



If calling, please ask for Democratic Services

Council

Thursday 7 April 2022, 9.30am

Remotely, via Microsoft Teams

Members

Cr Ponter (Chair)

Cr Staples (Deputy Chair)

Cr Blakeley

Cr Brash

Cr Connelly

Cr Gaylor

Cr Hughes

Cr Kirk-Burnnand

Cr Laban

Cr Lamason

Cr Lee

Cr Nash

Cr van Lier

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

Council

Thursday 7 April 2022, 9.30am

Remotely, via Microsoft Teams

Public Business

| No. | Item | Report | Page |
|-----|--|--------|------|
| 1. | Apologies | | |
| 2. | Conflict of interest declarations | | |
| 3. | Public Participation | | |
| 4. | Confirmation of the Public minutes of the Council meeting on 17 March 2022 | 22.115 | 4 |
| 5. | Update on the Progress of Action Items from Previous Council Meetings – April 2022 | 22.132 | 10 |

Strategy/Policy/Major Issues

| | | | |
|----|--|--------|-----|
| 6. | Waiōhine River Plan | 22.135 | 14 |
| 7. | Draft submission on Road User Charges | 22.138 | 255 |
| 8. | Fluoridation of Water Supply | 22.134 | 263 |
| 9. | Central government Co-investment in Flood Protection Schemes | 22.117 | 266 |

Governance

| | | | |
|-----|--|--------|-----|
| 10. | WRC Holdings - Draft Statement of Intent 2023 | 22.121 | 270 |
| 11. | Establishment of the 2022 Funding and Financial Policies Hearing Committee | 22.119 | 287 |
| 12. | Local Government New Zealand Annual General Meeting attendance | 22.133 | 293 |
| 13. | Wellington Water Committee meeting – 18 March 2022 | 22.129 | 297 |
| 14. | Wellington CDEM Group meeting - 22 March 2022 | 22.123 | 301 |
| 15. | Regional Transport Committee meeting - 22 March 2022 | 22.122 | 305 |
| 16. | Wellington Regional Leadership Committee meeting – 22 March 2022 | 22.124 | 357 |
| 17. | Resolution to Exclude the Public | 22.137 | 442 |

Public Excluded

| | | | |
|-----|--|----------|-----|
| 18. | RiverLink Project – Authorisation to Execute Project Partner Agreement Variation 2 | PE22.130 | 444 |
| 19. | Appointment of Director to Predator Free Wellington Limited | PE22.93 | 498 |
| 20. | Appointment of Directors – WRC Holdings | PE22.120 | 505 |



Please note these minutes remain unconfirmed until the Council meeting on 7 April 2022.

Report 22.115

Public minutes of the Council meeting on Thursday 17 March 2022

All members participating remotely via Microsoft Teams at 9.31am

Members Present

Councillor Ponter (Chair) (until 10.40am)
Councillor Staples (Deputy Chair)
Councillor Blakeley
Councillor Brash
Councillor Connelly
Councillor Gaylor
Councillor Hughes
Councillor Kirk-Burnnand
Councillor Laban
Councillor Lamason
Councillor Lee
Councillor Nash
Councillor van Lier

All members participated at this meeting remotely and counted for the purpose of quorum in accordance with clause 25B of Schedule 7 of the Local Government Act 2002.

Karakia timatanga

The Council Chair opened the meeting with a karakia timatanga.

Public Business

1 Apologies

There were no apologies

2 Item not on the agenda to be dealt with

The Council Chair advised that Council would need to deal with an additional report on the matter of Public Transport Fares: 50 percent reduction.

Moved: Cr Ponter / Cr Blakeley

1. That under Standing Order 3.5.5, Report 22.111 – Public Transport Fares: 50 percent reduction is dealt with at this meeting.
2. This report is not on the agenda for this meeting as at the time the agenda was prepared the Government had not announced their initiative to provide funding for public transport fares to be halved for a three-month period from 1 April 2022.
3. Discussion on matters contained in this report cannot be delayed until the Council's next meeting because the matters need to be progressed and finalised promptly to implement the proposed changes.

The motion was **carried**.

3 Declarations of conflicts of interest

There were no declarations of conflicts of interest.

4 Public participation

There was no public participation.

5 Confirmation of the Public minutes of the Council meeting on 24 February 2022 – Report 22.75

Moved: Cr Brash / Cr Hughes

That Council confirms the Public minutes of the Council meeting on 24 February 2022 – Report 22.75.

The motion was **carried**.

6 Confirmation of the Public Excluded minutes of the Council meeting on 24 February 2022 – Report PE22.76

Moved: Cr Blakeley / Cr Staples

That Council confirms the Public Excluded minutes of the Council meeting on 24 February 2022 – Report PE22.76.

The motion was **carried**.

7 Confirmation of the Restricted Public Excluded minutes of the Council meeting on 24 February 2022 – Report RPE22.77

Moved: Cr Brash / Cr Laban

That Council confirms the Restricted Public Excluded minutes of the Council meeting on 24 February 2022 – Report RPE22.77.

The motion was **carried**.

8 Update on Progress of Action Items from Previous Council Meetings – March 2022 – Report 22.84 [For Information]

Strategy, policy, or major issues

9 2022 Amendment of the Revenue and Financing Policy – Report 22.17

Alison Trustrum-Rainey, Chief Financial Officer, spoke to the report and tabled updated recommendations.

Moved: Cr Staples / Cr Brash

That Council:

- 1 Confirms that the Revenue and Financing Policy is to be amended in some respects, but a full review of the policy has not been undertaken.
- 2 Notes that the proposed amendments to the policy are not an amendment to the 2021-31 Long Term Plan.
- 3 Confirms the Council's analysis of the section 101(3)(a) and (b) Local Government Act 2002 considerations as set out in Attachment 1.
- 4 Notes that:
 - a in respect of the Predator Control Programme, Council has had regard to section 100T of the Biosecurity Act 1993; and
 - b In respect of the Stadium rate, a general rate was also considered but discounted as not appropriate.
- 5 Approves the proposed Revenue and Financing Policy as set out in Attachment 3 for the purposes of consultation.
- 6 Agrees the consultation and engagement approach outlined in paragraphs 60-65 of this report meets the requirements of sections 78, 82 and 82A of the Local Government Act 2002.
- 7 Approves the consultation document and supporting information for the proposed amendments to the Revenue & Financing Policy, as set out in Attachments 4 and 5.
- 8 Authorises Kyn Drake, Revenue and Financing Policy Review Project Manager, to receive and transcribe verbal submissions on the proposed Revenue and Financing Policy.

- 9 Authorises the Council Chair to make editorial changes to the proposed Revenue and Financing Policy and accompanying documents to correct errors and improve public understanding.

The motion was **carried**.

10 Rates Remission on Māori Land Policy – Approval of Policy for Consultation – Report 22.94

Monica Fraser, General Manager, Te Hunga Whiriwhiri, and Scott Summerfield, Consultant, Te Hunga Whiriwhiri, title spoke to the report and tabled updated recommendations.

Moved: Cr Connelly / Cr Kirk-Burnnand

That Council:

- 1 Approves the draft Rates Remission on Māori Land Policy (Attachment 1) for public consultation purposes
- 2 Approves the Consultation Document (Attachment 2) for public consultation purposes.
- 3 Agrees to the public consultation period being from 21 March and 2 May 2022 with hearing of submitters scheduled for 17 to 19 May 2022.
- 4 Authorises the following officers to receive and transcribe verbal submissions on the draft Rates Remission on Māori Land Policy:
 - a. Brett Cockeram, Manager, Māori Outcomes
 - b. Pauline Hill, Principal Advisor, Māori
 - c. Nora Moore, Senior Advisor, Māori
 - d. Renaee Clark, Senior Advisor, Māori Organisational Capability
 - e. Lisa Kenny, Senior Māori Economic Development Advisor
 - f. Sheryl Miller, Senior Advisor, Māori Engagement
 - g. Te Paea Ngāpo, Advisor, Māori Engagement.
 - h. Laura Burkett, Project Coordinator.
- 5 Authorises the Council Chair to make editorial changes to the draft Rates Remission on Māori Land Policy and the consultation document prior to publication to correct errors and improve public understanding.

The motion was **carried**.

11 Silverstream Pipe Bridge Funding Approval – Report 22.71

Samantha Gain, General Manager, Corporate Services, spoke to the report.

Moved: Cr Kirk-Burnnand / Cr Hughes

That Council approves for inclusion in the Council's budget for the Silverstream Pipe Bridge project, a total amount of \$92.2 million (an additional amount of \$51.7 million above the current Long Term Plan budget of \$40.5 million).

The motion was **carried**.

Note: Councillor Gaylor requested that her vote against the motion be recorded.

12 Public Transport Fares: 50 percent reduction - Report 22.111 [Tabled]

Scott Gallacher, General Manager, Metlink, spoke to the report.

Moved: Cr Blakeley / Cr Nash

That Council:

- 1 Notes that on 14 March 2022, the Government announced an initiative to provide funding for public transport fares to be halved for a three-month period from 1 April 2022.
- 2 Notes that amending public transport fares is a decision that rests with public transport authorities, in this case the Council.
- 3 Agrees to reduce Metlink Public Transport fares by a minimum of 50 percent for a three-month period commencing 1 April 2022.
- 4 Authorises officers to undertake actions to implement Council's decision.

The motion was **carried**.

The meeting adjourned at 10.40am and resumed at 11.06am, with the Council's Deputy Chair presiding at the request of the Council Chair, due to the Chair's absence from the reminder of the meeting due to Council business (Standing Order 2.3.1).

13 After-Midnight Bus Service Fares Review – Report 22.106

Scott Gallacher, General Manager, Metlink, spoke to the report. Mr Gallacher advised that officers recommended that the "1 July 2022" date referenced in the report recommendations be changed to 1 April 2022.

Moved: Cr Kirk-Burnnand / Cr Nash

That Council agrees that from 1 April 2022, standard Metlink fares will replace the current special fixed fares on after-midnight services to better encourage demand for the services.

The motion was **carried**.

14 2022/23 Annual Plan Process Update – Report 22.91 [For Information]

Zofia Miliszewska, Team Leader, Corporate Planning and Reporting, spoke to the report.

The public meeting closed at 11.15am.

Councillor D Ponter

Chair

Date:

**Council
7 April 2022
Report 22.132**



For Information

UPDATE ON PROGRESS OF ACTION ITEMS FROM PREVIOUS COUNCIL MEETINGS – APRIL 2022

Te take mō te pūrongo

Purpose

1. To update the Council on the progress of action items arising from previous Council meetings.

Te horopaki

Context

2. Items raised at Council meetings, that require actions from officers, are listed in the table of action items from previous Council meetings ([Attachment 1](#) – Action items from previous Council meetings – April 2022). 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 from this report, but there may be implications arising from the actions listed.

Ngā tūāoma e whai ake nei

Next steps

4. Completed items will be removed from the action items table for the next report. Items not completed will continue to be progressed and reported. Any new items will be added to the table following this Council meeting and circulated to the relevant business group/s for action.

**Ngā āpitihanga
Attachment**

| Number | Title |
|---------------|--|
| 1 | Action items from previous Council meetings – April 2022 |

**Ngā kaiwaitohu
Signatories**

| | |
|--------|---|
| Writer | Monica Fraser, General Manager, Te Hunga Whiriwhiri |
|--------|---|

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

Attachment 1 to Report 22.132

Action items from previous Council meetings

| Meeting date | Action | Status and comment |
|---------------------|--|---|
| 24 February 2022 | <p>Greater Wellington’s Quarter Two summary report – Report 22.60</p> <p>Noted:</p> <p>Councillors requested that they be provided with information regarding Mataranga Māori.</p> | <p>Status</p> <p>In progress</p> <p>Comment</p> <p>To be provided to Councillors and discussed at a council workshop. Date to be confirmed.</p> |

Council
7 April 2022
Report 22.135



For Decision

WAIŌHINE RIVER PLAN

Te take mō te pūrongo

Purpose

1. To seek adoption of the Waiōhine River Plan (WRP) as recommended by the Waiōhine River Plan Hearings Panel (Hearings Panel) and endorsed by the Wairarapa Committee.

He tūtohu

Recommendation

That Council **adopts** the Waiōhine River Plan (Attachment 2).

Te horopaki

Context

Waiōhine River

2. The Waiōhine River flows generally south from its origins in the Tararua Range west of Ōtaki. It turns south-east once it reaches the plain where it passes to the north of Greytown and flows into the Ruamāhanga River at Pāpāwai. In a major flood the Waiōhine will flood the town of Greytown and impact State Highway 2. For a 1 percent annual exceedance probability (AEP) event it is estimated that over a hundred properties could be affected.
3. When not in flood, the Waiōhine is an important community resource from the swimming holes in the middle reaches to the popular Waiōhine gorge in the upper river. Both of these aspects have been considered in the WRP.

The Waiōhine River Plan

4. The planning process started in the late 1990s. A series of investigations were undertaken assessing the Waiōhine River flood hazard. These investigations culminated in an agreed path to stopbank construction in 2007, however, this work did not proceed and a new floodplain management investigation commenced in September 2008. This planning process resulted in a draft floodplain management plan being shared by way of public consultation in September 2016. However, due to community feedback the resulting hearing process never took place and the draft plan was subsequently revoked by Greater Wellington in October 2016.

5. Following this, a project team was established to deliver a community led plan for flood and erosion risk management for the Waiōhine River.
6. The WRP has been developed by a project team (the Project Team) made up of members of the local Wairarapa community, who were elected at a public community meeting in July 2017, including representatives of Ngāti Kahungunu ki Wairarapa. These community members are drawn from the wider Waiōhine Action Group (WAG). The Project Team meetings are attended and supported by Greater Wellington officers.
7. The WRP Steering Group (the Steering Group), chaired by Councillor Staples, was established to oversee the WRP's development. Representatives of Ngāti Kahungunu ki Wairarapa and Rangitāne o Wairarapa sat on the Steering Group.
8. The proposed WRP provides direction to Greater Wellington in managing the flood and erosion hazards from the Waiōhine River. This includes structural works, such as stopbanks and rock groynes, along with non-structural works such as considerations for emergency management, flood hazard mapping, planning recommendations, operational and maintenance works. The proposed WRP will inform the river and flood risk management activities carried out by Greater Wellington in the Waiōhine catchment.
9. The WRP has been developed by a community led team supported by Greater Wellington officers. The WRP has taken the form of an investigation and options assessment. It should be noted that this is a community developed document and consequently the chapters in the WRP document may not match other Greater Wellington reports but follow a logical progression. The WRP also provides commentary on the assumptions and decision making process followed by the Project Team.
10. As a community developed document some of the decision making tools, methods of consultation and general structure of working undertaken in the development of the plan are not those used by Greater Wellington in similar work. This is intentional as the WAG group and Project Team wanted a point of difference and wanted the WRP to carry their unique mark and signature, instead of being received as a Greater Wellington developed document.
11. The Project Team has sought to deliver an open process. Participation while open to all, has in general been limited to those motivated to make a contribution to the process. When the community is mentioned in the WRP this is what is being described.
12. The WRP presents an evaluated set of options to mitigate the flood risk and manage the river. These options are described in the WRP and listed below:
 - a Do nothing
 - b Inland stopbanks Western North Street and Eastern near Kuratawhiti Street
 - c Inland stopbank near North Street and an extension of the Greytown stopbank to Beban's farm
 - d Inland stopbank near North Street and an extension of the Greytown stopbank beyond Beban's farm

- e Inland stopbank near North Street and an extension of the Greytown stopbank beyond Beban's farm with re-alignment on the inside of Fullers Bend stopbank
 - f Full true right stopbank with re-alignment of stopbank inside of Fullers Bend stopbank.
13. The options considered have been modelled, costed and shared with the community through a series of channels. The community events were not organised or overseen by Greater Wellington officers and consequently are in a different form than other planning processes may follow. Details of these consultations and decisions reached are clearly detailed in the WRP document itself.
 14. A wide range of variables were considered during the investigations to identify the flooding and erosion hazards. These flowed through into how the mitigation options were formed, evaluated, and consulted on. Therefore, a wide range of options have been evaluated in the WRP.
 15. The impacts of climate change, the use of new techniques to enhance the river and riparian environment and giving the river more room have all been included in the WRP. While not as comprehensive as a catchment management plan, the WRP goes further than what would be considered for a conventional floodplain management plan.

The submissions process

16. Consultation on the plan was delayed by the COVID-19 pandemic but started on 25 June 2021 and ended on 16 August 2021. This took the form of a submissions process and was supported by the Project Team being active in the Greytown community to promote the plan and to capture submissions.
17. A total of 189 submissions were received and hearings were held in November 2021. The Hearings Panel was chaired by Councillor Staples and the panel comprised of representatives from Ngāti Kahungunu ki Wairarapa, South Wairarapa District Council, Carterton District Council, and the community. Over two days 17 verbal submissions were heard from members of the community, the Greytown Community Board and Fish and Game NZ.
18. The Hearings Panel recommended that the Wairarapa Committee endorses the WRP for consideration and adoption by Council.
19. The WRP was endorsed by the Wairarapa Committee at its meeting on 29 March 2022 (see Report 22.29).
20. The Waiōhine Hearings Panel Deliberations Minutes and Action points, [Attachment 1](#), and the proposed The Waiōhine|Rakahanga River Plan (WRP), [Attachment 2](#) are attached to this report.

Risks

21. If Council does not adopt the WRP then this will result in either restarting the process or re-working elements of the WRP until it is acceptable to the Wairarapa Committee. This may result in:

- a **Risk to Greytown** – The WRP sets out the proposed flood and erosion risk management measures for the protection of Greytown. This plan provides the basis for Greater Wellington to proceed with the implementation of these measures.
- b **Community relationship** – The WRP has been developed by the community with the support of both Ngāti Kahungunu and Rangitāne o Wairarapa. Not supporting the WRP may result in damage to the relationship with the community and our partners.

Ngā hua ahumoni

Financial implications

- 22. The implementation work outlined in the WRP includes a predicted spend of up to 2 million dollars of capital expenditure. This has been identified and allocated in the 2021-31 Long Term Plan (LTP).

Te huritao ki te huringa o te āhuarangi

Consideration of climate change

- 23. Climate change and the allowing for the impacts of climate change on the flooding behaviour of the Waiōhine River have been integral to the Project Team’s work. Nationally recognised climate experts from NIWA provided advice to the Project Team. This advice consisted of how to best take these effects into consideration in the analysis of the hazards, and then through into design and evaluation of mitigation options.
- 24. By working with experts, a process to best address the uncertainties in the climate change information were developed and incorporated into the WRP.

Ngā tikanga whakatau

Decision-making process

- 25. The matter requiring decision in this report was considered by officers against the decision-making requirements of Part 6 of the Local Government Act 2002.

Te hiranga

Significance

- 26. 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 medium significance, for the following reasons.
 - a Importance to the region – This plan has a localised impact on the future wellbeing of the Greytown and surrounding area.
 - b Community interest – As a community developed plan this document has significant community input and interest.

- c Consistency with existing Council policy and strategy – This plan is consistent with Council policy, direction, and the principles of floodplain management planning adopted by Council.
- d Impacts on the Council’s capability and capacity – The capital works are budgeted for in Greater Wellington’s LTP.

**Te whakatūtakitaki
Engagement**

- 27. Consultation on the WRP started on 25 June 2021 and ran to 22 August 2021. The information was collated and analysed by officers and a hearing panel was established. The hearing was held on 29 and 30 November 2021. There were 189 submissions received. The majority of the submissions were in support of the WRP, with limited notable and significant submissions not in support.
- 28. The concerns of the submissions that were not in support have been noted and taken into consideration during the hearings deliberation. Please refer to **Attachment 1** for the outcome of these deliberations.

**Ngā tūāoma e whai ake nei
Next steps**

- 29. If Council adopts the WRP, the following steps will be taken:
 - a Implementation will be commenced with the establishment of the Living Plan team and planning for the stopbank construction. The Living Plan team is described in **Attachment 2** as the community entity that will replace the Project team who have developed the plan.
 - b Work on the Wairarapa Combined District Plan on flood hazard mapping and planning controls is currently ongoing and will continue in line with their timeframes.

**Ngā āpitihanga
Attachments**

| Number | Title |
|--------|---|
| 1 | Waiōhine Hearings Panel Deliberations Minutes & Action Points |
| 2 | The Waiōhine Rakahanga River Plan |

**Ngā kaiwaitohu
Signatories**

| | |
|-----------|--|
| Writer | James Flanagan – Senior Engineer, Flood Protection |
| Approvers | Andy Brown – Team Leader, Flood Protection Graeme Campbell – Manager, Flood Protection Wayne O’Donnell – General Manager, Catchment Management Group |

| He whakarāpopoto i ngā huritaonga Summary of considerations |
|---|
| <p><i>Fit with Council's roles or with Committee's terms of reference</i></p> <p>This matter within the role of Council as it contains implementation actions for Greater Wellington including the construction of assets and rating of the Greytown Community.</p> |
| <p><i>Implications for Māori</i></p> <p>The WRP and process is supported by both Ngāti Kahungunu and Rangitāne o Wairarapa. They have supported the community project team at both the team level and at steering group level.</p> |
| <p><i>Contribution to Annual Plan / Long Term Plan / Other key strategies and policies</i></p> <p>The matter contained in this report contributes to Councils strategic priority of safe guarding communities from major flooding.</p> |
| <p><i>Internal consultation</i></p> <p>The matter presented in this report has had extensive internal consultation during its development including Finance, Democratic Services and a range of Environment and Catchment Departments.</p> |
| <p><i>Risks and impacts - legal / health and safety etc.</i></p> <p>Risk to Greytown – The WRP sets out the proposed flood and erosion risk management measures for the protection of Greytown. This plan provides the basis for Greater Wellington to proceed with the implementation of these measures.</p> <p>Community relationship – The WRP has been developed by the community with the support of both Ngāti Kahungunu and Rangitāne o Wairarapa, not supporting the WRP may result in damage to the relationship with the community and our partners.</p> |

Waiohine River Plan – Hearings Panel Deliberations Minutes & Action Points

1.1 Purpose

This note summaries the deliberations of the Waiohine Hearings Panel and identifies the action points required ahead of recommendation to the Wairarapa Committee for endorsement for Council to adopt the Waiohine River Plan.

1.2 Hearings Panel

The hearings panel membership present for hearings and deliberations were;

- Chair Clr Staples – GWRC
- Clr Deller – CDC
- Clr Olds – SWDC
- RawiriSmith - Kahungunu Ki Wairarapa
- Michael Hewison – Community
- Bruce Slater – Community

1.3 Minutes

Deliberations and action points

- Many submissions mentioned the importance of gravel/river bed management.
- **The gravel management set out in the plan is sufficient. No change is required.**
- Ra: River management for flood protection is quite different to river management for the river. The Plan is a holistic view for flood protection thinking but it may not be holistic for the River.
- This is an overall plan and the FMP is a section of it.
- Some submissions mentioned groundwater and related issues.
- Waitua includes some of these. We could have a hyperlink to other relevant documents.
- Think about where this plan fits within GW and where does it fit in the community?
- Cover page can explain this

Action: Place the Plan in context. A section should be added in the introduction with an explanation of where this plan fits in with other plans and objectives. Add references to other plans in relevant sections within the document.

- Content points should fit with the wider context
- Check inconsistency with other documents.
- Some submitters were concerns about the quality of the document as statutory document and accountability.
- This is a not a statutory document so it doesn't have to meet those requirements.
- But it does need to be useable.

Discussions relating to specific submissions:

■■■■■ submission

- Thought there would be a new stop bank on the property. ■■■■■ was only one in that area who put in a submission. Detailed hydraulic modelling of the area didn't see the flow paths he talked about from previous events. This is because a stop bank has since been built.
- ~~- Triggers are in the plan.~~

■■■■■ submission

- Main concern is lack of consultation and the impacts on him.
- We have to demonstrate that ~~we go through some means to meet~~ his requirements have been considered. ~~Could do a minor tweak for his property.~~
- Will need to ~~change the way we speak to~~ adopt a different process to ensure those who are directly affected, loss to business, purchase of land, impacts on houses etc. are fully engaged. This can be handled as part of the implementation of the Plan.
- ~~- ■■■■■ was disappointed that the first plan was not used.~~
- The proposed stop bank will be on GWRC land not on Dieckermann's.

Action: ■■■■■ will need a more fulsome letter explaining the way forward for the project and impacts on them.

■■■■■ submission:

- Is there somewhere we can acknowledge long fin eels as an endangered species?
- People often treat longfin and shortfin the same. Longfin don't like sediment

Action: Acknowledgement of longfin eels, background and special considerations should be added through the living plan process.

- Can be included under ecological considerations or under fauna.
- The condition of pools and the bottom of pools can be a factor.

■■■■■ submission.

- At a couple points the river channel narrows. The water will come out of the river in these places.
- Part of their submission is about the focus of the plan being above the state highway.
- We have agreed to maintain the existing levels of protection.
- Can we emphasise that we are continuing maintenance downstream of state highway.
- The introduction needs to emphasise that the plan is for the complete length of the river.

Action: Respond to the ■■■■■ to explain that the plan is for the whole river and we will continue to manage this reach.

■■■■■ submission.

- Aquifers are beyond scope of plan at the moment
- A whole lot more needs to be added to the Plan to make it truly holistic.
- There is a whole range of ways to deal with sediment. Look at what we do in the hills, wetlands. In the gullies you can have wetlands.
- We can put this plan as first base and include references for what we also need to do.
- We are heading towards full catchment plans.
- The plan can pick up more in the future.
- The plan can point out what it currently doesn't cover and acknowledge ongoing work.
- This is a non-statutory document so it can be changed and added to more easily

■■■■■ submission

- Access to the horse-riding arena is through the flood way. This may be a property where the need for compensation is considered when the stopbank is built.
- The property is currently in the floodway but the house is elevated. Zoning of the land won't change.

Action: Letter to ■■■■■ to reiterate how we will proceed and respond to the main points of her submission.

- Also had concerns about cyclists going along the stopbank. Privacy. We can enter an agreement about privacy if needed during implementation.
- Walking and cycling is beyond scope of the Plan.

■■■■■ submission

- We could meet and walk over the property. Work through the options bit by bit. Explain the difference between the status quo and the preferred option.
- Effects of the stop banks and easements etc. define the impact of the extra water.
- Do nothing was an option as long as the channel was maintained. Need to figure out what 'maintained' means.
- The proposal on the table causes adverse effect where his infrastructure is.
- He proposed an alternative which was modelled for the Project Team but shown to not work.
- There is already a stop bank on the property.
- ■■■■■ may be eligible for compensation
- Land is in a floodplain now. The effect of the proposed stopbank on flooding on his land is not believed to be great.

Action: A letter to ■■■■■. Priority for Officers to start engagement with him.

- North Road SB needs to be extended. Need both banks. Can't have one without the other.
- Alternative land use may be restricted due to the the large native trees.
- GW policy is not to encourage building houses in a flood plain.
- Plan intends to protect Greytown but doesn't protect what is already floodplain.

SWDC's submission

- Question about critical areas.
- Some questions are easy to answer in writing to them. Don't need to change the plan to clarify.

█ submission

- Are we bound by the public works act to offer it back to them? Don't need to do anything further with the plan
- There are other opportunities for the area if it remains in GW ownership.

█' submission

- House was built in in the 70s
- There is probably only about 150mm increase from the modelling.
- 1991 was approximately a 20 year event.
- The property is already in the floodway.
- Mitigations to be considered during implementation - lift the house or put a u shaped bank around the house
- If we do nothing the land will still flood.
- 100 year design life. Big changes with climate change.
- Need an accurate survey to compare the floor level to the model.
- Community focussed plan. A whole component was about community and not the numbers.
- We understand that some people are making sacrifices.
- Look at the margin of error on the numbers

Action: Present the ideas the community gave us through submissions as a page.

- These can include Recovery funds, natural based solutions, and possible community activities to assist.

Stownstrail

Action: Acknowledge the trail master plan in the Plan.

- Possibly under section 2.2

- ██████████
- Have we considered a Flood reserve fund to help landowners with cleanup?
 - Targeted rate for FP. Is there another opportunity to collect money?
 - Look what other regions are doing. Canterbury
 - Can we maintain a reserve scheme for smaller events?
 - \$250k a year. Is that enough? What are the mechanisms for drawing down on that? We would have to do it for all the schemes.

Action: Investigate flood recovery as separate project

Greytown Community Board

- Emergency operations centres.
- GW is doing lots of background work with WREMO.
- Looking at how community can input into the flood response.
- Update the flood warning system. Use smartphones.
- Planning controls, guidance and advice. Don't want people filling in swales.
- COVID gives an opportunity with emergency operation centres. Most likely disaster is flooding
- One submission on the warning system. Can put it in as a recommendation.
- Its already in there
- Who is responsible for what? Could be covered in an answer to them.
- Community can take on responsibility. Need to know who is responsible for what

- ██████████
- Document doesn't have statutory responsibilities
 - ██████████: Does need some editing. Not content but layout and structure. Spelling.
 - Project team declined having it professionally laid out.
 - Fear that the content would be changed. Want to maintain the feel of it as a community document.
 - Not edited by GWRC. Independent editor.
 - Executive summary for quick checks. Half a dozen pages.
 - Consider who the intended audience is.
 - ██████████: not just a community plan, has to be able to work for those that need it to do their jobs.
 - Formatting rather than editing. Don't want to change content.

Action: Team will identify someone who can edit (structure only), format, and proofread the Plan. The Project team need to agree that the person is suitable and unbiased.

Officer's report. Endorsed recommendations in bold.

4.1.1 Recommendation A

4.3.1 Recommendations B and C

- Legal ramifications of property. Need to follow proper process, led by GWRC and involve project team.
- Provides only advice and recommendation to SWDC.
- Flood maps will be included in statutory plan.
- Ra: Concerned the community group doesn't know they are part of a statutory process
- Non statutory plan is an agreed set of actions.
- Ra: Is there non statutory information that will be made statutory and will the people who produced the information understand that?

4.4.1 Recommendation D

- Stakeholder engagement plan

4.5.1 Recommendation E.

Action: Convey this information to the Community Board

- Forecasting and warning service

4.6.1 Recommendation F.

- Governance model as opposed to regulatory model. Non statutory
- Worded loosely as GWRC cannot confirm the structures in the future.

4.6.1 Recommendation G. with amendments.

- Establish clear gravel analysis procedure which ensures sustainable gravel ~~extraction limits~~ **management** that is compliant with legislation, regional plans and consenting requirements **and reflects community aspirations.**
- Project team is not mentioned here. Make sure there is clarity and inclusion that project team will have input.

4.6.1 Recommendation H. with amendment

- **Add mention of the Project team.**
- Global consent for all rivers. Can have a chapter which related to the Waiohine. Will explore with project team how to do that.
- River management activities include the toolbox (Code of Practice). Currently misses some specific Wairarapa tools.
- Only sterile hybrid willow. Can't confirm actual rules around crack willow

4.7.1 Recommendation I

- Non statutory. Just an aspiration plan. Consistent with other parts of the region

4.8.1 Recommendation J

- Establish living plan team to take over from project team.

- Consider wider floodplain.
- River management measures will include living plan measures. Living plan will inform river management.
- Toolbox for western side has already gone through the criteria. Wairarapa one is being developed.

Suggested amendments to Waiohine Living River Plan recommendations

Recommendation on page 24 Section 2.1. Minor word change to clarify GWRC environs.

Page 30 clarification on Health Quality Index.

Page 44. 2 and 3 contradict each other. 10 year time frame is reasonable. **Need clarification: current model is as accurate as it can be today.**

Some recommendations are already complete. **Remove complete recommendations with consent from project team.**

Critical areas are already addressed. **Remove recommendation on page 55.**

Remove recommendation on page 56.

Page 58. Remove “until a full accurate reliable picture”. This should be continual.

Remove last recommendation on Page 59

Clarify Page 65.

Page 67 remove recommendation 2.

- Can we make public that we might subsidise house raising before it is confirmed?

Page 69 remove last two recommendations

Page 72 change writing to black (this is not a recommendation) **Clarify wording**

Clarification on page 73. Which stopbanks are most critical?

Refer [redacted] to the recommendation on Page 76

Pages 84, 86. Possibly remove recommendation due to repetition

Page 91. Exclude property purchase

Page 93. Finance is up to council. **State that all recommendations relating to finance/funding are subject to GWRC policy.**

Page 98. Concern over making recommendations to SWDC

Page 109. Critical areas are resolved. **Amend to state that critical areas are resolved but still important and may require special monitoring**

Page 125. This is wider than just natural character.

Might need a different tone for recommendations to one group vs another. Especially community. Recommendations or suggestions?

Wording of all recommendations should be reviewed to make it clear who they are for.

1.4 Actions Summary

| Action | Summary | Actioner |
|--------|---------|----------|
|--------|---------|----------|

| | | |
|----|---|---------------------|
| 1 | Action: Place the Plan in context. A section should be added in the introduction with an explanation of where this plan fits in with other plans and objectives. Add references to other plans in relevant sections within the document. | Project Team |
| 2 | Action: [REDACTED] will need a more fulsome letter explaining the way forward for the project and impacts on them. | GWRC |
| 3 | Action: Acknowledgement of longfin eels, background and special considerations should be added through the living plan process. | Project Team |
| 4 | Action: Respond to the [REDACTED] to explain that the plan is for the whole river and we will continue to manage this reach. | GWRC |
| 5 | Action: Letter to [REDACTED] to reiterate how we will proceed and respond to the main points of her submission. | GWRC |
| 6 | Action: A letter to [REDACTED]. Officers to start engagement with him. | GWRC |
| 7 | Action: Present the ideas the community gave us through submissions as a page. | Project Team |
| 8 | Action: Acknowledge the trail master plan in the Plan. | Project Team |
| 9 | Action: Investigate flood recovery as separate project | GWRC |
| 10 | Action: Team will identify someone who can edit (structure only), format, and proofread the Plan. The Project team need to agree that the person is suitable and unbiased. | GWRC / Project Team |
| 11 | Action: Update Officers Report as per summary | GWRC |
| 12 | Action: Update River Plan Recommendations as per summary | Project team |



The Waiōhine | Rakahanga River Plan

The Waiōhine River Plan

Incorporating the Waiōhine Floodplain Management Plan

Published as Draft Version 2.5 June 7th 2021

Waiohine River Plan 12_2

A forward for the Waiōhine

Kei te mihi mahana ki nga whanau o Waiōhine, ki nga whanau o Kuratawhiti me ki nga whanau o Wairarapa. Warm greetings to the families of the Waiōhine, to the families of Greytown and to the families of Wairarapa. Two ways that New Zealand recognises the mana or the importance of water is through viewing water holistically and through its connections that makes our waters integrated. This is not a new concept for people who live in the Waiōhine Catchment. When this community decided they would like to be more involved in some of the characteristics associated with water, flooding, they brought a collective consciousness to this task. The Waiōhine Plan then is the combination of holistic and interconnected views of water in the Waiōhine space we share.

Living in a province named after glistening waters, not just from our waterways, but named after the attachment we have to the place we call home. As a community people who are our neighbours started a journey that considered costs and infrastructure amongst many things, but a community became WAG, the Waiōhine Action Group because our work became about the place we call home. The complexity that is about building a resilient pathway for a swollen river includes the complexity that builds a community.

Making a living in the Waiōhine catchment is more than economic well being, it can also be about environmental wellbeing, social wellbeing and cultural wellbeing. You know you're from the social catchment that is the Waiōhine catchment when you know the river. When you can match the feeling of how a person by themselves, or the feeling with your family, can go to a place on the river because it leads you to a better standard of living. It's the common unity in our community. It's the marker of home that Māori present in the pepeha. Ko Waiōhine toku awa or Waiōhine is my river.

The holistic view of our community and of the place we call home has been a unifying vision, but the whole is made up of different parts, including the Waiōhine. While a river in flood flows at a level and in pathways that are alarming, this is the product of multiple pathways. How all these water routes, from the sky through precipitation, to a surface above the soil and through the soil that might emerge through seeps or springs to connect with the Waiōhine in flood. These are connections we can understand so we can make better decisions in planning for the

river that runs through us. The water contacts with different types of soils; a range of habitats for flora and fauna. Water is a foundation resource for people

From an essential element like drinking water, to a commercial opportunity in the agricultural industry and even a recreational place that entertains us. Water can connect with us negatively too as floods threaten to sweep away valuable items like homes, not just the brick and mortar of a house, but the space of heart felt memories of a family. As the Waiōhine Action Group confronted all of these concepts and more ideas, the contributors, from the consistent faces to those who shared the space intermittently, arrived at this, the Waiōhine Plan. Most will see this response as a plan for a joined up community, look just a little deeper, you'll see a catchment, you'll see a river. Ko Waiōhine tatou, we are the Waiōhine.

**Rawiri (Ra) Smith, Kahungunu Ki Wairarapa
Steering Group, Waiōhine River Living Plan**

Detailed table of contents

| | |
|--|----|
| A forward for the Waiōhine | 1 |
| A holistic, living river plan | 11 |
| A whole-of-river plan | 14 |
| <hr/> | |
| The Big Picture | 15 |
| Flood protection | 16 |
| A living plan | 17 |
| New flood protection structures | 17 |
| River management | 18 |
| Cost and funding | 18 |
| Governance and partnership in the Waiōhine river living plan | 19 |
| <hr/> | |
| 1 How this document works | 20 |
| 1.1 The structure of the Waiōhine river plan | 22 |
| 1.2 Strategy of the project, the Waiōhine river plan and its living plan | 24 |
| 1.2.1 Role of the Waiōhine River Plan Project Team | 24 |
| 1.2.2 This plan was developed on behalf of all stakeholders by the core of The Project Team (alphabetically) | 24 |
| 1.2.3 This plan is a living plan | 24 |
| 1.2.4 Consulted Stakeholders | 25 |
| <hr/> | |
| 2 The vision for the river of the community | 26 |
| 2.1 Manaakitanga ki o Papatuanuku (taking care of mother earth) – our vision for our river | 27 |
| 2.2 Things we care about for the next 70 Years that require the community and GWRC to work in partnership | 28 |
| 2.3 Things that this includes but isn't limited to: | 28 |
| 2.3.1 Safety | 28 |
| 2.3.2 Water quality and Te Mana o te Wai | 28 |
| 2.3.3 Flood protection works | 28 |
| 2.3.4 Access | 29 |
| 2.3.5 Commercial use and support for activities that may generate business | 29 |
| 2.3.6 Sustainability of flora, fauna and aquatic life in the gradual development of a wildlife corridor | 29 |
| 2.3.7 Water and bed levels | 30 |
| 2.3.8 Educating the next generation | 30 |
| 2.3.9 Climate change | 31 |
| 2.3.10 Walking, cycling, access tracks and amenities | 31 |
| 2.3.11 Protection of sacred places – Waihi Tapu | 31 |
| 2.3.12 Sourcing funds | 31 |

| | | |
|----------|--|----|
| 2.3.13 | Events – activities | 31 |
| 2.3.14 | Keeping our profile high | 31 |
| 2.3.15 | Downstream effects | 31 |
| 2.3.16 | Conserving, sustaining and improving our river | 32 |
| 2.3.17 | Conservation, sustainability and restoration strategies | 32 |
| 2.3.18 | Freshwater values (incorporating Whaitua) | 32 |
| 2.3.19 | Principles for maintaining and improving water quality | 33 |
| 2.3.19.1 | General | 33 |
| 2.3.19.2 | Measurement | 33 |
| 2.3.19.3 | Conservation & Restoration Strategies | 34 |
| 2.3.19.4 | Water quality measurements should be taken at three locations and eventually meet or exceed Whaitua objectives | 34 |
| 2.3.20 | Fauna | 34 |
| 2.3.21 | Flora | 35 |
| 2.3.22 | Cultural considerations | 35 |
| 2.3.23 | Rural Landowner Considerations | 36 |
| <hr/> | | |
| 3 | Climate Change | 37 |
| 3.1 | What we plan for | 38 |
| 3.2 | Why this increase? | 38 |
| 3.3 | How much climate change do we think there will be and when? | 40 |
| 3.4 | What did we choose? | 40 |
| 3.5 | Where does this come from and will it change? | 41 |
| 3.6 | We expect that as much more information on climate change will be available by 2040/2050 | 41 |
| 3.7 | Which climate change scenario did we use? | 42 |
| 3.7.1 | We Selected RCP 6.0 – what does that mean? | 42 |
| 3.8 | Note that floods do not last long on the Waiōhine | 43 |
| <hr/> | | |
| 4 | Planning Horizon | 44 |
| 4.1 | We have selected 2050 as the first planning horizon | 45 |
| 4.2 | The principle of adaptive management | 45 |
| 4.3 | What do these planning horizons inform? | 45 |
| <hr/> | | |
| 5 | Which flood could we use as the basis for developing and proving our models? | 46 |
| 5.1 | The kind of things that had to be determined | 47 |
| 5.2 | Which flood did we use? | 47 |
| 5.3 | Initial findings from review of the 1990 and 2004 floods (used to verify 1990) | 50 |
| 5.4 | Waiōhine FMP – flood modelling and mapping audit | 51 |

| | | |
|----------|---|----|
| 6 | Understanding the Waiōhine Hydrology | 52 |
| 6.1 | Background | 53 |
| 6.2 | Factors affecting Waiōhine hydrology | 53 |
| 6.2.1 | Climate cycles mean floods occur for 20-30 year periods that are 20-30 years apart | 53 |
| 6.2.2 | Stream characteristics – gravel trapping and build up, spreading in flood | 54 |
| 6.2.3 | How big is a one-in-one-hundred year flood? | 55 |
| 6.3 | How do climate and hydrology affect bed level and gravel management? | 56 |
| 6.3.1 | Qualifying notes to lend context to the diagram above | 60 |
| 6.3.2 | How serious a threat could gravel build up be? | 62 |
| 6.4 | Critical areas | 63 |
| 6.4.1 | Overview | 63 |
| 6.4.2 | Definition of Critical Area | 64 |
| 6.4.3 | How it works | 65 |
| 6.4.4 | Related Trigger events | 65 |
| 6.5 | Survey frequency and technology | 66 |
| 6.6 | Proposed: rules for gravel extraction | 66 |
| 6.6.1 | Gravel extraction must pass these tests | 66 |
| 6.7 | Dam breaks – how likely are they and what happens if we get one? | 68 |
| 6.8 | Gauging and rating | 69 |
| 6.9 | Mangatāre hydrology | 69 |
| 6.10 | 1:20 Year (5% annual flood risk) flood map discussion | 70 |
| 6.11 | Freeboard and flood sensitivity | 71 |
| 6.12 | Setting the flood sensitive area | 72 |
| 7 | Structural Solutions | 75 |
| 7.1 | Identifying important flood defence factors | 76 |
| 7.2 | Goal set for flood defence design | 77 |
| 7.3 | Principles for location and land ownership of stopbanks | 78 |
| 7.4 | Identifying stretches of the river sides that might need differing flood defences | 78 |
| 7.5 | What stopbank design is needed for this river plan? | 78 |
| 7.6 | Analysis of six options identified for flood defences | 80 |
| 7.6.1 | Option 1: Build Nothing | 81 |
| 7.6.2 | Option 2: Inland stopbanks western – near North Street, and eastern – near Kuratawhiti Street | 82 |
| 7.6.3 | Option 3 – inland stopbank near North Street and extension of Greytown stopbank to Beban’s Farm | 85 |
| 7.6.4 | Option 4 – Inland stopbank near North Street and extension of Greytown stopbank beyond Beban’s Farm(XS 30) | 88 |
| 7.6.5 | Option 5 – Inland stopbank near North Street and extension of Greytown Stopbank beyond Beban’s Farm (XS 30) with realignment of stopbank inside Fuller’s Bend | 90 |

| | | |
|-------------|--|------------|
| 7.6.6 | Option 6 – Full true right bank (Greytown Side) stopbank with realignment of stopbank inside Fuller’s Bend (XS 20) | 92 |
| 7.7 | Table of initial estimates of materials and costs of components of structural works | 95 |
| 7.8 | The six options for flood defence strategies were opened to public consultation using the following channels | 96 |
| 7.9 | Options comparison of costs and property impacts(out to 2050, without sensitivity) | 97 |
| 7.10 | Decision reached at 1:30pm on 15th August 2018 | 97 |
| 7.11 | Decision reached at 1:30pm on 20th September 2018 | 98 |
| 7.11.1 | Do Nothing | 98 |
| 7.11.2 | Conceptual Design | 98 |
| 7.11.3 | Greytown Stopbank | 99 |
| 7.11.4 | Freeboard | 100 |
| 7.11.5 | Fullers Bend | 101 |
| <hr/> | | |
| 8 | Cost and funding implications | 102 |
| 8.1 | MfE guidance to communities on flood risk management | 103 |
| 8.2 | Estimation of total capital cost of proposed works | 103 |
| 8.3 | Note to costing – parcels of land inside Fuller’s Bend | 104 |
| 8.4 | Further information and recommendations on costs | 105 |
| 8.4.1 | Term of Loan to fund Structural Works | 106 |
| 8.4.2 | How did we arrive at this? | 106 |
| 8.4.3 | Target rating – clarifying new build versus maintenance | 107 |
| 8.4.3.1 | Findings: Recommended Approach to Funding Structural Solutions: | 107 |
| 8.4.3.2 | Summary of the sources of funding for the ongoing project to rock line the outside of Fullers Bend | 108 |
| 8.4.3.3 | Waiōhine river scheme reserves treatment | 108 |
| 8.4.3.4 | Benefits of this approach | 109 |
| 8.4.3.5 | CAPEX, OPEX, and spend to date | 109 |
| 8.4.3.6 | Reserves for emergency works | 109 |
| <hr/> | | |
| 9 | Non-Structural Solutions | 110 |
| 9.1 | Interim maps, final maps, planning controls | 111 |
| 9.1.1 | The flood hazard area | 111 |
| 9.1.2 | The flood sensitive area | 111 |
| 9.2 | What controls are we seeking on flood plain (between buffer zones and edge of flood risk zones) as a recommendation to territorial authorities? | 112 |
| 9.3 | Relating to State Highway 2 | 114 |
| 9.4 | House Raising | 116 |

| | |
|---|-----|
| 10 Emergency management and flood warning | 118 |
| 10.1 What do we know about the risks? | 119 |
| 10.2 What tools do we use to mitigate these risks? | 119 |
| 11 The Living Plan | 121 |
| 11.1 How the stakeholders can be partners | 122 |
| 11.2 Active management triggers for the Living Plan | 127 |
| 11.3 The annual cycle for the Living Plan process | 130 |
| 11.3.1 It is recommended that Resource Consents for the Waiōhine River and its environs should adopt the following in both specific content and intent: | 131 |
| 11.3.1.1 Regulatory Framework and Change | 131 |
| 11.3.1.2 Operational Management Plans | 132 |
| 11.3.1.3 Annual Work Plans | 132 |
| 11.3.1.4 Site Specific Effects Management Plans and Monitoring | 133 |
| 11.3.1.5 Annual Reporting | 133 |
| 11.3.1.6 Independent Review Panel | 133 |
| 11.3.1.7 Ecological Enhancement Fund | 133 |
| 11.3.1.8 Walkovers (annual and other) | 134 |
| 11.3.1.9 Critical Areas of the Waiōhine River | 134 |
| 11.3.1.10 Site Specific Effects Management Plans and Monitoring (SSEMP) | 135 |
| 11.3.1.11 Reviews | 135 |
| 11.3.1.12 Disagreement Resolution | 135 |
| 11.4 Appropriate term of consent | 136 |
| 11.5 What is done by who by when for the Waiōhine River Living Plan – and cost estimates | 137 |
| 12 River Management | 138 |
| 12.1 Critical areas | 140 |
| 12.2 Critical area planning parameters | 141 |
| 12.2.1 Principles | 141 |
| 12.2.2 Remedial work | 141 |
| 12.2.3 Introduction of principles | 141 |
| 12.2.4 “Tool box” | 141 |
| 12.2.5 Adoption of additional critical area planning parameters: | 141 |
| 12.2.6 Independent peer review compliance | 141 |
| 12.3 Tools for critical area management | 141 |
| 12.4 Overarching principles for managing channel alignment, beaches and banks in critical areas | 142 |
| 12.4.1 This structured logic should be used to determine when to act: | 142 |
| 12.5 Specific five year plans (revised at each three year long term plan event) | 142 |
| 12.5.1 Critical area – Urupa bank above SH2 bridge | 142 |
| 12.5.2 Critical area – Fullers Bend | 143 |
| 12.5.3 Critical area – Platform Farm | 143 |

| | | |
|--------------|---|------------|
| 12.5.4 | Critical area – protect true left bank between cross sections 20-27 and channel alignment | 143 |
| 12.5.5 | Critical Area – Kuratawhiti Street | 144 |
| 12.5.6 | Critical area – mature significant native tree stand and natural nursery | 144 |
| 12.5.7 | Critical Area – Borefields | 144 |
| 12.6 | Ecological care and considerations | 145 |
| 12.7 | Other river management principles adopted | 147 |
| 12.7.1 | Shape and character | 147 |
| 12.7.2 | Bed level and gravel | 149 |
| 12.7.3 | Ecology, habitat, flora and fauna | 150 |
| 12.8 | River management toolbox | 151 |
| 12.8.1 | Including techniques that need proving | 151 |
| 12.8.2 | Showing river management tool hierarchies where these can be used | 151 |
| 12.8.3 | Gravel extraction tool hierarchy | 151 |
| 12.9 | Possible alternatives to ripping (a hierarchy in order of preference from the perspective of river health) | 152 |
| 12.10 | Possible Additional Tools | 153 |
| 12.11 | River management design lines | 153 |
| 12.11.1 | Why and when to act | 153 |
| 12.11.2 | This approach to river design lines answers several important questions | 154 |
| 12.11.3 | River management width. This varies by reach and location | 155 |
| 12.12 | River management needs vary by stretch of river | 156 |
| 12.12.1 | Reach A: Gooseneck to Rail Bridge | 157 |
| 12.12.2 | Reach B: Downstream of Rail Bridge to Wire Shed | 157 |
| 12.12.3 | Reach C: Wire Shed to SH2 Bridge | 158 |
| 12.12.4 | Reach D: Below State Highway 2 Bridge | 160 |
| 12.12.5 | Gravel extraction and management fees | 161 |
| 13 | Water quality management and other Whaitua programme obligations | 162 |
| 13.1 | Current state vs targets for water quality improvement | 164 |
| 13.2 | In-stream nutrient criteria for the management of periphyton | 164 |
| 13.3 | Nutrient limits and targets for diffuse sources of nitrogen and phosphorus, to be achieved by 2040 | 164 |
| 13.4 | Sediment load limits and targets to be achieved by 2050 | 164 |
| 13.5 | Water Quantity Management under the Whaitua Programme | 165 |
| 14 | Planting for River Management, Biodiversity and Cultural Resource | 167 |
| 14.1 | Restoration and Conservation of the Riverside | 169 |
| 14.1.1 | First pass | 169 |
| 14.1.2 | Second pass | 169 |
| 14.1.3 | Detailed plans for individual stretches | 169 |

| | | |
|-------------------|--|-----|
| 14.1.4 | How to proceed | 171 |
| 14.1.5 | Habitat – a matrix of the right plant in the right place | 172 |
| 14.1.6 | Matching plants to phase of planting: Establishment | 172 |
| 14.1.7 | Aids to identifying trees | 173 |
| 14.1.7.1 | Resources | 173 |
| 14.1.7.2 | Eco sourcing info | 173 |
| 14.1.7.3 | Waohine – Proposed Plantings | 173 |
| <hr/> | | |
| 15 | Conceptual stopbank design | 175 |
| 15.1 | Introduction | 176 |
| 15.2 | Investigation of alternative western (Kuratawhiti Street)stopbank alignment | 178 |
| <hr/> | | |
| 16 | Appendices | 179 |
| Appendix A | | 180 |
| | Waiōhine floodplain management plan initiation | 180 |
| | A record of the slides from the public meeting forming the WAG Project Team | 180 |
| Appendix B | | 183 |
| | Terms of Reference (TORs) for the Project Team | 183 |
| 1 | Purpose | 188 |
| 2 | Background | 188 |
| 3 | Review of the Draft FMP | 189 |
| 3.1 | Proposed approach to review the draft FMP | 189 |
| 3.2 | Proposed Waiōhine FMP steering group | 189 |
| 3.2.1 | Steering group – purpose | 189 |
| 3.2.2 | Steering group – membership | 190 |
| 3.2.3 | Steering group – role/responsibilities | 190 |
| 4 | Waiōhine FMP Project Team | 190 |
| 5 | Wairarapa committee’s functions | 191 |
| 6 | Communication | 191 |
| 7 | Recommendations | 191 |
| | How the Project Team work together – “housekeeping” | 191 |
| | Declarations of interest | 192 |
| | How were the community and other stakeholders involved? | 192 |
| | Steering Group recommendation of 2nd February 2018 | 192 |
| | Why was an interim flood map developed? | 193 |
| Appendix C | | 194 |
| | Intent of the Living Plan and it’sTerms of Reference | 194 |
| | The Living Plan model is predicated on the concept of what has come to be called co-governance | 194 |
| | Terms of Reference (TORs) Extensions for the whole of river plan and Living Plan process | 196 |

| | |
|---|-----|
| Appendix D | 199 |
| Relevant standards and guidelines | 199 |
| Relevant legislation regarding climate change | 199 |
| Appendix E | 201 |
| Example of easement agreement | 201 |
| Appendix F | 202 |
| Original diagrams and flip charts | 202 |
| Appendix G | 204 |
| Maps | 204 |
| Notes on the approach to mapping | 204 |
| Appendix H | 209 |
| Glossary and other explanatory notes | 209 |
| Appendix I | 213 |
| Links to supporting, reference and background documents | 213 |
| Appendix J | 215 |
| Which cross section is where? | 215 |
| Appendix K | 218 |
| Ecological effects of flood management activities in Wairarapa rivers | 218 |
| Appendix L | 219 |
| Package of related gravel strategy documents | 219 |
| Appendix M | 220 |
| Maps of restoration strategy | 220 |
| Appendix N | 221 |
| Interview with Bruce Slater and accompanying map of the river – August 2010 by Ian Gunn | 221 |



A holistic, living river plan

This is the first plan produced for the Greater Wellington Region that [views the river as a holistic, living, changing entity](#). It lays out a [30 and 70 year vision](#) for better flood protection and the gradual improvement and [restoration of a living corridor, pristine water, flora and fauna](#) (including aquatic species) for better environmental, [cultural, social and economic outcomes](#), for the river, from the gorge to the confluence with the Ruamahanga. It is prepared by the [community](#), Tangata Whenua, all other [stakeholders](#), and GWRC under the leadership of a Project Team reporting to the community and all stakeholders, statutory and otherwise.

We have tried to “walk a mile” in everyone’s shoes and recognise the goals and statutory mandates of each group. Wherever we say “community” or “stakeholders” in this plan, it is an inclusive term, recognizing these inputs and needs.

Significant professional expert inputs have also been made by Ian Heslop, Chartered Professional Engineer ([Independent Peer Review](#)), incorporating the findings of BECA ([Independent Peer Review](#)), also by Ra Smith of Hurunui o Rangī and Ngāti Kahungunu ki Wairarapa, Horipo Rimene of Rangitane and Michael Roera of Kahukuraawhitia, Ngāti Kahungunu ki Wairarapa and Rangitane, Report by Tonkin and Taylor ([Geomorphic Trends Assessment](#)), [Professor Ian Fuller](#), [Professor Russell Death](#) and [Will Conley](#) of Massey University, Matthew Gardner of [LandRiverSea Consulting](#), the late Doctor Brett Mullan and [Doctor Trevor Carey-Smith](#) of NIWA and many more.

In this plan GWRC have taken the progressive step of agreeing to place the responsibility for researching and creating the Waiōhine River Plan and the inherent ongoing [Living Plan](#), as resting on the collective shoulders of the community, Iwi, all other [stakeholders](#) and statutory bodies and GWRC itself and that leadership for this has been taken by the community, on behalf of, and working with all parties, this respects the principles of Te Mana O Te Wai and how it can be practically applied. It is recognized that the legal responsibility for delivering the agreed level of flood protection, amongst other responsibilities, rests with GWRC within the aegis of this plan. The community also recognizes the innovation, foresight and genuine intent for partnership GWRC, Iwi and all that the participating stakeholders bring to this community led plan on an ongoing basis.

Our approach follows the MfE advice:

“All communities and levels of government are able to make sustainable long-term decisions based on the best available information to reduce flood risk.”

and we have applied this with regard to the good health, mauri and management of the river; pragmatically, in the [Critical Areas](#) where critical infrastructure, assets or culturally sensitive locations are potentially at risk, we have applied the maxim of “a stitch in time saves nine”.

The community of the Waiōhine

When this plan says “community”, this is what the term embraces:

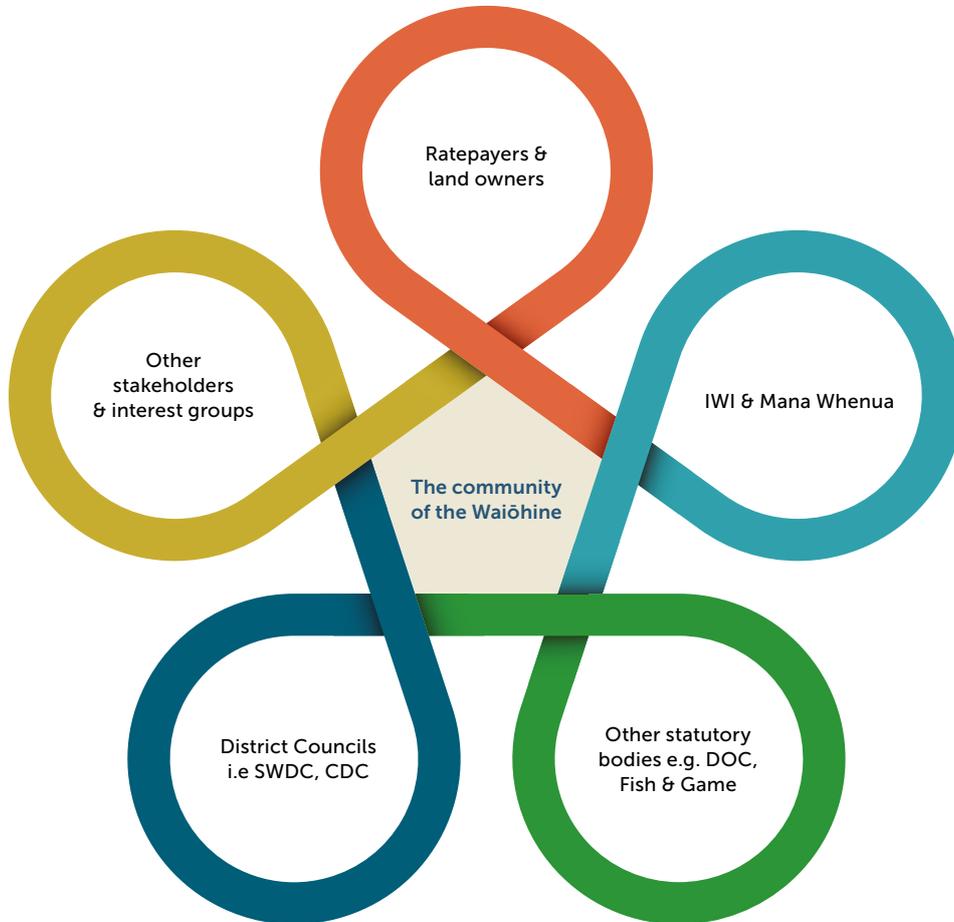


Figure 1: A Community of Stakeholders.



Our approach anticipated [Te Mana O Te Wai](#) and honours it's tenets, as depicted by the Ministry of the Environment. The plan embraces:

- Te Mana O Te Wai is understood to be a concept for the wider community, not just Tangata Whenua. It suggests an integrated approach from it's foundations upwards, but with a deep recognition of the special role of mana whenua and lwi respecting the foundational values of Te Tiriti O Waitangi.
- It embraces the concept of Kaitiakitanga,
- It's building blocks are to be guided by independent subject matter experts and to respect matauranga Māori, the Mauri of water, it's conservation and restoration to a naturalistic state wherever this is practicable.
- It engages the community and tangata whenua, not just in the writing of the River Plan but positive and respectful partnership in the ongoing conduct of the Living Plan – for the next seventy years or more,
- It applies the hierarchy of obligations under the National Policy Statement for Freshwater Management 2020, including the National Objectives Framework For Water (NOFFW),
- It creates a process and framework at the local level for how all stakeholders, including statutory bodies can, without impinging on their existing rights and obligations, work together for the best future of our river for all.
- It is a value led process, reflecting the need to rethink values based upon an holistic accounting for the integral values of the water. For instance swimmability is not just a question of pollutants but also of sediment in suspension. Rivers should be seen from an interdisciplinary, whole perspective, rather than the past "siloeed" approach.
- It respects natural indicators of the health and mauri of the water – such as the presence of Kaakahi.
- A whole of river (or catchment) living plan is the logical way to think about Te Mana O Te Wai. If we do this well, we will benefit all and pass the benefit down the river to other communities, other rivers, lakes, the sea and the oceans.
- We need to think in future about the whole transpiration cycle and include groundwater and precipitation in our planning and management. The principal of poutiriao – of rebalancing the earth in the environment – needs joined up thinking.



Figure 2: Essential Water Fact Sheet – MOE.

A whole-of-river plan

As a whole-of-river plan, we must recognize the cultural significance of the Waiōhine. Nowadays, the flood plains of the Waiōhine exist on a very different level than they did traditionally. What we must all hope for and all work for is that important principles might transcend the changed landscape so that a sense of cultural landscape remains. We have sought and will always seek leadership from Māori in understanding the cultural landscape of the Waiōhine, and where opportunities lie to restore its cultural elements, naturalistic elements and beauty. For the whole community, the work of building this River Plan, incorporating Floodplain Management Plan, has been inclusive, and a recognition of the need for a practical, natural, ongoing co-governance model for our river, between iwi, other statutory bodies, community and local government.

Developing a whole-of-river plan that embraces all the hopes and needs of the community, will take time. So this is not a one-time, fixed plan. It includes a Living Plan Process through which topics such as the gradual improvement of the ecological values and amenity of the river can be fleshed out and evolved to take advantage of advances in cultural understanding, science and our societal values.



The Big Picture

Flood protection

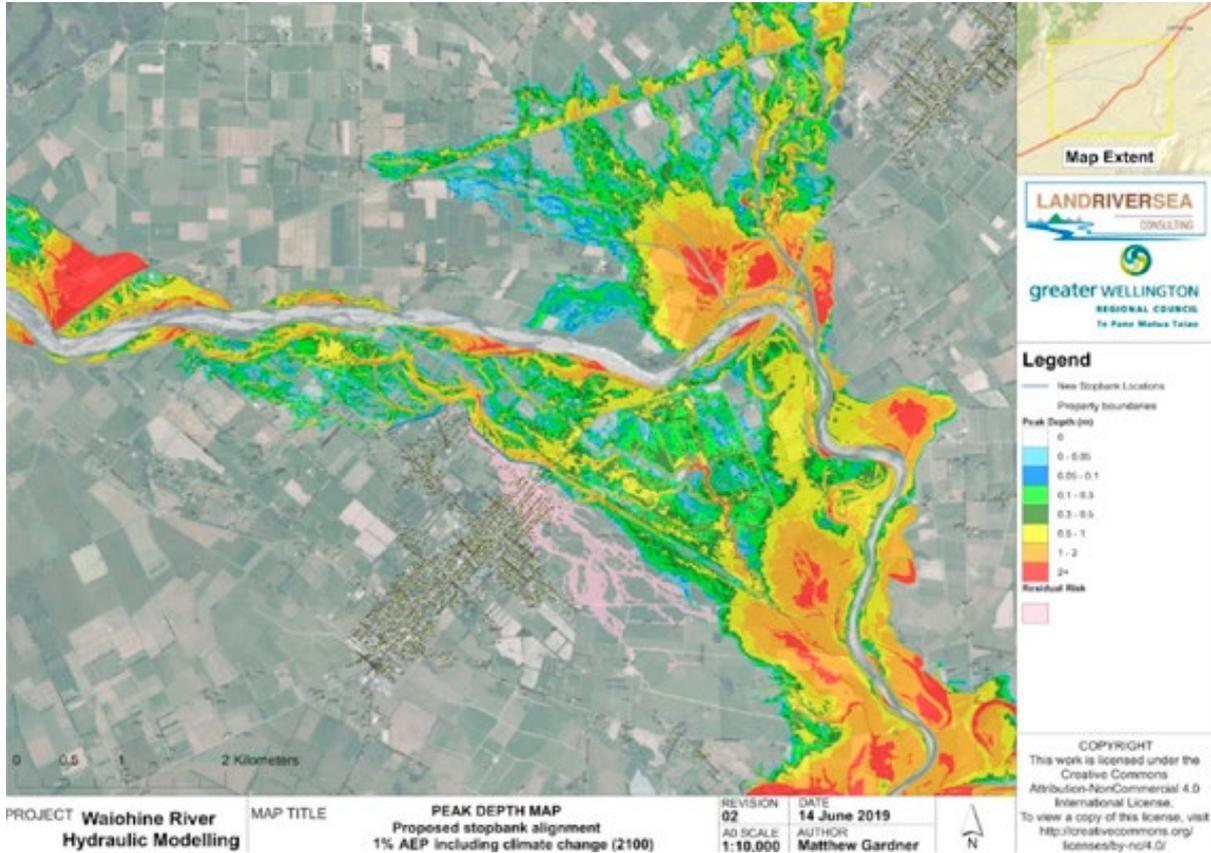


Figure 3: Flood map showing proposed stopbanks as blue lines.

Flood protection is intended to withstand a once-in-a-hundred-year flood for Greytown and a [once-in-twenty-year flood](#) for dwellings in the rural area of the floodplain. Allowance has been made for [climate change](#) estimates, derived from [IPCC](#) scenario [RCP6.0](#), allowance for margin of error of [LIDAR](#) surveying and as appropriate [freeboard](#) (where wind or velocity might push water higher up the side of an upright structure) or [flood sensitivity](#) (where there are reasons why the flood might spread slightly further in some places in some circumstances).

There is, of course, no such thing as a flood that is precisely the shape, duration and behaviour of a modelled one-in-one-hundred year flood (1% chance of occurring in any year) that occurs only once, if at all, in a hundred years. There is nevertheless, a high degree of confidence in the underlying data and [accuracy of models](#) and maps used to develop this plan, based upon careful cross-checking against aerial photography of actual floods, multiple flood events and a range of other [tools for correlating evidence](#). Over time this will keep on improving, as more events yield more data and new technology (e.g. more sophisticated LIDAR using drones) are available. We have made provision in the living plan models and processes within this plan, to [revise and improve the plan](#). We have also set an intermediate planning horizon that ensures the plan will be reviewed and updated before 2050, including climate change data.

A living plan

A pragmatic, cost effective and workable compromise has been reached between the need to protect important assets (railway, roads, towns, existing river defences, water supplies, Urupa and homes) and the need to step flood defences back from the river to allow it to assume more of a natural character.

This plan adopts the principles of shared responsibility embraced in te Mana O Te Wai, between the community and GWRC. This Living Plan will continually grow, change, manage and improve the River Plan. Whilst adopting new science and trialling new techniques it will remain faithful to the [vision for the river](#), owned by the community. The vision, targets and requirements of the [Whaitua](#) programme and [Te Mana O Te Wai](#) are also incorporated here.

A series of [“triggers”](#) have been identified and built into the [Living Plan](#) section, to identify situations for the [Project Team](#) to urgently review this plan and modify it. Also, in its ongoing capacity as an advisory [sub-committee](#) to the Wairarapa Committee, it will continue to provide leadership with the community as a partner to GWRC in [driving the annual and other planning cycles](#) to keep working to realise the [vision](#).

The Living Plan Process allows us to continue developing and improving the plan and address future questions such as: Should the plan become a catchment plan, in line with other catchment group plans, recognizing the interconnectedness of water? Should it seamlessly integrate with storm water management? Should it address the whole of the Waiōhine – including the gorge itself? Can the plan better respect Māori values, culture and wisdom? What impact are willows having on water levels? How can we improve water quality and water quality measurement, pest management, weed control, access – and many more opportunities. So, we ask that you see this document as a start, not an end in itself.

New flood protection structures

The whole river is approximately 66 kilometres long but the short reach of the Waiōhine, running from above the rail bridge ([Cross Section or “XS” 43](#)), down to the SH2 Bridge ([XS 17](#)), is a steep gradient, gravel bed, river that has been extensively widened from the rail bridge to Fullers Bend, following a previous strategy for flood management.

The river runs atop an alluvial fan, like a delta above the surrounding floodplain. It carries more water than the Ruamahanga itself at the point they join. The catchment sits deep in the Tararuas, well behind catchments for other rivers, it tends to flood only between October and February and floods last from six to twelve hours and do not tend to pond. The floodplain consists of free draining soils.

New flood protection structures and strategies are proposed. New inland stopbanks are to be constructed along the northern side of Greytown’s [North Street](#) to prevent flooding into the northern outskirts and, if required, across farmland to the North West of the town, [close to Kuratawhiti Street](#), to protect that side of Greytown. Gradual improvement to existing riverside defences is planned, principally using rock groynes, where the river could outflank existing defences and threaten to set a new course across country. We also rely on maintaining the Apple barrel Floodway as a diversion of floodwater away from Greytown.



Figure 4: SH2 North of Greytown.

River management

Ongoing [river management](#) is essential for the flood protection strategy to work and will rely on the maintenance and gradual improvement of most existing riverside flood defences, and work to protect some [Critical Areas](#). For example, work needs to continue to gradually improve the protection of the outside of Fullers Bend, with a combination of rock lining and, where practical, snub-nosed rock groynes. Where the river can safely move within buffer zones and develop a more natural “hourglass” shape, this should be allowed but a set of guidelines for preventing this getting out of control and threatening things like stopbanks, town water supplies and so on, have been developed. [Gravel extraction](#) will have to continue to be carefully used to manage bed levels, for the purpose of erosion control and flood prevention but more closely surveyed and mostly restricted to specific tasks in Critical Areas, to allow for more precise management by agreement between the community and GWRC.

Where extraction occurs, **recommended extraction methods** have been identified, to minimise impact on the natural character of the river and to have “less than minimal” impact. In some cases, these will be leading edge techniques, proposed by internationally recognized experts. These techniques should be trialled and closely monitored, to prove their ecological value.

Whilst measures of bed level have been made recently, there is insufficient data yet to cover all the cyclical behaviours of the river (See [Tonkin and Taylor](#) re: [Interdecadal Pacific Oscillation](#)) that cause the gravel bed to build up or lower. Continued measurement is necessary, until a full picture of bed level behaviour can be built up and a long-term strategy finalised, this is expected to be before 2050 (when a compulsory review of this plan occurs anyway).

We recommend using [Management of the height of the crown of SH2](#) in three locations between Greytown and the SH2 Bridge ([XS 17](#)).

There is a need for selective planting along the foot of, and extending the end of, the existing Greytown Stopbank. Small, rock, groynes are needed at the toe of and at right angles to that stopbank, that will prevent scouring in the event of a major flood. There is an urgent need for the introduction of flood risk warning signs at locations where the public accesses the river.

Three zones as one way of informing river management have been identified: i) the ideal path or [design lines](#), within which the river will normally run, ii) buffer zones that allow some movement and an “hourglass” or “beaded”, shape to develop and iii) the floodplain, where some features and stands of trees will play an important part in spreading and slowing the river in a major flood.

Recommendations are made for a practical approach to [planning options](#) for the area between the vegetative buffer zones, bordering the river, and the extent of flood risk. These show high, medium and low flood risk areas, informing District Council planning decisions..

Cost and funding

The capital cost of the proposed stopbank works and related programmes is estimated to be less than \$2 million.

It is recommended that where this relates to construction of new stopbanks near North Street and Kuratawhiti Street, this cost should be [amortised over 25 years](#) that is, gradually paid for from rates paid by all urban Greytown ratepayers and those rural ratepayers immediately benefiting from the new defences. This is roughly estimated to cost up to \$80 per annum on average per ratepayer within the new flood defences. All other works and programmes are recommended to be funded through the existing rating models.

Governance and partnership in the Waiōhine river living plan

MfE States that the local government's aim for flood risk management is: *"Sustainable river and catchment management that achieves the particular level of flood hazard protection desired and accepted by each distinct community of interest, with residual risks fully understood and taken into account."* Planning principles set by this community input to this process have guided decision making and should continue to do so, they include: A whole of river plan. A Living Plan, guided and overseen by the [community](#) together. We have taken the concept of co governance and partnership to a new level, one that, to our knowledge, has never been attained before. Our approach complies with law and regulation, and respects and builds on the Memorandum of Partnership between [Tangata Whenua ki Te Upoko o te Ika a Maui and Wellington Regional Council](#). Previous processes recognised the need for some co-governance. The new method builds on this and embraces:

Co-research – all parties (in the room as Project Team Members, the community and subject matter experts) used open and transparent sharing of information and a range of ways to participate.

Co-development – all parties (in the room as Project Team Members, the community and subject matter experts) used open and transparent sharing of information and a range of ways to participate.

Joint decision making – all parties (in the room as Project Team Members, the community and subject matter experts) used open and transparent sharing of information and a range of ways to participate.

Co-governance – The Waiōhine valley community shares governance through both the Steering Group and Wairarapa Committee.

Community participates in the process, through open and transparent feedback by all those not in the room being received and actioned by the Project Team.

Extensive consultation with a wide range of subject matter experts was invaluable and was also shared openly and transparently for feedback.

Frequent public meetings, including drop-ins and discussions encouraged the community to participate directly in making key decisions, such as which flood defence scenario to adopt.

For example, tangata whenua and iwi participate directly in the core Project Team, the Steering Group, the GWRC Wairarapa Committee and the GWRC Environment Committee as well as the Waiōhine Action Group and public meetings.

This approach applies to both the initial plan development and for the Living Plan – taking a long term view that takes into account the needs of all stakeholders, bodies and influences (such as Iwi outcomes and cultural imperatives, Whaitua, Climate Change, amenity) We will continually learn and acquire more facts, so we must make decisions now, that don't box us in – e.g. taking an adaptive management approach (i.e. a [Living Plan](#)) to key aspects such as housing and stopbank locations and making allowance for future upgrade to, for instance, meet future needs.

We must incorporate and improve Whaitua outcomes, in a pragmatic way, as it is an essential building block for our vision, for our river. We must use assessment tools that are simple, transparent and where everyone can see their views considered, to meet the needs of as many people as affordable and practical. We must recognize that past decisions mean that some reaches of the river may require more intensive [channel maintenance](#), but we must be able to explain why this is, to each other, and for example, how river management/stopbank locations are interrelated to the community. The overarching principle of community leadership is proclaimed to be a success by GWRC.

We recommend that it continues for the future of our river.



Figure 5: Each Project Team Working Day's outputs are photographed and shared with the community via Facebook and emails with summary links and an invitation for feedback and questions.



1

How this document works

A full table of contents is at the beginning of this document

Read through, or click on the topic link below.

| | |
|------------------|---|
| The big picture | Strategy of the Project the Waiōhine River Plan and it's Living Plan |
| | The Vision for the River of the Community and Stakeholders |
| | Climate Change |
| | Planning Horizon |
| | Cost and Funding Implications |
| River and flood | Which Flood Could We Use as the Basis for Developing and Proving Our Models? |
| | Understanding of the Waiōhine Hydrology |
| | Rules for Gravel Extraction |
| | Structural Solutions |
| | Non-Structural Solutions |
| | Emergency Management and Flood Warning |
| | The Living Plan |
| | River Management |
| | Stopbank Design |
| Restoring nature | River Management Needs Vary by Stretch of River |
| | Planting for River Management, Biodiversity and Cultural Resource |
| Support docs | Appendix A: Waiōhine Floodplain Management Plan Initiation |
| | Appendix B: Terms of Reference for the Project Team and Process |
| | Appendix C: Terms of Reference for the Waiōhine River Plan Committee/Project Team |
| | Appendix D: Relevant Standards and Guidelines |
| | Appendix E: Example of Easement Agreement |
| | Appendix F: Original Diagrams and Charts |
| | Appendix G: Maps and Notes on the Approach to Mapping |
| | Appendix H: Glossary and Other Explanatory Notes |
| | Appendix I: Links to Supporting Reference and Background Documents |
| | Appendix J: Which Cross Section if Where Reference Maps |

1.1 The structure of the Waiōhine river plan

The structure of the Waiōhine River Plan is based on the structure of the mind map put together on project team working day 1!

The intention is to:

- 1 **Make this River Plan easy to find your way around**, so that you can click on easy links above or use the [table of contents](#) or use word search tools to find what you need, wherever and whenever, on any device
- 2 **Make this River Plan easy to read** and not too complicated or technical to be useful for everyone,
- 3 **Make it easy to drill down** and see how the River Plan developed – as new information, fresh expert inputs and [community](#) feedback changed thinking and made the plan more relevant.

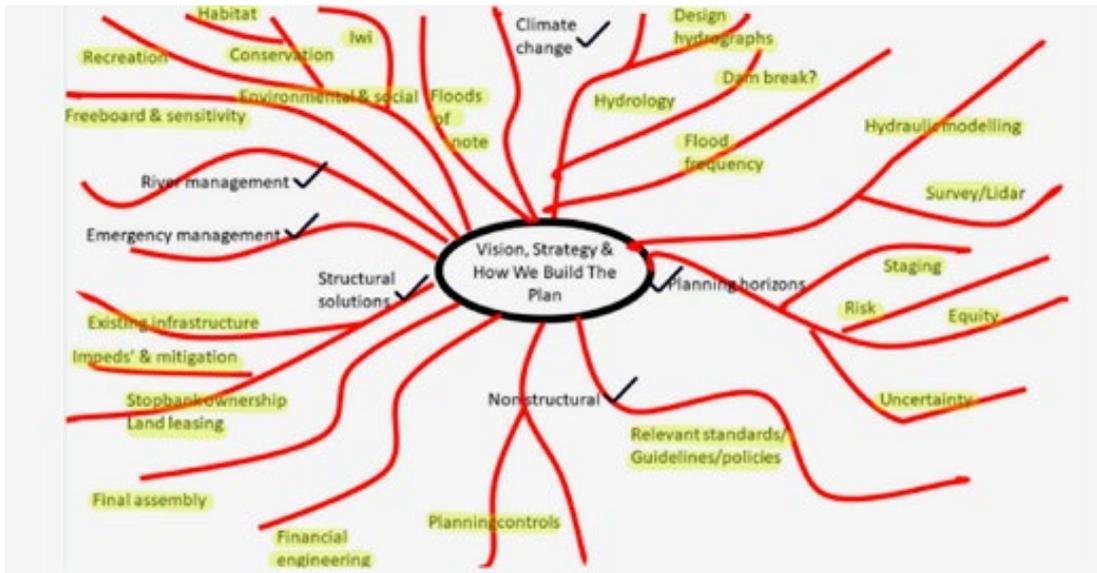


Figure 6: Waiōhine river plan mind map.

The original mind map can be seen above. The Project was broken into ‘chunks’ by subject, using a mind map technique, and a strategy based on this, was used to develop the Waiōhine River Plan. [The many flip charts and white board photos](#) that make up this plan are archived and remain accessible as an audit trail.

Planning horizons were set and aspects of cost/funding/affordability were chosen, so stakeholders could understand this and provide useful feedback, when weighed against risks.

Note that [Supporting Information](#), [Original Charts](#), [maps](#) and links are retained and are the foundation of the plan. They are shown as examples in the diagram but apply to and can be accessed from links in The Plan and Plan Topics levels. In this way the integrity of the journey, consultation and decision process, is captured for all time, and can be used to retain an understanding of how, and why, decisions were made. Also, the plan allows for the team to change or add elements as the Living Plan aspect of the River Plan develops and adapts, to meet changing needs over time and the availability of significant new data (e.g. restoration strategies and projects, amenity projects, climate change data, flood events or law changes).



Figure 7: Waiōhine river plan Project Team working day.

Throughout the history of this project, the Waiōhine valley [community](#) have directly participated in the development of this River Plan through the following widely advertised channels:

- 1 Open and free participation in the [Waiōhine Action Group](#).
- 2 Directly choosing and electing community representatives for the majority of the Project Team, who wrote this plan.
- 3 [Facebook](#), where documentation from every Project Team Working Day has been posted online for reading, comment and question.
- 4 Public meetings and WAG meetings.
- 5 Public Drop in Sessions.
- 6 Sharing information and answering questions at public events.
- 7 Media releases and Greytown Grapevine articles.
- 8 Flyers and posters.
- 9 Speaking to community organisations.
- 10 Interaction via the "Parking Lot" method.
- 11 Reports to the Wairarapa Committee of GWRC.
- 12 Presentation to SWDC, and to joint councils.
- 13 Invitations to stakeholder groups to participate in Project Team Working Days.
- 14 Regular emails to an extensive mailing list of interested parties.

1.2 Strategy of the project, the Waiōhine river plan and its living plan

1.2.1 Role of the Waiōhine River Plan Project Team

This River Plan and incorporated Floodplain Management Plan was developed by a Project Team appointed by the Waiōhine [community](#) and GWRC. A copy of its Terms of Reference and a description of the working methods can be found at [Appendix B](#).

The Project Team has oversight over production of this River Plan (and Floodplain Management Plan) document on behalf of the community. Everyone has had full access to all the work in progress during the development of the plan and has been able to interact with the plan and process, throughout the project.

Upon completion of the Waiōhine River Plan, the Project Team will continue to lead the Living Plan process as needed by the community, in its current form and terms of reference, but reporting to the community and as a sub-committee to the Wairarapa Committee of GWRC – see [Appendix C](#).

1.2.2 This plan was developed on behalf of all stakeholders by the core of The Project Team (alphabetically)

Mike Ashby (CDC), John Boon (Facilitator and Project Leader), Andy Brown (GWRC Investigations), James Flanagan (Senior Engineer, GWRC), Michael Hewison, Mark Hooker (Team Leader GWRC), Jock McNaught (Engineer GWRC), Michael Roera (Ngati Kahukuraawhitia, Kahungunu, Rangitane, Papawai Marae), Bruce Slater, Colin Wright (SWDC).

Aided by FOW (now WAG) representatives: Ron Sharpe, Tony Waters, Bob Chambers, Rebecca Laird and others.

Hundreds of people: GWRC employees, subject matter experts, stakeholders, community members, landowners and passionate individuals have voted, written, asked questions, suggested changes and improvements, edits and shared valuable information, maps, books, photos, videos and diagrams.

A special thankyou to "Professor RAG" and "Mrs. Smith", without whom this would not have been possible.

1.2.3 This plan is a living plan

It should never be finished or become static. The river changes, legislation changes, cultural understanding and reconciliation advances, communities and economies develop, science grows, climate changes, new threats and triumphs change the needs of flora and fauna, agriculture and land use change, expectations of amenity change.

The most important aspect of this plan is that it offers a process, model and mechanism for everyone who cares about the river and its future, to genuinely participate and have more than just a say but to come together to work towards consensus and find solutions that see the river as much more than a flood problem, a drainage problem, a waste disposal problem, a weed problem and a source of stone and water.

Our children already grow up knowing things we do not, they will find ways to live with the river that we have not. The Living Plan process hands the baton to future generations of our [community](#).

1.2.4 Consulted Stakeholders

A wide variety of [community](#), [statutory bodies](#) and stakeholder groups have an interest in the Waiōhine. In alphabetical order (*those with whom workshops were held):

- Academia ([Massey University](#))*
- Adjoining Landowners*
- Anglers*
- Business Owners (within the community)
- [CDC](#)
- Community Organizations
- Contractors
- DOC – statutory body*
- Emergency Services (e.g. [WREMO](#))*
- F&B*
- [Fish and Game](#) – A statutory body*
- Flora and fauna enthusiasts*
- FOW: Friends of the Waiōhine (now [WAG](#))*
- Gravel extractors
- GWRC Exec*
- Irrigators & water race users
- [Kahungunu](#) – statutory body*
- NZR
- NZTA*
- Politicians*
- Rail Trail/[Five Trails Trusts](#)*
- [Rangitane](#) – statutory body*
- Recreational Users (e.g. swim, boat, canoe)*
- (Residential) developers
- Schools
- Tourists
- SWDC*
- [Whaitua](#)*

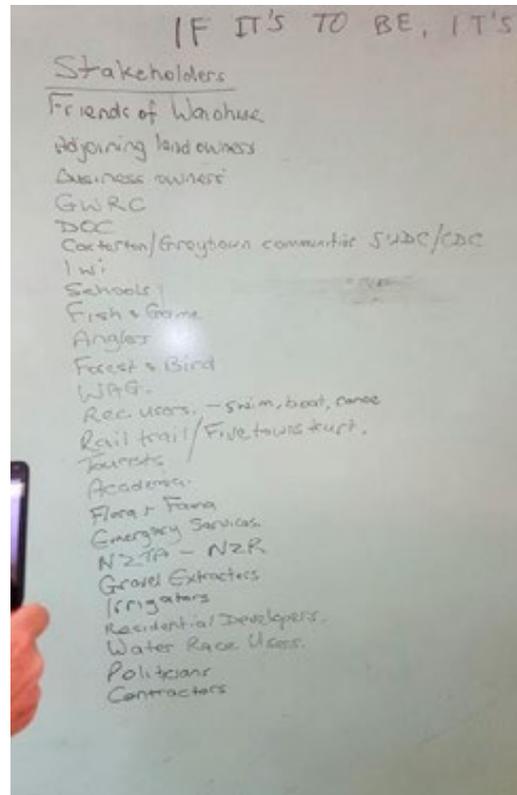
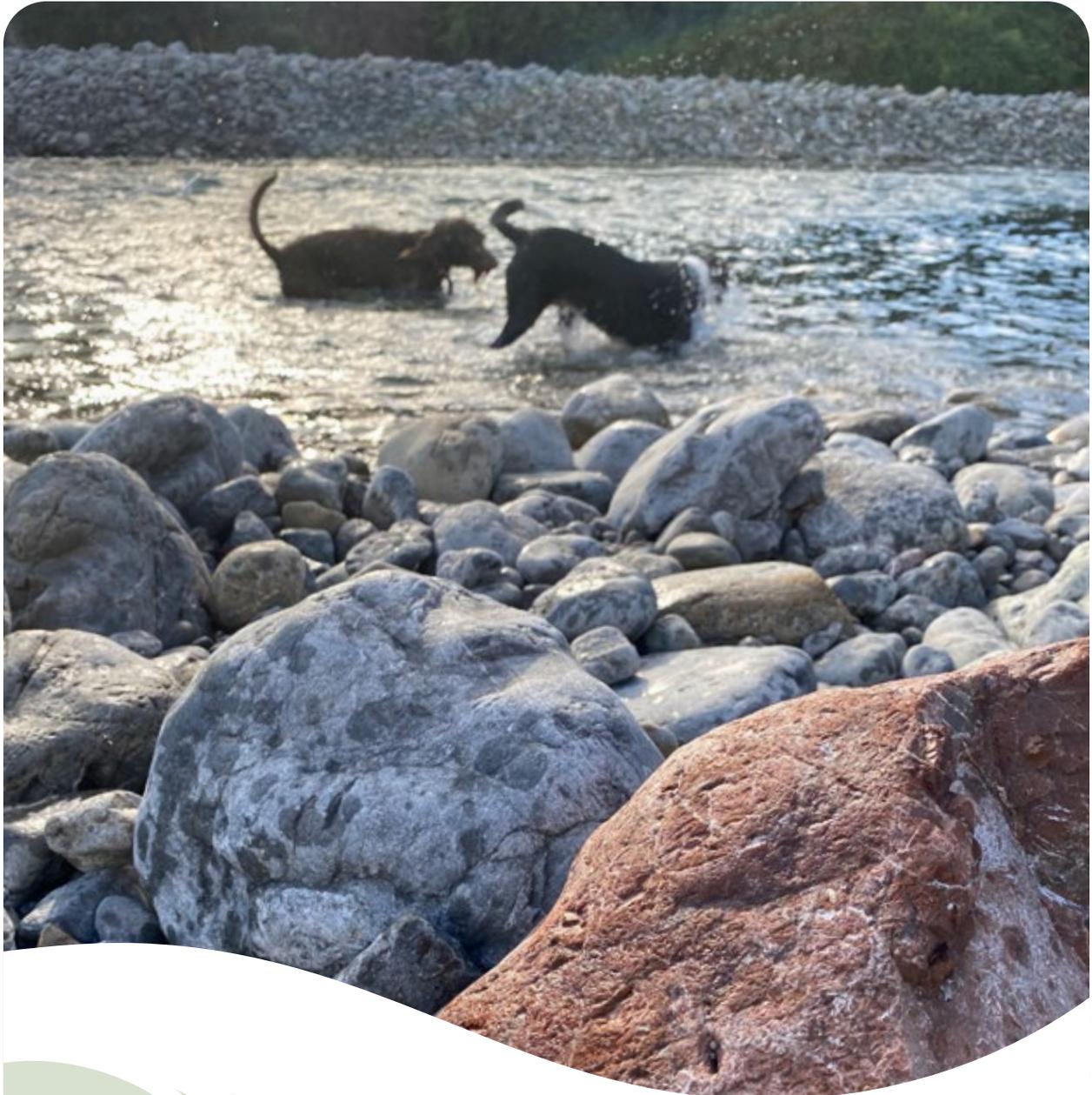


Figure 8: Brainstorm of Stakeholders.

Visions and strategies for all stakeholders are broadly compatible, making it possible to draw these together in a single [Living Plan](#). There is a need to keep looking out for best practices and new data, then weaving this into the River Plan. Represented here are the merged and summarized visions, strategies and concepts identified, as at end of 2019 with further work conducted through 2020 and the beginning of 2021 incorporated as at end March 2021.



2

The vision for the river of the community

The GWRC strategy is that the [Waiōhine catchment community](#) should drive outcomes its own way, to set a vision for the catchment, or [Freshwater Management Unit \(FMU\)](#).

2.1 Manaakitanga ki o Papatuanuku (taking care of mother earth) – our vision for our river

The [Cultural Impact Assessment](#) written by Ra Smith of Ngati Kahungunu ki Wairarapa, explains that many valued wetlands have been lost through drainage. These included: Papawai, Te Ahikouka and Kuratawhiti (aka Potakakuratawhiti). He states that the author A. G. Bagnall (*Wairarapa, An Historical Excursion*), noted that there were few breaks in the south of the Wairarapa bush cover, “At Papawai itself there was a much smaller clearing of a few hundred acres and another of approximately the same extent to the north west on the Waiōhine at Ahikouka. The Kuratawhiti clearing, roughly two and a half miles long by half a mile wide, lay parallel to the Waiōhine from which it was separated by a narrow belt of bush.” These clearings might well be indicators of areas affected by flooding, at least in terms of vegetation that did not settle long enough to establish wooded wetlands or dry land forests. On the other side of the river from Kuratawhiti and Ahikouka is Te Uru o Tane, known as an entrance to a forested area, while flood prone, there is an indication that the area was able to recover so it could establish at least wetland forest, typically made up of Kahikatea. On the other side of the river from Papawai is Pukengaki again as the name suggests a hilly area as is still the case today. It is of course a natural stopbank in a major flood event.

It is recommended that a Living Plan strategy of seeing the river and its GWRC environs (*where environ means the area of the river channel between the private property boundaries that run down either side of the river corridor. Includes wetted part of channel, at least some parts of the buffer strip (some of this is on private land)*) would benefit from a vision for gradual restoration, to a naturalistic (as distinct from its pre-European natural) state, would best respect its historical and cultural attributes. This plan represents a holistic approach to managing our river and the Wairarapa catchment – ki uta ki tai. We recommend that the vision for the restored flora and fauna of the river should be based upon it being “seen through Māori eyes”, empathising with iwi and hapū values, in keeping with [Te Mana O Te Wai](#).

We should use, wherever practical, given the changed landscape and society, Māori understanding of the right flora, fauna and ways to develop appropriate accessible ecosystems as the underlying philosophy, to deliver on the following community vision:

- 1 A beautiful and safe river for people, flora and fauna.
- 2 A (linear) park with restored natural beauty, with areas of public access so they can do whatever they want in keeping with the values of the river.
- 3 Maintaining the best water quality, purity and naturalness and for further conscientious use and local pride.
- 4 It is our back yard – we want no mess behind Greytown.
- 5 We must treat it as an holistic living entity, including native fish life and a respect for bird nesting etc.
- 6 We need to build and maintain practical, unobtrusive flood protection.
- 7 We will be aware of the whole environment (including the Ruamahanga downstream, Wairarapa Moana and Oneke) and improve it until it will be clean and safe to swim in the downstream lakes in 2090.

2.2 Things we care about for the next 70 Years that require the community and GWRC to work in partnership

- 1 GWRC will share in good time, with the WAG Project Team and [community](#), all relevant trigger data, events and findings that might inform planning inputs or actions that might need to be taken in between GWRC annual planning cycles.
- 2 With that in hand, everything listed below will be reviewed by the community including interested stakeholders, prior to each GWRC planning cycle (annual, operational or long term) commencing. New items may be added to this list with the agreement of the Wairarapa Committee. This in no way restricts the other ways in which statutory bodies and other stakeholders may choose to interact.
- 3 GWRC and the community will share all planning inputs that might affect the river and environs to be discussed as needed, by both parties, prior to the start of each formal GWRC planning cycle.
- 4 GWRC will produce each type of draft plan that affects the Waiōhine, for instance the annual plan and budget for management of the river, and share this with the WAG Project Team and community, in good time for the community to review it. The community will identify differing views or endorsements and present these along with any proposed initiatives to the Wairarapa Committee at which the GWRC plan is also presented.
- 5 GWRC will support the day to day running costs budgeted annually.
- 6 The GWRC Wairarapa Committee will decide what steps, if any, need to be taken where there are significant differences between what the community and GWRC wishes for the river.

2.3 Things that this includes but isn't limited to:

2.3.1 Safety

- 1 We need reasonably cost-effective measures for the prevention of death or injury between the banks of the river and in the buffer zones. Also, any improvements that can be made to [emergency procedures](#).

2.3.2 Water quality and Te Mana o te Wai

- 1 Keep improving where and when, on the river, [water quality testing](#) is best carried out.
- 2 Where the results are below target quality, GWRC and the community (linking with Whaitua, citizen science and Mana whenua practising Kaitiakitanga) will jointly define a plan to address any issue including a review of the sample sites as the issue arises.

2.3.3 Flood protection works

The community will monitor the implementation and engagement of the [flood defences](#) that are recommended by the FMP. Possible variations to the planned defences will be shared and agreed between the community and GWRC in accordance with the [Living Plan](#) process.

The construction of stopbanks, flood protection plantings and other river defence works must be carried out in accordance with this plan. The WAG Project Team and community shall have oversight of their implementation and be party to the planning process for any alterations to the FMP occasioned by the GWRC planning cycles, or any of the review triggers.

The Following Level of Flood Protection is aimed for (with care taken to consider the best affordable level of protection that is practical):

- a **Town** – protection from one in one-hundred-year flood plus climate change, freeboard and sensitivity. This applies to Greytown, as flooding of the Waiōhine does not threaten urban Carterton. This level of protection is required for towns and cities.
- b **SH2** – no worse than now but with gradual management of levels of State Highway 2, by shaving approximately 100 mm off the crown, [in sensitive spots](#).
- c **Fullers Bend** – maintain the status quo but continue to gradually reinforce strength of Greytown side (True Right Bank) defences.
- d **Rural** – Attempt to provide protection for dwellings on the floodplain from one in twenty-year floods plus climate change, freeboard and sensitivity.

For new build dwellings **it will be recommended** however that these should be built to withstand a one-in-one-hundred-year flood plus climate change, freeboard and sensitivity allowances.

Apart from the requirement to defend the urban area against one-in-one-hundred-year plus climate change floods, wherever possible the plan must not advantage one area at the disadvantage of another i.e. rob Peter to pay Paul.

2.3.4 Access

- 1 The community and GWRC will always seek improved access for river maintenance and stone extraction, to minimise impact on flora and fauna where practicable, and for amenity access, where and when agreed with landowners. Care will be taken to protect natural habitats and culturally significant sites.

2.3.5 Commercial use and support for activities that may generate business

- 1 Any changes in proposed commercial uses of the river is to be discussed between the Iwi, community and GWRC as they arise or are included in the pre-discussion of any planning cycle.
- 2 [Methods of extracting material](#) from the riverbed are set out in detail in this river plan and the subsidiary Code of Practice and will be overseen by the community where it considers this necessary.
- 3 It is possible that other opportunities for commercial activity might arise beyond the traditional activity of gravel extraction that benefit iwi, tourism and regional development aspirations. Community agreement will be required prior to applying for consents to do business in the environs and the river.

2.3.6 Sustainability of flora, fauna and aquatic life in the gradual development of a wildlife corridor

- 1 Planning for flora and fauna, including aquatic life, to improve the natural character and beauty will be developed by the community working with GWRC and be incorporated in each planning cycle. The community aspires to incorporate the tenets of the [Cultural Impact Assessment \(2010\)](#) document and the inputs of Iwi, other statutory bodies such as Fish and Game and DOC, recognized conservation groups and organisations e.g. [Department Of Conservation](#).
- 2 We will restore the natural character of the river (as distinct from the river being “natural” i.e. as it was before humans found it), wherever practical. See [Natural Character](#).

- 3 A plan to protect nesting birds will be maintained by the community and GWRC. Where rare and protected flora and fauna require extra care, therefore additional expense, GWRC support for this will be requested directly, or through the Wairarapa Committee.
- 4 Opportunities for and issues arising from riparian plantings will be agreed between the community and GWRC, adjoining landowners, Iwi and other interested parties as part of each GWRC planning cycle.
- 5 Maintenance of plantings (including necessary ground clearing, spraying and irrigation consents) and the best appropriate use of joint resources, will be planned between GWRC and the community.
- 6 The Community will work with GWRC to choose the most appropriate measures for pest and weed control. This will dovetail with the Maintenance of Planting and [Riparian Planting projects](#) and maintenance. Appropriate protocols will be decided between the Community, GWRC, Iwi, and affected landowners.
- 7 The community has a long-term vision to enhance specific habitats, such as wetlands, in cooperation with Iwi, GWRC, and landowners willing to participate. The entire Waiōhine River and its environs should become a living corridor for bird life and other flora and fauna to inhabit.
- 8 Opportunities to enhance the living corridor will be sought by the community and any planning sessions with GWRC should seek to improve this habitat.
- 9 Actions which substantially affect the natural character and beauty must be decided jointly by the [community](#), including Iwi, GWRC, and other stakeholders. Projects which influence the river environs will require agreement from the community in the planning stage. The community must have oversight in the nature of any proposed activities in the upper reaches via GWRC, DOC or other stakeholders to ensure the river is properly managed.

2.3.7 Water and bed levels

- 1 GWRC will continue to share all sets of bed level, gravel and water flow and level data with the community as it becomes available. Where issues occur, then GWRC will consult the community on future changes.

2.3.8 Educating the next generation

- 1 The community will liaise with local schools, enviro-schools and other academic institutions to educate future generations, to develop expertise to address the ongoing living plan and engage future generations. Community engagement with GWRC will provide an opportunity to develop an education plan.
- 2 Local Iwi knowledge and depth of understanding of the Waiōhine River and its habitat is a valuable resource to help the Community to better plan for and protect the River into the future. The Community will consult with Iwi to see the Waiōhine through Māori eyes, develop knowledge of native plants, medicinal and edible plant sources and information about the health and moods of the River and to identify opportunities to inform visitors to the river about these.
- 3 The community's long term vision is to support the provision of scholarships for local students who wish to undertake postgraduate study that focuses on the Wairarapa River systems and catchment with a view to helping the community to ensure ongoing expertise and access to the newest learnings to serve the Community. Expertise in the community may serve to mentor and encourage local talent. Scholarship funding may be accessible through the many sources that are available from time to time.

2.3.9 Climate change

The community will receive copies of all relative reports obtained by GWRC relating to climate change that either may, or are certain to, have an impact on the River, its habitat and environs and create or modify plans to mitigate any foreseen risks.

In the event of lack of clarity or conflicting information, GWRC will bring agreed independent experts to offer their advice to the community and GWRC jointly.

2.3.10 Walking, cycling, access tracks and amenities

The development and maintenance of these will be discussed between GWRC, District Councils and the Community. Plans for these projects will be input to GWRC planning cycles.

2.3.11 Protection of sacred places – Waihi Tapu

The community will continue to acknowledge and support the protection and care of [cultural and sacred places](#) and cultural practices. It is important that burials are undisturbed in context of any activities in proximity of Te Uru O Tāne Urupa or other known burial sites.

The cultural impact of not acknowledging places of memory is that Wairarapa Māori feel marginalised by work being done in places of significance. A confidential register of memorials should be kept by GWRC at the direction of iwi, or a process of consultation, to ensure care is taken not to damage significant places relating to the river.

If wetlands and/or native flora are used in floodplain buffer zones, a group of weavers could be established to instruct what plants would be best for use in weaving. This approach could also apply to other culturally significant materials.

2.3.12 Sourcing funds

The Community may seek to fundraise for projects to advance its long-term vision of the river or may approach GWRC to jointly fund some projects. Proposals will be input to the Living Plan Process and thence to the Wairarapa Committee.

2.3.13 Events – activities

The community aspires to the river being a site for events from time to time. The improvement of the river and its environs by the community working with GWRC should not exclude this.

The community will require consultation regarding events and activities prior to consents being considered, allowing the community to organise support for activities which are beneficial to the river, and being alerted to any which may impact Iwi rights or the long-term vision for the river.

2.3.14 Keeping our profile high

The community profile will be maintained to provide all stakeholders with regular feedback on activities it is involved with including discussions with GWRC. Communication channels like email lists, Facebook page, and a website will all be used for general coverage. The principal adopted during the FMP process of openness and transparency will be sustained.

2.3.15 Downstream effects

The Waiōhine, Mangatāre and Beef creek have the potential to affect the Ruamahanga and southern Wairarapa lakes downstream through increased flows or degraded water quality. GWRC will discuss with the community, if the Waiōhine has a detrimental effect on waters downstream. The community will liaise with other catchment groups to promote and participate in, where practical, a greater view and vision for Wairarapa rivers and catchments.

2.3.16 Conserving, sustaining and improving our river

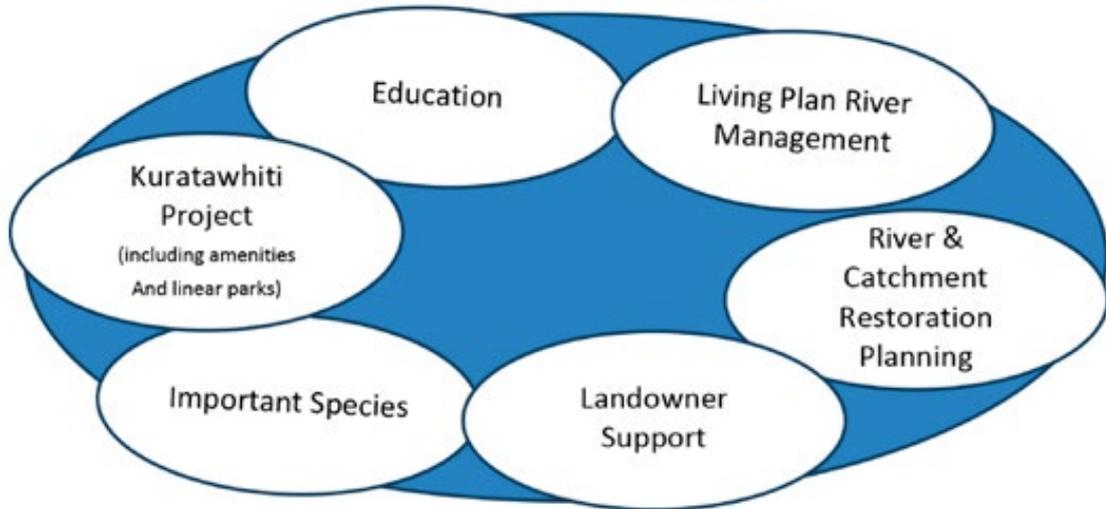


Figure 9: Conserving, sustaining and improving our river.

2.3.17 Conservation, sustainability and restoration strategies

- 1 We have developed a set of clear statements about how value identification and prioritisation will be set, how decisions will be made reach by reach e.g. balancing flood protection versus river ecology. These statements are our vision for the Waiōhine.
- 2 Direction is more important than time – we need to have a consistent vision of what the river should be and make sure we are always working and moving closer to realising it
- 3 GWRC allocates an approximate annual 3% of total budget for the river, to be set aside as river enhancement budget and therefore recognizes the need to sustain and enhance environmental projects.

2.3.18 Freshwater values (incorporating Whaitua)

The concept of a "Catchment [Community](#)" to implement the Ruamahanga Whaitua Implementation Programme outcomes is incorporated within the Waiōhine River Plan. Waiōhine has a lot less fine sediment than most other Wairarapa rivers. Flood works do not seem to have had as much ecological impact as may have been thought.

78% Of water quality outcomes, and most macroinvertebrates, come from smaller streams and it can be seen from the illustration below that whilst the river itself has very good water quality, there is opportunity to improve the quality of small feeder streams.



Figure 10: Aerial photograph of Waiōhine valley showing clean water as green and polluted water as orange – Russell Death, Massey University.

2.3.19 Principles for maintaining and improving water quality

2.3.19.1 General

Whilst the [Ruamahanga Whaitua](#) Implementation Programme (WIP) has been received in Council, the question remains as to how it is to be practically implemented in a way that meets the general intent of Whaitua.

We recommend that it is for the community in partnership with GWRC to determine how to implement it in a way that delivers useful outcomes and fits to the overall strategy of Whaitua. The carrying out of measurement and working towards Whaitua goals by community catchment groups, such as WAG, is seen as positive.

2.3.19.2 Measurement

As at 2018 the water quality of Waiōhine is rated "A". Ecological Health is rated "C". In accordance with [Whaitua](#), we have set a goal to maintain water quality as a minimum. Improving ecological health is our goal.

We note that the measured natural suspended sediment load is to be reduced to 5% by 2080.

2.3.19.3 Conservation & Restoration Strategies

Objectives that can join up together into a holistic strategy, have been collated from Iwi, FOW, DOC, F&B, F&G, Landowners, Massey University and all other stakeholders' inputs to this plan:

- 1 Retain the river's natural character of braidedness, backchannels and allow lower high beaches but minimise disturbance to the river itself. Well defined channels are preferable.

We recommend to run Habitat Quality Index measurement every three years, in preparation for revisions to the Long Term Plan, or after trigger events or works, take place.

- 2 Slow the water down where practical, it helps aquifers recharge and creates habitat. Deep pools are better for aquifer recharge.

We recommend taking care to avoid mobilizing fine sediment in the water ("fines"), which results in:

- a Smothering,
- b Filling in the voids.

We recommend where practical, pools and silt traps should be reinstated or created.

- 3 Whilst the main river still provides important habitat, riparian planting has the biggest water quality effect in smaller streams.

We recommend removal of 25% of crack willows within a 15 period as per Te Mana o te Wai, and replant with swamp Manuka and others.

2.3.19.4 Water quality measurements should be taken at three locations and eventually meet or exceed [Whaitua](#) objectives

- 1 The beach on the corner of the "Goose Neck" with access off the Waiōhine Valley Road.
- 2 The beach at SH2 Bridge ([XS 17](#)) with access off SH2.
- 3 The end of Tilson's Road, upstream of the Ruamahanga confluence, downstream of the Mangatāre confluence.

2.3.20 Fauna

- 1 Fauna (Including Fish and other aquatic life): Implement a "living" realistic recovery plan for the Waiōhine to meet or exceed Whaitua recommendations and to meet the goals of the community between now and the year 2100 including:
 - a The macro-invertebrate health of the river is to be gradually improved,
 - b Protect and sustain Dotterels and Black-Billed Gulls that nest along the river,
 - c Work towards gradually developing the concept of a "corridor" for native birds, that exploits "stepping stones" in the buffer zones and along the river itself,

- d Work towards gradually developing more places (pools) where migrating fish can pause and rest when moving up or down the river.
- 2 Start to designate zoned areas (e.g. dog control to conserve species etc.),
- 3 It is noted that snub groynes are better for providing habitat for fauna, including fish, than rock walls,
- 4 Gravel extraction and river maintenance should seek to minimise sediment release into the river and wherever possible, avoid using machines in the wet channel,

We recommend that the known Mangatāre nutrient problem needs to be addressed, as part of the Mangatāre Catchment Plan project, as this feeds the lower Waiōhine.

We recommend that a regular count of pools, riffles and runs should be made and shared with all interested Stakeholders at least annually.

- 5 Reintroduce Kaakahi.

2.3.21 Flora

- 1 To collaborate with individual landowners, who wish to help develop joined-up plans, to restore the ecology of the buffers and edges of the Waiōhine.
- 2 Focus on gradually restoring the planting and ecosystems at the end of Kuratawhiti street on GWRC land, as a priority area, to develop a sustainable environment and amenity for the community and native wildlife.
- 3 Develop the offer by DOC, for Involvement in planning, planting and advice.
- 4 Develop and maintain wetlands in buffer zones, to create a “wildlife ladder” or corridor, along the river.
- 5 Wetlands – seek opportunities for native planting, restoration and sustenance of wetlands.
- 6 “Ring fence” identified wetlands, engage Iwi and interested stakeholders to jointly develop the best planting strategy.
- 7 To seek appropriate management of browsing animals on the catchment, within the [gorge](#).
- 8 Plan and prioritise pest control throughout the river and buffer zones.
- 9 Where practical, leave room for the river to move around ([see River Management](#)).
- 10 Keep vegetation clear (within the defined fairway) on “dry” beaches, to minimise impact on fauna; mechanical spray work is OK to control weeds vegetation.
- 11 Consider the use of Manuka and Mahoe as [recommended planting](#), where flood protection is required, as well as Kanuka, Carexes also for underplanting (Germinata).
- 12 Where there is a general degrade of the riverbed next to high banks, willows planted on the high ground will struggle to hold mass – which can result in bank failure. Planting should be carried out on beaches below the high banks where practical.

2.3.22 Cultural considerations

The whole river is considered [taonga](#). There are historic sites of habitation, Urupa and other sites of significance along the length of the river. **Mana Whenua and Iwi should always be consulted regarding cultural considerations.**

2.3.23 Rural Landowner Considerations

Structural and non-structural solutions are [addressed elsewhere](#). Several landowners occupy rural land adjacent to the river, whilst this brings some benefits, they are affected by environmental and social aspects of the river, including the necessity to site inland stopbanks on their land. Factors considered in the development of this plan include:

- 1 Impact on commercial use of land for Inland Western (near Kuratawhiti Street) and Eastern (North Street) stopbanks,
- 2 Impact on farming operations.

There is a desire by landowners that proactive [river management](#) must continue, so that flood erosion management for rural land minimises the destruction of viable farmland. The Waiōhine Flood Plain contains some very high-quality agrarian soils, suitable for food production. The project team recognises that these soils may be needed for food production in future years. More Flood control systems may need to be considered at some point, by the Project Team, to protect this type of Farming within the [Living Plan](#).

KEY FINDINGS:

- Target urban areas to be defended against 1:100-year floods plus climate change (1% annual probability)
- Target rural dwellings to be defended against 1:20 year floods plus climate change (5% annual probability)
- Work towards gradual realisation of the vision for the river within the framework of the plan and the Living Plan process.



3
Climate Change

“Our changing climate will affect our economy, environment and way of life. We are uncertain about the pace and scale of future change. We do know that planning for the future means planning for a different climate. New Zealand needs resilient systems able to deal with the scale and pace of change.” Ministry for the Environment.

3.1 What we plan for

[Climate change](#) will increase river levels in an extreme rainfall event by up to 10% by the year 2050 (high confidence) and up to a further 6% by the year 2100 (low confidence in climate change predictability).

3.2 Why this increase?

There is an overall increase in temperature annually by 2090, which will vary by season. Total rainfall appears to have little annual change, but large seasonal changes. It will rain more on the western side of the Tararua Range. Drought days (over 25 degrees) will increase from thirty to seventy each year here in the Wairarapa. An increase in extreme rainfall events is predicted under [RCP6.0](#) (0-5% increase), it is not known how this is shared amongst the seasons (but the Waiōhine historically floods only between October and February). The number of ex-tropical cyclones affecting New Zealand is unlikely to change due to climate change by 2090, however they will likely intensify, with an increase in rainfall accumulations and wind speeds. It is expected these will mainly affect the Western side of the Tararuas but with rain falling in the Waiōhine catchment, which is deep in the hills. Some research suggests that storm intensity, small scale wind extremes and occurrence of thunderstorms, is likely to increase in New Zealand (Mullan et al. 2011 in MfE 2016). Temperature rise from climate change increases the amount of moisture that can be held in a column of air. This in turn makes rain events more extreme and increases the volume of water in a flood.

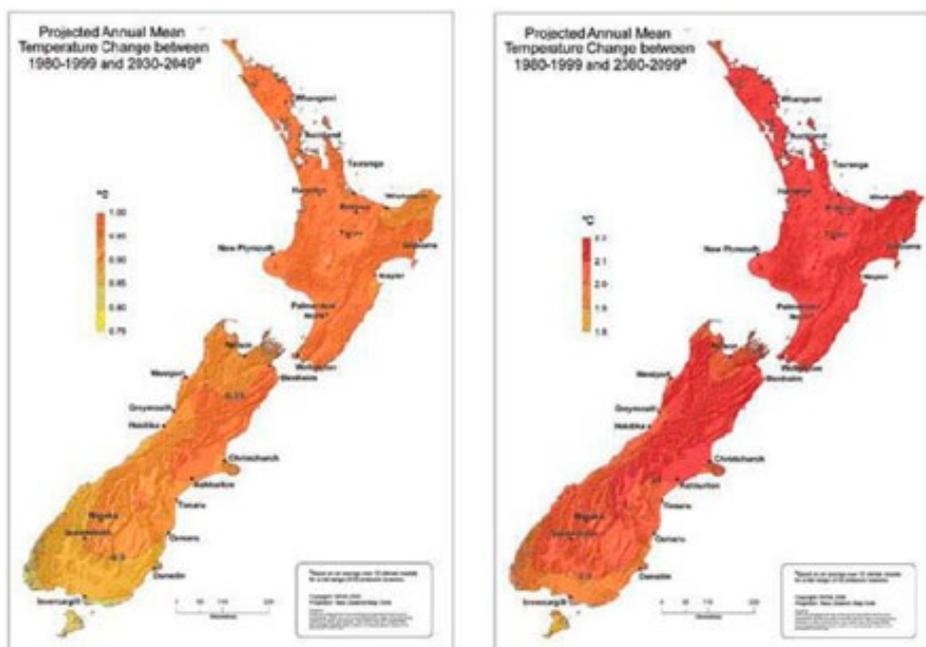


Figure 11: Regional Seasonal Changes in Rainfall – NIWA.

The increase in annual temperatures with a decrease in annual precipitation, may lead to a decrease in vegetation condition in the upper catchment, and possibly even a vegetation community shift (long term). Should this occur, then hillslopes will be less protected during rain events. This suggests that more landslides could occur with smaller rain events, than in the past. This would increase gravel build up in the Waiōhine River, should it eventuate. [See Tonkin and Taylor Report.](#)

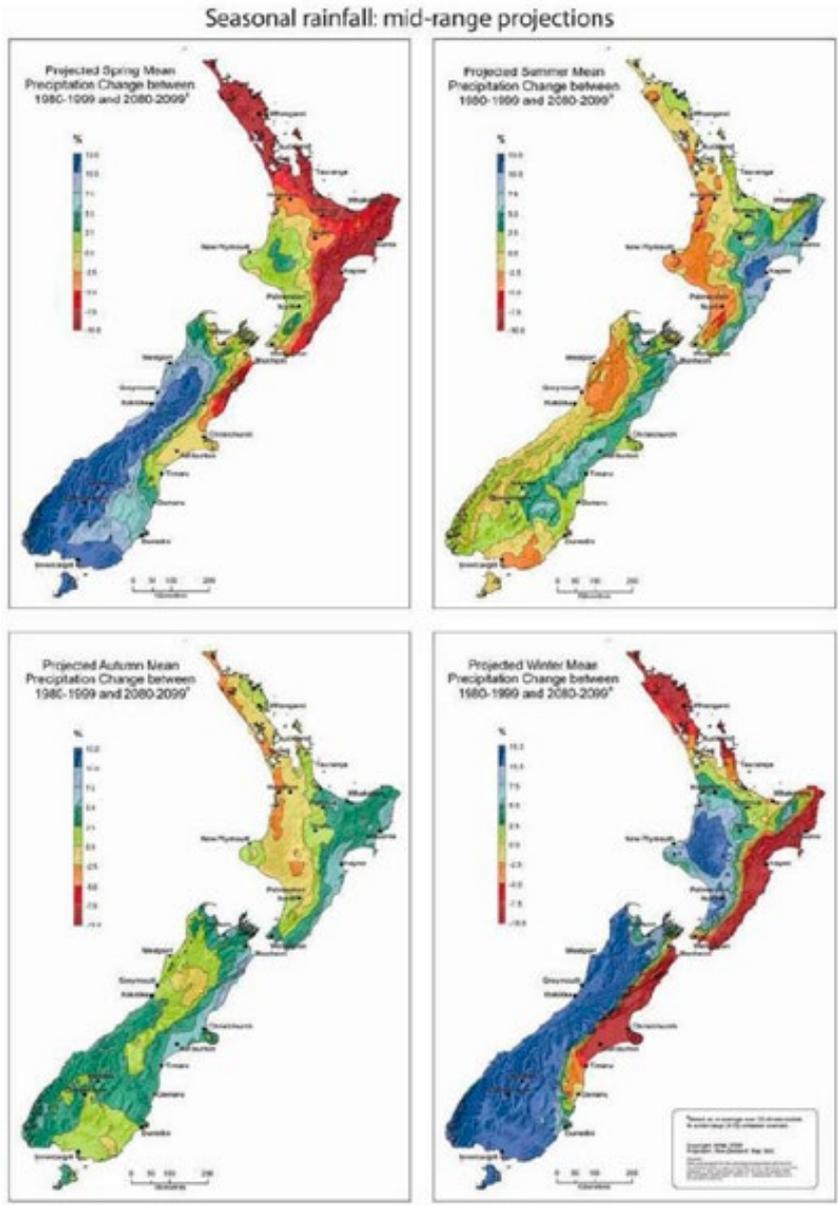


Figure 12: Seasonal Rainfall Mid-Range Projections – NIWA.

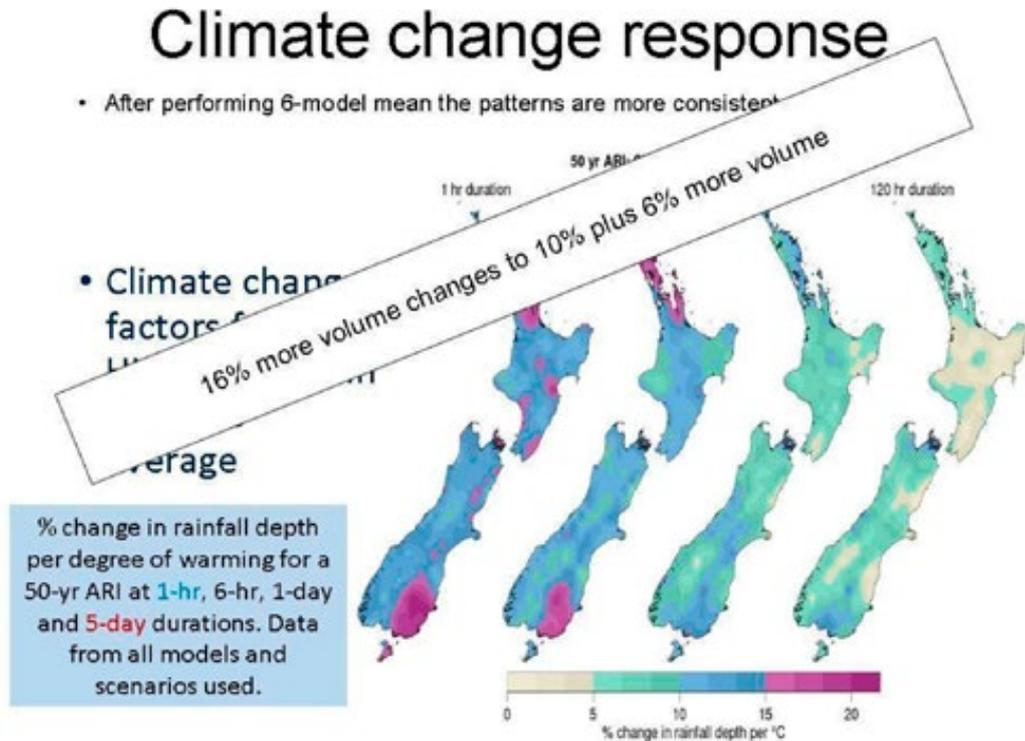


Figure 13: Climate Change Response.

3.3 How much climate change do we think there will be and when?

We have two planning horizons in this river plan, chiefly because of climate change: 2040/2050 and 2090/2100. Climate change is reasonably predictable up until sometime between 2040 and 2050, by then the actions of humans in the meantime, will dictate which of many climate change paths will be set in train between then and at least 2100. So, post 2050, climate change scenarios will be highly divergent (they fan out a lot). Therefore, until we can see what humans do to combat climate change, there can be little confidence in predictions of what path climate change will take, after 2050, and out until 2100.

Whilst current climate change information suggests that we should not need to worry about [sea level rise influencing the Waiōhine](#), as a precaution, we have chosen to include it as a [Trigger](#) to be included in the mandated 2050 review.

Note: Further work needs to be done on the impact of climate change on: flora and fauna in the Waiōhine, the upstream effects of sea level rise on flora and fauna in the Waiōhine and the effects of the impact from increases in drought days on river water levels, water tables, irrigation channels, artesian water or springs.

3.4 What did we choose?

After [extensive consultation with climate change experts from NIWA](#), we chose a flood modelling guideline of:

- By 2040/2050 +10% flood water volume and
- By 2090/2100 +16% flood water volume.

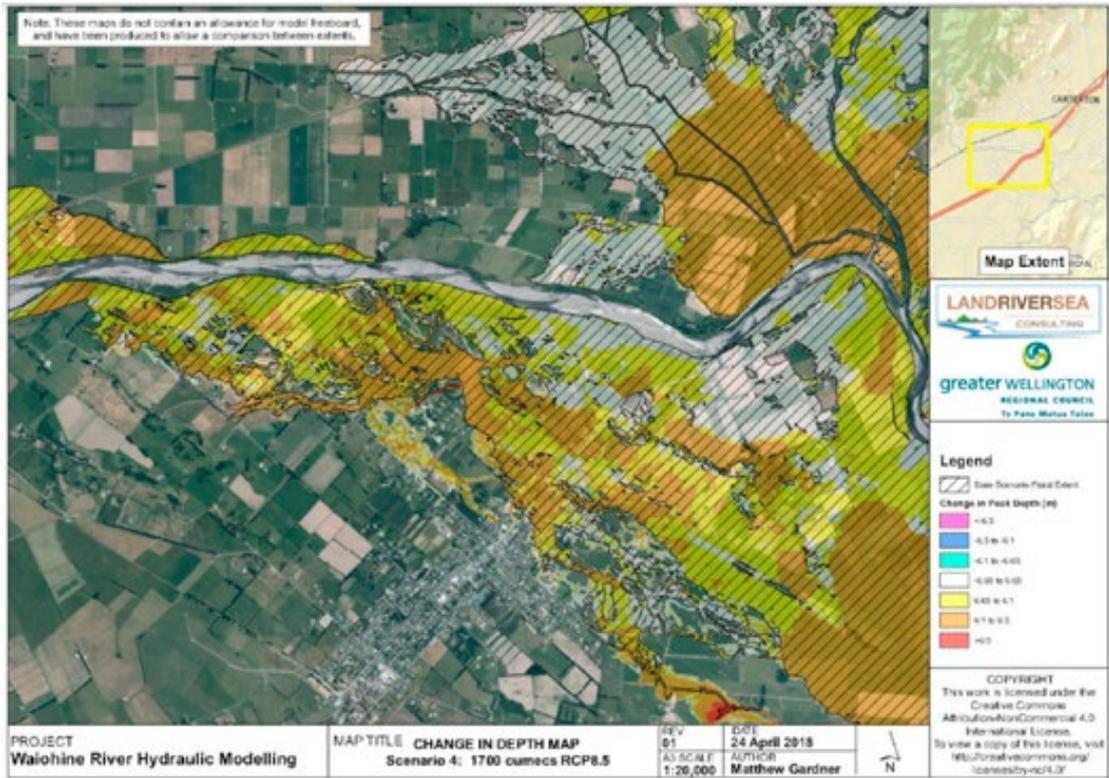


Figure 14: A flood map option showing a severe 1% flood with severe climate change (IPCC RCP 8.5 – landriversea Consulting).

3.5 Where does this come from and will it change?

World-wide data is accumulated and published on an 8-year cycle and of course, more is understood about climate change as time passes. Furthermore, as time passes our base of historical flood data extends and enables more accurate flood modelling. NIWA and other New Zealand agencies work to try to understand what this means to New Zealand. New Zealand has limited climate data measurement and a complex local climate, because of oceans and mountain ranges. So, our scientists must work hard to try to come up with what this might mean to an area as small as the Wairarapa, with limited historical data.

3.6 We expect that as much more information on climate change will be available by 2040/2050

Tools to more accurately model that and ways we can analyse it, will become more sophisticated. There will be a review of the climate change implications by then. So that is an obvious first planning horizon (there are other reasons for this, in addition to climate change). We are obliged to try to plan out towards 2090/2100: so, have that as the second planning horizon – although it is still difficult to predict how severe the impact of climate change will be by then.

3.7 Which climate change scenario did we use?

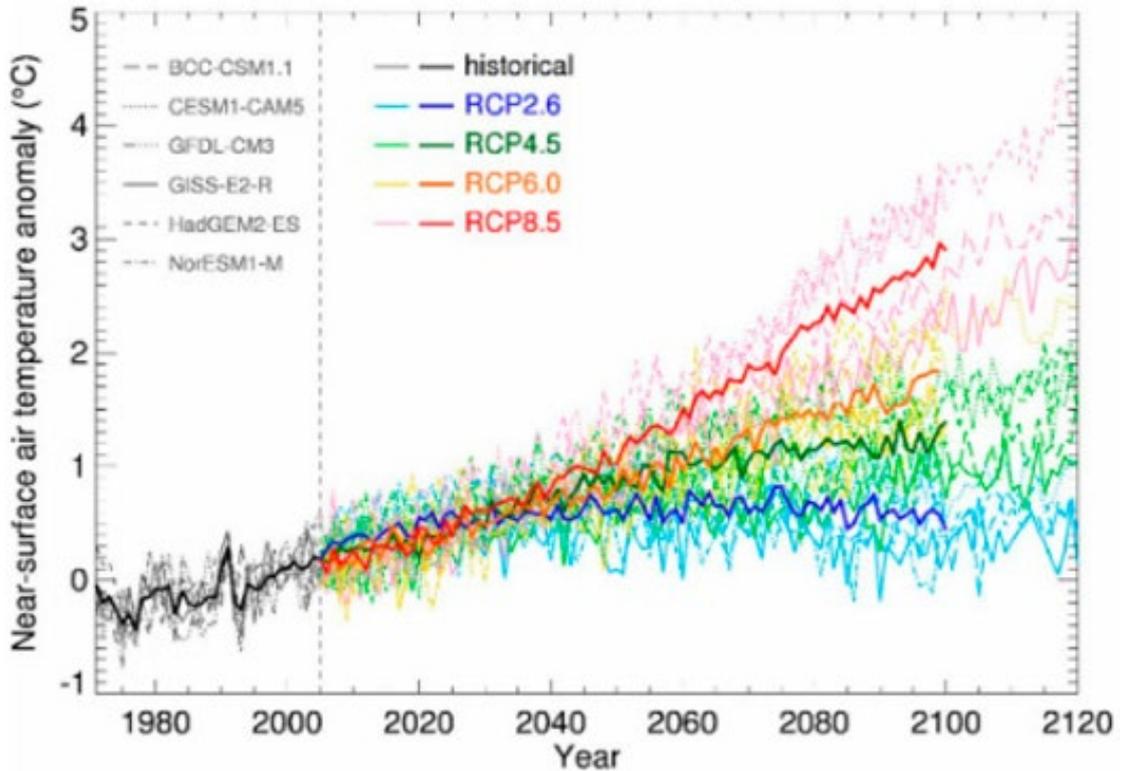


Figure 15: IPCC scenarios diverging – IPCC.

An explanation of climate change as it could affect the Wellington Region [can be found here](#).

3.7.1 We Selected RCP 6.0 – what does that mean?

It’s complicated. [RCP6.0](#) is a high mid-range outcome for climate change. It’s not as aggressive as RCP8.5, which was created as a worse case scenario, in which the world fails to curb the use of fossil fuels, or take other measures to slow or reverse climate change. RCP 8.5 is sometimes called “Business as Usual” because way back in the 1990’s journalists quite rightly latched onto the idea that if we continued as we were then, then disaster was certain – if we carried on with “business as usual”. Some things have already changed – some worse, some better. Following discussions with NIWA, the feeling of the project team was to have more faith in humanity than the grimness of RCP 8.5, but we did pick the next worse modelled scenario: RCP 6.0. Of course things will change and the models will improve but this is the best it is possible to do, before new data comes to light. [Much more information about RCP6.0 versus other scenarios can be found here](#).

See [NIWA’s Presentation](#) to the Project Team on Climate Change and [on Rainfall](#) factors that influence the Waiōhine.

3.8 Note that floods do not last long on the Waiōhine

Examining data on past floods we see that [major floods last between 6 and 12 hours](#) on the Waiōhine.

A worst case 12 hour flood, once in every one hundred years on average flood (1:100), with additional volume of water [for climate change scenario RCP 6.0](#). was looked at as an exploratory model. This gave a modelling guideline of 19.2% additional flood water volume for a 12-hour flood duration at 2090/2100. This will not be used because it is a highly unlikely combination of events, climate modelling out to 2100 is wildly unpredictable and we will review the climate change aspects of the River Plan by [2050](#), when a lot more data will be available anyway.

The soils of the floodplain are very free draining, so residual flood water drains away very quickly.

Changes in Heavy-Rainfall Days

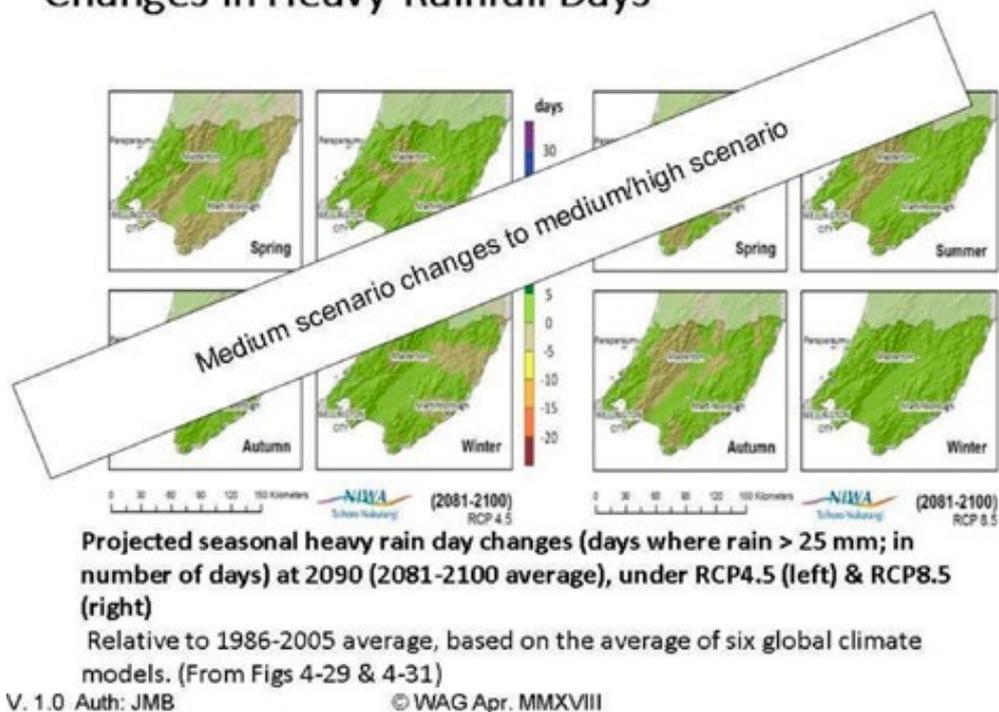


Figure 16: Changes in heavy rainfall days – NIWA.

KEY FINDINGS:

- +10% increased volume of flood water by 2050,
- +16% flood water by 2100,

We recommend that stakeholders review this:

- By 2050,
- If climate change exceeds 1 degree during that period,
- Or if significant new data becomes available from NIWA.



4

Planning Horizon

We have adopted two planning horizons for the Wai?hine River Plan: 2050 and 2100. Factors that have contributed to the selection of these:

- 1 Ministry for the Environment (MFE) guidance recommends up to 35 years span of time to pay off investment in major structural works.
- 2 The borrowing horizon for loans to build structural assets such as stopbanks, is typically 20-25 years.
- 3 Also, by 30 years we will see a generational change, the next generation may see things differently and see things better.
- 4 Councils typically have 30-year infrastructure strategies.
- 5 Climate change is reasonably predictable in the near term and by and large, has its course set until 2040-2050.

4.1 We have selected 2050 as the first planning horizon

Most of the factors that determine planning horizon above suggests a time for review between 2040 and 2050.

- 1 For new stopbank design, we will initially design to 2050 but will frequently test this and plan contingency for possible future needs.
- 2 Where the difference in estimated cost between building to 2050 and 2100 is insubstantial, we may opt to build to the 2100 horizon.
- 3 If we build to only the 2050 horizon, we will ensure that adjacent bare land is enough to allow addition to the stopbank, to cater for a possible "as at 2100" increase in height.

Note: This also means we will have tried to consider wider circumstances and the longer time horizon in choosing stopbank locations to keep our options open in future.

4.2 The principle of adaptive management

Is being able to set a point in future for a known decision that may be triggered by an event (the types of event that can [trigger](#) a revisit of this plan and new decisions being made have been [catalogued here](#)). This allows us to pick more than one planning horizon and a list of events which, if they occur, may trigger a review of this plan. This is seen as a key driver for the principle of a "Living Plan". In other words, "if this happens, get the community together, quickly agree actions, and review this plan".

4.3 What do these planning horizons inform?

- 1 House design life.
- 2 Stopbank location security, room to grow if needed.
- 3 Zoning implications, where future subdivision and development should occur and how.
- 4 Important horizons for understanding climate change.
- 5 Horizons for inter-generational change.
- 6 Ideal investment planning horizons, balancing cost of money versus spreading repayment.



5

Which flood could we use as the basis for developing and proving our models?

A wide range of information sources were correlated and used to cross validate the flood history of the Waiōhine, including:

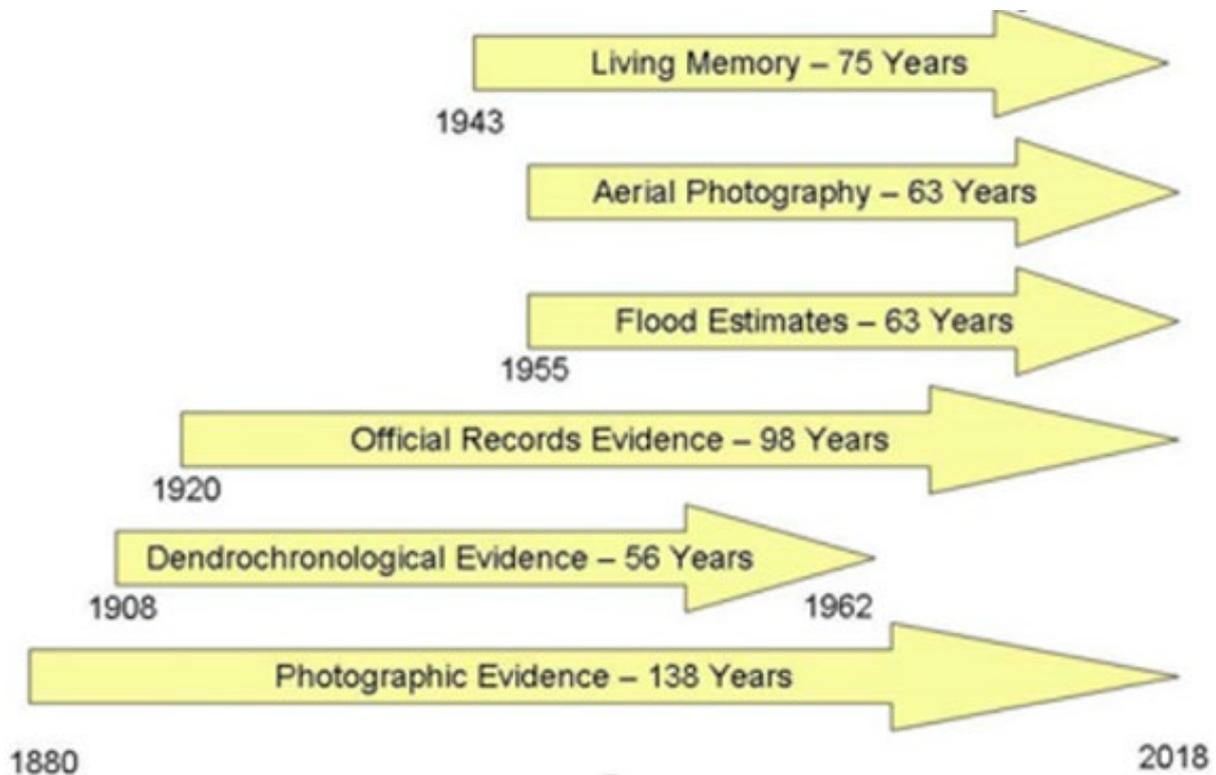


Figure 17: Sources of information on past floods tally.

5.1 The kind of things that had to be determined

- 1 Which floods are of note?
- 2 Which of these is best to base a model on?
- 3 Which flood events can be used to calibrate against (i.e. more than one flood)?
- 4 Is there enough data to inform design scenarios from these?
- 5 Is an analysis of flood frequency needed? Are there historic floods to consider?
- 6 Given 1990 is being modelled, which other floods might be important?

5.2 Which flood did we use?

It was decided to create a base model from which all other models could be derived, using the flood of 1990. Whilst several other floods were considered (see table below), those did not offer the larger return period (a one in twenty-year event or average frequency), or the relative wealth of information for cross referencing, such as aerial photographs.

New computer modelling software available to [LandRiverSea Consulting](#) allowed a far more detailed LIDAR (Light Detection And Ranging) sourced model for critical flood sensitive areas of the map. New sections and drone data were also correlated and used to improve the accuracy of the model. [The map for a one in one hundred year flood](#), including climate change and allowance for flood

sensitivity, was subsequently cross-checked against data modelled for the [2004 flood](#), which also was further cross-checked against local knowledge and aerial photography. As a result of this exhaustive process, a very high degree of confidence in the base model was reached. This base model was then confidently used to develop all further map sets and models, used to investigate flood risk and develop flood defence options.



Figure 18: Waiōhine in flood.

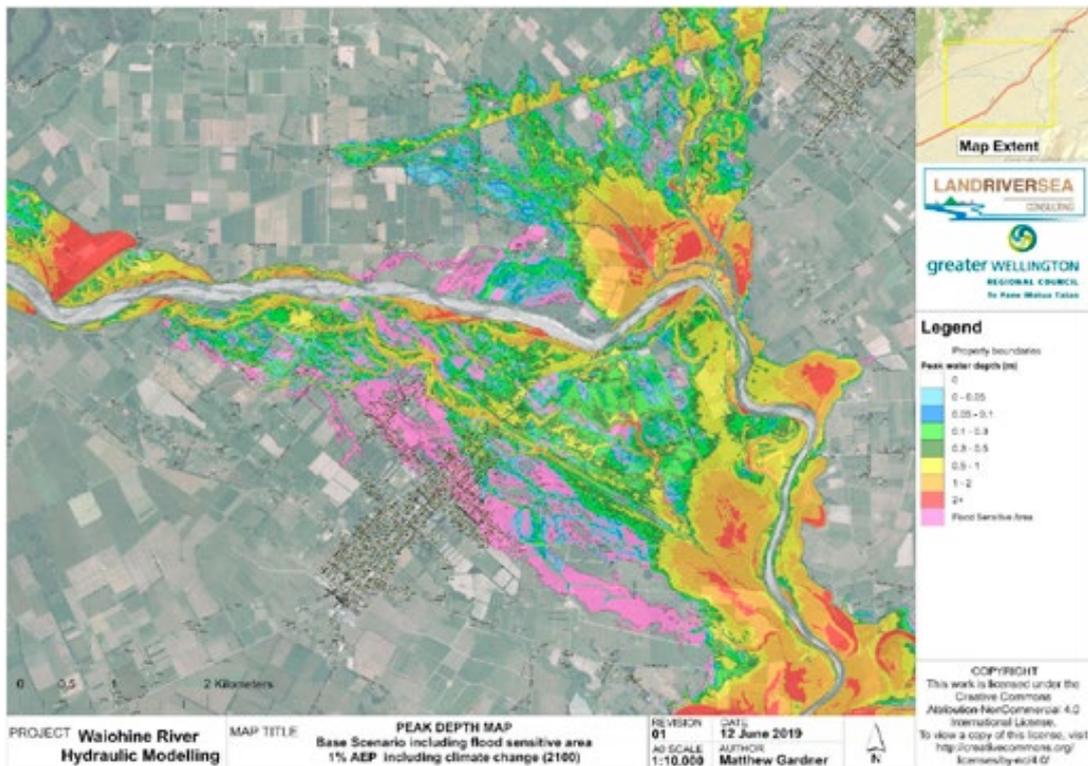


Figure 19: One in one hundred year flood, with climate change as at 2100, also showing Flood Sensitive Areas (where there may be some possible flooding in the event of unusual things happening in addition to climate change and a one in one hundred year flood).

| Date | Flood – and – [quality of flood, out of 10, for deriving base model] |
|----------------------------|--|
| 01/1980 | 1424 cubic metres per second. Some photos. Long duration – 2 peaks. Extensive land flooding. Getting old [4/10] |
| 12/12/1982 | 1558 cubic metres per second (some doubt about this number). Biggest on record. Some photos. Long duration (30 hours) Gauge validation/ Matt/ Hydrographs. New stopbank at Platform Farm [4 to 7/10] |
| 1990 | 1408 cubic metres a second, single peak, plenty of aerial photos and other reference material [8/10] |
| 06/09/1998 | 1104 cubic metres per second Long duration. Stopbank failure at TiceHurst. (used for validation) [0/10] Flooding at Papawai and behind the Urupa. |
| 2002* | 915 cubic metres per second [0/10] |
| 12/02/2004 | 1362 cubic metres per second. Small amount into Apple Barrel. Lack of photos. At night and short duration [5/10] |
| 2005* | 857 cubic metres per second |
| 18/01/2006* | 762 cubic metres per second. Small amount into Apple Barrel. |
| 07/10/2008 (Phil Wallace)* | 982 cubic metres per second. New bridge was in place |
| 2009 (Phil Wallace)* | Too small. Didn't leave channel |

*These floods were too small to use to model.

Figure 20: Floods of note – to identify candidates from which to develop a base model.

As can be seen from the table above, the 1980 flood was also eminent and therefore of interest as one of the largest recent floods on record. Although there is some useful aerial photography, the double peak profile and landslide damming the Waiōhine in the gorge was atypical, and it was therefore set aside in favour of the more typical 1990 flood event.

The earliest full cross section set dates from 1984. Given that there were major floods in 1982 and 1980, it's questionable whether the 1984 data set could represent the river cross sections at the peak of the 1980 flood, based on experience calibrating the 1990 event. Also, there were no flood marks to check against (showing the wet extent of the flood at peak), only flood photos.

Finally, the 2004 event was chosen to be used to cross check and calibrate the new flood model. There were two floods in Feb 2004 – our candidate is the first one on 12th Feb. Surveys were done in 1999, and May 2004 after the floods. These were validated against the May 2004 survey.

Assumption Used for Modelling: – agricultural land is to be grazed grass (in modelling we must choose the degree of roughness for land surface and of course for farmland, use may change).



Figure 21: Landslip in gorge during 1982 flood – GWRC.

5.3 Initial findings from review of the 1990 and 2004 floods (used to verify 1990)

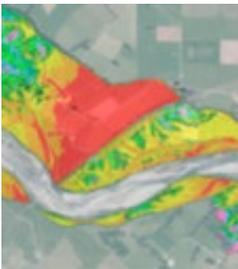


Figure 22: Detail from base scenario – landriversea Consulting.

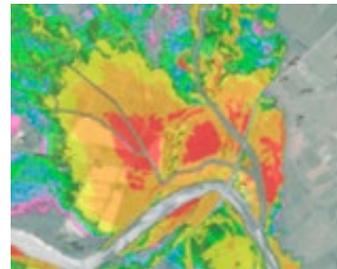


Figure 23: Detail of Mangatāre convergence.

- 1 The 2m deep “red” area behind the north side of the railway initially looked too high. After further investigation it was found this was entirely reasonable, it could be put down to the lack of spill from the channel due to the fast/sharp rise and fall of the river during this flood.
- 2 The modelling of the State Highway 2 Bridge did not appear to show the correct amount of overflow from that flood event (remembering this flood occurred when the old State Highway Bridge was still in place).
- 3 The flooding on the Mangatāre looked incorrect but we do not yet have Mangatāre data with which we might understand the real impact of this. Local experience suggests this might be more like 1m. It was noted that any findings of the yet to be completed Catchment Plan Incorporating Floodplain Management Plan for the Mangatāre should be used to verify this aspect of the Waiōhine model and any substantial variation can be used to [Trigger](#) a review of this plan.
- 4 Note that: Once the Catchment Planning project for the Mangatāre is completed, it is proposed that the boundary between the rivers be aligned with the [Freshwater Management Unit](#) boundaries, i.e. at the actual confluence of the Mangatāre and Waiōhine rivers.
- 5 The model showed riverbed widening effects – this is to be expected.
- 6 The 1990 flood calibration results do not reflect the exact observations on the ground e.g. flood levels on North Street.

5.4 Waiōhine FMP – flood modelling and mapping audit

Once the 1990 flood had been identified as by far the best on which to base the development of a base flood model – and that model had been developed and verified against the 2004 flood model and a variety of other [cross referenceable sources of data](#), we were able to develop a high degree of confidence in the base model.

We then asked Beca Ltd to return to the project to conduct an independent peer review of the model to help verify it and to ensure that several key shortcomings identified in the preceding draft Waiōhine Floodplain Management Plan had been successfully addressed. [This report can be found here](#). It was completed and presented to the Project Team and community on 14th February 2018. It was subsequently also reviewed by the [Ian Heslop](#) led, additional Independent Peer Review process.

This then allowed us to create a wide variety of other models to study floods of various intensities, durations, profiles and a wide range of other factors, such as climate change, channel blockages or gravel build up. In fact, the base model has provided the foundation for all subsequent floodplain management work in this River Plan.

Key Findings:

- **We recommended** that Ages/Dates attributed to photos 1990: 1980 needed correcting.
- **We recommended** newer modelling software with the ability to use variable mesh sizes allowed more detailed modelling.
- The model is as accurate as it can be today: there is a high degree of confidence in its accuracy. This has been independently peer reviewed.
- The area of the lower Mangatāreere tributary perhaps shows more overflow than occurred – but this could be attributable to a higher bed as cross sections for this stretch of river are not available. This has not impacted the plan or stopbank design.
- Bed levels have a very high impact on flood levels, especially in the stretch between the end of Kuratawhiti Street and Fullers Bend ([XS-20](#)) and therefore we note that river maintenance is key.
- Bed level was found to be more significant in comparison to increased Mannings 'n' (riverbed roughness) and peak river flow volumes for the 1990 flood event calibration.
- Once the Catchment Planning project for the Mangatāreere is completed, **it is recommended** that the boundary between the rivers be aligned with the [Freshwater Management Unit](#) boundaries, i.e. at the actual confluence of the Mangatāreere and Waiōhine rivers.



6

Understanding the Waiōhine Hydrology

6.1 Background

The vast majority of the length of the Waiōhine from its source to its confluence with the Ruamahanga, is uncomplicated and can be by-and-large, left to behave naturally. From the Gooseneck, where the river emerges from its gorge down to the State Highway 2 bridge, perhaps less than 5% of the river's length, is complicated and therefore the focus of this plan. We have identified seven [Critical Areas](#) of river and bank along this length that need particular attention.

Climate change and weather patterns combine with its hydrology to make the Waiōhine a challenge to manage well. The combined impact of these three factors on gravel and bed levels is a major concern for the community. Higher bed levels increase the risk of flooding, erosion and course change.

Gravel. When we use the term "gravel" we mean stones of every size carried down the river. From boulders to fine sand (sometimes called "fines").

Issues were identified within the previous draft Floodplain Management Plan. Consequently, Matt Gardner of LandRiverSea Consulting was contracted to this project team, as a hydraulic modelling specialist, and extensive use was made of his skills and services. In addition, the Project Team conducted workshops with Mike Gordon (GWRC), commissioned a detailed study by [Tonkin and Taylor](#) Consulting and also sought expert opinions from others, such as Professor Ian Fuller of Massey University. Independent Peer reviews of this work were conducted by [Beca](#) and [Ian Heslop](#).

Establishing which floods of note from past events could be best relied upon, from which to develop and prove a trustworthy hydraulic model, was of vital importance. From there an understanding of the characteristic hydrology could be pieced together and gaps in data, as well as areas where more detailed surveys, independent expert advice and models were needed, assembled. These have been used to explore options and outcomes for flood defence, river management and maintenance, for the Waiōhine. These were reviewed by the community as well as independently peer reviewed. A considerable number of sources of data, from living memory to a study of the [dendrochronology of Kahikatea trees in the Waiōhine floodplain](#) carried out by Rob Kennedy, were compared and found to be remarkably consistent. Note that they have also helped in the development of the vision, conservation and restoration strategies in this river plan.

The outcome is a set of hydrological modelling data that the Project Team now has a high level of confidence in, together with a range of hydrology maps used throughout this plan.

6.2 Factors affecting Waiōhine hydrology

6.2.1 Climate cycles mean floods occur for 20-30 year periods that are 20-30 years apart

[Tonkin & Taylor](#) identify a number of key influences that shape the Waiōhine: *"The character and behaviour of the Waiōhine River is influenced by and responding to a range of climatic cycles including those that occur over long timeframes (stadials/glacial maximums), those that operate over multi-decades (the [Interdecadal Pacific Oscillation](#) – IPO) and those that happen more frequently (El Niño and La Niña). Further to this, the Waiōhine River has shown a significant change in behaviour following a large-scale episodic event (1855 Wairarapa fault rupture)."*

Some of these, such as the Interdecadal Pacific Oscillation appear to be responsible for the periods of large flooding and then little or no flooding (as at present) on the Waiōhine, this in turn influences gravel and bed levels in the river.

The report goes on to say: “Increases in temperatures and decreases in base flows under two of three climate scenarios may lead to vegetation changes in the upper catchment. This **may lead to increases in sediment supply** to the valley floor under less intense rainfall events than current conditions. These predicted sediment stores will possibly be redistributed under less frequent but larger flood events in the future... The IPO is a large-scale, long-period oscillation that affects climate variability over the Pacific Basin, **with phases lasting around 20 to 30 years** (NIWA 2016). Positive IPO phases are generally associated with an increase in anticyclones resulting in drier than normal conditions, with some catchments showing lower than average base flow conditions (e.g. Manawatu River) (NIWA 2016). However, the Waiōhine River shows an increase in large magnitude flood events during positive phases of the IPO (PDP 2014, and chart below). Conversely, negative IPO phases are generally associated with more north easterlies over northern regions of New Zealand (NIWA 2016; MfE 2008) which is likely to increase annual precipitation in the Tararua Ranges, possibly resulting in higher base flows in the Waiōhine River. **There was a switch to a negative IPO phase in 1999** (NIWA 2016, PDP 2014; MfE 2008).”

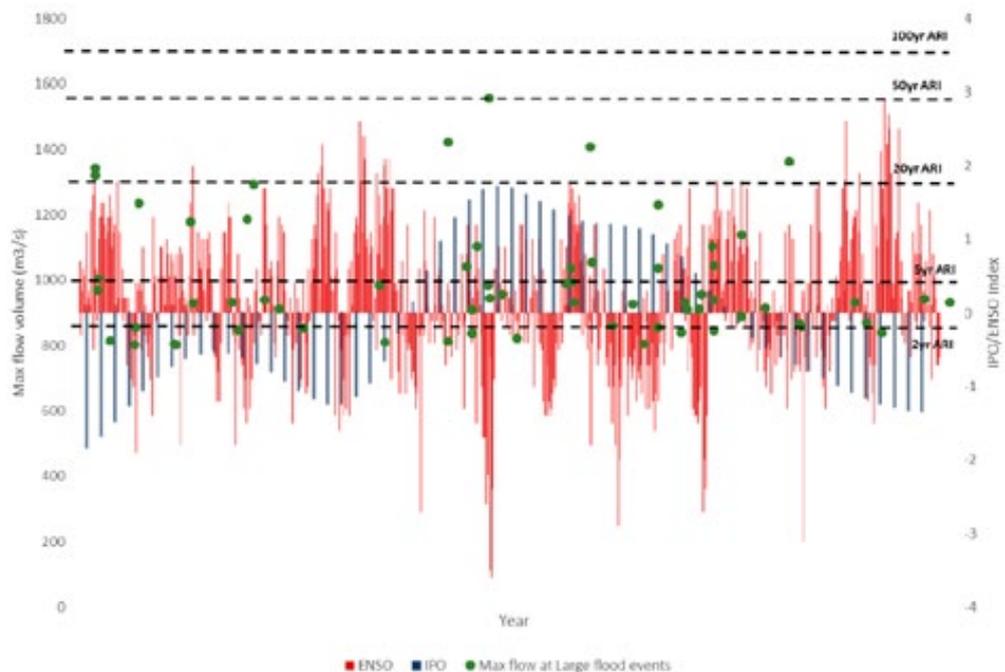


Figure 24: Maximum flood peaks for the 50 largest recorded floods in the Waiōhine River Catchment are shown as green dots, El Nino Southern Oscillation (ENSO) cycles are shown in red, IPO cycles are in blue. Tonkin and Taylor from Creative Commons.

6.2.2 Stream characteristics – gravel trapping and build up, spreading in flood

Note on chart below (Tonkin and Taylor): “Reach 2 (this is between the Goose Neck and State Highway 2 Bridge) is an unconfined wandering gravel-bed river. Wandering gravel-bed rivers are a transitional form of river form between a single thread meandering channel, and a braided river. This reach has previously been described as a braided river, and evidence of paleo-channels on some of the terrace surfaces suggest it would have been a braided river at some point in history. This reach also acts as a large instream sediment store, effectively trapping the larger gravels in this reach (Brierley et al 2011).”

| | Stream location | Reach length | Valley setting | Thalweg | Valley slope (%) | Valley width | Dominant sediment process | Sediment type |
|---------|----------------------------|--------------|-----------------|-----------------------------------|------------------|--------------|---------------------------|---|
| Reach 1 | The gorge to the gooseneck | 5.5km | Partly confined | 1 channel well defined | 0.45 | 236m | Transport reach | Course (boulder/ gravel) |
| Reach 2 | The gooseneck to SH2 | 8.7km | Unconfined | 1 channel regularly shifting | 0.43 | 1,352m | Deposition reach | Course (cobble/ gravel fining downstream) |
| Reach 3 | SH2 to the confluence | 6.15 | Unconfined | 1 channel well defined meandering | 0.19 | >2,000m | Deposition reach | Fine (sands and small gravels) |

Figure 25: Identified stream characterisation reaches of the Waiōhine River and their characteristic attributes. Tonkin and Taylor 2018.

Tonkin and Taylor further identify: “...localised bank retreat in some areas of up to 110 m. In a wandering gravel bed river, with limited change in bed level despite gravel extraction, lateral adjustment is expected. As the entire true right and true left floodplain comprises alluvial material, lateral adjustment of the channel is possible across the whole floodplain and is not limited to the current managed active channel extents. Engagement of the floodplain during out of bank events may limit the extent and severity of lateral erosion, by reducing flood peak velocities.” i.e. allowing floods to spread out will reduce the overall damage from erosion.

6.2.3 How big is a one-in-one-hundred year flood?

The Project team considered the important subject of what a 1:100-year (1% chance of occurring in any year) flood volume of water really should be, given the inaccuracy of measuring this in a major flood. Three formulae were considered:

- 1 Based on data for major floods between 1955 and 2008, we arrived at a volume of 1738 cubic metres per second (M³ per second) within plus or minus 110 M³ per second,
- 2 Based on data between 1955 and 2016, we arrived at a volume of 1700 M³/s within plus or minus 200 M³ per second,
- 3 Based on data between 1979 and 2016, we arrived at a volume of 1730 M³/s within plus or minus 230 M³per second.

The Waiōhine sometimes has double peak floods, such as the 1980 flood. The nature of the catchment with its two separated major tributaries can cause a double peak if the wind direction carries rain over first one, then the other.

The decision was therefore made to model using 1700 m³/ per second ± 200 m³ per second, using two temporal patterns, i.e. double and single peak hydrographs. Note that the largest estimated flood volume known in the Waiōhine was around 1558 M³/s – a double-peak flood in 1982. 1700 m³/s plus 200³/s plus up to 16% extra for climate change plus flood sensitivity where applicable may help put this in context.

What does “one-in-one-hundred-year” mean? A one-in-one-hundred-year flood is a flood event that has a one in one hundred chance (1%) of being equalled or exceeded in any one year. For more information [click here](#).

Findings:

- Flood hydrology, models and maps were peer-reviewed by Ian Heslop who found that “the adopted Waiōhine and Mangatāre River 100 and 20 year return period design and flow estimates are reasonable and appropriate.”
- **We recommend** that any measurements or observations of the hydrology of the Waiōhine must be viewed within the context of the full cycle of successive extended periods of major floods and periods of little or no flooding to account for the effect of the Interdecadal Pacific Oscillation.
- The decision was made to model using 1700 m³ per second ± 200 m³ per second.

6.3 How do climate and hydrology affect bed level and gravel management?

[Tonkin & Taylor](#) note: “The predicted river response to the 1855 fault rupture (earthquake) would have increased sediment supply and transport and would have been additional to any sediment contributed to the catchment through landslides generated by the rupture earthquake. It is possible that the Waiōhine River is still trying to achieve bed grade equilibrium from this event through incremental incision of the bed, especially in upstream reaches of the river. Any bedrock within the channel (below the gravel bed) will limit the depth of incision.”

Community history also shows that Waiōhine riverbed levels were lower in the 1930s than they are today. In addition to the 1855 quake, the 1942 Earthquake also caused bed levels to rise. This event led to the present Stopbanks being built in 1951 by Feast Contractors and paid for by the Ministry of Works, before the Catchment Board took over in 1953. Events suggest high beaches have caused past bank and berm erosion. The best-known estimate of frequency of the Wairarapa fault line earthquakes is an estimated 1:1200 years.

The Ministry of Works also built a weir above the previous State Highway 2 Bridge in 1945. The aim of this weir was to clear the gravel under the Bridge, which, at that time, only had half a metre of clearance. However, within two months the weir was destroyed by a flood. With so much flooding of State Highway 2 and the high bed levels, the present stopbanks were built in 1951.

These events and records suggest that the natural bed level may be lower than present bed levels and perhaps may indeed be lower than they were in the 1930s.

In contrast to the records of issues caused by high bed levels, there is no record of lower bed levels being a problem.

In April 2019 GWRC Flood Protection produced a document suggesting “significant” lowering of the entire riverbed (degradation) during the recent Interdecadal Pacific Oscillation (IPO) phase – approximately the last thirty years. This depended on a series of very widely spaced, cross section surveys taken at five year intervals and specifically excluded all other sources of existing available data, context and independent subject matter expert reports and observations (see for example Tonkin and Taylor report, commissioned by GWRC themselves, cited later in this section).

Once it became known that this document and its companions existed – in mid-2020, in keeping with the Terms of Reference, an attempt was made to validate its content, recommendations and data in these documents. The analysis of these documents “Gravel subproject for the Waiōhine River Plan – Documentation and Tolerance Analysis – Discovered Documents Unpacked and Categorised.” At Appendix L. For a long list of reasons covered in this analysis, the data, conclusions

and recommendations in the analysed documents, with some exceptions, have been found to be extremely unreliable. Fortunately GWRC have advised that these documents have been withdrawn from use and are not being relied upon. Unfortunately, there is evidence that they were, unbeknownst to the community, relied upon heavily in the management of the river for a period of around two years prior to 2021 and may still in one way or another, be misinforming operational decisions in the river as at January 2021.

Therefore it has been agreed with GWRC executive that these reports and their contents are set aside and will not be relied on. They are therefore not considered fit for purpose and are mentioned here solely for purposes of historical completeness and to learn lessons from this and apply these to the recommendations relating to the River Plan and its Living Plan provisions, including how any consent should reflect the intent of the Waihone River Plan.

Unfortunately it appears that, as the unreliable information was depended upon for maintaining the river, this will create additional burdens of cost and work to put right over time.

[Tonkin & Taylor](#): *“The Waiōhine River immediately upstream of Greytown is thought to be showing a degrading trend. Degradation (lowering) of the bed has been specifically noted in the gorge, where the flow gauge was left perched in 1954. Previous research suggests that the Waiōhine River may have cyclical periods of aggradation and degradation depending on several climatic factors (PDP 2014; NIWA 2016).”* See [Climate Cycles Mean Floods Occur For 20-30 Year Periods that are 20-30 Years Apart](#) above.

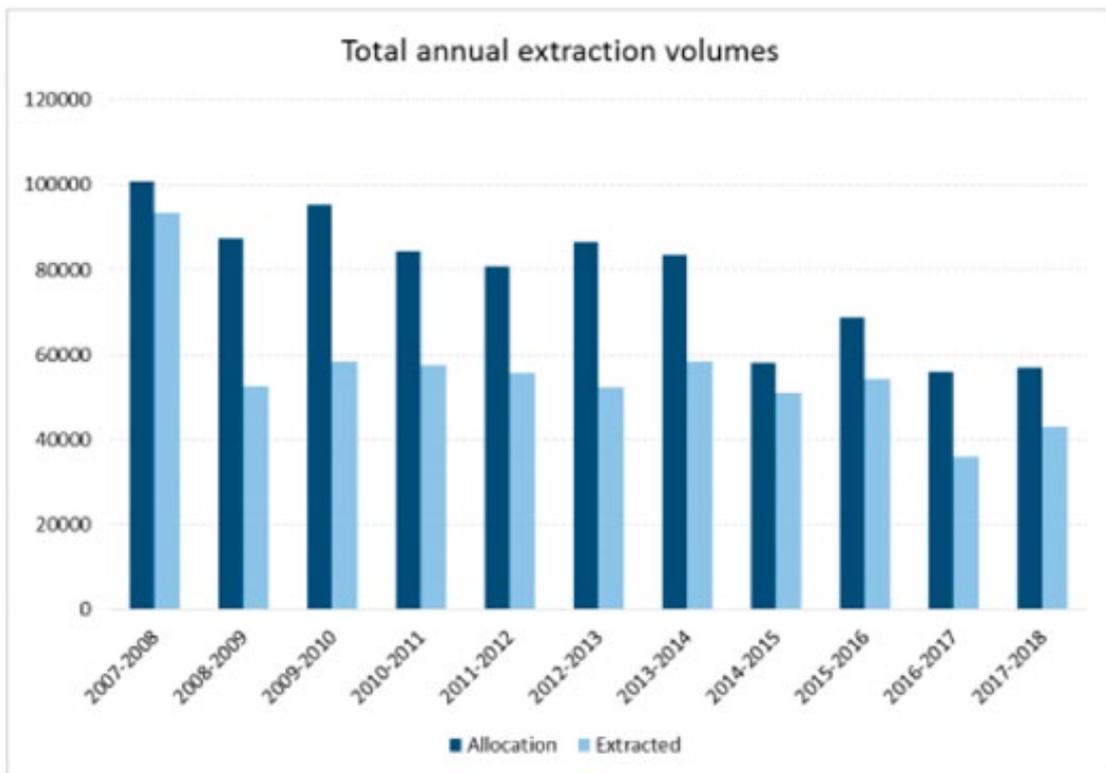


Figure 26: Gravel extraction Analysis Tonkin and Taylor from GWRC.

When major flooding occurs, the river tends to flood many times over a period of around twenty or thirty years (influenced by the [IPO](#) climate effect), with considerable build-up of gravel brought down from the gorge ([XS 43](#) and above) and the stretch of the river reaching far back into the Tararua hills upstream – [see figure 33 for a photograph of this](#). The last major flood was in 1990, with a smaller flood in 2004 that saw a “trickle” enter the Apple Barrel Floodway. It is therefore over 29 years since a flood of a scale likely to bring substantial amounts of gravel down from the gorge has occurred.

Detailed records of bed levels and gravel extraction have only been kept during the current period of limited or no significant flooding. The large distances between survey points and long times between surveys and massive re-engineering of the river shape, make this data far less useful than, for example, the techniques used on Western Rivers of Kapiti and Horowhenua. It is no surprise therefore that relying on just that limited data might imply a gradual decline in bed levels. However, history, the experience of past officers responsible for flood protection and records show that this will be followed soon, by a similar length period during which major flooding is more likely. Recent more accurate surveys support this.

Tonkin and Taylor: “While data provided to T+T shows a minor degradation response (between the Rail Bridge ([XS 37](#)) and State Highway 2 Bridge) in Reach 2 of the Waiōhine River since 1986, assessment of the wider landscape supports a slow-long term incision trend as secondary sediment stores in the upper catchment associated with the end of the last stadial are slowly exhausted. Annual gravel extraction of between 35,000 and 60,000 m³, does not appear to be having a detrimental impact on bed levels in Reach 3 with only minor incision observed at 5 of the 17 cross section locations downstream of SH2 bridge ([XS 17](#)), all of which are located on a straight section that has recently lost a meander. This suggests that gravel extraction at these volumes is not interrupting bed load transport, and acceptable bed level envelopes could be adapted for gravel management, instead of total allowable extraction volumes.”

We do not have enough measurements yet to understand both the “dry” and “wet” climate cycles affecting gravel build up or reduction in the Waiōhine. Clearly completing this set of measurements is critical to knowing where we could set high and low marks to arrive at a meaningful “bed level envelope”, to confidently manage gravel between. Such an “envelope” is desirable and will be important to long-term management, erosion control and flood prevention.

As noted in the [Independent Peer Review by Ian Heslop](#), “It would be ideal if the design bed level question could be clarified... It is understood that the river has a stable to degrade trend, so gravel extraction volumes and locations need to be carefully managed. A design bed envelope will greatly assist this.”

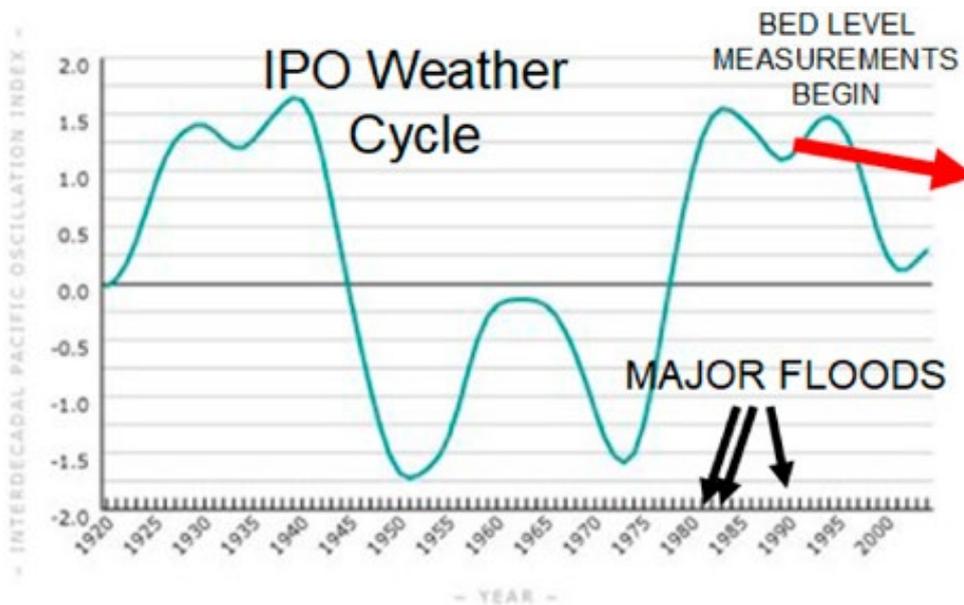


Figure 27: Major floods and start of bed level measurements shown against stages of IPO weather cycle.

As also noted in “Independent Gravel Management Review – Wairarapa Regional Gravel Status” of June 2020 by Laddie Kuta of E2 Environmental Consulting Engineers: “further work to understand an “optimum” bed level that is aligned with flood protection goals for each river is required”.

Findings:

- Stretches 3 and 4 (from above Kuratawhiti to the confluence with the Ruamahanga) are prone to aggradation (depositing) gravel (stones).
- During the current phase of the IPO (Interdecadal Pacific Oscillation) cycle, the riverbed tends to deposit far less gravel in these stretches.
- Nevertheless, there appears to be enough gravel deposited in these stretches to recommend a substantial extraction regime, even during this quieter phase of the IPO cycle. Indeed, in the most recent year (2019) more than 60,000 cubic metres has been extracted from below the SH2 bridge to control aggradation).
- This can be mainly constrained to [Critical Areas](#) where important assets (e.g. town water supply) need to be protected and channel alignment maintained.
- During the coming IPO cycle the riverbed will be likely to aggrade (deposit a lot more gravel), this has not been measured but is the very thoroughly observed and understood experience of those responsible for managing the river, during the last such phase (prior to 1999).
- It is recommended that being able to set a reliable bed level envelope would be very useful in the future management of the river, particularly as regards gravel extraction and flood prevention.
- Note that we do not yet have sufficient data to usefully indicate upper or lower limits for a bed level envelope. Aerial bed level surveying techniques are likely to make measurement possible.

In the absence of a reliable bed level envelope, we have developed a flexible but conservative rules-based approach that meets the needs of the current regulatory environment. This recommend that this be applied within the context and intent of this plan using the “stitch in time saves nine” principle for each of the seven [Critical Areas](#) of the river could be impacted by gravel raising or constricting flow, or diverting the river to attack critical high banks, the loss of which could lead to disaster in a major flood event. We have also created a [Trigger](#) within the Living Plan to implement a bed level envelope, as soon as it is agreed that a reliable one can be created from measurements.

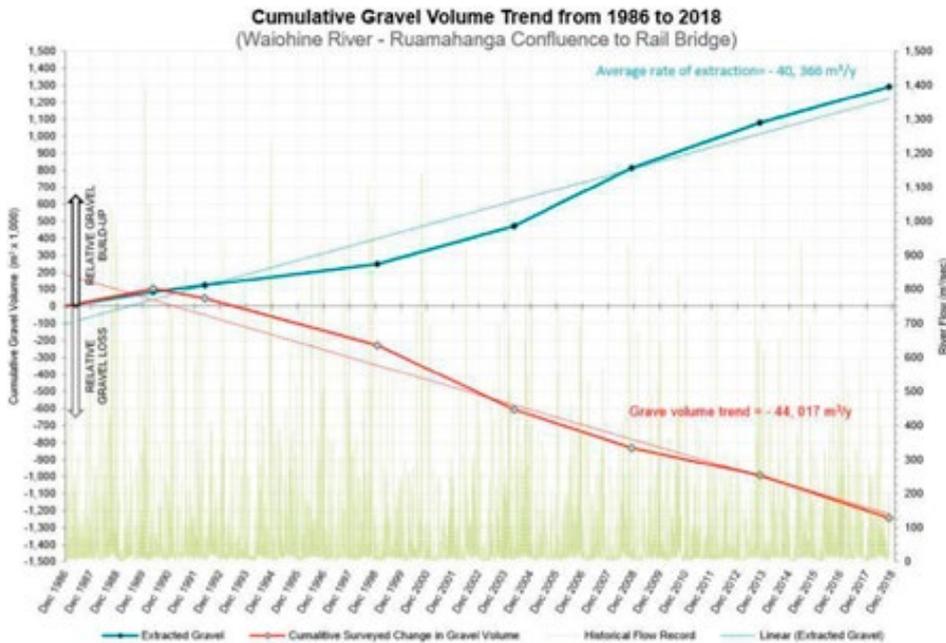


Figure 28: GWRC Study of measured bed levels and gravel extraction for the period after a cycle of major flooding occurred.

6.3.1 Qualifying notes to lend context to the diagram above

- 1 A more accurate and recent survey of the reach of the river adjacent to Kuratawhiti Street found the trends in the above diagram to be incorrect and that the river is in fact aggrading, this may well be true of other reaches of the river as well.
- 2 In 1986, when bed levels began to be measured the river was not in ideal condition, as a result of the following factors:
 - a River scheme funding deficits had run-down maintenance and led to several maintenance crises,
 - b The river had experienced several significant major floods, especially 1980 and then 1982 which involved the bursting and carrying away of large amounts of dammed gravels, which raised (aggraded) the riverbed.

The April 2019 “Gravel Management Review and Recommendations – Waiōhine River” shows a total deficit of 1.2 million cubic metres of gravel and 1.3 million cubic metres of extracted gravel. Once this and accompanying documents were revealed and able to be evaluated, the only conclusion that could be drawn was that they do not provide any reliable evidence of either degradation or aggradation and that the methods employed and data are insufficient, in isolation, to draw a conclusion about where a bed envelope or gravel extraction limit could be set (See Appendix L).

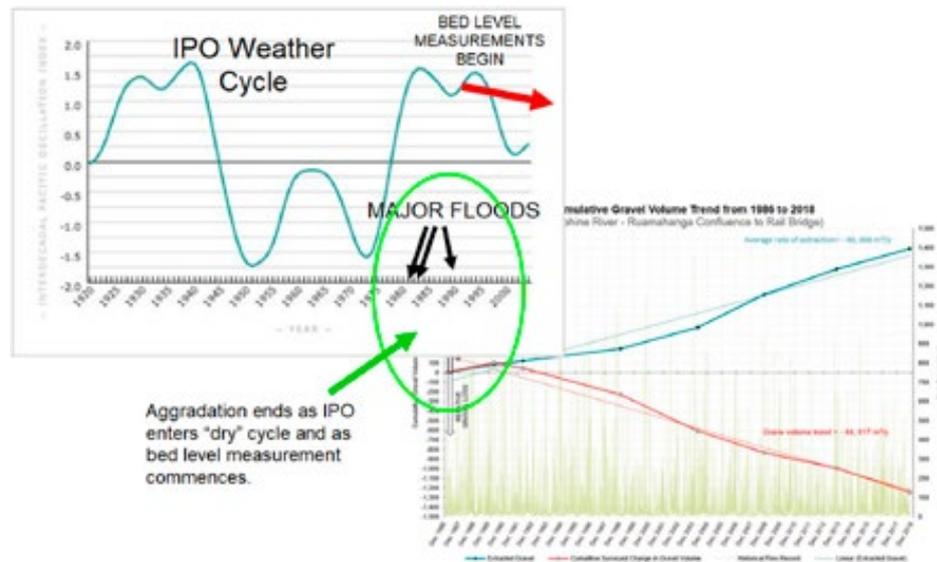


Figure 29: IPO “Dry” cycle begins as bed degradation and measurement begin.

In effect the years of inconclusive bed level measurement since 1990 have helped us learn how much we do not know. If we were, for instance, measuring a sine wave, it would give us an idea of less than one half of it. Because we have not experienced a change of IPO phase, we do not yet know where the high and low points of a bed level envelope should be. Continuing measurement through the change in IPO phase and through periods of major floods, that are likely to accompany that, will give us the other half of the sine wave, so to speak, as well as a reasonable idea of where the top and bottom of the wave occurs. As we take into account other factors, such as gravel increases following slips and seismic events, as well as each of these changes between phases of the IPO cycle, we will be able to successively set a lower and an upper bed level envelope limit for each stretch of the river. With each subsequent change of IPO cycle phase, we will be able to tweak and improve on the bed level envelope to consider the effects of ENSO, climate change etc.

Findings:

- Current techniques used for measuring bed levels and gravel are inaccurate and unreliable.
- We do not know whether each section of the river is in aggrade or degrade with enough accuracy to act on the faulty data we do have.
- **We recommend** a start needs to be made using newer techniques for bed level recording and past attempts to measure must be seen in the light of the limitations of the techniques and practices identified in the [“Gravel Sub Project for the Waiōhine River Plan – Documentation and Tolerance Analysis – Discovered Documents Unpacked and categorised.” At Appendix L.](#)
- The nature of the Waiōhine River emphasizes the importance of care in drawing conclusions from poor data and contextual information as the unintended consequences beginning to be evidenced in the deterioration of the river and natural flood defences (as at early 2021) bear out. See modelled flood scenario below – highlighting the impact of gravel restricting river flow.

6.3.2 How serious a threat could gravel build up be?

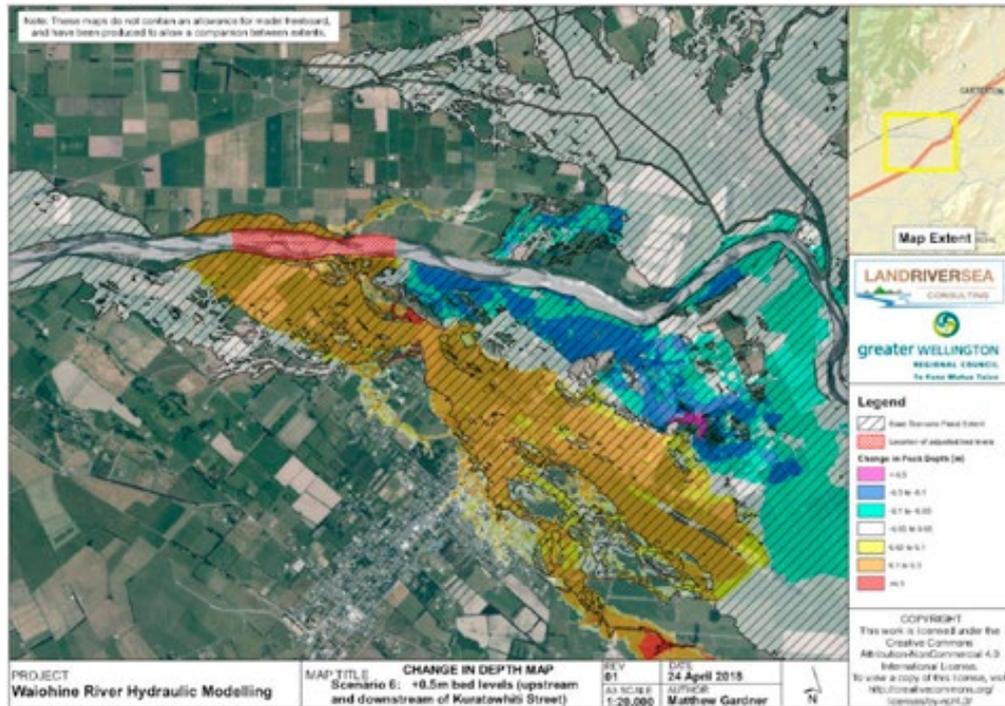


Figure 30: How the build-up of gravel beaches creates flood risk – yellow colour shows additional flooding.

Studies and computer modelling show that the reach between SH2 Bridge (XS 17) and the Rail Bridge (XS 37), particularly around and above the end of Wood Street and Kuratawhiti Street, is the most dynamic and the most critical for erosion control and flood protection. This stretch may be important as a “transport reach” i.e. transporting substantial amounts of gravel down the steep river and helping to prevent problematic build-up of gravel. The elevated risk of river course change (avulsion) here is noted by [Tonkin and Taylor](#): “The end of Wood Street was identified as being an avulsion risk area for climate change scenarios RCP6.0 and RCP8.5, with the risk increasing if lateral bank erosion immediately upstream is initiated.”

Indeed, as will be seen later in this plan: in the [analysis of flood sensitivity scenarios](#) that could make flooding worse, the risk of gravel build-up had by far the greatest impact. This reflected the experience of the community and those with past responsibility for flood prevention and river management in the Waiōhine valley and wider Wairarapa.

The risk posed by insufficient gravel management, in the event of gravel aggradation, caused by one or more successive major floods, expected to occur in the next Interdecadal Pacific Oscillation (IPO) phase, has had a substantial impact on the size and extent of stopbanking needed. If we could be sure gravel would continue to be well managed, or that the IPO would not change phase and that we will never lose adequate gravel extraction as a management tool, or that there would never be two major flood events in very quick succession, then a major savings could be made, as the [Western \(Kuratawhiti Street Stopbank\)](#) may not be required to be so substantial.

6.4 Critical areas

6.4.1 Overview

There are a number of Critical Areas at points along the managed stretch of the Waiōhine. Collectively they comprise a small percentage of the overall river length.

The hydrology, flood modelling of the river and resulting flood maps were created at a single point in time for a dynamic, mobile river. The proposed flood defences rely on channel and bank being maintained in the condition and alignment they were in at the time of modelling and mapping. This was emphasized as vitally important in the [Independent Peer Review](#) of the recommended flood protection strategy. Given the desire for a balance between a naturalistic river and effective flood defence, we propose restricting the concept of maintaining channels and banks as per the modelling, to a set of Critical Areas. This leaves the vast majority of the river free to adopt a more naturalistic shape. However, even in the Critical Areas, we have developed a series of measures that allow for more interplanting, back-channels, pools, riffles and runs to continually enhance habitat and ecosystems for flora and fauna.

Critical Areas shown in the workshop map below, where the practice of early intervention or: "A stitch in time, saves nine" is required in order to prevent serious later consequences in the form of damage to critical assets, such as dwellings, towns, water supplies, state highway, areas of key ecological importance or sacred urupa and surrounds. The cost of putting these right, after late or otherwise less effective gravel management intervention, can be excessive. It could be many times higher than effective early work and use of the range of measures in the river management "tool box", including gravel extraction. Therefore, where in doubt, the overarching principle of "a stitch in time, saves nine" should be applied.



Figure 31: Identification of critical areas as at 2021 – Project Team.

6.4.2 Definition of Critical Area

Where the consequence of doing nothing risks things that are important to the community, examples of such risks are:

- 1 Risk to life.
- 2 Critical assets are placed at possible future risk.
- 3 A risk to essential services.
- 4 A Negative cultural impact.
- 5 A future risk of change of course of the river.
- 6 A negative environmental impact, now or in the future.

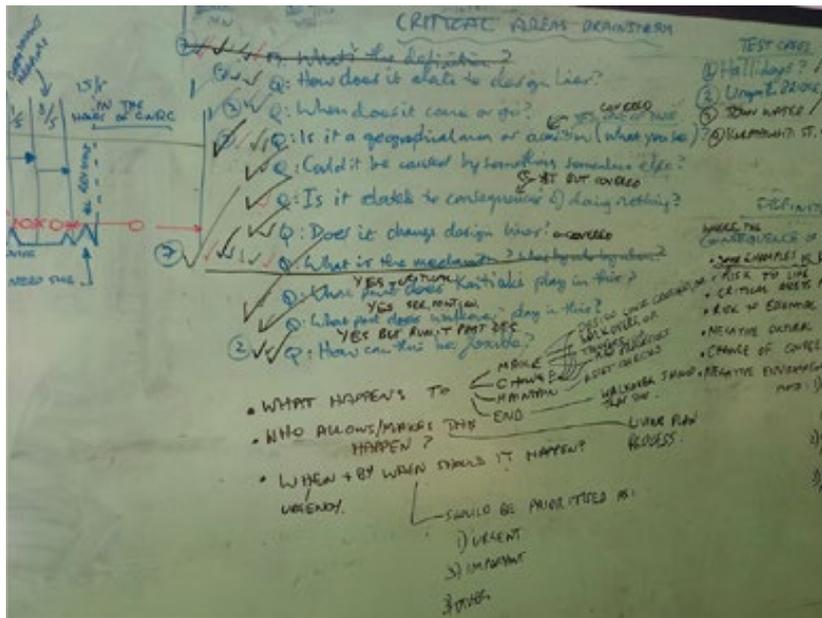


Figure 32: Analysing Critical Areas Lifecycle – Project Team.

Notes to definition:

- 1 We will comply with MPSFM, NRP and Te Mana O Te Wai in spirit, wherever practicable.
- 2 The cause of the risk needs to be identified, not just an attempt to address symptoms.
- 3 Kaitiakitanga should be used to monitor and report to stakeholders issues and actions agreed to be taken. We recommend this be adequately budgeted for.

In developing the definition a number of test cases were worked through and the risks involved were identified. Test Cases of Critical Areas:

- 1 Ecological and river bank damage at the place known as "Hallidays".
- 2 The Urupa and SH2 Bridge approach.
- 3 Near the bore fields for the Greytown and Featherston town water supplies.
- 4 The stretch of river alongside the end of Kuratawhiti Street.

In designing the definition of critical area, the following test questions were answered

- 1 Q: What's the definition? A: See above.
- 2 Q: How does it relate to design lines? A: It does not rely on design lines, they may help inform actions.
- 3 Q: When does a Critical Area come or go? A: See below.
- 4 Q: Is it a geographical area or condition of the river? A: Either or both.
- 5 Q: Could it be caused by something somewhere else? A: Yes it could be.
- 6 Q: Is it related to the consequences of doing nothing? A: Yes it could be.
- 7 Q: Does it change design lines? A: See 2. above.
- 8 Q: What is the mechanism? The "What is done by Who, by When"? A: See below.
- 9 Q: What part does Kaitiakitanga play in this? A: It is important – see Notes above.
- 10 Q: What part do "walkovers" play in this? A: They are important but should engage local GWRC staff.
- 11 Q: How can it be flexible? A: See below.

6.4.3 How it works

- 1 What happens to the lifecycle of a Critical Area: i.e. Make, Change, Maintain or End a Critical Area?
 - a Make – A design line is crossed by the river or a changed state is identified on a walkover, or a trigger event occurs there, or plan processes capture the need.
 - b Change – as for Make above.
 - c Maintain – Any check or review of "assets" – important structures at or near the river, e.g. the river bank at the end of Kuratawhiti Street
 - d End the designation of a Critical Asset – This should be spotted at a "walkover" to inspect the river.
- 2 Who allows/makes one of these events happen?
 - a The Living Plan Process governs this.
- 3 When and by when should it happen?
 - a It should happen as a matter of urgency, the Waiōhine changes very quickly and a great deal of damage can be done in a short space of time.
 - b Each time a Critical Area is reviewed for any reason e.g. a "walkover", it should be categorised as either:
 - i Urgent – do something right away.
 - ii Important – agree by when something should be done, and keep a watching brief in the meantime.
 - iii Other – keep a watching brief.

6.4.4 Related Trigger events

We have a [Trigger](#) in the Living Plan that is affected by issues arising from significant changes in gravel levels (aggradation or degradation).

We have a [Trigger](#) in the Living Plan that if something occurs that makes it obvious that an aspect of these techniques is failing to protect the banks and channels within the Critical Areas, then these techniques may need tuning.

6.5 Survey frequency and technology

Survey data is taken once every five years and at distant intervals on the river. Again, more frequent, ideally every two years, as well as more detailed surveying using new technology, would be helpful. The cost of this would be more than justified given the nature of the river and the potential cost of bank erosion or flood. The annual maintenance budget for the river is approximately \$300,000. The cost of second and subsequent aerial surveys would be in the region of \$10,000 and by supporting better informed decisions would likely be a sound investment.

Note that GWRC has invested in drone technology which would help to begin to build up a more detailed picture over time. Drone [LIDAR](#) is needed to be used for far more regular and detailed surveying between the Rail Bridge ([XS 37](#)) and SH2 Bridge ([XS 17](#)).

6.6 Proposed: rules for gravel extraction

As noted above, until sufficient data is collected to record gravel and bed levels through both “wet” and “dry” phases of the [IPO](#), an uncomplicated but conservative set of gravel extraction rules are needed, to ensure there is no unnecessary lowering of bed levels, and no unnecessary flood risk created.

To be able to develop a simple strategy for a complex problem, a set of Test Questions were developed, which are recommended as a simple but effective set of rules for gravel extraction, well within the current allocation. These are to be used within the context of the Living Plan Process in accordance with Appendices B and C. Any proposed gravel extraction should satisfy one or more of these:

6.6.1 Gravel extraction must pass these tests

Is it for flood protection or erosion control? And especially so where:

It will either protect assets or protect critical banks (or banks in Critical Areas)? or;

Is it in a Critical Area of the river i.e. known to be a flood or erosion sensitive reach, identified in this plan between SH2 bridge ([XS-17](#)) and the railway bridge ([Appendix J: Which Cross Section is Where](#))?

Note that: Gravel extraction should not detrimentally affect water quality ([MCI](#)) and a number of techniques to improve this [have been identified with the help of experts from Massey University](#) and “Ecological effects of flood management activities in Wairarapa Rivers” by aquanet Consulting Limited for GWRC.

Findings:

- Waiōhine hydrology is heavily affected by weather patterns, including climate change.
- There is a lot of concern within the community over related issues such as gravel build up and flood risk.
- A great deal of emphasis has been placed on understanding flood patterns and behaviours to get the best possible basis on which to model many future scenarios.
- There is a high level of confidence in the base model upon which the many scenarios and flood maps have been developed.
- If gravel build up should cause the river to change course (avulse) it may threaten urban Greytown or key assets such as the State Highway 2 Bridge, roads and dwellings. See Figure 30. This may not simply be a case of an increase in the overall bed level of the river but can be caused by a buildup of gravel beaches in a particular spot causing restriction of the river and damage to high banks that protect key assets, enabling later changes of river course during flood.

- It is not clear whether each stretch of the river is degrading or aggrading – as at the end of 2020 the most recent surveys indicate slight aggradation in the critical Kuratawhiti to SH2 stretch. There are many factors influencing gravel at any one point, including:
 - a Measurements largely being taken in an IPO “dry” cycle when gravel is not refreshed by large floods and
 - b Gravel extraction lowering (degrading) bed levels,
 - c A possible long-term trend since the 1855 earthquake, of the river very slowly lowering its bed level towards its natural state.
- Measurements taken prior to December 2020 have a number of issues affecting quality, accuracy and reliability of data, as well as lack of history and contextual information, without a full understating of these factors, they should not be relied upon to influence decision making.
- We do not have a complete set of measurements until there have been a series of further major floods in the coming IPO “wet” cycle or until a useful series of measurements over time have been taken in aerial surveying of the river bed .
- **It is recommended** that bed level measurements are regularly made on a continuing basis to provide the data that can be used in developing a long term strategy.
- **It is recommended** that until this is completed, we are not able to create a complete set of bed levels – (as recommended by Tonkin and Taylor and Ian Heslop) – between which we can manage gravel extraction with any confidence.
- Evidence of river management issues between mid 2019 and early 2021, during which time no gravel was extracted from the river above the SH2 bridge clearly indicates that the preceding regime of gravel extraction is necessary for the safe and ecologically positive maintenance of the river.

We therefore recommend continued collection of measurements towards developing a bed level envelope and in the meantime, a flexible but conservative, rules and River Plan based approach to extraction of gravel for necessary flood prevention and erosion control purposes.

We are concerned to sustain the viability of gravel extraction to ensure it can be used for flood prevention and erosion control when needed in future. Especially considering the increased size and power of flooding expected due to [climate change](#) (estimated to be an additional 16% volume of flood water by 2090).

We recommend that the current upper limit of extraction of 90,000 cubic metres is retained, as a contingency against sudden major successive floods creating severe aggradation (gravel build-up), from the next series of big flood events. Until there is certainty that a cycle of major floods has been recorded and the full picture is understood. Too much or too little gravel, could result in increased flood risk to assets such as the State Highway 2 Bridge, Urupa, stopbanks, roads and dwellings. There has been no evidence to date of issues caused by too little gravel but definite issues caused by gravel build up.

We recommend that the extraction test questions, and hierarchy identified above should be adhered to, to avoid unnecessary gravel removal but ensure flood protection, within the context and intent of the River Plan overall.

6.7 Dam breaks – how likely are they and what happens if we get one?

The history of earthquakes and their effects on the Waiōhine and similar rivers can be found in Section 3 of the [Tonkin and Taylor report](#).

In recent history, the flood of 1982 is included in the data for 100-year flood analysis. In 1982, despite large-scale landslides in the Waiōhine Gorge, no damage occurred. The combination of a 100-year flood & (erosion or quake) slip is a combination of frequency of two rare events and therefore is very rare. If due to a landslip a dam forms but doesn't breach, it may in fact serve to attenuate, rather than exacerbate, the flood peak.

As can be seen from the photograph above, large floods introduce a very large amount of gravel (stones) to the river, which is then carried down the gorge and into the stretch of river between the Rail Bridge ([XS 37](#)) and State Highway 2 Bridge ([XS 17](#)).

There are no special features of the Waiōhine River that indicate it is more prone to damming caused by slippages than other rivers. The risk and impact of damming of the river in its catchment due to slips, is so rare and has no history of causing additional damage that, in keeping with other flood plans, it is regarded as impractical to regard it as other than Force Majeure.

[Emergency Management](#) procedures will come into effect should a slip cause damming of the gorge that might result in sudden flooding. A slip forming that dams the river is to be a [Trigger](#) for the Living Plan provisions to come into effect.

Finding:

Damming and other effects of slips and earthquakes to be regarded as force majeure – it is extremely hard to prevent the effects of them.



Figure 33: Major landslide and dam break in 1982 flood – GWRC.

6.8 Gauging and rating

For a brief explanation of stream gauging, [see here](#).

It is known that the best gauging to date is unreliable at higher ratings and can only cope with less than an annual flood (therefore gauging is seen to not be very accurate or useful).

Therefore, **it is recommended** to investigate what investment is involved in installing better gauging systems. NOTE: that this would improve emergency management capability. Improving gauging and rating will eventually pay for itself through being able to optimise future works/costs.

Finding:

It is recommended to investigate what investment is involved in installing better gauging systems.

6.9 Mangatāre hydrology

The Hydrology of the Mangatāre is the subject of a separate study, which, when completed should be assessed for possible impact on the Waiōhine, including whether any aspect of the Waiōhine River Plan may need adjusting to take its findings into account. See [Living Plan Triggers](#).

6.10 1:20 Year (5% annual flood risk) flood map discussion

The Project Team has evaluated the impact of the road surface elevation (on State Highway 2) at the end of the Apple Barrel Floodway. We considered the impact on flood levels in the local area from changes in the road surface elevation, we did this with hydraulic modelling. It was found that an improvement (reduction) in these flood levels could be achieved by lowering the surface elevation of the road by 0.1m. We also discovered that lowering the road surface by 0.2m or more would have a negative effect by increasing flooding to local properties. In addition, any increase in the road surface elevation above the existing level would directly increase the flooding levels for local properties. We had an opportunity to discuss this with a representative of NZTA on Thursday 25 October 2018. In our conversation we outlined our discoveries and the fact that we would like the road surface decreased slightly (by 0.1m) in the future and that the road surface should not get higher than this as a result of any future NZTA works on State Highway 2. Greater Wellington Regional Council also sent a letter outlining this and requesting the permanent lowering of State Highway 2 at these locations by 0.1m as opportunity permits.

Finding:

NZTA Asked to consider lowering the SH2 crown by 100mm in selected places to minimise the flood effect. It is recommended to maintain the road crown at that level.

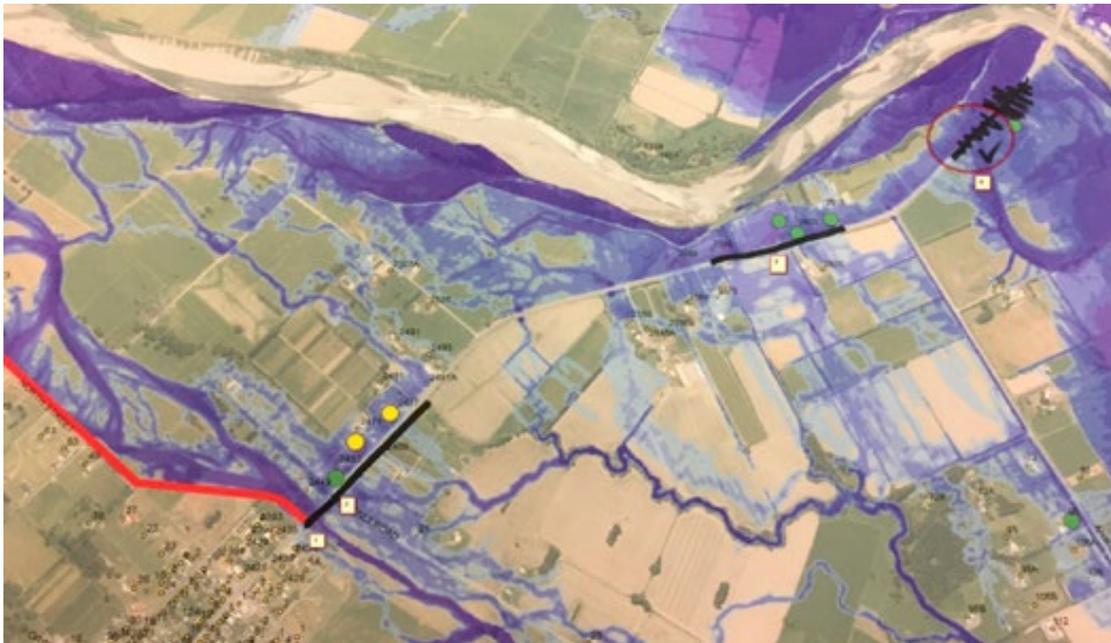


Figure 34: Flood Map – 1:20 Year Flood Risk Discussion – landriversea Consulting

6.11 Freeboard and flood sensitivity

What is a Flood Sensitive Area? The Flood Sensitive Area shows where, if exceptional things happen, above and beyond the modelled flood, the extra floodwater, might spread to.

For instance, the flood modelled for the Waiōhine River by the year 2090, is a one-in-one hundred-year flood (1% probability in any year), plus an extra 16% of water volume to represent climate change. In addition to this it is possible, but unlikely, that other factors could come into play and, however unlikely, might slightly extend the area affected by flood. Also, usually but not always, because these are typically, not major additional factors, the area and depth of extra flooding is relatively small. An example of an exception to this is the possible impact of gravel build-up (aggradation) in the stretch of river above the end of Kuratawhiti Street.

For instance, a flood sensitivity scenario might be:

- A one-in-one-hundred-year (with a chance of happening on average once every 100 years – i.e. a 1%) flood,
- PLUS 16% extra water volume for climate change,
- PLUS, a culvert being blocked by debris,
- EQUALS a slightly larger coloured area on the map (we've used pink colours to show what extra flooding might occur).

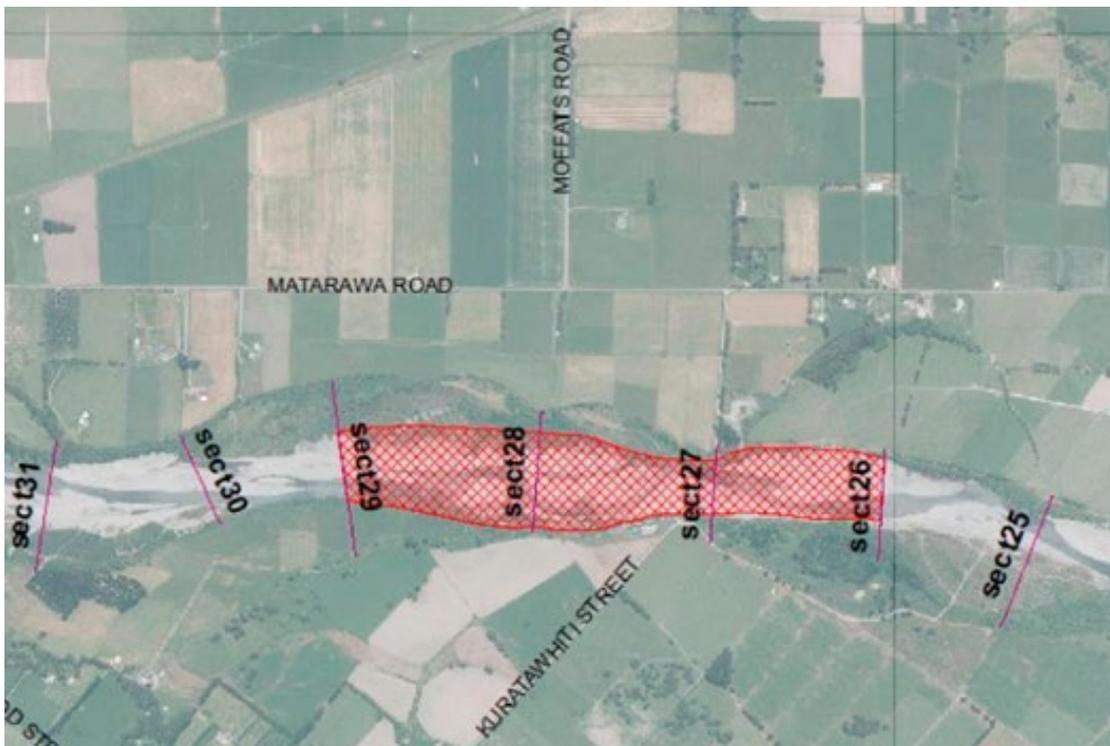


Figure 35: Showing Raised Bed Level At End of Kuratawhiti Street – landriversea Consulting.

6.12 Setting the flood sensitive area

A range of things were identified as possible contributors to flood sensitivity and each one became a separate “scenario”. In his study of flood sensitivity “Waiōhine River – Hydraulic Modelling – Summary of [Sensitivity and Stopbank Runs](#)”, Matt Gardner of LandRiverSea Consulting worked with the Project Team to identify, then model a wide range of possible factors that may influence flood sensitivity.

These included:

- Scenario 1 – LandRiverSea Consulting explain this as: “The base scenario simulates a 100-year event (peak inflow of 1700 Cumecs, or cubic metres per second of water, for the Waiōhine River), plus a climate change allowance until year 2100, running through the calibrated model setup. The climate change allowance is defined in terms of increase in peak rainfall intensity, which is 16% for this scenario (see Table 1). The inflow hydrograph for Waiōhine River has a single peak (temporal pattern 2 or “TP2”) for this run. The sensitivity runs detailed in the following paragraphs are defined with respect to this base scenario. ”
- Scenario 2 – 20% increase of Mannings ‘n’ (a measure of bed “roughness” or friction caused by a build-up of stones or other detritus)
- Scenario 3 – 20% decrease of Mannings ‘n’
- Scenario 4 – IPCC climate change scenario RCP 8.5
- Scenario 5 – IPCC climate change scenario RCP 2.6
- Scenario 6 – Bed levels near Kuratawhiti Street raised.
Note that for Scenario 6, the bed levels near Kuratawhiti Street have been raised uniformly by 0.5m. The reach of the Waiōhine over which the bed levels have been adjusted, is highlighted in the following diagram. These alterations were in practice, applied between cross sections 26 and 29:
- Scenario 7 – Bed levels near Kuratawhiti St lowered 0.5m
- Scenario 8 – Blockage at bridges and Apple Barrell floodway
- Scenario 9 – Small banks removed
- Scenario 10 – 1500 cumecs (cubic metres per second of water) single peak plus climate change up to year 2100
- Scenario 11 – 1500 cumecs double peak plus climate change up to 2100
- Scenario 12 – 1700 cumecs double peak plus climate change up to 2100
- Scenario 13 – 1900 cumecs single peak plus climate change up to 2100
- Scenario 14 – 1900 cumecs double peak plus climate change up to 2100
- Scenario 15 – 20-year (5% probability in any year) event temporal pattern 1 (current climate)
- Scenario 16 – 20-year event temporal pattern 2 (current climate)
- Scenario 17 – 50-year event temporal pattern 1 (current climate)
- Scenario 18 – 50-year event temporal pattern 2 (current climate)
- Scenario 19 – Bank erosion 1
- Scenario 20 – Bank erosion 2
- Scenario 21 – 1700 cumecs single peak (current climate)
- Scenario 22 – 50-year event temporal pattern 1 plus climate change up to 2100
- Scenario 23 – 20-year event temporal pattern 1 plus climate change up to 2050
- Scenario 24 – 20-year event temporal pattern 2 plus climate change up to 2050

- Scenario 25 – 20-year event temporal pattern 2 plus climate change up to 2100
- Scenario 26 – 50-year event temporal pattern 2 plus climate change up to 2050
- Scenario 27 – 50-year event temporal pattern 2 plus climate change up to 2100
- Scenario 28 – Base Scenario + Increase in Manning's 'n' by 20% between XS33 to XS38
- Scenario 29 – 20-year event temporal pattern 2 plus climate change up to 2050 + Increase in Manning's 'n' by 20% between XS33 to XS38
- Scenario 30 – 50-year event temporal pattern 2 plus climate change up to 2050 + Increase in Manning's 'n' by 20% between XS33 to XS38
- Scenario 31 – Base Scenario + Increase in Bed LEVELS by 1m between XS27 and XS28
- Scenario 32 – Base Scenario + Increase in Bed LEVELS by 0.5m between XS25 and XS18

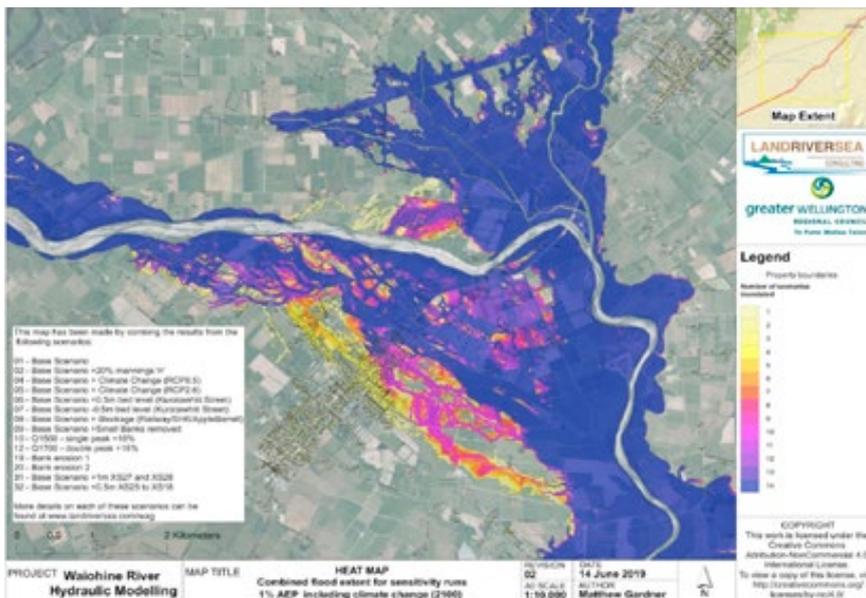


Figure 36: Significant flood sensitivity scenarios laid one on top of another to see maximum extent – landriverssea Consulting.

All of these “what if” factors were modelled in turn and the resulting maps were laid one over the other, to find the outer edge of the flood sensitive zone, that accounted for every identified scenario. This was then added to the flood map as a pink area. Where the proposed stopbanks prevent this possible extra flooding, a paler pink “ghost” was left on the maps to show the area protected from flooding and flood sensitivity.

Investigations into all these contingent risks were exhaustive. For a more detailed description refer to: https://drive.google.com/open?id=1UcZ0GXzm_UXNG38wuQh4fbP4fgoZDkP7.

[How could the area of flood sensitivity be used?](#) For instance, councils might ask for new houses constructed there, to be higher than normal above ground.

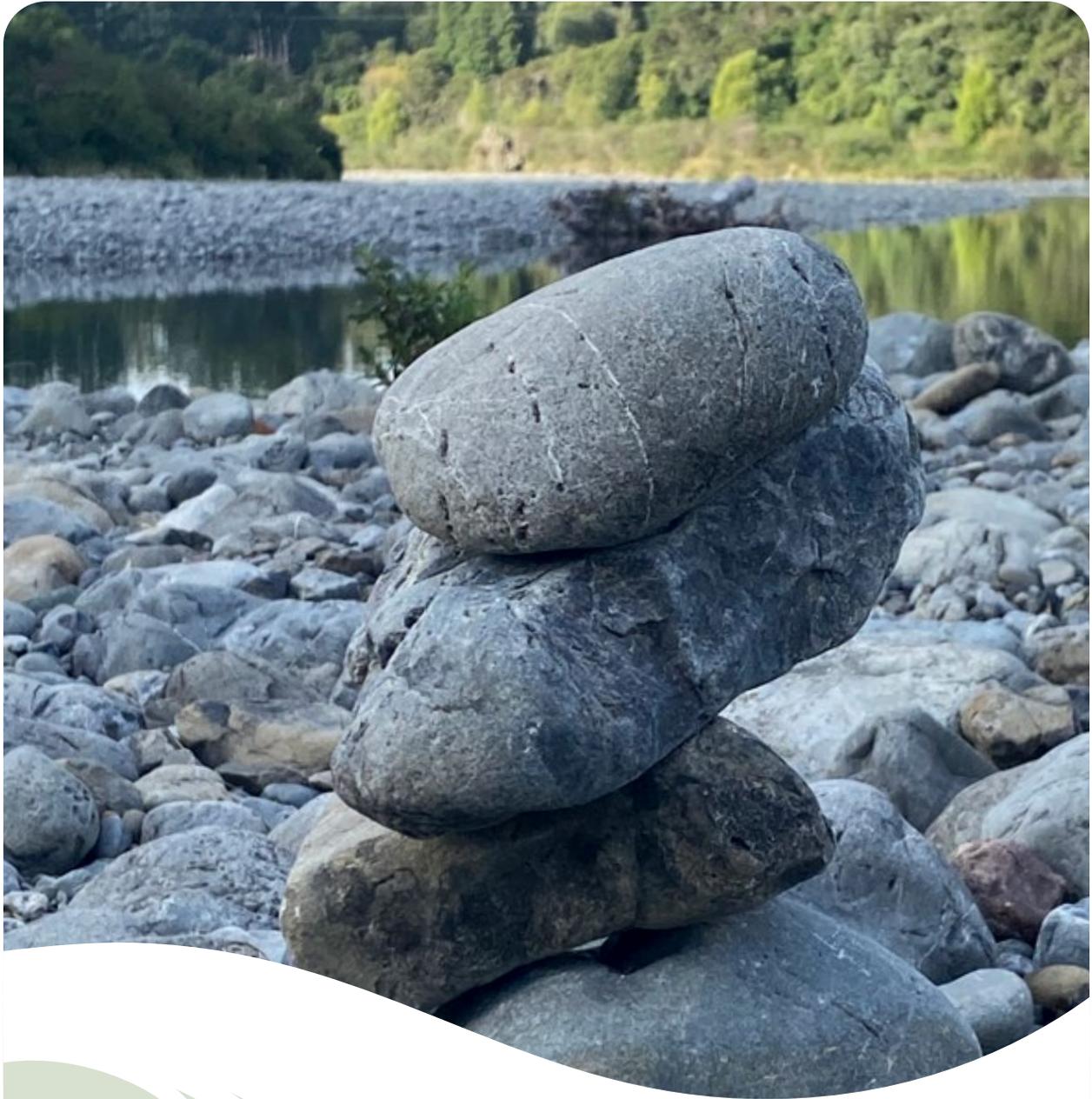
Findings:

We recommend setting a Flood Sensitive Area to allow for an informative, comprehensive view of any possible risks, no matter how unlikely, that could occur that may exacerbate flood conditions.

By far and away the most significant sensitivity is that of gravel build up/increase in bed "roughness" (as modelled using Manning's "n" tool).

It is recommended that Local councils can make best use of a tool that allows them, and their clients, to readily identify the potential depth and velocity of modelled floods in each location on a given property, with an accompanying guideline on the nature of the risk. The ARR guidelines offer such a tool.

Using this approach, we are able to offer local councils and the community useful advice on minimum height for a build in a flood sensitive zone based upon the use of High, Medium and Low Hazard classification labels for land within the floodplain.



7

Structural Solutions

Structural solutions are designed to keep floods away from people.

Ministry for the Environment: *“Flooding will always be a part of living in New Zealand, and decisions will need to be made continually on the best ways to manage the flood risk in response to the weather and people’s expectations. The challenge New Zealand faces now is how best to reduce the damages and losses from flooding as part of our everyday living and working lives.”*

7.1 Identifying important flood defence factors

To guide decision making, factors justifying flood defence have been identified, by the Project Team, in response to [community](#) feedback:

- 1 Protect the town
- 2 Erosion Control/optimisation
- 3 Keep Apple Barrel Working
- 4 Beware of old river courses
- 5 Avoid ponding next to stopbank
- 6 Total Cost of Ownership (explained opposite)
- 7 Landowner preferences
- 8 Safety of people
- 9 Consentability
- 10 Insurability of dwellings
- 11 Sustainability

Total cost of ownership

The total cost of ownership (TCO) is the [purchase price](#) of an asset plus the costs of operation. Assessing the total cost of ownership represents taking a bigger picture look at what the asset is and what its value is over time.

When choosing among alternatives in a purchasing decision, buyers should look not just at an item’s short-term price, known as its purchase price, but also at its long-term price, which is its total cost of ownership. The item with the lower total cost of ownership is the better value in the long run.

7.2 Goal set for flood defence design

The design criteria chosen for urban defences is: to be protected from an average once in 100 year flood (1%)* in the urban area of Greytown, up until the adaptive management [Trigger](#) of reaching the year 2050; by when this plan is to be refreshed or when another relevant Trigger event occurs beforehand.

Where * above is:

- 1 Flow is 1,700 cubic metres per second plus climate change (10% by 2050, 16% by 2100) + flood sensitivity,
- 2 Excludes projects completed within the annual works programme (budgeted c. \$350k p.a. at present),
- 3 Upgradeability should result in “no regrets” i.e. that the space is reserved alongside flood defences that allow them to be upgraded if a trigger or the 2050 review requires it.

Rules adopted for considering flood defence options:

- 1 All comparisons to be as at 2050,
- 2 All comparisons are on base model,
- 3 All design must allow for it to be possible to upgrade/extend flood defences, to be able to deal with conditions we may face by the year 2100.

Note however, it may be justified to build the new stopbanks to the estimated 2100 specification straight away, where the cost differential between design to 2050 and design to 2100, is small enough. Such a decision would be subject to the [Living Plan](#) process.

The design criteria chosen for rural defences is for dwellings to be protected from an average once-in-20-year flood (5%), plus climate change in the floodplain area.

It is however, recommended that planning authorities consider that:

- New build dwellings should be constructed to a one-in-one-hundred year plus climate change (1% risk each year of such a major flood happening) standard.

Where applicable, cases should be worked through to be fully understood, prior to resource consent being applied for.



Figure 37: What Level of Flood Protection is Required – Project Team.

7.3 Principles for location and land ownership of stopbanks

Several things determine the recommended location of the two new stopbanks:

- 1 Protection of urban Greytown.
- 2 Avoiding existing dwellings.
- 3 Avoiding public roads.
- 4 Using existing high ground where practical.
- 5 Try to minimise impact on farm operations.
- 6 Cost.

The [community](#) needs security for its investment – so some form of control over the land beneath stopbanks is critical. [Easements](#) are an acceptable tool to try to meet landowners' needs. An example of an Easement agreement is included at [Appendix E](#).

Which bank does what?

Stopbank – A shaped earth and gravel formation generally parallel to the river channel to confine floodwaters.

Training bank – A training bank is used to direct the flow and speed of floodwater to a better path during a minor flood. A training bank may be used to protect low risk assets, such as open farmland, from high frequency events, but will allow the area to be flooded in a large flood event to alleviate pressure on higher risk assets.

Sill Banks – provide a slightly higher edge to gill, or in many cases, reinstate a higher edge that had been lost by erosion. Not a stopbank.

7.4 Identifying stretches of the river sides that might need differing flood defences

| TRUE LEFT BANK (Carterton): | TRUE RIGHT BANK (Greytown): |
|---|---|
| River Road to Fullers Bend (XS 20) | Greytown Stopbank to between Vines and Kuratawhiti Street |
| | Bottom Greater Wellington Land to Kuratawhiti Street |
| Fullers Bend inside | Kuratawhiti Street to Fullers Bend |
| | Fullers Bend outside |
| Fullers Bend to SH2 Road Bridge (XS 17) | Fullers Bend to SH2 Road Bridge |

Figure 38: Stretches of River Needing Differing Flood Defences – Project Team.

7.5 What stopbank design is needed for this river plan?

A topographical survey of the proposed alignments was made – including the full width of road reserve where required. This showed the preliminary footprint and height of the stopbank, with respect to boundaries, and confirmed any works needed on or near State Highway 2.

The option to combine stopbank construction with North Street widening, or to use the lateral grass reserve alongside North Street road, was rejected. As building within the road reserve offered insufficient space, inboard of the existing power poles and we are advised against combining the stopbank with a foot or cycle way, for reasons of maintainability or of considering relocating the power poles there.

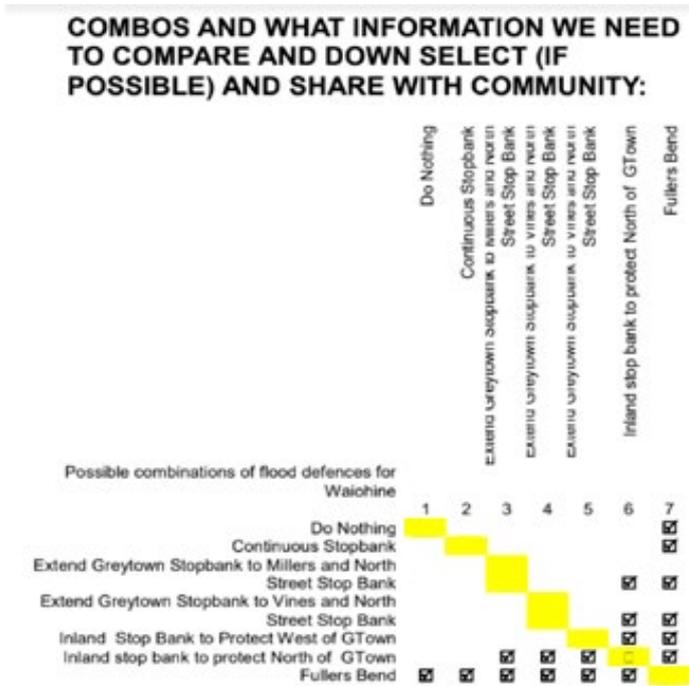


Figure 39: Various combinations of flood defences were analysed to find viable combinations.

The legal boundary of the North Street road corridor extends into the farmland to the north and east of the existing carriageway. SWDC has told the project team that they would like to ensure that the location of the North Street stopbank does not inhibit their future ability to widen the road corridor. The alignment of the North Street stopbank will therefore need to reflect the legal road boundary. There will also need to be at least 5 m between the bottom of the stopbank and the road boundary to allow for maintenance of the stopbank. This will also allow contingency if, for any reason such as failure to combat rampant climate change, the stopbank needs to be topped up.

As it is necessary to build on private land, then factors such as safety, security and access must be considered.

It is recommended that stopbanks constructed on the land of Platform Farm will consist of silt or mixed silt/gravel banks only and have a shape with sloping sides (batter) that minimizes impact on farm operation and grazing pasture.

It is recommended that stopbanks should be built where there is an optimum mix of minimal impact on farming operations, combined with minimal cost, yet maximised flood defence.

Full preliminary costing of these works has been provided. It has been necessary to push the design work to the next stage, to survey more detailed stopbank placement, height etc. to give more certainty to the conversation with landowners, and cost information to the ratepayers. Interim information has been obtained from [Cameron Fauvel](#), who was engaged to complete this work. Note that this will still be regarded as not yet a completed estimation, until final detailed design is completed, and all costs and works are fully known.

It is recommended that rock work on the true right bank (outside of) Fullers Bend (XS 20) should be gradually completed, from river maintenance budgets, over coming years. Following advice from the [Ian Heslop](#) review, where practical snub rock groynes should be considered, working from upstream, from proposed rock armouring on the True Right Bank (TRB or Greytown side) of Fullers Bend.

Regarding the area on Platform Farm characterised as the underside of the low bank with a hook, it is proposed not to attempt to protect this from erosion with trees on the high ground above the river as this is proven to be ineffective. The river simply would undercut the bank below the tree roots. Instead we recommend planting the resulting beach, if erosion creates one. This is necessary in order to maintain channel alignment and deter further erosion.

Regarding protecting the True Right Bank (Greytown side) at the Vines' Farm (XS 28-30) it is proposed a similar strategy is to be adopted, i.e. to plant the resulting beach if the high ground erodes (to deter further erosion). If this occurs and it is necessary, a sill bank should be constructed, to maintain height of the edge if necessary, to prevent substantial incursion.

7.6 Analysis of six options identified for flood defences

Notes: The "charts" accompanying the maps of each of the flood defence options below were based upon the best information available at the time (July 2018) of the very well attended public drop-in sessions. These were accompanied by the following cautionary note:

"Proceed with Caution – *this is our first sneak preview of what will be tightened up as we work to consult with community and stakeholders*

Rough as Guts (RAG) – *all figures may appear smaller than they really are. Excludes stakeholder related costs, detailed design and costing, GST and other stuff we haven't thought of. CAPEX is rounded up to the nearest \$.5m.*

For Comparison: *Areas of star charts are for the sole purpose of drawing attention to the comparative strengths and weaknesses of options. Some work remains to be done on firming up the statements of benefits for community and stakeholders.*

This is Not the Whole Picture of Cost: *It does not include a range of things that relate to an FMP that we have not completed work on yet. For instance, in the revoked draft FMP there was a budget of \$1.5 million for the rock lining of the outside curve bank (Greytown side) of Fuller's Bend (XS 20), near the SH2 bridge (XS 17). So, we should not, in any way, view these numbers as being close to the final, total cost of the FMP.*

Planning, building, consenting, LIMS etc. *are the province of District Councils, we won't know all the implications for those topics for each of the options here, until we've done more work and also have their considered view of this.*

Opinions are just that. *There is a lot more work to do and a lot of community and stakeholder consultation to go before the Waiōhine FMP Project Team can offer a recommendation, based upon all those things, as to what may be the best option for flood defences. In the meantime, personal opinions should not be assumed to be the collective view of the team, or the community, or the other stakeholders and anyway, as we do more and more work, as you would expect, our opinions do change."*

The Independent Peer Review of the following options by [Ian Heslop](#) noted: *"The range of modelling options considered is comprehensive, and appropriate for the adopted design standard".*

7.6.1 Option 1: Build Nothing

Option 1 was provided as a basis for comparison and to show what impact there would be if a decision were made not to invest in any additional form of flood protection and a major flood event occurred in the future.

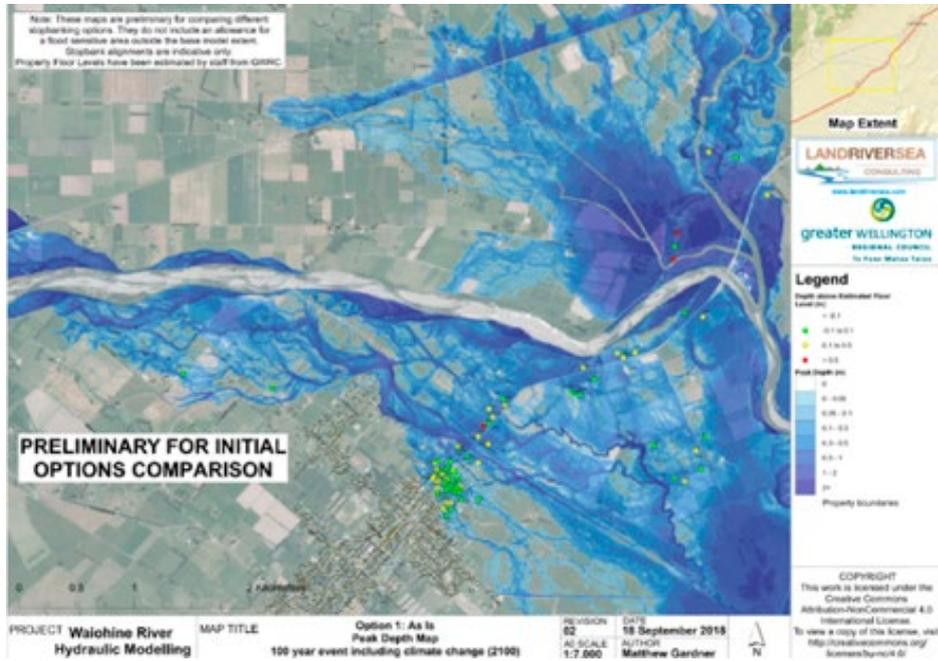


Figure 40: Used to identify impact if no defences are constructed. Note that there is some impact on urban dwellings at the North end of Greytown and along State Highway 2.

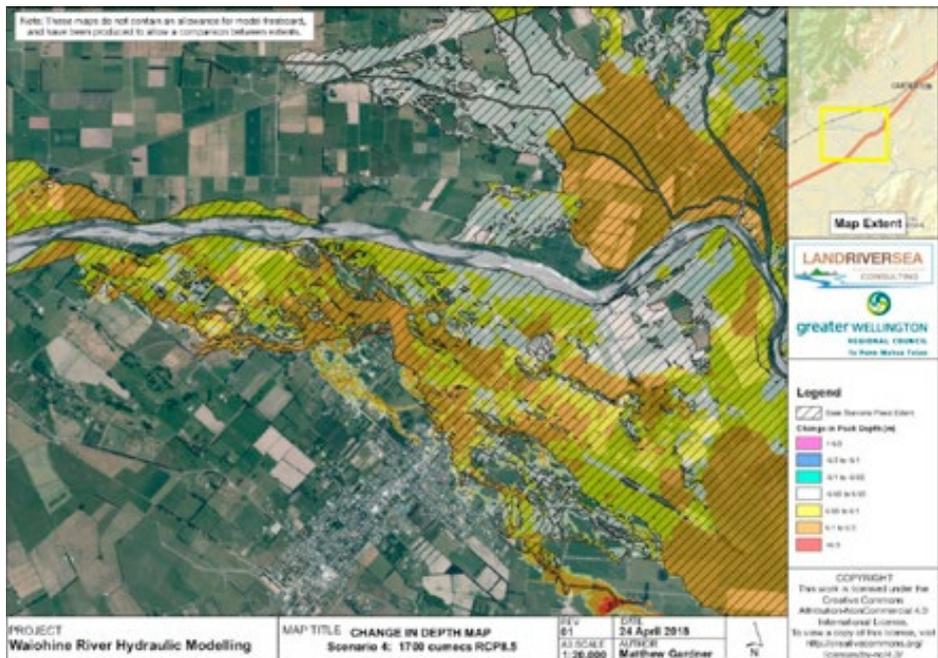


Figure 41: An option showing a severe 1% flood with severe climate change (IPCC RPC 8.5).

| Option | Rough Cost (plus or minus 30%) | Water somewhere on property (no. of houses) | Below >-0.1m below floor joists (no. of houses) | Above >0.1m above bottom of floor joists (no. of houses) | >0.5m above bottom of floor joists (no. of houses) |
|---|--------------------------------|---|---|--|--|
| 1 (build nothing) | \$0 | 128 | 45 | 18 | 1 |
| 2 Inland Stopbanks (North Street & K Street) | \$0.7m | 46 | 23 | 11 | 1 |
| 3 (North Street and Beban (XS 30)) | \$1.3m | 41 | 23 | 11 | 1 |
| 4 (North St. & Vines (XS 28-30)) | \$2.3m | 33 | 20 | 10 | 1 |
| 5 (North St, Vines and Fullers Bend (XS 20)) | \$2.5m | 35 | 19 | 10 | 1 |
| 6 (Continuous Stopbank) | \$3m | 24 | 14 | 6 | 0 |

Figure 42: Table showing Option 1 Implications – Project Team.

7.6.2 Option 2: Inland stopbanks – near North Street and western near Kuratawhiti Street.

Option 2 allows the river to behave relatively naturally, to spread out and slow down in flood. Relatively inexpensive stopbanks can be constructed near the edges of the urban area to provide one-in-one-hundred year, flood plus climate change, plus sensitivity standard. Seeking a slight change in road crown height on selected stretches of SH2 would enhance protection to some rural properties. This approach relies on continued good river and [gravel management](#) to prevent the river from taking a new course.

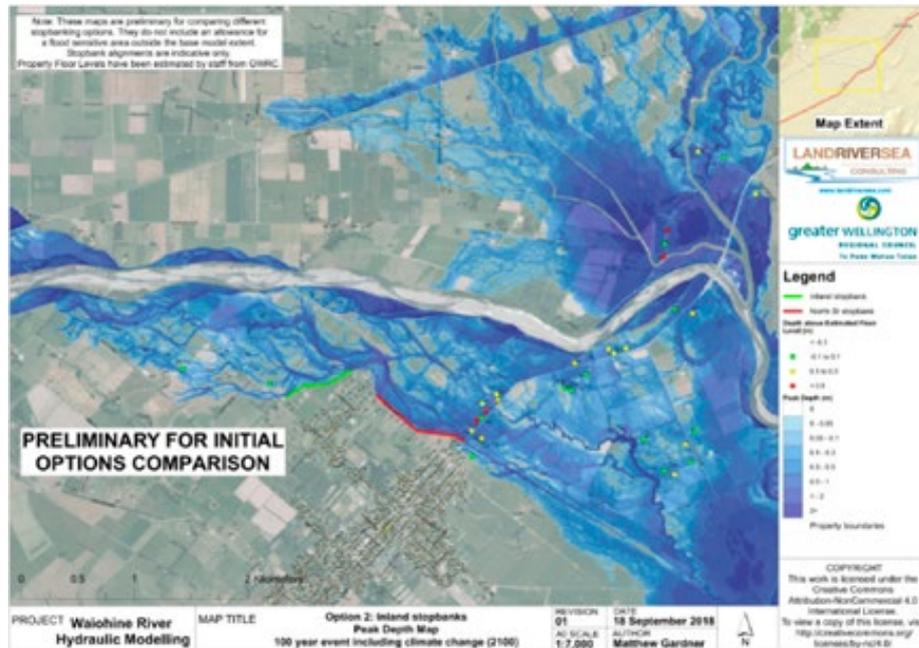


Figure 43: Flood Map – Option 2 Inland Stopbanks – landriversea Consulting.

| Option | Rough Cost (plus or minus 30%) | Water somewhere on property (no. of houses) | Below >-0.1m below floor joists (no. of houses) | Above >0.1m above bottom of floor joists (no. of houses) | >0.5m above bottom of floor joists (no. of houses) |
|--|--------------------------------|---|---|--|--|
| 1 (build nothing) | \$0 | 128 | 45 | 18 | 1 |
| 2 Inland Stopbanks (North Street & K Street) | \$0.7m | 46 | 23 | 11 | 1 |
| 3 (North Street and Beban (XS 30)) | \$1.3m | 41 | 23 | 11 | 1 |
| 4 (North St. & Vines (XS 28-30)) | \$2.3m | 33 | 20 | 10 | 1 |
| 5 (North St, Vines and Fullers Bend (XS 20)) | \$2.5m | 35 | 19 | 10 | 1 |
| 6 (Continuous Stopbank) | \$3m | 24 | 14 | 6 | 0 |

Figure 44: The option strongly preferred by most of the community and the Project Team.

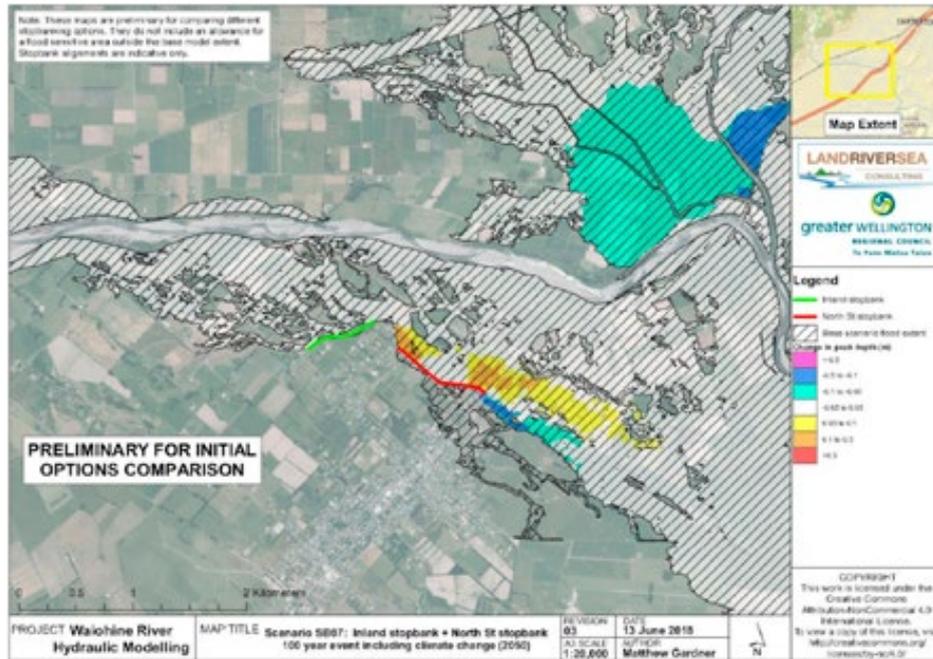


Figure 45: Shows minimal change in flood depth due to inland stopbanks and shows urban area saved from flooding.

Further study of Option 2 above, showing that a cross-hatched urban area is recommended to be saved from flooding by the urgent and important North Street Stopbank – shown as a red line.

The Inland Western or Kuratawhiti Street Stop Bank, shown in green, is close to Kuratawhiti Street. It is recommended that, whilst not as urgent as the North Street Stop Bank, this stop bank is built as soon as is practical.

A series of [flood sensitivity models](#) showed the risk of much greater flooding, as the result of possible gravel build up (aggradation) – see [Tonkin and Taylor report](#), in the stretch of river near the end of Kuratawhiti Street, although unlikely, would necessitate the Kuratawhiti Street Stopbank being built to avoid planning, permitting and insurance issues, for a large part of urban Greytown. The combinations of factors and possible outcomes are shown in this diagram:

| | | | | | | | | | | |
|----|-----------------------|-----------------------|-----------------------------------|-----------------------------------|---------------------------------------|--------------------------------------|----------------------------------|--|--|--|
| IF | 1:100 Year Flood (1%) | PLUS | Climate Change RCP 6 (+16% water) | THEN | | North Street Stop Bank is Needed | BUT | Kuratawhiti Street Stop Bank is Not Needed | | |
| IF | 1:100 Year Flood (1%) | PLUS | Climate Change RCP 6 (+16% water) | PLUS | Gravel builds up from poor management | THEN | North Street Stop Bank is Needed | AND | Kuratawhiti Street Stop Bank is Needed | |
| or | IF | 1:100 Year Flood (1%) | PLUS | Climate Change RCP 6 (+16% water) | PLUS | Gravel extractor quits | THEN | North Street Stop Bank is Needed | AND | Kuratawhiti Street Stop Bank is Needed |
| or | IF | 1:100 Year Flood (1%) | PLUS | Climate Change RCP 6 (+16% water) | PLUS | Second 1:100 Year Flood (1%) follows | THEN | North Street Stop Bank is Needed | AND | Kuratawhiti Street Stop Bank is Needed |

Figure 46: Table analysing which stopbanks are needed for which scenario – Project Team.

[The Ian Heslop led Independent Peer Review](#) noted that: “The preferred option is the combined North Street and Inland (Kuratawhiti Street) Stopbank. This option ticks the most boxes given least capital and ongoing maintenance costs, minimal flood diversion effects, negligible erosion and under-design breach risk, and least need for channel management. The prospect of securing high community support and resource consent will be high, and risk of inappropriate ongoing floodplain development minimised. One key point that needs to be reinforced is that bed level and channel management will need to continue, to maintain the current river alignment and both the rural and flood protection standards. Stopbanks on the northern side will continue to be protected and maintained.”

7.6.3 Option 3 – inland stopbank near North Street and extension of Greytown stopbank to Beban’s Farm

In scenario 3, the existing Greytown Stopbank near the end of Wood Street is extended to force flood water back towards the Waiōhine river channel (see pale yellow line on map below). No significant difference could be found in flood risk to either urban or rural dwellings but the cost to build and maintain was substantially more than Option 2. See diagram below:



Figure 47: Option 3 North St Stopbank plus Greytown Stopbank Extension – landriversea Consulting.

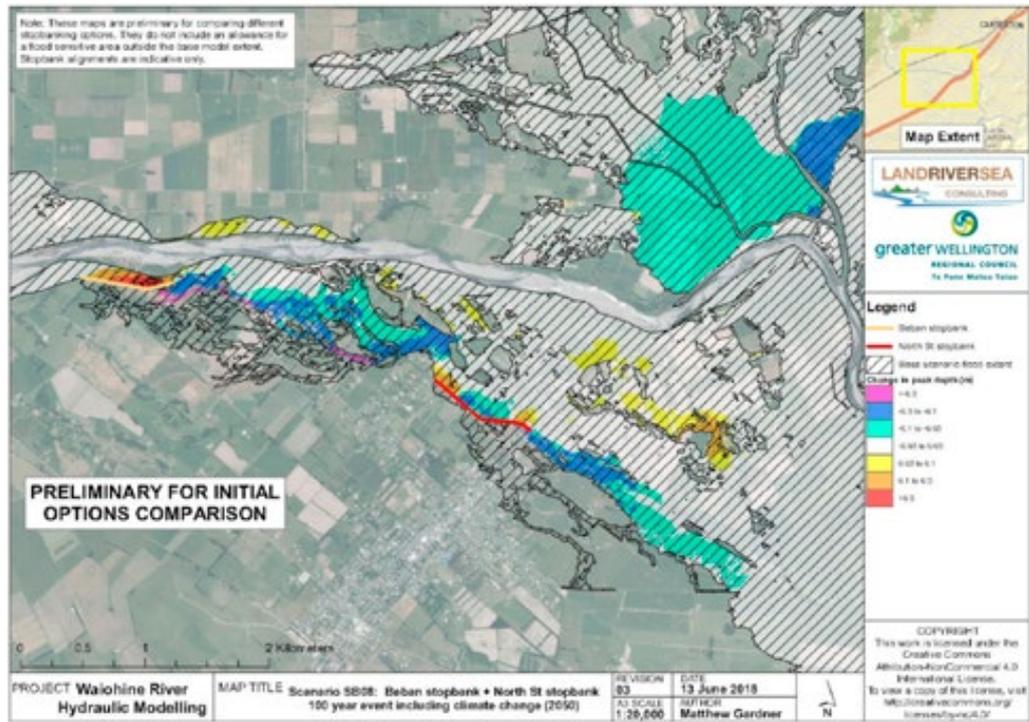


Figure 48: Option 3 North St Stopbank plus Greytown Stopbank Extension to XS 30 – landriversea Consulting.

Much of the “spread out and slow down the flood” effect was lost. Attempts were made through subsequent studies to try to model the effect of a much rougher/higher riverbed to force more water onto the Greytown Stopbank to see if it was justified through the creation of additional risks, either:

- Through scouring the lowest parts of the Greytown Stopbank and threatening to undercut the bank itself or,
- Through pushing more water around the end of the Greytown Stopbank to take a new path and threaten dwellings outside the floodplain.

Neither of these things could be made to happen. At that point the Project Team, supported by the strong public preference for Option 2 decided this option was less attractive and provided inconsistent flood protection for the rural community. However, it was nevertheless decided to:

- Plant trees along the toe of the existing Greytown Stopbank to help prevent scouring along it that might undermine the bank. If this is not viable, to alternatively build three small rock groyne, at right angles to the toe of Greytown Stopbank, to disrupt flood water and reduce the risk of scouring of the stopbank and;

It is recommended that planners require the retention of the row of mature trees that continue the line of Greytown Stopbank towards the river. Also, to plant additional trees on the toe and slope of the small escarpment on top of which the existing mature trees stand. The aim of this is to reinforce the escarpment and protect the mature trees to slow down any major flood and help to reduce excessive scouring of farmland etc.

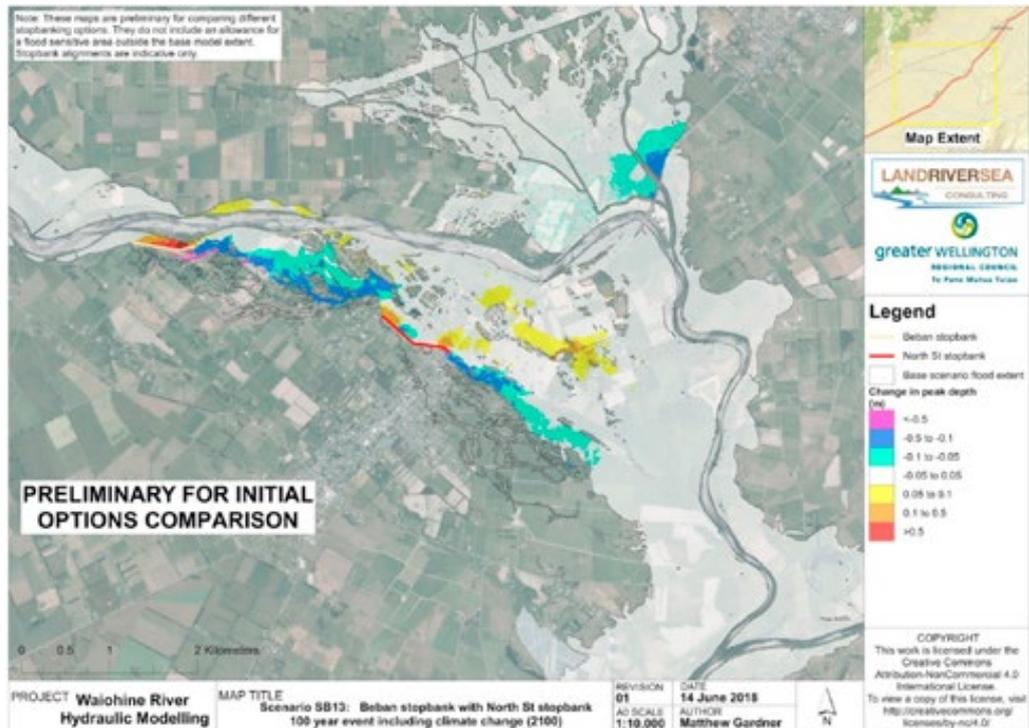


Figure 49: Showing changes in flood depth - principally to farmland but some downstream consequences in the SH2 and Ahikouka area.

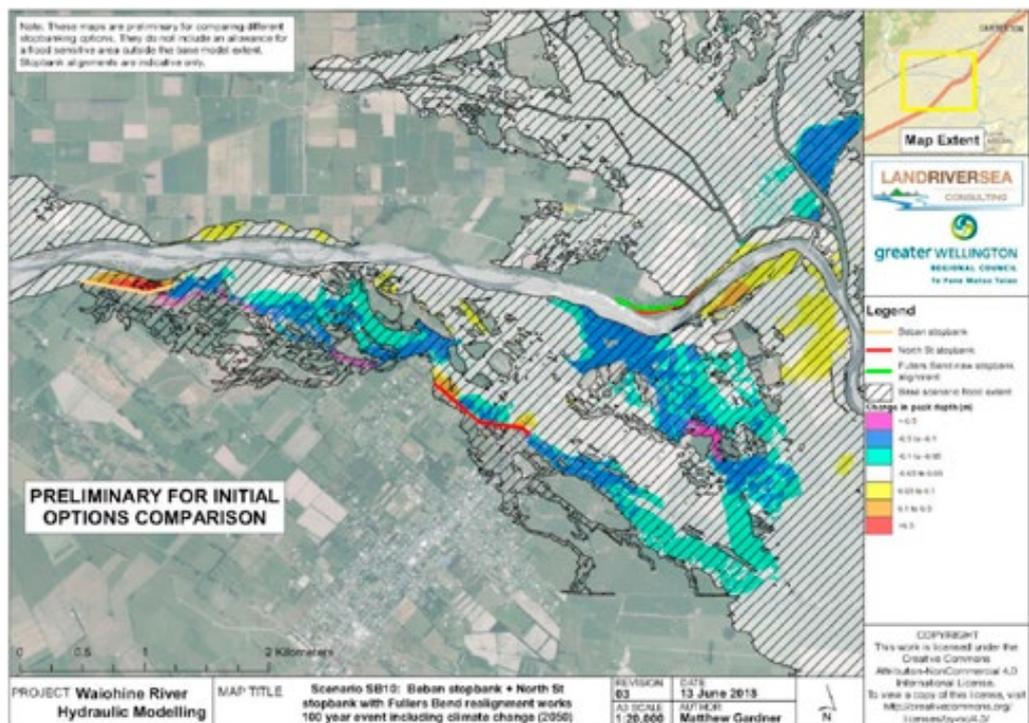


Figure 50: Option explored of adding the realignment of the inside of Fullers Bend to this scenario.

| Option | Rough Cost (plus or minus 30%) | Water somewhere on property (no. of houses) | Below >-0.1m below floor joists (no. of houses) | Above >0.1m above bottom of floor joists (no. of houses) | >0.5m above bottom of floor joists (no. of houses) |
|--|--------------------------------|---|---|--|--|
| 1 (build nothing) | \$0 | 128 | 45 | 18 | 1 |
| 2 Inland Stopbanks (North Street & K Street) | \$0.7m | 46 | 23 | 11 | 1 |
| 3 (North Street and Beban (XS 30)) | \$1.3m | 41 | 23 | 11 | 1 |
| 4 (North St. & Vines (XS 28-30)) | \$2.3m | 33 | 20 | 10 | 1 |
| 5 (North St, Vines and Fullers Bend) | \$2.5m | 35 | 19 | 10 | 1 |
| 6 (Continuous Stopbank) | \$3m | 24 | 14 | 6 | 0 |

Figure 51: Table showing Option 3 Implications – Project Team.

7.6.4 Option 4 – Inland stopbank near North Street and extension of Greytown stopbank beyond Beban’s Farm(XS 30)

The idea of a long extension to Greytown Stopbank as well as a Stopbank at North Street and the re-alignment of the inside of Fuller’s Bend ([XS 20](#)), was explored in Option 4. This added no improvement over Option 2 or 3, in terms of dwellings protected, or spreading out and slowing down the flood. In fact, it served to increase the flood depth in some areas, downstream from the long stopbank. The cost was considerably higher than options 2 or 3 for this approach with no discernible benefit and considerable downside.

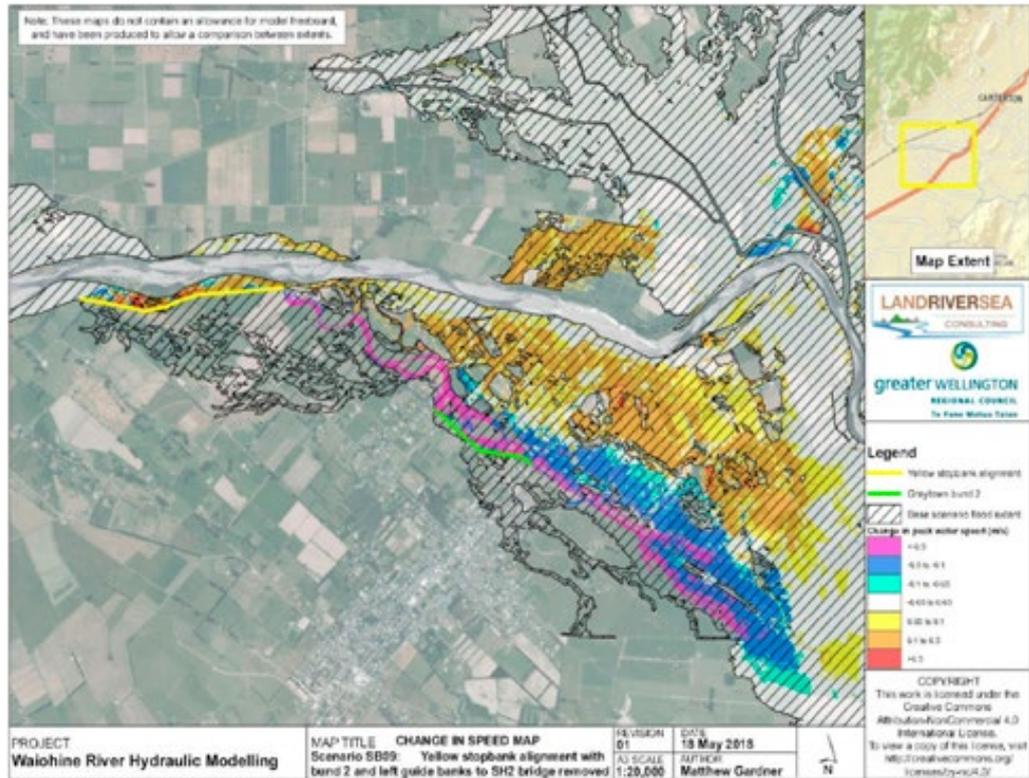


Figure 52: Option 4 North St Stopbank plus Greytown Stopbank Extension Beyond Bebans Farm – landriversea Consulting.

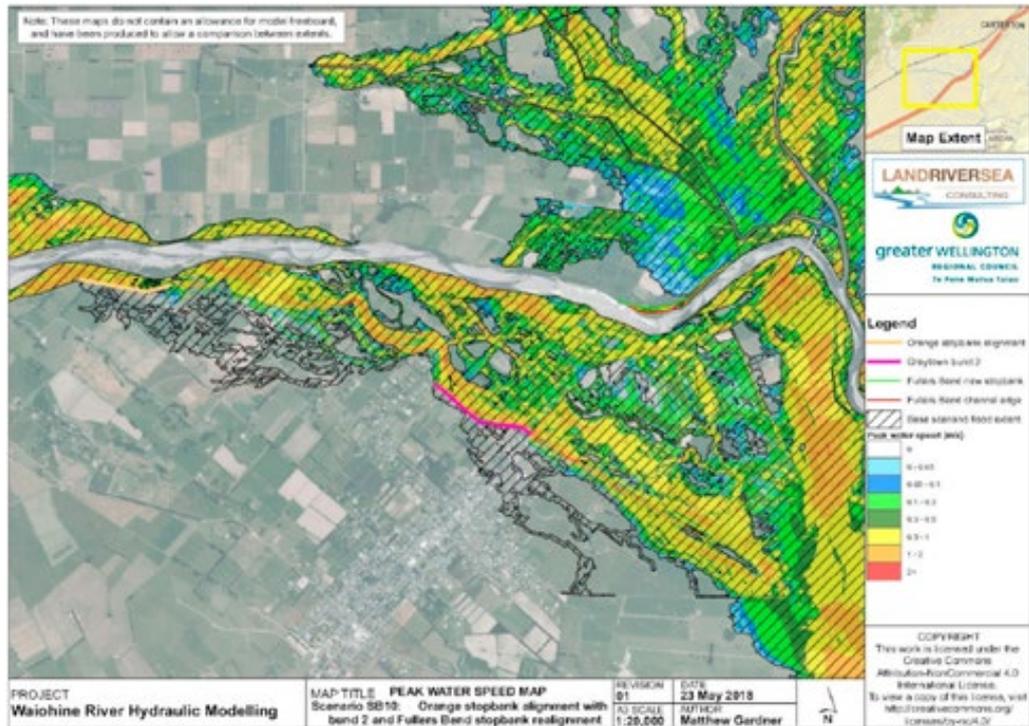


Figure 53: Peak Water Speed Map at Fullers Bend – landriversea Consulting.

| Option | Rough Cost (plus or minus 30%) | Water somewhere on property (no. of houses) | Below >-0.1m below floor joists (no. of houses) | Above >0.1m above bottom of floor joists (no. of houses) | >0.5m above bottom of floor joists (no. of houses) |
|---|--------------------------------|---|---|--|--|
| 1 (build nothing) | \$0 | 128 | 45 | 18 | 1 |
| 2 Inland Stopbanks (North Street & K Street) | \$0.7m | 46 | 23 | 11 | 1 |
| 3 (North Street and Beban (XS 30)) | \$1.3m | 41 | 23 | 11 | 1 |
| 4 (North St. & Vines) | \$2.3m | 33 | 20 | 10 | 1 |
| 5 (North St, Vines (XS 28-30) and Fullers Bend) | \$2.5m | 35 | 19 | 10 | 1 |
| 6 (Continuous Stopbank) | \$3m | 24 | 14 | 6 | 0 |

Figure 54: Table showing Option 4 Implications – Project Team.

7.6.5 Option 5 – Inland stopbank near North Street and extension of Greytown Stopbank beyond Beban’s Farm (XS 30) with realignment of stopbank inside Fuller’s Bend

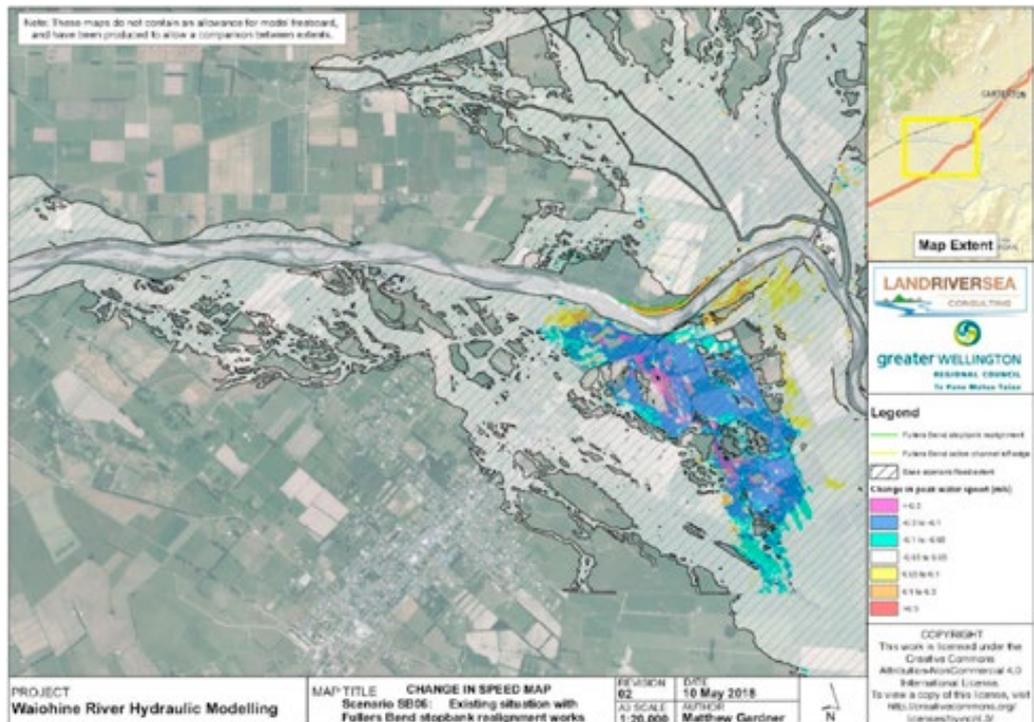


Figure 55: A study of the impact on flood depth of re-aligning the inside of Fuller’s Bend – showing little benefit in flood depth.

Option 5 shares the same concept as Option 4 but includes the realignment of Fuller’s Bend (XS 20), on the Carterton (true left) bank. Again, this added no improvement over Option 2 or 3 or 4 in terms of dwellings protected or spreading out and slowing down the flood and in fact increased the flood depth in some areas downstream from the long stopbank. The cost was considerably higher than options 2 through 4 and this approach was unpopular with the public.

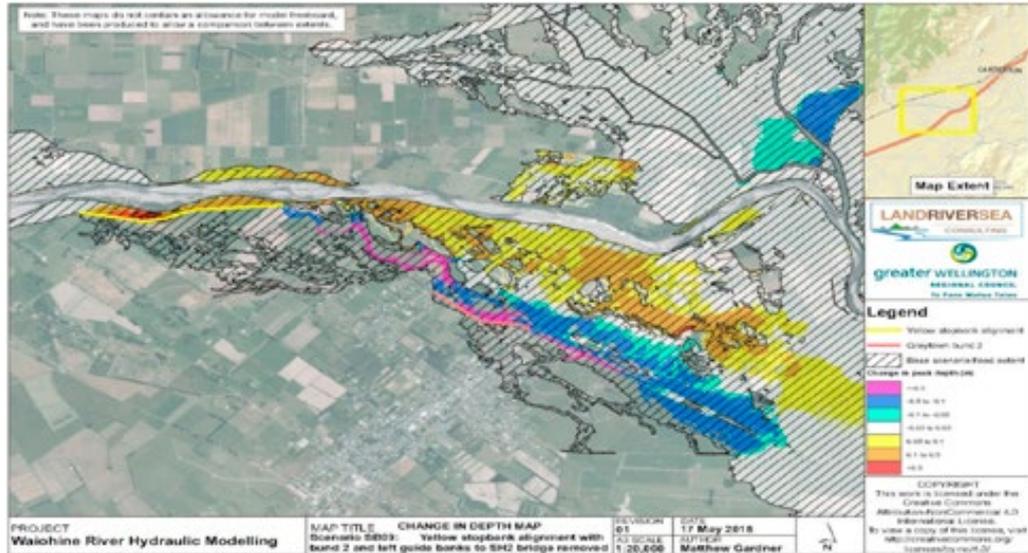


Figure 56: Option 5 – Long extension to Greytown Stopbank and Nth. Street Stopbank, showing change to depth.

| Option | Rough Cost (plus or minus 30%) | Water somewhere on property (no. of houses) | Below >-0.1m below floor joists (no. of houses) | Above >0.1m above bottom of floor joists (no. of houses) | >0.5m above bottom of floor joists (no. of houses) |
|---|--------------------------------|---|---|--|--|
| 1 (build nothing) | \$0 | 128 | 45 | 18 | 1 |
| 2 Inland Stopbanks (North Street & K Street) | \$0.7m | 46 | 23 | 11 | 1 |
| 3 (North Street and Beban (XS 30)) | \$1.3m | 41 | 23 | 11 | 1 |
| 4 (North St. & Vines) | \$2.3m | 33 | 20 | 10 | 1 |
| 5 (North St, Vines (XS 28-30) and Fullers Bend (XS 20)) | \$2.5m | 35 | 19 | 10 | 1 |
| 6 (Continuous Stopbank) | \$3m | 24 | 14 | 6 | 0 |

Figure 57: Table showing Option 5 Implications – Project Team.

7.6.6 Option 6 – Full true right bank (Greytown Side) stopbank with realignment of stopbank inside Fuller’s Bend (XS 20)

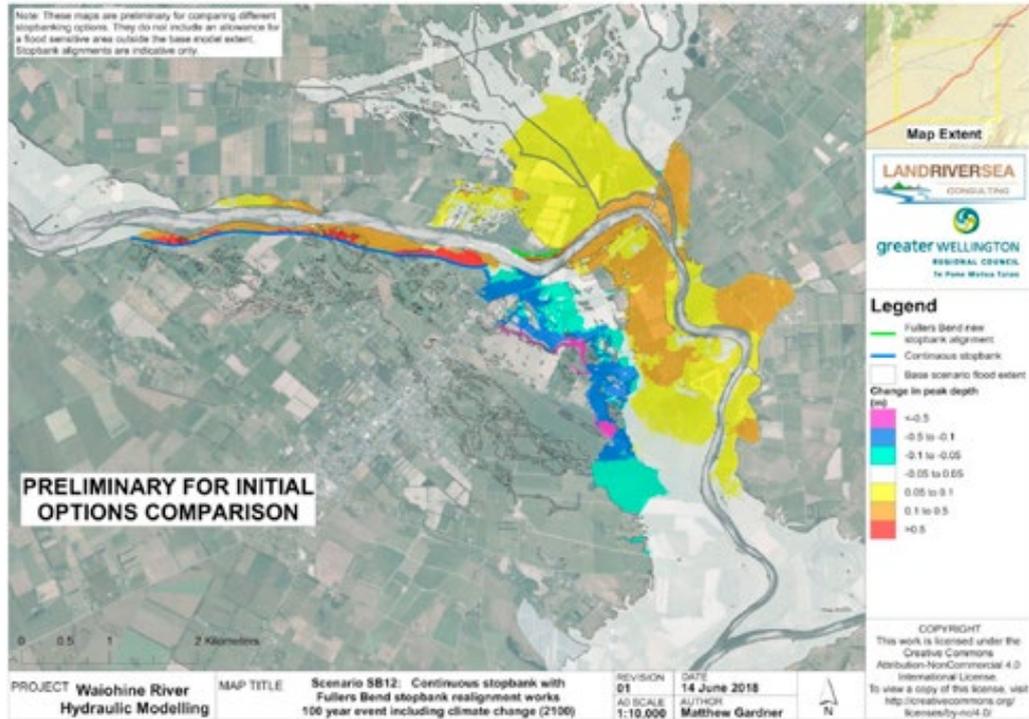


Figure 58: Study of impact of increasing depth and flooding created by a continuous stopbank. Bank is blue line.

One of the principles adopted at the beginning of the design stage was that beyond our obligation to try to protect the urban area against “one-in-one-hundred year” (1%) floods, it was unacceptable to protect one area at the expense of another – to “rob Peter to pay Paul”. The above map shows that the option of building a continuous stopbank on the Greytown (true right) bank simply pushes deeper flood water onto the Carterton (True Left) bank and downstream SH2 Road Bridge (XS 17) and Ahikouka Road area. A continuous stopbank, close to the river, also would lead to maintenance challenges, disruption of farm operations and higher build and maintenance costs. Furthermore, by implication, this approach of hemming the flooding river in fails to take the opportunity to spread out, and thus slow down and dissipate the flood, with consequences for downstream properties and assets. It was further noted that all the solutions that required stopbanks close to the river or works to encourage the river to realign may struggle in the consenting process. See map study of this effect below:

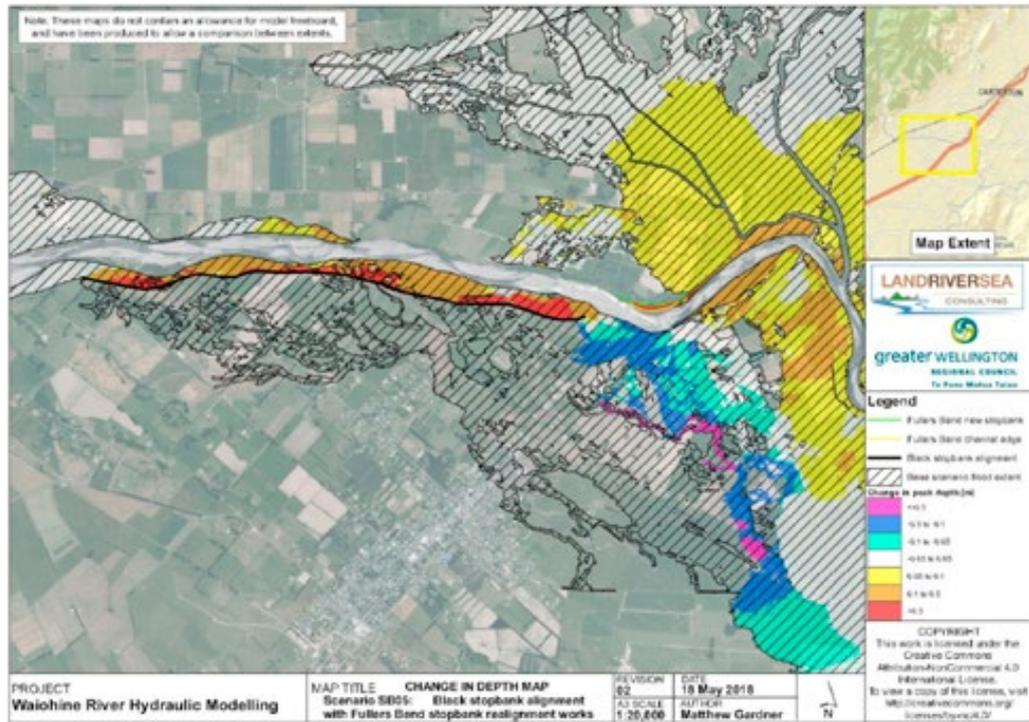


Figure 59: Study of increased flood depth downstream caused by continuous stopbank.

| Option | Rough Cost (plus or minus 30%) | Water somewhere on property (no. of houses) | Below >-0.1m below floor joists (no. of houses) | Above >0.1m above bottom of floor joists (no. of houses) | >0.5m above bottom of floor joists (no. of houses) |
|---|--------------------------------|---|---|--|--|
| 1 (build nothing) | \$0 | 128 | 45 | 18 | 1 |
| 2 Inland Stopbanks (North Street & K Street) | \$0.7m | 46 | 23 | 11 | 1 |
| 3 (North Street and Beban (XS 30)) | \$1.3m | 41 | 23 | 11 | 1 |
| 4 (North St. & Vines (XS 28-30)) | \$2.3m | 33 | 20 | 10 | 1 |
| 5 (North St, Vines and Fullers Bend (XS 20)) | \$2.5m | 35 | 19 | 10 | 1 |
| 6 (Continuous Stopbank) | \$3m | 24 | 14 | 6 | 0 |

Figure 60: Table showing Option 6 Implications – Project Team.

Findings:

- **Option 2 is recommended** as likely to be the best solution, best meeting criteria for defending against a one in one-hundred-year flood event (1%) i.e. a straw man of 1700 cubic metres per second plus or minus 200 M³ per second.
- Option 2 is more likely to meet the requirement of the solution being consentable.
- Option 2 was also far more popular than other options for the large number of people who attended the two community drop-in events, WAG meetings and online feedback.
- Other options revealed a very poor trade off of much higher cost for little or no additional protection of dwellings and critical assets and/or protected some agricultural land at the expense of greater flooding on other agricultural land (robbed Peter to pay Paul).

7.7 Table of initial estimates of materials and costs of components of structural works

Note: Re-aligning by widening the inside of Fuller's Bend is approximately \$1m build cost, is required for Options 4, 5 and 6. Other options also allow the sale of three parcels of land on the inside of Fullers Bend that were acquired to facilitate those works, freeing the annual cost of servicing this debt to boost river maintenance work.

| 'Rough As Guts' estimates | Volume of Material | \$ Cost of Build | \$ Maintenance Cost +/- \$ | \$ Contingencies (at 30% of Construction cost) |
|--|--|-------------------------|----------------------------|--|
| Continuous Stopbank | 99.4k M ³ 111.6k M ³ | 1.9m | 0.56 | 0.57m |
| Fullers Bend (XS 20) | | 0.3m | | 0.85m |
| Inland | 1.6k M ³ | 0.04m | 0.075 | 0.01m |
| Beban (XS 30) | 19.0k M ³ | 0.44m | | 0.13m |
| Vines (XS 28-30) | 43.0k M ³ | 0.82m | | 0.25m |
| North Street | 14.8k M ³ 11.0k M ³ 18.0k M ³ | 0.34m 0.25m 0.41m | | 0.10m 0.075m 0.123m |

Figure 61: Table of Initial Estimates of Materials and Costs – Project Team.

Notes:

- 1 From James Flanagan's Preliminary Numbers.
- 2 Excludes investigation.
- 3 Excludes normal river maintenance.
- 4 Plus sourcing the material from the Mangatāre banks near SH2, if practical, will allow trapped flood water to escape better from that area.
- 5 Plus "right hand column costs".
- 6 Subject to refinement see [Cameron/Fauvel](#) report.

7.8 The six options for flood defence strategies were opened to public consultation using the following channels

- 1 Publishing on social media (Facebook and Neighbourly) and email (WAG email list) to share information about the options.
- 2 Two very well advertised (posters, WAG meetings, word of mouth and local newspapers and publications) 'open day' type events for the public to drop in, ask questions and voice opinions to help with the decision making – one in the evening and one on a Saturday afternoon to provide alternatives for widest reach, attended by approximately one hundred and fifty residents.
- 3 Offers to [community](#) groups to meet and share (ongoing).
- 4 Public meetings were hosted by Waiōhine Action Group prior to and after the drop-in sessions for the same purpose (public meetings were hosted by WAG (open membership to everyone in Waiōhine valley) throughout this project – to share information and seek questions, feedback and help with decision making).
- 5 For each of the six options the following information was provided:
 - a Detailed maps, showing flood defences and impact on flooding,
 - b RAG ('Rough As Guts') comparative build costs,
 - c Best available data on the number of dwellings affected and impact on them,
 - d Project Team members to provide further information and answer questions.
- 6 What was learned:
 - a What information resonated well with the community,
 - b That there was an overwhelmingly obvious response as to which options were most favoured and which were not,
 - c Ideas for additional improvements were received to the most favoured options (these were all investigated and some adopted).

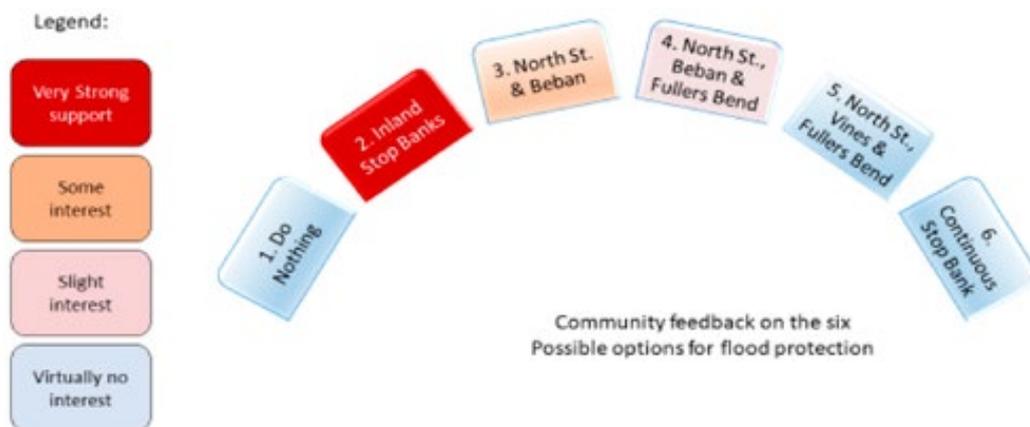


Figure 62: Community feedback on the six scenarios.

7.9 Options comparison of costs and property impacts (out to 2050, without sensitivity)

Note: All numbers are 'Rough As Guts' (RAG) and subject to refinement.

| Option | Rough Cost (plus or minus 30%) | Water on property (no. houses) | Below >-0.1m (no. of houses) | Above >0.1m (no. of houses) | >0.5m (no. of houses) |
|--|--------------------------------|--------------------------------|------------------------------|-----------------------------|-----------------------|
| 1 (build nothing) | \$0 | 128 | 45 | 18 | 1 |
| 2 (Inland Stopbanks (North Street & K Street)) | \$0.7m | 46 | 23 | 11 | 1 |
| 3 (North Street and Beban (XS 30)) | \$1.3m | 41 | 23 | 11 | 1 |
| 4 (North St. & Vines (XS 28-30)) | \$2.3m | 33 | 20 | 10 | 1 |
| 5 (North St. Vines and Fullers Bend) | \$2.5m | 35 | 19 | 10 | 1 |
| 6 (Continuous Stopbank) | \$3m | 24 | 14 | 6 | 0 |

Figure 63: Comparisons of Costs and Property Impacts – Project Team.

Notes:

- Based on visual assessment of floor levels as at present for recently built dwellings as well as data on other dwellings from the GWRC database. Excludes outbuildings.
- Projected to 2050 (this allows +10% extra flood water for [climate change](#))
- Costs exclude the remaining cost of purchasing the three parcels of land for the Fullers Bend ([XS 20](#)) re-alignment in options 4,5,6. For options 4-6 this additional cost (of around \$1.2 million plus mortgage interest) and for options 1-3 any net profit from sale will contribute to the scheme.
- In estimating costs of this solution, a 50% loading was added to land values, to represent fees etc. that could be incurred. This was adjusted to 60% if the land is close to the town.

7.10 Decision reached at 1:30pm on 15th August 2018

Having reviewed all the public feedback from the August 2018 public drop-in sessions, the six available options were short-listed to just three flood protection options, in order of public preference (high to low):

- **Recommended:** inland North Street (Eastern) and Western stopbank, near Kuratawhiti Street (was option 2 at drop-ins) also known as 'Protect the Town'.
- North Street and Beban (XS 30) (was option 3 at drop-ins) also known as 'Protect the town and short extension to Greytown Stopbank'.
- North Street, Bebans and Fuller's Bend(XS 20), (was option 4 at drop-ins) also known as 'Protect the town, short extension to Greytown Stopbank and re-align Fuller's Bend'.

The highlighted cells in the table above show the best available data relating to these three options, where there is a difference between the options. It was therefore decided that there is no need to do further work on flood defence options 1,5 or 6, as there was either little or no interest in these by the community.

7.11 Decision reached at 1:30pm on 20th September 2018

Once the decision was made by the community as to which flood defence option best matched its vision for the future of the Waiōhine River, it was decided to undertake a series of more detailed studies on a number of topics around [Option 2 \(inland stopbanks\)](#). These included:

- 1 A [flood sensitivity study](#) to identify the impact of extraordinary events coinciding with a one-in-one-hundred-year flood (1%) as at both the 2050 and 2100 planning horizons,
- 2 [Conceptual design](#) – to see more clearly where, how high, how long, what profile and what cost was associated with each of the two new stopbanks, including an additional investigation was made into the impacts of [re-aligning the Western Stopbank](#).
- 3 A more detailed study into modelling what would happen if the riverbed built up or was blocked near the end of [Greytown Stopbank](#), to find out if or what extension or other defences might be needed there and
- 4 How much [Freeboard](#) (room for water velocity or wind action etc. pushed up the side of the stopbanks) should be planned for.
- 5 What the impact of re-aligning Fullers Bend might be.

Having obtained the results of further modelling work for detailed investigations the following observations were made:

7.11.1 Do Nothing

This additional study did not show any new information but clearly illustrated that there is a need to eliminate this option of “do nothing” in order to prevent extensive flooding to the northern end of Greytown.

7.11.2 Conceptual Design

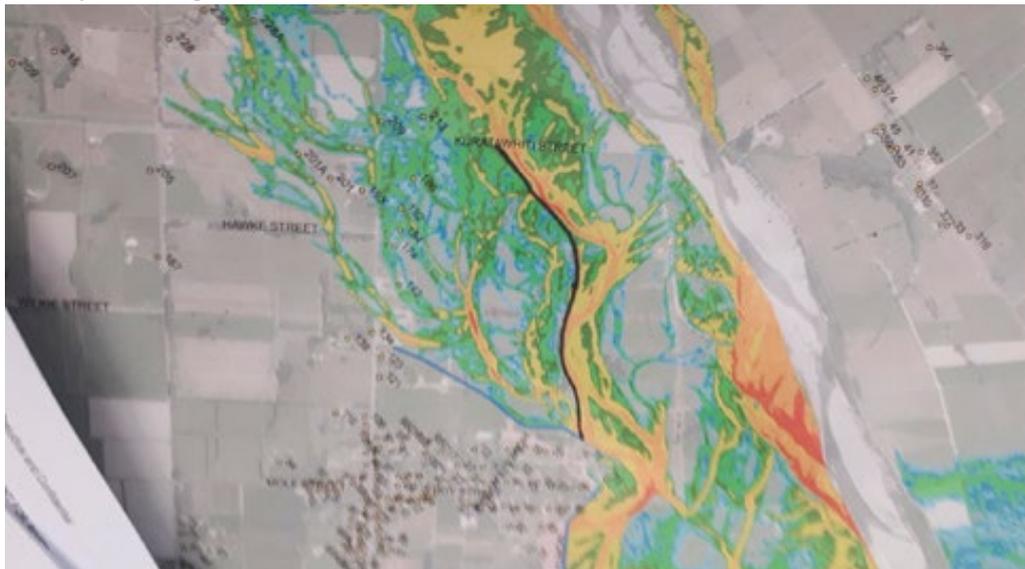


Figure 64: Investigation into possible alternative path for Western Stopbank - design path in blue, alternative path in black.

See [Cameron Fauvel Report](#) for conceptual design information.

As the result of a landowner consultation, an alternative path for the Western Stopbank (near Kuratawhiti Street) [was investigated](#).

Unfortunately, indications are that this path would result in a stopbank of at least twice the length, far higher, with a much wider base. It was realised that this would present several challenges:

- 1 A far higher cost than the preferred path,
- 2 A greater impact on farm operations,
- 3 It still exposed an open flank to the West that would require considerable further work to ensure the flood defences were not outflanked, bringing further cost and issues.

Whilst the exercise had been informative, it was decided that further work on this possible alternative was unjustifiable for these reasons.

7.11.3 Greytown Stopbank

Following landowner consultation, work was undertaken to attempt to find a way to attempt to prove if there could be a need for the extension of Greytown Stopbank, directing flood water back towards the river. To achieve this, a substantial increase in bed roughness (to make it behave as if there were a major obstruction or increase in gravel build up in that area) above Greytown Stopbank, was simulated in the model. This allowed for 1:100-year (1%) flooding plus 16% climate change, plus the additional 20% of channel roughness. The resulting model could not prove the need for extension to the Greytown Stopbank.

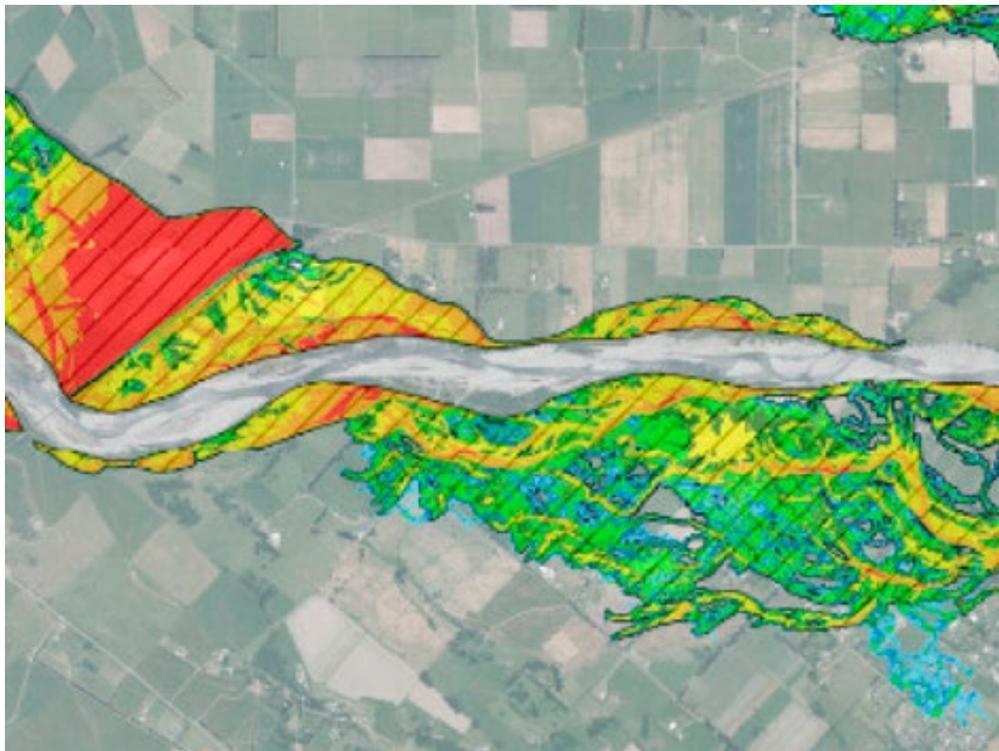


Figure 65: Attempt to force extra flood water at end of Greytown Stopbank (+20% bed roughness on top of 1:100 year plus climate change) makes little difference but has some negative downstream effects.

Regardless, as an extra precaution, in order to bolster flood defences here, it was decided, unless proven otherwise, to use trees to do the job of slowing any flood down. This can be done by planting along the toe of Greytown stopbank and to extend this planting along the base and face of the natural low bank that extends from Greytown Stopbank to support the existing tree line. Note that it is important that the existing trees are NOT cut down.

If evidence emerges that these defences become inadequate. Then the River Management/Living Plan contains a [Trigger](#) that allows two further measures to be considered:

- 1 If observed effects of sheer stress on ground alongside of the Greytown stopbank or tree planting is unsuccessful due to the nature of the ground or substantial channel blockage of one of the two main river channels below the rail bridge ([XS 37](#)) occurs, then there should be a review of need for some protection here – for instance small spur banks, [this has been accounted for in projected costs](#).
- 2 If future models indicate the need, the question of some form of extension to the Greytown Stopbank should be revisited. However, this should, if possible, not focus on forcing the flood back to the river but continue the strategy of spreading it out and slowing it down.

Subsequent modelling of increases in bed level of up to 1 metre in places show that the preferred option is quite tolerant of this with no significant increase to flood spread resulting in this location. Note that raising the bed level further downstream does have serious consequences, near the end of Kuratawhiti Street.

This was presented and supported at a public community meeting.

7.11.4 Freeboard

A definition of Freeboard in Civil Engineering: the height of the watertight portion of a building or other construction (in this case the stopbank) above a given level of water in a river, lake, etc.

Following advice from Ian Heslop during his review of the project it was agreed to build up a specific freeboard separately i.e. specific to the needs of each part of the system. This recognizes that 'not one size fits all'. The biggest components of Freeboard were recognized as:

- Velocity effects – how much power the flood waters exert as they collide with a stopbank
- Bed level changes – which could elevate the river level and increase flooding

Clearly this means that stopbanks set far back from the river will need a different approach to those close to the river. For instance, flood waters that have spread out and travelled far across the floodplain are likely to have a much lower velocity than those in or near the river channel.

[Freeboard](#) is distinguished from [Flood Sensitivity](#). Flood Sensitivity is used to denote the extra area sometimes found on the edge of the floodplain that might in some unlikely combination of circumstances, be slightly prone to a relatively small amount of flooding. This area is defined to help advise local authorities on building platform height, specific location of dwellings and access.

Freeboard has been set for the two inland stopbanks:

- 1 North Street – 500mm but tapering off at the Westernmost end.
- 2 Inland Stopbank (near Kuratawhiti Street) is set at 100mm.

This was arrived at having discussed the following considerations:

- 1 Probability
- 2 Tolerance
- 3 Weightings
- 4 Cumulative effects
- 5 Allowance for increase close to SH2
- 6 Accounting for:
 - a Ground survey error
 - b Stopbank cross section accuracy tolerance
 - c Velocity Head (blocking of flow)
 - d Other uncertainty
 - e Wave and wind set up

7.11.5 Fullers Bend

The third and final additional study was to try to prove a need for the re-alignment of the inside of Fuller's Bend ([XS 20](#), True Left Bank). This was developed as an analysis by modelling, of the force applied to the existing Stopbank on the outside of Fuller's Bend (True Right Bank) both with and without the best shape of re-alignment of the inside of the bend. The result of this investigation was that no significant additional flooding occurred when the inside of the bend was realigned. However, the point of impact of the force of the flood was moved slightly further downstream, to where existing river defences are weaker and inadequate to the task. In addition, the force of the river would likely be deflected to the outside of the next bend (True Left Bank) where there would be a high risk of the river breaking its banks. The concept of realigning the inside of Fullers Bend was therefore abandoned.



8

Cost and funding implications

8.1 MfE guidance to communities on flood risk management

States: "Lower-income areas and areas with a smaller rating base also experience difficulties in affording good flood risk management. Councils with better resources, including better information and funding, are more likely to achieve more robust flood risk management. This results in an equity issue, as some communities may not be able to afford an acceptable level of flood risk management. Reducing flood risk across the country requires that all councils are able to manage the flood risk effectively."

As part of the Wairarapa, the Waiōhine Valley is part of a large area, with less than 10% of the population of the Greater Wellington Region and approximately 80% of the river and lake area of the region. Average incomes are also lower than the remainder of the region, with a relatively older demographic. The practicalities of this dictate a high degree of care for what kind of burden the overall cost of flood protection is to such a community.

8.2 Estimation of total capital cost of proposed works

It is estimated that the total capital cost of the proposed solution will be less than \$2 million.

This includes an estimated cost of \$1,131,431.85 has been provided by [Cameron Fauvel Projects](#) for the physical works to complete the new Western and Eastern inland stopbanks near North Street and Kuratawhiti Street respectively. Their [Topographical Survey Report](#) contains a conceptual design of the two proposed stopbanks, including the topographical survey of the subject site, coordination and consultation with local stakeholders and optimization of the stopbank alignments, heights and earthworks volumes.

The total of \$1,131,431.85 for (both) the stopbanks construction costs therefore breaks down by location, as follows:

| | |
|--|-----------------------|
| Preliminary & General | \$67,500 |
| Kuratawhiti Street (West) Stopbank: | \$304,805.64 |
| North Street (East) Stopbank: | \$759,126.21 |
| Total: | \$1,131,431.85 |

Figure 66: Table of preliminary cost estimates – Project Team.

This cost is made up as follows (West Bank is near Kuratawhiti Street, East Bank is near North Street):

We investigated whether the build/cost of the Western stopbank, near Kuratawhiti Street, could be deferred until clear evidence of need emerges – this could be managed under the [Living Plan process](#). However, some risk, if unlikely, would exist and might possibly have a potential impact on issues like minimum build heights, insurance etc. for many urban properties.

So, **it is recommended** that whilst the new stopbank near North Street is urgent and important, the new stopbank near Kuratawhiti Street is also needed and should be built as soon as is practical.

In addition the estimate of approximately \$2 million includes estimates of structural and related works capital (one time) costs relating to improving flood defences at the Eastern end of Greytown Stopbank are:

- **\$30,000** (+ or – 30%) for planting at the foot of and end of [Greytown Stopbank](#). This cost is based upon a recent planting of natives.
- **Or alternatively: \$45,000** (+ or -30%) for the construction of [3 spur banks](#) for the Greytown Stopbank.

In addition, there will be other costs associated with the process, consents and related matters.

| Item | Description | Unit | Quantity | Rate | Amount |
|-------------|--|----------------|-----------|--------------|-----------------|
| 1.00 | PRELIMINARY AND GENERAL | | | | |
| 1.01 | Construction Set Out Survey | LS | 1.00 | \$ 10,000.00 | \$ 10,000.00 |
| 1.02 | Mobilisation of Plant and Equipment | LS | 1.00 | \$ 7,500.00 | \$ 7,500.00 |
| 1.03 | Site Establishment | LS | 2.00 | \$ 2,500.00 | \$ 5,000.00 |
| 1.04 | Installation of Environmental Controls | LS | 1.00 | \$ 15,000.00 | \$ 15,000.00 |
| 1.05 | Compaction Testing | LS | 1.00 | \$ 20,000.00 | \$ 20,000.00 |
| 1.06 | As Built Survey and Documentation | LS | 1.00 | \$ 10,000.00 | \$ 10,000.00 |
| | | | | | |
| | | | | Subtotal 1 | \$ 67,500.00 |
| 2.00 | EARTHWORKS | | | | |
| 2.10 | STOP BANK 1 - WEST BANK | | | | |
| 2.11 | Top Soil - Strip 250mm to Stock Pile | m ³ | 2,327.00 | \$ 14.19 | \$ 33,020.13 |
| 2.12 | Sub Grade Treatment | m ² | 9,308.00 | \$ 1.56 | \$ 14,520.48 |
| 2.13 | Imported Material (FOC) - Carted from 15 minute Radius | m ³ | 6,909.20 | \$ 9.90 | \$ 68,401.08 |
| 2.14 | Place and Compact Imported Fill | m ³ | 6,909.20 | \$ 20.10 | \$ 138,874.92 |
| 2.15 | Respread Top Soil on Bank | m ² | 930.80 | \$ 20.38 | \$ 18,969.70 |
| 2.16 | Respread Top Soil off Site | m ³ | 1,396.20 | \$ 10.19 | \$ 14,227.28 |
| 2.17 | Undercut - Provisional Sum | m ² | 690.92 | \$ 14.19 | \$ 9,804.15 |
| | | | | | |
| 2.20 | STOP BANK 2 - EAST BANK | | | | |
| 2.21 | Top Soil - Strip 250mm to Stock Pile | m ³ | 4,459.75 | \$ 14.19 | \$ 63,283.85 |
| 2.22 | Sub Grade Treatment | m ² | 17,839.00 | \$ 1.56 | \$ 27,828.84 |
| 2.23 | Imported Material (FOC) - Carted from 15 minute Radius | m ³ | 17,811.00 | \$ 9.90 | \$ 176,328.90 |
| 2.24 | Place and Compact Imported Fill | m ³ | 17,811.00 | \$ 20.10 | \$ 358,001.10 |
| 2.25 | Respread Top Soil | m ³ | 4,459.75 | \$ 20.38 | \$ 90,889.71 |
| 2.26 | Respread Top Soil off Site | m ² | - | \$ 10.19 | \$ - |
| 2.27 | Undercut - Provisional Sum | m ² | 1,781.10 | \$ 14.19 | \$ 25,273.81 |
| | | | | | |
| | | | | Subtotal 2 | \$ 1,039,423.95 |
| 7.00 | MISCELLANEOUS | | | | |
| 7.10 | STOP BANK 1 - WEST BANK | | | | |
| 7.11 | Vehicle Crossing Surfacing (Farm Access) - AP40 Supply and Place | m ² | 40.00 | 102.51 | \$ 4,100.40 |
| 7.12 | Fencing Reinstatement Works | LM | 165.00 | 17.50 | \$ 2,887.50 |
| 7.20 | STOP BANK 2 - EAST BANK | | | | |
| 7.21 | 86 North Street Detailed Earthworks and Landscaping | LS | 1.00 | 15,000.00 | \$ 15,000.00 |
| 7.22 | Fencing Reinstatement Works | LM | 144.00 | 17.50 | \$ 2,520.00 |
| | | | | | |
| | | | | Subtotal 7 | \$ 24,507.90 |

Figure 67: Table of preliminary cost estimates for stopbanks – Cameron Fauvel Design.

Therefore, at this stage we recommend that an estimated budgetary expectation of up to \$2,000,000 (which includes contingencies, options etc.). It is noted that this does not include the purchase of any land as that is not considered to be necessary.

We recommend that all other work on the river be addressed through the existing operational (OPEX) maintenance annual budget.

8.3 Note to costing – parcels of land inside Fuller’s Bend

As at 2021, ratepayers have been paying rates to cover loans taken out by GWRC to acquire three parcels of land. These properties were purchased by GWRC in recent years and set aside, in case the widening and re-alignment of the inside (true left bank) at Fuller’s Bend should need to go ahead. The first two of these were purchased (utilising the Public Works Act), specifically for realignment of the inside of Fullers Bend:

- 1 The Land at 127A Mataroa Road/Swamp Road, purchased for \$120,000 as at 2015.
- 2 The Land at 127C Mataroa Road/Swamp Road, purchased for \$595,000 as at 2014.
- 3 A third parcel of adjacent land was also later purchased at 65 Mataroa Road/Swamp Road for \$454,000 as at 2016.

Note that a small portion of this land, which lies between the river’s edge and the existing stopbanks, would need to be retained by GWRC. Also, current access to the river buffer will need to be retained (a portion of this access is over mana whenua land and will continue to need ongoing permission for access to be kindly granted). This land is needed specifically for a) a slight re-alignment of the river buffer against the need for its defence and b) for rights of access for ongoing gravel extraction.

It is roughly estimated that the total burden to ratepayers of servicing these three interest-only loans is in the order of \$65-70,000 per annum. Disposing of this land or at a minimum, shifting it out of the Floodplain Management aegis, would remove the annual burden of loan repayment from the ratepayer community and release it into the pool of funds set aside annually for river maintenance operations (OPEX). This would help speed stopbank strengthening of the outside of Fuller’s Bend for instance and would be most beneficial to the river overall.

As retaining this land within the flood plain management portfolio is no longer necessary, the community and Project Team have been asking for some time for this land to be released back onto the market and sold, or moved to another cost centre, to remove this unnecessary financial burden. GWRC have advised that as at the end of the 2020/21 financial year, this land will be moved out of the scheme and any improvement in value since purchase will be granted back to the Waiōhine river scheme.

Finding:
We recommend that these parcels of land, (except for land between the river edge and back of stopbanks) are sold as soon as possible, that any residual profit, should be used to progress protection work on the outside of Fuller’s Bend, which otherwise is funded from the annual river maintenance budget.

8.4 Further information and recommendations on costs

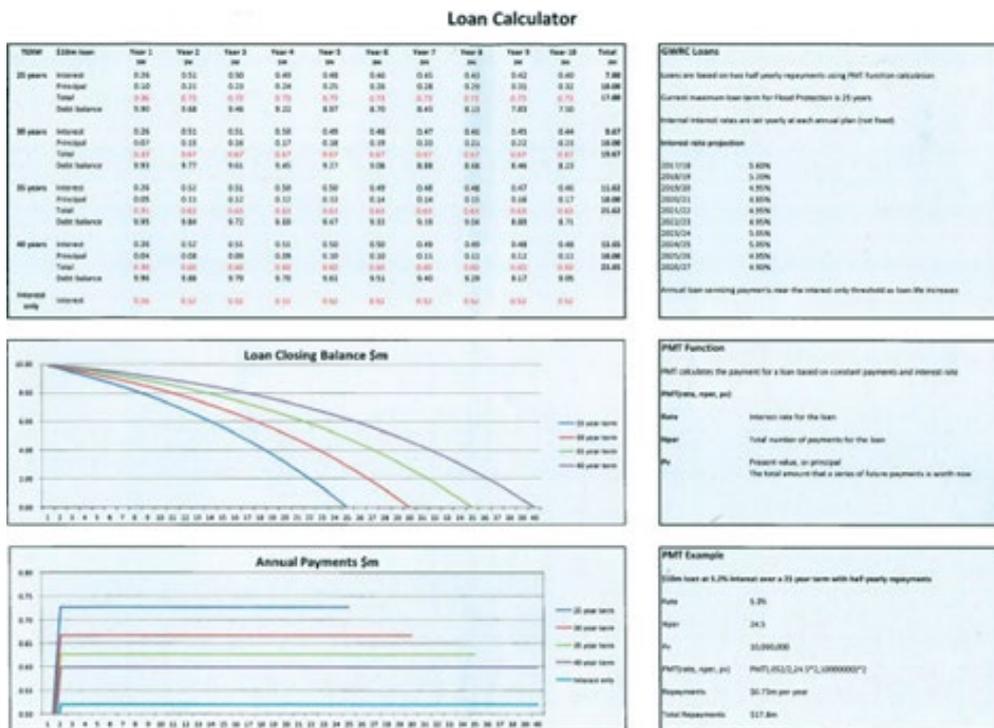


Figure 68: Loan Calculator – GWRC.

8.4.1 Term of Loan to fund Structural Works

The roughly estimated capital cost of works associated with this River Plan has to balance a range of factors, to find a way to meet the capital cost of [structural solutions](#), needed to provide flood defences, added to cost effective ways to continue to [manage the river](#).

Capital works can now be funded to a 25-year funding horizon if needed, or up to 30 years in some instances.

Different works can be phased and timed differently, therefore financed in different ways, that are the right fit for their use, cost and life.

It is recommended that capital costs are funded through a loan for a term of around 25 years. This will roughly align with the 2040-2050 first [planning horizon](#), and proposed full review of the plan at that time, whilst minimising the impact on annual rates in the meantime.

All recommendations relating to finance and funding are subject to GWRC funding policy in place at time. This policy is consulted on in a separate document.

8.4.2 How did we arrive at this?

The capital works for new inland stopbanks to protect urban Greytown and a small proportion of rural zoned properties within the flood defences are relatively inexpensive. If spread over 25 years, including interest, split between pan regional and local rates (currently a 50/50 split), this will have a very small impact on urban ratepayers and others within the defences, who will be the major beneficiaries of a 1:100 defence of dwellings, facilities and businesses. It is roughly estimated that on average, this should work out at approximately \$50-80 per ratepayer, per year.

It is recommended that the new inland (Western and Eastern) stopbanks and the minor work to build perpendicular snub groynes at the foot of Greytown Stopbank, should be funded from rates contributed by all urban dwellings and rural dwellings protected within the new (Western and Eastern) inland stopbanks.

Other rural dwellings along both sides of the whole river will continue to benefit from existing flood defences and river maintenance for flood protection to at least 1:20 year flooding (5% chance of occurring in any one year). New rural dwellings will be required to be built to the 1:100-year (1%) standard.

It is recommended that as those rural dwellings outside the new inland stopbanks, are not the major beneficiaries of the main new flood defences, they should not need to contribute above current levels to flood protection. As at present the maintenance projects and annual budget seems to be adequate to needs, this should continue as is but we recommend this should be subject to review if a significant [Trigger event](#) requires.

8.4.3 Target rating – clarifying new build versus maintenance

It is recommended that redistributed benefit should be recognised, and that the existing target rating classification remains for all river maintenance and operational management works. We see these as operational (Opex) in nature.

Therefore, we recommend that they should continue to be funded from annual rates, rather than capital expenditure, funded from long term borrowings identified for capital build.

Conversely, we recommend that new capital funding be raised for the construction of new stopbanks (such as Western (near North Street), Eastern (near Kuratawhiti Street) stopbanks and the perpendicular snub groynes at the toe of the Greytown Stopbank).

We recommend that a new targeted rate for this should be implemented, to be repaid over a term of 25 years, from a targeted rate on all urban and other properties behind (protected by) the new Inland Western and Eastern stopbanks.

Current policy is that up to 50% of the cost of flood defences are found from pan regional rates and the remainder is raised from the local share, based upon whatever is the current policy for that river.

8.4.3.1 Findings: Recommended Approach to Funding Structural Solutions:

Finding: It is Recommended that new capital works be Funded using a finance horizon of 25 years – fitting the horizons identified above.

These capital works include:

- Kuratawhiti Street (Western) Stopbank (new construction).
- North Street (Eastern) Stopbank (new construction).
- New perpendicular groynes, should they be required, on the toe of Greytown Stopbank.

This excludes:

- Completion of ongoing work to strengthen the major stopbank on the outside of Fuller's Bend ([XS 20](#)) to protect SH2.
- Other maintenance and operational works.

It is recommended that the excluded projects should be funded from operational funds allocated to river maintenance, which would be significantly boosted by the disposal of the three parcels of land on the inside of Fullers Bend and other means, see below.

8.4.3.2 Summary of the sources of funding for the ongoing project to rock line the outside of Fullers Bend

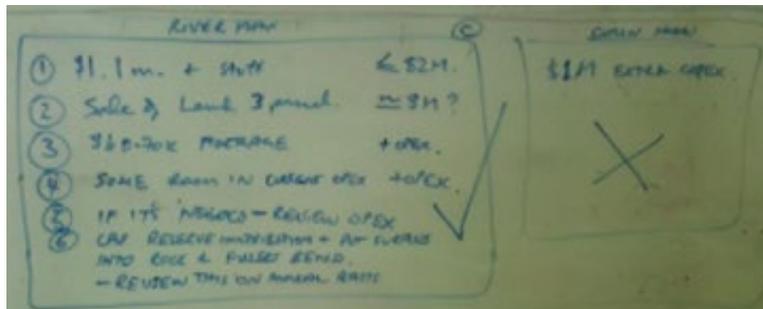


Figure 69: Summary of sources of funding – Project Team.

- 1 The remainder of the capital budget of \$2 million, i.e. what is left after the capital build and related costs are completed (see above).
- 2 Any profit that accrues from the eventual sale, transfer to another purpose, or disposal of the three parcels of land inside Fullers Bend that were specifically purchased for straightening and widening the river, which is no longer required and have been paid for by the community, out of GWRC rating for this purpose.
- 3 The savings to the operating budget of the estimated \$60-70,000 per annum servicing the mortgages on these three parcels of land should be redirected towards the rock lining project for Fullers Bend. Once completed, the savings should become part of the operating budget for river maintenance and restoration.
- 4 As some work has already been completed, it is evident that there is some continuing room for funding from the existing operating budget.
- 5 Capping the river scheme reserve for the Waiōhine at \$750,000 and redirecting the excess now and in the future into the rock lining project. See Notes on Waiōhine River Scheme Reserves Treatment below.
- 6 If all these fail for good reason, then review whether a small increase in opex budget is needed. This is viewed as unlikely.

NOTE: This should be reviewed in each annual plan until this project is completed.

8.4.3.3 Waiōhine river scheme reserves treatment

There is, at the time of writing this plan, substantial financial reserves have accrued to the river scheme. These reserves are used to:

- 1 Provide go-to funding in the event of a major flood event on the river and the need to undertake extensive emergency repairs and maintenance to flood defences, or
- 2 Provide a “buffer” of funding that can be dipped into and replaced in the event that operating and maintenance budgets are stressed during any one year.

There are two reserve funds. As at early 2021, these would stand at approximately \$750,000 and \$55,000 respectively. If needed for emergency work after a major flood, these would be boosted by a contribution from the rest of the GWRC rating

base. They have been temporarily depleted but will be restored from the net residual when the bulk of the Fullers Bend land is removed from the scheme.

Ideally, reserves could accrue until a target of approximately 10% of river asset (stopbanks etc.) value has accumulated. However, an interim target of \$750,000 is deemed adequate.

8.4.3.4 Benefits of this approach

- 1 Capital works will be fully amortised by the first [planning horizon of up to 2050](#) this will leave the way clear to invest in further works then needed.
- 2 This fits to repay the loans within the span of one generation, leaving a much better-informed next generation to review the needs beyond the up-to-2050 horizon out to 2100 where climate change and new data might drive adjustments to the River Plan.
- 3 By 2050 strategies for river management, fuelled by new science, engineering and technology may well provide new opportunities for a new generation to adopt its own strategy for their river. We will, for instance, have a zero-carbon economy and hopefully have made steps in the vision of this plan, which will positively change the relationship between mana whenua, town, country, land, climate and river.

8.4.3.5 CAPEX, OPEX, and spend to date

Spend to Date on developing a Waiōhine Floodplain Management Plan has been approximately \$1 million. This was funded through a consolidated loan over 15 years: Levied equally across GWRC in accordance with current GWRC policy (that Floodplain Management Plan Investigations and plan development is spread 100% across the regional funding base). These costs therefore have no impact on the costs associated with this, current, River Plan.

8.4.3.6 Reserves for emergency works

A strategy is in place of setting aside a small portion of the operational river management budget in quiet years and periods (see [Waiōhine Hydrology](#)) when no damaging floods occur to build up a financial reserve that can be drawn upon in the event of emergencies and damaging events (for instance major floods or earthquakes). We understand that **this reserve currently amounts to approximately \$770,000.**

It is important, given the aggressive and unpredictable nature of the Waiōhine, the urban infrastructure and other assets at risk, that this reserve be exclusively retained for use as intended, on the Waiōhine, whose ratepayers have funded it.

Finding:

It is recommended that the reserve fund should be maintained at or near \$750,000, allowing for it to be gradually replenished, in the event of its use in an emergency. This reserve should be clearly and distinctly reported separately and categorically earmarked for emergency use on the Waiōhine river. Funds accumulating in the reserve in excess of the \$750,000 cap should be used to accelerate the rock lining of the outside of Fullers Bend and, once that is completed, other projects as agreed between stakeholders.



9

Non-Structural Solutions

Non-structural solutions keep people away from floods.

9.1 Interim maps, final maps, planning controls

Until the proposed new inland stopbanks can be built soon (≈ 2 years from approval of this plan), **we recommend** that we should retain the interim maps currently in use for planning and approvals, then publish new maps that can be adopted after the stopbanks are completed.

There are two major flood hazard zones identified through the mapping exercise and that we have agreed to, these are:

- 1 The Flood Hazard Area
- 2 The Flood Sensitive Area

Here is a description of these two hazard zones:

9.1.1 The flood hazard area

This relates to the area of flood hazard from the Q100 flood event in the river plus an increase in water to consider the increase in rainfall intensities from climate change. In this case the increases were 10% and 16% for the 2050- and 2100-year planning scenarios respectively. In this hazard area we were going to use the hazard categorization (H1 to H6) that is in the Australian Rainfall and Runoff (ARR) guidelines. Flood levels given out would be to the Q100 + 16% climate change + the top of the flood sensitive area. These rules are given in the following section 9.2.

9.1.2 The flood sensitive area

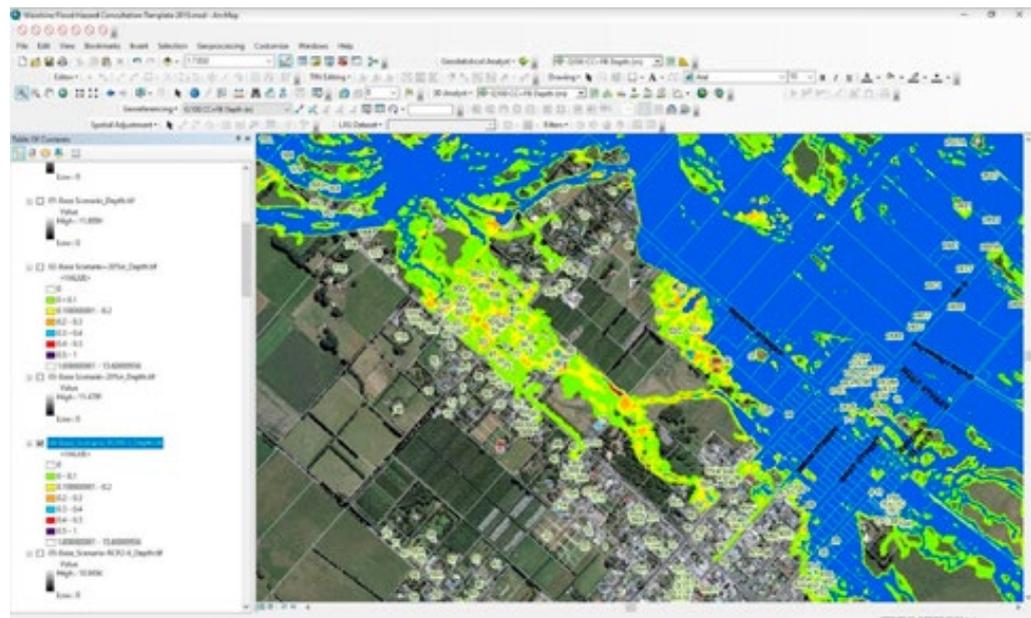


Figure 70: Flood Map – Detailed Study of Flood Sensitive Area 1 – landriversea Consulting.

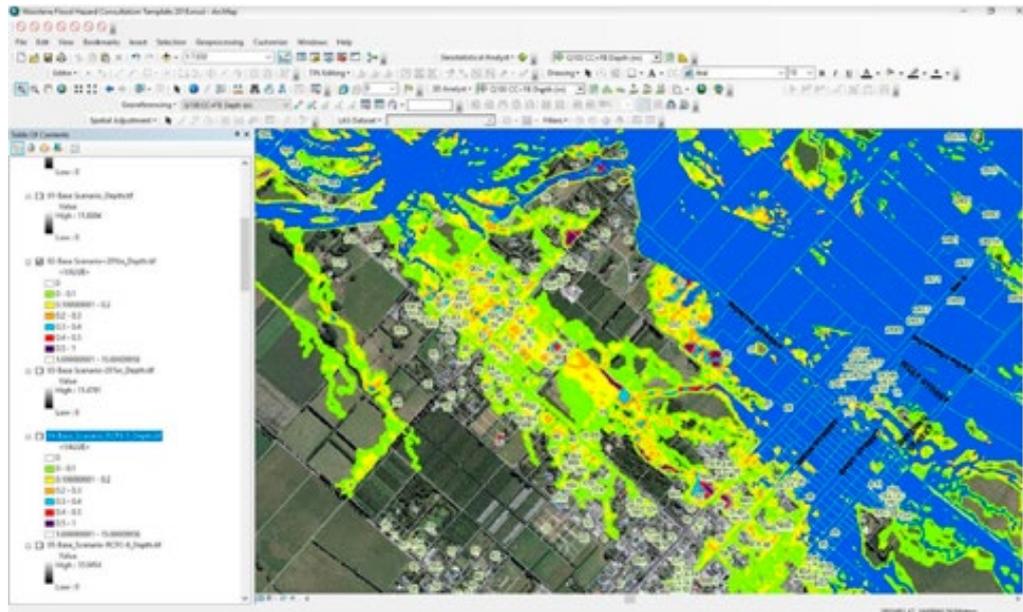


Figure 71: Flood Map – Detailed Study of Flood Sensitive Area 2 – landriversea Consulting.

We agreed that there should be recommended build levels in this area, but that these would be based on a blanket 300mm above ground level flood height requirement for the entire area. We subsequently learned when looking through this area in some detail, that there are quite a few locations where the sensitivity flood depths are greater than the 300mm (see detailed study images inset) we have chosen; so we needed to consider what to do to address this. It was agreed that it would be prudent and more informative, to use the actual flood depths in this flood sensitive area to recommend building levels.

9.2 What controls are we seeking on flood plain (between buffer zones and edge of flood risk zones) as a recommendation to territorial authorities?

The area outside the riverbanks but inside the greatest extent the river may flood to in a 1% (one-in-one-hundred-year flood) is the floodplain of the Waiōhine river.

It was decided to use the Australian Rainfall and Run-off method ([ARR](#)) for depicting the degrees and types of risk from flood waters in the floodplain. This was chosen in consultation with Planning Officers from SWDC and CDC. Using this method allows the Project Team to provide information that is most useful to both the community and territorial authorities.

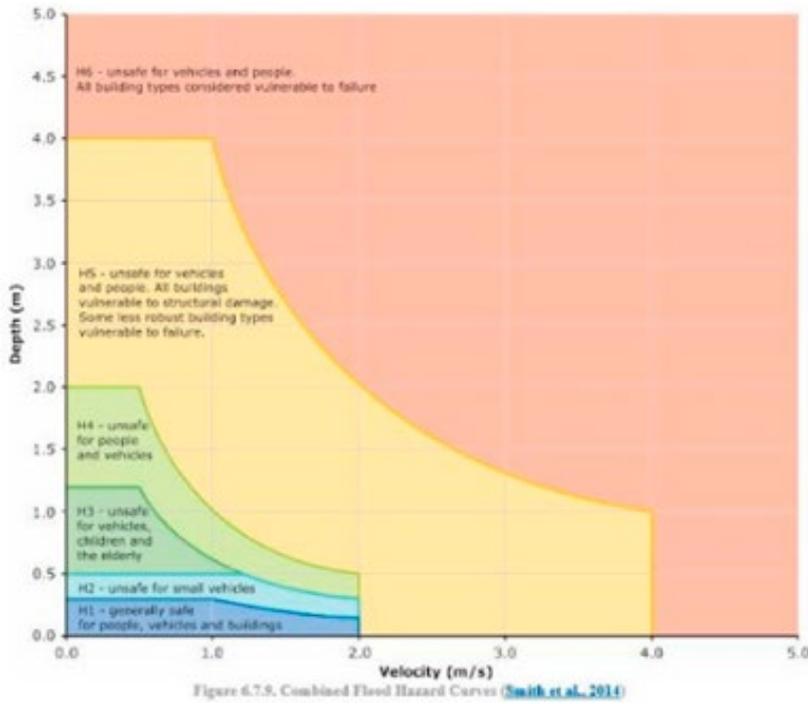


Figure 72: Australian Rainfall Runoff Guidelines hazard classification – ARR.

| Hazard Vulnerability Classification | Description |
|-------------------------------------|---|
| H1 | Generally safe for vehicles, people and buildings |
| H2 | Unsafe for small vehicles |
| H3 | Unsafe for vehicles, children and the elderly |
| H4 | Unsafe for vehicles and people |
| H5 | Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure. |
| H6 | Unsafe for vehicles and people. All building types considered vulnerable to failure. |

Figure 73: Table of Hazard Classifications – ARR.

The following recommendations are made:

- Land Information Memorandums (LIMs) will still be annotated for properties still in at-risk areas.
- A control on building floor levels at minimum height should be adopted.
- The planning principle that the town should intensify/spread away from the river.
- No filling/impeding of old flood channels also storm water channels should be allowed.
- Land in the flood plain will indicate the degree of hazard from major floods using the [Australian Rainfall and Runoff Guidelines](#).
- That Land designated as Australian Rainfall and Runoff model High hazard (H5 & H6) has a high velocity multiplied by depth combination that should not be considered as fit for new building or access,

- That Medium Hazard (H3 & H4) may be used for building or access, subject to specific requirements,
- That Low Hazard (H1 & H2) does not mean no hazard, but includes the rest of the flood risk area and includes the flood sensitive area
- Recommendations relating to subdivision:
 - a Maintain low density i.e. minimum 4-hectare sections
 - b Must have suitable building site
 - c Must have safe access
 - d Must not impede flows
- That Territorial Authorities (T.A.s) adopt the implementation of control on vegetation we want protected in the flood risk zone because it does an important job of flood protection – and on areas that need to be kept cleared of large vegetation or other impediments
- That T.A.s adopt measures to protect critical landscaped features e.g. small bumps that may play any part in impeding flooding
- The Independent Peer review by Ian Heslop recommends considering the use of Protection Works Contracts on the titles of land on which existing features, such as banks, groups of trees and so on, need to be retained in order to protect the integrity of flood defences.
- That within the flood risk zone, shipping containers and other large objects that could be swept away by a major flood, should be somehow securely anchored. A shipping container or similar obstruction can cause serious blockage or damage when carried along on floodwater.

Findings:

To propose that local councils adopt a minimum height for a building in a flood sensitive zone based upon the use of High, Medium and Low Hazard classification labels for land within the floodplain. These are designated, considering both depth and velocity of flood water in any location on the floodplain.

9.3 Relating to State Highway 2

NZTA reseal this stretch of road, typically raising the height of the crown by 10-12 mm every 8-10 years. This gradual increase in height increases the effect of damming water behind the road crown and increases flood depth and risk to dwellings in a 1:20 plus climate change flood event, putting some adjacent properties at additional risk.

We recommend that NZTA maintain the height of the crown of SH2 in identified locations, within an envelope of heights (for the crown of the road surface).



Figure 74: Flood Map – Detailed Study of need to raise crown of SH2 – landriversea Consulting.

There are 4 key locations for maintaining the road surface height:

- 1 To slightly raise the road south of the Apple Barrel shop (e.g. 100 mm), creating an improved barrier to the risk of flood water over spilling the Apple Barrel and entering the North end of Greytown.
- 2 To keep the Apple Barrel floodway at the current height.
- 3 To keep the road crown past Pinehaven retail outlet (2471 SH2), on the straight stretch, between current height and -100mm.
- 4 To keep the road crown at its current height, in the slight dip in the road near Clark's farm (XS 18).

NZTA have undertaken to consider these recommendations in their own planning.

NZTA advises that pavement heights are upgraded at 25-year intervals.

Computer information has been provided to NZTA by GWRC, depicting the locations of start and stop for surface heights, for each stretch of road.

Progress on this will be monitored under the [Living Plan Process](#).

9.4 House Raising

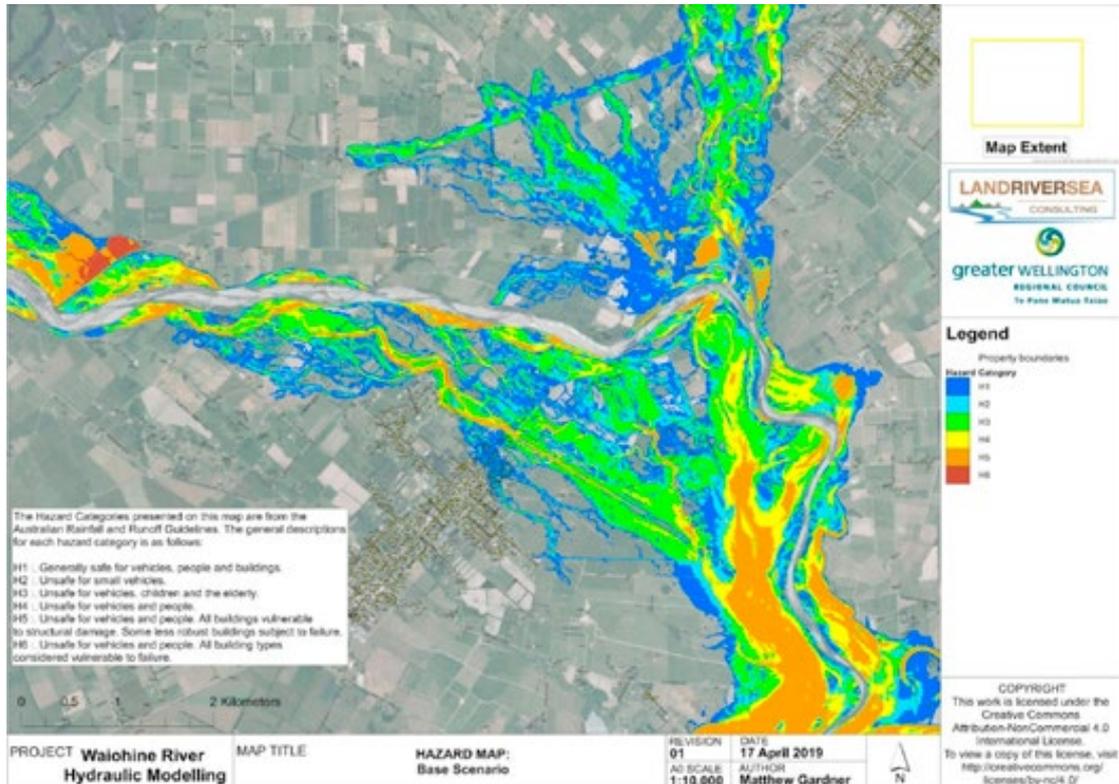


Figure 75: Hazard Map depicting types of risk from flood waters using the Australian Rainfall and Run-off Guidelines method. [A map that can be expanded can be found here.](#)

In some situations, the possibility of offering to part subsidise [the raising of house foundations](#), where properties are seriously threatened by floodwaters, and other defences that fall within the plan have been considered. At the time of planning, there are no rural dwellings that we know will be inundated by up to a 1:20 year flood plus climate change and no urban dwellings will be inundated by 1:100 year river floods plus climate change (conditional upon the [proposed stopbanks](#) being constructed), as at 2050. However, if for some reason an [event trigger](#) in the [Living Plan](#) occurs to change this (e.g. a dramatic upswing in [climate change](#) forecasting, or the result of the forthcoming catchment planning of the Mangatāre), then this can be revisited within the [River Maintenance](#) Living Plan provisions of this plan. We also note that house raising options are rarely taken up for a variety of reasons, but feel this should be nevertheless held in reserve, as a tool that the Living Plan may call upon, if a good reason to do so emerges in the future.

Notes:

- 1 House raising is a possible tool that has been used elsewhere. For the Waiwhetu stream in 2013 the estimated cost of house raising was in the region of \$170k – \$300k per house, **this is not budgeted within this plan.**
- 2 There is no identified need for house raising for properties relating to the Waiōhine at present, although there might at some stage be a possible application on the true left bank (Carterton side) relating to the Mangatārere. This should be considered, following completion of the Catchment plan for that river and consequent review, if necessary, of the Waiōhine River Plan.
- 3 For these reasons, any consideration of need in the future is adequately covered by [existing triggers](#).



10

Emergency management and flood warning

10.1 What do we know about the risks?

The nature of its remote catchment and its steep gradient make the Waiōhine prone to sudden flash floods that can be life threatening. It is necessary to install suitable signage to warn the public of the possible dangers of sudden flooding. These should be provided at the following major access points:

- 1 At Kuratawhiti Street end access.
- 2 At State Highway 2 access.
- 3 At the access area above the railway bridge ([XS 37](#)) known as the gooseneck.
- 4 At River Road access.

Flooding of the Waiōhine is rated as a “Major” risk by [WREMO](#).

WREMO Coordinates Civil Defence and emergency management services on behalf of the nine councils across the Wellington Region.

10.2 What tools do we use to mitigate these risks?

Stopbanks are the main tool to [protect urban Greytown](#).

Planning controls are the main tool to [protect new development](#).

Emergency Management is the main tool for protecting residents of existing development in [high hazard area](#). See [hazard map](#).

Provide Warning: Flash flooding occurs so quickly that the current method of escalation and warning to the public cannot respond in time to prevent risk.

It is recommended that some form of automated flash flood warning system, as those in widespread use overseas, should be investigated under the [Living Plan Process](#). Examples of such technologies are media tools e.g. phone alerts, sirens, text alerts.

As a minimum, we need to add Greytown and Carterton Civil Defence volunteers into alerts from the current flood telemetry system.

Utilizing the text-based emergency mobile alert service should also be investigated under the Living Plan.

Enable Evacuation: High hazard properties should have evacuation plans and warnings of one in twenty year or greater flood events. These should be maintained via an online portal and implemented and periodically reviewed under the [Living Plan Process](#). It is likely that road closure at the Apple Barrel Floodway may occur and a practical system for this needs to be verified.

There is a system of notification of neighbours in rural flood risk areas where flooding above 1:20 year return period could pose a risk, with evacuation plans to go to “safe houses”.

Maintain Awareness: SWDC, CDC and WREMO must be included in developing joint planning via the Living Plan Process.

Appropriate signage should be provided at the most popular access points to the river to help make users aware of the sudden danger flash flooding poses.

It is recommended to:

- Install suitable warning signs at popular access points to the river
- Investigate automated flash flood warning system within the Living Plan
- Add Greytown and Carterton area Civil Defence volunteers into the flood warning process
- Investigate using the text-based emergency mobile alert service in the Living Plan
- Keep emergency evacuation process up to date under Living Plan
- Include WREMO as stakeholder in Living plan process



11

The Living Plan

11.1 How the stakeholders can be partners

It would be folly to assume that a River Plan would be able to anticipate every eventuality that may arise for seventy years into the future. So, we must have an approach that allows the community to continue to work together with GWRC to keep on developing and adapting this plan, as the river, legislation, the community, climate and our society and economy evolve and interact.

A Living Plan An Holistic Approach

| | |
|------------------------|-----------------------|
| Static: | Living: |
| Point in time analysis | Long term vision |
| Level set | Interdependency |
| Fixed flood defence | Triggers |
| | Community partnership |
| | River Management |
| | River Projects |

Figure 76: A Living Plan – A holistic Approach – Project Team.

Finding:
It makes sense that the processes and models that have been successful in bringing everyone together to analyse and understand the issues, and to come up with solutions, based on broad consensus, should continue to deliver in a living plan form. This is what the Living Plan Model is built upon.

While developing the Waiōhine Floodplain Management Plan it was agreed that it should address all aspects of the river (and therefore became the Waiōhine River Plan).



Figure 77: Global Consenting and River Management Framework Diagram – Project Team.

It was agreed that:

- 1 It must contain all the necessary processes, mechanisms, personnel, triggers and plans to continue the partnership of [community](#) and GWRC.
- 2 It must contain all the necessary processes, mechanisms, personnel, triggers and plans for the ongoing management and improvement of the river, for the timespan of the River Plan: this aspect of the Waiōhine River Plan is what makes it a Living Plan.

Finding:

The Living Plan: It is recommended that the Waiōhine River Plan can evolve as needed by consensus between the community represented by the Waiōhine Action Group Project Team in partnership with GWRC. Its job is to make decisions and recommendations on what the community conceives as the best model for engagement; to ensure the most likely success of the Living Plan. This will report formally as an advisory committee to the Wairarapa Committee of GWRC.

The Waiōhine River Plan as a Living Plan is subordinate to the law, and superordinate to operating manuals, annual and other GWRC operational plans, and other operational instruments. Any consent should embrace its intent and recommendations. It must address the needs of the whole river, not just floodplain management.

It is noted that different communities and different rivers have different needs and thus expect (GWRC to have) a flexible enough model to accommodate this – including the stakeholders combined needs for their shared vision of the Waiōhine.

Monitoring of flood protection and other work by the community include Maori cultural consideration from research and monitoring. The possibilities for cultural enhancement of the environment, should be considered as an opportunity, when undertaking flood protection work in the Waiōhine Floodplain – [see Cultural Impact Assessment](#).

The Terms of Reference and Operating Model for the Waiōhine River Living Plan and the Waiōhine WAG Project Team Committee are at [Appendix C](#). This will be refined by WAG reporting to the Wairarapa Committee, as the Living Plan comes into effect, once this plan is ratified and adopted by GWRC in Council.

“The Living Plan model is very sound, and given continued ongoing strong community engagement and consultation, it is expected to produce a Floodplain Management Plan which aligns community and Council expectations.” [Review of Waiōhine River Floodplain Management Plan](#).

What Partnership Looks Like



Figure 78: What Partnership Looks Like Diagram – Project Team.

| |
|---|
| ONE |
| <p>GWRC will share in good time, with the WAG Project Team and community, all relevant trigger data, events and findings that might inform planning inputs or actions that might need to be taken in between GWRC annual planning cycles, or that fall within the aegis of this Waiōhine River Plan (Incorporating Floodplain Management Plan), such as, for instance, Living Plan trigger events or measurements and studies of the river, or that generally relate to the river and floodplain.</p> |
| TWO |
| <p>With that in hand, everything provided will be shared and reviewed by the community prior to each GWRC planning cycle (annual, operational or long term) commencing. New items and topics may be added to this with the agreement of the Wairarapa Committee.</p> |

The Waiōhine Living River Plan (Incorporating Floodplain Management Plan) Process

2. Consultation: Information the community has collected itself, from GWRC and other sources is shared with Iwi all interested stakeholders and they are invited to share in the planning process, or "do their own thing".



THREE

GWRC, the WAG Project Team and community will share all planning inputs and discuss as needed, by both parties, prior to the start of each formal GWRC planning cycle that might affect the river and environs.

The Waiōhine Living River Plan (Incorporating Floodplain Management Plan) Process

3. Evolve the Living Plan: Engage as a Project Team with GWRC planners, subject matter experts and interested stakeholders, using the same open and transparent process and tools as are used in developing this plan, whilst GWRC also develop their draft plan.



FOUR

GWRC will produce their draft plan and share this with the WAG Project Team and community in good time for the community to communicate with all stakeholders, meet, seek additional information if necessary, review it, and identify differing views or endorsements. It may be necessary to engage independent subject matter experts during this period.

The Waiōhine Living River Plan (Incorporating Floodplain Management Plan) Process

4. Discuss GWRC's draft plan: This may be an annual budget and plan, a three year revision of a ten year plan, planning required under the consent process or other. Keep everyone engaged as with the development of this plan.



FIVE

The Project Team will present these along with any proposed community initiatives to the Wairarapa Committee at which the GWRC plan is also presented.

The Waiōhine Living River Plan (Incorporating Floodplain Management Plan) Process

5. Provide and present the Wairarapa Committee with the updated Living Plan Draft and any views making recommendations with regard to GWRCs own draft operational plan: Either a). through agreement with GWRC to view the Wairarapa Committee as reviewer and arbiter for any divergence between the updated Living Plan draft and the GWRC draft operating (or other) plan, or b). By recommendation from the Wairarapa Committee to GWRC in Council or c). Through delegated authority to the Wairarapa Committee from GWRC in Council to govern the Living Plan planning process and outcomes.



Figure 79: Four Steps of the Annual Planning Cycle – Project Team.

Notes:

- 1 This is not intended to displace any of the existing rights of iwi or community groups as per the consenting process.
- 2 GWRC will support the actual and reasonable day to day running costs of this process, budgeted annually, in keeping with the process for producing the River Plan.
- 3 GWRC Wairarapa Committee will decide what steps, if any, need to be taken where there are significant differences between what the community and GWRC wishes for the river, guided by this Waiōhine River Plan. Either a). Through agreement with GWRC to view the Wairarapa Committee as reviewer and arbiter for any divergence between the updated Living Plan draft and the GWRC draft operating (or other) plan, or b). By recommendation from the Wairarapa Committee to GWRC in Council or c). Through delegated authority to the Wairarapa Committee from GWRC in Council to govern the Living Plan planning process and outcomes. D) Any other model agreed to by the community and GWRC.

The principle of the Living Plan model is to create a collaborative partnership in which the community remains in a leadership position as keeper of the vision and overall plan for the river (the Waiōhine River Plan, Incorporating Floodplain Management Plan), with GWRC and there are checks and balances to make sure rifts cannot happen again, between the community and GWRC. It should in effect act as a tool for collaboration and therefore a “fence at the top of the cliff” rather than, as in times past, relying on an “ambulance at the bottom of the cliff”.

Finding:

We recommend that the process incorporates the current planning cycles of GWRC: annual and Long-Term Plan, budgeting, planning around consented activities, other planning process current or future that relate to or impact on the Waiōhine River, incorporated data sharing and shared decision making for significant aspects of river management and development to eventually realise the vision and River Plan. This process can be updated as necessary by agreement between the community and GWRC, which may be delegated to the Wairarapa Committee.

11.2 Active management triggers for the Living Plan

These are events that compel the WAG Project Team to reconvene, compel GWRC in a timely fashion, to provide to [the community](#) with any information that it holds or that is required by WAG and for the Project Team to identify what actions need to be taken and how the River Plan should be improved upon, using the lessons provided by the trigger event. The WAG Project Team may learn about these from any source and choose to reconvene as they feel the need, but the general expectation is that the commitment by GWRC to quickly pass on any information that relates to any of these triggers, will be the main source. If in doubt about the relevance of any information, then GWRC should supply it and rely on the WAG Project Team to always advise if it is no longer necessary. It is expected that the WAG Project Team will engage closely with GWRC throughout the process and vice versa.

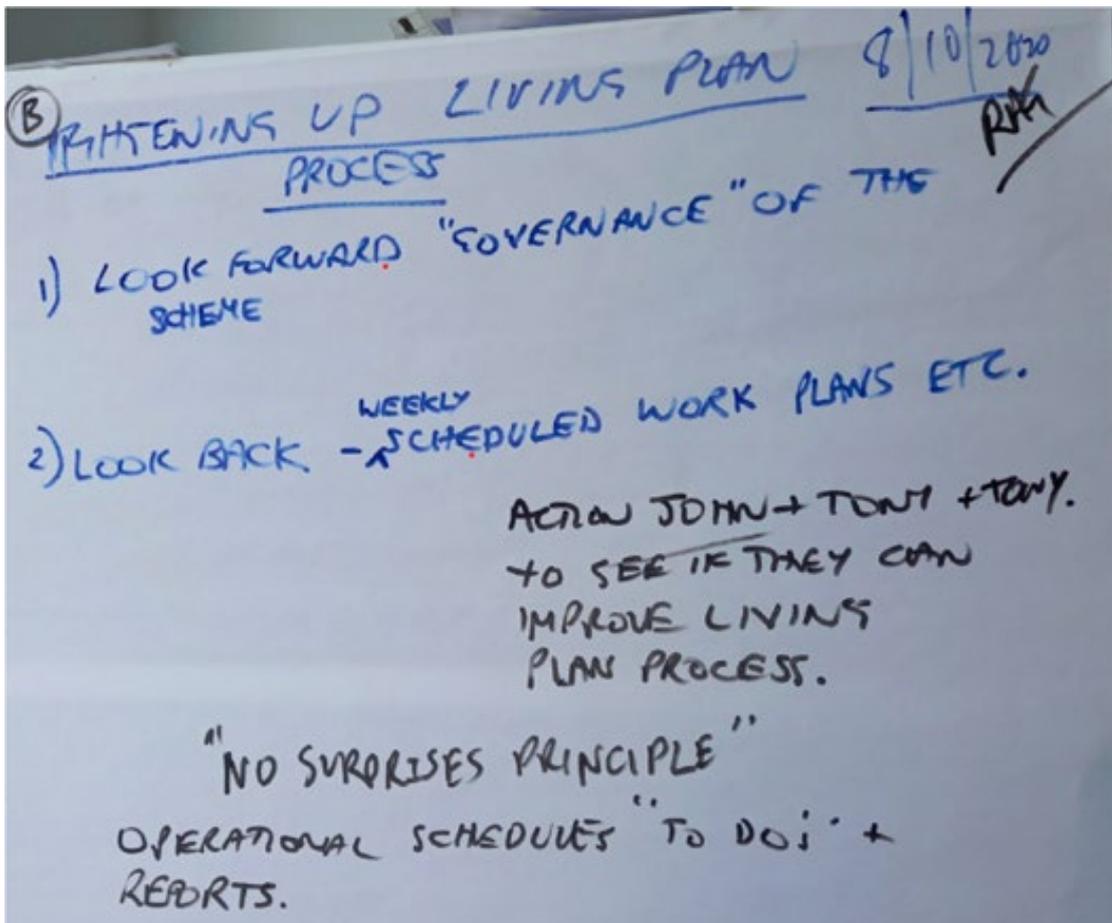


Figure 80: Tightening up the Living Plan Process involves adopting the “no surprises principle”.

Trigger events may be added to in future but presently include:

- 1 2050 – The first of **two major planning horizons** for this River Plan. This review of the plan may occur earlier if significant new data comes to light.
- 2 [Climate Change](#) – any new information that changes our understanding of how **climate change** will affect flood or other risks to the Waiōhine catchment and valley,
- 3 **Earthquake** – an event that changes the geomorphology or creates a [dam](#) or other change that substantially affects the behaviour of the river, new LIDAR should be obtained.
- 4 A **Large flood** i.e. unforeseen consequences (for example major stopbank failure or damage to flood defence or other critical infrastructure, or the likelihood of this), new LIDAR and/or survey data should be obtained.
- 5 **Failure/dissolution of WAG**, it's Project Team or its successor as [community](#) catchment group/ organization such that (in their opinion) the community are no longer able to work in partnership with GWRC and other stakeholders, or of the Wairapa Committee.
- 6 **Major change in insurance** protection conventions or community demand for change in flood protection level based on new societal expectations and norms.
- 7 [Bed level maintenance](#), **river management**, habitat and gravel management not meeting targets

of preventing the river from changing course and threatening towns or Critical Areas (such as bridges, roads, stopbanks and dwellings), creating additional flood risk through the riverbed rising (aggradation) or bed level dropping (degradation), this includes any gravel formation that could risk avulsion or erosion of Critical Areas and river banks.

- 8 **Environmental** objectives (e.g. [Whaitua](#)) not met.
- 9 Significant **impacts on flora, fauna** and ecology.
- 10 Major change in **funding policy** or cost, affecting affordability, in the eyes of the community.
- 11 Major change in **flood hazard** information.
- 12 Major change in **land use**.
- 13 **Major change (of knowledge)** in relationship between river and catchment (including the discovery of relevant documentation).
- 14 Annual [work programmes](#) **cannot deliver Waiōhine River Plan** commitments.
- 15 Rapid **change in vegetation** in catchment (e.g. move away from grass paddocks to other forms of farming which will affect the way floods may behave).
- 16 Major **economic impact** (e.g. massive increase in interest rates).
- 17 Possible **future extension** of [Greytown stopbank](#). This can be invoked if evidence emerges that the currently proposed measures will no longer be enough to protect vital assets (such as bridges), the town (from 1% floods) and rural dwellings (from 5% floods).
- 18 Any major influence from **Ruamahanga** or **Mangatāre** schemes.
- 19 If as a result of observing high velocity points, **issues are identified that threaten flood** defences or key assets.
- 20 Treaty settlement or other significant **cultural implications**.
- 21 Risk to the **oxidation ponds** bringing any heightened flood threat.
- 22 Any substantial risk to [water quality](#) improvement or it's measurement.
- 23 Any opportunity, such as the availability of **significant new knowledge**, techniques, data, methods, events, to improve the Waiōhine River Plan (such as enough data and science to implement a meaningful bed level envelope).
- 24 **Any issue that arises that is seen as critical** by iwi, landowners, or any other [stakeholder](#) group, including GWRC, that engages in the [Living Plan process](#).
- 25 Any time there is a **new river related issue deemed important** enough for inclusion in this list by [the community](#).
- 26 Any other issue or cause that WAG or its successor, mana whenua, Iwi, Fish & Game or other **stakeholder considers may impact** the success of the Waiōhine River Plan.
- 27 Identification by any stakeholder of possible new Critical Area or significant change to existing Critical Area.
- 28 When something occurs that makes it obvious that an aspect of these techniques is **failing to protect the banks and channels within the Critical Areas**, then these techniques may need tuning.

It is recommended that the WAG Project Team or its community nominated successor can, during the full term of this plan, convene as needed by the community to consider any issues relating to the river and floodplain management plan. Any statutory body or stakeholder group can ask WAG to convene but is not limited to any indication that a Trigger Event or threshold may have been reached, significant information has been shared from GWRC regarding the Waiōhine, planning information or inputs to planning information relating to the Waiōhine are available from GWRC, to prepare a report to the Wairarapa Committee or GWRC in Council, if the Wairarapa Committee is unavailable for any reason, to engage with GWRC regarding the river or their annual planning and budgeting cycle or any other planning or budgeting cycle (such as the three year revision of the ten year Long Term Plan) or one-time event of interest.

11.3 The annual cycle for the Living Plan process

“To ensure that GWRC management of activities remains appropriate and focused over the life of the new consents, while at the same time retaining the flexibility to change in response to new information over time; it is proposed that an adaptive management regime be approved as part of the resource consent conditions. This approach is integral to the success of the Code.”

In this section of the Waiōhine River Plan, we cover how that adaptive management regime necessary for such a volatile, high risk and flood prone river as the Waiōhine needs to translate into a resource consent that draws together all the threads of this plan and puts them into action in an adaptive manner through a working partnership.

GWRC included within the Terms of Reference for this plan the need to address the operational management of the river. On 11th April 2019 the General Manager, Catchment Management Group wrote to the Project Team advising that resource consent should be the mechanism to address challenges in the operational management of the river. To do this, it is therefore necessary for this plan to describe what is needed, within any resource consent for the Waiōhine, to enact this Living Plan. The following sections to inform consenting are as far as practicable, based on the principles of:

- 1 To make this easy for GWRC to adopt and as consistent as practicable with current consenting practice.
- 2 As well as to be wholly consistent with this plan.
- 3 And to adopt tools and mechanisms already inherent in other recent GWRC river consents.

11.3.1 It is recommended that Resource Consents for the Waiōhine River and its environs should adopt the following in both specific content and intent:

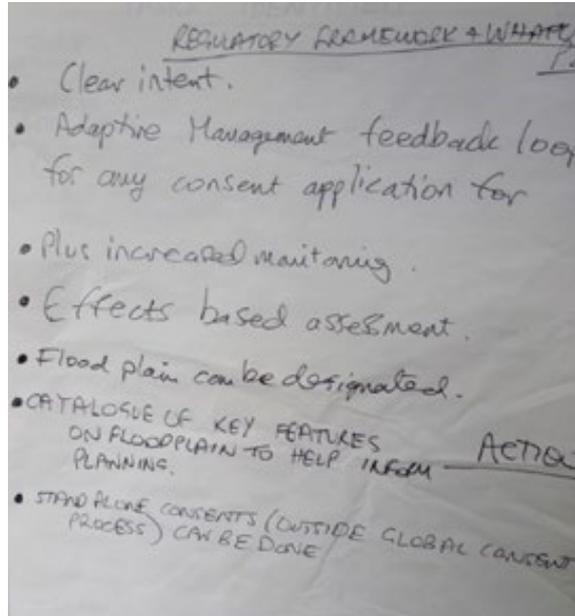


Figure 81: Regulatory Framework and Change chart – Project Team.

11.3.1.1 Regulatory Framework and Change

- 1 The Waiōhine River Plan shows a clear intent which should be reflected in any application for consent regarding ot's care and management.
- 2 A key principle of the Living Plan is Adaptive Management. For this large, steep, fast flowing, fast changing, major flood prone river, carried above the surrounding floodplain on a raised alluvial fan, with a string of adjacent critical assets – fast and constant change is the norm.
- 3 Given the above there is a greater than normal need for an increased level of monitoring and managing – making best use of collective stakeholder, local expert and independent subject matter expert wisdom to adapt to change based upon assessing risks and effects.
- 4 **There is a need to recommend** that Territorial Authorities (local councils) designate the extent of the floodplain as needing care in earthworks, tree felling and building that could impact or be impacted by the river in flood.
- 5 It is proposed that by designating certain areas along the river as Critical Areas, a pragmatic approach to maintenance and gravel extraction is able to be taken that allows the river to behave more naturalistically away from the Critical Areas that make up a small proportion of the approximately 66 kilometres of it's length.

- 6 **It is recommended** that initially seven stretches of the river are designated as Critical Areas:

| Found Between Cross Section | And Cross Section | Brief Descriptor |
|-----------------------------|-------------------|--|
| XS 17 | XS 18 | Urupa and banks above SH2 Bridge |
| XS 20 | XS 21 | Fullers Bend, above and below |
| XS 21 | XS 22 | Platform Farm |
| XS 20 | XS 26 | True Left (Carterton Bank) stopbank protection |
| XS 27 | XS 28 | Kuratawhiti Street |
| XS 31 | XS 32 | Hallidays |
| XS 39 | XS 40 | Town water bore field |

Figure 82: Table of Critical Areas – Project Team.

- 7 Where projects such as most carefully conducting controlled testing of new concepts, such as those proposed by Massey University subject matter experts for even lower impacts of works that have to be conducted in the river, from time to time, separate stand alone consents, strictly limited to those proofs of concept required.

11.3.1.2 Operational Management Plans

for the Waiōhine River must, within 12 months after the commencement of a consent:

- 1 Consent holder must invite Waiōhine Action Group (WAG), or it's community appointed successor, to facilitate and coordinate stakeholders including mana whenua (representing Papawai Marae), Ngati Kahungunu Ki Wairarapa, Rangitane o Wairarapa, Fish & Game, Department of Conservation and South Wairarapa District Council to be involved in the design and development of Operational Management Plans in accordance with The Waiōhine River Plan (incorporating the Waiōhine Floodplain Management Plan).
2. Submit each Operational Management Plan to GWRC Wairarapa Committee for review, then to the Manager, Environmental Regulation. Each Operational Management Plan for the Waiōhine River must be consistent with the The Waiōhine River Plan (Incorporating the Waiōhine Floodplain Management Plan).

11.3.1.3 Annual Work Plans

For the Waiōhine River, the consent holder must, by 1st July each year:-

- 1 Invite Waiōhine Action Group, or it's community appointed successor, to facilitate and coordinate stakeholders (see above) to be involved in the design and development of the Annual Work Plan in accordance with The Waiōhine River Plan (incorporating the Waiōhine Floodplain Management Plan).
- 2 Ensure any data, information or documentation, whether in note, draft or final form, is provided to Waiōhine Action Group (WAG) or its successor, as it comes to hand at GWRC in order that it can be shared with other stakeholders and used to inform them with regard to all matters pertaining to the river and its environs.

- 3 Submit each Annual Work Plan to GWRC Wairarapa Committee and WAG for review and also provide copies of the plan to each of the parties listed above.

When translating the Waiōhine River Living Plan into Resource Consents each Waiōhine River Annual Work Plan should also:

- 1 Be consistent with the vision, specifics and intent of the Waiōhine River Plan and supporting documents.
- 2 Identify opportunities for environmental enhancement in collaboration with the Waiōhine Action Group (WAG) and other stakeholders that contribute towards the vision for the river, and as identified by a suitably qualified, mutually agreed ecologist.

11.3.1.4 Site Specific Effects Management Plans and Monitoring

Each Operational Management Plan must be consistent with the Waiōhine River Plan (Incorporating Floodplain Management Plan). Before the consent holder commences one or more of the activities listed, it should consult Waiōhine Action Group (WAG), or its community appointed successor, who will use the Living Plan Process, to attempt to facilitate responses from interested stakeholders. Additionally, Rangitane o Wairarapa, should be invited to appoint a kaitiaki to oversee the work permitted by the SEMP on behalf of the Waiōhine River Plan, Waiōhine Action Group or its successor and other stakeholders if they wish.

11.3.1.5 Annual Reporting

The consent holder must, by 31st August each year also share each stage of the drafting of the Annual Report with Waiōhine Action Group (WAG) or its successor (See Waiōhine River Plan) along with contributory data, reports and documentation.

Annual reports should comment fully on the past year's actual contribution to realisation of the vision of the Waiōhine Living Plan, together with any actions, or their lack that has impacted negatively on the River Plan.

A copy of the Manger, Environmental Regulation's review document should also be shared with Waiōhine Action Group (WAG) or its successor and the Wairarapa Committee of GWRC.

11.3.1.6 Independent Review Panel

Independent experts appointed to the Independent Review Panel must be acceptable to mana whenua, Waiōhine Action Group (WAG) or its successor and Fish and Game; who must all also be able to submit information, make presentations, or make representation to the Independent Review Panel.

All parties should be provided with the report as should be the Wairarapa Committee of the GWRC. The Review Panel's report should thoroughly consider the consent holder's alignment against the vision and specifics of the Waiōhine River Plan and what might be done to better deliver against it in future.

11.3.1.7 Ecological Enhancement Fund

Should be used where it is mutually agreed with Waiōhine Action Group (WAG) or its successor, that the application advances the Waiōhine River Plan's vision for restoration and enhances the mauri of the river.

11.3.1.8 Walkovers (annual and other)

The consent holder should undertake at least two formal walkovers each year where river management activities may, in the opinion of any party, need to be undertaken pursuant to these consents at times mutually agreed with Waiōhine Action Group (WAG) or its successor, that will coordinate attendance of interested stakeholders.

The purposes of walkovers is:

- 1 To review new or known data and information relating to the river and environs.
- 2 To identify and agree on work needed in the maintenance and restoration of the river and environs.
- 3 To ensure completed and proposed work aligns with the vision and specifics of the Waiōhine River Plan (Incorporating Floodplain Management Plan).
- 4 To identify any new work required to be coordinated by Waiōhine Action Group (WAG) or its successor, to further develop the Waiōhine River Plan.

Additional walkovers may be necessary in the event of any trigger event occurring that is listed in the Waiōhine River Plan.

11.3.1.9 Critical Areas of the Waiōhine River

The size, steepness, speed, location, size and nature of tributaries, flood, slip and earthquake affected history, elevation above floodplain, gravel loading and proximity to sensitive and critical infrastructure and dwellings, make the Waiōhine a particularly complicated river to plan and manage safely.

Critical infrastructure includes bridges, town water supply bore fields, and the high risk to Greytown and SH 2 of avulsion or damage to key assets. The Flood Protection aspects of the River Plan rely on a point in time survey, model and mapping of the river. In taking an approach to new flood defences of stepping well back from the river and allowing it to spread out and slow down, it has been identified that channel alignment and bank protection must remain as it was in January 2019. This has been adapted by applying this only to Critical Areas, where risk of damage to Critical Assets must be prevented and avulsion or course change for the river must also be prevented for the flood protection part of the plan to be viable.

The Waiōhine River Plan identifies these high risk locations as [Critical Areas](#) and how they may be assessed as such. It is important that the river is managed in such a way as to minimise these risks within the context of such factors as long term weather and flood cycles, climate change and changes to gravel beaches that might force significant changes of river channel. In other stretches of the river, more latitude to spread out, slow down and assume a more naturalistic manner is achievable. In [Critical Areas](#), decision making should seek a balance between protection and naturalistic outcomes with care to use techniques that create and maintain habitat. For guidance on this, see the Waiōhine River Plan, with particular reference to the subsidiary document "Ecological effects of flood management activities in Wairarapa Rivers" 2013, authors Russell and Fiona Death of Massey University and Aquanet Consulting. See references within this plan relating to Critical Areas.

11.3.1.10 Site Specific Effects Management Plans and Monitoring (SSEMP)

Each Operational Management Plan should be consistent with the Waiōhine River Plan (Incorporating Floodplain Management Plan). Before the consent holder commences one or more of the activities listed, it should consult Waiōhine Action Group (WAG), or its community appointed successor, who will attempt to facilitate responses from mana whenua (representing Papawai Marae) who should be invited to appoint a kaitiaki to oversee the work permitted by the SSEMP on behalf of other stakeholders if they wish. If mana whenua do not wish to provide kaitiaki services, then WAG or another stakeholder may elect to provide oversight instead, that work carried out is in keeping with the Waiōhine River Plan.

11.3.1.11 Reviews

The consent holder when undertaking a review should consult with Waiōhine Action Group (WAG), who may make a submission to accompany the review, on what has not been achieved to progress the restoration of the river and environs, towards the vision and specifics of the Waiōhine River Plan (Incorporating Floodplain Management Plan).

11.3.1.12 Disagreement Resolution

In the event that consensus is not reached amongst the parties during a walkover or in WAG's subsequent work to enhance or implement the River Plan, then the issue is to be resolved by the next meeting of the Wairarapa Committee of GWRC, or if urgency dictates by a meeting attended by WAG, the interested stakeholders and the Wairarapa Councillor of GWRC, who will chair the meeting, in accordance with provisions in the Waiōhine River Plan.

This disagreement resolution mechanism should also be applied in any situation where consensus is not attained through reasonable efforts to find a consensus solution that can be added to the River Plan or for work to be done in the river and its environs.

In the event of disagreement, law and regulation, together with the Waiōhine River Plan (Incorporating Floodplain Management Plan), Waitua Implementation Plan, Code of Practice, Management and Operational Plans (in that order of precedence) should be used to guide resolution. Mutually acceptable independent experts can be called upon where additional advice is wanted.

This disagreement resolution mechanism should also be applied in any situation where consensus is not attained through reasonable efforts to find a consensus solution that can be added to the River Plan or for work to be done in the river and its environs.

11.5 What is done by who by when for the Waiōhine River Living Plan – and cost estimates

Notes:

- 1 As at November 2020
- 2 Needs to be updated annually and used as one of the inputs to inform the LTP and annual plan.

| | Within how long after this plan is approved | Rough (RAG) Budget | Refer to page in this plan | Notes |
|--|---|--------------------|--|--|
| Planning Controls in District Plan | 2 years | <\$200,000 | 9.1 Interim maps, final maps, planning controls on page 111 | Synchronize to District Plan process, repeat |
| North Street Stopbank | 2 years | <\$800,000 | Conceptual stopbank design on page 175 | |
| Kuratawhiti Street Stopbank | 2 years | <\$330,000 | Conceptual stopbank design on page 175 | |
| Greytown Stopbank Spurs/groynes | 2 years | <\$45,000 | 7.11.3 Greytown Stopbank on page 99 | Either this or the planting on next line |
| Greytown Stopbank Planting | 2 years | <\$30,000 | 7.11.3 Greytown Stopbank on page 99 | See above |
| Gravel Extraction proof of concept testing | 2 years | <\$20,000 | 6.6 Proposed: rules for gravel extraction on page 66 | Depends on expert from Massey or other |
| Improved warning of flood risk (@river access and homes) | 2-5 years | \$25,000 | Emergency management and flood warning on page 118 | Depends on 3rd parties e.g, Fire Service and WREMO |
| Additional Aerial Survey | 2 years | <\$20,000 | 8.4 Further information and recommendations on costs on page 105 | Cost benefit may need to be better understood to set frequency |
| Bed Level Envelope | ASAP | C. \$20,000 ? | 12.7.2 Bed level and gravel on page 149 | Depends upon when reliable and trusted data found |
| Design Line Review | ASAP | C. \$2,000? | 6.12 Setting the flood sensitive area on page 72 | Tweaks and tidy ups but no major changes to size of buffers |
| Water quality monitoring | As required JFDI | | Water quality management and other Whaitua programme obligations on page 162 | Citizen science, stop waiting for GWRC |

Figure 84: What is done by who and when – cost estimates – Project Team.



12
River Management

Where it joins the Ruamahanga, the Waiōhine is comparable in size to the Ruamahanga itself. As discussed above, it has a large catchment, deep in the Tuataras, a steep profile and runs atop a delta built up above the floodplain. It has a long history of sudden, major floods that endanger the adjacent towns.

For these reasons, careful and frequent maintenance of the river is vital to keep people and places safe and the banks must be maintained against erosion and avulsion (sudden changes of course) in the stretch of the river between the gorge and State Highway 2 Bridge. This must be done to protect the bridges, town water supply, Greytown and Carterton and State Highway 2.

The [Independent Peer Review](#) of this plan by Ian Heslop of ECAN, dated January 2019, states that:

“One key point that needs to be reinforced is that the bed level and channel management will need to continue, to maintain the current river alignment and both the rural and flood protection standards.”

The feasibility of the flood protection scheme for the Waiōhine relies on this rule. Between 2019 and 2021 river management has changed considerably, gravel extraction was drastically reduced and the river allowed to deviate from its existing channel alignment to attack its banks. In most of the river this has not been problematic, however it has caused issues in the seven Critical Areas (see below) and a programme of remedial work and ongoing maintenance was agreed to in March 2021 to restore and maintain the river so as to ensure for critical areas, banks and channels tip towards the safety of community and cultural assets.

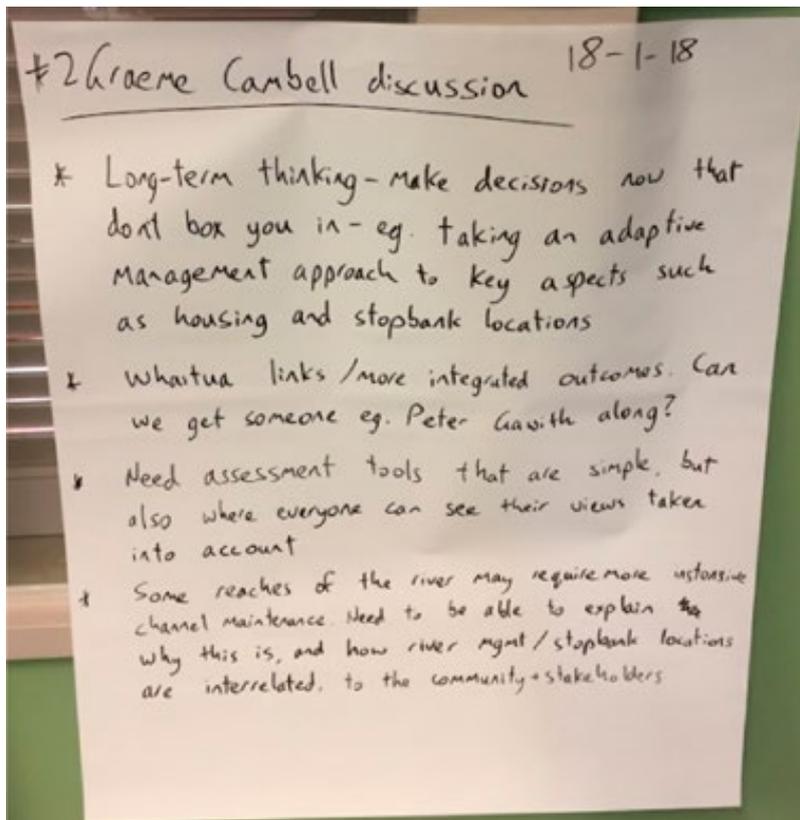


Figure 85: Graeme Campbell Discussion chart – Project Team.

12.1 Critical areas

Where there is a risk of an erosion weakened bank or the river being turned against a bank because of compacted gravel banks/beaches having built up, and that bank is in a Critical Area of the river – then important assets are endangered by either continued erosion causing a change of course, or the banks being too weak to withstand a major flood event – thus causing a major avulsion (change of course) or other event that endangers important assets. So it is important to distinguish what must be protected from flood and what must be protected from erosion:

| | What Are We Protecting? | From flood | From Erosion |
|----|---------------------------------|------------|--------------|
| 1 | Towns | Yes | No |
| 2 | Stopbanks | Yes | Yes |
| 3 | Bridges (SH2, Rail) | Yes | Yes |
| 4 | Roads | Yes | Yes |
| 5 | Bore Field – towns water supply | No | Yes |
| 6 | Water Races | No | Yes |
| 7 | WasteWater Network | Yes | Yes |
| 8 | Private Dwellings | Yes | Yes |
| 9 | Papawai | Yes | Yes |
| 10 | Farmland | No | Yes |
| 11 | Urupa | Yes | Yes |
| 12 | Change of course | No | Yes |

Figure 86: Critical Areas Table – What Are We Protecting? – Project Team.

This also means that maintenance of Critical Areas should be done early – on the principle that “a stitch in time saves nine” and nothing should be left until risk and cost mount up. Leaving maintenance until major works, such as lining the banks with massive rocks shipped down from the central north island, is necessary – would be an example of very poor river management. Extracting surplus gravel and protecting banks with appropriately designed boulder groynes, interplanted with trees that provide shade and shelter to ecosystems and help manage swirls and slow down water flows – would be an example of good river management.

12.2 Critical area planning parameters

12.2.1 Principles

The following management principles may be applied to all areas on the Waiōhine but must be applied to areas Critical Areas. Stakeholders and GWRC should work together on this in the spirit of a multi-disciplinary, cross functional team.

12.2.2 Remedial work

Initial remedial work (as at April-June 2021) needs to be undertaken in these areas to bring them back to complying with the channel alignment and bank protection requirements of the flood protection scheme and it's Independent Peer Review.

12.2.3 Introduction of principles

From 1st July 2021 the operational management principles of this plan will be adopted to continue to manage the river pending formal adoption of the entire Waihone River Plan.

12.2.4 "Tool box"

This has implications for the toolbox in regular use to manage the river, for instance, including gravel extraction.

12.2.5 Adoption of additional critical area planning parameters:

- 1 Balance Critical Area protection and environmental values
- 2 In Critical Areas the balance of consideration tips in favour of protection of critical assets and cultural values.
- 3 Plan channel alignment and bank protection maintenance out to five year horizon
- 4 Refresh plan at time of each three year revision of the Long Term Plan
- 5 Invoke review of plans if trigger events occur that affect relevant critical area(s)

12.2.6 Independent peer review compliance

Comply with Waiōhine River Plan Independent Peer Review January 2019) guides with regard to maintaining channel management and bank protection for Critical Areas.

12.3 Tools for critical area management

- 1 Extract Gravel to
 - a Remove high beaches
 - b Re-align channel
- 2 Maintain alignment of channel upstream of Critical Area – to keep from attack against bank in Critical Area
- 3 Well designed and constructed snub nosed groynes
 - a Interplanted
- 4 Move gravel
 - a Beach contouring
 - b Batter banks
- 5 Rock lining of bank
- 6 Ripping/cross-blading

12.4 Overarching principles for managing channel alignment, beaches and banks in critical areas

12.4.1 This structured logic should be used to determine when to act:

- 1 IF it's a High-beach in the design alignment channel, OR
- 2 IF the river is in contact with the buffer zone THEN
- 3 Extract-or-move-gravel

Where:

- 1 A High-Beach occurs:
 - a IF it's in or immediately above a flow less than ten cubic metres ($>10M^3$)
 - b AND the High-beach is in the design alignment channel
 - c AND it is more than 2 metres above water level
 - d AND not Undermining-a-Structure (e.g. bank)
- 2 THEN Extract-or-move-Gravel OR
- 3 IF it's Undermining-a-structure then
 - a Move enough gravel to protect the structure
 - b AND extract the balance to resolve the High-Beach¹ OR
- 4 IF High-beach occurs in design alignment channel OR
- 5 IF in contact with the buffer zone
- 6 THEN extract gravel.

12.5 Specific five year plans (revised at each three year long term plan event)

12.5.1 Critical area – Urupa bank above SH2 bridge

- 1 Issue – loss of irreplaceable land
- 2 Cause – Alignment of channel
- 3 Solutions:
 - a Well designed, snub nosed groynes at the Urupa bank and smart planting
 - b Extract true left bank gravel beach around the corner upstream, maintain backchannel, keep beach low and flat. Initially remove 15,000 cubic metres of gravel from here to remove the high beach
- 4 Maintain extraction of true right bank opposite Urupa and above SH2 Bridge, to be low/flat
- 5 Keep possibility of re-contouring in mind
- 6 These will be needed to be kept up through the next five years.

12.5.2 Critical area – Fullers Bend

- 1 Complete rock lining “revetment” across rest of eroded “bay” at XS 20 to beyond halfway to XS 21 (or approximately 150 metres from access road)
- 2 Complete detailed design of snub nosed groynes upstream of rock lining, to be okayed by Project Team, then built
- 3 At XS20 extraction may be necessary to maintain low and flat beaches (same principles as urupa Critical Area to be applied), this will be needed to be kept up through the next five years.

12.5.3 Critical area – Platform Farm

- 1 Plant planned natives to supplement remedial work done as at May 2021
- 2 Gravel Extraction to lower and clear high beaches
- 3 Bed Recontouring
- 4 Build snub nosed rock groynes if channel reaches bank again.



Figure 87: Critical Area Photograph – Platform Farm – GWRC.

12.5.4 Critical area – protect true left bank between cross sections 20-27 and channel alignment

- 1 Keep channel alignment away from buffer zone
- 2 Move or extract high beaches as they occur, where they impact channel alignment.

12.5.5 Critical Area – Kuratawhiti Street

- 1 As at 22nd May 2021 extract 10,000 cubic metres of gravel from the high beaches as remediation.
- 2 Construct 3 150 ton snub nosed rock groynes to protect the exposed True Right Bank (Greytown side) at 25 metre nominal spacing, using quarried rock.
- 3 Push over 2,000 cubic metres of river gravel to be battered in under the groynes.
- 4 Further groynes may be needed to be added at some later date above or below these.
- 5 Both science (LIDAR) and “art” (Observation and experience) are needed to manage these Critical Areas – these should be applied in good faith collaboration between stakeholders.



Figure 88: Critical Area Photograph – Kuratawhiti Street – GWRC.

12.5.6 Critical area – mature significant native tree stand and natural nursery

- 1 Use overarching principles for removing high beaches and protecting banks.

12.5.7 Critical Area – Borefields

- 1 Remedial action – push over gravel (big stones) – some thousands of cubic metres of material to fill deep cutting near borefield bank and batter that bank.
- 2 Extract beaches to be low and flat, this will be needed to be kept up through the next five years.
- 3 Restack and maintain existing rock groyne.



Figure 89: Critical Area Photograph – Mature Native Trees – GWRC.

12.6 Ecological care and considerations

We have taken overarching guidance from the excellent document: “Ecological effects of flood management activities in Wairarapa Rivers” Russell and Fiona Death, Massey University & Aquanet Consulting, December 2013, prepared for Greater Wellington Regional Council (see Appendix I); which documents detailed studies carried out on the Waiōhine River, amongst others. It is worth quoting its conclusions here:

- 1 “Weight of evidence from all 3 studies strongly indicates a less than minor effect on riverine ecology of the engineering activities we investigated. It would thus be reasonable to assume that similar works in other reaches of these types of Wairarapa rivers would have less than minor effects.
- 2 This can be attributed to a number of factors including the activities were relatively small (80 – 150m length of river works) and discrete (no consideration of cumulative effects was made), this type of activity (despite the increased turbidity and substrate movement) is not dramatically dissimilar to the physical effects of a fresh or flood, which are common in all three rivers, and that such activities have occurred in these rivers (along with other anthropogenic disturbances) for many years.
- 3 Effects scaled with the size of the engineering activity, so that the Waingawa River study which had the greatest length and severity of works, exhibited the biggest ecological effect. Although, even here the number of macroinvertebrates and trout were the only biological parameters that were still “affected” at the final sampling after the first major fresh.
- 4 The scale effect may be particularly important when the cumulative effects of these engineering activities are considered (which we did not do in this study) and it is thus important that although localised effects may not occur, a wider river perspective must be maintained. To that end activities, such as using boulder groynes, leaving and creating backwaters, and minimising the on-site vehicle activity footprint is extremely important.

- 5 Directly after the works biological communities changed, periphyton biomass was reduced and deposited sediment did accumulate. However, the first major fresh or flood reset the local habitat and biological communities, so that the ecological impact of the works essentially disappeared.”

In addition to this, a range of principles, tools and hierarchies to help choose the best tools for each situation have been identified below.

The expertise shared by subject matter specialists [Professor Ian Fuller](#), [Professor Russell Death](#) and [Will Conley](#) of Massey University, are the cornerstone of this aspect of the Waiōhine River Plan. The living plan depends upon continued access to those or similar skills from time to time to trial, measure and develop solid science around the techniques, tools and hierarchies discussed below.

We have also [engaged with NZTA](#) who have agreed to attempt to mesh the plan into their planning process for the maintaining of State Highway 2. This offers the opportunity to maintain the level of stretches of the highway in a way that reduces the impact of flooding on dwellings alongside the highway and helps to protect the Greytown urban area. For example, between the Apple Barrel and Waihaakeke Road the level of SH2 should not be raised, otherwise it will reduce the capacity of the floodway.

We note that approximately 3% of the budget GWRC allocated to the annual River Management budget may be available for river enhancement and restoration.

We recommend that this practice should continue and where available, be used to promote native planting and the restoration of native ecosystems, in keeping with the [Vision for the River](#).

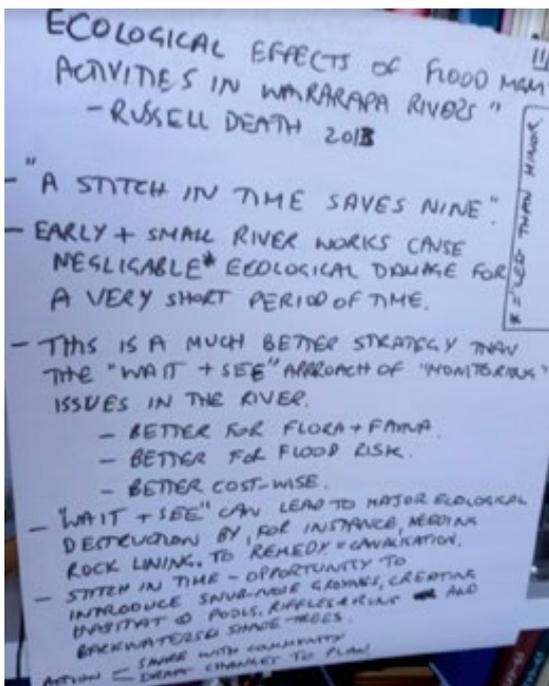


Figure 90: Ecological Care and Considerations chart – Project Team.

12.7 Other river management principles adopted

River management should be undertaken in compliance with statutes and regulations and in consultation with statutory authorities, such as Iwi, Fish and Game and the Department of Conservation. This is embraced in the Living Plan Process for the Waiōhine River and should also be reflected in the Code of Practice that is to be developed for the Waiōhine River (see Living Plan Process).

NOTE that all principles below should be in keeping with the conclusions of “Ecological effects of flood management activities in Wairarapa Rivers”.

12.7.1 Shape and character

- 1 **We recommend** that the river, with the exception of works needed in Critical Areas, be aimed at achieving Natural Character, as distinct from returning the river to its original natural state. See [Natural Character](#).
- 2 **We recommend** that giving the river room, wherever practical, is good and better supports the geomorphology, gives flexibility and future options and room for natural eco systems to develop.
- 3 Geomorphically, “working with the river” is better, where assets (such as in Critical Areas) are not threatened and the threat of the river adopting a whole new course, can be safely contained.
- 4 Maintaining wider margins reduces the need for intervention.
- 5 The distance between the banks doesn’t necessarily have to be the same width all the way down. It is natural for a river to adopt an “hourglass” or “beaded” shape, alternating wider and narrower distances between banks. Whilst maintaining an “hourglass fairway” has no NZ precedent yet in practice: it is now recognized as the current best way to manage the river channel.
- 6 **We recommend** that structural work for prevention of flooding should be set back as far as practical from the river, where practical, and there is no immediate threat of a change in river course. Consequently, some erosion of high banks outside of Critical Areas may have to be tolerated pending more permanent repairs. If collapse does eventuate, then there is a need to quickly manage the eroded area (i.e. the beach from the collapsed bank) by planting vegetation to resist further erosion. This is the case in several locations outside Critical Areas, for instance, along the Beban (XS 30)/Vines(XS 28-30) /Fairbrother section of the true right bank and at points alongside Platform Farm, also on the true right bank.
- 7 **We recommend** to defend, where practical, areas where there might be high shear stress (to prevent the erosive power of the river from causing it to break out and change course, threatening assets and dwellings) with [riparian mosaics](#) (planting along lines/ spaces that will slow and control the river in extreme events).
- 8 High beaches (in and alongside the river) are an effect of a constrained river: so, the more we attempt to constrain the riverbanks, the more we will be faced with high beaches that need to be reduced. High gravel beaches serve to constrain the river and so put banks at risk. Of course, Critical Areas may not offer this latitude.
- 9 It is noted that the Matarawa area is ponding and creates potential gravel storage. Over time, the river is going to want to change direction there. We advise that Fuller’s Bend

(XS 20) works would be an engineering, rather than geomorphic response, and will not usefully solve the problem.

- 10 **Where practical we recommend** that floods be allowed to spread and slow, this means more silt will be deposited across the flood plain and less will be carried downstream, to damage lower reaches of the river, Ruamahanga and Wairarapa Moana. We note that there is some benefit to aquifer recharge from allowing a flood to spread.
- 11 **We recommend** that it should be important to maintain dual river channels in the reach immediately below the rail bridge (XS 37), in order to ensure the river in flood does not block with debris easily, and force too much water onto the true right bank, alongside Greytown Stopbank, that could scour its toe and undermine the bank. Or create such a volume of water at the end of the Greytown Stopbank, that if rapid or otherwise unmanageable, would lead to greater flows on that berm. This is also an opportunity to maintain backwaters, pools, runs and riffles.
- 12 Velocity modelling results based on a substantial (+20% roughness) blockage of the existing channel have been used to generate significant shear stress, at the toe and end of Greytown stopbank. **We recommend** that planting should be made (or if this is unsuccessful over time, spur banks) along the toe of the existing stopbank and in extension of the line of the stopbank. This needs to be done in a way that reinforces the existing bank and row of trees, so it will bolster existing defences here.
- 13 **We recommend disposal of the three Fullers Bend properties** that were specifically acquired to facilitate the repositioning of flood defences. These are no longer required for that purpose and should be freed from being an ongoing financial burden to ratepayers, releasing costs into the river maintenance budget to speed such work as the rock lining of the outside of Fullers Bend.
- 14 Bed levels have been monitored periodically since 1986. There is no clear evidence that the Waiōhine is degrading or aggrading significantly, or that gravel extraction or limits should be reduced at this time; but this should be monitored and is a Trigger for review under the [Living Plan](#). In order to avoid increased risk of flooding and erosion, **we recommend that continued gravel extraction must be sustained**. Note other comments relating to triggers needed to [manage effects of gravel extraction](#).
- 15 Bank erosion is the biggest maintenance issue at present (2020-2021) (between the Rail Bridge (XS 37) and State Highway 2 Bridge). There is some evidence of changed management (between 2019 and 2021) practices elevating flood risk and risk of significant bank erosion in this stretch.
- 16 **We recommend** that designate features on the floodplain that should not be altered without care and consultation, as they may affect flood management and safety. These should be listed and maintained as part of the Living Plan and will include:
- Rows of trees and vegetation (for example the row of mature pine trees that run from the gate at the end of the Greytown Stopbank in an Easterly direction, towards the river buffer zone),
 - Old water channels and drains,
 - Existing road crossings and culverts,
 - Roads of any sort.

12.7.2 Bed level and gravel

- 1 An envelope to guide the upper and lower acceptable levels of the riverbed at each cross section (sometimes called a morphological or hydraulic envelope) is desirable. It will require a completed IPO cycle so that the full range of quantities of material brought down by high flows can be taken into account. Then the high and low marks can be set. Then these will guide the decision to extract gravel because the upper limit has been exceeded and the decision to stop extraction and/or replace gravel when the lower limit is exceeded.

We recommend that this should be safeguarded through the use of Trigger Events within this Living Plan, to ensure action is taken where any evidence emerges that there might be increased risk of flooding, bank instability that could lead to collapse, risk to assets, such as bridge abutments, or significant erosion in the view of a stakeholder.

- 2 Gravel extraction is a necessary part of river maintenance and **we recommend** that it is considered imperative to the success of flood defences that gravel extraction is continued by reasonable consensus, within the plan, especially for Critical Areas: [see Gravel Extraction Tool Hierarchy](#).
- 3 There are a number of places where gravel can come from into the Waiōhine River:
 - a Entering from the gorge into the top of the river below the gorge, this is caused by slips in the steep catchment tributaries, deep in the Tararuas that may be brought about by such actions as:
 - i Rainfall,
 - ii Earthquakes,
 - iii Erosion caused by wild animals grazing.
 - b From the Maungataarere tributary below SH2 bridge.
 - c From lateral erosion of the river banks caused by the river eroding it's banks where this can be allowed.
 - d Bed erosion.
 - e Minor tributaries, of which there are very few once the river emerges from it's gorge.
- 4 Removing large material higher up is not recommended unless dictated by the need to manage Critical Areas, as it will increase riverbed mobility and cause the river to move it's channel more.
- 5 Removing large material and leaving fines creates a pollutant problem, this is to be avoided wherever practical. The introduction of excessive fines into the river damages fauna and impacts the river and lakes downstream.
- 6 **It is recommended** that "[Ecological effects of flood management activities in Wairarapa Rivers](#)" at [Appendix K](#) for guidance and information on when moving or removing material in the river is acceptable and the significance of impacts and opportunity to create improved habitat (pools, runs, riffles and backwaters) that more than offsets downside.
- 7 **It is recommended** that where extraction takes place, techniques should be used that take the fines (sand and grit that is easily carried away in the river), and that minimise impact on the water and habitat quality. Extraction is all about balance, this can be

achieved by taking a range of material, rather than only one type. Only taking large stones must be avoided as, if this happens, fines can overwhelm invertebrates in the next flood event: stripping the river of life.

- 8 **Where possible, we recommend** increasing the number of points of access for machinery, to reduce the need to travel up and down the riverbed.
- 9 Beach extraction could create a sediment trap, encouraging more gravel to drop. Leaving a more hydraulically effective channel might be better; **it is recommended** to consider new techniques, even wet extraction in some carefully considered cases.

12.7.3 Ecology, habitat, flora and fauna

It is necessary to Identify an agreed toolbox for protection and eco zoning of the river to help manage the ongoing [Living Plan](#), **we recommend to:**

- 1 Use appropriate plantings ([see E&S](#)).
- 2 Prioritise the establishment of buffers.
- 3 Protect plantings until they are established.
- 4 Create an amenity where there is an opportunity.
- 5 Create diversity of habitat wherever there is a choice.
- 6 Involve [stakeholders](#) where they have expressed interest.
- 7 Habitat diversity is better ecologically. A varied range of habitats is better. Keep up weed and pest control and where practical, the trimming of willows.
- 8 Where practical, use non-structural tools (vegetation, planning tools etc.) to manage the river,
- 9 If there is a fine sediment problem ripping should not be employed.
- 10 Ensure a supply of willow poles/sterile hybrid or equivalent and appropriate natives where practical.
- 11 Rock groynes are preferable to rock revetments (rock lining of the bank), as groynes create a better environment for flora, fauna, habitat diversity and slowing down the river, to recharge aquifers. Expert advice is that groynes may be more effective larger and further apart, work needs to be done to study and test this in controlled, measured conditions.
- 12 Allowing a "Crumple Zone" of vegetation. Provides large woody debris too, which helps to develop erosion and flood protection, natural habitat and ecosystems.
- 13 There has been the potential long-term loss of some floodplain habitat, e.g. former river channels that are now spring fed streams, as the river no longer floods the floodplain as frequently as it once did.
- 14 The [stakeholders](#) need to share a common set of objectives for weed and pest control (IWI/GWRC/WAG/DOC etc...), within the combined vision for the Living Plan.
- 15 Regular counts of pools, runs and riffles need to be conducted, recorded and published by reach, in consultation with the Department of Conservation, Wellington Fish and Game Council, mana whenua and other interested stakeholders as part of the [Living Plan](#) process.

- 16 The advice and guidance offered in "[Ecological effects of flood management activities in Wairarapa Rivers](#)" should be used as a guide in decision making where work in the wet will be needed. But always seek to create backwaters, pools, runs and riffles, so as to leave the river in a better condition for ecosystems and migrating fish.

12.8 River management toolbox

12.8.1 Including techniques that need proving

There is an opportunity to conduct well defined experiments to prove new management techniques in such areas as gravel management. These should be a partnership between GWRC, the community and an agreed body of independent experts such as Massey University. These would be best consented as standalone consents in the short term, rather than the less agile vehicle of global consenting.

12.8.2 Showing river management tool hierarchies where these can be used

Hierarchies are shown "best to worst" i.e. try to use the lowest numbered tool that works.

12.8.3 Gravel extraction tool hierarchy

- 1 **Trench close to the river technique.** This technique creates a dry trench to remove all material, close to the active channel of the river but not connected to the wet river. Only once all extraction is completed, can the river be allowed to enter the trench, thus minimising the transport of fines downstream. If this technique is to be considered, then either:
 - a) Information on its successful use elsewhere is needed or
 - b) A carefully managed trial should be conducted, and its effectiveness measured before determining whether to continue to use the tool. It would be useful to get the direct oversight of experts from Massey University or elsewhere for a trial.
- 2 **Remove the armour layer and then re-establish this,** once extraction is complete. Once removed, this fragile ecosystem is destroyed, and fine sediment is released into the river to interrupt downstream ecosystems. The concept of the "tool" of removing the armour layer and then attempting to restore it after gravel extraction, is intended to restore this environment in a way that encourages the protection and eco environment that the armour layer provides. It is agreed that the concept of armour layer restoration needs to be further investigated with the possibility of conducting trials, to measure actual effectiveness. It was also considered whether it was possible to remove stone, in such a way as to expose an earlier armour layer that might exist intact below. However, it was concluded this would be difficult and investigating restoration would probably be a better option.

The Armour Layer is the surface of a gravel beach that has compacted naturally over time, with the finer sediment falling between bigger rocks and locking the surface layer together, whilst forming purchase for flora and eventually a habitat for fauna.
- 3 **"Scalp" Beaches.** This is the traditional approach to gravel extraction. It involves removing a layer off the top of a gravel beach, removing the armour layer and disrupting any eco systems, whilst exposing the loose fines to being washed into the river in the event of high water.
- 4 **Wet Channel Work.** This involves working in the river to remove material, releasing all the fines to be carried downstream. It is undesirable.

12.9 Possible alternatives to ripping (a hierarchy in order of preference from the perspective of river health)

- 1 **Widen the Channel.** This needs to be properly understood either through access to data from the technique being used elsewhere or through a managed and measured trial here on the Waiōhine, before being more widely adopted. The concept is to evaluate the practicality of widening the channel in selected problem sections. This may create the need for additional edge protection. Note that widening the channel does not increase the risk of avulsion. It creates lower energy in slower water. This needs data from a proven application elsewhere or a properly managed and measured trial to assess efficacy.
- 2 **Avoid ripping in the first place.** NOTE: This may not be possible in Critical Areas, where channel alignment and protection of key assets is at stake.
- 3 **Targeted gravel extraction** – [see above](#)
- 4 **“Ripping” after extraction.** It has limited effectiveness, is only ever a temporary solution and causes considerable damage to the environment. It is seen as a tool of last resort, because of damage to the armour layer and attendant eco-systems.

Beach “Ripping” or “Raking” is a process which involves the manual breakup of the Armour Layer using a tractor and custom-built “ripping” blades. It is done to encourage river “freshes” to carry away problem high beaches.

- 5 **Using rock-built groynes** should always be preferred to ripping beaches.

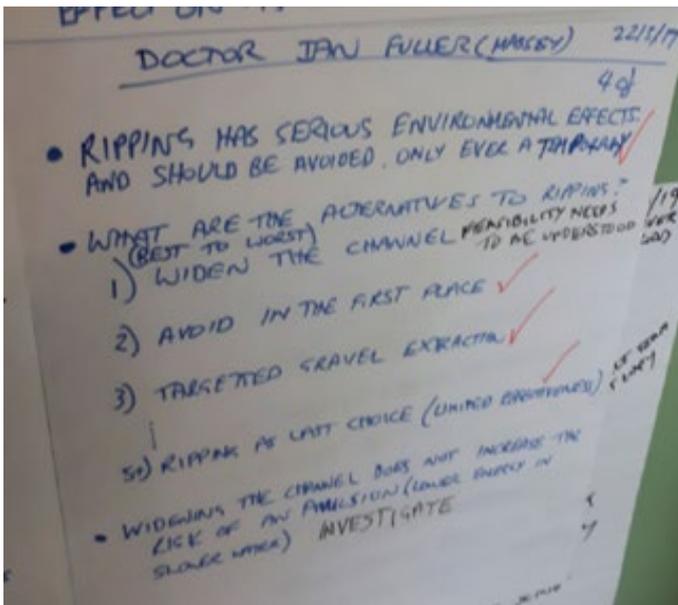


Figure 91: Finding the best way to manage gravel – workshop with Professor Ian Fuller (Massey University).

12.10 Possible Additional Tools

- 1 **Use of a Sediment Trap Further Upstream.** A sediment trap is created by scooping out a section of the riverbed to create a hollow into which sediment and gravel being transported will fall and remain. Clearly this is not a permanent solution and will require ongoing attention if it is to be maintained over any period. We do not yet have any clarity around its effectiveness or impacts, so an agreed approach to trialling and measuring the trial to investigate feasibility would be required, unless that data can be acquired from elsewhere.
- 2 **Use of groynes for bank protection.** Groynes are much better than rock revetments, offering better opportunities for flora, fauna, habitat diversity and slower water in the form of rock pools. For this purpose, Groynes are preferred to be larger and further apart. How large and how far apart should be the subject of a managed and measured trial, ideally under the guidance of Massey University subject matter experts. For guidance see “Ecological effects of flood management activities in Wairarapa Rivers” at Appendix K

12.11 River management design lines

River design lines are used as a planning, management and maintenance tool. They simply act as a guide to show, at the time of planning:

- 1 What care and maintenance are intended for each zone (Riverbed, buffer and floodplain)?
- 2 What agreement has been reached as to how each of these is to be treated,

12.11.1 Why and when to act

In reviewing River Design Lines and what job they need to do, it was asked:

- 1 Do we accept using River Management Lines as useful for the Waiōhine?
- 2 What do these lines represent to [everyone](#)?
- 3 Do site specific directions fit to River Management Lines?
- 4 How do we improve these lines to work better for the [techniques we now use](#)?
- 5 Can we evaluate the current river management width and/or make it better?

The diagram below shows the method devised for River Management Lines on the Waiōhine.

It is recommended this is adopted. NOTE this differs from previous approaches to meet the need for management of the flood plain out to the extent of the flood risk area and the planned stopbanks.

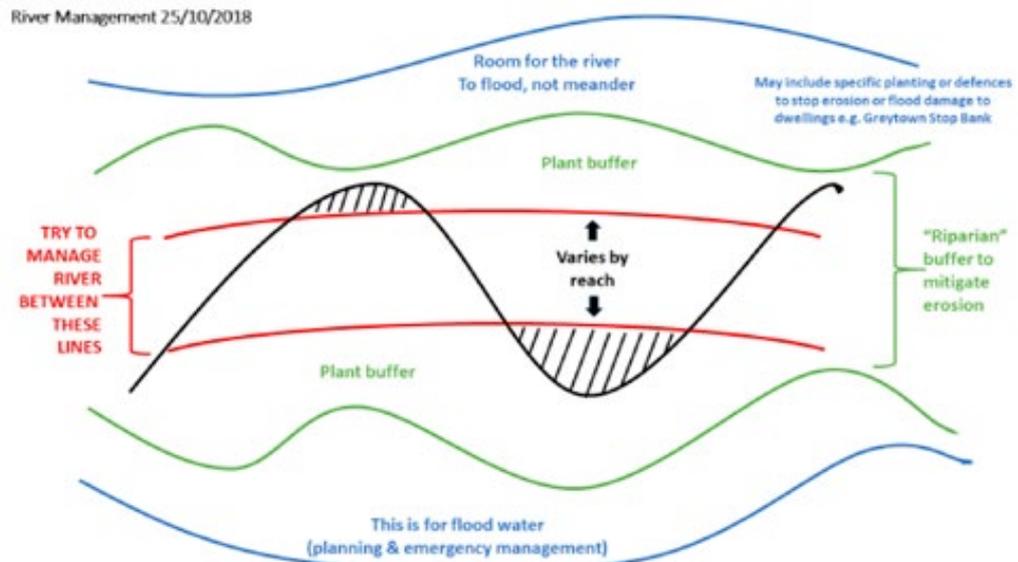


Figure 92: River Management Zones Diagram – Project Team.

The river design lines are provided as a guide, NOT set in stone and must be interpreted holistically.

Note that contrary to long standing expectation that river management lines should in the main be parallel, newer science calls for more of an hourglass shape. The Waiōhine is to be allowed to evolve to conform more to the hourglass shape, where practical ([see Critical Areas](#)). It is proposed to ask Massey University subject matter specialists to assist in redrawing this set of management lines in a way that makes most sense for the Waiōhine river management strategy.

It is recommended that this needs adjusting above the rail bridge ([XS 37](#)) to create an alignment that protects the pumps and wells for the Greytown water supply.

It is also desirable to allow the river to develop a combination of braiding and (without threatening the viability of defences, utilities, homes and farms) meandering, now known as "wandering" that allows the river, as much as is practical given Critical Areas, to obey its own dynamics and natural processes without endangering breaking down important banks or breaking through buffer zones.

12.11.2 This approach to river design lines answers several important questions

Q: In what circumstances would we be happy about the river being outside the red lines?

A: During major flooding.

Q: Are we happy with the river being entirely within the red lines?

A: No. See below.

Q: How much of the river should be expected to fall within the red lines at any time?

A: Approximately 80% should be relied on as a guideline.

Q: When should these lines be reviewed?

A: After a relevant [trigger event](#) and whenever the Waiōhine River Plan is fully reviewed.

Q: What would be relevant triggers for intervention for erosion into the buffers?

- A: The risk of the river breaking through the buffer.
- A: The risk of erosion on the opposite side, caused by the widening meander of the river as the result of it eating into a buffer zone.
- A: Likely risk to existing assets, such as important banks or any stopbanks where maintenance is desirable.
- A: In Critical Areas the river should be kept within its existing banks.

Q: What are the simple rules for management of the buffer?

A: We will use the principle of a 'stitch in time' to prioritize work that impacts the Buffer Zones in Critical Areas.

12.11.3 River management width. This varies by reach and location

- 1 Above rail bridge (XS 37) to upstream of Fullers Bend = 145 m. (steep bed)
- 2 Upstream Fullers Bend (XS 20) to SH2 bridge (XS 17) = transition down to 100 m
- 3 SH2 bridge (XS 17) to Mangatāre confluence = 80 m
- 4 Beyond the red lines on either bank is a buffer zone, delineated in green. The buffer zone does these jobs:
 - a Tolerates some river erosion (in non critical areas) and slows it.
 - b Forms an ecological corridor that can be sustained and improved as a reserve for environmental improvement projects.
 - c Provides a landscape and amenity value.
 - d Acts as a riparian filter to groundwater and run-off between adjacent farms and the river.

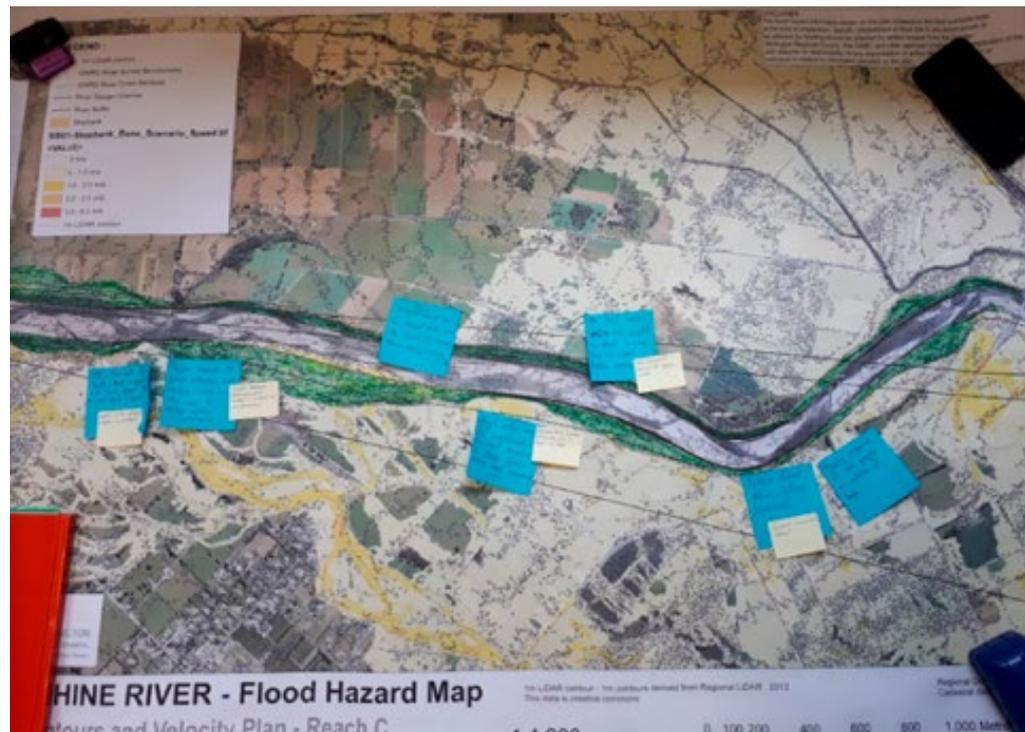


Figure 93: Example of tools used in developing an understanding of the needs of each stretch of river – Project Team.

- 5 **Beyond the Buffer zone on either bank is an area that depicts the expected maximum reach of a 1:100-year flood (delineated in blue)** with added contingency for climate change and for the flood sensitive area. The outer-blue lines are a new concept that we feel is necessary as our river plan has some things that should happen and shouldn't happen in that space. This area between the green and blue lines on the diagram should be designated as the floodplain in district and other plans. Some reasons for this are:
 - a **Proposed stopbanks** will be out at the edge of the blue lines, protecting the limits of the urban area.
 - b **Floodplain care:** There will be one or two places between the blue and green lines where for example, we'd suggest some trees be planted and gullies should not be filled in, without carefully considering planning the changes: as these things would affect the behaviour of flood waters in the event of a major flood.
 - c **Building:** Obviously, there will have to be a care about where and how high off the ground new buildings and safe access to new buildings, might be allowed to be built [in this zone](#).
- 6 Several locations have been identified as key for maintaining the river in its current course and to avoid unnecessary risk, to major flood protection assets and dwellings:
 - a Platform Farm,
 - b Vines Farm (XS 28-30),
 - c Kuratawhiti Street.

Guide notes on following sections:

"XS" is an abbreviation of "Cross Section", "TLB" and "TRB" stand for "True Left Bank" (Carterton side) and "True Right Bank" (Greytown side) respectively.

12.12 River management needs vary by stretch of river

There are four distinct stretches of the Waiōhine River, each with a distinct character, each presenting different river management challenges and opportunities for the long term delivery of the community's [vision](#) for the river. Several approaches were taken to understanding these and developing strategies for each stretch. It was recognised that there was a need to balance a number of competing goals, including: the protection of [Critical Areas](#), culturally sensitive sites, restoration and conservation of habitat to, for instance, preserve the high water quality, improve macro-invertebrate and fish environments, use "a stitch in time" touch to protect existing assets, manage flooding and erosion risks through river and gravel action, preserve important nesting sites and provide amenity. It is recognised that the job of effectively delivering against all these interests is difficult and complex but best achieved by partnership between Iwi, community, stakeholders and GWRC as proposed in [the Living Plan process](#).

Of particular note are the seven Critical Areas, where gravel build up or constriction of the river may lead to erosion of high banks, attacks on critical assets (irrigation inlet, town water supplies, SH2, the Urupa) or weaken the river banks risking a change of river course in the event of a flood, running downhill into Greytown.

12.12.1 Reach A: Gooseneck to Rail Bridge[See full maps](#)

- 1 This reach is steeper due to the fault line.
- 2 It features the sensitive "Critical Area" of the adjacent town water supply bore fields for Greytown and Featherston.
- 3 Wairarapa Fault: Water speed here is very fast at XS41:43 so a 140-metre width is not needed as overflows use Farmland Road.
- 4 Increase width of buffer areas to reflect existing vegetation.
- 5 XS 43-42 Carterton side (True Left Bank) replaces the training bank if destroyed, to protect from a river course change which could impact the water intake.
- 6 XS 42-40 TRB: Town water supply and bore field need care to maintain the bank to protect the bore field from river encroachment.
- 7 Just below and above the rail bridge ([XS 37](#)) – no mining of boulders is to be permitted e.g. near the water race intake ([XS 42](#)).
- 8 XS 38: Optimise design lines upstream and downstream of the Rail Bridge.

**Figure 94: River management needs vary by stretch of river – photos – GWRC.****12.12.2 Reach B: Downstream of Rail Bridge to Wire Shed**

- 1 This is a highly sensitive stretch as it is proven elsewhere in this plan that high gravel beaches in this stretch can cause the river to avulse (take a new course) in a flood and inundate Greytown. Management, including extraction of gravel build up is essential in this stretch.
- 2 XS 38 Optimise design lines upstream and downstream of the Rail Bridge.
- 3 XS 37-34: River to be kept wide to allow for a split channel below Rail Bridge to obviate risk to Greytown Stopbank and beyond.
- 4 XS 38-34: Maintain split channel downstream of Rail Bridge.
- 5 XS 36-35: Maintain stopbank bund as it is.
- 6 XS 36-33 (TRB): Design lines to follow groynes to prevent the river putting extra pressure on TLB downstream.
- 7 XS 33: Design lines can move closer to the river to prevent alignment issues downstream.
- 8 XS 29: The high riverbank on the TRB, if eroded, plant the resulting beach to counter further erosion.
- 9 XS 27 TRB: Move design lines to the north to avoid road end (River Road) and adjacent low ground.



Figure 95: River management needs vary by stretch of river – photos – GWRC.

12.12.3 Reach C: Wire Shed to SH2 Bridge

- 1 This is a highly sensitive stretch (containing [Critical Areas](#)) as it is proven elsewhere in this plan that high gravel beaches in this stretch can cause the river to avulse (take a new course) in a flood and threaten State Highway 2, the North end of Greytown and Udy Street. Management, including extraction of gravel build up is essential in this stretch. Constriction of flow by high gravel banks should also be avoided due to risk of destruction of high banks or assets.
- 2 XS 27: there is an unquantified risk that if the river gets above the true right bank here it could escape into lower ground beyond the car park and Kuratawhiti Street. Where practical, the existing riverbank should be hardened with rock groynes. If this should become non-viable and at risk of failure, then this will trigger a review within the [Living Plan](#) provisions. Note that this area is also the lower spill location to the start of the Apple Barrel floodway.
- 3 XS 27-26 Gravel extraction likely to be necessary in this area due to risk of avulsion (the river changing course) on the true right bank (Kuratawhiti Street side). We have also modelled the bed level to show it is sensitive to aggradation in this area, increasing some risk of flooding.
- 4 XS 27-21: True left bank high edge – rock groynes need to be keyed back into the bank to avoid them being outflanked.
- 5 XS 24-23 True right bank. Floodwater here may be already affecting State Highway 2. There is a need to plant and maintain the buffer zone. If a high bank erodes, plant on the resulting beach.

- 6 XS 27-21: Needs at least some rock groynes to extend to the inner line of buffer zone to protect buffer development. These would be big groynes – around 40 metres long. For reasons of practicality the chosen strategy is to harden the river edges with groynes but to maintain a [trigger](#) that if this ceases to be viable, then a new management strategy is needed.
- 7 XS21-19: At Fullers Bend maintain the 100-metre active channel. Fuller’s Bend true right bank (Greytown side) stopbank: Whilst ongoing scouring out of the toe of stopbank is a problem, it does not require a true left bank (Carterton side) stopbank retreat. Repairs in this area to work towards a consistent design with ability to draw on Capex if agreed with the [community](#), or flood reserves under the Living Plan process. Focus on improving standard of protection in stages, in response to erosion. Preference is for a programme of rock groynes on the outside of Fullers Bend (true right bank) upstream of new rock lining as this potentially offers the most cost-effective solution – to be undertaken as maintenance funds permit.
- 8 XS 21-17 Options for the long-term vision for the stretch of the true left bank (Carterton side) River Road and SH2 bridge could follow this decision hierarchy:
 - a Harden the edge with groynes,
 - b Push stopbank back from the river,
 - c Surrender land on the true right bank (Greytown side) to create more room.

For reasons of practicality the chosen strategy is to harden the river edges with groynes but to maintain a [trigger](#) that if this ceases to be viable, then a new management strategy is needed.



Figure 96: River management needs vary by stretch of river – photos – GWRC.



Figure 97: River management needs vary by stretch of river – photos – GWRC.

12.12.4 Reach D: Below State Highway 2 Bridge

All banks below the State Highway 2 Bridge are training banks, rather than stopbanks (they do the job of helping the river stay within design lines in normal situations but will not prevent major flooding). They will be managed based on the principle of maintenance and replacement, if the need arises.

Shingle aggrades on this reach and by its nature, can be less attractive to contractors to quarry. So, extraction may not be able to keep pace with aggradation in the long term and there is an acceptance that flood risk may gradually increase here.

- 1 XS 14: True right bank (Greytown side). Maintain a rock line at the property known as “Wong’s”.
- 2 XS 5-6: Design Line to follow line of groynes.
- 3 XS 17-1: Maintain channel width and channel by periodic vegetation removal.
- 4 XS 4-2: Bicknell Lower Gravel Bank. We confirm the need for the Bicknell lower gravel bank to protect SWDC wastewater.
- 5 XS 2: True left bank.

We recommend the retirement of the damaged Herrick bank and the need for a new training bank to deal with regular flooding at that location. Important note, this is a site of cultural significance – several Maori burials are located here.

12.12.5 Gravel extraction and management fees

The steep nature of the river and its catchment mean that large amounts of gravel have been washed down onto the floodplain historically. The amounts of gravel have been significant after large earthquakes (e.g. 1855 and 1942) and major floods in the area (which coincide with the Interdecadal Pacific Oscillation). Experience has shown that during these times gravel extraction was crucial in controlling flood and erosion risk. Since then gravel extraction has been found to also be essential during the quiet times in the river. In particular when used to manage bed levels and the related flood risk.

We understand that there are a great number of constraints on gravel extraction, but we consider it important and recommend that it continue into the future. The main reason for this is to constrain and limit flood risk. There are management fees collected for gravel extraction from the Waiōhine River. **It is recommended** that the monies obtained as management fees for gravel extraction in the Waiōhine River and all the other rivers in the Wairarapa continue to remain set aside for the Wairarapa catchment.



13

Water quality management and other Whaitua programme obligations

We recognize that GWRC has not yet conceived or implemented an overall solution to the urgent and important need for water testing and quality improvement yet.

In support of GWRC, the community see a shared opportunity to proactively engage in being part of the solution, until and unless something better comes along:

- 1 We will seek help from subject matter experts within GWRC, such as Amanda Death, and experts within the community, such as mana whenua, or other independent experts.
- 2 We will develop a community led, collaborative solution, under the Living Plan process.
- 3 We will incorporate whatever exists that is useful.
- 4 We want access to any test results, materials and methods etc. that exist in the public or GWRC domain.
- 5 We need to know on an ongoing basis what, if any, resources exist to help.

A [trigger](#) exists in the Living Plan to adapt and adjust the process and model as new knowledge and resources come to light.

The Whaitua Implementation Plan document concerns itself with the long-term improvement of the natural character of rivers and lakes. This includes water quality, in-stream ecosystems, riverbank ecosystems of flora and fauna and the attendant control of pests and weeds. Although not yet a regulatory document, it must form an integral part of any river plan and set some specific targets and target dates for things like water quality improvement. The community and GWRC should work in our own way, within the general direction set by Whaitua, to meet or exceed water quality commitments.

The Waiōhine River provides town water supply and serves a water race ([XS 42](#)). Past flood management regimes and gravel extraction may have had a significant impact on macroinvertebrate health. The Waiōhine River has good water quality and ecological health in its forested headwaters, contrasting with macroinvertebrate (MCI) scores at the very bottom of the “fair” grade farther down in the catchment, where the river has been subject to ongoing mechanical disturbance but principally, the influx of polluted water from the Mangatāre and Beef Creek tributaries.

The Waiōhine River has very good water quality above the confluence with the Mangataare. Whilst MCI outcomes are at the very bottom of the “fair” band according to the Whaitua research, this appears to be arrived at by interpolation – i.e. without the benefit of actual measurement. Advice from Doctor Russell Death of Massey University suggests this should be checked and based upon actual measurement.

To fulfil obligations under the Whaitua programme to improve the natural character of the river, water measurement and observation will need to be regularly conducted in three key locations:

- 1 The Gooseneck (access off Waiōhine Valley Road) ([XS 43](#)).
- 2 At the State Highway 2 Road overbridge.
- 3 At the end of Tilsons Road, upstream of the confluence of the Ruamahanga (identified in the Ruamahanga Whaitua document as “Bicknells” [XS 1](#)).

Water quality goals (at the end of Tilsons Road below the confluence of the Mangatāre) are as follows:

- Ammonia (toxicity) needs to remain as quality “A”, with a median (average) concentration of no more than 0.05 milligrams per litre and no more than 0.015 milligrams per litre at the 95th percentile.
- Nitrate (toxicity) needs to remain as quality “A”, with a median (average) concentration of no more than 0.34 milligrams per litre and no more than 0.85 milligrams per litre at the 95th percentile.

Periphyton and Macroinvertebrate Community Index (MCI) need to remain as quality “A”, with a count of less than or equal to 50 per cubic metre. This holds a current rating of “Fair” and the goal should be to lift this to a rating of “Good” with a count of between 110 and 130 per cubic metre by 2040. It should be noted that this is largely dependent on water quality improvement in the Mangatāre.

13.1 Current state vs targets for water quality improvement

| | E. coli | | Periphyton | | Ammonia toxicity | | Nitrate toxicity | | MCI | | Achieve by |
|----------------|---------|--------|------------|--------|------------------|--------|------------------|--------|------|--------|------------|
| | Now | Target | Now | Target | Now | Target | Now | Target | Now | Target | |
| Waiōhine River | A | A | A | A | A | A | A | A | Fair | Good | 2080 |

Figure 98: Targets for Water Quality Improvement – Whaitua/PNRP.

13.2 In-stream nutrient criteria for the management of periphyton

| | Nutrient criteria (concentrations) | | | |
|----------------|---|-----------------|--|-----------------|
| | Dissolved inorganic nitrogen (DIN) (mg/L) | | Dissolved reactive phosphorus (DRP) (mg/L) | |
| | Median | 95th percentile | Median | 95th percentile |
| Waiōhine River | 0.35 | 0.87 | 0.006 | 0.023 |

Figure 99: In-stream nutrient criteria – Whaitua/PNRP.

13.3 Nutrient limits and targets for diffuse sources of nitrogen and phosphorus, to be achieved by 2040

NB. “Limit” = current load. Loads are un-attenuated. t/yr = tonnes per year

| | Nitrate (NO3-N) | | | Total phosphorus (TP) | | |
|----------------|-------------------|--------------------|------------------|-----------------------|--------------------|------------------|
| | Limit load (t/yr) | Target load (t/yr) | % load reduction | Limit load (t/yr) | Target load (t/yr) | % load reduction |
| Waiōhine River | 122 | 121 | 1 | 9.0 | 8.6 | 5 |

Figure 100: Nutrient limits and targets – Whaitua/PNRP.

13.4 Sediment load limits and targets to be achieved by 2050

Notes: 1. Current total FMU sediment load = current annual sediment load from all “non-native” and all “native” land. 2. Sediment limit = current annual sediment load from all “non-native” land. 3. Load reduction required by 2050 = reduction in sediment load from “non-native” land only, as annual load. 4. Sediment target = change in annual sediment load from all “non-native” land as % reduction from sediment limit. 5. Figures derived from modelling of sediment loss from net bank and hill-slope erosion processes for land uses in 2017.

| Freshwater management unit | Current total FMU sediment load | Sediment limit | Load reduction required by 2050 | Sediment target |
|----------------------------|---------------------------------|----------------|---------------------------------|------------------------|
| | t/yr | t/yr | t/yr | % reduction from limit |
| Waiōhine River | 137,200 | 22,200 | 6,400 | 26 |

Figure 101: Sediment load limits and targets – Whaitua/PNRP.

13.5 Water Quantity Management under the Whaitua Programme

The Waiōhine River supports large town supply and water race takes (XS 42). A proportion of these large takes continues below the minimum flows in order to provide water for domestic and stock drinking needs. Two minimum flow thresholds are prescribed in the Proposed Natural Resources Plan (PNRP) (3,040L/s and 2,300L/s) to ensure that takes for other purposes are progressively reduced as river flow drops.



Figure 102: Water Management Wheel – Whaitua/PNRP.

The Whaitua dictates the higher minimum flow of 3,040L/s (litres per second) and considers that this threshold represents an appropriate balance between giving effect to the habitat objective and largely maintaining existing reliability of supply for users. However, the lower PNRP minimum flow (2,300L/s) is to be removed. This minimum flow is well below that which would provide for the habitat objective (2,990L/s). The Committee considers that all reasonable efforts to reduce takes in the catchment should have been made before 2,300L/s is reached.

Currently the 2,300L/s threshold is used to manage the town supply and water race takes (XS 42), with some amount of reduction required at this flow. The town supply and water race will have to further reduce their takes from current levels at the 3,040L/s minimum flow to just those volumes necessary for the health needs of people and stock drinking needs.

Whaitua recommends: Greater Wellington includes in the PNRP the following water allocation limits for the Waiōhine River:

- 1 Remove the existing PNRP “lower” minimum flow of 2,300L/s.
- 2 Retain the “higher” minimum flow level of 3,040L/s.
- 3 Cap the amount of water available to be allocated through consents at the existing consented use. (Existing consented use at June 2018 is 950L/s).

The total existing allocation from the catchment (950L/s) is moderate but below the default allocation amount in the PNRP (1,590L/s).

The PNRP allocation amount is seen as too generous and **recommends** capping the allocation at the existing level of use.

The reasoning for this is similar to that for the other rivers in which there is potentially some allocation headroom on paper: further allocation would be incompatible with the Committee’s view that more resilience needs to be built in to the river management regime to counteract the likely future impacts of climate change.



14

**Planting for River Management,
Biodiversity and Cultural Resource**

We would like to acknowledge the great expertise brought to this aspect of the plan by tangata whenua.

We recommend that this rich vein of knowledge be sought out at every future stage of the restoration of the river corridor to a naturalistic state.

It is recommended that the [cultural impact](#) on the connected places and the indigenous flora in these places can be restored as a part of the river and floodplain management.

It is recommended that: Buffer zones in the floodplain area include managed planting of indigenous flora and the opportunity for larger scale wetlands be researched in line with the biodiversity regional strategy and the mana whenua and community [vision for the river](#).

There is a question as to how to make best use of traditional river management planting tools, such as willow in combination with native varieties. This is complicated by possible reductions in willow condition through pests such as giant willow aphid and willow sawfly and natural stand aging could limit their effectiveness in maintaining design lines and reducing bank erosion.

It is recommended that existing plantings should be complemented with suitable indigenous species that will have a long-term benefit for managing river widths, maintaining bank stability if mass wasting occurs, and improving wet and dry habitats.

The [Cultural Impact Assessment](#) makes an excellent point that the original natural environment cannot be fully restored as a revolution, but the scope for establishing indigenous flora in buffer zones behind protective exotics as plants like kahikatea establish themselves, is part of the evolution. The Papawai Marae project for riparian planting of the Papawai stream is an example of planting that Wairarapa Maori expect in the Waiōhine River Living Plan.

The Living Plan Process should ensure that community driven projects and local government plans and budgets are coordinated and in agreement. We can learn together the best way to restore the river to a naturalistic state that will benefit the entire community.

Several approaches to slowing or preventing bank erosion, using a variety of vegetative tools, have been developed internationally, including vegetated groynes, linear willow plantings with indigenous plantings in between, or timber pile training fields with vegetated buffers. [See Tonkin and Taylor](#).

Supporting existing features on the floodplain, with willow and indigenous plantings, would reduce maintenance costs in the long term, and potentially alleviate some of the concerns around flooding of neighbouring properties. An example of this would be the opportunity to plant additional trees to bolster existing trees in line with the end of Greytown Stopbank.

Another location of cultural significance is the junction or confluence of the Waiōhine and other rivers, the Mangatāre and Ruamahanga. The cultural impact of protecting the junctions of rivers in the flood protection work can ensure a place for sacred rituals to be repeated.

Finding:

It is recommended to highlight these river junctions and other significant areas through targeted planting with indigenous flora to fit the significance of the area.

14.1 Restoration and Conservation of the Riverside

Restoration and conservation of the riverside is a huge task, so to address this in a way which can be easily understood, thorough, and be able to be handed on to the next generation, the following method has been adopted –

Starting with the map having the cross sections of the river, (Appendix J in the plan), it is envisaged that we will make two passes of detailed planning of the area, review and improve these with stakeholders and refine:

14.1.1 First pass

- 1 Identify culturally sensitive areas,
- 2 Identify the 'no-go' areas for GWRC, TA's, landowners, etc.
- 3 Identify areas of riverbank requiring/not requiring restoration.

This leaves us with the extent of our potential work area.

From this we should be able to build a list of people to contact for permission to do restoration work

14.1.2 Second pass

- 1 Label the type of habitat at each cross section.
- 2 Identify what's currently there.
- 3 If restoration is required, agree suggested plantings at each, using Iwi knowledge, the GWRC Central Wairarapa Plains planting guide, and Akura's restoration planting guide, and all our local knowledge.

This should give us the skeleton of a plan which can be taken onwards by the next generation(s), and a fair indication of the sheer size of the task to be broken down into manageable chunks and approached one at a time, with its own appropriate strategy.

A complete pass down the river needs to be done at this stage to capture the wealth of local knowledge about the river we have available to us now, which can be added to this plan to help future generations.

Once this is done, **it is recommended** that this information can be included in an annotated map which can be distributed, added to, amended, zoomed in on, or expanded and printed for display purposes. This can then be submitted to the community and stakeholders for their input before becoming part of this Living Plan.

14.1.3 Detailed plans for individual stretches

Prioritise the work areas.

Break these areas down into doable chunks for a working bee,

Produce a timeline for the first few areas, to include –

Preparation work required –

- 1 Weed and pest control
- 2 Watering
- 3 Plant protection and support
- 4 Fencing and shelter if required
- 5 Access ways for volunteers
- 6 Design of paths through the plantings for public access, where appropriate.

Phases of planting -

- 1 Pioneers and nurse plants
- 2 maintenance
- 3 2nd phase
- 4 Heritage trees

We will then have -

- 1 A long term overall plan
- 2 A detailed plan for the next few years
- 3 A shopping list
- 4 A list of requirements for funding and GWRC assistance
- 5 Something specific to take to the community for volunteers
- 6 Bite size chunks to take to schools for their involvement.

There is a lot of expertise in this locality, and if done well, this plan could generate a lot of positive feedback from the submissions process at the start of this Living Plan journey.

It will also allow the forward ordering of plants a few years in advance, plant from seed, justify a nursery.

There are many other things to be taken into consideration – e.g.

- 1 Edible and medicinal native plants
- 2 Material for weavers
- 3 Integration with flood control plantings
- 4 Cooperation with other restoration bodies
- 5 Funding
- 6 Organisation of working days
- 7 Keeping a close working relationship with GWRC,
- 8 All the flora and fauna items already incorporated in this Living Plan.

At the time of writing this plan (2021) the first pass has been done, such as identifying owners of the riverside properties who should be approached for permission to embark upon restoration. In many cases this is GWRC, whose sites are the best-fit initial sites for work.

Local knowledge has also identified private sites where the owners have expressed interest in restoration/conservation, and these first two categories of site should account for many years of work.

It is hoped that landowners who may be less enthusiastic at the moment will see progress being made and be more open to joining in. There is ample time ahead for this.

A series of river "walks" have identified the current state of the riverbank vegetation in a number of target sites, requiring actions varying from heavy duty clearance of the land eg at Kuratawhiti Street, to areas further upstream where natives are coming up underneath tree lucernes, gorse and willows, and will require little attention.

This data has been collated onto a spreadsheet, then overlaid on aerial photographs of the riverside.

This annotated map currently shows ownership, habitat, culturally sensitive areas, current and proposed vegetation and other features of interest. It can also now be used to record proposed work areas and schedule, progress, problems etc. and is scalable down to 'working bee area' size.

See maps at Appendix M Maps of Restoration Strategy

14.1.4 How to proceed

- 1 Local volunteers prepare and plant easily accessible areas with a variety of natives suited to each microhabitat, and locally sourced, to give the young plants the best chance of success. These areas are likely to include amenity areas like parkland, pathways, walking and cycling tracks etc.
- 2 As budget permits, GWRC planting teams to include natives e.g. flaxes and cabbage trees interspersed with their annual willow pole planting programs. These are typically on less accessible parts of the riverbank and planted in bulk.

With the volume of young plants required and the expected shortages due to so many current planting schemes, it is proposed to eco-source some seedlings from unwanted natives self-seeded in local people's gardens. This ensures that local varieties are used. A careful process for this will be developed. As the project progresses there may be a need for nurseries at various places along the river.

Help and ideas from the GWRC local operations team have been offered, including the idea of engaging a GWRC landscape designer in mapping out the block at Kuratawhiti Street.

GWRC Land Management have been very helpful in offering planning for plant sourcing and wetland restoration / enhancement, and info on eco sourcing.

As well as trees, native plantings should include as many varieties of flaxes as possible, advised by the local weavers group. Maori knowledge and expertise will guide the planting plans as we seek to include heritage trees, edible plants and medicinal plants over time.

Plantings should be planned to enhance the existing bird corridor along the river with food source plants for birds, for instance, harakeke and kowhai for Tuis, and berry producing trees and shrubs, which will self propagate with the help of the birds over time.

Some sites may have to be "no-go" areas for the public, for instance to establish nesting sites for birds along the tree corridor. Other areas may require long term exclusion to improve the chances for trees in their junior forms. Pest control will have to be rigorous here.

The creation and conservation of wetlands will be beneficial to the river in terms of water quality and biodiversity. A number of places along the river, especially on the true left bank, look to be ideal for this. We look forward to working with GWRC Land Management on this. In addition to habitat, wetlands offer a number of benefits in terms of water quality, flood management and natural water storage that helps river levels be maintained.

14.1.5 Habitat – a matrix of the right plant in the right place

| Habitats | | |
|---------------|--------------------|-------------|
| Terrain | Nurse/pioneer | 2nd Phase |
| Very Stony | Tree Lucerne | Mahoe |
| | Chatham Is. Akeake | |
| Soil/stones | Tree Lucerne | Beeches |
| | Manuka | Matai |
| | Kanuka | Black Maire |
| | Totara | Broadleaf |
| | | Lancewood |
| Deep Soil | Cabbage Tree | Black Maire |
| | Manuka | Lemonwood |
| | Kanuka | Rewarewa |
| | | Makomako |
| Boggy/wetland | Cabbage Tree | Kahikatea |
| | Flaxes | Totara |
| | Swamp Manuka | Miro |
| | Raupo | Fivefinger |
| | Akeake | Mahoe |
| | Swamp flax | |

Figure 103: Habitat Matrix Table – Project Team

14.1.6 Matching plants to phase of planting: Establishment**Pioneer/Nurse Plants**

Ti Kouka or Cabbage Tree: Favours open places in or near swamps or hill slopes near seepages. Up to 12m in height with a trunk of up to 2m. Pollinated by moths, bees and other insects. Abundant flowers in spring, fruiting from mid-summer to autumn. Leaves are used in weaving and plaiting.

Kanuka: First colonisers of cleared land and will occupy landslips. Prefers well drained soils. Up to 20m high and with a trunk up to 600mm. Densely covered with flowers. Flowers spring to summer, fruiting through late spring to autumn. Will not regenerate in its own shade, so will slowly be replaced by more shade tolerant species.

Flax. Wharariki: Grows in wetland and stream sides up to 1.5m high. Produces large yellow flowers. A source of nectar for Tuis and bellbirds. The leaves are a source of material for weavers.

Flax. Harakeke: Larger than the Wharariki. Many different varieties. Used for many different purposes by weavers from cordage, fishing nets to rain capes. A source of nectar for Tuis bellbirds and other nectar feeding birds. Note – main and local varieties need to be listed individually.

Manuka: Tolerant of low fertility soils. Likes open ground, not good in shade. Grows up to 10m high, trunk up to 150mm. Pioneer in forest regeneration or cleared ground. Flowering from spring to autumn

Toetoe: Native Grass growing to 2m tall forming large tussocks or clumps The flowering stems rise to 4m high with showy flower plumes. Will grow in swamps, stream banks, bush clearings etc Already found growing along the river bank above the rail bridge Has medicinal properties.

14.1.7 Aids to identifying trees

14.1.7.1 Resources

- 1 DOC
- 2 www.doc.govt.nz/get-involved/conservation-activities/let-nature-in/

14.1.7.2 Eco sourcing info

- 1 New Zealand Plant Conservation Network – nzpcn.org.nz
- 2 "How to identify native seedlings" – nzpcn.org.nz/flora/plant-identification/
- 3 Select "Written Descriptions", hit the hyperlink "flora search engine", use the "Search Flora" box to search on scientific name or common name
- 4 Bushmansfriend – leaves and foliage. Great pictures but mainly scientific names
- 5 NZtree. Free app. Put together by Len Gillman of AUT, can be accessed via rnz. Takes you through a series of pictures relating to the foliage you're looking at. Then gives you a list of trees with that type of foliage, and several pictures of the one you select. Unfortunately only 98 species are listed so far.
- 6 Wellington regional native plant guide. GWRC "What to plant at your place"

14.1.7.3 Waohine – Proposed Plantings

True Right Bank

Bore Field. Cross section 40

- 1 Toetoe
- 2 Karamu
- 3 Koromiko
- 4 Ponga (fern)

Rail Bridge. (above and below). Cross sections 39 – 35

- 1 Flaxes
- 2 Cabbage Trees
- 3 Kanuka
- 4 Some natives already established,
- 5 Spot planting heritage trees:
- 6 Kahikatea
- 7 Totara
- 8 Tawa

Cross sections 31 – 28

- 1 Flaxes
- 2 Cabbage Trees
- 3 Kanuka
- 4 Ferns

Kuratawhiti Street. Cross sections 27-25

- 1 Extend existing planting of
- 2 Manuka
- 3 Kanuka
- 4 Cabbage Trees
- 5 Totara
- 6 Kowhai
- 7 Flaxes

Notes:

- 1 Plan mixed use of the cleared area with grassed areas, native trees, amenity areas, pathways, signage.
- 2 Spot plant bigger tree seedlings amongst the established vegetation e.g. Totara, Matai, Black Beech, Broadleaf, Lemonwood, Tawa, Black Maire, etc.
- 3 Pest control for rabbits, possums etc.

True Left Bank**Rail Bridge. (above and below) cross sections 39 – 31**

- 1 Planting opportunities with Hank Van Den Bosch possibly including wetlands

Bassets. Cross sections 24 – 22

- 1 Kanuka
- 2 Flaxes
- 3 Cabbage Trees
- 4 Kowhai

Fullers Bend. (GWRC) cross section 21

- 1 Kanuka
- 2 Cabbage Trees
- 3 Flaxes

Note: clear blackberry and convolvulus

Cross sections 20 – 18

- 1 Options for planting between the willows
- 2 Flaxes,
- 3 Cabbage Trees to help stabilize the bank.
- 4 Larger trees where there is already established cover which is not under threat from the river.



15

Conceptual stopbank design

15.1 Introduction

This section provides more detailed information on the work done by the Project Team and [Cameron Fauvel Projects Limited](#) in developing a greater understanding for the path, location, shape, length and costs for the proposed two new inland stopbanks required for the recommended [\(Option 2\)](#) solution.

Costs for these can be [found here](#).

The Cameron Fauvel Projects Design documentation can be [found here](#). This includes a series of detailed annotated aerial maps, showing the possible path of the stopbanks in large scale, as well as detailed profile diagrams illustrating the height and profile of the proposed stopbanks.

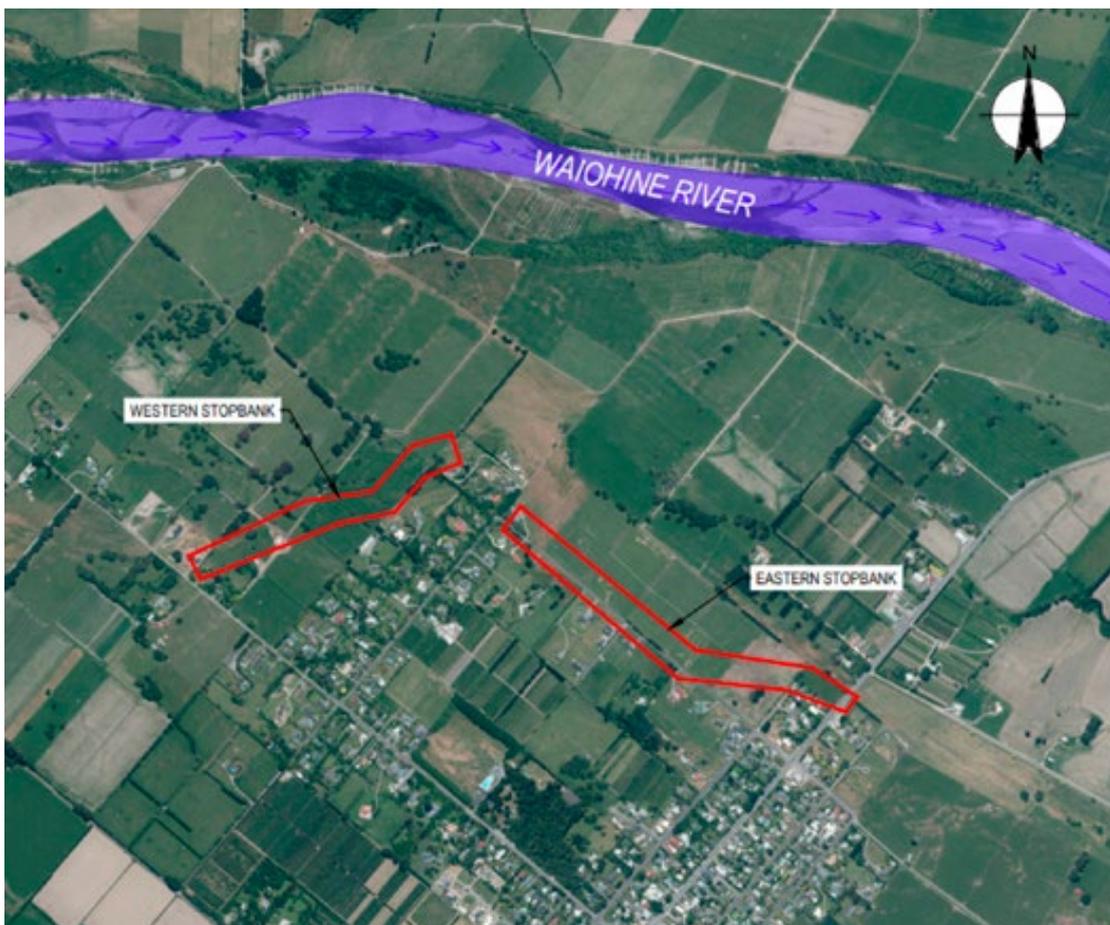


Figure 104: Conceptual Stopbank Design – CF Projects Limited.

It is important to note that these form a preliminary conceptual design. This is further into the design process than traditional river plans have gone, however, there is a wish to provide the community, stakeholders and landowners, with as full a set of information as practical, prior to the detailed design and associated discussions and procedures.

Ideally material resulting from the removal of unnecessary banks near the State Highway 2 Bridges over the Mangatāre and Beef Creek could become available to assist in the construction of the inland stopbanks. This may be complicated by discussions between GWRC and the Urupa Trust, so it may become necessary to source material from elsewhere. The size of the inland stopbanks also suggests that that material alone may not be enough for the whole construction.



Figure 105: Example of Mapped Path of Stopbank – CF Projects Limited.

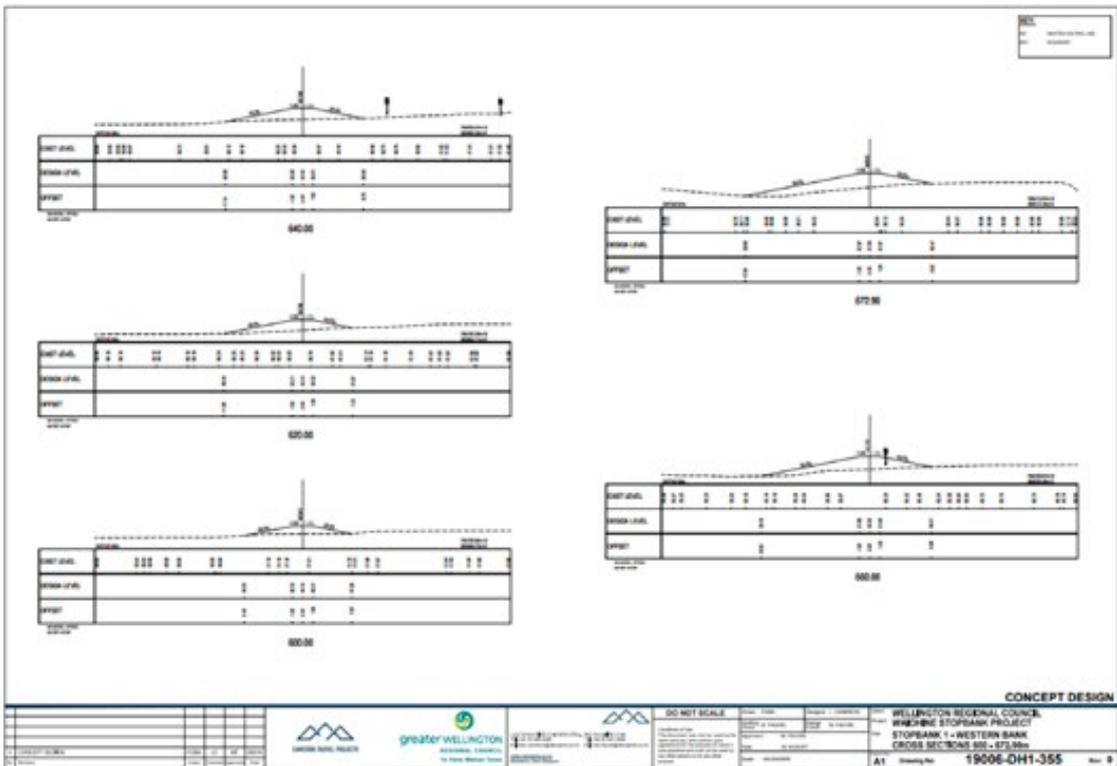


Figure 106: Example of Profiles of Stopbanks – CF Projects Limited.

15.2 Investigation of alternative western (Kuratawhiti Street) stopbank alignment

In response to a suggestion of a possible alternative stopbank alignment for the upstream Western (Kuratawhiti Street) stopbank, a first level investigation was carried out to assess the viability of this by comparison to the proposed path and design. It revealed the following information illustrated in the following diagrams:

Yellow line, the proposed stopbank alignment chosen by the community, approximately 650m in length and 3000m³ in volume, this bank effectively blocks all the flood waters coming across the floodplain towards Udy street;

Red line, the possible alternative stopbank alignment suggested by landowner, approximately 1400m in length and 14,000m³ in volume. Unfortunately, this bank does not effectively block all the flood water coming across the floodplain towards Udy Street so additional works, cost and impact on farm operations would be implied, in addition to the figures in section 8.

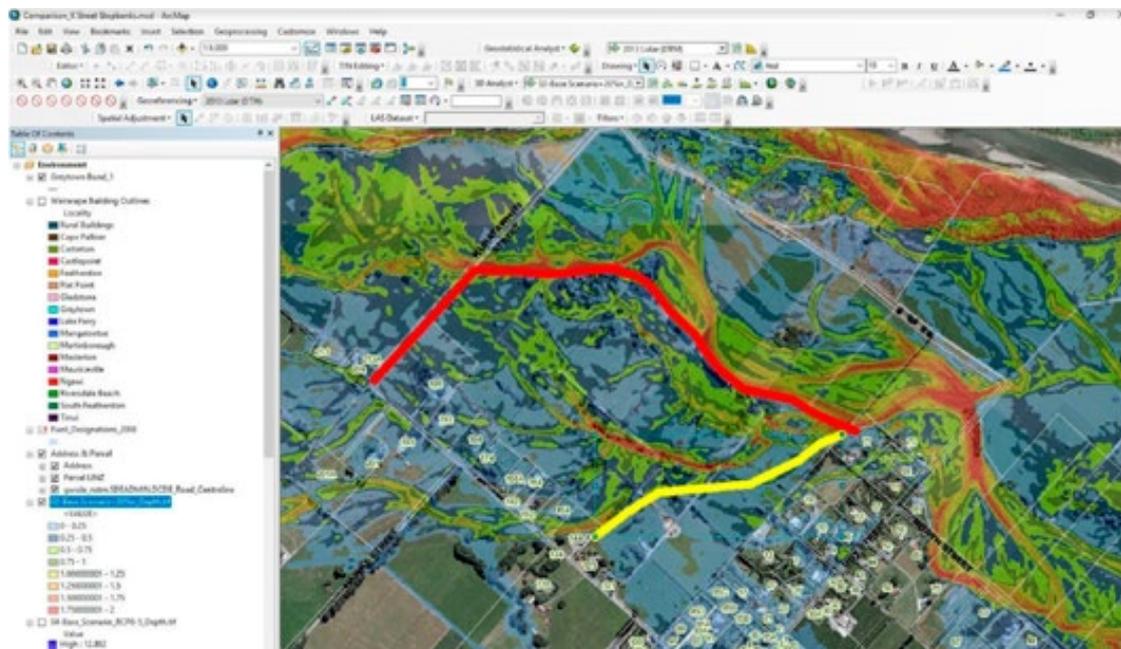


Figure 107: Investigation of Alternative Western Suburbs Stopbank Alignment – GWRC.

It is recommended not to proceed with further investigation of this possible stopbank alignment as there would be a very substantial additional cost (at least 4 times higher). Based on the design guidelines set out at the start of the project no discernible benefit can be identified against the design goals.



16

Appendices

Appendix A

Waiōhine floodplain management plan initiation

A record of the slides from the public meeting forming the WAG Project Team

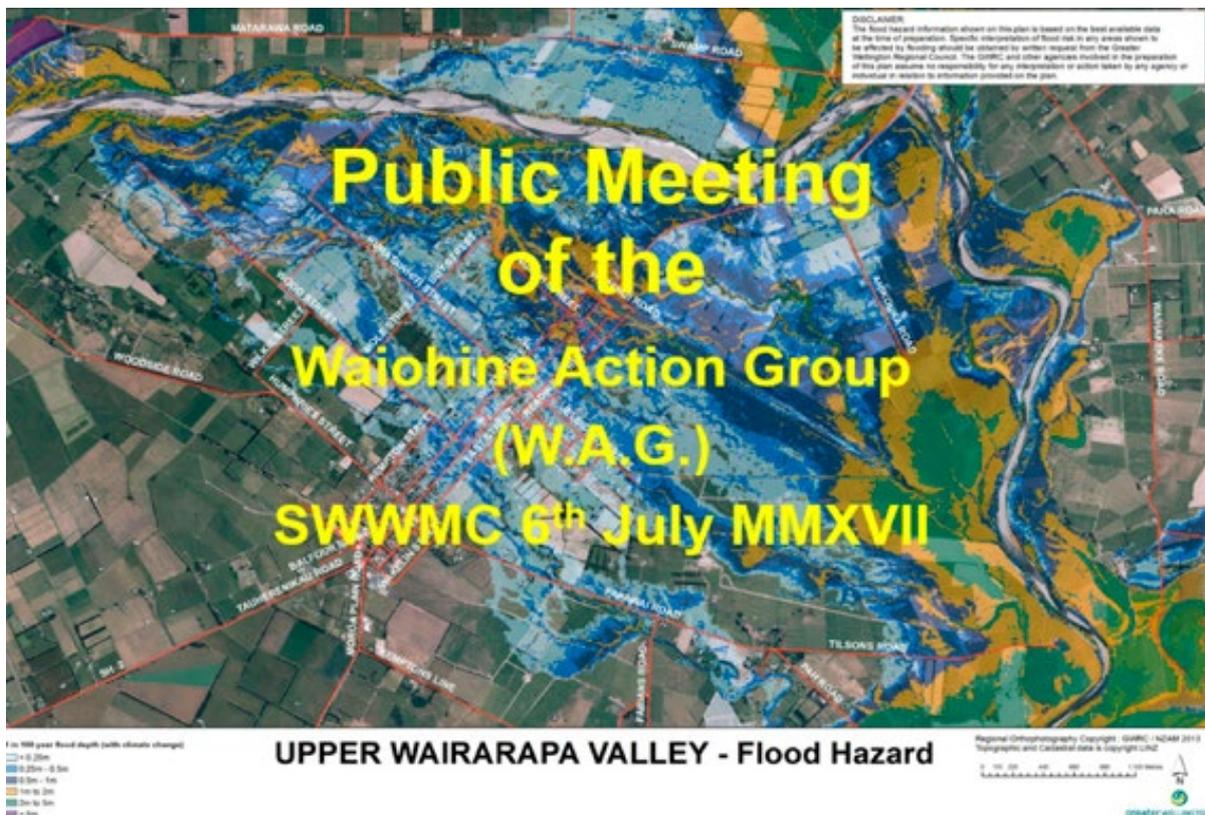


Figure 108: Public Meeting – 6th July 2017.

All information in this appendix is copyright Waiōhine Action Group 2017

Welcome – Colin Wright

- Recap on last year’s public meeting
- The Public Submissions “process”
- Fire Station Group = Waiōhine Action Group
 - What we’ve been doing

The Waiōhine – Bruce Slater

- The River and its Flood History:
 - Impact of past Waiōhine floods
 - Why nothing for over 60 years?
 - Why the river has more capacity now

The GWRC FMP – Mike Hewison

- The BECA report, survey and flood map
 - What was excluded
 - What was included
 - What was the real message
 - Why the flood map is no use

GWRC and Local Government Involvement – Colin Wright and Mike Ashby

- SWDC (South Wairarapa Council)
- CDC (Carterton Council)
- GWRC (Greater Wellington Regional Council)
- Impact on property owners
- The latest approach to our community & WAG

What we know – John Boon

- GWRC ads: after 9 years GWRC FMP process has not worked
- GWRC Flood Management Plan has multiple flaws
- GWRC FMP GWRC FMP is overkill
- GWRC FMP is insanely expensive for a rural community
- GWRC has conceded they will not proceed until community supports an FMP
- GWRC councillors and our councils have come to WAG
- They suggested a new, project team approach working to steering group of Wairarapa Committee to GWRC

A way forwards – John Boon

- WAG Picking up the ball from GWRC
- Taking the initiative on the Project Team strategy
- A core Project Team of local experts
- Affordable, practical, adequate flood protection
- Continuous consultation with community
- Invitation to GWRC to participate in community driven project team
- Questions
- Consider draft resolution

The community of Greytown and of the Carterton side of the Waiōhine resolve to:

Approve the establishment of a project team and facilitators drawn from the WAG speakers and such other expertise as may from time to time be required. The Project Group will, as far as is practicable, engage constructively and collaboratively with the GWRC and its staff to determine the parameters of sensible flood protection for the Waiōhine River, establish an accurate cost; keeping the WAG and Waiōhine Ratepayers continuously informed of progress.

Passed unanimously by circa 200 present.

Wrap up and questions – Colin Wright

- Spot WAGers you know
- Where you can get more information and stay informed – website or Facebook coming
- Trust fund at WCM Legal
- How to get involved and keep having your say
- Invite to cup of tea
- Thanks to everyone and close



Figure 109: Public Meeting – 6th July 2017.

Appendix B

Terms of Reference (TORs) for the Project Team

Origins – A Community Led Process in Partnership with GWRC and Stakeholders – Establishment by the Waiōhine [community](#) in July 2017 following two years of community discussion and opposition to the preceding draft floodplain management plan which had taken ten years to develop.

Terms of Reference – WFMP Project Team

Version: 1.0

Authors Boon, Wright, Ashby, Hayes, Hewison, Slater et al

Date: 4th May 2017

Purpose and introduction: What does success look like?

GWRC wish to complete a new FMP for the Waiōhine River. The background and history of this project is well documented elsewhere.

It is recognised by all parties that the process to date, whilst accumulating much valuable data, -has failed to bring about a plan that is credible and meets the needs of all stakeholders – GWRC, SWDC, CDC and importantly, the community to be served by and pay for, a flood management plan.

There is an opportunity to put aside unsuccessful practices and start afresh, using a facilitation process and team trusted by the community to review and pull together a trusted, acceptable to all, plan under the aegis of a WFMP Steering Group (Steering Group) appointed by the new Waiōhine Committee.

Once lost for whatever reason, rebuilding trust is hard. So to succeed in this and deliver to the Greater Wellington Regional Councillors and District Councillors a completed outcome that is technically viable, low risk and trusted: a WFMP Project Team (Project Team) must be facilitated by and made up of individuals who possess appropriate skills and the confidence of the community. It requires a departure from the past, according to Einstein: "The definition of insanity is doing the same thing over and over again but expecting different results".

The process, method and techniques employed will review existing data and wherever it is trustworthy, validate this consensually. It will identify what can be readily done to as many remaining issues as practical in the time available to come to a consensus on these and through analysis make recommendations on the remainder based upon pre-defined guides from the Steering Group. In this way the process will build upon consensus and positive step by step outcomes.

This approach therefore proposes a low-risk, win-win path to delivering a successful FMP. It also serves as a Terms Of Reference (TOR) for the formation of a facilitated project team charged with delivering on this, quickly and inexpensively. Obviously, it assumes easy, timely access to GWRC WFMP information and a positively oriented participation by willing officers, who can work in a new paradigm to share in a successful outcome. It also relies upon modern facilitation techniques, together with simple, immediate sharing of the workings of the team, to grow and demonstrate transparency and trust by all stakeholders. It must therefore be immediate, open and transparent for all. It is specifically designed to build trust and support whilst meeting the tenets of government and regulatory frameworks.

Time matters. This approach will speed up outcomes. Until the FMP is resolved, council planning and consenting and community subdivision and building work, amongst other things, are trapped in a nightmare of wasted time and money.

This is the approach that will be acceptable to the community and local councils. It represents the lowest risk in the circumstances. By following this course GWRC at the highest levels, can once again plan for a successful outcome to the WFMP and focus it's time and energy on other, pressing issues.

How will we know when we are there?

Three tests are to be pre-ordained by the Steering Group that can be used to guide investigation and decision making by the project team on a day to day basis and used by the Steering Group when reviewing whether the practice and recommendations of the Project Team are fit for purpose. In this way everyone can be guided to build consensus and be confident of when issues are resolved.

For the purposes of preparing the Terms of Reference we have proposed three "straw man" examples of such tests:

e.g. Does this meet the minimum requirements of the law?

e.g. Does this provide adequate protection in the eyes of the community in a way that is affordable and pragmatic (risk vs. cost)?

e.g. Has there been transparency of communication and information with all stakeholders so that they can understand, comment if needed and agree?

Chosen by the Steering Group

- 1 That the draft FMP be implementable
- 2 That it provides adequate protection in the eyes of the community and other affected parties that is affordable, pragmatic and sustainable.
- 3 That there has been transparency of communication and information with all affected parties so that they could understand and comment if needed

The Three Tests must come under the aegis of the Steering Group, handed down and regarded as mandated to the Project Team (past experience of this technique shows that more than three will become cumbersome, hard to remember in context and reference without unduly complicating process and delaying outcomes: less than three tends not to provide a firm enough framework).

Once every issue is resolved through consensus or acceptance of recommendation by the Steering Group, the project should be ready to be represented as-a-whole to the community (see below). After that, the work of the project Team is done.

Terms of Reference Outputs

What is to be delivered by the end of the project?

- 1 **FIRST DELIVERABLE:** engagement of the community to build trust
- 2 Convene project team
- 3 Familiarisation with TORs, inputs, methods, housekeeping
- 4 Settle in – forming/storming/norming/performing curve starts
- 5 Meet GWRC Steering Group
- 6 Receive Three Tests and other guidance
- 7 Set up community communication channels, inform and engage public

SECOND DELIVERABLE: common basis for understanding

All existing assumptions, data, inputs and outputs are to be shared and common understanding reached on their virtue.

Target subjects should cover

- 1 Assumptions and inputs
- 2 Survey efficacy
- 3 Engineering design
- 4 Contingencies
- 5 Funding/staging/timing
- 6 Costs vs Risks
- 7 Options
- 8 Mitigations
- 9 Other subjects as needed by Steering Group to meet deliverables

Terms of Reference Approach

How will subjects be evaluated, consensus reached, or recommendations made?

THIRD DELIVERABLE: It is anticipated that in the first workshop priorities, dependencies and completeness of this list will be addressed and passed to Steering Group for ratification.

All deliverables should be shared with the community as delivered and community feedback, questions and comments should be responded to by the project team via facilitator. An immediate and simple mechanism is required for this. All findings and notes of the workshops will be initially written onto flip charts during the workshops. At the close of each workshop these will be digitally photographed and posted up online, where all stakeholders can see, question and comment on them. This meets the need for immediacy, transparency and full communication with everybody – instilling confidence, sharing findings and showing progress. This offers a degree of probity that engenders trust and encourages progress.

FOURTH DELIVERABLE: Recommendations to Steering Group on each target subject and how to modify draft FMP to pass each test. It is expected that in some instances later findings will result in review of earlier recommendations where previously unknown material exists. If significant, these will be re-presented to the Steering Group, otherwise presented to them when the project ends, and the completed solution is presented for final review and approval.

To deliver these regular workshops will be conducted by a project team comprising:

Facilitator

- 1 Convenes and runs workshops
- 2 Drive for consensus wherever possible, or an agreed process to resolve differences, or failing that note positions and arguments and make recommendation that is best known fit to Three Tests
- 3 Deliver recommendations that pass the Three Tests
- 4 Lead a positive and constructive process, free of past politics and break down any entrenched positions using modern tools, processes and techniques fit for purpose
- 5 Captures outputs and posts online or delegates this
- 6 Drives timeline and delegates offline tasks
- 7 The Facilitator reports to Steering Group on:
 - 8 Consensuses, recommendations (and rationale) on non-consensual issues,
 - 9 Recommendations relating to opportunities and roadblocks
 - 10 Progress and forecasts for completion including dependencies
 - 11 Manages process, drives outcomes, facilitates understanding and consensus, resolves conflict, keeps things moving
 - 12 Ensures transparency of process, information, recommendations and outcomes to all interested parties

Members

- 1 At least 5 Core Members: Greytown and Carterton community representatives with essential knowledge of the river and it's maintenance, floodplain management, surveying and engineering, economics and local government,
- 2 Additionally at least 2 further Core Members: GWRC staff able to share FMP information and advice, liaison and continuity as determined appropriate by Steering Group,
- 3 As needed representative landowners from both sides of the river,
- 4 Others as needed, invited by the Facilitator such as GWRC specialists and civil works experts based upon subjects under consideration.

The task of core members is to share assumptions, inputs and data, identify all items that are consensual, isolate the delta of non-consensual items and under the guidance of the facilitator find the best solution that passes the three tests and delivers outcomes.

Sending alternates is subject to Facilitator's agreement and requires full delegated authority of alternate

It is anticipated that more than one member of the Project Team may also be present in the Steering Group, ensuring good governance, communication and liaison with local councils.

FIFTH DELIVERABLE: Completed WFMP acceptable to Steering Group and community, final presentation and dissemination to community, followed by final review and sign-off by Steering Group as being complete, accepted by the community and passing the Three Tests.

Time Constraints: By when should it start and finish?

The project team could convene and hold it's first workshop within three weeks of being agreed by the Steering Group. It is envisaged that workshops will be weekly for a minimum of half a day each, with background work being carried out between. This is fairly intense by the standards of past approaches but it is believed that it is in the interest of all stakeholders to work expeditiously to minimise the impact of current issues on planning and consent within the community.

The first task is to inform the wider community of the process, how they can come up to speed (if not already involved) and how they can stay informed and have input if desired. This will be done via public meeting, flyers, news media and a Facebook site (or equivalent). By involving the wider community from day 1 we work in a way that will serve to restore confidence in the process and therefore outcomes. The importance of this cannot be overstated.

The first Project Team workshop will establish the team, it's culture and collective way of doing things (form/ storm/norm), deal with housekeeping, digest TORs and absorb direction from the Steering Group, such as Three Tests.

Then no more than three months to complete tasks and deliver outputs ready for final presentation to the community and sign-off. Beyond three months if the project is not completed, the Facilitator must recommend changes to rapidly complete the project and seek Steering Group approval for these.

Assumptions

- 1 Prioritisation of time by participants.
- 2 All information is made available and ready when needed.
- 3 Team members available to complete "homework" off-line.
- 4 No interference. No redirection. No change. No information from the draft FMP and contributory processes withheld, incomplete, incomprehensible or redacted – but fittest for use.
- 5 Facilitator can replace unavailable or non-contributing members if necessary (with Steering Group agreement) .

Method: What is to be determined?

- 1 Ratify and extend if necessary, the Target Facts list,
- 2 Dig down to find the facts,
- 3 Analyse and understand these, where they have not been previously shared
- 4 Share assumptions and model inputs,
- 5 Share all background documents and data,
- 6 Identify items that have consensus (Consensus),
- 7 Categorise remainder as either able to be resolved (Resolve) and how to reach consensus or needing recommendation (Recommend),

Recommend items should be explored (with other subject matter experts and contributors as necessary), positions noted and a recommendation developed by the chair that must pass the three tests, then that recommendation presented to the Steering Group for them to cross examine and ratify as resolved, or push back for further work.

When all subjects are resolved the project team will prepare an easy to understand summary and information for all stakeholders that can be presented by well publicised website, mail shot, media and public meeting, ensuring the community and all other stakeholders are fully informed and supportive. Project Team to propose coms. pack to Steering Group.

Once all these tasks are completed the Project Team should be dissolved by the WFMP Steering Group, but all the documents produced should remain in the public domain to assure probity during the implementation and operation of the WFMP.

Added by the Steering Group

The Steering Group also wished to stress that a Flood Management Plan encompasses a much broader range of options than just stopbanks and that the Project Group must be able to demonstrate that all these options have been considered in the course of its work. This would include but is not limited to:

- 1 Values of the river environment
- 2 Iwi values
- 3 Flood mapping
- 4 Climate Change
- 5 River management
- 6 Emergency management
- 7 Structural river control
- 8 Non-structural river control

Paper to the Environmental Committee of GWRC to Establish the Project Team Waiōhine Floodplain Management Plan governance and project delivery structure**1 Purpose**

To propose a governance and project delivery structure for completing the development of the Waiōhine Floodplain Management Plan (Waiōhine FMP).

2 Background**Draft Waiōhine FMP – development**

- 1 The intended purpose of the Waiōhine FMP is to manage the risk of flooding and erosion from the Waiōhine River.
- 2 In 2016 a draft Waiōhine FMP (Draft FMP) was developed by the Waiōhine Floodplain Management Plan Advisory Committee (Advisory Committee).
- 3 On 10 May 2016 the Environment Committee approved the Draft FMP for public consultation.

Draft Waiōhine FMP – consultation

- 1 On 21 June 2016, the Environment Committee (on recommendation of the Advisory Committee) established the Waiōhine River Draft FMP Hearing Subcommittee (Hearing Subcommittee) to hear and consider submissions on the Draft FMP.
- 2 The hearing that was to have been held on the Draft Waiōhine FMP never took place due to the unavailability of Hearing Subcommittee members.
- 3 The Draft FMP did not achieve community support.
- 4 Submitters on the Draft FMP have not been heard.

Waiōhine Action Group

The Waiōhine Action Group is a large, diverse and growing number of ratepayers, including three serving Councillors. It works for the ratepayers and communities of Greytown and those who live near the Waiōhine river on its Carterton side. Amongst the members are deep skills including expertise and experience in managing the Waiōhine River issues, relevant engineering and surveying Greytown and the area, actually maintaining the riverbanks and bed, running local District Council and so on. Some members have a heritage of three or more generations of knowledge of the community and river. The group have completed many thousands of hours of reading, research and contribution of findings relating to the draft FMP project and the draft plan. Through consensus and genuine consultation, the group fosters openness and transparency to help the community investigate the good, bad and other work done on the draft FMP by GWRC, understand the costs and implications and participate in a better outcome than the failed approaches of the last nine years.

3 Review of the Draft FMP

Due to feedback on the 2016 Draft FMP, officers consider that Draft FMP should be set aside and reconsidered.

3.1 Proposed approach to review the draft FMP

Following discussions with Carterton District Council (CDC) and South Wairarapa District Council (SWDC), and in response to their approach, a proposed TORs and Project Team from WAG have been elected by a public meeting attended by over 180 ratepayers for a community led, open, consultative and consensus driven model, using a range of local experts to carry out due diligence throughout the draft FMP and make recommendations for a pragmatic, affordable solution that fits within the law and re-established trust between the community and GWRC.

This proposed delivery model will be subject to a steering group to oversee the completion of a Waiōhine FMP.

3.2 Proposed Waiōhine FMP steering group

Officers recommend the establishment of a Waiōhine FMP Steering Group (Steering Group).

A copy of proposed terms of reference for the Steering Group is attached as Attachment 1 to this report.

A summary of the Steering Group's proposed membership, roles and Responsibilities is set out below.

3.2.1 Steering group – purpose

The purpose of the Steering Group is to make recommendations to the Wairarapa Committee on areas of practical improvement identified and recommended by the Project Team of the Draft FMP that are preferred by the community, including local IWI and council representatives.

The management of the existing river scheme and the implementation will sit outside the remit of this Steering Group unless directed by the Waiōhine Committee to review areas of overlap with implications for the draft FMP. An example would be the ongoing maintenance implications and costs of FMP design options.

The draft terms of reference (see Attachment 1 to this report) propose that the recommendations of the Steering Group, if endorsed by the Wairarapa Committee, would be submitted directly to Council for approval without the need for consideration by the Environment Committee.

3.2.2 Steering group – membership

The following membership is proposed:

- Two members, being elected members of the Carterton District Council
- Two members, being elected members of the South Wairarapa District Council
- Two members, being elected members of the Wellington Regional Council
- Two members to represent the Waiōhine Action Group (one of whom will be the Waiōhine Project Team chair)
- One member to represent Kahungunu ki Wairarapa
- One member to represent Rangitane o Wairarapa

3.2.3 Steering group – role/responsibilities

The final decision on the adoption or otherwise of a draft or final Waiōhine FMP is retained by the Wellington Regional Council.

To deliver on its purpose, the range of suggested responsibilities to be assumed by the Steering Group includes the following:

Guide and support the Project Team and its Facilitator to deliver on its Terms of Reference as adopted by the public meeting of 7th July of the ratepayers of the Waiōhine valley

Familiarisation with the work that has been undertaken on the Waiōhine

FMP to date as well as the views of community, including IWI, conservation authorities, CDC and SWDC

Oversee the scoping of viable options for the project and ensure strong support within the affected communities for recommendations

Review recommendations received from the Project Team, and set and oversee the three guiding rules for the Project Team

Ensure the work of the Project Team delivers a comprehensive, long term and sustainable solution for the Waiōhine River and the people who occupy its floodplain

Develop and implement a communication strategy to facilitate effective engagement with WAG, the wider Greytown/Carterton communities and the general public in the work of the Project Team and its oversight

Identify and manage potential and relevant project risks.

4 Waiōhine FMP Project Team

Ratifying a Project Team is a matter for the Steering Group. Attachment 2 to this report contains Terms of Reference for this team. At its public meeting of 7th July, the ratepayers of the Waiōhine valley adopted these TORs and appointed five members of the community as its Core Team members, with one being chosen as its Facilitator/Chair. The Steering Group will select and appoint one or more core team members from GWRC. The Project Team will bring in members from time to time with skills appropriate to the aspects of the FMP being worked on.

5 Wairarapa committee's functions

The terms of reference for this Committee set out that it may consider and make recommendations to Council on any issues relevant to the Wairarapa, including but not limited to flood protection.

The terms of reference for the Council's Environment Committee sets out that one of its responsibilities is to monitor/oversee the development and implementation of floodplain management plans, including the Waiōhine River Plan, Incorporating Floodplain Management Plan.

As both Committees have responsibility for flood protection matters, it is considered appropriate at this stage in the process that this matter being presented to the Wairarapa Committee is also presented to the Environment Committee for information before being sent to Council for decision.

6 Communication

The Committee's decisions will be presented to the Environment Committee and Council.

7 Recommendations

That the Committee

- 1 **Receives** the report.
- 2 **Notes** the content of the report.
- 3 **Notes** that a report advising the Environment Committee on the proposed establishment of a Waiōhine FMP Steering Group and Project Team will be presented to the Environment Committee on 9 August 2017.
- 4 **Recommends to Council:**
 - a that it establishes a Waiōhine FMP Steering Group; and
 - b that it adopts terms of reference for the Waiōhine FMP Steering Group as set out in Attachment 1 of this Report.

How the Project Team work together – "housekeeping"

- One out, all out – the entire team must be in the room in order to be familiar with all material and make sound decisions by consensus.
- Write up, not down – in this way there is immediate consensus about every word that is recorded from conclusions regarding data and analysis and from interviews of subject matter experts and stakeholders. These cannot be misconstrued or misinterpreted and become a permanent record at source.
- One conversation – to avoid missing information and ensure consensus
- All opinions are equal – ensuring equal input and weight in decision making
- Play the ball, not the person – making it possible to build consensus
- Park it – if the team do not know the answer to any question asked by any party, do not lose the question, save it in the parking lot to ensure it is addressed and not lost.
- Does it make a better flood management plan? – of course, this is now, does it make a better river plan?
- Tests – test all decisions against the three tests set by the Steering Group to guide the Project Team:
 - Can we get resource consent?
 - Can our community afford it?
 - Will it work?

- Silent – setting for mobile phones etc.
- GWRC values –recognizing the cultural values set by GWRC as being pertinent to the River Plan
- **For People By People** – ensures we are thinking about the community and stakeholders and can walk a mile in their shoes
- **No sacred cows** – we should not be afraid to challenge anything within the law if it doesn't make common sense anymore.
- **Own it** – if there's something that needs doing, we shouldn't just wait for someone else to do it.
- **All on the same side** – everyone wants a River Plan that works and therefore we are on the same side.

Declarations of interest

A register of interests for the Project Team and people who worked closely with the Project Team was created at the outset and maintained throughout the project.

How were the community and other stakeholders involved?

- To consult with and keep everyone informed and involved in decision making in an open and transparent way, a range of channels were used:
- Via Facebook, as each working day or other event concluded, outputs (mainly the flip charts that reflect the structure of the mind map above and underpin this plan) were photographed and those photos posted, together with links to maps etc. on Facebook,
- Links to this material and a commentary were distributed by email to all interested people,
- Project Team members met with and briefed Waiōhine Action Group members of the community whenever anything of significance needed to be shared and to gain advice, feedback, guidance and major decisions,
- Public drop-in sessions, group and sometimes one-on-one briefings and input to decisions were conducted at key points, usually in the project room, where there was best access to project materials,
- At other key times public meetings were called, information shared, and key decisions made, and important motions put to the vote,
- Feedback received from all these channels was either addressed straight away, or captured on a "Parking Lot" to be addressed once the relevant piece of analysis had been completed,
- A Steering Group met regularly, chaired by a GWRC Councillor and attended by representatives of Iwi, CDC, SWDC and the Project Team. The job of the Steering Group was to challenge and test the Facilitation and Project Management, give guidance and direction to the project and assure probity and good governance within the process. The Facilitator/Project Manager presented a simple progress report to each meeting, which was also shared publicly via Facebook (an example can be found at Appendix A)
- An example of an action by the Project Steering Group is the decision to take a recommendation to the Wairarapa Committee of GWRC to take the unique step of GWRC publishing an Interim Flood Map for the Greytown side of the Waiōhine, this offered an effective interim solution to many planning issues and largely correcting flaws in the extant flood maps. Here is the record of this:

Steering Group recommendation of 2nd February 2018

To: "Release for use, the Interim Flood Map approved by the Project Team and satisfying the outcome of the peer review" to the Wairarapa Committee. All agreed and happy that concerns will be addressed by doing this.

Why was an interim flood map developed?

Early on the project team identified better data and had access to better tools to create a more accurate base model and set of flood maps. As a result of this a far more useful interim flood map was able to be developed. At this point a simple set of questions were posed to decide what needed to be done with the new, more accurate map:

Question: Does it benefit the community to recommend it be promulgated?

Answer: Yes

Question: If so, then what notes, and caveats would be necessary to ensure that it is used wisely?

Answer: Explain context of overall process

Question: How long before we get a set of final flood maps? What's our best guess?

Answer: Possibly by end of April 2018

Question: Are there any other intermediate steps?

Answer: No"

Appendix C

Intent of the Living Plan and it's Terms of Reference

The Living Plan model is predicated on the concept of what has come to be called co-governance

Ra Smith of Ngati Kahungunu ki Wairarapa proposed the idea that, to be useful, this plan needed to be a living plan. If the river is a living entity, so must it's plan be.

- A traditional, static plan is characterised by being useful as a:
- Point in time analysis,
- A level set that offers a chance to think about everything once,
- A fixed flood defence that enables a short-term programme of building structures but cannot adapt to constant change.

A living plan is characterised by adaptability and learning that enables:

- Long term vision – setting horizons out to 2050 and 2090,
- Interdependency – being able to keep on adjusting for climate change, better flood and map data, improved cultural understanding and much more,
- Triggers – that enable adaptive management and updating of the plan cooperatively between the community and GWRC,
- Iwi and Community partnership in gradually restoring the river to a more “naturalistic” state.
- River Management that respects the changing needs of the land, mana whenua, ratepayers, users and landowners,
- River Projects that everyone can get behind.

A living plan allows flexibility in the year by year operational management of the river in partnership with iwi and the community. This could lead to better on the ground decisions about cultural aspects, pest and weed control, restoration, gravel extraction, setting up a meaningful bed level envelope (once sufficient data becomes available to identify high and low points), flood mapping, safety and emergency management as technology evolves, water quality measurement and goal setting and many other valuable improvements.

A living plan allows the River Plan to avoid having to fix everything at one point in time, only to immediately be overtaken by events.

A living plan allows improvements to measures, goals, additions to scope to, for example, adapt to legislative change, technology, better science or the addition of other important aspects of the catchment’s needs.

So, having settled on the need for the plan to be a living Waiōhine River Plan (Incorporating FloodPlain Management Plan), the question then was, how would the Living Plan continue to bring together everyone to make the best decisions, in the way the Project Team, iwi, community and stakeholders have throughout the project itself. The project team developed a simple, pragmatic working model and then sought the advice of the community.

To adapt the flood plain management plan to become a whole of river plan and a living plan, the mana whenua, community and stakeholders of the Waiōhine valley adopted Ra’s concept and resolved to: “Approve the continuation of The Project Team, embracing Iwi, Friends of the Waiōhine, Ratepayers, Landowners and all other stakeholders, to engage constructively with GWRC to prepare and implement the Waiōhine River Plan, represent our interests and continue to keep everyone openly and transparently, informed of progress.” This was passed unanimously at a public meeting, at a Waiōhine Action Group meeting and subsequently added to the Terms of Reference for the project by the Steering Group and thence the Wairarapa Committee.

Relationship Model for Living Plan

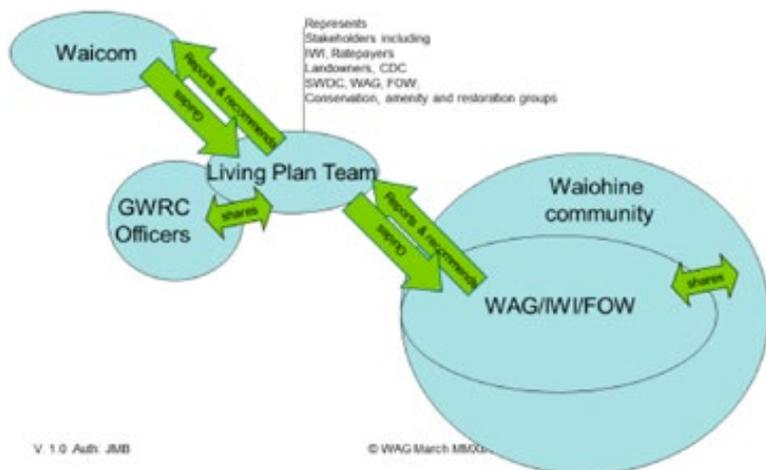


Figure 110: Intent of the Living Plan and TORs – Relationship model.

The Project Team will continue to meet and work as needed to support the Living plan process. It is envisaged that this would be far less often than for the development of the initial plan but would synchronise with GWRC planning cycles. At the start of each annual planning cycle or other planning cycle e.g. three year review of the Long Term Plan.

The Living Plan comes into effect as soon as the Waiōhine River Plan (incorporating Floodplain Management Plan) is enacted. At this point the Terms of Reference below is combined with the Project Team Terms of Reference so that it carries on in an operational mode under the revised Relationship model. See above.

The process will ensure that there is joint planning and management of the river and opportunities are taken to gradually implement the [Vision for The River](#). It will ensure principles of adaptive management are followed, that there is governance and buy-in by iwi, community and all other stakeholders, that there is good understanding of what GWRC need to do to manage the river on their behalf and in return, GWRC can engage the help and resources of the community to deliver the vision and make good decisions together.

Terms of Reference (TORs) Extensions for the whole of river plan and Living Plan process

The ongoing Role of the Community (WAG) in Partnering GWRC to Oversee Implementation and Operation of the Waiōhine River Plan, both through the building of the proposed new stopbanks and flood defences and until the plan expires in 2100. This allows time for the vision to be realised for our river and to adapt and improve this plan as new data, science and events make possible, a fuller explanation of the intent process of the Living Plan can be found [here](#).

What Partnership Looks Like



Figure 111: What Partnership Looks Like

- 1 GWRC will share in good time, with the WAG Project Team and [community](#), all relevant trigger data, events and findings that might inform planning inputs or actions that might need to be taken in between GWRC annual planning cycles, or that fall within the aegis of this Waiōhine River Plan (Incorporating Floodplain Management Plan), or that generally relate to the river and floodplain.
- 2 With that in hand, everything provided will be shared to and reviewed by the community, including tangata whenua and all other interested stakeholders, prior to each GWRC planning cycle (annual, operational or long term) commencing. New items and topics may be added to this with the agreement of the Wairarapa Committee.
- 3 GWRC and the WAG Project Team and community will share all planning inputs that might affect the river and environs for discussion, as needed prior to the start of each formal GWRC planning cycle.
- 4 GWRC will produce its draft plans and budgets that relate in some way to the Waiōhine and share this with the WAG Project Team and community in good time for the community to communicate with all stakeholders, meet, seek additional information if necessary, review it, identify differing views or endorsements and present these along with any proposed community initiatives to the Wairarapa Committee at which the GWRC plan is also presented.
- 5 GWRC will support the day to day running costs budgeted annually.
- 6 GWRC Wairarapa Committee will decide what steps, if any, need to be taken where there are significant differences between what the community and GWRC wishes for the river.

Above is the model for how the relationship between the community (including stakeholders) and GWRC will operate once the River Plan is ratified and the project moves into an operational mode to implement the plan, keep it relevant and oversee maintenance of the river in partnership with GWRC. The principle is to create a collaborative partnership in which the community remains in a leadership position as keeper of the vision and overall plan for the river, with GWRC and there are checks and balances to make sure rifts cannot happen again, between the community and GWRC. The process incorporates the current planning cycles of GWRC: annual and Long-Term Plan, incorporating data sharing and shared decision making for significant aspects of river management and development to eventually realise the vision and plan. This process is to be overseen by the Wairarapa Committee of GWRC who will also act as a “circuit breaker” in the event the Community Position presented to them differs from that of GWRC in some regard.

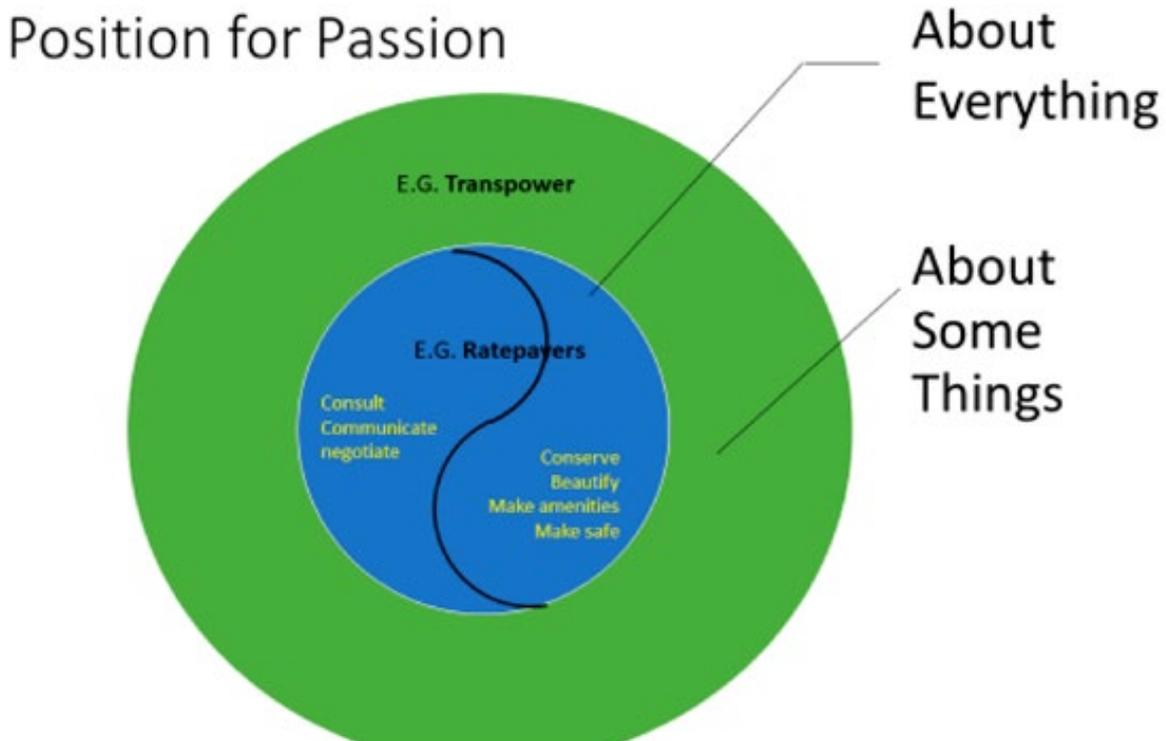


Figure 112: Position for Passion – some stakeholders are interested in all topics and some in specific topics.

The assumption at this stage is that folks in the middle need to participate in every cycle of input into GWRC, caused by either GWRC planning cycles, or event triggers ([see list](#)). Whereas the stakeholders outside the middle are probably only interested in some topics, relating to the river, and should elect which those topics are, and be always invited to participate when those topics come up. This model will be refined by WAG as a foundation task under the Living Plan Process.

The Waiōhine catchment has roughly:

- 1 2,200 ratepayers
- 2 1,800 urban ratepayers
- 3 400 rural ratepayers

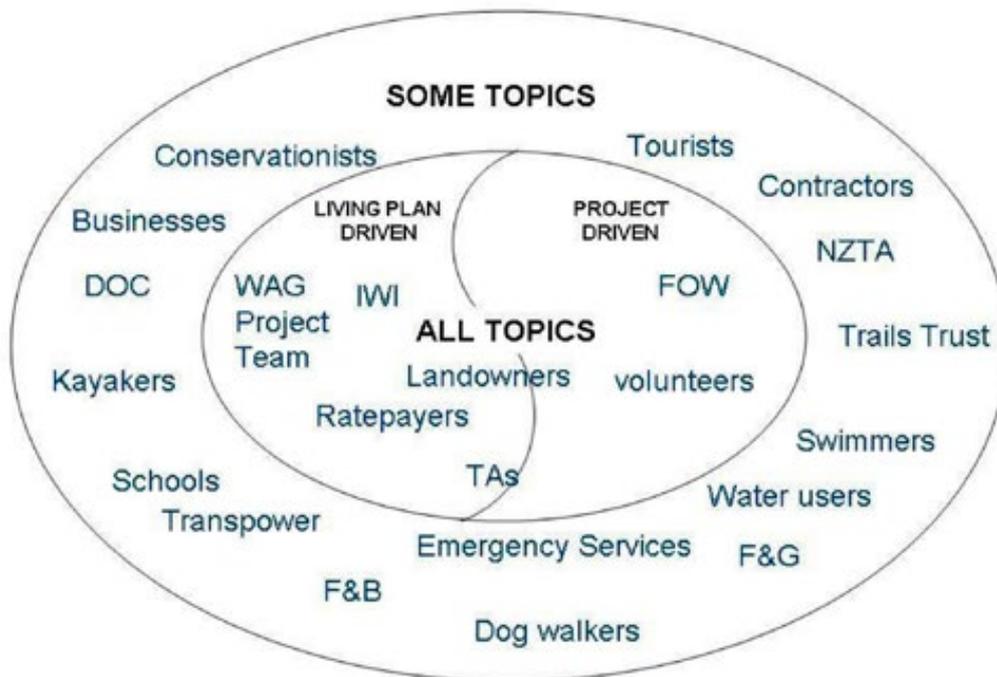
Ideally the ongoing team should represent all types of stakeholders as much as possible by optimising the number of "hats" people wear at the table.

Optimum team size is no more than nine regular members, ideally with a similar distribution amongst stakeholders as the following example of representative 'Hats' (or stakeholder groupings):

- 1 IWI (1 "hat" on current project team)
- 2 Urban ratepayers (1 "hat" on Project Team)
- 3 Rural landowners (5 "hats" on current project team)
- 4 FOW/sustainability advocates (1 "hat" on current project team)
- 5 River expertise(5 "hats" on current project team)
- 6 District Councils (2 "hats" on current project team)
- 7 GWRC (2 "hats" on current project team)
- 8 Conservation and restoration friends of the Waiōhine (WAG) (2 "hats")

Much of the input data needed from GWRC would be as prepared for annual operations reporting, to be collected for Whaitua, from a joint walkover and as currently used in the delivery against conditions of river management consents.

POSITION FOR PASSION



V. 1.0 Auth: JMB

© WAG Dec. MMXVIII

Figure 113: Position for Passion.

Appendix D

Relevant standards and guidelines

The Waiōhine River Plan considers the following laws, policies and regulations:

- 1 Relevant GWRC Flood Management Policies include:
 - 2 Where practical avoid flood risk (See GWRC policies 50 & 51),
 - 3 Protect existing flood protection assets,
 - 4 Incorporate allowances for climate change,
 - 5 New stopbank heights should be designed for:
 - a Urban areas: 100-year flood plus climate change,
 - b Rural areas: 20-year flood plus climate change.
 - 6 It is necessary to distinguish strategy between existing versus new development
 - 7 Legislation that must be complied with includes:
 - a The Building Act 2004 about land and buildings
 - b The Resource Management Act 2017 about consents for work and district plans
 - c NZS 4404 2010 about land development and subdivision infrastructure. E.g. rural subdivisions will affect all flood defence works
 - 8 Public Works Act 1981 Soils, Conservation, & River Control Act 1941

Relevant legislation regarding climate change

The two main pieces of legislation relevant to climate change and flood risk management are the Resource Management Act 1991 (RMA) and the Civil Defence Emergency Management Act (CDEM) 2002.

The RMA requires regional authorities to control the use of land for the avoidance or mitigation of natural hazards. Territorial authorities are required to control the actual or potential effects of the use, development or protection of land, including for the purpose of avoiding or remedying natural hazards. The Resource Management (Energy and Climate Change) Amendment Act 2004 further requires local authorities to have regard to the effects of climate change.

The CDEM Act is another key piece of legislation for flood risk management. The Act primarily focuses on the sustainable management of hazards, resilient communities and on ensuring the safety of people, property and infrastructure in an emergency. The CDEM Act recommends an approach based on risk reduction, readiness, response and recovery.

Although risk reduction is primarily achieved through proactive planning as required by the RMA and the CDEM Act, other relevant legislation for climate change and flood risk management includes the Building Act 2004, the Local Government Act 2002 and the Soil Conservation and Rivers Control Act 1941.

Appendix E

Example of easement agreement

| | | | |
|--|--|--|---|
| Easement instrument to grant easement or <i>profit à prendre</i> Section 109 Land Transfer Act 2017 | | | |
| Land registration district | | | |
| Wellington | | | |
| Grantor | | <i>Surname(s) must be <u>underlined</u>.</i> | |
| | | | |
| Grantee | | <i>Surname(s) must be <u>underlined</u>.</i> | |
| WELLINGTON REGIONAL COUNCIL | | | |
| Grant* of easement or <i>profit à prendre</i> or creation of covenant | | | |
| The Grantor, being the registered owner of the burdened land set out in Schedule A, grants to the Grantee (and, if so stated, in gross) the easement(s) or profit(s) à prendre set out in Schedule A, with the rights and powers or provisions set out in the Annexure Schedule(s). | | | |
| Schedule A | | Continue in additional Annexure Schedule if required. | |
| Purpose of easement, or profit | Shown (plan reference) | Burdened land (Record of Title) | Benefited land (Record of Title) or in gross) |
| Stopbank Easement | ?? on Deposited ?? | Insert CT reference | Wellington Regional Council in gross |
| Easements or profits à prendre rights and powers (including terms, covenants, and conditions) | | Delete phrases in [] and insert memorandum number as required. Continue in additional Annexure Schedule if required. | |
| Unless otherwise provided below, the rights and powers implied in specific classes of easement are those prescribed by the Land Transfer Regulations 2018 and/or Schedule 5 of the Property Law Act 2007. The implied rights and powers are varied/negated/added to or substituted by: Memorandum number, registered under section 209 of the Land Transfer Act 2017: The provisions set out in the Annexure Schedule. | | | |
| Covenant provisions | Delete phrases in [] and insert memorandum number as required. Continue in additional Annexure Schedule if required. | | |
| The provisions applying to the specified covenants are those set out in: Memorandum number, registered under section 209 of the Land Transfer Act 2017: Annexure Schedule 2: | | | |

Figure 114: Example of easement.

Appendix F

Original diagrams and flip charts

These are images of the flip charts and whiteboard photographs from the Project Team Working Days which are the direct source of everything within this river plan. All these charts and photos were shared with the community within days – ensuring complete openness and transparency of every aspect of every decision (“Professor RAG” or final) and any subsequent revision as new expertise or data came to hand. By including these here we ensure probity and auditability between the agreed positions of the community, including GWRC and this complete river plan. It also serves as a complete record of discovery and decision making, sometimes involving the direct decision making by the wisdom of the crowd i.e. community.

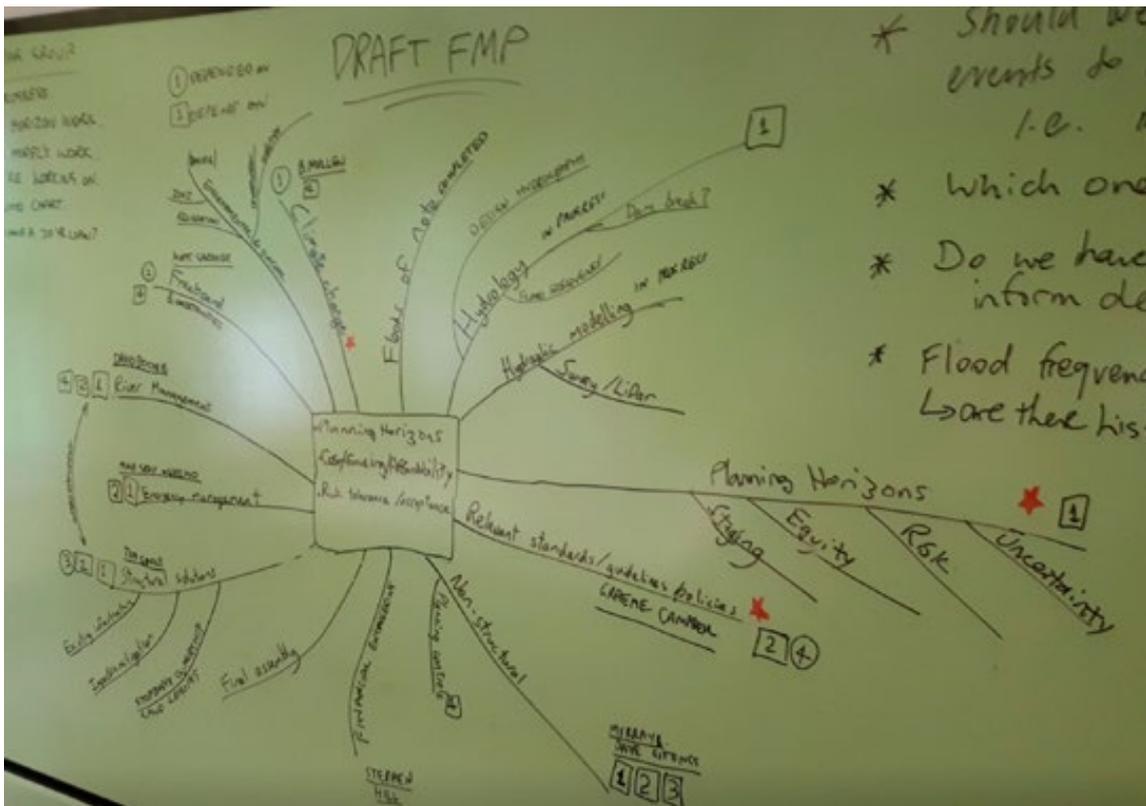


Figure 115: The Mind Map with linkages – an example of techniques used.

A directory of flip chart photographs, showing the day to day work of the Project Team, as published on [Facebook](#) with links and summaries of progress emailed to a wide range of interested people – can [be found here](#).

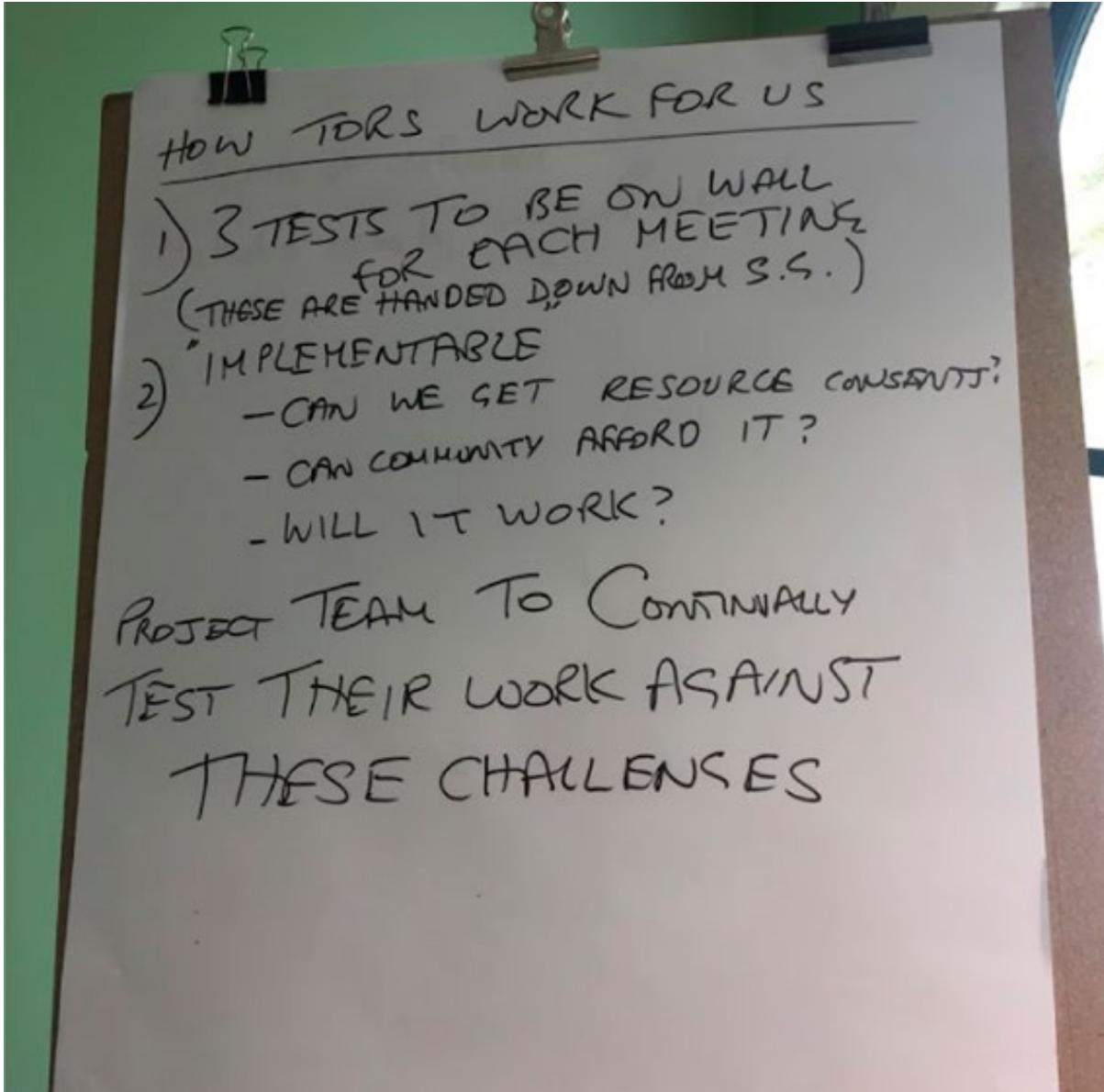


Figure 116: Setting up the project team and relating work practices to the Terms of Reference and community drivers.

Appendix G

Maps

Notes on the approach to mapping

“National flood risk maps are essential because we need accurate and comprehensive information about the impact and costs of flooding today and under different climate change scenarios so everyone can plan and adapt.” [NIWA](#)

Maps were prepared by Land, Sea River Consulting Limited to requirements developed by the Project Team. The approach of analysis until it was reasonably believed that all known facts were revealed led to a larger than usual number of models and maps but perhaps a higher degree of confidence as a result and more opportunity to refine and test alternative solutions.

It was identified that the following Flood Maps would be needed For the River Plan as a minimum:

- Land that could be flooded today (20 [5%]/50[2%]/100 year[1%] {old CCH, new CCH}) [DFL]
- Land that could be flooded in future (climate change, etc...) [DFL]
- Current structural assets (banks, bridges, culverts, etc...) [DFL]
- Hazard (Low, Medium, High) risk to life [DFL]
- Future non-structural assets [END]
- Future structural assets (20/50/100) [END]
- Emergency management map [END]
- Time series map [END]
- Planning Map (including residual hazard- same as 5.)

Notes:

Inevitably as the project progressed and new questions were raised, requiring deeper investigation, the list of models and maps needed expanded to include all the editions listed below.

Flood hazard maps were prepared using the Australian Rainfall and Run-off Method ([ARR](#)).

When will these be needed?

[END] = Completion of FMP final maps

[DFL] = Draft flood map stage

As expected, this plan set was expanded as questions that arose during analysis and design tasks were undertaken. So, a far larger map set eventuated. We have catalogued these here and provided embedded links to online jpeg files of these maps.

All flood maps and models were prepared by Matthew Gardner – External Consultant. Chartered Professional Engineer with expertise in modelling flood risk, particularly in gravel river systems. Based in Christchurch with no ties in the Wairarapa, however, previously employed by GWRC in the Flood Protection department.

Overview maps showing the proposed solution:

- 1 This map shows the proposed inland [stopbanks as blue lines](#). This scenario shows a 1% (one in one-hundred-year flood, plus 16% extra volume of water to account for climate change, as at 2100), with depths in colour. It also shows [flood sensitivity](#) i.e. flood risk that is eliminated once the stopbank is built, as a pale pink “ghost”.
- 2 This map also shows the proposed inland [Eastern \(North Street\) and Western \(Kuratawhiti Street\) Stopbanks as blue lines](#). It differs from the one above in that it shows one in one-hundred-year flood (includes 10% climate change), as at 2050, with depths in colour. Again, it shows flood sensitivity that is eliminated by construction of the stopbanks as a pale pink “ghost”.
- 3 This map shows the proposed inland Eastern (North Street) Stopbank as a blue line. It shows 1% annual probability (one-in-one-hundred year flood), including an extra 10% flood water volume for climate change, [as at 2050](#), with depths in colour. Again, this shows flood sensitivity that is eliminated by the proposed stopbank as a pale pink “ghost”.
- 4 [This map adds all the overlaid “sensitivity” run scenarios](#) on top of the base model (1% annual probability) to show, in various colours, how much farther a flood might possibly spread if one or more of these scenarios occurs. The proposed new stopbanks are not shown, so it is possible to see the potential impact on the urban area too. It emphasizes the need for the proposed stopbanks, not just to offer some protection from a 1% annual probability, plus climate change flood but to also defend against these possible but unlikely contingencies. The flood sensitivity area is the area that if these possible but improbable events occurred might be flood affected if no flood defences are built. This is intended to help, for instance, local planners to understand where there might be some benefit to property owners in requiring new buildings to be slightly higher to guard against the possibility, however remote, of flood damage.
- 5 This map shows the maximum extent of a flood in the same circumstances as the above map. It offers a [demarcation between the modelled flood and the extent of the flood sensitive area](#) beyond the modelled flood.
- 6 This scenario shows the peak depth of a 1% (one in one-hundred-year flood, plus 16% extra volume of water to account for climate change, as at 2100), with depths in colour. It also shows [flood sensitivity](#) i.e. flood risk that is eliminated once the stopbank is built, as a pale pink “ghost”.

River maintenance maps:

- 7 [Maintenance Reach A](#): Gooseneck to the Rail Bridge
- 8 [Maintenance Reach B](#): Rail Bridge to the Wire Shed
- 9 [Maintenance Reach C](#): Wire Shed to State Highway 2 Bridge
- 10 [Maintenance Reach D](#): State Highway 2 Bridge to Ruamahanga

Sheer stress modelling maps – used to see what risk might be posed by the power of flood waters at critical locations:

- 11 [Sheer Stress modelling as at Saywells](#) – i.e. the end of Greytown Stopbank and stretch below. This model was used to analyse risk to the Greytown Stopbank to help determine whether the bank needed to be

extended. No evidence that the bank would fail was found. No evidence that flooding around the end of the stopbank would cause significant additional issues inland. However, the use of tree planting along the toe of the Greytown Stopbank (first choice – to be verified) or right angle groins at the toe of the stopbank (second choice if first choice fails because tree roots might not find adequate purchase in the stony ground), to prevent scouring that could undermine the bank are deemed a necessary precaution. A Trigger has been created in the [Living Plan](#) in the event that evidence does come to light that Greytown Stopbank does in fact need to be extended.

- 12 [Sheer Stress modelling as at Fullers](#) – i.e. the stretch of both banks at and below Fullers Bend. This model was used to help determine whether the inside of Fullers Bend needs to be realigned in order to widen the river to remove pressure and stress on the outside of Fullers Bend. The study showed that there is presently no evidence that the True Right Bank would fail. Modelling of the sheer stress on the True Right Bank (Greytown side) of Fullers Bend would not cause significant additional flooding. In fact, modelling indicates that widening Fullers Bend would create higher sheer stress on the True Right Bank further downstream from the existing flood defences on the outside of the bend and therefore actually create a new flood risk there.

Hazard Maps – Designed to help the community and district council planning officers make informed decisions about future development and maintenance of the floodplain:

- 13 [Hazard Map](#) for proposed solution. This map divides the floodplain into degrees of hazard – to help to identify where District Council (S.W.D.C. and C.D.C.) planners may decide to allow certain activities – e.g. construction of dwellings, access drives etc..
- 14 [Hazard Map for Base Scenario](#) (i.e. is we do nothing and a one-in-one-hundred-year flood plus 16% extra volume of matter for climate change as at 2090/2100 occurs) – this shows relative risk by location and highlights ponded water versus fast moving water in the flood zone. This technique relies on GWRCs normal method.
- 15 [Hazard Map for Base Scenario](#) (i.e. is we do nothing and a one-in-one-hundred-year flood plus 16% extra volume of matter for climate change as at 2090/2100 occurs) – this shows relative risk by location and highlights ponded water versus fast moving water in the flood zone. This technique relies on the Australian Rainfall Runoff Guidelines method – which is preferred as being more informative for this plan.

Modelled Scenarios – these maps reflect the many “what-if” questions that were asked about what a flood might do if something unusual happened, over and above the base model (1% annual probability) flood. For example, what if river maintenance is neglected and gravel builds up the riverbed by a half metre?

- 16 [Scenario 1](#) – Base scenario – Q1700 (cubic metres per second flow) TP2 + 16% (for climate change) – showing depth
- 17 [Scenario 2](#) – 20% increase of [Mannings 'n'](#) (a measure of bed “roughness” or friction)
- 18 [Scenario 3](#) – 20% decrease of Mannings 'n'
- 19 [Scenario 4](#) – IPCC climate change scenario [RCP 8.5](#)
- 20 [Scenario 5](#) – IPCC climate change scenario RCP 2.6
- 21 [Scenario 6](#) – Bed levels near Kuratawhiti St raised 0.5 metre
- 22 [Scenario 7](#) – Bed levels near Kuratawhiti St lowered 0.5m
- 23 [Scenario 8](#) – Blockage at bridges and Apple Barrell floodway
- 24 [Scenario 9](#) – Small banks removed
- 25 [Scenario 10](#) – 1% Flood @ 1500 cumecs (cubic metres per second of water) single peak plus climate change up to 2100

- 26 [Scenario 11](#) – 1500 cumecs double peak plus climate change up to 2100
- 27 [Scenario 12](#) – 1700 cumecs double peak plus climate change up to 2100
- 28 [Scenario 12b](#) – 1700 cumecs double peak plus climate change up to 2100 – showing change in depth
- 29 [Scenario 13](#) – 1900 cumecs single peak plus climate change up to 2100
- 30 [Scenario 14](#) – 1900 cumecs double peak plus climate change up to 2100
- 31 [Scenario 15](#) – 20-year (5% probability in any year) event temporal pattern 1 (current climate)
- 32 [Scenario 16](#) – 20-year event temporal pattern 2 (current climate)
- 33 [Scenario 17](#) – 50-year event temporal pattern 1 (current climate)
- 34 [Scenario 18](#) – 50-year event temporal pattern 2 (current climate)
- 35 [Scenario 19](#) – Bank erosion 1
- 36 [Scenario 20](#) – Bank erosion 2
- 37 [Scenario 21](#) – 1700 cumecs single peak (current climate)
- 38 [Scenario 22](#) – 50-year event temporal pattern 1 plus climate change up to 2100
- 39 [Scenario 23](#) – 20-year event temporal pattern 1 plus climate change up to 2050
- 40 [Scenario 24](#) – 20-year event temporal pattern 2 plus climate change up to 2050
- 41 [Scenario 25](#) – 20-year event temporal pattern 2 plus climate change up to 2100
- 42 [Scenario 26](#) – 50-year event temporal pattern 2 plus climate change up to 2050
- 43 [Scenario 27](#) – 50-year event temporal pattern 2 plus climate change up to 2100
- 44 [Scenario 28](#) – Base Scenario + Increase in Manning’s ‘n’ by 20% between XS33 to XS38 12
- 45 [Scenario 29](#) – 20-year event temporal pattern 2 plus climate change up to 2050 + Increase in Manning’s ‘n’ by 20% between XS33 to XS38
- 46 [Scenario 30](#) – 50-year event temporal pattern 2 plus climate change up to 2050 + Increase in Manning’s ‘n’ by 20% between XS33 to XS38
- 47 [Scenario 31](#) – Base Scenario + Increase in Bed LEVELS by 1m between XS27 and XS28 13
- 48 [Scenario 32](#) – Base Scenario + Increase in Bed LEVELS by 0.5m between XS25 and XS18 14 – showing depth
- 49 [Scenario 32 Version 2](#) – Base Scenario + Increase in Bed LEVELS by 0.5m between XS25 and XS18 14 – Showing difference in depth

Stopbank Option Runs – these are the maps for the six flood defence options and their variations. These were the scenarios shared with the community at public meetings and drop-in sessions from which they and subsequently the project team, selected the best (recommended) solution:

- 50 [Scenario SB01](#) – Stopbank base scenario – 1700 cubic metres per second volume + 10% climate change (as at 2050) – showing speed
- 51 [Scenario SB02](#) – Continuous stopbank – blue stopbank without Fullers Bend works – showing speed
- 52 [Scenario SB02 Version 2](#) – Continuous stopbank – blue stopbank without Fullers Bend works – showing speed change
- 53 [Scenario SB02 Version 2.2](#) – Continuous stopbank – blue stopbank without Fullers Bend works – showing depth change
- 54 [Scenario SB03](#) – Continuous stopbank with Fullers Bend realignment -Blue stopbank with Fullers Bend works – showing speed
- 55 [Scenario SB03 Version 3.2](#) – Continuous stopbank with Fullers Bend realignment -Blue stopbank with Fullers Bend works – showing speed change

- 56 [Scenario SB03 Version 3.3](#) – Blue stopbank with Fullers Bend works showing depth change
- 57 [Scenario SB04](#) – Black stopbank without Fullers Bend works – showing speed change
- 58 Scenario SB05 – Black stopbank with Fullers Bend realignment
- 59 [Scenario SB05 Version 2](#) – Black stopbank with Fullers Bend realignment – showing speed
- 60 [Scenario SB05 Version 2.2](#) – Black stopbank with Fullers Bend realignment – showing speed change
- 61 [Scenario SB05 Version 2.3](#) – Black stopbank with Fullers Bend realignment – showing depth change
- 62 [Scenario SB06](#) – Fullers Bend realignment shown in isolation from other works – showing depth
- 63 [Scenario SB06 Version 2](#) – Fullers Bend realignment shown in isolation from other works – showing speed
- 64 [Scenario SB06 Version 3](#) – Fullers Bend realignment shown in isolation from other works – showing change of speed
- 65 [Scenario SB07](#) – Inland stopbank + North St stopbank – Small bunds and guide bank Beef Creek bridge removed – showing depth change
- 66 [Scenario SB08](#) – Beban stopbank + North St stopbank – orange stopbank with bund 2 and left guide banks removed – showing depth change
- 67 [Scenario SB09](#) – Vines (XS 28-30) stopbank + North St stopbank – yellow stopbank with bund 2 and left guide banks removed – showing speed change
- 68 [Scenario SB10](#) – Beban stopbank + North St stopbank with Fullers Bend realignment
- 69 Scenario SB11 – Vines (XS 28-30) stopbank + North St stopbank with Fullers Bend realignment
- 70 [Scenario SB12](#) – Continuous stopbank with Fullers Bend realignment (2100) – showing change in depth overview
- 71 [Scenario SB13](#) – Beban stopbank + North St stopbank (2100) showing depth change
- 72 Scenario SB14 – Vines(XS 28-30) stopbank + North St stopbank with Fullers Bend realignment (2100)
- 73 [Scenario SB15](#) – Inland stopbank + North St stopbank (2100) – change in depth
- 74 Scenario SB16 – Beban stopbank + North St stopbank with Fullers Bend realignment (2100)
- 75 Scenario SB17 – Extended Greytown Stopbank
- 76 Scenario SB18 – Extended Greytown Stopbank with 20% increase in Manning’s ‘n’ between XS (river cross section) 33 and XS38
- 77 SH2 Crown Lowering – shows locations where **we recommend** that NZTA consider lowering the height of the crown of SH2 by 100mm in order to reduce the damming effect of the road increasing flood risk to adjacent properties on the Western side.
- 78 [Scenario SB10](#) – Depth Change Map for Beban stopbank + North St stopbank with Fullers Bend realignment

Appendix H

Glossary and other explanatory notes

Looking for a term to do with rivers not covered in the glossary below? [Try here.](#)

Active Bed or Riverbed – The part of a river channel which gets wet, always or sometimes. Apart from flood events, the active bed of a gravel bed river is normally only partially covered by flowing water.

Aggradation – or a rising riverbed – The increase in the general level of the riverbed as stuff accumulates on it: stones, gravel, grit (a.k.a. “fines”) and other detritus. This may arise because a lot of bed material has moved through a reach or due to changes in river processes affecting the carrying of bed material.

ARR – Australian Rainfall and Runoff Guidelines – Australian Rainfall and Runoff (ARR) is a national guideline document, data and software suite that can be used for the estimation of design flood characteristics. [More information can be found here.](#)

Asset – an important structure or material, that is valued by the community & GWRC, such as stopbanks, rock lining material, bridges, roads, debris fences, natural or manmade features that help to manage flooding etc.

Avulsion – When the river leaves its existing river channel and the forms a new river channel

Bank or Stopbank – A shaped earth and gravel formation generally parallel to the river channel to confine floodwaters.

Beach – general term for an area of deposited material within the active bed or riverbed, that is relatively clear of vegetation, often lying between the wet channel and the riverbanks.

Berm – An area of relatively low-lying land within a waterway beyond the active bed, and generally from a bank landwards to a higher natural feature or stopbank. Berms usually have some vegetative cover. They flood easily and so help manage floods but allow some erosion and the bed to change naturally.

Buffer – [An identified area, along the margin of the river](#), that may be prone to some erosion for river management purposes. Buffers planted with vegetation to control bank erosion are called [“riparian planting”](#) of buffers.

Catchment – The land area bounded by watersheds, draining through tributaries, into a river – comprising an FMU.

Code of Practice – The Code of Practice is a document developed by GWRC that guides all river management activities undertaken by GWRC for the purposes of flood and erosion protection across the Wellington Region. It is subordinate to this River Plan.

Community – In the context of this plan, “community” includes Iwi and other statutory bodies, mana whenua and other urban and rural dwellers in the Waiōhine catchment and all [stakeholders](#), including but not limited to those [identified](#). By definition: “community” *n.* A group of people living in the same locality and under the same government. *n.* The district or locality in which such a group lives. The community of the Waiōhine catchment is represented by the Waiōhine Living Plan Project Team (elected by public meeting of the community, as an advisory committee to the Wairarapa Committee of GWRC), representing WAG (Waiōhine Action Group) or organisations that may succeed it or their equivalent acting through the Waiōhine River Living Plan Project Team that may reasonably attempt to represent the whole rate paying community and other stakeholders interests.

Degradation – A lowering of the level of the riverbed, through removal of bed material such as stones and gravel. This happens from human extraction or naturally. It happens more when the river runs faster and higher. Vastly more material is moved down the river, and deposited, when a major flood occurs – such as a once-in-fifty-year (2%) or once-in-a-hundred year (1% flood).

Designation – This is an ability to reserve land under the District Plan, either to note a hazard or to note the location of a structure to provide protection from that hazard. There are generally strict rules which control [what may happen in these areas](#) and they can be used to reserve land for construction in the future.

ENSO – [El Niño and La Niña \(collectively known as El Niño-Southern Oscillation\)](#).

Flood Hazard Map – a map showing flood hazard in terms of depth of inundation, flow velocities or combinations of these for different types of events. [The maps](#) are produced based on computer modelling

Freeboard – <https://www.fema.gov/freeboard> “Freeboard is a factor of safety usually expressed in feet (or metric equivalent) above a flood level for purposes of floodplain management. “Freeboard” tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed.”

Freshwater Management Unit (FMU) – This is an important concept for the understanding of where a river starts and stops for the purposes of guardianship, management, cultural consideration and catchment management. [A Guide to Identifying Freshwater Management Units](#)

In-Stream – means the wet river stream running between its banks.

In Stream Works – means anything done in the wet part of the river

IPO – [Interdecadal Pacific Oscillation](#)

Kaitiakitanga – Guardian or steward or to have guardianship or stewardship.

Level of service – Another important part of the risk evaluation stage is reaching agreement through community consultation and engagement on the minimum levels of service that you and your community want from your infrastructure. Many local authorities define minimum levels of service for new development, and some define intervention levels for existing development. The flood risk assessment process will enable local authorities to decide whether they will be able to maintain these levels of service under climate change, or whether it will be acceptable to reduce minimum levels of service over time. When considering whether the levels of service should be allowed to be reduced in the future, inter-generational equity should be considered. This will help ensure that decision-making is not unfairly burdening future generations with flood risk that will be unacceptable to them.

LIDAR – An optical sensing technology used to determine the position, velocity, or other characteristics of distant objects by analysis of pulsed laser light reflected from their surfaces.

Mauri – The life essence present in things. Beyond just quality and quantity – it's more than that – it's a respect and reverence for the water, it's natural behaviours, surrounds and ecosystems within its natural setting, context and time. It's how the "catchment" should naturally be or as close as you can restore it to be, were it not damaged or altered by man.

MCI – [Macroinvertebrate Index](#)

Natural Character – Natural character is the natural condition of the river before any modification has occurred. Natural character is referenced within [section 6 of the Resource Management Act](#).

Non-Structural Flood Defences – keep people away from floods

One in One Hundred Year Flood – sometimes we say it's a "1%" or "1% Annual Exceedance Probability" this is a flood event that has a one percent or one-in-100 chance of being equalled or exceeded in any one year. On average, this is expected to occur once in 100 years, based on past flood records and best estimations, though in reality it could happen at any time. This is far from an exact science but the best we can do until we collect more data to analyse.

Operational Management Plan – Operational Management Plans are developed by GWRC in partnership with the community, through the [Living Plan Process](#). It will provide specific and detailed guidance on the short-term view of implementation of the River Plan, at a task by task, year by year, reach by reach, scale. The OMP identifies the management objectives and reach specific values that must be considered in the selection of the most appropriate river management methods to be used for each reach. It is subordinate to the living plan that is the Waiōhine River Plan (Incorporating Floodplain Management Plan).

Overflow Path or just Flow Path – Overflow paths (also known as flow paths) include areas in the river corridor and its adjacent floodplain, where a large volume of water could flow during a big flood. They are often areas of land which lead fast-flowing water away from the river corridor and over the floodplain. The depth and speed of flood waters are such that development could sustain major damage, and there may be danger to life. The rise of flood water may be rapid. Evacuation of people and their possessions would be dangerous and difficult, and social disruption and financial loss could be high. [A blocked overflow path](#) could potentially cause a significant change in flood flows to other areas of the floodplain. Due to water depths and velocities, overflow paths are generally unsuitable for development, unless adequate flood avoidance and/or mitigation provisions are made.

Pool, Riffle, Run – These are the areas in the river channel characterised by a diverse mix of flows and depths.

'**Pool**' is an area of low flow channel where depth is relatively greater, and velocity of the flow is lower, than in the surrounding parts of the river.

'**Riffle**' is an area of the low flow channel that is shallow and steep, with higher flow velocities and unbroken standing waves over the bed material.

'**Run**' is an area of the low flow channel with relatively fast consistent flow and shallow depths. Runs form downstream of riffles or between pools.

Residual Risk – Residual risk is the risk remaining after risk reduction measures have been put in place. Residual risk may be related to failure of the risk reduction measures, parts of the community that do not benefit from the risk reduction measures proposed, or risks from events that exceed the design standards of the structural risk-reduction options. Climate change may increase the amount of residual risk you need to manage over time. Examples of options for managing residual risk include insurance, emergency management planning, warning systems and community education.

Riparian – The border between land and a river or stream.

Riverbank – The side of a river acting as a barrier between the water and more level ground to either side.

Riverbed – [The Resource Management Act](#) defines a river bed as ‘*The space of land which the waters of the river cover at its fullest flow without overtopping its banks*’. Often the horizontal extent of a riverbed defined thus corresponds to the extent of the active bed.

Riverbed Level Envelope – A term referring to a theoretical area between defined limits that relate to the known natural highest and lowest levels the bed reaches, based upon historical evidence. This can be used as a guideline that helps decide whether or not the riverbed is rising (aggrading) or lowering (degrading) too much. This in turn helps in deciding whether gravel (stone) needs to be, or can safely be, extracted or moved in such a way to reduce risk of flood or change of direction by the river (avulsion); or whether this is in fact necessary and can be avoided or delayed, allowing the river, flora and fauna, to behave more naturalistically.

River Corridor – The river corridor includes land immediately next to the river channel. It is the minimum area able to contain a major flood and allow the water to pass safely downstream. The extents are identified based on modelled depth and velocities of a one-in-one-hundred year or 1% annual risk flood event. The depth and speed of flood waters in the river corridor are such that they represent a potential danger to people and structures.

Sill banks – provide a slightly higher edge to ground, or in many cases, reinstate a higher edge that had been lost by erosion. Not a stopbank.

Stopbank or stopbank – A shaped earth and gravel formation generally parallel to the river channel to confine floodwaters

Structural Flood Defences – keep floods away from people

Sustainable Management – As defined by Section 5 of the [Resource Management Act](#): “*Managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while:*

- Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
- Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and avoiding, remedying, or mitigating any adverse effects of activities on the environment.”

Taonga – treasure, anything prized – applied to anything considered to be of value including socially or culturally valuable objects, resources, phenomenon, ideas and techniques. Examples of the word’s use in early texts show that this broad range of meanings is not recent, while a similar range of meanings from some other Eastern Polynesian languages support this (e.g. Tuamotuan). The first example sentence below was first published in a narrative in 1854 by Sir George Grey, but was probably written in 1849 or earlier.

Training bank – A training bank is used to direct the flow and speed of floodwater to a better path during a minor flood. A training bank may be used to protect low risk assets, such as open farmland, from high frequency events, but will allow the area to be flooded in a large flood event to alleviate pressure on higher risk assets.

Whaitua – <https://www.gw.govt.nz/environment/freshwater/protecting-the-waters-of-your-area/>

Appendix I

Links to supporting, reference and background documents

[Floods: Things to Know](#)

[Climate Change Reference Impacts Assessment – MBE](#)

[Preparing For Climate Change for Local Government](#)

[New Reports Highlight Flood Risk Under Climate Change](#)

[Matauranga Maori](#) – can be defined as ‘the knowledge, comprehension, or understanding of everything visible and invisible existing in the universe’ and is often used synonymously with wisdom. In the contemporary world, the definition is usually extended to include present-day, historic, local, and traditional knowledge; systems of knowledge transfer and storage; and the goals, aspirations and issues from an indigenous perspective

[Independent Peer Review – Ian Heslop – Chartered Professional Engineer](#)

[Geomorphic Trends Assessment Report – Tonkin and Taylor](#)

[Waiōhine River – Hydraulic Modelling Summary of Sensitivity and Stopbank Runs](#)

[Conceptual Design – Cameron Fauvel Projects](#)

[Waiōhine FMP – Flood Modelling and Mapping Audit – February 2018 Update BECA](#)

[Ecological effects of flood management activities in Wairarapa rivers – Professor Russell Death and Fiona Death](#)

[Extreme Rain – NIWA Presentation Slides](#)

[NIWA – Climate Change Effects on Upper Ruamahanga Catchments – 2017](#)

[Aerial photographs of 1990 flood](#), which was used for developing the base model for this plan

[Proposed Natural Resources Plan](#)

2013 Boffa Miskell report on [stopbank assessment](#).

GWRC Consent application form.

GWRC Partnership with Tangata Whenua agreement.

[Fish Communities of Wairarapa Rivers](#) – Russell Death – Massey University [WRC doc 1136937]

[Impact of Climate Change on Inflows to the Ruamahanga Groundwater Management Zone](#) – NIWA for GWRC
– February 2017

[High Intensity Rainfall and Climate Change](#) – Doctor Trevor Carey Smith – NIWA March 2016

[Assessment of Kahikatea for Dendrochronology](#) – Rob Kennedy

[Buffer Management – Benefits and Risks](#) – Russell Death – Massey university

[Waiwhetu Stream – House Raising Options Review](#) (provided as background to the concept of house raising –
GWRC April 2014

Appendix J

Which cross section is where?

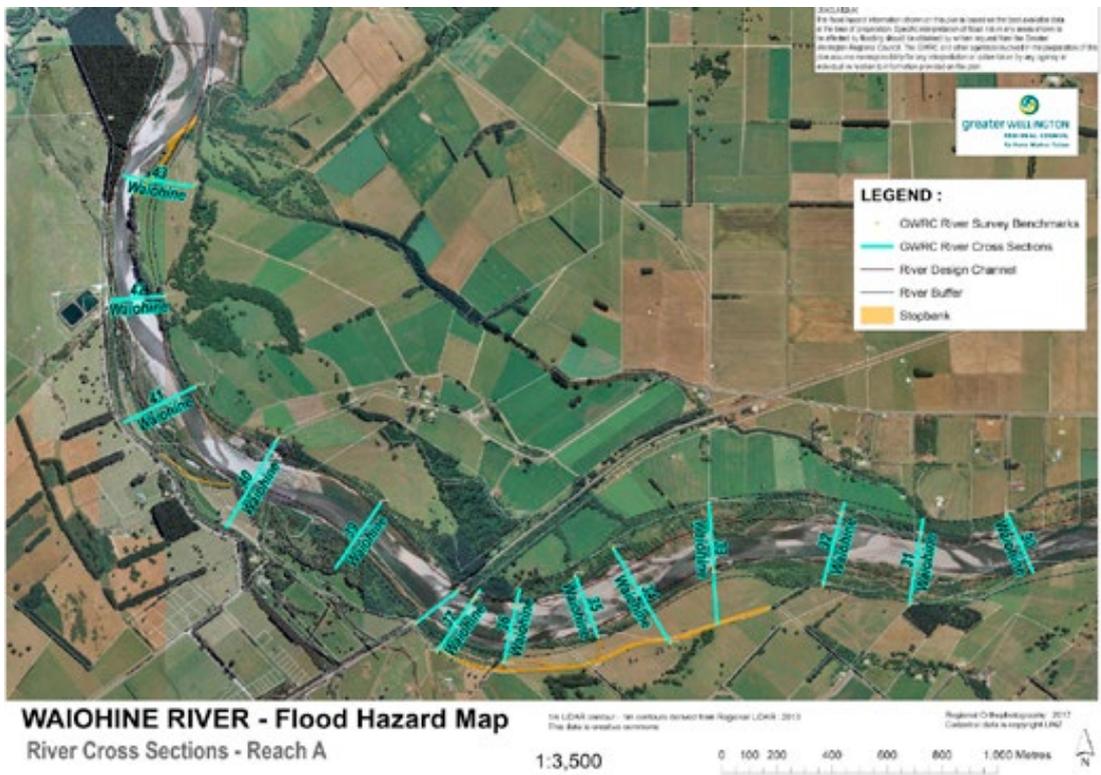


Figure 117: River Cross Sections – Reach A.

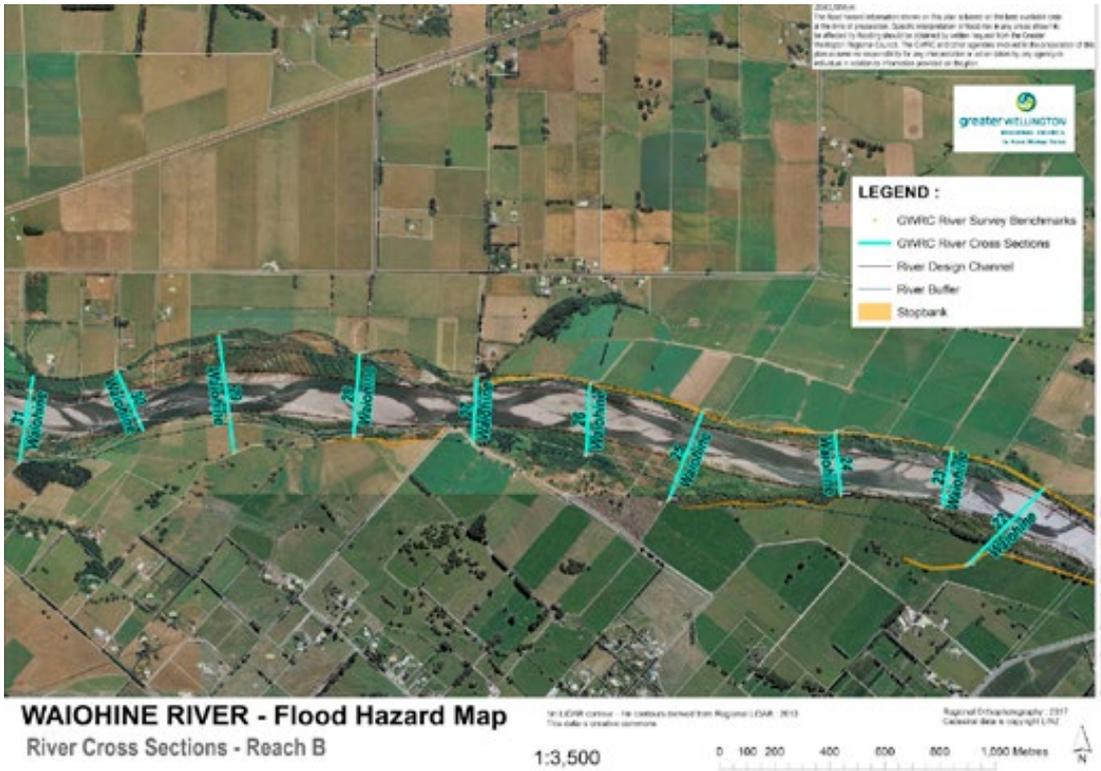


Figure 118: River Cross Sections – Reach B.

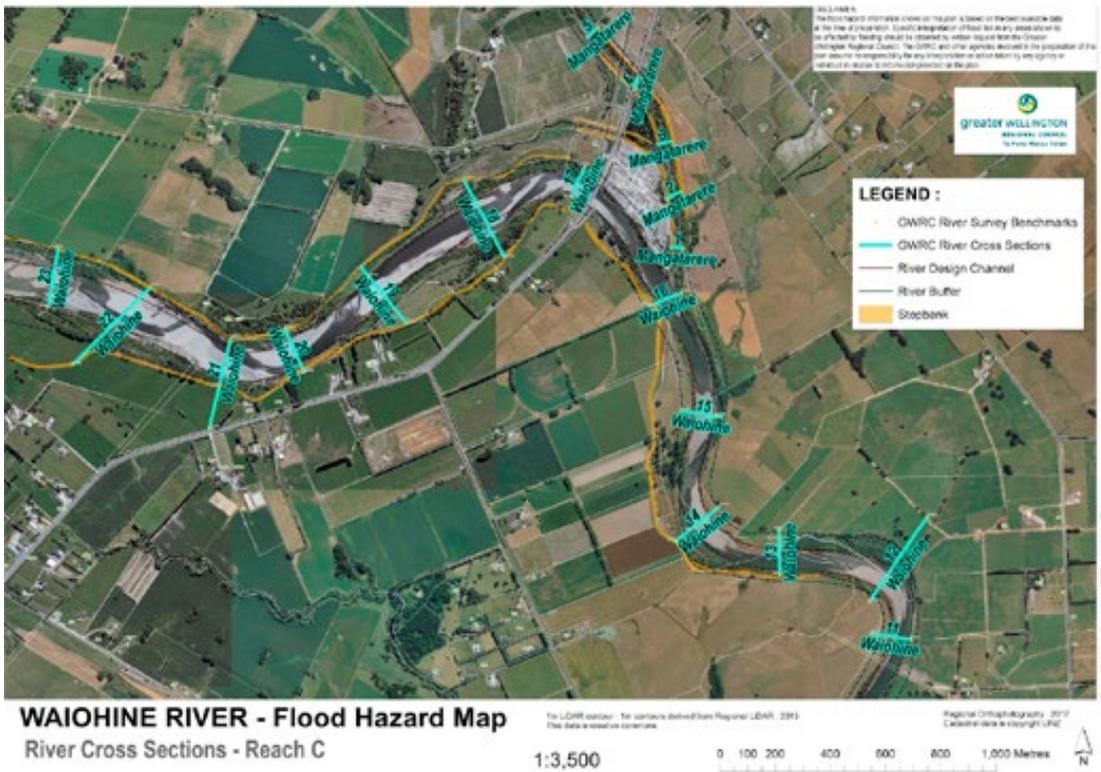


Figure 119: River Cross Sections – Reach C.

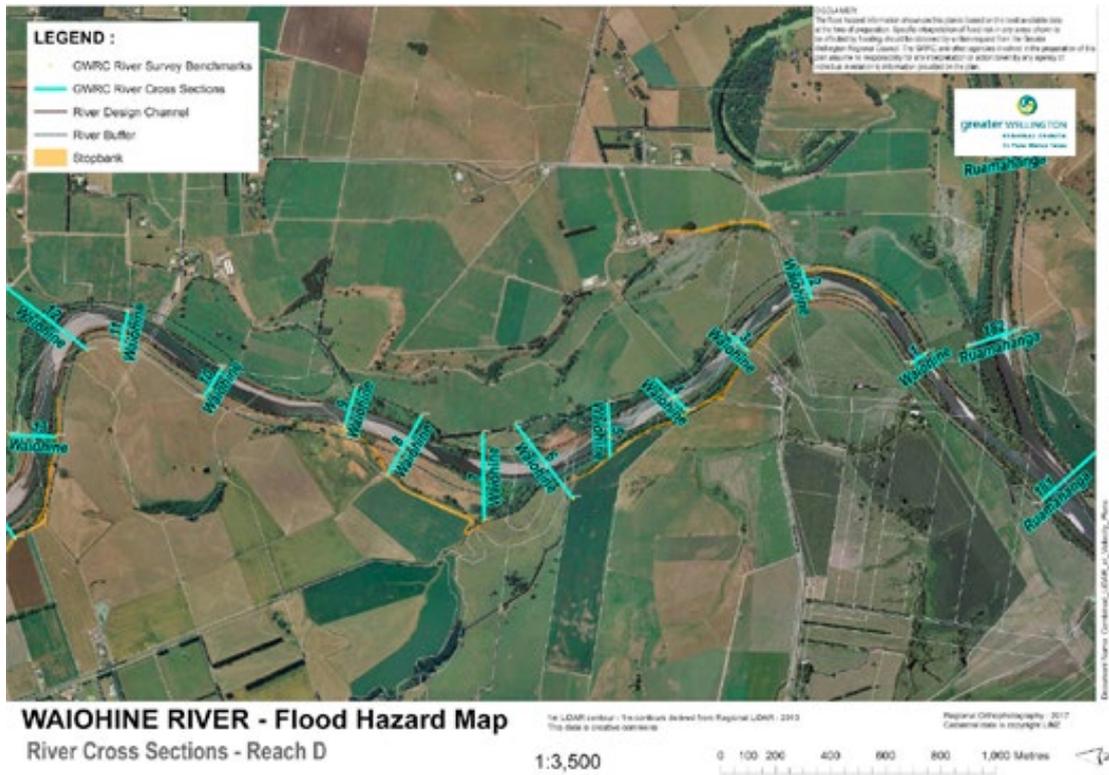


Figure 120: River Cross Sections – Reach D.

Appendix K

Ecological effects of flood management activities in Wairarapa rivers

Report prepared for Greater Wellington Regional Council by Russell Death and Fiona Death. Published by Massey University and Aquanet Consulting Limited, December 2013.

https://drive.google.com/file/d/16hfUW1PAeel3Mdua_f7Y9E3eYHDKFfIG/view?usp=sharing

Appendix L

Package of related gravel strategy documents

Earliest to latest, in order:

- 1 1st April 2016 Memorandum To Mark Hooker: **"Discussion document on methods to determine mean bed levels and gravel volumes"**
- 2 **"Gravel Management Review and Recommendations"** – Waiōhine River April 2019. Signed off by Jock McNaught – 10th July 2019, Reviewed by James Flanagan – 12th July 2019, reviewed by Graeme Campbell, Department Manager, Flood Protection 23rd August 2019. Instruction for external parties using the document to contact GWRC. NOTE that the following report was withdrawn from use by GWRC, in order that it should not be used to poorly inform WRT operational management of the Waiōhine River.
- 3 **"Independent Gravel Management Review – Wairarapa Regional Gravel Status"** – June 2020 written by Environmental Consulting Engineers. Author Laddie Kuta. Purpose is not to: "dictate gravel extraction decisions and operations..but provide sound evidence for discussion and decision planning", "shut down in-channel industry operations or encourage land based gravel extraction operations.", "Override existing planning documents; or provide immutable values for aggrading and degrading trends". It notes that "further work to understand an "optimum" bed level that is aligned with flood protection goals for each river is required".
NOTE that all data and text and all references to the Waiōhine River were withdrawn from use by GWRC from the above report in order that it should not be used with regard to the operational management of the Waiōhine River.
Significantly it states that "The gravel analysis for the Waiōhine River was separately completed by GWRC, with results interpreted by e2 in this report. A separate report with reach-specific detail is available for the Waiōhine River."
- 4 "Wairarapa Gravel Management Plan 2020/2021" Table describing itself as "Draft plan presented at the industry Workshop held in Masterton on 15 July 2020". Shows data taken from withdrawn documents used for public presentation.
- 5 A set of new cross sectional surveys as at December 2020 for the reach near Kuratawhiti Street. Undertaken using a more accurate technique than item 2 above and showing that rather than degradation (bed lowering), some aggradation (bed raising and river constriction) is occurring and significant constraint of the river flow.

Appendix M

Maps of restoration strategy

To be provided.

Appendix N

Interview with Bruce Slater and accompanying map of the river – August 2010 by Ian Gunn

Link to the interview:

[Interview with Bruce Slater Part 1](#)

[Interview with Bruce Slater Part 2](#)

[Map that accompanies interview with Bruce Slater](#)

Index of Illustrations

| | | |
|-------------------|---|----|
| Figure 1: | A Community of Stakeholders. | 12 |
| Figure 2: | Essential Water Fact Sheet – MOE. | 14 |
| Figure 3: | Flood map showing proposed stopbanks as blue lines. | 16 |
| Figure 4: | SH2 North of Greytown. | 17 |
| Figure 5: | Each Project Team Working Day's outputs are photographed and shared with the community via Facebook and emails with summary links and an invitation for feedback and questions. | 19 |
| Figure 6: | Waiōhine river plan mind map. | 22 |
| Figure 7: | Waiōhine river plan Project Team working day. | 23 |
| Figure 8: | Brainstorm of Stakeholders. | 25 |
| Figure 9: | Conserving, sustaining and improving our river. | 32 |
| Figure 10: | Aerial photograph of Waiōhine valley showing clean water as green and polluted water as orange – Russell Death, Massey University. | 33 |
| Figure 11: | Regional Seasonal Changes in Rainfall – NIWA. | 38 |
| Figure 12: | Seasonal Rainfall Mid-Range Projections – NIWA. | 39 |
| Figure 13: | Climate Change Response. | 40 |

| | | |
|-------------------|---|----|
| Figure 14: | A flood map option showing a severe 1% flood with severe climate change (IPCC RCP 8.5 – landriversea Consulting). | 41 |
| Figure 15: | IPCC scenarios diverging – IPCC. | 42 |
| Figure 16: | Changes in heavy rainfall days – NIWA. | 43 |
| Figure 17: | Sources of information on past floods tally. | 47 |
| Figure 18: | Waiōhine in flood. | 48 |
| Figure 19: | One in one hundred year flood, with climate change as at 2100, also showing Flood Sensitive Areas (where there may be some possible flooding in the event of unusual things happening in addition to climate change and a one in one hundred year flood). | 48 |
| Figure 20: | Floods of note – to identify candidates from which to develop a base model. | 49 |
| Figure 21: | Landslip in gorge during 1982 flood – GWRC. | 50 |
| Figure 22: | Detail from base scenario – landriversea Consulting. | 50 |
| Figure 23: | Detail of Mangatāre convergence. | 50 |
| Figure 24: | Maximum flood peaks for the 50 largest recorded floods in the Waiōhine River Catchment are shown as green dots, El Nino Southern Oscillation (ENSO) cycles are shown in red, IPO cycles are in blue. Tonkin and Taylor from Creative Commons. | 54 |
| Figure 25: | Identified stream characterisation reaches of the Waiōhine River and their characteristic attributes. Tonkin and Taylor 2018. | 55 |
| Figure 26: | Gravel extraction Analysis Tonkin and Taylor from GWRC. | 57 |
| Figure 27: | Major floods and start of bed level measurements shown against stages of IPO weather cycle. | 59 |
| Figure 28: | GWRC Study of measured bed levels and gravel extraction for the period after a cycle of major flooding occurred. | 60 |
| Figure 29: | IPO “Dry” cycle begins as bed degradation and measurement begin. | 61 |
| Figure 30: | How the build-up of gravel beaches creates flood risk – yellow colour shows additional flooding. | 62 |
| Figure 31: | Identification of critical areas as at 2021 – Project Team. | 63 |
| Figure 32: | Analysing Critical Areas Lifecycle – Project Team. | 64 |
| Figure 33: | Major landslip and dam break in 1982 flood – GWRC. | 69 |
| Figure 34: | Flood Map – 1:20 Year Flood Risk Discussion – landriversea Consulting | 70 |
| Figure 35: | Showing Raised Bed Level At End of Kuratawhiti Street – landriversea Consulting. | 71 |
| Figure 36: | Significant flood sensitivity scenarios laid one on top of another to see maximum extent – landriversea Consulting. | 73 |
| Figure 37: | What Level of Flood Protection is Required – Project Team. | 77 |
| Figure 38: | Stretches of River Needing Differing Flood Defences – Project Team. | 78 |
| Figure 39: | Various combinations of flood defences were analysed to find viable combinations. | 79 |
| Figure 40: | Used to identify impact if no defences are constructed. Note that there is some impact on urban dwellings at the North end of Greytown and along State Highway 2. | 81 |

| | | |
|-------------------|--|-----|
| Figure 41: | An option showing a severe 1% flood with severe climate change (IPCC RPC 8.5). | 81 |
| Figure 42: | Table showing Option 1 Implications – Project Team. | 82 |
| Figure 43: | Flood Map – Option 2 Inland Stopbanks – landriversea Consulting. | 83 |
| Figure 44: | The option strongly preferred by most of the community and the Project Team. | 83 |
| Figure 45: | Shows minimal change in flood depth due to inland stopbanks and shows urban area saved from flooding. | 84 |
| Figure 46: | Table analysing which stopbanks are needed for which scenario – Project Team. | 84 |
| Figure 47: | Option 3 North St Stopbank plus Greytown Stopbank Extension – landriversea Consulting. | 85 |
| Figure 48: | Option 3 North St Stopbank plus Greytown Stopbank Extension to XS 30 – landriversea Consulting. | 86 |
| Figure 49: | Showing changes in flood depth - principally to farmland but some downstream consequences in the SH2 and Ahikouka area. | 87 |
| Figure 50: | Option explored of adding the realignment of the inside of Fullers Bend to this scenario. | 87 |
| Figure 51: | Table showing Option 3 Implications – Project Team. | 88 |
| Figure 52: | Option 4 North St Stopbank plus Greytown Stopbank Extension Beyond Bebans Farm – landriversea Consulting. | 89 |
| Figure 53: | Peak Water Speed Map at Fullers Bend – landriversea Consulting. | 89 |
| Figure 54: | Table showing Option 4 Implications – Project Team. | 90 |
| Figure 55: | A study of the impact on flood depth of re-aligning the inside of Fuller’s Bend – showing little benefit in flood depth. | 90 |
| Figure 56: | Option 5 – Long extension to Greytown Stopbank and Nth. Street Stopbank, showing change to depth. | 91 |
| Figure 57: | Table showing Option 5 Implications – Project Team. | 91 |
| Figure 58: | Study of impact of increasing depth and flooding created by a continuous stopbank. Bank is blue line. | 92 |
| Figure 59: | Study of increased flood depth downstream caused by continuous stopbank. | 93 |
| Figure 60: | Table showing Option 6 Implications – Project Team. | 94 |
| Figure 61: | Table of Initial Estimates of Materials and Costs – Project Team. | 95 |
| Figure 62: | Community feedback on the six scenarios. | 96 |
| Figure 63: | Comparisons of Costs and Property Impacts – Project Team. | 97 |
| Figure 64: | Investigation into possible alternative path for Western Stopbank - design path in blue, alternative path in black. | 98 |
| Figure 65: | Attempt to force extra flood water at end of Greytown Stopbank (+20% bed roughness on top of 1:100 year plus climate change) makes little difference but has some negative downstream effects. | 99 |
| Figure 66: | Table of preliminary cost estimates – Project Team. | 103 |
| Figure 67: | Table of preliminary cost estimates for stopbanks – Cameron Fauvel Design. | 104 |

| | | |
|-------------------|---|-----|
| Figure 68: | Loan Calculator – GWRC. | 105 |
| Figure 69: | Summary of sources of funding – Project Team. | 108 |
| Figure 70: | Flood Map – Detailed Study of Flood Sensitive Area 1 – landriversea Consulting. | 111 |
| Figure 71: | Flood Map – Detailed Study of Flood Sensitive Area 2 – landriversea Consulting. | 112 |
| Figure 72: | Australian Rainfall Runoff Guidelines hazard classification – ARR. | 113 |
| Figure 73: | Table of Hazard Classifications – ARR. | 113 |
| Figure 74: | Flood Map – Detailed Study of need to raise crown of SH2 – landriversea Consulting. | 115 |
| Figure 75: | Hazard Map depicting types of risk from flood waters using the Australian Rainfall and Run-off Guidelines method. A map that can be expanded can be found here. | 116 |
| Figure 76: | A Living Plan – A holistic Approach – Project Team. | 122 |
| Figure 77: | Global Consenting and River Management Framework Diagram – Project Team. | 122 |
| Figure 78: | What Partnership Looks Like Diagram – Project Team. | 124 |
| Figure 79: | Four Steps of the Annual Planning Cycle – Project Team. | 126 |
| Figure 80: | Tightening up the Living Plan Process involves adopting the “no surprises principle”. | 128 |
| Figure 81: | Regulatory Framework and Change chart – Project Team. | 131 |
| Figure 82: | Table of Critical Areas – Project Team. | 132 |
| Figure 83: | How the relationship between River Plan, stakeholders and the consent process should work (based on existing consent mechanisms)-Project Team. | 136 |
| Figure 84: | What is done by who and when – cost estimates – Project Team. | 137 |
| Figure 85: | Graeme Campbell Discussion chart – Project Team. | 139 |
| Figure 86: | Critical Areas Table – What Are We Protecting? – Project Team. | 140 |
| Figure 87: | Critical Area Photograph – Platform Farm – GWRC. | 143 |
| Figure 88: | Critical Area Photograph – Kuratawhiti Street – GWRC. | 144 |
| Figure 89: | Critical Area Photograph – Mature Native Trees – GWRC. | 145 |
| Figure 90: | Ecological Care and Considerations chart – Project Team. | 146 |
| Figure 91: | Finding the best way to manage gravel – workshop with Professor Ian Fuller (Massey University). | 152 |
| Figure 92: | River Management Zones Diagram – Project Team. | 154 |
| Figure 93: | Example of tools used in developing an understanding of the needs of each stretch of river – Project Team. | 155 |
| Figure 94: | River management needs vary by stretch of river – photos – GWRC. | 157 |
| Figure 95: | River management needs vary by stretch of river – photos – GWRC. | 158 |
| Figure 96: | River management needs vary by stretch of river – photos – GWRC. | 159 |
| Figure 97: | River management needs vary by stretch of river – photos – GWRC. | 160 |
| Figure 98: | Targets for Water Quality Improvement – Whaitua/PNRP. | 164 |

| | | |
|--------------------|--|-----|
| Figure 99: | In-stream nutrient criteria – Whaitua/PNRP. | 164 |
| Figure 100: | Nutrient limits and targets – Whaitua/PNRP. | 164 |
| Figure 101: | Sediment load limits and targets – Whaitua/PNRP. | 165 |
| Figure 102: | Water Management Wheel – Whaitua/PNRP. | 165 |
| Figure 103: | Habitat Matrix Table – Project Team | 172 |
| Figure 104: | Conceptual Stopbank Design – CF Projects Limited. | 176 |
| Figure 105: | Example of Mapped Path of Stopbank – CF Projects Limited. | 177 |
| Figure 106: | Example of Profiles of Stopbanks – CF Projects Limited. | 177 |
| Figure 107: | Investigation of Alternative Western Suburbs Stopbank Alignment – GWRC. | 178 |
| Figure 108: | Public Meeting – 6th July 2017. | 180 |
| Figure 109: | Public Meeting – 6th July 2017. | 182 |
| Figure 110: | Intent of the Living Plan and TORs – Relationship model. | 195 |
| Figure 111: | What Partnership Looks Like | 196 |
| Figure 112: | Position for Passion – some stakeholders are interested in all topics and some in specific topics. | 197 |
| Figure 113: | Position for Passion. | 198 |
| Figure 114: | Example of easement. | 201 |
| Figure 115: | The Mind Map with linkages – an example of techniques used. | 202 |
| Figure 116: | Setting up the project team and relating work practices to the Terms of Reference and community drivers. | 203 |
| Figure 117: | River Cross Sections – Reach A. | 215 |
| Figure 118: | River Cross Sections – Reach B. | 216 |
| Figure 119: | River Cross Sections – Reach C. | 216 |
| Figure 120: | River Cross Sections – Reach D. | 217 |

Council
7 April 2022
Report 22.138



For Decision

DRAFT SUBMISSION ON ROAD USER CHARGES

Te take mō te pūrongo

Purpose

1. To advise Council of Greater Wellington Regional Council's draft submission to the Ministry of Transport on their consultation document *Te Huringa Taraiwa: Te arotake i te pūnaha utu kaiwhakamahi rori | Driving Change: Reviewing the Road User Charges System*, also known as the *Road User Charges (RUC) discussion document*.

He tūtohu

Recommendations

That Council:

1. **Approves** the submission on the Road User Charges discussion document (Attachment 1).
2. **Authorises** the Council Chair to make minor editorial amendments to the submission to correct errors and improve public understanding.

Te tāhū kōrero

Background

2. The Ministry of Transport released a consultation document titled [Te Huringa Taraiwa: Te arotake i te pūnaha utu kaiwhakamahi rori | Driving Change: Reviewing the Road User Charges System, also known as the Road User Charges \(RUC\) discussion document](#), on 28 January 2022.

The RUC discussion document raises the question around what changes are needed to make RUC work more effectively. It discusses the inclusion of externalities when setting RUC rates, exemptions for electric vehicles, improvements of the RUC system for end users, and technical amendments to the Road User Charges Act 2012 that may be required on review of consultation responses. Submissions close on 22 April 2022.

3. The Road User Charges Act was legislated in 1977 'to impose a charge for the use of roads by heavy vehicles and certain other vehicles; and to abolish mileage tax and heavy-traffic licensing.' A significant reform was undertaken in 2012 to modernise and simplify it.
4. The revenue generated through RUC contributes 45 percent of the National Land Transport Fund (NLTF), which supports a wide range of activities including the building

of new and significant roads and infrastructure, through to cycleways and subsidising public transport.

5. Since 2012, there has been a considerable shift in the volume of light diesel vehicles and therefore the volume of people paying RUC. The core of the scheme is centred around heavy vehicles, mainly operated by companies, but which now only makes up 60 percent of RUC revenue. New Zealand is also committed to reducing carbon emissions in the transport sector. The demands on the NLTF have now exceeded its capacity to fund what is being asked of it.

Te tātaritanga Analysis

6. The focus areas in the RUC consultation are:
 - a The inclusion of externalities when setting RUC rates;
 - b Exemptions for electric vehicles;
 - c Improvements of the RUC system for end users; and
 - d Technical amendments to the Road User Charges Act that may be required on review of consultation responses.
7. The consultation does not, however, consider the future funding of the NLTF, which is critical to achieving Greater Wellington strategic objectives around mode shift, and addressing climate change. The Government itself has committed to significant reductions in greenhouse gas emissions. For transport, if delivered through a reduction in distance travelled by private vehicles, as currently signalled, this will mean reduced revenue in the form of RUC and Fuel Excise Duty. In addition, to achieve mode shift, transformational change to the current offerings of public transport and safe, accessible active mode provision will be required. The NLTF already has considerable strain on funding and an overhaul of the funding system is required, not just a focus on RUC.
8. Externalities can include, as examples, environmental damage, accidents, or congestion. These are not explicitly considered when setting RUC and should remain a charge borne as close to the harm, or to the behaviour to be changed, as reasonably possibly. A rural driver should not be expected to contribute to urban congestion, for example.
9. Exemptions for private electric vehicles currently end in March 2024, and heavy vehicles are exempt until December 2025. Consideration needs to be given to the wear and tear caused to the network by vehicle distance and weight and apply the appropriate charge. Research suggests the greatest barrier to the purchase of an EV is the initial capital cost, so something like the Clean Car Discount is more appropriate to encourage initial uptake, rather than using the RUC.
10. An efficient RUC system should be easy for the end-user with minimal administrative burdens. Further technical commentary is out of scope for this submission.
11. The proposed submission ([Attachment 1](#)) addresses these points.

Ngā tikanga whakatau

Decision-making process

12. The matters requiring decision in this report have been considered by officers against the requirements of Part 6 of the Local Government Act 2002 (the Act). Part 6 sets out the obligations of local authorities in relation to the making of decisions.

Part 6 requires Council to consider the significance of the decision. The term 'significance' has a statutory definition set out in the Act.

Te hiranga

Significance

13. Officers have considered the significance of the matter, taking the Council's *Significance and Engagement Policy* and Greater Wellington's *Decision-Making Guidelines* into account. Officers recommend that the matter be considered to have low significance, due to its administrative nature.

Te whakatūtakitaki

Engagement

14. The Region's territorial authorities were contacted for general feedback.
15. Engagement on the matters contained in this report aligns with the level of significance assessed. In accordance with the significance and engagement policy, no further engagement on the matters for decision is required.
16. The Ministry of Transport is inviting feedback from stakeholders, interest groups and the public as part of the *RUC* consultation process.

Ngā tūāoma e whai ake nei

Next steps

17. Officers will liaise with the Council Chair and provide the final submission to the Ministry of Transport before the closing date of 22 April 2022.
18. A package of measures will be submitted to government by the Ministry of Transport in August 2022. This will be followed by the first batch of regulations proposed for consultation and the first regulations to come into effect late 2022. Amendments to the Act will be considered by Parliament in 2023.

**Ngā āpitihanga
Attachment**

| Number | Title |
|---------------|---------------------------------------|
| 1 | Draft submission on Road User Charges |

**Ngā kaiwaitohu
Signatories**

| | |
|-----------|---|
| Writer | Amelia Wilkins – Strategic Advisor |
| Approvers | Grant Fletcher – Manager, Regional Transport Luke Troy – General Manager, Strategy |

| |
|---|
| <p>He whakarāpopoto i ngā huritaonga Summary of considerations</p> |
| <p><i>Fit with Council's roles or with Committee's terms of reference</i></p> <p>The Council has responsibility for approving submissions to external organisations on matters pertaining to land transport management.</p> |
| <p><i>Implications for Māori</i></p> <p>There are no known impacts for Māori.</p> |
| <p><i>Contribution to Annual Plan / Long Term Plan / Other key strategies and policies</i></p> <p>The programme of activities included in the Wellington Regional Land Transport Plan 2021 (RLTP) is partially funded through the National Land Transport Fund (NLTF), of which Road User Charges make a significant contribution. The future certainty of funding available through the NLTF is crucial to achieving the targets set out in the RLTP.</p> |
| <p><i>Internal consultation</i></p> <p>Metlink, Air Quality, Climate Change, and Environmental Policy were consulted to form the basis of Attachment 1.</p> |
| <p><i>Risks and impacts - legal / health and safety etc.</i></p> <p>There are no risks arising from this report.</p> |



Attachment 1 to Report 22.138

By email

XX April 2022

Email to: RUCconsultation22@transport.govt.nz

Office of the Chairperson
100 Cuba Street
Wellington
T 04 384 5708
www.gw.govt.nz

Tēnā koutou

Submission on the Ministry of Transport's *Te Huringa Taraiwa: Te arotake I te pūnaha utu kaiwhakamahi rori* | *Driving Change: Reviewing the Road User Charges System*

Thank you for the opportunity to provide feedback on *Te Huringa Taraiwa: Te arotake I te pūnaha utu kaiwhakamahi rori* | *Driving Change: Reviewing the Road User Charges System*.

In keeping with government direction, the Wellington Regional Land Transport Plan (RLTP) 2021-24 has ambitious targets to reduce carbon emissions and increase mode share in favour of public transport and active modes. We welcome the opportunity to provide feedback on something that is both integral to achieving this and directly impacted by its success.

Our submission focuses on transport funding as a wider consideration and charging for externalities, including equity considerations.

National Land Transport Funding

The National Land Transport Fund (NLTF), of which Road User Charges (RUC) currently contribute 45%, is the main funding source for the RLTP programme of activities. The NLTF is currently partially debt funded. Without further intervention, we can expect pressures to increase, particularly in light of the expected announcement of the Emissions Reduction Plan mid-year that will further guide transport in leading efforts to reduce emissions.

We appreciate that the Ministry of Transport (the Ministry) is already looking into the future of transport funding. Relying principally on road user charges and fuel excise duty (FED) to fund the transport network, while simultaneously discouraging the use of private vehicles appears counter-intuitive. Although the use of electric vehicles (EVs) will make a considerable difference to tailpipe emissions, it will fail to resolve other issues like parking and congestion.

We look forward to discussions with the Ministry on a more integrated and sustainable way to fund transport in the near future, including the availability of road pricing tools to influence how, when and where people travel.

While it is difficult to look at RUC in isolation from the overall funding situation, we support the Ministry's proposals to ensure that the collection and monitoring of RUC is done efficiently and

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with minimal administrative burdens as we investigate new ways of revenue generation. We support the use of technologies to enhance this process.

Exemptions and Externalities

Fundamentally, we believe users should pay their fair share for use of the road network. We support the long-standing principle that underpins RUC that charges are based on distance travelled and vehicle weight and this approach should be applied to all vehicles irrespective of power source. The exception to this could be public transport and school services to signal support for decarbonisation and uptake of public transport. We support all other EVs being integrated into the RUC system after the current exemptions expire. Research shows the greatest barrier to shifting to an EV is the higher capital outlay, so an incentive like the Clean Car Discount is better placed to encourage initial uptake.

We disagree that charging for externalities through RUC is the right step and would prefer to see charges closer to harm or to the behaviours we want to change. The Emissions Trading Scheme is an example of where the charge is applied at the source and if hypothecated back into the transport fund, could increase investment in future technologies that support decarbonisation and alternatives to the private vehicle. This apportions the charge to those using the fuel, further incentivising a shift to alternative fuels. We do believe there is some merit in a small environmental charge for non-tailpipe related emissions, such as tyre and brake particulates, but again this should be based on vehicle type and distance travelled.

Influencing travel demand management and mode shift

A suite of road pricing tools would be more appropriate to encourage or disincentivise targeted behaviours than applying a universal congestion charge to RUC (and Fuel Excise Duty). The transparency of these charges indicates a more accurate cost of travelling at certain times by certain means, and allows for greater decision making in the home. Critical to changing behaviour is making available viable alternatives in the form of public transport and active modes or work-from-home support and we would expect any revenue generated to be invested back into this.

Separation of charges such as these support a more equitable shift as they would be imposed on those using the service or infrastructure at a specific time and not to people travelling in less congested areas. As an example, Let's Get Wellington Moving is investigating pricing tools as part of a travel demand management package to support the wider programme of public transport and active mode improvements.

Equity

All New Zealanders must be considered in the transition to a low-carbon future. Lower income households are less likely to have the capital to invest in an EV, and heavy vehicles currently have very few viable alternatives available or are faced with significant initial capital costs and different cost models when compared with traditionally powered vehicles. Unless these issues are

addressed, these users will be left paying a disproportionate share of the transport system cost without choice. We support ongoing investment in the alternatives to fossil-fuelled vehicles as policies to curb greenhouse emissions are developed. We support user-pays on its current actual and reasonable cost basis, and that these principles be applied to any road pricing tools and emissions related charges.

We look forward to continued work with the Ministry of Transport around long-term funding solutions.

Ngā mihi nui,

Daran Ponter

Chair

Greater Wellington Regional Council

For further discussion on the specifics of this submission, please contact Amelia.Wilkins@gw.govt.nz.

Council
7 April 2022
Report 22.134



For Information

FLUORIDATION OF WATER SUPPLY

Te take mō te pūrongo

Purpose

1. To inform Council about issues relating to the inconsistent fluoridation of drinking water.

Te horopaki

Context

2. Wellington Water Limited manages and delivers the bulk supply of drinking water to the four metropolitan city councils in the Wellington Region, on behalf of Greater Wellington Regional Council (Greater Wellington). This function includes the fluoridation of drinking water.
3. At a Council workshop on 15 March 2022 Wellington Water advised Greater Wellington of some issues with fluoridation of the water supply, and that as a result, the fluoride facilities at two of the four water treatment plants (Te Marua and Gear Island) had been turned off.
4. This was followed by an initial public announcement on 16 March 2022, and subsequent announcements as further information came to light. It is understood that fluoridation was stopped at the Te Marua Water Treatment Plant in May 2021 and at the Gear Island Water Treatment Plant in November 2021. The Wellington Water Committee was formally advised at its meeting on 18 March 2022.
5. Wellington Water has commissioned a technical review of the operation of the two water treatment plants, and is investigating how the issues can be addressed in order that consistent fluoridation can be resumed as soon as possible. Funding implications will be a matter for discussion and agreement with Greater Wellington.
6. The Board of Wellington Water has commissioned an independent inquiry into the events.

Ngā tūāoma e whai ake nei

Next steps

7. Further information regarding the outcomes of the investigations and reviews that are under way will be provided to Council.
8. Any funding implications of addressing the issues that require Council approval, will be the subject of a future report.

**Ngā kaiwaitohu
Signatories**

| | |
|----------|---|
| Writer | Samantha Gain – General Manager, Corporate Services |
| Approver | Nigel Corry – Chief Executive |

| He whakarāpopoto i ngā huritaonga Summary of considerations |
|---|
| <i>Fit with Council's roles or with Committee's terms of reference</i> It is appropriate that Council is kept up to date with the matters in this report, as they impact Greater Wellington assets and water supply for the region. |
| <i>Implications for Māori</i> There are no implications for Māori from this specific report. |
| <i>Contribution to Annual Plan / Long Term Plan / Other key strategies and policies</i> There are no direct contributions by this report. |
| <i>Internal consultation</i> No internal consultation was required. |
| <i>Risks and impacts - legal / health and safety etc.</i> The impacts will be identified through the investigations and inquiries referred to in the report. |

Council
7 April 2022
Report 22.117



For Information

CENTRAL GOVERNMENT CO-INVESTMENT IN FLOOD PROTECTION SCHEMES

Te take mō te pūrongo

Purpose

1. To note the ongoing conversation with central government for permanent co-investment in flood protection schemes.
2. To inform the public of the supplementary report prepared for central government on permanent co-investment in flood protection schemes.

Te horopaki

Context

3. A Regional Council¹ business case seeking a central government co-investment contribution of \$150 million per annum to enhance the integrity of flood protection schemes was presented to central government officials in 2019. The three-year programme of COVID-19 relief funding has been a major contribution to Regional Councils' efforts to respond to the challenges that climate change presents. However, the business case has not yet achieved the ongoing central government commitment to co-investment it was intended to achieve. Hence the preparation of a 'supplementary report' entitled *Central Government Co-investment in Flood Protection Schemes - Supplementary Report*, (Supplementary Report) prepared for Regional and Unitary Councils Aotearoa by the River managers Special Interest Group (**Attachment 1** – provided to Councillors separately).
4. Following the significant flood events of 2021, Environment Canterbury led the creation of the Supplementary Report. The purpose of the Supplementary Report is to update a 2019 comprehensive business case on the same topic.
5. Floods are New Zealand's most frequent and, cumulatively, most significant, and avoidable hazard. They are the natural hazard where a first step to mitigation can be through application of a well-proven package of flood protection schemes. They are also the natural hazard with the best return on investment from measures contributing to active 'risk reduction'. In the Wellington Region, Greater Wellington's annual investment of \$50 million protects over \$100 billion dollars of assets.
6. Climate change will substantially increase the risk of severe and frequent flooding. The challenge is to make sure the existing schemes are managed and enhanced in a way

¹ In the context of this report the term "Regional Council" also refers to a unitary authority undertaking flood protection activities.

that enables them to continue to play a vital part in New Zealand's approach to building climate resilience. Seeking co-investment from central government as part of a nationwide solution to a national problem is a key part of this response. The recent Ashburton, Westport and Marlborough floods have provided further evidence of the need for central government investment and the Supplementary Report documents that evidence as an update to the earlier report.

7. The Supplementary Report draws on case examples from 2021 - with a focus on the 31 May 2021 Ashburton/Canterbury flooding, and drawing on information from the July 2021 Westport and Marlborough events. The Supplementary Report describes these flood events, flood protection scheme locations and performance assessments, community responses, details about the on-going impacts of the flood events and scheme value propositions. Most importantly, the Supplementary Report also provides event-specific details about the many millions of dollars of valuable Crown assets protected from 2021 floods by flood protection schemes. The protection of these assets is just one of the many reasons for central government to invest in flood protection schemes.
8. The Supplementary Report notes that while infrastructure remains of critical importance, avoiding risk through appropriate land-use planning is vitally important. This includes hazard assessment, mapping and zoning, locating new development in low-risk areas, restrictive planning in high-risk areas and managed retreat.
9. In addition, the Supplementary Report reflects regional council progress towards achieving the flood protection schemes of the future. Compared to those of the past, these must satisfy a wider spectrum of community, environmental, cultural, climate change, economic objectives, and contemporary iwi / Te Mana o te Wai partnerships.
10. As the lead local authority regarding the Supplementary Report Environment Canterbury will be publicly releasing the Supplementary Report on 6 April 2021.

Te attracting Analysis

11. The intention is to use the release of the report as a tool to highlight the issue to New Zealand and support the ongoing case for Crown investment in flood risk management

Ngā hua ahumoni Financial implications

12. There are no immediate financial implications as a result of the Supplementary Report; however, if central government was to include a permanent budget line for flood protection in the 2023/24 budget this would be a significant boost for the Wellington Region and other local economies.

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

- 13. The release of the Supplementary Report is proactive and seeks further investment now, considering the effects of climate change which will bring more frequent and more intense flood events.
- 14. Climate resilience is currently being enhanced by the accelerated delivery of flood protection projects under a programme of work to support COVID-19 recovery. This one-off central government investment, combined with local investment, has bought forward \$24 million of infrastructure projects providing community resilience earlier than would have otherwise been affordable for ratepayers.

Te whakatūtakitaki
Engagement

- 15. The regional sector has been engaged in the preparation of the Supplementary Report.
- 16. Engagement with Ministries, the regional sector nationally, our partners and stakeholders will take place to ensure the Supplementary Report’s findings are shared with central government as well as articulated locally.
- 17. A two-phase release strategy, led by Environment Canterbury, for the Supplementary Report is currently being prepared starting with a national level media release, key messages and additional collateral to be shared with Regional Council Chief Executives, Council Chairs and communications staff.
- 18. The report will be sent by the regional sector under the signature of Chairs Hughey, Ponter and Leeder to community resilience Ministers and senior officials in advance of the planned release on 6 April 2022.
- 19. The Supplementary Report will be sent by the regional sector, under the signatures of Chairs Hughey (Environment Canterbury), Leeder (Bay of Plenty Regional Council) and Ponter, to community resilience Ministers and senior officials in advance of the planned release on 6 April 2022.

Ngā āpitihanga
Attachment

| Number | Title |
|--------|--|
| 1 | Attachment 1 to Report 22.117 (provided to Councillors separately) |

Ngā kaiwaitohu
Signatories

| | |
|----------|---|
| Writer | Graeme Campbell – Manager, Flood Protection |
| Approver | Wayne O’Donnell – General Manager, Catchment Management |

| He whakarāpopoto i ngā huritaonga Summary of considerations |
|--|
| <i>Fit with Council's roles or with Committee's terms of reference</i> This report aligns with Greater Wellington's responsibilities for flood protection. |
| <i>Implications for Māori</i> Flood protection measures have significant benefits and impacts on communities, particularly those communities, including Māori communities, located on low-lying land which may also be affected by climate change. |
| <i>Contribution to Annual Plan / Long Term Plan / Other key strategies and policies</i> Not applicable. |
| <i>Internal consultation</i> Not applicable. |
| <i>Risks and impacts - legal / health and safety etc.</i> There are no direct risks associated with the issue of the Supplementary Report. |

Council
7 April 2022
Report 22.121



For Decision

WRC HOLDINGS - DRAFT STATEMENT OF INTENT 2023

Te take mō te pūrongo

Purpose

1. To advise Council of the Draft WRC Holdings Statement of Intent 2023.

He tūtohu

Recommendations

That Council:

1. **Receives** the Draft Statement of Intent from WRC Holdings.
2. **Provides** any further comment and feedback to be considered for the final Statement of Intent.

Te horopaki

Context

2. The Local Government Act 2002 (the Act) Schedule 8, Part 1 requires the board of a council-controlled organisation to deliver a draft statement of intent to its shareholders on or before 1 March in the year preceding the financial year to which the draft statement of intent relates.
3. The board must consider any comments on the draft made by the shareholders on or before 1 May. The board must then deliver a completed statement of intent to the shareholders before the commencement of the financial year to which it relates.
4. The WRC Holdings draft statement of intent (SOI) was delivered to the shareholder (Council) in February 2022 and is attached ([Attachment 1](#)).

Te tātaritanga

Analysis

5. Council issued a Statement of Expectations in December 2021 outlining a number of issues it wished WRC Holdings to address in its SOI. This letter is included in the Draft SOI.
6. While the WRC Holdings SOI does include and incorporate the performance of CentrePort at a group level, the focus and intent of the SOI are the matters of strategic importance to WRC Holdings and Greater Wellington Rail Limited (GWRL). CentrePort

has produced a draft Statement of Corporate Intent which the board of WRC Holdings will consider at its next meeting in May 2022.

7. The board remains actively focused on its Health, Safety and Wellbeing oversight and has a work programme for Directors to discharge their duties and obligations.
8. The draft SOI highlights the ongoing concerns raised by the board around slope stability across the rail network and it remains a focus area for GWRL to work with Council and others to mitigate this risk.
9. The draft SOI elevates a commitment to reporting on progress towards net zero carbon emissions, with a particular onus on CentrePort activity and ensuring reporting standards are met.
10. The content of the draft SOI was previously presented to a Council briefing and Council will also be briefed separately on the draft SOIs from WellingtonNZ, LGFA and Wellington Water.

Ngā hua ahumoni Financial implications

11. The financial implications of delivering activities in accordance with the SOI are in line with Council's 2021-31 Long Term Plan.

Ngā tikanga whakataua Decision-making process

12. The matters requiring decision in this report were considered by officers against the decision-making requirements of Part 6 of the Local Government Act 2002.

Te hiranga Significance

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

Te whakatūtakitaki Engagement

14. Due to the low significance of the matters for decision, no external engagement was required.

Ngā tūāoma e whai ake nei Next steps

15. Any additional feedback from Council will be submitted to WRC Holdings to allow them to address these in the final SOI.

**Ngā āpitihanga
Attachment**

| Number | Title |
|---------------|--|
| 1 | WRC Holdings Draft Statement of Intent |

**Ngā kaiwaitohu
Signatories**

| | |
|----------|---|
| Writer | Seán Mahoney – Company Portfolio and Economic Development Manager |
| Approver | Samantha Gain – General Manager, Corporate Services |

| |
|---|
| <p style="text-align: center;">He whakarāpopoto i ngā huritaonga Summary of considerations</p> |
| <p><i>Fit with Council's roles or with Committee's terms of reference</i></p> <p>It is Council's responsibility under the Act to review the Draft Statement of Intent.</p> |
| <p><i>Implications for Māori</i></p> <p>There are no direct implications.</p> |
| <p><i>Contribution to Annual Plan / Long Term Plan / Other key strategies and policies</i></p> <p>The performance measures and plans are in line with Council's 2021-31 Long Term Plan and Asset Management Plans.</p> |
| <p><i>Internal consultation</i></p> <p>Various Council Officers have contributed to this document across the relevant services.</p> |
| <p><i>Risks and impacts - legal / health and safety etc.</i></p> <p>There are no risks to considering the SOI.</p> |

WRC
holdings group

greater wellington rail ltd
wrc holdings ltd

Statement of Intent
WRC HOLDINGS
For the year ending 30 June 2023

1. Introduction

WRC Holdings (Holdings) is a Council-Controlled Trading Organisation owned by Greater Wellington Regional Council (Council). It was established to manage Council's commercial investments.

This Statement of Intent (SOI) is prepared in accordance with Section 64 and Schedule 8 of the Local Government Act 2002.

The SOI sets out the performance measures, targets, objectives and activities of Holdings and forms the major part of the companies' accountability relationship with its shareholder, Wellington Regional Council.

Council issued a Statement of Expectations to Holdings in December 2021 as prescribed in section 64b of the Local Government Act 2002. This statement has been taken into account when completing the SOI.

The group SOI includes information for Greater Wellington Rail Limited (GWRL).

2. Objectives of the Group

The primary objective of Holdings is to support Council's strategic priorities and operate a successful, sustainable and responsible business while managing its assets prudently. This is achieved by separating Council's investment and commercial assets from its public good assets.

The core role of Holdings is to impose commercial discipline on the Group's activities and generate a commercial rate of return (where appropriate) and manage within agreed levels of debt to equity.

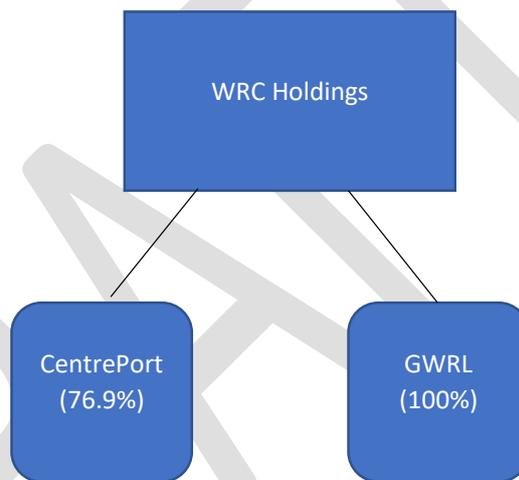
Holdings provides a structure that allows independent external directors with commercial backgrounds to provide advice and expertise at the governance level.

3. Governance

Holdings is governed by a board of seven directors all of whom are appointed by the shareholder. Council has a policy on the appointment and remuneration of directors as specified in Section 57 of the Local Government Act 2002. All director remuneration is set by Council. Holdings provides directors and officer’s liability insurance cover at its own expense.

The Holdings Board meets regularly to conduct the business of the organisation. Holdings reports on its activities to the shareholder through formal quarterly reports, annual reports and through the SOI process. The Holdings structure is illustrated in Figure 1.

Figure 1



a. Greater Wellington Rail Limited

Council approves the directors of GWRL, who are appointed by special resolution of Holdings. Holdings and Council share the same directors.

b. CentrePort Limited

Holdings own 76.9% of the shareholding in CentrePort Limited. The remaining shareholding is held by MWRH Limited.

The current directors of Holdings / GWRL are

| Director | Appointed | Current term expiry |
|----------------------|---------------|---------------------|
| Prue Lamason (Chair) | November 2010 | November 2022 |
| Roger Blakeley | November 2016 | November 2022 |
| Glenda Hughes | November 2019 | November 2022 |
| Chris Kirk-Burnnand | November 2019 | November 2022 |
| Nick Leggett * | October 2017 | December 2023 |
| Helen Mexted* | June 2019 | June 2022 |
| Nancy Ward * | June 2019 | June 2022 |

*Independent Directors

All CentrePort directors are independent and external of Council. CentrePort directors are appointed in accordance with the Port Companies Act and the company constitution.

4. Health, Safety and Wellbeing

GWRL

The holdings board takes an active interest in the ongoing maintenance program for the stewardship of railway assets including rolling stock maintenance and station asset safety. These form regular reporting items and performance measures, in addition to board activities and site visits.

CentrePort

As a major employer in the Wellington region CentrePort continues to focus on the identification and effective management of critical risk, and reducing serious harm. A culture of engagement around Health, Safety and Wellbeing is created through active worker consultation and participation in Health, Safety and Wellbeing matters. Specific wellbeing initiatives are being delivered and are detailed in CentrePort's own Statement of Corporate Intent, including the opening of an on-site gym for Port Staff.

The Holdings board takes an active and engaged role in the health and safety of employees and customers at all its sites and operations and has an annual health and safety work program.

5. Slope Remediation

Slopes on the Wellington Metro Rail Network are owned and maintained by KiwiRail. GWRL are aware of ongoing issues with slope stability across the network and the potential damage to GWRL rolling stock that may result from trains hitting slips. This also creates health and safety risks for passenger and crew, and service continuity risk (rolling stock availability).

The GWRL board has requested that they work with Council to ensure concentrated pressure be applied for increased funding for slope remediation under the Wellington Metro upgrade agreement, so this risk is mitigated as far as reasonably practicable. GWRL will continue to work with Council and others on this issue.

6. Reporting Framework

The Holdings Board will provide quarterly reports to Council, which will include reporting against the performance measures, a summary of the activities and a strategic overview of the coming quarter for the board.

In addition the board will provide statutory reporting including the delivery of a half-yearly report by 28 February 2023, an annual report for the year by 30 September 2023 and a draft Statement of Intent by 01 March 2023.

The board will continue to report on matters that arise outside of these reporting timeframes on the basis of no-surprises.

7. Statement of Strategic Intent

In responding to the challenge of the port regeneration and developing responses to the governance of the group, highlighted by the Boardworks report, Holdings created a Statement of Strategic Intent with regards to the Port. This was developed in late 2019 and provides five key strategic elements for Holdings when considering the activity and performance of the port.

| Objective area | Intent |
|----------------|--|
| Strategic | Secure Port Development As Enabler of Regional Economic Growth |
| Strategic | Strategic Asset to Promote Community Benefits |
| Financial | Optimise Return on Council Capital |
| Financial | Secure Capital for Port Investment and Future Growth |
| Strategic | Deliver Open Access to Service Operations to all Port Users and Other Stakeholders |

8. Relationship with Mana Whenua

As well as complimenting cultural awareness through the organisations, with CentrePort undertaking cultural competency and Maori language training, the Holdings board will look through the year to identify opportunities to deliver on the Maori Outcomes Framework now adopted by Council.

9. Carbon Neutrality

CentrePort has a target of net zero emissions by 2040, with a 30% reduction in emissions from 2019 to 2030. There are ongoing investments into low carbon vehicles and plant with ongoing work to embed the zero emissions target into the regeneration plans. Holdings commits to reporting on the progress towards net zero to Council over the 2022/2023 reporting year.

The delivery of Rail Passenger Services is focused on improving customer satisfaction, and hence driving mode shift from private motor vehicle to Public Transport, and hence reducing overall transport emissions for the region. New procurement of rolling stock, will seek low or zero emission vehicles to minimise emissions.

GWRL

10. Nature and Scope of Activities

GWRL is responsible for asset management, procurement and stewardship through a management contract with Council. Operational delivery of the service is the responsibility of Council via a long term performance based contract with Transdev Wellington.

GWRL owns the investment on metro rail assets. These include the following rolling stock and infrastructure assets:

Rolling Stock

- 18 SW Carriages
- 6 SE Carriages
- 1 AG Luggage Van
- 2 Remote controlled electric Shunt crabs
- 83 2 Car Matangi units
- 1 Matangi driving simulator.

Infrastructure Assets

Thorndon electric multiple unit (EMU) depot and EMU train wash Metro wheel lathe and building

48 Railway stations

14 Pedestrian over-bridges

11 Pedestrian underpasses

A range of carparks, station improvements and ancillary rail related assets.

| <u>Key Activities & Initiatives</u> | |
|---|---|
| Maintenance | Deliver train maintenance services, within approved budgets, through an operations and maintenance contract, while ensuring that train condition and performance is maintained, to deliver required level of service, throughout the assets life. |
| | Deliver rail station infrastructure cleaning and maintenance, within approved budgets, through various contracts ensuring asset are able to deliver the required level of service throughout the assets life. |
| Renewal | Deliver rolling stock heavy maintenance renewals, within approved budgets, through an operations and maintenance contract, while ensuring that train availability and reliability targets are met. |
| | Deliver rail infrastructure asset renewals and like-for-like replacement and improvement programme, to ensure asset condition and performance, are able to deliver the required level of service throughout the assets life. |
| Seismic Strengthening | Undertake seismic strengthening works on a number of earthquake prone subways, and station buildings, in accordance with the multi-year programme to ensure all structures have at least 67% seismic strength of the New Building Standard. |

11. Non-financial performance targets

Operational Performance Targets for GWRL are set within the context of the strategic targets and objectives of GWRC's Long Term Plan 2021-2031 and associated GWRL Asset Management Plan.

| Level of Service | Current | 2022/23 Target | Target (by end of 2021-31 LTP) |
|--|---------|----------------|--------------------------------|
| CUSTOMER SATISFACTION WITH RAIL ASSETS | | | |
| Percentage of passengers who are satisfied with their current trip | 95% | ≥93% | ≥93% |
| Percentage of customers who are satisfied with the condition of the station | 92% | ≥92% | ≥96% |
| Percentage of customers who are satisfied with the inside temperature of vehicles | 95% | ≥93% | ≥93% |
| Percentage of passengers who are satisfied with the condition of the vehicle fleet | 92% | ≥92% | ≥92% |
| Percentage of passengers who are satisfied with overall station | 95% | ≥92% | ≥92% |
| Percentage of passengers who are satisfied with the cleanliness of the station | 92% | ≥91% | ≥92% |
| Percentage of passengers who are satisfied with provision of shelter from weather at shelter/station | 84% | ≥84% | ≥85% |
| Percentage of customers who are satisfied with their personal safety at station | 93% | ≥93% | ≥95% |
| Percentage of passengers who are satisfied with information about service delays or disruptions | 67% | ≥73% | ≥75% |
| ROLLING STOCK - ASSET MANAGEMENT | | | |
| Matangi - Mean distance between failure | 68,173 | ≥40,000km | ≥40,000km |
| Carriage - Mean distance between failure | 188,024 | ≥80,000km | ≥80,000km |

| Level of Service | Current | 2022/23 Target |
|---|---------|----------------|
| RAIL FIXED ASSET - ASSET MANAGEMENT | | |
| Percentage of pedestrian bridges and subways which meet at least 67% of NBS earthquake rating | 72% | 88% |
| Percentage of stations with CCTV coverage | 96% | 96% |
| Average condition grade of: | | |
| Station buildings and shelters: | 1.5 | ≤2.5 |
| Structures (pedestrian subways & bridges): | 2.5 | ≤2.5 |
| Park & Ride: | 2.0 | ≤2.5 |
| Percentage of assets in condition grade 4 (Poor) or worse | | |
| Station buildings and shelters: | 3% | ≤5% |
| Structures (pedestrian subways & bridges): | 11% | ≤8% |
| Park & Ride: | 5% | ≤8% |

12. Financial information

To be added to the final version

13. Attachment – Statement of Expectations from Council December 2021.

20 December 2021

Prue Lamason
Chair, WRC Holdings Limited
Prue.Lamason@gw.govt.nz

Dear Prue

Statement of Expectations – WRC Holdings Limited’s Statement of Intent for 2022/23

This letter sets out a statement of our expectations, as the shareholder in WRC Holdings Limited, as you begin drafting the Statement of Intent (SOI) for the 2022/23 financial year. Our statement of expectations, as prescribed in section 64B of the Local Government Act, specifies the relationship we expect to have with you over the period and our general expectations of the Holdings group.

The draft SOI is due to Council by 1 March 2022. We will then consider this document and provide feedback by 1 May 2022 to allow the document to be finalised before 30 June 2022.

Long Term Plan 2021-31

Council has adopted a Long Term Plan which includes four strategic priorities. These should also act as a guide for the Holdings group in developing its Statement of Intent. These are

- Responding to the climate emergency
- Improving outcomes for mana whenua and Maori
- Adapting and responding to the impacts of COVID-19
- Aligning with Government direction

The Long Term Plan also anticipates a continued revenue stream from dividend payments and these need to continue to be factored into the SOI.

Relationship framework

Council will require formal quarterly reports from WRC Holdings Limited to ensure we have a good understanding of performance against the SOI. These reports should focus on strategic issues facing the Holdings group and how these are being managed.

We expect a no surprises approach and to be informed of any issues that arise in a timely manner outside of this reporting.

Strategic Ownership Objectives

WRC Holdings own a significant portion of investment on behalf of Council. The Holdings board have previously considered their ownership and strategic objectives and Council would like to work with the board over the coming year to ensure that the Council and Holdings companies' strategic objectives align and are understood.

Board Development and Diversity

Council welcomes the initial steps taken towards understanding the Boards development needs and skillset. There are a number of succession and development considerations to be addressed over the coming year and Council will look to the Holdings Board to provide advice and a framework for addressing these issues.

Council will also look to the board to have a continued focus on diversity and cultural competency not only at a board level but throughout it wider relationships.

Minimising the risk of workplace incidents

The health, safety and wellbeing of our workforce and residents are key issues for Council as shareholder. We would like to see clarity that the Holdings group is aware of and managing its key critical risks, and that any assurance needed from other parties is satisfactory. Health and Safety should remain a key focus of the board work program.

Regional Projects

Where appropriate, Holdings should look to support and align to Councils regional projects including the Regional Growth Framework.

In accordance with section 64B of the Local Government Act 2002, this letter will be published on Greater Wellington's website.

If you have any need for clarification on the above matters, then please feel free to contact me at the soonest opportunity.

We look forward to receiving your draft SOI by 01 March 2022.

Yours sincerely

Daran Ponter

Chair - Wellington Regional Council

Council
7 April 2022
Report 22.119



For Decision

ESTABLISHMENT OF THE 2022 FUNDING AND FINANCIAL POLICIES HEARING COMMITTEE

Te take mō te pūrongo

Purpose

1. To advise Council on the establishment of the 2022 Funding and Financial Policies Hearing Committee (the Committee) to hear and deliberate on submissions made on the Revenue and Financing Policy and Rates Remission on Māori Land Policy consultations.

He tūtohu

Recommendations

That Council:

- 1 **Establishes** the 2022 Funding and Financial Policies Hearing Committee.
- 2 **Adopts** the Terms of Reference (Attachment 1) for the 2022 Funding and Financial Policies Hearing Committee.
- 3 **Appoints** councillors to the 2022 Funding and Financial Policies Hearing Committee, as follows:
 - a Councillor Blakeley
 - b Councillor Brash
 - c Councillor Connelly
 - d Councillor Gaylor
 - e Councillor Kirk-Burnnand
 - f Councillor Lee
 - g Councillor Nash
 - h Councillor Ponter
 - i Councillor Staples.
- 4 **Appoints** Councillor Ponter as 2022 Funding and Financial Policies Hearing Committee Chair.
- 5 **Notes** that the hearing is scheduled for 17 to 19 May 2022.

Te horopaki

Context

2. The consultation period for the proposed changes to the Revenue and Financing Policy is 21 March to 20 April 2022.
3. The consultation period for the proposed changes to the Rates Remission on Māori Land Policy is 21 March to 2 May 2022.
4. Council set its schedule for 2022 at its meeting on 19 August 2021 (Meeting Schedule for 2022 – Report 21.339). When setting the schedule, Council resolved to include dates in May 2022 for any necessary hearings on the 2022/23 Annual Plan and any other concurrent consultations. While the Annual Plan 2022/23 is not being consulted on, the Revenue and Financing Policy and Rates Remission on Māori Land Policy are and require a hearing. The hearing is scheduled for 17 to 19 May 2022.

Te tātaritanga

Analysis

Terms of Reference

5. The proposed Terms of Reference for the 2022 Funding and Financial Policies Hearing Committee ([Attachment 1](#)) provide for:
 - a Submitters to speak to their submissions by remote participation
 - b All members of the Committee have equal speaking rights and a deliberative vote. In the event of an equality of votes, the Chair has a casting vote.

Appointments

6. Democratic Services engaged with Councillors for their interest in being members of the Committee. Democratic Services also engaged with the Council Chair on who should be Chair of the Committee. The following councillors are proposed to be appointed:
 - a Councillor Blakeley
 - b Councillor Brash
 - c Councillor Connelly
 - d Councillor Gaylor
 - e Councillor Kirk-Burnnand
 - f Councillor Lee
 - g Councillor Nash
 - h Councillor Ponter
 - i Councillor Staples.
7. It is proposed that Councillor Ponter chairs the hearing committee.

Ngā hua ahumoni
Financial implications

8. There are no financial implications arising from this report.

Ngā tikanga whakataua
Decision-making process

9. Officers considered the matters requiring decision in accordance with the requirements of Clause 30 and 31 of Schedule 7 of the Local Government Act 2002 and the decision-making requirements of Part 6 of the Local Government Act 2002.

Te hiranga
Significance

10. 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 these matters are of low significance due to its administrative nature.

Te whakatūtakitaki
Engagement

11. Due to the low significance of the matters for decision, no external engagement was required.

Ngā tūāoma e whai ake nei
Next steps

12. Committee members will be advised of the scheduled meeting dates, which will also be publicly notified.

Ngā āpitihanga
Attachments

| Number | Title |
|--------|--|
| 1 | Terms of Reference for the 2022 Funding and Financial Policies Hearing Committee |

Ngā kaiwaitohu
Signatories

| | |
|-----------|---|
| Writer | Lucas Stevenson – Kaitohutohu Advisor, Democratic Services |
| Approvers | Alex Smith – Kaitohutohu Matua Senior Advisor, Democratic Services Francis Ryan – Kaiwhakahaere Matua Manager, Democratic Services Luke Troy – Kaiwhakahaere Matua Rautaki General Manager Strategy |

| He whakarāpopoto i ngā huritaonga Summary of considerations |
|---|
| <i>Fit with Council's roles or with Committee's terms of reference</i> It is appropriate for the Council to determine how it wishes to consider submissions on these policies. Clause 30 of Schedule 7 to the LGA and Council's Standing Orders provide for the Council to establish committees, as it considers appropriate. |
| <i>Implications for Māori</i> One of the policies out for consultation and the subject of the hearing, Rates Remission on Māori Land Policy, directly relates to Māori land interests. |
| <i>Contribution to Annual Plan / Long Term Plan / Other key strategies and policies</i> The hearing supports Council in the adoption of the Rates Remission on Māori Land Policy and amendments to the Revenue and Financing Policy. |
| <i>Internal consultation</i> Te Hunga Whiriwhiri and the Finance and Strategic and Corporate Planning departments were consulted. |
| <i>Risks and impacts - legal / health and safety etc.</i> There are no known risks or impacts. |

Attachment 1 to Report 22.119

2022 Funding and Financial Policies Hearing Committee

1 Purpose

To hear and consider submissions made on the proposed changes to the Revenue and Financing Policy and the Rates Remission on Māori Land Policy, and recommend to Council any amendments.

2 Powers

The 2022 Funding and Financial Policies Hearing Committee has the power to:

- Consider both the written and oral submissions on the proposed changes to the Revenue and Financing Policy and the Rates Remission on Māori Land Policy.
- Seek clarification from Council officers on any technical matters.
- Develop recommendations on amendments to the proposed changes to the Revenue and Financing Policy and the Rates Remission on Māori Land Policy for consideration by Council.

3 Responsibilities

The 2022 Funding and Financial Policies Hearing Committee shall ensure that:

- The hearing and consideration process is carried out in a way that is effective and timely;
- Submitters are provided with the best possible opportunity to be heard in support of their submission;
- Hearing Committee members receive submissions with an open mind and give due consideration to each submission;
- The decision making process is robust and transparent.

4 Members

The members of the 2022 Funding and Financial Policies Hearing Committee are:

- Cr Roger Blakeley
- Cr Jenny Brash
- Cr Ros Connelly
- Cr Penny Gaylor
- Cr Chris Kirk-Burnnand
- Cr David Lee
- Cr Thomas Nash
- Cr Daran Ponter
- Cr Adrienne Staples

5 Chair

Cr Ponter is the Chair of the Funding and Financial Policies Hearing Committee.

Attachment 1 to Report 22.119

6 Quorum

Five Committee members.

7 Meeting procedures

- All members have equal speaking rights and a deliberative vote.
- The Chair has a deliberative vote; and, in the case of an equality of votes, has a casting vote.
- Members must be present for the substantial part of the hearing and deliberations in order to participate in the decision-making of the Hearing Committee.
- Submitters may speak to their submission by remote participation.

8 Duration of Committee

The 2022 Funding and Financial Policies Hearing Committee is deemed to be dissolved at the end of the decision-making processes on changes to the Revenue and Financing Policy and the Rates Remission on Māori Land Policy.

DRAFT

Council
7 April 2022
Report 22.133



For Decision

LOCAL GOVERNMENT NEW ZEALAND ANNUAL GENERAL MEETING ATTENDANCE

Te take mō te pūrongo

Purpose

1. To advise Council of:
 - a Councillors attending the 2022 Local Government New Zealand (LGNZ) Annual General Meeting (AGM)
 - b The authority for Council representatives to act as delegates at the AGM.

He tūtohu

Recommendations

That Council:

- 1 **Approves** the attendance of Councillors Ponter, Staples and Nash, and Nigel Corry, Chief Executive, at the 2022 Local Government New Zealand Annual General Meeting.
- 2 **Appoints** Councillor Ponter as the Presiding Delegate for voting on behalf of the Council at the 2022 Local Government New Zealand Annual General Meeting.
- 3 **Appoints** Councillors Staples and Nash, and Nigel Corry, Chief Executive, as Alternate Delegates for voting on behalf of the Council at the 2022 Local Government New Zealand Annual General Meeting if Councillor Ponter is absent.

Te horopaki

Context

Attendance

2. The 2022 LGNZ AGM will be held on 28 July 2022 as an online meeting. Greater Wellington Regional Council is entitled to have four delegates (including officers) at the AGM and must appoint:
 - a the Presiding Delegate (the person responsible for voting on behalf of the Council at the AGM)
 - b one or more Alternate Delegates (person/s responsible for voting on behalf of the Council if the Presiding Delegate is absent from the AGM).

3. The Council Chair has advised officers that the proposed Councillor attendees are Councillors Ponter, Staples and Nash. The Chief Executive will also be attending.
4. Councillors Ponter, Staples and Nash, and the Chief Executive will also be attending the LGNZ annual conference, which is being held in Palmerston North from 20 and 22 July 2022.

Te tātaritanga Analysis

5. It is normal procedure for Greater Wellington to send the Chair, the Chief Executive and either one or two other councillors as delegates.

Ngā hua ahumoni Financial implications

6. There are no financial implications.

Ngā tikanga whakatau Decision-making process

7. The matters requiring decision in this report were considered by officers against the decision-making requirements of Part 6 of the Local Government Act 2002.

Te hiranga Significance

8. Officers considered the significance (as defined by Part 6 of the Local Government Act 2002) of the matters for decision, taking into consideration Council's *Significance and Engagement Policy* and Greater Wellington's *Decision-making Guidelines*. Officers consider that these matters are of low significance due to their administrative nature.

Te whakatūtakitaki Engagement

9. Due to the low significance of the matters for decision, no engagement was considered necessary.

Ngā tūāoma e whai ake nei Next steps

10. LGNZ will be notified of Greater Wellington's attendees for the AGM.

**Ngā kaiwaitohu
Signatories**

| | |
|-----------|---|
| Writer | Alex Smith, Kaitohutohu Matua Senior Advisor, Democratic Services |
| Approvers | Francis Ryan – Kaiwhakahaere Matua Manager, Democratic Services Luke Troy – Kaiwhakahaere Matua Rautaki General Manager Strategy |

| |
|--|
| <p style="text-align: center;">He whakarāpopoto i ngā huritaonga Summary of considerations</p> |
| <p><i>Fit with Council's roles or with Committee's terms of reference</i></p> <p>It is normal procedure for Greater Wellington to send the Chair, the Chief Executive, and either one or two other councillors as delegates. Attendance supports the Council's role of providing regional leadership in promoting and facilitating discussions on key issues.</p> |
| <p><i>Implications for Māori</i></p> <p>There are no known implications for Māori.</p> |
| <p><i>Contribution to Annual Plan / Long Term Plan / Other key strategies and policies</i></p> <p>There are no specific contributions to Council strategies/policies but attendance contributes to relationship building between Councils.</p> |
| <p><i>Internal consultation</i></p> <p>The Chair was consulted regarding the Councillor attendees.</p> |
| <p><i>Risks and impacts - legal / health and safety etc.</i></p> <p>There are no known risks or impacts.</p> |

**Council
7 April 2022
Report 22.129**



For Information

WELLINGTON WATER COMMITTEE MEETING - 18 MARCH 2022

Te take mō te pūrongo

Purpose

1. To inform Council of the deliberations of the Wellington Water Committee (the Committee) at its meeting on 18 March 2022.

Te horopaki

Context

2. The business considered by the Committee is set out in the following paragraphs:

Water reforms

3. Dougal List, Programme Director, Water Reforms Wellington Region, provided an update to the Committee on a range of work streams, including the publication of the Working Group report released on 9 March 2022¹. The revised bill and Select Committee process will begin in May 2022.
4. A National Transition Unit is being established and staffed, charged with developing a transition programme, the criteria for the release of “better off funding”, and the development of “no worse off” methodology for debt and asset transfers.
5. The Committee discussed the lack of consistency with engagement with Iwi through the reform process.

Wellington Water company update

6. Work safe are working with Wellington Water following the tragic fatality of a contractor recently at a Wellington Water site. This investigation will continue and could take up to a year and Wellington Water acknowledges the risk as the PCBU.
7. At the time of the meeting, 12 percent of Wellington Water’s frontline staff were impacted by COVID-19. This has reduced from 30 percent since the change in isolation requirements.
8. The company provided an update on water metering. There is progress on a business case for smart user meters using Greater Wellington transition funding – these processes are currently on hold while there is a greater understanding of the future

¹ [https://www.dia.govt.nz/diawebsite.nsf/Files/Three-waters-reform-programme-2022/\\$file/Governance-Working-Group-Report.pdf](https://www.dia.govt.nz/diawebsite.nsf/Files/Three-waters-reform-programme-2022/$file/Governance-Working-Group-Report.pdf).

developments and transition reforms. This includes discussion about further investment in lakes and water storage.

9. There was a discussion on the three current abatement notices at Wastewater treatment plants (non-compliance with a Resource Consent), including one at Moa Point in place since December 2021. The company continues to work with and negotiate with Greater Wellington on the resolution of this issue, including agreeing a date by which compliance can be achieved.

Wellington Water Half-Yearly Report

10. Was received with no discussion.

Capital works programme

11. The programme is 25 percent ahead of prior year, a major issue impacting delivery at the moment is the impact of staffing through COVID-19. Wellington Water is now reviewing the activities for years two and three of the Long Term Plan capital programming.

Wastewater Treatment Plant contract review

12. The implementation plan is on track to be delivered to Councils in early April 2022. Wellington Water have a new contract manager and programme manager to oversee the implementation. There was general discussion on the scope of the implementation and the ongoing cost as well as possible future options.

Drinking water regulation update

13. Impacts across central government, regional councils, territorial authorities, and Wellington Water for the new Source Water Standards. Source Water Risk Management Plans are being developed with Tonkin & Taylor. Drinking Water Safety Plans will also need to be provided to the regulator later this year.
14. Environmental Performance Measures are currently being consulted on, these measures are fairly broad and include economic viability and sustainability.
15. Reporting templates are being developed for the coming year to demonstrate deliverability against regulatory standards.

Six Monthly Value for Money report

16. The Chief Executive of Wellington Water discussed how the reporting is compiled and that the company would focus down on the metrics contained within the report to provide greater detail.

Draft Statement of Intent

17. The draft focuses on delivery through remaining years of Wellington Water through the transition to the new water entity. There was discussion around clarifying the pressures on levels of funding and levels of service for the 2022/23 and 2023/24 years.

Fluoridation of drinking water

18. Wellington Water outlined a “Wellington Region Path back to fluoridation” for the four treatment plants with measures over the next 12 months. Gear Island and Te Marua were highlighted as having the highest risk in the current and short term (1 month).

19. Wellington Water is in discussion with the Ministry of Health and Taumata Arowai regarding fluoridation. Greater Wellington has agreed to receive funding requests for short- and medium-term remediation.
20. Wellington Water confirmed there had been no risk to health or the consumer from over-dosages of fluoride from the failures in the plant. Wellington Water would not respond to questions around how long they had known about reliability issues given the ongoing inquiry into the failures in the plants.

Appointment of Director

21. The Wellington Water Committee, being comprised solely of members with delegated authority from shareholders who jointly hold 100 percent of Class A shares in Wellington Water Limited, agreed unanimously to appoint Nick Leggett to the Wellington Water Limited Board for a two-year term until 18 March 2024.

Ngā kaiwaitohu

Signatories

| | |
|-----------|---|
| Writer | Seán Mahoney – Company Portfolio and Economic Development Manager |
| Approvers | Samantha Gain – General Manager, Corporate Services Councillor Josh van Lier – Wellington Water Committee member |

| |
|--|
| <p style="text-align: center;">He whakarāpopoto i ngā huritaonga Summary of considerations</p> |
| <p><i>Fit with Council's roles or with Committee's terms of reference</i></p> <p>It is appropriate for Council to be kept informed of the business conducted by its committees.</p> |
| <p><i>Implications for Māori</i></p> <p>There are no direct implications for Māori from this specific report.</p> |
| <p><i>Contribution to Annual Plan / Long Term Plan / Other key strategies and policies</i></p> <p>There are no direct contributions by this report, but the subject matter referenced contributes to key programmes of regional work.</p> |
| <p><i>Internal consultation</i></p> <p>No internal consultation was required.</p> |
| <p><i>Risks and impacts - legal / health and safety etc.</i></p> <p>There are no known risks or impacts arising from this report.</p> |

Council
7 April 2022
Report 22.123



For Information

WELLINGTON CIVIL DEFENCE EMERGENCY MANAGEMENT GROUP MEETING
22 MARCH 2022

Te take mō te pūrongo

Purpose

1. To inform Council of the proceedings of the Wellington Civil Defence Emergency Management (CDEM) Group meeting on Tuesday 22 March 2022.

Te horopaki

Context

2. The business of the CDEM Group is set out in the following paragraphs.

Written Reports

Wellington Region Emergency Management Office Quarter Two Quarterly Report – 31 December – Report 22.109

3. The CDEM Group approved the Wellington Region Emergency Management Office (WREMO) Quarter Two Quarterly Report (October to December 2021).

Wellington Civil Defence Emergency Management Group Appointments – Report 22.112

4. The CDEM Group approved the removal of the following statutory appointees:
 - a Mike Mendonca as Alternate Controller (Wellington City Council)
 - b Jay Houpapapa as Alternate Controller (Hutt City Council)
 - c Kevin Currie as Alternate Controller (Kāpiti Coast District Council)
 - d Rian van Schalkwyk as Alternate Controller (Kāpiti Coast District Council)
 - e David Hopman as Controller (combined Wairarapa district councils)
 - f Mike Mendonca as Recovery Manager (Wellington City Council)
5. The CDEM Group approved the addition of the following statutory appointees:
 - a Kym Fell as Alternate Controller (Wellington City Council)
 - b Nienke Itjeshorst as Alternate Controller (Kāpiti Coast District Council)
 - c Barry Vryenhoek as Alternate Controller (Hutt City Council)
 - d Steven May as Controller (combined Wairarapa district councils)

Oral Reports

COVID-19 and Regional Covid Coordination Centre Update

6. Dan Neely, Acting Regional Manager, WREMO, advised that case numbers are doubling roughly every two-three days. District Health Boards (DHB) are struggling with testing and tracing, and are focusing on priority communities and high risk events, and is compounded by staff shortages.
7. As at 21 March 2022, there were approximately 1800 new cases reported in the Wellington Region, with 15,000 active cases. Omicron infections are expected to peak mid-late March, with fatalities expected to peak in April 2022.
8. The Regional Covid Coordination Centre was established on 3 December 2021, and is supported by Upper Hutt City Council and Greater Wellington Regional Council. WREMO and Council officers are filling roles until the vacancies are filled.

Trifecta Update and Intended Next Steps

9. Mr Neely advised that the Minister for Emergency Management (Hon. Kiritapu Allan) met with mayors and the Council Chair, and iwi representatives in February 2022, with feedback generally aligned with Group feedback.
10. The National Emergency Management Agency (NEMA) is now reviewing content of responses to its survey. The biggest concerns were engagement timeframes and section 17 of the Civil Defence Emergency Management Act 2002 roles and responsibilities. NEMA is reviewing the content of section 17 options, and the Minister has decided to delay the Bill engagement until after the local government elections in October 2022.

WREMO Agreement

11. Mr Neely advised that the WREMO services agreement is due for renewal on 1 July 2022. Officers have been waiting for clarity from Trifecta, but this will not happen in time. It is proposed that the current Agreement is extended for a further 12 months under the existing terms to account for expected Trifecta changes.

Sector Strategy

12. The Civil Defence Emergency Management (CDEM) Sector Strategy is a joint initiative between CDEM Group Managers and NEMA to work together more effectively. Its aim is to achieve greater alignment between NEMA and the 16 CDEM Groups. The Sector Strategy changed to a Partnership Charter in 2021 after the National Disaster Resilience Strategy was published in 2019, and work on Trifecta started in 2020.
13. The Charter will provide the basis for the development of a series of supporting protocols and practices, as well an integrated and prioritised work plan for the 17 entities.

Capability Development, Targets and Training

14. Mark Duncan, Manager, Operational Readiness, WREMO, advised that there were twelve events in 2021, covering almost the full spectrum of emergency events and hazards.
15. Due to attrition, many experienced staff have been lost and there is a need to fill these gaps. In the short-term, training opportunities have been moved to online venues, due to the COVID-19 restrictions, as well as further engagement to provide knowledge check

reminders and May 2022 exercise, and support councils in recruitment of new staff. In the medium-long term a working group will be established to develop a strategy, policies and plans to ensure the Region’s emergency management workforce is fit for purpose.

Welfare Capability Maturity Model and Intended Next Steps

- 16. The Welfare Capability Maturity Model (WCMM) was developed in consultation with local welfare managers, and was designed to measure the maturity across the welfare portfolio. It’s intended to identify strengths, weaknesses and opportunities to guide work programmes and prioritisation. The average result was 4.2 (out of 10) and places the Region at the Basic level, where foundation policies, capabilities and practices are in place and repeatable, but are mainly reactive and inconsistent.
- 17. The review identified that iwi/Māori perspectives across the portfolio, and capability and capacity of the Region’s welfare emergency management workforce are opportunities for development.

Annual Campaign Update

- 18. Mr Neely advised that due to inflation and COVID-19 supply chain issues, the supplier of the Grab&Go Emergency Toilet is no longer able to meet the proposed price point.
- 19. Mr Neely also advised that due to the public’s attention being on COVID-19 and other pressures, the annual campaign will be postponed to the next financial year (dates to be confirmed).

Recovery Operations Guide Update

- 20. The Recovery Operations Guide provides an easy to use framework to improve the coordination and community outcomes for council and other recovery actors from response through to longer term recovery. It sets out the roles and responsibilities for recovery managers, and other key actors, including governance and engagement with iwi and Māori.

**Ngā kaiwaitohu
Signatories**

| | |
|-----------|---|
| Writer | Ainslie Ryder – Readiness and Deployment Lead |
| Approvers | Donna Hickey – General Manager, People and Customer Councillor Ponter – Council’s representative on the CDEM Committee |

| |
|---|
| He whakarāpopoto i ngā huritaonga Summary of considerations |
| <i>Fit with Council's roles or with Committee's terms of reference</i> It is appropriate for Council to be informed of the business of joint committees it is a member of. |
| <i>Implications for Māori</i> Refer to paragraphs 9, 17 and 20. |
| <i>Contribution to Annual Plan / Long Term Plan / Other key strategies and policies</i> This report contains information relating to emergency management and preparedness, business continuity, and the 2021-31 Long Term Plan strategic outcome of adapting and responding to COVID-19 impacts. |
| <i>Internal consultation</i> No internal consultation was required. |
| <i>Risks and impacts - legal / health and safety etc.</i> There are no known risks or impacts arising from this report, but the CDEM Group received updates on the Region's ability to response to emergencies. |

Council
7 April 2022
Report 22.122



For Information

REGIONAL TRANSPORT COMMITTEE MEETING - 22 MARCH 2022

Te take mō te pūrongo

Purpose

1. To inform Council of the deliberations of the Regional Transport Committee (the Committee) at its meeting on 22 March 2022.

Te horopaki

Context

Written Reports

Progress Report on the Wellington Regional Land Transport Plan 2021 Programme of Activities 2021-24 (July – December 2021) – Report 22.90

2. This report provided the Committee with an update on the progress of activities contained within the Regional Land Transport Plan 2021 (RLTP) Programme of Activities 2021-24.
3. Key activities highlighted were:
 - a Progression of Let's Get Wellington Moving programmes
 - b Detailed business case developed for the renewal of the Manawatū and Wairarapa rail fleet
 - c Public transport initiatives; including National Ticketing Solution and replacement of the Real Time Information service.
4. The Committee was also updated on emerging issues and opportunities, as well as an update on RLTP monitoring improvements.

Oral Reports

Waka Kotahi NZ Transport Agency Update – March 2022 – Report 22.103

5. Emma Speight, Waka Kotahi NZ Transport Agency (Waka Kotahi) member, provided an update on Waka Kotahi programmes and initiatives (nationally and regionally) ([Attachment 1](#)).

KiwiRail Update – March 2022 – Report 22.102

6. Lyndon Hammond, Manager, NLTF Programme, KiwiRail, provided an update on KiwiRail activities in Wellington Region. These included:
 - a Progress made on the work undertaken during the Christmas/New Year period

- b Plimmerton area capacity enhancements
- c North Island Main Trunk – Tunnel 2.

Metlink Update – March 2022 – Report 22.89

- 7. Scott Gallacher, General Manager Metlink, updated the Committee on patronage levels, reliability, trends, and related COVID-19 impacts on the rail and bus network.

Let’s Get Wellington Moving Update – March 2022 – Report 22.101

- 8. Dave Dunlop, Programme Director, Let’s Get Wellington Moving, provided an update on Let’s Get Wellington Moving programmes and activities ([Attachment 2](#)).

**Ngā āpitihanga
Attachments**

| Number | Title |
|--------|---|
| 1 | Waka Kotahi update - March 2022 |
| 2 | Let’s Get Wellington Moving update - March 2022 |

**Ngā kaiwaitohu
Signatories**

| | |
|-----------|--|
| Writer | Lucas Stevenson – Kaitohutohu, Democratic Services |
| Approvers | Alex Smith – Kaitohutohu Matua, Democratic Services Francis Ryan – Kaiwhakahaere Matua, Democratic Services Luke Troy – Kaiwhakahaere Matua Rautaki General Manager Strategy Councillor Staples – Committee Chair, Regional Transport Committee |

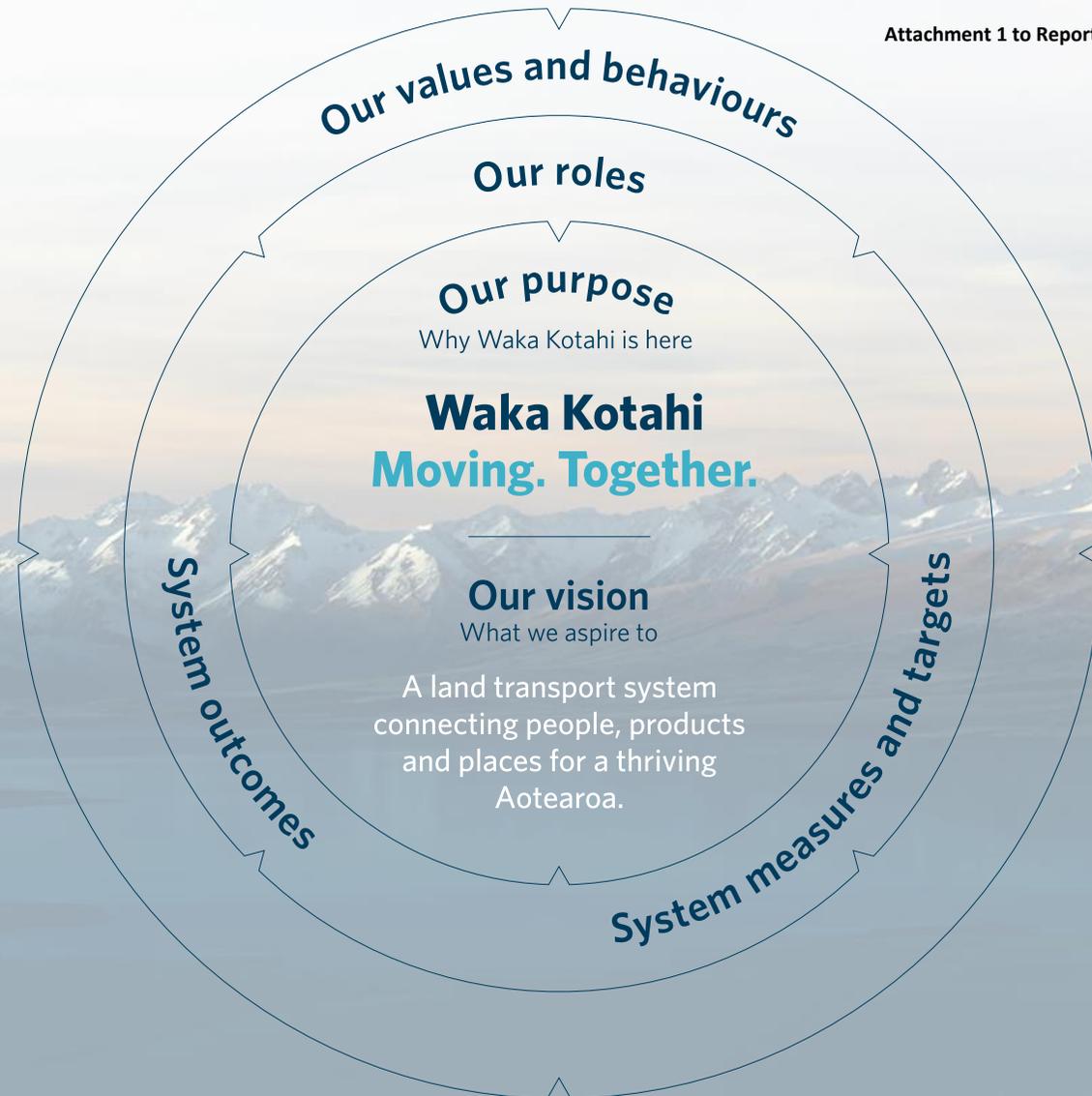
| |
|---|
| He whakarāpopoto i ngā huritaonga Summary of considerations |
| <i>Fit with Council's roles or with Committee's terms of reference</i> It is appropriate for Council to be kept informed of the business conducted by its committees. |
| <i>Implications for Māori</i> There are no known implications for Māori. |
| <i>Contribution to Annual Plan / Long Term Plan / Other key strategies and policies</i> The business conducted at the Committee meeting contributes to the Regional Land Transport Plan 2021, as the reports provide updates, progress, and insights into the key objectives of the Regional Land Transport Plan 2021. Let's Get Wellington Moving additionally is a key project in the 2021-31 Long Term Plan. |
| <i>Internal consultation</i> The Regional Transport department was consulted. |
| <i>Risks and impacts - legal / health and safety etc.</i> There are no known risks or impacts arising from this report. |

Regional Transport Committee

Greater Wellington
22 March 2022



Te kāpehu Our compass



Our focus in 2022

- Reviewing land transport revenue with the Ministry of Transport.
- Updating our emissions reduction and adaptation strategy.
- Implementing the One Network Framework.
- Forging ahead with Road to Zero initiatives:
 - public awareness campaign
 - speed management programme
 - safety camera transfer and expansion, and
 - vehicle safety rating updates.
- Beginning planning for 2024-27 NLTP development.

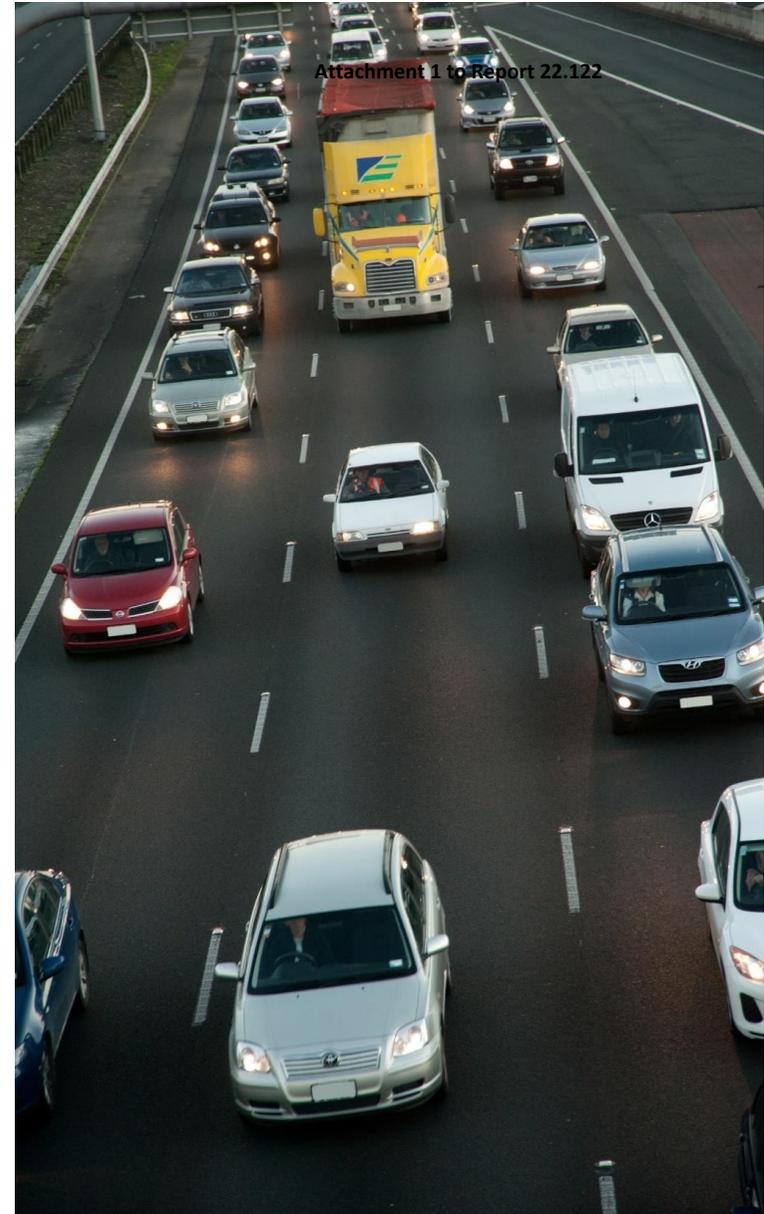
Land transport revenue review

- NLTF funding has been under pressure for some time from:
 - increasing demands
 - rising cost of labour and materials, and
 - the impact of COVID-19.
- The review is focused on short-term changes – it will be completed by August 2022.
- The review is an important first step in future-proofing our land transport system.



Our new regulatory funding model

- We've developed a new regulatory funding model so that we can deliver:
 - improved compliance, and
 - safety outcomes.
- The new model will mean that :
 - our regulatory functions are appropriately funded, and
 - the right people paying for the right things.
- Consultation on the new funding model will begin on 21 March.



Consultation on the new model

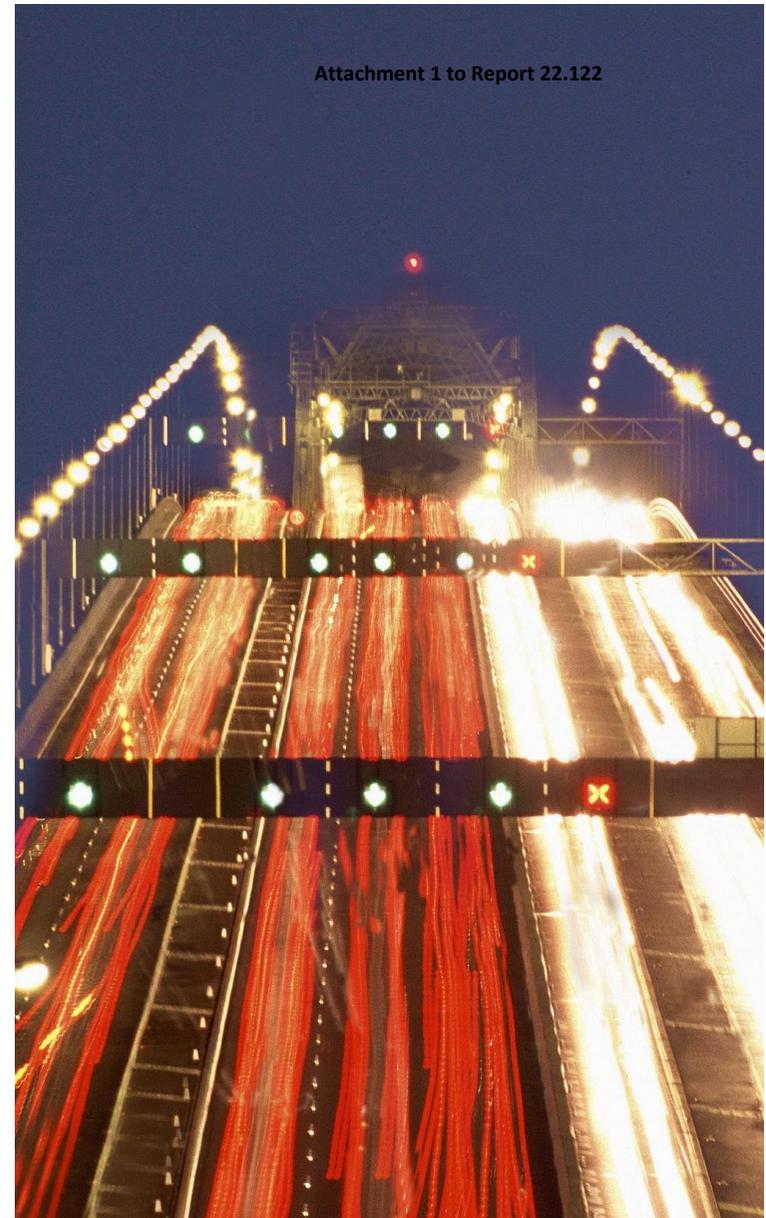
Proposed changes cover eight areas

- How land transport revenue is allocated to regulatory activities.
- Charges for data access on the motor vehicle and driver license registers.
- Fees and charges for:
 - driver licencing and testing
 - fees for motor vehicle licensing and registration
 - road user charges administration
 - transport service license holders
 - motor vehicle certifier activities, and
 - electronic road user charges providers.



Reducing emissions

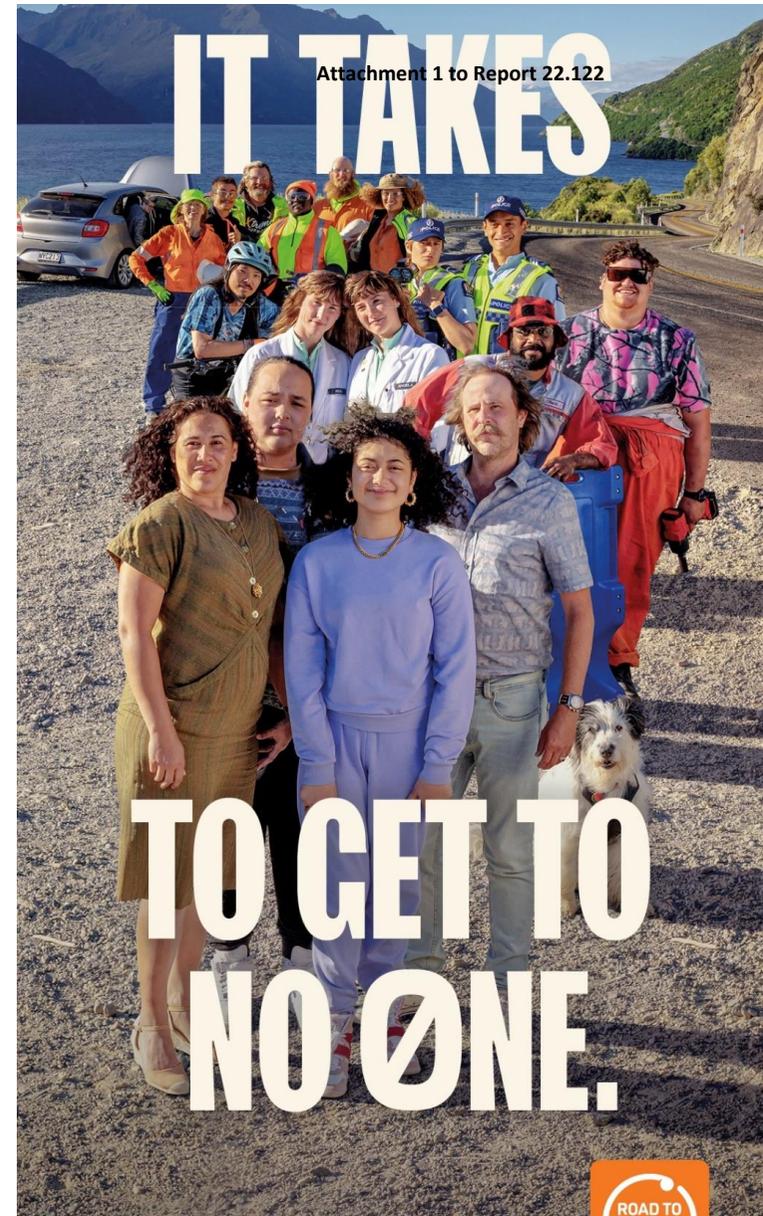
- The Emissions Reduction Plan is on target to be finalised in May 2022.
- We are also working on the National Adaptation Plan to be released around August 2022.
- We anticipate that this is going to impact on our work.
- We are looking at how we make investment decisions and how these can help achieve national climate change mitigation and adaptation objectives.



Public awareness campaign

Road to Zero

- We launched the campaign on 13 February and there are three phases:
 - **Disrupt**
We address complacent attitudes to road safety – it's time we stopped paying the road toll.
 - **Vision**
We explain our vision of zero deaths and serious injuries on New Zealand roads by 2050.
 - **System**
We demonstrate the Safe System and how all the different parts of the road system work together to keep us safe.
- Resources are available to help you join this important conversation.



One Network Framework

Links with Road to Zero

- Each RCA has classified their networks using the Framework's categories.
- The next step is to classify:
 - public transport routes,
 - freight, walking and cycling paths,
 - and general traffic, alongside a future function view of the network.
- Over the next 18 months, our focus is to integrate the Framework into policies and processes.
- This includes how the street categories link with speed management planning.
- We aim to deliver the Framework in time for the development of the 2024-27 NLTP.

Speed Management Programme

Road to Zero

- What we're working on in 2022:
 - a new speed management framework
 - the new Aotearoa New Zealand Speed Management Guide
 - introducing the National Speed Limit Register
 - a new Speed Management Planning Solution, and
 - updating MegaMaps.



Safety camera transfer and expansion

Road to Zero

- We'll begin to transfer the management of safety cameras from mid-2023
- We are implementing a new approach on how we use safety cameras, including:
 - expanding the network, and
 - putting cameras on the highest-risk roads.
- We are increasing the number of safety cameras and want to work with you about where they should go.



Vehicle safety rating update

Road to Zero

- The Rightcar website has been updated with the latest vehicle safety ratings.
- The ratings assesses the safety of all road users including:
 - drivers
 - people in other cars
 - pedestrians
 - cyclists
 - and motorcyclists.
- Carbon emissions values were also updated.



Public attitudes to road safety

Road to Zero

- 1,600 New Zealanders were surveyed for the report, which has some key findings including:
 - 44% of respondents think deaths from road crashes are acceptable.
 - 23% of respondents believe there's not much chance of a crash if you are careful when you speed.
 - Three in four respondents support lower speed limits around schools in urban areas.
- We're publishing a report each year so that we can get public feedback and monitor trends around road safety.



Greater Wellington Regional Update

February/March 2022

Greater Wellington Regional Update

| Activity | 2021 – 24 NLTP 2021/22 Allocation | Key date(s) | Progress | |
|--|--|----------------|----------|---|
| State highway maintenance, operations and renewals | <i>36 Million Yr1 126 Million 3Yrs</i> | Ongoing | Green | <ul style="list-style-type: none"> • Good progress being made on 2021/22 renewals, despite Covid impacts and recent weather event • Costs for Yr2 & 3 will be confirmed once the Wellington Transport Alliance is fully established |
| Low Cost / Low Risk | <i>8.6 Million</i> | On-going | Amber | |
| Emergency Works | <i>1.3 Million</i> | On-going | Amber | <ul style="list-style-type: none"> • February rainfall event may result in some minor ongoing remedial works, once geotech assessment is completed |

Wellington Transport Alliance update

A new alliance is being set up to deliver maintenance and operations activities across Greater Wellington's highway corridors, commencing **1 July 2022** (for 11 years)

- Progress to date:
 - Alliance Manager – Dave Rendall has been appointed
 - Currently working through the Interim Alliance phase with Non-Owner Participants – WSP & FH
 - Briefing held with other potential suppliers, for our vision to retain a healthy supplier market in Wellington
 - WTA presents opportunity to work with partners/stakeholders to deliver combined 'transport as a service' to Wellington travellers, and beyond



RiverLink / Melling Transport Improvements

Attachment 1 to Report 22.122



Looking south at the new Melling bridge (*draft impression, subject to change*)



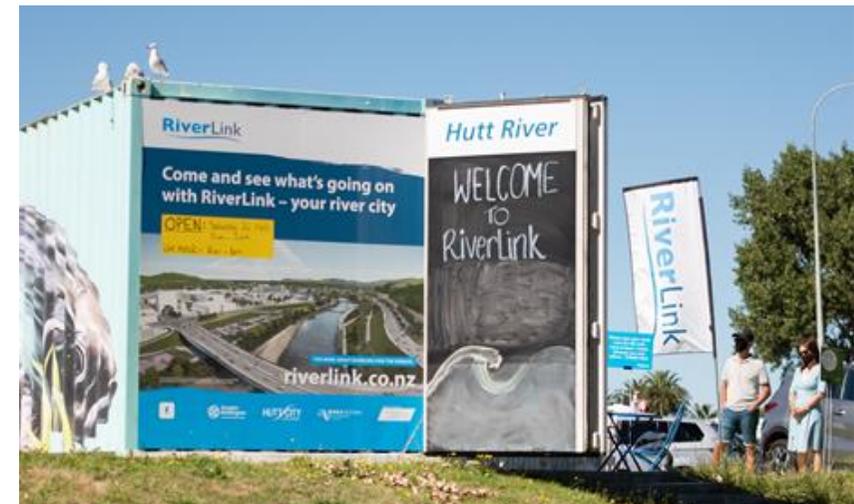
Heading southbound on SH2 towards new grade separated Melling interchange (*draft impression, subject to change*)

NZ Upgrade Programme – RiverLink project

Attachment 1 to Report 22.122

Grade-separated Melling interchange and new river bridge, with improved links to cycling/walking modes, including relocated Melling station.

- The regulators agreed to change the consent pathway to a direct referral to the Environment Court.
- Mediation was held late Jan/early Feb and resolved many concerns submitters had.
- Four submitters wish to be heard at the Environment Court hearing starting 26 April 2022 and we continue to work with them prior to the hearing.
- A procurement timeline update went to the market early Feb with a target to close the RFP in December 2022.
- There is high public interest in the project, with the majority in support of it, as seen at the recent weekend opening of the RiverLink container – where people can look at information and talk to the team – by Te Awa Kairangi Hutt River.

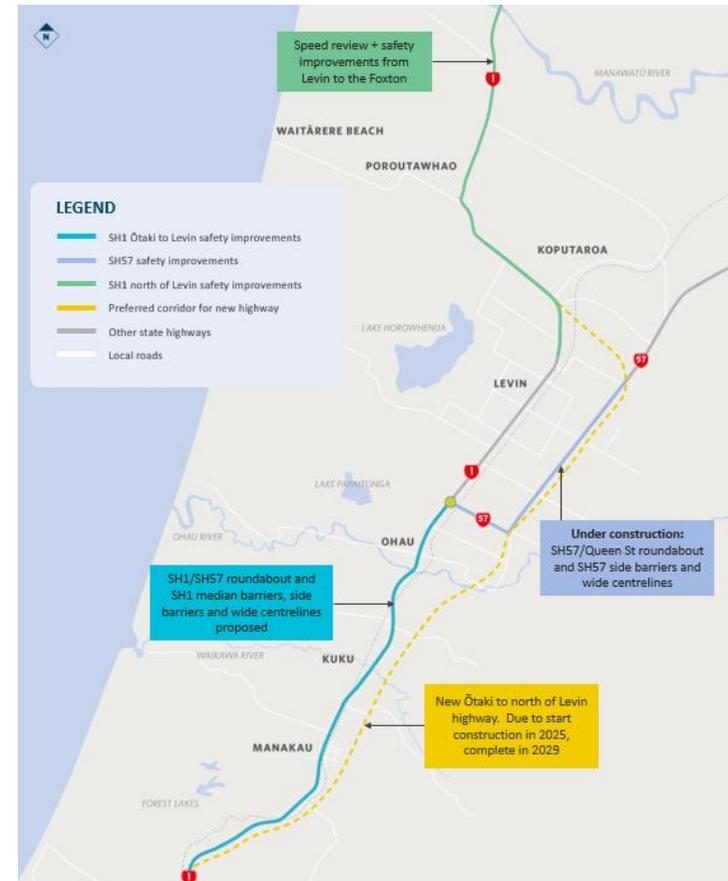


Ō2NL safety improvements and speed

Attachment 1 to Report 22.122

Safety improvements and speed reviews on existing highways are progressing in parallel with the Ō2NL new highway

- **SH57:** SH57 / Queen St roundabout, wide centre lines and stretches of edge barrier, plus speed review
 - SH57/Queens St roundabout open to southbound traffic in April
 - Widening shoulders and installing safety barriers began in January; we're looking at options for ending the SH57 northbound detour before midyear
 - Speed consultation held in late 2021; submissions are being considered
- **SH1 Ōtaki to Levin:** Wide centrelines and shoulders, stretches of median barrier, SH1 / SH57 roundabout, plus speed review
 - Early safety improvements completing at Kuku
 - Construction of remainder (excluding roundabout) expected to start late 2022
 - Consultation on speed coming up
- **SH1 from Levin to Foxton:** Roundabout at Waitarere Beach Rd / SH1, stretches with wide centreline and side / median barriers, plus speed review
 - Early engagement since late 2020
 - Community engagement on proposed safety improvements and speed by midyear.

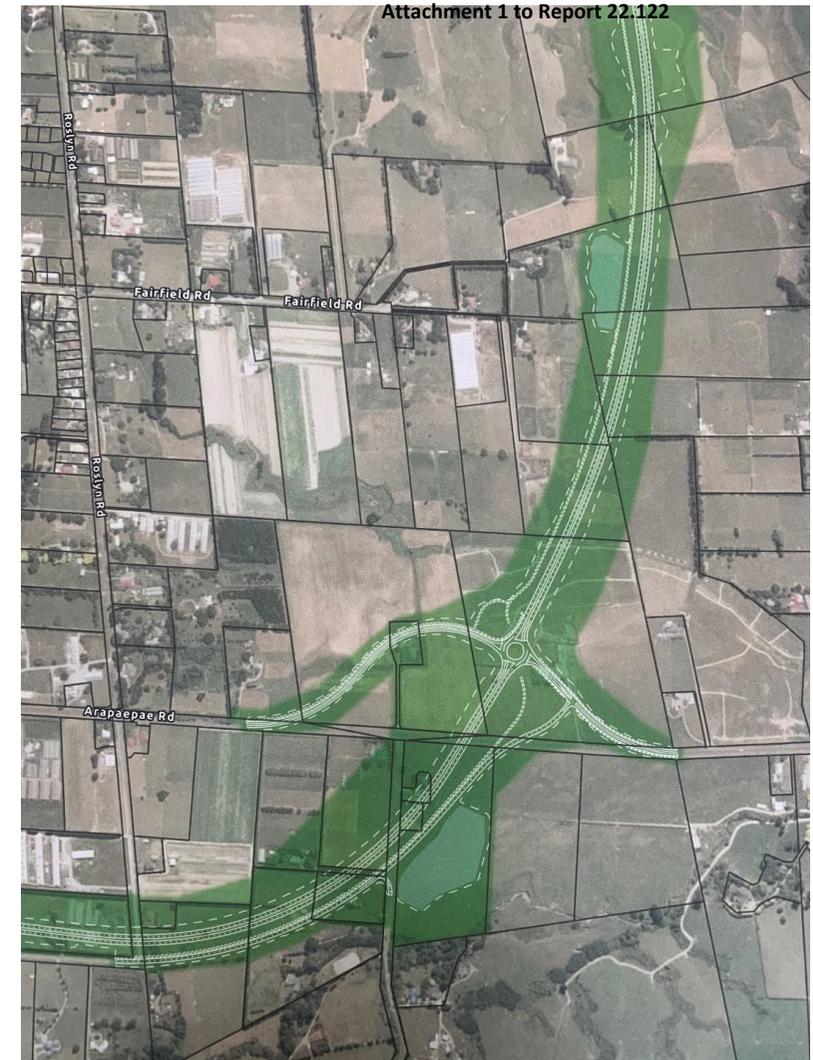


Improving **safety and resilience** of the **Ōtaki to north of Levin** transport corridor in the medium term, while progressing a new four-lane highway to **support growth** in Levin and **increase transport choice** for the growing population by the end of the decade.

Ō2NL new highway

NZ Upgrade Programme-funded 24km four-lane new highway to improve safety and resilience in the Ōtaki to north of Levin transport corridor

- Preferred alignment and preliminary concept design shared with property owners and community in December
- Further work progressed on Queen St East connection and additional half interchange at Taylors Rd (to provide full connectivity at PP2O connection)
- To provide certainty for growth and planning processes and route protection, a Notice of Requirement was prepared for the section of new highway at Tara-Ika. RMA applications for remainder of highway to follow later in the year
- Work is continuing on finalising / approving Detailed Business Case and consent preparation
- Revocation workshops are ongoing
- Community engagement next month will provide an update on the new highway, potential effects identified and measures to address – and seek feedback on this work



Preferred alignment shared in December, including preliminary concept design. 300m corridor lines removed.

Greater Wellington Large Capital Project Updates - PP20

Attachment 1 to Report 22.122



Relocating fish before culvert construction



New wire rope barrier



Working on the subgrade (bottom) layer of the new road

Greater Wellington Large Capital Project Updates - PP20

Attachment 1 to Report 22.122



Makahuri Rail Overpass (Bridge 9) now open for construction vehicles



New overpass at Ōtaki Gorge Road



Laying down the asphalt

Greater Wellington Large Capital Project Updates - PP20

| Activity | 2018 – 21 NLTP | Key date(s) | Progress | Commentary |
|---------------------------|----------------|-------------|--|--|
| Peka Peka to Ōtaki (PP20) | \$410m | Underway | Amber  | <ul style="list-style-type: none"> • Bulk earthworks have been completed, with 3,600,000 cubic metres of earth moved in total. • 'Final trim' earthworks: <ul style="list-style-type: none"> ○ recently finished in the Waitohu Stream Bridge area at the north end of the project. ○ progressing between Ōtaki River Bridge and Ōtaki Gorge Road Bridge in the central zone of the project. • Good progress laying the structural asphalt - so far, around 80,000 tonnes of asphalt laid on the Expressway with an expected 50,000 tonnes still needed. • The installation of streetlights and wire rope barriers is continuing - once finished, the Expressway will be illuminated with 107 streetlights along the main alignment and approximately 33.4 km of wire rope barriers will be in place. • Around fifty culverts are now in place to carry stream water under the road to avoid flooding, with the help of roadside drainage. • The Makahuri Rail Overpass is now open for our construction vehicles to drive across. This will also benefit the community as it will reduce construction traffic on the already busy local roads. |

Transmission Gully: Te Ara a Toa

Attachment 1 to Report 22.122



Transmission Gully: Paekākāriki Interchange

Attachment 1 to Report 22.122



Transmission Gully: Waitangirua interchange

Attachment 1 to Report 22.122



Greater Wellington Large Capital Project Updates - TG

| Activity | 2018 – 21 NLTP | Key date(s) | Progress | Commentary |
|--------------------|----------------|--|--|---|
| Transmission Gully | c.\$500m | Road opening tbc Project completion tbc | Amber  | <ul style="list-style-type: none"> To facilitate an earlier than otherwise possible road opening, Waka Kotahi has agreed to defer 19 outstanding quality assurance tests that were originally required under the contract to be completed prior to the road opening, leaving a total of 81 tests required. Waka Kotahi has also agreed to reduce the requirements for a further 30 assurance tests. These deferred and reduced assurance tests will all be completed to the contractually agreed standards after the road opens to traffic. The three remaining consent tasks for road opening are being worked through with Greater Wellington Regional Council and other territorial authorities. Waka Kotahi is not prepared to compromise on the long term safety of the road but we are working to balance this along with the road’s reliability, safeguarding the public from any future financial liability for defects not remedied now, while doing everything we can to ensure people can use this vital transport connection as soon as possible. Commercial negotiations continue on compensation for delays as a result of the Covid-19 lockdown and Alert Level restrictions. Once the road opens, Waka Kotahi will start paying Wellington Gateway Partnership (WGP) for construction, operation and maintenance of the road. WGP have financed the project and have contracts with CPB HEB to build the road and with Ventia to operate and maintain the road. |

Greater Wellington Project Updates – TG

Attachment 1 to Report 22.122

| Activity | 2018 – 21 NLTP | Key date(s) | Progress | Commentary |
|---|----------------|---|--|---|
| Wellington Network Operational Readiness for Transmission Gully | \$20.4m | TBC | Green  | <ul style="list-style-type: none"> Ongoing communications to improve driver behaviour such as merging, keeping left and tail-gating are having an observable effect on driver behaviour. The State Highway between Linden and Mackays Crossing has been re-numbered to SH59 in preparation for Transmission Gully which is SH1 as the main arterial route in and out of Wellington. Installation of Intelligent Transport Systems, between Porirua and Johnsonville, is well underway. These will improve safety and efficiency, and include new variable message signs, CCTV and an extension of the southbound Ngauranga Gorge variable speed system. |
| TG Revocation | \$0.6m | Jun 2021 Porirua future function agreed | Green  | <ul style="list-style-type: none"> Waka Kotahi continues discussions on proposals to retain SH59 Linden to Mackays as a state highway, and revoke the state highway status of SH58 Paremata to Pāuatahanui The work includes consultation with Porirua City Council, Kāpiti Coast District Council, Greater Wellington Regional Council, Wellington City Council, iwi, communities and stakeholders TG BOI requires that consultation on the future of these roads must begin no earlier than six months after TG opening. This will include speed reviews of SH59 and SH58. Feedback will be sought from the wider community. Future function of these roads has been agreed through Porirua NOF |

SH58 Safety Improvements

Below and centre: Pavement construction on Stage 2A

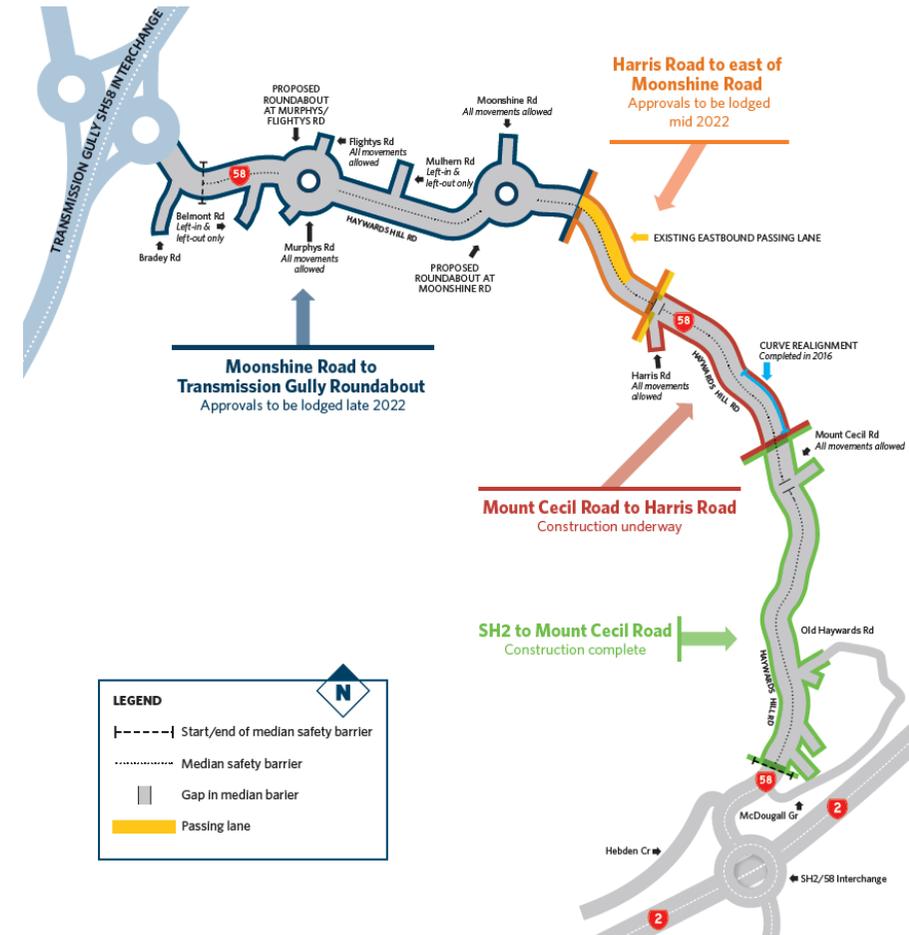
Right: retaining wall completed recently on Stage 2A



NZ Upgrade Programme – SH58 Safety Improvements

Stage '2B' Harris Road to Transmission Gully moving to property and consenting

| Project / deliverables | Progress | Key dates |
|------------------------------|---|--|
| Stage 1 (NLTF \$55m) | | |
| Construction | Stage now complete (except culvert works) | Road completed December 2021 |
| Stage 2a (NZUP \$16m) | | |
| Construction | Surfacing underway Culvert and retaining wall construction begins shortly | Completion mid-2022 |
| Stage 2b (NZUP \$89m) | | |
| Consenting | Advancing works from Harris Road to Moonshine in an early package. Consenting and property for Moonshine to TG interchange (including two roundabouts) | Property owner and community engagement this month |



Greater Wellington Large Capital Project Updates Attachment 1 to Report 22-122

| Activity | 2021-24 NLTP | Key date(s) | Progress | Commentary |
|------------------------------------|--------------|-------------|----------|---|
| Let's Get Wellington Moving (LGWM) | \$407.8m | Underway | A | <p>Mass Rapid Transit, Strategic Highway Improvements</p> <ul style="list-style-type: none"> With the preferred programme option decision in the middle of the year the goal is to close out the IBC by the end of 2022. Preliminary planning for the subsequent Detailed Business Case is underway. The team is also scoping the early investigation of stabling yard locations and the development of more detailed transport modelling tools. <p>City Streets package</p> <ul style="list-style-type: none"> Over 150 interventions have been proposed by partner staff for the bus priority and general targeted improvements projects. The proposed interventions have been reviewed and prioritized for incorporation into the business case. The business case is planned to be completed in draft form in March for Technical Advisory Group review prior to progressing through LGWM and partner reviews and approvals from March to June. Planning for design of the prioritised interventions is underway. <p>Travel Demand Management</p> <ul style="list-style-type: none"> The draft SSBC is being updated following its inclusion in the Transformational Programme engagement in December 2021. Work is underway to complete the management case with the aim to obtain approval of the SSBC from the LGWM Board and Partners at the same time as the Transformational programme preferred option decision mid-2022 |

Greater Wellington Large Capital Project Updates

| Activity | 2021-24 NLTP | Key date(s) | Progress | Commentary |
|------------------------------------|--------------|-------------|----------|---|
| Let's Get Wellington Moving (LGWM) | \$407.8m | Underway | A | <p>Thorndon Quay - Hutt Road</p> <ul style="list-style-type: none"> Single Stage Business Case (SSBC) was approved by WCC and GWRC. It will be submitted to the Waka Kotahi Board in April <p>Golden Mile</p> <ul style="list-style-type: none"> In February, businesses, building owners, and residents living directly on and nearby to the Golden Mile were invited to join early engagement on the emerging detailed design for the Golden Mile. Their ideas, comments and suggestions will be used by the design team to inform a more detailed illustrative design. <p>Cobham Drive Crossing & SH1 Safer Speeds</p> <ul style="list-style-type: none"> The revised Single Stage Business Case Lite (SSBCL) for the alternate design was approved by the Partnership Board The speed limit proposal along SH1 was approved by Waka Kotahi on 1 March 2022. The gazette notice has been published, with the 28-day gazetting period commencing on 4 March 2022. Wellington City is taking their speed limit proposal to their Planning and Environment Committee on 10 March 2022. The new speed limit will be implemented in April |

Greater Wellington Project Updates – Active Modes

| Activity | 2018 – 21 NLTP | Key date(s) | Progress | Commentary |
|--|-----------------|---------------------------|--|---|
| <ul style="list-style-type: none"> Te Ara Tupua - Petone to Melling | \$63m | Completion early-mid 2023 | Green  | <ul style="list-style-type: none"> Construction is ~65% complete with project completion now in early-mid 2023. Recent work includes: <ul style="list-style-type: none"> Stormwater work is nearing completion Light pole and fence foundations Ramp excavation at Normandale underway |
| <ul style="list-style-type: none"> Te Ara Tupua – Ngauranga to Petone | \$178 - \$197 m | | Green  | <ul style="list-style-type: none"> Interim Project Alliance Agreement (iPAA) signed between Waka Kotahi, Downer NZ, HEB Construction and Tonkin + Taylor on 2 July – now named Te Ara Tupua Alliance. Alliance team mobilised to project office at 180 Taranaki Street (though COVID means many are WFH) and working through design development and planning of construction logistics. This work is now well into the 'estimating' phase to develop the agreed Target Outturn Cost (TOC). Work on site now expected to start in 2022. Collaboration between Waka Kotahi, Alliance, and Hutt City Council means Alliance is preparing to deliver Eastern Bays Shared Path (now named Tupua Horo Nuku by mana whenua), starting with southern portions (Windy Point and Sunshine Bay) |

Greater Wellington Project Updates – corridor improvements

| Activity | 2018 – 21 NLTP | Key date(s) | Progress | Commentary |
|---|----------------|-------------|--|--|
| Mackays to Peka Peka revocation (M2PP Revocation) | \$17.5m | Underway | Green  | <ul style="list-style-type: none"> 13km of corridor improvements including road resurfacing and remarking, construction of footpath and cycle lanes, kerb realignment, pedestrian crossings, new traffic signals and stormwater system works etc. Works at the northernmost 4km (north of Waikanae) have been completed. Works on the southernmost 2km, up to SH1 Ihakara St intersection, were completed in December 2021. Works on the old state highway through Paraparaumu and Waikanae Town centres are underway. Engagement on safer speed limits for the corridor took place in April/May 2021. Preparations for formal consultation in early 2022 are now underway. |
| Peka Peka to Ōtaki revocation (PP2Ō revocation) | \$12.3m | Underway | Green  | <ul style="list-style-type: none"> Community and stakeholder engagement on preliminary designs for upgrading the old SH1 took place in April/May 2021. The detailed design phase will get underway in the second quarter of 2022. The target is for the works to start once the PP2Ō Expressway project is completed. Engagement on safer speed limits took place in April/May 2021. Preparations for formal consultation in early 2022 are now underway. |

Greater Wellington Project Updates – Safety

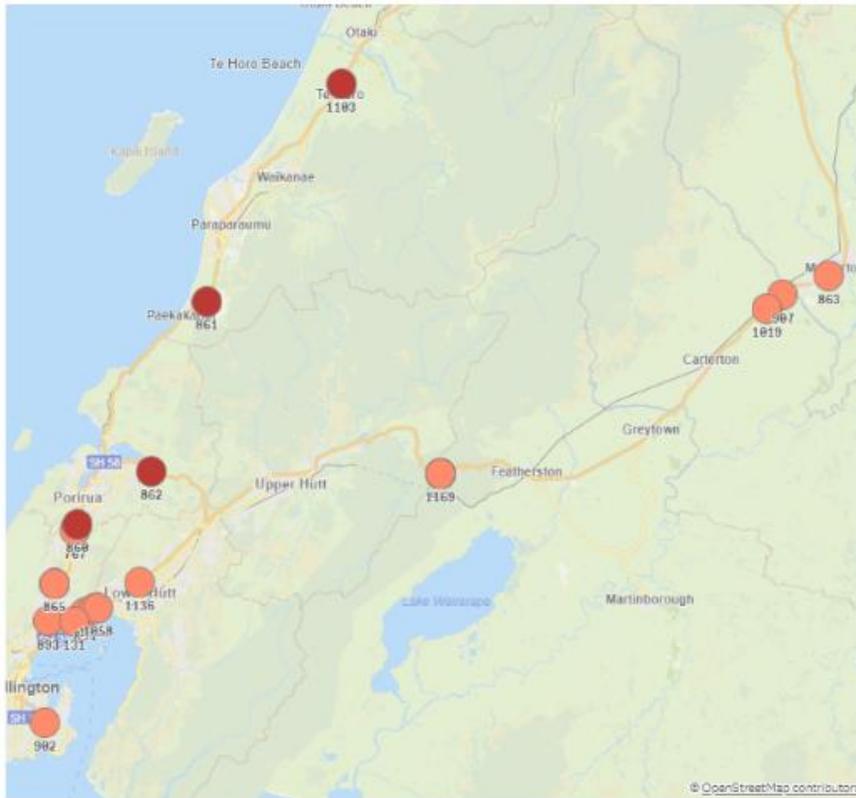
| Corridor | Speed Review Status | Infrastructure Interface |
|---------------------------------------|--|---|
| SH2 Masterton to Featherston | Consultation complete and summary report is being completed | Yes – SH2 Masterton to Carterton safety improvements moving to construction |
| SH2 Featherston to Ngauranga | Engagement finished and engagement summary report is being completed | Yes – SH2 Remutaka Hill and SH2 Ngauranga to Upper Hutt safety improvements |
| SH2 Pahiatua to Masterton | Engagement to begin in 2022 | No |
| SH58 Paremata Rd (SH1 to Pauatahanui) | Engagement to begin with Transmission Gully Revocation team undertake speed limit review | Yes – Transmission Gully Revocation |

Network Activity

There are many high impact activities (not Public Events) planned in the Wellington Region over the next 12 months

as at 8/3/2022

Approximate dates for planning purposes



Project Details (Dates are approximate and are susceptible to change)

| Impact Rating | ProjectID | Proj_Name/Description | StartDate | FinishDate | Confidence in StartDate |
|---------------|-----------|---|------------|------------|-------------------------|
| 4 | 131 | Ta Aru Tupua - Ngauranga to Petone cycleway | 01/11/2021 | 01/01/2025 | +/- Month |
| 4 | 478 | P2J Porirua to Johnsonville - SB closures TG Operational Readiness - Tawa to Churton Park | 03/02/2022 | 03/04/2022 | +/- a week |
| 4 | 767 | SH1 SB Full Night Closures for Gantry Installation - Stage 2 - TBC once TG Opened | 01/03/2022 | 01/05/2022 | +/- Month |
| 5 | 860 | Transmission Gully - Opening Day SH1 Linden and Porirua - Stage 1 REVISED OPENING TBC | 15/03/2022 | 15/04/2022 | +/- Month |
| 5 | 861 | Transmission Gully - Opening Day SH1 Mackays - Stage 1 REVISED OPENING TBC | 15/03/2022 | 15/04/2022 | +/- Month |
| 5 | 862 | Transmission Gully - Opening Day SH58 - Stage 1 REVISED OPENING TBC | 15/03/2022 | 15/04/2022 | +/- Month |
| 4 | 865 | P2J Porirua to Johnsonville - SB closures TG Operational Readiness - TPorirua to Tawa | 16/03/2022 | 16/03/2022 | +/- a week |
| 4 | 893 | LCLR Resilience Ngauranga Rockfall Hazard | 01/04/2022 | 25/04/2022 | +/- 3 months |
| 4 | 894 | LCLR Resilience Petone to Ngauranga Rockfall Hazard | 01/04/2022 | 25/04/2022 | +/- 3 months |
| 4 | 902 | LQWM - Cobham Drive Pedestrian Crossing | 01/04/2022 | 01/07/2022 | +/- a week |
| 4 | 907 | SIP - M2C Norfolk Road RBT 2 | 01/04/2022 | 01/01/2023 | +/- 6 months |
| 4 | 919 | Remutaka Hill Closures (1 night - Sunday to Monday) - Apr 2022 | 10/04/2022 | 11/04/2022 | sure |
| 4 | 863 | NOC POSSIBLE Rehab, Chapel Street Masterton | 15/04/2022 | 30/04/2022 | +/- Month |
| 4 | 970 | Remutaka Hill Closures (5 nights - Sunday to Friday) - 1 of 2 May 2022 | 15/05/2022 | 20/05/2022 | sure |
| 4 | 973 | Remutaka Hill Closures (5 nights - Sunday to Friday) - 2 of 2 May 2022 | 22/05/2022 | 27/05/2022 | sure |
| 4 | 989 | Remutaka Hill Closures (1 night - Sunday to Monday) - June 2022 | 11/06/2022 | 13/06/2022 | sure |
| 4 | 1019 | SIP - M2C Wiltona Road RBT 3 | 01/09/2022 | 01/04/2023 | +/- 6 months |
| 4 | 1055 | NOC Barrier - SH2 Petone - Ngauranga (NJB) - CJR-B6024 (unlikely to proceed as slip form) | 01/10/2022 | 01/04/2023 | +/- 3 months |
| 4 | 1058 | NOC Barrier - SH2 under Petone Overbridge - CJR-B6012 (likely to be redesigned) | 01/10/2022 | 01/04/2023 | +/- 3 months |

Attachment 1 to Report 22.122

Hei konā mai



New Zealand Government



Attachment 2 to Report 22.122

BRIEFING TO REGIONAL TRANSPORT COMMITTEE

Teams meeting

22 March 2022



Looking ahead 2022

A big programme – lots to get through

- **Central City Walking improvements** – upgrade 12 intersections on waterfront and Vivian Street
- **Thorndon Quay/Hutt Road proposed option** – complete design, start construction on Aotea Quay intersection
- **Golden Mile transformation** – complete detailed design, public engagement, prepare for construction
- **SH1 Cobham Drive and Safer Speeds east of Mt Victoria** – build crossing and change speeds
- **City Streets** – complete first tranche of business cases and prepare designs for construction start next year
- **Transformational programme** (MRT, Basin, Mt Vic) – preferred option and start detailed investigations
- **Travel Demand Management** – business case sign-off and pricing Investigation

Challenges

- Local government election year
- Funding discussions
- Other major projects
- Urban development decisions
- COVID-19 and the stakeholder environment

Engaging with business

Currently

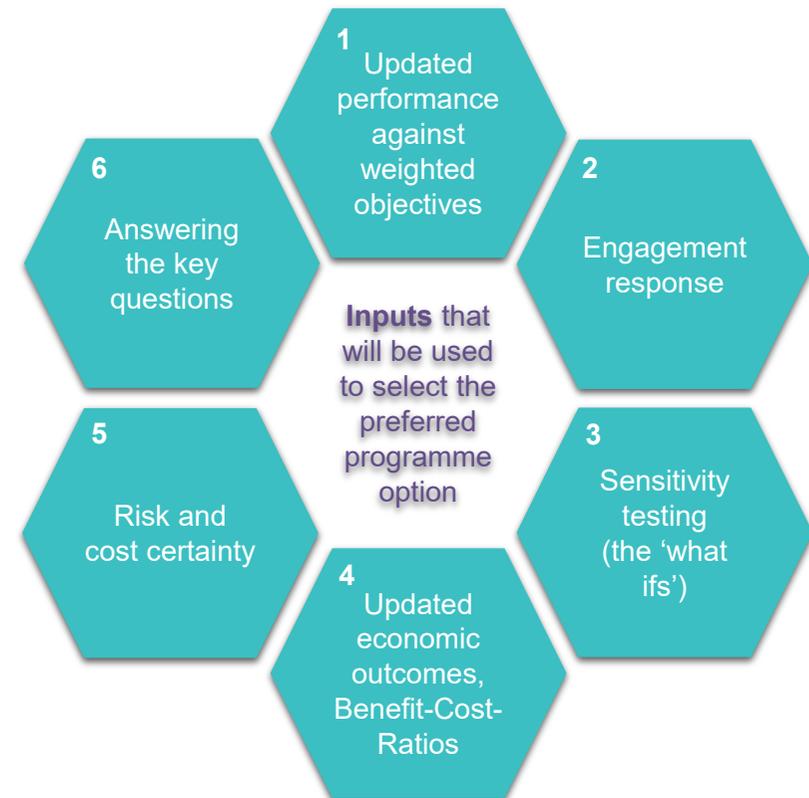
- COVID-19 and the recent protest at Parliament are impacting central city businesses but we are seeing good engagement online (via Social Pinpoint)
- Public desire for progress
- We're continuing to engage with care – sympathetic to business needs

Examples

- Extending timeframes for engagement
- Multiple options/opportunities for engagement online
- Multi-step process for detailed design – e.g. Golden Mile and Thorndon Quay/Hutt Road will have preliminary key stakeholder engagement followed by public engagement
- Development response plan – work has commenced

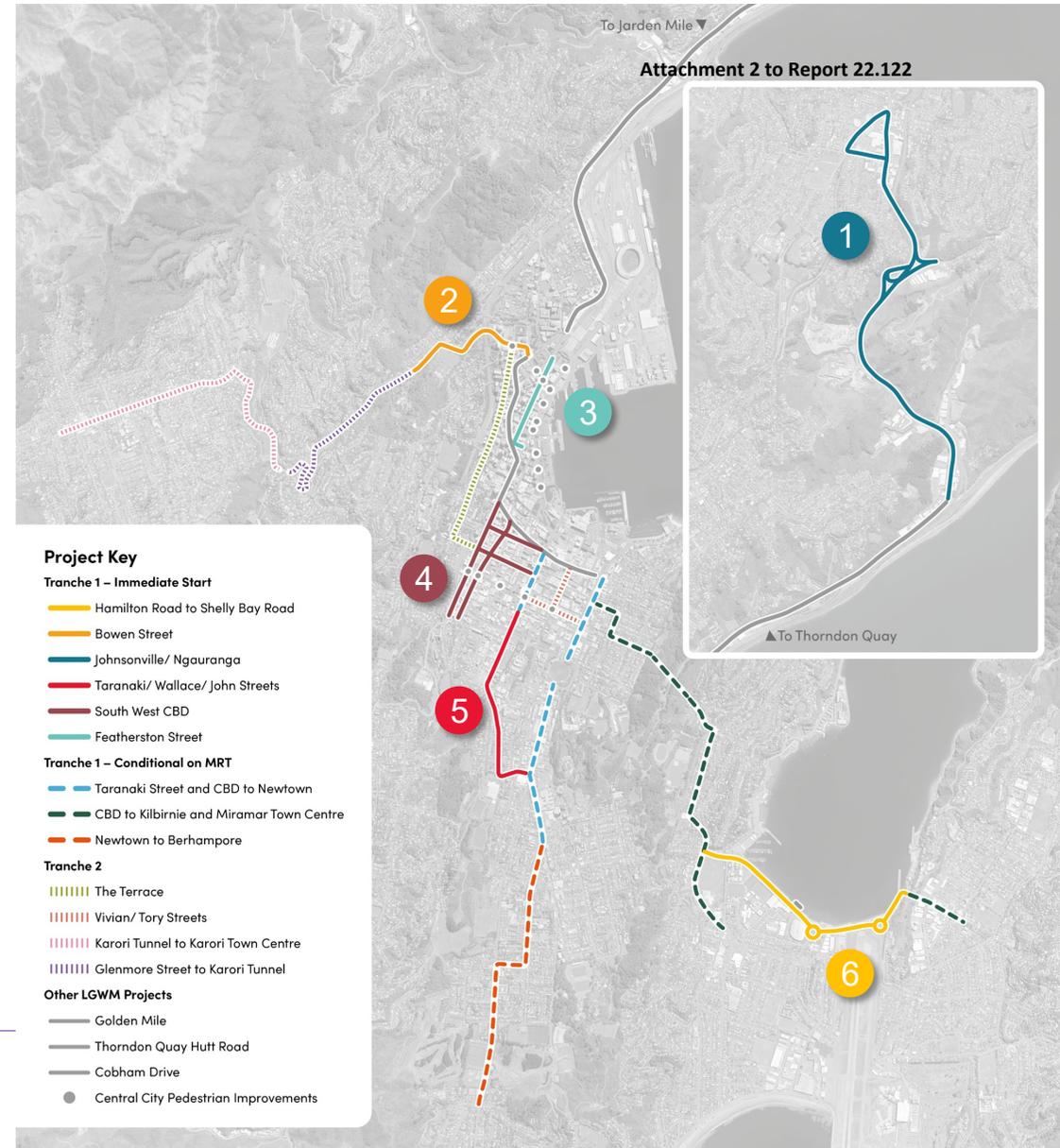
Transformational programme

- Public engagement in Nov/Dec 2021: 5000 people around the city and region, over 40 stakeholders groups.
- Analysing feedback
- One of six inputs for selecting preferred programme (see diagram)
- Key issues: funding discussions and urban development
- Plan: announce preferred option in June/July
- Complete the Indicative Business Case and start detailed investigation later this year



City Streets

- Bus, walking, cycling, safety and amenity improvements – focus is central city and key routes central city → suburban centres
- \$350m investment over 10 years
- Targeted improvements for early delivery
- Multi-modal network plan for central city
- Six projects being scoped in first tranche:
 - 1 Johnsonville/Ngauranga
 - 2 Bowen Street
 - 3 Featherston Street
 - 4 South West CBD
 - 5 Taranaki/Wallace/John Streets
 - 6 Hamilton Road to Shelley Bay Road



Golden Mile

Attachment 2 to Report 22.122

Targeted stakeholder engagement

- Sought feedback from businesses, building owners and residents along the Golden Mile
- So we can understand needs for deliveries, access, personal safety, loading zones, street layouts etc
- Over 350 individuals visited the engagement website leaving over 130 comments
- Feedback will help us develop a detailed design for engagement with the public in May/June
- Final design, traffic resolutions and construction planning by the end of the year



Social Pinpoint example

Central City Walking Improvements

Attachment 2 to Report 22.122

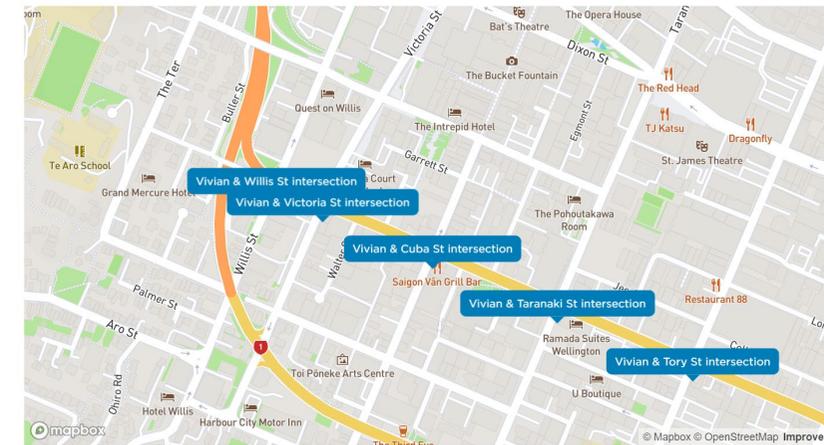
Intersections completed

- **Whitmore / Stout**
- **Whitmore / Featherston**

Intersection upgrades scheduled

- **Bowen / Terrace** (WCC-led through transitional programme, pending protest resolution)
- 12 intersections on **Vivian St** and **Waterfront** corridors:
 - Construction starts in April
 - Expected completion by November 2022

Vivian Street between Willis Street and Cambridge Terrace



Waterfront route (Waterloo, Customhouse and Jervois Quays) between Bunny Street and the City to Sea Bridge



Thorndon Quay and Hutt Road

- WCC and GWRC approved Single Stage Business Case
- Road Safety Audit for Aotea Quay Roundabout in March
- Stakeholder and public engagement mid year to inform detailed design
- Construction start on Aotea Quay later this year



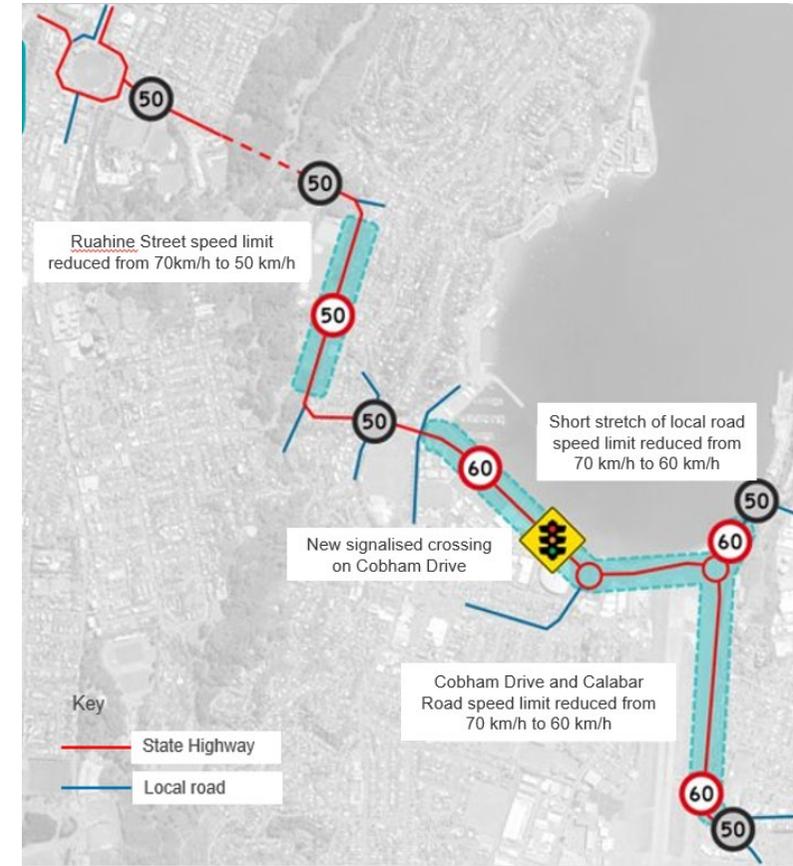
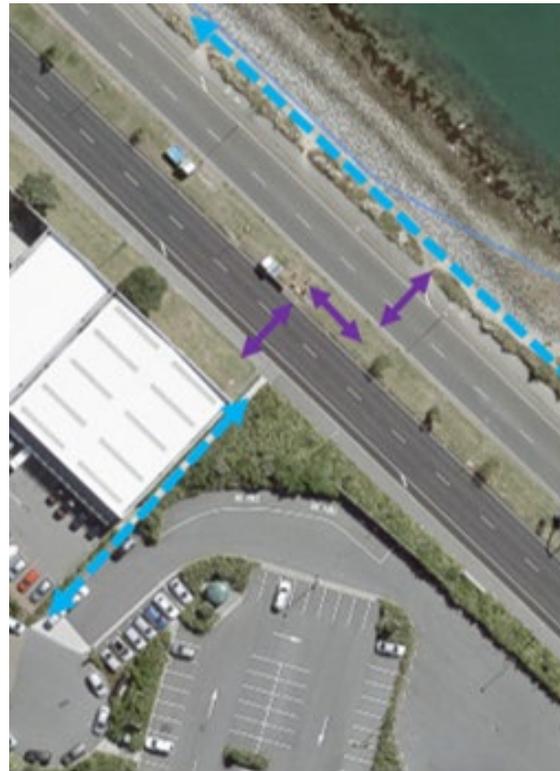
SH1 Cobham Crossing and Safer Speeds

The project

- A safe crossing of Cobham Drive
- Changes to travel speeds on State Highway 1 (and short section of local road)

Investment objectives

- Improve safety
- Improve connections
- Maintain predictable and acceptable journey times



A safe crossing

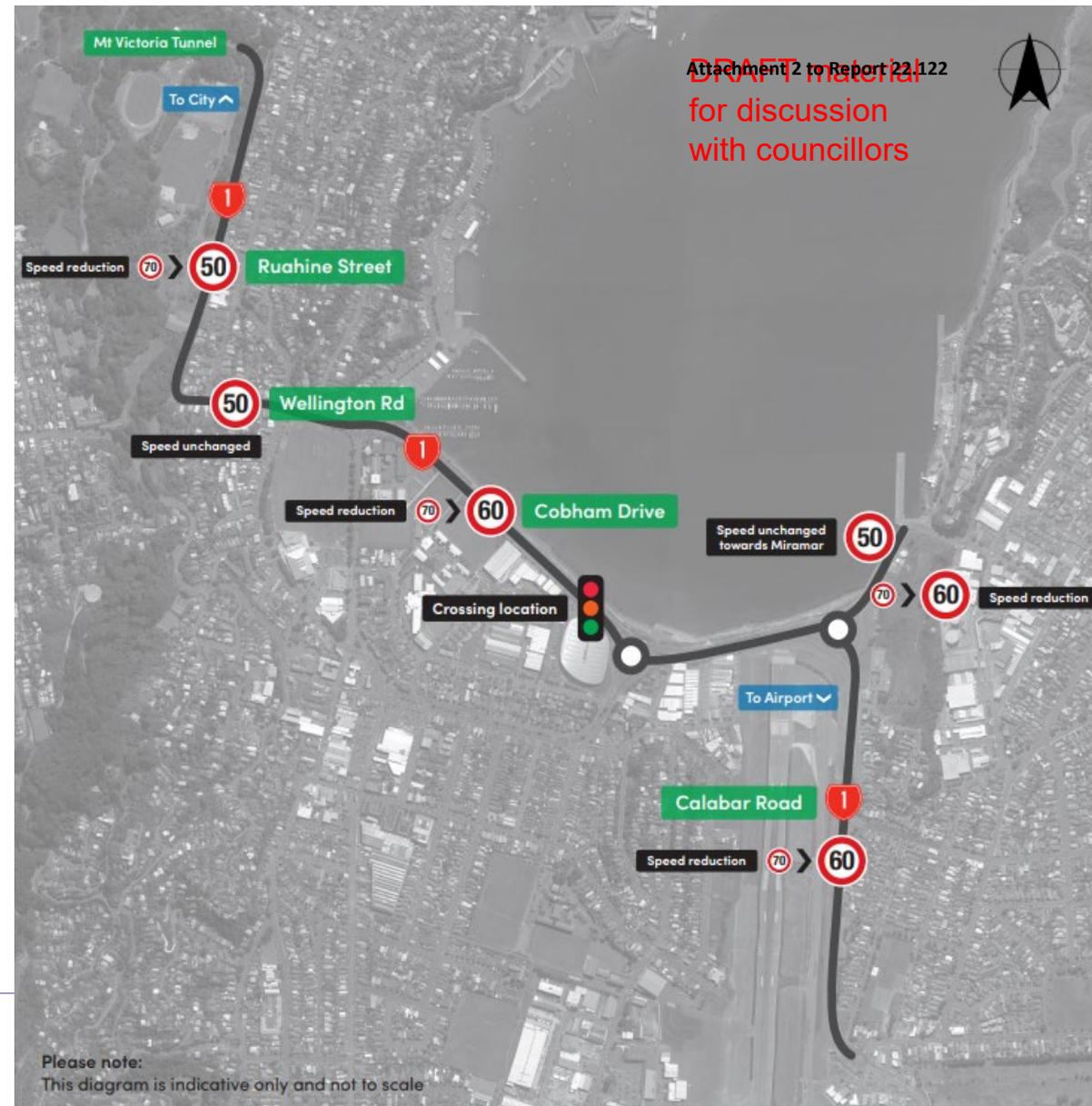
- Public engagement : 3500 people provided feedback
- Decision: progress with at-grade crossing
- Provides a safe option for people to cross SH1 as soon as possible
 - ‘Staggered’ traffic lights
 - Traffic stops only when crossing signals are activated
 - Better access for people walking and cycling, including people with mobility challenges, than overbridge/underpass which needs long ramps
- Changes due to feedback: removed raised intersection, monitoring and further investigations into alternative options
- Construction April → July



Safer speeds

Decision

- Proposed speed limit changes on SH1 come into effect in April
- Less than 50 second delay (crossing, when activated + speed changes) to vehicles in free-flow traffic for Ngauranga to airport trip
- Less delay when network congested
- Travel time delays monitored for 12 months





Council
7 April 2022
Report 22.124



For Information

WELLINGTON REGIONAL LEADERSHIP COMMITTEE MEETING – 22 MARCH 2022

Te take mō te pūrongo

Purpose

1. To inform Council of the deliberations of the Wellington Regional Leadership Committee (the Committee) at its meeting on 22 March 2022.

Te horopaki

Context

2. The business considered by the Committee is set out in the following paragraphs:

Written reports

Draft Regional Housing Action Plan – Report 22.79

3. The Committee approved the draft Regional Housing Action Plan ([Attachment 1](#) – Draft Regional Housing Action Plan), subject to the incorporation of the below changes:
 - a Strengthened commentary regarding the importance of integrating transport and urban planning as one.
 - b More specific recognition of other vulnerable communities, and the incorporation of these communities into existing focus areas.

Regional Housing Delivery Options – Report 22.80

4. The Committee supported the development of a detailed proposal for a “regional expertise and advice unit”, with the proposal to be finalised for the Committee and then provided to the Committee’s Chief Executive Officer group.
5. The Committee endorsed further investigation into a “regional housing delivery unit” and a “joint building consent unit”, after the above proposal is complete and in time to inform 2024 Long Term Plans.
6. The Committee requested that following the Strategic Planning Act and the Natural and Built Environments Act being enacted, the secretariat report back to the Committee on proposed options for a regional response to the development of the Regional Spatial Strategy and the Natural and Built Environments Plan, and the potential establishment of a regional resource consenting unit.

Programme Director’s Report – March 2022 – Report 22.78

7. The Committee supported the proposed approach to undertaking the Future Development Strategy and Housing and Business Development and Capacity Assessment for the region.

Complex Development Opportunities – Report 22.81

8. The Committee supported the work being undertaken on Complex Development Opportunities and noted that a further report on the matter will be provided at its next meeting in May 2022.

Wellington Regional Leadership Committee Programme Reporting – Report 22.74

9. The Committee was presented with programme reporting updates and dashboard monitoring ([Attachment 2](#) – Wellington Regional Leadership Committee programme reporting).

Oral Reports

Introduction to the Wellington Transport Analytics Unit – Report 22.108

10. Andrew Ford, Manager, Wellington Transport Analytics Unit, introduced the Wellington Transport Analytics Unit to the Committee and spoke to a presentation ([Attachment 3](#) – Wellington Transport Analytics Presentation).

Ngā āpitihanga

Attachments

| Number | Title |
|--------|--|
| 1 | Draft Regional Housing Action Plan |
| 2 | Wellington Regional Leadership Committee Programme Reporting |
| 3 | Wellington Transport Analytics Unit Presentation |

Ngā kaiwaitohu

Signatories

| | |
|----------|--|
| Writer | Alex Smith, Kaitohutohu Matua Senior Advisor, Democratic Services |
| Approver | Councillor Staples, Council’s alternate representative on the Wellington Regional Leadership Committee |

| |
|--|
| He whakarāpopoto i ngā huritaonga Summary of considerations |
| <i>Fit with Council's roles or with Committee's terms of reference</i> It is appropriate for Council to be kept informed of the business conducted by its Committees. |
| <i>Implications for Māori</i> There are no direct implications for Māori from this specific report. |
| <i>Contribution to Annual Plan / Long Term Plan / Other key strategies and policies</i> There are no direct contributions by this report but the subject matter referenced contributes to key programmes of regional work. |
| <i>Internal consultation</i> No internal consultation was required. |
| <i>Risks and impacts - legal / health and safety etc.</i> There are no known risks or impacts arising from this report. |

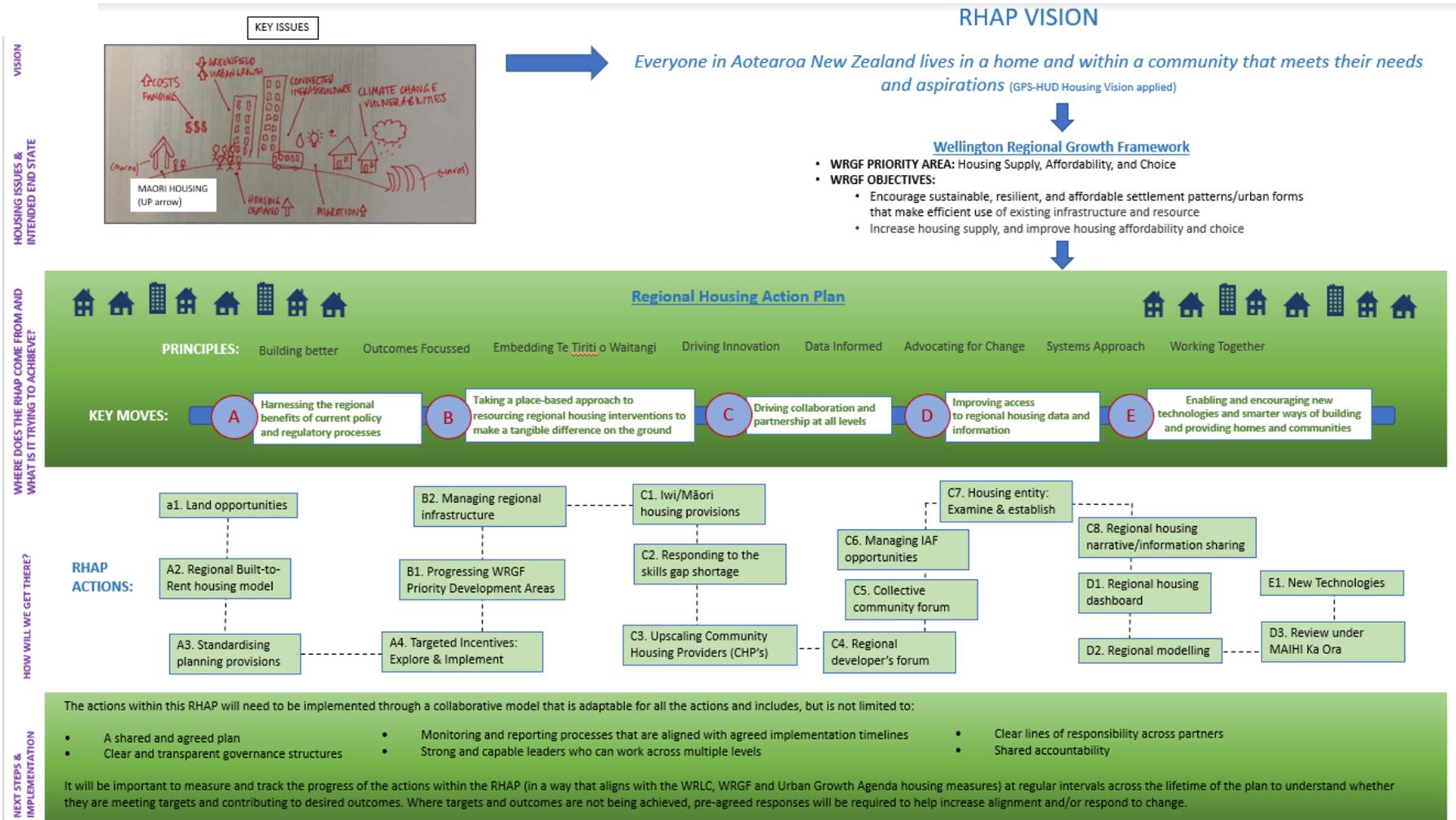
Draft Regional Housing Action Plan 2022-2027

Table of Contents

| | |
|--|----|
| Regional Housing Action Plan on a page..... | 4 |
| 1.1 Preface | 6 |
| 1.2 Why do we need this Regional Housing Action Plan? | 6 |
| 1.2.1 Housing challenges | 6 |
| 1.2.2 Interconnected dynamics of housing challenges and interdependencies..... | 7 |
| 1.2.3 Māori specific housing issues..... | 7 |
| 1.2.4 Housing issues that are specific to particular groups | 8 |
| 2. What is this Regional Housing Action Plan? | 9 |
| 2.1 Background | 9 |
| 2.2 Scope..... | 9 |
| 2.3 Problem statements for the Regional Housing Action Plan..... | 9 |
| 2.4 Principles..... | 12 |
| 3. Vision, Mission and Key Moves..... | 13 |
| 3.1 Overarching housing vision..... | 13 |
| 3.2 Moving towards the vision..... | 13 |
| 3.3 Mission for this Housing Action Plan | 14 |
| 3.4 Key moves for this Regional Housing Action Plan..... | 14 |
| 4. What do we know about housing in the region?..... | 16 |
| 5. How will we help accelerate growth and quality housing outcomes: The Action Plan..... | 18 |
| Timeline of RHAP Actions..... | 18 |
| Sequencing of RHAP Actions..... | 18 |

| | |
|---|----|
| The Actions..... | 19 |
| 6. Implementation | 23 |
| 6.1 Overarching Regional Housing Action Plan (RHAP) project..... | 23 |
| 6.2 Implementing the RHAP Actions..... | 24 |
| 6.3 Potential implementation issues | 24 |
| 6.4 The need to measure and track progress | 25 |
| APPENDICES | 27 |
| Appendix 1 – The Housing Ecosystem | 28 |
| Appendix 2 – Interdependencies | 29 |
| Appendix 3 – Current housing issues..... | 33 |
| Appendix 4 - What do we know about housing in the region? | 37 |
| Appendix 5 - What is currently planned and going on in the region? | 40 |
| Appendix 6 - Actions considered but not progressed through the RHAP | 49 |

Regional Housing Action Plan on a page



1.1 Preface

This five-year Regional Housing Action Plan (RHAP) focuses on housing related interventions to 2027. It has been developed in the context of regional growth and significant reforms the Government is proposing.

A particular focus has been on the Resource Management (RM) reform, which in spatial and statutory contexts, is driving planning in a regional direction through the proposed Regional Spatial Strategies and Natural and Built Environment Plans. Where possible, the actions within this RHAP have been developed to support the intent of the RM reform.

1.2 Why do we need this Regional Housing Action Plan?

1.2.1 Housing challenges

The region¹ is growing faster than it has done for many decades. While we know that there is enough land across the region to satisfy projected housing demand over time (subject to the release of land), we are at present dealing with both a housing shortfall (i.e., we don't have enough quality houses of the right type, affordability and tenure) and the need to enable housing for growth. This shortfall and growth requirements are across the housing ecosystem².

The shortfall is in response to multiple interconnected factors that include but are not limited to the cost and supply of building materials, labour availability, incentives to develop (e.g., capital gains), and infrastructure readiness.

Consequently, the region lacks a sufficient supply of affordable and quality³ housing and housing choice. These factors contribute towards increasing inequality in housing outcomes across the towns and cities of our region that, in some instances, results in outward migration.

Significant investment in infrastructure to support accelerated growth is also needed to enable enough housing and quality urban environments. These immediate and longer-term challenges are regional issues that are best dealt with cumulatively and not individually. Many of these challenges cross local council boundaries and the maximum benefits can be had from tackling these together.

¹ The region for this Regional Housing Action Plan aligns with the region for the Wellington Regional Growth Framework being Wellington-Wairarapa-Horowhenua

² See **Appendix 1** for information on the Housing Ecosystem

³ Applies StatsNZ definition that housing quality refers to the degree to which housing provides a healthy, safe, secure, sustainable, and resilient environment for individuals, families, and whānau to live in and to participate within their kāinga, natural environment, and communities: <file:///C:/Users/MB203/Downloads/developing-a-definition-for-housing-quality-findings-from-public-consultation-october-2018.pdf>

1.2.2 Interconnected dynamics of housing challenges and interdependencies

Significant investment in housing, urban development, transport, electricity infrastructure and the three waters infrastructure and services, as well as regional and district planning and policy changes, will be needed to support future growth.

Beyond the forecast population and housing growth there are several other challenges facing the region, including projected sea-level rise, the severity of weather events, environmental pressures, barriers to mana whenua housing their people and fulfilling their role as kaitiaki and natural hazards.

An increasing number of vehicles on the roads, capacity and reliability issues associated with buses and trains, and network resilience issues are straining the regional transport system and may not result in the necessary transport system shifts that we are seeking, such as improving safety and access, reducing emissions, and reducing reliance on private vehicle travel.

Community infrastructure needs more coordinated investment to accommodate growth, including in open spaces, community facilities, schools, and health care facilities. These challenges need to be resolved for the future and are regional issues best dealt with together and not individually.

Further details on interdependencies that influence the region's ability to achieve the desired housing outcomes are provided at **Appendix 2**.

1.2.3 Māori specific housing issues

The Wellington Regional Growth Framework confirms that Māori communities in the region are relatively young and face several challenges. These include lower rates of housing ownership compared to the non-Māori population. In terms of responding to specific housing issues, it is recognised that each iwi has its own priorities and perspectives, and that ongoing work is needed to reflect the perspectives of all mana whenua.

A key initiative identified in the Wellington Regional Growth Framework is the development of an iwi spatial plan, to bring together mana whenua values and knowledge to determine their collective aspirations in relation to the spatial form of the region. This will directly inform future updates of the Framework.

MAIHI Ka Ora, the National Māori Housing Strategy, has a shared vision that “all whānau have safe, healthy, affordable homes with secure tenure, across the Māori housing continuum”. The Strategy has been developed in partnership with Māori and identifies the immediate and short-term challenges facing Māori housing that we need to address across key priority areas. MAIHI Ka Ora represents the first phase of work. The second phase builds on this foundation document, and in partnership with Māori looks to develop a detailed implementation plan.

Once the second phase of a national implementation plan has been developed our regional partners can build on that work to acknowledge our regions priority challenges and opportunities for Māori Housing, and to test whether there would be benefit in developing a regional Māori Housing Strategy to sit under the national strategy.

1.2.4 Housing issues that are specific to particular groups

There are many minority and vulnerable populations in the region who face specific or additional challenges, constraints and potential barriers to meeting their housing needs. These can include system inequities, language barriers, lack of existing equity or access to credit, or specific housing needs that are not readily met by the market. These groups should be supported by regional partners to achieve equitable outcomes that afford them the same opportunities as other groups.

The definition of vulnerable groups has a contextual and historical element, which makes it somewhat hard to define in the absolute. For the purposes of this RHAP, therefore, we have provided some existing definitions for contextual purposes rather than seeking to define explicitly.

An Auckland University⁴ report on housing for vulnerable populations confirms that vulnerability is multifaceted and provides a broader catchment for those experiencing numerous hardships. Vulnerable groups include, amongst others, those with mental health problems, addictions or physical impairments, rough sleepers, refugee populations, victims of family violence and those leaving institutional accommodation such as prison. Vulnerability is often linked to economic and social marginalisation, and disproportionately affects Māori.

A report by The Council of Europe⁵ confirms that they were unable to find a general and “context-free” definition of vulnerable groups, but that they consider it to include immigrants, disabled people, the frail and elderly, Roma/Gypsy people, one-head households, the unemployed, victims of disasters and wars, and so on.

⁴ Meeting the Housing Needs of Vulnerable Populations In New Zealand (2015), The University of Auckland: <https://cdn.auckland.ac.nz/assets/auckland/creative/our-research/doc/urban-research-network/housing-vulnerable-groups.pdf>

⁵ Housing Policy and Vulnerable Social Groups (2008), The Council of Europe Publishing: https://www.coe.int/t/dg3/socialpolicies/socialrights/source/Publication_Housing%20policy%20vulnerable%20groups.pdf

2. What is this Regional Housing Action Plan?

2.1 Background

The Wellington Regional Growth Framework (WRGF) is a spatial plan that has been developed by local government, central government, and iwi partners in the Wellington-Wairarapa-Horowhenua region to provide an agreed regional direction for growth, alignment and investment.

The WRGF has several agreed initiatives to address housing and urban development. This Regional Housing Actions Plan (RHAP) represents one of the agreed initiatives and has been developed in the context of all the other initiatives underway (including a number of structure plans and investigations).

It is intended that the RHAP project will assist in achieving the following priority and objectives from the WRGF:

| | |
|---------------------------|---|
| WRGF PRIORITY AREA | <ul style="list-style-type: none"> • Housing Supply, Affordability, and Choice |
| WRGF OBJECTIVES | <ul style="list-style-type: none"> • Encourage sustainable, resilient, and affordable settlement patterns/urban forms that make efficient use of existing infrastructure and resource • Increase housing supply, and improve housing affordability and choice |

2.2 Scope

The geographic scope of this RHAP includes all the districts within the Wellington-Wairarapa-Horowhenua region. This project acknowledges that the National Policy Statement on Urban Development (NPS-UD) is already enabling councils to respond to intensification through District Plan processes and that changes to plans should come into effect within the next five years. This workstream, therefore, focuses on non-District Plan mechanisms that can have an impact on supply, affordability, and choice in the short-term period of one to five years.

This RHAP does not seek to directly address Māori specific housing issues. Rather, a separate but associated workstream will be progressed in due course under the WRGF that represents a regional extension of the MAIHI Ka Ora – The National Māori housing strategy. This has been considered in RHAP Actions to be implemented (Section 5.1, Action C1).

2.3 Problem statements for the Regional Housing Action Plan

At present, there is sub-regional variance across policy/regulatory processes and the collection and management of data. In some areas information is not available because it is not gathered – such as accurate information on the number of people who are homeless and in precarious housing. This makes it difficult to fully understand the nature and extent of the overall housing problem for our region, to monitor change over time consistently, and ultimately to

develop a regional approach to managing issues. Limited cross-council collaboration on policy processes also increases risks associated with innovative approaches (e.g., inclusionary zoning), and limited knowledge sharing on data collection and management increases resourcing and cost requirements for Councils. A full list of the issues underpinning this RHAP is provided at **Appendix 3**.

The problem statements for the RHAP can be defined as follows:



There is not yet a regionally agreed plan to collaborating on housing to accelerate growth. This can result in unintended outcomes, misalignment of priorities, duplication of information, and a fragmented approach that does not maximise funding opportunities or joined up housing outcomes.



The private development sector is not yet a partner in the regional housing plan and therefore we run the risk of not fully achieving what is required for homes and communities in the future.



Partners (including councils, iwi housing organisations, and community housing providers) have limited capacity and lack of capital funding, which impacts on their ability to resource projects while other partners have access to funding but not land.



Existing advocacy approaches on key regional housing matters are siloed and do not optimise the benefits of working together.



Growth is impeded by constrained building supplies and the composition of the current building industry, which is dominated by a small to medium enterprise model that does not enable delivery at pace and scale. The region is not yet widely utilising emerging technologies and construction techniques that have the potential to help increase efficiency and reduce build time, cost and emissions for housing as effectively as possible.



There is an existing knowledge gap in the nature, form and extent of locational or place-based housing issues across the region.

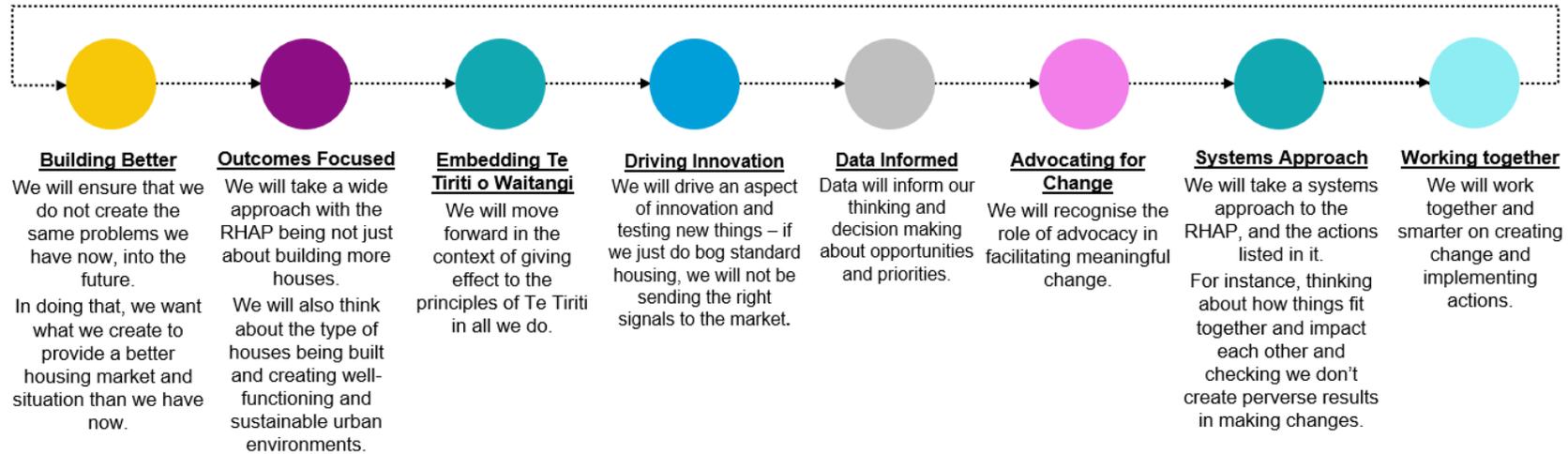


We do not have a clear and consistent response to other important factors in achieving quality housing outcomes⁶. The current state impacts on our ability to achieve these outcomes, particularly in relation to factors that span territorial boundaries.

⁶ Applies StatsNZ definition that housing quality refers to the degree to which housing provides a healthy, safe, secure, sustainable, and resilient environment for individuals, families, and whānau to live in and to participate within their kāinga, natural environment, and communities: <file:///C:/Users/MB203/Downloads/developing-a-definition-for-housing-quality-findings-from-public-consultation-october-2018.pdf>

2.4 Principles

The identified challenges and issues of housing in the region have helped identify the following principles for the Regional Housing Action plan:



3. Vision, Mission and Key Moves

3.1 Overarching housing vision

At present there is no one single housing vision statement for the region agreed by all partners and stakeholders. For the purposes of this RHAP we have applied the vision within the Government Policy Statement on Housing and Urban Development (GPS HUD), which seeks that:

Everyone in Aotearoa New Zealand lives in a home and within a community that meets their needs and aspirations.

The GPS HUD confirms that:

- This vision means that homes should be stable, affordable, healthy and of a high quality, accessible, environmentally sustainable and energy efficient. There will be homes of different sizes, layouts and tenure types, reflecting the diversity in household sizes and structures. They should meet people’s needs over their lifetime and support their overall wellbeing.
- The places should be accessible, connected, well designed and resilient. The places we live should reflect our culture and our heritage, enable and encourage people to come together as a community, and have a low environmental impact. The location and design of homes will support us to mitigate and adapt to the effects of climate change.

3.2 Moving towards the vision

Achieving a vision of homes and communities that meet the existing and future needs and aspirations of our residents will require a mix of longer-term actions and short-term ‘quick wins’ that, where possible, are enduring.

Given current housing insufficiencies, it is vital that the region starts working to achieve the vision now by progressing actions concurrently, and in the context of present realities (e.g., what is achievable in the short-term considering current constraints, such as resourcing).

A dynamic and adaptive approach will be required that is responsive to potentially varying issues over time. The vision should be revisited frequently to ensure that the actions being progressed align with the vision and work is progressing on course to help implement the vision.

Moving towards our vision will require the following processes and practices over the short-and-long-term to support the vision:



3.3 Mission for this Housing Action Plan

The **mission for this RHAP is to identify and implement short-term actions to influence and improve the acceleration of growth and quality⁷ housing outcomes, with a focus on the 2022-2027 period.**

Short-term actions within this RHAP focus on actions that increase the effectiveness and efficiency of regional processes and partnerships. They will require collaborative working, commitment and resourcing from partners and stakeholders over the life of this RHAP, with the potential to extend beyond this timeframe where actions are enduring.

3.4 Key moves for this Regional Housing Action Plan

This RHAP provides key moves and actions for areas where local government, iwi, central government, and the broader housing sector, including the private sector, could collectively affect the greatest level of change across the region. **In achieving the key moves we expect there will be a positive impact on quality outcomes (supply, affordability, choice, accessibility, healthy homes, and energy efficiency) from 2022 – 2027.**

The RHAP key moves have been translated into actions in Section 8.

Note that advocacy has not been identified as a specific key move for the RHAP. Rather, it is recognised as a thread that weaves through the RHAP by way of a ‘collective individualism’ that allows partners to support the joint principles, key moves and actions within the RHAP while maintaining organisational positions on individual matters.

⁷ Applies StatsNZ definition that housing quality refers to the degree to which housing provides a healthy, safe, secure, sustainable, and resilient environment for individuals, families, and whānau to live in and to participate within their kāinga, natural environment, and communities: <file:///C:/Users/MB203/Downloads/developing-a-definition-for-housing-quality-findings-from-public-consultation-october-2018.pdf>

| REGIONAL HOUSING ACTION PLAN KEY MOVES | |
|--|---|
| <p>A Harnessing the regional benefits of current policy and regulatory processes</p> <p>By optimising our use of policy and regulatory processes we can increase certainty and make significant efficiency gains – allowing the right type of housing to be delivered, more quickly, where demand is and at scale and at pace.</p> | <p>D Improving access to regional housing data and information</p> <p>By collating and disseminating regional data on housing we can maximise use of resources and impact. This will also enable better analysis of how we are achieving targets regionally and reduce duplication of process to help deliver the best outcomes.</p> |
| <p>B Taking a place-based approach to resourcing regional housing interventions to make a tangible difference on the ground</p> <p>By being clear on our region’s priority housing areas and actions, we can make the most of our resources: preventing duplication and making the best use of joint opportunities.</p> | <p>E Enabling and encouraging new technologies and smarter ways of building and providing homes and communities</p> <p>By embracing the advantages of new technologies, we’ll support:</p> <ul style="list-style-type: none"> • Lower carbon developments • better and more efficient manufacturing techniques • less construction wastage • easier, faster, and more effective processes • more efficient housing stock management • the ability to develop new, innovative approaches |
| <p>C Driving collaboration and partnership at all levels</p> <p>By working together, we can maximise resources to achieve common goals. Collaborative working provides a common understanding and allows partner agencies to take ownership of their individual responsibilities. It helps foster regional knowledge sharing and innovation and provides opportunities to increase engagement.</p> | |

4. What do we know about housing in the region?

4.1 Overall summary

By collectively identifying and working on housing related issues the region can move to resolve some of the more longer-term issues such as affordability, choice and quality. A list of the issues underpinning this RHAP (under the RHAP Key Move themes) is provided at **Appendix 3**. Some of the key trends affecting the region have been identified below:

- Demand for housing has outstripped existing delivery and housing development opportunities.
- Greenfield opportunities across the region are limited, and most new supply will be in existing urban areas.
- Our region is responding to both an existing housing shortfall and an accelerated demand for more diverse housing now and in the future.
- High housing costs restricts opportunities to live in metro areas, pushing people to live in the Wairarapa/Otaki/Horowhenua and commute. Wairarapa, Otaki and Horowhenua have the highest housing unaffordability (relative to salaries) in the region so increased migration and housing demand has significant implications on housing affordability for existing communities.
- There is limited knowledge or use of innovative techniques to support improved quality and low carbon housing outcomes in retrofits or new developments.
- Transport, three waters, electricity and other infrastructure needs investment to meet projected growth in population, services and housing.
- There are a multitude of existing central government housing programmes and funds. A more consistent and joined up approach to implementing these programmes and enabling access to funding is needed.
- Our vulnerable communities rely on the region's housing stock to provide quality, healthy, and efficient homes that must also respond over time to the climate crisis.
- Māori in the region are not able to easily utilise their own land for housing developments, prohibiting them from establishing a physical connection to their whenua.
- The Wellington Regional Growth Framework and council and iwi plans are informing where land can be unlocked to enable the region to grow up and out for the future.
- More housing support is needed across the continuum in the near term, from public, to affordable rental, to affordable ownership and capital is needed to achieve this.

Appendix 4 provides further information about what we know about housing in the region including current data on housing demand and affordability, housing supply and what and where we are building in the region.

4.2 What is currently planned and going on in the region?

There is a significant amount of national, regional and local growth planning, planning for housing, and development that has already happened or is happening within the region. Regional partners are also in the process of responding to the housing related legislative and statutory requirements of the National Policy Statement on Urban Development and the Resource Management (Enabling Housing Supply and other Matters) Amendment Act 2021 to enable more housing in conducive locations and a general increase in housing supply. These actions come together to make significant gains towards achieving quality⁸ housing outcomes. Further information including maps can be found at **Appendix 5** under the following headings:

- The Wellington Regional Growth Framework corridor view of the Future Urban Development Areas
- Planning and Policy that is planned and underway across the region
- Housing Development Areas by stage – build, regulatory, early planning, pre-planning.

⁸ Applies StatsNZ definition that housing quality refers to the degree to which housing provides a healthy, safe, secure, sustainable, and resilient environment for individuals, families, and whānau to live in and to participate within their kāinga, natural environment, and communities: <file:///C:/Users/MB203/Downloads/developing-a-definition-for-housing-quality-findings-from-public-consultation-october-2018.pdf>

5. How will we help accelerate growth and quality housing outcomes: The Action Plan

5.1 RHAP Actions

The suite of actions being progressed under this RHAP to help accelerate growth and quality housing outcomes over the next five years (2022 – 2027) is detailed below. These actions have been agreed through workshops and one-on-one meetings and have been selected based on partners ability to resource and alignment with the RHAP Key Moves. A list of all the potential actions identified in the development of this RHAP that were **not selected** for inclusion in the RHAP is provided in **Appendix 6**.

Timeline of RHAP Actions

During the development of the RHAP actions work began on how the suite of actions will be progressed over time. Due to the pertinent nature of many of the actions (particularly in relation to the requirements of the National Policy Statement on Urban Development Capacity) a significant proportion of the actions have been recommended for early implementation by regional partners (i.e., year 1).

Confirmation of timelines for individual actions, key partners for each action and a responsibility assignment matrix will be established after the RHAP has been signed off.

The proposed timing of most actions within year 1 indicates that significant in-house resourcing or funding for external resourcing will be required by regional partners to complete the actions within the timeframes anticipated. On-going conversations will continue post-RHAP on the best approach moving forward.

Sequencing of RHAP Actions

For the purposes of this RHAP, the implementation of actions is defined under the following categories. These categories refer to the time required to start achieving the desired outcomes only. In many instances actions will be enduring. In some instances, actions have sub-actions (e.g., explore and implement) or will extend across multiple timelines, which is reflected in the numbers in the table below. Confirmation on the sequencing of actions will be established after the RHAP has been signed off.

| Type of Action | Timeline | Potential No. of Actions/ Sub Actions Commencing |
|--------------------|----------------|--|
| Quick win | 0 – 6 months | 8 |
| Short term action | 6 – 18 months | 10 |
| Medium term action | 18 – 36 months | 4 |
| Long term action | Over 36 months | 2 |

The Actions

Details are included on how the actions connect to the RHAP Key Moves and what each action involves. As discussed in Section 6, varying organisational priorities and capacity means that details on the role and responsibilities of different regional partners in implementing individual actions will need to be managed carefully. One of the next steps will be to investigate the development and funding of a project resource to progress this work.

| RHAP Key Move | | Action | Details | Timeframe for Action | |
|---------------|---|--------|---|---|--|
| A | Harnessing the regional benefits of current policy and regulatory processes | A1 | Land opportunities: Investigate & release | a. Identify (undertake stocktake) and release central government, local government land and any other land available for disposal (e.g., church owned land). This should include the use of a case study approach to developing an efficient and consistent process to unlock land. b. Investigate the feasibility of providing emergency or social housing on Council-owned land c. Consider land tenure barriers and opportunities e.g., leasing land and what a regional response and/or plan for this might be d. Work in partnership to coordinate land-use e.g., Council and Kainga Ora and make more effective use of land. Build on discussions Kainga Ora already having. | Quick Win: - Stock take - Investigate Short Term – Long Term: - Release |
| | | A2 | Regional Build-to-Rent housing model | Roll out the WCC Build-to-Rent housing example across the whole region as applicable. See https://wellington.govt.nz/property-rates-and-building/property/te-kainga | Short Term |
| | | A3 | Standardising planning provisions | Develop standard planning provisions for use across the region (e.g., Design Guides, stormwater solutions, Inclusionary Zoning, Horowhenua District Council Streamline Housing Process) | Quick Win |
| | | A4 | Targeted incentives: Explore & implement | Explore and where appropriate implement targeted incentives e.g.: <ul style="list-style-type: none"> • Incentivizing open book practices by prioritizing transparent processes • Rebates for affordable housing development or fast track deals | Quick Win: - Explore |

| RHAP Key Move | Action | Details | Timeframe for Action | |
|---------------|---|---|--|--|
| | | <ul style="list-style-type: none"> incentives or similar to target affordable and appropriate homes supply Specific resource within local authorities to provide dedicated service to social and/or affordable housing consents | Short Term: - Implement | |
| B | Taking a placed-based approach ⁹ to resourcing regional housing interventions to make a real and tangible difference on the ground | B1 | Progressing WRGF Complex Development Opportunities Develop a plan for identifying and resourcing Complex Development Opportunities (CDOs) in the region through regulatory tools e.g., Specified Development Project (SDP), Special Purpose Vehicle (SPV), Infrastructure Funding & Financing (IFF), Fast Track process. | Quick Win |
| | | B2 | Managing regional infrastructure Use existing capacity information to develop solutions for reducing regional infrastructure gaps (particularly three waters, transport and network utilities). Should be progressed in the context of national infrastructure project and Central Government reform timelines. | Short Term: - Developing solutions Medium Term: - Implement |
| C | Driving collaboration and partnership at all levels | C1 | Iwi/Māori housing provision Provide regional support to iwi/Māori housing provision, in alignment with the Government’s Māori Housing and Innovation (MAIHI) Framework and the Māori Housing Strategy. Seeing if we can support mana whenua and iwi housing work - with developers – e.g., similar to Te Puna Wai - see https://www.stuff.co.nz/national/118692859/papakinga-development-to-help-mori-into-home-ownership | Short Term |
| | | C2 | Responding to the skills gap shortage Work with the trade industries and educational institutions to identify and start to close the existing and anticipated future building and related skills gap shortage through educational, technical, and training programmes that can support the growth we need. This would include feeding into the relevant Skills Leadership Groups. | Quick Win: - identify Long Term: Start to close |

⁹ For information on a “place based approach” see [A place-based approach to housing and urban development | Te Tūāpapa Kura Kāinga - Ministry of Housing and Urban Development \(hud.govt.nz\)](#)

| RHAP Key Move | | Action | Details | Timeframe for Action | |
|---------------|---|--------|--|---|--------------------------|
| | | C3 | Upscaling Community Housing Providers (CHP's) | Plan with and support and upscale CHPs at a regional level through leveraging private/public partnerships such as Pt England and Onehunga build-to-rent developments on the way (rnz.co.nz) | Short Term |
| | | C4 | Regional developer's forum (as agreed Nov 2021 WRLC meeting) | Establish a regional developers forum for input in WRGF projects and activities (such as the RHAP) and also to provide regional information and plans to e.g., presentation to regional/key developers about the region's opportunities. | Quick Win (Underway) |
| | | C5 | Community housing forum | Roll out the Hutt City Council community housing forum regionally to enable a community-first response to the housing crisis. | Short Term – Medium Term |
| | | C6 | Housing entity: Examine & establish | Examine and then establish a regional resource/entity for housing in the region (e.g., staff resources at scale, experts at Special Purpose Vehicles (SPVs), master planning, data analytics, demonstration developments). To include the development of a regional approach, plan, and targets for accessing central government programmes and tools e.g., Local Innovation and Partnership Fund (homelessness), Land for Housing Programme and Progressive Home Ownership Programme – see: https://www.hud.govt.nz/residential-housing/progressive-home-ownership/ | Short Term (Underway) |
| | | C7 | Regional housing narrative/information sharing | Establish a regional programme for developing a regional housing narrative to help inform communities and information sharing e.g., what is medium density. This could include the development of a platform where the community can learn more about what is already happening in this space in other parts of New Zealand (e.g., key pilots like Bay of Plenty) | Short Term |
| D | Improving access to regional housing data and information | D1 | Regional Housing Dashboard | Improve the provision of Regional Housing Dashboard – a regionally consistent up-to-date data, information and agreed definitions e.g., affordability. | Quick Win (Underway) |
| | | D2 | Regional modelling | Develop regional modelling on such aspects as price affordability (e.g., Regional Housing and Business Assessment) | Short Term |

| RHAP Key Move | | Action | | Details | Timeframe for Action |
|---------------|---|--------|---------------------------|---|----------------------|
| | driving housing innovation | D3 | Review under Maihi Ka Ora | As a key stakeholder participate in/actively provide feedback on the next phase of Maihi Ka Ora – the National Māori Housing Strategy to develop an Implementation Plan. | Quick Win |
| E | Embracing innovation by introducing new technologies and smarter ways of building and providing homes and communities | E1 | New technologies | Develop a programme to support the wider uptake of new technologies across the region (what and when) including investigating extent to which a regional centre of excellence for housing technologies could be established. Could include the integration of alternative financing ideas, including local government housing bonds to reflect the high credit rating of local authorities. | Medium Term |

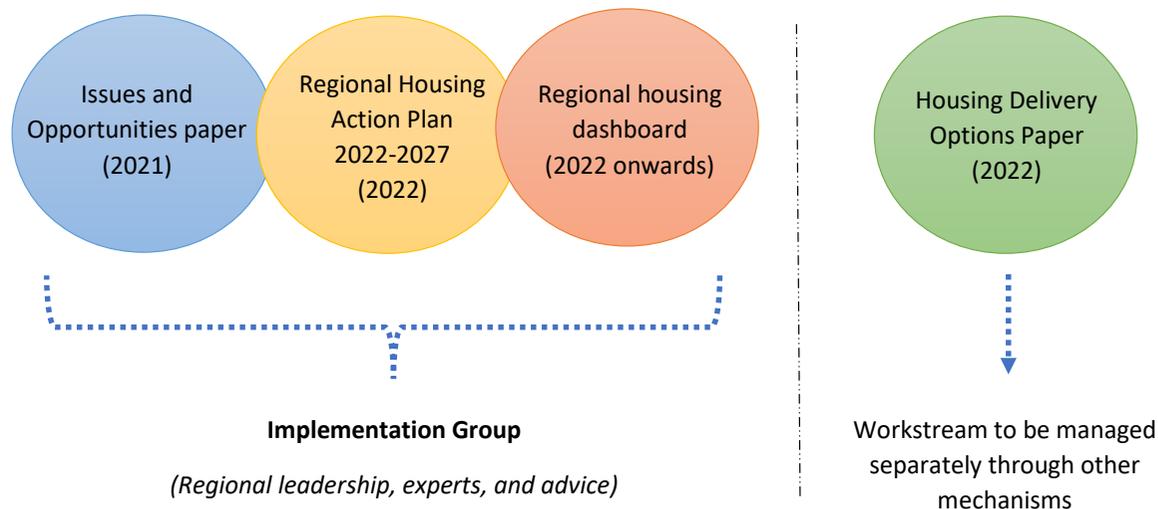
6. Implementation

6.1 Overarching Regional Housing Action Plan (RHAP) project

This action plan forms just one part of an overarching RHAP project under the Wellington Regional Growth Framework. The overall project aims to cumulatively accomplish our regional goals over the next five years and beyond, and consists of the following four components:

| Component | Stage |
|---|---|
| Issues and Opportunities paper | Completed in late 2021 |
| Regional Housing Action Plan 2022-2027 | To be adopted in early 2022 |
| Regional housing dashboard (2022 onwards) | To be completed in early – mid 2022 with live dashboard to follow |
| Housing Delivery Options Paper (2022) | To be completed in 2022 |

The four components have been developed to be implemented as follows:



6.2 Implementing the RHAP Actions

Section 6 confirms the RHAP actions that partners have prioritised to progress to help accelerate growth and quality housing outcomes to 2027. It is important to note that not all partners will be able to or choose to participate in each action. For instance, it may not be relevant for the partner organisation, other activity underway may be a higher priority or there may not be funding to participate.

The actions within this RHAP will need to be implemented through a collaborative model that is adaptable for all the actions and includes, but is not limited to:

- A shared and agreed plan
- Clear and transparent governance structures
- Monitoring and reporting processes that are aligned with agreed implementation timelines
- Strong and capable leaders who can work across multiple levels
- Clear lines of responsibility across partners
- Shared accountability

The implementation model will be developed in the next stages of the RHAP using existing or newly developed structures. Aspects to be agreed include:

- Quantifying the impact of each action on the acceleration of growth and/or quality outcomes. Quantification of expected outcomes or benefits is a key component of other Housing Action Plans such as the Toronto Housing Action Plan¹⁰ (Housing TO 2020 – 2030 Action Plan) and is a useful tool for understanding the intended impact of actions and monitoring and evaluation processes.
- Confirming structures (e.g. governance, reporting and implementation)
- Developing project and implementation plans where applicable
- Confirming resources to ‘do the doing’

6.3 Potential implementation issues

The following points represent potential implementation issues for the RHAP. This list is not exhaustive and has been developed in the context of the broader RHAP rather than individual actions.

- Capacity and resourcing: To date, the key implementation issue identified is the capacity of partners to resource the development and day-to-day running of the actions within this RHAP. This will need to be managed carefully and the development and funding of a project resource will be investigated further.

¹⁰ Housing TO 2020 – 2030 Action Plan <https://www.toronto.ca/wp-content/uploads/2020/04/94f0-housing-to-2020-2030-action-plan-housing-secretariat.pdf>

- Enhancing partnerships with iwi: Iwi have a key role in implementing the actions within this RHAP. It will be important that iwi of the region are supported to provide meaningful contributions across all RHAP implementation workstreams.
- Continuing to work collaboratively: There are multiple agencies and groups with similar but nuanced housing interests in the region. This brings a deep complexity to collaborative approaches. Achieving effective cross-organisational collaboration will require partners to understand each other's objectives and priorities, and for these objectives and priorities to be sufficiently reflected through the actions being progressed.
- Understanding influencing factors: There are multiple factors that impact on the ability of the actions within this RHAP to achieve accelerated growth and quality housing outcomes. Two of the key influencing factors are infrastructure provision and statutory and regulatory processes (e.g., Resource Management Reform, NPS UD, Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021). As further information becomes available on these matters continued investigations and analysis will be required.
- Upskilling staff: Potential knowledge gaps on new technologies, data capture and management, and collaborative working approaches should be identified. Upskilling staff and providing regional training programmes where appropriate would help to reduce risks.
- Managing a regional multi-party approach to advocacy: Changing policy and regulatory processes through advocacy can be difficult to achieve, especially given the short-term timeframe of this RHAP. To prevent misalignment between the advocacy of different regional partners all relevant parties will be engaged when agreeing regional advocacy approaches. A greater understanding on the disconnect between some housing opportunities and requirements of banks, and opportunities for financing models for non-traditional equity models (e.g., collective, cooperative, and shared equity models) would be advantageous. In addition, a regional position on the Building Code would help to ensure consistency of response (the Building Code does not yet meet the minimum level in comparable countries and often seen as a "target" and not the minimum requirement).

6.4 The need to measure and track progress

It will be important to measure and track the progress of the actions within the RHAP (in a way that aligns with the WRLC, WRGF and Urban Growth Agenda housing measures) at regular intervals across the lifetime of the plan to understand whether they are meeting targets and contributing to desired outcomes. Where targets and outcomes are not being achieved, pre-agreed responses will be required to help increase alignment and/or respond to change.

It is anticipated that measuring and tracking progress can be best achieved through an objectives-targets-indicators approach that is tailored to the RHAP project. In the context of monitoring and evaluation, an indicator is a quantitative metric that provides information to monitor performance, measure achievement and determine accountability. There are different types of indicators that can be investigated for the RHAP, including:

- **Input/response indicators**: indicators that focus on actions to be undertaken to achieve an outcome. These are 'means' indicators.
- **Outcome indicators**: indicators that focus on the outcome sought rather than how it should be achieved. These are 'ends' indicators.
- **Process delivery indicators**: indicators that gauge the implementation of processes.
- **Contextual indicators**: indicators that are used to assist in understanding the evolving context in which the RHAP operates.

Measuring and tracking progress can also be tied to how funding gets unlocked. Further investigation on funding pathways and partnerships for delivery, and how these can be linked to monitoring, should be investigated further.

Potential indicators for the RHAP suggested to date but not yet investigated include:

- No. of completed new dwellings
- Integration of innovative technologies e.g. new builds using modular or prefab housing.
- Distribution of new homes across the 'eco-system' as measure of whether we are meeting goals to increase the 'middle' section of the eco-system (collective/shared equity).
- Emissions by population groups (e.g., income quartiles, tenure, ethnicity, disability, single-parent households, age)
- Energy efficiency of homes

APPENDICES

Appendix 1 – The Housing Ecosystem

The diagram represents the housing ecosystem.

The housing ecosystem frames housing within the broader context of community well-being and self-determination, recognizing that housing, because of its link to the economic, social, and cultural well-being of a community, is one of the key leverage points for systems change and social innovation.

The ecosystem focuses on community-led development opportunities rather than dependency on/independence from housing subsidy (the traditional housing continuum approach). The RHAP embraces this way of thinking about future housing outcomes to help empower our communities.

While the key element of a housing ecosystem is a **built environment**, other supporting elements (currently not included in the representation below) are people wellbeing (skills, knowledge, attributes), community infrastructure, and governance.



Source: How we Live Report (2021) - MOTIF

An Upgraded Housing Continuum

Appendix 2 – Interdependencies

National Policy Statement on Urban Development (2020)

The actions within this RHAP have been developed to complement on-going work to provide long-term system responses to enabling intensification through District Plan processes, as required by the National Policy Statement on Urban Development (“NPS UD”). The NPS UD requires the preparation of Future Development Strategies (“FDSs”) and Housing and Business Capacity Assessments (“HBAs”) for Tier 1 and 2 urban environments.

FDSs are intended to promote long-term strategic planning by setting out how a local authority intends to (i) achieve well-functioning urban environments and provide at least sufficient housing and business development capacity; and (ii) assist the integration of planning decisions with infrastructure planning and funding decisions. The purpose of a HBA is to provide information on the demand and supply of housing and of business land. Relevant Councils must provide information on the amount of development capacity that is required to meet expected demand for housing and for business land over time.

Some Councils in the Wellington-Wairarapa-Horowhenua region include Tier 1 and 2 environments that are subject to the above requirements. The Wellington Regional Growth Framework provides an early regional response to the FDS requirements and there is an existing 2019 HBA that covers the Tier 1 and 2 urban environments for the region (this assessment is currently being updated).

In preparing this RHAP due consideration has been given to existing and on-going work by the region to satisfy the requirements of the NPS UD and other relevant national directions like the National Policy Statement Freshwater Management (NPS-FM). For example, regulatory and policy processes proposed through this RHAP have been developed in the context of helping to progress the spatial initiatives, including priority development areas, and the enablement of desired housing outcomes in locations identified for growth in the Wellington Regional HBA Final Report 2019.

Resource Management (Enabling Housing Supply and other Matters) Amendment Act 2021

The Resource Management (Enabling Housing Supply and Other Matters) Amendment Act was passed into law on 20th December 2021. The Act contains amendments to the Resource Management Act 1991 to bring forward and strengthen the National Policy Statement on Urban Development 2020. The intention of the Act is to increase housing supply in New Zealand’s five largest urban areas, including this region.

The Ministry of Housing and Urban Development website confirms that this amendment to the RMA does two things. Firstly, it requires tier 1 councils in Auckland, and greater Hamilton, Tauranga, Wellington, and Christchurch to change their planning rules so most of their residential areas are zoned for medium density housing. Secondly, it creates a new streamlined process so these councils can implement the NPS-UD’s intensification policies faster.

Both components of the Act could impact on the applicability or achievability of some of the actions proposed within this RHAP, particularly for key moves A, B and E:

- A. Harnessing the regional benefits of current policy and regulatory processes
- B. Taking a placed-based approach to resourcing regional housing interventions to make a real and tangible difference on the ground
- E. Embracing innovation by introducing new technologies and smarter ways of building and providing homes and communities

Given the short timeline between the introduction of the Bill (19th October 2021) and the Act coming into law (20th December 2021), the potential implications of the Act were not fully known at the time of finalising this Action Plan. An on-going action for the RHAP workstream, however, is to review the effectiveness or on-going relevance of the Act on the RHAP initiatives.

Māori specific housing issues

The Wellington Regional Growth Framework confirms that Māori communities in the region are relatively young and face several challenges. These include lower rates of housing ownership compared to the non-Māori population. In terms of responding to specific housing issues, it is recognised that each iwi has its own priorities and perspectives, and that ongoing work is needed to reflect the perspectives of all mana whenua.

A key initiative identified in the Wellington Regional Growth Framework is the development of an iwi spatial plan, to bring together mana whenua values and knowledge to determine their collective aspirations in relation to the spatial form of the region. This will directly inform future updates of the Framework.

MAIHI Ka Ora, the National Māori Housing Strategy, has a shared vision that “all whānau have safe, healthy, affordable homes with secure tenure, across the Māori housing continuum”. The Strategy has been developed in partnership with Māori and identifies the immediate and short-term challenges facing Māori housing that we need to address across key priority areas. MAIHI Ka Ora represents the first phase of work. The second phase builds on this foundation document, and in partnership with Māori looks to develop a detailed implementation plan.

Once the second phase of a national implementation plan has been developed our regional partners can build on that work to acknowledge our regions priority challenges and opportunities for Māori Housing, and to test whether there would be benefit in developing a regional Māori Housing Strategy to sit under the national strategy.

Proposed and existing housing plans/strategies and national housing plans and programmes

In response to acute housing issues many of the councils and other entities in the region already have, or are developing, housing plans and strategies to improve housing outcomes and livability, and to manage growing pressures in their area. For example, Horowhenua District Council has a Housing Action Plan, Upper Hutt City Council has an Affordable Housing Strategy, and Ngāti Toa has a Housing Strategy.

This RHAP is intended to work alongside and, where possible, strengthen other plans and strategies that have been developed to cover a longer timeframe than the RHAP and have not been limited to effectiveness and efficiency outcomes. For example, Wellington City Councils 10-year Housing Strategy confirms

that one of the ways they will work towards achieving their 10-year outcomes for the city is ‘*Central Government initiatives and partnerships*’. Both the progression of Central Government initiatives and developing cross-level partnerships are short-term actions identified within the RHAP and associated actions that will help to achieve these outcomes have been proposed.

Central government has also been working with local government, the housing sector and communities to release a number of housing plans and programmes to help improve housing affordability and supply, and to ensure tenants live in warm, dry, healthy and safe rental housing, and there are improved housing quality and choices for Māori and their whānau. Examples of Government plans and programmes include the Homelessness Action Plan (Local Innovation and Partnership Fund), Public Housing Plan, Progressive Home Ownership, MAIHI Ka Ora – National Māori Housing Strategy (Whai Kāinga Whai Oranga Fund), Healthy home standards, Residential Tenancies Amendment Act, First Home Grants and Loans and Housing Acceleration Funds, and the Infrastructure Acceleration Fund (IAF).

Interplay with provision of infrastructure

This Plan acknowledges that a significant investment in all hard and soft infrastructures will be required to enable large-scale housing development in the region (e.g., transport, three waters, electricity infrastructure, open space, community services and facilities).

Each authority in the region has plans and infrastructure strategies to support growth specific to their district. The Long-Term Plans and Infrastructure Strategies for each authority in the region provide (a) investment in renewals and upgrades (including addressing a backlog of under or deferred investment); and (b) investing for growth. Funding allocation for (b) growth investment is typically substantially smaller than for (a) investment in renewals and upgrades.

All the authorities and those in the housing development market have identified investment in three waters and transport infrastructure as being most critical to support growth and have acknowledged limited capacity to fund that investment. A high-level review of Council documents by the Ministry for Housing and Urban Development confirms a regional infrastructure gap that will continue to grow (being worsened by the NPS-UD, Housing Acceleration Fund, Medium Density Residential Standards and other initiatives) unless additional investment is committed to over the long term. Infrastructure investment will need to increase otherwise the next 30 years of growth in the region will not be accommodated.

The 2019 Wellington Regional Housing and Business Assessment, Long Term Plans and Infrastructure Strategies indicate the gap is most acute in the long term (2027 on) whereas the short and medium term is better provisioned. Ideally, the 2021 Wellington Regional Housing and Business Assessment would have been completed in time to inform this analysis. When complete, however, it will provide valuable up-to-date insight into the demand for housing in the region. Estimating the size and timing of the infrastructure gap requires further technical investigations and studies, and access to data not publicly available, to complete in-depth analysis. This is not part of this project.

Given the urgency of managing existing and projected three waters deficiencies, one early key initiative for the region through the will be the development of a 50- to 100-year regional three waters strategy (Year 2 of the WRLC programme of work). For the first time, local government, iwi, and central government will work together to develop a regional view of the longer-term three waters infrastructure requirements.

The strategy will identify existing regional issues, desired long-term outcomes, three waters principles and programmes of work that will support the region to achieve growth and environmental outcomes. To support the delivery of the 50- to 100-year three waters strategy, a regional delivery plan will need to be developed.

Longer term electricity provision for housing, employment activity and activities such as electric vehicles and ferries is an aspect of infrastructure that needs further analysis. This is highlighted as a project to be explored (including the resilience aspects) in the WRGF.

Appendix 3 – Current housing issues

| RHAP Key Move | | Regional Housing Issue | |
|---------------|--|------------------------|--|
| A | Harnessing the regional benefits of current policy and regulatory processes | 1 | Some regulatory settings may need or benefit from review to improve the efficiency of the system e.g., National Direction instruments such as the NPS FM, modular dwellings, and building consent requirements. It is also important to ensure alignment between these work programmes and wider work programmes (e.g., Building Code updates, Building System Legislative Reform, recommendations for the Climate Change Commission, Resource Management Reform and other relevant programmes) |
| | | 2 | The partners to the WRLC own or have access to quite a lot of land in the region e.g., central government, local government, iwi, but we don't understand how much of this is potentially "excess to requirements" and/or could be freed up and developed and we don't have a process for putting it all together |
| | | 3 | The social housing register does not reflect all those who are in need of social housing – for instance it does not count the number of people in a family, or where individuals (often vulnerable) have left the register before being housed. |
| | | 4 | Lack of clear accessible information around regulations that may enable individuals/developers to contribute to increased affordable housing supply especially when/if they have changed recently. |
| | | 5 | The lack of incentives at both a local and regional level to drive new typologies at scale and pace, with some possible incentives being rebates where appropriate, "fast track", affordability outcomes, inclusionary zoning |
| B | Taking a placed-based approach to resourcing regional housing interventions to make a real and tangible difference on the ground | 6 | <p>Resourcing is an issue now and is likely to continue. We have the numbers that indicate the level of building required to meet growth projections for the next 30 years – how do we work to ensure we have capacity over the next 5 years and beyond.</p> <ul style="list-style-type: none"> a) Councils are at capacity for issuing consents (both resource consents and more importantly building consents). Building consents teams are maxed out and are competing with the rest of the country for a relatively small pool of Building Consent Officers. b) Papakāinga housing – there is some money available but limited capacity to develop these. We need people to manage approved projects/outcomes and the capacity is not there to manage/deliver projects. c) Māori housing needs more support and assistance |

| RHAP Key Move | | Regional Housing Issue | |
|---------------|---|------------------------|--|
| | | | <p>d) CHPs and even community collectives, non-profit developers may have land, experience, and management capacity to deliver housing, but lack the necessary equity capital and/or access to finance</p> <p>e) There is already a lack of builders, electricians, plumbers etc and we know we need to build more houses than ever before – we should be planning for this</p> |
| | | 7 | We are at present dealing with both a housing shortfall (i.e., we don't have enough houses of the right type and tenure at present) and the need to enable housing for growth. |
| | | 8 | There are existing challenges associated with managing quality housing outcomes for both our existing housing stock (through maintenance and retrofit) and new dwellings (through a design led approach to accessibility, healthy homes, and building efficiency, and typology). |
| | | 9 | There is sub-regional variance in the level of housing acceleration and application of structure plan processes to support additional growth |
| | | 10 | We are lacking a regionally consistent and connected picture of social infrastructure needs based on the flow of communities as they live, work and play |
| C | Driving collaboration and partnership at all levels | 11 | <p>There are many central government programmes and tools to target increased housing options e.g., Land for Housing, Progressive Home ownership but:</p> <p>a) We (the region as a whole) are not making the most of these tools and programmes at present.</p> <p>b) We don't understand them as well as we could - there are multiple entities across the region trying to understand and/or access these programmes and tools resulting in a duplication of resources.</p> <p>c) We have no regional picture of the need for each of these programmes i.e., where does the Land for Housing programme fit into the regional demand?</p> |
| | | 12 | There is a lack of whole of government approach to aspects of the regulatory framework that impacts on housing supply e.g., different government entities providing submissions to district plan changes that provide conflicting opinions (based on their organisational direction) and lack of clarity over the interaction between the NPS-UD and NPS-FM |

| RHAP Key Move | | Regional Housing Issue | |
|---------------|--|------------------------|--|
| | | 13 | The region lacks a collective approach to the housing market and parts of it, for instance: <ul style="list-style-type: none"> a) What is the regional public housing plan/requirement and how do we portray this regional joined up (e.g. central government, local government, iwi, and Community Housing Providers (CHPs) approach? Including looking at local issues such as a lack of public housing in some areas (e.g., Wairarapa have no Kainga Ora presence). b) How do we support community housing and others to step into housing provision or upscale? |
| | | 14 | We (collectively) need to get better at working with the development community across the region such as: <ul style="list-style-type: none"> a) In a number of cities/districts the current district plan allows/enables the type of change in housing typology the region wants, but developers are not building these – why is this? b) Developers in the region have an appear to be reluctant to change and their business models tend to build what they know (there is a slow change in products) c) The limited capacity of developers in some areas (e.g., Kapiti) to deliver housing at scale d) Providing more certainty that arises through district plan changes/reviews. |
| D | Improving access to regional housing data and information driving housing innovation | 15 | Data and information on housing: <ul style="list-style-type: none"> a) Is kept in multiple places and is generally redeveloped and repackaged by multi entities for their individual use b) Is not easily and quickly accessible for all |
| | | 16 | The housing and urban development sectors require better data and therefore a better understanding of the housing market and opportunities. |
| | | 17 | There is limited knowledge of and access to information driving housing innovation making change hard to understand and/or implement |
| E | Embracing innovation by introducing new technologies and smarter ways of | 18 | Growth is impeded by constrained building supplies and the composition of the current building industry, which is dominated by a SME model that does not enable delivery at pace and scale.’ There are a number of emerging technologies and approaches to housing that are being developed at a small scale, but these are not currently being engaged at scale. One reason is that individual projects or agencies lack the capacity or reach to try these at a larger scale. In turn the absence of larger scale and predictable markets hinders development of capacity in areas such as prefabrication. |

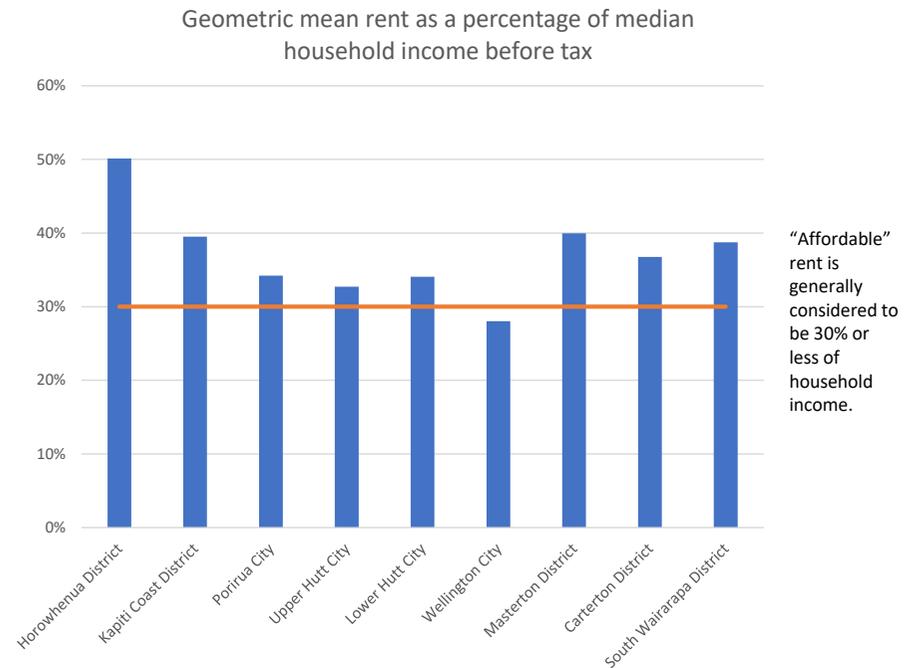
| RHAP Key Move | | Regional Housing Issue |
|--|----|--|
| building and providing homes and communities | 19 | There is a limited regional, multi-party work on how to use innovative solutions for short term solutions. e.g. temporary housing on future development sites. |

Appendix 4 - What do we know about housing in the region?

What do we know about demand and affordability in the region?

The WRGF figures shows we need to accommodate 200,000 more people and 85,500 dwellings in the next 30 years' time. Sense Partners suggests we need to accommodate 250,000 more people and 107,000 more dwellings. This means we need to build between 2833-3566 a year (depending on which measure you go with) to meet the target. The statistics below shows a point in time picture of what the current demand for housing is in the region.

For a household earning the median household income, this graph shows how much of their income would be taken up by the median rent. Only Wellington has a median rent figure that is "affordable" for the median Wellington income.



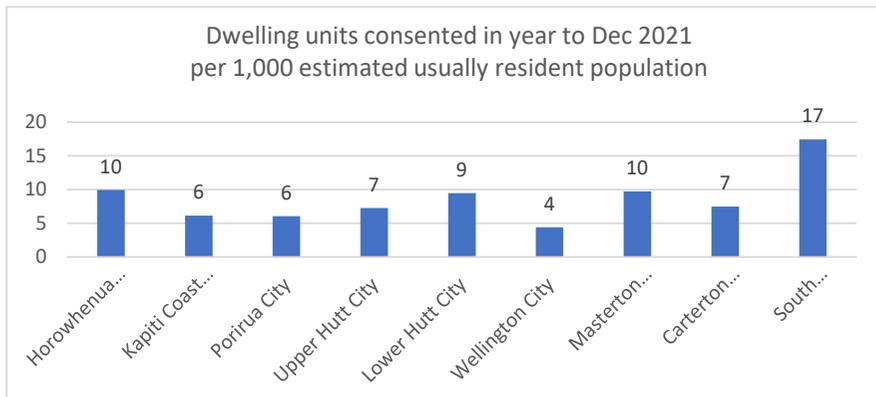
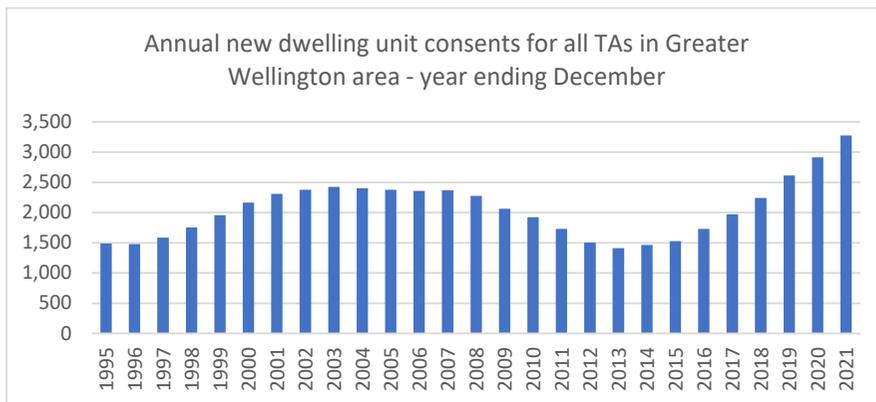
No. of Households **Median sales prices**
UP 5.3% **UP 70.29%**
 Between 2013-2018 Censuses since June 2017

Housing register **Quarterly EHSNGs**
UP 320% **UP 244.71%**
 since Sept 2017 since June 2018 quarter

What do we know about supply of housing in the region?

We're currently consenting (and maybe building) at an all-time high, but:

- Not all consents result in a finished dwelling, and the building sector has historically been quite volatile
- There are indications that the sector is currently operating near capacity, with COVID-related supply and staff shortages
- Not all the growth potential in the region may be able to be realised, and there are variances in how much is being built across the region.



| | | |
|---|---|---|
| <p>Public Housing tenancies</p> <p>8962</p> <p>Quarter ending June 21 (+4% since June 2018)</p> | <p>Transitional Housing places</p> <p>436</p> <p>Quarter ending June 21 (+106% since June 2018)</p> | <p>Dwelling unit consents</p> <p>4,019 issued</p> <p>in the 12 months to Dec 2021</p> |
|---|---|---|

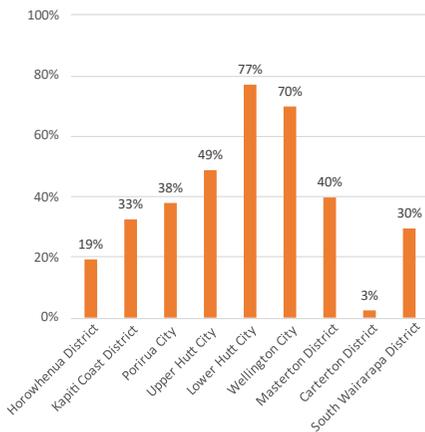
What do we know about what and where we are building in the region?

This diagram below shows what we are building in terms of standalone houses versus apartments, units and townhouses – and how big and expensive these dwellings are. Average size and value of dwellings tells the “affordability” story. If we are building big and expensive apartments or standalone houses, then they are not “affordable” dwellings. “Average size” is also partly a reflection of the availability of land in a place – e.g. houses are bigger in the Wairarapa.

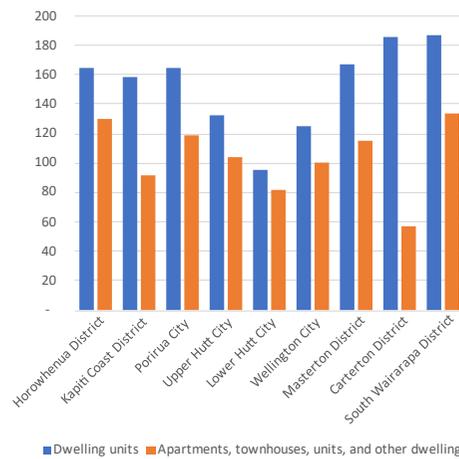
What are we building, and where – a snapshot



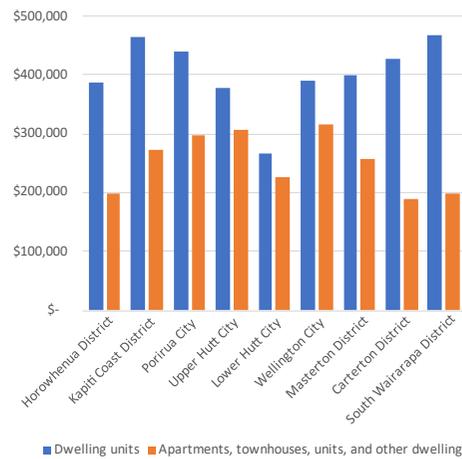
Apartments, units and townhouses as percentage of total dwelling consents 2021



Average floor area of dwellings consented 2021



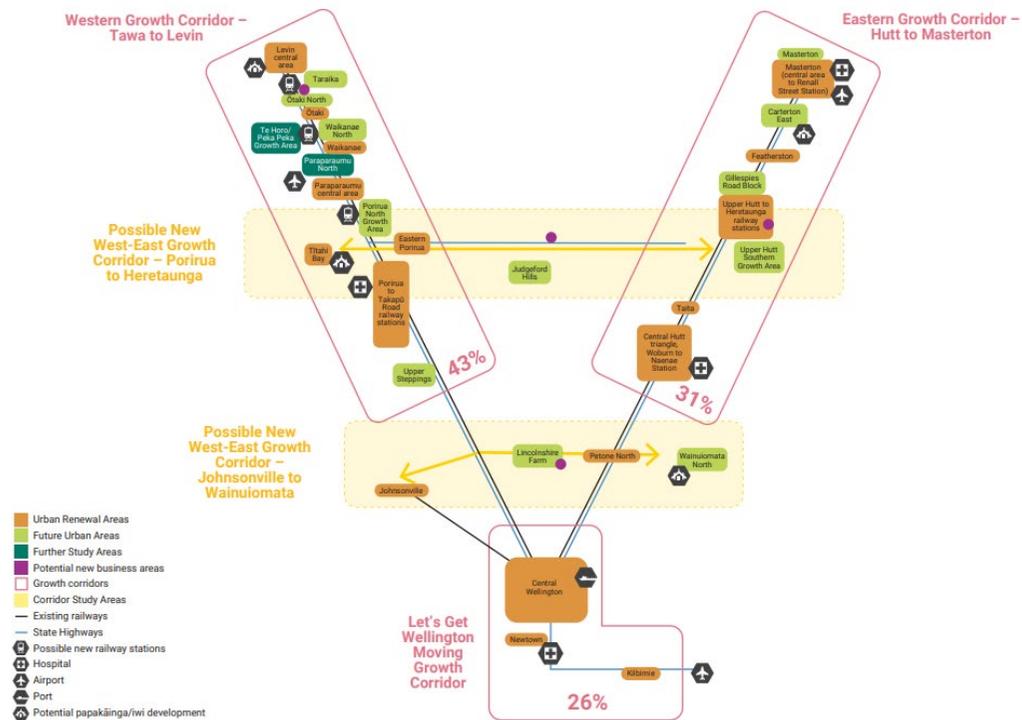
Average value of dwellings consented 2021



Appendix 5 - What is currently planned and going on in the region?

This Appendix provides information on the Wellington Regional Growth Framework representation of growth over the next thirty years, key housing developments underway or planned and key policy work underway or planned. It is view at this point in time for the RHAP and will be kept updated as a live set of information as part of the regional dashboard.

A growth corridor view of the Future Urban Development Areas



Planning and Policy planned and underway

The table below provides a list of the District Plan Reviews, Plan Changes, growth strategies, housing strategies and similar documents that have been or are being progressed in the region and/or nationally by the partners to the RHAP.

| Organisation | District Plan Review | Plan Changes | Growth Strategies | Housing Strategies or Plans |
|---|--|---|--|---|
| Carterton District Council | n/a | n/a | n/a | Housing Action Plan |
| Central Government, councils from the region and mana whenua | n/a | n/a | Wellington Regional Growth Strategy | n/a |
| Community Housing Aotearoa | n/a | n/a | n/a | Strategic Plan 2018 |
| Dwell Housing Trust | n/a | n/a | n/a | Strategic Plan 2020 – 2025 |
| Greater Wellington Regional Council | n/a | n/a | Wellington Regional Land Transport Plan 2021 | n/a |
| Horowhenua District Council | n/a | Proposed Plan Change 4 – Taraika Growth Area Proposed Plan Change 5 - Waitāreere Beach Growth Area | Horowhenua 2040 | A Community Driven Housing Action Plan Our Vision: 'Homes for All' 2019 |
| Hutt City Council | Early-stage consultation on District Plan Review <i>Upcoming intensification plan change to implement NPS UD Policy 3</i> | Plan Change 43 – Residential and Suburban Mixed Use | Urban Growth Strategy (2012-2032) | Research Report – Housing Demand and Need in Hutt City 2019 |
| Kapiti Coast District Council | Kapiti Coast District Plan 2021 | n/a | Te Tupu Pai – Growing Well | Housing Strategy 2022 |

Attachment 1 to Report 22.124

| Organisation | District Plan Review | Plan Changes | Growth Strategies | Housing Strategies or Plans |
|---|--|--|--|--|
| | <i>Upcoming intensification plan change to implement NPS UD Policy 3</i> | | | Housing Need Research Report - Housing Demand and Need in Kapiti District |
| Ministry for Housing and Urban Development | n/a | n/a | n/a | Government Policy Statement – Housing and Urban Development Public Housing Plan 2021-2024 MAIHI Ka Ora - National Māori housing strategy |
| Ngāti Toa Rangatira | n/a | n/a | n/a | Te Rūnanga O Toa Rangatira Strategic Plan (2017) Ngāti Toa Housing Strategy (2022) |
| Porirua Council | Proposed District Plan <i>Upcoming intensification plan change to implement NPS UD Policy 3</i> | Up-coming Intensification Plan Change | Growth Strategy 2048 | n/a |
| Port Nicholson Block Settlement Trust | n/a | n/a | n/a | Five Year Strategic Plan 2011 – 2015 |
| South Wairarapa District Council | n/a | n/a | South Wairarapa Spatial Plan – Our Future Focus 2050 | n/a |
| Upper Hutt City Council | <i>Upcoming intensification plan change to implement NPS UD Policy 3</i> | Plan Change 50 – Rural and Residential Chapters Review | Land Use Strategy – Upper Hutt 2016 – 2043 | Upper Hutt Affordable Housing Strategy 2020 |

| Organisation | District Plan Review | Plan Changes | Growth Strategies | Housing Strategies or Plans |
|---|---|--------------|--|--|
| Waka Kotahi | n/a | n/a | Ngā Kaupapa Huarahi o Aotearoa (2021–24 National Land Transport Programme) | |
| Wellington City Council | Draft District Plan (non-statutory) <i>Upcoming intensification plan change to implement NPS UD Policy 3</i> | n/a | Spatial Plan: Our City Tomorrow | Housing Strategy: Our 10-year Plan 2018 – 2028 |
| Wellington Regional Healthy Housing Group | n/a | n/a | n/a | Strategy and Action Plan (Updated February 2021) |

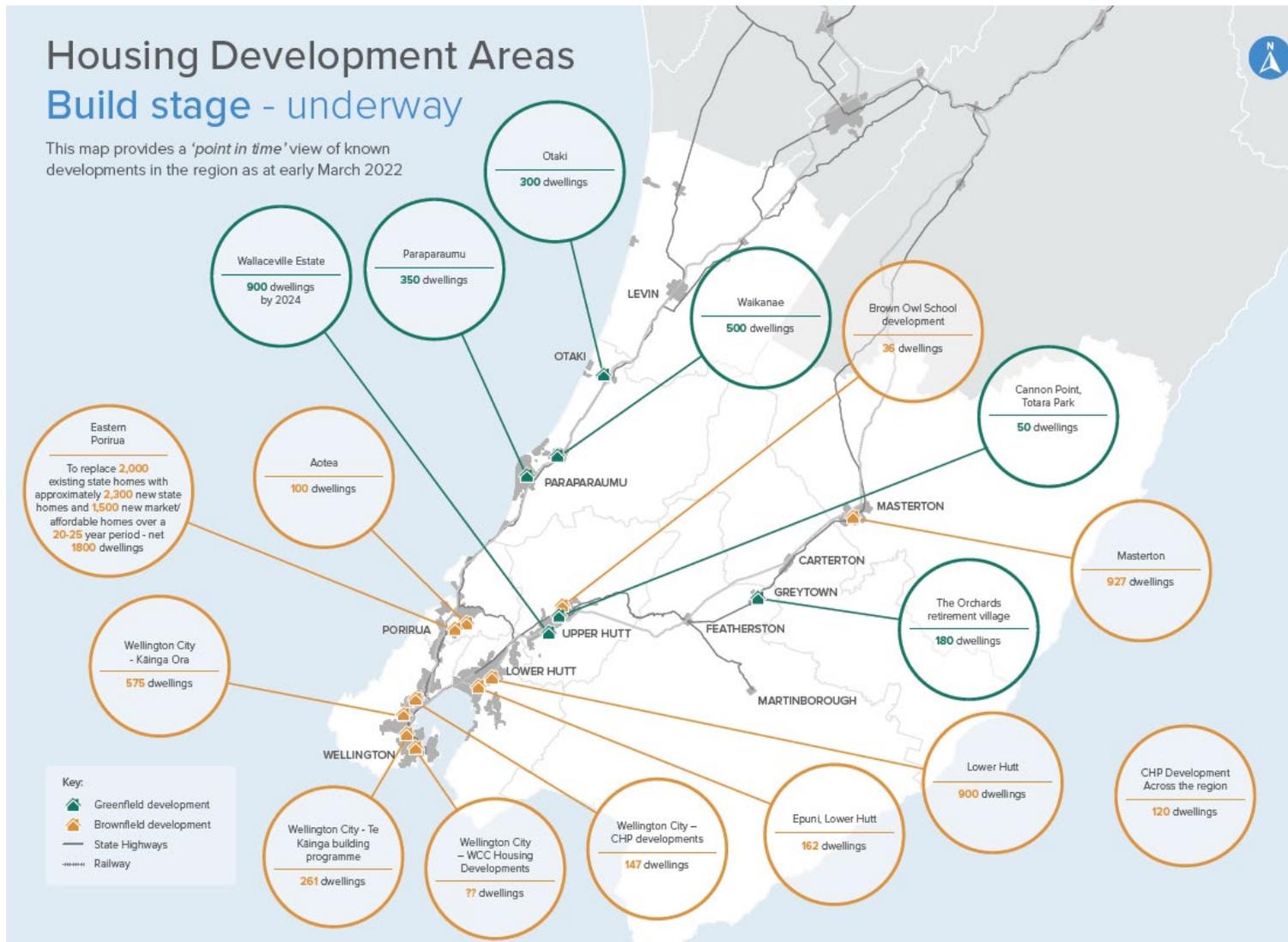
Housing Development Areas

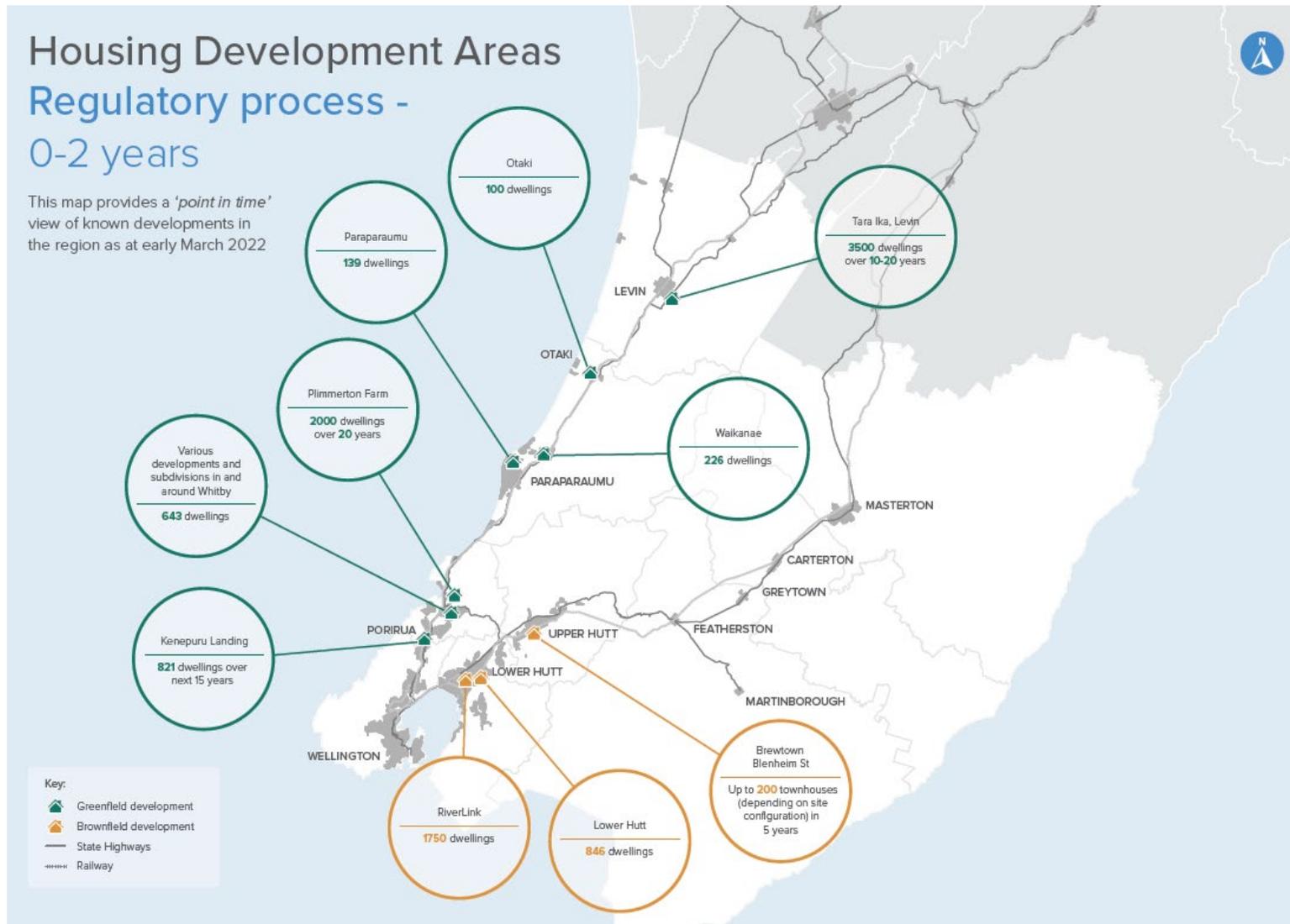
The maps below outline a ‘point in time’ view of known developments in the region as at December 2021 over four categories of planning timeframe.

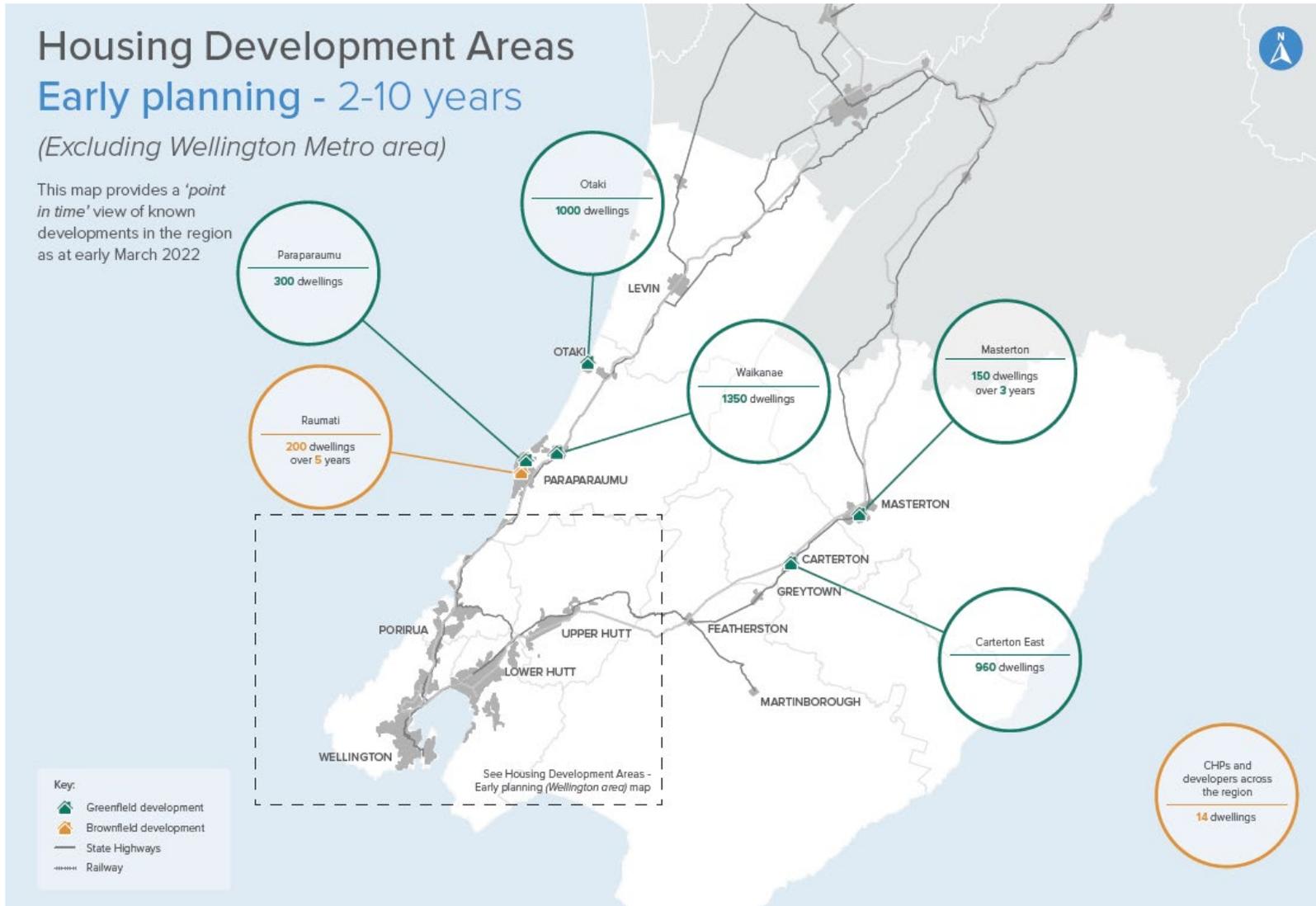
Within the maps developments have been identified in a number of different ways to provide the most accurate picture possible (e.g., individually, cumulatively, with specific development figures, or as an estimate figure).

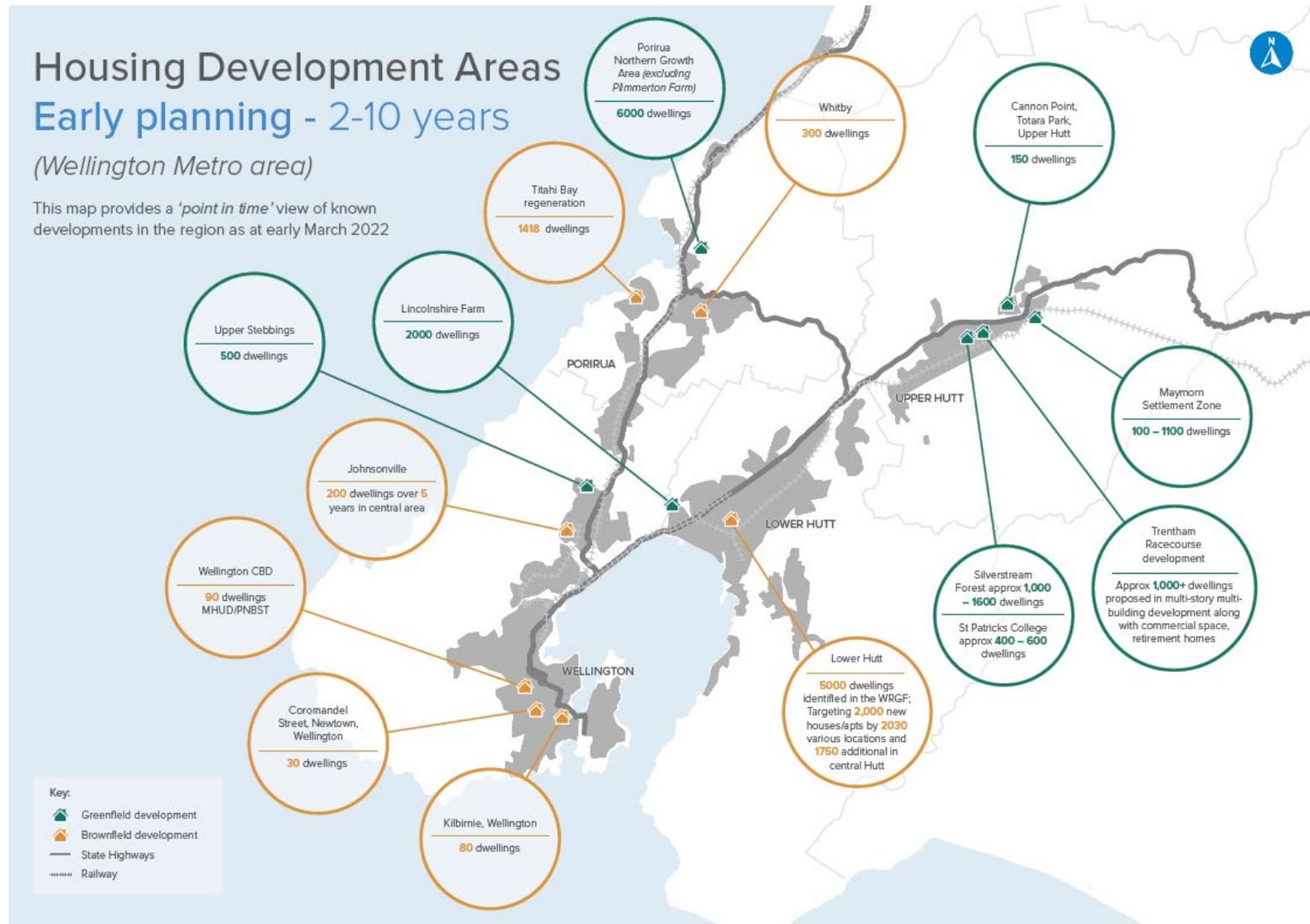
This list excludes a quantification of expected uplift from proposed District Plan zonings or the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021.

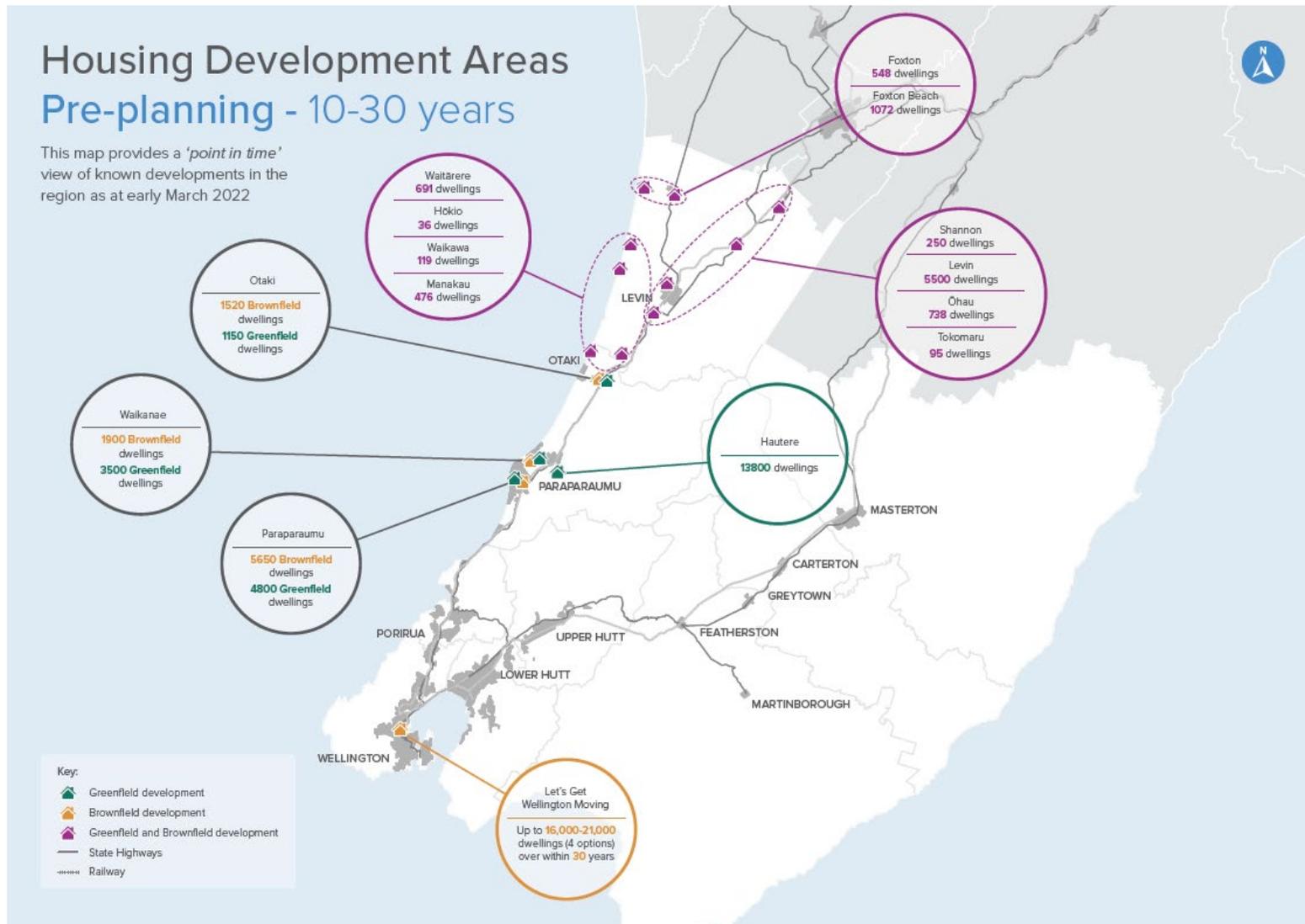












Appendix 6 - Actions considered but not progressed through the RHAP

While all the identified actions would, in some way, contribute to the acceleration of growth and quality outcomes this RHAP has been developed in the context of a five-year timeline and constrained resourcing. All actions could not, therefore, be progressed within the lifetime of the RHAP and a refined list was necessary to ensure successful outcomes. The actions that are not being progressed have been omitted for various reasons, such as they could not reasonably be expected to be completed within the lifetime of this RHAP, they were less aligned with regional priorities than other actions, or there was insufficient capacity to resource.

Notwithstanding, some of these actions are enduring and can be progressed post-RHAP in 2027, should this be considered appropriate. Retaining this list also allows for fluidity across the lifetime of the RHAP should changes to regional prioritisation or capacity be identified through on-going monitoring processes.

| RHAP Key Move | | Identified Potential Action |
|---------------|--|---|
| A | Harnessing the regional benefits of current policy and regulatory processes | Identify current regulatory barriers that could be changed and/or reduced to ease the time to market for new housing e.g., modular dwellings building consents |
| B | Taking a placed-based approach to resourcing regional housing interventions to make a real and tangible difference on the ground | All identified actions have been included within the RHAP |
| C | Driving collaboration and partnership at all levels | Establish a “whole of government” approach e.g., a whole of government submission on district plan changes rather than individual entities, taking a more systems approach to housing supply in the region. |
| D | Improving access to regional housing data and information driving housing innovation | Include data from Aotearoa NZ Homelessness Action Plan: Data and Evidence Initiative – fit for purpose, data and evidence system for homelessness (2020-ongoing) |
| E | Embracing innovation by introducing new technologies and smarter ways of building and providing homes and communities | Work with the development community to confirm regional capacity for modular housing, release suitable and available land, and achieve faster off-site manufacturing to speed-up supply Develop opportunities for collective housing and other models in the region and what a regional view on this might look like. See example here https://www.stuff.co.nz/life-style/homed/latest/124774974/collective-housing-is-our-future-new-report-recommends-a-solution-to-the-housing-crisis |

In addition to the list of potential actions identified above, we also identified the following potential actions for achieving a regional multi-party approach to the advocacy of key housing matters:

| | |
|----------|--|
| 1 | Advocate for councils to have the ability to provide the Income Related Rent Subsidy |
| 2 | Advocate for speedy visas for current overseas staff in NZ and import of new people to meet skills gaps (including those involved in planning, consenting, and building) |
| 3 | Advocate for central government enabling opportunities such as considering 'emergency legislation' that enables temporary housing on future development sites. |

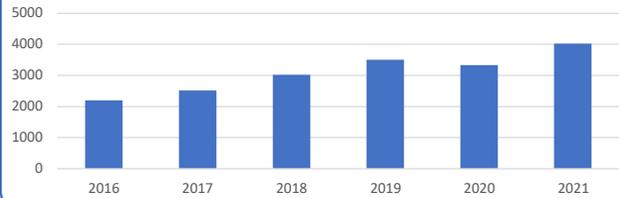
WRLC DASHBOARD

INDICATORS

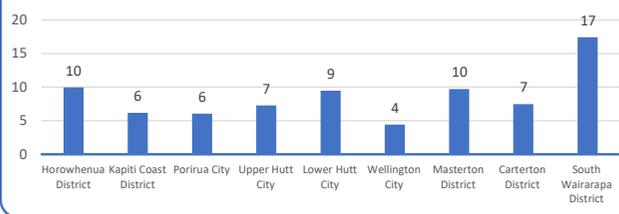
INCREASE HOUSING SUPPLY AND IMPROVE HOUSING AFFORDABILITY AND CHOICE

Building consents are currently at an all-time high, but not all consents result in a finished dwelling. There are indications that the sector is currently operating near capacity, with COVID-related supply and staff shortages. Not all the growth potential in the region may be able to be realised, and there are variances in how much is being built across the region.

Annual building consents for new dwellings for the WRLC region - year ending December 2021

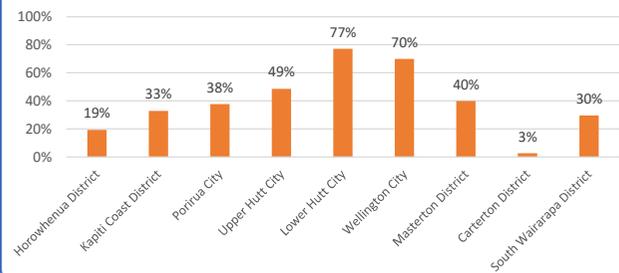


Dwelling units consented in year to Dec 2021 per 1,000 estimated usually resident population

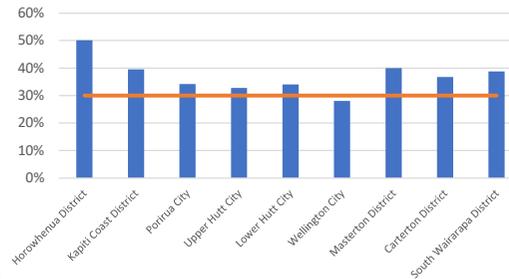


New standalone houses versus apartments, units and townhouses

Apartments, units and townhouses as percentage of total dwelling consents - 2021



Geometric mean rent as a percentage of median household income before tax

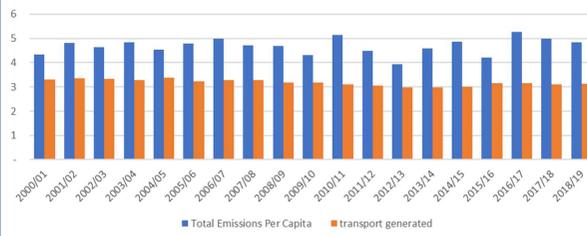


"Affordable" rent is generally considered to be 30% or less of household income.

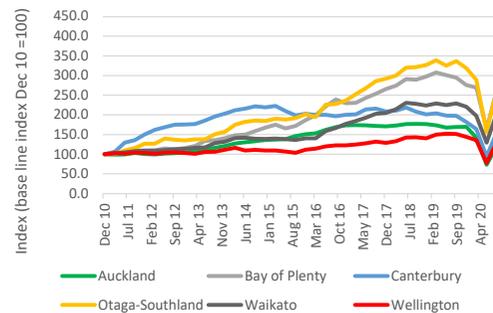
ENABLE GROWTH THAT PROTECTS AND ENHANCES THE QUALITY OF THE NEUTRAL ENVIRONMENT AND ACCOUNTS FOR A TRANSITION TO A LOW/NO CARBON FUTURE

This data is sourced from the last emissions inventory.

Emissions per capita (tCo2e)

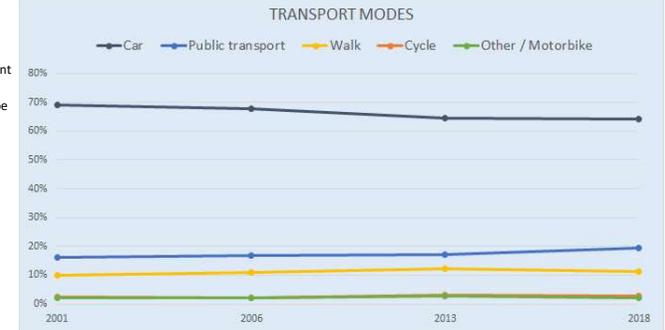


Regional All Vacancies Index (AVI) 2010 - 2021

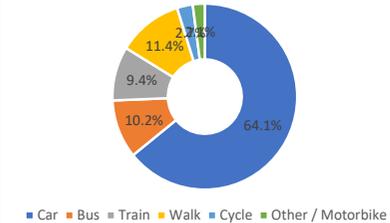


IMPROVE MULTI-MODAL ACCESS TO AND BETWEEN HOUSING, EMPLOYMENT, EDUCATION, SERVICES

Transport mode share - Journeys to work Wellington Region (census 2001-2018)

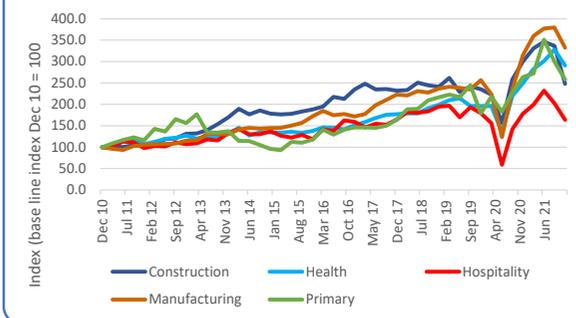


TRANSPORT MODE SHARE WELLINGTON REGION 2018



We are working with the GW team to produce some indicators relating to protection of the natural environment and sea level rise. We aim to have some great data for the next meeting.

Wellington Region Industry AVI 2010 - 2021



| WRLC DASHBOARD | | PROGRAMME DASHBOARD | | | | | Wellington Regional Leadership Committee | | | | |
|--|---|---------------------|------------------------|--------------------------|------------|-----------------------|---|-----------|--------|--------|------------|
| project name | Category <small>Regional / local</small> | lead organisation | leader | project plan sign-off | start date | project completion | Scope | Programme | Budget | Risk | Confidence |
| Iwi capacity and capability | Regional | WRLC Secretariat | Kim Kelly | Nov 21 | Jan 2022 | May 2022 | ● ↓ | ● ↓ | ● ↓ | ● ↓ | ● ↓ |
| Levin Structure Plan | Local | HDC | Cherie McKillop | Nov 21 | Feb 2022 | Nov 2022 | ● ↓ | ● ↓ | ● ↓ | ● ↓ | ● ↓ |
| Lower Hutt Structure Plan | Local | HCC | Becky Kiddle | Aug 21 | Mar 2022 | Oct 2022 | ● ↓ | ● ↓ | ● ↓ | ● ↓ | ● ↓ |
| Ōtaki Pilot Project | Local | KCDC | Angela Bell | Nov 21 | Feb 2022 | Dec 2022 | ● ↓ | ● ↓ | ● ↓ | ● ↓ | ● ↓ |
| Regional approach to climate change impacts | Regional | WCC | Jamuna Rostein | Nov 21 | Sep 2021 | Dec 2022 | ● ↓ | ● ↓ | ● ↓ | ● ↓ | ● ↓ |
| Regional Economic Development Plan | Regional | Wellington NZ | Stuart Taylor | Aug 21 | Aug 2021 | Jun 2022 | ● ↓ | ● ↓ | ● ↓ | ● ↓ | ● ↓ |
| Regional Emissions Reduction Strategy | Regional | GWRC | Lisa Early | Nov 21 | Feb 2022 | Feb 2023 | ● ↓ | ● ↓ | ● ↓ | ● ↓ | ● ↓ |
| Regional Housing Approach and Action Plan | Regional | MHUD, WRLC | Kashmir Kaur/Kim Kelly | Aug 21 | Jul 2021 | Aug 2022 | ● ↓ | ● ↓ | ● ↓ | ● ↓ | ● ↓ |
| Wellington Regional Growth Framework and Regional Policy | Regional | GWRC | Fleur Matthews | Aug 21 | Jul 2021 | Jun 2022 | ● ↓ | ● ↓ | ● ↓ | ● ↓ | ● ↓ |

| project name | Category <small>Regional / local</small> | lead organisation | What Is This Project? | Planned sign-off |
|-----------------------------|---|-------------------|---|---------------------|
| Johnsonville Masterplanning | Local | WCC | The opportunity can maximise mixed-use and residential opportunities. WCC is progressing Johnsonville as a key suburban centre within its Draft Spatial Plan and through its review it is likely to result in District Plan policies, infrastructure, investment, and a suburban centre investment plan that will incentivise and enable the high levels of growth required. It leverages the already regionally significant centre connected by infrastructure and public transport (rail and bus) that serves several adjacent suburbs. | May 22 |
| 3 Waters | Regional | WRGF - WWL | A regional plan to identify key strategic 3 waters assets at a regional scale to support growth levels and locations. This should also consider opportunities for utilisation of new or emerging technologies (e.g., decentralised wastewater systems) within the region. It should consider a 50-100 times scale. It should include recommendations for trial activities. | May 22 |
| Upper Hutt Structure Plan | Local | UHCC | This opportunity can increase housing density in this area with a District Plan change underway along an already established rail corridor and in an area with a lower hazard profile than other parts of the region. It leverages identified key development opportunities around stations, including changes in housing density at Trentham, potential for office development in Wallaceville, the development of a sports hub in Heretaunga and development opportunities in Upper Hutt centre as well as rail and road (SH58 and Transmission Gully) investment. | May 22 |
| Food production | Regional | TBC | This regional strategy project will investigate and research the sustainability of the region's food systems to support planned, future growth, including consideration of food security issues and the efficacy of supply chains, to underpin a healthy, prosperous, and resilient regional community and economy. | May 22 |
| Iwi Spatial Plan | Regional | Iwi | To provide a wider iwi view on this spatial plan by developing a specific mana whenua driven spatial plan and to develop iwi management plans which are required to address matters of resource management activity of significance within their respective rohe (region) but do not currently exist for many iwi at present (mainly due to resourcing issues). This would also assist in meeting Future Development Strategy requirements. Regional work to understand options for improved housing for Iwi/Maori including papakainga and affordable housing options. To include targets for housing ownership. | May 22 |

| | | | |
|--------|-----------------------|---|---|
| Status | ● Tracking as planned | ● Some areas requiring action, some potential risks | ● Significant issues or stop/go decision required |
| Trend | ↑ Improvement | ↔ Unchanged | ↓ Decline |

WRLC DASHBOARD

PROGRAMME DASHBOARD



Status Summary

| Project | Project Progress / Status Summary |
|---|--|
| Iwi capacity and capability | A consultant has been engaged to prepare a scoping report for each of the three opportunities and to assist in determining which (if any) of the opportunities to take forward. One on one meetings are being held initially with iwi WRLC members - this is underway. Also underway is information gathering on other similar opportunities. |
| Kāpiti and Horowhenua Greenfield | This project is scheduled to commence in 2022-23, but preliminary discussions about the project have commenced. |
| Levin Structure Plan | The project team has been established and progress is well underway. No scope changes or issues identified at this stage. |
| Lower Hutt Structure Plan | The project is nearing the end of its planning phase. A workshop with key community leaders was held in November to set the direction, kawa (what we do) and tikanga (how we do it). |
| Ōtaki Pilot Project | <ul style="list-style-type: none"> A Housing and Social Needs Assessment is underway, which is expected to provide increased understanding about the housing needs for iwi/Māori in Ōtaki and their housing aspirations. Procurement processes are beginning for a consultant to produce the toolkit for papakainga housing |
| Regional approach to climate change impacts | The tender process is underway to appoint a consultant(s) to undertake the assessment in approximately mid-March; an Iwi/Maori Engagement Plan for the project has been started with further work is due to be completed in February after a workshop with WRGF with more guidance about how to develop the engagement approach under the WRGF; GWRC Flood Vulnerability Assessment is tracking well and is almost complete. |
| Regional Economic Development Plan | Project plan and delivery team has been set up. Work Progress at slower pace with iwi-engagement plan. Steps been taken to incorporate Māori perspective in the REDP. Wairarapa Economic Development Governance Group is revising the WED Strategy with focus on aligning their priorities with REDP. Work in progress by Chapter Leads to engage with stakeholder to plan and draft engagement, planning and starting to write the chapters using the template and guidance |
| Regional Emissions Reduction Strategy | Stage 1, a technical stocktake, is being done by Jake Roos Consulting for completion by financial year end. Iwi, central and local government agencies were invited to propose Steering Group members; names were received from most TAs and one government agency. The next step is to hire a project manager who will detail the scope and resource requirements for Stages 2 and 3. With good confidence for delivery of Stage 1, amber ratings refer to Stages 2 and 3. |
| Regional Housing Approach and Action Plan | The project has 4 deliverables. The Issues and Opportunities paper has already been presented to the WRLC. The draft RHAP will be presented to this round of meetings for signoff. Version 1 of the Dashboard is due in March/April 2022 and work on the Housing model options continues with an initial paper being presented in this round of meetings. |

| Project | Project Progress / Status Summary |
|--|--|
| Wellington Regional Growth Framework and Regional Policy | Climate change, indigenous biodiversity and freshwater create an integrated frame for how the RPS will direct urban development capacity and housing intensification. Work on developing draft issue statements and objectives is complete, drawing on the Wellington Regional Growth Framework, national direction and documents produced by the three completed whitua processes. |
| West-East Access, Housing and Resilience Investigation | In December, Waka Kotahi's delegations committee deferred endorsement of the programme business case (PBC) to the National Manager System Design and requested assurance the timing of this PBC is appropriate given resourcing and other work underway such as the Emissions Reduction Plan. We are in the process of recruiting new PMs and Transport Planners. This PBC is the first priority to start once new team members are onboard. |

Upcoming communications and engagement opportunities

| |
|---|
| The WRLC Communications and Engagement Strategy was completed in November 2021. |
| The WRLC Website went live in December 2021. |
| The first monthly eNews sent early Feb 22, subscribers have nearly doubled since it was sent to 416. |
| Our LinkedIn page went live late January, now has 152 followers. |
| Most projects are moving quickly towards engagement stage. The comms and engagement advisor will be working closely with them to support a consistent approach based on our agreed engagement principles, and identify opportunities for alignment, efficiency and regional coordination. |
| MPs meeting planned for March 17th may be online given COVID restrictions. |
| Next horizon for comms manager is finalising project-specific key messaging, increasing our presence on our partners websites and eNews, and building relationships with other relevant sector organisations. |

Top Programme Risks and Issues.

| Risk | Mitigation and comment |
|--|---|
| Councils may have limited capacity to deliver or participate in project delivery | Participating councils have indicated that resource availability and capacity may become an issue, which may impact the programme. This is due to both people will key experience moving to other organisations and the amount of resource required to participate in all the reform programmes. Careful prioritisation and planning will be needed to prevent this. Programme management look for opportunities to collaborate or achieve efficiencies, as well as encouraging project leaders to signal any issues early. |
| Iwi capacity and capability to participate in all levels of the WRLC work programme is limited | A consultant has been engaged to prepare a scoping report to examine three opportunities that may improve iwi capacity and capability to participate in our programme, and to assist in determining which (if any) of the opportunities to take forward. |
| Issue | Mitigation and comment |
| No issues have emerged yet | |

WELLINGTON TRANSPORT ANALYTICS UNIT

Who are we

- A partnership between GWRC, Waka Kotahi and local councils established in 2021
- A dedicated, independent team that provides transport modelling and analytical services to the region
- A team that will work together with partners to support a regional view of transport, providing the evidence to support efficient decision making



Purpose Statement

Transport analytics provides the evidence base to inform transport and land use decisions, with potentially far-reaching implications that affect our environment, economy, social well-being and urban form

DELIVERING A REGIONAL APPROACH

Delivering a regional approach

- One voice
- Effective use of data
- Informed decision making
- Centre of innovation



Delivering a regional approach

- One voice
- Effective use of data
- Informed decision making
- Centre of innovation



Delivering a regional approach

- One voice
- Effective use of data
- Informed decision making
- Centre of innovation



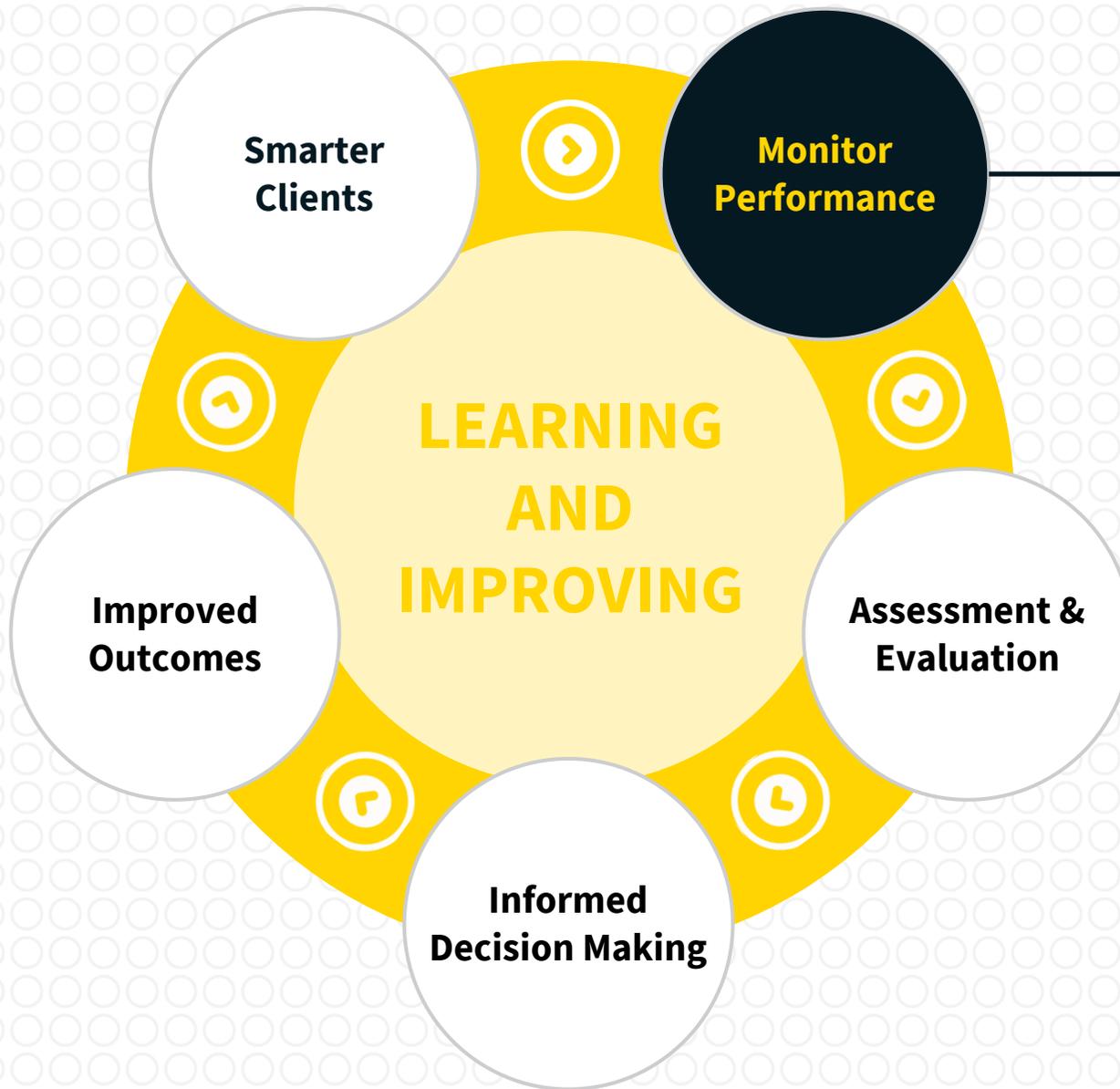
Delivering a regional approach

- One voice
- Effective use of data
- Informed decision making
- Centre of innovation

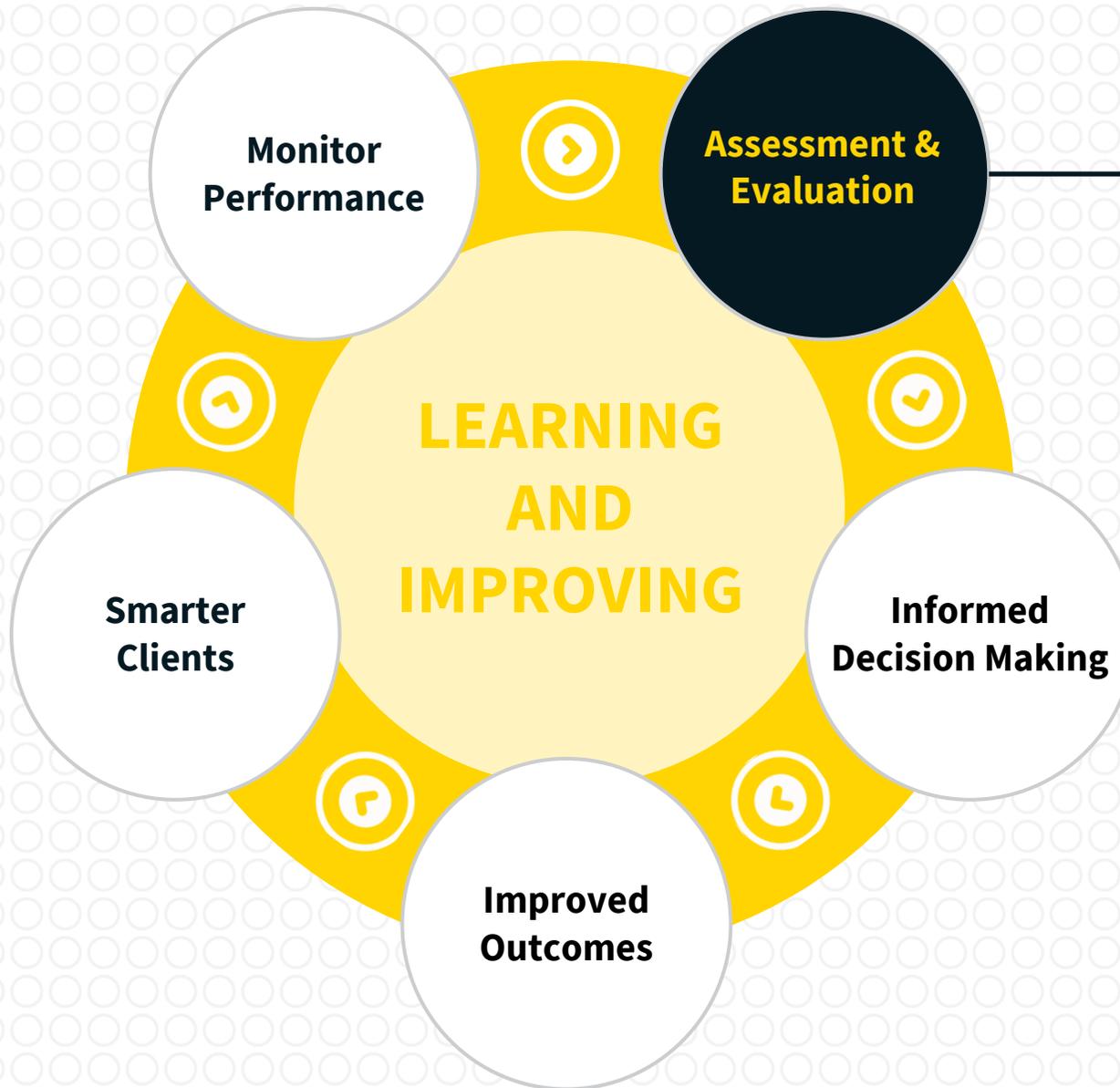


HOW WE WORK AND ADD VALUE





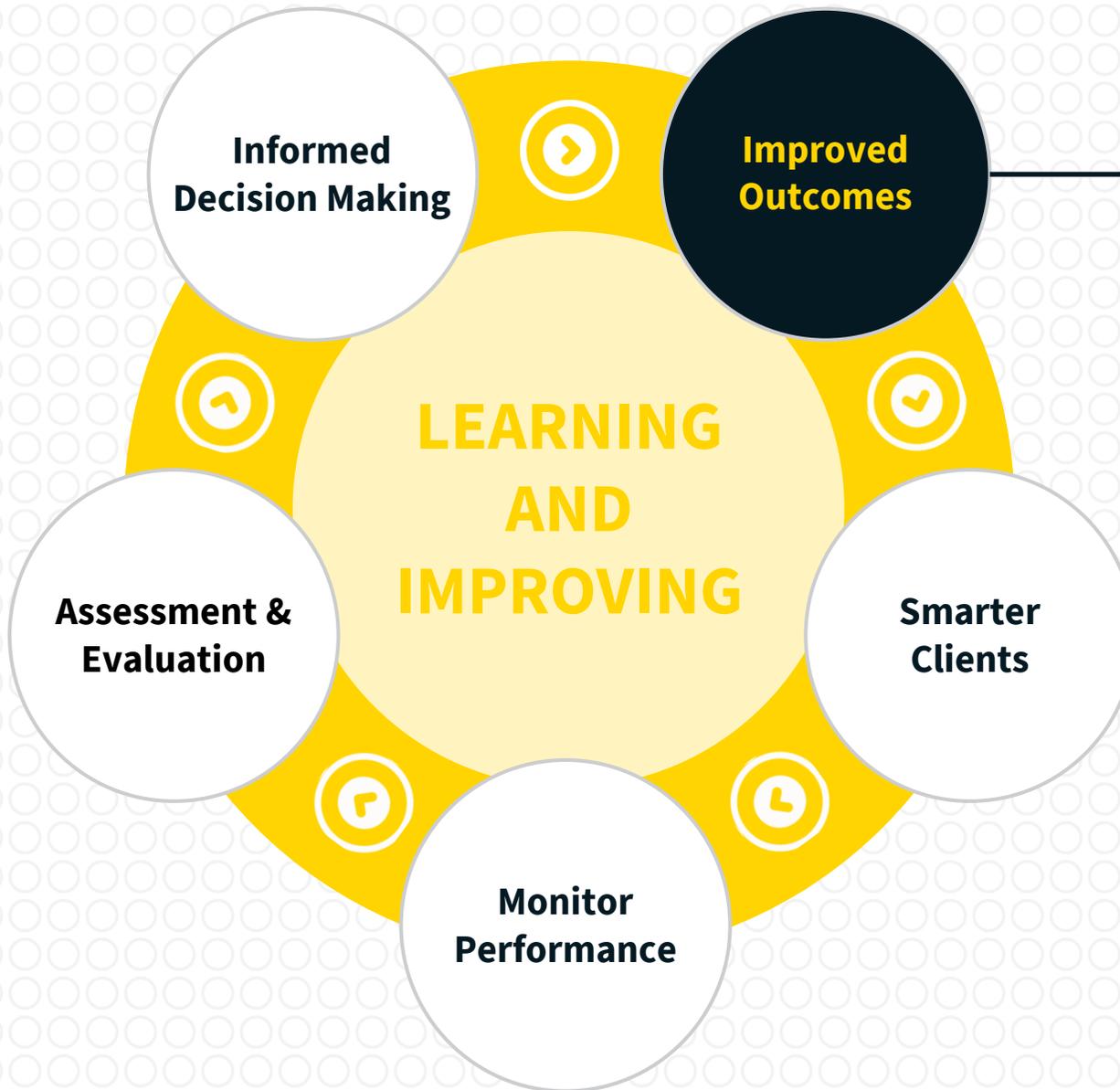
We actively monitor how people move around the Wellington region looking at mode choice, traffic volumes and use of public transport. We are all about continuous improvement and learning from our experience.



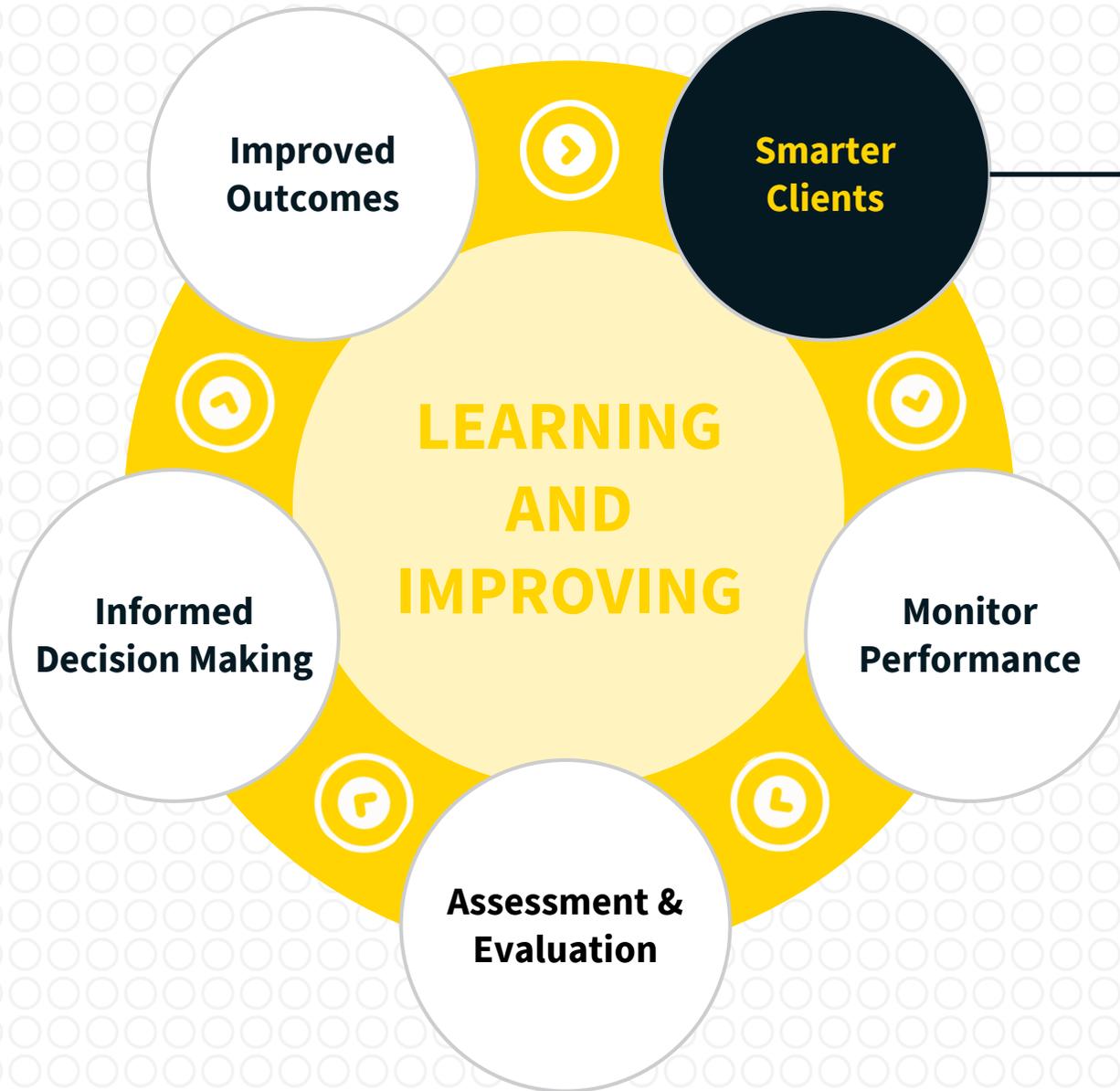
We use specialist forecasting tools and available data to develop transport models and travel demand forecasts to help inform future investment.



We provide specialist support and advice to partner organisations. We present data and model outputs in a format that can be understood by all and used to support informed decision making and greater investor confidence.



More effective and timely interventions leading to improved community outcomes that fit with the region's strategic direction.



Better informed, smarter clients with access to high quality information driving informed regional decision making and investment.



- A consistent regional voice
- Efficient use of resources
- Avoid duplication of work
- Value for money
- Use latest technology
- Proactive
- Continuous Improvement

BENEFITS FOR WELLINGTON REGION



Improved access to analytical resources



Improved alignment



Improved information for decision making



Increased confidence

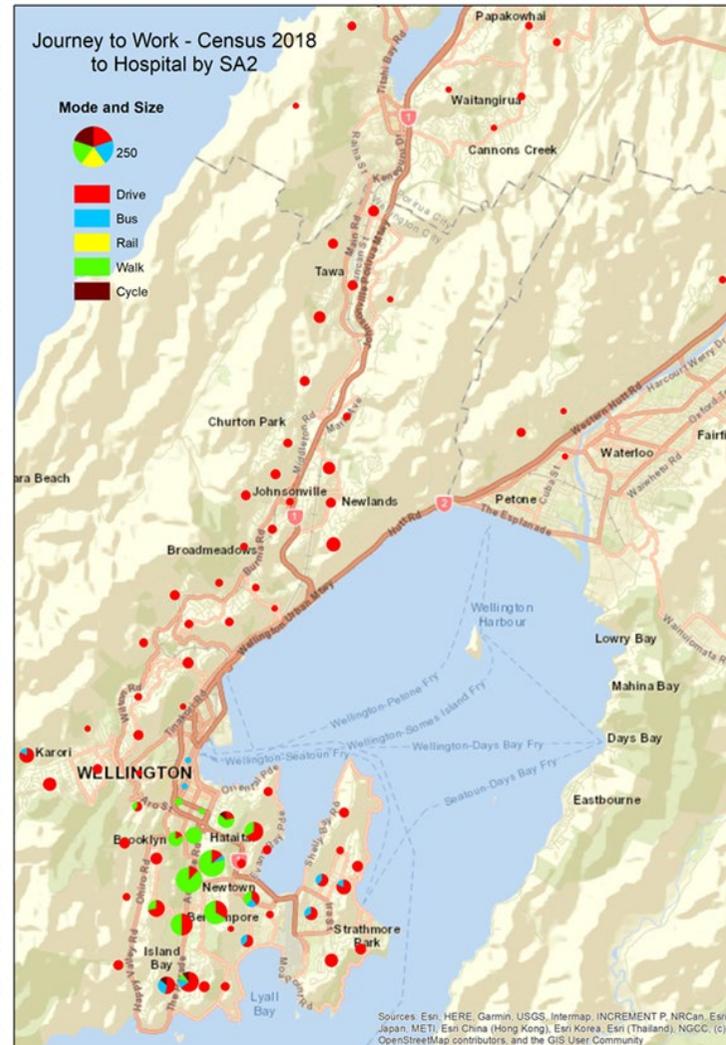
Work programme

- At its core, the work programme supports delivery of the RLTP 2021:
 - 35% increase in non-car mode share
 - 40% reduction in deaths and serious injuries
 - 35% reduction in transport generated carbon dioxide
- The work programme does this by:
 - Providing the **evidence base** to understand opportunities for mode shift, emissions reductions and safety improvements
 - Using **analytics and modelling to inform decision making** to help achieve objectives

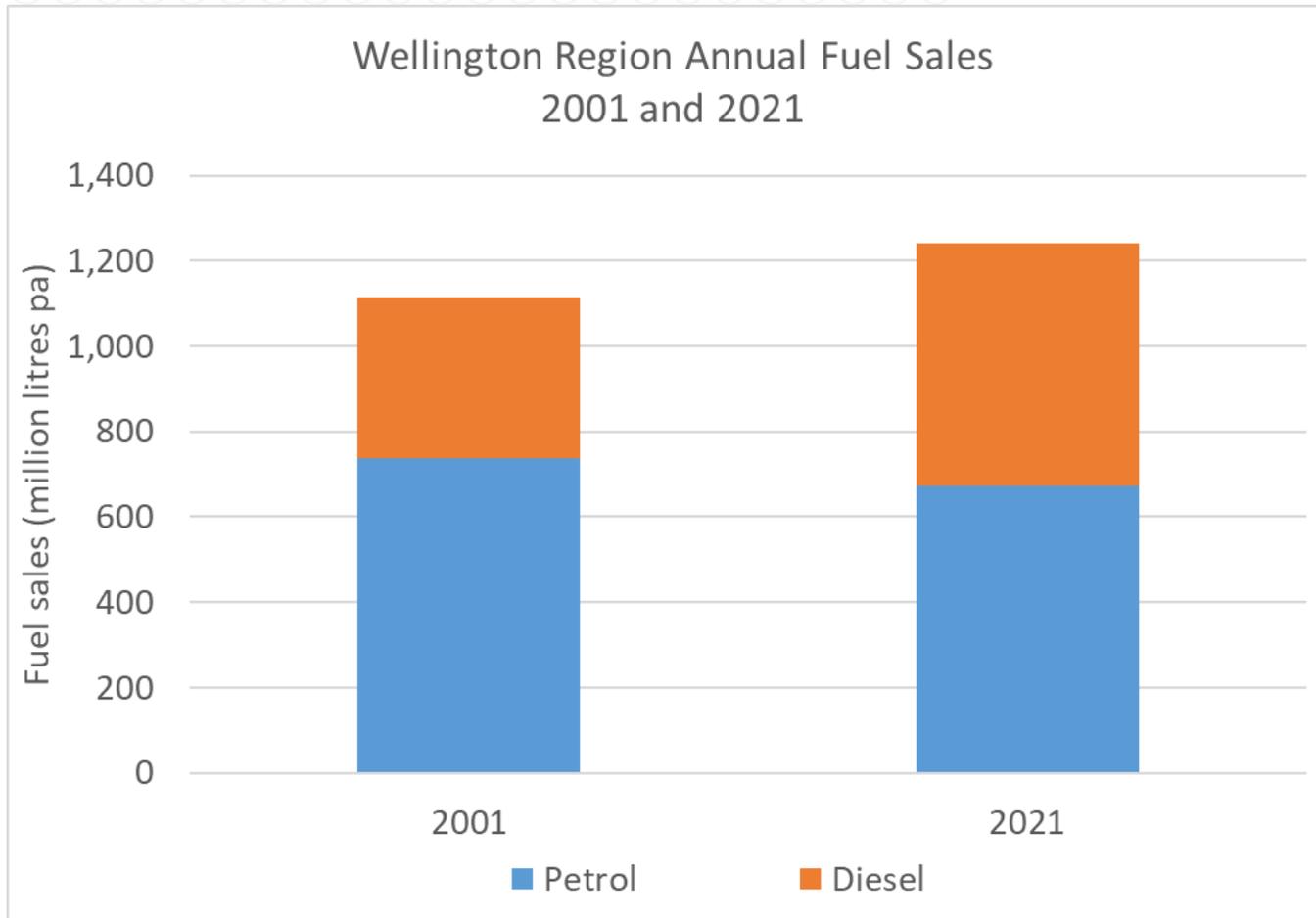
Analytical insights were at the centre of the Wellington Regional Hospital travel action plan

Other projects

- Let's Get Wellington Moving
- Hutt City Transport Strategy
- Eastern Porirua



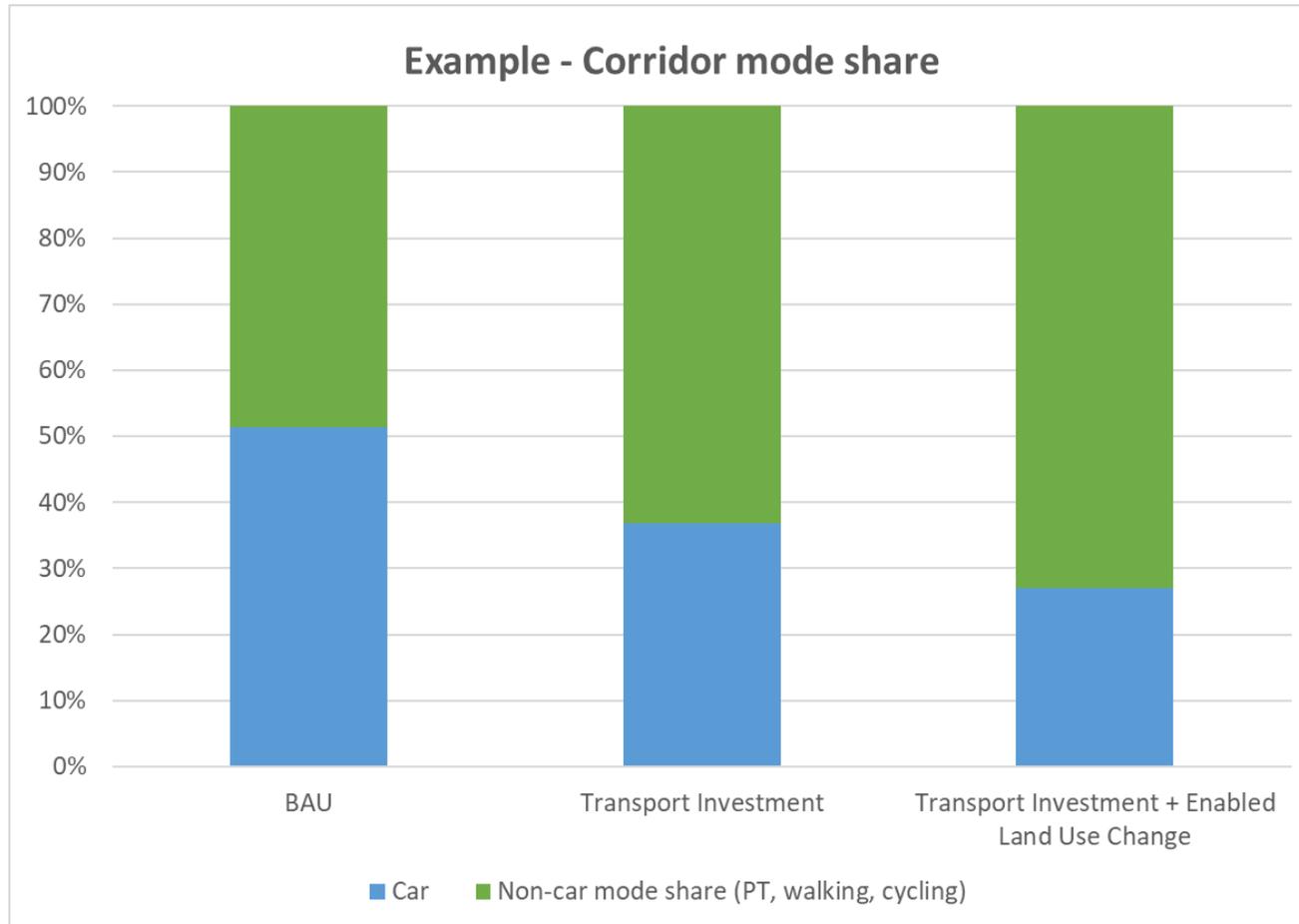
Importance of freight as part of any emissions reduction plans



**10% reduction
in petrol sales
(2001 to 2021)**

**50% increase in
diesel sales
(2001 to 2021)**

Modelling can be used to understand the combined impact of transport and land use

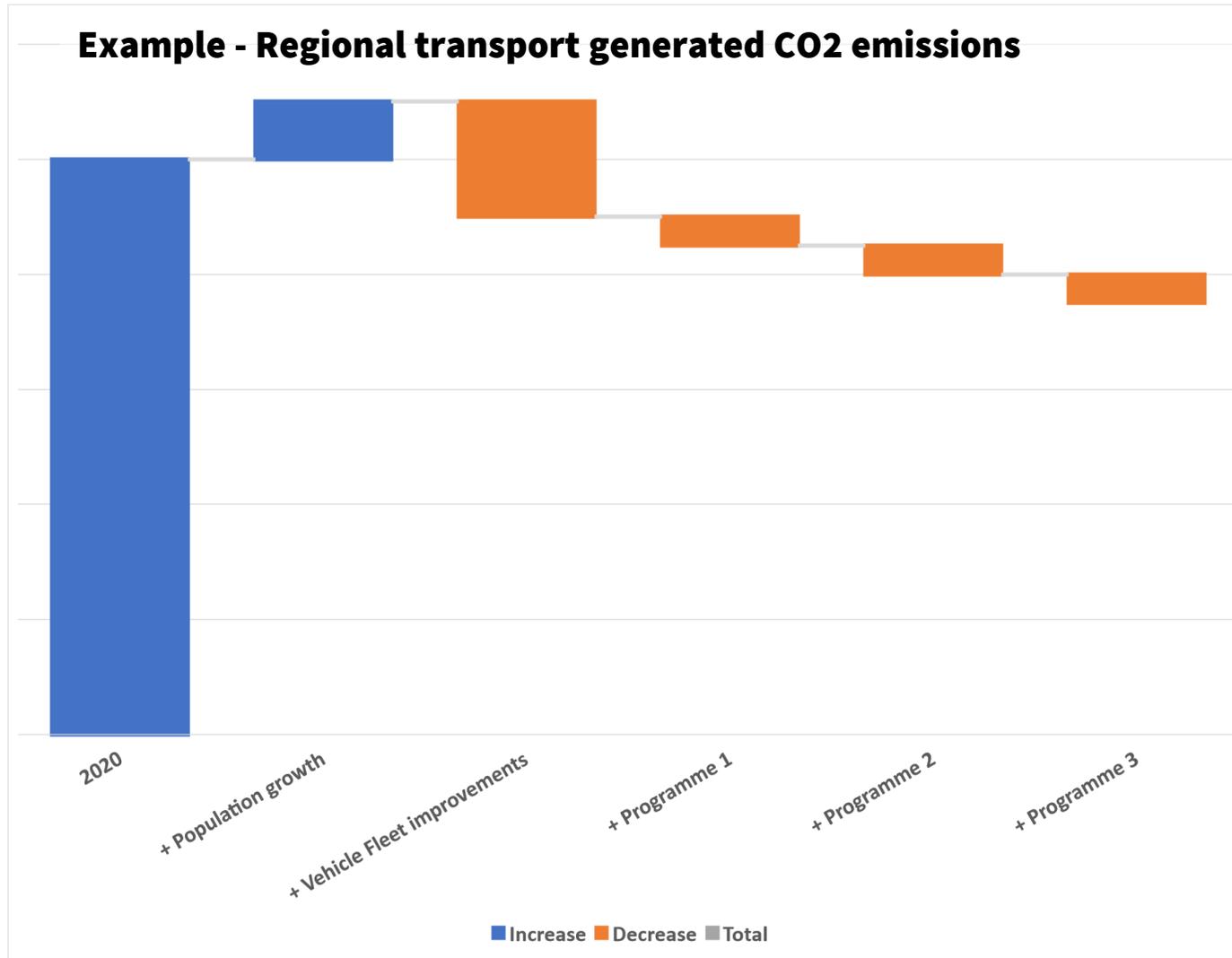


BAU
50% non-car

Transport investment
65% non-car

Transport investment + land use
75% non-car

The analytics unit can provide a regional view across multiple projects



Opportunities to develop

- economic and housing data combined with transport?
- improved integration of transport and land use planning?
- real time monitoring to improve knowledge and benefits realisation?
- any other suggestions?

Thank you

Any questions?

Council
7 April 2022
Report 22.137



For Decision

RESOLUTION TO EXCLUDE THE PUBLIC

That Council excludes the public from the following parts of the proceedings of this meeting, namely:—

RiverLink Project – Authorisation to execute project partner agreement Variation 2 – Report PE22.130

Appointment of Board Member to Predator Free Wellington – Report PE22.93

Appointment of Directors – WRC Holdings – Report PE22.120

The general subject of each matter to be considered while the public is excluded, the reasons for passing this resolution in relation to each matter and the specific grounds under section 48(1) of the Local Government Official Information and Meetings Act 1987 (the Act) for the passing of this resolution are as follows:

| RiverLink Project – Authorisation to execute Project Partner Agreement Variation 2 – Report PE22.130 | |
|--|---|
| <i>Reason for passing this resolution in relation to each matter</i> | <i>Ground(s) under section 48(1) for the passing of this resolution</i> |
| <p>Certain information contained in this report relates to RiverLink Project procurement and contracting information and costs. Release of this information would be likely to prejudice or disadvantage the ability of Greater Wellington to carry on negotiations without prejudice (section 7(2)(i) of the Act).</p> <p>Greater Wellington has not been able to identify a public interest favouring disclosure of this particular information in public proceedings of the meeting that would override the need to withhold the information.</p> | <p>The public conduct of this part of the meeting is excluded as per section 7(2)(i) of the Act (to enable any local authority holding the information to carry on, without prejudice or disadvantage, negotiations).</p> |

| Appointment of Director to Predator Free Wellington Limited – Report PE22.93 | |
|--|---|
| <i>Reason for passing this resolution in relation to each matter</i> | <i>Ground(s) under section 48(1) for the passing of this resolution</i> |
| <p>The information contained in this report includes personal and identifying information about the proposed appointee. Withholding this information prior to Council’s decision is necessary to protect the privacy of that natural person (section 7(2) (a) of the Act) as releasing this information would disclose their consideration as a board member of Predator Free Wellington.</p> <p>Greater Wellington has not been able to identify a public interest favouring disclosure of this particular information in public proceedings of the meeting that would override the need to withhold the information.</p> | <p>The public conduct of this part of the meeting is excluded as per section 7(2)(a) of the Act, to protect the privacy of natural persons.</p> |
| Appointment of Directors – WRC Holdings – Report PE22.120 | |
| <i>Reason for passing this resolution in relation to each matter</i> | <i>Ground(s) under section 48(1) for the passing of this resolution</i> |
| <p>The information contained in this report includes personal and identifying information about the proposed appointees. Withholding this information prior to Council’s decision is necessary to protect the privacy of those natural persons (section 7(2) (a) of the Act) as releasing this information would disclose their consideration as Directors of WRC Holdings.</p> <p>Greater Wellington has not been able to identify a public interest favouring disclosure of this particular information in public proceedings of the meeting that would override the need to withhold the information.</p> | <p>The public conduct of this part of the meeting is excluded as per section 7(2)(a) of the Act, to protect the privacy of natural persons.</p> |

- * This resolution is made in reliance on section 48(1)(a) of the Act and the particular interest or interests protected by section 6 or section 7 of that Act or section 6 or section 7 or section 9 of the Official Information Act 1982, as the case may require, which would be prejudiced by the holding of the whole or the relevant part of the proceedings of the meeting in public.