**Rangitiaki River Scheme Review: FROM THE PANEL**

**Questions and Answers**

**Why did the flood wall at College Road fail?**

The failure was the result of the river water finding a way (preferential seepage path), through the wall foundation material.

This caused a buildup of pore water pressure in the ground on the landward side of the wall.

The pore pressures exerted both lateral load against the ground immediately behind the cribwall and uplift pressure under the concrete walkway and wall slab, reducing the resistance of the ground and wall to the water pressure.

A progressive failure then occurred, first the cribwall (in front of concrete wall sections) sheared off and slid inland. Without the support of the cribwall the adjacent sections of concrete wall then slid outwards onto the road allowing the river water to flood into the town.

**What caused the buildup of pressure in the wall?**

A combination of factors appear to be responsible for these effects:

1. the floodwall appears to have been constructed on pre-existing fill likely to have been placed without proper quality control
2. damage to the wall foundation material which occurred during the 1987 earthquake was not rectified before the wall was reconstructed
3. the concrete "mowing strip” added to the landward side of the concrete wall and on top of the cribwall in 2012 confined seepage and prevented it from dissipating to the surface, thus causing a build-up of pore pressure

In addition the foundations of the wall may have sustained damage during the 2004 flood.

**Was the flood wall monitored during the event?**

As part of its monitoring during the event, the BOPRC inspected College Road floodwall at 01:33 and 05:37 on 6 April and found no obvious signs of seepage or concern. At 0730 community members raised concerns about stopbank with BOPRC, the fire service and Civil Defence.

**Could more have been done to prevent the wall failing during the event?**

Once it was realised that there was an issue at the College Road floodwall, the Regional Council Principal Works Engineer, Works Coordinator and a Regional Council contractor decided to undertake mitigation works by putting weight on the soft spot and toe-load and weight along the length of wall for security. As the contractor’s digger was being unloaded from its transport truck it became apparent that the wall was in danger of imminent collapse and the operation was urgently abandoned.

**What role did the Matahina Dam play in the flood?**

The Panel has found that the Matahina Dam played an important role in reducing the size of the flood from a one-in-200 year flood to a less than one-in-100 year flood. The BOPRC issued a number of requests to the dam operator Trustpower to allow the lake level of the dam to be reduced before the flood, allowing for that capacity to be used to store water during the event and to manage the release of this water downstream.

**Could the Matahina Dam have been used more effectively to stop the wall from failing?**

The Panel has found not found conclusive evidence that reducing the lake level earlier or using more lake storage capacity would have prevented the wall from failing. It may have delayed the peak of the flood level but it is inconclusive whether this would have prevented the wall from failing.

**Why were the other dams (Aniwaniwa and Flaxy-Whaeo) further upstream not used to manage the floodwater?**

The smallest dam, the Flaxy Wheo is a “run of river” scheme and has no storage capacity. The AniwaniwaDam also essentially operates as a “run of river” scheme in large events such as this and therefore has no ability to store water.

**Why did Reid’s Floodway not operate during the April flood?**

Works to enlarge the Reid’s Floodway and improve the spillway were not completed by April’s flood. Floodwater had only started to flow into the upper reaches of the floodway when the wall failed.

**Why are the works to improve Reid’s Floodway incomplete?**

Due to limitations in its original design the Reid’s Floodway is currently of limited utility during a flood. Following the 2004 flood the Council has considered options to increase its capacity and its operating threshold (the spillway). Since then geotechnical, hydraulic modelling and design issues has meant the project is delayed, and therefore incomplete, and has doubled in cost.

**If the Reid’s Floodway been completed would it have prevented the wall failure?**

If the Reid’s Floodway capacity been completed and a fixed crest spillway added, the flow in the Rangitāiki River would have been reduced and would have lowered water levels by approximately 0.45 m.

This would have reduced the pressure on the College Road wall during the flood event. It is possible that the failure would not have occurred had Reid’s Floodway and spillway been completed.

**Why weren’t Edgecumbe residents told to evacuate earlier?**

The Panel has found that inadequate plans were in place to facilitate a planned or precautionary evacuation. The indicative warning levels”the WDC’s *Flood Response Plan* appear to be too high, the BOPRC’s *Flood Warning Manual* assumed that the upgrades to Reid’s floodway would be completed, and assumptions appear to have been made that the scheme would perform as per design.

During the April flood the Regional Council advised Civil Defence to evacuate Edgecumbe 20 minutes before the floodwall failed.

Without the “planned evacuation” thresholds specified in the *Flood Response Plan* being exceeded (or forecasted to be exceeded) it is unreasonable to expect the Regional Council Flood Managers to have recommended ad-hoc evacuations to Civil Defence and Whakatāne District Council any earlier than was done so during the event.

**What understanding did the community have of the risks?**

The Panel found that there is a very low awareness reported of flooding risk and the hazards that this posed. This was particularly evident with more recent residents. The community had no awareness of any formal evacuation procedures.

**What does this mean for the long-term future of the Rangitāiki River Scheme?**

The location and arrangement of the Rangitāiki River flood management assets (like many across New Zealand) were set in place in the late 1960s. At that time there was generally a focus on the confinement of river and maximising the areas of “protected land”.

More recently the framework now being more widely adopted look towards allowing greater room for rivers to move. This change is underlined by the fact that climate change is leading to more severe and more frequent extreme weather events, as well as providing for cultural values and the desire for access to rivers.

The BOPRC and associated bodies have been thinking about what this means for the future but are yet to implement this new approach

**What did the Review Panel recommend?**

The Panel has made 29 detailed recommendations on all key elements of this report. In summary, these include:

* **The legal and planning framework for flood hazard management** - complete the application of the hazard management framework and ensure comprehensive cover of all of the region.
* **The College Road floodwall** - Replace wall with a stopbank, investigate condition of downstream wall, reconsider any impermeable barriers, quality control fill, install automatic river water level monitoring devices
* **Operation of Matahina Dam** - Review the Lake Matahina Flood Management Plan - improve communications, investigate min and max lake levels, improve placement and maintenance of rain gauges, consider Aniwaniwa Dam for storage
* **Reid’s Floodway** - pursue option of spill compartments, an additional outlet from Floodway and lower fixed crest for Spillway, reconsider stopbank raising
* **Evacuation planning** - develop evacuation plan for Edgecumbe and in the event of stopbank failures, assess river level trigger thresholds
* **Long-term strategy** **and design philosophies** - develop long term sustainable flood risk management solutions for the Rangitāiki Plains
* **Community engagement** - Engagement of the full community should be undertaken when considering further options for Reid’s Floodway.

**What happens next with the report and recommendations?**

This was an independent review and report commissioned by the BOPRC. It will be up to the Council to decide what to do with the Review’s findings and recommendations.