
Storm Recovery and Resilience Consultation

WRITTEN FEEDBACK Volume 5

Date published: Wednesday, 06 September 2023

Local Board	Pages
Kaipātiki	1 - 357



Storm Recovery and Resilience Consultation

#3

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

The People of Tāmaki Makaurau are not a bottomless pit of money. I am Already considering leaving Auckland due to additional council costs i.e. Target rates, Council services I do not require, rates increases, increases in cost of other council services, costs brought on by failure of CCO's to do their jobs, removal of the ability to choose alternative providers if appropriate

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#16

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Extensive small slips damaging sewers, flooding damaging houses, falling trees damaging houses and endangering lives

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

Neighbors helping each other out. Local triathlon club clearing debris. Clive Barnes (manager arboriculture, Ak council) - the man's a legend.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Removal or remaining dangerous trees

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Remove at-risk trees

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

It doesn't consider the impacts of falling trees on people, property or waterways

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Did I mention trees? Did I mention they are council-owned trees on council-owned land?





Storm Recovery and Resilience Consultation

#33

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Glenfield and the Shore and my surrounding neighbourhood were severely flooded.

My property was not affected

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Community FB page where people helped each other

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

More planting of trees and grasses

Less infill housing and concrete areas

Look at where AKL council has approved housing and see if its on a flood plain / is enough garden/green space. The new rules of 1m away from the boundary and no green space is quite frankly stupid.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Not happy if we the Ratepayers are expected to pay for all of this and the bloated AKL Council and CCO's

Since becoming a super city the costs have ballooned - not decreased as was promised. Auckland has more bureaucracy, less common sense and is still not listening to the needs of Aucklanders

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Less infill housing with no garden or green space

Leve trees to grow and not chop them down

Leave green spaces in the community and don't sell them off



Storm Recovery and Resilience Consultation

#65

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

I was not personally affected, but I have several friends that were very badly affected. One person has only just had her lower floor restored, another still hasn't been able to return to her house house, though insurance did pay out immediately for her to buy a new car.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Insurance claims and alternative accommodation.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Better means of dispersing excess surface water.

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**

Improve storm water provisions

- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**

All have some merit.

- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**



Storm Recovery and Resilience Consultation

#79

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Very little - some debris but the infrastructure coped.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Some conversations on the community FB page but otherwise it was life as usual.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

N/A

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Sort out the infrastructure in deeply affected areas. Have regular maintenance processes in place. Have ongoing communications (email, mail, TV, digital ads), with citizens about who/how/when people can communicate with the necessary agencies in case of natural disasters such as this. Los Angeles city communicates with citizens regularly regarding 'in event of earthquakes', so you know exactly what to do, where to go, predetermined emergency evacuation centres etc. I would not have had a clue what to do if I'd been affected. I still don't.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

If that means another rate increase on the rate increase we have just had then I'd be opposed. If it's in another couple of years I could cope, but right now with mortgage increases I'd be homeless.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#85

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Some of my near neighbours had slip damage on their properties and a number of houses in Birkenhead and Northcote Points were red-stickered.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Good communication, particularly by radio, was incredibly important. And neighbours looked out for each other, making sure we were all safe.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Clearing away a lot of the damage which still remains such as the landslip which came down on the tennis courts at Little Shoal Bay. I realise that engineering reports need to be done, budgets approve etc but it's a constant reminder of what happened. A bulldozer could tidy it up a lot in a short time.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Have a plan as we now know which areas are likely to be affected and first emphasis needs to go on them.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

I agree with targeted rates for some of the spending but in other cases the general rates need to be used because of the amount involved.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

A greater emphasis on restricting housing development where it might contribute to more flooding problems. For example there are very old stormwater pipes in Birkenhead Point which have not been upgraded as more houses have been built or existing ones enlarged. New development would just contribute further to these problems.



Storm Recovery and Resilience Consultation

#95

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

We fared pretty well. Our trees survived the high winds and we had some flooding under our house but this was within our cinder-block substructure, so no risk of wood-rot but perhaps some rising-damp potential. It has been difficult for things to dry-out. We are on a hill so water flows down and away. Those in the flood plain/valley were certainly flooded.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

We have benefitted from having trees soak up the excess water and being on a hill, but far too many trees have been cut down in our neighbourhood. Crazy when these are replaced with hard surfaces. The lower parts of the neighbourhood had to follow insurance process to replace carpet and jib, etc.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Communication.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Stop building and in-filling absolutely everywhere. Plant more trees. Return waterways to their natural flow paths.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

You need to fine people who do stupid things - get money that way too. Happy to see a rates increase but not if it goes to consultants - spend some money on enforcement. Too many developers are not attending to the land they build on - cutting down mature trees, building on flood plains, with too many hard surfaces, high retaining walls and fences (i.e. you should compel using hedges over fences to help soak up water, stabilise the soil and allow water flow.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Push back against relentless densification everywhere. It will only increase the problems we are already facing.



Storm Recovery and Resilience Consultation

#105

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

No affect on our household since our section is on a high side as well as being slightly slopping down from the front.To my knowledge only few properties were affected by flooding

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

having high & slopping section with good drainage

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

not having more heavy downpours in the future

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Ensure that storm water drains are not blocked with debris

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Hopefully this amount will be already covered in the already announced increase of rates like our rates for 2023 are up 9.9%

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

nothing come to mind since you've already covered all important aspects



Storm Recovery and Resilience Consultation

#111

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Landslide nearby has disrupted sewerage lines resulting in a hose down the sidewalk and into our driveway. More importantly, we are concerned for neighbours with yellow- sticker Ed houses, and have list access to local reserves

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods, Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

Appreciated the on-site briefings from Watercare, and excellent service from Tree King (private arborist company)

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Landslide stabilised and access reinstated - noting that I understand why this will take a while!

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Strongly support an increased focus on maintenance, and preventing further building in flood-prone areas and near cliffs

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

See my response to question 5

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

I noticed that part of the issue in the Wairau valley was water backing up from a stormwater pumping station. I would like to know if these could be managed differently during major storms: stop trying to control water and just let it pass through as quickly as possible.

Maybe they already do this 👍



Storm Recovery and Resilience Consultation

#122

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Property flooded. Local walkways closed.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

Help received by friends. Repaired on my own.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Sort out the waterways. Repair the damage to parks.

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**

Sort out the water catchment areas.

- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**

Charge the new-builds and infill housing!

- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**



Storm Recovery and Resilience Consultation

#136

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Inconvenience but the only major problem was trying to get home in the evening from the North Shore ED on Auckland Anniversary weekend. No buses or taxis, though we are elderly and one of us was ill.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

We live in a retirement village, so there are good social connections, and the staff are very nurturing.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

I'm not sure I can speak for others but I'd guess prompt clearing up of debris, clearing blocked drains etc.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

The location and structure of buildings have to be more carefully considered BEFORE planning permission is granted. This may mean taller buildings with more open space between them. Demolishing existing buildings and developing the site should not be approved automatically, but as part of the overall disaster-preparedness plan. The proportion and nature of proposed ground cover should form part of the application.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

If that's a realistic cost then the package is a bargain. Even at 2 or 3 times more it's still a bargain.

Does it have to mean additional rates? Why is Mayor Brown in his wisdom not trying to sell a few golf courses? Such a small percentage of the population play.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Community involvement, such as local groups to clean waterways then keep them unobstructed. This has to be an ongoing effort on all our parts.



Storm Recovery and Resilience Consultation

#157

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

House was partly flooded. Neighbours houses were flooded. Excess water from neighbouring properties.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

Nothing.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Better drainage. Any council input. Any council authority to help prevent neighbours pushing overland water onto our property.

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**

Plan for the future, not just for today.

- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**

Link or it doesn't exist.

- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**



Storm Recovery and Resilience Consultation

#169

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Difficult to get to work and some water in the garage

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods, No damage to my home

3. In the months following the storms, what has helped you and your community get through?

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Houses in flood zones all purchased and no other houses allowed in the zones , even bare land switch 99 percent potential should not get a house permit

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

I am staggered at the number of deciduous trees around auckland that constantly clog drains year after year, council should slowly take away such trees and private owners should pay the cost of drain cleaning where a private tree is clearly causing the issue .

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Regarding number 9 , I would like to see publicly shared info on each curb and drain on how often and when it is scheduled for maintenance so we can monitor the work on behalf of council and report if the paid for work is not taking place.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Yes , I think all lawn mowing contractors should have a licence, a video could be made to establish a minimum standard for lawn mowing and licence revoked if non compliant. So many contractors blow grass into the gutters instead of back on to the property it adds up to a significant issue.



Storm Recovery and Resilience Consultation

#175

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Yes

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

We got builders in to fix some of our damage.

I volunteered with SVA to help other flood damaged homes.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

That everyone is safe and have a safe place to live in. That tennis courts are restored and walking paths - which will take years to address.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

1. Have a different Mayor that takes it seriously, it felt like having town drunk at the steering wheel.
2. Stop all events if prognosis looks bad, concerts etc, so people don't risk their lives. Leaders need to stop being afraid of making tough calls and get mocked by the opposition party.
3. Share information with people from now on about what to do in the next event, because there will be one.
4. Make sure the national preparedness plan is set up better and that all involved are on the email list
5. Declare the national state of emergency earlier.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#190

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

We had a slip on our property, a bush gully with a stream at the bottom, which exposed some council infrastructure, ie waste water pipes. All my upstream neighbours discharge storm water into this stream apparently, which is why we were required to install a rainwater tank when we built out house in 2009. Our community reserves are in a parlous state as a result of the storms.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by slips or landslides, No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Not much. Despite my repeated attempts at contact the council has repeatedly ignored my request for communication. We have had two council geotechs visit, but there has been no communication with regard to their findings and the exposed waste water pipe whatsoever. It's very depressing, as I would like to rehabilitate my land but can't until someone tells me if they are ever going to underground the slumping pipes.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Some communication. Being wilfully ignored increases my sense of rage and powerlessness. I understand the mess is huge, but all I need is for someone to correspond, even if it is just to say "we are never going to fix the mess our infrastructure made on your property".

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Give rates rebates for the retro-fitting of detention/retention water tanks for existing houses and make them compulsory for all new builds. Set our wetlands free. More protections for our mature significant trees. Get a better Mayor.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Yes. I do not wish to hear our mouthy Mayor on the radio speaking of his vanity projects with regard to the Auckland waterfront whilst my community has smashed up bush reserves, and we need \$1.65 billion in extra rates to fund recovery and resilience. Will someone tell him to shut his gob please? Thank you.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

See my answer to question 5.



Storm Recovery and Resilience Consultation

#191

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

My workplace was affected which in turn had an affect on the local community

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Nothing. Self serving social media posts by local board members was unhelpful/patronising

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Restoring paths and walkways in public areas

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Regular (monthly) clearing of gutters and drains

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Does the council really think they can maintain more infrastructure when many basic amenities are poorly maintained?

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Regularly clear the streams and water ways that form part of the council waterways



Storm Recovery and Resilience Consultation

#198

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

the Developed Basement area of the house was flooded. The water was only about 18mm deep. The floor was tiled and carpeted. The water depth was restricted as it just carried on flowing finding ways to exit the house through doorways. Although the water was not deep it still did enough damage to warrant stripping out the carpet and cutting away a lot of gib from the walls and replacing four doors due to water damage. The timber framing behind the Gib had to be dried out before replacing the Gib. Repairs have only just been completed as of end of July. Last to complete was tiling of a room instead of replacement carpet. We have not been compensated by our insurance company to date for electricity used for fans to dry out Timber, the loss of carpet and the loss of a fitted clothes storage open wardrobe arrangement.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

The flood water came onto our property from our neighbours property as they are higher than our property and water flows down hill. The problem there is that they do not have any storm water collection and drainage within their property that would stop water flowing on to my property. In order to prevent the same event occurring again I have installed a

drain on my property at a cost of \$4000 to myself. I have installed sand bags in an attempt to divert the storm water away from the side corner of the house where it was soaking through the ground and resurfacing in our basement area. I am still very worried that unless the storm water from my neighbours property is managed and steps are taken to drain it properly that I will be flooded out again and my property will become uninsurable and subsequently unsaleable. I live on the North Shore and there are numerable properties in the same situation as the land is very hilly and water flows downhill and the property at the bottom gets it. Properties should never have been given consent in the past without adequate storm drainage. To add insult to injury when we built in a bathroom and laundry area in the basement area in 2010, the council made us install a storm drain to prevent water flowing from our property onto the neighbouring lower property. Sloping land, so this had to be done by directional drilling underground from my property to the road at a cost of \$17,000. I have spoken to the new owner of the offending house on the upper side of my property and told him of the flooding problem and requested he do something about it. I have also reported the issue to the Council who at the time replied that they were too busy to deal with it.

4. What would help you and your community feel like you had ‘recovered’ from these extreme weather events?

If when ever it rains I did not see any rainwater coming on to my property from my neighbours property. So far as the community goes. If we actually saw the drains in the road being cleaned when ever a situation exists or is going to occur that would cause trees to shed leaves and block said drains, that would allay fears of a re-occurrence of the road flooding. Cleaning the top of the drains is not sufficient. Back in the day sucker trucks were used to clear the actual drain. This should and must be a regular occurrence in a low lying area ie at the bottom of a hill Alton Avenue to Shanaway Rise Hillcrest. During the floods this area quickly flooded due to the drains not being able to handle the shear volume of water, (or perhaps they were blocked). The water built up and then flowed down an adjacent right of way towards Moor street, flooding houses down a right of way off Moore street.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Storm water must be managed. Draining from one property onto another is not storm water management. Road drainage maintenance must be improved and implemented as per previous comments. All drainage culverts must be widened and deepened and inspected on a regular basis in order to manage the influx of water. As an example, Hillcrest creek was widened where it passes under Hillcrest road some years ago. It is now approximately double the width under the road and also before and after the road. During the event of January 2023, despite the work carried out the water level rose to a level in the creek at the widened area that had never been seen before and was just short of overflowing and flooding the road and surrounding area. If the work of widening the flow area of the creek had not been carried out, the area would have been another flood statistic of the January 2023 flood event.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

The money has to come from somewhere, however Ratepayers would prefer it came not from them. In hindsight the council are liable for what happened due to poor storm water design and lack of proper maintenance. I have already spent a lot of money on storm water drainage around my house and do not see that I should spend anymore due to lack of foresight, planning and maintenance on behalf of the council. Central Government needs to come to the party.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#202

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Flooding through the property and on nearby streets which were impassable.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Council investment in infrastructure

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

With all the activities you have proposed in your paper.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Get on with them quick as well as factoring flood prone areas into your future resource planning and consent process.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Look internationally and see what works. Have larger green blue spaces, to help with flooding.



Storm Recovery and Resilience Consultation

#217

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Storm water overflows

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

More favourable weather

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Clean up the landslide on the tennis courts at little shoal bay

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Storm water maintenance. Less intense housing.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Less intensive housing so we have more permeable surfaces.



Storm Recovery and Resilience Consultation

#229

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Our road Athena drive turned into a river; the compacted clay under our house got broken up and a stream of silt ran through the garage. It now does this every time it rains. Not covered by the insurance as so far no actual damage to the property. Further down the valley / Wairau/ people died.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by slips or landslides

3. In the months following the storms, what has helped you and your community get through?

Helping each other with fixing stuff where we could

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Better draining but also more encouraging/financial/ for native tree / bush planting especially around the infill housing going on in Totara Vale and similar areas

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Drains, plant trees, have an alert system to residents

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

They are good but It's more than stream rehabilitation .. developers need to include more rain gardens and similar requirements for new builds

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Include developers requirements to mitigate against flooding in the Planning stage



Storm Recovery and Resilience Consultation

#267

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Daycare was closed so my 2 children were home with me. My partner had trouble getting home from the city due to flooded roads. We were scared but on relatively high ground so we weren't flooded.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Talking about the events, sharing stories, pitching in to help clean up and recovery at the daycare.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Preparing and feeling well oreparef for the next big climate induced event.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Subsidise or incentivise home retrofitting to improve property level resilience at home. Supercharge stormwater network capacity to deal with more severe downpours. Plant more street trees, swales and vegetation to help absorb more water.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Do it. Preparation saves money in the long run. Better to be prepared than lose more lives or homes to easily foreseeable events.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#274

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Key transport routes were blocked and houses were flooded

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Local board initiatives

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

No remaining visible damage

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Better, nature based stormwater solutions that are designed for exceedence events to be safely managed such as protected overland flow paths

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

I support all of them

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#276

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

commercial premises flooded

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

our own work

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

maybe if maintenance was conducted, like leaves and street debris removed from drains or gutters

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Auckland can be better prepared if ratepayer funds were applied to core services like roads/water etc, not fancy do-nothing wasteful projects

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

why does this require additional rates? If something happens to my home, I don't expect my employer to pay me more, I make cuts to wasteful spending and prioritise spending to the most needed. What is it with council that they think the first and only option is always the ratepayer?

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

maintenance of roadways, curbs, gutters and the associated drainage. Clear streams and waterways of rubbish, shopping trollys, and debris, stop in-fill housing that does nothing but adds more hard run-off surfaces and crams more water into an aging wastewater network. This is the result in part of the 'density' zealots and supposed urban planners



Storm Recovery and Resilience Consultation

#367

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Flooded garage, minor loss of assets, ongoing damp & moisture issues. Rented property with roof leaks causing mould.

Local shops seriously flooded, lots of insurance claims, most back to normal now, saw many cars ruined.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods, Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

Not being the worst affected. Rental agency got landlord to improve drainage and perform roof repairs

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Assurance that infrastructure improvements had been completed so it couldn't be so bad again

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Separation of stormwater & sewage, maintenance & cleaning of drains,
improvement/enlargement of stormwater drains

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#382

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

I was renting a property I believed to be safe. I woke up from a nap to find my cat meowing in distress, scrambling for high ground and my bed wet - with a flowing river running through my rental home. Water was gushing through the sides, bottom and top of my back door. All of my furniture was ruined and lots of my things at a lower level were underwater. I opened the front door and the water was gushing from the back door out through the front door. The power plugs had been on before I had a nap but the power cords (all underwater) luckily didn't interact with the water to electrocute me. I went to investigate: Debris and water from up the hill was gushing down the hill, hitting the fence and all of it collecting into my rental home.

It wasn't safe to stay. I drove to work (hazardous I know) to have somewhere for me and my cat to be safe/have somewhere to sleep etc. I spoke to the neighbours downhill from me (behind the fence) before I left - they were repeatedly bailing water all night long as it flooded their garage, but at least they were on a second floor not living IN the flood water.

The land agent was difficult. Wouldn't do anything to floodproof the place. Wouldn't even consider changing the carpet until I asked about paying rent on a home I couldn't live in. And it was uninhabitable - debris over a foot tall, I got gastroenteritis and severe asthma just from visiting for 20 minutes to get my stuff out!

My cat and I lived in a dog kennel (I work as an Animal Attendant) at work for a few weeks (no shower/bath but at least we had a human bed, light switch, toilet and kitchen, etc). It was hard getting any information about what to do because everything was online - but my phone was struggling to get internet service and I couldn't use my laptop because the

modem etc was all underwater... I had to rely on other people to access emergency services and my bank/insurance for me.

I finally got emergency accommodation for me while my cat stayed at work. The hotel was great/awesome and had internet service so I could look for a new rental home. About a few weeks? later and hunting 100s of rental homes - I finally got success for me and my cat.

Emergency services were still working through their kinks - ringing me up asking if I needed help getting into emergency accommodation almost a month after moving into my new private rental home - but at least they were trying to help :)

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

Family searching the internet etc for help I could get, when I had no internet service.

A wonderful work-boss who let me and my cat sleep in one of the dog kennels for free.

A great hotel employee (Sunrise Hotel Apartment in Albany) who extended my room for me when no one at Emergency Services or its affiliates would answer my calls/emails that I needed accommodation before my time allocated expired (Emergency Services called 3 days after the time expired - "do you still need accommodation?")

Emergency services for finding me hotel accommodation when I was homeless and paying for my stay.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

ASB insurance finally paying out my insurance claim

To know that the government/Auckland Emergency management could do something to help renters know if they were about to rent somewhere with flood risk

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

- '1. Flood risk assessment to be made available not just to landowners but also renters
2. Planning for getting information out to people without internet access (eg power out, modem under water, etc)
3. Confirmed permanent locations to drive to in-case of homelessness from flooding etc (to know before you lose internet access)
4. Communication between Emergency services and affiliates:
 - make it easier for people to get in contact, know who to contact
 - staff to communicate with each other and have some sort of database with the affected person's code or something in order for different branches of Emergency help to have shared info (reduces mix ups and people being forgotten etc)

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

They are some good initiatives

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Please read my answers for No. 5

Also; I understand that land run-off is a private landowner's issue but can anything be done to help renters when the landowner/land-agent won't tell you there's a risk, won't acknowledge there's a risk, and won't fix the current risk?





Storm Recovery and Resilience Consultation

#398

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

the local reserve became unusable

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

patience

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

If NZ would move forward to proactively plan for more of these events

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**

Follow the plan proposed and educate people to accept the need of it

- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**

Need to accept them

- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**



Storm Recovery and Resilience Consultation

#417

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Trapped up North because of damage to flooding and roads unable to be driven over

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

not much

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

just got to get on with it

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Put the correct infrastructure in first before building high density houses developments, more road maintenance , unblocking drains , building more culverts /ponds for storing huge amounts of water etc.

6. There are nine possible initiatives outlined in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

the maintenance should have been done prior to the flooding and the infrastructure for drainage , so rates shouldn't have to increase,. isn't it Council job to make sure this flooding doesn't happen

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Stop removing exotic trees , and spraying off pest plants that actually stop erosion in certain areas. Eg, Agapanthus in the Waitakeres on the berms, pampas grass etc.



Storm Recovery and Resilience Consultation

#425

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Not much

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Insurance cover

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Getting Insurance companies to pay promptly

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**

Infrastructure design and implementation

- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**

Do the infrastructure upgrades/maintenance but reduce money spent on community stuff.

- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**



Storm Recovery and Resilience Consultation

#432

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

We live at the top of a gully and had a major slip at the back of our property. It was covered with native bush. The slip started 1 m from the back of our house

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by slips or landslides

3. In the months following the storms, what has helped you and your community get through?

Promptly enlisting the services of a professional repair company

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

A good repair and paperwork from the council to say our land is as good as/ better than before

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Better maintenance of water outflow structures and retrofitting suburbs with thoughtful flood mitigation infrastructure

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#476

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Our private property lost a third of our section into the harbour and also took out the main sewer pipe. Instead of a 3-4 meter high rock cliff boundary with the beach and mean high tide edge we are now at beach level.

the sewer pipe has been restored in a long term temporary [5 year timeframe before replacement or upgrade] and the beach is now a step and jump away from the property. This will require some form of 'sea wall/rock wall' and specific planting to guard against obvious long term erosion. how is the council going to assist in this matter??? We are awaiting EQC reports for possible options and of course our property is now \$300,000+ less in value, but we will still be rated at the now out of date value placed on this! And we are in our 70s !

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by slips or landslides, Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

we all talked with each other as during the duration of the sewer line being out - we were provided with portaloos per household! This 'out suite' was a daily/nightly experience for 13 weeks before the sewer pipe was restored.

4. What would help you and your community feel like you had ‘recovered’ from these extreme weather events?

That we were actually TOLD if this was possible of course WHEN we would be considered for further council action.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Change the storm water system so we can get out of our street when this culverts are overwhelmed as this floods a significant dip.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Where is Beach Haven listed in these endeavors????

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#490

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Flooding in the community, slips in reserves, overflowing catchments

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Community groups/volunteers

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Don't think so, some streams are still littered with items as a result of the flooding with slips blocking paths in some local reserves. With the weather this is difficult to feel any sort of recovery for some.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Better planning across all entities (AT, Auckland Council and Watercare) when dealing with future development

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

If this initiative will prove to provide long term benefits and is part of future developments then we have no issues but paying more rates for a Band-Aid solution then there will forever be concerns and issues.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#510

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

flooded on the first floor

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

the repairing job has been ongoing still. I have to pay \$1200 as excess to insurance company though.

The flooding is partially caused by a wrong installation of storm water pipe from one of my neighbors, as attached below.

The second factor is the pipe which connecting my property underground water pipe and the public one is too narrow, which has caused heavy rain not be able to flow away as quick as possible.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

I have reported both factors to the council. The council has advised me to sort out the neighbor's pipe through neighborhood. But the neighbor has told me that their storm water pipe was built properly, and they will not change the pipe direction from my property side to the public (curb side).

The council has advised me that they will send their contractor to do CCTV on the narrow pipe issue, but I have not heard from them yet.

I would like to see that the council could sent their builder or engineer to investigate the storm water pipe on my neighbor site, and send me and my neighbor the investigation report and suggestions, to prevent the flooding incident happen again.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Upgrade under ground storm water pipe system.

Update the regulations on water pipes underground/onground on all new domestic and commercial buildings, to prevent the neighbors and communities get bad affected.

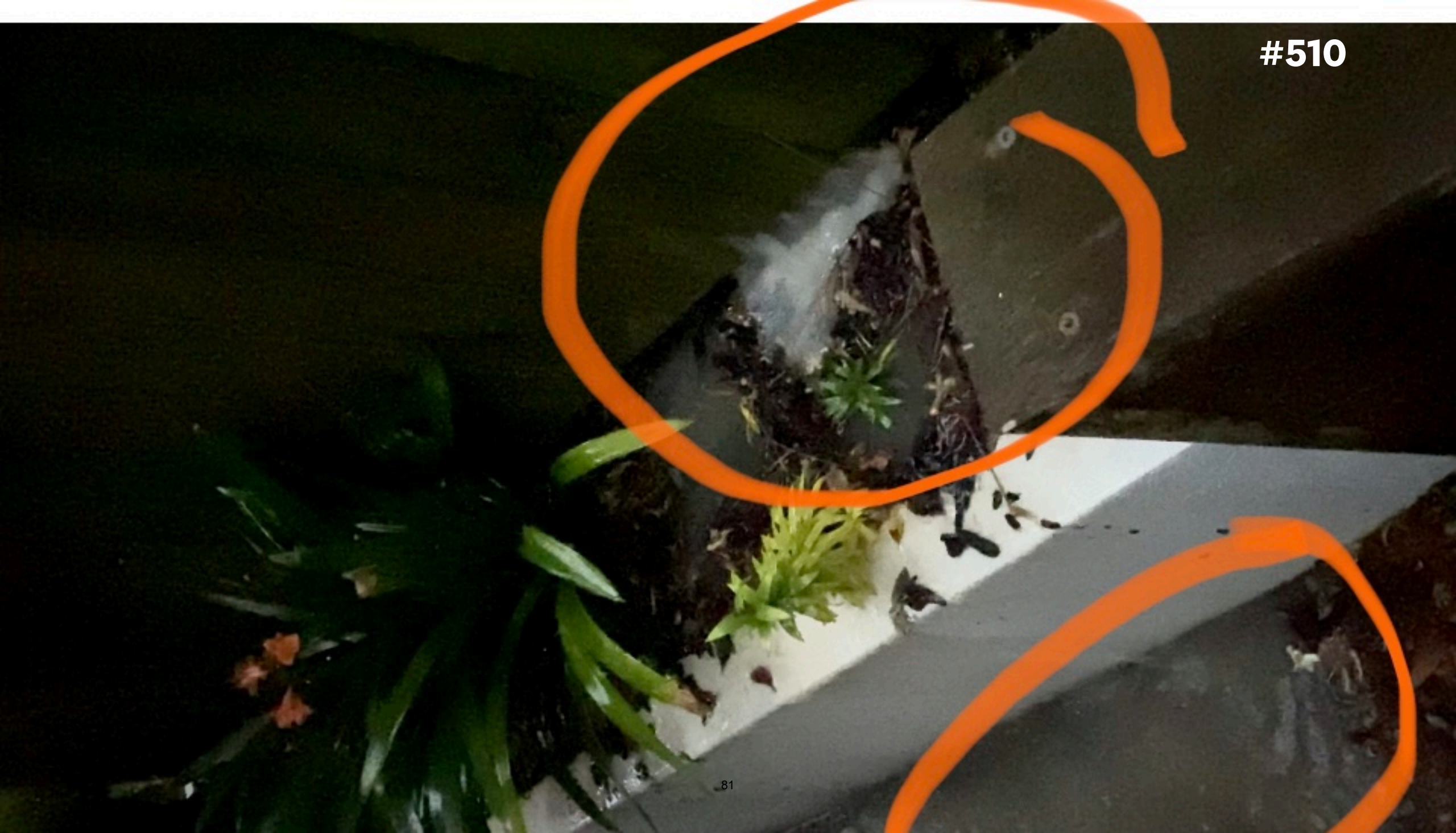
6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

good ones

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

The council should have set up a team dealing with the flooding cases.

#510





Storm Recovery and Resilience Consultation

#519

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Massive amounts. of surface water came over our property from overflow from road drains being blocked and of inadequate size. Council have not provided any storm water assets despite infill housing still being approved. As the ground cannot hold any more water soak pits are not suitable and in fill housing should not proceed until these have been installed. It's the people on the lower side of new developments that are taking the brunt of the problem and I put this squarely on council for allowing development to continue.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods, Affected by slips or landslides

3. In the months following the storms, what has helped you and your community get through?

not much

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Having council stop development and start planning storm water infrastructure.

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**

Start working on storm water infrastructure and limit development.

- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**

- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**



Storm Recovery and Resilience Consultation

#567

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Transport in my area was affected and the priorities at my work changed.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Talking to others about emotional toll of event not just at the time but in the long term with general feelings of uncertainty and less safe.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Would not say I personally have recovered. Do not know how my community feels. I think most of them have almost forgotten about the extent of the impacts of the events.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Early warning systems for storms. Readily available information about centres to go to in the event your home is damaged available all the time so we can come up with household safety plans. It would be nice to also have a transport network online map that we can visit in the event of a disaster to know what routes are unsafe.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

This initiative is required and very important. The additional rates will be used to benefit the whole community in the short and long term with climate change. There are also community wellness opportunities/amenities possible in parallel with making space for water that will help community wellbeing especially with urban density increasing.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#569

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

I live near Wairau. My house along with most of the area lost power for 2 days. Most other houses were severely affected by floods

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Not the Mayor.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

No property damage, so unsure.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Keeping overland flow paths clear. More regular drain clearing/inspections. Better communication from city leadership.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#570

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Our home was without power for 36 hours. Neighbours and friends in the area flooded.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Being more prepared by cleaning the street drains before heavy rain and checking in on more vulnerable neighbours

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Compared to many others, we have been lucky and have not had property damage. Knowing that people are keeping their overland flow paths and drains clear will help to trust that this might not happen again.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Local resilience/emergency plans, better communication from council/mayor, better blue green infrastructure to take water, more regular maintenance

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

I think government and new three waters entities should assist with paying for the recovery. Overall i think the 9 initiatives show a good range of approaches to flood management

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#591

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Just a bit of flooding at work nothing around home

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**
- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**
- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**

More infistucture when building and developing



Storm Recovery and Resilience Consultation

#672

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Had small flood in our basement garage caused by the land being unable to absorb the amount of water. Don't know of anything else that happened in the community.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

We just pumped the water out ourselves.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Just need the sun to shine to dry out the land.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

If you are going to allow people to build on flood prone land, then they need to build their houses up off the ground.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Good idea to keep the streets clear of leaves and rubbish, (maybe a job for people on Periodic Detention) There are many good ideas but the only one I don't like is raising the rates for all ratepayers.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#703

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

I was affected by Council channeling all its road storm water into inadequate drains which couldnt cope which a) overflowed into a Council walkway that has been concreted at an angle so the water flows directly into my property from the walkway and b) flowed down my driveway. Despite me asking the council for 8 years prior to this to do something about it. They are still to respond at all 7 months later. My community was affected through poor understanding of how the smaller waterways are connected and how they impact the urban environment for these 'new normal' events.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Sandbags mostly, we keep a pile at the end of our driveways and watch predicted rainfall like a hawk

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

the council doing what they have been asked to do

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

think, plan and create for the future not what we are experiencing today or the last 50 years. require higher ground levels for building, build green structures that divert or delay rivers of rain in urban environments, force feed education to the population of what it needed and why, be relentless in your comms (not the Mayor), learn from other countries, embrace innovation and tech solutions. At a bare minimum LISTEN when home owners tell you that Council is directly causing flooding outcomes. Also, listen to Maori they know what they are doing.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

be responsive to communities who alert you to issues ahead of time. rather than increased maintenance what about increased responsiveness to existing assets - there is a world of difference in those 2 statements. only 3 of the 9 possible initiatives are forward facing, the other 6 are doing what we have always done but tarted up. What about green infrastruture? porous infrastructure? bio swales? incentivising rainwater harvesting. using community infrastructure as stormwater buffers and storage

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

see above



Storm Recovery and Resilience Consultation

#704

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Thats a very subjective question.Badly / Shocking or alright- how is this measured? I will not answer as too vague

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by slips or landslides, No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Talking thro the problems which translate up to the road and overflows across our properties causing slip on my land

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Another unusual question.Would like to see real question

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Maintain their stormwater services by cleaning out cesspits regularly like they say they are going to do - but sceptical as not a good track record

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Define low lying/flood prone areas and circulate to ALL property owners and develop holding 'tanks' to take sudden bursts of rain eg Northcotes new grassed tank

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Making sure that streams are free and open to handle sudden bursts of rain and dead dying trees removed in reserves that are contributors to the slash problem like we saw in Awataha Stream where twin culverts were partially blocked and that Kitewao Esp Reserve mudflats are dredged out regularly to hold increased silt and debris. A proper concrete based area with debris catcher is desperately needed so machines can clean out without too much fuss /but money is needed



Storm Recovery and Resilience Consultation

#710

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

flooding in my basement.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

Assistance from my neighbours.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Processing of insurance claim.

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**

Upgrade storm water systems to cope.

- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**

- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**



Storm Recovery and Resilience Consultation

#771

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Inundation into baement area of house at 7 A Coronation rd Hillcrest on 23 Januaay, flooding downstairs bedroom and laundry/kitchenette. silt residue. basement still unremediated as additional and separate roof leak uncovered. Massive waterfall spilled over property above us also flooding garages at 5 and 5 A.indication poor stormwater retention. and down long drive which has deteriorated badly. Council culvert in corner of property barely held. Houses below us in trelawney place were flooded up to garage ceilings as stormwater system was blocked . Reports that gravity fed stormwater system at apartment settlement at 3 Coronation is NOT functioning as water continuallyleaksdown the drive at 7 and 7A even when its not raining

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

We are still engaged with insurance. who ran heaters for2 weeks to dry, No remediation has yet taken place. I have emailed council at least 3 times with video to show the problem which we suspect has its originsin poor stormwater catchment at 1 or 1 A or possibly 3 coronation rd but have had no action or requested inspection.

4. What would help you and your community feel like you had ‘recovered’ from these extreme weather events?

to have action to clear and unblock all stormwater drains and culverts and remediate old ones

To have trucks vacuuming all the leaves and detritus which blocks the drains on the roads everywhere in Auckland.

To send drainages inspectors to sectors and quadrants such as our one on the corner of Glenfield and Coronation where 13 infill apartments and units have been built and older homes which may not have adequate stormwater systems.

To make all properties compliant as stormwater and sewage systems in some areas ie mt Roskill are NOT compliant and have caused overflows.to check that they comply with bylaws for separate systems

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

need proper channels and wet areas that can be used as flood plains. Trelawny place and Orion place are supposed to be areas that catch water in the Hillcrest area BUT THEY Flooded instead as culverts and channels were blocked as they are never cleared. Inspections need to be carried out and advice given to homeowners and landlords about how to improve or correct drainage where problems are reported. Your average drainlayer and plumber is not equipped to do this.. presumably Council had signed off on all property development so they have responsibility to ensure that everything is compliant. They are responsible to all private and public stormwater. To date we have had NO advice despite our contact with council about longstanding issues that came to a head with the flood on 23 Jan.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

anything is better than NOTHING which is the current situation. Council has contributed to this problem by ignoring climate change and allowing rampant development, loss of trees, covering of old streams and not maintaining the stormwater system. Stop whinging about costs. We are now paying rates on totally inflated land values and the return is minimal.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Massive civic awareness programme encouraging neighbourhoods to keep the gutters and drains on roads Clear.

Stop the clear felling of sections and increase the permeable amount of land when property development takes place as this is a major contributory factor in flooding for houses around and below these developments.

I have actually observed idiots tipping leaves and rubbish into the drains near the intersection of Glenfield and coronation rds. It is too difficult for trucks to clear gutters as there are TOO MANY cars parked on the roads all day and at night. People should be told to park in driveways so the trucks can get around.



Storm Recovery and Resilience Consultation

#785

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Water poured down the hill and off the neighbour's section into ours. As a result we had water incursion in our garage (white sticker). Further down the hill the houses were less fortunate that we were - there was considerable flooding and houses were yellow stickered.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

Don't know of anything specific

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Knowing that drainage has been fixed so there is significantly less likelihood of a 'repeat'

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Stop covering everywhere with impermeable surfaces. There is a lot of infill housing in this area (one house being replaced by 5-8 townhouses. There is no permeable area left on these sections, even though I thought there is supposed to be regulation to ensure a certain percentage of the development must remain permeable. If these developments are following the current regulations, then the regulations are WRONG!!

6. There are nine possible initiatives outlined in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Why 'possible'? All are essential.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Where is the discussion on permeable surfaces - other than the 'blue-green' initiative. A few blue-green areas amongst acres of concrete won't be enough,



Storm Recovery and Resilience Consultation

#814

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

We weren't personally affected by the weather, but we are sad to see that many of our local walking bush tracks were badly damaged and remain closed.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Not being personally affected.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

The tracks being open again.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Have water catchment and water culverts for the rain to go on, have tighter controls on new builds so that the water run off from a property is accounted for.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

It would seem an over reaction to one event to aim to make the city completely future proof. Its not fair to put that much cost on ratepayers when this may not happen again or may not happen again soon. Yes we need to make the city more resilient, but people can also take personal responsibility for their properties by putting in drains or changing the use of their land. Insurance companies should also foot the bill for houses that are at risk of repeated flooding. In otherwords, is it right that people who have carefully chosen their house by looking at the land, and haven't done questionable work to put living in their basement, should pay for people who chose a house on a cliff with sea views?

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

'- Give advice to home owners on how they can reduce the risk to their own home, and to the neighbours properties.

- Don't let developers break/challenge existing planning and resource consent rules - require porous driveways, holding tanks etc.

- Bring resilience into the of intensification rules eg terraced housing means that the site can have areas that are not concreted, whereas standalone housing might have more concrete driveway; require houses in low lying areas to have garage only ground floors; don't allow housing in low lying areas, or require the developer to create water catchment areas



Storm Recovery and Resilience Consultation

#873

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Our (hillside) property had an amazing volume of water flowing through and under the house.

It was a very worrying time and

we know there will be more floods any time soon.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

We didn't need any help.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

If Government and Local Government took serious, urgent and genuine action on greenhouse gas reductions I would feel less uneasy.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Stop covering the land with concrete.

Bring back the North Shore City tree protection scheme.

Get the streams out of the pipes.

Instead of planning for 2 million people, plan for a sustainable population.

Open up a lot more land for stormwater detention ponds.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Please get started on as many of the initiatives as are feasible.

I don't mind paying higher rates to help fund it.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Take urgent action to reduce burning of fossil fuels to reduce the amount of atmospheric water.

Don't talk about building resilience or any flood protection.

The main action needed is retreat from flood prone areas.



Storm Recovery and Resilience Consultation

#899

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Yes

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

A good Property Manager - found another house while the other is fixed

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Faster insurance work, more protections for flooding put in place

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

One thing that could be done is that where the roads become waterways such as Lingfield St they could be made significantly deeper by raising the verges by 2-300 mm including driveways and divert any excess water that floods after culverts are not able to cope along roadways, rather than through houses. This could include a warning system maybe, so cars do not suffer too badly. But roads are wide and if they are also "deep" they could be used as a floodway, and would be an affordable solution to some point at least.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

You are clearing waterways, but really they would be better to have retention dams in place at locations where the water can back up, to reduce the "flash" load on the system. Houses have them to slow it down yet streams you are wanting to remove everything that slows that water, that will surely make matters worse. Sure no dams that will flood neighbourhoods, but ones to flood parks etc would be sensible.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

As I have mentioned in my previous comments!

Plus in future don't let people build in floodplains! or indeed too close to the sea, as rising sea levels will be the next issue people are facing, so move new housing back further, and or make people sign a waiver, where it isn't the councils' problem when *not if, their house gets damaged by the rising sea level!.

The same goes for the clifftop by the sea, the sea is going to rise, it is going to erode the cliff and the houses are going to fall down. Don't let the problem get worse. Think of the future, know that we are facing worse weather for sure and start addressing the risks while mitigating our contributions to climate change.

Cheers



Storm Recovery and Resilience Consultation

#931

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

My 83 years old mums house was flooded and surrounded houses also flooded and damaged.

4 Lingfield st Glenfield, now in a flood prone area

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

Absolutely nothing,

Insurance finally commenced work on repairs 8 August 2023 ,

My mum has been living in the flood damage house .

I would have thought the council would have at least visited the property to talk to her , as you have two large Colvert drains along the side and back of her property.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Something needs to be done about the flood prone area in Marlborough Lingfield Glenfield area , nothings been done except put speed bumps in the road , no drainage fixed .

Public meeting in Marlborough Glenfield with the council would help , as residents know it will happen again, and are in constant fear when it rains.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Identify flood zone . Fix the drainage in the area or buy out houses and turn them into wet zones

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

First identify houses that are in flood areas that continue to flood . Turn them into water catchments areas .

The house owners are going to have insurance issues if the continue to flood .

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

You need to inform the public in the areas as to what is happening

Even if you don't know, you still need to assure them they haven't been forgotten.





Storm Recovery and Resilience Consultation

#937

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Had to find alternative routes to get home from work. Nearby roads were flooded

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Did not need help

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

We feel pretty okay as it is

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**

Clearer drains

- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**

I don't know

- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**

not sure



Storm Recovery and Resilience Consultation

#953

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Badly affected. Property on landslide. Cannot occupy my property (yellow stickered, possible upgrade to red). Cannot get temporary accommodation in the area of property damage. Was offered place in West Auckland which is no good for stability for family. Had to relocate to holiday house at Waiheke temporarily. Insurance taking far too long. Costs escalating and rates, power, water still require payment, along with alternative accommodation.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by slips or landslides, Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

- Having a holiday home to go to.
- Other people in similar position to vent to.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

- Certainty

- Faster resolution
- insurance/geotechs/EQC not dragging their heels.
- Payout so we are not in limbo indefinitely.
- Auckland Council getting stuck in to fix the problems.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

- '- Upgrade stormwater network,
- give rates rebates for installation of retention/detention tanks, drainage etc.
- do more maintenance of parks to ensure potential landslides are identified early on (sloping trees etc).

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

'- Appreciate the initiatives, however these initiatives are a long term solution and doesn't help people people displaced with their short term needs.

- People displaced already face significant additional costs so should not be paying any rates until they are able to occupy the damaged property/land. Furthermore, people displaced need resolution/closure now!

High Risk properties - where people have been displaced from damaged property and solution is long term, expensive, requires extensive investigation (ie. geotech engineers), and/or requires community input - then owner should have option to accept Category 3 assessment on property to expedite insurance payout on damaged dwelling. Owner should also be able to apply to Council for a Category reassessment if engineering solution is acceptable to enable further development on the land.

Where multiple properties are affected by landslide including public reserves (ie. Raymond Terrace/Kauri Glen Reserve), and global fix is required and/or specialised due to the nature of the council land affected - then Council/Government should fund remediation and owner should have option to accept Category 3 assessment as above.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

- Prioritising consents or rates rebates for properties that install storm water retention/detention tanks or additional drainage where required, or rain garden (<https://www.aucklandcouncil.govt.nz/environment/looking-after-aucklands-water/stormwater/docsconstructionguides/rain-gardens-construction-guide.pdf>)

- Alternatively upfront costs could be paid by Council, added to the rates and paid off interest free by property owner over 5-10 year timeframe.
- Council could initiate a scheme to make this process easier, such as fast tracking consents, bulk discount from approved installers, etc.
- Vetiver Grass for erosion control - <https://www.vetiversystems.co.nz/erosion-control/>



Storm Recovery and Resilience Consultation

#955

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

We were almost isolated away from our home after roads between our home and where we were camping was. Our tent was shin deep in water. with main roads closed we had to take our own route back through country back roads and hope for the best. Our home in Glenfield was mostly spared with some water underneath the house, but after digging a small trench managed to reduce water away in later events. Other properties on the other side of the hill were not as lucky.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Community groups

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Restored public spaces, parks and reserves

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Better planning for land use away from flood prone areas. daylighting of more historic waterways and work similar to the northcote development.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1026

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

My local community was not affected at all

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

NA

4. What would help you and your community feel like you had ‘recovered’ from these extreme weather events?

NA

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

I think it is important to have increased maintenance with street sweeping and catchpit clearance, provide support for community groups to restore stream banks, have stream rehabilitation, culvert and bridge upgrades, blue-green networks and overland path management.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

I read that the open area on the west side of Lake Rd Northcote opposite the shopping centre was designed as a flood mitigation area and that this was successful with no flooding in this area.



Storm Recovery and Resilience Consultation

#1042

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

North Shore Events Centre Trust Board

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Eventfinda Stadium sustained approximately \$4m in damage and was out of commission for a number of months with damage as a result of Jan 27th.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

Very little other than hard work and great staff who have helped keep the building functioning in some respect.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Better prepare for the routing of water away from the building and properly maintaining stormwater systems.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

The priority should be on providing overland flow paths and drainage to relocate the surface water as we will never "stop it" and managed retreat is not realistic in a recession.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1081

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**
- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**
- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**



Storm Recovery and Resilience Consultation

#1097

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

My house was ok. However, friends were flooded. Fire fighters and operational staff put their lives at risk. My child still gets nervous any time there is rain. She's afraid her dad will get hurt or killed.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

The response from Civil Defense was poor. My belief is that local board Chair people should be responsible for working on localised issues. They can subcontract community organisations to have stocks of food, bedding and a venue covered. They can run drills with community organisations, schools, police, fire etc to ensure that everyone in that neighbourhood is connected and has the same information on emergency procedures. Running emergency work from a central office did not work.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

It needs to consider areas that would flood if the tides were higher ,or if it was a King Tide. Conversations on managed retreat need to be happening now.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1114

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Ongoing problems with stormwater drainage. Have had at least 6 rivers go through our garage as a result of poor stormwater drainage from neighbouring properties

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods, Affected by slips or landslides

3. In the months following the storms, what has helped you and your community get through?

Still struggling as root cause not yet fixed

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Improved stormwater drainage systems

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**

Update stormwater drainage systems

- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**
- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**



Storm Recovery and Resilience Consultation

#1115

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

notice the rain water came down my lawn and down the foothpath and out to the road.It seems there is no drainage underground where in the past

I dont have these problems.After watercare did digging along the road and it starts to happen and everytime it rain there are water fall from neighbours footpath and down my lawn and concrete path

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

none

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

someone from Auckland council to come and look on how to improve the stormwater drainage and not to say this is not our problem

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**

come to access the problem during heavy rain

- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**

- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**

dunno



Storm Recovery and Resilience Consultation

#1120

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

The Kaipatiki and Wairua Creeks were severely flooded, one suspects that the narrow and possibly blocked stormwater networks; plus, the hilly topology of the area exacerbated these floods and its current. As we know, a young man (Daniel Newth), died in the floods attempting to kayak them. Though we may not have known him personally, I think the community was shocked and sad to hear of the tragedy.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

Actually, the NZ people are incredibly kind. A sentiment which ran through the pandemic and perseveres even now.

The community ran shelters for those whose houses were uninhabitable and there was much empathy (even from my insurance company).

4. What would help you and your community feel like you had ‘recovered’ from these extreme weather events?

There's two parts really; one is to get my property back to looking like a home (the fences and gardens were obliterated) so there isn't that constant reminder that all was not well.

NB: I had logged the broken stormwater border with the council before (the floods in Jan took out fences on two sides of the garden.... I am right by the Kaipatiki Creek..) but no one came to fix it, the floods in May then took out the rest of the fences. All in all it took the council 6.5 months to have a contractor fix the fences facing the creek.

But secondly, to know that the council has a plan to mitigate these risks.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Well, if it's fair to say that climate change has affected weather patterns; then city planning/ building consents should have someone with environmental knowledge on how urban green spaces and waterbodies need to be built/ maintained/ preserved for projected weather changes.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

So far, the plans look good. I do wonder if more work needs to be done on existing stormwater infrastructure (rather than just ensuring they aren't blocked). The stormwater network that runs behind my garden was overwhelmed very quickly which caused a pretty scary current and fast water rise.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1127

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

I live on Nile Road which suffered significant flooding and there were houses and businesses all along the Wairau creek culverts impacted.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Good communication from the relevant Council and Government organisations

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Confirmation on status of impacted houses and buildings. Clear plan communicated on measures that were being undertaken to help with future events e.g. plan around ongoing regular clearing & maintenance of road gutters, drains and creeks/culverts along with any planned infrastructure upgrades.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

I think the Making Space for Water is a good plan.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

These look to be very good initiatives.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Options to ensure green space on properties is more protected so that housing intensification does not make the problem worse by removing natural water capture rather than just concrete/roofing all feeding into storm water infrastructure. There could also be options to incentivise property owners to make their properties more spongy by removing concrete driveways/paved areas and replacing them with porous solutions. Other options could also include incentives for rainwater tanks to help handle water volume from large intense downpours so it is not released immediately into the drainage network.



Storm Recovery and Resilience Consultation

#1134

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

The whole groundfloor of the house we're renting at 17a Totaravale Dr, Totara Vale was completely submerged .

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

practical and financial help from Windsor Park Baptist Church and its congregation.
financial support from ASB. support from family and friends.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

when we can come back to the house with the knowledge that the council has done its best—or at least do everything they possibly can—to prevent this from happening again

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

improve or add water ways. consistent regular maintenance of sewerage and waterways—even during summer.

6. There are nine possible initiatives outlined in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

hope these are done a lot sooner.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

consistent, visible and clear communication via multiple media





Storm Recovery and Resilience Consultation

#1159

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Council stormwater pipes failed, and took about 1500m³ of our yard with them when they washed the ground around them. Risk to 9 neighbouring properties

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by slips or landslides

3. In the months following the storms, what has helped you and your community get through?

Family support

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Being able to have a home again, and for the neighbours to not fear their houses will fall into a ravine

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Listen to the public when they point out stormwater pipelines at immanent risk of failure (as we had done 6 months before the storm)

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Bring back rain gardens as a priority feature



Storm Recovery and Resilience Consultation

#1160

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Unable to effectively make my way home due to traffic and flooding on roads

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Local areas looking like how they did before the weather events e.g. buildings repaired, parks accessible

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Resilient infrastructure including "sponge city" infrastructure such as parks that are able to accommodate a large volume of water. Improvements to public transport that can handle surge in passengers. Improvements to public transport infrastructure so trains are able to continue running during/after weather events

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

They will benefit the city in the long run

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1165

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

My garage flooded. Underneath my home was like a river. Torrents of water from 2 neighbors homes came onto my property causing flooding

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

Nothing. Council doesn't help when the issue is coming from another property or your own

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Council to pull finger and look after storm water drains on properties

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Assess and fix what rate payers need instead of passing the buck

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

These don't affect me directly. I need to council to take accountability for storm water drains on properties- especially those from the 60's and 70's

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

As commented above



Storm Recovery and Resilience Consultation

#1205

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Restrict intensive development on unsuitable, unstable land in the city. The unbridled obsession with intensification is literally destroying the land and buildings within this city

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1281

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

I had some flooding to my property but no damage. There are people in my community who were affected

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

We were able to clean up the area in our home that was affected with no damage fortunately. I note other homes in our area had a lot of damaged items from their homes on the berms that were picked up by council . It was good that the council did this

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

I think that the gutters and storm water drains need regular maintenance which does not appear to happen since the super city was formed. This is a short sighted cut back.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Proper maintenance in the infrastructure. Don't allow developments to flood prone areas

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Nothing comes for free . We need to spread the coat over an extended period so the rates do t raise too sharply. This is import to invest in the infrastructure for the future

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1306

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Fallen trees - some basement flooding - surface flooding = overflowing carchpits - exrteme runoff from neighbouring properties

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

neighbouring support

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Future risks mitigated

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**

Take action on The Tāmaki Makaurau Recovery Plan

- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**

Don't waste time, just get on with it

- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**



Storm Recovery and Resilience Consultation

#1317

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

I was not affected however some properties in the vicinity had slips.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Just got on with life.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Did not require any help.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

What can anyone do - cant predict nature.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Rates high enough thank you. Some very poor decision making regarding permits issued for unsuitable home building sites has come home to roost.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Very difficult considering Aucklands urban sprawl.



Storm Recovery and Resilience Consultation

#1331

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Neighbour houses got flooded and yellow stickered

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Talking to each other on how to prevent water over flowing into properties around our houses as we live at the end of a long driveway with 3 other houses at the front

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

When there is no flooding and the infrastructure surrounding our homes can handle the heavy rain

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Upgrading our water system. The neighbour has employed the local plumbing company to upgrade their drain to cater for the overflow so it drains out straight to the sea below at the front of their house rather than to ours. We live in the coastal area so it is prone to slips as well. Luckily our house has a good retaining wall however our neighbours next door are not so lucky

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

At this stage small increments in rates are fine to support this initiative however due to the cost of living big increase in rates needs to be reconsidered

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1373

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Not much just some local roads a bit flooded and the Bridge restrictions and concerns.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

NA

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**
- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**
- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**

You need to make a plan to completely replace the related infrastructure and start doing it now. After all the design lifetime of all that infrastructure has long since expired and we should expect to replace it in that case (not just patch it up and whinge about the situation we let ourselves get in to by not paying attention to the expected designed lifetime).



Storm Recovery and Resilience Consultation

#1386

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

We weren't adversely affected

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

It wasn't the mayor!

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

More rapid repair of damaged buildings, houses and infrastructure

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

A new mayor would be a great start

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

It is clear council has allowed over building into areas that should never have been built on. Council should anticipate more frequent events such as this

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

A better mayor



Storm Recovery and Resilience Consultation

#1387

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Road flooding, which caused rubbish to be on the road

Community cliffs slipping which cut off great walks in the community

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Being able to get out and walk on the roads and see the damage and realise climate change is effecting us.

Community updates from Facebook

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Better infrastructure for water drainage especially on the road and catchments for rubbish!

More workers able to collect rubbish

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Better infrastructure

Less people in the same area

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

The more rates, will put people off owning homes, but if people rent that will just keep increasing.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Planting more trees, vegetation holds the water



Storm Recovery and Resilience Consultation

#1389

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Extreme land flooded house red stickered

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods, Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

It's our 2nd house lost income as empty

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Council and insurance work quicker. Better communication. 6 months no action

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Have department ready. Don't allow houses by creeks. Keep public creeks clear. Don't have small culverts down stream..

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Need to have house free creeks

Don't erect houses buildings in flat areas. Like wairau creek not big enough outlet poor design buildings with no base. Entrance at ground level were allowed

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1397

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Our house was flooded when the storm water drain overflowed and my car was written off trying to get home from an elton john concert that should've been cancelled hours earlier

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

Insurance for us. Community helped each inheritance clean up

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Insurance claims sorted. We have neighbours who are still trying to recover, living in homes that are still damp and mouldy while they wait for insurance

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Change housing laws that are permitting too many houses being built on one section with no additional infrastructure

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

They all seem reasonable but what's missing is building regs and making sure developers build responsibly. Keeping green spaces rather than concreting them. We don't need 5 houses on one section that has the impact of 5 x the water usage and impacting those up stream

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Yes. Building regs!



Storm Recovery and Resilience Consultation

#1404

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

My next door neighbour white-stickered because back yard slid away, and house two doors down redstickered for same reason. When I phoned Tower Insurance yesterday to get a quote for contents insurance (I rent) they declined to cover because of the effects on my locality of the 'January-February weather events'.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

A clear city plan for retreat and adaptation.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Retreat and adaptation. Ban building in areas in danger from landslides or flooding. Buy out existing uninsurable properties with maximum payout median Auckland house price.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

All nine initiatives are necessary

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1410

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Water, 25cm high x 3 metre wide came from my right neighbour.

On other side, [I just found out today] my water 60cm high, flooded into my left neighbour's back swimming pool and onto her house. Insurance is fixing it. And her front is sinking at berm+concrete footpath from a pipe behind my garage stopping 2 m before end of my property.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

All the phone calls. Help with getting my groceries.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

If the rain would stop. If not, get more help getting adequate drainage off my property.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Check sink holes and drain covers work, every two months.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Just do it.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Instil in the public, especially hoons, that it is not \$\$\$\$ or morally right to break council equipment in parks.



Storm Recovery and Resilience Consultation

#1428

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Slips on properties surrounding my one.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

Support from neighbours.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Having the huge slips stabilised.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Apart from the infrastructure improvements in the plan, not allowing building in known flood zones and removing the crazy amount of red tape involved in home owners doing flooding remediation work on their property would be essential.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

For the overland flow management to work the council needs to remove the crazy amount of red tape involved in home owners doing flooding remediation work on their property. "Providing information to to homeowners about overland flow management" is pointless if it's going to cost thousands of dollars in engineering reports and council paperwork before a homeowner can even begin to deal with the issue.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1431

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Some flooding in one nearby street and otherwise fine. Luckily most houses around me are on a hill so we escaped the worst.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

I did not suffer any damage so have not paid much attention to this.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

All slips and walk ways cleared up and able to be used again.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Think about waste water before granting consent to the mass housing projects. The waste water was built for one house per property and no pre-work to enlarge waste water from property to treatment plant was done in preparation. Brainless city planning.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Love the blue green approach. Having more green spaces in a city being ruined by mass housing and removal of gardens, is vital for wildlife. Move past the Maori and non-Maori nonsense. We are all Aucklanders and floods do not discriminate by race so neither should Council plans.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

It could be a nice idea to have some kind of social media reach out for volunteers when it comes to planting in wetlands or cleaning streams. Many hands make light work as they say and by getting through jobs faster we can be in a better position to handle any potential future flooding sooner.



Storm Recovery and Resilience Consultation

#1441

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

We have lost a substantial lot of our land from erosion due to the increase in water flow and intensity of the stream that runs through the back of our property. Over the past year the increase in water has turned the stream into a rapid river when we have heavy rain. The events in January 2023 have washed away our native planting, retaining and landscaping we had done previously.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by slips or landslides

3. In the months following the storms, what has helped you and your community get through?

The kindness of our neighbours and crossing our fingers we will be ok. And hope that we will get some help for some remedial work to be done to help prevent this from further happening and getting worse

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

More support from the council to prevent further damage from the stream and more help to prevent more erosion of our land.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Have more thought put in to infrastructure when increasing the amount of homes, and the storm-water coming from these properties and more thought and support into maintaining streams and waterways that run through peoples properties. Fix land that has slipped and that is at risk of getting worse if not repaired in its current state. And maybe a reduction in rates until situations are rectified.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Help maintain stormwater and drainage on private properties that have streams and water running through there properties. And help maintain the land that is directly affected by these events that causes erosion. I know it has to be paid for but I feel that it is unfair to have a rates hike when we have lost land and will continue to if something isn't done to make the current situation more more stable and future proof. We have spent a significant amount of money on helping secure maintain the bank and land that is being affected by the weather events and pressure of more stormwater pressure from more housing increasing rapidly in the area.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

More council responsibility to maintain the waterways running through private properties that are at increasing risk of flooding. And making the land that those properties pay rates for become more volatile and lower in value or attractivity. Without even considering the stress which is caused when there is significant rainfall and you can blatantly see the increase in erosion.



Storm Recovery and Resilience Consultation

#1469

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Extreme flow of water from road down through properties on saturated ground

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

Attempt at channelling water away to drive rather than through neighbour's fenceline.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Seeing signs that work is being done to mitigate further damaging flooding

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Ensure all gutters, drains, ditches, culverts, streams are clear of leaves, debris etc. Perhaps swales put in where possible. Where slips are likely build gabions or other structures which would prevent landslides/slips.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Use present rates assisted by cutting down on non-essential projects such as some beautification projects. Use fewer consultants on various matters of lesser importance. Simply reduce excessive and unnecessary spending as ratepayers have to do.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1470

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Severely, we live in a valley and many properties were damaged/flooded.

whole of the ground floor flooded, lost many possessions and some structural damage.
LOCALLY MANY OTHERS WERE AFFECTED.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods, Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

Not much. There has been almost ZERO communication from banks or Insurance companies. Sadly the old-fashioned way of neighbours/community, has ALL but disappeared.

Not much has been done. Communication has been ZERO.. That includes Council and Insurance companies.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Replacing OR even installing infrastructure to alleviate storm-water. I have have lived at this address for 30yrs. Have only had a flood like this

about 25 yrs ago....

Maybe finally DO something about drainage of the road and properties/sections above us, in PARK RD Glenfield. We are in the valley area of Wyvern Place below.....

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Install capable infrastructure. Storm water drains and pipework etc.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Cant afford the present exorbitant amount. And after 43yrs of paying rates on my homes,still no second Harbour crossing,still relying on 50-60yr old infrastructure etc. SO NO Wont be paying for what should have been progressively achieved over many years.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1471

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

our household was fine, although some plants in our garden didn't survive the flooding, but neighbours directly opposite had flooding in their garage/basement areas, also aware of many other local residents who were adversely affected.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

nothing for us per se, although navigating public transport when there are fresh weather warnings make us think twice about where/when we're going.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Insurance payouts and remedial works completed, and drains updated to ensure flooding diverted from homes.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Think the make space for water is a good approach.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

We are becoming a densely populated city and our infrastructure has been underfunded for decades. There has never been significant future planning hence why our infrastructure can't cope and the water has nowhere to go. it needs to be done.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1506

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Mostly just roadway flooding. Some houses in the suburb with driveways that sloped down into garages and who have converted ground floors into flats also flooded.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

It's a rich neighbourhood, having money is their resilience.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Better urban planning, better infrastructure planning and maintenance, and more areas being converted back into the original ecosystem.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Better urban planning - stop building on flood plains, on coast lines, on cliffs! Quality infrastructure and actually maintaining it. Require property owners to maintain berms and cleaning out storm water drain grates and curb gutters of leaves and rubbish bordering their property. Require cars to be parked on private properties rather than on residential streets to block water flow/drainage and the accumulation of debris. Encourage property owners to install rainwater tanks and use grey water systems to reduce the amount of pressure on public infrastructure and natural resources. Require new developments to build self-sufficient (water gardens and collection tanks, solar, greywater systems etc) and to the highest spec for insulation and energy efficiency. Less use of concrete and impermeable ground surfaces. More natural areas planted out with native trees. Planting out commercial building rooftops into green spaces that help to filter air quality, absorb rainwater, insulate and lower built area temperatures. Find a better rubbish collection system rather than using stinky curbside bins that encourage resource disposal and block path and roadways. Maintain flood plains and waterways, requiring private properties to keep creeks on or bordering their properties clear of pest plants like wild ginger, fallen branches and rubbish. Put in a decent and affordable public transport system, cycleways, and safe pedestrian walkways (including over the current harbour bridge) rather than wasting money on building more roads that encourage car congestion and pollution.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

The identified initiatives are a good start, however with the way government agencies and councils waste public money while failing to deliver basic public services, it's going to cost more than \$1.65 billion. Auckland residents need to become better stewards of the environment and start taking responsibility for their lifestyle, emissions, and building houses in stupid places. Money won't save Auckland from the stupidity of the past few decades without intelligent leaders working for the community rather than their own agenda. The burden will be on the younger generations to adapt to the mess left to them by previous generations and to be smarter.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Flooding is one part of the whole. Without synergising all of Auckland's policies to move towards the same overall objective of a healthy environment and communities, policies will keep undermining one another to make this another pointless political exercise.



Storm Recovery and Resilience Consultation

#1512

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

There was overland flow coming through my property, and three houses in our street were yellow stickered because of a slow moving slip, and the storm water runoffs into our local reserve carved 2 mtr culverts into the soil where the water was discharged into the local stream.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

The local street Facebook helped when people needed help sandbagging. Having a street network allready working made it easier.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

That the footpaths would be cleaned (all mossy) and the slow moving slip is resolved at the end of the street. That is very unsettling.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

I think that the concept of overland flow and understanding the flood risk areas. your GIS overlays for this was amazingly accurate. These concepts and what are the homeowner responsibilities are key. Also, extending this to landlords, are they upholding their responsibilities for the management of risk to their properties and surrounding community? Overflow is interesting, and many diverted the water away from their property, but just sending to the next one. An example of what we have done with a neighbour is allowed their stormwater pipe to come through our property to the discharge point. They are above us, and allowing an easement to enable them to do this, helps them, and also us as it reduces the flow upstream. You can only have these conversations if you have a respectful relationship ship with each other.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

I think we need to prepare for an increasingly volatile climate. Now is the time for stormwater investment!!! From a change mgt point of view, swim with the current tide of sentiment.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1527

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

we live in Northcote, Auckland and our house (and many of our neighbours) was flooded when the cul de sac overflowed during the Auckland Floods.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

private insurance, neighbour support.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Council presence following the flooding would have been appreciated. We were left to deal with the impacts alone - thankfully we have a strong community and we helped each other.

In the follow up - a community Q&A session (even online) so we could understand why the area flooded so quickly and so severely - this could help the council from being blamed for everything too.

I'll only feel as though I've recovered when some resiliency measures are in place so I'm not afraid about what's going to happen next time. The driveway that runs down to the reserve next to ours (council owned) needs to be lowered so in the event of a flood, the water flows down that driveway, and not into our homes. It's currently higher than our neighbour's and our driveway which makes no sense. We have had no contact from the council to look at what's happened, let alone offer practical support solutions. We would happily contribute to the cost, as would our neighbours.

Our street (Arahia St) needs more stormwater capacity as there has been intensification in our area (we are in a cul de sac at the bottom of a hill so take the run off from all higher streets around). Multiple dwellings have been built on the street adjoining ours (Deuxberry) which has resulted in extra strain on our infrastructure, which now cannot cope.

Council desperately needs to build extra drainage and storm water capacity into the plans when consenting multi site dwellings. (Stormwater is just one issue - parking and public transport accessibility is another major problem caused by the intensification process).

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

There needs to be more frequent connection between weather modelling and decision makers in the lead up to major events. Modelling should be taken seriously and take precedence over other activities.

We don't operate in a vacuum. Look at other countries and cities that have been affected by floods and the ones that have recovered well. What have they done well? What can we learn and implement locally?

In the event, an operational communications protocol that rolls out to first responders, councillors (who flow through to their local networks), and Civil Defence. Build it now and practice it frequently. Build relationships with insurers, foodbanks, Marae.

Clarity on responsibilities from Council. A robust crisis management plan that involves working with the media, not against them.

Ongoing preventative maintenance - council ongoing and visibly addressing tree/shrub blockages, culvert/grate blockages, increasing capacity of stormwater capacity of areas that are near/on flood plain.

Helping property owners understand what they need to do when the weather is good - when the storm comes it's too late.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

A number of these initiatives are hygiene factors, a number are secondary, and a few are critical. I think you should prioritise the list, it will make it easier for people to understand why their rates are increasing if you're really clear about which of these need investment and the reasons.

For instance - increased maintenance - this is a hygiene factor and should absolutely be happening right now. More visible maintenance year-round - but don't position that as a new initiative that will increase rates. People will roll their eyes and say well, what ARE we paying for?! Not sure why this would increase rates as Council should be all over this already.

Flood intelligence - yes - and partner with those who are already doing it. Finity consulting just announced a strategic partnership with Niwa. Auckland Council should announce a strategic partnership with a modelling agency. This will cost but is a worthy investment. It's

something material and new that Council can talk about in media and point to as an action that we're taking to make a difference.

Community led flood resilience - yes - again a hygiene factor, let's not overstate how much community can do. These are people with full lives and you cannot put the balance of the burden on them. Undoubtedly they can be supported to implement resilience measures, and this can build community engagement e.g. the kaipatiki groups. This should be a secondary pillar.

Stream rehabilitation - join with increased maintenance.

Rural settlements - this is crucial - it sounds like it will cost a lot -double down on consultation with iwi and community needs. especially consider future focused, what is going to happen if these rural/semi rural areas experience intensification over the coming years and what does that mean? Opportunity for council to demonstrate that it actually does plan and have some forward looking capacity (the biggest gripe we have and that I hear is that everything is so reactive, transport and infrastructure planning isn't fit for the future)

Culvert and bridge upgrades - absolutely - failed bridges mean people are isolated. You can't have that. Aspects of this category could be scooped into the maintenance section, and then investment in the bridges themselves dealt with separately. I think ratepayers would ok with a portion of their rates going towards bridge upgrades, but not the maintenance part as that's something that's already happening (or should be).

Blue Green networks - this is super interesting. We have one in Northcote and it worked during the storms - this needs to be talked about more because a lot of community didn't realise it was designed to fill up like that. I think it's a great idea with all risks considered. Good to see this would align with the Government categorisation process. Not sure how this would fit with the proposed budget - it would be good to see how many houses and where, and more detailed costings for Blue Green spaces. This is something that people could understand rates increasing to cover.

Overland flow path management - interesting this is posited as the greatest opportunity for flood management - when most of the burden lands on residents and property owners. understand this in practice, but the detail needs to be around how Council will support and fund people to make changes to their fences/property should that be required. Great if there is a specialist who goes to residences and tells people what needs to happen, then council assists with the funding, comes back and checks it off? good PR opportunity to introduce that person/those people through media and Council owned comms channels - this would also materially demonstrate change and action. There is quite a big piece around community engagement and education that needs to be built into this plan - effect change together and Council will get a better result (than threats of infringement notices and legal action)

High risk properties - not sure this can be addressed in the initial proposed budget - we don't yet know how many properties are impacted by the govt categorisation and to what degree. Agree with flood plain management - connecting blue green networks. Redevelopment should be a secondary goal.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

One thing that isn't discussed in the plan is the current intensification process. How can Council grant consents for such intensification without addressing infrastructure and storm water improvements? It's irresponsible and risky. This needs to be integrated into any planning for flood management - that all consents are reviewed in line with their potential impact on existing drainage systems/storm water capacity/local flood plains (per the Council viewer) - and if not addressed, mitigation happens before construction (can developers pick up portion of the tab for this?) otherwise the city is going to become unliveable.

#1527





Storm Recovery and Resilience Consultation

#1530

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

There were various effects from nil to moderate in my community.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Aside from the Wairau Valley Our community seems to have faired very well - an aspect of its topography

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Because of limited adverse impacts the question is probably not applicable to my community.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Considerably improved urban planning (including catchment plans) and engineering design of roads, bridges, culverts etc and appropriate levels of ongoing maintenance.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

In general the nine possibilities are just plain common sense. The addition of urban planning would perhaps be the most important single aspect e.g ratio of built and hard surfaces to ground area. In addition the initiatives omit to mention both green and blue roofs, and onsite retention tanks or urban and rural forests. Most roads in new subdivisions are very narrow. One of the several adverse impacts of these is the inability to construct swales. It seems grossly unfair that owners of properties who have streams and similar which run through their properties are held responsible for them even though they have very little or any influence on the volume of water which flows through them - often predicated by Council issuance of building and resource consents, changes in land form etc.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Yes, see answer to previous question. In addition a 30 or 40 year practice of successive mayors and councils taking pride in keeping rates at or below the level of inflation. The flooding and other issues are one of several adverse outcomes of such flawed (political) policies.



Storm Recovery and Resilience Consultation

#1534

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Personal inconvenience but no specific damage

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Huh?

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Huh?

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

1. Fire consultants and PR people.
2. Hire a few civil engineers with knowledge of storm water and wetlands and give them a big budget.

6. There are nine possible initiatives outlined in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

A lot of consultant-style babble. But yes, fixing this will require a few billion of infrastructure improvements. Give it to the engineers and minimize the touchy-feely community stuff. This is a pure engineering problem. And don't build houses in flood-prone places, d'oh.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1576

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

I live near Wairau Park where the local Bunnings and Pak n Save were flooded and closed for weeks. I had stormwater running like a river across my property. I have trees in my garden that are on a 45 degree lean and need cutting down. My roof was damaged by the wind and required repair. Almost all the beautiful bush tracks in my neighbourhood (some that had just reopened after extensive work) are damaged by slips and closed to the public.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

Everyone rallying together to help each other.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Having everything put back the way it was. I feel distressed every time I see the boarded up bush walks.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Taxpayer funded weather data being made available to everyone so that we have a better chance of timely warnings (currently it is commercially paywalled). Less building on unsuitable land.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

I think they are all excellent.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Identification of land that is unsuitable for development, and marking it as recreation land instead. For example, there is an empty field behind my parents' retirement village that has been earmarked for new housing. It is marked on GeoMaps as a flood plain and every time it rains, it turns into a lake. It seems like madness to build houses on this land when it should be made into a blue-green network. Surely no insurer would cover a property built in an area with a known flood risk.



Storm Recovery and Resilience Consultation

#1602

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Commitment to decreasing climate change by local and national government

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**

Civil defence education for adults and children; better city planning

- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**

- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**



Storm Recovery and Resilience Consultation

#1646

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Flooding

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

No one

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**

Yes, keep the drains clean

- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**

- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**



Storm Recovery and Resilience Consultation

#1649

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Unaware of anything in my local area.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

No help offered or requested.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Not having experienced them in the first place.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Plan for periods of heavy rainfall so that the water can be 'stored' and/or removed via drains at the appropriate time.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Yes, reduce the population of Auckland and housing requirements and therefore have more grass, fields and woods available to soak up the rainwater, instead of having running off of concrete.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Yes, reduce the population of Auckland, stop relying on 'experts' and don't build in places that really aren't suitable.



Storm Recovery and Resilience Consultation

#1654

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Our community storm water system failed to meet the demand put on it

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Our body corp. organised a check and clean up of storm water facilities

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

No help needed

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Personal responsibility relating to low lying or storm flow effects - home occupiers need to be aware of their possible situation complications rather than be surprised

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Another resting burden. could there be an occupier charge rather than slapping it on the ratepayer

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1660

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

My home was flooded on 27 January and I had to physically swim out of my house with my children on my back.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

'- friends and family support

- have felt let down by slow pace of govt / council decision making process - being displaced from home for 210 days and counting has serious negative knock-on effects on my mental health and the mental health wellbeing for my children. The delays are also causing financial strain which means council have to support me for longer which means rates are increasing

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

to see council actually fixing the storm water pond & culverts which were the cause of the flooding ie increased maintenance. Stop letting land be sub-divided until the infrastructure in area has been upgraded to cope! Stop talking and start doing!

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

To actually action their plans rather than just talking about them.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Think blue-green networks are a good idea. Increased maintenance is an easy one but yet to see any evidence of this

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1679

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Our cul-de-sac flooded because there was too much water for the drains to cope with. The excess water poured through the neighbours' property and then onto our back lawn. It eroded the bank on our property and that of the neighbours'. (If we hadn't planted trees on the bank, the damage to our property would have been worse.) The intensity of the stormwaters shifted the concrete facade of the stormwater pipe outlet at the bottom of our property and caused erosion of Adah Reserve as well as bringing down a tree which fell into the stormwater stream. We are still waiting for the Council to do something about the damaged pipe and the fallen tree in the stream.

The neighbour's townhouse was flooded.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

My husband filled sandbags, and we helped place these against the neighbour's dwelling to prevent further ingress of water.

4. What would help you and your community feel like you had ‘recovered’ from these extreme weather events?

For the Council to come and fix the broken stormwater drain and unclog the stormwater stream. Also secure the banks and the reserve against further erosion.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

More warning would have been helpful about the intensity of the events.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

They are all sensible initiatives. But why do ratepayers yet again have to provide extra funding when these things should be classified as infrastructure? How about using that money from our rates that is targeted for climate change?

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Yes, let us know the progress on getting the stormwater stream fixed please. I can understand it might take awhile but at least give us some feedback on a timeframe, please.



Storm Recovery and Resilience Consultation

#1689

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

I think it affected us all. Blocked roads. Concerns for over burdened public systems. Lack of response after has also been a concern.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

People are resilient, checking on neighbours and friends, making meals etc.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

If the lesser rain events didn't cause damaging surface run off due to a burdened system and increased water table.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Less covering of waterways, more spongy surfaces and better use of water run off. Archaic rules around no water tanks coupled with mains supply. If we housed our water for reuse instead of loading sw systems it may help in part. Less money spent of beaurocrats and more pumped into services upgrades.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

No rates increase. This should have been forcasted and should come out of cutting councils pointless jobs.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1729

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

There is a stream fed by piped storm water run-off from Onewa Rd and our sections, at the bottom of my and my neighbours properties. This stream became a large and powerful flow of water in the storm events. 4 of my neighbours had large slips on their land that compromised the poles of their homes and all were yellow stickered, 2 of the homes are still not being lived in while they wait for remedial work to their land. My property wasn't affected but could be in a future event, which makes me nervous.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

If someone from council had inspected the stream and storm water outlet from the road to see what could be done to lessen the flow or power of the water in future events.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

By reducing infill housing, those allowing more land to absorb the water.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

I support them all.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

There is no mention of changing where new houses are built, away from steep sections or close to streams, or areas that would cause more run-off on to neighbouring properties. The location of new homes needs to be assessed against the impact they would have adding to this problem.

There is no mention of slips in the plan. In my situation the slips were caused by a stream rising up at the bottom of steep sections and underscoring the toe of the slope. Can you please include remedial work to streams that cause damage through slips in the plan (not just streams that cause damage directly to homes through flooding).



Storm Recovery and Resilience Consultation

#1773

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Damaged local bush tracks and parks, loss of community resources (tennis court, basketball court etc), neighbours flooded and immediate family members trapped on Archers Rd.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Reading articles about flood mitigation and what is possible and has been done elsewhere. The signs of resilience - community coming together.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

A clear plan (timeline) clearly communicated about when local amenities will be fixed and also what the plan is going forward for future flooding events. More information specific to my neighbourhood about where to go and what to do in an emergency flood situation.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Clear communication about what to do, where to go and where to find information in times of emergency. More funding for projects like Project Twin Streams in West Auckland that have already been working on flood mitigation for many years and go unrecognized and unacknowledged.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

The blue-green network is a great idea. Initiatives already in existence like Project Twin Streams should get more funding and more acknowledgement of the work they've been doing for years and years in this space. Rather than funding brand new initiatives with no experience.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Communicating in plain English to all communities frequently so people are prepared - instead of just when there has been an emergency.



Storm Recovery and Resilience Consultation

#1787

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Very affected

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

No one except me, the home owner advocating for self and my family

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

Settlement financially from insurance. Admission that cyclone Hale NOT Gabrielle lost more lives. Please not the Auckland Anniversary floods but cyclone Hale - yes it had a name

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Better communication. During an alert please dont think Auckland evacuating at once is a good idea! it was dangerous and stressful for everyone in the city. It should have been staggered.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1838

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Large slip

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Advice from independent professionals to understand the ramifications options

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

EQC have paid out approx one quarter of the estimated repair cost. This leaves me with a huge financial burden at age 66 .Finding \$150K will totally impact retirement it hangs over my head and concerns me every day. There will be considerable long term impact financially and will affect my resale value. It is likely I will not be able to afford to stay in my cherished home.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

Don't build on flood prone areas.

Intensification must surely be a contributing factor

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Current rates are already high and any homeowners are struggling with mortgage rate increase; the cost of living.....

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1840

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Pest Free Kaipātiki

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

We are a community conservation organisation based in Kaipātiki. Our community was badly impacted by the storms with widespread flooding and significant slips. Our community, both existing volunteers and people living in the local area who had not previously been in contact with us, immediately turned to us as a source of information and help to find out how they could act to 'fix' things in the immediate aftermath and the longer term recovery. The widespread landslides have been the most important consequence of the weather events for us, with many threatening people's homes, closing much-loved and cared for reserves and reversing decades of volunteer work to restore the native bush in some locations. As well as this we have seen extreme levels of erosion and sedimentation of our streams, which has caused great concern among our communities.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

We, and our community, have been drawn together by a spirit of wanting to get out and make a difference. PFK immediately set up a community task force to help repair tracks in reserves, clear drains and smaller pieces of vegetation blocking tracks. We fielded so many

requests for information and support about what to do with landslips in the aftermath that we began a project to provide Auckland-specific advice about native plant stabilisation of slips. A public workshop as part of this drew a large crowd of attendees, many of whom were extremely grateful to have their experiences heard and feel there was something they could do (or at least plan towards) to move forward and begin to heal the land and with it their emotional trauma. Having opportunities for the community to come together has been very important as has events and information that help guide people about what steps they can take to remediate damage and prevent other slips from occurring. Our community appreciates feeling heard, respected, being able to share their experiences and not be alone with them and being given constructive advice to repair damage and protect themselves and their property from any similar future events.

4. What would help you and your community feel like you had ‘recovered’ from these extreme weather events?

Recovered might not be the right word, but we and our community would feel more able to move forward from the weather events once our reserves are fully opened with safe tracks and funding and support for the community to replant areas that have slipped with appropriate natives. We would feel more confident of moving forward from the storm events with a sound 'sponge-city' plan of future works to adapt Auckland to be able to withstand future flooding clearly set out and committed to by both the Council and Government.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

By requiring all new builds to be constructed with water-sensitive design, retrofitting existing buildings with water-sensitive design features, protecting our urban trees (especially large trees) as important assets that slow surface-water flooding, absorb and clean water flows, using nature-based solutions to incorporate sponge-city design into Auckland, by daylighting and naturalising more (all) of our waterways, requiring greater permeable surface requirements for properties, working with Auckland Transport to allow more community planting on berms to soak up excess surface water, and by taking every opportunity to be climate positive - especially in regards to prioritising excellent public transport options to enable Aucklanders to choose not to drive private vehicles.

6. There are nine possible initiatives outlined in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

We support the recommendations set out on pages 8 and 9 of the Sponge Cities report (attached). Of the nine initiatives listed in the Making Space for Water document we particularly support stream rehabilitation and blue-green networks. It is essential that we work with nature-based solutions to prepare for future events and minimise their impact. These are also opportunities to create additional benefits to both local communities and biodiversity by improving native habitat as part of work done to improve Auckland's preparedness for future weather events.

While we do not disagree with the nine initiatives outlined in the Making Space for Water document, we think they do not seem as aspirational as they could be. There seems to be a lack of leadership and drive in the initiatives and they feel like the sort of work that we would be expecting our Council to be doing anyway. Considering the severity of the weather events and the loss of life that resulted from them we would have expected a far more cohesive and bold set of initiatives from the Council. What is suggested here is lacklustre and also seems to shift a large portion of the effort back onto the community. While we support community-driven initiatives and opportunities to empower the community, this will need to be done right with respect, support, open communication and resourcing. Setting out the expected cost of the initiatives is fair, but what is not given is the cost of not doing anything, or doing things poorly. We all know that climate change is happening and this means more extreme weather is very likely to occur more frequently. The cost of not preparing properly for it is far more expensive than investment to properly minimise impacts and support our communities. We want to see the Council take a leadership role in this area and shoulder responsibility, rather than pass this on to community groups and private landowners. We want to see a major effort to develop a long term, well coordinated

plan with Auckland Transport, Watercare, Mana Whenua and community leaders as this is what it will take to really be prepared for future events. We want to see drive to implement strong legislative change to enable effective flood prevention and mitigation work, aligning with the recommendations of the Sponge Cities report (attached). Be bold and strong for the city and community you work for.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

We would like to see incentives for landowners taking positive action to make their land more able to soak up flood water, including by retaining trees and plant coverage of the site, building up (rather than out or infilling sites) and using water-sensitive designs or retrofitting these to existing buildings, we would also like to see more aspirational plans to use nature-based solutions to prepare Auckland for future weather events and more actions taken to reduce emissions and support our communities to live in ways that have less impact on the climate, particularly in regards to enabling active and public transport options.

Sponge Cities

Can they help us survive
more intense rainfall?

A REPORT BY

August 2023



Table of Contents

1 Executive Summary.	5 Summary of Recommendations.	09 Chapter 1 - Cities in Aotearoa New Zealand face increasing flood risks.
21 Chapter 2 - What are sponge cities?	45 Chapter 3 - Understanding the Aotearoa New Zealand context.	56 Chapter 4 - Do sponge cities offer Aotearoa New Zealand a viable solution?
61 Chapter 5 - An Aotearoa New Zealand model for sponge cities.	89 Chapter 6 - Making it happen.	102 Conclusion.

About Mahi Rongo / The Helen Clark Foundation



MAHI A RONGO | THE HELEN CLARK FOUNDATION IS AN INDEPENDENT PUBLIC POLICY THINK TANK BASED IN AUCKLAND, AT THE AUCKLAND UNIVERSITY OF TECHNOLOGY. IT IS FUNDED BY MEMBERS AND DONATIONS. WE ADVOCATE FOR IDEAS AND ENCOURAGE DEBATE; WE DO NOT CAMPAIGN FOR POLITICAL PARTIES OR CANDIDATES. LAUNCHED IN MARCH 2019, THE FOUNDATION ISSUES RESEARCH AND DISCUSSION PAPERS ON A BROAD RANGE OF ECONOMIC, SOCIAL, AND ENVIRONMENTAL ISSUES.

OUR PHILOSOPHY

New problems confront our society and our environment, both in Aotearoa New Zealand and internationally. Unacceptable levels of inequality persist. Women's interests remain underrepresented. Through new technology we are more connected than ever, yet loneliness is increasing, and civic engagement is declining. Environmental neglect continues despite greater awareness. We aim to address these issues in a manner consistent with the values of former New Zealand Prime Minister Helen Clark ONZ, who serves as our patron.

OUR PURPOSE

The Foundation publishes research that aims to contribute to a more just, sustainable, and peaceful society. Our goal is to gather, interpret, and communicate evidence in order to both diagnose the problems we face and propose new solutions to tackle them. We welcome your support. Please see our website www.helenclark.foundation for more information about getting involved.

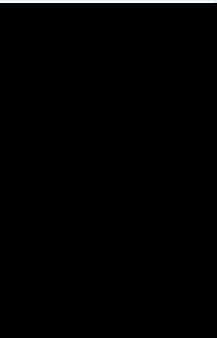
About WSP



AS ONE OF THE WORLD'S LEADING PROFESSIONAL SERVICES FIRMS, WSP PROVIDES STRATEGIC ADVISORY, PLANNING, DESIGN, ENGINEERING, AND ENVIRONMENTAL SOLUTIONS TO PUBLIC AND PRIVATE SECTOR ORGANISATIONS, AS WELL AS OFFERING PROJECT DELIVERY AND STRATEGIC ADVISORY SERVICES.

Our experts in Aotearoa New Zealand include advisory, planning, architecture, design, engineering, science, and environmental specialists. Leveraging our Future Ready® planning and design methodology, WSP use an evidence-based approach to help clients see the future more clearly so we can take meaningful action and design for it today. With 67,000 talented people globally, including 2,200 in Aotearoa New Zealand located across 36 regional offices, we are uniquely positioned to deliver future-ready solutions, wherever our clients need us. See our website at wsp.com/nz.

He Mihi / Acknowledgements



With flooding in early 2023 leading to tragic loss of life and widespread damage to property, New Zealanders have been profoundly confronted by the realisation that climate change is happening, and our cities and towns need to find ways to adapt. ‘Sponge Cities’ offer a way to increase resilience to intensifying rainfall. But they also offer us a model for cities that are more beautiful, less polluted, and more hospitable, both to humans and wildlife. The vision that emerged for Aotearoa in writing this report is not one of doom and gloom, but one of green and blue cities and towns that can both survive, and thrive.

To all those who helped shaped my thinking and helped with this report in other ways, ngā mihi nui ki a koutou. I’d like to start by thanking the Helen Clark Foundation staff and board, particularly our Executive Director Murray Bruges and our patron, Rt Hon Helen Clark, for their excellent feedback and support.

A huge thank you to our partners at WSP New Zealand, who are supportive, helpful and extremely well informed. In particular Campbell Gardiner, Nadine France, Nicole Tucker, Liam Foster, James Reddish, James Douglas, Vivienne Ivory, Reginald Profitt, Heather Wilkins, WSP Creative Solutions Team, and Peter Hall from the Global team - thank you all.

We also rely greatly on our partners at AUT for the support that allows us to continue this important work - ngā mihi nui.

I was lucky enough to have many engaging conversations with many smart people as I developed this report - thank you all so much for your time. I particularly want to acknowledge Belinda McFadgen, Dr Timothy Welch, Matt Paterson, Dr Wendy McWilliam, Dr Suphicha Muansgri, and Juliana Reu Junqueira.

Finally, a special thank you to Mark, Willow and Miro, for moral support and the many welcome cups of tea.

Kali Mercier
WSP Fellow, and Deputy Director of the Helen Clark Foundation
7 August 2023

Glossary

TECHNICAL TERMS AND ACRONYMS

- Blue-green infrastructure (BGI)**
The use of blue elements such as rivers, ponds and wetlands, and green elements such as parkland and urban forests, for stormwater management.
- Brownfield development**
Development on land that has already been developed and has existing infrastructure.
- Extreme rainfall event**
Unusually intense rainfall compared to average rainfall events for a given area or time period.
- Flood plain**
Areas predicted to be covered by water during heavy rain. Flood plains appear in low-lying areas and next to streams and rivers.
- Green infrastructure (GI)**
A natural area, feature or process that helps manage floodwater, such as trees, rain gardens, permeable pathways, and planted stream banks.
- Greenfield development**
Development on land that has not been previously developed, often on the periphery of existing urban areas.
- Grey infrastructure**
Traditional stormwater infrastructure, generally made of concrete, such as pipes, drains and gutters.
- Infill**
The construction of buildings on previously unused land within an existing urban area - such as in residential backyards.
- LGA**
Local Government Act 2002.

Nature-based solutions (NBS)

These aim to address societal challenges such as climate change, threats to human health and food and water security, by protecting, sustainably managing, and restoring natural ecosystems.

Overland flow path

The route water will naturally take across the ground during heavy rain when the stormwater network is at capacity.

Runoff

Stormwater that drains from the surface of an area of land, or off a building.

Sustainable Urban Drainage Systems (SUDs)

An approach to stormwater management that uses ponds, planters, tanks and other green infrastructure to manage surface water sustainably.

Water sensitive urban design (WSUD)

A design approach that considers stormwater management alongside the ecology of a site. WSUD works with nature, minimises the use of impervious surfaces and uses vegetation to trap sediment and pollutants.

WSE

Water services entities. These new entities will run drinking water, wastewater and stormwater services under the Affordable Water Reform programme.

TE REO MĀORI WORDS AND TERMS

Hapū

Clans or descent groups that sit within iwi, or tribes, in Māori society.

Iwi

The tribes that form the structure of Māori society.

Mana

Prestige, status, authority, spiritual power, charisma.

Mātauranga Māori

The body of knowledge and wisdom originating from Māori ancestors, including the Māori world view and perspectives, Māori creativity and cultural practices.

Mauri

The essence or life force that provides life to all living things and gives water and land the potential to support life.

Papatūānuku

In Māori tradition, Papatūānuku is Mother Earth, who gave birth to all things.

Ranginui

In Māori tradition, Ranginui is the Sky Father / the heavens.

Te Mana o te Wai

The central concept for freshwater management in Aotearoa New Zealand. It translates as mana - or prestige and power - of water.

Wai

Water. Wai has its own (mauri) life force and spirit, and is linked to identity and whakapapa.

Wairua

Spiritual existence or soul.

Whakapapa

Genealogy, ancestry. Whakapapa links people to all other living things, and to the natural and spiritual world, past, present, and future.

Executive Summary

OUR CITIES FACE INCREASING RAINFALL-RELATED RISKS INTO THE FUTURE AS A RESULT OF GLOBAL WARMING, BOTH FROM FLOODING AND FROM DROUGHT. AOTEAROA NEW ZEALAND IS ALREADY EXPERIENCING THE IMPACTS OF A CHANGING CLIMATE, WITH THE FIRST HALF OF 2023 DELIVERING SEVERAL DEVASTATING RAINFALL EVENTS ACROSS MANY PARTS OF THE COUNTRY.

Even if global carbon emissions drop significantly in the coming years, the science indicates we will experience more frequent and more intense rain events for the foreseeable future. This report explores how our urban areas can adapt to the impact of these inevitable changes.

Aotearoa New Zealand’s current approach to urban design and flood management is falling short. Our so-called ‘grey infrastructure’ (pipes and drains) is ageing and in many cases not coping with current requirements, much less up to the task ahead. Meanwhile our urban areas have become less green in recent years, and therefore less able to absorb the large amounts of rain with which they have to deal, now and in the future.

Could ‘sponge cities’ offer a solution? That approach aims to

protect, enhance and sustainably manage water resources in urban environments by slowing the passage of stormwater. It involves cities working with water rather than against it. This can include building or restoring urban wetlands, ‘daylighting’ streams and creating space for urban waterways to flood safely – including by moving people and houses out of the way, for example. It also includes relatively new but effective ideas such as pocket parks and tiny urban forests.

Some potential solutions lie in the public domain, and some in the private. Using all the different types of spaces in our urban areas, including parks and school grounds, roads, industrial areas, homes and businesses, helps to spread the water load and the cost, and ensures a better outcome overall.

Adapting Aotearoa New Zealand’s cities and towns to a sponge cities model will be expensive. However, there is strong evidence that sponge city approaches provide a compelling cost-benefit ratio, both when compared with conventional stormwater management approaches, and especially when compared with taking no action to prepare for climate change.



For a sponge city approach to be implemented successfully in Aotearoa New Zealand, it will need to reflect the unique national and local context. It would need to be supported in our planning frameworks, and draw on existing knowledge from mātauranga and tikanga Māori in this space.

Incorporating a mātauranga Māori approach, a sponge cities model would be assessed not just by its ability to mitigate flood risk, but also by how well it is able to accelerate ecological restoration in our cities to flourishing levels, rather than to a minimum baseline.

It will also be important to adopt a holistic approach. Aotearoa New Zealand is dealing with a biodiversity crisis alongside the increasing impacts of a climate crisis. Thus, the model we adopt should enhance rather than reduce biodiversity in our cities, adopting a ‘nature-based solutions’ framework. Nature-based solutions aim to address societal challenges such as climate change, threats to human health and food and water security. They also aim to reduce disaster risk, simultaneously providing both human well-being and biodiversity benefits. A sponge city approach therefore should work for the human beings who live in those cities and towns, providing beautiful spaces for rest, recreation, and contemplation.

While sponge cities undoubtedly represent a powerful tool for cities and towns to reduce the damage caused by excess rainfall, it must be recognised that no approach to dealing with that in urban areas can completely eliminate hazards or remove all risks. Sponge city approaches should be seen as reducing the impacts of increasing rainfall in cities, complementing existing grey infrastructure – and not as a silver bullet to all flood risks.

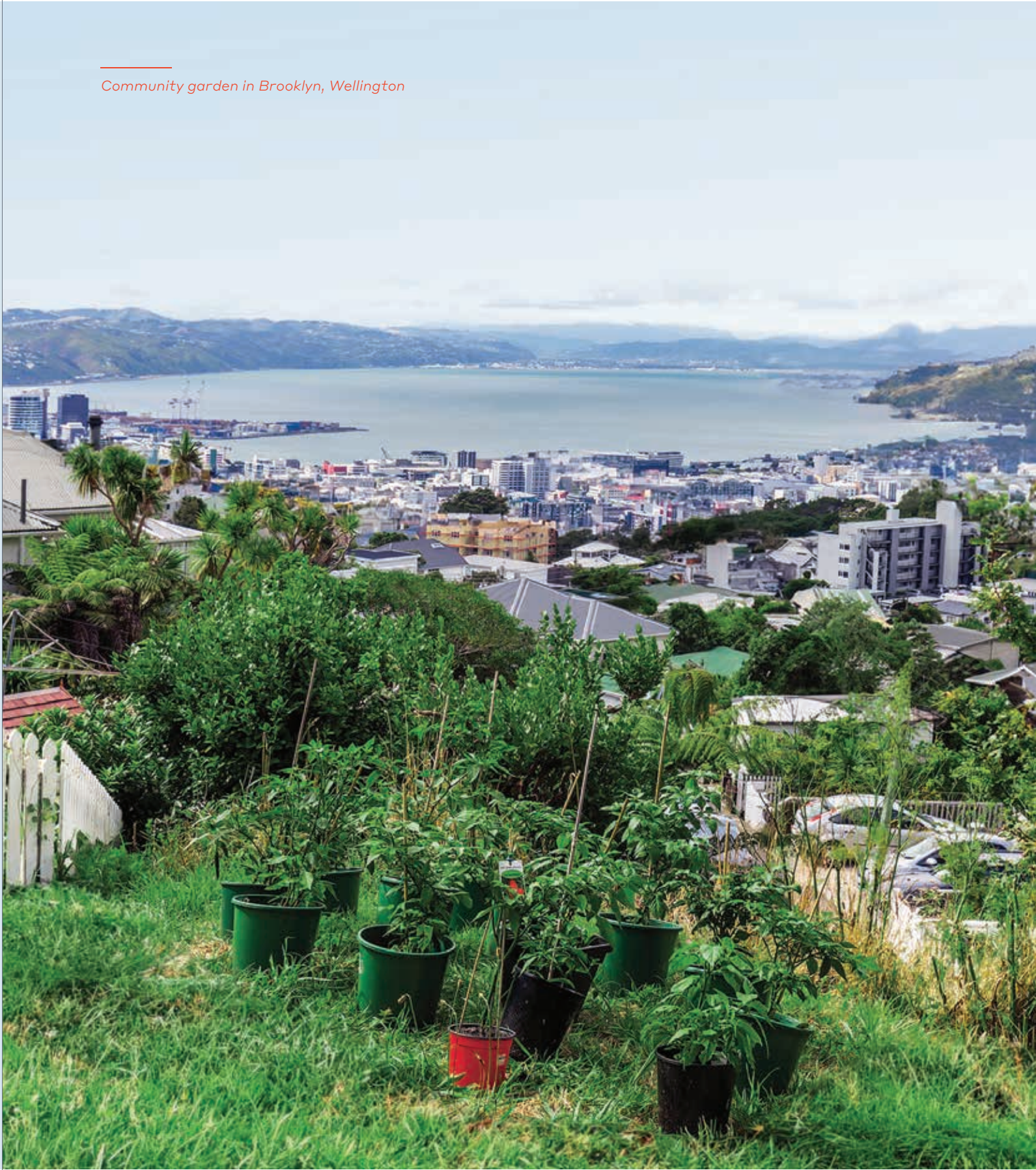
The sponge city approach presents a compelling, and likely essential, pathway if urban areas are to prepare for a much wetter future, a future in which we can be certain that our grey stormwater infrastructure alone will prove to be inadequate again and again. While elements of the approach will be expensive and

will present complex planning and implementation challenges, investment in sponge city solutions will be less costly to society overall than continual flooding of urban and town infrastructure.

Importantly, the evidence also suggests that even inexpensive sponge city actions would be effective in reducing the impacts of intense rainfall in urban areas if undertaken in the most appropriate locations as part of a strategic long-term vision. As the first half of 2023 has demonstrated, doing nothing will not be free – intense rainfall is already causing major damage in our urban areas and the cost of implementing a sponge city approach will be a fraction of the cost of not preparing. Aotearoa New Zealand must act quickly and decisively.



Community garden in Brooklyn, Wellington



Summary of recommendations



KEY RECOMMENDATIONS:

1. **Retrofit cities and towns to become sponge cities** to help us survive and thrive despite increasing rainfall. Take a holistic, nature-based approach to ensure we also capture benefits for biodiversity and human health and wellbeing.
2. **Act urgently and decisively, and plan strategically** for the long-term at the national, regional, and local levels. Name and prioritise nature-based sponge city approaches as a key climate adaptation approach for Aotearoa New Zealand.
3. **Develop a clear vision for a sponge cities model for Aotearoa New Zealand** that draws on our strengths and unique context, such as mātauranga Māori, and community-led nature-based initiatives.
4. **Have high aspirations.** Aim to revive the mauri (life force) of water by improving its quality, achieve rauora (natural abundance) in the environment, and make beautiful spaces in which to live - rather than simply 'managing stormwater'.

A sponge city model for Aotearoa New Zealand should:

1. At the city and catchment level:

- **Require councils to plan for and provide public green spaces** as they do with other infrastructure, and amend the Local Government Act accordingly.
- **Require councils to set out nature-based sponge city approaches in their long-term plans**, including making space for water along flood plains and flow paths and increasing the provision and connectivity of urban blue and green spaces, both to increase city absorbency and enhance biodiversity.

2. At the neighbourhood and development level:

- **Retrofit existing neighbourhoods, roads and private land to become more absorbent.** Use urban and suburban road corridors and other public places to provide space for green infrastructure; require new buildings in the inner city to include green roofs or equivalent infrastructure; and unseal hard surfaces such as pavements and carparks.
- **Encourage 'upwards' development** in preference to 'outwards' sprawl and 'infilling' back yards, to leave more green space available to absorb water. Develop clear guidance on how to address conflict between housing needs, and the need to provide green spaces.

◆ **Raise the national minimum standards for proportion of the total area of new developments that must be left unsealed,** and require more

parkland to be zoned as part of new developments. Require new developments to follow sponge city approaches, such as minimising disturbances to topsoil and clustering buildings to retain more green space.

3. **At the local level:**

◆ **Incentivise and educate homeowners to make land around private residences more absorbent,** for example by providing free advice such as home audits. Consider rates rebates (including ‘treebates’) or discounts on materials.

Encourage homeowners to:

- Minimise the use of sealed surfaces.
- Make sure flow paths are not blocked.
- Replace lawns with plants and trees, install rainwater tanks and small-scale rain gardens to collect water and remove pollutants, and recycle rainwater.

4. **Embrace incremental approaches as part of a long-term vision.** Even small investments can have a big impact when strategically implemented.



Recommendations to support implementation include the following:

1. **Be guided by mātauranga Māori** (Māori knowledge) in setting policy and community decision-making around flood adaptation.
2. **Partner with tangata whenua in decision-making around sponge city approaches** at the national, local, and community levels.
3. **Develop and agree a national funding approach** that is coordinated and comprehensive.
4. **Identify cities and towns at the greatest risk,** and prioritise support accordingly.
5. **Rise above policy and operational silos** by providing clear national leadership on sponge city implementation,

supported by a cross-agency work programme and catchment scale working groups at the local level.

6. **Establish a sponge cities and nature-based solutions stormwater expert advisory group** at national level to advise on policy approaches and best practice.
7. **Encourage community involvement** to achieve more equitable outcomes.
8. **Develop an information portal as a one-stop shop for decision-makers.**
9. **Invest in research and development on sponge city solutions** to help communities choose the most appropriate solutions.



CHAPTER 1.

Cities in Aotearoa New Zealand face increasing flood risks

New Zealanders are used to natural hazards, so it is not surprising that the country has been rated the second riskiest in the world for expected annual losses from natural disasters, as a proportion of GDP.¹ Flooding is the most common natural hazard in Aotearoa New Zealand. On average, the country experiences a major flood event every eight months.² Floods cost more than \$160 million dollars in direct economic damages each year, and cause ongoing economic, social, cultural, and environmental impacts.³ Luckily, floods are also one of the most avoidable hazards – they can be planned for and mitigated.⁴

CLIMATE CHANGE BRINGS EXTREMES OF RAINFALL AND DROUGHT

The impacts of climate change are becoming increasingly obvious, even to non-scientists, both globally and in Aotearoa New Zealand. The evidence is now unequivocal that human activities have caused global warming, mostly through emissions of greenhouse gases.⁵ Depending on how successfully emissions can be reduced globally, a person who

is in their early twenties today might experience warming in their lifetime of as much as 2.7°C (under an intermediate scenario), or even 4.4°C (under a high emissions scenario).⁶

As average temperatures rise, more water evaporates, which in turn increases overall precipitation. Globally, the International Panel on Climate Change (IPCC) already reports widespread and substantial impacts from climate change, in terms of both inland and coastal flooding to cities. They attribute these events to global warming “with a high degree of confidence”.⁷

In the short term, every region in the world is projected to face further increases in climate hazards, including an increase in the frequency and intensity of heavy precipitation. In more bad news, as the temperature warms further, the ‘risk drivers’ of climate change (such as changing ocean flows, and ice caps melting) are expected to become increasingly complex and more difficult to manage.^{8,9}



The impacts can already be seen in Aotearoa New Zealand

Aotearoa New Zealand now regularly breaks daily, monthly, and yearly temperature records, and temperature extremes are becoming more common.^{10,11} Most sites around the country have similarly recorded a change in the number and intensity of extreme rainfall events since 1960, whether becoming more, or less, frequent.¹²

Overall increases in annual rainfall in an area will cause stress on existing stormwater infrastructure, but even in those areas where rainfall is going down on average, an increase in extreme rainfall events may pose a risk of flooding.¹³

In the past three years alone, significant, and in some places repeated, flooding has taken place in many cities and towns around the country, with huge sums in damages claimed against insurance.

Marlborough flooding in July 2021



Significant flood events include:

- upper North Island in July 2020 (\$44 million)
- Napier and Greater Wellington in November 2020 (more than \$90 million in combined claims)
- Ashburton and Timaru in May 2021 (\$46 million)
- the West Coast, Tasman, Marlborough and Wellington in July 2021. The West Coast was particularly affected (\$97 million)
- West Auckland in August 2021 (\$62 million)
- Gisborne in November 2021 (over \$3 million) and then again (along with Auckland), in March 2022 (nearly \$120 million)
- widespread flooding at the top of the South Island, on the West Coast, and in Northland, Taranaki and Wellington in August 2022 (nearly \$68 million).¹⁴

The Insurance Council of New Zealand has identified a clear pattern of rising climate-related claims. Insurers reported total claim costs of \$351.26 million in 2022 for damages caused by extreme weather events country-wide – a new record at that time, and the third consecutive year in which a new record was set.¹⁵

In January this year, catastrophic flooding occurred in Auckland, Northland and Waikato after a 1-in-200-year rainfall event.¹⁶ This was followed closely afterwards by Cyclone Gabrielle in mid-

February, which struck the North Island and resulted in tragic loss of life, along with significant flooding and property damage.

During the cyclone, Hawke's Bay and Tairāwhiti recorded particularly high rainfall, with whole towns under water, including some that remained uncontactable and without basic services for days afterwards. One weather station in Gisborne recorded more than half a metre of rain – 621mm – over two days.¹⁷

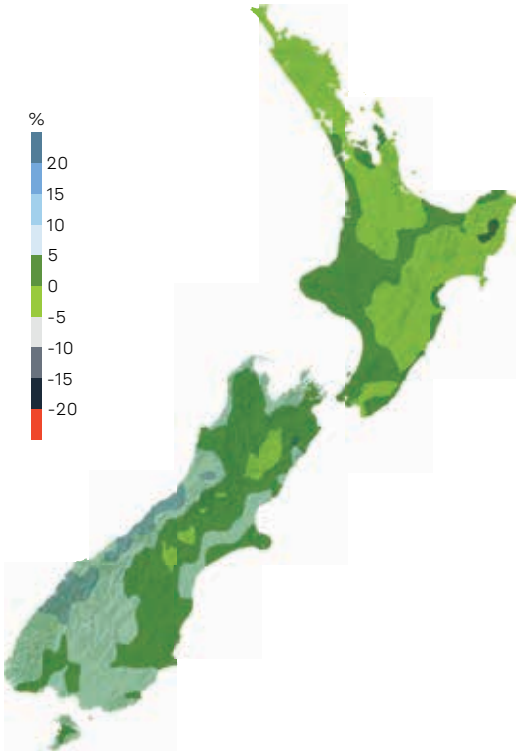
These two events dramatically overtook previous records for insurance claims from flooding, with combined damages estimated at \$2.47 billion.¹⁸ Since then, the North Island has been pummelled by further flooding caused by extreme rainfall, including in Auckland (with lesser impacts in Northland, Waikato and Bay of Plenty) in May, and Tairāwhiti in June.

Extreme rainfall events will continue to intensify

Unfortunately, as global temperatures continue to rise, Aotearoa New Zealand can expect rainfall intensity to keep increasing. Shorter duration rainfall events will increase the most, and rainfall events will become more concentrated, or 'spikier', within smaller areas.¹⁹ What was once a rare, extreme event for us is likely to become common for our children and grandchildren.²⁰

Figure 1.1 shows NIWA's predictions for changes in annual mean rainfall levels. Under a moderate–high temperature increase scenario, Aotearoa New Zealand can expect to see an average increase of mean rainfall of up to fifteen per cent in some areas by 2055, and a reduction of up to five per cent in other areas. Annual rainfall is a different measure to extreme rainfall events, which are harder to model. Even the places that will see less rainfall overall are likely to experience more cases of extreme precipitation.

Figure 1.1. Source: NIWA. Annual Mean Rainfall Change Between 1995 and 2055.⁵⁹



In addition to increases in rainfall, we simultaneously face slow-onset changes, such as rising sea levels and coastal inundation. The National Adaptation Plan refers to this as a “complex adaptation challenge”.²¹ Adaptation for sea level rise is out of scope for this report - although some of the adaptation responses suggested here to deal with pluvial flooding may be similar.

Flooding causes huge impacts, and these will grow

About 675,000 (one in seven) people across Aotearoa New Zealand already live in flood-prone areas, and this number will increase as rainfall increases, storms become more frequent and sea levels rise.²² Recent analysis by NIWA and the University of Auckland found that 441,384 residential buildings are at risk of flooding, most in urban areas, with an estimated value of \$218 billion.²³

Flooding of homes and cultural significant places.



Increasing rainfall is likely to cause more floods, slips, landslides, pollution of stream water, and impacts on biodiversity, infrastructure, buildings, and homes, as well as culturally significant places such as urupā (burial grounds).²⁴ Heavy rain and floods also affect wastewater services, road networks, and power and water supplies. These effects impact the safety of individuals as well as their quality of life and mental and physical health.²⁵

Māori face particular challenges

Indigenous peoples worldwide are more likely to be negatively affected than other groups by the impacts of climate change,²⁶ and Māori face many challenges ahead. For example, of nearly 800 marae situated across Aotearoa New Zealand, eighty per cent are built on low-lying coastal land or flood-prone rivers.²⁷

Māori land, including burial sites and traditional food sources are at risk from a changing climate, imposing increasing social, economic, health, cultural and spiritual pressures.²⁸

United Nations agreements such as the Sendai Framework for Disaster Risk Reduction²⁹ acknowledge that progress in addressing disaster risk reduction priorities is hindered by insufficient attention to Indigenous Peoples and emphasise the importance of strengthening Indigenous governance, workforce capacity, and capabilities as a climate change adaptation response.³⁰



As the climate continues to change, seasonal tohu become less reliable, places of special significance are affected, taonga species face increased risk of extinction, te mātauranga me ngā tikanga (knowledge and customs) are lost, and risks to the unique Māori values at the heart of our society grow. Ministry for the Environment.⁶¹

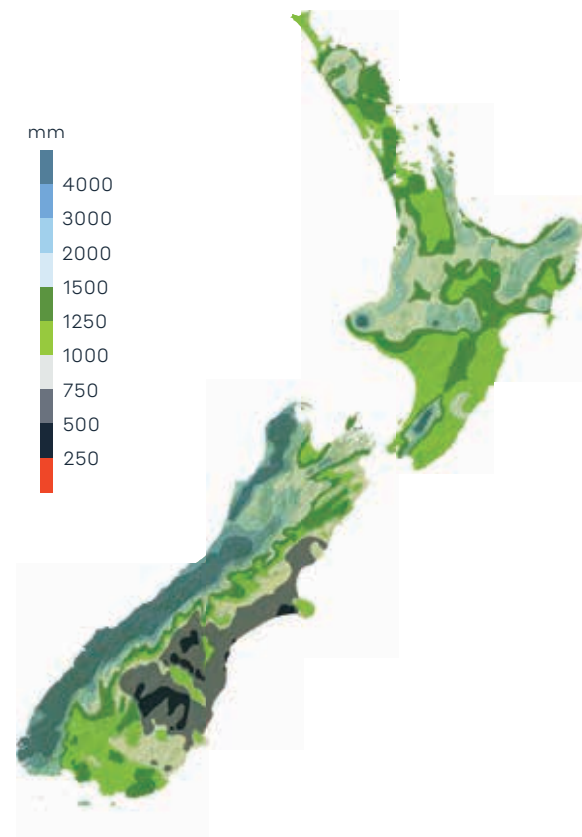


Aotearoa New Zealand is not yet tracking risk comprehensively or consistently

NIWA carries out regional-level modelling for annual average rainfall, and number of wet days,³¹ and can run reports for individual weather station sites predicting high-intensity rainfall levels under different climate change scenarios.³²

Modelling of current and future flood hazards has been done by regional and unitary councils in some of Aotearoa New Zealand's bigger cities. Auckland's GIS1 can show flood hazards and risks down to the level of flow paths through neighbourhoods, for example. This

Figure 1.2. Source: NIWA. Median Annual Rainfall NZ, 1981 - 2010 ⁵⁹



level of modelling, however, is not yet standard.

The lack of consistent regional plans, and the absence of a national database that can measure relative risks in different urban areas makes it very difficult to prioritise accurately which areas are most in need of attention, nationwide.

An MBIE Endeavour project is aiming to remedy that by producing an updateable and nationally-consistent flood hazard and risk assessment database. It will cover both current conditions and future scenarios under climate change³³ and will be able to compare risks across different urban locations. While the tool will help to identify the neighbourhoods most at risk, so councils will know where to best focus their efforts, it won't give information down to the granular level that cities may need, nor take into account existing stormwater networks and other relevant information. The database is still some way from being completed, and will need ongoing funding to be a viable tool for the future.

THE COUNTRY'S CURRENT APPROACH TO URBAN DESIGN AND FLOOD MANAGEMENT WILL NOT CARRY US THROUGH

The conventional approach has been to rely on 'grey infrastructure' to take stormwater away

The conventional approach to flood water management in western societies originated more than 2,000 years ago in ancient Greece, and is more about defending people from nature than working with it. The approach stems from a perception that water in an urban environment is a hazard that needs to be moved as quickly as possible away from the hard surface on which it lands, into our drains, and then away out of sight.³⁴

Typical approaches to stormwater management include above- and below-ground drainage and

diversion systems such as pipes and culverts, and physical barriers such as stop banks and dams. These approaches are called 'grey' solutions because they typically require large amounts of concrete.³⁵

Conventional grey, engineered, infrastructure often routes runoff to the sewerage system, which may overflow during extreme rainfall events, or sends it directly to streams or into the ocean, where it can pollute and degrade the ecosystem.



This approach is no longer fit for purpose

The pipes and other infrastructure in which cities place such faith are ageing, and increasingly creaking under the strain even at current rainfall levels. Aotearoa New Zealand’s \$20 billion water network infrastructure – including 17,000km of storm systems – was not designed for the huge volumes of rainfall which they will have to manage with rising seas and increasing extreme rainfall events.³⁶

Bringing all the country’s water networks (including stormwater) up to scratch is expected to cost as much as \$120–\$185 billion over the next 30 years.³⁷ Meanwhile, councils only spend around \$1.5 billion on water pipes each year – a significant shortfall on what is likely to be required.³⁸

Houses and other developments continue to be built on flood plains and across flow paths, raising risks further. Where urban areas were once seen as a place of safety, with technical solutions as the answer to all society’s problems, White refers to cities now as “the hub of modern risks”³⁹.



"The perception that risk can be effectively managed and that engineering can remove environmental constraints is now being questioned in the face of a rising incidence of 'natural' disasters." Iain White, author of *The Absorbent City*.³⁹

Traditional city design favours covering natural surfaces with concrete and asphalt

Meanwhile, the traditional approach to city-building leads most available ground to be covered over with roads, buildings, pavements, and other infrastructure. Part of that development often includes draining and removing lakes, and diverting or covering over streams – many cities in Aotearoa New Zealand have dozens of streams buried beneath them.⁴⁰

When buildings and roads replace natural ground cover, the flow of water is severely modified. Water cannot be absorbed into soil, and instead runoff flows on the surface. This increases the chance of erosion and flooding of urban streams, causing damage to natural habitats, properties, and infrastructure and increasing the chance of overflows of untreated sewage in some cities.⁴¹

The more impervious the surfaces in a city, the greater the volume of water that needs to be artificially managed, the faster it flows, and the more often it becomes a problem for residents. Calculations made by the Parliamentary Commissioner for the Environment using online stormwater tools suggest that should urban green coverage in a typical Aotearoa New Zealand city block drop from 45 per cent to 35 per cent of the total area, this would increase rainfall runoff

volume approximately eighteen per cent from a single rainfall event.⁴²

Where impervious surfaces increase, and rainfall is removed via drains and pipes, it no longer replenishes water tables and groundwater. Streams and rivers may run more slowly or dry up entirely, with impacts on biodiversity and complex ecosystems.⁴³ Pollution, particularly caused by runoff from roads and from roofs, is also a major problem exacerbated by traditional stormwater management systems.⁴⁴

Cities in Aotearoa New Zealand are becoming less green

While the country’s main cities are endowed with good green space overall, it is concerning that the amount of urban greenspace is declining, both in total area and in area per capita. Between 1980 and 2016, for example, green space per person fell thirty per cent in

Auckland, and at least twenty per cent in Hamilton.⁴⁵

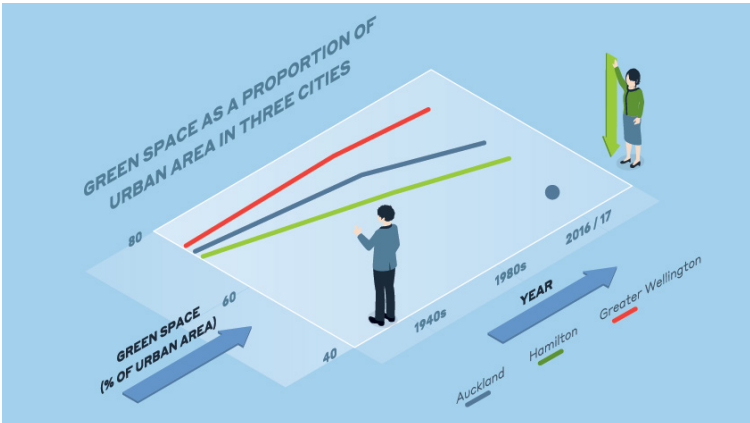
There is significant variation between cities. In 2021, 45 per cent of Hamilton’s urban area was green (including private lawns). The equivalent figure in Wellington was 64 per cent. The imagery available for Auckland is older – in 2011, 55% of Auckland’s urban area was green space, but that area has reduced since, under the pressure of intensification.⁴⁶

These pressures have led to an increase in the proportion of the total urban surface area that is feeding directly into stormwater networks, rather than being absorbed by the land onto which it falls.

Analysis by the Parliamentary Commissioner for the Environment, drawing on work by Cameron Moore found that decline in green spaces in major cities in Aotearoa New Zealand can be attributed mostly to changes on private land, and is driven by two trends.

First, as land values increase, there is a huge incentive to build houses in backyards and other undeveloped green space within cities ('infill development'). Second, where development trends used to favour small houses on big sections, new greenfield developments now favour much larger houses on smaller sections. As just one example, average new houses in Papatoetoe in the 1970s covered less than one quarter of the land they sat on. In 2016 in Flat Bush, the size of land parcels

Figure 2. Source: Martin et al⁶³, Parliamentary Commissioner for the Environment ⁶⁴



had reduced by nearly half, and dwellings covered half of the much smaller space. Sealed driveways and paths now cover much of the remaining space (Figure 3). On average, green space accounts

Figure 3. Adapted from Cameron Moore 65,66

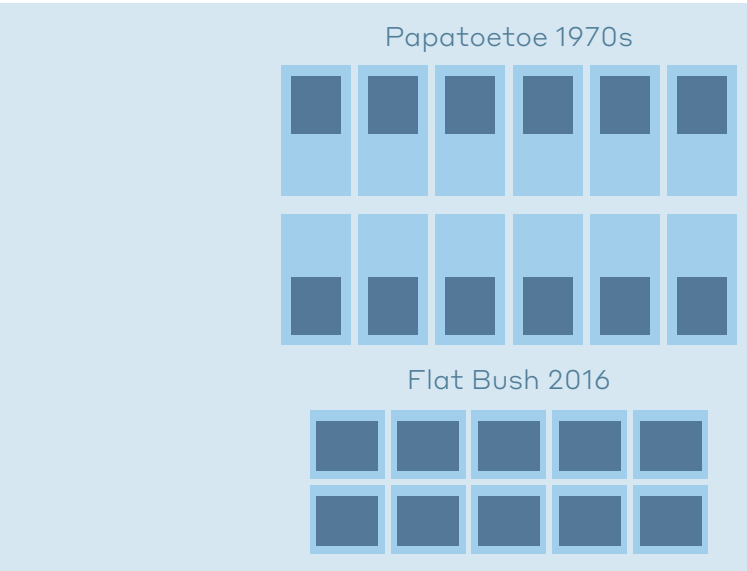


Figure 4. The picture on the left shows a suburb in Mt Roskill, built after World War II. The picture on the right is a suburb in Flat Bush, built in 2010.



for roughly fifty to sixty per cent of the existing area of private land in Auckland, Hamilton and Greater Wellington. This contrasts with the green space provided in the most recent developments - which on average amounts to only around twenty to thirty per cent of each section. Most councils do not appear to be trying to set aside larger areas of public green space to compensate for these losses in green spaces.

Cities are also losing trees

The type of green space in a city is also very relevant. Lawns create far more runoff than trees or shrubs, and can act very similarly to impervious surfaces when dry and compacted.

It is therefore concerning that cities in Aotearoa New Zealand are losing trees. Increasing development, combined with a permissive current legislative environment has led to a massive reduction in the number of urban trees over the past decade or more. According to Global Forest Watch, Auckland has lost as much as nineteen per cent of its tree cover in the past twenty years, Dunedin a staggering 24 per cent, Greater Wellington around eleven per cent and Christchurch thirteen per cent.

The ecosystem services provided by trees are essential in cities. An international study of 10 ‘megacities’ calculated that trees provide each city with more than \$500 million each year in services, including reducing

stormwater runoff, and make urban environments cleaner, more affordable and more pleasant places to live. The quantity of trees and other green spaces in cities has even been linked to how fast or slowly people age.

Trees also absorb carbon dioxide, helping to mitigate the impacts of climate change. They provide cooling shade in warming cities, and can remove pollutants and filter particulate matter from the air. Existing Auckland woodlands have been estimated to remove 1,320 tonnes of particulate matter annually.

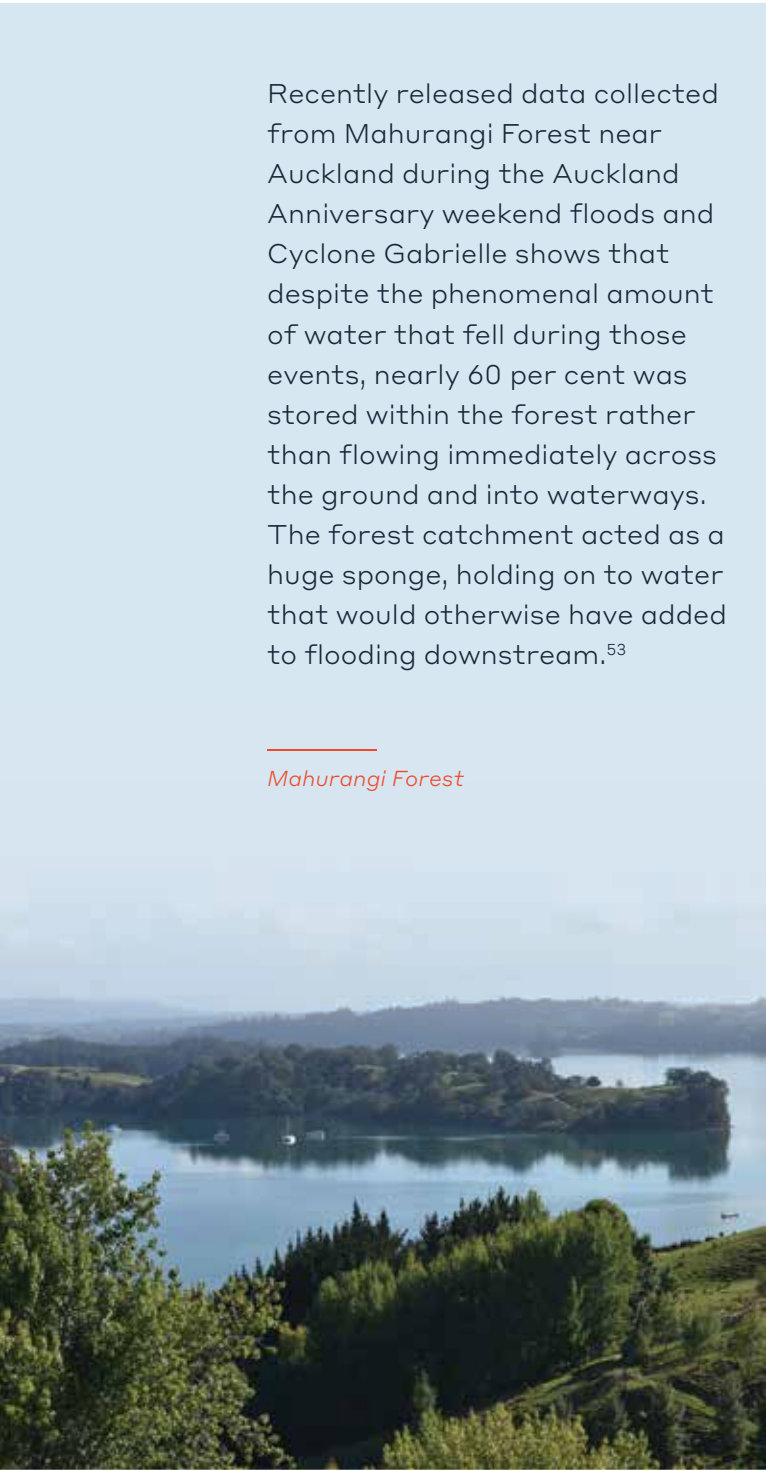
Aotearoa New Zealand cities need to house more people

Sitting behind these existing difficulties is the compounding challenge of the continuing growth of the population. The median projection from Statistics New Zealand is that the population will increase by about 1.5 million between 2022 and 2073 to 6.6 million people. Nearly three quarters of this growth is expected to be in cities. By 2048, it is projected that there will be almost one million more people living in cities in Aotearoa New Zealand than there were in 2018.

This there is a risk under current settings of covering more and more of remaining green spaces with built infrastructure. Aotearoa New Zealand needs a new approach, and urgently. Could sponge cities offer that solution?

Recently released data collected from Mahurangi Forest near Auckland during the Auckland Anniversary weekend floods and Cyclone Gabrielle shows that despite the phenomenal amount of water that fell during those events, nearly 60 per cent was stored within the forest rather than flowing immediately across the ground and into waterways. The forest catchment acted as a huge sponge, holding on to water that would otherwise have added to flooding downstream.

Mahurangi Forest



CHAPTER 2.

What are sponge cities?

THE TERM 'SPONGE CITY' WAS COINED BY A LANDSCAPE ARCHITECT, DR KONGJIAN YU IN 2003. HE HAD OBSERVED THAT FLOODING WAS BECOMING INCREASINGLY PREVALENT ACROSS CHINESE CITIES UNDER CLIMATE CHANGE, AND SET OUT TO DEVELOP NEW APPROACHES. YU WAS INSPIRED BY CHINESE FARMERS OF 2,000 YEARS AGO, WHO SET ASIDE TWENTY PER CENT OF THEIR CULTIVATED LAND FOR PONDS, TO REGULATE WATER THROUGH THE RAINY AND DRY SEASONS.^{68,69}

Yu observed that natural and constructed wetlands alongside rivers function like giant sponges, retaining water during flooding and recharging water tables during times of drought. His proposal therefore was to turn whole Chinese cities into giant, absorbent sponges using a network of 'blue' and 'green' nature-based infrastructure comprised of natural green areas, rivers, lakes, and wetlands.⁷⁰



China launched a massive-scale Sponge Cities Programme 10 years later, investing billions of dollars towards sixteen pilot projects.⁷¹ The programme has been described as a “fundamental, transformative change of China’s water management from the traditional sector based, engineering oriented paradigm to a nature-based, holistic approach.”⁷²

SPONGE CITIES INCLUDES A RANGE OF RESPONSES, TAILORED TO THE LOCATION

The sponge city approach promotes a range of green and blue measures, such as:

- creating or improving parks and greenspaces to make them more absorbent, improve water retaining capacity and biodiversity
- increasing wetland areas, daylighting streams, and dredging urban rivers and lakes
- protecting and restoring overland flow paths
- improving the connectivity of the urban water system and urban green spaces, to allow unimpeded water flows and create corridors for wildlife
- introducing green infrastructure such as rain gardens, green roofs and rainwater harvesting systems



- using porous materials to construct permeable roads, carparks, and pavements.⁷³

The sponge city approach is not only about cities becoming more absorbent, but also includes an acceptance that many cities and towns will be more 'watery' in the future. This may mean moving houses and businesses from harm's way, making space for water alongside rivers and flow paths, and no longer building on flood plains, for example.

The vision in China is that green and blue infrastructure should replace traditional grey infrastructure where possible. So for example, naturalised waterways would replace concrete dams and dikes, bioswales would replace stormwater pipes, and constructed wetlands would replace sewage treatment plants (these can be constructed to use natural and biological processes to provide the same kind of services). Separating stormwater and

sewage pipeline networks is a key feature of the approach.

In practice, it is unlikely that many cities would want to get rid of grey infrastructure entirely. This would involve huge cost, and is unlikely to be practical in most built-up urban areas. Instead grey systems would be upgraded to work seamlessly with the new nature-based infrastructure, and green infrastructure would be seen as a complement to existing stormwater networks.⁷⁴

The sponge city is conceived as both a large-scale intervention that happens at the city or catchment level – including urban river restoration and building of wetlands, for example. But it also relies on small-scale infrastructure such as bioretention devices, rain gardens and local tree planting that can be implemented in a small-scale way at the community level, and in private homes and gardens.⁷⁵

THE SPONGE CITY APPROACH BRINGS A RANGE OF BENEFITS



"We need a paradigm shift in planning and designing our cities to adapt to the changing climate. We need to rethink single-minded, industrial technology-based engineering solutions and turn to nature-based and symbiotic solutions. Ultimately, we need to rediscover the ancient art of survival that has been evolving for as long as humans have been on the earth." Dr Kongjian Yu, initiator of the sponge cities concept in China.⁶⁸

Sponge cities are intended not only to help with flood mitigation, but also to enhance cities and ecosystems in additional ways. That is a huge part of their value proposition.

Sponge cities help to restore and promote biodiversity by cleaning contaminated water and providing nourishing habitats.⁷⁶ If implemented well, they should be able to provide improvements to the integrity of, and mauri ('life force'), of the whole environment, with additional benefits for cultural well-being and connections to nature and whakapapa. Ecological connections are built and maintained using blue belts and green belts throughout the city.⁷⁷

Sponge cities are designed to be resilient to climate change and natural disaster. They aim not only to slow down rainwater runoff, but also to retain and reuse water, meaning they can mitigate the impacts of droughts as well as floods.⁷⁸

In addition, sponge cities approaches can help to mitigate the impacts of climate change. Whereas conventional approaches to urban development can be carbon-intensive and polluting, sponge city approaches rely on green infrastructure such as trees. The overall impact should be a net positive for the environment.⁷⁹

Finally, sponge city approaches make cities more pleasant places in which to live. They can reduce inner city temperatures and noise pollution, and create beautiful spaces that contribute to well-being, and improvements in physical and mental health.⁸⁰

THE TECHNIQUES THEMSELVES ARE NOT NEW

While the name 'sponge cities' is new and has caught the public imagination, a gradual evolution in thought in stormwater management has taken place in many countries, under different names. The 'new' part of sponge cities as a concept is really the comprehensive ambition of the projects that have begun in China, the planning and funding that has gone into getting those off the ground, and the sheer scale of the projects that have been undertaken there.

Other concepts that inform or are similar to sponge city approaches include:

- ◆ Indigenous approaches worldwide, including mātauranga Māori in Aotearoa New Zealand
- ◆ Water Sensitive (Urban) Design (WSUD) (Australia and Aotearoa New Zealand)
- ◆ Sustainable Urban Drainage Systems (SUDS) (United Kingdom)
- ◆ Blue Green Infrastructure (BGI) (UK, Europe and the United States)
- ◆ Low Impact Development (LID) (United States).
- ◆ Nature-Based Solutions (NBS) (international).^{81,82}

Benjakitti Forest Park, Bangkok



These approaches all aim to reduce runoff and improve water quality using low-impact technologies, and various types of blue and green infrastructure. Some approaches (WSUD and SUDS, for example) place a greater emphasis on the water cycle. Others place a greater emphasis on reducing runoff (GI and LID for example). They also differ in the specific approaches they use, their scalability, and the emphasis they put on the integration of other benefits, such as increasing biodiversity.⁸³

Indigenous approaches, along with nature-based solutions are worth highlighting as the most holistic of the approaches listed above. They are not just focused on water, but also provide a philosophical framework for the wellbeing of the environment as a whole. The mātauranga Māori approach

(discussed below) respects the life-force or ‘mauri’ of water, for example, and promotes the overall health of the natural world, of which humans are seen as just one part.

MĀTAURANGA MĀORI
VALUES NATURE IN A
HOLISTIC WAY

While the term ‘sponge cities’ is imported, an Aotearoa New Zealand-specific approach would draw on mātauranga Māori (knowledge and wisdom), which values nature as something to be respected and honoured. Māori have a long history of facing natural hazards using mātauranga Māori.⁸⁴

The health of the natural world, and the connections that exist between all living things are of critical importance to Māori, who see humans as part of the natural world, and in service to it, rather than dominant over it. For Māori, all aspects of nature are intertwined and connected through whakapapa - the Māori relationship to the land is one of kinship⁸⁵.

The Māori way of viewing nature is therefore more holistic than traditional western approaches, and includes both the physical and the metaphysical. It translates as finding a way to work with the environment, rather than needing to change the world to fit around people.

Wai is an integral part of Māori wellbeing and identity.⁸⁶ Legend

tells of water originating as the tears of grief of Ranginui and Papatūānuku when they were forcefully separated from one another, with their tears creating the waterways and oceans of te whai ao (the world as we know it today).⁸⁷

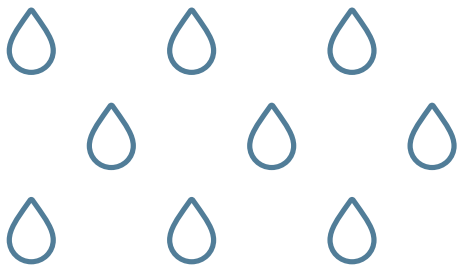
Central to the approach is the concept of ‘mauri’, the essence or life force that provides life to all living things and gives water and land the potential to support life. Mauri can also be translated as the “gift of life and wellness”.⁸⁸ It is inherently related with other metaphysical characteristics, including tapu (sacredness), mana (authority), and wairua (spiritual existence or soul). All water bodies have their own mauri, which gives them distinct personality and mana. The Māori approach therefore is to respect water and its life energy as tapu - sacred, spiritual, and cleansing.⁸⁹

Wai can be described in many different states, including:

- ◆ waiora (water in its most ‘pure’ form)
- ◆ waimāori (water for consumption)
- ◆ waimate (water that has lost its mauri and is no longer able to sustain life)
- ◆ waikino (water that is dangerous, such as rapids)
- ◆ waitai (seawater, the surf or the tide).^{90,91}

Stormwater starts as rainfall (waiora) but is transformed into waikino once it flows over impervious surfaces, or makes contact with pesticides, fertilisers, and other pollutants. This contamination diminishes water’s mauri. Discharging stormwater (waikino) into clear water (freshwater or seawater) is an example of unnatural mixing of mauri, and to be avoided.⁹²

Figure 5. Adapted from Water NZ, Ngā Momo Wai¹⁴⁵ - Types of water



Te Puhinui Stream, Auckland

Te Puhinui Stream Regeneration Project

Stormwater approaches that value mātauranga Māori look very similar to nature-based sponge city approaches. For example, cleansing polluted water by passing it through a planted ‘soil’ filter can help transform waikino back to waimāori before it enters a stream. Tikanga approaches also incorporate other values and benefits in terms of community and social development.⁹³

Te Whakaoranga o te Puhinui is a regeneration programme in south Auckland which is focused on the ancestral stream of Te Puhinui. The programme aims to regenerate Te Puhinui “in a way that is “inclusive, place-sourced, culturally led and community-fed so that Te Puhinui and its people can thrive once more”.⁹⁴

The programme is a collaborative partnership between Te Waiohū iwi, the Auckland Council, crown agencies, community organisations, and members of the community, with Waiohū iwi taking a lead in delivery.

Over the next five years, thirty million dollars of investment is planned across the catchment, to pay for new wetlands, cycleways, stream restoration and significant native planting. The project also includes a range of initiatives such as education, food sovereignty, work development, and pollution prevention.

NATURE-BASED SOLUTIONS ADDRESS SOCIETAL CHALLENGES

Nature-based solutions are increasingly recognised as an approach internationally, and in Aotearoa New Zealand are often expressed as sitting within a mātauranga Māori framework. Nature-based solutions protect, sustainably manage, or restore natural ecosystems. They aim to address societal challenges such as climate change, threats to

human health and food and water security. They also aim to reduce disaster risk, simultaneously providing both human well-being and biodiversity benefits.⁹⁵

Indigenous approaches and nature-based solutions are much wider than stormwater management, but can inform the way sponge cities are framed. Approaches such as water sensitive urban design (WSUD), are tools or techniques that can be used as part of sponge city approaches (see Figure 6).

Figure 6. How sponge cities fit with existing design.



HARNESSING MĀTAURANGA MĀORI

Integrating Mātauranga Māori (traditional Māori knowledge) with contemporary flood management strategies presents an opportunity to better prepare for climate-fuelled extreme weather events. Māori Reg Proffit explains.

Waipuke (floods) can be devastating natural disasters, inflicting significant damage on communities, infrastructure, and the environment. With the increasing frequency and intensity of wild weather events due to climate change, exploring innovative and complementary approaches to flood mitigation is crucial.



WORKING IN HARMONY WITH NATURE

Mātauranga Māori lets communities tap into Indigenous wisdom, observations, and sustainable practices developed and refined by Māori over centuries.

Central to Mātauranga Māori is an emphasis on working harmoniously with nature instead of trying to dominate or control it. Traditional practices, rooted in an understanding of natural landforms and waterways, can inform flood mitigation strategies.

Panoramic view of Waatarua Reserve wetland area, Remuera - Auckland





Māori knowledge recognises the natural flow patterns of rivers and respects ecosystems' ability to absorb water, giving valuable insights into sustainable approaches for managing floodwaters. Examples include re-establishing wetlands and protecting riparian vegetation, which enhance water retention and minimise the impacts of flooding.

There's plenty of examples of Mātauranga Māori in this context. A project is underway in Gisborne to enhance urban stream networks that drain into the Tūranganui estuary.⁹⁶ It's using Mātauranga Māori and modern science to help restore the health of the culturally significant estuary system. By the end of the project in June 2026, around 170,000 native plants will have been used in wetland and riparian planting.

The reimagining of Southland's Maitara River system combines modern catchment science with Mātauranga Māori to foster cultural, environmental, and economic resilience within the catchment.⁹⁷ And in rain-lashed Northland, Māori Councillors at Northland Regional Council are making sure Mātauranga Māori and te taiao (nature) are considered in decisions around flood relief efforts.⁹⁸



RESPECTING WHAKAPAPA

At the heart of Mātauranga Māori is the concept of whakapapa, which recognises the interconnectedness of all living beings and elements of the natural world. This perspective acknowledges the interrelationship between land, water, and people, enabling a comprehensive understanding of the complex systems at play in flood mitigation efforts.



COMMUNITY COLLABORATION AND DECISION-MAKING

Whanaungatanga, the principle of kinship and collective responsibility, is another crucial aspect of Mātauranga Māori. In the context of flood mitigation, this principle emphasises involving local communities and stakeholders in decision-making processes.

Inclusive participation is encouraged by Mātauranga Māori, ensuring diverse voices are heard, and traditional knowledge is integrated into flood management strategies.

In Northland, a major project focussed on restoring and protecting rare wetlands in the Wairua River system / Te awa o Wairua has brought together the people of the awa through hui wānanga (meetings) to discuss a new pathway of ecological



management based on Mātauranga Māori.⁹⁹

When developing community resilience programs, targeted engagement with Māori communities in high-risk flood areas becomes essential. Incorporating Māori perspectives, which prioritise long-term sustainability and the well-being of future generations, enables the achievement of more holistic and culturally appropriate solutions.

KNOWLEDGE SHARING, ADAPTATION, AND COLLABORATIVE SYNERGY

Mātauranga Māori isn't just a static body of knowledge; it's a living and evolving approach that adjusts to changing circumstances. As flood risks continue to rise, embracing this approach becomes a promising pathway towards effective and sustainable flood mitigation.

To advance the development and use of Mātauranga Māori, Massey University hosts the Te Toi Whakaruruhau o Aotearoa New Zealand research hub.¹⁰⁰ The hub aims to generate and apply Mātauranga Māori in shaping new knowledge for risk reduction. Through a Māori viewpoint, it highlights the interconnectedness of all aspects of natural hazard risks and catastrophic events.

By fostering collaboration between Māori knowledge holders and scientific experts, a powerful and constructive interaction emerges. This collaboration enables the integration of traditional wisdom with contemporary flood mitigation technologies and strategies. The combination of indigenous knowledge and scientific expertise paves the way for resilient and sustainable solutions that benefit both Māori communities and wider society.

This collaborative effort enhances our ability to mitigate and adapt to floods. It provides an opportunity to develop solutions that are resilient and culturally appropriate. By using Mātauranga Māori, we can create solutions that will benefit all Aotearoa New Zealand's present and future generations.



THERE IS GOOD EVIDENCE FOR THE USE OF SPONGE CITY APPROACHES

While large-scale sponge city approaches are relatively new to modern planning, they are already showing significant promise in flood mitigation and other benefits.¹⁰¹

Examples from China include:

- in Jinan, the number of city areas at high risk of flooding decreased by approximately 45 per cent for one-in-fifty-year rainfall events after undergoing a 'sponge cities' transformation¹⁰²
- in Wuhan, 389 sponge city projects across 38.5 square kilometres have reduced flooding, sequestered 725 tons of CO₂ a year, and reduced temperatures by more than 3°C in the city¹⁰³
- In Shaoxing, the city installed 45,000m² of permeable pavements, as well as sunken greenbelts, landscaped water bodies and rainwater reuse systems. After project completion, 87 per cent of rainfall across the city (by volume) was being captured, rather than directed to stormwater networks - nearly double what was captured previously using traditional methods (45 per cent).¹⁰⁴

Analysis by Fu et al.¹⁰⁵ found that sponge cities in China have been effective in reducing or mitigating

high probability floods but are less able to deal with very low-probability, high-damage events (such as one-in-100-year events). In short, they have been able to significantly reduce, rather than eliminate, risks from increasing flooding – at least in their current form.

In other parts of the world, the IPCC evaluated ecosystem-based adaptation approaches such as urban greening and restoration of wetlands and upstream forest ecosystems and found them to be effective in reducing flood risks and urban heat, with a high degree of confidence.¹⁰⁶ The IPCC also points to benefits in terms of carbon uptake, reduced energy use, and reduced risks from extreme events such as heatwaves and droughts, while generating co-benefits for health, well-being and livelihoods.

A literature review by Junqueira et al.¹⁰⁷ found that the use of green infrastructure can reduce total flood volumes on average by a huge 30–75 per cent. A study by design firm Arup found nature-based infrastructure to be fifty percent more affordable than human-made alternatives, and 28 percent more effective.¹⁰⁸



Green infrastructure provides 30 - 75% reduction in flood volumes.

SOME EXAMPLES OF SPONGE CITY APPROACHES

Naturalisation, rehabilitation, and daylighting of streams and rivers

Sponge city approaches, in common with mātauranga Māori and nature-based solutions, promote the rehabilitation and restoration of rivers and streams. This may include 'daylighting' streams that had been covered over, re-profiling channels, dredging sediment, changing the natural forms of rivers, and extending pluvial floodplains.¹⁰⁹ Sponge city approaches also entail the establishment and restoration of planted buffer zones alongside rivers, to decrease the speed of runoff into rivers and stop pollutants entering freshwater systems.¹¹⁰

Stream daylighting is the practice of uncovering streams that had previously been buried and concreted over, culverted, or diverted into pipes. Urbanisation and stream modification have had significant impacts on stream ecological health¹¹¹. In Wellington alone, estimates suggest there may be as many as 700km of culverted streams within city limits, compared to as little as 60km of open streams.¹¹²

Stream daylighting is intended to help with flood management by reducing flow velocities and increasing capacity, and it can also enhance local ecology.¹¹³ It can be comparable in cost, or less costly, than continuing to maintain and replace existing piped infrastructure. The practice can provide significant economic returns and social benefits¹¹⁴.



Travis Wetlands, Christchurch



Creation of wetlands and ponds

Wetlands and ponds provide some of the best absorptive capacity of any blue-green infrastructure solution. They also provide huge ecological benefits, including temperature regulation and biodiversity enhancements.¹¹⁵ Christchurch City Council's construction of wetlands and other green infrastructure in the southwest suburbs has not only helped mitigate flooding, but also has created places for walking, cycling, and other public recreation.¹¹⁶

Timaru Wetland

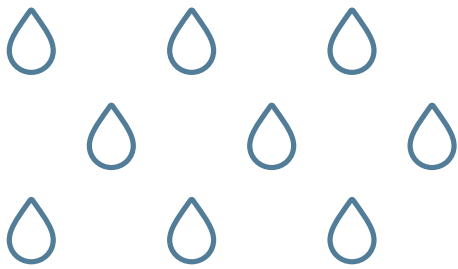


Figure 7. Meisha River corridor, Haikou City, 2016. Elevated pedestrian paths are integrated with the mangroves.¹⁴⁶



Figure 8. Meisha River Corridor, Haikou City, 2016. Terraced wetlands are densely covered with various plants that remove nutrients from primary treated wastewater.¹⁴⁷

Hainan Island

Hainan Island was picked as one of the Chinese Sponge City project's leading demonstration sites because of its frequent flooding, pollution and habitat loss¹¹⁷. The project began in 2015 in the cities of Haikou (2.3 million population) and Sanya (640,000 population). Areas at risk of flooding were integrated with wetlands, ponds, rice paddies, parks and coastal habitats to form a 'holistic sponge system' to retain, clean and recycle water. Buildings were removed from the flood plain and concrete flood walls were replaced with embankments made from earth and vegetation.¹¹⁸

Making space for water: flood plains and flow paths

Flood plains are areas of low-lying land next to rivers which are particularly susceptible to flooding. Unfortunately, in Aotearoa New Zealand cities housing is often built on them, using hard infrastructure such as flood banks and stormwater drainage to minimise, but not eliminate, the risks.

The sponge city approach is to restore natural flood plains to create extra storage for flood waters. This can mean not building on flood plains, or in some cases abandoning areas currently used for buildings. Corridors alongside rivers can function as environmental corridors, or ‘blue belts’.¹¹⁹

Sponge cities also promote the restoration of overland flow paths within cities. A flow path describes the pathway water takes to get to the nearest stream when drainage systems are overloaded. When blocked – by fences, landscaping, or fallen trees for example, they can cause flooding.¹²⁰

Hamilton aerial view over Lake Rotorua.



Designing public spaces to flood

In extreme rainfall events, it will not always be possible to prevent flooding entirely. Therefore, it is preferable to design public spaces to store or absorb as much water as possible, rather than have water flowing into houses, businesses, and essential infrastructure.

In Aotearoa New Zealand, a playing field in Greenslade Reserve in Northcote was designed to flood and then quickly drain. During the Auckland Anniversary Weekend floods it handled an estimated twelve million litres of water within fifteen hours, slowing down water that would otherwise have rushed through the town centre and houses¹²¹.

Greenslade Reserve Northcote, Auckland



Enhancing the quantity and quality of public and private green spaces

A large component of the sponge city approach is to increase and enhance the green spaces in a city, on both public and private land. Green spaces act like giant sponges, slowing the flow of rainwater, trapping and filtering pollutants, and delivering the refreshed water slowly to underground water tables.



When rain falls on green spaces, up to one third is caught by vegetation and later evaporates.

Of the rainwater that hits the ground, some percolates into the soil and is taken up by plant roots, or stored in the earth. Some percolates deeper, recharging groundwater systems and replenishing streams and rivers.¹²²

In heavy rainfall, a densely planted green area may well have some runoff, but this will be significantly less than from an area covered in impervious

surfaces such as buildings and asphalt. The more impervious surfaces, the more runoff created, the faster it will flow, and the more chance the existing hard stormwater infrastructure will be overwhelmed in a heavy rainfall. The United States Environmental Protection Agency estimates a typical city block generates more than five times more runoff than a woodland area of the same size¹²³.

Green spaces also regulate temperatures and provide other services

Green spaces cool surrounding areas, mitigating one of the more dangerous effects of global warming by preventing the formation of so-called ‘urban heat islands’.¹²⁴ Blue spaces such as ponds also have a cooling effect.¹²⁵

Other ‘biophysical services’ provided by parks and other green spaces include carbon sequestration, erosion control, food provision, air and water filtration and habitat for biodiversity.¹²⁶



All blue and green space is not equal

Analysis from the Parliamentary Commissioner demonstrates the differing benefits of different kinds of blue and green spaces (Figure 9). The most beneficial for stormwater control and water filtration are wetlands. Along with tree cover, wetlands also offer the best impacts for biodiversity. Lawns offer some benefit for cooling, stormwater control and water filtration - but only at a low level compared to other forms of green space.¹²⁷

Research examining the health and public health benefits of access to nature is extensive.¹²⁸ Lower exposure to green space has been associated with a number of lifestyle diseases such as obesity, Type II diabetes and stress-related illnesses such as depression, heart diseases and mental fatigue. Studies indicate that exposure to biodiverse environments can promote mental health and alleviate stress.¹²⁹

Figure 9: The relative benefits of four broad types of green space. Adapted from Parliamentary Commissioner for the Environment.¹⁴⁸



ASSOCIATED BENEFITS	TYPES OF URBAN GREEN SPACES			
	Lawn	Low shrubs	Wetlands	Trees
Air-filtering	Very little	Some	Some	A lot
Biodiversity	Very little	Some	A lot	A lot
Shading	Very little	Some	Some	A lot
Cooling	Some	Some	Some	A lot
Stormwater control	Some	Some	A lot	Some
Water filtering	Some	Some	A lot	Some

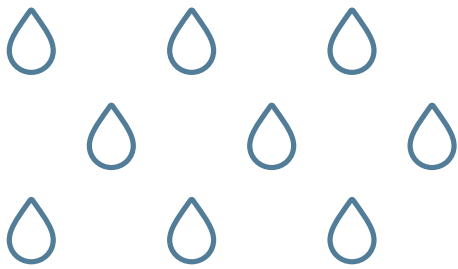


Figure 10: Singapore has maximised urban green space along the river banks to help soak up rain.



Figure 11: Singapore is known internationally for its integration of nature into the urban environment.

Singapore

With a tropical rainforest climate, Singapore has an average monthly rainfall of over 176mm¹³⁰ – significantly more than Auckland's 93mm monthly average.

After major floods in 2010 and 2011, Singapore refocused on urban flood resilience. Wetlands were reinvigorated. River channels that were previously concreted-over were naturalised, and in some cases deepened and widened, with native trees planted alongside to absorb and filter water. More and more green and blue spaces have been added over time, including on rooftops.¹³¹

Efforts in Singapore have seen flood-prone areas reduced from 3200 hectares in the 1970s to less than 30 hectares today. Flash floods are still common, especially during monsoons, but typically subside within an hour.¹³²

Smaller scale approaches that make cities more absorbent

Sponge city approaches include efforts at different scales. Green infrastructure devices on a smaller (neighbourhood, street or private property) scale, such as the ones outlined below, can be rolled out widely as finances in a city allow, and retrofitted into cities and towns.

Many of these devices have been used in Aotearoa New Zealand for at least fifteen years, although implementation of water-sensitive urban design and blue-green approaches is not yet mainstream in the country. Tools such as porous pavement, green roofs, and vertical green walls are not yet used widely. Bioretention devices such as rain gardens are used increasingly, but do not yet play a central role in spatial planning for urban stormwater management across the country.¹³³



Bioretention devices, including rain gardens and swales

Bioretention is the process by which contaminants and sedimentation are removed from stormwater runoff. Bioretention systems filter storm water through plants and soils. They either slow the water down, or completely stop it entering the stormwater system. This filtering and slowing of stormwater runoff helps reduce the polluting impacts of road runoff, protects waterways and reduces peak flows.¹³⁴

Bioretention devices include:

- 1. tree pits - runoff from carparks or roads filters through tree roots and the surrounding soil
- 2. swales – convey water away from a road or parking area using vegetated channels rather than pipes
- 3. bioretention basins or rain gardens – shallow basins or gardens used to slow and treat on-site stormwater runoff.¹³⁵

These are a relatively new technology for the country, but are now starting to be used widely. Bioretention devices generally look like normal gardens, but contain features directing water towards them (by being built below the pavement level, for example). They include a ‘ponding area’ where water can stand when needed (often gravel), and overflow systems in case they fill up with water.

Studies have shown reductions in peak flow from areas planted with bioretention devices ranging from 46–100 per cent and up to 56 per cent for infiltration trenches. The deeper the device, the more water it can store.¹³⁶

Green roofs and vertical green spaces

Rooftops can make up forty to fifty per cent of impermeable surfaces in urban areas. Thus, green roofs have the potential to play a major role in stormwater management.¹³⁷ They can help significantly reduce the runoff from a storm event, as well as lower city temperatures, support biodiversity, enhance air quality, and reduce pollution (such as heavy metals) that would normally flow from rooftops. They also provide insulation for buildings, reducing the need to heat and cool them.¹³⁸



A study modelling the effect of greening roofs in downtown Nanjing City concluded that overall surface runoff for the areas studied would be reduced by up to twenty per cent if green roofs were built on usable rooftops.¹³⁹

Plants can also be grown vertically up the sides of buildings and up fences, walls and trellises, allowing for high density and high diversity vegetation on existing structures. These vertical green spaces take up minimal space but bring many of the benefits of urban green spaces in terms of cooling, noise reduction, air purification, and biodiversity enhancement.

Figure 12. Milan's Bosco Verticale - a pair of residential towers that is home to over 21,000 trees, shrubs and perennial plants, and which converts an average of 44,000 pounds of carbon each year.



Permeable roads, pavements, car parks driveways and paths

Permeable pavement is a porous urban surface that can be composed of pavers, permeable concrete, or permeable asphalt, laid over an underlying porous medium that functions as a reservoir or filtration system. Rather than sending rainwater straight to drains as impervious surfaces do, permeable pavement catches the water in its ‘pores’, slowly allowing it to infiltrate into the soil below or discharge via a drain.¹⁴⁰

A literature review of more than 500 studies found positive results from its use across the board, though results varied widely. One study found it reduced total runoff volume by up to 97 per cent. It is more effective with shorter rainfall events than heavy storms.¹⁴¹

Because paved areas cover so much of a typical city’s surface, replacing these surfaces with

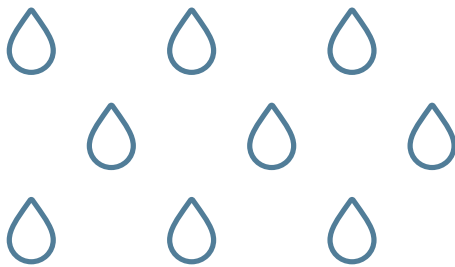
permeable pavement has great potential as a retrofit option for dense cities. Permeable pavements are more expensive than traditional hard surfaces, and are less durable. For this reason, permeable paving is only really suitable for low-traffic areas.

Green infrastructure vs grey - the distinction is often not so simple

While one of the advantages of green infrastructure over grey is that it uses less concrete, the distinction is often not clear cut. In practice, green infrastructure can be highly engineered, and infrastructure components may sit on a continuum of green, grey-green or grey solutions.¹⁴²

For example, chicanes (outcrops that slow traffic on suburban roads) often have a green component, but are made largely of concrete. While the ideal is to incorporate as little concrete as possible in the design, this will not always be possible when retrofitting densely built cities.

Green spaces in city

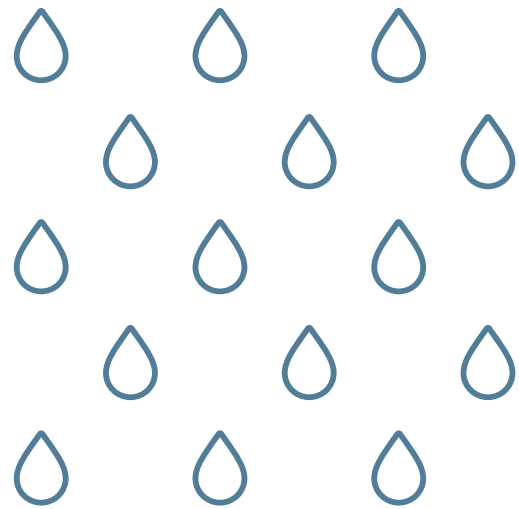


Mansfield, UK

Mansfield, UK

Mansfield (about the size of Dunedin) is the United Kingdom’s first city-wide project to transform a whole town to make it more flood resilient and ‘spongy’. The project is currently underway, and due to be finished in 2025. £76 million is due to be invested to pay for a range of nature-based solutions.

Around 20,000 Sustainable Drainage Systems devices will be built, including water basins, planters, swales, rain gardens and permeable paving. These are expected to reduce flood risks, cut pollution and bring more plant and animal biodiversity to the city.¹⁴³



CHAPTER 3.

Understanding the Aotearoa New Zealand context

THE REGULATORY FRAMEWORK FOR STORMWATER MANAGEMENT IS COMPLEX, AND CURRENTLY IN FLUX WITH CHANGES TAKING PLACE AT THE NATIONAL LEVEL. THIS PROVIDES BOTH A CHALLENGE AND AN OPPORTUNITY TO GET THINGS RIGHT FOR THE FUTURE.

THERE IS A CLEAR AGENDA FOR ADAPTATION ON THE INTERNATIONAL STAGE



“Adaptation is not an alternative to a redoubled effort to stop climate change, but an essential complement to it. Failing to lead and act on adaptation will result in a huge economic and human toll, causing widespread increases in poverty and severely undermining long-term global economic prospects.” **Global Commission on Adaptation.**¹⁶⁹



In the face of increasing and more intense floods, droughts and other natural disasters worldwide, action to reduce risk has grown in importance on the international agenda. Climate adaptation is now seen as essential to safeguard sustainable development efforts and achieve the Sustainable Development Goals.¹⁴⁹

Some of the key international agreements that cover work in this space are:

- ◆ **the Sendai Framework for Disaster Risk Reduction**, which aims to reduce the impact of natural disasters. A key focus is 'building back better' after a disaster.
- ◆ **the New Urban Agenda**, which supports nature-based innovation in urban environments, and sustainable solutions to climate challenges.
- ◆ **the Sharm-El-Shiekh Adaptation Agenda**, which agrees outcomes in relation to extreme wet weather events, and promotes nature-based solutions.

The international community has recognised the need for all cities to take action to build resilience urgently, and green and nature-based solutions are increasingly an international focus.



AOTEAROA NEW ZEALAND IS MOVING TOWARDS AN ADAPTATION APPROACH

Central government is taking climate change-induced flood adaptation seriously at a national level, and there are signs it is beginning to turn to nature-based (spongy) approaches as a possible solution.

The National Adaptation Plan prioritises nature-based solutions in strategy and policy:

✓ To address the climate and biodiversity crises together, the Government will prioritise nature-based solutions in planning and regulations, where possible, for both carbon removal and climate change adaptation ... By 2024, a framework will be developed, and prioritising of nature-based solutions in regulations and planning will be underway...¹⁷⁰

This initiative provides a basis for a nature-based sponge city approach to be developed in Aotearoa New Zealand. The Plan also encourages councils and communities to consider adaptation options for their area, and requires central government to identify options to increase the integration of nature-based solutions into urban form.¹⁵⁰

In Budget 2023, the Government dedicated an initial \$100 million for co-investment with local councils on projects to improve future flood resilience in areas impacted by the North Island weather events of early 2023. It also

dedicated \$22.9 million to increase Westport's flood resilience, and \$24.7 million to improve data on the impacts of climate change and on adaptation and mitigation responses taken.¹⁵¹

Similarly, the national strategy on biodiversity, Te Mana o te Taiao, references nature-based solutions, and cross agency working groups have been established to enable better integration of climate and biodiversity issues¹⁵².

Yet, despite these positive developments, specific and comprehensive responses to increasing flood risks — and the importance of nature-based solutions to strengthen this resilience — have not yet been woven systematically into Aotearoa New Zealand's policy frameworks.

WATER SENSITIVE URBAN DESIGN IS INCREASINGLY COMMON, BUT NOT MAINSTREAM

Water sensitive urban design (WSUD) is closely aligned with sponge city approaches, but tends to be implemented at the level of the individual development rather than at the city or catchment level. It prioritises minimising impervious areas to limit runoff, minimising earthworks to prevent soil compaction, protecting and enhancing vegetated areas and maintaining natural drainage systems where possible. In common with the sponge city approach, WSUD adopts green solutions such as wetlands, swales and rain gardens.¹⁵³

These approaches are not new in Aotearoa New Zealand, but nor are they yet mainstream,

Napier Gardens



or a first go-to for stormwater management. Central government has recently committed to working with local governments to encourage the use of WSUD.¹⁵⁴ The National Planning Standards define green infrastructure, but it is not a requirement for councils to follow a WSUD approach.

More councils are now adding green infrastructure such as rain gardens to built environments, restoring existing wetlands, and working with communities to daylight streams. However, Aotearoa New Zealand hasn't yet fully embraced the necessity of making space for water on flood plains and often continues to build on these. More than fifteen per cent of state houses have been built on flood-prone land, for example.¹⁵⁵

Top: Christchurch Botanic Garden, Bottom: Caroline Bay, Timaru



It is also rare to find tall buildings sporting green roofs or green walls. Permeable paving hasn't caught on in a big way, and, unfortunately, Aotearoa New Zealand is going backwards in terms of the green spaces available in cities, both overall and per capita.

The way stormwater is managed varies significantly between local authorities, regions, and rural and urban areas. The technical and financial resources available to councils also varies widely, with the bigger cities having far more expertise to draw on¹⁵⁶.

In comparatively well-resourced Auckland, the Making Space for Water plan is expected to be released for public consultation in August 2023. It is an ambitious plan to sort out Auckland's flooding problems with an estimated price tag of \$1 billion. It includes a "substantial but achievable" acceleration of work to deliver new blue-green infrastructure. Whereas Healthy Waters has typically delivered a new blue-green network project just once every two years, 'Making Space for Water' proposes to deliver up to fifteen such projects within six years.¹⁵⁷

In addition to accelerating the provision of blue-green infrastructure, Auckland Council is adopting aspects of a sponge city approach by recognising the need to open up waterways, remove houses from flood prone areas to make space for flood water and develop new linear parks

alongside waterways.¹⁵⁸ Central government has agreed to work with local councils to make offers to buy up around 700 houses and properties in Auckland, Hawke's Bay, and Gisborne that can no longer be lived in since they were damaged or destroyed outright in the January floods or by Cyclone Gabrielle.¹⁵⁹

SADLY, CITIES IN AOTEAROA NEW ZEALAND ARE STILL LOSING GREEN SPACE

Analysis undertaken by the Parliamentary Commissioner for the Environment shows that private green space in Auckland currently covers around 30.6 per cent of the city's total urban area. This is predicted to fall to just 24.3 per cent coverage by 2043 on current settings. A similar analysis in Hamilton shows current private green space predicted to drop by 5.5 per cent by 2043, to cover just 18.9 per cent of the total urban area.¹⁶⁰

Our cities are losing these green spaces at the very time when these spaces are becoming more and more important for managing floods, protecting biodiversity, and sequestering carbon.



THE REGULATORY FRAMEWORK IS COMPLEX

Flood management in urban spaces is governed by a complex web of legislation, regulation, and policy statements, and suffers from a lack of coordination.

Currently, regional councils are responsible for managing rivers and catchments, mitigating soil erosion and flood control. They provide information on where flooding occurs and maintain flood defence systems. Territorial authorities (district and city councils) are responsible for the provision of stormwater infrastructure. They manage building consents, and controlling the effects of land use, such as natural hazards and Indigenous biodiversity.

At the local level, regional and district plans set out processes for managing stormwater and floods, as do hapū and iwi management plans and local treaty settlements.

The current statutory and regulatory framework governing and/or impacting stormwater management includes more than a dozen Acts of Parliament, including the Local Government Act 2002, the Climate Change Response Act 2002, and the Resource Management Act 1991.

Stormwater management is also addressed under a number of

national strategy documents and directions, including the National Adaptation Plan and the National Resilience Plan, which sets aside \$6 billion in initial funding to focus on 'building back better' from recent weather events.

One of the key documents worth noting is the strategic direction expressed by Te Mana o te Wai, which has been part of the National Policy Statement for Freshwater Management¹⁶¹ since 2014, and was strengthened in 2020. It is Aotearoa New Zealand's central concept for freshwater management. Te Mana o te Wai recognises the mana and the mauri of water and takes a mātauranga Māori approach to water management.

The document imposes a hierarchy of obligations beginning with protecting the health and well-being of water, then of people, and finally of other interests. This approach is new in the country's regulatory framework, and could be transformative. In practice, the strategy would mean that preserving or rebuilding the mauri of water in urban environments is placed before economic, financial, or other imperatives.

One new and potentially very impactful requirement is that each council will now need to go through a consent process to release storm water into a freshwater source. Te Mana o te Wai must be incorporated into regional council plans by October 2024. The strategy may help promote more widespread

implementation of sponge city approaches and nature-based solutions.

THE MANAGEMENT OF STORMWATER AND NATURE-BASED SOLUTIONS IS IN FLUX

The regulatory context for stormwater management and nature-based solutions is currently in flux, making it difficult to be clear about who is required to do what, and by when. However, this moving space provides significant opportunity for change.¹⁶²

Two pieces of legislation that are scheduled to replace the Resource Management Act later in 2023 – the Natural and Built Environment Bill and the Spatial Planning Bill – could have a significant impact on how the impacts of climate change are planned for, how stormwater is managed, and the extent to which sponge city approaches and nature-based solutions become mainstreamed.

While neither bill specifically provides for a framework that would support sponge city approaches, under the Spatial Planning Bill each region will be required to set out a long term high-level strategic direction, including consideration of which areas are vulnerable to the effects of climate change, and plans for stormwater management and major new infrastructure.

The proposed legislative changes provide an opportunity to ensure

that essential flood adaptation approaches are given priority, such as making space for water, preserving green spaces, protecting trees, and using approaches such as nature-based solutions and water sensitive urban design. A lot appears to rest on the National Planning Framework, which will sit under the Natural and Built Environment Bill when passed.

The third piece of proposed legislation as part of the Resource Management Act reforms, the Climate Adaptation Bill, is yet to be tabled but will also impact this space. It will cover the rules around relocating settlements away from vulnerable areas, and adaptation approaches such as installing seawalls, or putting houses on stilts.¹⁶³

Recent public statements from the main opposition party¹⁶⁴ imply that a change of government would see such new legislation overturned or at least significantly amended. This adds further uncertainty to the regulatory space.



THE 'AFFORDABLE WATER REFORMS' PROGRAMME

A significant change in the stormwater management regulatory space currently is the 'Affordable Water Reforms' programme, previously known as 'Three Waters'. Under the proposed reform, stormwater management will move from councils to 10 new water service entities (WSEs) by 2026.

Under new legislation, stormwater assets will be transferred from councils to the new WSEs. Where infrastructure is grey, such as a pipe, that process would be relatively straightforward. However, blue-green infrastructure that serves multiple purposes (such as parks) would require thought and cooperation between councils and WSEs.

Green stormwater infrastructure located on public land are referred to as 'mixed-use assets' – they have both a stormwater and another function, such as recreation. The operation of mixed-use assets will transfer to a WSE where the use of that asset is predominantly for stormwater purposes. However, in the case of a football field that is designed to flood during significant weather events, for example, that asset will remain the responsibility of the local council.¹⁶⁵

In either case, the council and the relevant WSE will be required to reach an agreement about how mixed-use assets will be co-managed between their

stormwater function and their alternative use.^{166,167}

The potential advantages of the reforms in terms of moving councils towards sponge city approaches are many. The new model should enable standardisation of approaches, and more consistent use of best practice by allowing specialisation in stormwater management to become more evenly spread across the country (some councils currently make do with very limited stormwater management expertise on staff). The new structure intends to ensure more consistent investment, even in places with low rates bases, as money will be gathered for a specific purpose and must be used for that purpose, rather than being subject to competing priorities.

The reforms could present an opportunity to introduce nature-based sponge city approaches as the standard approach, and to make sure that these are funded and implemented at a whole-catchment level.

However, the new system may also struggle with the additional layers of administrative complexity that



will result from responsibility being split between WSEs and councils. This will particularly be the case for blue green infrastructure which will have significant cross over with the responsibility of councils. The extent to which councils and new water services entities are able to work together on things like whether berms should be planted with natives, or roofs should be 'greened' will have to be agreed between them and this will require excellent relationship management.

Concerningly, the new entities will, it appears, have no basis to recover the costs of providing public benefits such as recreation and improving public health. This risks their decision making around stormwater focusing on options that are cheaper in the short-term such as piped, hard infrastructure, rather than solutions which promote cultural, social, and environmental wellbeing.¹⁶⁸

To ensure the new model helps, rather than hinders, the roll out of sponge city approaches, national direction promoting this approach should be embedded in all the various planning frameworks currently under development. Thought should be put into how the new entities can share those costs which provide benefits such as increased amenity, but do not relate strictly to stormwater management. Finally, there will need to be sound mechanisms for integrated planning and investment across the regional entities and councils.

CHAPTER 4.

Do sponge cities offer Aotearoa New Zealand a viable solution?

SPONGIER URBAN AREAS ARE JUST ONE PART OF THE SOLUTION

Sponge cities as a concept properly entered the public consciousness in Aotearoa New Zealand after the two major flood events that took place at the beginning of 2023 – the Auckland Anniversary Weekend floods and Cyclone Gabrielle. Whether or not the damage caused by those events would have been limited by ‘spongier’ cities has become an important topic for debate.

A crucial point is that the sponge city approach is designed for urban areas. It will not be a solution for rural, or agricultural, areas – though some of the approaches, such as remediating wetlands, may well be helpful in those places too, alongside whole catchment water management in general. Sponge cities cannot fix problems such as land erosion and slash from forestry, which increased the intensity of flood damage in areas such as Hawkes Bay and the East Coast during the cyclone.

The townships that bore the brunt of the flooding from the cyclone as rivers overflowed their banks

and stop banks were breached, likely wouldn’t have been able to withstand the sheer quantity of water that flowed towards them, regardless of how absorbent they were.

A review of the literature and anecdotal feedback from experts shows mixed views on the extent to which sponge city approaches might have mitigated damage in Auckland and other northern towns after the January flooding. The January rainfall event was huge in scale – a 1-in-200-year event according to NIWA,¹⁷¹ and the biggest rainfall event in Auckland’s modern history. Many parts of Auckland received more than 400 mm of rainfall during the five-day flood period. The Hunua East monitoring station recorded the most, with a phenomenal 639.6 mm.¹⁷²

While using green and blue infrastructure to manage flood waters would not be expected to present a full solution for that kind of extreme event¹⁷³, areas in Auckland that have incorporated sponge city concepts do appear to have done better than other areas in the January flooding.

In the Hobsonville Point housing development, for example, wetlands were preserved and various sponge city concepts were built in, including rain tanks, underground detention tanks, bioswales and rain basins placed over stormwater drains to slow flow. The area experienced very little flooding in January compared to neighbouring areas.¹⁷⁴

Similarly, in Northcote, which has historically suffered from flooding during storms, new stormwater provision prevented most private houses in the area from being flooded in January.¹⁷⁵ Two significant projects were completed there in 2022 - the daylighting of the Awataha Stream and the transformation of Greenslade Reserve into a stormwater detention park. Greenslade Reserve now incorporates a planted urban wetland and detention basin. The sports field was designed to hold twelve million litres of water, which limited damage to nearby houses in the January floods.

Te Ara Awataha Greenway, Northcote



OTHER APPROACHES
WILL ALSO BE NEEDED TO
OFFSET RISK, INCLUDING
MANAGED RETREAT

The sponge city model likely to be most successful is one that acknowledges that a range of solutions will be required as flood risks increase over time. These solutions may require a combination of blue, green, and grey approaches alongside other mitigation strategies.

A successful sponge city approach will make space for water, recognising that from time to time, flood waters will need to take up significant space. Finding a way to let that happen with the least possible damage to life, property, and infrastructure, is key.

That will mean moving houses and businesses that have previously been built on particularly vulnerable flood plains, or in the way of overland flow paths, and ensuring that those areas cannot be built on again (an approach known as 'managed retreat'). IAG, the country's biggest insurer, estimates that this may affect 20,000 homes.¹⁷⁶ Over time, that number is likely to grow.

Dealing with increasing flood hazards in urban areas is likely to necessitate a combination of the following approaches, which could take place alongside a sponge city approach:¹⁷⁷

- ◆ Design bigger and better grey infrastructure in certain locations (pipes and drains).

That would be expensive but may be the only solution for flood prone areas that must be protected at all costs.

- ◆ Increase flood protections such as stop banks. Stop banks come with some risks – they may encourage growth in areas that are not suitable to be habited in the long term, for example.
- ◆ Raise houses, or design houses with living spaces on higher floors.
- ◆ Minimise damage by using wet proofing techniques on buildings, using materials for floors and cupboards that are less susceptible to flood damage, or siting electrics higher up.

- ◆ Develop better data – including data that updates in real time – to help communities mitigate risks in advance, and to help respond to floods as they happen.

Adapting to increasing flood risk brought about by climate change will pose unprecedented challenges, and it will not be possible to eliminate risk entirely. New Zealanders need to be having conversations both as a country, and locally, about what level of risk is acceptable in cities, and what level of cost can be tolerated to achieve higher levels of resilience.





EARLY ADAPTATION WILL
COST, BUT SAVE MONEY
LATER

China has invested significant sums into its Sponge Cities Programme. A total investment of around NZ \$20 billion was budgeted for the first three years of implementation, split between the sixteen pilot cities. Central government underwrote cities by up to twenty per cent of the full cost.¹⁸⁹

While this may seem a lot, across Aotearoa New Zealand, the estimated cost of renewing the ‘three waters’ network (wastewater, potable water and stormwater assets) is in the order of \$30 billion to \$50 billion over the next 15 years.¹⁷⁸ Any investment decisions must be seen in this context – and must also be compared with the cost of doing nothing.

Research by the Global Commission on Adaptation found that early adaptation is in countries’ strong economic self-interest, with an overall rate of return on investment in improved resilience showing cost-benefit ratios of as much as 10:1 within ten years for some interventions.¹⁷⁹

Evidence for the cost-benefit value of sponge city approaches, both at the city-wide and development scale, include the following:

WUHAN'S TRANSFORMATION INTO A SPONGE CITY SAVED

≤ US\$600M

COMPARED WITH THE COSTS OF EQUIVALENT
GREY INFRASTRUCTURE

180

NATURE-BASED
SOLUTIONS ARE

181

50%
MORE
ECONOMICAL

AND ARE

181

28%
MORE
EFFECTIVE

A LITERATURE REVIEW FOUND
WSUD ON AVERAGE SAVES

182

14 - 35%

ON SITE PREPARATION AND
EARTHWORKS COMPARED TO
CONVENTIONAL FORMS OF
DEVELOPMENT

WSUD SAVED AN AVERAGE OF

183

22%

AT THE KIRIMOKO PARK
DEVELOPMENT IN WANAKA

IN NZ, A CASE STUDY OF
THREE DEVELOPMENTS
FOUND WSUD DELIVERED A
GREATER

184

RANGE
AND LEVEL OF
BENEFITS FOR
LOWER COST

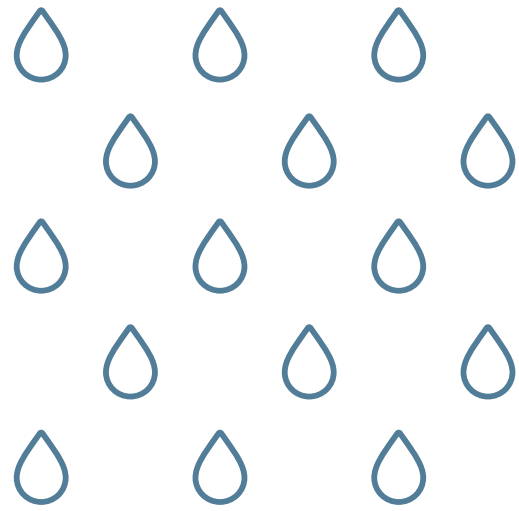


Investing in adaptation means making the most of a so-called ‘triple dividend’. This holds that benefits should not be measured only in terms of avoided losses, but also in positive economic impacts (such as increased productivity and innovation), as well as in social and environmental benefits.¹⁹⁰

Sponge city approaches also have other benefits, such as supporting biodiversity, or improving public health, and these benefits are not usually calculated in cost-benefit analyses as they are difficult to monetise. Other cost-benefit challenges are that the best solutions for a given location are dependent on the characteristics of the soil and climate, the nature of the existing infrastructure, and whether the land in question is privately or publicly owned.¹⁸⁵ The costs of retrofitting compared with building in green infrastructure will also affect the cost-benefit of a proposed solution.¹⁸⁶

A key impediment to implementation of sponge city-type approaches in Aotearoa New Zealand has been the perception that these cost more to implement – often the short-term cost will be the most important decision-making criteria, rather than the full life cycle cost, and other wider benefits it may bring.¹⁸⁷

There are now tools available to help decision-makers calculate these extra benefits – the ‘More than Water’ assessment tool is one good example.¹⁸⁸



CHAPTER 5.

An Aotearoa New Zealand model for sponge cities

THIS REPORT PROPOSES AN AOTEAROA NEW ZEALAND MODEL FOR SPONGE CITIES THAT PRIORITISES RESILIENCE, NATURAL ABUNDANCE (RAUORA) AND HOLISTIC APPROACHES THAT CAN FULFIL MULTIPLE FUNCTIONS, AND WORKS TO VALUE AND RESPECT WATER FOLLOWING THE PRINCIPLES OF MĀTAURANGA MĀORI AND NATURE-BASED SOLUTIONS.

An approach for Aotearoa New Zealand will be most successful, and affordable, if it requires and incentivises sponge city approaches at the whole-city level as well as for new developments, and within private residences. Approaches should be tailored to location based on city size, geography and budget.



PRIORITISE RESILIENCE
AND RAUORA (NATURAL
ABUNDANCE)



RECOMMENDATIONS:

► **Have high aspirations.**

Aim to revive the mauri (life force) of water by improving its quality, achieve rauora (natural abundance) in the environment, and make beautiful spaces in which to live - rather than simply 'managing stormwater'.

'Climate resilience' is about being able to anticipate, prepare for and respond to the impacts of a changing climate¹⁹¹. A town or city's level of resilience is reflected in its ability to survive, adapt and (ideally) thrive in the face of climate-related pressures.¹⁹²

A key point in both international and local narratives, is that flood mitigation and climate resilience can be reframed by decision-makers as a net positive. Rather than being seen as a threat, it can be an opportunity, and an 'enabler for urban transformation'. Water management can be used to grow economic activity, reduce emissions, improve public health and contribute to thriving ecosystems.¹⁹³

The Māori concept of rauora sets out what it means to be

resilient. The Rauora Indigenous Worldview Framework, developed for the National Climate Change Adaptation Plan describes the need to work within a mindset of rauora and have high aspirations, using Indigenous knowledge to guide us in climate adaptation. The framework centres the principles of balance, interconnectedness, collectivity and inter-generational equity, complemented by Māori values. Rather than assessing outcomes against minimum requirements, they are assessed against a measure of natural abundance, vibrancy, regeneration and optimal health.¹⁹⁴

Under the Rauora Framework, a sponge city model should be considered not just for its ability to mitigate flood risks, but also for how well it is able to accelerate ecological restoration – not to a minimum baseline, but to flourishing levels. It should also provide beautiful spaces to live, work and play.

The Indigenous worldview also encourages society to look at the driving forces behind the current situation more holistically. Flood resilience is thereby not just a discrete issue of stormwater management, but part of bigger picture issues such as colonialism, and the western economic model that have contributed to environmental degradation and created the drivers for climate change.

BE GUIDED BY
MĀTAURANGA MĀORI



RECOMMENDATIONS:

- **Be guided by mātauranga Māori and tikanga** in setting policy and community decision-making around flood adaptation.
- **Partner with tangata whenua in decision-making around sponge city approaches** at the national, local and community levels.
- **Increase Māori workforce in stormwater management-related professions**, to help mainstream tikanga and mātauranga approaches.

Māori knowledge and leadership is an important positive enabler towards implementing nature-based sponge city approaches model for Aotearoa New Zealand. Tikanga is closely aligned with sponge city approaches such as water conservation, restoring buffers of native vegetation alongside waters, and avoiding mixing water from different sources.

Mātauranga Māori knowledge and wisdom provides a supportive framework for addressing climate issues and biodiversity loss together, with a strong focus on innovation, cultural connections

to species and place. Sector professionals interviewed as part of qualitative research by Abbie Reynolds noted that Māori governance promotes integrated decision-making around climate issues, that balances economic considerations with the well-being of people and the environment.¹⁹⁵

The National Adaptation Plan recognises the importance of elevating te ao Māori and mātauranga Māori in the adaptation process, and of empowering Māori in adaptation planning. Actions under the plan include partnering with Māori to support Māori-led approaches to adaptation planning (Action 7.3), and producing guidance on integrating mātauranga Māori into planning together with mana whenua (Action 3.7.6).

Strengthening Māori workforce in stormwater related professions would help mainstream tikanga and mātauranga approaches within the sector.¹⁹⁶ Bringing more Māori into the workforce will take coordinated efforts from a range of stakeholders, including professional bodies, educational institutions, councils and central government.

SET A CLEAR VISION FOR SPONGE CITIES AND NATURE-BASED SOLUTIONS



RECOMMENDATIONS:

- ▶ **Act urgently and decisively, and plan strategically** for the long-term at the national, regional, and local levels. Name and prioritise nature-based sponge city approaches as a key climate adaptation approach for Aotearoa New Zealand. This strategic vision may sit in documents including: the proposed National Planning Framework, the next National Adaptation Plan, NEMA's National resilience strategy, the Climate Adaptation Bill, and future regional spatial strategies.
- ▶ **Build political consensus across the spectrum** for the importance of nature-based sponge city approaches.



"By reviving the knowledge of the old techniques and connecting them with contemporary sciences and arts, we are able to build nature-based green infrastructures replacing the conventional grey infrastructures... Living with nature is inexpensive and easy, comfortable and beautiful, and an art of survival". Dr Kongjian Yu²⁵⁰

The International Union for Conservation of Nature defines nature-based solutions as approaches that protect, sustainably manage, and restore natural and modified ecosystems. They aim to address societal challenges effectively and adaptively, simultaneously benefitting people and nature. Nature-based solutions target major challenges like climate change, disaster risk reduction, food and water security, biodiversity loss, and human health.¹⁹⁷

With many competing and increasing pressures on limited public funds, any proposed climate adaptation solutions must be efficient, evidence-based, and effective at reducing flood risks. The best way to get value for money is to choose approaches that are not just focused on one solution – in this case, flood mitigation – but that deliver multi-functional solutions that provide benefits across a range of indicators.

A sponge city model for Aotearoa New Zealand that incorporates the holistic principles of nature-based solutions, working together with mātauranga Māori, can produce those multiple benefits. An ideal model would ensure this holistic view is factored in as part of the cost-benefit analysis for any city-wide sponge city plan or smaller stormwater project.

Aotearoa New Zealand's first national adaptation plan, published in 2022, emphasises the value of working with nature in this way, rather than against it, pointing out that the climate and biodiversity crises are inextricably linked, and noting the importance of working with nature to restore and protect Indigenous ecosystems.¹⁹⁸

Building political consensus about the importance of nature-based sponge city approaches as a climate adaptation will be essential to keep momentum. Interviewees in a qualitative study led by Reynolds noted that changing government priorities make it harder to implement long-term nature-based projects at the local level. Building political consensus will help minimise this – though it is often easy to achieve.¹⁹⁹



APPROACHES AT THE CITY AND CATCHMENT LEVEL



RECOMMENDATIONS:

- **Require councils to set out nature-based sponge city approaches in their long-term plans.** This requirement may be set out under regulations for the new Spatial Planning Bill, for example. Solutions may include:
 - » making space for water – where necessary removing homes and other buildings from flood plains and major overland flow paths
 - » naturalisation, rehabilitation, and daylighting of streams, rivers and lakes
 - » restoration of flood plains
 - » protecting and restoring major overland flow paths
 - » creation of wetlands and ponds
 - » improving the connectivity of the urban water system and urban green spaces, to allow unimpeded water flows and create blue-green corridors for wildlife
 - » designing public spaces to flood – transport

networks such as roads and railways, and other public spaces, can be made to serve as “sacrificial storage areas” when it rains heavily²⁰⁰

- » increasing the quantity of public green and blue spaces – where limited space is available, ‘pocket parks’ and ‘tiny forests’ are an option
- » upgrading existing parkland to be more absorbent – by replacing lawns with native trees and shrubs, for example, or building wetland areas.

- **Value green spaces as essential infrastructure.** Require councils to plan for and provide public green spaces as they do with other infrastructure. Plans should set out the multiple benefits each green space will be expected to fulfil, including stormwater management, amenity, and enhancing biodiversity.
 - » National policy should set out minimum requirements for the quantity of public green spaces in urban areas, whether calculated by area, or by population.

- » Remove the limit on development contributions a council may charge for the development of new green spaces under the Local Government Act 2002 (LGA), to bring this into line with how other infrastructure is treated.

All towns and cities in Aotearoa New Zealand need long-term plans that assess flood risk for different areas, down to the neighbourhood level, and ideally in even more detail. The Spatial Planning Bill will require long-term spatial plans to be produced regionally, and to take into account matters relating to the effects of climate change. The challenge will be to ensure these plans take a catchment-wide approach to flood mitigation, and use sponge city approaches in preference to hard infrastructure. This report recommends such a requirement be developed, whether in legislation or within the National Planning Framework.

The quantity and quality of green spaces at the city level also need attention. Aotearoa New Zealand’s cities have increasingly less public green space as a percentage of the total area, and offer less public space per resident. Most councils spend only a fraction of capital expenditure budgets on parks and reserves.²⁰¹

Since the 1960s, there has been

no statutory requirement in place for councils to plan for, or to provide public green and blue space. This compares to other forms of infrastructure (such as stormwater infrastructure), for which they do have to plan and provide.²⁰² While most councils publish service statements for public spaces, targets often amount to just one-two per cent of areas used for new developments – far less than was historically provided.²⁰³

Public green and blue spaces should be considered essential infrastructure in their own right, rather than simply a nice-to-have amenity, and be planned for accordingly. Setting national minimum requirements would help to achieve this.

Under the LGA (s203(1)(a)), councils are empowered to require contributions from property developers to create new public green space. They may ask for contributions totalling up to 7.5 per cent of the value of additional allotments created by a subdivision. While the LGA caps development contributions for parks and reserves, there is no cap for development contributions for infrastructure. In fact, many councils are currently asking nowhere near the maximum they are entitled to.²⁰⁴

Amending the LGA to remove the contribution cap for green spaces would help support councils to provide essential green space – but they would need to use the powers they have to charge accordingly.

It is not always easy to find space in densely built urban areas suitable to convert to large new parks. Fortunately, evidence suggests that inserting smaller parks in residual spaces within neighbourhoods can also be very useful for flood mitigation if placed in the right areas. ‘Pocket parks’ can also help regulate the microclimate, allow for biodiversity, and improve air quality.²⁰⁵

Urban Creek Catchment Vision for Christchurch City Council.



In a similar way, urban forests, also known as tiny forests, can help with flood mitigation, both by absorbing water and by breaking up the soil for water to drain through more slowly. A tiny forest may be as small as a tennis court, yet support dozens of different species of trees and plants.²⁰⁶

Finally, making space for an increasing quantity of water in urban areas will necessitate moving some houses and businesses that have previously been built on vulnerable flood plains or in the way of major overland flow paths. Current estimates are that there are as many as 20,000 such homes in Aotearoa New Zealand.²⁰⁷ Removing at-risk buildings will involve difficult decisions, but is essential to minimise cost and heartbreak in the future. The upcoming Climate Adaptation Bill is due to set out the rules governing managed retreat.

APPROACHES AT THE NEIGHBOURHOOD AND DEVELOPMENT LEVEL

At the neighbourhood and development level, options include retrofitting existing areas, and working to ensure that new residential developments are designed to be more absorbent. To prevent further erosion of public green space caused by ‘infill’ development, policies should focus on ‘upwards’ development, alongside provision of adequate private and public green space.

Utilise large sections of land in urban areas, whether privately or publicly held



RECOMMENDATIONS:

► **Direct that all land owned by government agencies be considered for its potential to mitigate current and future flood hazards by incorporating sponge city approaches.**

- » Landowners such as the Ministry of Education and Ministry of Health should identify land, including sports fields for example, that may be retrofitted

to slow or retain flood water while retaining their original purpose, and develop plans to do so in areas facing flood hazards.

- » Types of land use that promote absorbability should be favoured on public land where possible, both at the design stage and as a retrofit (trees rather than concrete, for example).

► **Incentivise private owners of large sections to make these more absorbent.**

- » Incentivise large private landowners to replace concrete surfaces with permeable paving, plant trees in areas that are not being used, build rain gardens, or retrofit their property with underground bioretention tanks.
- » Options include providing rates rebates or tax breaks, or providing green certification for businesses that reach a specific ‘spongy standard’.
- » Councils (or WSEs) could also pay for green infrastructure to be built on private land in key areas, where landowners are amenable.



While it is administratively easier to focus on sponge city solutions for public land, private land – such as underused industrial sites – also provide opportunities to keep stormwater out of grey networks. Areas of industrial land that are underused could be fitted with green infrastructure, or car parking could be converted to permeable paving, for example.

Research by Muangsri et al.²⁰⁸ modelled the potential for a number of industrial properties in Christ church to be enhanced with green infrastructure for flood mitigation under different climate change scenarios. They found that adding in-ground stormwater storage into selected industrial properties could offset climate change-induced runoff impacts to a manageable level in those catchments. These findings held true even when a major climate change scenario was modelled.

While the research focused on industrial areas, the findings could equally well be applied to other types of large property, including land owned by councils, central government, or private trusts for example. Schools, universities, hospitals, and public housing all sit on large areas of land that may in many cases be put to better use.

Deal with densification by encouraging ‘upwards’ development rather than ‘infill’



RECOMMENDATIONS:

- **Focus national housing policies to encourage ‘upwards’ development** in preference to ‘inwards’ or ‘outwards’ development.
- **Ensure the new National Planning Framework gives clear guidance** on how to address any conflict between housing needs, and sponge city approaches.

Aotearoa New Zealand’s national housing strategy, set out in the Urban Growth Agenda²⁰⁹ is to encourage housing both on the urban fringe and as ‘infill’ and ‘upwards’ development. The country is currently experiencing a significant housing shortage. The recently introduced Medium Density Residential Standards (MDRS) aim to address that by requiring councils in our fourteen biggest cities to allow medium-density housing in residential areas, and multi-storey apartment buildings in city centre zones. Under the MDRS, three homes of up to three storeys can be built on most sites without the need for resource consent from local councils.²¹⁰

Councils were required to incorporate the MDRS into their regional plans by 2022, though some have sought extensions. The new standards should boost much-needed housing supply, but are also likely to place increasing strain on stormwater infrastructure as existing gardens in residential areas are covered over with impervious new buildings, driveways and patios.

Unfortunately, there is no straightforward solution. Housing is urgently needed in much of Aotearoa New Zealand and land is expensive, making subdivisions financially attractive. Building new houses at the urban fringe is also undesirable in most cities as it encourages sprawl, locks in higher emissions through increased transport needs, and creates competition between land for development and land dedicated to supporting biodiversity, or for food production.²¹¹

Building upwards uses urban land more efficiently than infill development, or medium density housing such as terraced houses. Buildings with more floors take up less space per resident, and, if planned well, can be designed to include a large amount of green space, and incorporate sponge city approaches as part of the development.

A recent analysis of cities around the world concluded that while there are tensions between density and urban green spaces, urban areas can be made to be both green and dense by taking advantage of green infrastructure.²¹² By prioritising upwards growth, ensuring development rules are fit for purpose, and utilising the sponge city approaches outlined here, Aotearoa New Zealand can grow denser while also future-proofing for floods.

Aotearoa New Zealand needs a clear vision on how it will balance the need for housing with the need to make cities more absorbent. Both are important, so clear direction will be important for decision-makers. This could sit within the National Planning Framework, for example.



Retrofit towns and cities with green infrastructure



RECOMMENDATIONS:

- **Use urban and suburban road corridors and other public places** to provide space for green infrastructure such as rain gardens, swales, tree pits and vertical walls. Replace grass with other plants where possible.
- **Require new buildings in the inner city to include green roofs or other equivalent infrastructure** to minimise runoff. Incentivise existing buildings to retrofit green solutions.
- **Where appropriate, unseal hard surfaces such as pavements and carparks**, and replace with permeable paving or plants. This may happen as part of scheduled upgrades.

Streets and roads represent a large proportion (fifteen to twenty per cent) of the surface areas of cities in Aotearoa New Zealand, and can therefore help connect green spaces into ecological and water management networks in a way that isolated parks cannot.²¹³ Retrofitting streets is highlighted in the literature as having good potential to take the pressure off

urban stormwater networks.²¹⁴ Although much of the existing road networks in Aotearoa New Zealand are already ‘green’, councils’ willingness to plant on street berms varies widely, reflecting the impact on car parking, the extra maintenance costs created for councils, and the difficulties caused by plant and tree roots sharing underground space with utilities buried beneath the street.²¹⁵ Raised beds can sometimes provide a solution, though access to utilities for maintenance still must be provided.

Figure 13. Inner city footpaths in Wellington are narrow and contain more than 100 years-worth of old pipes and cables, making it hard to find a spot for plants.



Trees are the most valuable for water absorption, as well as for their knock-on benefits on air quality, biodiversity, and city cooling. However, trees can also interfere with power lines above and pipes below. Solutions include underground cages to keep roots contained, increasing the size of the road corridor, or locating infrastructure trenches under the road rather than the footpath. Combining infrastructure such as pipes and cables in single continuous conduits can also provide more room alongside for plants.²¹⁶

To deal with increased maintenance costs, councils might charge targeted rates, or require developers of new housing to continue paying for maintenance for green street infrastructure

in the mid-term. As extreme rainfall events become more common, the country will need to develop a change in mindset to regard nature in cities as critical infrastructure that must be worked around even where that is difficult and costly.

Other retrofitting ideas for inner cities include incentivising or requiring green roofs, tanks or other retention devices on rooftops of buildings. Finally, unsealing hard surfaces in public areas such as carparks, urban squares, and pavements, and replacing those surfaces with permeable paving and/or natural surfaces, such as plants, could significantly minimise runoff in cities.²¹⁷

Make new residential developments more absorbent, or compensate with new parks



RECOMMENDATIONS:

- ▶ **Raise the national minimum standard for new developments** for percentage of the development area that must be left unsealed. This should apply to both greenfield development and ‘infill’ development within existing residential areas.
- ▶ **Incentivise developers financially to do even better than the national minimum** (by charging lower development fees, for example)
- ▶ **Councils should invest more in compliance** to ensure current rules are followed.
- ▶ **Set a national minimum standard for percentage of parkland to be zoned as part of new greenfield developments** to avoid cities becoming less green overall. Ensure this space is designed to provide amenity as well as stormwater function.

- ▶ **Where it is not possible to leave sufficient space unsealed, provide additional new public green spaces,** funded by development fees.

As houses in new greenfield residential developments have become bigger, the parcels of land they sit on have become smaller. Meanwhile, it has become fashionable to surface over increasing amounts of the space not covered by houses for off-street parking, driveways and patios. A second major trend is for more and more back gardens and other available space within existing residential areas to be filled with new developments as housing pressures bite. This means green spaces held in private residential areas – one of the country’s biggest contributors to green spaces – have been shrinking.²¹⁸

Until recently, the amount of land kept as green space in private developments has been left to councils. Most councils in the bigger cities allowed a total built area on new dwelling sites of 35–40 per cent.²¹⁹ New national rules under the MDRS provide that where new homes are built under those standards, buildings may cover up to half of the total site area, and only twenty per cent of the site must be landscaped with grass or plants. This policy will further erode green spaces in residential areas.²²⁰



To keep and improve the sponginess of cities in Aotearoa New Zealand the trend of losing green spaces on private land will either need to be reversed, or green spaces will have to be provided elsewhere – whether within new developments or nearby.

The Parliamentary Commissioner for the Environment proposes several options for doing that.²²¹ First, new developments could be required to leave a greater proportion of available land space within each section unbuilt and unsurfaced than is currently provided for in the MDRS.

Anecdotally, an additional issue here is that rules set by councils concerning areas to be left unsurfaced are not always complied with by developers, or are further eroded by landowners over time.²²² Dedicating more resourcing within councils to compliance would be a worthwhile investment to reduce costs later on.



Second, councils could zone more parkland within development areas, or require developers themselves to set aside more public green space than they currently do. This may be done as part of the consent process, and by applying covenants to the land.²²³ Councils can and should fund new parks and green spaces by raising levies against developers under the Resource Management Act or the Local Government Act.

A drawback of charging developers more is that the extra costs will be passed to new owners. That is particularly unpalatable during housing shortages. However, new housing that is designed poorly puts additional stress on the stormwater networks that are already buckling under the strain. An alternative is that the costs are passed on to the general public via increased rates, which would also not be welcomed.

To make up for some of the additional costs that may need to be paid by new owners to cover better and more public green spaces, councils could offer rate rebates or stormwater discounts to ‘spongier’ housing developments, meaning that homeowners could recoup some of the costs over time.

Change the way new housing sites are developed



RECOMMENDATIONS:

► **Require new developments to follow the principles of sponge city approaches / WSUD,** to retain natural drainage features and minimise soil disturbances across sites. Options include:

- » requiring natural drainage features such as wetlands, streams, and overland flow paths to be left intact as part of new developments²²⁴
- » requiring or incentivising developers to retain existing trees
- » clustering buildings to leave more green space with topsoil intact²²⁵
- » building houses on the areas within development sites that are the least valuable for drainage (on clay, for example), leaving the most absorbent areas undisturbed²²⁶
- » using different building techniques, such as building houses on stilts or pads, to minimise soil disturbances.²²⁷

» increasing the depth of topsoil that must be replaced after developments are complete to a level that can support full-grown trees rather than just lawns.²²⁸

- **Set standards around allowable runoff quantity, or require full ‘hydraulic neutrality’ from new developments.** New developments could be required to deal with more (or all) of rainwater in situ, for example by:
- » adding retention and infiltration systems such as ponds and tanks
 - » reducing the quantity of impermeable outdoor areas in site designs
 - » requiring footpaths, driveways and paved surfaces to reach a minimum permeability standard and detention storage volume²²⁹
 - » installing rain gardens, swales and filter strips.

The way sites are prepared to make way for new housing developments reduces the ability of soils to absorb and retain water. This is because areas set aside for new residential developments in Aotearoa New Zealand are usually stripped of existing trees,

vegetation and topsoil and then compacted to provide a hard surface in preparation for building. Natural drainage features such as gullies, wetlands or streams may be smoothed over, diverted, covered up or filled in.

A thin layer of topsoil is then added back once the development is complete. Often this layer of topsoil is too thin to allow trees and shrubs to survive or grow to maturity. New development practices are needed, both to conserve soils for maximum drainage, and to preserve and enhance natural ecology and biodiversity in areas to be developed.²³⁰

As one example, clustering houses, rather than designing them to sprawl across a whole site as is typical in Aotearoa New Zealand developments, can significantly reduce the amount of impervious

area and volume of earthworks needed.²³¹ Water sensitive urban design techniques also include adopting measures that conserve natural areas, retain soils that are particularly valuable for infiltration, and work around flow paths.

The Government of the United Kingdom recently announced that it will be mandating sustainable drainage systems (SUDS) in all new housing developments.²³² SUDS use ponds, planters, green roofs, tanks, soakaways, tree pits, permeable paving and other green infrastructure to manage surface water sustainably.²³³ In Aotearoa New Zealand, the equivalent would be to require mandatory use of WSUD in new developments.

Some councils in Aotearoa New Zealand now require new sites to attain 'hydraulic neutrality', meaning no additional stormwater is to be discharged into the public stormwater system, either piped or by street drainage, as a result of the new development. Dealing with stormwater in situ eases the strain on public systems. Hydraulic neutrality is required for all new residential projects on the Kāpiti Coast, for example.²³⁴



AT THE LOCAL LEVEL,
MAKE PRIVATE
RESIDENCES MORE
ABSORBENT



RECOMMENDATIONS:

- ▶ **Educate and incentivise homeowners to make their properties more absorbent, and not to block overland flow paths.** Approaches include minimising the use of sealed surfaces, replacing lawns with plants, and recycling rainwater. Incentives may include free advice (home audits), rates rebates or discounts on materials.
- ▶ **Ensure the new National Planning Framework provides sufficient protection for urban trees,** and provide local incentives (such as 'treebates') for homeowners to plant new ones.
- ▶ **Develop tools to monitor the quantity and quality of private green space in cities, and set goals (at central or regional level) to maintain minimum levels.** This is currently technically challenging to do accurately, though good estimates can be made.

- ▶ **As monitoring tools are developed,** consider charging homeowners stormwater rates based on quantity of impermeable surfaces on private properties.

Residential yards and gardens account for slightly more than half of available green space in the country's biggest cities. Meanwhile some cities, such as Auckland and Hamilton, are becoming less green due to changes on private land. This points to the potential for encouraging private landowners to make the most of existing spaces for flood mitigation.²³⁵

Homeowners can contribute to sponge city approaches in several ways. One of the most important is to observe where water congregates, and ensure existing overland flow paths are not blocked by garages, buildings, or fences.

All green space is not equal. Trees, shrubs and wetlands can absorb far more water than dry, hard lawns. Options for residential properties to absorb more stormwater include replacing lawns with trees and native plants, fitting rain tanks, and building small ponds or mini wetlands. Directing rainwater from the roof into the garden or a grass swale will not only reduce runoff, but will reduce the pollution caused by roofing materials.

As touched on earlier, Aotearoa New Zealand has been losing trees in private yards since changes to the Resource Management Act in 2009 and 2013 removed blanket tree protections - a phenomenon that has been referred to as 'death by a thousand cuts'.²³⁶ Cities have lost a staggering number of trees as a result.²³⁷

The Natural and Built Environments Bill, if passed, should improve the situation by requiring the National Planning Framework (NPF) to provide direction on urban trees (cl 58(f)). The key will be to ensure the NPF provides sufficient protection to halt the losses, while still enabling homeowners to remove trees where a case can be made that it is necessary.



Other options include financial disincentives to cut down native trees, combined with incentives to plant them. In Portland, Oregon, for example, ratepayers are offered a 'treebate' - a credit on their stormwater bill when they purchase and plant a tree in their private residential garden. Larger trees receive bigger credits.²³⁸

Paved spaces take up a large percentage of private yards. Homeowners could be incentivised to retrofit permeable surfaces with subsidised materials. Alternatively, they could be offered reduced rates if they undertake a certain number of interventions, or reach a certain standard in terms of runoff quantity.

Houses obviously take up the greatest portion of residential land. Options to reduce runoff from houses include green roofs and private rainwater tanks. Using water from roof areas for potable and non-potable purposes can significantly reduce the volume of water discharged to downstream receiving environments.²³⁹

ONE SIZE DOES NOT FIT ALL



RECOMMENDATION:

► Tailor approaches to suit different locations and budgets.

A key takeaway from the literature is that a 'sponge city' won't look the same as a 'sponge regional town'. In fact, every place is likely to benefit from a different combination of approaches, tailored to local geography and geology, climatic conditions, population density, and urban form.²⁴⁰

For example, Wellington is rich with trees and green spaces because of its topology, and a focus for the city is preventing landslips. Auckland is facing increasing densification and reduced tree cover, and suburban flooding is a major issue. Major water features in a city, such as the Waikato River in Hamilton, or the estuary in Porirua, also make different approaches necessary.

Large, built-up cities tend to have more impervious surfaces and are therefore often (but not always) more vulnerable to flash floods than smaller places. At the same time, land is also more expensive, making it harder and more expensive to retrofit sponge city approaches.

In big cities, lots of smaller initiatives may therefore be more appropriate, such as rain gardens, pocket parks, and green roofs, for example. Permeable paving can also be a cost-effective solution in built up areas.²⁴¹ Alongside these sponge city approaches, some grey infrastructure is likely to remain essential in larger cities due to their dense populations and the limited space available for green solutions.

Small towns by contrast generally have less money due to a lower rates base, and may have less technical expertise to draw on. However, they are also less built up, and so they may be able to choose between a greater range of different approaches to match their budget. In smaller towns, it may be easier to increase the number of parks, and create new green belts, for example.

It is important to reiterate that sponge city approaches will not work everywhere, or may only partially reduce flooding in some places. As one example, the water table in South Dunedin sits just below ground level, and the land is sinking slowly. When it rains, the rainwater has nowhere to go.²⁴² Building green infrastructure cannot fix that problem. At best it may help to reduce the worst impacts of climate change for a time. Areas that are built on wetlands, such as some parts of Christchurch, face similar problems.

Similarly, areas with peat, clay or silty soils will not be able to absorb large quantities of water, so in those cases, a combination of green and grey infrastructure may be more appropriate – such as on-site storage in holding tanks for example.²⁴³

Flooding south of Dunedin.



DON'T GET STUCK ON
'ALL OR NOTHING'



RECOMMENDATIONS:

- **Embrace incremental approaches as part of a long-term vision.** Where comprehensive sponge city approaches are not financially possible, towns and cities should consider a range of green infrastructure as part of a staged process.

Investing funds upfront to convert towns and cities in Aotearoa into sponge cities will be the most financially efficient approach over time. However, as towns and cities simultaneously prepare to deal with increasing flood hazards, a staged approach may be more realistic for some.



Even small, incremental steps to make urban areas spongier can have a swift impact.

Recent modelling of a large city and a small regional town in Aotearoa found that where 10 per cent of a given area incorporated green infrastructure, peak rate and total runoff volume in that sub-catchment could be reduced by 50–75 per cent.²⁴⁴

This research compared varying rainfall intensities and different types of green infrastructure. Even when only a very small area

of the whole catchment was converted (less than 1 per cent), modelling showed a reduction in the potential impacts of extreme precipitation events. This suggests the strategic implementation of targeted green infrastructure areas can be hugely effective.

Of particular interest in the results was the efficiency of relatively cheap alternatives such as permeable paving and bioretention technology. The authors concluded that many small projects – and a combination of different types of solutions – could potentially be even better than incorporating just a few big ones. These are particularly useful findings for towns considering how best to retrofit their existing built areas.

However, incremental approaches should be incorporated as part of a long-term strategic vision rather than in a piecemeal way. This ensures the investment is targeted to locations with the greatest capacity to reduce flood risks.



The alternative... is that we continue with our 'Groundhog Day' approach to flood policy, but with the unpleasant twist that with each repeated failure to understand the consequence of our actions, things get worse.²⁴⁵

PUTTING DOWN ROOTS: THE IMPORTANCE OF NATIVES

By WSP principal landscape architect [redacted]

The putaputāwētā (marble leaf) tree is a beautiful member of Aotearoa New Zealand's native flora. Thriving in wet conditions, the species is named after wētā that live in holes in its trunk. Come autumn, its masses of white flowers and small chewy berries attract flocks of insects and birds.

Since Aotearoa New Zealand separated from the ancient supercontinent of Gondwana, the native plant species found here have had millions of years to adapt to local rainfall patterns, humidity, temperature, and soil type – along with developing a symbiotic relationship to our unique fauna. As a result, we boast a dazzling array of indigenous plants from towering trees to small shrubs, climbers, and grasses.

Native plants such as putaputāwētā play an important role in flood mitigation and stormwater management. As water soaks into the ground, some is taken up by the plants and some evaporates out of the soil. At the same time, leaves emit some of the water they've picked up.

The putaputāwētā (marble leaf) tree.



This process is performed by all plants, but due to their superior adaptation to local conditions, native plants are generally more effective at using water. In places with thick canopies and lush undergrowth, they're also better at deflecting water - slowing it down before it hits the ground.

A study from Scion reveals the incredible sponginess of Aotearoa New Zealand's native forests. Data from Mahurangi Forest over Auckland Anniversary weekend and during Cyclone Gabrielle shows 60 percent of that intense rainfall was held within the forest, preventing excess runoff.²⁴⁶ Elsewhere, native planting along streams and rivers in Marlborough has been effective at mitigating flooding in catchment areas.²⁴⁷

INSPIRING URBAN TRANSFORMATION WITH NATIVE PLANTING

While we can't turn towns and cities into native forests, we can incorporate more natural systems and processes into our urban areas. Integrating well-designed (and properly cared for) native planting is an effective and cost-efficient way of bridging the gap between our built and natural environments.

Reducing impervious surfaces and increasing permeable areas of planting is a simple first step. This approach is often overlooked as a tool in the climate fight, due to competing space demands from other infrastructure. It also has significant benefits for biodiversity and potential for 'cultural harvest,' and can reduce urban heat islands.²⁴⁸

Over the past few decades, attitudes towards native planting have changed for the better. There's now greater recognition of its cultural and social values, and biodiversity benefits. In contemporary Aotearoa New Zealand, decorative exotic planting has lost much of its significance - especially in public spaces. In fact, most local authorities now prioritise the use of native species in public projects.

Take a stroll along Wellington's waterfront and see the beauty of such nature-based approaches. Developed in 2006, Waitangi Park uses water-loving natives to help manage the flow of stormwater. The entire area used to be a wetland fed by the Waitangi Stream before urbanisation. It's wonderful to see this part restored to a truer version of its former self.

Further south in Christchurch is the Dudley Creek waterway. An award-winning flood remediation project run by WSP, Beca and Eos saw flooding in the creek reduced to pre-earthquake levels. Along with waterway widening and infrastructure improvements, riparian and native tree planting was a strong feature of the project, helping inhibit flood capacity at times of peak flow - also providing an inviting and accessible corridor for locals and visitors. Collaboration between technical specialists, council organisations and community was a big part of the project's success.

Dudley Creek, Christchurch



To address these challenges, it's important that urban planners and landscape architects continue to work closely with the nursery industry to keep genetic plant material diverse, and with the science community to identify and use resilient local varieties that are better able to take the knocks.

CAREFUL PLANNING NEEDED

Landscape architects are fond of saying 'right plant, right place'. Much of that is about understanding the regional significance of a plant species, its relationship to other species, and what it needs to succeed.

Walk down a major throughfare and it's likely you'll see the consequences of poor spatial planning, where the built environment and infrastructure has been prioritised over natural systems and processes. All too often, natives in urban public areas are confined to narrow strips along the perimeters of new developments – usually as an afterthought to meet minimum requirements.

It's far better to take a cue from what natives are already thriving in an area and how they function in the water cycle. These days, landscape architects are also benefitting from scientific research into naturally occurring ecosystems and what would once have been the dominant land cover.

Using more native plants in urban areas is a powerful way to create a greener and more sustainable future. So, let's prioritise the right plant for the right place and embrace the beauty and benefits of naturally occurring ecosystems, while also making things a little easier when the heavens open!



BUT IT'S NOT ALL PLAIN SAILING

There's an inherent risk in propagating any plants – let alone natives. After all, they're living organisms that survive or die. For this reason, it's important to prepare plant supply contracts well in advance – especially if 'eco-sourcing' plants, where seed is gathered from local, naturally occurring populations. This too can be tricky when you consider some projects require tens of thousands of natives and have complex construction contract arrangements.

Thanks to climate change, plants of all varieties are at risk of being exposed to more pathogens.²⁴⁹ We're already seeing this, with myrtle rust and Kauri dieback diseases running rampant. Warm, moist environments are part and parcel of climate change, and we need to prepare ourselves for the arrival of more such diseases.

CHAPTER 6.

Making it happen

IDENTIFY AREAS AT THE GREATEST RISK AND PRIORITISE SUPPORT



RECOMMENDATIONS:

- ▶ **Continue to fund work on the flood hazard and risk assessment database** in the long-term, and improve this over time.
- ▶ **Supplement the information provided by identifying the locations that will need the most support** in the short and long term.
- ▶ **Develop a national risk assessment and planning strategy prioritising the localised support needed** to mitigate flooding risks in urban areas. The strategy will need to be a living document that can change as climate change science improves and develops.

Risk assessment and adaptation planning for increased flooding need to take place both at national and local level.

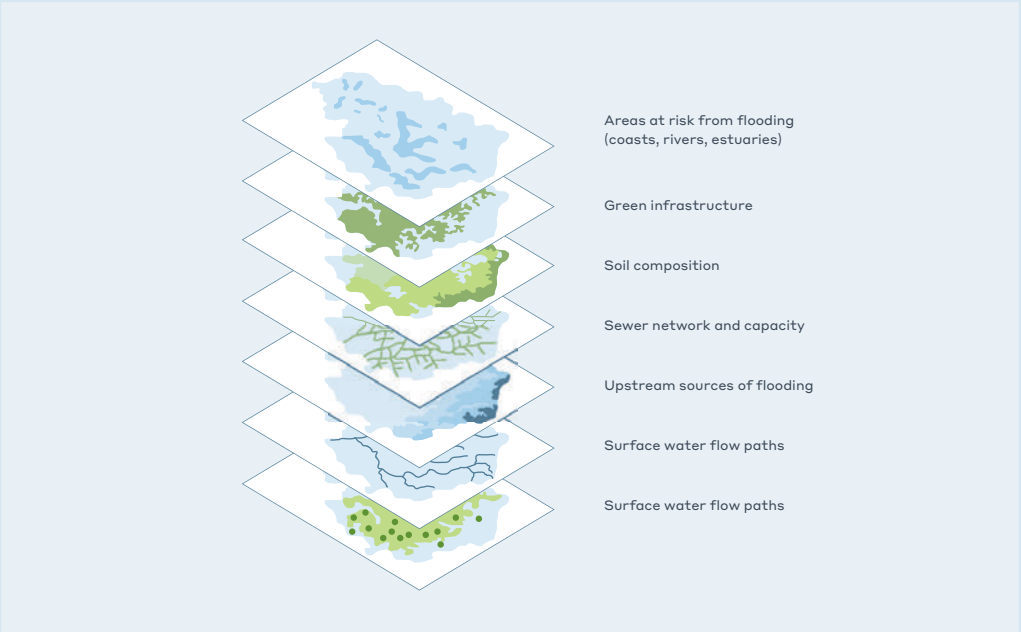
As discussed earlier in this report,

Aotearoa New Zealand does not yet have a national database that can show the relative risks of flooding in different urban areas. It is not easy to compare the risks in Dunedin with the risks in Napier, for example, nor to predict how this will change over time with climate change.

An MBIE Endeavour project currently underway is expected to provide information on flood risks now and under different climate change scenarios. The project will produce an updateable nationally consistent flood hazard and risk assessment database.²⁵¹ When completed it will provide an extremely valuable tool to help prioritise which urban areas may need more investment sooner, or other support from the national level.

However, once complete, the information provided will need to be supplemented by information from local areas about their local infrastructure, and their capacity to plan for and respond to hazards. This is not straightforward. White points to seven 'layers' of information needed to make good decisions about absorbent cities (Figure 14).

Figure 14. Different layers of knowledge needed in urban areas to become an absorbent city. Adapted from 'The Absorbent City' by Iain White.³⁹



At present, some cities may have developed many of these, whereas smaller places may have just one, or none.

Bringing this various information together, at both the national and local level, will enable comprehensive and long-term plans to be developed about which areas in Aotearoa New Zealand are particularly vulnerable, and which need additional support. This analysis will take time and require ongoing investment.

Given what is coming in terms of increasing hazards, it is essential

this risk assessment takes place and is accompanied by long-term planning as urgently as possible. As the Global Commission on Adaptation points out, making risk visible is the best way to ensure climate impacts are integrated into all planning decisions.²⁵²

Aotearoa New Zealand's first national climate change risk assessment, published in 2020, did not break down flood risks by area.²⁵³ Future risks assessments could do this as more information becomes available, and it would make sense to do so.

FUND SPONGE CITIES UPFRONT TO SAVE MONEY LATER



RECOMMENDATIONS:

- **Aim for a coordinated, comprehensive, large-scale approach** - at least in the most at-risk cities and towns. This may require co-investment between local and central government.
- **Develop and agree a national funding approach** to ensure those urban areas with the least resources are still able to prepare themselves for climate change.
- **Spread costs across stakeholders in the public and private sector** by requiring and/or incentivising practices that will reduce stormwater runoff.

Early adaptation clearly makes the most sense, financially. As mentioned in the previous chapter, the Global Commission on Adaptation concluded that early adaptation is in countries' strong economic self-interest, with an overall rate of return on investments in improved resilience showing cost-benefit ratios as high as 10:1, or higher.

Nevertheless, the costs involved are likely to be considerable. In China, billions of dollars were set aside for just a few cities.

Central government has put some thought into this already. The National Adaptation Plan includes several actions on investing in adaptation, including an action to integrate adaptation into Treasury recommendations on infrastructure (Action 4.6), and into decision-making for Waka Kotahi (Action 4.7).

Aotearoa New Zealand is rather smaller than many other places that have begun sponge city implementation. Our cities tend to be more sprawling and less densely populated. That means that the cost per capita of installing sponge city solutions could be much higher. Advantages for Aotearoa New Zealand include a better ratio of green spaces in urban areas than in many other places, thanks in large part to gardens in private residences. Maintaining and improving on these, while also addressing housing shortages, will help keep costs down.

To avoid the biggest losses in the future, Aotearoa New Zealand will need a coordinated, large-scale approach rather than a piecemeal one. This means finding ways to fund a potentially very large investment, quite soon.

Setting aside the overall total cost, preparing cities for climate adaptation is complex. That will be especially true if Aotearoa New Zealand adopts a holistic approach that aims to improve other indicators such as biodiversity and human wellbeing – essential, but not straightforward. Some of the issues to be addressed in the funding space include:

- ◆ Water catchment areas don't always align with political boundaries and associated budgets.
- ◆ A small town that may have flood risks equalling a larger one, but will have a far smaller rate base to work with
- ◆ Agencies or departments responsible for a sponge city solution may not be the agency that reaps the benefits. For example, a school may pay for a sports field designed to flood when it rains heavily, but the benefits will be felt by surrounding neighbourhoods, or a transport agency may pay for a street garden, and the local council benefits in reduced stormwater treatment costs. This makes it hard to identify who should be responsible, and makes it easier to go for cheaper but less effective options when funding decisions must be made.

- ◆ Some of the benefits of sponge city approaches not being easy to calculate – such as increased quality of life, better mental health outcomes, or a long-term contribution to biodiversity. This makes it harder to make good investment decisions.

The proposed changes under the Affordable Water Reforms programme could address some of these issues, for example by making it easier to spread costs across a bigger base of people within a region. They may however also add other layers of complexity, as the new water service entities juggle questions of jurisdiction with local councils.

What is clear from the research is that there is no silver bullet to solve the potentially very large funding gap facing councils and network operators in Aotearoa New Zealand as they prepare for climate change. In likelihood, a toolbox approach to funding will be needed, whereby costs are shared between national and local governments, the new water service entities, and the private sector (including developers, and business and house owners).²⁵⁴

The first approach at the local level should be to incentivise (or require) practices that will reduce the quantity of stormwater entering existing grey

infrastructure.²⁵⁵ This approach can help spread the costs across several stakeholders and thus reduce the costs shouldered by ratepayers.

A number of options for this were discussed in the previous chapter, and include:

- Finding incentives for private residential property owners to install swales or green roofs, or replace lawns with trees.
- Changing development practices around topsoil removal and requiring developers to leave a greater area of new developments unsealed, or to pay more towards the development of new public green spaces.
- Incentivising private investment in green infrastructure through use of tax incentives, for example, incentives (such as green branding certification) for local businesses who install bioretention devices on unused spaces of land.

Using a runoff-based stormwater fee for businesses and residential property is also a common means of funding stormwater services in the United States, Canada, United Kingdom, and Europe.²⁵⁶ Aotearoa New Zealand could consider something similar.

Other solutions proposed in the literature include:

- ‘Green-score’ accreditation schemes to encourage better green space outcomes on private land.²⁵⁷
- Land value capture - green infrastructure can increase the value of land nearby quite significantly.²⁵⁸
- Betterment charges or hypothecated rates paid by ratepayers in areas with new green infrastructure.²⁵⁹

Settling on the right options for Aotearoa New Zealand will require careful deliberation - the key point is that there are plenty of international examples to draw upon for inspiration and ideas.

Although there is potential to spread some costs in these ways, it is clear significant investment will also need to be found at both local and national government level to pay for sponge city solutions.

Although stormwater management is traditionally a local matter, the impacts of climate change are potentially so huge, and so unevenly distributed, that central government will have to play a role. Failure to do so will likely incur even greater costs down the line in compensation payments for uninsurable or destroyed homes,

or in foregone tax revenue if the social and economic impacts of climate change are as serious as anticipated. Investing in adaptation now will give Aotearoa New Zealand the best hope of a resilient future.

As one example of a way forward, regional and unitary councils recently submitted a proposal to central government suggesting a system of co-investment between local and national government to deal with risks posed by sea level rise and increasing pluvial flooding.²⁶⁰ The current government acknowledged the need for a national funding model for flood protection in a 2020 Cabinet paper. Though this has not yet been developed into policy, government has put some substantial sums towards this already.²⁶¹

One example of the Government investing in local flood mitigation efforts is the Kānoa Climate Resilience Flood Protection Programme initiative. This programme aims to develop and upgrade crucial river management and flood protection schemes via a co-investment partnership approach with central government. Through this initiative, \$312 million worth of flood resilience projects are being delivered around the country.²⁶²

The yet to be released Climate Adaptation Bill is expected to set out how funding should be split between government and local governments to recover managed relocation costs for people and businesses forced relocate due to climate change. Similar decisions will need to be made about how other types of adaptation should be funded - whether in the Bill or elsewhere.



“Climate change is expected to lead to more frequent and intense floods, and adapting to these increasing risks in the face of climate change comes with costs that can no longer be shouldered at a regional level alone”. **Te Uru Kahika** ²⁸⁰

While there is no silver bullet for funding sponge cities, there are a number of alternatives to consider. It’s clear that relying solely on local councils to fund essential infrastructure is not going to be sufficient in many places. The new regional Water Service Entities may be better funded, but in all likelihood central government will still need to play a significant role.

RISE ABOVE SILOS AND
OTHER STRUCTURAL
BARRIERS



RECOMMENDATIONS:

- **Ensure clear national leadership on nature-based sponge city implementation, supported by a cross-agency work programme.**
- **Establish a sponge city or nature-based solutions stormwater expert advisory group** at national level, to identify research and funding needs, and advise on best practice and policy approaches.
- **Establish catchment scale working groups within councils and WSEs to implement sponge city approaches,** and fund these appropriately.

While the benefits of taking a holistic, nature-based approach to flood mitigation seem unarguable given the multiple challenges our urban areas face, the real difficulty lies with putting the approach into practice.

A qualitative study in Aotearoa New Zealand, in which 46 sector professionals were interviewed, identified a number

of barriers to joint action on climate change (including uptake of nature-based solutions.²⁶³

Some of the key barriers were political and institutional in nature – issues such as institutional fragmentation (silos), inconsistency in policies, lack of governance frameworks for implementation, and lack of political will.

The way our governance is structured means functions are often siloed, both at national and local levels. One agency, or one department within a council, will be responsible for biodiversity, another for flood mitigation, another for transport, and a fourth for parks and recreation. Decisions take longer to reach where many departments must work together to achieve goals. There can be uncertainty about roles and leadership.²⁶⁴

At the same time, the practicality of flood mitigation happens at several different spatial scales, from the whole catchment (such as river dredging), down to the level of individual properties (such as requiring homeowners to install rain tanks). This again makes it harder to coordinate, as plans, policies and agencies may be focused on work within specific spatial scales.²⁶⁵

These factors make it harder to support an integrated approach

that delivers a wide variety of benefits.²⁶⁶ At the national level, this can mean best practice is incorporated in some strategies, and not others – or worse: policies conflict. At the local level, decisions can be made for the easy, cheap, or ‘known’ option – often grey infrastructure – rather than the one that will give the best outcomes over the longer term and across a wider range of indicators.

One solution at the local level, already implemented in at least one council, is to set up a cross-departmental network that brings together staff from all relevant departments to develop a collective understanding of the implications of climate change, and agree on strategy.²⁶⁷

At the national level, clear strategy and a shared vision across departments is essential, including across environment, transport, housing, and internal affairs. Reynold’s research highlighted the potential deep benefits to be gained by creating a coalition of people working on nature-based solutions who could share learning and insights, identify high priority actions to speed transition to adaptation, and identify good examples of the linkages between climate mitigation, climate adaptation and biodiversity loss.



ENCOURAGE COMMUNITY INVOLVEMENT TO ACHIEVE MORE EQUITABLE OUTCOMES



RECOMMENDATION:

- **Encourage community involvement** in nature-based solutions and climate resilience initiatives. Ensure voices that are typically under-represented are heard.

The impacts of increased flooding on individuals within urban areas, and their ability to adapt to or cope with those changes will be uneven, and will likely reflect existing inequalities. Some people will be disproportionately affected by financial impacts, or lack the resources to adapt – such as low-income and beneficiary households. Others will have specific adaptation needs – such as older people and disabled people.²⁶⁸

Involving communities in decision making around sponge city approaches to climate adaptation will be a long-term process, rather than a one-off.²⁶⁹ Councils and the new water service entities will need to be confident that when they engage they are hearing from

communities that are most at-risk, and that the community has sufficient trust, confidence and capacity to respond.



“At all levels disaster prevention measures are regularly designed without engaging the insights, wisdom and capacities of local and diverse communities. As a result, we all suffer from a less informed, less inclusive and ultimately less effective approach to reducing disaster risk.” **IFRC Under Secretary General Xavier Castellanos.**²⁸¹

IMPROVE ACCESS TO GOOD INFORMATION



RECOMMENDATIONS:

- **Create a nature-based sponge city information portal** – a one-stop shop for decision-makers who want to understand the science, identify their risks, and learn what to do about it.
- **Invest in public and professional education** on the need to adapt and the potential of nature-based solutions.

Reynolds identifies a clear need in Aotearoa New Zealand for better tools (for example to compare options), clearer science (for example on the value of biodiversity), and consolidation of current evidence and knowledge about why to favour nature-based solutions, and how to do it.²⁷⁰

A lack of quality information on nature-based solutions, including their suitability and application in different contexts, can hamper innovation and risk taking from decision-makers, including planners, engineers, private land-owners, councils, and political decision-makers.²⁷¹ Because the evidence base for blue-green

infrastructure, while compelling, is still being developed, there is still a widespread lack of knowledge, awareness and recognition of its potential.²⁷²

An example of good practice in this area is Naturvation, funded by the European Commission.²⁷³ Naturvation is an online toolbox that promotes the use of nature-based solutions in urban environments as an alternative to grey infrastructure and technology-driven solutions. The tool sets out information for local authorities in Europe, including how to finance projects, promote innovation, learn from international research and engage with communities.

A similar toolbox for Aotearoa New Zealand could help decision-makers be less wary of trying something new. Ideally, a database with information about flood risks across the country would also provide information on best practice solutions, as part of a one-stop shop. This could potentially sit alongside the information portal for climate adaptation proposed under the national adaptation plan.²⁷⁴

Alongside better information, there is a need for education and professional development on nature-based solutions across a range of sectors to help mainstream the approach.²⁷⁵

The general public will also need to be educated on the need for these approaches, to develop buy-in over the long term, to make it politically palatable to spend what needs to be spent and to ensure communities are able to consult on issues from a degree of knowledge.

Pittsburg, Pennsylvania USA



INVEST IN RESEARCH AND DEVELOPMENT



RECOMMENDATIONS:

- **Invest in research and development** to help prepare for climate change, and help choose the most appropriate sponge city solutions for each location.
- **Invest in further development and standardisation of tools** that can assess whole of life costs and incorporate non-monetary benefits.

Moore et al. highlight a number of gaps in Aotearoa New Zealand research that, if filled, could help prompt better uptake of sponge city approaches.²⁷⁶ Future areas of research could include the best ways for councils to incentivise the uptake of green infrastructure, the role of green solutions in climate change adaptation and/or mitigation, tools that can help select and prioritise the best approach for a specific location, and the potential for public health economics to contribute to a more comprehensive assessment of the benefits of WSUD.

Investing in research and development could also help Aotearoa New Zealand make

better and more effective decisions about flood-related climate adaptation. Better technologies and tools could help us assess the performance of different sponge city solutions across multiple potential climate scenarios, for example, or help measure and evaluate the cost-benefit (including the non-financial benefits) of those solutions.

As one high-tech example, creating 'digital twins' of cities shows good promise as a technology to help us map risks and choose the best solutions in different scenarios.²⁷⁷ A digital twin is a dynamic digital representation of the built and natural environment that can be used to plan, visualise, report on and control assets and operations.²⁷⁸ Creating a digital twin of a city can help us to understand what is happening in terms of stormwater management, what is likely to happen in different future scenarios and then model potential solutions in terms of effectiveness. A digital twin has already been developed for Wellington, though it doesn't yet cover weather-related information.

Conclusion

AOTEAROA NEW ZEALAND, ALONG WITH MANY OTHER COUNTRIES, IS FACING CLIMATE AND BIODIVERSITY CRISES. THIS REPORT HAS EXAMINED JUST ONE ASPECT OF THE IMPACTS THESE CRISES WILL CAUSE - RAINFALL, AND THE CERTAINTY THAT THIS WILL INCREASE IN BOTH FREQUENCY AND INTENSITY OVER TIME. WHILE SOME TOWNS WILL BECOME WETTER, AND OTHERS DRIER, ALL ARE LIKELY TO EXPERIENCE MORE EXTREME PRECIPITATION EVENTS, AND ALL NEED TO BE MAKING PLANS NOW ON HOW THEY INTEND TO MANAGE THIS.

It is the clear recommendation of this report that Aotearoa New Zealand cities need to become sponge cities. Nature-based sponge city approaches provide a promising way to help conceptualise and coordinate the work that urgently needs to be done to prepare for the impacts of climate change. While sponge cities are a relatively new concept, the ideas behind them are not, and there is good evidence to support the approaches they propose. They are also compelling from a cost-benefit point of view.

Adopting this approach will not be straightforward, and nor will it be cheap. However, in many places there will be no real alternative as the cost of enhancing the capacity of our pipes to deal with increasing water load becomes ever more prohibitive. The evidence strongly suggests that failing to prepare will be considerably more expensive. Perhaps, even more importantly, failing to act now will lead to multiple heartbreaks as people needlessly lose their homes and businesses.

The vulnerability of cities to intense and increasing rainfall – and the potential of sponge city approaches to reduce risk and improve resilience – are both high in the public consciousness following major rain events during 2023. This awareness, combined with multiple regulatory reform processes currently underway, presents an important opportunity to kickstart sponge city approaches in Aotearoa New Zealand.

Endnotes

1 Lloyds and CEBR. A World at Risk: Closing the Insurance Gap. United Kingdom: Lloyds and CEBR, 2018.

2 Ministry for the Environment. Meeting the Challenges of Future Flooding in New Zealand. Wellington: Ministry for the Environment, 2008.

3 Te Uru Kahika/Regional and Unitary Councils Aotearoa. Before the Deluge: Building Flood Resilience in Aotearoa. New Zealand: Te Uru Kahika/Regional and Unitary Councils Aotearoa, 2022.

4 "

5 Intergovernmental Panel on Climate Change. "Summary for Policy Makers". In Climate Change 2023: Synthesis Report. A Report of the Intergovernmental Panel on Climate Change (2023).

6 "

7 "

8 "

9 Ministry for the Environment. Aotearoa New Zealand's First National Adaptation Plan. Wellington: Ministry for the Environment, 2022.

10 "

11 Ministry for the Environment. National Climate Change Risk Assessment for Aotearoa New Zealand: Main Report. Wellington: Ministry for the Environment, 2020.

12 "

13 "

14 Insurance Council of New Zealand. "Cost of Natural Disasters Table". Accessed 30 May 2023. <https://www.icnz.org.nz/industry/cost-of-natural-disasters/>.

15 Insurance Council of New Zealand. "2022 Confirmed as Record Year for Climate Claims (Press Release)". 12 April 2023. <https://www.icnz.org.nz/industry/media-releases/2022-confirmed-as-record-year-for-climate-claims/>.

16 NIWA. "Auckland Suffers Wettest Month in History". Accessed 20 May 2023. <https://niwa.co.nz/news/auckland-suffers-wettest-month-in-history>.

17 Olivia Wannan. "Climate Change Supercharged Cyclone Gabrielle. By How Much Remains Unknown." Stuff 15 March 2023. https://www.stuff.co.nz/environment/climate-news/131488716/climate-change-supercharged-cyclone-gabrielle-by-how-much-remains-unknown?rm=a&cx_rm-ctrl=true.

18 Insurance Council of New Zealand. "\$395.3 Million of \$2.47 Bn of 2023 Climate Claims Settled." April 4 2023. <https://www.icnz.org.nz/industry/media-releases/aaw-and-cg-1-april-update/>.

19 Ministry for the Environment. Climate Change Projections for New Zealand. Atmospheric Projections Based on Simulations Undertaken for the Ipcc 5th Assessment 2nd Edition. Wellington: Ministry for the Environment, 2018.

20 Ministry for the Environment, Aotearoa New Zealand's First National Adaptation Plan, 2022.

21 "

22 Ministry for the Environment, Aotearoa New Zealand's First National Adaptation Plan, 2022.

23 Krystal Gibbens. "More Than 400,000 Residential Buildings in Flood Prone Areas." RNZ, . 5 July 2023. <https://www.rnz.co.nz/news/national/493223/more-than-400-000-residential-buildings-in-flood-prone-areas>.

24 Ministry for the Environment, Aotearoa New Zealand's First National Adaptation Plan, 2022.

25 Ministry for the Environment. National Policy Statement for Freshwater Management 2020. Wellington: Ministry for the Environment, 2023.

26 Intergovernmental Panel on Climate Change, "Summary for Policy Makers", (2023).

27 Te Rina Kowhai. "Māori Cultural Sites among Most Vulnerable to Climate Change, Rising Sea Levels." Newshub. 8 May 2022. <https://www.newshub.co.nz/home/new-zealand/2022/05/m-ori-cultural-sites-among-most-vulnerable-to-climate-change-rising-sea-levels.html>.

28 Ministry for the Environment, National Policy Statement for Freshwater Management 2020.

29 International Institute for Sustainable Development. Summary Report: High-Level Meeting on the Midterm Review of the Sendai Framework for Disaster Risk Reduction 2015–2030. United Nations Office for Disaster Risk Reduction, 2023, <https://sendaiframework-mtr.undrr.org/news/summary-report-17-19-may-2023-high-level-meeting-midterm-review-sendai-framework>.

30 Suzanne Phipps and Christine Kenney. "Indigenous Responses to Environmental Hazard Events." In Routledge Handbook of Environmental Hazards and Society. Milton Park: Routledge. 2022.

31 NIWA, "Our Future Climate in New Zealand: Local Charts".

32 NIWA. "High Intensity Rainfall Design System V4". Accessed 30 June 2023. <https://hirds.niwa.co.nz/>.

33 Emily Lane. "Project Overview - Increasing Flood Resilience across Aotearoa. Power Point Presentation". NIWA 2 November 2022. <https://niwa.co.nz/sites/niwa.co.nz/files/Project%20Overview%20Nov2022.pdf>.

34 Juliana Reu Junqueira, Silvia Serrao-Neumann, and Iain White. "Managing Urban Climate Change Risks: Prospects for Using Green Infrastructure to Increase Urban Resilience to Floods." In The Impacts of Climate Change. A Comprehensive Study of Physical, Biophysical, Social and Political Issues. Bath: Elsevier. 2021.

35 Lucy Oates, et al. "Building Climate Resilience and Water Security in Cities: Lessons from the Sponge City of Wuhan, China". In Coalition for Urban Transitions (2020). <https://urbantransitions.global/wp-content/uploads/2020/03/Building-climate-resilience-and-water-security-in-cities-lessons-from-the-Sponge-City-of-Wuhan-China-final.pdf>.

36 Jamie Morton. "Analysis: The Three Biggest Lessons from Auckland's Historic Floods." NZ Herald. 2 February 2023. <https://www.nzherald.co.nz/nz/analysis-the-three-biggest-lessons-from-aucklands-historic-floods/SKKD6HGILZENPMN2WK5Q3MP4/>.

37 Department of Internal Affairs. "Water Services Reform Programme: Frequently Asked Questions". Accessed 20 July 2023. <https://www.dia.govt.nz/three-waters-reform-programme-frequently-asked-questions#:~:text=it's%20estimated%20that%20%24120%2D%24,meet%20health%20and%20environmental%20standards>.

38 Morton, "Analysis: The Three Biggest Lessons from Auckland's Historic Floods."

39 Iain White. "The Absorbent City: Urban Form and Flood Risk Management". In Urban Design and Planning 161, (2008).

40 Joel MacManus. "Reimagining Wellington: Bringing the Capital's Streams Back to Life and Light." Stuff NZ. 18 December 2021. <https://www.stuff.co.nz/domain-post/wellington/127211689/reimagining-wellington-bringing-the-capitals-streams-back-to-life-and-light>.

41 Junqueira, Serrao-Neumann, and White, "Managing Urban Climate Change Risks."

42 Parliamentary Commissioner for the Environment. Are We Building Harder, Hotter Cities? 2023.

43 "

44 John Herald. "Pointing the Way to Reducing Stormwater Impacts on Urban Streams". Landcare Research Accessed 14 July 2023. <https://www.landcareresearch.co.nz/uploads/public/researchpubs/HeraldH30.pdf>.

45 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

46 "

47 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

48 "

49 Timothy Welch. "Green Space Getting the Red Light as Demand for Housing Rises." RNZ, . 16 March 2023. <https://www.rnz.co.nz/news/national/486120/green-space-getting-the-red-light-as-demand-for>

housing-rises.

50 Global Forest Watch. "Interactive Charts". Accessed 15 June 2023. <https://globalforestwatch.org/dashboards/>.

51 ScienceDaily. "What's the Annual Value of Trees? \$500 Million Per Megacity, Study Says: Researchers Focus on 10 Cities on 5 Continents". Accessed 18 June 2023. www.sciencedaily.com/releases/2017/08/170822104849.htm.

52 Kyeezu Kim, et al. "Inequalities in Urban Greenness and Epigenetic Aging: Different Associations by Race and Neighborhood Socioeconomic Status". In Science advances 9, no. 26, (2023). <https://doi.org/10.1126/sciadv.adf8140>.

53 Scion. "Forest Spenges: New Research Reveals How Forests Absorb Water in Extreme Weather (Press Release)". 9 June 2023. <https://www.scionresearch.com/about-us/news-and-events/news/2023-news-and-media-releases/forest-sponges-new-research-reveals-how-forests-absorb-water-in-extreme-weather-events>.

54 E. Scott Krayenhoff, et al. "Cooling Hot Cities: A Systematic and Critical Review of the Numerical Modelling Literature". In Environmental Research Letters 16, no. 5, (2021). <https://doi.org/10.1088/1748-9326/abdcf1>.

55 Jo-Anne E. Cavanagh and Janine Clemons. "Do Urban Forests Enhance Air Quality?". In Australasian Journal of Environmental Management 13:2, (2006). <https://doi.org/10.1080/14486563.2006.9725122>, <https://www.tandfonline.com/doi/ff/10.1080/14486563.2006.9725122?needAccess=true>.

56 Stats NZ. "National Population Projections: 2022(Base)–2073". Accessed 1 July 2023. <https://www.stats.govt.nz/information-releases/national-population-projections-2022base2073/>.

57 Holly Walker. Nau Mai. Welcome Home. Can Aotearoa New Zealand Meet the Needs of Our Diaspora, Attract Some of Them Home, and Prepare for the Treands of a Post-Pandemic Future? The Helen Clark Foundation and WSP New Zealand, August 2021.

58 Ministry for the Environment. Meeting the Challenges of Future Flooding in New Zealand. Wellington: Ministry for the Environment, 2008.

59 NIWA. "Our Future Climate in New Zealand: Local Charts". Accessed 30 June 2023. <https://ofcnz.niwa.co.nz/#/localCharts>.

60 NIWA. "Auckland Suffers Wettest Month in History". Accessed 20 May 2023. <https://niwa.co.nz/news/auckland-suffers-wettest-month-in-history>.

61 Ministry for the Environment & Stats NZ. New Zealand's Environmental Reporting Series: Our Atmosphere and Climate 2020. Wellington: Ministry for the Environment, 2020.

62 White, "The Absorbent City" (2008).

63 B Martin, et al. Quantifying the Historical Evolution of Green Space in New Zealand's Cities. Palmerston North: Manaaki Whenua/Landcare Research, 2022.

64 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

65 Cameron Moore. "Backyard Death in Auckland". In X-Section 7, (2017). <https://hdl.handle.net/10652/4278>.

66 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

67 Parliamentary Commissioner for the Environment. "Aotearoa's Cities Are Losing Their Leaves". <https://storymaps.arcgis.com/stories/e3f4c7a2f8534d4e877d140ec209514c>.

68 Kongjian Yu. "The Sponge City: Planning, Design and Political Design". In African Journal of Landscape Architecture no. 2, Article 2, (2021). <https://www.ajlajournal.org/articles/the-sponge-city-planning-design-and-political-design>.

69 Peter Yeung. "Cities Are Becoming More Like Sponges." Reasons to be Cheerful. 2023. <https://reasonstobecherful.world/sponge-cities-china-climate-change-resilience/>.

70 "

71 Oates et al., "Building Climate Resilience and Water Security in Cities", (2020).

72 Yong Jiang, Chris Zevenbergen, and

Yongchi Ma. "Urban Pluvial Flooding and Stormwater Management: A Contemporary Review of China's Challenges and 'Sponge Cities' Strategy". In Environmental Science and Policy 80, (2018). <https://doi.org/https://doi.org/10.1016/j.envsci.2017.11.016>.

73 Yu-Tong Shao and Kevin Sheng-Kai Ma. "Sponge City as a Civil Engineering Solution to Climate Change That Improves Urban Flood Resilience". In E-Health and Bioengineering Conference, (E2022). <https://doi.org/10.1109/EHB55594.2022.9991281>.

74 Yu, "The Sponge City: Planning, Design and Political Design", (2021).

75 Anna Zaręba, Alicja Krzemińska, Mariusz Adnykiewicz-Piragas, Krzysztof Widawski, Dan van der Horst, Francisco Grijalva, and Rogelio Monreal. "Water Oriented City—a '5 Scales' System of Blue and Green Infrastructure in Sponge Cities Supporting the Retention of the Urban Fabric". In Water 14, No. 24 (2022). <https://doi.org/https://doi.org/10.3390/w14244070>.

76 Jie Han, et al. "China's Sponge Cities Alleviate Urban Flooding and Water Shortage: A Review". In ENVIRONMENTAL CHEMISTRY LETTERS (2023). <https://doi.org/10.1007/s10311-022-01559-x>.

77 Zaręba, "Water Oriented City", (2022).

78 "

79 Oates et al., "Building Climate Resilience and Water Security in Cities", (2020).

80 Yu, "The Sponge City: Planning, Design and Political Design", (2021).

81 Robert C. Brears. "Exploring the Differences between Nature-Based Stormwater Management Approaches: A Comparison of BGI, GI, WSUD, SUDS, LID, ABC Waters, and Sponge Cities". Medium 15 February 2022. <https://medium.com/mark-and-focus/exploring-the-differences-between-nature-based-stormwater-management-approaches-a-comparison-of-b282e3c8f962>.

82 Dr Emily Afoa and Troy Brockbank. "Te Ao Māori & Water Sensitive Urban Design". In Activating WSUD Aotearoa NZ. National Science Challenge (2019). <https://www.landcareresearch.co.nz/discover-our-research/environment/sustainable-society-and-policy/activating-water-sensitive-urban-design-for-healthy-resilient-communities/research-outputs/>.

83 Brears, "Exploring the Differences between Nature-Based Stormwater Management Approaches".

84 Darren N. T. King, James Goff, and Apanui Skipper. "Māori Environmental Knowledge and Natural Hazards in Aotearoa New Zealand". In Journal of the Royal Society of New Zealand 37, no. 2, (2007). <https://doi.org/10.1080/03014220709510536>.

85 Robert McGowan. Mauri Tū! Mauri Ora! Māori Perspectives on Exotic Plants in Aotearoa. Wellington: Parliamentary Commissioner for the Environment, 2021.

86 Phyllis Callaghan, et al. "Tuākana/Teina Water Warriors Project: A Collaborative Learning Model Integrating Mātauranga Māori and Science". In New Zealand Journal of Marine and Freshwater Research 52, no. 4, (2018). <https://doi.org/10.1080/00288330.2018.1509880>.

87 Dr Emily Afoa and Troy Brockbank, "Te Ao Māori & Water Sensitive Urban Design", (2019).

88 McGowan, Mauri Tū! Mauri Ora! , 2021.

89 Dr Emily Afoa and Troy Brockbank, "Te Ao Māori & Water Sensitive Urban Design", (2019).

90 E.M.K. Douglas. Waiora, Waikino, Waimate, Waitai: Maori Perceptions of Water and the Environment. Occasional Paper No. 27. Hamilton: University of Waikato Centre for Maori Studies and Research, 1984.

91 M Lewis, et al. Landscape and Ecology Values within Stormwater Management. Auckland: Boffa Miskell for Auckland Regional Council, 2010.

92 E.M.K. Douglas, Waiora, Waikino, Waimate, Waitai: Maori Perceptions of Water and the Environment. Occasional Paper No. 27, 1984.

93 Dr Emily Afoa and Troy Brockbank, "Te Ao Māori & Water Sensitive Urban Design", (2019).

94 Eke Panuku Development Auckland.

"Te Whakaoranga O Te Puhinui Regeneration". Accessed 20 July 2023. <https://www.ekepanuku.co.nz/projects/te-whakaoranga-o-te-puhinui/>.

95 IUCN. "Nature-Based Solutions". Accessed 5 June 2023. <https://www.iucn.org/our-work/nature-based-solutions>.

96 Gisborne District Council. "Millions to Help Restore Our Urban Waterways (Press Release)." Scoop. 18 February 2022. <https://www.scoop.co.nz/stories/AK2202/S00370/millions-to-help-restore-our-urban-waterways.htm>.

97 Reimagining Mataura. "Reimagining Mataura: Key Objectives and Goals.". Accessed 15 July 2023. <https://www.reimaginingmataura.org.nz/>.

98 "More Rain Expected to Batter the Far North." Te Hiku Media,. 5 May 2023. <https://tehiku.nz/te-hiku-radio/tautinei/35791/more-rain-expected-to-batter-the-far-north>.

99 "Reducing Sediment to Restore and Protect Rare Wetlands in Wairua". Living Water, Accessed 22 July 2023. <https://www.livingwater.net.nz/catchment/wairua-river-te-awa-o-wairua/reducing-sediment-to-restore-and-protect/>.

100 Te Toi Whakaruruhau o Aotearoa. "Te Toi Whakaruruhau O Aotearoa". Accessed 16 July 2023. <https://www.tetoihakaruruhau.co.nz/>.

101 Han et al., "China's Sponge Cities Alleviate Urban Flooding and Water Shortage: A Review", (2023).

102 Yu-Tong Shao and Kevin Sheng-Kai Ma, "Sponge City as a Civil Engineering Solution to Climate Change That Improves Urban Flood Resilience", (2022).

103 Yeung, "Cities Are Becoming More Like Sponges."

104 Han et al., "China's Sponge Cities Alleviate Urban Flooding and Water Shortage: A Review", (2023).

105 G. Fu, et al. "Are Sponge Cities the Solution to China's Growing Urban Flooding Problems?". In Wiley Interdisciplinary Reviews: Water 10, no. 1, (2023). <https://doi.org/10.1002/wat2.1613>.

106 Intergovernmental Panel on Climate Change, "Summary for Policy Makers", (2023).

107 Juliana Reu Junqueira, Silvia Serrao-Neumann, and Iain White. "Using Green Infrastructure as a Social Equity Approach to Reduce Flood Risks and Address Climate Change Impacts: A Comparison of Performance between Cities and Towns ". In Cities. The International Journal of Urban Policy and Planning, 131, (2022).

108 Arup Global. Global Sponge Cities Snapshot. London: Arup, 2022.

109 European Environment Agency. Nature-Based Solutions in Europe: Policy, Knowledge and Practice for Climate Change Adaptation and Disaster Risk Reduction. 2021, <https://www.eea.europa.eu/publications/nature-based-solutions-in-europe>.

110 "

111 Logan Samuelson. "Giving Light to the Waimapihi. The Challenges of Governance and Policy for Daylighting Urban Streams in Aotearoa New Zealand". In Policy Quarterly 18, no. 1, (2022).

112 MacManus, "Reimagining Wellington: Bringing the Capital's Streams Back to Life and Light."

113 L. Khirfan, N. Mohtat, and M. Peck. "A Systematic Literature Review and Content Analysis Combination to "Shed Some Light" on Stream Daylighting (Deculverting)". Article, In Water Security 10, (2020). <https://doi.org/10.1016/j.wasec.2020.100067>.

114 Auckland Council. "Stream Daylighting". Auckland Design Manual. Water Sensitive Design, Auckland Council 2023. <https://www.aucklanddesignmanual.co.nz/regulations/technical-guidance/wsd/guidance/conceptdesign/enhancingthereceivingenvironment/streamdaylighting>.

115 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

116 Finance and Expenditure Committee. Water Services Legislation Bill: Select Comittee Report. Wellington, June 2023, <https://selectcommittees.parliament.nz/v/>

SelectCommitteeReport/e0cc99c4-e3ee-477f-ba9a-08db67a57cd8.

117 Yeung, "Cities Are Becoming More Like Sponges."

118 Yu, "The Sponge City: Planning, Design and Political Design", (2021).

119 Iain White. "The Absorbent City", (2008).

120 Auckland Council. Managing Overland Flow. Auckland Council Auckland, n.d.

121 Ellen Rykers. "When Your Footy Field Is Also a Flood Basin." The Spinoff. Online 26 June 2023. <https://thespinoff.co.nz/science/26-06-2023/when-your-footy-field-is-also-a-flood-basin>.

122 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

123 United States Environmental Protection Agency. "Protecting Water Quality from Urban Runoff". Accessed 20 May 2023. https://www3.epa.gov/npdes/pubs/nps_urban-facts_final.pdf.

124 F Aram, et al. "Urban Green Space Cooling Effect in Cities". In Heliyon Apr 8; 5(4):e01339, (2019). <https://doi.org/10.1016/j.heliyon.2019.e01339>. PMID: 31008380; PMCID: PMC6458494., <https://pubmed.ncbi.nlm.nih.gov/31008380/>.

125 Junqueira, Serrao-Neumann, and White, "Managing Urban Climate Change Risks."

126 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

127 "

128 J Moores, et al. WSUD Can Be Cost-Effective and Low-Maintenance, Not to Mention All the Other Benefits. 2019, https://www.waternz.org.nz/achment?Action=Download&Attachment_id=3823

129 World Health Organization. Urban Green Space Interventions and Health. A Review of Impacts and Effectiveness. 2017, https://cdn.who.int/media/docs/librariesprovider2/euro-health-topics/environment/urban-green-space-intervention.pdf?sfvrsn=a2e135f3_1&download=true.

130 Arup Global. Global Sponge Cities Snapshot. London: Arup, 2022.

131 Anna Salleh. "Nature-Based Solutions, and How Countries Like Singapore and the Netherlands Are Using Them to Fight Floods." ABC Science. 27 April 2022. <https://www.abc.net.au/news/science/2022-04-27/flood-mitigation-lismore-nature-based-solutions-singapore/101004622>.

132 Smart Water Magazine. "Building Singapore's Flood Resilience in a Changing Climate." 9 January 2023.

133 Sue Ira and Robyn Simcock. Understanding Costs and Maintenance of WSUD in New Zealand. Activating WSUD for Healthy Resilient Communities. 2019.

134 Auckland Transport. Bioretention Planting Guide, 2021, <https://at.govt.nz/media/1991233/auckland-transport-bioretention-planting-guide-version-one-may-2021.pdf>.

135 River Sands Pty Ltd. "Understanding Bioretention Systems". 22 September 2020. <https://www.riversands.com.au/understanding-bioretention-systems/>.

136 Piyush Malaviya, Rozi Sharma, and Pradeep Kumar Sharma. "Raingardens as Stormwater Management Tool." In Sustainable Green Technologies for Environmental Management. February 2019.

137 Lewis et al., Landscape and Ecology Values within Stormwater Management, 2010.

138 Matthew Bradbury, Water City : Practical Strategies for Climate Change Abingdon, Oxon ; New York, NY: Routledge, 2021.

139 Z. Ling, L. Peng, and H. Wen. "Comparison on the Stormwater Runoff Effects of Roof Greening in Different Urban Functional Areas". In Ying Yong Sheng Tai Xue Bao 34, no. 2, (2023). <https://doi.org/10.13287/j.1001-9332.202303.019>.

140 Upper Midwest Water Science Centre. "Evaluating the Potential Benefits of Permeable Pavement on the Quantity and Quality of Stormwater Runoff ". March 17 2019. <https://www.usgs.gov/centers/upper-midwest-water-science-center/science/evaluating-potential-benefits-permeable-pavement#overview>.

141 Junsong Wang, et al. "Performance

Synergism of Pervious Pavement on Stormwater Management and Urban Heat Island Mitigation: A Review of Its Benefits, Key Parameters, and Co-Benefits Approach". In Water Research 221, (2022). <https://doi.org/10.1016/j.watres.2022.118755>.

142 Ksenia I. Aleksandrova, Wendy J McWilliam, and Andreas Wesener. "Status and Future Directions for Residential Street Infrastructure Retrofit Research". In Urban Science (2019). <https://researcharchive.lincoln.ac.nz/bitstream/handle/10182/10675/urbansci-03-00049.pdf?sequence=1&isAllowed=y>.

143 Severn Trent Water. "Doing Right by Our Water: Reducing Flood Risk in Mansfield". Accessed 30 June 2023. <https://www.stwater.co.uk/wonderful-on-tap/green-recovery/mansfield-sustainable-flood-resilience/>.

144 Yu, "The Sponge City: Planning, Design and Political Design", (2021).

145 Kia Kaha Te Reo Maori and Water NZ. "Ngā Momo Wai". 2018. https://www.waternz.org.nz/achment?Action=Download&Attachment_id=3346.

146 Yu, "The Sponge City: Planning, Design and Political Design", (2021).

147 "

148 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

149 International Institute for Sustainable Development, Summary Report, 2023.

150 Ministry for the Environment, Aotearoa New Zealand's First National Adaptation Plan, 2022, Action 5.16.

151 New Zealand Government. "Wellbeing Budget 2023. Support for Today. Building for Tomorrow.". New Zealand Government 18 May 2023. <https://budget.govt.nz/budget/pdfs/wellbeing-budget/b23-wellbeing-budget.pdf>.

152 Abbie Reynolds. Twin Crises, Many Solutions. The Barriers to Addressing Climate Change and Biodiversity Loss Together. Next Foundation, 2023.

153 Ira and Simcock, Understanding Costs and Maintenance of WSUD in New Zealand, 2019.

154 Cabinet Economic Development Committee. Minute of Decision. Improving Resilience to Flood Risk and Supporting the Covid-19 Recovery. Wellington: New Zealand Government, 1 July 2020.

155 Gibbens, "More Than 400,000 Residential Buildings in Flood Prone Areas."

156 Stormwater Technical Working Group. Proposed Approach to the Transfer of Stormwater Functions and Delivery to New Water Service Entities 2021, [https://www.dia.govt.nz/diawebsite.nsf/Files/Three-waters-reform-programme/\\$file/stormwater-technical-working-group-transition-plan-report-25-august-2021.pdf](https://www.dia.govt.nz/diawebsite.nsf/Files/Three-waters-reform-programme/$file/stormwater-technical-working-group-transition-plan-report-25-august-2021.pdf).

157 Tim Murphy. "Auckland's Anti-Flooding Plan Now 'on Steroids'" 24 May 2023. https://www.newsroom.co.nz/aucklands-anti-flooding-plan-now-on-steroids?utm_source=Newsroom&utm_campaign=ab288d9235-Daily_Briefing+24.05.2023&utm_medium=email&utm_term=0_71de5c4b35-ab288d9235-97981517.

158 Auckland Council. "Mayor Supports 'Making Space for Water'". 17 May 2023. <https://ourauckland.aucklandcouncil.govt.nz/news/2023/05/mayor-supports-making-space-for-water/>.

159 Rob Stock. "Government's Buyout Plan 'Hope-Inducing,' Owners of Flooded Homes Say." Stuff NZ. 01 June 2023. <https://www.stuff.co.nz/business/132208092/governments-buyout-plan-hopeinducing-owners-of-flooded-homes-say>.

160 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

161 Ministry for the Environment, National Policy Statement for Freshwater Management 2020.

162 Reynolds, Twin Crises, Many Solutions, 2023.

163 Giles Dexter. "Climate Change Minister's Legislative Balancing Act after Gabrielle." RNZ. 20 February 2023. <https://www.rnz.co.nz/news/national/484507/climate-change-minister-s-legislative-balancing-act-after-gabrielle>.

164 National Party. "National Will Repeal RMA 2.0 Bills". 27 June 2023. https://www.national.org.nz/national_will_repeal_rma_2_0_bills.

165 Water Services Reform Programme. "Stormwater". Accessed 30 July 2023. <https://www.waterservicesreform.govt.nz/the-case-for-change/stormwater/>.

166 "

167 Stormwater Technical Working Group, Proposed Approach to the Transfer of Stormwater Functions and Delivery to New Water Service Entities 2021.

168 Finance and Expenditure Committee, Water Services Legislation Bill: Select Committee Report, June 2023. (Differing view from the Green Party).

169 Global Commission on Adaptation. Adapt Now: A Global Call for Leadership on Climate Resilience. 2019.

170 Ministry for the Environment, Aotearoa New Zealand's First National Adaptation Plan, 2022, Action 5.9.

171 NIWA, "Auckland Suffers Wettest Month in History".

172 Julia Gabel and Chris Knox. "Auckland Floods - Interactive Map: How Hard Was Your Suburb Hit? ." NZ Herald. 5 February 2023. <https://www.nzherald.co.nz/nz/auckland-floods-interactive-map-how-hard-was-your-suburb-hit/OZZ3SVMVFUENBES7C2X2ANQFME/>.

173 Fu et al., "Are Sponge Cities the Solution to China's Growing Urban Flooding Problems?", (2023).

174 WaterSmart. "How One Suburb Made It through Severe Flooding, When Those around Were Hit Hard (Press Release)". 12 February 2023. <https://www.scoop.co.nz/stories/BU2302/S00138/how-one-suburb-made-it-through-severe-flooding-when-those-around-were-hit-hard.htm>.

175 Auckland Council. "Rain Drain: Northcote's New Stormwater Infrastructure Tested to the Max". Auckland Council 7 February 2023. <https://ourauckland.aucklandcouncil.govt.nz/news/2023/02/rain-drain-northcote-s-new-stormwater-infrastructure-tested-to-the-max/>.

176 Connor Whitten. "Are Flood Protections Putting New Zealanders at Greater Risk?" 1 News. 5 March 2023. <https://www.1news.co.nz/2023/03/06/are-flood-protections-putting-new-zealanders-at-greater-risk/>.

177 Iain White, "The Absorbent City", (2008).

178 Moores et al., WSUD Can Be Cost-Effective and Low-Maintenance, 2019.

179 Global Commission on Adaptation, Adapt Now: A Global Call for Leadership on Climate Resilience, 2019.

180 Oates et al., "Building Climate Resilience and Water Security in Cities", (2020).

181 Kim Harrisberg. "Are 'Sponge Cities' Enough to Curb Climate-Fueled Floods?" Thomson Reuters. 19 April 2023. <https://www.reuters.com/article/safrica-climate-change-floods/feature-are-sponge-cities-enough-to-curb-climate-fuelled-floods-idINL8N34V61O>.

182 Moores et al., WSUD Can Be Cost-Effective and Low-Maintenance, 2019.

183 Ara Associates. "Kirimoko Park (Wanaka)". Accessed 30 June 2023. <https://www.arassociates.co.nz/kirimoko-park>.

184 Moores et al., WSUD Can Be Cost-Effective and Low-Maintenance, 2019.

185 Ira and Simcock, Understanding Costs and Maintenance of WSUD in New Zealand, 2019.

186 Junqueira, Serrao-Neumann, and White, "Managing Urban Climate Change Risks."

187 Ira and Simcock, Understanding Costs and Maintenance of WSUD in New Zealand, 2019.

188 Moores et al., WSUD Can Be Cost-Effective and Low-Maintenance, 2019.

189 James Griffiths, et al. "Interpretation and Application of Sponge City Guidelines in China". In Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences 378, no. 2168, (2020). <https://doi.org/doi:10.1098/rsta.2019.0222>.

190 Global Commission on Adaptation, Adapt Now: A Global Call for Leadership on Climate Resilience, 2019.

191 Ministry for the Environment, Aotearoa New Zealand's First National Adaptation Plan, 2022.

192 Resilient Cities Network. "Climate Resilient Cities". Accessed 15 July 2023. <https://resilientcitiesnetwork.org/climate-resilient-cities/>.

193 "

194 Ihirangi. Insight to the Rauora Indigenous Worldview Framework for the National Climate Change Adaptation Plan. Wellington: Ministry for the Environment, 2 March 2021, <https://environment.govt.nz/assets/publications/Exploring-an-indigenous-worldview-framework-for-the-national-climate-change-adaptation-plan.pdf>.

195 Reynolds, Twin Crises, Many Solutions, 2023.

196 Phibbs and Kenney, "Indigenous Responses to Environmental Hazard Events."

197 IUCN, "Nature-Based Solutions".

198 Ministry for the Environment, Aotearoa New Zealand's First National Adaptation Plan, 2022, Objective NE3.

199 Reynolds, Twin Crises, Many Solutions, 2023.

200 Iain White, "The Absorbent City", (2008).

201 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023, 109.

202 "

203 "

204 "

205 Federica Rosso, et al. "Pocket Parks Towards More Sustainable Cities. Architectural, Environmental, Managerial and Legal Considerations Towards an Integrated Framework: A Case Study in the Mediterranean Region". In Environmental Challenges 7, no. 100402, (2022). <https://doi.org/10.1016/j.envc.2021.100402>.

206 Ben Webster. "Tiny Forests Help Towns to Tackle Climate Change." Y, 2020.

207 Whitten, "Are Flood Protections Putting New Zealanders at Greater Risk?."

208 Suphicha Muangsri, et al. "Effectiveness of Strategically Located Green Stormwater Infrastructure Networks for Adaptive Flood Mitigation in a Context of Climate Change". In Land 11, (2022). <https://doi.org/10.3390/land11112078>.

209 Ministry of Housing and Urban Development. "Urban Growth Agenda". Accessed 30 July 2023. <https://www.hud.govt.nz/our-work/urban-growth-agenda/>.

210 Ministry for the Environment. Medium Density Residential Standards: A Guide for Territorial Authorities. Wellington: Ministry for the Environment, July 2022.

211 Reynolds, Twin Crises, Many Solutions, 2023.

212 Robert I. McDonald, et al. "Denser and Greener Cities: Green Interventions to Achieve Both Urban Density and Nature". In People and Nature 5, no. 1, (2023). 84, <https://doi.org/https://doi.org/10.1002/pan3.10423>, <https://besjournals.onlinelibrary.wiley.com/doi/abs/10.1002/pan3.10423>.

213 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023, 101.

214 Aleksandrova, McWilliam, and Wesener, "Status and Future Directions for Residential Street Infrastructure Retrofit Research", (2019).

215 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

216 "

217 Wang et al., "Performance Synergism of Pervious Pavement on Stormwater Management and Urban Heat Island Mitigation", (2022).

218 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

219 "

220 Ministry for the Environment, Medium Density Residential Standards: A Guide for Territorial Authorities, July 2022.

221 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

222 "

223 "

224 Protection of wetlands is already required by the National Policy Statement for Freshwater Management, though exceptions can currently be made for some types of urban development. Ministry for the Environment, National Policy Statement for Freshwater Management 2020, 26.

225 Ira and Simcock, Understanding Costs and Maintenance of WSUD in New Zealand, 2019.

226 United States Environmental Protection Agency, "Protecting Water Quality from Urban Runoff".

227 Auckland Regional Council. Hydrological Effect of Compaction Associated with Earthworks. May 2009.

228 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

229 Auckland Regional Council, Hydrological Effect of Compaction Associated with Earthworks.

230 Bradbury, Water City : Practical Strategies for Climate Change.

231 Ira and Simcock, Understanding Costs and Maintenance of WSUD in New Zealand, 2019.

232 Department for Environment Food and Rural Affairs. The Review for Implementation of Schedule 3 to the Flood and Water Management Act 2010. United Kingdom 2023.

233 E. C. O'Donnell, J. E. Lamond, and C. R. Thorne. "Recognising Barriers to Implementation of Blue-Green Infrastructure: A Newcastle Case Study". In Urban Water Journal, 14, no. 9, (2017). <https://doi.org/10.1080/1573062X.2017.1279190>.

234 Alide Elkink. "Hydraulic Neutrality". In Build 171, (2019). <https://www.buildmagazine.org.nz/assets/PDF/Build-171-36-Design-Right-Hydraulic-Neutrality.pdf?#:~:text=Move%20to%20hydraulic%20neutrality&text=With%20this%20approach%2C%20any%20rainfall,piped%20or%20by%20street%20drainage>.

235 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

236 Margaret Stanley. "Where Have All the Trees Gone?" RNZ. 29 October 2018. <https://www.rnz.co.nz/national/programmes/afternoons/audio/2018668806/where-have-all-the-trees-gone>.

237 Global Forest Watch, "Interactive Charts".

238 City of Portland Oregon. "Treebate: Get a Credit on Your Utility Bill When You Purchase and Plant a Tree". Accessed 25 July 2023. <https://www.portland.gov/bes/grants-incentives/about-treebate>.

239 Ira and Simcock, Understanding Costs and Maintenance of WSUD in New Zealand, 2019.

240 Iain White, "The Absorbent City", (2008).

241 Juliana Reu Junqueira, Silvia Serrao-Neumann, and Iain White. "Developing and Testing a Cost-Effectiveness Analysis to Prioritize Green Infrastructure Alternatives for Climate Change Adaptation". In Water and Environment Journal (2022). <https://doi.org/https://doi.org/10.1111/wej.12832>.

242 James Renwick. "The Coast Is under Threat." Newsroom. June 12, 2023. https://www.newsroom.co.nz/the-coast-is-doomed?utm_source=Newsroom&utm_campaign=f950ee463c-Daily_Briefing+12.06.2023&utm_medium=email&utm_term=0_71de5c4b35-f950ee463c-98007622.

243 Junqueira, Serrao-Neumann, and White, "Developing and Testing a Cost-Effectiveness Analysis", (2022).

244 Junqueira, Serrao-Neumann, and White, "Using Green Infrastructure as a Social Equity Approach", (2022).

245 Graham Houghton and Iain White. "Groundhog Day: The Great Floods of 2015". In Geography 104, no. 2, (2019). <https://doi.org/10.1080/00167487.2019.12094070>.

246 Scion, "Forest Sponges: New Research Reveals How Forests Absorb Water in Extreme Weather (Press Release)".

247 Jennifer Eder. "Young Native Plantings Prove Hardy against Flood Damage in Te Taihu." Stuff. 18 September 2022. <https://www.stuff.co.nz/environment/129885050/young-native-plantings-prove-hardy-against-flood-damage-in-te-taihu>.

248 F Aram et al., "Urban Green Space Cooling Effect in Cities", (2019).

249 Brajesh K. Singh, et al. "Climate Change Impacts on Plant Pathogens, Food Security and Paths Forward". In Nature Reviews Microbiology 2023/05/02 (2023). <https://doi.org/10.1038/s41579-023-00900-7>.

250 Yu Kongjian. "A Green Sponge in the City – Nature-Based Solutions Benefiting Urban Planning". In Climate Diplomacy, (2020). <https://climate-diplomacy.org/magazine/environment/green-sponge-city-nature-based-solutions-benefiting-urban-planning>.

251 Lane, "Project Overview - Increasing Flood Resilience across Aotearoa. Power Point Presentation".

252 Global Commission on Adaptation, Adapt Now: A Global Call for Leadership on Climate Resilience, 2019.

253 Ministry for the Environment, National Climate Change Risk Assessment for Aotearoa New Zealand: Main Report, 2020.

254 Moores et al., WSUD Can Be Cost-Effective and Low-Maintenance, 2019.

255 Stormwater Technical Working Group, Proposed Approach to the Transfer of Stormwater Functions and Delivery to New Water Service Entities 2021.

256 Moores et al., WSUD Can Be Cost-Effective and Low-Maintenance, 2019.

257 Parliamentary Commissioner for the Environment, Are We Building Harder, Hotter Cities? 2023.

258 Moores et al., WSUD Can Be Cost-Effective and Low-Maintenance, 2019.

259 Oates et al., "Building Climate Resilience and Water Security in Cities", (2020).

260 Te Uru Kahika/Regional and Unitary Councils Aotearoa, Before the Deluge, 2022.

261 Cabinet Economic Development Committee, Minute of Decision. Improving Resilience to Flood Risk and Supporting the Covid-19 Recovery, 1 July 2020.

262 Te Uru Kahika/Regional and Unitary Councils Aotearoa, Before the Deluge, 2022.

263 Reynolds, Twin Crises, Many Solutions, 2023.

264 Janet Stephenson, et al. "Engaging with Communities for Climate Change Adaptation. Introducing Community Development for Adaptation". In Policy Quarterly 16, no. 2, (2020). <https://resiliencechallenge.nz/outputs/engaging-with-communities-for-climatechange-adaptation-introducing-communitydevelopment-for-adaptation/>.

265 "

266 Junqueira, Serrao-Neumann, and White, "Managing Urban Climate Change Risks."

267 Stephenson et al., "Engaging with Communities for Climate Change Adaptation", (2020).

268 Ministry for the Environment, Aotearoa New Zealand's First National Adaptation Plan, 2022.

269 Stephenson et al., "Engaging with Communities for Climate Change Adaptation", (2020).

270 Reynolds, Twin Crises, Many Solutions, 2023.

271 "

272 O'Donnell, Lamond, and Thorne, "Recognising Barriers to Implementation of Blue-Green Infrastructure: A Newcastle Case Study", (2017).

273 The Naturvation Project. "Naturvation: Cities, Nature, Innovation". Accessed 12 July 2023. <https://naturvation.eu/>.

274 Ministry for the Environment, Aotearoa New Zealand's First National Adaptation Plan, 2022, Action 3.2.

275 Reynolds, Twin Crises, Many Solutions, 2023.

276 Moores et al., WSUD Can Be Cost-Effective and Low-Maintenance, 2019.

277 Te Waihangā New Zealand Infrastructure Commission. Rautaki Hanganga O Aotearoa. New Zealand Infrastructure Strategy 2022 - 2052 Wellington: New Zealand Infrastructure Commission, Te Waihangā, 2022.

278 WSP Australia. "WSP Tool Demystifies Digital Twins". 10 November 2022. <https://www.wsp.com/en-au/news/2022/wsp-tool-demystifies-digital-twins>.

279 Iain White, "The Absorbent City", (2008).

280 Te Uru Kahika/Regional and Unitary Councils Aotearoa, Before the Deluge, 2022.

281 United Nations Office for Disaster Risk Reduction (UNDRR). "Inclusive Disaster Risk Reduction Means Resilience for Everyone". 2023. <https://sendaframework-mtr.undrr.org/news/inclusive-disaster-risk-reduction-means-resilience-everyone>.





Storm Recovery and Resilience Consultation

#1891

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

My rented apartment was seriously flooded and leaking.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods, Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

Friends offered for staying over night, and helped a bit for moving out.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

If possible to apply the state housing

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

To improve the quality of housing, piping as well overall infrastructure, including emergency centres/shelters etc.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

The initiatives are good hopefully but they will add up my rates, which will be definitely out of my financial ability. That's my honest comment.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Any other activities also mean more rates to pay. What would you expect me to say then?



Storm Recovery and Resilience Consultation

#1893

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

- 1. How were you, and your local community, affected by the extreme weather events in early 2023?**
- 2. Was your home flooded or damaged during the extreme weather events in early 2023?**
- 3. In the months following the storms, what has helped you and your community get through?**
- 4. What would help you and your community feel like you had ‘recovered’ from these extreme weather events?**

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

active transport corridors incorporated into the blue-green areas (the plan mentions Te Auaunga / Oakley Creek in Roskill as an amazing example)

bridge upgrades to provide safe spaces for bikes

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

more frequent sweeping of cycleways included in increased maintenance

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1913

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

- 1. How were you, and your local community, affected by the extreme weather events in early 2023?**
- 2. Was your home flooded or damaged during the extreme weather events in early 2023?**
- 3. In the months following the storms, what has helped you and your community get through?**
- 4. What would help you and your community feel like you had ‘recovered’ from these extreme weather events?**

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**
- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**
- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**



Storm Recovery and Resilience Consultation

Feedback must be received by **31 August 2023**

To inform the Tāmaki Makaurau Recovery Plan and guide recovery, we want to hear from you about how the storms have affected you, your aspirations for recovery, and how you think Tāmaki Makaurau can be more prepared for events like these in the future.

We'd also like to hear your views on our flood mitigation options. We have identified ways to make space for water which will improve the council's stormwater operations, and support communities, households and businesses to be more resilient to future floods. We want to know if you agree with the council making these activities a priority.

We encourage you to read the storm recovery and resilience consultation document before answering any of the following questions. You can give feedback online at [akhaveyoursay.nz](https://www.aucklandcouncil.govt.nz/akhaveyoursay), or:

Scan and email your completed form to:

stormrecoveryconsultation@aucklandcouncil.govt.nz

Post your completed form to:

Auckland Council

Attention: Storm Recovery

Freepost Authority 190153

Private Bag 92300, Victoria Street West

Auckland, 1142

Your details

Your name and feedback will be included in public documents. All other personal details will be kept private.

First name:

Last name:

Email address or postal address:

Suburb:

Your local board:

Kaipatiki

Is your feedback on behalf of a group, Māori organisation or business?

(If yes, this confirms you have authority to submit on the organisation's behalf)

☐ Yes

☒ No

Name of organisation /
rōpū / business:

Important privacy information

The personal information that you provide in this form will be held and protected by Auckland Council in accordance with our privacy policy (available at [aucklandcouncil.govt.nz/privacy](https://www.aucklandcouncil.govt.nz/privacy) and at our libraries and service centres) and with the Privacy Act 1993. The privacy policy explains how we can use and share your personal information in relation to any interaction you have with the council, and how you can access and correct that information. You should familiarise yourself with this policy before submitting this form.

These questions are optional but will help us understand which groups of the community are engaging with us.

What gender are you?

☒ Male ☐ Female ☐ Another gender (please specify): _____

What age group do you belong to?

☐ Under 15 ☐ 15-17 ☐ 18-24 ☐ 25-34 ☐ 35-44
☐ 45-54 ☐ 55-64 ☐ 65-74 ☐ 75+

Which ethnic group(s) do you feel you belong to? (Please select as many as apply)

☒ Pākehā/NZ European ☐ Other European ☐ Māori
☐ Cook Islands Māori ☐ Samoan ☐ Tongan
☐ Indian ☐ Chinese ☐ Southeast Asian
☐ Other (please specify): _____

Would you like to subscribe to any of the following (tick all that apply):

☐ People's Panel – to take part in council surveys
☐ Our Auckland – your weekly guide to what's happening in Auckland
☒ Auckland Conversations - free public events, offering ideas, inspiration and action for world-class cities

You can also visit AK Have Your Say at [akhaveyoursay.nz](https://www.akhaveyoursay.nz) to find out about, or register to receive regular updates on, consultation activities happening across Auckland

Your feedback (all questions are optional)

1. How were you, and your local community, affected by the extreme weather events in early 2023?

My home was not affected as I am on high ground, have a drainage coil in the ground near the low point of the house at the back door and no properties drain onto mine.

Roads were flooded and this limited my travel. My car wasn't affected by travelling through water but my flatmate's was but she was able to get it going again. I know someone that had a vehicle was written off due to water damage. One friend had their downstairs flooded and another's had their house move due to a bank collapsing - both cases were due to retaining walls of neighbours collapsing

2. Was your home flooded or damaged during the extreme weather events in early 2023?

☐ Affected by floods ☐ Affected by slips or landslides
☐ Other damage to my home ☒ No damage to my home
☐ I don't know

3. In the months following the storms, what has helped you and your community get through?

Supporting one another by keeping in contact and providing support and help that was needed

I am part of a church group and so church support was good.

Also sharing information with each other about government and community help and support that was available as well as information about people who needed assistance

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

1. For those that have experienced damage and loss to be able to get the help and support they need to return, as far as possible, to live as they did before the storm.

2. Make sure that steps are taken to future proof us from the effects of storms - with regard to housing and infrastructure this means building back better to future proof against further storms. (NB there have been cases of building back the same and getting hit with the same type of damage over and over again)

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

1. When developing and maintaining roads we need to make sure that drainage options are adequate to deal with flooding. Remedial action needs to be taken for areas where there is a history of repeated flooding

2. Council needs to be more proactive at the building consent process. I have seen numerous houses build on concrete pads at ground level - I thought, this is a disaster waiting to happen and it happened. There seems very little provision for drainage for new builds and the effect of run off onto neighbouring properties.

6. There are nine possible initiatives outlined in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

The 9 point plan is good. It is costly but once we get necessary upgrades done then regular maintenance, which could involve the use of volunteer and community groups, should help keep the ongoing costs down. Building better from now on should help reduce the possibility of future cost blow outs due to weather events.

I believe more regulation around newbuilds is needed. I would like to see a minimum Height from the ground requirement introduced and more scrutiny and regulation around excavation, retaining walls and drainage plans.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

I believe building intensification is a huge issue here - a lot of the problems I am seeing are related to new builds and intensification. Building on concrete pads that move and the use of excavation and retaining walls plus cutting down trees resulting in hillside instability. Another issue relating to this is the laying of massive amounts of concrete and the removal of green areas where water can flow. Developers with \$ in their eyes are driving this - council needs to take back control so the development is done in a planned way that is sustainable for the environment and the people living here. Home owners need to be empowered so that they can take back control of their neighbourhood

Need more room? You can attach extra pages.

rather than being driven out of their homes by developers who build monstrosities next to them that give them no alternative but to sell to a developer at a reduced price since no one else will buy their property since they development next door has taken away all their light and privacy. There used to be daylight provisions when building next to a neighbour - these should be brought back along with blanket protection of native trees. Intensification that has been dictated by Central Government doesn't have to take into account urban planning and urban design. We are building for the future and so the council needs to take control of how this happens and not just leave it up to developers who often only care about the short term financial gain for them - build the most they can at the cheapest cost and make as much money as they can and run away and be thankful they don't have to live in what they built. Our city is in danger of being turned into one big slum and council needs to step up and see this doesn't happen.



Storm Recovery and Resilience Consultation

#1917

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods

3. In the months following the storms, what has helped you and your community get through?

Nothing really.

4. What would help you and your community feel like you had ‘recovered’ from these extreme weather events?

You cannot alter the risk of these events happening again. I am planning improved drainage on my property but it's very expensive.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

You need much better infrastructure. Auckland is third world in terms of roads, sewage, electricity etc. These events will definitely happen again. How do other cities (eg singapore) manage?

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

The cost of living in NZ is absolutely ridiculous. You should raise the money by taxing businesses that are making obscene profits, not by charging residents.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Is there a way to use the rainwater? The next 20 years will be challenging for water management all over the world. I don't see any plans for long term water management and storage. We will need reservoirs surely? And what about all the snow melt, can't that be stored? Any plans for desalination of sea water?



Storm Recovery and Resilience Consultation

#1919

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Glenfield Citizens Advice Bureau

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

Parts of Glenfield get cut off in the lower lying areas, and flooded in the extreme weather. Some homes in these areas have been affected not just because of location but also as a result of badly managed earth works on neighbouring properties

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

1. The response in Sunnynook Community Centre also helped some outside of Glenfield, such as sharing knowledge in regard to finding new accommodation. 2. Insurance companies coming into the libraries to make themselves easily available to the public who needed help. Well done on initiative number two Auckland Council.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

From talking to people the appropriate people at Auckland Council taking action when it needs to be taken, such as in the case of neighbouring properties having issues because of

something one of the two has done, and slow or no action by Auckland Council is making things worse.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

- a) More appropriate infrastructure and planning. Auckland Council having more say as a local government, and less instructions from central government about what must happen.
- b) Floods happen because water has nowhere to go, so maybe some requirement for grass on properties instead of 100% concrete, especially on higher up properties. Also more trees on berms, perhaps some community initiatives, requirements on developers to make space for trees and small areas of green on new properties, perhaps also a nice native planting on the berm area of new developments, trees hold water in their trunks so this may help with consistently heavy rains.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Community led flood resilience can only be effective if the council supports these initiatives efficiently and acts quickly in response to any problems faced by these community groups.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

The practice of allowing property owners who carry out obviously illegal works that then cause issues to surrounding properties without financial penalties from Auckland Council could stop. Taking a hard stand in regard to compliance may make people think twice before commencing work while leaving Auckland Council out of the loop.



Storm Recovery and Resilience Consultation

#1948

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

New Zealand Association for Environmental Education

Local Board: Kaipātiki

- 1. How were you, and your local community, affected by the extreme weather events in early 2023?**
- 2. Was your home flooded or damaged during the extreme weather events in early 2023?**
- 3. In the months following the storms, what has helped you and your community get through?**
- 4. What would help you and your community feel like you had 'recovered' from these extreme weather events?**

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

I am making feedback on behalf of the New Zealand Association for Environmental Education.

We believe that Auckland Council needs to incorporate education into any recovery plan. In terms of the document 'Making Space for Water', our feedback aligns with the third objective – education for raising people's awareness of flood risks. It involves:

- Knowing if people live in a hazard area
- Managing stormwater on property
- What to do before, during and after a flood

We are advocating for the development of education programmes because in general, people don't always understand how stormwater systems work, where the water goes and what they can do to help prevent flooding.

An education programme could involve these points that are linked to these 'Ways' in 'Making Space for Water'.

Way 1 – Increased maintenance

People need to understand the importance of taking responsibility for their 'place' that involves knowing about the need for increased street sweeping and catchpit cleaning, particularly where catchpits are near to heavy leaf fall areas.

Way 2 – Flood Intelligence

People need to learn how to access and use a Flood viewer tool to help raise their awareness of the location of flood hazard areas in their community so they can assess the potential risks to their house.

Way 3 – Community-Led Flood Resilience

Auckland Council needs strategies for empowering communities to become guardians of their stormwater and waterways, where they take responsibility for the water in their community and know what to do before, during and after a flood. Empowering communities in this way also strengthens people's relationships so they are better able to look after each other in the event of disaster event such as flooding.

Way 4 – Stream Rehabilitation

This is an area with great potential for education – rehabilitating high-risk streams to become more resilient. Education about weeds and rubbish blocking streams, planting on riparian regions to stabilise slopes would also link to Way 7 – developing blue-green spaces. These ideas could easily be incorporated into the programmes delivered by Wai Care.

We believe that education can play a crucial part to developing more flood resilient communities and that Auckland Council could ensure that these education programmes are developed and delivered.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?



Storm Recovery and Resilience Consultation

#1949

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

- 1. How were you, and your local community, affected by the extreme weather events in early 2023?**
- 2. Was your home flooded or damaged during the extreme weather events in early 2023?**
- 3. In the months following the storms, what has helped you and your community get through?**
- 4. What would help you and your community feel like you had ‘recovered’ from these extreme weather events?**

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**
- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**
- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**

Storm recovery and resilience feedback

[REDACTED]

[REDACTED]

[REDACTED].¹

I wanted to start by outlining some of the flood impacts from the disability community I'm aware of, through a combination of media (referenced where applicable) and own conversations.

It's important to reflect on how in each of the accounts below there are multiple impacts any one person, whānau or org experiences. I have grouped by experience rather than by type of impact because I think it's critical that we centre people in the response, and that means strategising for a response which does actually put the person, whānau and community at the centre and work out from there. So taking that holistic perspective.

1. A wheelchair user was stranded in his house for a week when floodwater intrusion destroyed the accessibility home modifications and specific set-up which he was reliant upon to live adequately and safely. ACC provided a hotel for a fortnight but hotel stays of that length were not suitable for his needs. ACC funded the modifications previously but not this time leaving him and his family to come up with the funding.²

2. No evacuation centres, hospitals or rest homes were not equipped or willing to take in a tetraplegic man who had to be evacuated in the flood aftermath. Police took him for the night and then he moved to stay with a member of the disability community with accessible facilities. Wheelchair taxis not running posed an additional barrier as did the lack of info on social media about whether evacuation centres were accessible.³

3. It was not enough for people medically reliant on power to register with their power provider or Vector to notify of this. They had to [register as a medically dependent consumer](#) of electricity instead and this process requires GP or hospital sign-off. This poses an extra logistical barrier especially as this isn't widely known.⁴

4. A disability residential service with people with multiple and complex disabilities needed to evacuate the residents. They did so successfully to a day service with the assistance of Civil defence, police

¹ E.g. <https://www.stuff.co.nz/pou-tiaki/127955661/the-missing-conversation-about-disabled-leadership-in-climate-justice>

² [Auckland floods: Disabled man 'in limbo' as house wrecked, much-needed modifications ruined - NZ Herald](#)

³ [Tāmaki Makaurau flood response put disabled at risk, advocate says | Stuff.co.nz](#)

⁴ Guidelines: [Medically dependent consumers of electricity – Te Whatu Ora - Health New Zealand](#)

Reference to these posing a barrier: ['Life or death' for disabled people caught in Auckland floods, improvements needed | Stuff.co.nz](#)

and neighbours. But they also highlighted that there was not a way for local authorities to know where those who would be highest priority are in an emergency.⁵

5. Two blind people impacted, who both live alone and have guide dogs, reported anxiety and uncertainty about how they could evacuate if they needed to, which in the end they did not. One does not have family or friends near by who could assist and taxi and Ubers were not running. The flooding was also stressful for their guide dogs, one of whom wouldn't toilet outside for two days. One person needed sandbags delivered and Council did not or could not arrange this. She then needed to navigate the logistics of a floating broom breaking the laundry room window glass, damage to shelves and other items, gib needing replacing and cracks in the concrete carport, as well as traversing footpaths strewn with flood debris. The other noted that a known flood risk of the building was not notified to her before she signed the tenancy and despite being signposted prior to the 2023 floods, the landlord did not act on it.⁶ A Deaf member requested Civil Defence support and sandbags to stop the water coming in. But police were sent instead, she thinks on the untested assumption that because she was disabled she needed evacuation support. There were communication barriers which left her stressed and without the sought support.⁷ A community member spent much of the night typing out information for her as this hadn't been provided accessibly.⁸

6. Through conversing with the mother, I'm aware of a family on the North Shore whose home became uninhabitable in the floods. Her son is a wheelchair user with multiple disabilities. They're been staying in temporary accommodation since which still is not wheelchair accessible (although the shower has recently been made accessible). They are in a drawn out process with insurance, with the insurance company coming back with lower figures than they originally had agreed to etc. Her home was never red stickered but it's uninhabitable. She didn't know about the separate long-term risk categorisation process auckland Council's now running (but has now submitted the form for a property assessment). The ongoing stress of the temporary set-up along with accessibility barriers is immense.

7. An auckland council staff member who used to work as an occupational therapist told me in conversation that as part of first response door-to-door checks on people, she encountered a disabled person whose door ramp i.e. the only accessibility house entrance, was damaged in the floods. Because of her OT knowledge, she was able to connect that person with the provider AccessAble who could sort out a solution.

8. My mother got stranded overnight in Auckland airport during the floods. She's not disabled but another passenger on her flight was chronically ill. There was a welcome announcement playing on a loop for much of the night, and music. A sensory hell for anyone with any sort of sensory processing conditions or intense fatigue. So then, my mum came back with that other passenger and her other family member in tow to our house, and stayed for another 6 days in the end. The flight rebooking process was hideous as the airline had implied, inaccurately, that they'd do it, and everyone had to spend literal hours on hold on their phone line. There was no non-phone option, so not accessible for deaf or non-speaking people. Also hey had to do a

⁵ ['Life or death' for disabled people caught in Auckland floods, improvements needed | Stuff.co.nz](#)

⁶ [When the rain doesn't stop – Blind Citizens NZ \(abcnz.org.nz\)](#)

⁷ ['Life or death' for disabled people caught in Auckland floods, improvements needed | Stuff.co.nz](#)

⁸ [Tāmaki Makaurau flood response put disabled at risk, advocate says | Stuff.co.nz](#)

separate trip to the airport to collect their luggage as they couldn't do that on the Saturday morning when they left. The many travellers all had to sort out their own accommodation. I'm well aware this sort of particular issue falls outside the ambit of the plan but I think it's an interesting illustration of the sorts of knock-on effects that don't really get talked about in the depth I think they should.

9. As for my house – it was not damaged in the flood or cyclone. But there is a very poorly designed drainage system for ensuring there isn't water ingress on the middle storey via ranch sliders. It turns out that you need to keep two tiny little holes clean for water to flow through them. One neighbour alerted me to this after the floods (when some, but not too much, water did come in through them, it was manageable with a basin and towels). So someone helped me clean mine – I'm blind so this would've been a tricky thing for me to do myself and an issue I'd never have spotted. One neighbour didn't though and had considerable water damage in the cyclone and the insurance still isn't sorted. Their roof, over the equivalent room of my bedroom, also leaked during the cyclone and we had an inspector come out to check all the rooves but they couldn't spot the issue. It does make me nervous that in a not-so-distant-future high-winds storm, mine may well leak.

I've put more thoughts on response into the emergency response consultation, I'll paste them here as well for completeness.

Re tangata whenua partnership

It's specifically important to also include tangata whaikaha Māori / whānau hauā in here too, seek them out, their voices won't get heard otherwise and the intersectional impacts for disabled Māori are very under-recognised. I say this as disabled Pākehā who knows the emergency response area for the disability community a bit and even I hardly see anything--and I know how rough it already is for disabled Pākehā let alone Māori.

Re risk: info for understanding risk needs to be Accessible to the disability community. For example, I am a blind screen reader user, I looked at Auckland Council's flood viewer the other day and I can't access that at all, as it is a map, and there is no alternative system seemingly. Put in my address but I can't find out anything about the flood risk.

So, we need access for screen reader users, access in plain language in EAsy Read, info in NZSL, face-to-face hui, a range of ways

Operational readiness/strategic partnership: one of those areas of strategic partnership Needs to be with the disability community and sector. It's not enough to see the disability communities as response recipients. We already are responding but there needs to be the communication and relationships there at a high level.

With the close involvement of disability community and sector, build and maintain a database of disability community and sector organisations and well-connected individuals, and ensure that active outreach to the community via this channel as well as two-way communication into the CIMS system is well-facilitated.

Resilience and community preparedness: Need to partner with the disability community and sector, including Māori and Pasifika organisations and providers, so that it is the people who are closest to our communities who are delivering that training. Otherwise it will seem very top down and it won't land. Too easy to tell people who don't possibly have the means to just evacuate or just stockpile resources to do those things and further alienate them and damage trust.

Response: Prioritise capacity-building for disabled people and advocacy organisations with strong disability community ties, whānau, disability service providers including Māori and Pasifika providers, occupational therapists, health providers and others with highly-networked, lived experience and specialist knowledge of our community.

This is necessary because disabled people will best trust those they know and also because these orgs and service providers have the means of actually reaching disabled people. In addition, they have the specialised knowledge to provide a more effective first response, especially where people need particular disability or accessibility-related supports which those without the knowledge simply would not know where to connect them with or how to facilitate.

Do not rely on a registry system alone but a registry system for organisations may be helpful as one of a suite of tools.

Recovery: I find it a little bit strange that there's no overarching framework around Disaster risk Management as is standard to have internationally. I feel like there's this loop where the bad thing we were ridiculously under prepared for happens, and then we're scrambling to recover, recover, recover. If we could put maybe 10 times more resources into the prevention side, and reframe the entire response so that's really prominent, I think that would be very helpful. I know it's something that would need to happen at central government as well ideally, but I do think it's something that Auckland can lead with regardless.

CDEM governance and management: The leadership across both management and governance of CDEM needs to be as diverse as Auckland is. Anything less is not going to set the priority and directions in a way that reaches into communities. Critical in particular to have Māori meaningfully represented at the highest decision-making levels.

Evaluation: Evaluation needs to reach out to the most impacted communities to ask what they think and close The loop by incorporating their feedback. The disability community is one of those communities. I don't know that we've ever been reached out to to see how CDEM is doing.



Storm Recovery and Resilience Consultation

#1993

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

* My summer vegetable garden failed to produce because of heavy rainfall + cold conditions.

* I drove to Epsom in the first storm and ended up having to traverse flooded streets and find my way when the flood blocked my way. No officials were out to guide people though some young travelers were very helpful.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

No damage to my home

3. In the months following the storms, what has helped you and your community get through?

Neighbours supporting each other and being reasonable about blocked drains on their properties that impacted other places. The patience of people, considering its crazy to blame anyone, better to work through the happenings.

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

I'd like the council to stop covering land with housing developments - covering sections with multiple houses and concrete driveways - very little grass areas. The government needs to steer "new kiwis" into other areas of NZ as Tamaki Makauri is FULL.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

All your plans outlined is good - and for cheaper than what the floods etc. cost. Would like to know how the Waitakere's can be helped as far as landslides go, and maybe those in such areas to vacate at risk housing whether it is labeled as such or not so fire men and police are not put at risk.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

I love the "make space for water" idea and all the proposals, community involvement is really good.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

Definitely stop building private or business/industrial places that cover almost all the ground. Maybe work on a model that increases the amount of green space vs concrete and building covering on any site, and no talk of 'growing Auckland' It is far too populated already.

Places outside Auckland need to be developed, with industry taken out of Auckland area and put in maybe 'planned towns'.

And more self-reliance in Auckland so produce doesn't have to be shipped in. Semi-trailers are a traffic hazard at any time, let alone in a flood or storm.

Universities and the like could also be built in 'planned towns' to cut the population of Auckland. Though farms are impacted by floods they are also a deferral to floods - take up the excess water, bring back some of the farming.



Storm Recovery and Resilience Consultation

#1998

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Local Board: Kaipātiki

1. How were you, and your local community, affected by the extreme weather events in early 2023?

My house and property were damaged by floodwaters arising from inadequate drainage systems on the road. My house has been exposed to risk through floods and will continue to be so, until the problem is addressed. There is little I can personally do to correct this situation.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

Affected by floods, Affected by slips or landslides, Other damage to my home

3. In the months following the storms, what has helped you and your community get through?

I have documented and measured damage and on-going erosion to land beneath and in proximity to my house. I have lodged claims with EQC. My insurance broker seems to listen, I have met with EQC representatives. (No water entered my home, I am fortunate)

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

To 'recover' for me, would be to have the actual cause of the flooding, i.e., the inadequate drainage system, fully investigated and made fir for purpose. It would be to have my property restored to its original condition and know this is secure.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

All EQC claims should be considered as indicators of potential risk and sources of information about how to address future events. Possibly data can be analyzed so that instances of flooding such as occurred here at Brigantine Drive are made evident to city engineers.

6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Unless the issue at my property are addressed, I am certainly not going to support paying more rates. In front of my property the land is designated 'special ecological area'. This land has been "trashed" by the flood and by neglect. What was meant to be a "coastal reserve" for the public environment/natural heritage is now a mess.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

I heard about the redesign of roads, changing the camber of a road in order to contain flood water, to slow it down and control it. This was done in Copenhagen, as reported by Mathew Bradbury of the New Zealand landscape architect's climate actions working group.

I have attached 4 pages with photographs details flood damages at my property.



Storm Recovery and Resilience Consultation

Feedback must be received by **31 August 2023**

To inform the Tāmaki Makaurau Recovery Plan and guide recovery, we want to hear from you about how the storms have affected you, your aspirations for recovery, and how you think Tāmaki Makaurau can be more prepared for events like these in the future.

We'd also like to hear your views on our flood mitigation options. We have identified ways to make space for water which will improve the council's stormwater operations, and support communities, households and businesses to be more resilient to future floods. We want to know if you agree with the council making these activities a priority.

We encourage you to read the storm recovery and resilience consultation document before answering any of the following questions. You can give feedback online at akhaveyoursay.nz, or:

Scan and email your completed form to:

stormrecoveryconsultation@aucklandcouncil.govt.nz

Post your completed form to:

Auckland Council

Attention: Storm Recovery

Freepost Authority 190153

Private Bag 92300, Victoria Street West
Auckland, 1142

Your details

Your name and feedback will be included in public documents. All other personal details will be kept private.

First name: [redacted] Last name: [redacted]

Email address or postal address: [redacted]

Suburb: Beachhaven

Your local board: Kaipatiki

Is your feedback on behalf of a group, Māori organisation or business?

(If yes, this confirms you have authority to submit on the organisation's behalf)

☐ Yes

☒ No

Name of organisation /
rōpū / business:

Important privacy information

The personal information that you provide in this form will be held and protected by Auckland Council in accordance with our privacy policy (available at aucklandcouncil.govt.nz/privacy and at our libraries and service centres) and with the Privacy Act 1993. The privacy policy explains how we can use and share your personal information in relation to any interaction you have with the council, and how you can access and correct that information. You should familiarise yourself with this policy before submitting this form.



Storm Recovery and Resilience Consultation

Feedback must be received by **31 August 2023**

To inform the Tāmaki Makaurau Recovery Plan and guide recovery, we want to hear from you about how the storms have affected you, your aspirations for recovery, and how you think Tāmaki Makaurau can be more prepared for events like these in the future.

We'd also like to hear your views on our flood mitigation options. We have identified ways to make space for water which will improve the council's stormwater operations, and support communities, households and businesses to be more resilient to future floods. We want to know if you agree with the council making these activities a priority.

We encourage you to read the storm recovery and resilience consultation document before answering any of the following questions. You can give feedback online at akhaveyoursay.nz, or:

Scan and email your completed form to:

stormrecoveryconsultation@aucklandcouncil.govt.nz

Post your completed form to:

Auckland Council

Attention: Storm Recovery

Freepost Authority 190153

Private Bag 92300, Victoria Street West
Auckland, 1142

Your details

Your name and feedback will be included in public documents. All other personal details will be kept private.

First name: [redacted] Last name: [redacted]

Email address or postal address: [redacted]

Suburb: Beachhaven

Your local board: Kaīpatiki

Is your feedback on behalf of a group, Māori organisation or business?

(If yes, this confirms you have authority to submit on the organisation's behalf)

☐ Yes

☒ No

Name of organisation /
rōpū / business: _____

Important privacy information

The personal information that you provide in this form will be held and protected by Auckland Council in accordance with our privacy policy (available at aucklandcouncil.govt.nz/privacy and at our libraries and service centres) and with the Privacy Act 1993. The privacy policy explains how we can use and share your personal information in relation to any interaction you have with the council, and how you can access and correct that information. You should familiarise yourself with this policy before submitting this form.

These questions are optional but will help us understand which groups of the community are engaging with us.

What gender are you?

☐ Male ☒ Female ☐ Another gender (please specify): _____

What age group do you belong to?

☐ Under 15 ☐ 15-17 ☐ 18-24 ☐ 25-34 ☐ 35-44
☐ 45-54 ☐ 55-64 ☒ 65-74 ☐ 75+

Which ethnic group(s) do you feel you belong to? (Please select as many as apply)

☒ Pākehā/NZ European ☐ Other European ☐ Māori
☐ Cook Islands Māori ☐ Samoan ☐ Tongan
☐ Indian ☐ Chinese ☐ Southeast Asian
☐ Other (please specify): _____

Would you like to subscribe to any of the following (tick all that apply):

☒ People's Panel – to take part in council surveys
☐ Our Auckland – your weekly guide to what's happening in Auckland
☐ Auckland Conversations - free public events, offering ideas, inspiration and action for world-class cities

You can also visit AK Have Your Say at akhaveyoursay.nz to find out about, or register to receive regular updates on, consultation activities happening across Auckland

Your feedback (all questions are optional)

1. How were you, and your local community, affected by the extreme weather events in early 2023?

My house and property were damaged by floodwaters arising from inadequate drainage systems on the road. My house has been exposed to risk through the floods and will continue to be so, until this problem is addressed. There is little I can personally do to correct this situation.

2. Was your home flooded or damaged during the extreme weather events in early 2023?

☒ Affected by floods ☒ Affected by slips or landslides
☒ Other damage to my home ☐ No damage to my home
☐ I don't know

3. In the months following the storms, what has helped you and your community get through?

I have documented and measured damage and on-going erosion to land beneath and in proximity to my house. I have lodged claims with EQC. My insurance broker seems to listen, I have met with EQC representatives. (No water entered my home, I am fortunate)

4. What would help you and your community feel like you had 'recovered' from these extreme weather events?

To 'recover', for me, would be to have the actual cause of the flooding, ie the inadequate drainage system, fully investigated and made fit for purpose. It would be to have my property restored to its original condition and know this is secure.

5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?

All EQC claims should be considered as indicators of potential risk and sources of information about how to address future events. Possibly data can be analysed so that instances of flooding such as occurred here at Brigantine Drive are made evident to city engineers.

6. There are nine possible initiatives outlined in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?

Unless the issues at my property are addressed, I am certainly not going to support paying more rates. In front of my property the land is designated a "Special Ecological Area". This land has been "trashed" by the flood and by neglect. What was meant to be a "coastal reserve" for the public enjoyment / natural heritage is now a mess.

7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?

I heard about the redesign of roads, changing the camber of a road in order to contain flood water, to slow it down and control it. This was done in Copenhagen, as reported by Matthew Bradbury of the New Zealand Landscape Architects Climate Action Working Group.

Need more room? You can attach extra pages.

I have attached 4 pages with photographs detailing flood damage at my property.
(K.S.)

My house is located at the catchment focus on a 'sag curve' of Brigantine Drive, that is the lowest point of a hillside on Coastal Beachhaven.

All catchment from roads and drains along the street above my house feed toward my house, as do all impervious surfaces such as driveways from houses on right of way properties in this area. The GIS map shows that this 'flow path' runs directly beneath my house.

On the street above my house there are 2 catchpits. There is also a manhole within my property which is covered with the slotted grate of a catchpit. (Is this Legal?)

The probable reason that the manhole has a slotted grate is that stormwater can be released from it. If this happens, my house and my property are put at risk.

See Images of that Manhole. Sandbags covered with a tarpaulin now installed behind the Manhole/Catchpit since the flood. Below- Drains either side of street after flood subsided.



On 27th January and 24th February my property was inundated with stormwater washing away steps and causing severe erosion below the house.

EQC investigation is extremely slow, restricted to photography, yet to be completed.

I am beginning to realise that any eventual contribution towards restoration will be minimal. I note that on an "estimate" provided to me by EQC that the 'payout' intended for the property-owner would about equal the cost of expenses to cover Claim Management.

I have been told that I will need to engage my own Geo Technical Engineer and Structural Engineer as no inspection beyond photographs will be forthcoming from EQC.

All the damage at my home is caused by Stormwater, that emerged from a public drainage system. This was not simple rainfall.

No water entered my home, however the water pipe which services the property began to leak after the floods. This has cost approximately \$5000 in plumbing bills and hidden leaks to the water supply.

Drainage and Restoration of the land beneath and surrounding the house will be required.

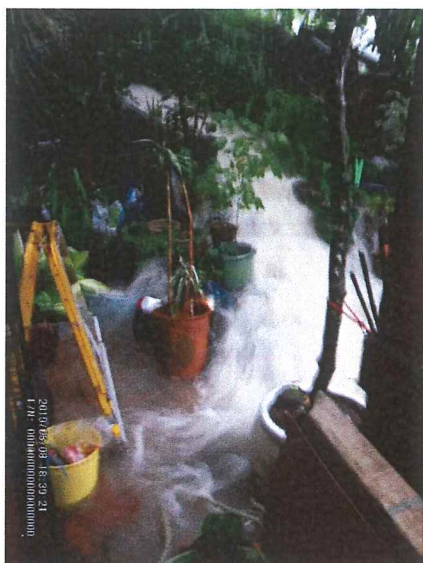
What will this cost?

As flooding in the Future is clearly a Possibility, to simply repair damage would be foolish!

I need the Auckland Council to address the source of this problem.

The drains on the street above my house clearly are inadequate. There is only a single record of flooding at my address that was in 1979. In a letter from this time, a Council Engineer recommended placing a third drain on the street. Is this how the Manhole was converted into a "Catchpit"? (see images)

On 27th January 2023, Stormwater surged down from streets on the hillside above, it collected in a vast pool on the street above my house, the drains could not serve that amount of water. Stormwater rose over the gutter and footpath and flowed down my garden path in a torrent.



On 24th February 2023, Stormwater again inundated the roadway, the drains could not serve that amount of water. Instead of flowing down to the Sea, the Stormwater flowed out of the slotted grate over the Manhole down to my house. The images show the flooding on the road and water racing down through my property and that of my neighbour.



That Stormwater caused flooding to the neighbour's basement. The response of the neighbour has been to extend that solid wall in an attempt to block the path of water into their property. As a result all such stormwater flooding is likely to be diverted toward my house so that it will be even more exposed in future.

Auckland Council must examine all situations like my own and seek ways to control and prevent future occurrence of this kind.

Properties now demonstrated to be at risk as documented by EQC, whose owners face huge costs, stress and strain as a result of damage by failure of the Public Stormwater System, seem deserving of compensation beyond that of EQC. The stormwater flowing over my property came from a great number of houses on the streets and hillside above my house. Many were quite unaffected by the floods. The responsibility for costs of addressing such Floodwater should be shared on an equitable basis. I am among many for whom this year has been one of constant concern at losses and costs. Can some relief be considered for those truly affected by the floods?



Damage did not cease in February.

Photographs show how the clay continues to erode, and will do so until restoration is made possible. Destruction resulting from the failure of the Council StormWater System must be Addressed. The circumstances of every individual Ratepayer affected by flooding need to be addressed, ie no large plan to address parts of Auckland and in doing so, to overlook individuals such as myself.



Storm Recovery and Resilience Consultation

#2017

Note: this version of the feedback form has been created for the purpose of publishing submissions. As such, contact and demographic information has been removed and handwritten submissions have been transcribed.

Your feedback

Kaipātiki Project EcoHub

Local Board: Kaipātiki

- 1. How were you, and your local community, affected by the extreme weather events in early 2023?**
- 2. Was your home flooded or damaged during the extreme weather events in early 2023?**
- 3. In the months following the storms, what has helped you and your community get through?**
- 4. What would help you and your community feel like you had 'recovered' from these extreme weather events?**

- 5. How can Tāmaki Makaurau Auckland be more prepared for events like these in the future?**
- 6. There are nine possible initiatives outlines in Making Space for Water (see the Storm Recovery and Resilience consultation document for details). Our initial budget suggests it will cost \$1.65 billion to deliver them and will require additional rates from Aucklanders. Do you have any comments on the initiatives?**
- 7. Are there any other activities that you think are important to manage flooding that haven't been included in Making Space for Water?**

See attached



Storm Recovery & Resilience

Kaipātiki community organisations- 31 August 2023

Tēnā koutou katoa

Ko Janet Cole tōku ingoa

Kaiwhakahere - Kaipātiki Project EcoHub te mahi

No Te Raki Pae Whenua -based on the North Shore.

Kei roto Te Henga, Bethells – out west- e noho ana.

My experiences of the climate emergency we experienced around Anniversary weekend was initially out west, focused on family, neighbours and my immediate community, people trapped at the beach in the valley by slips, no power, internet or phone, families rescued in the dead of night by rubber boat. I remember sitting on an RT at the top of a bluff with the storm raging straight up the cliff – I could see the damage, and see people's houses flooded, but we couldn't get through to help, and nor could emergency services. We had to relay information through to Emergency Services, so they could plan helicopter visits and deliveries.

After that first day or two, my focus turned to my second home of Kaipātiki, where I grew up and work in community, and bring those stories to you as part of this consultation. I am also informed by my professional background working in community sustainable catchment management and engagement planning, including a programme where there was a planned buyout programme of houses in floodplains.

Our key message: Climate resilience = community resilience + environmental resilience

1. **Thank you for the opportunity** to reflect and to contribute to capturing our region's experience and designing a better system.
2. **We would like to share the experience of the community anchor organisations in the Kaipātiki Local Board area and more broadly across Auckland's North, which has shown up gaps, but has also created space for innovative responses that worked so well and can be the basis for better risk management/ reduction, as well as response and recovery.**
3. **This submission draws on the experience and contribution of 10 community anchor organisations:**
 - the community houses/ centres from Highbury, Glenfield, Beach Haven, Birkdale and Bayview, the Kaipātiki Facilities Community Trust (our local board's community development partner), Kaipātiki Project (North Shore Environment Hub), Hearts & Minds (North Shore community mental health), Awataha Marae, Localised Community Recycling & Inorganic Hub; and Pest Free Kaipātiki; and
 - **the engagement during the emergency with a huge network** - local Councillor Richard Hills, Local Board Chair John Gillon and Deputy Chair Danielle Grant, other North local board members, Council staff, local MP Shanan Halbert, AEM, Community Connections, Parks, ANCAD, Harbour Sport, Albany Community Hub, North Shore Māori Committee, De Paull House, the Pacific Forum, Asian Family Services, Te Puni Kōkiri, and Devonport Community House.



17 Lauderdale Road, Birkdale
Tāmaki Makaurau Auckland 0626
09 482 1172
kaipatiki.org.nz

4. We acknowledge the parallel and related Recovery Plan consultation, and our contribution relates to both.
5. We support the overall approach outlined in Make Space for Water and prioritising it for budget through the Long-Term Plan.
6. As community anchor organisations and networks, we ask that Healthy Waters and Emergency Management **place communities and their organisations at the centre of the planning process and outcomes**. Right up front, the consultation document describes those with a role in supporting the region's recovery yet does not mention the community sector or community anchor organisations. This approach needs to change in all considerations in the Recovery Plan and Make Room for Water eg we welcome the establishment of the Recovery office but ask why the Community Recovery piece has only recently emerged.
7. We would like to see the same attention to detail for business applied to community. Eg **BAU- Business as Usual- we need to talk about Community as Usual. If we're talking about Business Continuity, let's also focus on Community Continuity**- the services we provide to connect people, and enable them to thrive.



8. We acknowledge first response must build on Emergency Response models of Command and Control – linear decision-making designed to be most efficient in task completion. However, the best of community means **No one gets left behind**. We are already out there building community resilience. We are inclusive and we are very good at what we do. We support the Healthy Waters approach but would ask please don't replicate what we are already doing using community-led models. We can deliver in partnership, but we can't do it without resources and communication. **Bring the brave champions of system change, innovation and problem-solving of the community sector to the table for early-stage planning and appropriate engagement. Then devolve the responsibility to community organisations, along with the resources needed to get the job done.**
9. **Let's do the scenario planning together to test better and joined up responses over time** between emergency response and community response – first 12 hours, next 24 hours, 48 hours, a week etc – to find out which combination works best for different scenarios, document and share further afield.

10. **Let's look to the community response planning already being used successfully in some communities eg Emergency Response Group models previously supported to be set up.** These models do not duplicate the role of AEM or emergency response agencies, they complement and ensure communications channels are open for emergencies because so much of the planning and risk reduction has already been done.
11. Our final point on this is- **we are already doing it well in some places- locally and through regional networks; let's share the learnings, build on what we've now learnt and increase the momentum.** In Northcote, the collaboration between Healthy Waters, Eke Panuku, Kainga Ora, Kaipātiki Local Board, Kaipātiki Project, Kaipātiki Community Facilities Trust and others has been very successful working to deliver what is effectively a Making Room for Water programme. Ngā manawhenua o Tamaki Makaurau have led a design process to create the mauri indicator framework Take Mauri Take Hono which acts as the korowai for the integrated programme outcomes, now known as **Te Ara Awataha**. **The area which once would have been flooded houses, distraught families and destroyed ecosystems, this year is being held up as an example of what works.**

<https://youtu.be/HWv3lfkgbGU?si=sR3MBVSlrY1xScVb> (YouTube- Māori TV)

<https://northcotedevelopment.co.nz/news/greenslade-reserve-does-its-job-in-aucklands-floods/>

<https://isthmus.co.nz/thinking/northcotes-landscape-infrastructure-in-action/>

Applying these principles offers a way to be effective, joined up and build community resilience and environmental resilience as a way to create climate resilience.

What was our experience?

12. Yes, the overall crisis response was slow, badly coordinated and barely communicated.
13. Messaging from that point on was poor – people were left to their own devices and largely prepared as well as they could within their means.
14. **The frustration through it all was the lack of a widely shared plan that could be understood and rallied behind. This created huge workloads for everyone just doing their best through trial and error. If there was a plan, it was too high-level and centrally-focused to be of value.**

"There was a lack of leadership to deliver on a plan. I was shocked to find that there didn't seem to be a plan from Council as to what should take place in an emergency like the one we experienced. There was a sense of making it up as we went along."

"The main point from me was the lack of communication and connection in Kaipatiki initially, then it seemed like we were plugging gaps and not knowing who was leading responses and who the decision-makers were. We needed strong & knowledgeable leaders within our area who were looking at, or knew the small details while taking in big picture."

15. Our community anchor organisations, including those owned by Council, were not contacted directly to inform us we were not to open during the State of Emergency (we chose not to in order to avoid any confusion and to help keep people off the roads or taking unnecessary trips).
16. Parts of our area were very badly affected, with the Northern busway flooded, houses in whole street sides all flooded, and drownings meaning distraught families in shock. Slips across walking tracks and into streams prompted parks to close. Those worst affected were often those who needed to go to community support centres but couldn't get there because

their car had been flooded. Any organisation with a van was called on to help ferry people or damaged carpets and food.

17. As the scale of impact became public, donations flooded in to the point the tap had to be turned off within a few days, as the community response was intense, although well intended.
18. **Awataha Marae did a fantastic job as our initial central place where people could go in person to get support, food, clothing and advice. It was all hands on deck.**
19. **Localised did a fantastic job**, turning their trucks which could not operate in flooded areas, to work **collecting and distributing goods**, and using their warehouse as a point of sorting and collection, including for whole household lots for those who were being rehoused.
20. **The Kaipātiki Community Broker played a crucial role connecting and relaying information when community was being excluded from decision-making; helping us to prioritise support.**
21. **KLB Chair & Deputy Chair, our Councillor and our MP worked together and with our communities as a tireless team providing the leadership absent from elsewhere.**
22. **Once a community information centre was set up in Birkenhead War Memorial, community organisations supported with staff volunteers and deliveries.**
23. **The lack of a coordinated Wellbeing response** by major agencies was a sad reflection of the under-funding in this area for many years – Worksafe, the Mental Health Foundation, and others were unhelpfully silent while our own Hearts & Minds people were run off their feet. There continues to be unacknowledged trauma from these events and a risk this is untreated and will create long-term impacts, contributing further to delayed recovery.

So what have we learnt, now what's possible?

24. **Organising based on current Local Board structures and relationships** would support a return to a locally-led response, with a plan that is based on high-quality engagement, and is well-communicated to the community and adequately funded. A core organising team model eg Leisure Mgr, Community Broker, Local Board rep, Cr, MP, community houses rep, community development organisation, community Envirohub etc
25. **The same scenario planning, scenario rehearsals and testing that goes on within EM circles needs to be rolled out across communities to test our local and neighbourhood plans.**
26. **Locally-led:** What worked? Let's build on that. In Kaipātiki Local Board, we had about 100 people on a Teams meeting in the second week after the cyclone. With no other communication planning in place or means to get the information out to groups and agencies, we ad libbed with the systems we had to ensure we were on the same page. Can we be supported to host a workshop to bring the groups and individuals together who came together by Teams at the time - to pool knowledge and resources, and create an outcomes-focused robust plan. This could include documenting what happened, timing, amazing resources and systems generated- what worked, and what else would be good for next time.
27. **Strengths-based:** How do we better support Emergency Management, marae, community orgs to be able to respond? Who do we liaise with in Emergency Management? Council Community Connections? AEM? What is the Local Board's role? Councillors? MPs?
28. How do we **communicate at different scales effectively** (floodwaters don't stop at political boundaries). How do we liaise across local boards across the north and northwest? Would a neighbourhood scale approach work better? Could we do a neighbourhood mapping exercise under AEM umbrella to support a strengths-based approach?

29. **Safety net**- How do we ensure our most vulnerable people are supported/ prioritised in any response plan?
30. How do we apply an **appropriate lens** eg how do we support Māori orgs to support Māori community? How do we support ethnic community orgs to support ethnic communities? Pacifica? Accessibility lens? Elder lens?
31. **Central resource kete**: Could we set up a central place for templated docs and resources?
32. **What does environmental resilience look like?** The actions listed in the Making space for Water document seem to lack ambition, be business as usual and rely a lot on community and individuals. It was disappointing to see that the suggestions are mostly focused on “more of the same but better or bigger”. **To make the necessary changes in our infrastructure and living environments we will need to be ambitious, thinking long term and have a high degree of coordination amongst key stakeholders.**
33. **We will also need regulatory change**, ensuring all the central and local government changes work together towards the integrated outcomes we need.

Nāku noa, nā

Collated by



Manager, Kaipātiki Project EnviroHub

Informed by reflections and input from the following:

Kaipātiki Project:

“Formed in 1998 in Auckland’s North, Kaipātiki Project acknowledges the rights and interests of nature, place and people using a whole living systems approach. Our work is to support and engage our community in regenerative environment and sustainable living activities that enhance skills and creativity, and build a sense of pride across Kaipātiki and the wider North networks and communities. Our programmes include native plant nurseries, food and soil resilience, community compost hubs, Zero Waste Hub, and environmental education delivered in schools, communities, reserves, streams, and coastal margins in Auckland’s North. These programmes are critical to empower our communities to implement climate actions that aim to reduce greenhouse gas emissions, achieve a greater balance and reciprocity between the carbon emitted and the carbon that our environment can sequester, and support renewed and regenerated ecosystems and communities. Embracing Te Ao Māori, we partner with mana whenua and mataawaka Māori to understand how mātauranga iwi/ hapū can improve environmental outcomes for the area, to help restore the Taiao, whenua, awa, and moana.”

Bayview Community Centre:

“The Bayview Community Centre operates seven days a week, with our office being open from Monday to Friday, and staff on hand during weekends to support community events. However, if our community-based developments, events, and groups were subjected to a 50% cut, our operations would be severely impacted. Our Centre is built around providing a welcoming space for the community to explore new hobbies, engage in working bees, and participate in wellbeing groups, creative groups, exercise, church, dance, and more. One of our most successful programmes is the ‘Craft Mob’, which has been well attended for years and helps improve the wellbeing of community members, welcomes newcomers, fosters creativity, and promotes a sense of belonging.”

Beach Haven Birkdale Community Project:

“The Birkdale Beach Haven Community Project spans two community houses in low income areas on the North Shore. The facilities are available to the public seven days a week and a dedicated team of staff and volunteers ensure quality programming and events are provided for and with our culturally diverse community. Long-standing and essential programmes such as ‘Community Eats’, run from Beach Haven House, address the dire food insecurity in the area — this is a programme that has been called upon to scale-up during the Covid pandemic and more recently the disastrous weather events. Since becoming New Zealand’s first community house in the 1970s, Birkdale Community House has provided classes, initiatives and space hire across a myriad of sectors as well as a loved community holiday programme.”

Glenfield Community Centre:

“In the recent Cyclone Gabrielle disaster, it was facilities like GCC that stepped up to the challenges and who were agile and flexible enough to respond to real need in real time.”

Highbury House:

“We have worked incredibly hard over the last 7 years to have a community house that is responsive to the wants and needs of our neighbourhood, to be proactive and a connector for people and with other organisations.”

Hearts and Minds:

“Since 1990 H & M has received funds from Council and appreciated their funding support ensures the continuance of our community development work:

- *H & M provides the community-based wellbeing hub in Northcote;*
- *We undertook and published research on ‘The Impact of Northcote’s Urban Regeneration on Community Wellbeing’;*
- *We publish and provide the ‘Support Services Directory’ for North Shore, Waitakere and Rodney online and bi-annually publishes the hard copy (free to community organisations);*
- *We ensure people are connected to appropriate support for their family / whānau needs via our information and navigation service;*
- *We are a member of the strong cohesive community network within KLB; and*
- *We are a Community Touchstone in Northcote.”*

Pest-free Kaipātiki:

“Pest Free Kaipātiki helps to provide resources, expertise and events to help enable our community to connect with one another and create a flourishing natural environment. PFK helps enable volunteer efforts that are a vastly more cost-effective way of achieving the outcomes produced than alternative methods, as well as providing additional indirect benefits that would not otherwise be achieved, such as strengthened neighbourhood connections.”

Kaipātiki Community Facilities Trust:

“The lead community partner with the Kaipātiki Local Board.”