

The key areas of action required to address climate change are to: ...

Take adaptation action to increase the resilience of our communities, the natural and built environment to prepare for the changes that are already occurring and those that are coming down the line. Critical to this is the need to protect and restore natural ecosystems so they can continue to provide the important services that ensure clean water and air, support indigenous biodiversity and ultimately, people.

Climate change and the decline of ecosystem health and biodiversity are inseparably intertwined.

Climate change is placing significant additional pressure on species, habitats, ecosystems, and ecosystem processes, especially those that are already threatened or degraded, further reducing their resilience, and threatening their ability to persist. This, in turn, reduces the health of natural ecosystems, affecting their ability to deliver the range of ecosystem services, such as carbon sequestration, natural hazard mitigation, erosion prevention, and the provision of food and amenity, that support our lives and livelihoods and enable mana whenua to exercise their way of being in the Te Ao Tūroa, the natural world.

What might our future look like ?

- High intensity downpours (not just floods)
- Prolonged dry periods
- Reduced annual rainfall
- Increased ambient temperatures – Urban heat island
- Rising sea levels



What are the risks

Form and spatial layout of urban development having a significant influence on outcomes

- Increased contaminant discharges to waterways
- Instream scour and slumping
- Landslides (flow on impacts)
- Thermal stress
- Loss of indigenous species
- Disconnection with waterways
- Increased human mortality and heat stress
- Increased energy demands (cooling)
- Reducing resilience to future climate change



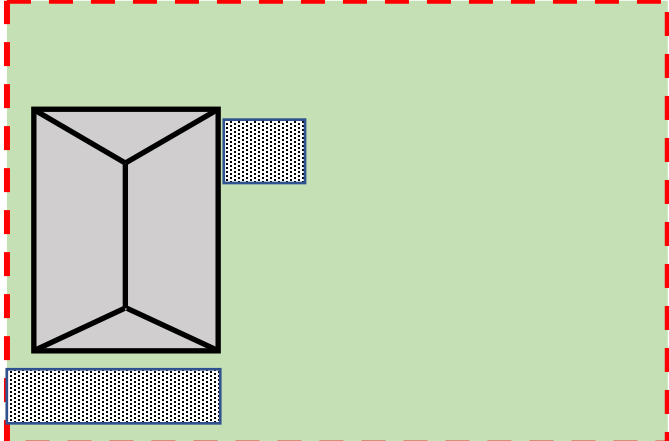
Nature Based Solutions

“Actions to protect, enhance, or restore natural ecosystems, and the use of engineered systems that mimic natural processes, to reduce greenhouse gas emissions and/or strengthen the resilience and well-being of humans people, indigenous biodiversity, and the natural and built environments to the effects of climate change .”

Climate Resilience

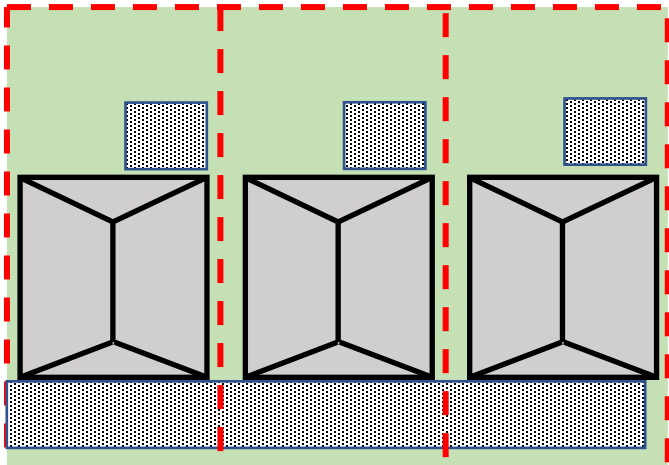
“The capacity and ability of the natural and built environment, including people, communities, businesses, infrastructure, and ecosystems, to withstand the impacts and recover from the effects of climate change, including natural hazard events ”





1) Existing case - 600 m² Lot with single 120 m² dwelling

- Roof coverage 120 m² (20%)
- Driveway 60 m² (10%)
- Hardstand 30 m² (5%)
- Pervious area 390 m² (65%)

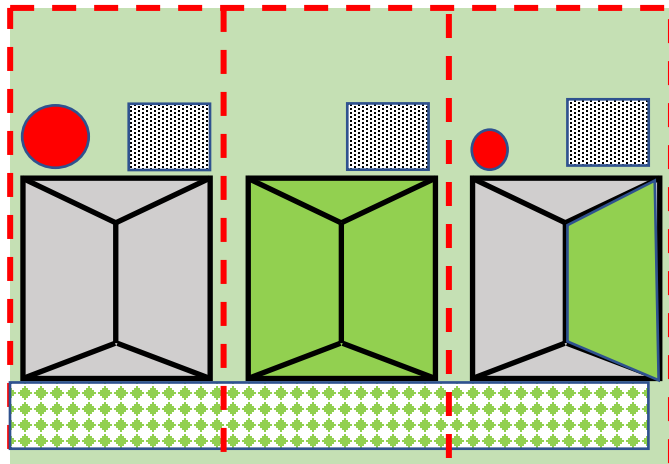


2) Future infill case - 3X 200 m² Lots with 90 m² dwellings

- Roof coverage 270 m² (45%)
- Driveway 60 m² (10%)
- Hardstand 30 m² (5%)
- Pervious area 240 m² (40%)

~70% increase in Stormwater Volume from frequent storms (<10mm depth)

~40% loss in urban greenspace

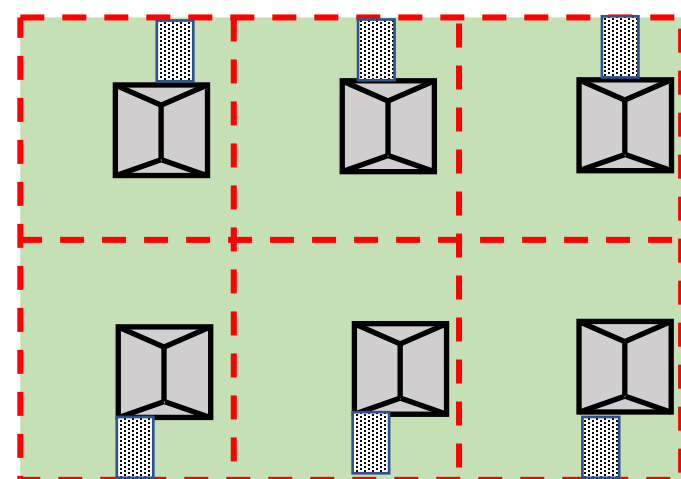


3) Nature based solutions

- Rainwater collection and reuse (toilet flushing/irrigation)
- Green roofs
- Permeable paving
- Lot scale raingarden

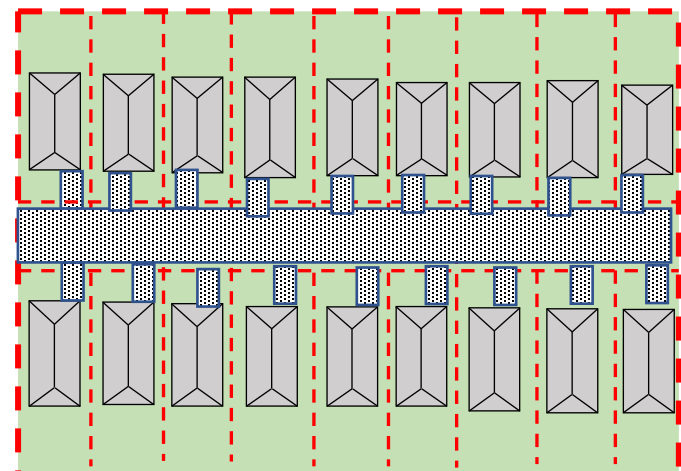
~80% decrease in Stormwater Volume from frequent storms (<10mm depth)

~10% gain in urban greenspace



1) Existing case – 6 X 500 m² Lot with single 110 m² dwellings

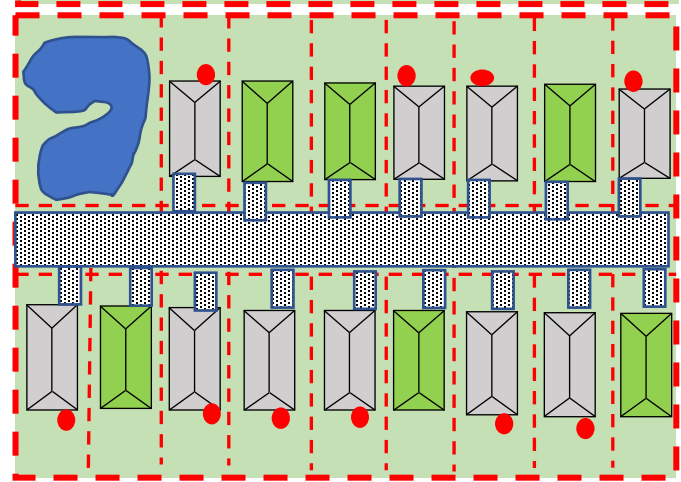
- Roof coverage 660 m² (22%)
- Driveway 120 m² (4%)
- Hardstand 120 m² (4%)
- Pervious area 390 m² (70%)



2) Future infill case – 18 X 150 m² Lots with 70 m² dwellings

- Roof coverage 1215 m² (40%)
- Driveway 360 m² (12%)
- Public road 300 m² (10%)
- Pervious area 1125 m² (37%)

~110% increase in Stormwater Volume from frequent storms (<10mm depth)
 ~50% loss in urban greenspace



3) Nature based solutions

- Rainwater collection and reuse (toilet flushing/irrigation)
- Green roofs
- Permeable paving
- Lot scale raingarden

~80% decrease in Stormwater Volume from frequent storms (<10mm depth)
 ~10% gain in urban greenspace – Public realm

Policy CC.4 is a key policy to ensure that district plans facilitate climate-resilient development. I consider that the recommended amendments improve the policy, with clauses providing a comprehensive list of the required activities or practice to address predicted climate stressors in the Wellington Region. I consider that these provide clear direction to Territorial Authorities (and future Water Entity) on what objectives, policies and rules need to cover, without being excessively prescriptive. The amended explanation has been simplified and provides a clear description of the reason for the focus on nature-based solutions in terms of the multiple benefits they provide.