



Report 10.82
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Committee Catchment Management Committee
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Climate Change

1. Purpose

- To inform the council of the impacts of climate change on Flood Protections' Design Criteria and how we incorporate this into our ongoing investigation and flood risk management work.
- To recommend to council specific climate change design criteria for investigations and design work.

2. Significance of the decision

The matters for decision in this report do not trigger the significance policy of the Council or otherwise trigger section 76(3)(b) of the Local Government Act 2002.

3. Background

Scientific evidence and thinking points to an increase in global temperatures due to climate change. This increase in temperature has many implications for New Zealand. Implications of climate change have been evaluated by the Ministry for the Environment (MfE). The National Institute of Water and Atmospheric Research (NIWA) was the agency commissioned by MfE to evaluate the magnitude of these changes and their implications for New Zealand. Council does not have any specific policy with regards to flood protection design criteria taking into account climate change.

The increase in temperatures predicted by MfE for the end of this century will have a direct effect on two elements crucial to flood risk management and design of flood protection for the community.

- **Increased rainfall intensity;** As the air temperature increases the atmosphere is able to hold more moisture, leading to an increase in rainfall intensity. This has a direct effect on the amount of water flowing in our rivers and streams and hence the level of protection required and the depth and extent of the resulting flood hazard. An

assumption is made (based on NIWA guidance) of an 8% increase in rainfall intensity per degree Celsius increase in temperature.

- **Sea level rise;** There has been a recorded increase in sea level for the last 100 years of approximately 200mm and this rate of rise is predicted to increase dramatically by the end of this century. This has a direct effect on flood hazard schemes close to the coastline and in particular for the larger schemes such as the Lower Valley Scheme in the Wairarapa, the Waiwhetu Stream, the Hutt, Waikanae and Otaki Rivers.

Direction from NIWA for predicted temperature increases are based on the Intergovernmental Panel on Climate Change (IPCC) 4th Assessment. The current modelling estimates that New Zealand is likely to experience an increase in temperature of 2^oc by 2090. Eastern portions of the country which currently have a dry weather pattern are likely to experience drier conditions and the western parts of the country which generally experience wetter conditions on average. The predictions for sea level rise from the IPCC 4th assessment are between 0.18 and 0.59m. Recent recommendations from agencies suggest that 1m is more likely to be the sea level rise by 2100.

4. Discussion

Much has been written on the impact of climate change and how it might affect New Zealand. From all of this debate there is sufficient certainty that rainfall intensity and sea level will increase. The uncertainty is by how much. With much of the flood protection work influencing decisions about long term development it is recommended that an allowance for climate change is made for GW design work. The estimates made by all of the agencies give quite broad ranges for climate change whereas for GW design work we must use a specific number. For this reason we are recommending using the mid range of the current assessments. GW should continue to use these numbers until National and International research refines the guidelines more specifically for the Wellington region.

The design criteria will be used in all future flood hazard assessment work. An allowance has already made for climate change, similar to those recommended in this report, for the WFMP review and for the Waiohine and Pinehaven flood hazard assessments. The Hutt River design standard was also chosen at the 2800 m³/s level to allow for some climate change although not specifically for the criteria recommended in this report. The work undertaken earlier for the Waiwhetu and the LWVDS review does not take any account of climate change at this stage.

5. Criteria Selected

The two design criteria selected are as follows:

Increased Rainfall Intensity: for all floods of or greater than a 1 in 50 year return period, the increase in rainfall intensity to be used will be 16% based on a 2^oc increase in temperature. The reason why this is applied to 50 year and greater return period floods is that the changes will take place over 80 to 90

years and hence the return period events need to be within a similar timeframe context.

Sea Level Rise: based on the top of the mid level range identified by IPCC 4th assessment, the design sea level to be used is current sea level plus 0.5m.

6. Consultation

The design criteria for climate change will be clearly conveyed to the community as we proceed with flood hazard assessment work. No general press release is proposed at this stage.

7. Recommendations

That the Committee:

1. ***Receives the report.***
2. ***Notes the content of the report.***
3. ***Notes that any selected climate change design criteria will likely change over time.***
3. ***Endorses the currently selected Design Criteria Selected being:***
 - *The increase in rainfall intensity to be used for calculation will be 16%*
 - *The Sea Level Rise to be used for calculation is 0.5m by 2100.*

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