

Media statement
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Central Plains Water dam designed to be 40 times safer than Australasian requirements

A careful and considered reading of the Central Plains Water (CPW) Dam Safety Assurance report proves conclusively that the dam proposed for the Waianiwi Valley will be very, very safe. Indeed it will be constructed to a safety level that exceeds all current international safety guidelines. In particular, the dam's safety design standards exceed the ANCOLD (Australia National Committee on Large Dams Inc) guidelines by 40 times.

"The report is a highly technical document that was required by Environment Canterbury as part of the resource consenting process that CPW must complete in order to build its irrigation scheme," says one of the report authors Cliff Tipler, principal of engineering firm URS New Zealand.

"However because it is a technical document, the average reader could easily misinterpret the report's contents. That's because, in order to assess the dam's potential to create adverse environmental effects, the report writers had to follow established methodology which requires them to calculate the flood wave that would occur if the dam were to fail."

Cliff Tipler says most dams in the world are earth dams and many of the large earth dams in New Zealand are built 'upstream' of communities. One of the largest earth dams in the southern hemisphere is Benmore, completed in 1965. Other large earth dams include Aviemore, Matahina, and Ohakuri which are used for power generation; as well as a series of earth dams in the Hunua and Waitakari Ranges that supply water for Auckland City. There are similar earth dams that store water for Wellington city.

Modern dams are very safe because they use what are called 'multiple lines of defence'. They are constructed with a very strong and thick central 'core', which is overlaid with special materials that automatically fill any cracks that may occur in the core, drains designed to let out any water naturally entering into the overall structure, a 'cut off' below the dam that anchors it into the bedrock, spillways, as well as several other structural features incorporated to keep all possible risks to the dam as low as reasonably practicable.

In fact the Waianiwi dam will be designed to such high safety specifications it will withstand an earthquake so severe that many houses and bridges in Canterbury would be severely damaged. "Despite this level of shaking, the Waianiwi dam will remain intact," says Cliff Tipler.

"This is why certain aspects of the Dam Safety Assurance Report must be considered in context," he continues. "Sensationalist headlines such as 'Dam burst horror' are extremely concerning because the average reader would quite naturally take from this that the dam is unsafe. In fact it's the complete opposite and the risk of failure is significantly lower than a catastrophic earthquake occurring."

Exhaustive calculations show that in the event of the worst conceivable earthquake (the engineering benchmark for this is calculated as being a 1 in 10,000 year event), and assuming that all the dam's safety design features and the scheme's evacuation procedures failed, the probability of the dam failing in any one year is 1 in 100,000,000. As a comparison, the risk of being killed in a car accident is 1 in 7,000 and in a plane crash it is 1 in 100,000.

To further satisfy technical reporting requirements, URS engineers also had to calculate the level of risk that would be experienced by the most disadvantaged person living immediately downstream of the dam, and who was unable to be evacuated in time if the dam breached. "In any one year, the risk they would be killed is 1 in 4,300,000 however this assumes they were unable to leave their home, even if warned in advance," says Cliff Tipler. "The risk to able bodied people would of course be significantly less."

As far as a potential flood is concerned, the report concluded it would not cause the dam to fail because the Waianiwaniwa stream has a very small rainfall catchment. "Even in the worst flood imaginable, the total volume of rainfall in the valley could be stored within the reservoir without the dam 'overtopping' however we'll be building a spillway just in case," says Cliff Tipler. "Floods do not happen over a short time period so if overtopping started to erode the face of the dam, there would be ample time to evacuate anyone living downstream."

He said it is very important people understand that when modern dams are built with multiple barriers of defence, they are very safe.

"This is why Central Plains Water held a meeting with local Coalgate and Glentunnel residents prior to the report's release, to ensure they gained an accurate understanding of the risks and didn't misinterpret the contents of the report," says Cliff Tipler.

"Some residents felt that even the 1 in 4,300,000 chance of the district's most disadvantaged resident being killed if the dam failed was an unacceptable level of risk. They likened it to the chances of winning first division Lotto, which of course, many people do throughout a year. Since the meeting I have researched Lotto's statistics and can confirm that someone who buys a \$6 Lucky Dip ticket every week for a year actually has a 1 in 7,382 chance of winning First Division. This clearly shows how easy it is for the average reader to misinterpret the contents of the Dam Safety report."

He continues: "Every single engineer who has worked on this project, including the report's three international reviewers, would happily live immediately below the dam and quite literally wouldn't lose a minute's sleep about the risks."

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