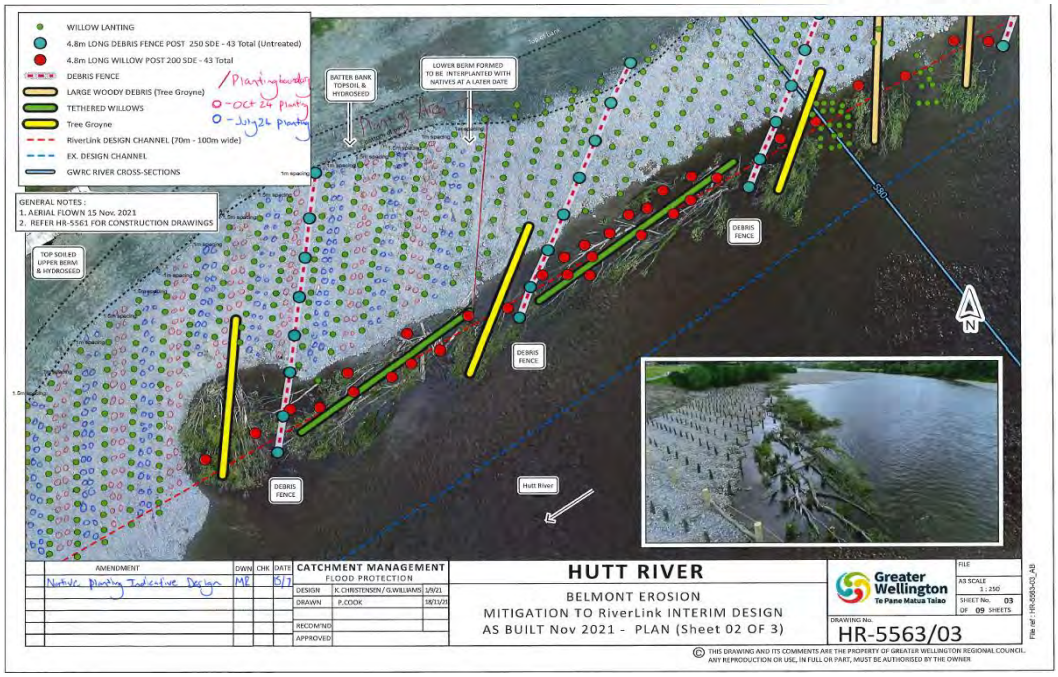


Figure 12. Planting Area Three- the blue rows (resembling natives) will be installed in July; the red rows will be installed in October.

Outcome

This planting area will illustrate how native vegetation survives, thrives, and grows amongst establishing willows. This approach reflects in part, the consented design, as explained below in Additional Design Options. A detailed maintenance plan will be required to ensure the natives have the best chance of survival while competing with the willows.

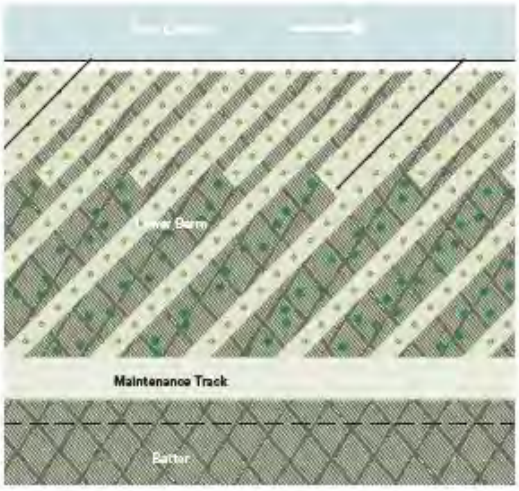
ADDITIONAL DESIGN OPTIONS

A number of additional planting options and designs were not considered for this trial site due to the cost, accelerated nature of the trial, and site-specific conditions present.

1. Biodegradable matting lined trench planting
    a. This technique involves excavating a narrow trench and lining with biodegradable matting, before filling with topsoil and planting. Matting would then wrap over the top of the trench to hold the plant and soil in place. Wool bags were selected instead, to provide a similar, cost-effective function, improving moisture retention and providing organic matter (in the soil added to the bag). The presence of sediment in the trial plot also provides an improved growing material compared to gravels alone (regardless of the quality), for the roots to grow into as the bag degrades. Digging out long narrow trenches can also run the risk of a flood event undermining the planting[8].
2. The use of nursing crops were not explored due to programme pressures however, these may be used in future planting works[9].
3. The Bioengineering design proposed as part of the consented design can be seen through Planting Area Three. [10]The consented design details two plant layouts:
    a. Stage one (a) - planting up against the active channel edge.
    b. Stage one (b) - when a gravel beach is present between the active flow and lower berm.

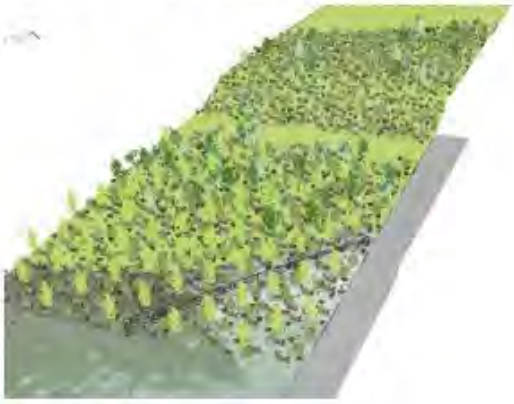
[8] Taylor, T & Staley, G. Scour Bay Regeneration: Native Plants as Flood Protection Assets, 2024, p,10.
[9] Nursing crops can be installed to provide protection of other plants and are often faster growing and or provide symbiotic benefits.
[10] Te Awa Kairangi, Te Momi Ki Maraenuku Ki Motutawa, Riverlink, Urban & Landscape Design Framework, 2021.

c. The trial planting area sits behind a gravel beach, and Planting Area Three will assess stage one a) and b), where native successional trees species and mixed native understory planting will be installed.



Stage 1.

For berm areas against the active channel edge willow pole rows with native successional tree species in alternating rows to back half of berm. Mixed native species underplanting. Debris fences to front half of berm at regular spacings.



Stage 1.

For lower berm areas protected by gravel beaches native successional tree species with mixed native underplanting (no willows) to the central 1/4 of the length of each beach, graduating out with alternating rows of willow and native trees to the active channel edge.

Figure 13. The consented vegetated lower berm buffer design for the upper reaches of Te Awa Kairangi.

Methodology

SITE ASSESSMENT

The early bioengineering work commenced in October 2021, with multiple rain events causing river levels to rise up through the trial plot. Despite the flooding events that occurred prior to this site visit, the willows have established with few casualties. Sediment has also washed in and built up around the willows, essential for supporting native plant growth. A summary of the site conditions are listed below:

- A majority of the trenched willows remain attached to the untreated fence posts; however, a couple have perished and show little signs of life in Planting Area Two. It is noted that some of the manilla ropes have broken but overall, solid front line edge protection is still in place
- The debris fences remain in place, excluding the fence at the southern end, which was removed during a flood event. In a couple of locations, the rope has also dislodged itself from some of the posts.
- Sediment buildup through the gravel and rock layer is prolific. This buildup of fines and material washed in during flooding has created an extremely free draining growing media. However, the soil appears very sandy and may require additional organic material to support plant growth.
- The willows are in good condition, with very few casualties. Eight to ten small rows (two willows per row) at the southern end have been removed, with minimal fatalities throughout the rest of the trial plot.
- Grass coverage, non-invasive weeds such as Clover (*Trifolium repens*) and a mixture of broadleaf weeds are present, providing shallow stabilisation. There is minimal presence of invasive vines and regional pest weeds however, certain weeds will be removed including Pampas Grass (*Cortadaria selloana*), Broad-leaved fleabane (*Conyza sumatrensis*) and Gorse (*Ulex europaeus*). While these weeds are supporting the stability of the berm, their below ground structure is inferior to native vegetation and will be removed.

Figure 14. Existing willows growth and healthy grass coverage throughout a majority of the trial plot.

Figure 15. Exemplary hole showing sediment buildup

Figure 16. A self-seeded *Veronica stricta* in the Trial Planting Plot.

SITE PREPARATION

Prior to native planting, site preparation will be required:

- Weed control:
  - Mechanical weed clearance in the planting location (hand operated machinery).
  - Chemical weed control of unwanted and invasive weed species (if required).
  - Releasing weeds from around the trunks of willows.
  - Note: Special attention is required to protect regenerated native vegetation, notably *Veronica stricta*, *Coprosma robusta* and *Coriaria arborea.*
- Pest animal control - direct control of known pests along Te Awa Kairangi to minimise pest damage after planting.
- Rubbish removal.

Minimising chemical weed control would be advised, considering the cool, winter conditions. If necessary, spraying a minimum of four weeks before planting is advisable.

PLANTING SET OUT & INSTALLATION

This plan assumes the procurement and delivery of plants are of good quality, as referenced in the Quality Assurance Guide.

Setting Out

A site responsive approach will be taken when laying out plant species prior to installation. Due to the assumed inconsistency of growing material through the trial plot, spacings and plant layout will need to be flexible and factor in site conditions. Plants can be laid out as per the design and re-evaluated onsite in each planting area. The plant set out stage should be monitored and approved by the designer or suitably qualified subject matter expert (SME), prior to installation.

Installation

The following guidelines should be followed during the planting process:

1. Adequate weather is required to support optimal planting conditions.
   a. Plant during winter/spring.
   b. All planting operations shall be suspended during periods of severe frosts, waterlogging, drought or persistent drying winds.
   c. Plant in mild, dull, and moist conditions where possible.
2. Ensure the base monitoring requirements are recorded, as per the criteria listed in the Monitoring and Reporting section.
3. Holes will be dug only slightly bigger than the size of the root ball. This differs from best horticulture practice, but minimal space either side of the root ball will ensure the plant sits firm in the hole.
4. The bottom of each hole will be pierced with fork tines to ensure optimal root penetration.
5. The sides of the hole will be roughened to remove any glazing of the surface.
6. At the base of each hole, fertiliser will be applied before plants are installed, minimise direct contact with the plant roots.
7. The plant packaging will be removed immediately before planting. Once packaging is removed, any damaged roots will be cleanly cut off and if required, the root ball can be teased out.
   a. If wool bags are used, plant packaging will be discarded before the soil and plant are placed in the wool bag.
8. All plants will be watered prior to installation.
9. All plants will be placed in the hole with the main stem vertical.
10. The hole will be deep enough to allow the crown to sit flush with the top layer of ground material.
11. Roots will be spread out naturally and the soil will be compacted around the root ball to ensure the plant sits firmly in the ground.
12. Install plant support structures where required.

Completion

After the planting is completed, a practical completion report will be written by the designer or SME, confirming implementation against reporting design and objectives.

Monitoring & Reporting

The monitoring reports will detail progress against the project objectives, and importantly, what plant layout, design, and supporting structures are benefitting the natives.

Quarterly monitoring visits will be undertaken to determine the success of the trial native transitional planting, with monitoring visits informing the contractor of maintenance requirements.

During the planting preparation stage, the following information will be recorded to prepare for the monitoring process:

- The location of each plant will be recorded.
- Plants installed with one or more support structure will be detailed.
- Flagging tape will also be used to inform which plants have been installed with support structures (on-site maintenance purposes).
- Indicative measurements of each plant species will be recorded.

While it is not expected that every plant will be measured and reported on throughout the monitoring period, as per the below criteria, thorough record keeping at the time of installation will allow GW to accurately track progress.
Drone monitoring will be used to track canopy coverage and plant survival. Drone imagery will be captured annually.

Quarterly inspections will continue for a minimum of 60 months after practical completion. Considering the long-term objectives of Te Awa Kairangi soft edge bioengineering, GW may choose to continue these inspections indefinitely.

Responsive inspections will also be required to review any and all damage to the soft edge bioengineering, after flood events. For the purpose of this report, a flood event is defined as the trial planting area being inundated with water. Data gathered after these events will be required to determine necessary design detail for future planting. For example, biodegradable guards may be found to survive flood events up to a certain depth, before being washed away. This information can be viewed alongside potential triggers regarding river maintenance, to help produce the most cost effective and practical approach for re-vegetating Te Awa Kairangi River.

REPORTING

A reporting template will be used to detail the status of the trial planting area. This report will be updated after each inspection, and will include the below information:

- Plant name and location (planting area).
- Plant survival per planting area (%).
- Mean height and width.
- Plant vigour (1-5 rating).
- Notable species loss/thriving.
- Root growth*.
- Willow and bioengineering infrastructure status.
- Notable flooding or weather events including flood level depths and length of inundation.
- Replacement planting required.
- Effectiveness of plant support structures.
- Overall comment.

* Selected plants will be uprooted to measure the root size, root penetration, health, and overall effectiveness of ground stabilisation, throughout the monitoring period.

Maintenance & Remediation

A maintenance programme is required to ensure the native plants have the best chance of survival, understanding why plants have not survived can inform future design and mitigate plant loss.

Maintenance visits will be conducted quarterly, aligning with the quarterly inspections, with any notable defects reported and remedied by the contractor. The maintenance visits are outlined in the planting maintenance programme attached as Appendix Two.

A summary of tasks required during the maintenance period include, but are not limited to:

- Weed control, including physical removal of weeds and chemical application.
- Rubbish removal.
- Trimming and thinning out of willows as required (directed by GW).
- Remedial action for plant support structures.
- Animal pest control.
- Responsive maintenance tasks after flood events.

To support vegetation survival, ongoing mechanical intervention of the riverbed to both manage bed levels and erosion (gravel extraction and bed recontouring) will also be required. Further detail regarding river maintenance will be included in the Bioengineering Transitional Planting Plan.

The maintenance programme attached is indicative and is subject to change once planting is complete and the monitoring and reporting phase begins. Replanting can be undertaken in the following planting season, with specialist input to help improve survival rates. This report does not detail the remedial work required for replanting.

Risk

A risk register will be developed for the Bioengineering Transitional Planting Plan. The key risks for the trial plot are outlined below.

- Weather events including flooding and drought. If extreme weather occurs and negatively impacts the trial planting plot, or the plants themselves, a site inspection will be undertaken by GW.
- Reputational risk for GW resulting from remedial work and routine maintenance of the riverbed and lower berm, requiring the removal of native vegetation to allow access. GW appreciates this may upset members of the public, community groups, or Mana whenua, but ensures it is essential for the safe operation of the river. All reasonable steps will be taken to minimise harm to establishing vegetation.
- The removal of willows to allow for native transitioning may weaken the structure of the berm. When extreme flooding occurs, this may undermine the berm or encourage erosion of the bank edge. GW intend the results of this trial to guide inform the approach of the transition.
- Ongoing maintenance is required as failing to drop bed and berm levels, or side effects of Te Awa Kairangi Project River construction, has the ability to undermine and negatively influence the trial planting site.
    - This risk is paramount for all future bioengineering endeavours, where the management and maintenance of the river needs to be viewed synonymously with the soft edge bioengineering.

ASSUMPTIONS & CONDITIONS

Key assumptions have been made when writing this trial planting plan.

1. Te Awa Kairangi Project and GW intend native vegetation to support long-term stabilisation of the river berms. This trial assumes the planting trial plot provides adequate conditions to support native plant growth, specifically:
    a. The sediment buildup present is sufficient and provides an improved planting environment when compared to gravels alone. The presence of growing material is key to understanding why more engineered solutions were not adopted to help native plants establish, such as steel planting pits and below ground structures to support material retention.
    b. It is assumed that the size and establishment of the willows will provide an adequate level of protection for native plants during small to medium flood events.
    c. The flow path of the river at the time of planting has not been factored into the trial planting design, considering the construction going on in this section of the river at the time. River design and maintenance will be detailed in the Bioengineering Transitional Planting Plan.
2. Large-scale weather events have the potential to undermine and remove the berm entirely, including the planting and other bioengineering structures installed. Alternatively, prolonged periods of heat can also increase the chance of plant fatality, especially in extremely free draining soils. This plan acknowledges adverse weather events may render all efforts redundant.
3. It is assumed certain native plants will struggle compared to others in this environment. However, certain species have been requested by key stakeholders or are present in GW's river planting guide. Monitoring the survival rates of different species will provide valuable information for future soft edge bioengineering attempts.
4. This report does not detail the use of hard engineering structures in the river, such as rock groynes or revetments. If and when such structures are required, as a result of erosion for example, part of the vegetation buffer may require removal to facilitate the work.
5. Plant support structure application will be confirmed onsite, with support from the designer or suitably qualified SME. The installation of these will be tracked through as-built process, after planting is completed.

Milestones

The below list of milestones will be integrated into the holistic programme for the remaining planting and maintenance work along the river.

Table 1: Planting and Maintenance Programme

Task	Date
Belmont Trial Planting Plan workshop	18 May 2024
Procurement for trial planting confirmed	11 July 2024
GW to confirm procurement with contractors (contractual)	18 July 2024
Belmont Trial Planting Plan Report due	19 July 2024
Site preparation- weed control + willow removal	22- 26 July 2024
Belmont Trial Planting - phase 1	6 August - 9 August 2024
Practical completion report – phase 1	12 August- 16 August
Maintenance visit & monitoring - #1	15 October 2024
Belmont Trial Planting - phase 2	29-31 October 2024
Practical completion report- phase 2	4 November- 6 November
Maintenance visit & monitoring - quarterly	Jan 2025

When the monitoring inspections begin, information will feed into the wider Bioengineering Transitional Planting Plan for Te Awa Kairangi Project.

Next Steps

When the trial is complete, a practical completion report of the planting area will be written, ensuring information is recorded to begin the monitoring period. GW will then review the planting process and plan the next phase of the bioengineering scope. Next steps include:

- Maintenance and monitoring will begin in the planting trial plot to inform future bioengineering design.
    - A lessons learnt memo will be drafted and updated after each quarterly report, tracking successes and failures within the trial.
- Consent requirements will be reviewed, such as those related to the protection of fauna and avifauna
- Additional trials may be carried out around Wellington, testing bioengineering design in different environments across multiple rivers. This information can be shared and used to influence future design for Te Awa Kairangi.
- A Bioengineering Transitional Planting Plan will be written detailing the soft edge bioengineering within the remaining upper reaches of Te Awa Kairangi. This report will include information that directly influences the soft edge bioengineering. The report will include but is in no way limited to:
    - A detailed description of Te Awa Kairangi River, including the sediment transport processes active within the upper reaches, previous modifications of the river, and future design intents that will influence the bioengineering and transitional planting programme.
    - Maintenance requirements within the river, including gravel extraction, remedial action and triggers for intervention, and monitoring requirements for the river channel and meander pattern. Channel maintenance (berm and riverbed levels) is a prerequisite for plant survival.
    - Detail regarding potential triggers after weather events, including remedial action of the lower berm and river channel levels, in relation to bioengineering.
    - Detail future native transitional planting in the trial plot, including additional pioneer species and eventual enrichment species.
    - Regionally threatened plants will be included for future design.
    - Additional consideration will be given to Mana Whenua and the Mana Whenua Values Plan, for future work.
    - Whole of life costs (estimates), a detailed maintenance programme and lessons learnt memo from this trial planting will be included.
    - Connecting Bioengineering scope across Greater Wellington's numerous sites and projects.

References

1. Phillips, C. 2006- Use of Plants for Ground Bioengineering and Erosion & Sediment Control in New Zealand.
2. Williams, G. & Christensen, W. 2021: River Channel Design Report- Consent stage- River Channel Refinements.
3. Rethink. Te Awa Kairangi. Isthmus.
4. Te Awa Kairangi, Te Momi Maraenuku Ki Motutawa, Riverlink, Urban & Landscape Design Framework, 2021.
5. Integrating native planting and flood protection: an operational guide for Greater Wellington, 2021.
6. Taylor, T & Staley, G. Scour Bay Regeneration: Native Plants as Flood Protection Assets, 2024.

Appendices

Appendix One- Plant Schedules

Attachment 2 to Report 24.550

	Total Plant Numbers	Enrichment species	Trial Plot area (m2)
Planting Area 1	172	10	150
Planting Area 2	280	15	260
Planting Area 3 (JUL)	480	60	450
Planting Area 3 (OCT)	480	0	450
QUANTITY TOTALS	**1412**	**85**	**1310**

Design and install methodology unconfirmed.

Attachment 2 to Report 24.550

Plant support structures	Planting Area 1	Planting Area 2	Planting Area 3 (Jul)	Planting Area 4 (oct)	Additional product (spare)	Total
Biodegradable guards +wool mat	54	147	100	100	20	421
Wool bags	114	147	50	50	20	381
Root Pegs	54	294	0	0	652	1000

Attachment 2 to Report 24.550

Cluster planting- Planting Area 1		LABEL	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
		Area (M2)	25	25	25	25	25	25
Aristotelia serrata		Spacing (m)	1	1	1	1	1	1
		Bag size	1.3L	1.3L	1.3L	1.3L	1.3L	1.3L
		Quantity						
Corprosma robusta		Spacing (m)	1	1	1	1	1	1
		Bag size	1L	1L	1L	1L	1L	1L
		Quantity	5	5	5			5
Cordyline australis		Spacing (m)	1	1	1	1	1	1
		Bag size	1.3L	1.3L	1.3L	1.3L	1.3L	1.3L
		Quantity				4	4	
Veronica stricta		Spacing (m)	1	1	1	1	1	1
		Bag size	1L	1L	1L	1L	1L	1L
		Quantity	5	5	5			5
Hoheria sextylosa		Spacing (m)	1	1	1	1	1	1
		Bag size	1.3L	1.3L	1.3L	1.3L	1.3L	1.3L
		Quantity						
Leptospermum scoparium		Spacing (m)	1	1	1	1	1	1
		Bag size	1L	1L	1L	1L	1L	1L
		Quantity				4	4	
Myoporum laetum		Spacing (m)	1	1	1	1	1	1
		Bag size	1L	1L	1L	1L	1L	1L
		Quantity				4	4	
Myrsine australis		Spacing (m)	1	1	1	1	1	1
		Bag size	1L	1L	1L	1L	1L	1L
		Quantity						
Grisilinia littoralis		Spacing (m)	1	1	1	1	1	1
		Bag size	1L	1L	1L	1L	1L	1L
		Quantity						
Plagianthus regius		Spacing (m)	1	1	1	1	1	1
		Bag size	1.3L	1.3L	1.3L	1.3L	1.3L	1.3L
		Quantity				3	3	
Olearia solandri		Spacing (m)	1	1	1	1	1	1
		Bag size	1L	1L	1L	1L	1L	1L
		Quantity				3	3	
Pittosporum tenuifolium		Spacing (m)	1	1	1	1	1	1
		Bag size	1.3L	1.3L	1.3L	1.3L	1.3L	1.3L
		Quantity						
Sophora microphylla		Spacing (m)	1	1	1	1	1	1
		Bag size	1L	1L	1L	1L	1L	1L
		Quantity				3	3	
Phormium tenax		Spacing (m)	1	1	1	1	1	1
		Bag size	1.3L	1.3L	1.3L	1.3L	1.3L	1.3L
		Quantity	6	6	6			6
Austraderia toetoe		Spacing (m)	1	1	1	1	1	1
		Bag size	1.3L	1.3L	1.3L	1.3L	1.3L	1.3L
		Quantity	6	6	6			6
Macropiper excelsum		Spacing (m)	1	1	1	1	1	1
		Bag size	1L	1L	1L	1L	1L	1L
		Quantity				3	3	
Olearia paniculara		Spacing (m)	1	1	1	1	1	1
		Bag size	1L	1L	1L	1L	1L	1L
		Quantity						
Ozothamnus leptophyllus		Spacing (m)	1	1	1	1	1	1
		Bag size	1L	1L	1L	1L	1L	1L
		Quantity				3	3	
Coprosma propinqua		Spacing (m)	1	1	1	1	1	1
		Bag size	1.3L	1.3L	1.3L	1.3L	1.3L	1.3L
		Quantity	6	6	6			6
Melycytus ramiflorus		Spacing (m)	1	1	1	1	1	1
		Bag size	1L	1L	1L	1L	1L	1L
		Quantity				3	3	
		Sub total	28	28	28	30	30	28
		Total						**172**

Attachment 2 to Report 24.550

Block planting- Planting Area 2	LABEL	Block 1	Block 2
	Area (M2)	130	130
Aristotelia serrata	Spacing (m)	1.0	1.0
	Bag size	1.3L	1.3L
	Quantity	7	7
Corprosma robusta	Spacing (m)	1.0	1.0
	Bag size	1L	1L
	Quantity	7	7
Cordyline australis	Spacing (m)	1.0	1.0
	Bag size	1.3L	1.3L
	Quantity	7	7
Veronica stricta	Spacing (m)	1.0	1.0
	Bag size	1L	1L
	Quantity	7	7
Hoheria sextylosa	Spacing (m)	1.0	1.0
	Bag size	1.3L	1.3L
	Quantity	7	7
Leptospermum scoparium	Spacing (m)	1.0	1.0
	Bag size	1L	1L
	Quantity	7	7
Myoporum laetum	Spacing (m)	1.0	1.0
	Bag size	1L	1L
	Quantity	7	7
Myrsine australis	Spacing (m)	1.0	1.0
	Bag size	1L	1L
	Quantity	7	7
Grisilinia littoralis	Spacing (m)	1.0	1.0
	Bag size	1L	1L
	Quantity	7	7
Plagianthus regius	Spacing (m)	1.0	1.0
	Bag size	1.3L	1.3L
	Quantity	7	7
Olearia solandri	Spacing (m)	1.0	1.0
	Bag size	1L	1L
	Quantity	7	7
Pittosporum tenuifolium	Spacing (m)	1.0	1.0
	Bag size	1.3L	1.3L
	Quantity	7	7
Sophora microphylla	Spacing (m)	1.0	1.0
	Bag size	1L	1L
	Quantity	7	7
Phormium tenax	Spacing (m)	1.0	1.0
	Bag size	1.3L	1.3L
	Quantity	7	7
Austraderia toetoe	Spacing (m)	1.0	1.0
	Bag size	1.3L	1.3L
	Quantity	7	7
Macropiper excelsum	Spacing (m)	1.0	1.0
	Bag size	1L	1L
	Quantity	7	7
Olearia paniculara	Spacing (m)	1.0	1.0
	Bag size	1L	1L
	Quantity	7	7
Ozothamnus leptophyllus	Spacing (m)	1.0	1.0
	Bag size	1L	1L
	Quantity	7	7
Coprosma propinqua	Spacing (m)	1.0	1.0
	Bag size	1.3L	1.3L
	Quantity	7	7
Melycytus ramiflorus	Spacing (m)	1.0	1.0
	Bag size	1L	1L
	Quantity	7	7
	Sub total	140	140
	Total		280

Attachment 2 to Report 24.550

Dense planting- Planting Area 3	LABEL	Area 1 (July)
	Area (M2)	450
Aristotelia serrata	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Corprosma robusta	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Cordyline australis	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Veronica stricta	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Hoheria sextylosa	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Leptospermum scoparium	Spacing (m)	1L
	Bag size	1L
	Quantity	24
Myoporum laetum	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Myrsine australis	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Grisilinia littoralis	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Plagianthus regius	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Olearia solandri	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Pittosporum tenuifolium	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Sophora microphylla	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Phormium tenax	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Austraderia toetoe	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Macropiper excelsum	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Olearia paniculara	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Ozothamnus leptophyllus	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Coprosma propinqua	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Melycytus ramiflorus	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
	Total	480

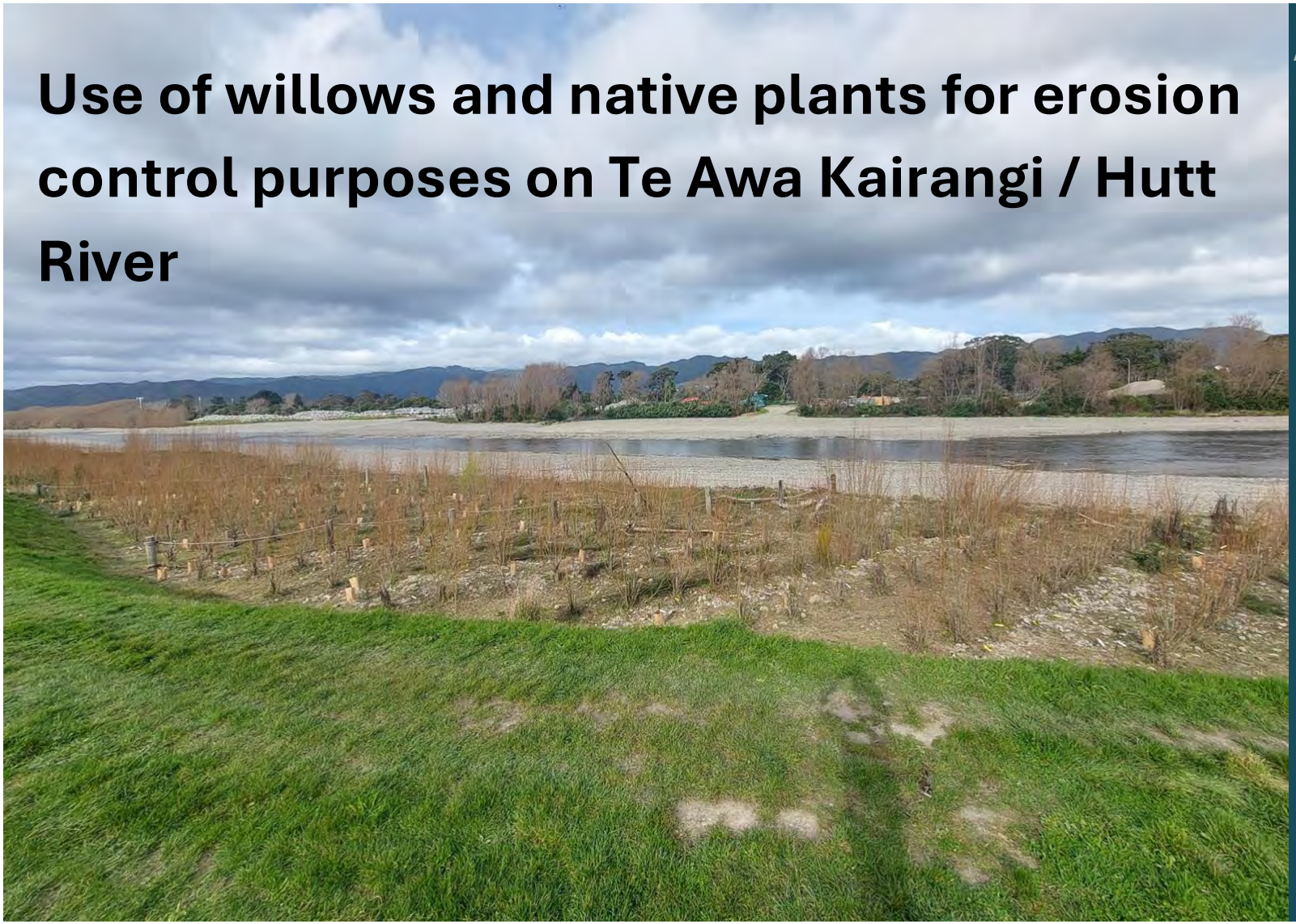
Attachment 2 to Report 24.550

Dense planting- Planting Area 3	LABEL	Area 1(Oct)
	Area (M2)	450
Aristotelia serrata	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Coprosma robusta	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Cordyline australis	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Veronica stricta	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Hoheria sextylosa	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Leptospermum scoparium	Spacing (m)	1L
	Bag size	1L
	Quantity	24
Myoporum laetum	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Myrsine australis	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Griselinia littoralis	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Plagianthus regius	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Olearia solandri	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Pittosporum tenuifolium	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Sophora microphylla	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Phormium tenax	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Austraderia toetoe	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Macropiper excelsum	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Olearia paniculata	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Ozothamnus leptophyllus	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
Coprosma propinqua	Spacing (m)	1.0
	Bag size	1.3L
	Quantity	24
Melycytus ramiflorus	Spacing (m)	1.0
	Bag size	1L
	Quantity	24
	Total	480

Attachment 2 to Report 24.550

Enrichment Species		LABEL	Planting Area 1	Planting Area 2	Planting Area 3
		Area (M2)	210	260	450
Dacrycarpus dacrydioides		Spacing (m)	5	5	5
		Bag size	1.3L	1.3L	1.3L
		Quantity	2.0	3.0	12.0
Laurealia novae-zelandiae		Spacing (m)	5	5	5
		Bag size	1L	1L	1L
		Quantity	2.0	3.0	12.0
Podocarpus totara		Spacing (m)	5	5	5
		Bag size	1.3L	1.3L	1.3L
		Quantity	2.0	3.0	12.0
Prumnopitys taxifolia		Spacing (m)	5	5	5
		Bag size	1.3L	1.3L	1.3L
		Quantity	2.0	3.0	12.0
Syzygium maire		Spacing (m)	5	5	5
		Bag size	1L	1L	1L
		Quantity	2.0	3.0	12.0
		Sub total	10	15	60
		Total			85

Use of willows and native plants for erosion control purposes on Te Awa Kairangi / Hutt River



Attachment 3 to Report 24.550

Greater Wellington
Te Pane Matua Taiao

Agenda

- Hard and soft erosion protection methods
- Installation and maintenance of vegetative willow buffers
- Enhanced-nature based solutions using native plants and the challenges
- Integrated River Management

Attachment 3 to Report 24.550

Erosion protection methods

Hard engineering – rock structures

Attachment 3 to Report 24.550

1. Effective erosion control
2. Robust and strong
3. Risk and scheme performance

Soft engineering – installation of vegetative willow buffers

1. Bank stabilisation
2. Flexible / sacrificial edge
3. Flood velocity mitigation

Maintenance of willows

1. Layering
2. Pruning and mulching
3. Mowing between willows
4. Replacement

Enhanced nature-based solutions using native plants

1. Flood resilience opportunities
2. Enhanced Biodiversity
3. Cultural connection

Native planting challenges

Nine - month-old *Salix matsudana x alba* 'Moutere' (Willow) – 132cm root spread

1. Establishment period
2. Erosion control
3. Inundation tolerance
4. Initial costs

Four-year-old *Coprosma robusta* (Karamu) – 100 cm spread

Attachment 3 to Report 24.550

Integrated river management

1. Defined intervention triggers for maintenance
2. Bed recontouring
3. Gravel extraction

Questions?

Te Awa Kairangi / Hutt River Valley Subcommittee
22 October 2024
Report 24.570

For Information

WAINUIOMATA FRESHWATER (INCLUDING FLOOD RISK) MANAGEMENT

Te take mō te pūrongo
Purpose

1. To provide the Te Awa Kairangi / Hutt River Valley Subcommittee (the Subcommittee) with an overview of water management including flood risk and flood risk management in the Wainuiomata suburb of the Hutt Valley.

Te tāhū kōrero
Background

History

2. Wainuiomata is a large suburb of Lower Hutt occupying a basin at the headwaters of the Wainuiomata River between the Eastern Hills and the Orongorongo range. The suburb is separated from Lower Hutt by the Eastern Hills and only accessible by one major road. The latest census figures indicate the population to be approximately 20,000 inhabitants mainly located in the northern Wainuiomata suburb with isolated rural properties in the river valley to the south.

3. Being a major river in the takiwa, the Wainuiomata River was of great significance to iwi Māori from the earliest times. It was a mahinga kai throughout its length for Te Atiawa-Taranaki Whānui for fishing and birding, being replete with long-finned eel/tuna, inanga, kokopu, smelt and other species. Mahinga kai interests increased downstream toward the mouth. Canoes travelled up and down from the coast, however, the Wainuiomata was not as easily navigated as Te Awa Kairangi. There are many places along the river Māori used largely for fishing[1]. The Wainuiomata river mouth and foreshore is a scheduled site of significance to Taranaki Whānui for mahinga kai in the Natural Resources Plan.

4. The 1855 earthquake raised predominantly swamp land and encouraged European settlement. Wainuiomata remained a small sawmilling and farming community until after the Second World War, when new housing soon transformed it into a working-class suburb of Lower Hutt. During the 1950s many young families lived there, earning it the nickname ‘Nappy Valley’.

5. From the late 1980s the economy slowed, and the population decreased, but since about 2020 there has been a housing boom and corresponding increase in population. Wainuiomata is noted for being the origin of New Zealand's kōhanga reo (Māori-language immersion preschool) movement.

1 - Cultural Values report, Te Whaitua Te Whanganui-a-Tara. 2019. Raukura Consultants.

Watercourses

6. **Black Creek -** Black Creek flows through the urban area of Wainuiomata to join the Wainuiomata River at the southern end of the suburb by Rotary Park.

7. **Wainuiomata River -** The Wainuiomata River flows from the Water Collection area through the south of the Wainuiomata urban area before following the valley and the coast road out to Baring head and Wainuiomata beach. There are no major urban areas in the rural portion of the catchment but a few isolated properties.

Figure 1 - Wainuiomata Map

Te tātaritanga
Analysis

Flood Risk & History of flooding

8. The Regional Flood Hazard Exposure Assessment conducted by Greater Wellington has estimated that approximately 8,800 people are exposed to flood hazard in the Wainuiomata Catchment. This is primarily from stormwater flooding and flooding from Black Creek. This is compared to approximately 19,000 in the Waiwhetū Catchment.

9. The most notable flood events occurred in May 1981, July 1985, February 2004 and July 2017. During the 2004 flood event the area experienced flooding of at least 2 houses, and extensive flooding of the lower valley flats as a result of flooding from

the Wainuiomata River and tributaries. Infrastructure damage included a wash out of the Moores Valley Road culvert, wash out of the Wainuiomata River intake pipeline, damage to the Wainuiomata Treatment Plant access bridge and damage to the Coast Road.

10. During this flood the most extensive damage to flood protection assets were experienced in the Wainuiomata. This included:
    - Extensive damage to edge stabilisation plantings.
    - Major channel blockages caused by trees and shingle.
    - Several erosion areas including at Faulkes footbridge.
11. Figure 2 shows the extent of flooding in the lower reaches during the 2004 flood event and the 1985 event.

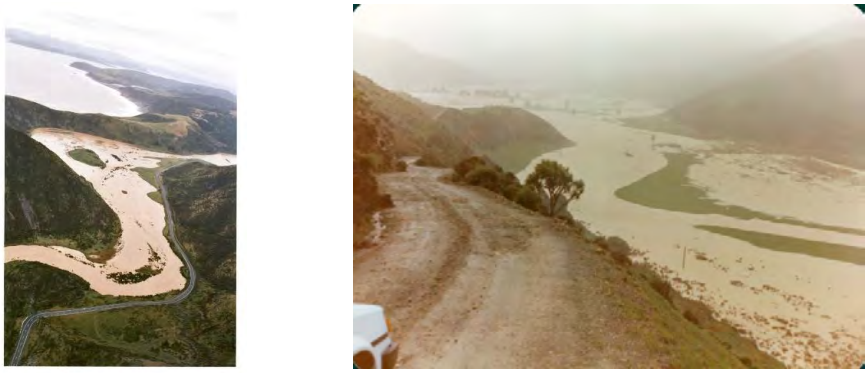


Figure 2 - Flooding in the 2024(L) and 1985 (R) events

Water quality and ecology: Current state, targets and Whaitua recommendations

12. Between 2019-2021, Greater Wellington convened Te Whaitua o te Whanganui-a-Tara process to support giving effect to the National Policy Statement for Freshwater Management 2020 (NPSFM). Two documents (previously provided to the Subcommittee) were produced which both emphasise the importance of the Wainuiomata Catchment:
    - Te Mahere Wai o Te Kāhui Taiao (Te Mahere Wai)
    - Te Whaitua te Whanganui-a-Tara Implementation Programme (WIP)

Current State and Targets

13. In the whaitua process, the current ecological state of these waterbodies, including Wainuiomata River, was comprehensively assessed.
14. Te Mahere Wai assessed the state of waterways in the Wainuiomata catchment across 36 health indicators, resulting in an overall assessment of **wai kino** (dangerous/polluted) due to the presence of human waste (*E. coli*), which poses a health risk and means that contact with the water should be avoided.

15. The current state and targets of the National Objectives Framework for the National Policy Statement for Freshwater Management are included in the NRP Plan Change 1 as follows:

Part Freshwater Management Units for Te Awa Kairangi, Ōrongorongo and Wainuiomata (Map 79)														
				Wainuiomata urban streams					Wainuiomata rural streams					
				Black Ck @ Rowe Parade					Wainuiomata River D/S of White Br.					
				Baseline[2]		TAS[1]		Part FMU default TAS[1]	Baseline		TAS[1]		Part FMU default TAS[1]
Parameter	Unit	Statistic	Timeframe	Numeric	State	Numeric	State		Numeric	State	Numeric	State	
Periphyton biomass[2]	mg chl-a/m²	92nd %ile	By 2040	Insufficient data		≤200	C	M	324	D	≤200	C	I
Ammonia (toxicity)	mg/L	Median		0.025	B	≤0.03	A	I	0.004	A	M	A	M
		95th %ile		0.066		≤0.05			0.025				
Nitrate (toxicity)	mg/L	Median		0.4	A	M	A	M	0.2	A		A	
		95th %ile		0.7					0.4				
Suspended fine sediment	Black disc(m)	Median		1.3	D	≥2.22	C	I	2.1	D	≥2.22	C	I
Escherichia coli (E. coli)	/100mL	Median		1250	E	≤130	C	I	100	B	≤100	A	
		%>260/100mL		86		≤34			18		≤18		
		%>540/100mL		71		≤20			7		≤5		
		95th %ile		4,360		≤1200			1,000		≤540		
Fish	Fish-IBI	Latest		Insufficient data		≥34	A	M	Insufficient data		≥34	A	M
Fish community health (abundance, structure and composition)		Expert assessment[3]				N/A[3]	C	I			N/A[3]	B	I
Macroinvertebrates (1 of 2)	MCI	Median				≥90	C		109.5	C	≥110	B	
	QMCI	Median				≥4.5			4.9		≥5.5		
Macroinvertebrates (2 of 2)	ASPM	Median				≥0.3	C		0.4	B	≥0.6	A	
Deposited fine sediment[2]	%cover	Median		11	A	M	A		20	C	≤13	A	
Dissolved oxygen	mg/L	1-day minimum		Insufficient data		≥7.5	A	M	Insufficient data		≥7.5	A	M
		7-day mean minimum				≥8.0					≥8.0		
Dissolved inorganic nitrogen[4]	mg/L	Median		0.5		M			0.17		M		
Dissolved reactive phosphorus[4]	mg/L	Median		0.021		≤0.018		I	0.011		≤0.01		I
		95th%ile		0.035		≤0.035			0.023		≤0.023		
Dissolved copper	µg/L	Median		1.0	C	M	C	M	Insufficient data		≤1	A	M
		95th %ile		2.0							≤1.4		
Dissolved zinc	µg/L	Median		11.2	D	≤11.2	C	I			≤2.4	A	
		95th %ile		71.2		≤42					≤8		
Ecosystem metabolism	g O_2 m^{-3} d^{-1}	N/A[5]		M									

Figure 3 – Baseline and Target Attribute States tables excerpted from the notified NRP PC1, pg. 66.

16. Recommendations for water quality targets for the Wainuiomata River from the WIP and Te Mahere Wai have been incorporated into Proposed Change 1 to the Natural Resources Plan for the Wellington Region (Proposed Change 1) notified in October 2023.

Whaitua Recommendations

17. Te Mahere Wai recommendations for Wainuiomata holistic river care:

    a Rec 8: Te Korokoro o te Mana (Korokoro Stream), Te Manga o Kaiwharawhara (including Te Māhanga and Korimako streams) and Wainuiomata are prioritised for protection and restoration. (pg. 50).

    b Rec 9: The Korokoro and Kaiwharawhara streams, and the entire length of the Wainuiomata Awa are designated as outstanding waterbodies in Schedule A: Outstanding Water Bodies of the Proposed Natural Resources Plan (PNRP). (pg. 50).

c Rec 10: Te Awa Kairangi, Akatārawa, Pākuratahi, Whakatīkei, Wainuiomata, Te Awa o Ōrongorongo, and the Parangārehu Lakes are classified as areas that have outstanding natural character in the PNRP. (pg. 50).

d Rec 11: …the entire length of the Wainuiomata Awa, are taonga and should be protected and restored by conferring a legal personhood on each. (pg. 50).

e Rec 60: A partnered management approach is adopted so that Mana Whenua have a meaningful role in developing, applying, monitoring and enforcing best practice holistic care for rivers. (pg. 50).

f Rec 61: Greater Wellington works with Mana Whenua to review the design channel, buffer zones and optimum bed levels in the relevant floodplain management plans for Te Awa Kairangi and Wainuiomata Awa. (pg. 54).

g Rec 62: Greater Wellington works with Mana Whenua to incorporate managed retreat and positive engineering options into the floodplain management plans for Te Awa Kairangi and Wainuiomata Awa. (pg. 54).

h Rec 63: Greater Wellington resources managed-retreat expertise in each level of decision-making. (pg. 54).

i Rec 64: The existing global flood protection consent is reviewed so that it gives effect to Te Mana o te Wai, by putting the needs of the river first. (pg. 54).

18. Te Mahere Wai describes a range of outcomes for Wainuiomata awa. Regarding flood hazards and river management it states the following as a long-term goal:

> "The flood hazard risk to communities near Wainuiomata is managed so that the river is able to exhibit its natural form and character rather than being constrained and that river management includes opportunities for positive design such as recreating ngā ūranga (landing, arrival places)."

19. Te Whanganui-a-Tara WIP recommendations for Wainuiomata catchment:

a Rec 64: Greater Wellington works with Mana Whenua, community groups and territorial authorities to amend (by 2024) all relevant regulatory documents to ensure:

i That river management enhances habitat restoration and stormwater treatment along the full length of developed rivers;

ii The protection of swimming holes. (pg. 47)

b Rec 65: Territorial authorities update the relevant regulatory documents (by 2025) to ensure they incorporate up-to-date flood hazard mapping and are supported by rules that prevent property development in high-risk areas

c Rec 66a: By 2024, Greater Wellington amends the relevant regulatory documents to include policies that aim to avoid unsuitable property development, with reference to setbacks from stream/river margins and hydraulic neutrality.

d Rec 66b: By 2025, territorial authorities incorporate rules in their district plans that:

20. Require Water Sensitive Urban Design (WSUD), including hydraulic neutrality in any developments

    i Provide for buildings to be set back from river and stream margins (these setbacks are to provide for āhua and natural character)

    ii Restrict development in known overland flow paths (in line with Recommendation 61)

b Rec 67: Greater Wellington amends the relevant regulatory documents by 2023, while working with Mana Whenua and territorial authorities to co-design operational guidelines for undertaking flood works on small urban streams, including those on private property. These guidelines would:

    i Leave room for the river, floodwater and natural processes

    ii Establish native riparian vegetation, which also gives effect to the values in the NPS-FM 2020

Roles and Responsibilities

21. There are two main watercourses in Wainuiomata that cause a flood risk to the community: Black Creek and the Wainuiomata River.

Black Creek

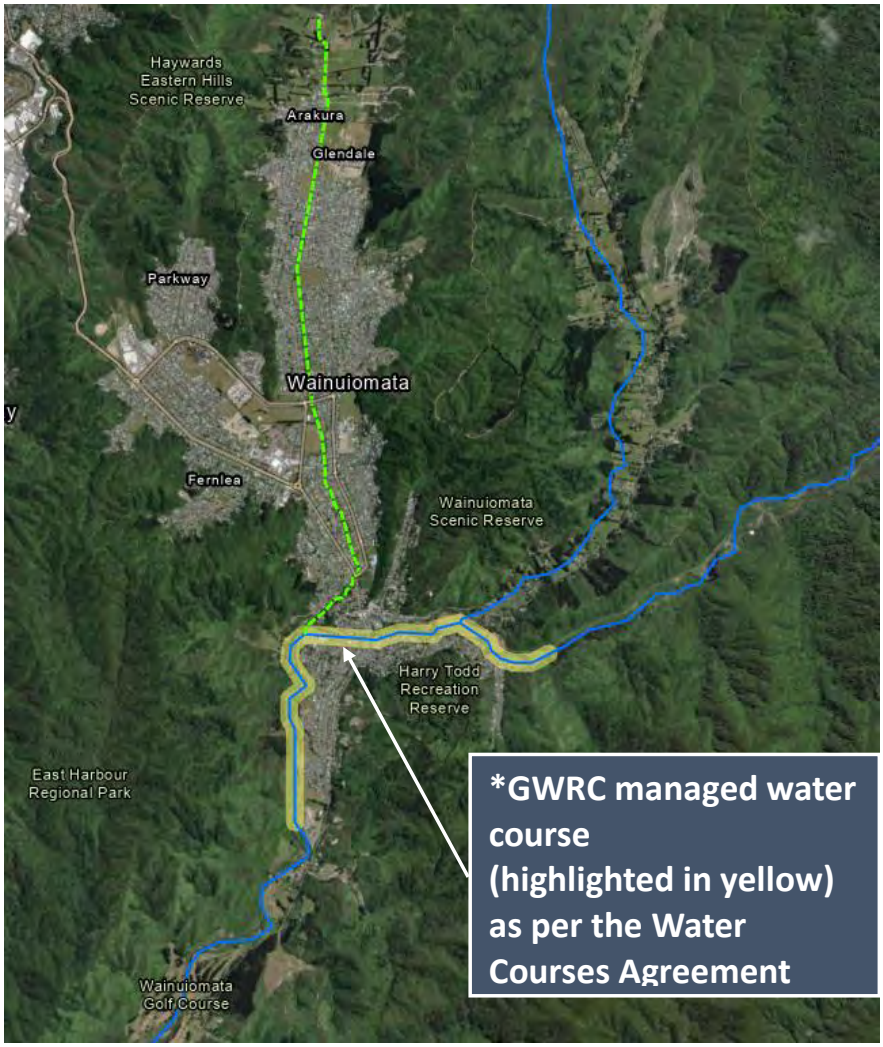
22. Black Creek watercourse and the stormwater network is administered by Wellington Water and Hutt City Council.

23. Wellington Water has recently developed a stormwater model for the Black Creek catchment that terminates at the Black Creek-Wainuiomata River confluence. This is being used to generate district plan flood hazard layers and to provide recommended building floor levels in the Black Creek catchment. Wellington Water is also in the process of building a new Wainuiomata model covering the whole of the suburb/township but excluding Moores Valley.

Wainuiomata River

24. Greater Wellington has limited maintenance responsibilities on the Wainuiomata River. These are limited to channel works and stop banking from Wainuiomata Regional Park to Ngaturi Park.

25. The Wainuiomata River is covered by the Global Consent for River Management. This allows gravel extraction in the wetted channel in certain locations.



Wellington Water stormwater management in Wainuiomata

26. Wellington Water has produced stormwater flood hazard mapping for events that has a 1% chance of occurring in any year (excluding Moores Valley). The hazard maps show areas that are prone to flood from the local stormwater network including Black Creek. The maps are based on hydraulic models, flood records and feedback from the local community.

Greater Wellington Water Management in Wainuiomata

27. Greater Wellington has produced flood hazard mapping for events that has a 1% chance of occurring in any year. The hazard maps show areas that are prone to flooding from Wainuiomata River. The mapping is based on hydraulic modelling and flood records which is then used to provide flood advice to the community.

28. Greater Wellington maintains a number of flood protection assets on the Wainuiomata River in the area of the confluence with Black Creek. This includes

willow plantings and gabion baskets for edge protection, rock armour and stop banks. Maintenance on these assets consists of annual asset inspections, and annual clearing runs, planned work programmes based on budgets and risks as well as pre-and post-flood checks.

Planned and Ongoing Projects

Flood Hazard Mapping

29. In 2012, Greater Wellington produced flood hazard maps for the Wainuiomata River. Since these maps were produced there have been some course changes in the lower part of the catchment, so we are going to update these maps to better reflect the river and possible floodable areas. The update of the flood hazard model is programmed to commence in this financial year (2024-25) once the flood hazard modelling for Te Awa Kairangi/Hutt River has been completed.

Asset Investigations

30. The latest asset performance assessment for Wainuiomata River has identified two 'high risk' segments attributed to potential overtopping in the 1% Annual Exceedance Probability (AEP) event. An investigation is planned into these areas to determine local raising of defences is required. This will progress once the modelling available.

Flood Warning and Response

31. Greater Wellington has been progressing a regional programme of improvements to warning and response. This programme is looking at capability across the Region and incorporates the following;

    - **Flood Response –** In 2022 Greater Wellington adopted new flood response procedures covering all catchments managed by Greater Wellington Flood Protection department. These procedures were developed collaboratively with the Wellington Region Emergency Management Office (WREMO) and are regularly reviewed and updated. To support the new procedures we implemented a comprehensive training and exercise programme for flood duty officers in flood warning and response which runs annually.
    - **Flood Monitoring Network Improvements –** In 2021 we commenced a programme to upgrade the flood monitoring network across the region. In 2023 following Cyclone Gabrielle we developed a new set of 'Resilience Standards' for the network covering key aspects such as power, infrastructure, data, and communication. We are now developing a long-term improvements programme to bring our network to this standard. This will include key flood warning sites in Wainuiomata.
    - **Flood Forecasting** – Since 2020 we have been progressing a programme to improve our flood forecasting capability. This has entailed global system reviews and market sounding, optioneering and now system piloting. Once operational this system will have flood forecast models in place for all catchments managed by Greater Wellington's Flood Incident Management Team including the Wainuiomata River.

Water Quality

32. Freshwater Action Plans – NRP Proposed Change 1 requires that Freshwater Action Plans be developed for the Wainuiomata streams for Ammonia (toxicity), *E. coli*, Macroinvertebrates, Dissolved reactive phosphorous, Dissolved Zinc, and Suspended fine sediment.

Wellington Water

33. Greater Wellington understands that Hutt City Council has identified long term funding in the Long-Term Plan (LTP) for flood mitigation works on Black Creek commencing in 2026/27.

Future Development

34. As with many Catchments around the Wellington Region we are aware of significant development pressure to the North of Wainuiomata particularly around Fitzherbert Road. While not impacted from flooding from the Wainuiomata River we will support Hutt City Council and Wellington Water to ensure that as far as reasonably practicable any development considers flood hazard.

Ngā hua ahumoni
Financial implications

35. This report is an overview report for the Committee. All projects identified above are funded and in progress. As such there are no financial implications for this Committee.

Ngā Take e hāngai ana te iwi Māori
Implications for Māori

36. Greater Wellington is required to manage land and water within a range of statutory requirements, including giving effect to Te Mana o Te Wai and considering Te Tiriti o Waitangi in the development and implementation of the Council's strategies, plans, programmes and initiatives.

37. Implementation with mana whenua partners is guided by Te Whāriki – the new Māori Outcomes Framework as part of Council's Long-Term Plan 2024–34.

38. Approximately 28% of the population of the Wainuiomata Central area is Māori, and 15.9% when including the wider Wainuiomata valley areas[2].

39. Wainuiomata Marae is situated close to Black Creek and is partially sitting within the flood hazard area.

40. Key governance and management recommendations from mana whenua (in Te Mahere Wai) are outlined in this report. The current state of water quality and ecology of the Black Creek and Wainuiomata River do not meet mana whenua values for mahinga kai and other values.

2 - "Statistical area 1 dataset for 2018 Census", Wainuiomata Central. 2020. Statistics New Zealand.

41. The design, management and investment challenge to achieve integrated flooding solutions and ecological outcomes is significant, especially for Black Creek. Implications such as managed retreat would affect the residents, Wainuiomata marae and local businesses.

42. Staff will continue to engage with iwi directly and develop partnership arrangements in relation to matters within the Wainuiomata catchment.

Te huritao ki te huringa o te āhuarangi
Consideration of climate change

43. Each project within the catchment considers and responds to the predicted impacts of climate change when considering the appropriate response to the issue the project seeks to address.

44. This programme aligns with the 2015 Climate Change strategy, which states 'we will help the region adapt to climate change'. The projects increase climate change adaptation and resilience to natural disasters in the region.

45. Greater Wellington currently assesses options to address flood risk based on the predicted impacts of climate change over the next 100 years. Increased rainfall and sea level rise predictions are assessed on a catchment-by-catchment basis. With the modelling of the Wainuiomata River the latest climate change allowances will be incorporated.

Ngā kaiwaitohu
Signatories

Writers	Andy Brown – Knowledge Risk Management & Resilience Lead Phill Barker – Senior Catchment Advisor, Te Whanganui-a-Tara
Approvers	Dave Hipkins – Hautū Whai Māramatanga | Director Knowledge and Insights Jack Mace – Hautū Whakatutuki | Director Delivery Lian Butcher – Kaiwhakahaere Matua, Taiao | Group Manager Environment

He whakarāpopoto i ngā huritaonga **Summary of considerations**
Fit with Council's roles or Committee's terms of reference The Subcommittee has responsibility for overseeing the effectiveness of implementation and delivery of floodplain management plans for Te Awa Kairangi/Hutt River floodplain. While the Wainuiomata areas fall outside the scope of the Subcommittee, receiving information and updates about flood management in the Wainuiomata area supports a catchment approach to the management of the wider Hutt Valley area
Contribution to Annual Plan / Long term Plan / Other key strategies and policies The projects contained within this report deliver on Greater Wellington's strategic priority area of te tū pakari a te rohe/regional resilience, and support delivery of Greater Wellington's strategic priority area of te oranga o te wai māori me te rerenga rauropi/freshwater quality and biodiversity.
Internal consultation Specific projects consult with groups and functions across Greater Wellington where relevant to a project.
Risks and impacts: legal / health and safety etc. The purpose of implementation floodplain management plans is to reduce the risk to communities and improve the region's resilience.

Te Awa Kairangi / Hutt River Valley Subcommittee
22 October 2024
Report 24.360

For Decision

TE AWA KAIRANGI / HUTT RIVER VALLEY ANNUAL ASSET MANAGEMENT CONDITION REPORT

Te take mō te pūrongo
Purpose

1. To advise the Te Awa Kairangi / Hutt River Valley Subcommittee (the Subcommittee) of the overall performance and physical condition of flood protection and erosion control infrastructure assets (assets).

He tūtohu
Recommendations

That the Subcommittee:

1 **Notes** that identified issues are being addressed through maintenance and improvement work programmes.

2 **Recommends** to the Environment Committee that it is satisfied that Flood protection and erosion control infrastructure assets have been managed satisfactorily to the agreed Level of Service (LoS).

3 **Notes** that the 2024-34 Long Term Plan provides an increased level of funding for capital works and operational resources over the next 10 years.

Te tāhū kōrero
Background

2. Greater Wellington Regional Council (Greater Wellington) is responsible for flood protection and erosion control infrastructure assets, including land and property, located on 15 river schemes across the Wellington Region. These assets have a total combined value of $621 million[1] and provide flood and erosion protection to the communities, businesses and infrastructure located on these floodplains.

3. The Environment Committee has overall responsibility to monitor the maintenance and improvement of these assets on behalf of Council. The Environment Committee relies on feedback from the various subcommittees, scheme advisory committees and friends' groups to confirm assets are being satisfactorily maintained to the agreed service level.

[1] Revaluation as at 30 June 2024

Current Challenges

4. The context and overall environment in which Operations and Maintenance (O&M) is undertaken is evolving, with the introduction of a catchment-based approach better enabled through the restructure of the Environment Group last year, and with more focus on nature-based solutions.

5. Over the past decade we have constructed a broader range of assets, aside from those that provide flood protection and erosion control, and these assets have different uses and more intensive maintenance requirements. For example, the Hutt River Trail which includes tracks, gates, signs and benches. The introduction of more nature-based solutions will have an impact on maintenance, in terms of cost and time, such as a potential increase in maintenance requirements around pest plants and animals.

6. Central and local government reforms coupled with increasing compliance costs (health, safety and wellbeing, environmental), increasing expectations on how we should work to improve environmental outcomes, partnering with mana whenua and the increasing community desire for consultation and engagement to achieve broader social objectives continue to increase operational resource requirements.

7. Climate change is also requiring more complex planning. More frequent and extreme weather events may result in reactive maintenance taking precedence over the annual works programme. These events have proven to be significantly disruptive in other parts of Aotearoa.

8. Greater Wellington transitioned to a new asset management information system (AMIS), called Ngātahi, in February 2022. Migrating to, and rolling out, a new AMIS comes with its challenges, such as change management, new technology to learn, additional training requirements, and data migration and validation. While we have made significant progress with the new systems and tools, it remains a process that will take time to embed.

9. We require broader skillsets within our teams than we have had in the past if we are to achieve Greater Wellington's strategic outcomes in light of the above considerations. Disciplines across the public works sector such as engineering, operations, and asset management are known skill shortage areas.

10. Across the board, resourcing for operational maintenance and asset planning has fallen short of what is required. This has been addressed through the 2024-34 Long-term Plan with a significant package of additional funding.

Te tātaritanga
Analysis

11. A comprehensive, national risk-based framework (Figure 1) is used to assess asset performance at 100-200m segments along both banks of the river. The output of the assessment produces a risk profile for each major flood protection scheme.

12. The national risk-based framework for assessing the performance of flood protection schemes was originally developed by the National River Managers

Special Interest Group in 2015. The framework is used by local authorities across the motu.

13. The risk assessment framework assesses both the probability and consequence of failure of a group of assets within a discrete section of the river (e.g. 100-500m).

14. Assessing the probability of failure includes analysing the structural strength of stopbanks (intrinsic strength), the capacity of the channel to attenuate flood flows, and the physical condition of infrastructure assets.

15. The consequence of failure relates to the risks posed to both the community and environment from asset failure from a design flood event. Once a probability and consequence score have been determined for each reach, a risk level is assigned at from 'Very Low' to 'Very High'.

16. Application of the framework also highlights where the confidence in the underlying technical information is low and informs the investigative work programme to gather new or additional information to improve this confidence.

17. Assets do not work in isolation; they typically belong to a system of assets that are interconnected. Flood protection and erosion control assets are no different. A system of assets can be identified as critical in the same way individual assets can.

18. The following diagram illustrates the relationship between asset condition, probability, and risk.

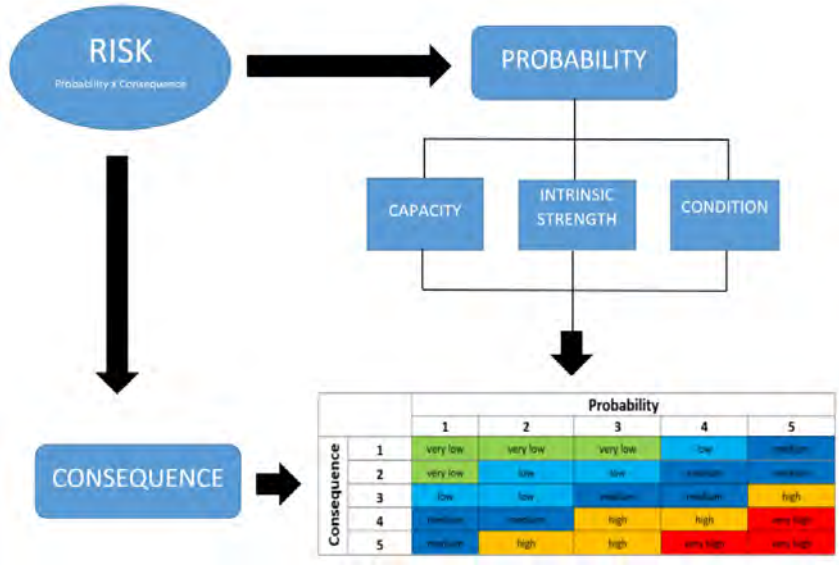


Figure 1. Risk-based framework used for assessing performance of flood protection assets.

Asset condition

19. Asset condition is a measure of the physical state of the asset and is assessed through a visual inspection. Table 1 below outlines condition rating descriptions used during visual inspections.

20. Monitoring asset condition enables us to identify, plan and prioritise maintenance, forecast replacement requirements, and develop effective and proactive work programmes. Asset condition information is essential to managing flood risk because it influences the likelihood of asset failure.

Table 1: Condition rating descriptions taken from the Greater Wellington Condition Rating Guide.

Score	Condition Rating	Definition
1	Very Good	Sound physical condition well maintained. No work required.
2	Good	Generally sound physical condition, showing minor wear or deterioration, well maintained. Minor work may be required.
3	Moderate	Acceptable physical condition but showing some wear or deterioration. Generally maintained well but some work is required to improve the asset condition or make sure it is working well.
4	Poor	Poor physical condition, significant wear or deterioration impacting much of the asset. May not meet level of service.
5	Very Poor	Failed/failure imminent. Major work or replacement required.

21. Asset condition alone does not identify the criticality of the asset, or whether the asset meets the required service level. This is addressed through asset performance assessments, covered further below.

22. The following table and graph show the volume of assets in each condition grading. Table 2 shows that there has been a significant increase in the number of assets in Very Good to Moderate condition. Note the total number of assets inspected has increased significantly (441) which is why the ratio has not changed significantly.

Table 2. Summary of asset condition by year – Te Awa Kairangi, Waiwhetu and Wainuiomata.

Year	2022		2023		2024	
Condition Scores	**Ratio**	**Count**	**Ratio**	**Count**	**Ratio**	**Count**
1 - Very Good	92%	392	89%	551	90%	927
2 - Good		944		669		746
3 - Moderate		377		261		313
4 – Poor	8%	137	11%	132	10%	190
5 - Very Poor		22		52		28
Totals	**100%**	**2106**	**100%**	**1665**	**100%**	**2204**

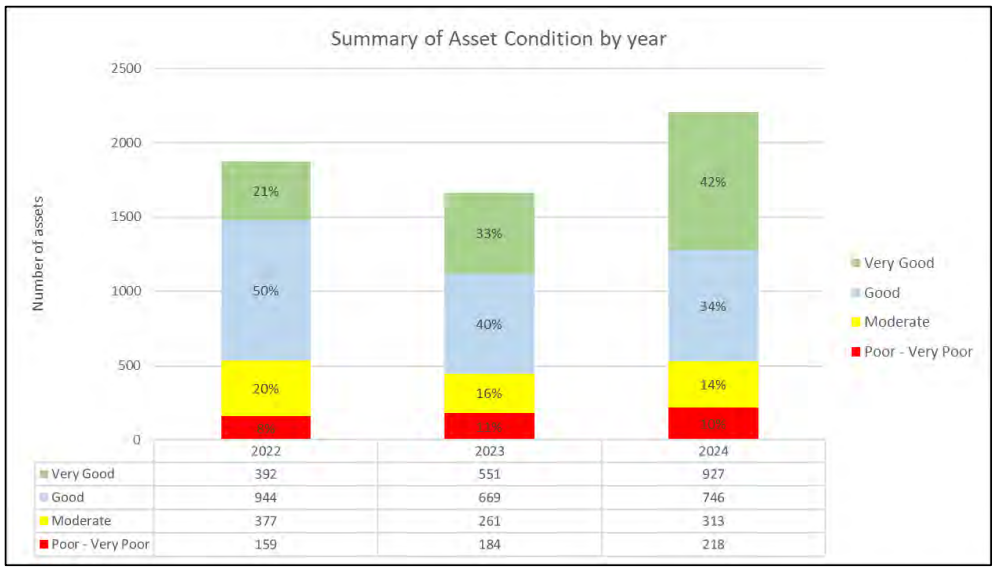


Figure 2. Summary of asset condition by year

23. The total number of assets inspected in 2023 was notably lower due to technical issues experienced whilst implementing our new asset information management system, which meant we could not map the asset locations in time for the inspections and therefore were unable to inspect all assets. This was rectified in time for the 2023/24 condition rating programme.

24. Additional assets were also added as part of the Climate Resilience and rock work programmes completed in the last 12 months. The rock work programme completed in April 2024 has improved the condition of assets on Te Awa Kairangi/Hutt River. Compared to last year where a slight decline was emerging, a substantial increase in the number of assets in 'Very Good' and 'Good' condition has been observed.

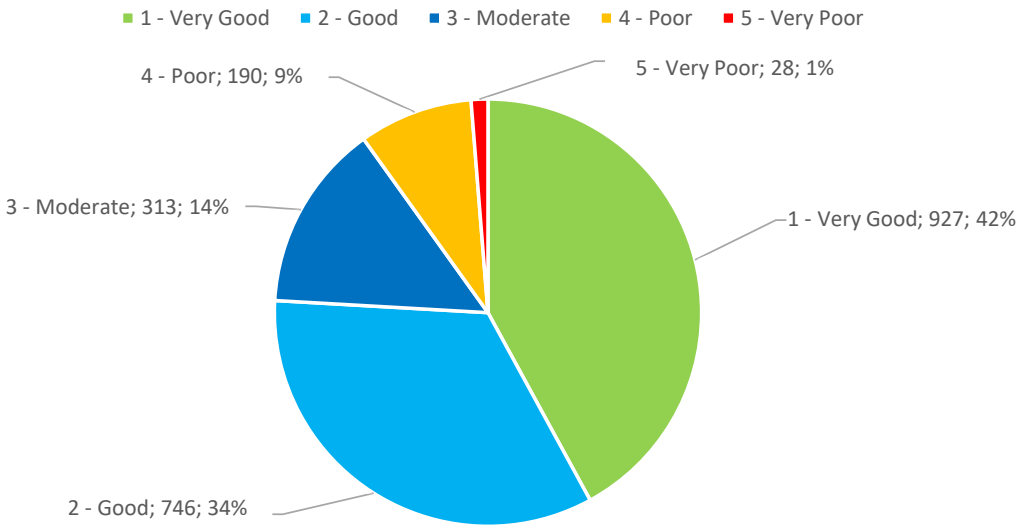


Figure 3. Summary of 2024 condition by grade.

25. During the 2024 condition assessment programme, there were 28 assets (1%) assessed as Very Poor condition and 190 assets (9%) in Poor condition (Figure 3). Of the 28 assets in Very Poor condition, the majority are debris defences or vegetative assets, and a few rock protection assets. A summary of condition by asset type is provided (**Attachment 1**).

26. Table 3 provides a summary of assets in Poor and Very Poor condition across our significant asset types, including commentary on the issues reported. There are 37 stopbank assets in Poor condition. Greater Wellington takes a conservative approach with trees and invasive roots in or within close proximity of stopbanks. This year we updated the inspection guide to assign a Poor score if there were trees/vegetation within 5m of the stopbank toe. This has resulted in an increase of stopbanks rated as Poor. We will continue to refine this methodology, considering clearer criteria to support inspectors assessing condition (such as the height, age and condition of the tree).

Table 3. Summary of poor condition by significant asset type.

Asset Type	Total Number	4 - Poor	5 - Very Poor	Issue(s) reported
Culvert	20	0	0	Weeds to be cleared
Floodgate	23	0	0	No issues reported
Floodwall	27	2	0	Crack in wall
Groyne	133	14	4	Loose rocks or missing material
Headwall/Wingwall	18	0	0	No issues reported
Retaining wall	9	3	1	Evidence of cracking, potential misalignment
Riprap	174	6	1	Erosion, weed infestation
Stopbank	269	37	0	Invasive weeds , trees

27. To prioritise maintenance across our assets, we use a risk-based approach. We analyse the location of our poorest condition assets and prioritise those significant assets that are in our highest risk areas. **Attachment 2** provides a summary of poor condition assets across the risk profile.

28. The majority of Poor and Very Poor condition assets fall outside the highest risk areas. Those assets in poor condition that sit within our highest risk areas have been identified and are being addressed through maintenance and improvement work programmes. **Attachment 3** highlights targeted maintenance in the proposed 24/25 work programme for poor condition assets.

29. Since 2023 there have been 90 additional assets added to our asset management information system (Table 4), which primarily comprise new assets planted or constructed, but also include several older assets that had not previously been captured or accounted for. The latter represents the small portion of assets in Average to Poor condition. Newly planted natives and rock groynes/riprap account for over two thirds of the additional assets.

Table 4. Additional assets newly built or captured since 2023.

Asset type	No. of assets	Observed Asset Condition				
		1 – Very Good	2 - Good	3 - Average	4 - Poor	5 – Very Poor
Bridge	1	1				
Carpark	6	6				
Culverts	2		2			
Fence	8	6	2			
Gate	2	2				
Groyne	13	5	4	3	1	
Native planting	37	27	5	5		
Retaining wall	2			2		
Riprap	9	3	4	1		1
Seat	1	1				
Signs	6	6				
Stopbank	1				1	
Weir	1		1			
Willow	1	1				
Total	**90**	**58**	**18**	**11**	**2**	**1**

Asset performance and risk

30. Currently, the national, risk-based framework is applied to Te Awa Kairangi/Hutt River and the Wainuiomata River schemes because this framework is applicable to assets such as stopbanks. This risk-based framework is not applied to the Waiwhetū or Pinehaven streams due to the limited amount of assets on these waterways.

31. Across the Te Awa Kairangi/Hutt River and the Wainuiomata River schemes, there are 640 segments assessed for risk, each being approximately 100-200m in length. A summary risk by segments is provided in Table 5, and presented spatially in **Attachment 4**.

32. There are several segments that have been assessed as ‘High’ or ‘Very High’ risk. This can be attributed to one or more of the following failure modes: capacity, intrinsic strength, condition, or consequence of failure.

33. Due to the inherent consequences should parts of the Te Awa Kairangi/Hutt river scheme fail, the proportion of segments in ‘High’ or ‘Very High’ risk is elevated

compared to more rural areas, such as in the Wairarapa. Still, many segments within the Hutt Valley schemes are attributed as 'Very Low' to 'Medium' risk (77%), which is a slight improvement since 2023.

34. Since 2023, the risk across thirteen 'High' risk segments has reduced. This is largely attributed to the Climate Resilience programme completed in the last 12 months, as well as operational work to remove invasive roots/trees away from stopbanks.

Table 5. Summary of segments by risk scores across the Hutt and Wainuiomata schemes.

Year	2024		2023		2022	
Risk Scores	Ratio	Count	Ratio	Count	Ratio	Count
1 – Very Low	77%	249	75%	246	76%	245
2 – Low		171		171		146
3 – Medium		75		65		94
4 – High	23%	109	25%	122	24%	119
5 – Very High		36		36		36
Totals	**100%**	**640**	**100%**	**640**	**100%**	**651**

Management response

35. With the recent approval of the 2024-34 Long Term Plan[2], increased budgets and resources will be available over the next ten years to ensure we can maintain agreed scheme service levels and continue to undertake routine O&M activities.

36. It is worth noting that the increased funding is incremental over the ten years, and the operational funding in 24/25 is not significantly higher than 23/24. While we can expect an improvement in condition over the ten years, next year we will continue to prioritise those poor condition assets in our highest risk areas.

37. The highest risk areas shown in **Attachment 4** and **Attachment 5**, are discussed below from downstream to upstream of Te Awa Kairangi/Hutt River, followed by the Wainuiomata River.

38. At the Te Awa Kairangi / Hutt River mouth, downstream of the Estuary Bridge, capacity is an issue as the area is inundated during a 1,900 cumec event (1% Annual Exceedance Probability – AEP) and is shown as 'High' risk. There are no stopbanks in this reach and no new stopbanks are currently signalled in the Hutt River Floodplain Management Plan (HRFMP). Initial investigations have been completed through the RiverLink project and these may be progressed further when the HRFMP is reviewed.

39. Sections of Te Awa Kairangi/Hutt River from Moera to Strand Park, and adjacent to Alicetown are 'High' risk. This is an inherent risk as the consequences of any stopbank failure is significant.

40. Pharazyn Street and Lower Hutt city stopbanks have capacity and intrinsic strength issues; they are predicted to overtop in the 2,800 cumec design event and are

[2] https://www.gw.govt.nz/your-region/plans-policies-and-bylaws/plans-and-reports/long-term-plan/

shown as 'Very High' risk. As both the probability and consequence of failure are very high, the risk rating reflects this. RiverLink will retreat, raise, and improve the stopbanks and enhance channel capacity through this section of the Te Awa Kairangi/Hutt River. Advance works are in progress for the Mills Street stopbank and are nearing completion.

41. The River Road stopbank above Moonshine Bridge has a capacity issue and average intrinsic strength; it is predicted to overtop in the 2,800 cumec event and is shown as 'Very High' risk. Modelling for Te Awa Kairangi/Hutt River is mostly complete. A targeted detailed investigation on this stopbank is planned this financial year and will consider options for managing this risk.

42. The latest assessment for the Wainuiomata River has identified two 'high risk' segments attributed to potential overtopping in the 1% Annual Exceedance Probability (AEP) event. An investigation is planned into these areas to determine whether local raising of defences is required. An update to the flood hazard model is programmed to commence this financial year once the flood hazard modelling for the Te Awa Kairangi/Hutt river has been completed.

43. The highest risk areas discussed above are known to officers and unless stated otherwise, have been identified for treatment either through an existing Floodplain Management Plan (FMP), a planned technical investigation, or as part of an operational work programme. Existing and proposed FMP improvement works have been considered as part of the recent Activity Management Planning and Long Term Plan process.

Ngā hua ahumoni
Financial implications

44. The proposed recommendation has no immediate financial implications.

Ngā Take e hāngai ana te iwi Māori
Implications for Māori

45. Greater Wellington is required to manage land and water within a range of statutory requirements, including giving effect to Te Mana o Te Wai and considering Te Tiriti o Waitangi in the development and implementation of the Council's strategies, plans, programmes and initiatives.

46. Our partnership with mana whenua partners within Council's Long-term Plan 2024-34 recognises and supports mana whenua as kaitiaki (guardians) of their broad whenua, freshwater and moana interests in their ancestral lands. We continue to work with our mana whenua partners in new ways at all levels of our organisation including governance, management and operations.

47. A significant number of Māori, both mana whenua and mātāwaka, live and work in flood prone areas within Te Awa Kairangi. There are also numerous sites of cultural and spiritual significance potentially at risk from flooding. Effective delivery of our flood risk management programme helps to protect Māori communities and their values across the four wellbeings (social, economic, environment and cultural).

Te huritao ki te huringa o te āhuarangi
Consideration of climate change

48. Matters discussed in this report have been considered by staff in accordance with the process set out in Greater Wellington Climate Change Consideration Guide.

49. The assets discussed in this report were developed over an extensive period of time, during which climate change projections (e.g. rainfall intensity, sea level rise) have evolved with the scientific community's understanding of how climate change will affect the Wellington Region. Climate change projections were incorporated into the modelling that underpins relevant management plans and asset designs at the time they were developed. Previous climate change projections of 20% increase in rainfall intensity and 0.8m sea level rise were used for modelling in Te Awa Kairangi/Hutt. Current climate projections estimate a 25-30% increase in rainfall intensity and a sea level rise of 1.35m and are used for recent modelling projects. The policy for modelling projects is to use latest national guidance for incorporating climate change into flood risk assessments and responses.

50. The Climate Resilience projects completed in 2023 incorporated significant planting areas to offset carbon footprint.

Ngā tikanga whakatau
Decision-making process

51. The matters requiring decision in this report have been considered by officers against the requirements of Part 6 of the Local Government Act 2002.

Te hiranga
Significance

52. Officers considered the significance (as defined by Part 6 of the Local Government Act 2002) of this matter, taking into account Council's *Significance and Engagement Policy* and Greater Wellington's *Decision-making Guidelines*. Officers recommend that this matter is of low significance due to the administrative nature of the decision.

Te whakatūtakitaki
Engagement

53. Due to the low significance of this matter, no engagement was considered necessary.

Ngā tūāoma e whai ake nei
Next steps

54. Officers will present **Attachment 6** at the Subcommittee meeting on 22 October 2024.

Ngā āpitihanga
Attachment

Number	Title
1	Summary of condition by asset type
2	Risk vs Condition
3	Maintenance plan for addressing poor condition assets
4	Te Awa Kairangi/Hutt River risk assessment maps 2024
5	High and very high risks and their remediation
6	Annual Asset Management Condition Presentation for Report 24.360

Ngā kaiwaitohu
Signatories

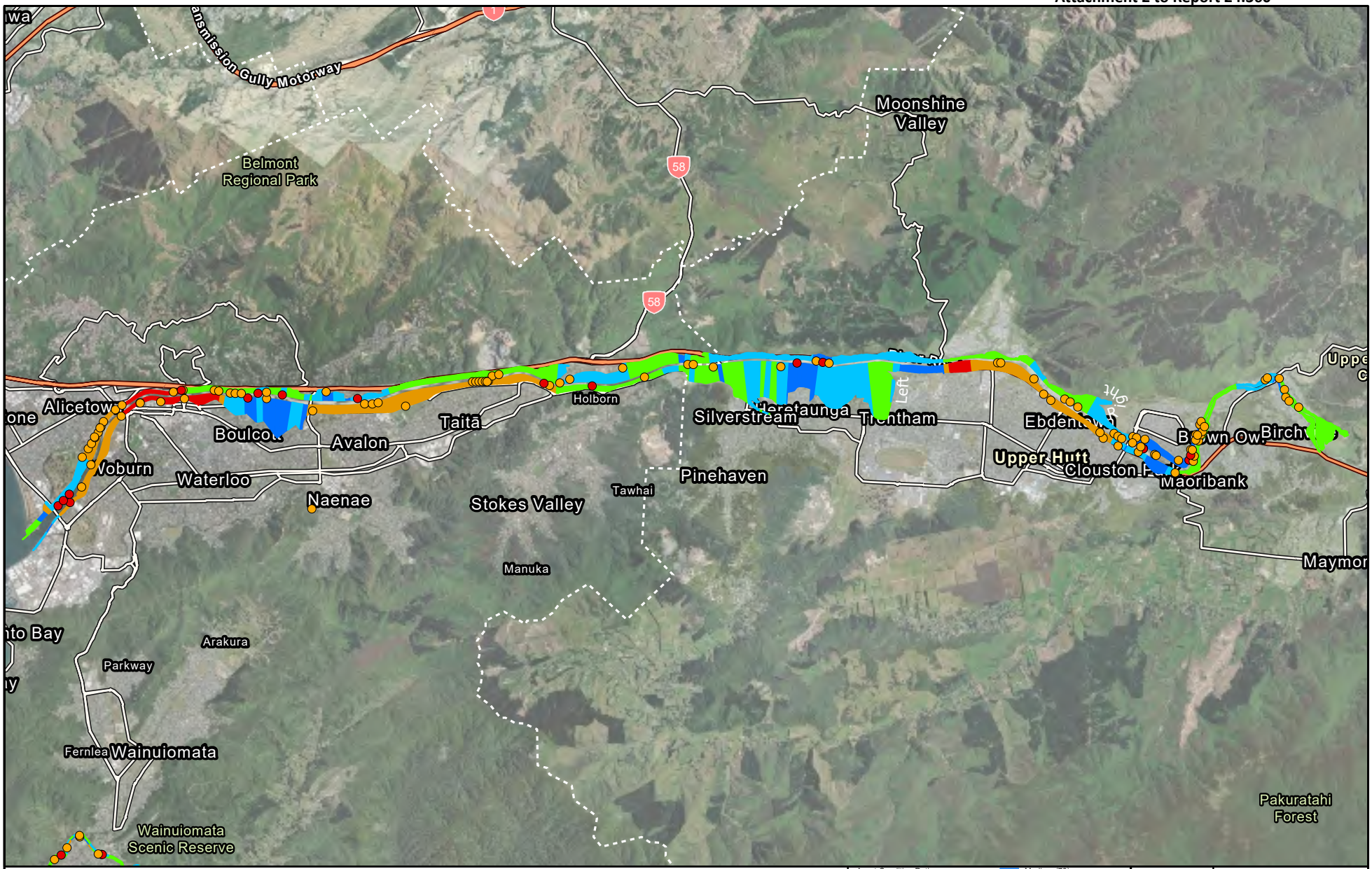
Writer	George Bowman – Team Leader, Assets and Performance
Approvers	Jacky Cox – Manager, Infrastructure - Assets and Support Jack Mace – Director- Delivery Lian Butcher – Kaiwhakahaere Matua Taiao - Group Manager Environment

He whakarāpopoto i ngā huritaonga **Summary of considerations**
Fit with Council's roles or with Committee's terms of reference The Subcommittee provides oversight of the development, implementation, and review of the Floodplain Management Plan for the Te Awa Kairangi/Hutt River floodplain; the infrastructure assets that form the flood protection and erosion control scheme are a critical element of this.
Contribution to Annual Plan / Long Term Plan / Other key strategies and policies The confirmation from the Subcommittee that the infrastructure assets in the Te Awa Kairangi/Hutt River have been satisfactorily maintained fulfils one of the Department's non-financial performance measures in the Long Term Plan. This report and confirmed minutes are supplied as evidence to Audit NZ that the Department has achieved this.
Internal consultation There was no internal consultation.
Risks and impacts - legal / health and safety etc. The reports note that there are a small number of sections of Te Awa Kairangi/Hutt River that pose either a 'Very High' or 'High' risk to the communities and businesses on the River's floodplain but that the infrastructure assets providing protection are in very good to moderate condition. These areas are also identified in for either a technical investigation or in an operational or improvement programme.

Attachment 1 to Report 24.360

Asset Grouping	1 – Very Good	2 – Good	3 – Moderate	4 – Poor	5 – Very Poor	Total
Blockline	0	7	3	2	0	12
Bridge	1	0	1	0	0	2
Carpark	7	2	0	0	0	9
Channel	285	88	36	5	0	414
Constructed wetland	0	2	0	0	0	2
Culvert	3	14	3	0	0	20
Cycle path/access track	209	113	19	0	0	341
Debris arrestor	0	1	0	1	1	3
Debris fence	3	23	26	68	9	129
Demolition line	0	6	0	0	0	6
Drain/modified channel	29	23	20	1	0	73
Fence	13	4	0	0	0	17
Floodgate	4	16	3	0	0	23
Floodwall	2	21	2	2	0	27
Gate	45	15	2	1	2	65
Groyne	20	67	25	14	4	130
Headwall/Wingwall	4	12	2	0	0	18
Native planting	39	54	20	1	2	116
Retaining wall	0	2	3	3	1	9
Riprap	18	126	24	6	1	175
Rock Mattress	0	1	1	0	0	2
Seat	10	1	0	0	0	11
Sign	17	5	0	0	0	22
Stopbank	149	52	31	37	0	269
Three Water Asset	1	0	0	0	0	1
Weir	1	2	0	0	0	3
Willow	67	89	92	49	8	305
Total	**927**	**746**	**313**	**190**	**28**	**2204**

Attachment 2 to Report 24.360



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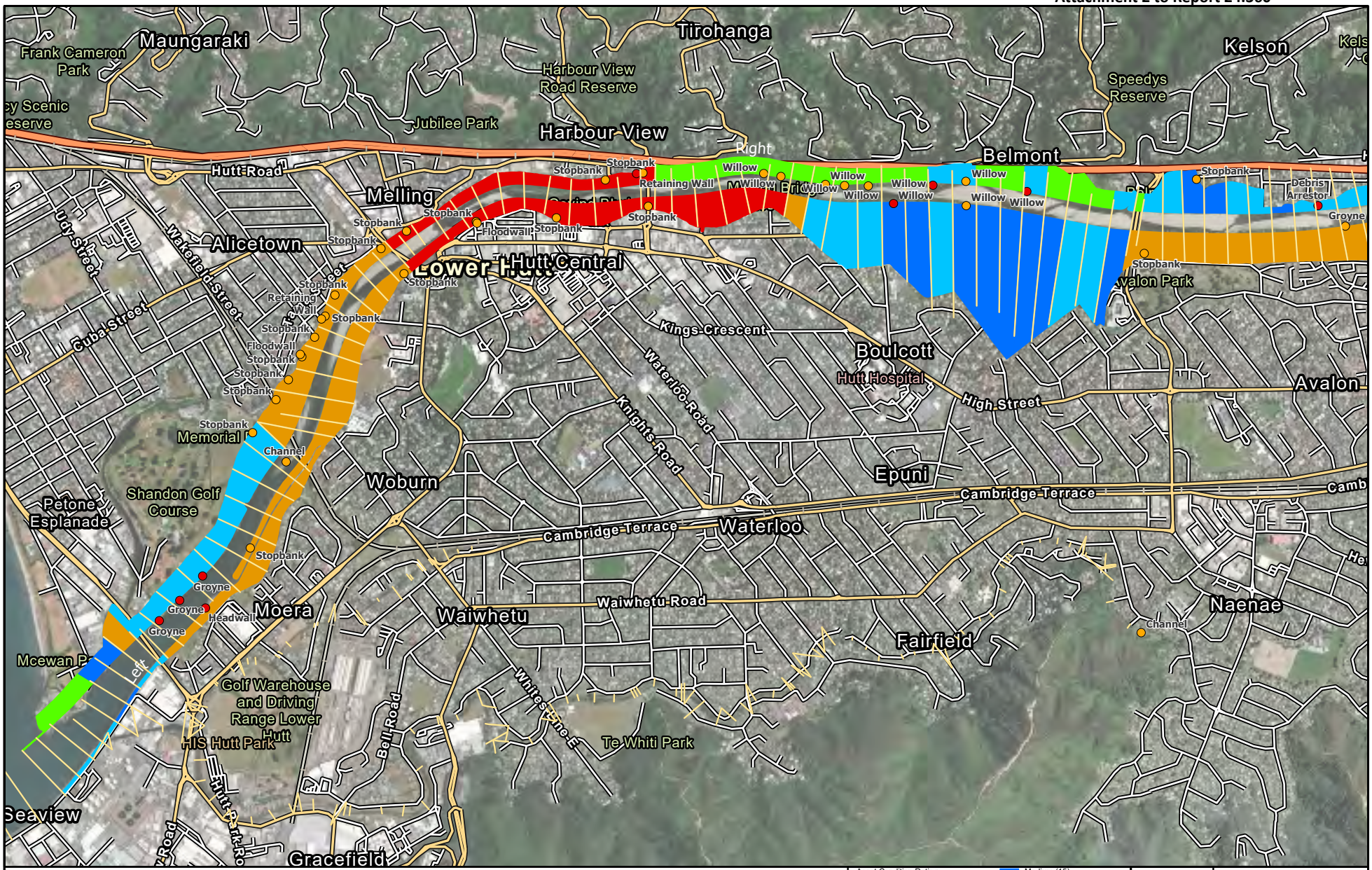

Greater Wellington
Te Pane Matua Taiao

Hutt 1 APT Map

2024 Asset Performance Tool Risk Assessment

Legend

Asset Condition Rating
- Poor Condition (31)
- Very Poor Condition (9)

Risk Classification
- Very High (32)
- High (46)
- Medium (15)
- Low (36)
- Very Low (23)

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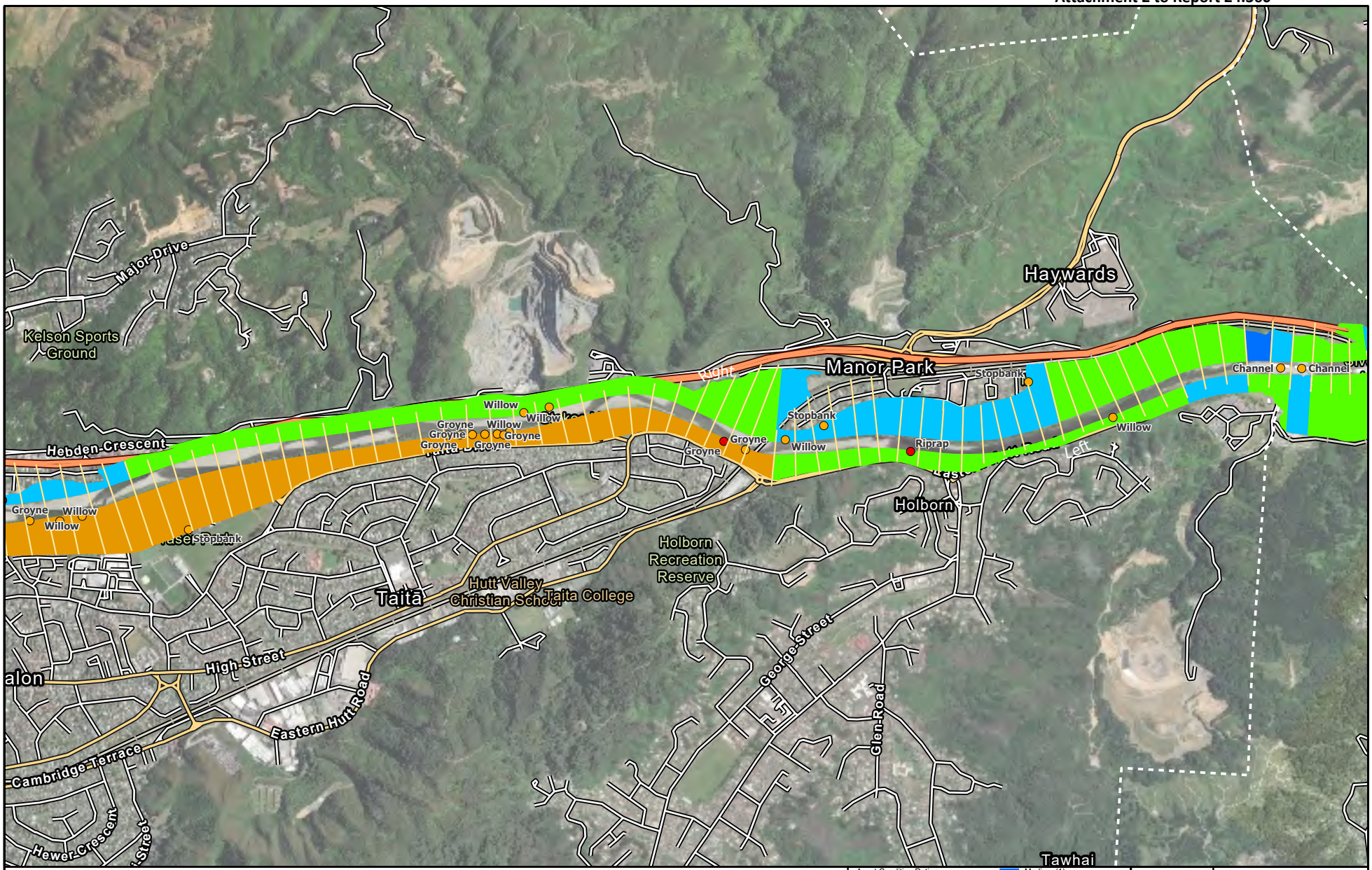

Greater Wellington
Te Pane Matua Taiao

Hutt 2 APT Map

2024 Asset Performance Tool Risk Assessment

Legend

Asset Condition Rating
- Poor Condition (20)
- Very Poor Condition (3)

Risk Classification
- Very High (0)
- High (36)
- Medium (1)
- Low (26)
- Very Low (67)

Project Name:	APT
Author:	TurnerL
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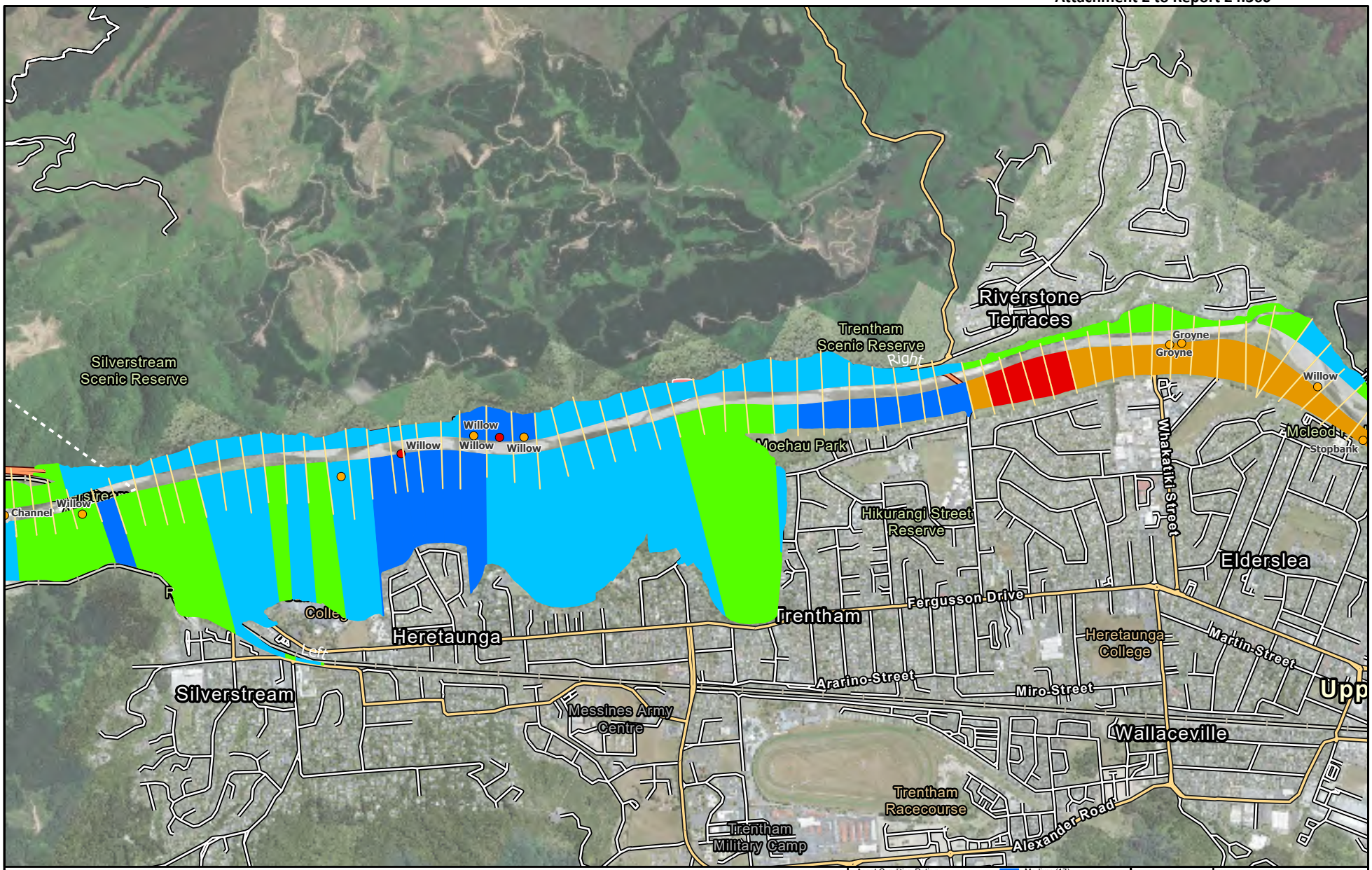

Greater Wellington
Te Pane Matua Taiao

Hutt 3 APT Map

2024 Asset Performance Tool Risk Assessment

Legend

Asset Condition Rating
- Poor Condition (9)
- Very Poor Condition (2)

Risk Classification
- Very High (4)
- High (16)
- Medium (17)
- Low (56)
- Very Low (34)

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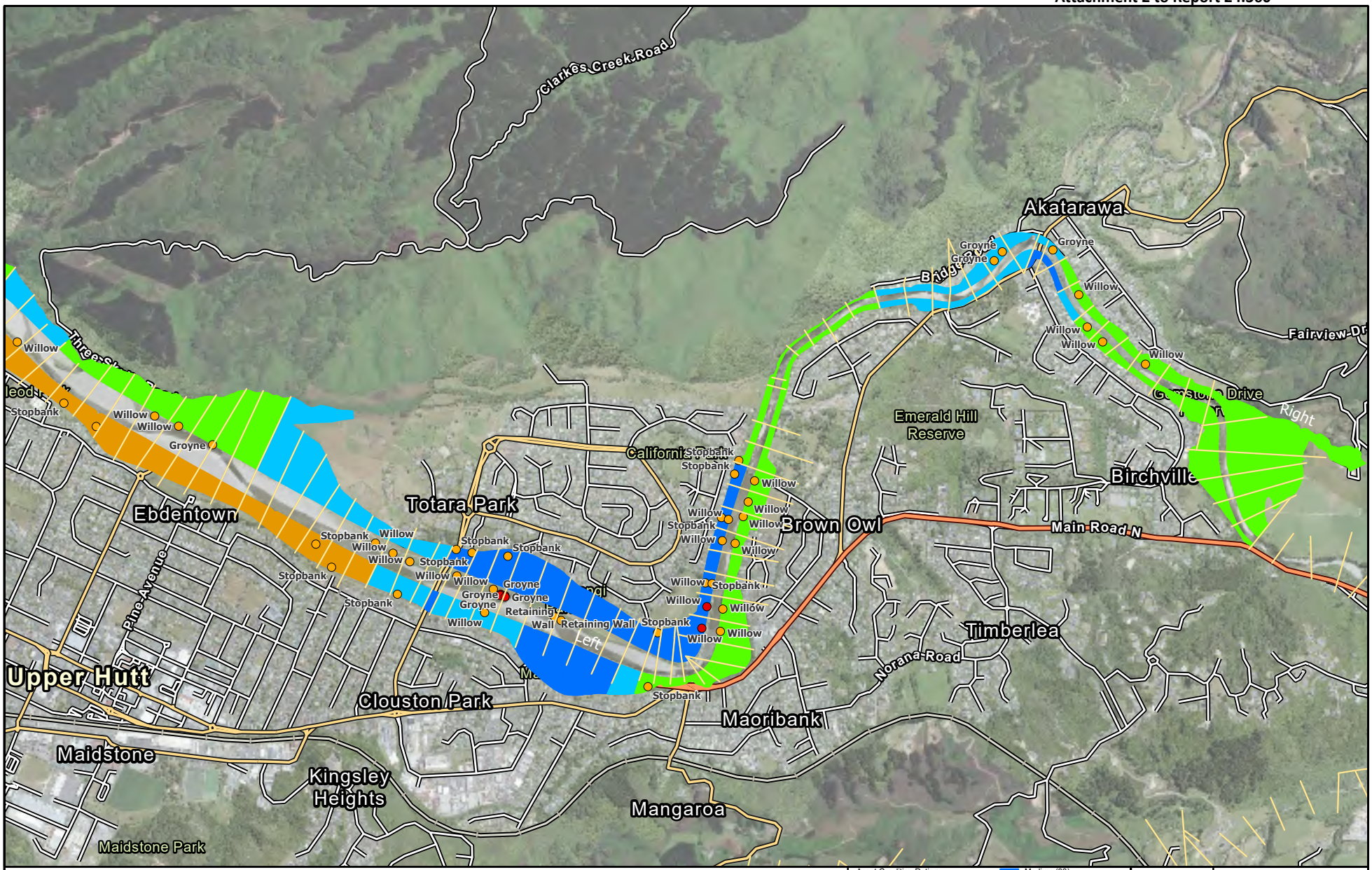

Greater Wellington
Te Pane Matua Taiao

Hutt 4 APT Map

2024 Asset Performance Tool Risk Assessment

Legend

Asset Condition Rating
- Poor Condition (42)
- Very Poor Condition (6)

Risk Classification
- Very High (0)
- High (17)
- Medium (33)
- Low (37)
- Very Low (69)

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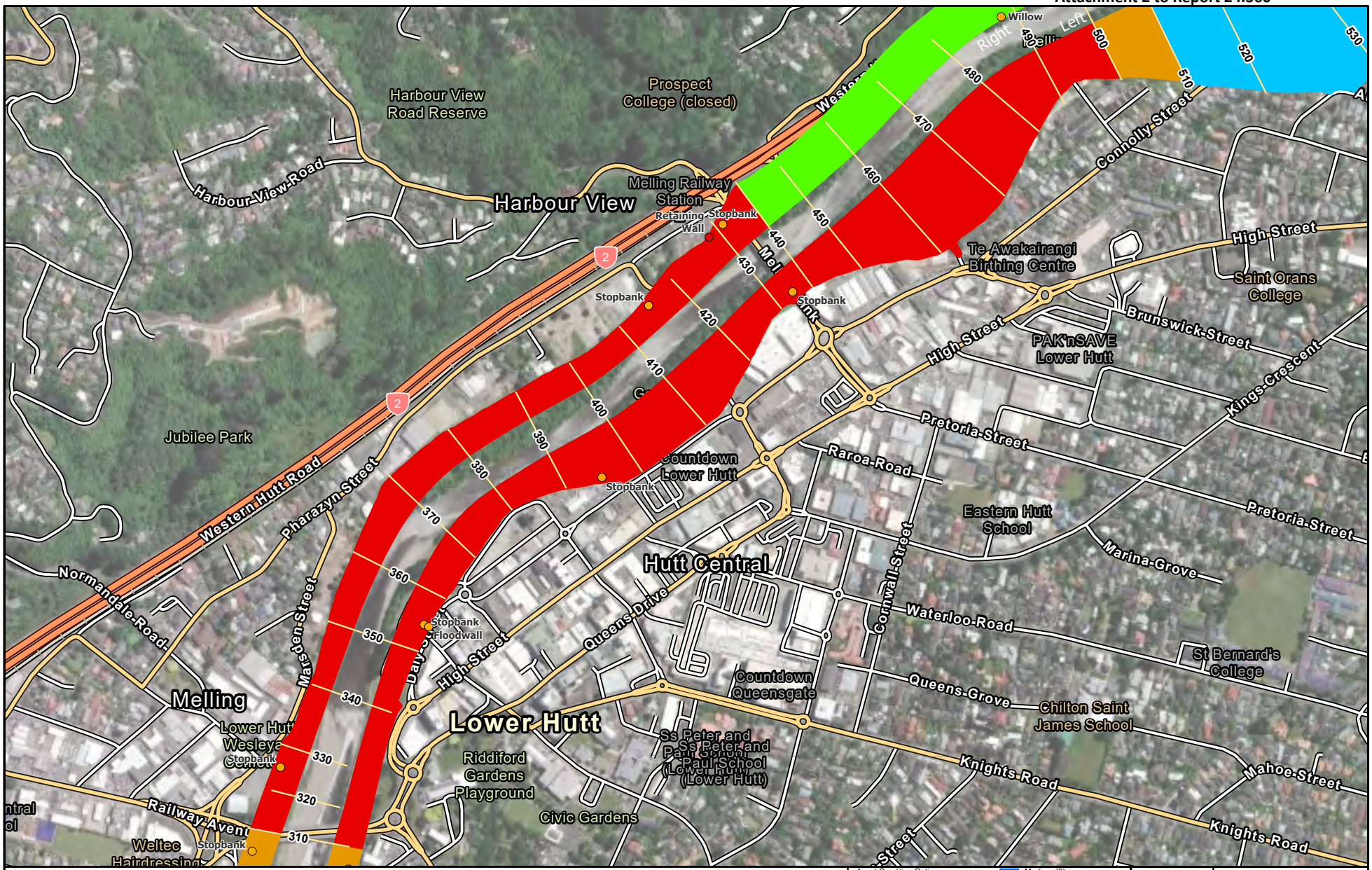

Greater Wellington
Te Pane Matua Taiao

Hutt City Centre APT Map

2024 Asset Performance Tool Risk Assessment

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Author:	TurnerL
Date of Issue:	12/09/2024 11:22 am
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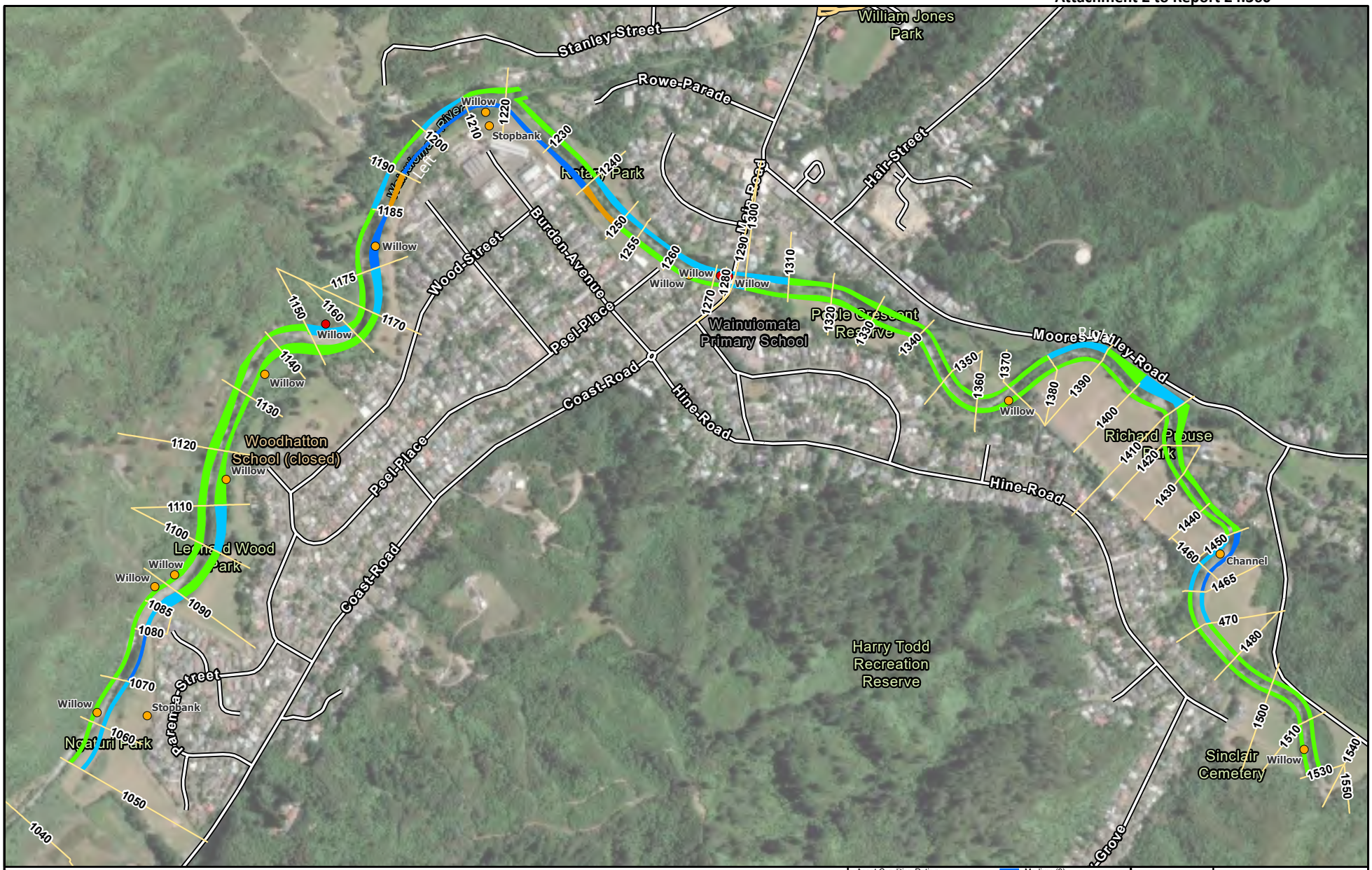
Attachment 2 to Report 24.360



Greater Wellington
Te Pane Matua Taiao

Wainuiomata APT Map

2024 Asset Performance Tool Risk Assessment

Legend

Asset Condition Rating
- Poor Condition (13)
- Very Poor Condition (3)

Risk Classification
- Very High (0)
- High (2)
- Medium (9)
- Low (24)
- Very Low (65)

Project Name:	APT
Author:	TurnerL
Date of Issue:	12/09/2024 11:22 am
Scale at A4:	1:9,000

Path: C:\C_GIS\APT\APT.aprx

Attachment 2 to Report 24.360

Greater Wellington
Te Pane Matua Taiao

Wainuiomata - Rotary Park APT Map

2024 Asset Performance Tool Risk Assessment

Legend

Asset Condition Rating
- Poor Condition (4)
- Very Poor Condition (3)

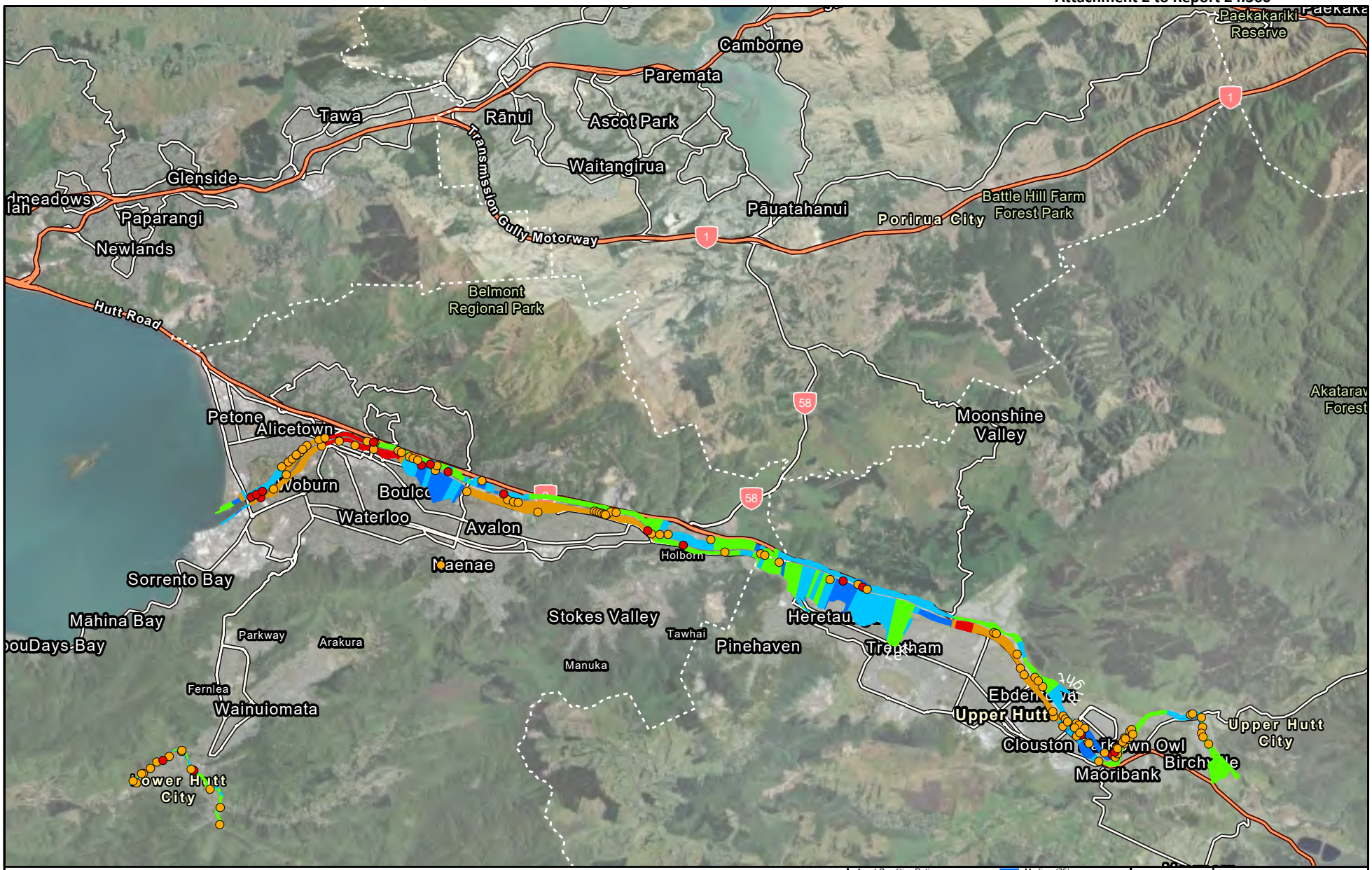
Risk Classification
- Very High (0)
- High (2)
- Medium (6)
- Low (14)
- Very Low (16)

Project Name:	APT
Author:	TurnerL
Date of Issue:	12/09/2024 11:22 am
Scale at A4:	1:3,000

Esri Community Maps Contributors, LINZ, Stats NZ, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, LINZ

Path: C:\C_GIS\APT\APT.aprx

Attachment 2 to Report 24.360



Proposed Hutt Work Programme (as at 25th September 2024)

Hutt Lower

Location	Cross Section	Work Planned	Segment Risk	Condition of Asset
Alicetown Plantings	SR240-SR250 SR290-SR300	Remove tree from stopbank by flood walls	High	4
Various	Various	Repairs to berm drainage issues	Various	Various
Various	Various	Remove dead willow trees in willow lines that are critical	Various	Various
Belmont Norfolk street	SR680	Remove tree from stopbank by flood walls	Medium	4
Whole lower river	SR0570-SR1350	Vegetation clearing only 200 hrs x $400	Various	Various
KGB to Belmont	SL/R660-SL/R0780	Bed re-contouring wet channel	High	Various
Taita-Pomare	SL1030-SL1050	Bed contouring Taita/Pomare section total 120hrs 40hrs wet	High	N/A
KGB to Owen street beach	SL/R660-SL/R0780	Gravel Extraction (dry only)	High	Various
Above KGB L/B	SL660-SL0680	Willow planting by augering	High	3
Harcourt Werry Drive Kennel L/B	SL0730-SL0750	Willow planting by old Kennel club L/B	High	N/A

Attachment 3 to Report 24.360

Location	Cross Section	Work Planned	Segment Risk	Condition of Asset
Owen Street area R/B	SR0740-SR0760	Willow Planting along Owen street section R/B	Low	N/A
Manor Park R/B lower golf course	SR1090-SR1150	Willow planting between new groynes, grid pattern spot planting	Very Low	N/A
Marsden Bend rockline	SR0340-SR0370	Repair holes along rockline	Very High	3
Strand Park rockline	SL0210-SL0220	Repair holes along rockline	High	2
Croft Grove rockline	SL0100-SL0110	Repair holes along rockline	High	2
Avalon Groynes number 6 - (10t) 7 - (15t) 8 - (20t)	SL0760-SL0770	Repair holes on groynes	High	2
Stokes Valley training bank	SL1150-SL1190	Repair holes in rockline	Low	5,3
Nash Street groyne repair	SL0950-SL0970	Groynes C, D, E	High	4

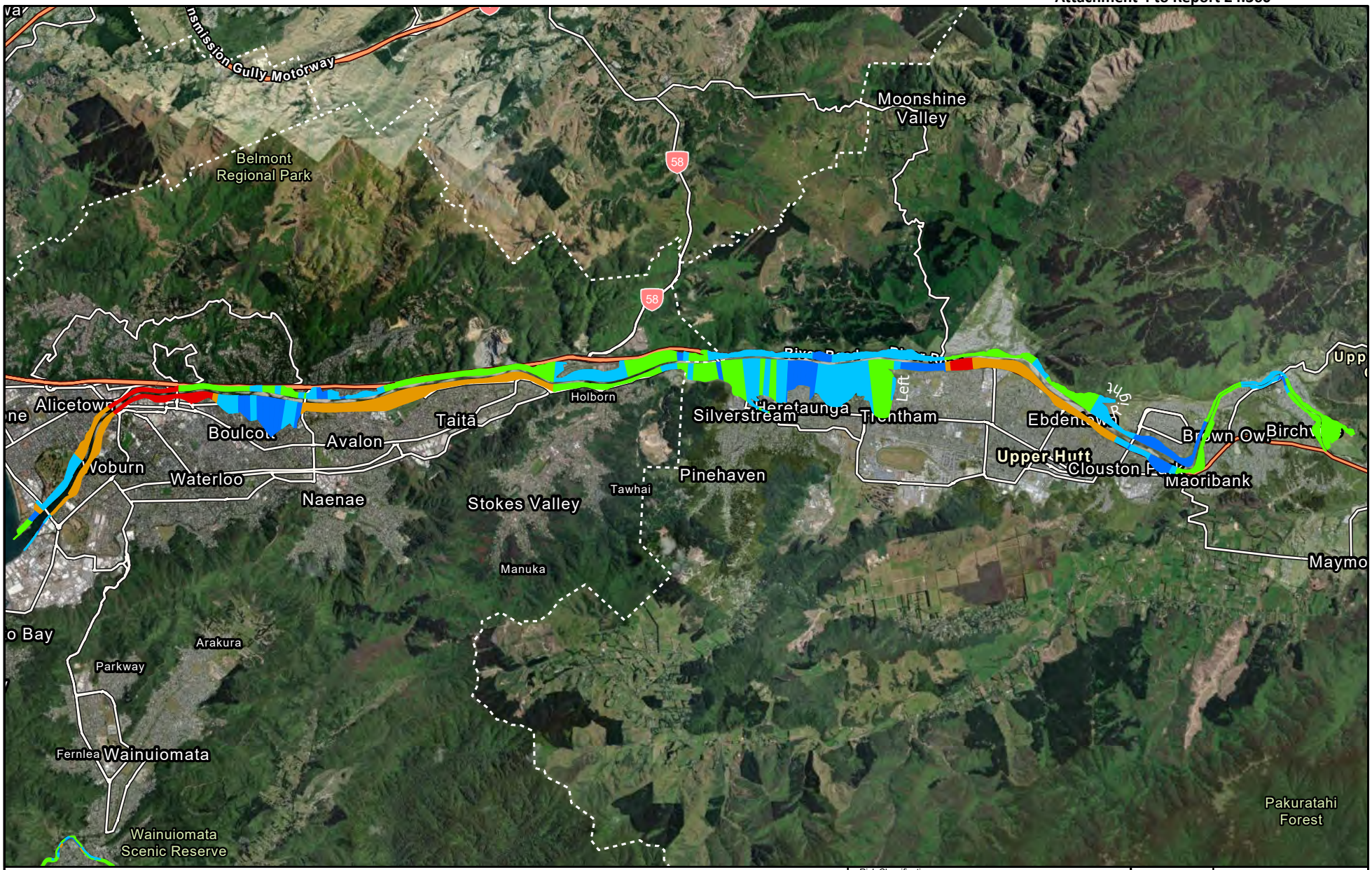
Hutt Upper

Location	Cross Section	Work Required	Segment Risk	Condition of Asset
Elbow Bend	SR2230-SR2320	Remove tree stumps and further trees from stopbank	Medium	1
Maoribank Stopbank	SL2240	Remove trees from stopbank	Medium	4
Gemstone Drive	SL2570-SL2580	Repair hole in stopbank	Medium	2
River Road section	SR1570-SR1600	Willow Planting erosion area between Moonshine and Silverstream bridge R/B	Medium	4-5
Gibbons street north	SL2050-SL2070	Willow Planting north Gibbons Street	High	1
Bridge Road Groyne (5)	SR2530	Repair groyne nose	Low	3
Bridge road Groyne (4)	SR2530+ 40	Repair groyne nose	Low	4
Maoribank rockline	SL2220-SL2240	Rockline repair	Low-Medium	2
Norbert Street	SR2370-SR2380	Rockline repair	Medium	4

Wainuiomata

Location	Cross Section	Work Required	Segment Risk	Condition of Asset
Burden Ave by funeral home	SL1200 – SL1210	Remove 2 trees in stopbank	Medium	3
Wood Street	SL1160 – SL1185	Remove 4 trees in stopbank profile	Low-Medium	3
Leonard Wood Park	SL1070	Repair rutting on top of stopbank	Medium	4
Leonard Wood Park	Various	Willow Planting 2024-2025	Various	Various
Richard Prouse Park	Various	Willow Planting on bank edge	Various	Various
Poole Cres rockline	SL1350	Rock structure top up	Very Low	4

Attachment 4 to Report 24.360



Greater Wellington
Te Pane Matua Taiao

Hutt Overview APT Map

2024 Asset Performance Tool Risk Assessment

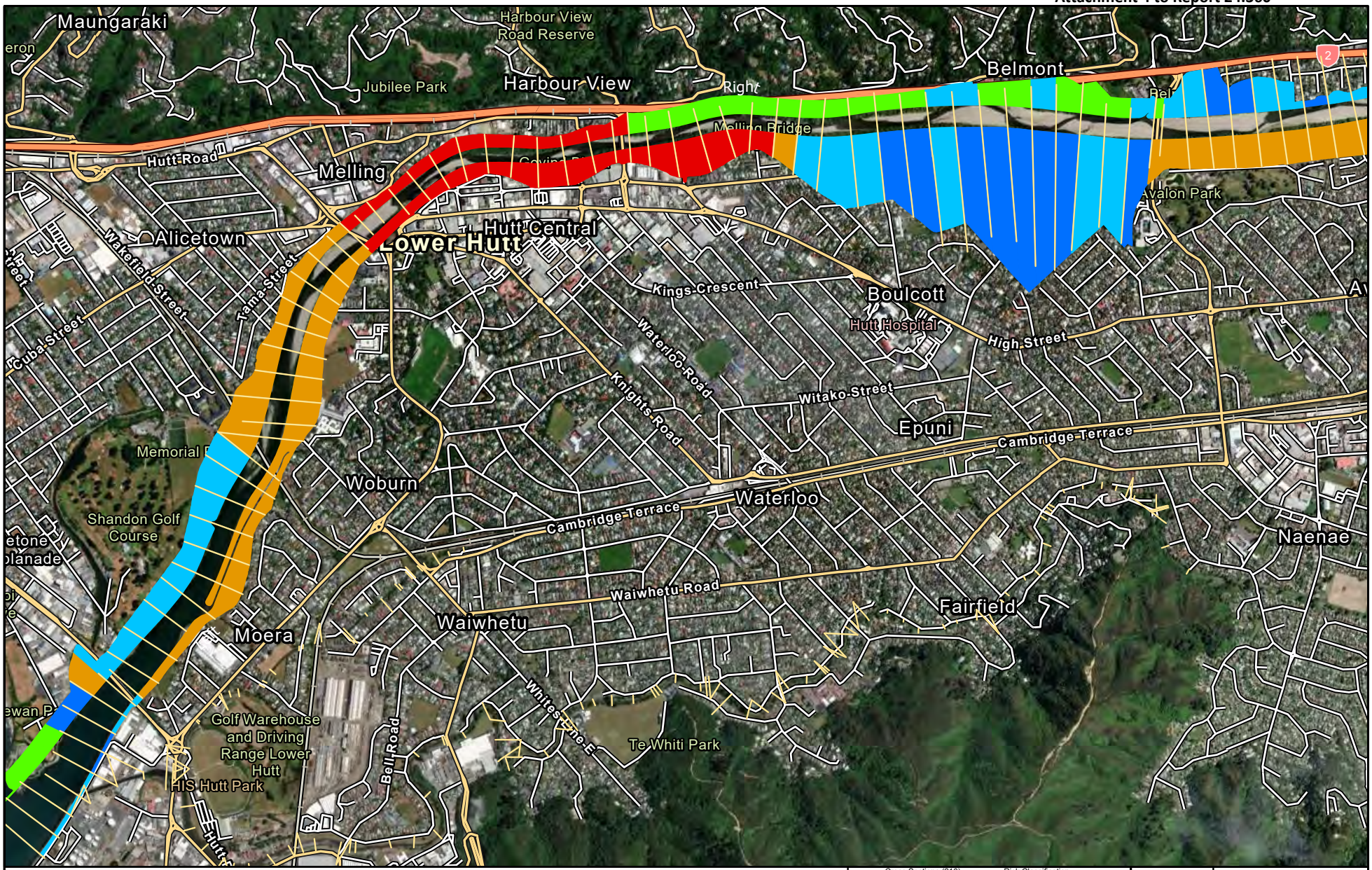
Legend

Risk Classification
- Very High (36)
- High (109)
- Medium (72)
- Low (161)
- Very Low (212)

Project Name:	APT
Author:	TurnerL
Date of Issue:	8/07/2024 8:25 am
Scale at A4:	1:88,000

Path: C:\C_GIS\APT\APT.aprx

Attachment 4 to Report 24.360



Greater Wellington
Te Pane Matua Taiao

Hutt 1 APT Map

2024 Asset Performance Tool Risk Assessment

Legend

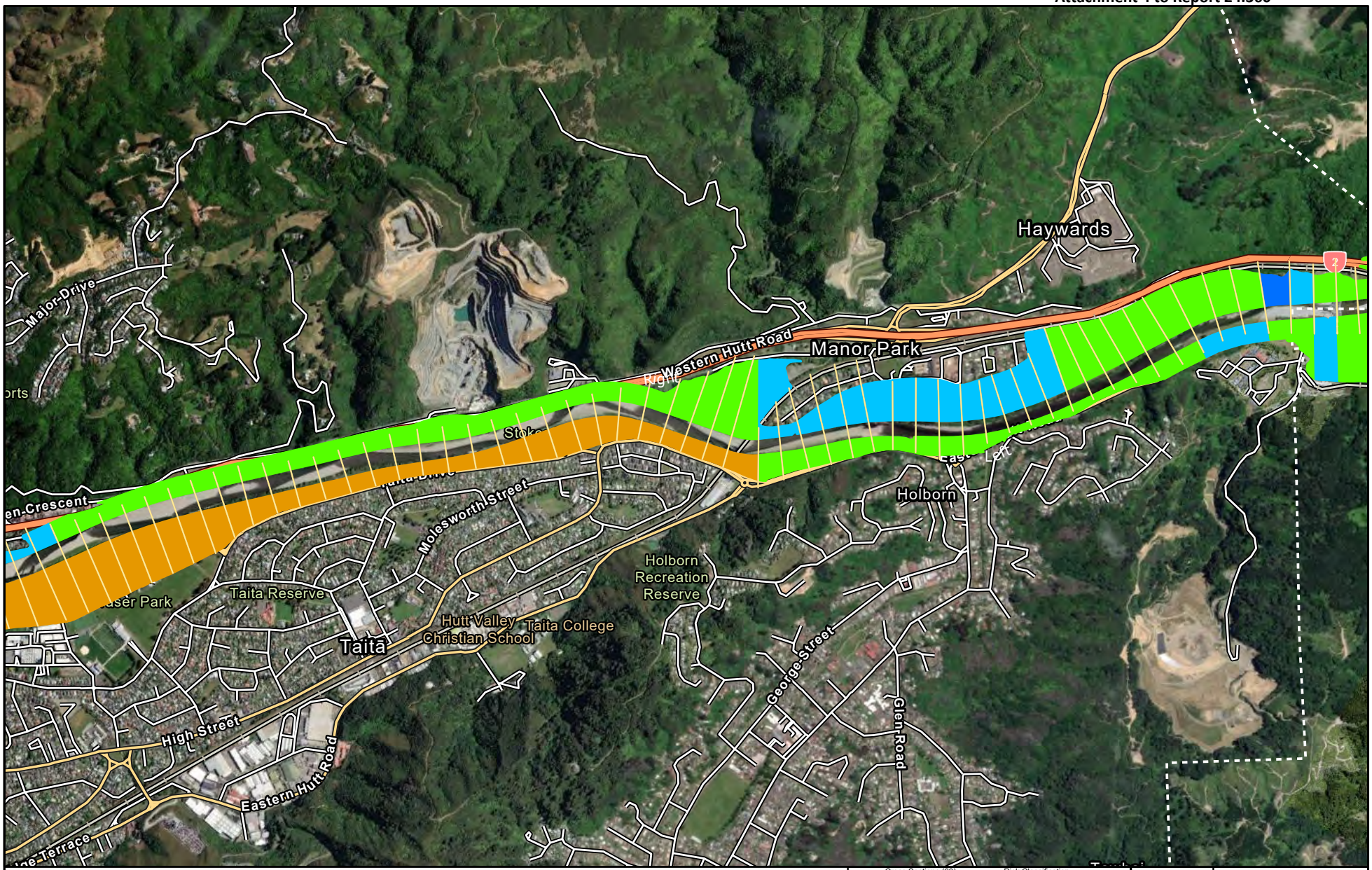
Cross Sections (210)

Risk Classification
- Very High (32)
- High (44)
- Medium (15)
- Low (34)
- Very Low (23)

Project Name:	APT
Author:	TurnerL
Date of Issue:	8/07/2024 8:26 am
Scale at A4:	1:21,000

Path: C:\C_GIS\APT\APT.aprx

Attachment 4 to Report 24.360



Greater Wellington
Te Pane Matua Taiao

Hutt 2 APT Map

2024 Asset Performance Tool Risk Assessment

Legend

Cross Sections (60)

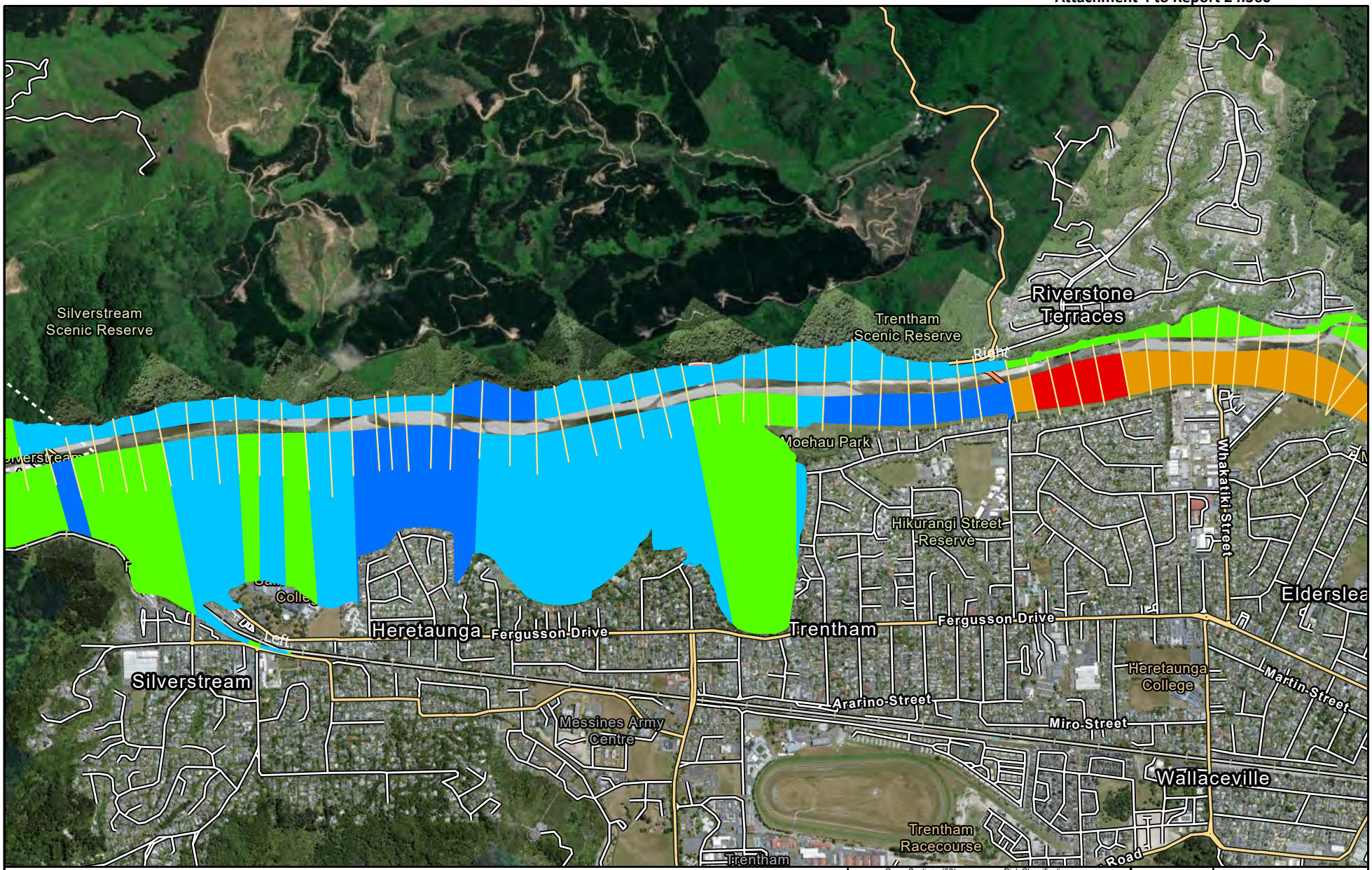
Risk Classification
- Very High (0)
- High (33)
- Medium (1)
- Low (22)
- Very Low (65)

Project Name:	APT
Author:	TurnerL
Date of Issue:	8/07/2024 8:26 am
Scale at A4:	1:21,000

Maxar, LINZ, Stats NZ, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS

Path: C:\C_GIS\APT\APT.aprx

Attachment 4 to Report 24.360



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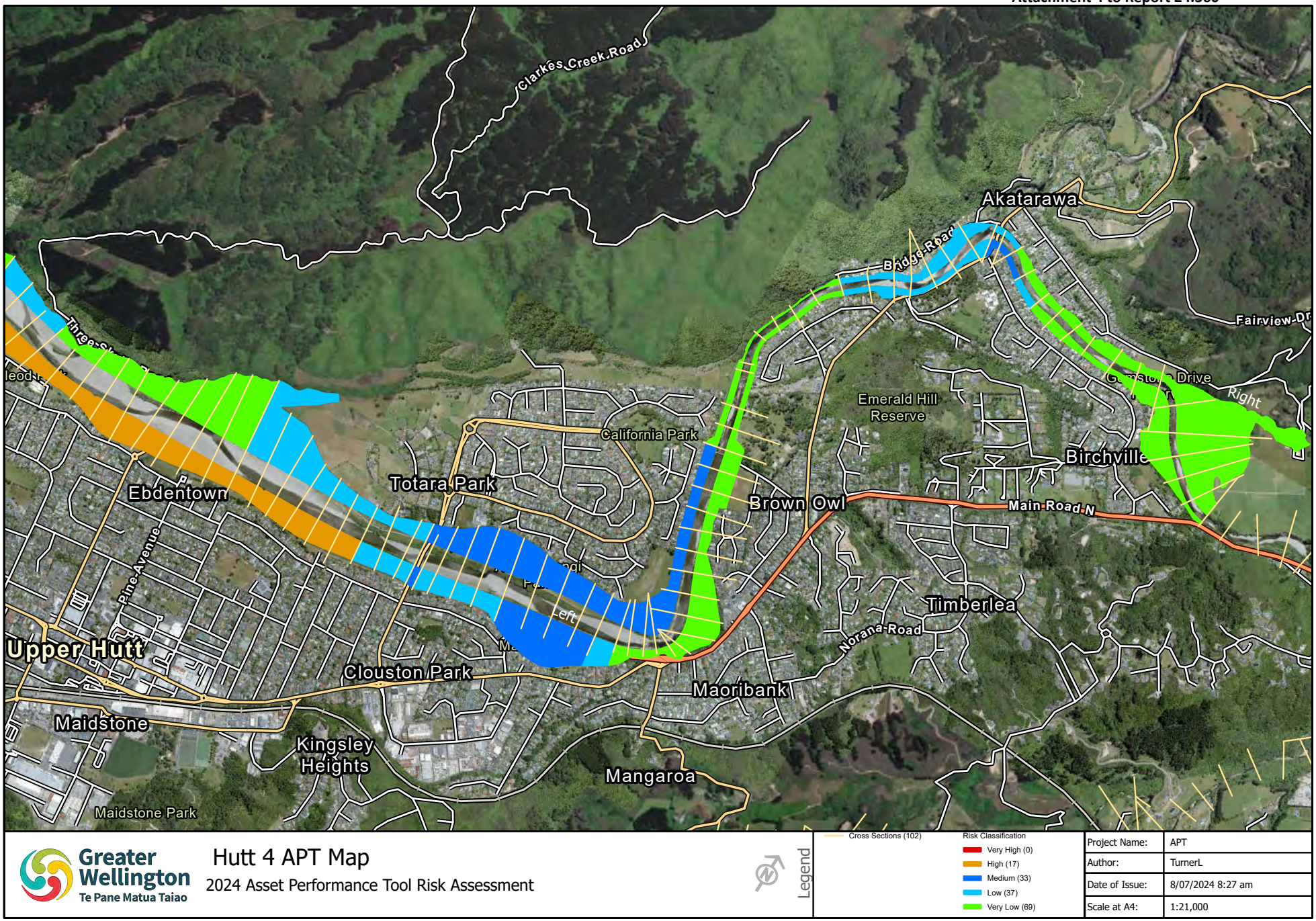

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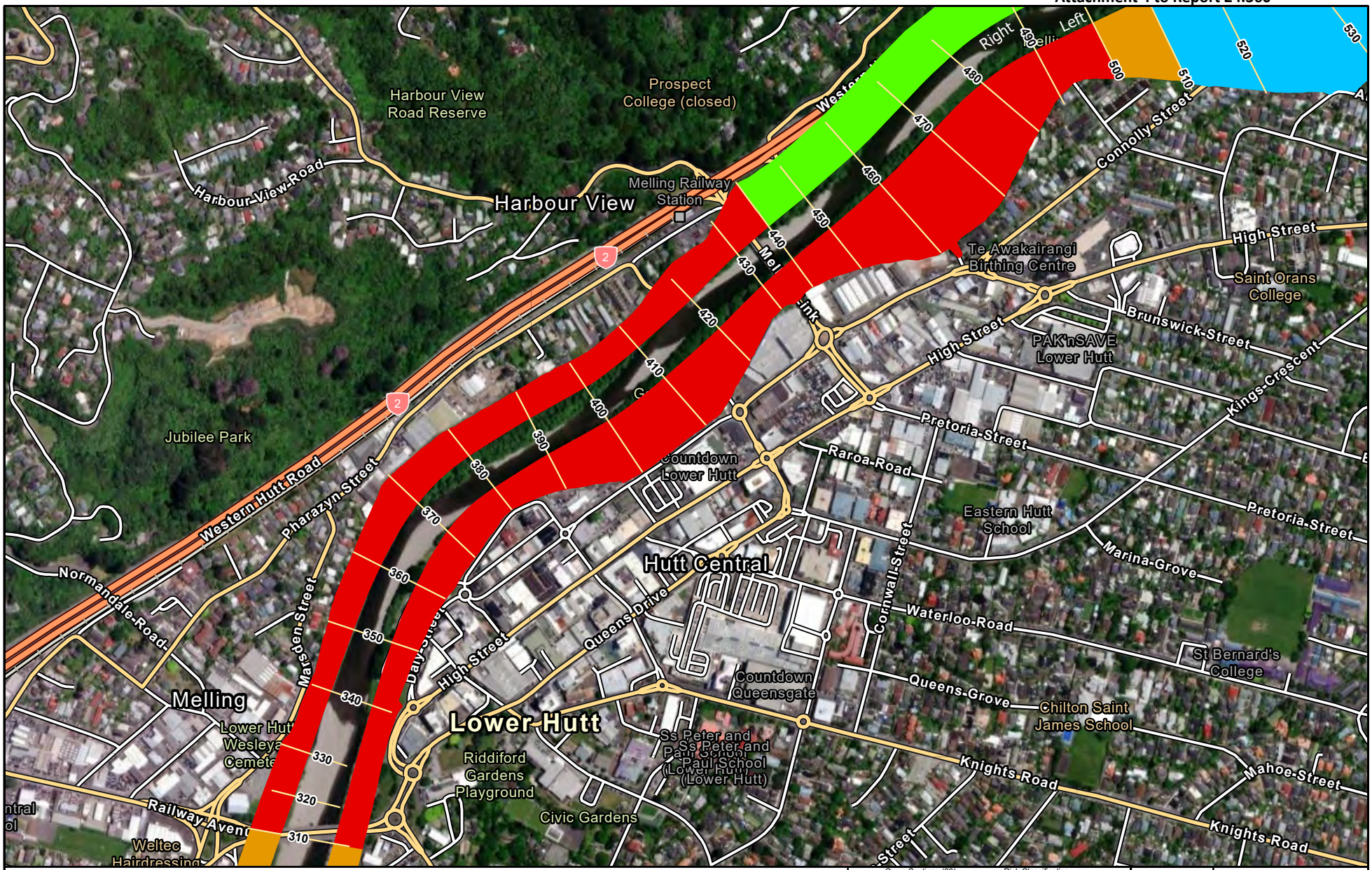


Greater Wellington
Te Pane Matua Taiao

Hutt City Centre APT Map

2024 Asset Performance Tool Risk Assessment

Legend

Cross Sections (23)

Risk Classification
- Very High (32)
- High (3)
- Medium (0)
- Low (3)
- Very Low (6)

Project Name:	APT
Author:	TurnerL
Date of Issue:	8/07/2024 8:27 am
Scale at A4:	1:8,000

Path: C:\C_GIS\APT\APT.aprx

Attachment 4 to Report 24.360

Greater Wellington
Te Pane Matua Taiao

Wainuiomata APT Map

2024 Asset Performance Tool Risk Assessment

Legend

Cross Sections (54)

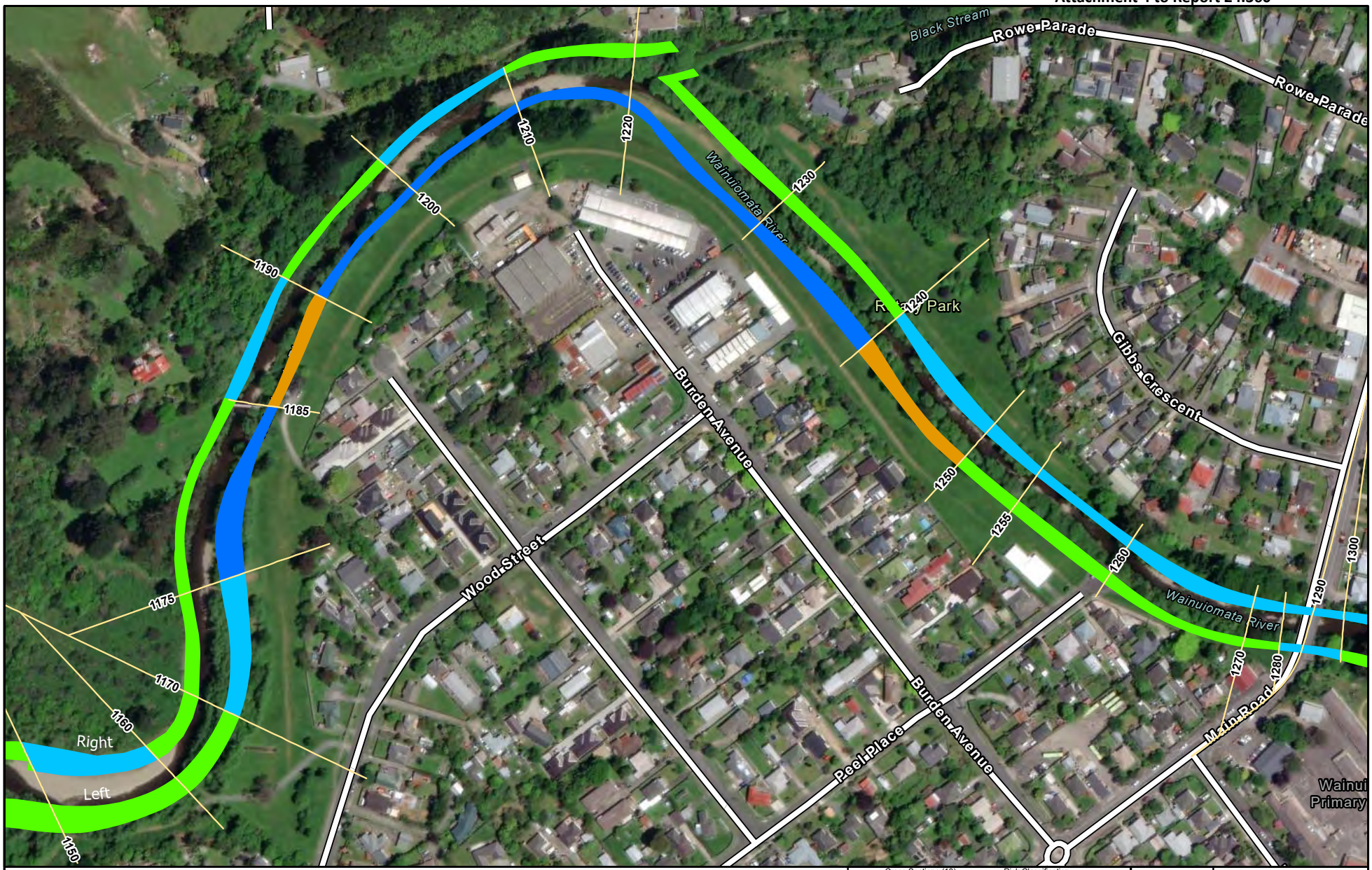
Risk Classification
- Very High (0)
- High (2)
- Medium (9)
- Low (24)
- Very Low (65)

Project Name:	APT
Author:	TurnerL
Date of Issue:	8/07/2024 8:27 am
Scale at A4:	1:9,000

Esri Community Maps Contributors, LINZ, Stats NZ, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Maxar

Path: C:\C_GIS\APT\APT.aprx

Attachment 4 to Report 24.360



Greater Wellington
Te Pane Matua Taiao

Wainuiomata - Rotary Park APT Map

2024 Asset Performance Tool Risk Assessment

Legend

Cross Sections (18)

Risk Classification
- Very High (0)
- High (2)
- Medium (6)
- Low (14)
- Very Low (16)

Project Name:	APT
Author:	TurnerL
Date of Issue:	8/07/2024 8:27 am
Scale at A4:	1:3,000

Esri Community Maps Contributors, LINZ, Stats NZ, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS, Maxar

Path: C:\C_GIS\APT\APT.aprx

Attachment 5 to Report 24.360

Scheme	Location, XS, Bank	Failure Mode(s)	Description	Probability of Failure	Consequence of Failure	Risk	Remediation 2024
Hutt	Pharazyn Street, 310-430, Right bank	Capacity; Intrinsic Strength	Stopbank will overtop from 2800 cumec event. Stopbank intrinsic strength is 'average'	5	5	**Very High**	RiverLink project will retreat, raise and improve stopbank structure.
Hutt	City Centre, 310-490, Left Bank	Capacity; Intrinsic Strength	Stopbank will overtop from 2800 cumec event. Stopbank intrinsic strength is 'average'	5	5	**Very High**	RiverLink project will retreat, raise and improve stopbank structure.
Hutt	River Road above Moonshine Bridge 1780-1820, Left Bank	Capacity; Intrinsic Strength	Stopbank will overtop from 2800 cumec event.	5	5	**Very High**	Modelling for Te Awa Kairangi/Hutt River is mostly complete. A targeted detailed investigation on this stopbank is planned this financial year and will consider options for managing this risk.
Wainuiomata	Rotary Park, 1185; 1240, Left Bank	Capacity	Possible overtopping at x2 locations in 1% AEP event.	3	4	**High**	A quick investigation is planned into these areas to determine whether local raising of defences is required. An update to the flood hazard model is programmed to commence this financial year once the flood hazard modelling for the Te Awa Kairangi/Hutt river has been completed.
Hutt	River mouth, (80 Right bank)	Capacity	Stopbank will overtop from 1900 cumec event.	5	3	**High**	Initial investigations have been completed through the RiverLink project and these will be progressed further when the HRFMP is reviewed.

Attachment 5 to Report 24.360

Scheme	Location, XS, Bank	Failure Mode(s)	Description	Probability of Failure	Consequence of Failure	Risk	Remediation 2024
Hutt	Strand Park to Moera, 100-300, Left bank	Consequence; Condition	Inherent high consequence will result in high risk. Some XS have condition issues.	2-3	5	**High**	Operational work programs to prioritise maintenance of critical assets within reaches to improve condition rating.
Hutt	Alicetown, 200-300, Right bank	Consequence; Condition	Inherent high consequence will result in high risk. Some XS have condition issues.	2-3	5	**High**	
Hutt	Harcourt Werry/ Taita Drive, 600-1080, Left bank	Consequence; Condition	Inherent high consequence will result in high risk. Some XS have condition issues.	2-3	5	**High**	
Hutt	Various River Road, 1830-2100	Consequence; Condition	Inherent high consequence will result in high risk. Some XS have condition issues.	2-3	5	**High**	

Attachment 6 to Report 24.360

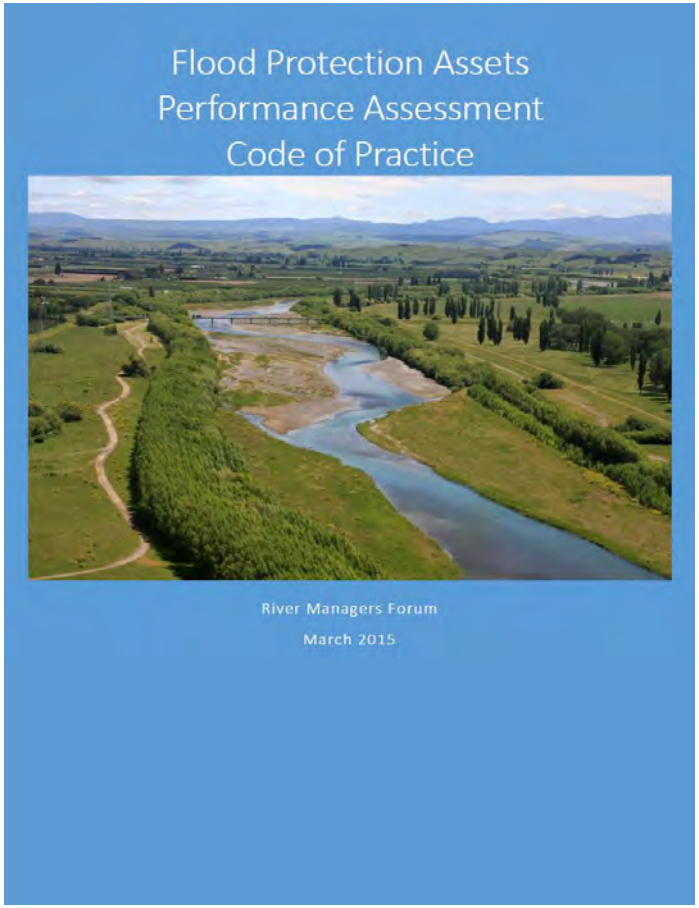
Te Awa Kairangi / Hutt Valley Subcommittee Annual Asset Management Condition Report

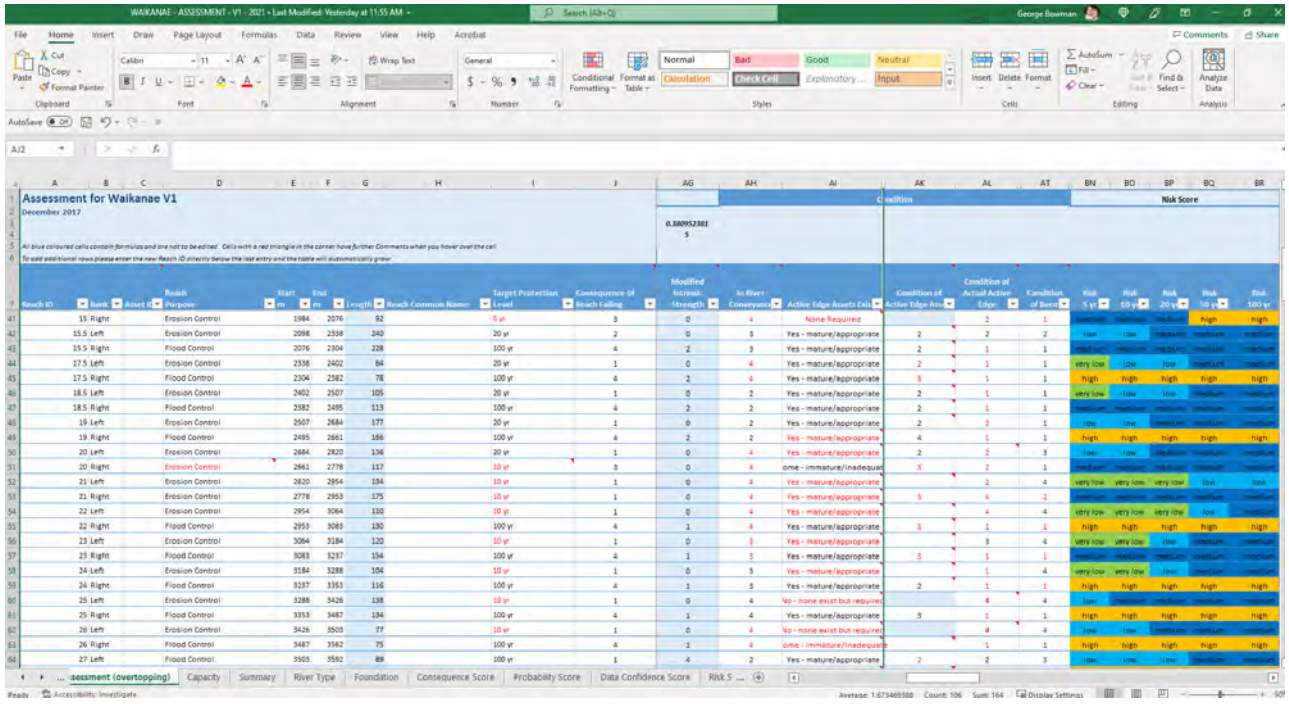
22nd October 2024

Greater Wellington
Te Pane Matua Taiao

Attachment 6 to Report 24.360

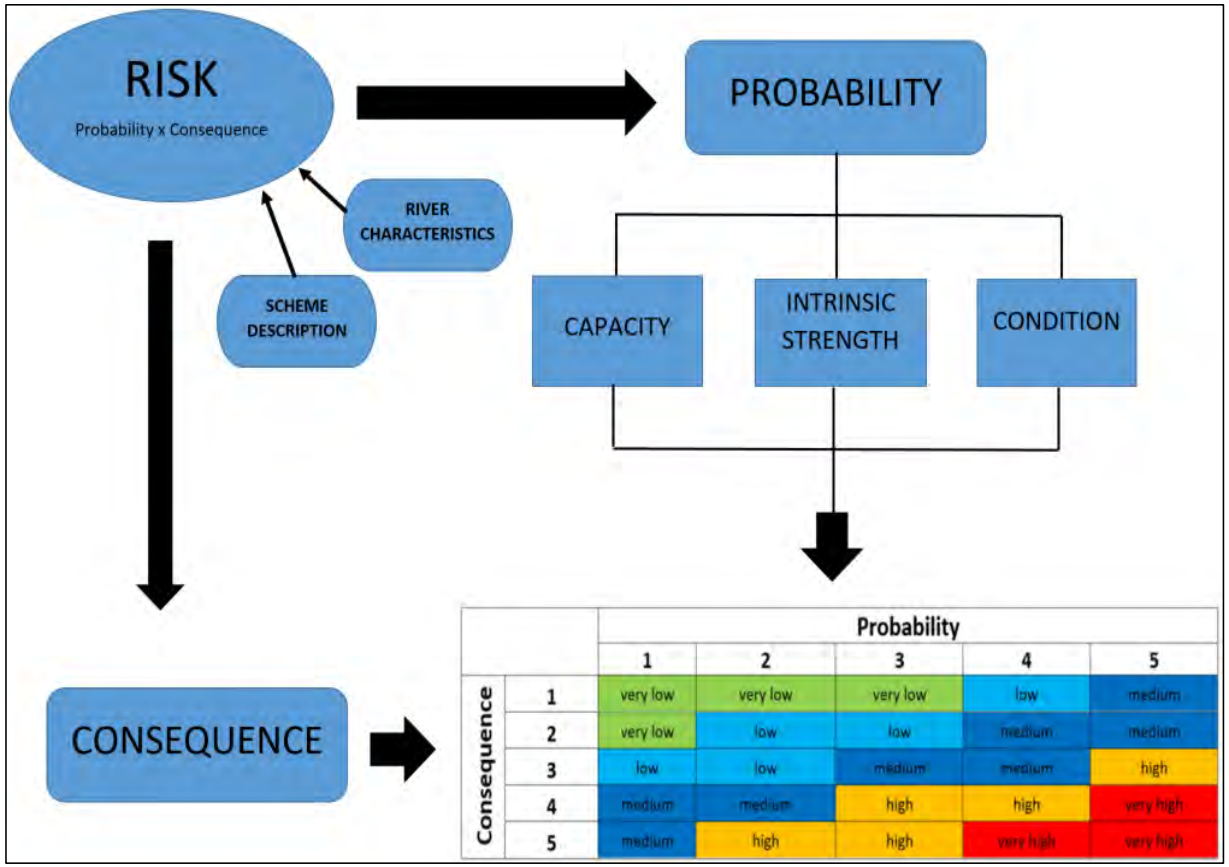
OVERVIEW – Asset Performance Framework





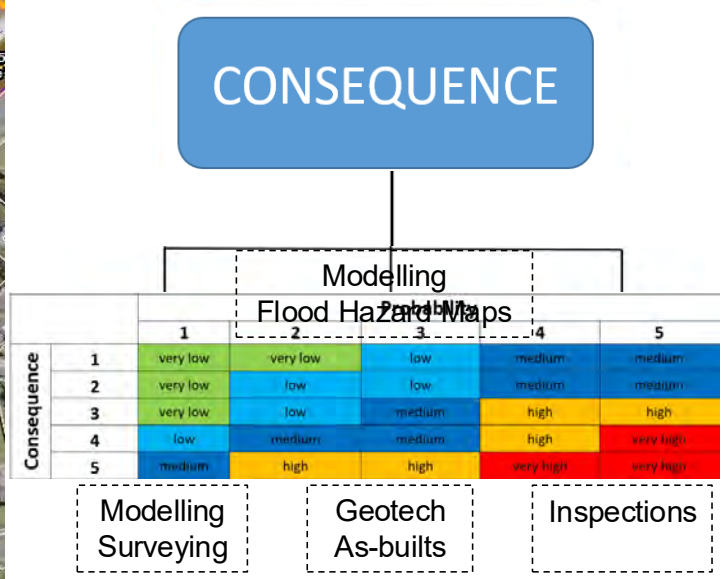
Attachment 6 to Report 24.360

OVERVIEW – Asset Performance Framework



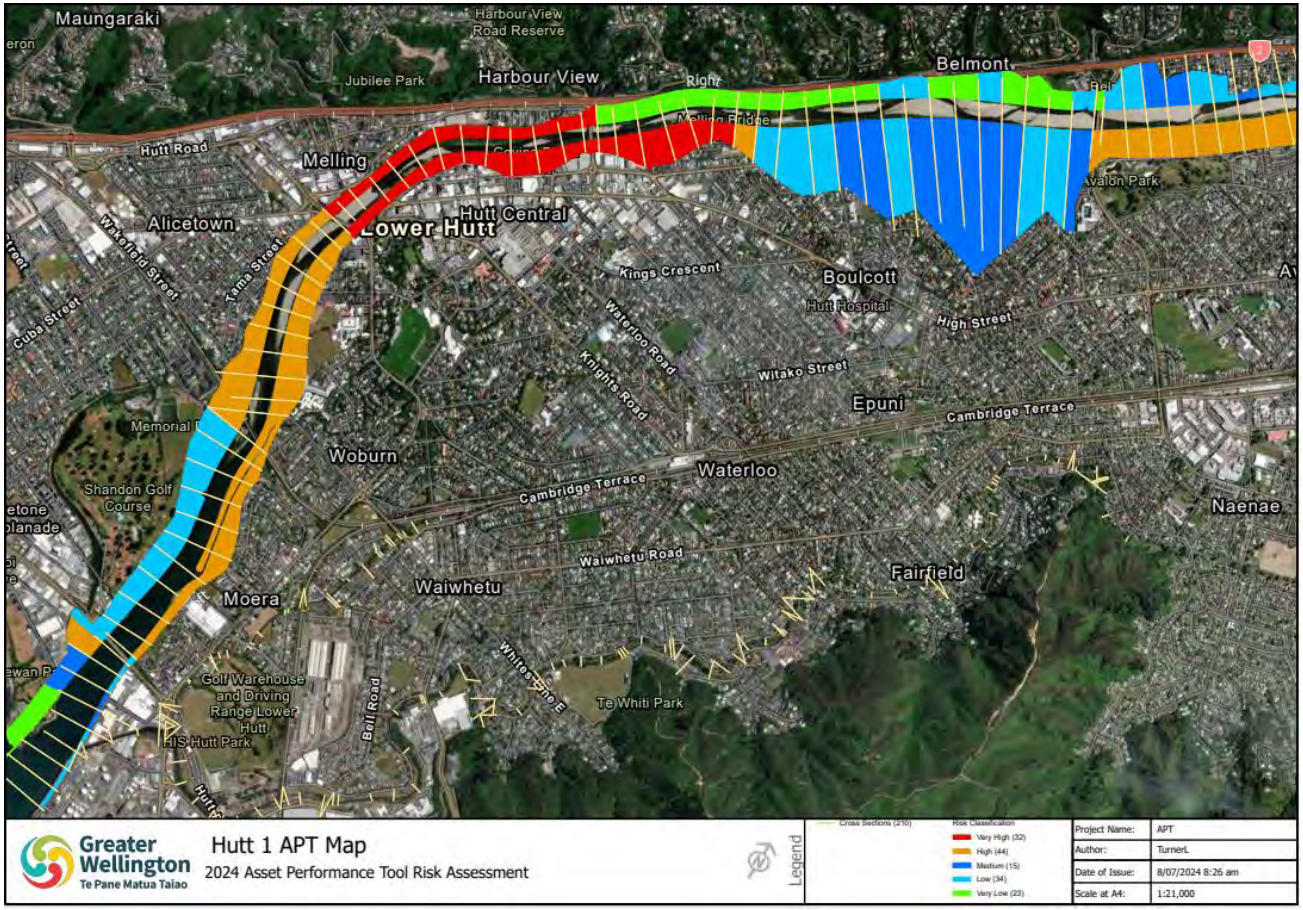
Consequence	Probability 1	2	3	4	5
1	very low	very low	very low	low	medium
2	very low	low	low	medium	medium
3	low	low	medium	medium	high
4	medium	medium	high	high	very high
5	medium	high	high	very high	very high

OVERVIEW – Asset Performance Framework



Performance Information

OVERVIEW – Asset Performance Framework



BENEFITS

- Risk communication
- Work program prioritisation
- Identifies failure modes
- Identifies critical assets
- Identifies missing information

Attachment 6 to Report 24.360

Asset information request

1. What are the degraded assets?
2. How important are these degraded assets?
3. Where are the important degraded assets?
4. What is the plan for remediating them?

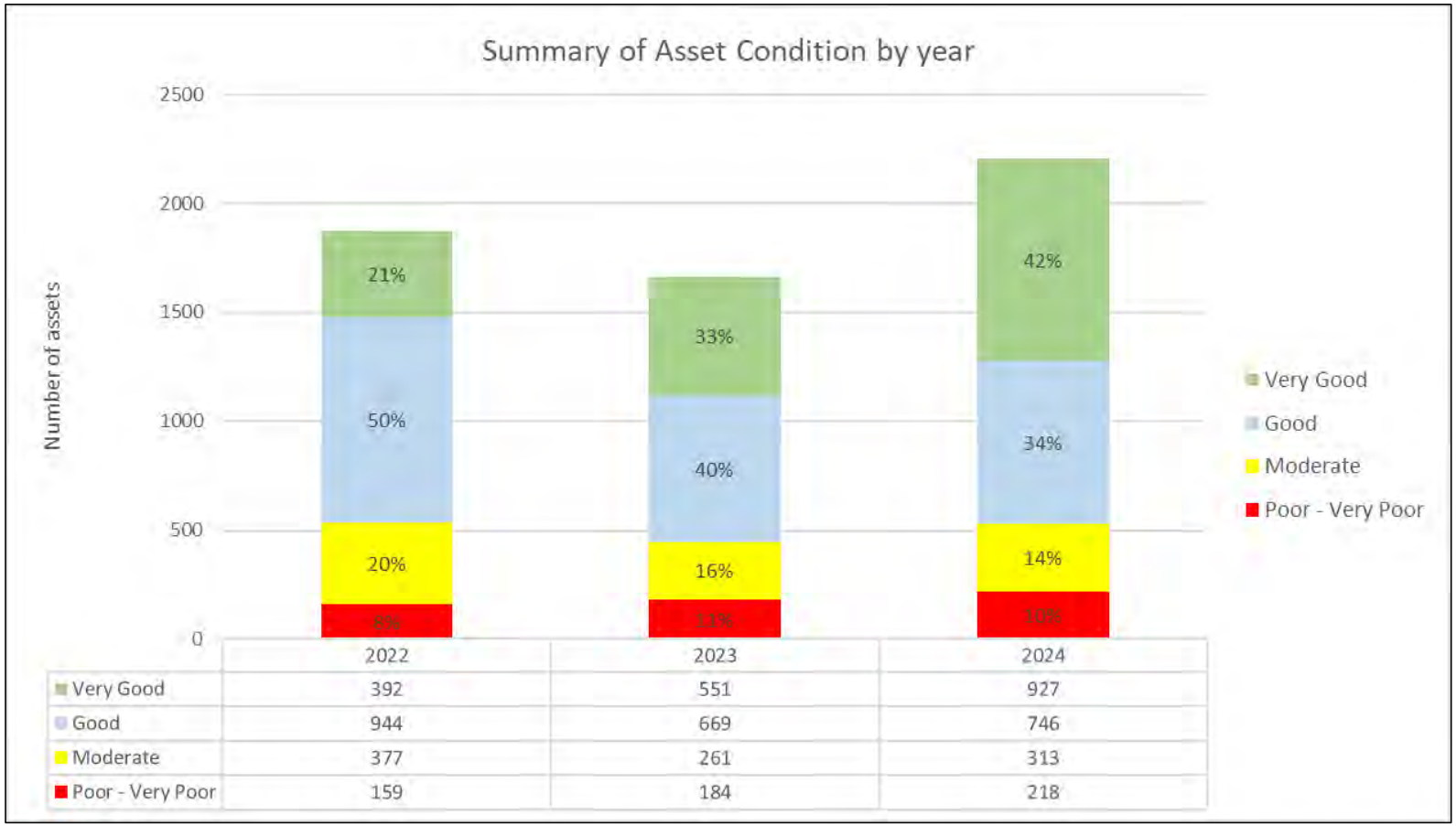
Attachment 6 to Report 24.360

Hutt Valley – Condition Trend

Year	2024		2023		2022	
Asset Condition Rating Scores	Ratio	Count	Ratio	Count	Ratio	Count
1 - Very Good	90%	927	89%	551	92%	392
2 - Good		746		669		944
3 - Moderate		313		261		377
4 – Poor	10%	190	11%	132	8%	137
5 - Very Poor		28		52		22
Totals	**100%**	**2204**	**100%**	**1665**	**100%**	**1872**

Attachment 6 to Report 24.360

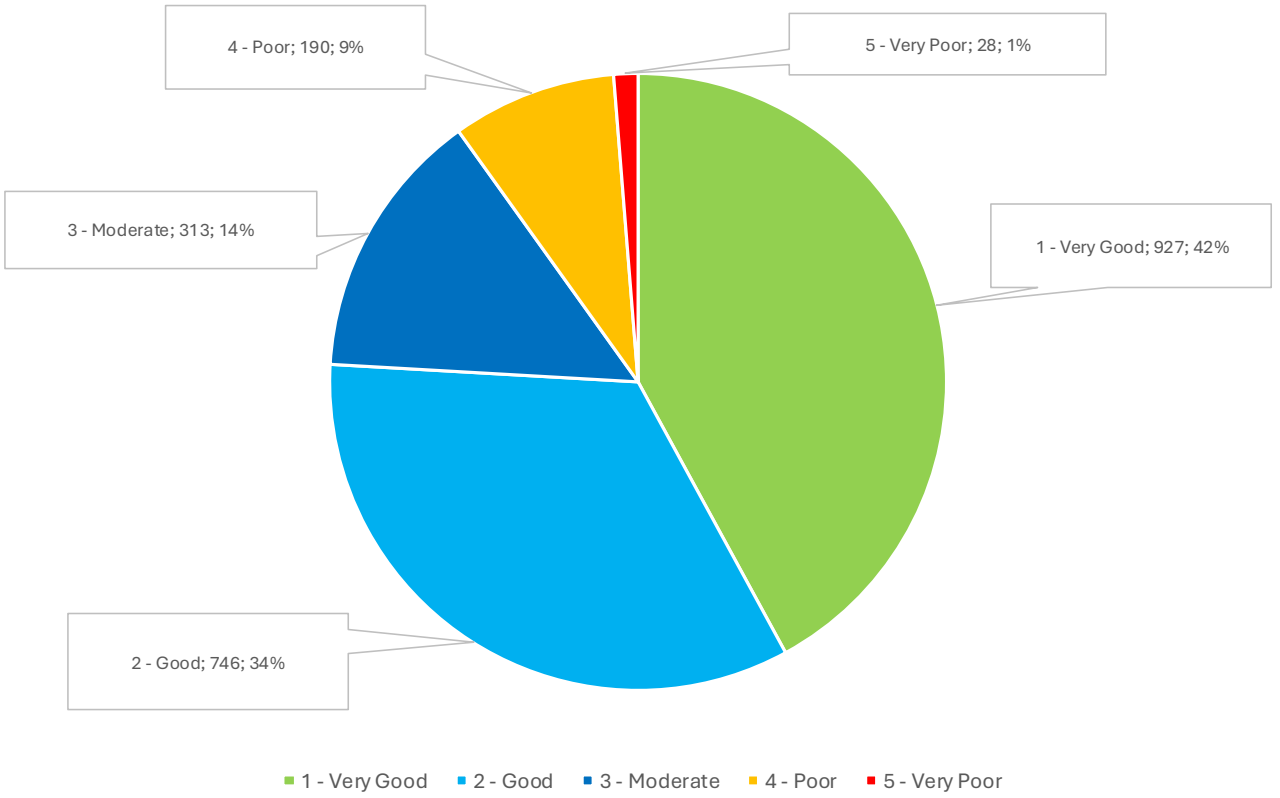
Hutt Valley – Summary of Condition by year



	2022	2023	2024
Very Good	392	551	927
Good	944	669	746
Moderate	377	261	313
Poor - Very Poor	159	184	218

Attachment 6 to Report 24.360

Hutt Valley – 2024 Condition Summary



Attachment 6 to Report 24.360

Hutt Valley – 2024 Condition by Asset Type

Asset Grouping	1 – Very Good	2 – Good	3 – Moderate	4 – Poor	5 – Very Poor	Total
Blockline	0	7	3	2	0	12
Bridge	1	0	1	0	0	2
Carpark	7	2	0	0	0	9
Channel	285	88	36	5	0	414
Constructed wetland	0	2	0	0	0	2
Culvert	3	14	3	0	0	20
Cycle path/access track	209	113	19	0	0	341
Debris arrestor	0	1	0	1	1	3
Debris fence	3	23	26	68	9	129
Demolition line	0	6	0	0	0	6
Drain/modified channel	29	23	20	1	0	73
Fence	13	4	0	0	0	17
Floodgate	4	16	3	0	0	23
Floodwall	2	21	2	2	0	27
Gate	45	15	2	1	2	65
Groyne	20	67	25	14	4	130
Headwall/Wingwall	4	12	2	0	0	18
Native planting	39	54	20	1	2	116
Retaining wall	0	2	3	3	1	9
Riprap	18	126	24	6	1	175
Rock Mattress	0	1	1	0	0	2
Seat	10	1	0	0	0	11
Sign	17	5	0	0	0	22
Stopbank	149	52	31	37	0	269
Three Water Asset	1	0	0	0	0	1
Weir	1	2	0	0	0	3
Willow	67	89	92	49	8	305
Total	**927**	**746**	**313**	**190**	**28**	**2204**

Attachment 6 to Report 24.360

Hutt Valley – Poor Condition by Asset Type

Asset Type	4 – Poor	5 – Very Poor	Total
Blockline	2	0	4
Channel	5	0	5
Debris arrestor	1	1	2
Debris fence	68	9	77
Drain/modified channel	1	0	1
Floodwall	2	0	2
Gate	1	2	3
Groyne	14	4	18
Native planting	1	2	3
Retaining wall	3	1	4
Riprap	6	1	7
Stopbank	37	0	37
Willow	49	8	57
Total	**190**	**28**	**218**

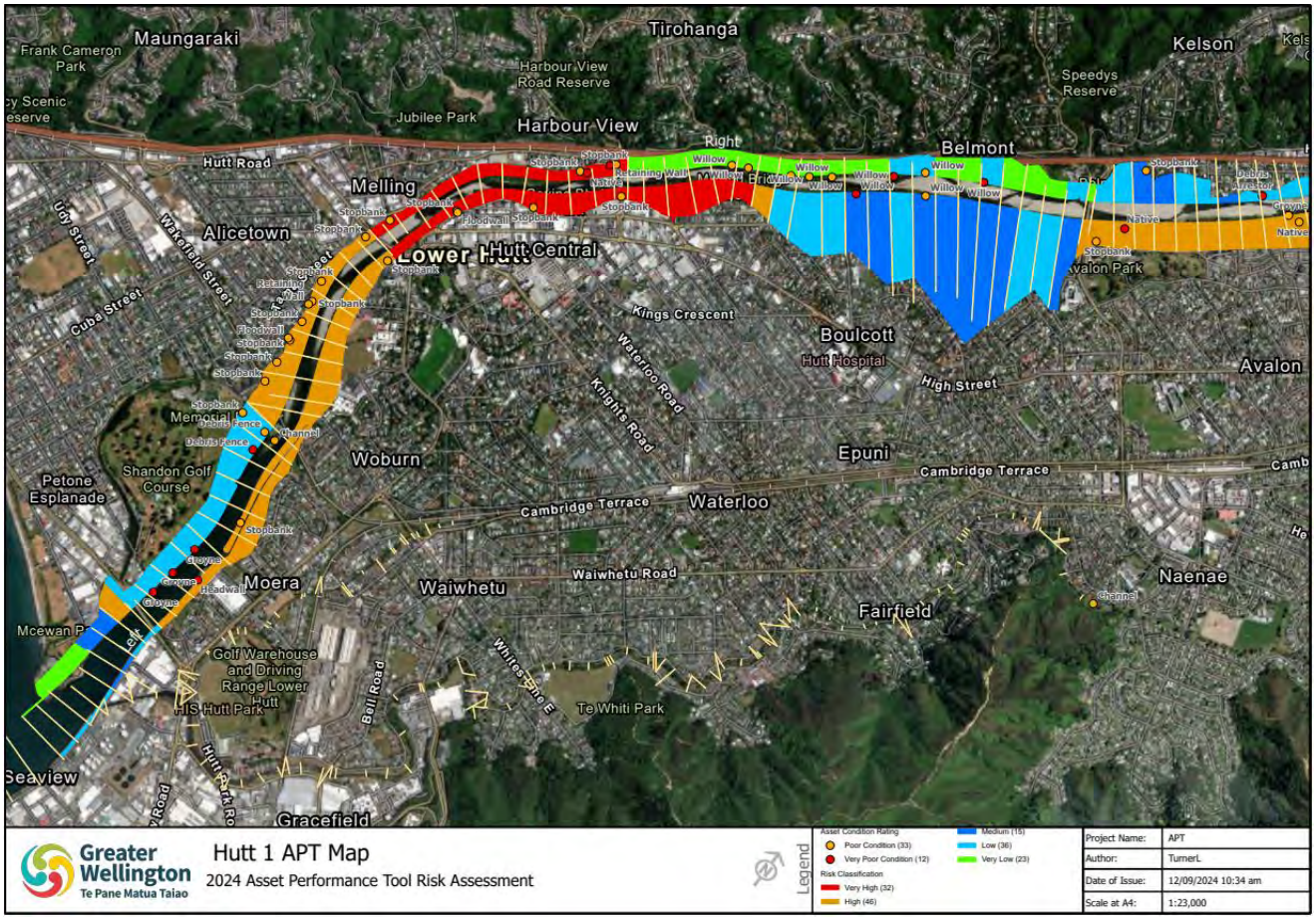
Attachment 6 to Report 24.360

Hutt Valley – Condition by Significant Asset Type

Asset Type	Total Number	4 - Poor	5 - Very Poor	Issue(s) reported
Culvert	20	0	0	Weeds to be cleared
Floodgate	23	0	0	No issues reported
Floodwall	27	2	0	Crack in wall
Groyne	133	14	4	Loose rocks or missing material
Headwall/Wingwall	18	0	0	No issues reported
Retaining wall	9	3	1	Evidence of cracking, potential misalignment
Riprap	174	6	1	Erosion, weed infestation
Stopbank	269	37	0	Invasive weeds , trees

Attachment 6 to Report 24.360

Hutt Valley – Poor condition ft. Risk



Attachment 6 to Report 24.360

Hutt Valley – Remediation

Proposed Hutt Work Programme (as at 25th September 2024)

Hutt Lower

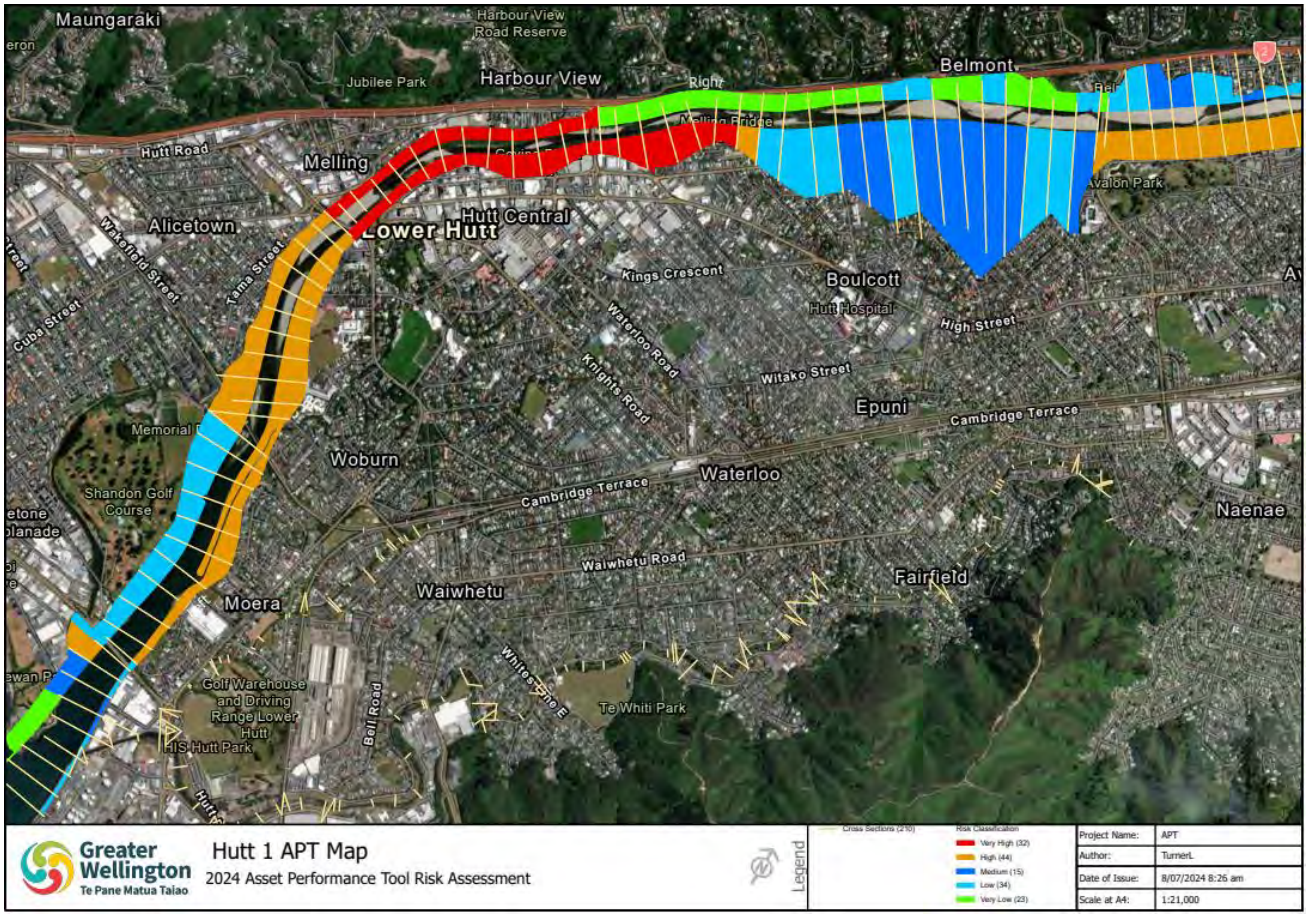
Location	Cross Section	Work Planned	Segment Risk	Condition of Asset
Alicetown Plantings	SR240-SR250 SR290-SR300	Remove tree from stopbank by flood walls	High	4
Various	Various	Repairs to berm drainage issues	Various	Various
Various	Various	Remove dead willow trees in willow lines that are critical	Various	Various
Belmont Norfolk street	SR680	Remove tree from stopbank by flood walls	Medium	4
Whole lower river	SR0570-SR1350	Vegetation clearing only 200 hrs x $400	Various	Various
KGB to Belmont	SL/R660-SL/R0780	Bed re-contouring wet channel	High	Various
Taita-Pomare	SL1030-SL1050	Bed contouring Taita/Pomare section total 120hrs 40hrs wet	High	N/A
KGB to Owen street beach	SL/R660-SL/R0780	Gravel Extraction (dry only)	High	Various
Above KGB L/B	SL660-SL0680	Willow planting by augering	High	3
Harcourt Werry Drive Kennel L/B	SL0730-SL0750	Willow planting by old Kennel club L/B	High	N/A

Hutt Valley – New assets built/captured after 1/10/23

Asset type	No. of assets	Observed Asset Condition				
		1 – Very Good	2 - Good	3 - Average	4 - Poor	5 – Very Poor
Bridge	1	1				
Carpark	6	6				
Culverts	2		2			
Fence	8	6	2			
Gate	2	2				
Groyne	13	5	4	3	1	
Native planting	37	27	5	5		
Retaining wall	2			2		
Riprap	9	3	4	1		1
Seat	1	1				
Signs	6	6				
Stopbank	1				1	
Weir	1		1			
Willow	1	1				
Total	**90**	**58**	**18**	**11**	**2**	**1**

Attachment 6 to Report 24.360

Hutt Performance – Reach 1



Attachment 6 to Report 24.360

Risk Mitigation

Scheme	Location, XS, Bank	Failure Mode(s)	Description	Probability of Failure	Consequence of Failure	Risk	Remediation 2024
Hutt	Pharazyn Street, 310-430, Right bank	Capacity; Intrinsic Strength	Stopbank will overtop from 2800 cumec event. Stopbank intrinsic strength is 'average'	5	5	**Very High**	RiverLink project will retreat, raise and improve stopbank structure.
Hutt	City Centre, 310-490, Left Bank	Capacity; Intrinsic Strength	Stopbank will overtop from 2800 cumec event. Stopbank intrinsic strength is 'average'	5	5	**Very High**	RiverLink project will retreat, raise and improve stopbank structure.
Hutt	River Road above Moonshine Bridge 1780-1820, Left Bank	Capacity; Intrinsic Strength	Stopbank will overtop from 2800 cumec event.	5	5	**Very High**	Modelling for Te Awa Kairangi/Hutt River is mostly complete. A targeted detailed investigation on this stopbank is planned this financial year and will consider options for managing this risk.
Wainuiomata	Rotary Park, 1185; 1240, Left Bank	Capacity	Possible overtopping at x2 locations in 1% AEP event.	3	4	**High**	A quick investigation is planned into these areas to determine whether local raising of defences is required. An update to the flood hazard model is programmed to commence this financial year once the flood hazard modelling for the Te Awa Kairangi/Hutt river has been completed.
Hutt	River mouth, (80 Right bank)	Capacity	Stopbank will overtop from 1900 cumec event.	5	3	**High**	Initial investigations have been completed through the RiverLink project and these will be progressed further when the HRFMP is reviewed.

Te Awa Kairangi / Hutt River Valley Subcommittee
22 October 2024
Report 24.544

For Information

RIVERLINK PROJECT UPDATE

Te take mō te pūrongo
Purpose

1. To update the Te Awa Kairangi / Hutt River Valley Subcommittee (The Subcommittee) on Te Wai Takamori o Te Awa Kairangi (Te Wai Takamori)and provide a presentation on the Mills Street Stopbank and Greater Wellington Regional Council (Greater Wellington)W proposed high level future work programme will follow.

Te tāhū kōrero
Background

2. Te Wai Takamori is a partnership between Greater Wellington, Hutt City Council (HCC), NZ Transport Agency Waka Kotahi (NZTA), Ngāti Toa Rangitira and Taranaki Whānui ki Te Upoko o Te Ika.
3. Delivery of Te Wai Takamori relates to Greater Wellington's strategic priorities for regional resilience and public transport. Strategic priorities for freshwater quality, biodiversity, and multi-modal transport options are also supported by the successful completion of Riverlink.
4. The flood protection components are a key deliverable of the Hutt River Floodplain Management Plan.
5. The objectives for Te Wai Takamori o Te Awa Kairangi are:

Achieve Ora Tangata, Ora Taiao and Ora Wairua	To reorient the city to face and connect with Te Awa Kairangi and respond to climate change by: • Providing resilient transport choices allowing all people and businesses to move safely and reliably to, from and within our city centre. • Improving flood protection for the Lower Hutt city centre and areas south of the city to enable better resilience for people and property. • Stimulating and supporting urban regeneration and economic development. Encourage growth and the regeneration of Lower Hutt city centre and promote commercial and residential development.

Te tātaritanga
Analysis

Overall Project

6. The Te Wai Takamori o Te Awa Kairangi Partnership Governance Group (PGG) at their meeting on 21 August 2024 approved the winding up of the Project Management Office (PMO) on 30 September 2024. This includes the disestablishment of the Project Director role. The PMO has been replaced by a refreshed partnership operating model recognising the change to a coordinated delivery approach.
7. Partner Leads are leading the transition together and prioritising building the new 'team of teams' and completing the Coordinated Delivery Programme.
8. There will no longer be a Project Directors report.

Property

9. There have been no changes since the last update.
10. A total of 144 properties are being acquired for the Project:
    a 142 properties have now been acquired with two land acquisition remaining. (39A Mills & 69-95 High St)
    b 62 commercial rights (lessee interests, easement interests, business closures and business relocations) have been acquired with 6 lease acquisitions remain (Millies House and the five retailers at 69-95 High St).
    c Vacant possession has now been secured for:
    d Area E (85-103 Pharazyn Street)
    e Area B (even numbers 50-90 Marsden Street)
    f Area I (7-12 Daly Street)
    g Area H (39b-56 Mills Street) note that 39A Mills is now in the scope for this area and unlikely to be secured until Q1/Q2 next year
    h Area A (22-77 Marsden Street)
11. Further tenants in lower Daly Street/High Street vacant possession in September 2025 (nine lessees). Millies House (5 Daly), Vibe and The Call Centre (4 Daly St) and the six retailers at 69-95 High St.

Property Relocation and Demolition

12. Demolition of remaining commercial sites on Marsden Street took place during August 2024. Due to asbestos removal at one of the properties, an alternative vehicle access route had to be established between commercial buildings and Marsden Street. Several meetings took place with business owners to ease the impacts of the closure on their business activities, and alternative travel routes and parking spaces were provided. A thank you morning tea was held for the commercial tenants on Marsden Street on Friday 27 September 2024 following the

recent access closures and disruptions. All scheduled above ground demolition works were completed in September 2024.

13. CERES NZ have been engaged to complete below ground demolition works, which commenced in August 2024. Vegetation removal was completed in early August 2024 ahead of below ground demolition commencing. Some of the removed foliage was gratefully accepted by Wellington Zoo Te Nukuao, who used it to feed their herbivore animals (giraffes, nyalas, capybaras, kangaroos, wallabies, sheep and primates).

Mills Street Stopbank Construction

14. The temporary stopbank experienced minor flooding from the Hutt River on 26 August 2024 and 31 August 2024 (just below a 1 in 2 year event). No issues with the stopbank integrity were reported.

15. Minor remedial works were undertaken at a nearby property due to vibration damage sustained during pre-load work last year. Currently working through reported vibration damage to a residential property on Connolly Street, with the preferred approach being to make a Principal's deduction from the NZS:3910 Contract Claim.

16. Practical completion of stage 1 is scheduled for October 2024. Demobilisation of Fletchers plant and equipment will take place and the site will be handed over to Greater Wellington. Greater Wellington will undertake on site care and maintenance until a new contractor is mobilised for stage 2.

17. Survey pins are being installed so that movement of the stopbank can be observed over the next six months.

River works, rocklines, and bioengineering

18. Damwatch has been engaged for the first stage of design.

19. A Return on Investment was issued on GETS in relation to rocklines work planned for the 2024/2025 earthworks season. Seven responses were received and an evaluation memo is being drafted with the recommendation to progress to Request for Proposal stage with three contractors.

20. AECOM has been engaged to work on consent management plan changes so rocklines work can get underway in early 2025.

21. A native planting trial is being undertaken in Belmont. The purpose of this trial and associated monitoring is to inform how the remaining sections of Te Awa Kairangi/Hutt River will be bioengineered.

22. Wellington Electricity have undertaken a feasibility assessment for relocation of the 33kV and 11kV high voltage cables. The proposed route for the 33kV cable is on the true left bank road corridor from Transpower Melling substation through Lower Hutt to Ewen Bridge, and across Ewen Bridge to Railway Avenue. Detailed design is now being undertaken.

Ngā hua ahumoni
Financial implications

Greater Wellington

23. Greater Wellington has, through its 2021-31 Long Term Plan and subsequent annual planning processes, committed funding of $295 million to delivery of the flood protection benefits of Te Wai Takamori o Te Awa Kairangi. Further changes to this funding commitment may be necessary prior to signing the funding agreement.
24. These budgets do not include allowances for improvements to facilities related to public transport associated with the relocation of Melling Train Station, as NZTA is responsible for its relocation.
25. Inflation and escalation will need to be adjusted during the project life.

Hutt City Council

26. HCC's 2024-2034 Long Term Plan (LTP) has been finalised and published. It includes additional funding for Te Wai Takamori o Te Awa Kairangi. HCC is progressing with the design and delivery of Te Wai Takamori o Te Awa Kairangi scope brought in-house, to reflect affordability.
27. HCC's focus remains on the development of a coordinated programme delivery plan and construction sequence that meets the Partners' expectations.

Ngā Take e hāngai ana te iwi Māori
Implications for Māori

28. Ngāti Toa Rangitira and Taranaki Whānui ki Te Upoko o Te Ika are members of the Te Awa Kairangi Project Governance Group.
29. The Mana Whenua Steering Group established between Waka Kotahi and Ngāti Toa Rangitira and Taranaki Whānui ki Te Upoko o Te Ika to oversee Te Ara Tupua, Eastern Bays Pathway has been expanded to include Te Wai Takamori o Te Awa Kairangi.

Ngā ā Te huritao ki te huringa o te āhuarangi
Consideration of climate change

30. Riverlink considers and responds to the predicted impacts of climate change when considering the appropriate response to the issue the project seeks to address.
31. This programme aligns with the 2015 Climate Change strategy, which states 'we will help the region adapt to climate change'. The project increase climate change adaptation and resilience to natural disasters in the region.
32. Greater Wellington currently assesses options to address flood risk based on the predicted impacts of climate change over the next 100 years. Increased rainfall and sea level rise predictions are assessed on a catchment-by-catchment basis.

Ngā tūāoma e whai ake nei
Next steps

33. Officers will present **Attachment 1** at the Subcommittee meeting on 22 October 2024.

Ngā āpitihanga
Attachments

Number	Title
1	Presentation – MSSB and planned upcoming work

Ngā kaiwaitohu
Signatories

Writer	Tracy Berghan – Manager Te Wai Takamori o Te Awa Kairangi
Approvers	Wayne O'Donnell – Programme Manager - Greater Wellington Sponsor Lian Butcher – Kaiwhakahaere Matua, Taiao | Group Manager, Environment

He whakarāpopoto i ngā huritaonga **Summary of considerations**
Fit with Council's roles or with Committee's terms of reference Te Awa Kairangi Subcommittee's specific responsibilities include to "review periodically the effectiveness of implementation and delivery of floodplain management plans for the Te Awa Kairangi/Hutt River floodplain", of which the Te Wai Takamori o Te Awa Kairangi project is part of.
Contribution to Annual Plan / Long Term Plan / Other key strategies and policies Te Wai Takamori o Te Awa Kairangi contributes to the delivery of Greater Wellington's strategic priorities of Regional Resilience, Freshwater Quality and Biodiversity, and Public Transport.
Internal consultation There was no internal consultation beyond the Te Wai Takamori o Te Awa Kairangi team in preparing this report.
Risks and impacts - legal / health and safety etc. Escalation and general uncertainties in the construction market will continue for some time and cost pressure on construction will remain. Potential affects in relation to Procurement, Greater Wellington property purchase programme, and the associated reputational risk and costs incurred by early termination of leases and business relocations if construction start delayed.

Attachment 1 to Report 24.544

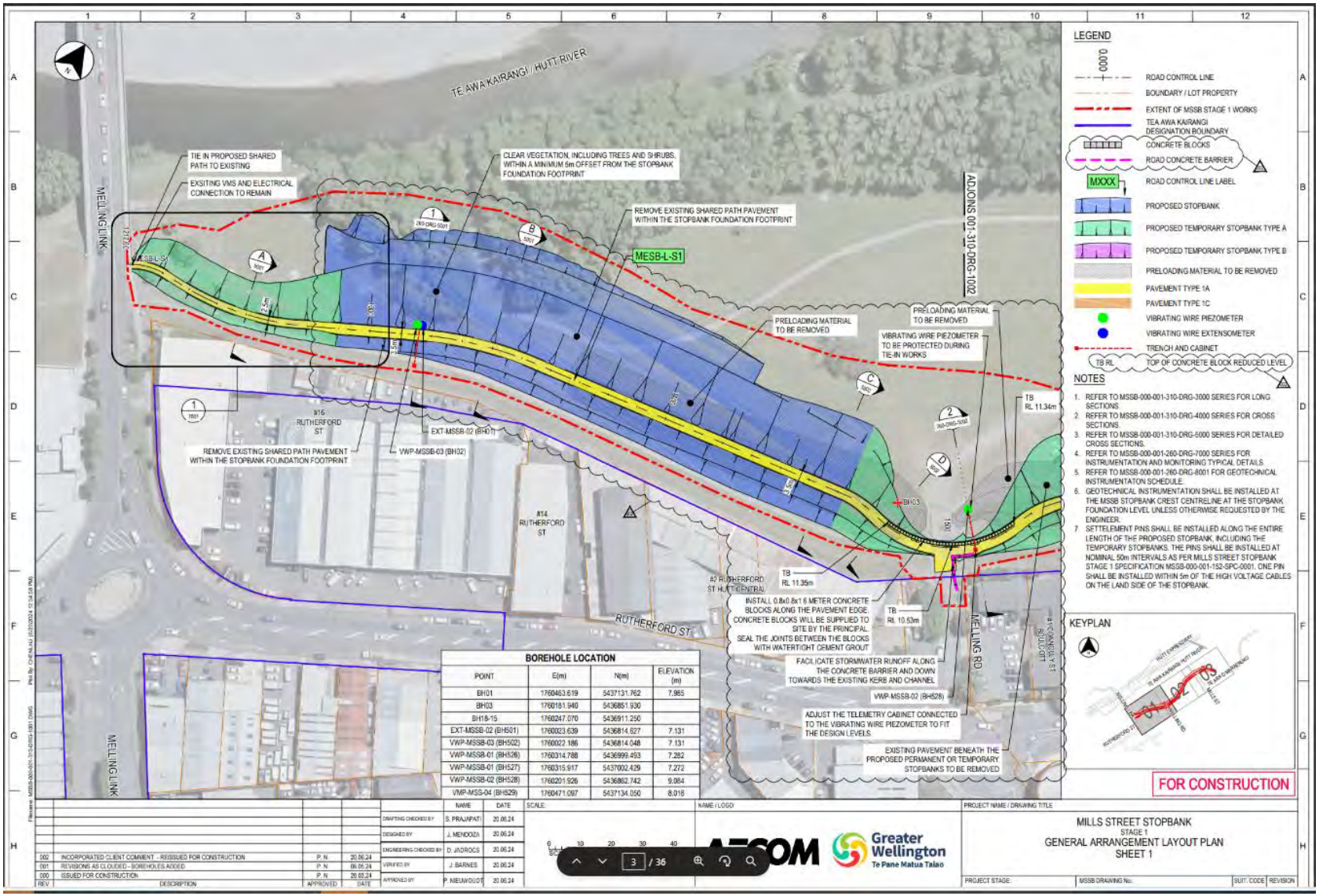
Mills Street Stopbank and Upcoming Work

Greater Wellington
Te Pane Matua Taiao

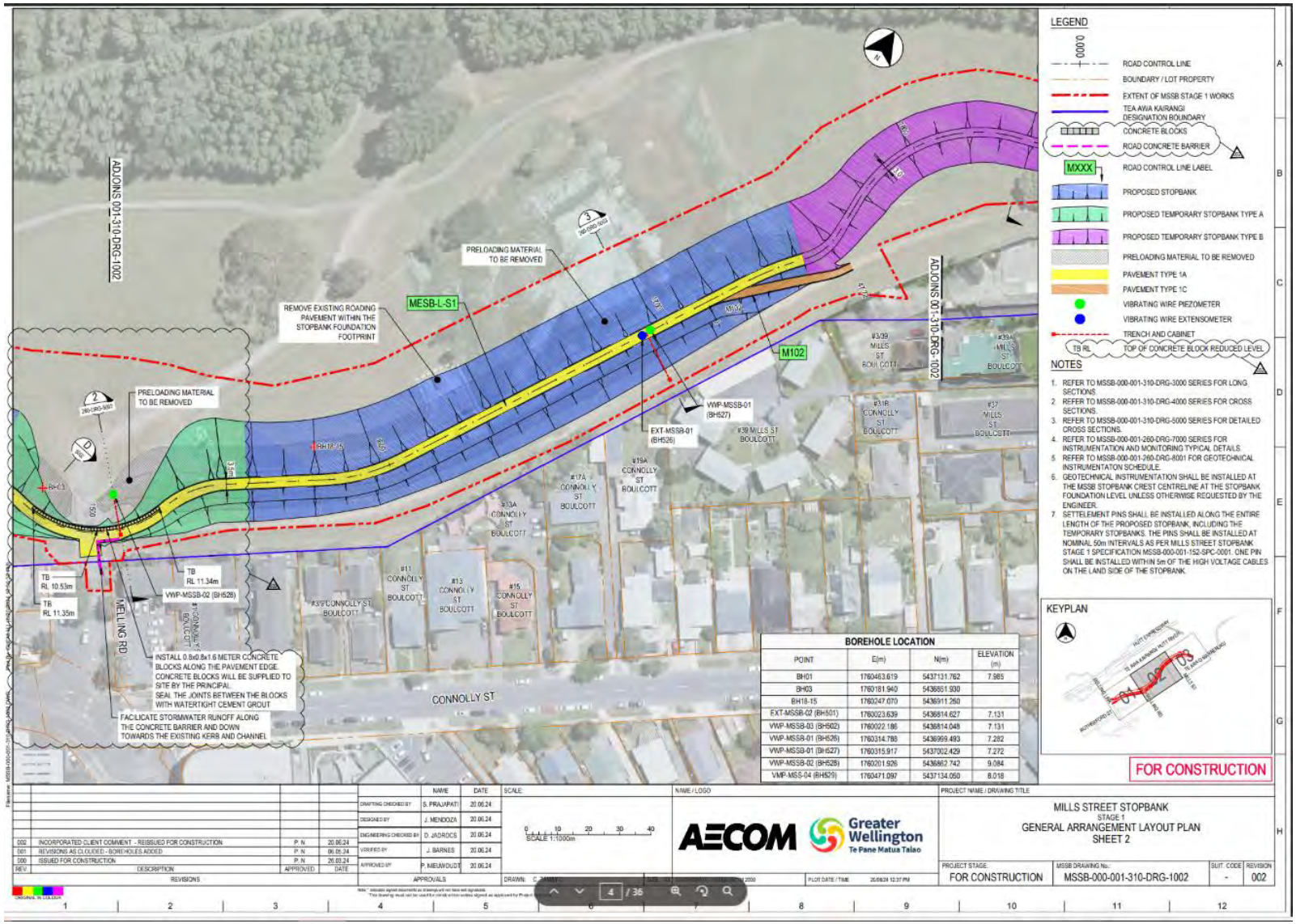
Mills Street Stopbank

- Stage 1
  - Raise crest level of most of stopbank at river side of existing stopbank, including removing utilities under Stage 1 stopbank footprint
  - Construct temporary stopbanks at Melling Bridge and Mills Street
- Stage 2
  - Relocate HV power cables under existing stopbank, replace Outlet 40, and associated penstock work
  - Complete stopbank construction over full stopbank profile, and remove temporary stopbank at Mills Street
- Stage 3
  - Landscaping, active mode construction (some may be carried out in Stage 2)
  - After Melling Bridge is removed, complete stopbank at Melling Bridge

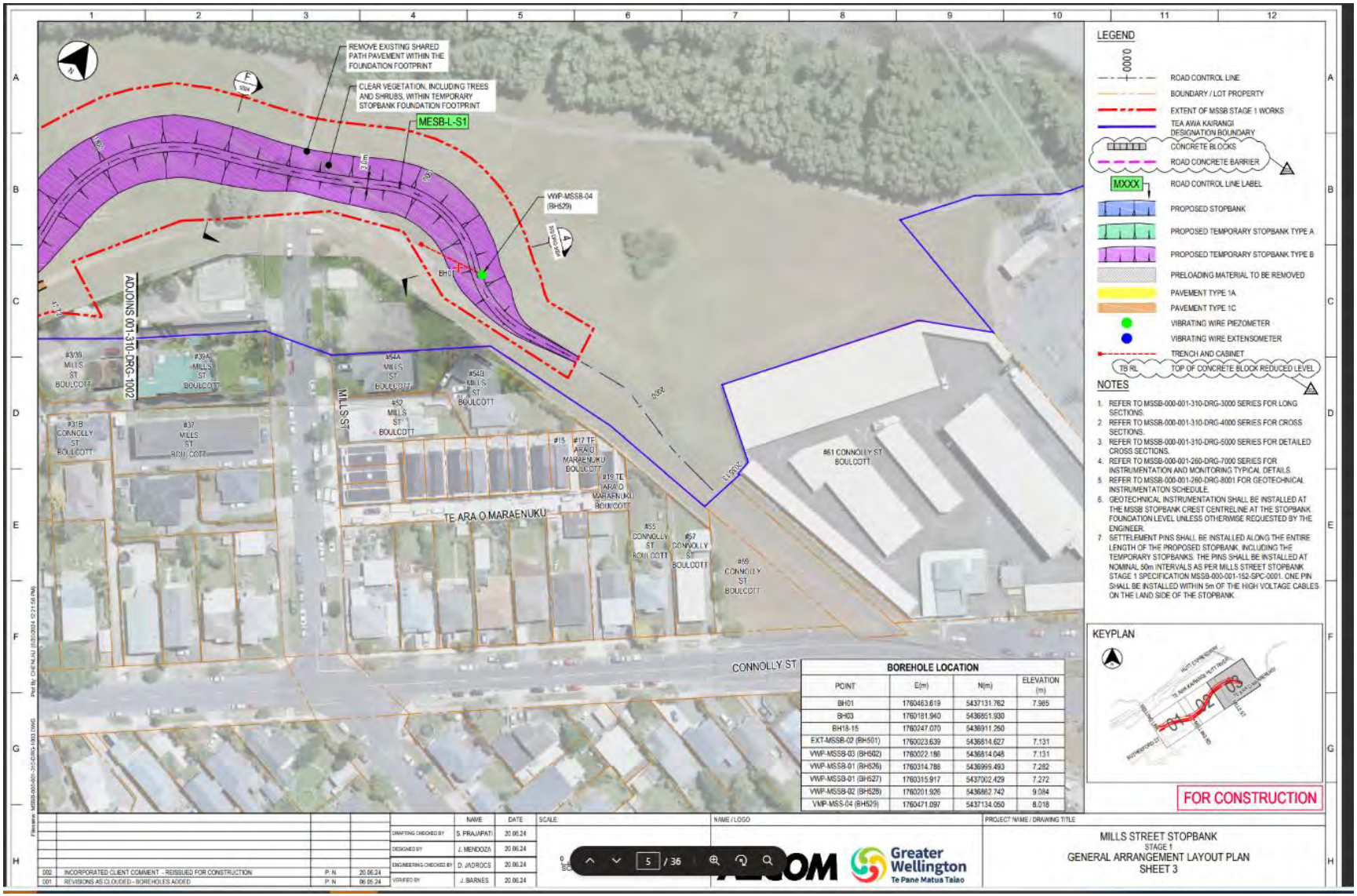
Attachment 1 to Report 24.544



Attachment 1 to Report 24.544



Attachment 1 to Report 24.544



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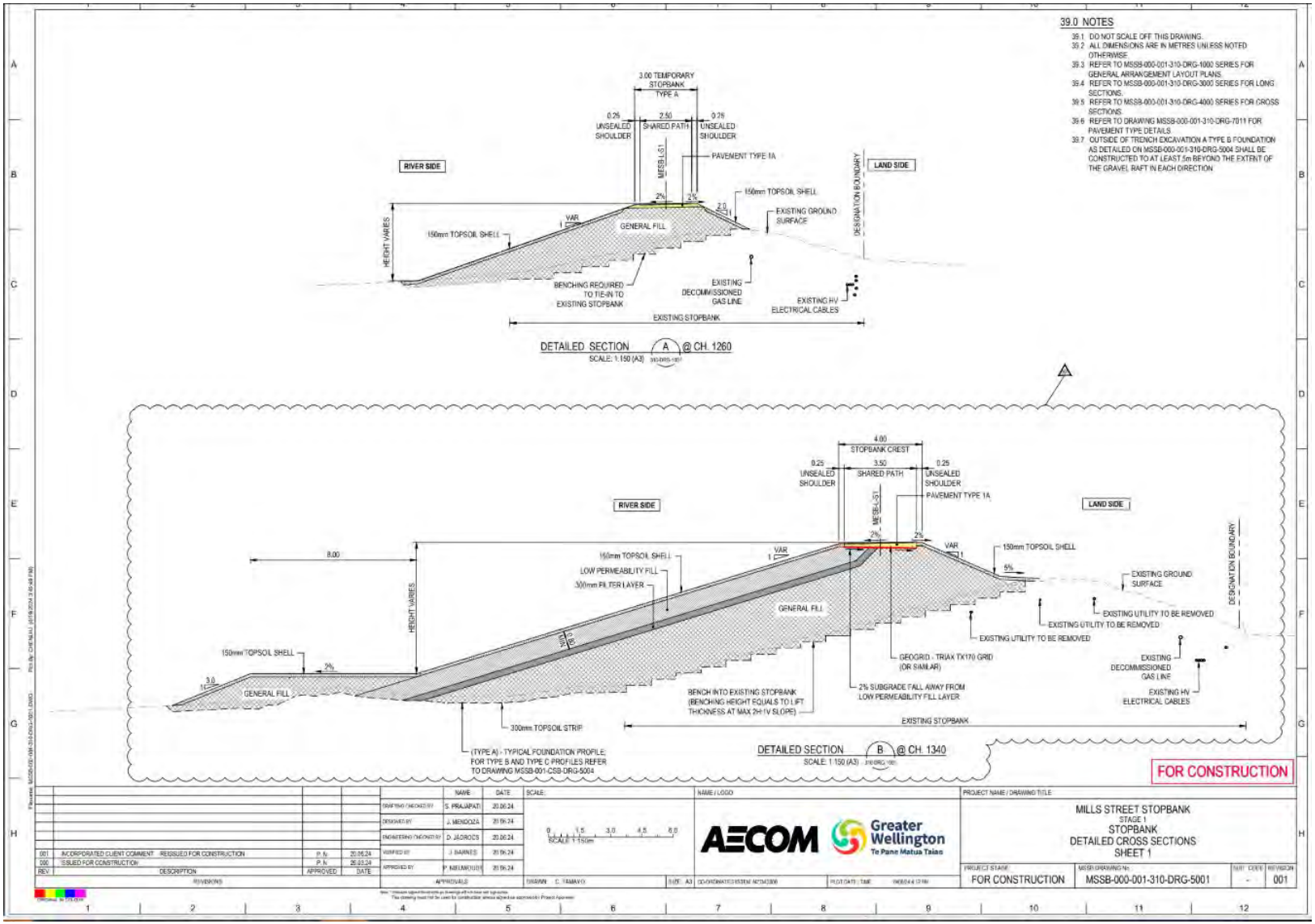


Stage 1

- 2 small recent floods affected the site (2 year return period)
- Practical Completion given 4 October 2024
- Completing demobilisation and site handover
- Handover from Contractor to GW scheduled for end October.

Site Progress Photos March 2024

Attachment 1 to Report 24.544


Attachment 1 to Report 24.544

8.1 FCI_MSSB_April 24_Site Progress Photos


Attachment 1 to Report 24.544

8.1 FCI_MSSB_May 24_Site Progress Photos


Attachment 1 to Report 24.544

Attachment 1 to Report 24.544

FCI_MSSB_June 24_Site Progress Photos


Attachment 1 to Report 24.544

Attachment 1 to Report 24.544

FCI_MSSB_July 24_Site Progress Photos


Attachment 1 to Report 24.544


Attachment 1 to Report 24.544

Attachment 1 to Report 24.544

FCI_MSSB_August 24_Site Progress Photos


Attachment 1 to Report 24.544

Attachment 1 to Report 24.544

FCI_MSSB_September 24_Site Progress Photos


Attachment 1 to Report 24.544

Rocklines and River Works

Attachment 1 to Report 24.544

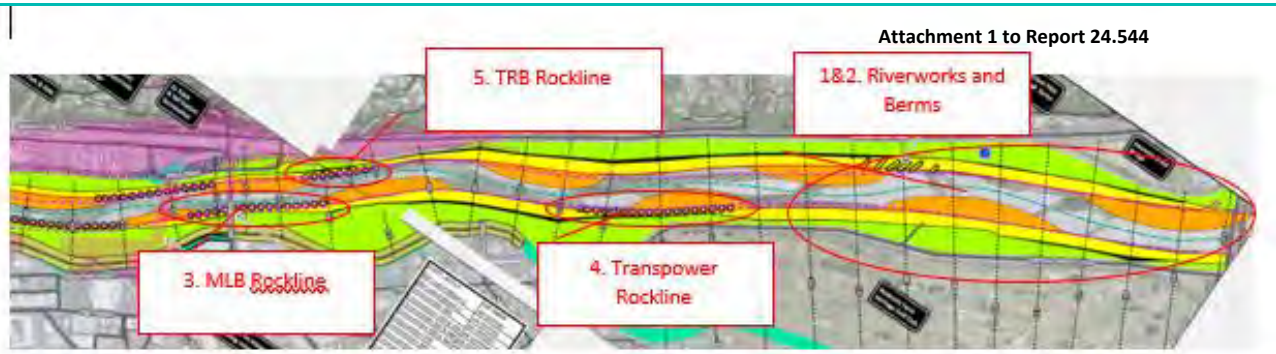
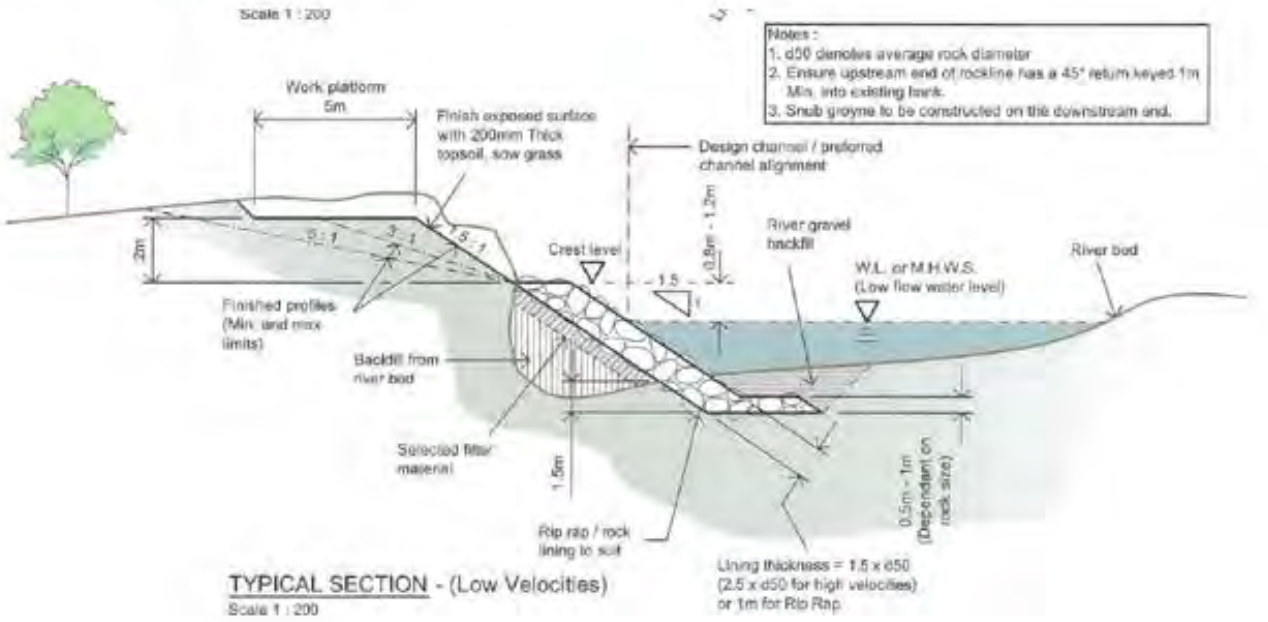


Fig 1: Mark up of scope areas (red)

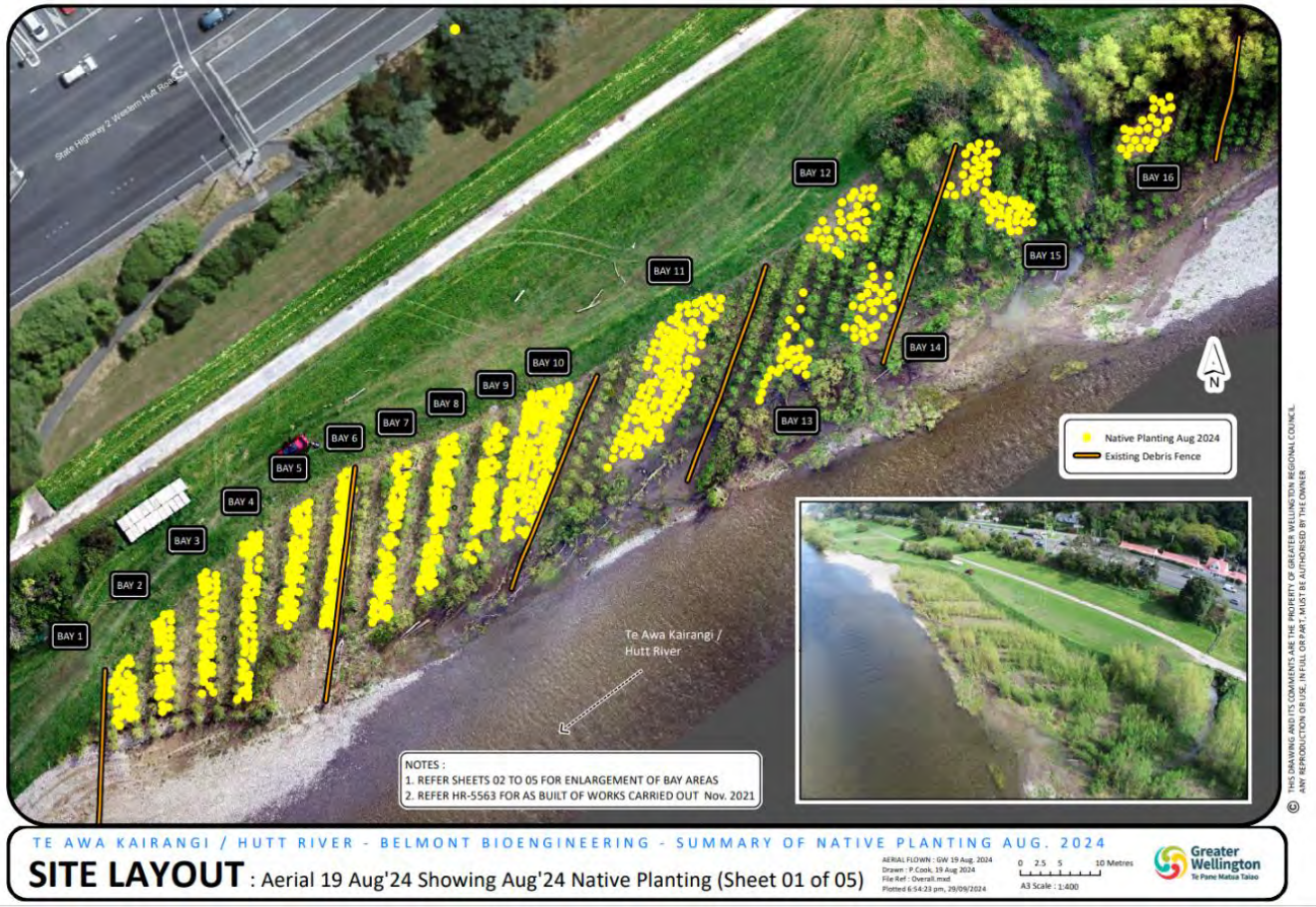
Scope that could be delivered in the 2024/2025 Earthworks season:

1. Flexible edge trial at Belmont
2. Commencing bioengineering by relocating willow trees from rockline locations
3. Rockline at Transpower
4. True Right Bank rockline between Melling Link Bridge and Transpower



Attachment 1 to Report 24.544

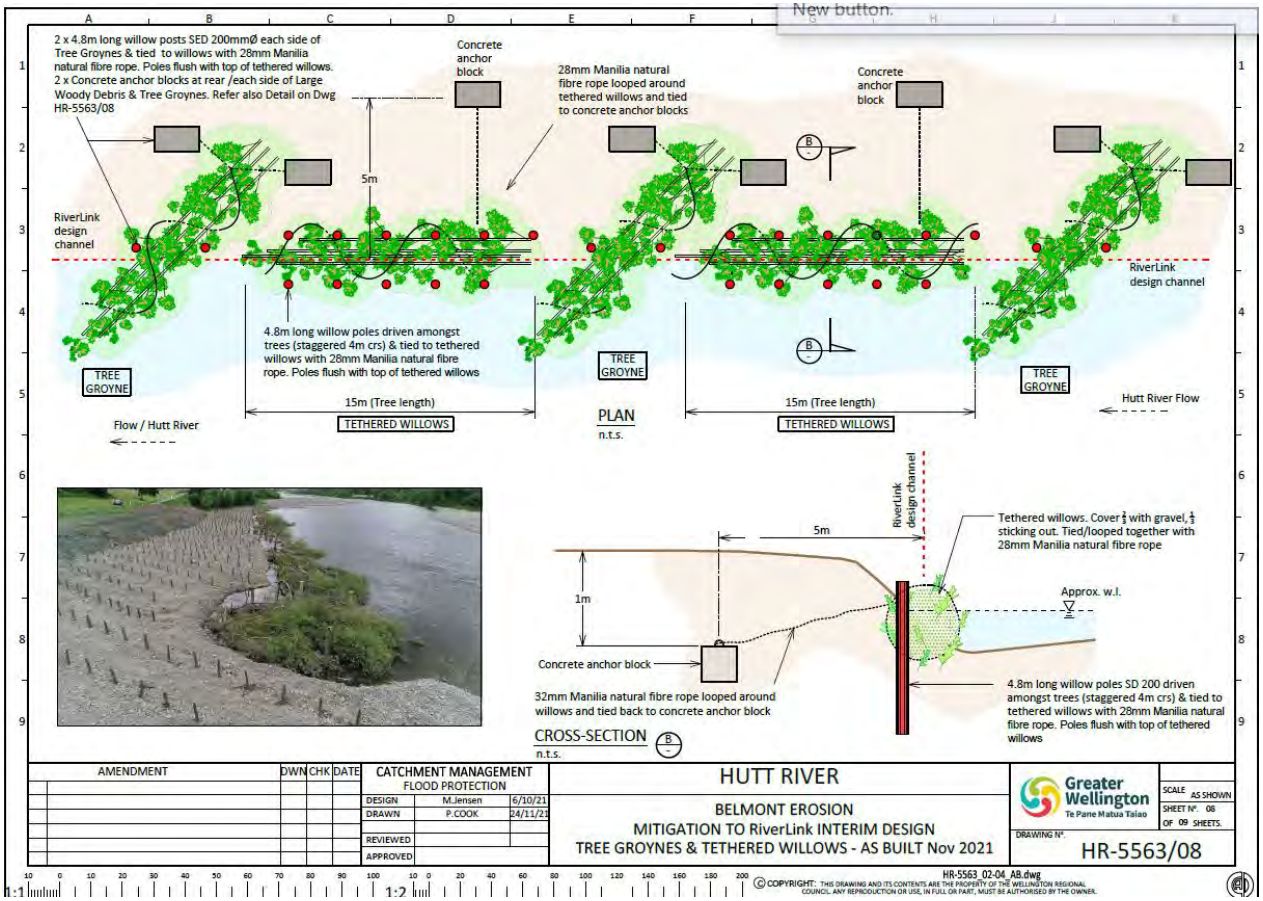
Bioengineering - Flexible Edge Trial at Belmont



Attachment 1 to Report 24.544

Bioengineering - Tree Groynes and Tethered Willows

New button.



Te Awa Kairangi / Hutt River Valley Subcommittee
22 October 2024
Report 24.460

For Information

HUTT VALLEY FLOOD RISK MANAGEMENT UPDATE – OCTOBER 2024

Te take mō te pūrongo
Purpose

1. To advise the Te Awa Kairangi / Hutt River Valley Subcommittee (the Subcommittee) of progress on flood risk management activities in the Hutt Catchment.

Te horopaki
Context

2. Greater Wellington Regional Council (Greater Wellington) has an ongoing programme of projects within the catchments of Te Awa Kairangi/Hutt River and the Pinehaven Stream. The projects are included in or guided by the floodplain management plans and river management schemes for the rivers and streams within these catchments.

Te tātaritanga
Analysis

Te Awa Kairangi / Hutt River

3. Native enhancement projects are underway in Taitā, Pomare and Poets Park/Whakatiki. Mawaihakona Stream native grass planting works have been undertaken along rock line and native garden margins. Memorial Carpark off River Road, which is closed due to vehicle vandalism, is due for renovations before year end.

4. Community group work has occurred supporting Forest & Bird projects at Moonshine and Manor Park. Hutt Valley Rotary and Eastern Hutt Rotary groups were also engaged in winter planting and clean-up work along the Hutt River Trail.

5. The Hutt River Trail brochure has been re-designed and is currently in print for spring/summer. Hutt River Trail and berm signage audit has been completed to identify outdated signage. An affordable solution for replacement opportunities is expected in November 2024. Installation of all 32 Hutt River Trail Km markers up the valley to Te Marua is currently underway and expected to be completed by Christmas 2024. An upgrade is being planned along the Hutt River Trail between Tōtara Park and Riverstone Terraces using the expertise of Parks Maintenance teams.

6. Track work has been undertaken in Taita Gorge to improve the width and camber of the track. Drainage work and edging has also been completed. The footbridge and approaches have been re-conditioned to meet structural standards. Traffic management has been improved at Taita Rock carpark with the installation of a two-way mirror on the stopbank crest for oncoming vehicles.
7. Wellington Water Ltd (WWL) has advised it is moving to monthly monitoring of the Taita Rock erosion site. Flood Operations is bringing the trail inland away from the edge through re-alignment and another barrier fence.
8. The willow planting programme has been completed at various sites along the river. Around 1200 poles were planted. Reinstatement works are still to be completed.
9. Planning has started on the Belmont Wetlands to remove gravel in the forebays and upper wetland area. The Ecological Monitoring Plan has been approved.
10. Flood events in recent months has caused damage to some of the access roads along Te Awa Kairangi/Hutt River. Flood debris and silt have been cleared and routine maintenance on the tracks has been programmed to make them useable.
11. Routine maintenance has been underway. Mowing on the stopbanks and river berms has started to address spring growth. Existing native planting maintenance has been undertaken along the river corridor including cutting and spraying and infilling areas. Maintenance work on rock structures and stopbanks has also commenced.

Designations

12. A designation is a provision in a district plan that authorises works and activities by a requiring authority[1] on a particular site, without the need for land use consent.
13. Greater Wellington has requested that existing flood protection and erosion control designations are rolled over (excluding WRC 6) in the Hutt City Council (HCC) proposed District Plan (pDP). We have requested minor modifications to some of these existing designations to better reflect the activities and sites.
14. We are also designating the remainder of the Te Awa Kairangi / Hutt River corridor within the HCC boundary for flood and erosion purposes. Both the new and existing designations will be publicly notified as part of the District Plan review. HCC has asked for the Notice of Requirement (NOR) to be supplied by 31 October 2024.
15. The HCC pDP is scheduled to be released for public consultation in early 2025.

Pinehaven Stream

16. The review paper scheduled to be presented to this subcommittee meeting has been deferred until early 2025 so further information can be obtained.
17. WWL has paused delivery of Phase 3 of the Pinehaven Stream project but has committed to completing Phase 2 by the end of October 2024, at which time the construction teams will demobilise from site.

[1] A Minister of the Crown, a local or regional authority, or a network utility operator approved by the Minister of the Environment as a requiring authority

Proposed FMP Implementation Capital Project Deferrals

18. Due to the Pinehaven Stream project review, it is proposed that the approved budgets for this project are adjusted to reduce the need for carry forward, and defer these out a year, with the intention to revisit the total budget by financial year once the review has been completed, and the delivery approach for the project is confirmed.

19. Other proposed deferrals are for three projects: Manor Park, Bridge Road and Norbert Street to Gemstone Drive. These deferrals are to push out a financial year to allow for appropriate scoping and planning prior to delivery in FY26/27 and FY27/28.

Flood Hazard Modelling

20. The flood hazard modelling for the Waiwhetū Stream has been through an independent audit process and is now finalised.

21. Te Awa Kairangi/Hutt River flood hazard modelling is nearing completion. Community engagement with the Upper Hutt community is being planned and is required prior to finalisation of the Hutt River modelling.

22. Updated flood hazard overlays for Te Awa Kairangi / Hutt River and the Waiwhetū Stream will be provided to HCC for inclusion in the pDP.

Flood Knowledge Investigations

23. The Knowledge Water Resilience team is planning the next stages of the Moonshine Stopbank investigation. This project will identify and assess options for addressing the identified asset level of service issues between the Moonshine Road and Whakatiki Street. Project planning and procurement is being prepared.

Flood incident management training and exercising

24. In the last reporting period, the Environment Group has been focussing on building flood incident management capability. This has included the following activities:

    a Training of a new Duty Officer cohort from across the Environment Group.

    b Integrating new Duty Officers with the existing Flood Incident Management team at training workshop.

    c Training ‘Senior Managers’ from across the Environment Group in flood incident management.

    d Signing the contract for the delivery of new flood forecasting capability for the region.

    e Worked with the Wellington Regional Emergency Management Office (WREMO) to develop key links with stormwater management agencies across the Wellington Region (WWL and Kāpiti Coast District Council) in the emergency management space.

    f Establishment of a new role in the Knowledge & Insights function to lead risk management and resilience including the coordination of Greater Wellington’s flood incident management capability.

g Supporting WREMO in the delivery of an evacuation planning exercise in Lower Hutt.

h Running the annual flood response exercise from the Kapiti Emergency Operations Centre focused on a major flood event in the Hutt catchments.

Figure 1 - SCRUM meeting Exercise Deluge 2024

Figure 21 - Flood Incident Management Team receiving a briefing from the Group Controller.

25. The Environment Group will be working closely with WREMO on the continued development of our flood incident management capability including the conversion of flood hazard mapping for use in emergency management, completing the wider rollout of the automated warning system and considering how we plan and manage overdesign flood events.

Ngā hua ahumoni
Financial implications

26. For this reporting period, projects are within the current budgets.

Ngā Take e hāngai ana te iwi Māori
Implications for Māori

27. Greater Wellington is required to manage land and water within a range of statutory requirements, including giving effect to Te Mana o Te Wai and considering Te Tiriti o Waitangi in the development and implementation of the Council's strategies, plans, programmes and initiatives.

28. Implementation with mana whenua partners is guided by Te Whāriki – the Māori Outcomes Framework as part of Council's Long-Term Plan 2024–34.

29. Ngāti Toa Rangitira and Taranaki Whānui ki Te Upoko o Te Ika are members of the RiverLink Board.

30. A significant number of Māori, both mana whenua and mātāwaka, live and work in flood prone areas within Te Awa Kairangi. There are also numerous sites of cultural and spiritual significance potentially at risk from flooding. Effective delivery of our

flood risk management programme helps to protect Māori communities and their values across the four wellbeings.

Te huritao ki te huringa o te āhuarangi
Consideration of climate change

31. Each project within the catchment considers and responds to the predicted impacts of climate change when considering the appropriate response to the issue the project seeks to address.

32. This programme aligns with the 2015 Climate Change strategy, which states 'we will help the region adapt to climate change'. The projects increase climate change adaptation and resilience to natural disasters in the region.

33. The greenhouse gas emissions from rock supply vary depending on the quarry source of the rock and transport to the work sites. Quarry sources for projects vary. The emissions from rock supply production and transport are not presently part of the organisation's greenhouse gas inventory.

34. Greater Wellington currently assesses options to address flood risk based on the predicted impacts of climate change over the next 100 years. Increased rainfall and sea level rise predictions are assessed on a catchment-by-catchment basis.

Ngā kaiwaitohu
Signatories

Writers	Tina Love – Team Leader Infrastructure Projects Hamish Fenwick – Team Leader, Flood Operations Delivery Tim Sharp – Catchment Manager, Te Whanganui a Tara Francie Morrow – Team Leader, Knowledge Water Resilience Andy Brown – Knowledge Risk Management and Resilience Lead
Approvers	David Hipkins – Hautū Whai Māramatanga | Director Knowledge and Insights Jack Mace – Hautū Whakatutuki | Director Delivery Nicola Patrick – Hautū Manaaki Wai | Director Catchment Lian Butcher – Kaiwhakahaere Matua, Taiao | Group Manager Environment

He whakarāpopoto i ngā huritaonga Summary of considerations
Fit with Council's roles or Committee's terms of reference The Subcommittee's specific responsibilities include *"reviewing periodically the effectiveness of implementation and delivery of Floodplain Management Plans for the Te Awa Kairangi/Hutt River floodplain"*.
Contribution to Annual Plan / Long term Plan / Other key strategies and policies The projects contained within this report deliver on Greater Wellington's strategic priority area of te tū pakari a te rohe/regional resilience, and support delivery of Greater Wellington's strategic priority area of te oranga o te wai māori me te rerenga rauropi/freshwater quality and biodiversity.
Internal consultation Specific projects consult with groups and departments across Greater Wellington where relevant to a project.
Risks and impacts: legal / health and safety etc. The purpose of implementation floodplain management plans is to reduce the risk to communities and improve the region's resilience.

Te Awa Kairangi/Hutt River Valley Subcommittee
22 October 2024
Report 24.572

For Decision

TE AWA KAIRANGI HUTT RIVER TRAIL UPDATE

Te take mō te pūrongo
Purpose

1. To share the Te Awa Kairangi Hutt River Trail existing state assessment with the Te Awa Kairangi / Hutt River Valley Subcommittee (the Subcommittee) and get agreed direction on next steps.

He tūtohu
Recommendations

That the Subcommittee:

1 **Agrees** to continue the proposed trail plan work under the existing strategic frameworks.

2 **Requests** officers to schedule a review of the 2018 Environment Strategy in 2027/28.

Te horopaki
Context

2. A commitment was made to engage a consultant to look at the entirety of the Hutt River Trail and work alongside Hutt City Council (HCC), Upper Hutt City Council (UHCC) and New Zealand Transport Agency Waka Kotahi (NZTA) to map current and potential future states for the trails within this area.
3. After further conversations, a first step was agreed to survey the Hutt River Trail and map the current state of the trail, and then bring this back to the Subcommittee.
4. The consultant examined the existing state of the trail on both sides of Te Awa Kairangi/Hutt River extending from Te Whanganui a Tara/Wellington Harbour through to Te Marua.
5. **Attachment 1** provides a series of maps that categorise the existing state and notes opportunities and constraints around the current condition and use of the trail.
6. The intention of the current state assessment is to provide baseline information to inform a discussion around the need for further work to determine if there is a potential need for trail upgrades/redevelopment, changes to user group access and/or ongoing maintenance.

7. This also builds on the 2024 Shared Spaces study which was presented to the Subcommittee in June 2024. A key finding of this study was that the recreational use of the river corridor is not necessarily in tension with the use and potential increased use of the trail for transport use. In that study, 66% of all users did not feel that increased commuter use would impact their own experience. They also found conflicting opinions on if the trail should be gravel or sealed.

Te tātaritanga
Analysis

8. There is an ongoing need to provide fit for purpose trails within the Hutt River corridor. The challenge along the river corridor is to provide trails that meet the needs of a range of user groups in a way that allows for upgrades and renewals over time, maximises user experience and minimises flood management impact.

9. The current state of the trails is a mix of sealed, compacted and loose gravel at a variety of widths. Creating a consistency of experience would benefit all users. Careful design and planning around separation and/or widening of the trail in certain areas would further alleviate concerns between different user groups.

10. The recommendation from the Shared Spaces report regarding addressing potential conflict between users was to examine separate paths as the best-case scenario. One of these paths could be sealed while the other could remain as gravel, creating the mixed-use experiences that people value. In parts of the corridor that lack the space for separate paths, the recommendation was to widen the trail to 2.5m. The standard width for a shared path is 2.5-3m.

11. There are several documents that have been developed by Greater Wellington Regional Council (Greater Wellington) which give direction to the use and development of the Hutt River corridor. These documents support the ongoing development of the Hutt River Trail for recreational purposes, while recognising the primary purpose of the land which is flood risk management.

12. The Hutt River Floodplain Management Plan (2001) gives direction to upgrade the Hutt River Trail to an all-weather surface. This is supported by the subsequent Te Awa Kairangi/Hutt River Environmental Strategy Action Plan (2018) which is intended to encourage both passive and active recreational activities along the corridor and develop more opportunities for walking and cycling loop routes throughout the river corridor.

13. The Future of The Te Awa Kairangi/Hutt River Corridor (2022) notes that with future urban intensification there are opportunities to improve walking and cycling access to and along the Te Awa Kairangi/ Hutt River Trail.

14. It directs that in general, gravel surfacing will be used throughout the trail; however, in areas of high commuter use, hard surfacing will be used. Regardless of surface, the trail should be designed to be able to accommodate cycling and walking access and occasional Greater Wellington heavy vehicles associated with river and berm works and maintenance.

15. So while these documents are clear that the purpose of the river corridor (beyond flood and river management) is to provide an appropriate range of recreational opportunities, this can include the creation of new trails, sealing trails and widening trails and allows for a focus on trails for high commuter use.

16. Treating the river corridor as a transport corridor would require a substantial planning exercise and the resetting of these key documents. If the primary intent is to improve the route for commuter cyclists, along with other users, this can be done under the existing frameworks without the need to reset the Hutt River Trail as a transport corridor.

17. A review of the 2018 Environment Strategy (which would include broad engagement with the community and should be carried out in partnership with mana whenua) would be the place to reset any strategic direction and should be done as part of a standard 10-year review cycle. This would also allow for design elements of the Riverlink project to be confirmed (river design expected mid next year, with associated infrastructure to follow).

18. As part of mapping current state, the attached report has identified some key issues and pinch points (such as Taita Gorge) and highlighted that there are already relatively long sections of the trail that are of consistent condition.

19. A second stage of work would involve establishing a consistent specification in width and surface material, then identifying areas of the trail where investment would be best directed, for example where longer sections of consistent standard can be linked together. This would result in immediate improvements in user experience.

20. The report also identifies opportunities to explore around developing key entranceways at either end of the trail to further enhance user experience and connect people to the area and to work with other agencies on river crossings to better link the trails on either side of the river.

21. The aim of alleviating conflict between user groups using separation and widening of trails can be achieved through continuing trail planning under the existing strategic framework. Under this framework a range of specifications can be agreed that provide appropriate guidance in response to anticipated users, and thresholds for change to design or user management.

Ngā hua ahumoni
Financial implications

22. There is no current funding allocated within Greater Wellington for significant upgrades of the Hutt River Trail.

23. UHCC, HCC and NZTA may contribute funding alongside Greater Wellington, however currently they don't have dedicated funding available.

24. Minor upgrades could be carried out in partnership with these other organisations and delivered from within existing budgets.

25. There are also central government funding opportunities being explored for projects associated with our Environment Strategies.

26. As the quality of trails is improved over time, there will be a need for operational funding to increase to achieve a level of service for maintaining trails and clearing/repairing them after flood events and heavy machinery access.

27. Changes to trails and public access can result in a need for changes in methodology and/or time on different tasks for river management. This can have significant cost implications.

Ngā Take e hāngai ana te iwi Māori
Implications for Māori

28. Enhanced recreational access will be beneficial across the community, including for Māori.

29. Partnering on a review of the Environment Strategy would result in a stronger mana whenua voice when it comes to the intention of protecting and strengthening the river values through careful management, environmental improvements and recreational development. Time and funding will need to be allocated to create space for this to happen.

Te huritao ki te huringa o te āhuarangi
Consideration of climate change

30. Any infrastructure constructed within the river corridor needs to be designed with impacts of climate change (particularly the potential for increased flooding) in mind.

31. Encouraging active transport through provision of improved trails for cycling will have a positive impact on climate change due to reduced transport emissions.

Ngā tūāoma e whai ake nei
Next steps

32. Flood Operations team to continue working with UHCC, HCC and NZTA to:

    a Continue work on a trails plan for the river corridor now that a current state has been mapped, including indicating where areas could be sealed, or where loose gravel could be compacted to create a more consistent surface.

        i This would be directed by best practice options as suggested by the Shared Spaces study with separation as an ideal state, followed by widening where practicable.

    b Define what standard would be appropriate for a through-path, e.g. sealed grade 1 with 2m width, unlit, from Maoribank/Totara Park through to Petone/a connection with the Melling-Ngauranga route.

    c Identify what would be required to upgrade the current trail to meet that standard – cost, barriers/constraints etc.

    d Link in the relevant transport strategies to ensure key connections are identified, including working with relevant authorities on potential upgrades

to river crossings and identifying where signage can be installed to let users locate access points.

e Cost and prioritise these options.

Ngā āpitihanga
Attachment

Number	Title
1	Te Awa Kairangi Hutt River Trail existing state assessment

Ngā kaiwaitohu
Signatories

Writer	Myfanwy Hill – Environment Operations Manager
Approvers	Jack Mace – Director Delivery Lian Butcher – Group Manager Environment

He whakarāpopoto i ngā huritaonga **Summary of considerations**
Fit with Council's roles or with Committee's terms of reference The Subcommittee's specific responsibilities include overseeing the development and review of Council's environmental strategies, policies, plans, programmes and initiatives in the areas of river control and flood protection.
Contribution to Annual Plan / Long Term Plan / Other key strategies and policies This project would deliver on Greater Wellington's overarching strategic priority around responding to the climate emergency and is directly aligned with the key activities of environment and flood protection.
Internal consultation As this project progresses, there will be consultation with groups and departments across Greater Wellington where relevant.
Risks and impacts - legal / health and safety etc. This work will be designed to not negatively impact on the primary purpose of flood risk management to reduce the risk to communities and improve the region's resilience.

Attachment 1 to Report 24.572

Boffa Miskell

TE AWA KAIRANGI HUTT RIVER TRAIL

EXISTING STATE ASSESSMENT

OCTOBER 2024

TOITŪ NET CARBON ZERO ISO 14064-1 ORGANISATION

Boffa Miskell is proudly a
Toitū net carbonzero certified consultancy

DOCUMENT QUALITY ASSURANCE

BIBLIOGRAPHIC REFERENCE FOR CITATION:

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PREPARED BY:	Bec Ramsay Open Space & Recreation Planner Boffa Miskell Ltd	
REVIEWED BY:	Emma McRae Landscape Planner Boffa Miskell Ltd	
STATUS:	Revision / version: 1	Issue date: October 2024

File ref: BM240187_Te_Awa_Kairangi_Trail_Development_20241002

Cover photograph: Te Awa Kairangi trails, © Bec Ramsay, 2024

CONTENTS

INTRODUCTION

Figure 1: Hutt River Trail and Remutaka Cycle Trail signs on shared path near Taita Rock

PURPOSE

The purpose of this project was to examine the existing state of the river trail on both sides of Te Awa Kairangi/Hutt River extending from Te Whanganui a Tara/Wellington Harbour through to Te Marua.

This document provides a series of maps that categorise the existing state and note opportunities and constraints around the current condition and use of the trail.

The intention is that the document is used to provide baseline information to inform a discussion around the need for further work to determine if there is a potential need for trail upgrades/redevelopment, changes to user group access and/or ongoing maintenance.

METHODOLOGY

Initial information gathering

A series of eight aerial maps were prepared in GIS to examine spatial and asset information (ownership) in relation the the existing trails and the surrounding river environment. In addition to the GIS information, existing plans and documentation including the Hutt River Environment Strategy Action Plan (HRES) and the Future of the Te Awa Kairangi/Hutt River Corridor Plan were reviewed to understand strategic context and key projects and work programmes in relation to the trails.

Workshop to review and discuss

A project group workshop was held using large format (A1 sized) printed maps, where initial notes were reviewed and added to, with discussion around key areas of opportunity or constraint. The project group included River Rangers and operational experts who could share in depth knowledge about current state conditions and use and potential issues and opportunities in the future.

Site visits to check and confirm

Time was spent out on the river trails to check conditions on site and give further consideration to issues and opportunities raised in the workshop. Photographs were taken to illustrate the various trail conditions and highlight key issues and opportunities.

Completion of existing state map series

The maps were then developed including detailed notes, before being issued for a further round of review and comment by the GWRC project team. A final set of maps (included in this document) bring together all of the information gathered, through document review, the workshop, site visits and project team review.

Summary of observations

In addition to the maps, a final map and notes describes key observations that can help inform more detailed consideration of the potential need for (and scale of) further work required on trails planning, development and ongoing management.

TRAIL CONDITIONS AND USE

The river trails exist in a dynamic natural environment where there is a need for ongoing management of the river to manage risks to people and property and environmental quality.

Public access to this environment needs to be managed in this context, but is a key contributor to urban form and quality of life for both the local and wider community. The HRES notes the intention to:

...protect and strengthen the river values through careful management, environmental improvements and recreational development alongside the flood protection measures. It is an integrated approach that will see the river environment improved while also reducing the flood risk over time.

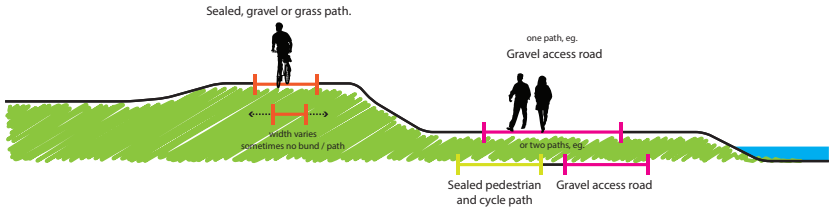
There is currently a broad range of trail conditions along the length of the river that are influenced by access needs of different users, the amount of riverside space available for access, the urban development context (including relationship to housing, roads, parks, utilities infrastructure and other community facilities), and trail ownership (influencing budgets for upgrades over time and ongoing management/maintenance priorities).

Use patterns vary at different locations. At the Silverstream track counter 72% of users are pedstrians and all user numbers increase significantly at weekends (from 268-429/day for pedestrians and from 78-146/day people on bikes).

At the Boulcott track counter (currently paused for Riverlink work) 42% of users are pedestrains and all user numbers do not increase as significantly at weekends (140-171/day for pedestrians and 200-239 /day for people on bikes.

Generally speaking, the following typical conditions (and any number of variations on these) are found along the length of the river.

CROSS-SECTION - TRACK TYPES



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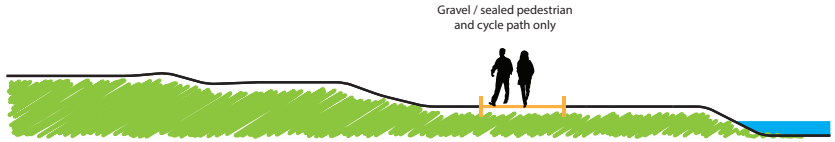

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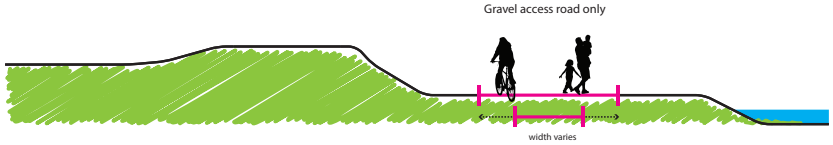

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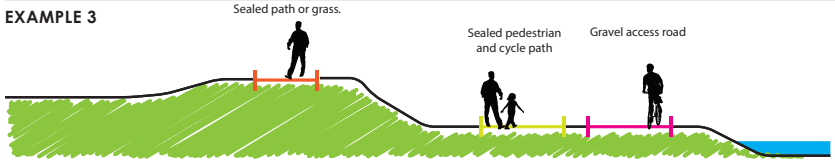
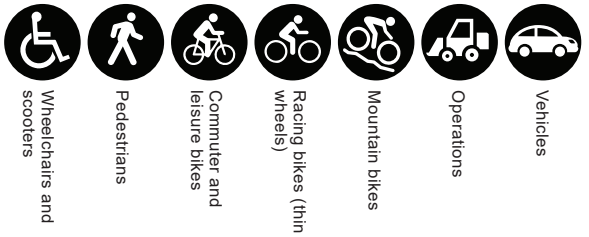


Note:

- Sometimes informal “desire lines” paths along grass
- Sometimes pedestrian / cycle path adjacent to river and gravel road
- Sometimes there is no stopbank and / or different conditions on either side of river
- Trails can pass through a variety of conditions (formal car parks, urban edges, rural edges, golf courses etc)
- Any combination of the above track types can exist

MODES OF MOVEMENT



TRACK CHOICE

Along most parts of the river corridor there is more than one trail type running in parallel. Where there are options, trail choice depends on ability, desired setting (eg. quiet, busy, rural, shaded, open, near the road, beside the water etc) and the activity (eg. family walk, training run, dog walk, bike commute, group ride, lunch break, swim etc).

Operational access is less about preference and more about a need to complete a task in a certain way (can be time/cost drivers) with certain machinery and/or in a certain location.

MANAGING USER EXPERIENCE

As more and more people use the river trails for recreation, both on foot and on bikes, the need to manage user behaviour and provide fit for purpose trails for anticipated use becomes more important. It is the combination of volume and mix of types of user that drives a need for changes to trail conditions over time. This will have implications for existing users with behaviour change education often required alongside physical changes to the trails and associated signage.

Additionally, providing for heavy machinery access requirements for river management adds a further layer of complexity to the provision of trails that meet operational needs (for both flood management and to support recreation or environmental quality/amenity outcomes) in an area that floods. Changes to trails and public access can result in a need for changes in methodology and/or time on different tasks for river management. This can have significant cost and practicality implications.

The challenge along the river corridor is that the trails are connected and well managed in a way that:

- allows for improvement over time and a range of experiences

- maximises volume and mix of users

- minimises flood management impact.

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WAIONE STREET BRIDGE TO EWEN BRIDGE

TE ARANUI O PŌNEKE/THE GREAT HARBOUR WAY. (67KM SHARED PATH AROUND SHORELINE OF WELLINGTON HARBOUR)

POTENTIAL FOR OFFICIAL START/FINISH OF RIVER TRAIL OR HARBOUR TRAIL.

PATH PASSES THROUGH PARKING AREA. NEEDS BETTER SIGNS AND PATH TREATMENT.

SHORT STEEP, GRAVEL SECTION TO FOOTPATH.

TRAIL GAP. FOOTPATH ONLY. BOARDWALK DECOMMISSIONED.

INFORMAL ACCESS TO HUTT RIVER TRAIL THROUGH GOLF COURSE.

STEEP CONCRETE UNDERPASS.

BRIDGE ACROSS IS SIGNIFICANT BARRIER TO CONTINUITY OF QUALITY TRAIL - HARBOUR TRAIL AND RIVER TRAIL, PLUS POOR PARKING AREA.

ENTRY/EXIT TO HUTT RIVER TRAIL AND REMUTAKA CYCLE TRAIL. ON-ROAD CYCLE AND PEDESTRIAN CONDITIONS POOR WITH NARROW FOOTPATH.

ROCK WALLS. OPERATION ACCESS REQUIRED FOR HEAVY MACHINERY.

TRAIL WILL MOVE WITH FUTURE STOPBANK WORK.

LOOSE GRAVEL 2.5-3M

GRAVEL LESS THAN 2.5M

SEALED PATH 2.5-3M

SEALED PATH LESS THAN 2.5M

Port Road

Waione Street

Adelaide Street

Jackson Street

TE MOME STREAM

WAIWHETŪ STREAM

Seaview Marina

Randwick Road

Seaview Road

Marine Drive

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0 120 m

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Data Sources: HCC, GWRC, Google

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Study Reach
- Benches
- Toilet
- Bridge
- Car Parking
- Remutaka Cycle Trail
- Hutt River Trail
- Connectors

Ownership

- Flood Protection
- HCC
- Transit NZ
- UHCC
- UHCC Cycleway
- General Notes
- Street Access Points
- Operational Access
- Erosion and/or potential loss

Condition

- Compacted gravel 2.5 - 3m
- Loose gravel 2.5-3m
- Sealed path 2.5-3m
- Sealed path less than 2.5m
- Gravel less than 2.5m
- Informal grass trail
- Public Road

TE AWA KAIRANGI/HUTT RIVER TRAIL

Document Maps: Reach 1A

Date: 03 October 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: bec.ramsay@boffamiskell.co.nz | Drawn: DHi | Checked: BRa

Attachment 1 to Report 24.572

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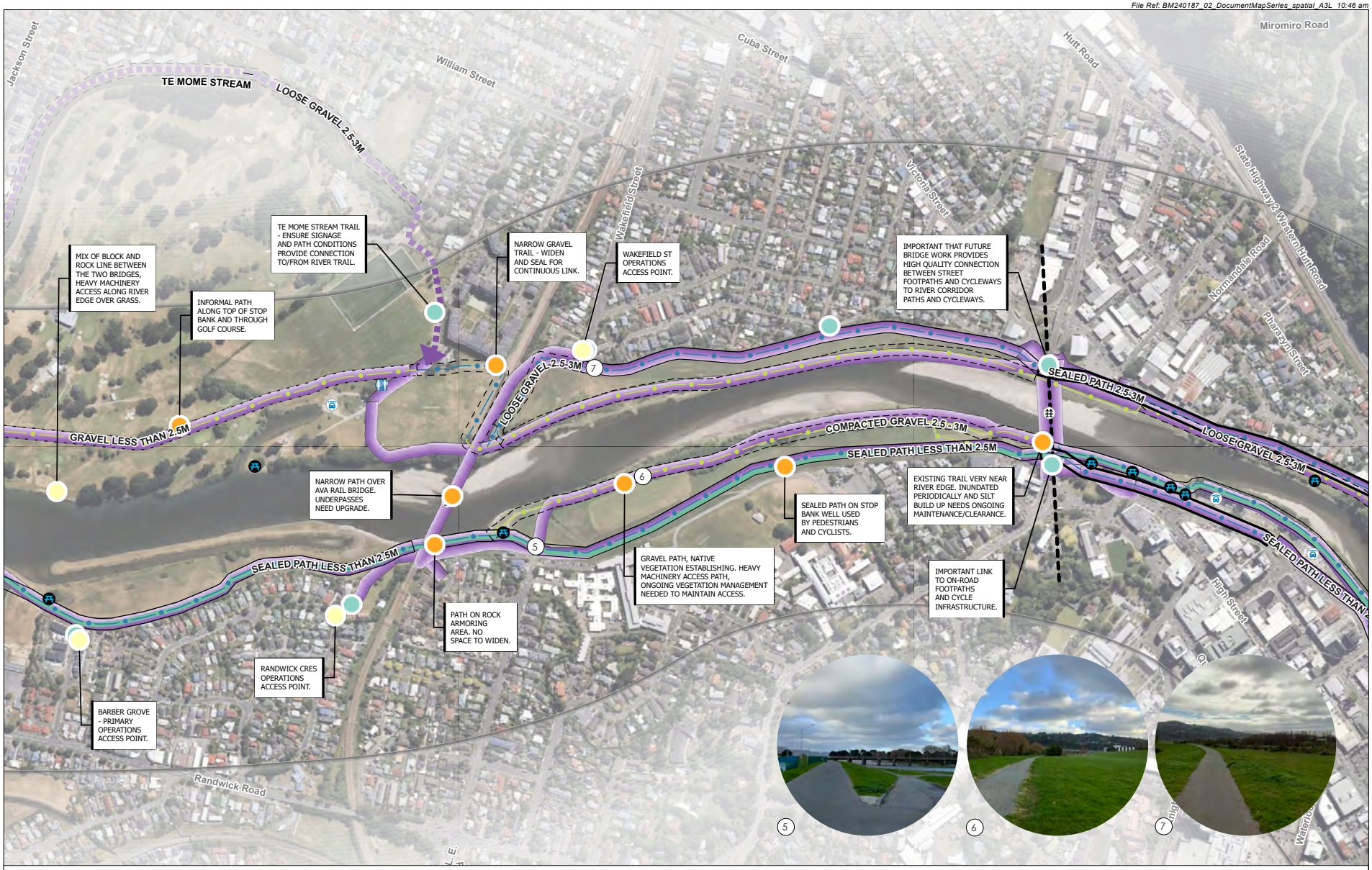

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TE AWA KAIRANGI/HUTT RIVER TRAIL

Document Maps: Reach 1B

Date: 03 October 2024 | Revision: 0

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Attachment 1 to Report 24.572

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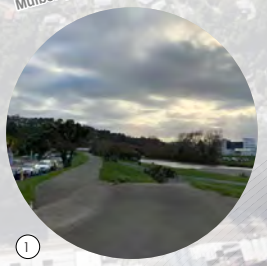
EWEN BRIDGE TO KENNEDY GOOD BRIDGE



Mulberry Street

Tirohanga Road

Harbour View Road

State Highway 2 Western Hutt Road

Pharazyn Street

Victoria Street

High Street

Queens Drive

Knights Road

Waterloo Road

Pretoria Street

Kings Crescent

Epuni Street

LARGE SCALE DEMOLITION UNDERWAY. IMPORTANT TO RE-ESTABLISH 2.5M MINIMUM SEALED PATH ON TOP OF STOP BANK, OPERATIONAL ACCESS TO RIVER EDGE AND IDEALLY INFORMAL PATHS (GRAVEL) ALONG RIVER EDGE.

RELATIVELY LONG STRETCH OF RIVER WITH NO CONNECTION TO STREET. UPGRADE TO MAXIMISE USE AND USER SAFETY.

CROSSING IMPROVEMENT REQUIRED.

OPPORTUNITY TO SIGNIFICANTLY IMPROVE RIVER TRAIL ENTRY/EXIT AND CONNECTION TO ROADS AND TO PROVIDE CONTINUOUS QUALITY/EXPERIENCE ALONG RIVER TRAIL.

VEHICLE ACCESS ROAD USED BY ALL TRAIL USERS. NOT DESIGNED OR MAINTAINED FOR CURRENT USE.

DIGGER ACCESS NEEDED TO REPAIR RIVER EDGES.

SEALED TRAIL PASSES THROUGH CAR PARK AND USES ROAD. DELINEATE AS 'SHARED SPACE' OR FORMALIZE PATH FOR CONTINUOUS SURFACE/WIDTH.

RIVERLINK DESIGN WILL NEED TO PROVIDE FOR OPERATIONAL ACCESS THIS SIDE OF RIVER BETWEEN THE TWO BRIDGES.

NARROW SEALED PATH AROUND PARKING AREA EDGE AND AT RIVER EDGE. OPPORTUNITY TO IMPROVE QUALITY AND EXPERIENCE AND USER APPEAL THROUGH RIVERLINK REDESIGN. KEY PATH VERY CLOSE TO CITY CENTRE AND BETWEEN TWO RELATIVELY CLOSE BRIDGE CROSSINGS.

OPERATIONS ACCESS. NEEDS TO CHANGE AS DIFFICULT TO GET HEAVY MACHINERY OFF ROAD THROUGH GATE. CURRENTLY CAUSES TRAFFIC DISRUPTION AND SOME MACHINERY CAN'T NAVIGATE THE SPACE.

ROAD CROSSING IF MAIN SEALED PATH REMAINS ON TOP OF STOP BANK RATHER THAN CLOSER TO RIVER EDGE.

ROAD CROSSING IF MAIN PATH REMAINS ON TOP OF STOP BANK.

CURRENTLY NO TRAILS AS RIVERLINK STOP BANK REBUILD UNDERWAY. NEW PATHS REQUIRED TO PROVIDE CONTINUOUS ROUTE UP/DOWN RIVER SUITABLE FOR WIDEST RANGE OF USERS, OPTIONS FOR DIFFERENT EXPERIENCES AND ONGOING OPERATIONAL ACCESS.

REDEVELOPMENT SHOULD PROVIDE A CONSISTENT PATH TYPE ALONG RIVER EDGE, CONNECTING THE CITY EDGE AND BEYOND FOR THE WIDEST RANGE OF TRAIL USERS. WILL REQUIRE MORE THAN ONE PATH TO ACCOMMODATE OPERATIONAL ACCESS, CYCLE, WALKING AND HIGH QUALITY URBAN EDGE AMENITY PARK SPACES.

SEALED PATH 2.5-3M

LOOSE GRAVEL 2.5-3M

SEALED PATH LESS THAN 2.5M

SEALED PATH LESS THAN 2.5M

COMPACTED GRAVEL 2.5 - 3M

SEALED PATH 2.5-3M

SEALED PATH 2.5-3M

LOOSE GRAVEL 2.5-3M

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Data Sources: HCC, GWRC, Google

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Study Reach
- Benches
- Toilet
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- Hutt River Trail
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- UHCC Cycleway
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- Informal grass trail
- Public Road

TE AWA KAIRANGI/HUTT RIVER TRAIL

Document Maps: Reach 2A

Date: 03 October 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: bec.ramsay@boffamiskell.co.nz | Drawn: DHi | Checked: BRa

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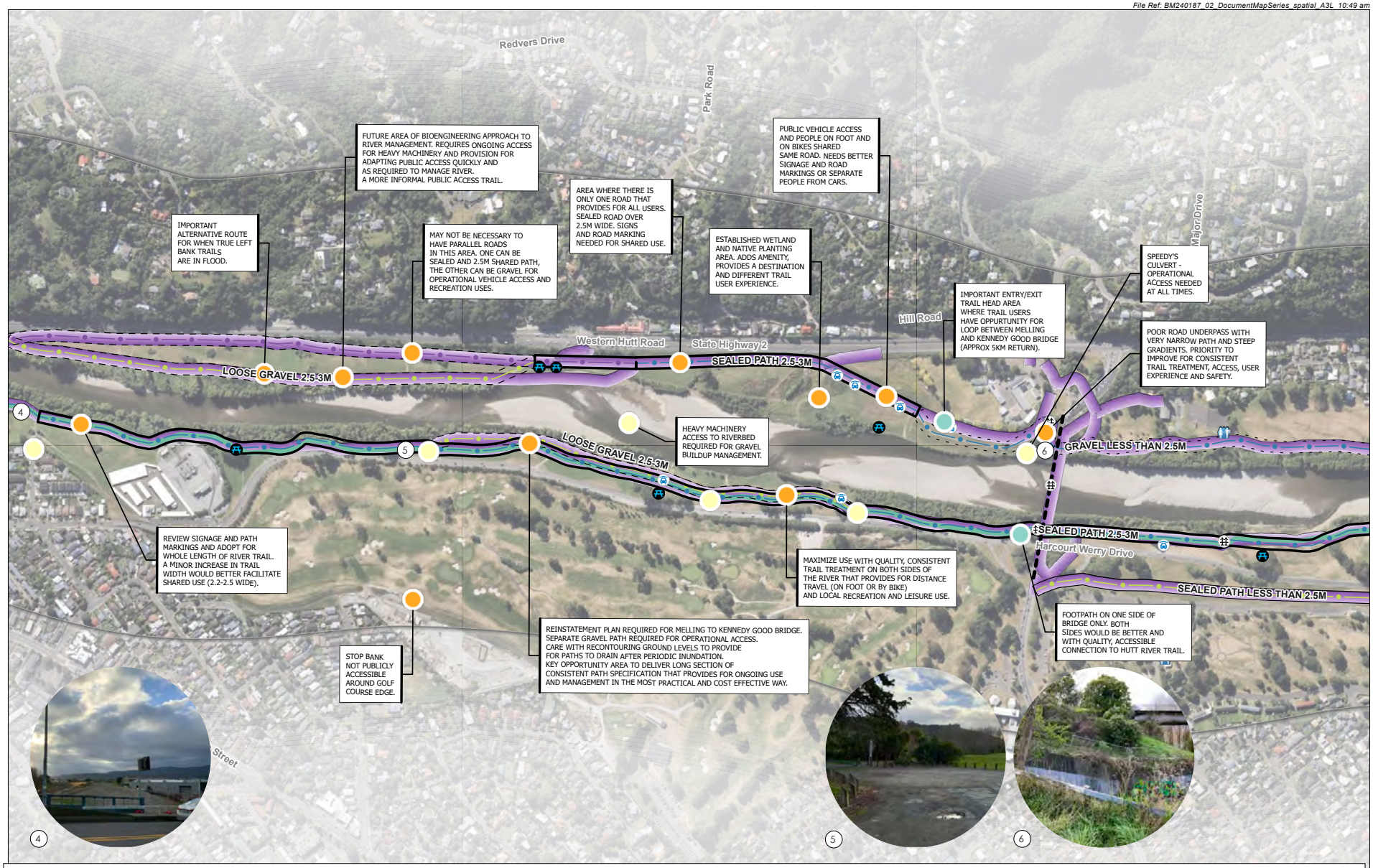

BOFFA MISKELL | TE AWA KAIRANGI/HUTT RIVER TRAIL : EXISTING STATE ASSESSMENT | EWEN BRIDGE TO KENNEDY GOOD BRIDGE

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Data Sources: HCC, GWRC, Google

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TE AWA KAIRANGI/HUTT RIVER TRAIL

Document Maps: Reach 2B

Date: 03 October 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: bec.ramsay@boffamiskell.co.nz | Drawn: DHi | Checked: BRa

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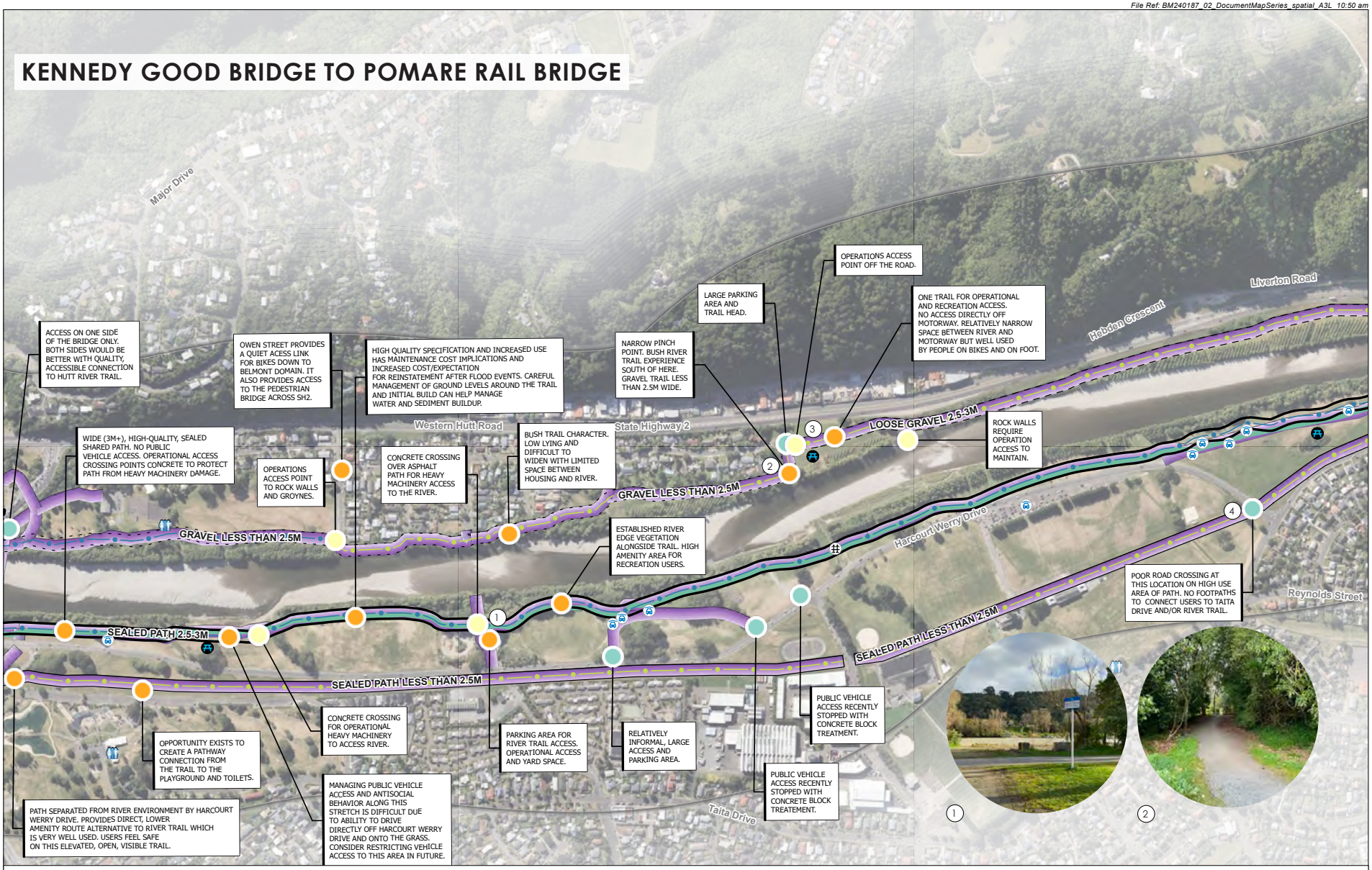
KENNEDY GOOD BRIDGE TO POMARE RAIL BRIDGE



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TE AWA KAIRANGI/HUTT RIVER TRAIL

Document Maps: Reach 3A

Date: 03 October 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: bec.ramsay@boffamiskell.co.nz | Drawn: DHi | Checked: BRa

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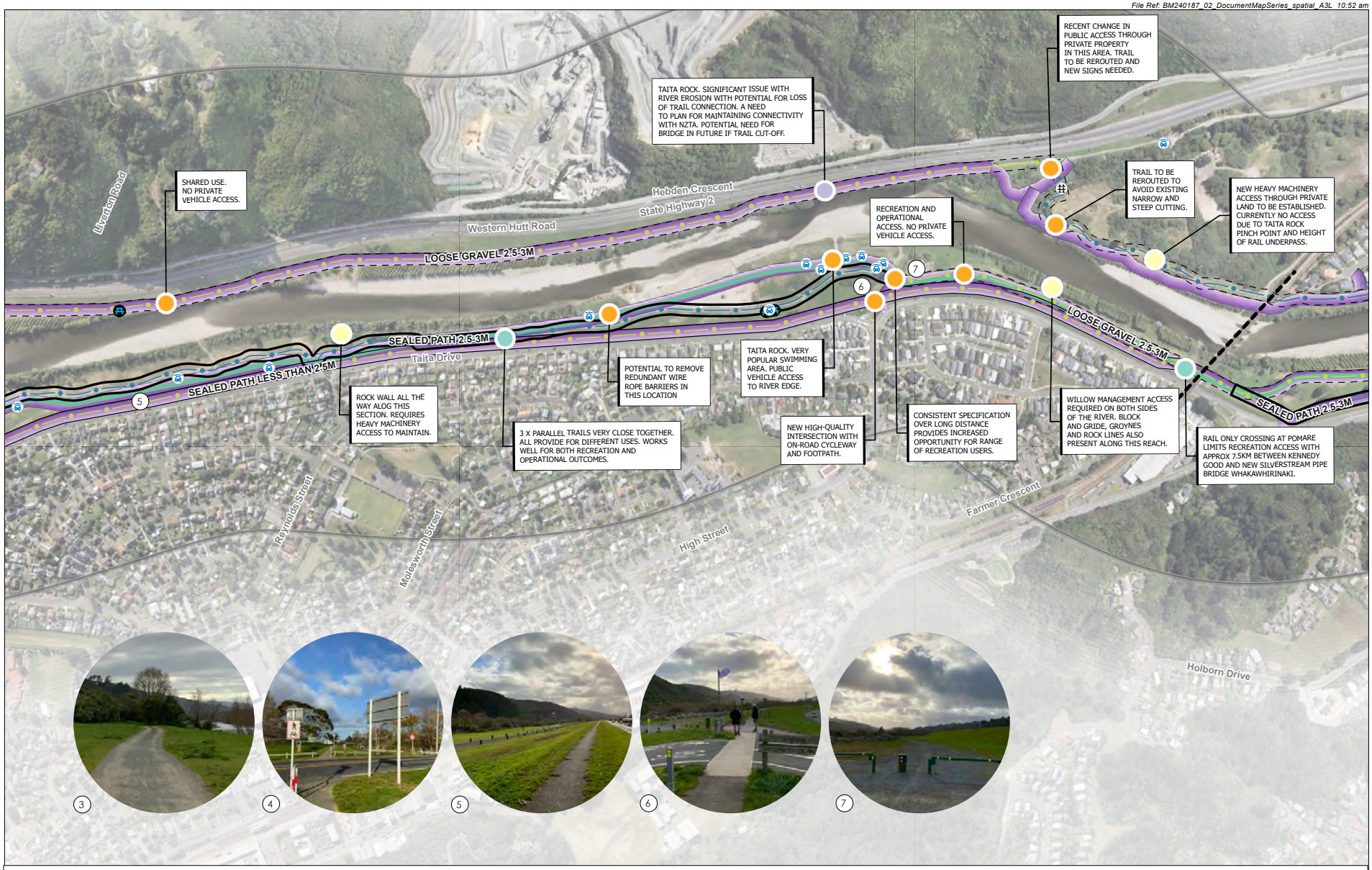

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TE AWA KAIRANGI/HUTT RIVER TRAIL

Document Maps: Reach 3B

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File Ref: BM240187_02_DocumentMapSeries_spatial_A3L 10:53 am

POMARE RAIL BRIDGE TO SILVERSTREAM BRIDGES

Buchanan Road
State Highway 58
McDougall Grove
Haywards Hill Road
Hebden Crescent
Western Hutt Road
State Highway 2
Taita Drive
High Street
Molesworth Street
Eastern Hutt Road
Holborn Drive
Farmer Crescent
Stk. Vll. Rd.

SEALED PATH 2.5-3M
SEALED PATH LESS THAN 2.5M
LOOSE GRAVEL 2.5-3M
GRAVEL LESS THAN 2.5M

POTENTIAL KEY START/FINISH POINT FOR WALK/BIKE UP TO NEW WHAKAWHIRINAKI BRIDGE AND BACK. NEED BETTER SIGNS AND WAYFINDING.

NEED SAFE ROAD CROSSING AND ON ROAD CONNECTION. BREAK IN OFF-ROAD RIVER TRAIL CONNECTION. LONG TERM CREATE TRAIL FOLLOWING STOP BANK AND WITHIN GOLF COURSE.

HUTT RIVER TRAIL CONNECTION (SHORT TERM)

FUTURE OFF-ROAD HUTT RIVER TRAIL LOCATION (LONG TERM)

DIRT TRAIL WITH SOME AREAS OF LOOSE GRAVEL SURFACE.

OPERATIONAL ACCESS AND PUBLIC RECREATION USE. RUNS BEHIND RESIDENTIAL HOUSES ALONG THE TOP OF THE STOP BANK.

ACCESS OFF ROAD EDGE TO HUTT RIVER TRAIL. NO FOOTPATHS OR FORMAL ROAD CROSSING.

ROAD ACCESS. CHECK SIGNS AND WAYFINDING AND ROAD CROSSING SAFETY. NO FOOTPATH CONNECTION.

SHORT SECTION OF STEEP GRAVEL TRAIL, WIDE WITH GOOD SITE LINES AND NO DROPS FROM TRAIL EDGE. SIGN POST CONDITIONS FOR USER SAFETY.

NO PUBLIC ACCESS TO CROSS RAIL BRIDGE. UNDERPASS PROVIDED.

GRID PATTERN BLOCKS REQUIRE ACCESS.

GROYNES REQUIRE OPERATION ACCESS FOR ONGOING MANAGEMENT.

LOW AMENITY POOR QUALITY EXPERIENCE WITH NARROW FOOTPATH CLOSE TO BUSY, HIGH SPEED ROAD CORRIDOR. LIMITED SPACE AT RIVER EDGE LIMITS OPPORTUNITY FOR IMPROVEMENT.

GOOD HEIGHT ALLOWS MACHINERY TO PASS UNDER BRIDGE AT RIVER EDGE.

ROCK LINED TRAINING BANK.

OPERATIONAL ACCESS TO DELIVER TRAIL MAINTENANCE MATERIALS.

NEED FOR SAFE AND WELL SIGN POSTED CROSSING IN THIS AREA.

APPROX 1.4KM 'GAP' IN CONSISTENT TRAIL SPECIFICATION BETWEEN THIS POINT AND TAITA ROCK.

GATE TO STOP PUBLIC VEHICLE ACCESS.

HEAVY MACHINERY ACCESS OFF BUSY ROAD.

CHECK ACCESS SAFETY.

VERY NARROW PINCH POINT IN TRAIL WITH NARROW BRIDGE.

NARROW SEALED PATH CONNECTING TO RIVER TRAIL SOUTH.

ENTRY/EXIT TO HIGH QUALITY SEALED PATH BUT NOT WELL SIGN POSTED OR CONNECTED TO ON-ROAD FOOTPATHS AND CYCLEWAYS.

PUBLIC VEHICLE ACCESS TO CARPARK. NEEDS ROAD MARKINGS AND SIGNAGE FOR SHARED USE.

TRAIL SEPARATES FROM ROAD. NARROW (DOWN TO 1M IN PLACES) LOOSE GRAVEL TRACK WITH STEEP SECTIONS. NOT SUITABLE FOR PEOPLE ON BIKES WITH LOW CONFIDENCE/SKILLS. NO SPACE TO PASS OTHER USERS.

TAITA GORGE. SIGNIFICANT ISSUES WITH LAND STABILITY IN THIS AREA BOTH ABOVE AND BELOW THE ROAD. FUTURE WORK TO STABILISE RIVER EDGE AND OR LAND ABOVE THE ROAD SHOULD INCLUDE PROVISION FOR IMPROVED SHARED PATH CONNECTION FOR PEDESTRIANS AND CYCLISTS. ONE OF ONLY 2 AREAS ALONG FULL HUTT RIVER TRAIL LENGTH WHERE CONNECTIVITY IS AT RISK.

BOFFA MISKELL | TE AWA KAIr Ang I HuTT r IvEr Tr AIL : ExISTIng STATE ASSESSMEnT | POMAr E rAIL Br Idg E TO SILvEr STr EAM Br Idg ES

0 120 m
1:6,000 @ A3

Data Sources: HCC, GWRC, Google

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Study Reach
- Benches
- Toilet
- Bridge
- Car Parking
- Remutaka Cycle Trail
- Hutt River Trail
- Connectors
- Ownership
- Flood Protection
- HCC
- Transit NZ
- UHCC
- UHCC Cycleway
- General Notes
- Street Access Points
- Operational Access
- Erosion and/or potential loss

Condition
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- Loose gravel 2.5-3m
- Sealed path 2.5-3m
- Sealed path less than 2.5m
- Gravel less than 2.5m
- Informal grass trail
- Public Road

TE AWA KAIRANGI/HUTT RIVER TRAIL

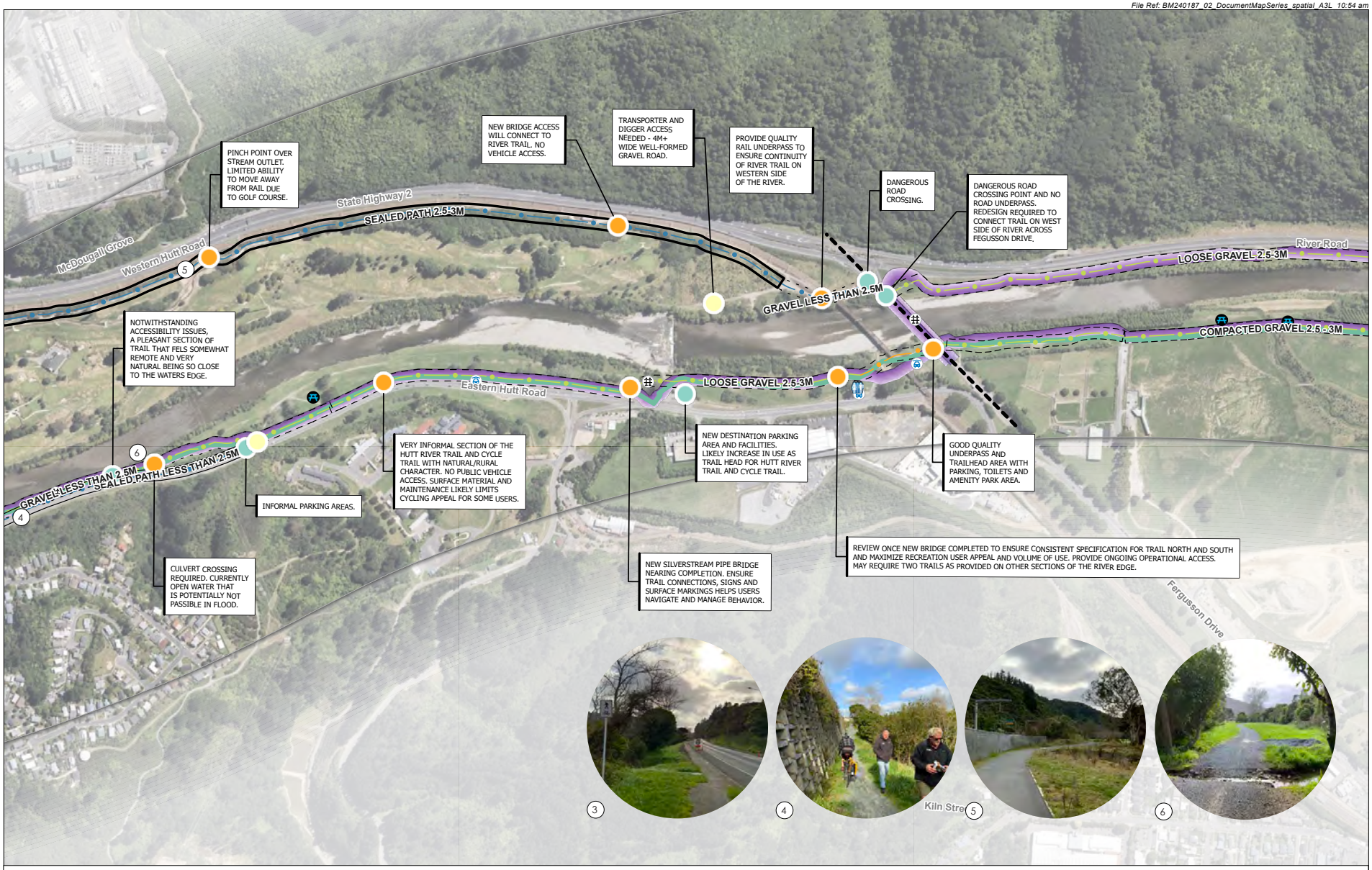
Document Maps: Reach 4A

Date: 03 October 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: bec.ramsay@boffamiskell.co.nz | Drawn: DHi | Checked: BRa

File Ref: BM240187_02_DocumentMapSeries_spatial_A3L 10:54 am



BOFFA MISKELL | TE AWA KAIr Ang I HuTT r IvEr Tr AIL : ExISTIng STATE ASSESSMEnT | POMAr E rAIL Br Idg E TO SILvEr STr EAM Br Idg ES

0 120 m
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Data Sources: HCC, GWRC, Google

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TE AWA KAIRANGI/HUTT RIVER TRAIL

Document Maps: Reach 4B

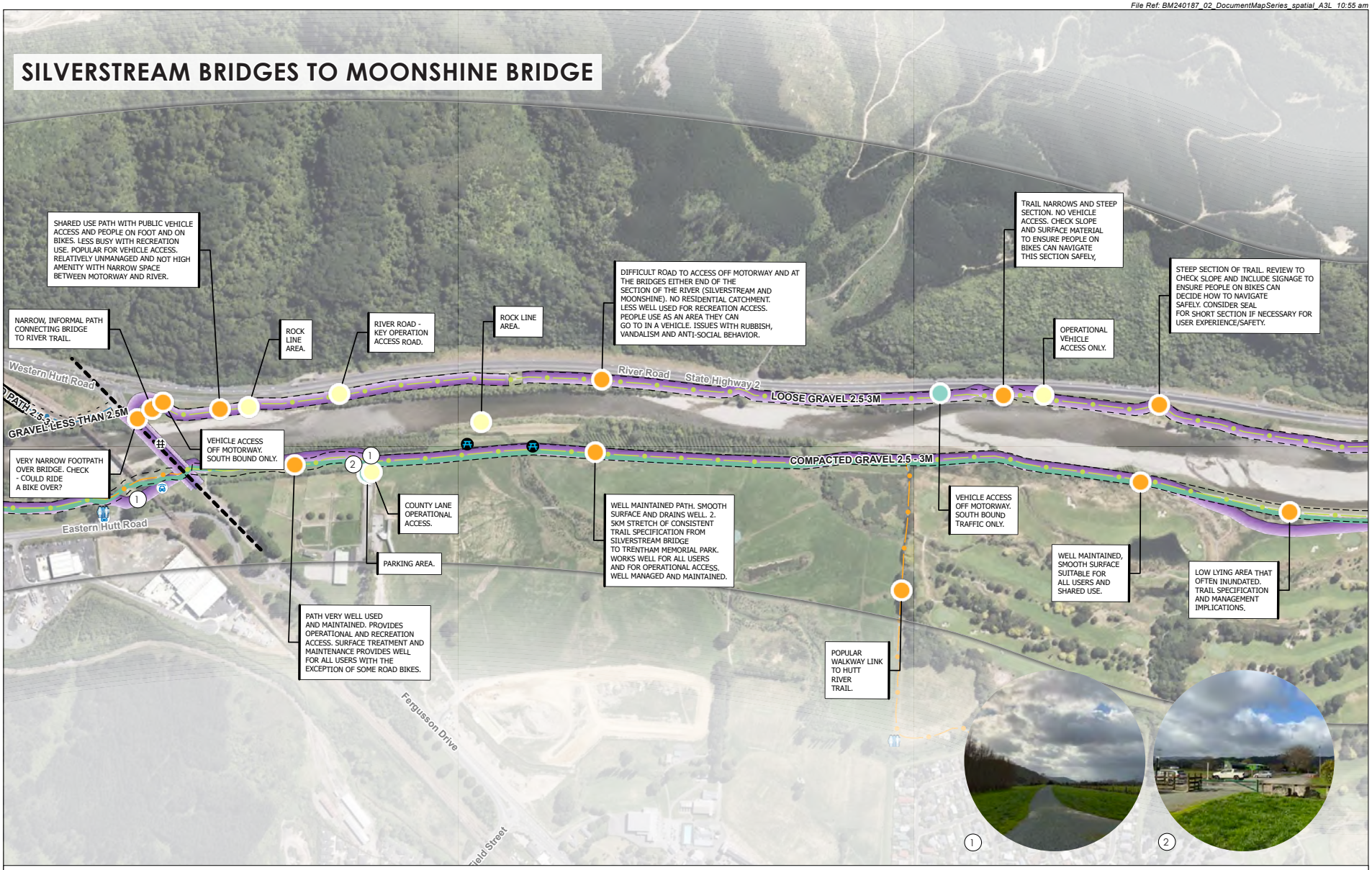
Date: 03 October 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: bec.ramsay@boffamiskell.co.nz | Drawn: DHi | Checked: BRa

File Ref: BM240187_02_DocumentMapSeries_spatial_A3L 10:55 am

SILVERSTREAM BRIDGES TO MOONSHINE BRIDGE



BOFFA MISKELL | TE AWA KAIRANGI HUTT RIVER TRAIL : EXISTING STATE ASSESSMENT | SILVERSTREAM BRIDGES TO MOONSHINE BRIDGE

0 120 m
1:6,000 @ A3

Data Sources: HCC, GWRC, Google

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

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- Public Road

TE AWA KAIRANGI/HUTT RIVER TRAIL

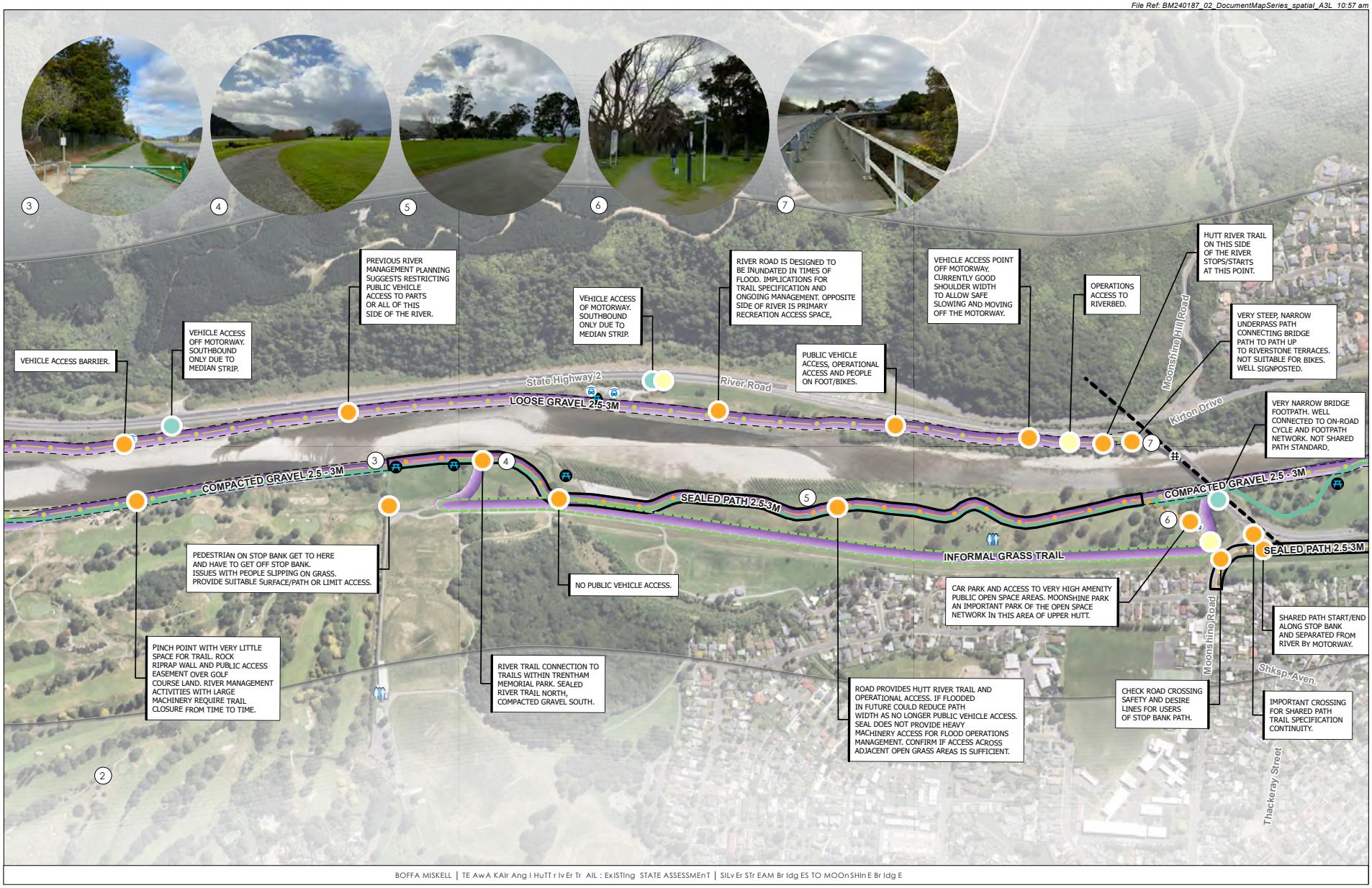
Document Maps: Reach 5A

Date: 03 October 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: bec.ramsay@boffamiskell.co.nz | Drawn: DHi | Checked: BRa

File Ref: BM240187_02_DocumentMapSeries_spatial_A3L 10:57 am



BOFFA MISKELL | TE AWA KAIRANGI HUTT RIVER TRAIL : EXISTING STATE ASSESSMENT | SILVER STREAM BRIDGE TO MOONSHINE BRIDGE

0 120 m
1:6,000 @ A3

Data Sources: HCC, GWRC, Google

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

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- Public Road

TE AWA KAIRANGI/HUTT RIVER TRAIL

Document Maps: Reach 5B

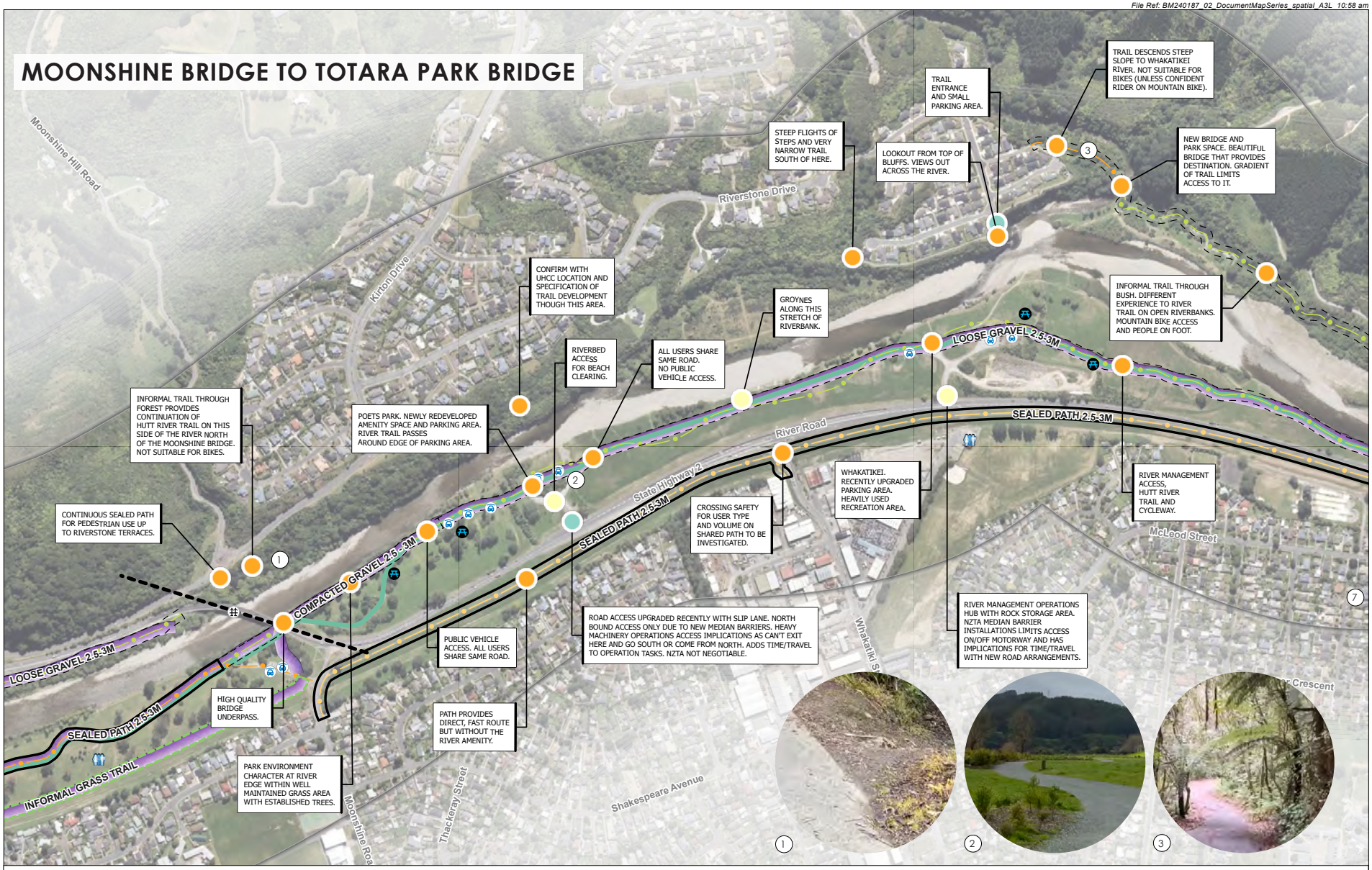
Date: 03 October 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: bec.ramsay@boffamiskell.co.nz | Drawn: DHi | Checked: BRa

File Ref: BM240187_02_DocumentMapSeries_spatial_A3L 10:58 am

MOONSHINE BRIDGE TO TOTARA PARK BRIDGE



BOFFA MISKELL | TE AWA KAIRANGI/HUTT RIVER TRAIL : EXISTING STATE ASSESSMENT | MOONSHINE BRIDGE TO TOTARA PARK BRIDGE

0 120 m
1:6,000 @ A3

Data Sources: HCC, GWRC, Google

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

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- Toilet
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TE AWA KAIRANGI/HUTT RIVER TRAIL

Document Maps: Reach 6A

Date: 03 October 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: bec.ramsay@boffamiskell.co.nz | Drawn: DHi | Checked: BRa

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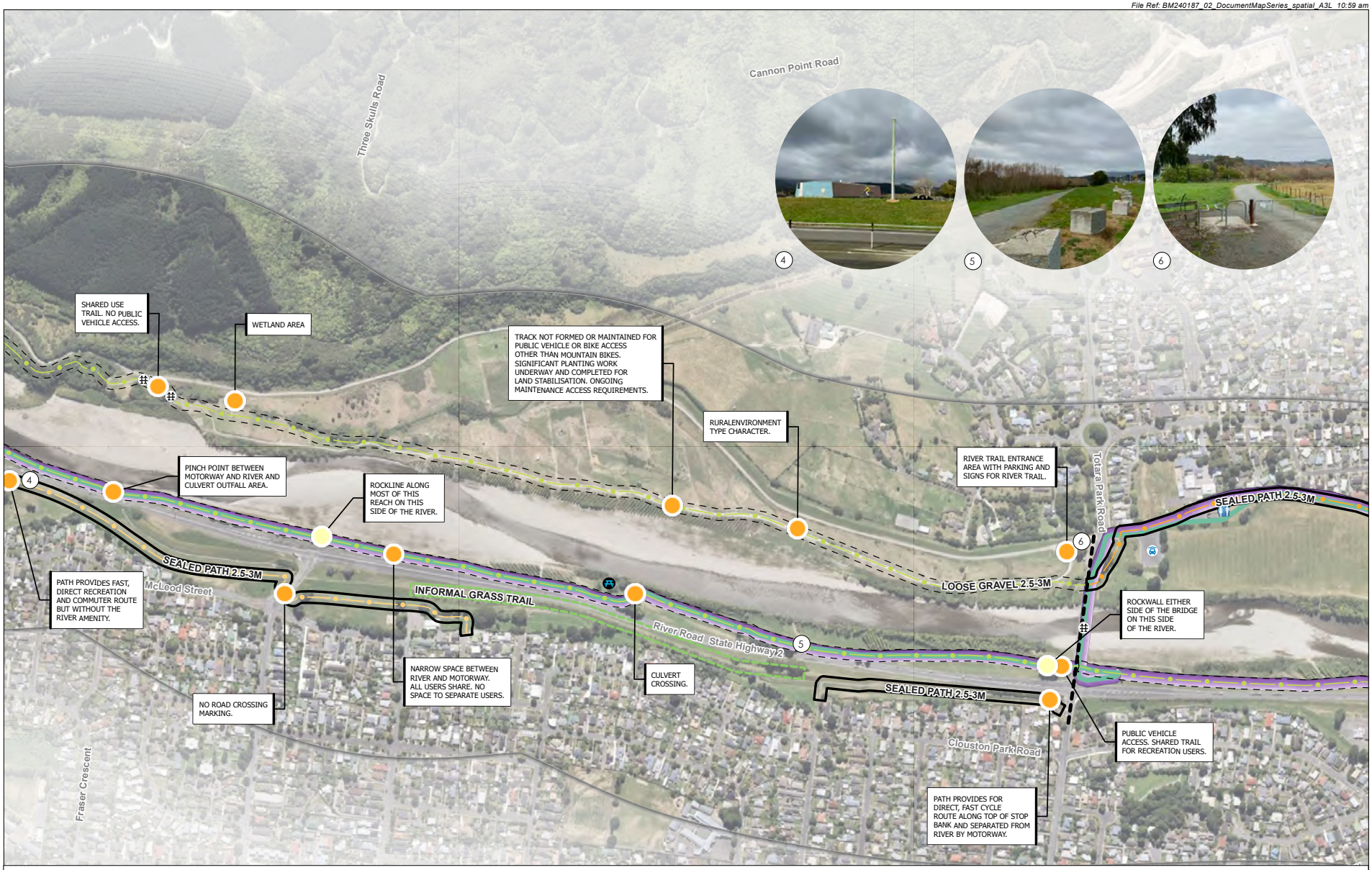

BOFFA MISKELL | TE AwA KAIr Ang I HuTT r IvEr Tr AIL : ExISTIng STATE ASSESSMEnT | MOOnSHInE Br Idg E TO TOTAr A PAr K Br Idg E

0 120 m
1:6,000 @ A3

Data Sources: HCC, GWRC, Google

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

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TE AWA KAIRANGI/HUTT RIVER TRAIL

Document Maps: Reach 6B

Date: 03 October 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: bec.ramsay@boffamiskell.co.nz | Drawn: DHi | Checked: BRa

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TOTARA PARK BRIDGE TO BIRCHVILLE BRIDGE

GOOD CONNECTION TO ON-ROAD CYCLE AND FOOTPATH INFRASTRUCTURE.

GOOD QUALITY UNDERPASS.

HUTT RIVER TRAIL & REMUTAKA CYCLE TRAIL. SOME DISTANCE FROM RIVER EDGE. NO VEHICLE ACCESS. NO FLOOD OPERATIONS HEAVY MACHINERY ACCESS REQUIREMENTS.

SHARED PATH THROUGH HIGH AMENITY WELL MAINTAINED OPEN PARK SPACES ELEVATED ABOVE RIVER.

RIVER TRAIL CONNECTION TO CALIFORNIA PARK AND STREET NETWORK.

PATH PASSES CAMPGROUND. UHCC OWNED BUT LEASED. WIDENING RIVER TRAIL WOULD REQUIRE MOVING BOUNDARY FENCE.

REMUTAKA CYCLE TRAIL CROSSES RIVER AT THIS POINT. GOOD CONNECTION TO BRIDGE.

NO TRAIL AT RIVER EDGE. HEAVY MACHINERY AND FLOOD MANAGEMENT VEHICLES ACCESS ACROSS GRASS.

KEY INTERSECTION POINT WHICH REQUIRES DESIGN TO IMPROVE FOR PEDESTRIAN AND CYCLE ACCESS. REVIEW SIGNAGE ALSO. REMUTAKA CYCLE TRAIL CHANGES SIDES OF THE RIVER AT THIS POINT.

SHARED BY ALL USERS.

FLOOD GATE - ACCESS REQUIRED AT ALL TIMES.

BUSY PARKING AREA FOR ACCESS TO THE RIVER FOR SWIMMING AND RECREATION.

GABION BASKET AND ROCK LINING BETWEEN BRIDGE AND SWIMMING AREA ON THIS SIDE OF RIVER.

ROAD SHOULDER HAS RECENTLY BEEN NARROWED WITH MEDIAN BARRIERS INSTALLED. MAKES SLOWING TO EXIT MOTORWAY MORE DIFFICULT.

KEY ACCESS TO RIVERBED, ROCK LINES AND DEBRIS ARRESTOR OPPOSITE.

ROAD SHARED BY ALL USERS. WELL USED BUT LOWER AMENITY THAN AREAS FURTHER SOUTH AND NORTH DUE TO PROXIMITY TO MOTORWAY AND NARROW RIVERBANK.

NO ROAD MARKINGS AND NOT FORMALLY DESIGNED FOR SHARED USE. POTENTIAL FOR VEHICLES TO TRAVEL AT HIGHER SPEEDS BUT GOOD VISIBILITY. SHARED USE.

HIGH QUALITY SHARED PATH FOR PEDESTRIANS AND CYCLISTS. THIS AREA BETWEEN THE TOTARA PARK BRIDGE AND THE PEDESTRIAN BRIDGE AT NORBERT STREET IS THE ONLY PART OF THE HUTT RIVER TRAIL AND REMUTAKA CYCLE TRAIL THAT IS HIGHER QUALITY AND AMENITY ON THE TRUE RIGHT OF THE BANK RATHER THAN THE LEFT.

NO IMPEDIMENT TO PUBLIC VEHICLE ACCESS ALONG THIS AREA.

NO VEHICLE ACCESS NORTH OF THIS POINT.

SHARED USE. BUSY RECREATION AREA.

SEALED PATH LESS THAN 2.5M

SEALED PATH 2.5-3M

LOOSE GRAVEL 2.5-3M

GRASS TRACK

GRAVEL 2.5-3M

Totara Park Road

Gloston Park Road

River Road

California Drive

Fergusson Drive

Montgomery Cr

State Highway 2

Ngaroa Hill Road

Eastbourne Road

R.N.

King Cha

1

2

3

4

5

BOFFA MISKELL | TE AWA KAIRANGI HUTT RIVER TRAIL : EXISTING STATE ASSESSMENT | TOTARA PARK BRIDGE TO BIRCHVILLE BRIDGE

0 120 m

1:6,000 @ A3

Data Sources: HCC, GWRC, Google

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

- Study Reach
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- Public Road

TE AWA KAIRANGI/HUTT RIVER TRAIL

Document Maps: Reach 7A

Date: 03 October 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: bec.ramsay@boffamiskell.co.nz | Drawn: DHi | Checked: BRa

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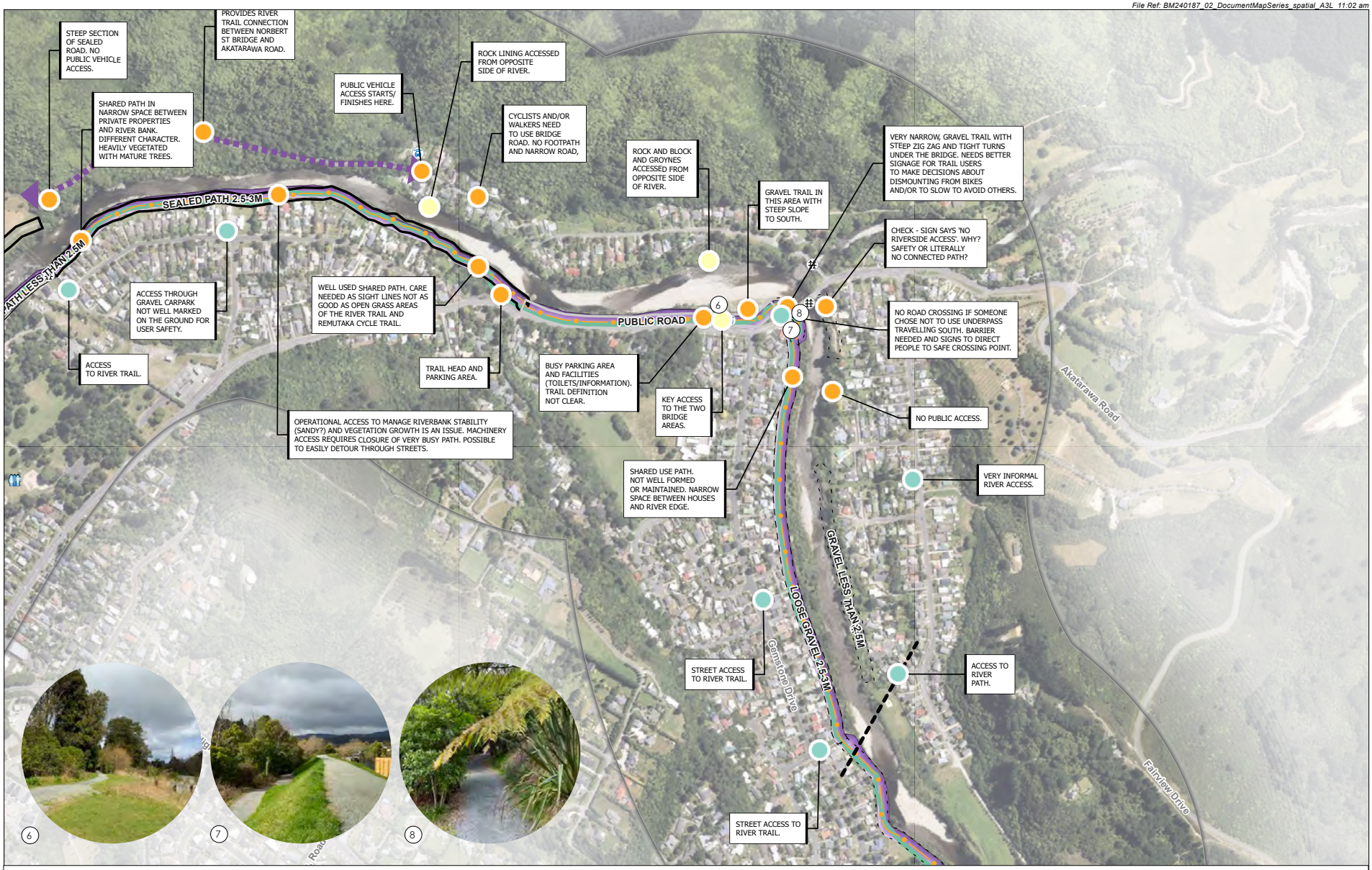

0 120 m
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Data Sources: HCC, GWRC, Google

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

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TE AWA KAIRANGI/HUTT RIVER TRAIL

Document Maps: Reach 7B

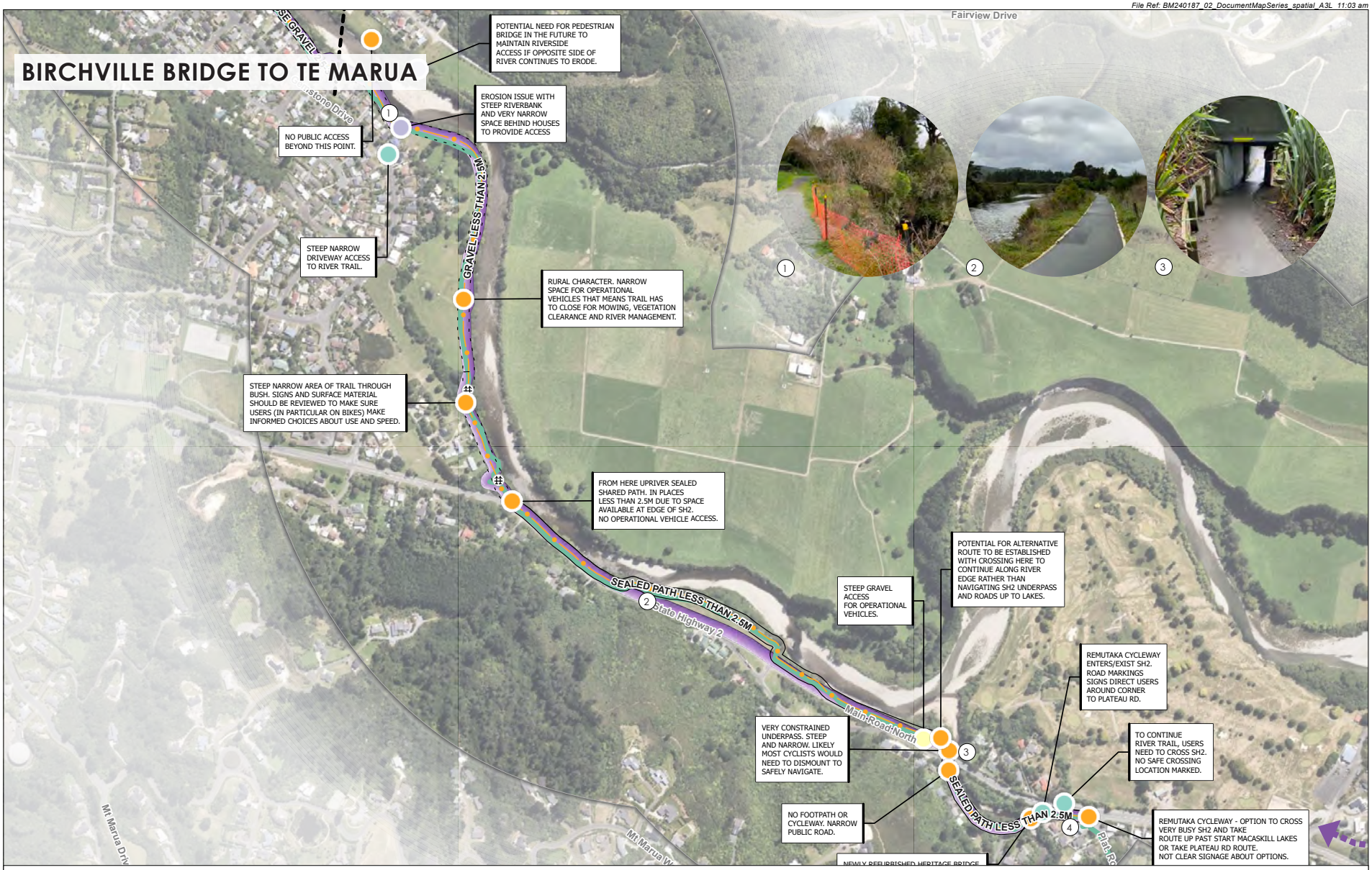
Date: 03 October 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: bec.ramsay@boffamiskell.co.nz | Drawn: DHi | Checked: BRa

File Ref: BM240187_02_DocumentMapSeries_spatial_A3L 11:03 am

BIRCHVILLE BRIDGE TO TE MARUA



BOFFA MISKELL | TE AwA KAIr Ang I HuTT r IvEr Tr AIL : ExISTIng STATE ASSESSMEnT | BIr CHvILLE Br Idg E TO TE MAru A

0 120 m
1:6,000 @ A3

Data Sources: HCC, GWRC, Google

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TE AWA KAIRANGI/HUTT RIVER TRAIL

Document Maps: Reach 8A

Date: 03 October 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: bec.ramsay@boffamiskell.co.nz | Drawn: DHi | Checked: BRa

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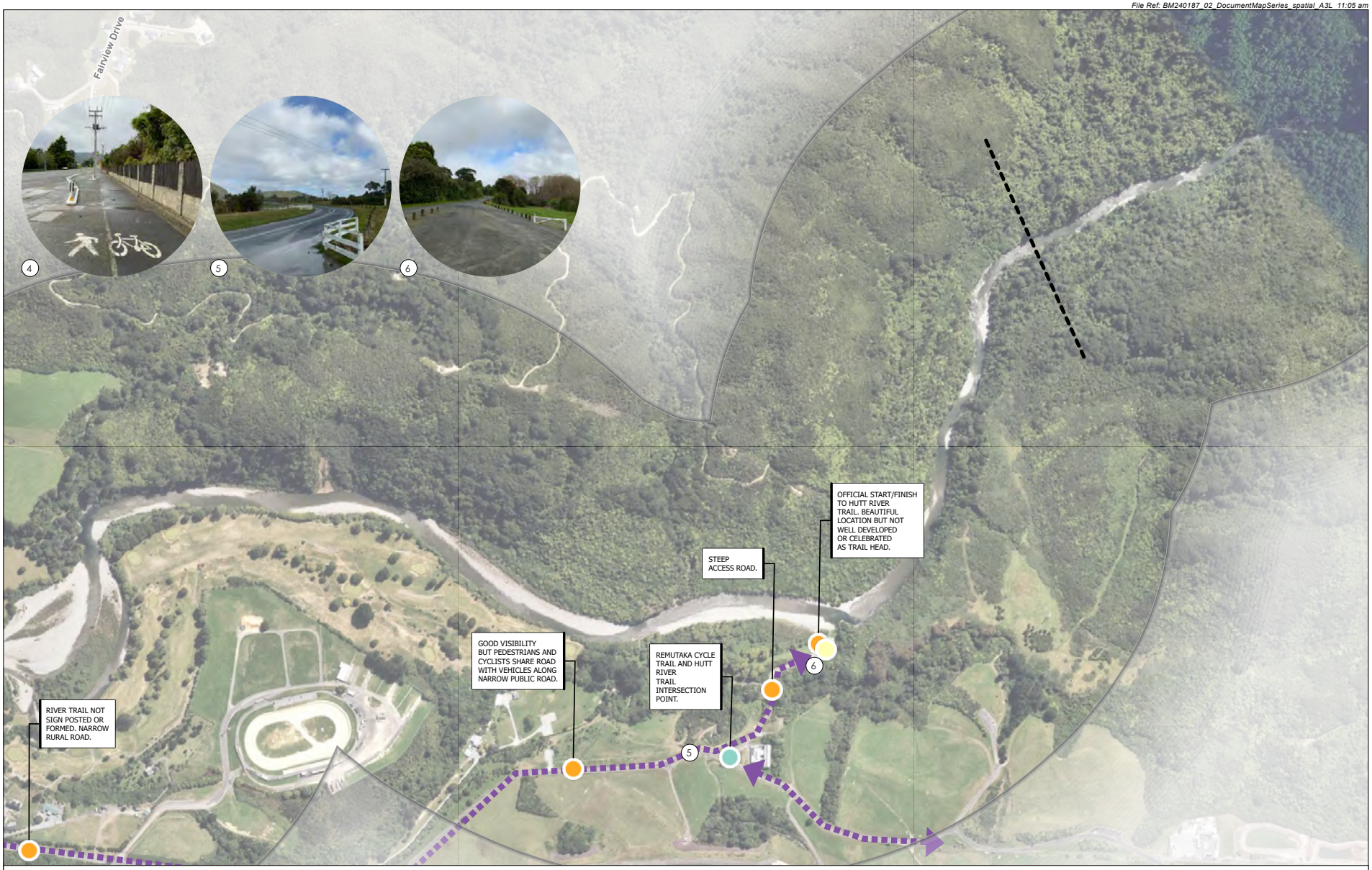

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Data Sources: HCC, GWRC, Google

Projection: NZGD 2000 New Zealand Transverse Mercator

LEGEND

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TE AWA KAIRANGI/HUTT RIVER TRAIL

Document Maps: Reach 8B

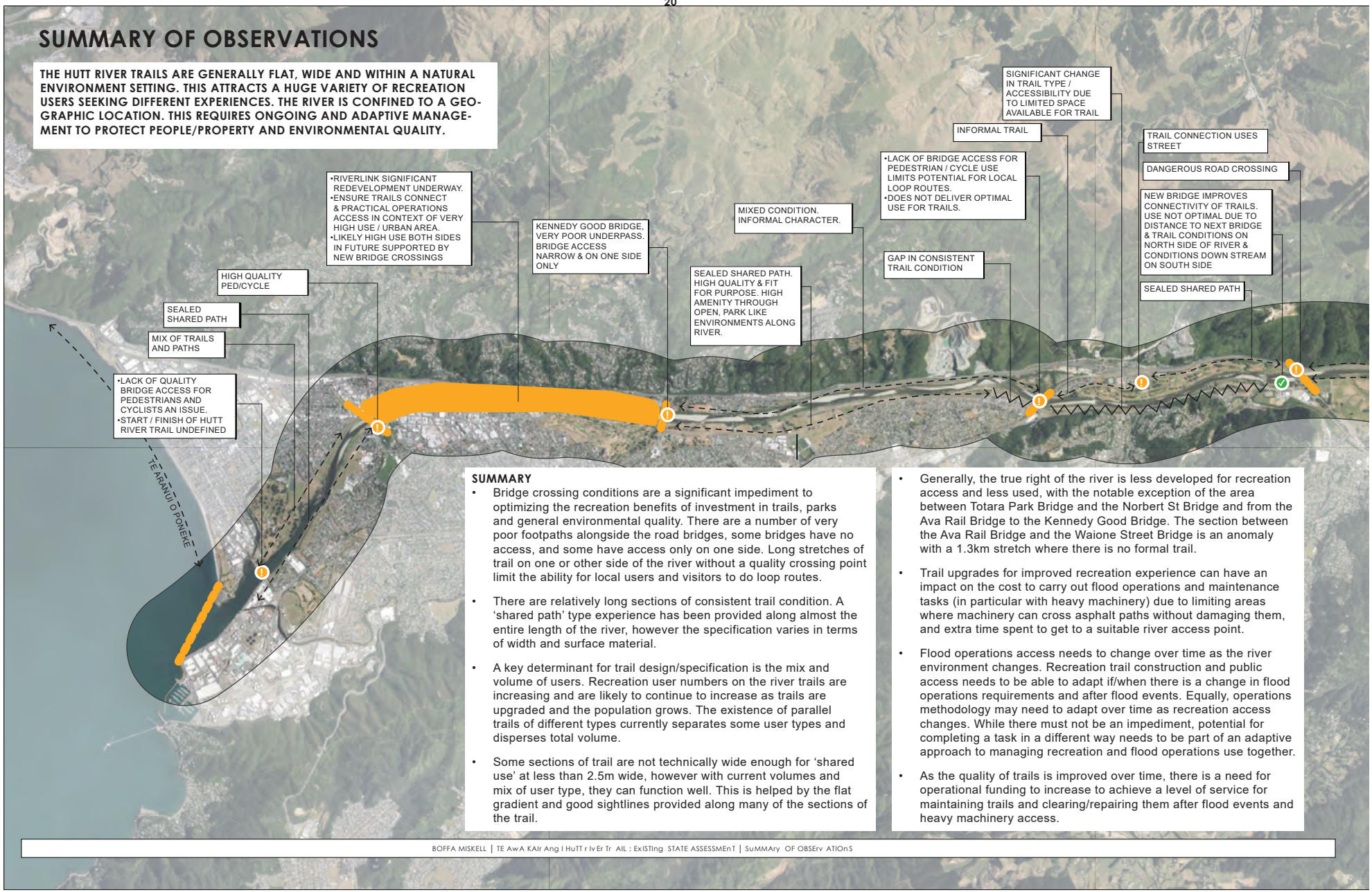
Date: 03 October 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

Project Manager: bec.ramsay@boffamiskell.co.nz | Drawn: DHi | Checked: BRa

SUMMARY OF OBSERVATIONS

THE HUTT RIVER TRAILS ARE GENERALLY FLAT, WIDE AND WITHIN A NATURAL ENVIRONMENT SETTING. THIS ATTRACTS A HUGE VARIETY OF RECREATION USERS SEEKING DIFFERENT EXPERIENCES. THE RIVER IS CONFINED TO A GEOGRAPHIC LOCATION. THIS REQUIRES ONGOING AND ADAPTIVE MANAGEMENT TO PROTECT PEOPLE/PROPERTY AND ENVIRONMENTAL QUALITY.



SUMMARY

- Bridge crossing conditions are a significant impediment to optimizing the recreation benefits of investment in trails, parks and general environmental quality. There are a number of very poor footpaths alongside the road bridges, some bridges have no access, and some have access only on one side. Long stretches of trail on one or other side of the river without a quality crossing point limit the ability for local users and visitors to do loop routes.
- There are relatively long sections of consistent trail condition. A 'shared path' type experience has been provided along almost the entire length of the river, however the specification varies in terms of width and surface material.
- A key determinant for trail design/specification is the mix and volume of users. Recreation user numbers on the river trails are increasing and are likely to continue to increase as trails are upgraded and the population grows. The existence of parallel trails of different types currently separates some user types and disperses total volume.
- Some sections of trail are not technically wide enough for 'shared use' at less than 2.5m wide, however with current volumes and mix of user type, they can function well. This is helped by the flat gradient and good sightlines provided along many of the sections of the trail.
- Generally, the true right of the river is less developed for recreation access and less used, with the notable exception of the area between Totara Park Bridge and the Norbert St Bridge and from the Ava Rail Bridge to the Kennedy Good Bridge. The section between the Ava Rail Bridge and the Waione Street Bridge is an anomaly with a 1.3km stretch where there is no formal trail.
- Trail upgrades for improved recreation experience can have an impact on the cost to carry out flood operations and maintenance tasks (in particular with heavy machinery) due to limiting areas where machinery can cross asphalt paths without damaging them, and extra time spent to get to a suitable river access point.
- Flood operations access needs to change over time as the river environment changes. Recreation trail construction and public access needs to be able to adapt if/when there is a change in flood operations requirements and after flood events. Equally, operations methodology may need to adapt over time as recreation access changes. While there must not be an impediment, potential for completing a task in a different way needs to be part of an adaptive approach to managing recreation and flood operations use together.
- As the quality of trails is improved over time, there is a need for operational funding to increase to achieve a level of service for maintaining trails and clearing/repairing them after flood events and heavy machinery access.

BOFFA MISKELL | TE AWA KAIRANGI HUTT RIVER TRAIL : EXISTING STATE ASSESSMENT | SUMMARY OF OBSERVATIONS

Boffa Miskell

www.boffamiskell.co.nz

0 720 m

1:40,000 @ A3

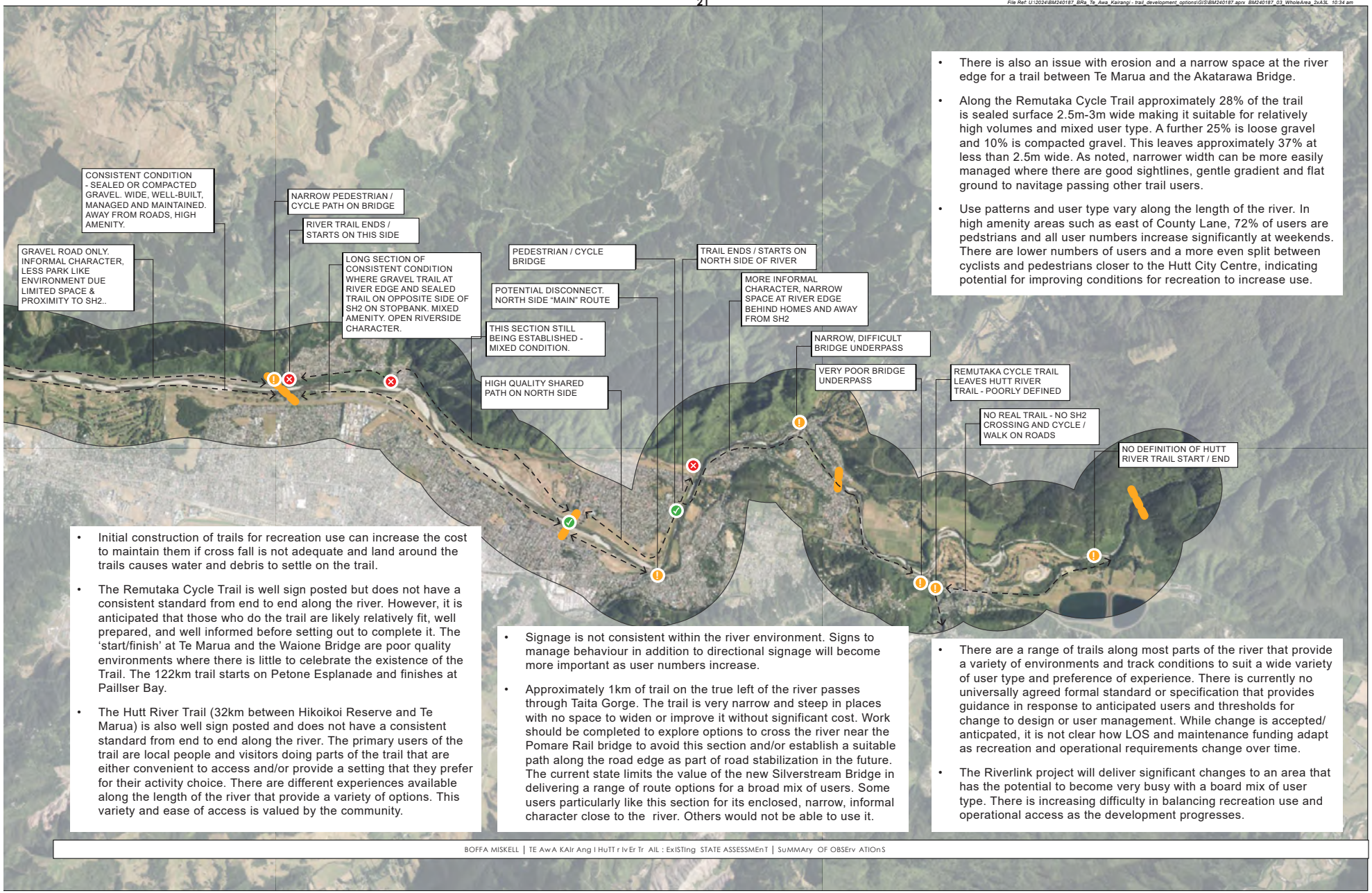
Data Sources: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

Projection: NZGD 2000 New Zealand Transverse Mercator

DRAFT

LEGEND

File Ref: U:\2024\BM240187_BRa_Te_Awa_Kairangi - trail_development_options\GIS\BM240187.aprx BM240187_03_WholeArea_2xA3L 10:34 am



- There is also an issue with erosion and a narrow space at the river edge for a trail between Te Marua and the Akatarawa Bridge.
- Along the Remutaka Cycle Trail approximately 28% of the trail is sealed surface 2.5m-3m wide making it suitable for relatively high volumes and mixed user type. A further 25% is loose gravel and 10% is compacted gravel. This leaves approximately 37% at less than 2.5m wide. As noted, narrower width can be more easily managed where there are good sightlines, gentle gradient and flat ground to navitage passing other trail users.
- Use patterns and user type vary along the length of the river. In high amenity areas such as east of County Lane, 72% of users are pedstrians and all user numbers increase significantly at weekends. There are lower numbers of users and a more even split between cyclists and pedestrians closer to the Hutt City Centre, indicating potential for improving conditions for recreation to increase use.

- Initial construction of trails for recreation use can increase the cost to maintain them if cross fall is not adequate and land around the trails causes water and debris to settle on the trail.
- The Remutaka Cycle Trail is well sign posted but does not have a consistent standard from end to end along the river. However, it is anticipated that those who do the trail are likely relatively fit, well prepared, and well informed before setting out to complete it. The 'start/finish' at Te Marua and the Waione Bridge are poor quality environments where there is little to celebrate the existence of the Trail. The 122km trail starts on Petone Esplanade and finishes at Paillser Bay.
- The Hutt River Trail (32km between Hikoikoi Reserve and Te Marua) is also well sign posted and does not have a consistent standard from end to end along the river. The primary users of the trail are local people and visitors doing parts of the trail that are either convenient to access and/or provide a setting that they prefer for their activity choice. There are different experiences available along the length of the river that provide a variety of options. This variety and ease of access is valued by the community.

- Signage is not consistent within the river environment. Signs to manage behaviour in addition to directional signage will become more important as user numbers increase.
- Approximately 1km of trail on the true left of the river passes through Taita Gorge. The trail is very narrow and steep in places with no space to widen or improve it without significant cost. Work should be completed to explore options to cross the river near the Pomare Rail bridge to avoid this section and/or establish a suitable path along the road edge as part of road stabilization in the future. The current state limits the value of the new Silverstream Bridge in delivering a range of route options for a broad mix of users. Some users particularly like this section for its enclosed, narrow, informal character close to the river. Others would not be able to use it.

- There are a range of trails along most parts of the river that provide a variety of environments and track conditions to suit a wide variety of user type and preference of experience. There is currently no universally agreed formal standard or specification that provides guidance in response to anticipated users and thresholds for change to design or user management. While change is accepted/ anticpated, it is not clear how LOS and maintenance funding adapt as recreation and operational requirements change over time.
- The Riverlink project will deliver significant changes to an area that has the potential to become very busy with a board mix of user type. There is increasing difficulty in balancing recreation use and operational access as the development progresses.

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TE AWA KAIRANGI TRAIL

Trail Extent

Date: 27 September 2024 | Revision: 0

Plan prepared by Boffa Miskell Limited

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Together. Shaping Better Places.

Boffa Miskell is a leading New Zealand environmental consultancy with nine offices throughout Aotearoa. We work with a wide range of local, international private and public sector clients in the areas of planning, urban design, landscape architecture, landscape planning, ecology, biosecurity, Te Hīhiri (cultural advisory), engagement, transport advisory, climate change, graphics and mapping. Over the past five decades we have built a reputation for creativity, professionalism, innovation and excellence by understanding each project's interconnections with the wider environmental, social, cultural and economic context.

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