

Critical infrastructure in vulnerable locations

A near catastrophe



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What is the problem?

“Looks as though some stormwater has caused a slip near our bulk main valve chamber...”









Problem Established - “Lets affect the repair”

- Identify source of leak
- Refer to shutdown procedures for the bulk mains
- Source necessary spares from critical spares store
- Communicate potential outage to customers
- Isolate bulk mains
- Repair leak
- Return to service
- Total time to repair → mins/hours?

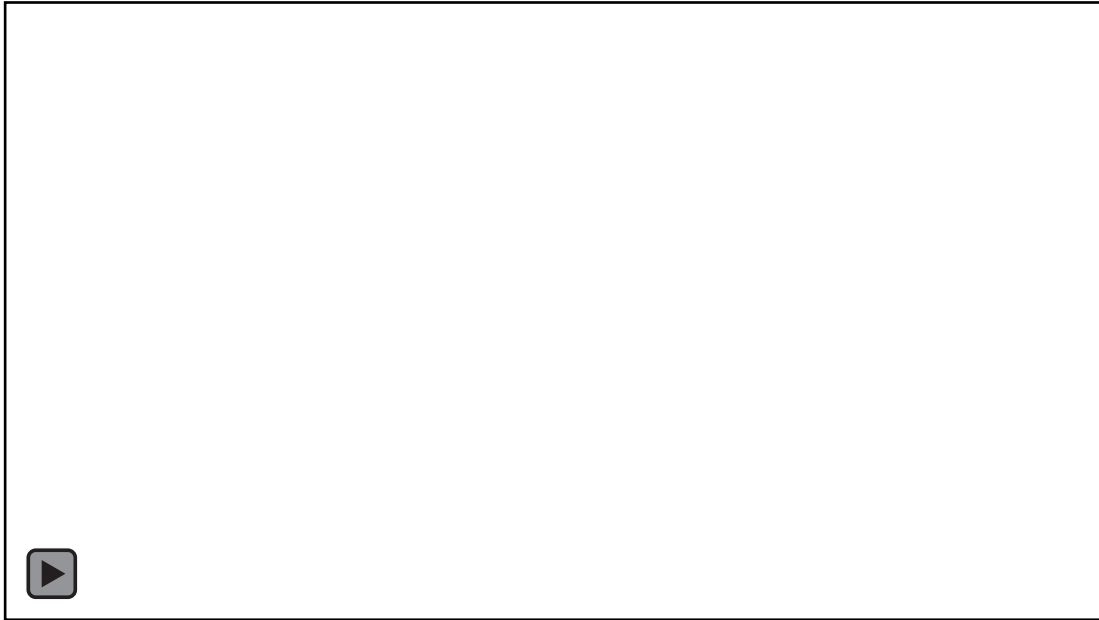


Wet Season

Swollen Waikato River with 3 ex. Tropical cyclones

- Delay in any bank stabilisation works
- Continuous monitoring onsite 24/7
- Continued erosion
- Liaison with key stakeholders
- Emergency isolation of bulk mains affecting level of service
- Risk to integrity of assets

The Public Plead



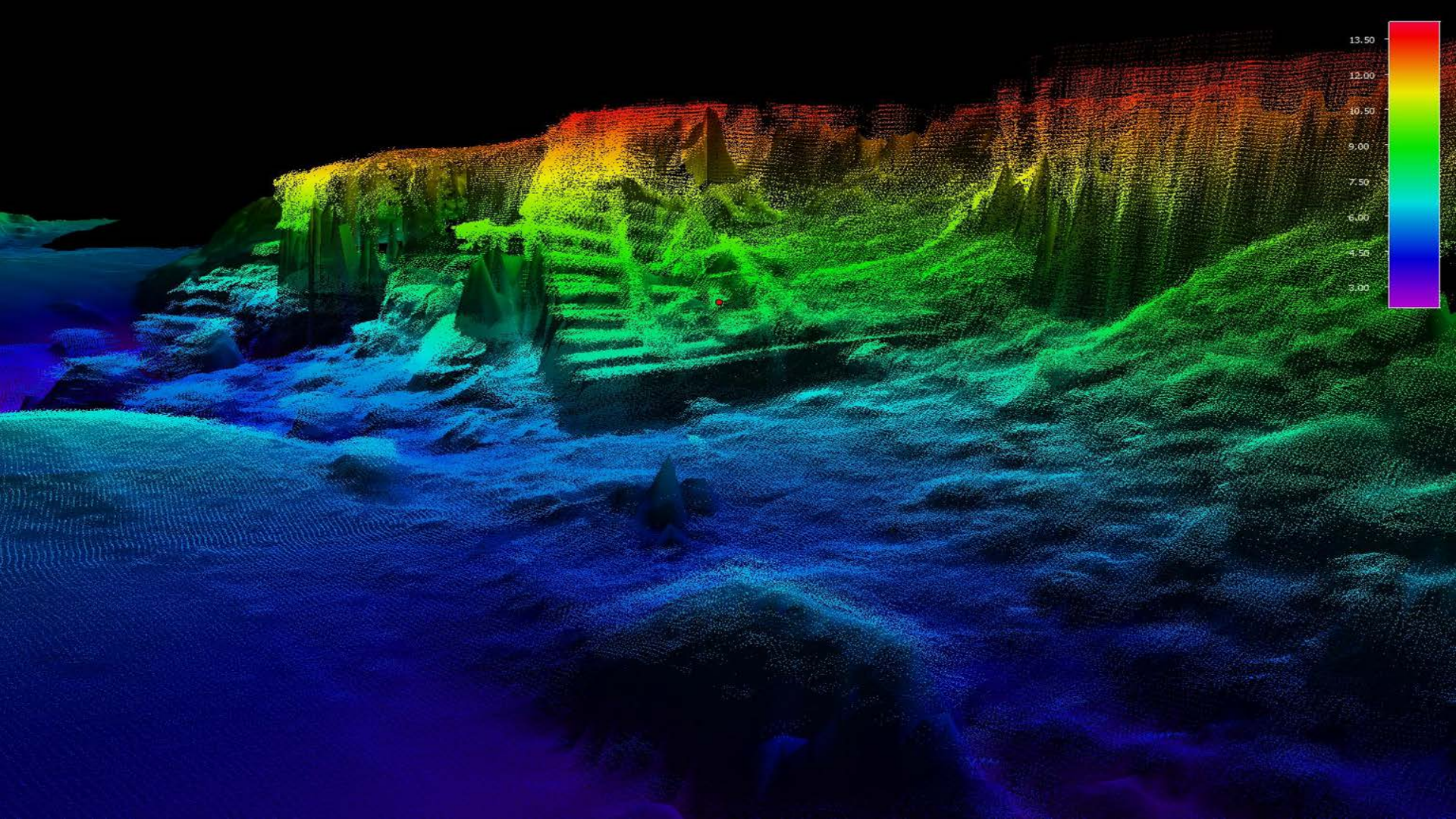




Assessing the Risk

- Critical Assets no longer protected by river embankment and sheet piling
- Loss of bedding material beneath the chamber
- Stability of remaining riverbank uncertain
- Specialist engineering advice
- Undertaking a condition assessment





Condition Assessment Findings

- Material holding the bank had failed, along with the sheet piling anchors evidenced from the sheet piles bent over under the water line.
- Along with exposure of the twin pipes and the water intake, material had been lost from beneath the concrete chamber.
- The remaining material in the immediate vicinity of the pipe and the chamber was classified as weakly cemented alluvial soils, hence presenting a risk of further erosion.
- Continued water seepage from the bank was observed following the isolation of the water supply.



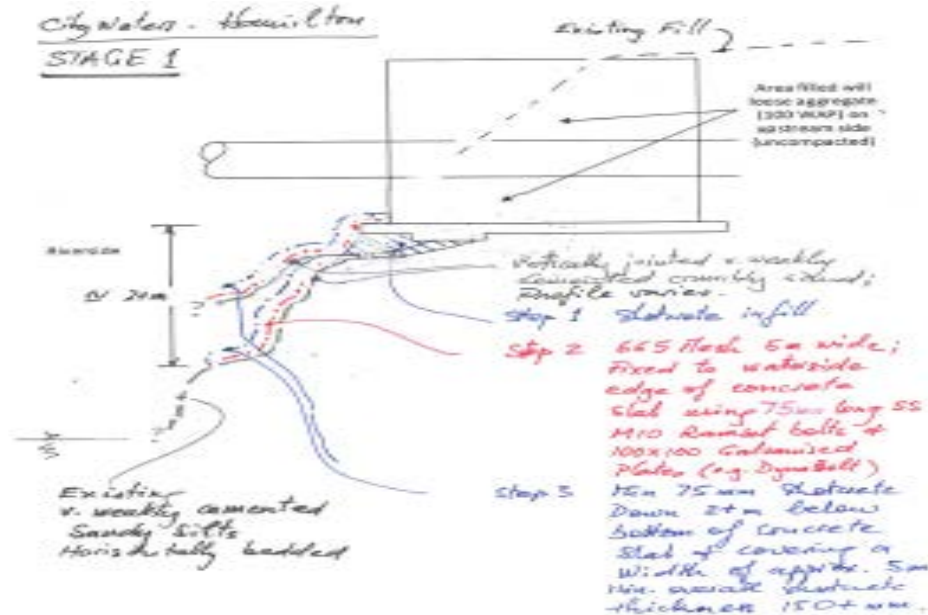


Stakeholder Communication and the other challenges

- Contractor Engagement
- Communication with Stakeholders (Waikato Regional Council and Iwi)
- Classification as the site of a historic pa
- Major storms continuing to affect the stability of the site



Fixing the Bank - Initial Concept



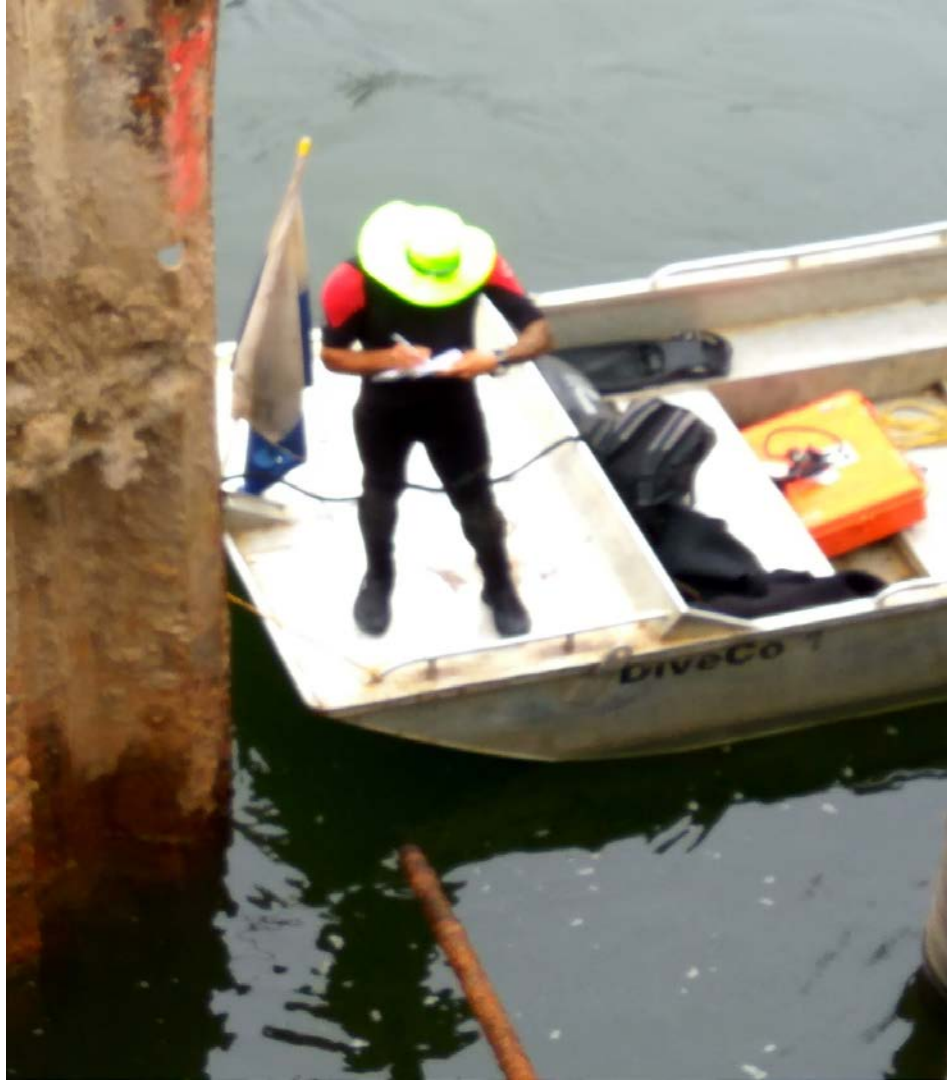
**HAZARDOUS AREA
STAY CLEAR**

REMAIN 30M CLEAR OF THIS AREA AT ALL TIMES

Following a landing there are underwater obstructions
and slip hazards in this area

No swimming or boating

Environment Canterbury
Department of Conservation



When a temporary solution becomes permanent

- Soil nail reinforcement treatment to the existing landscape
- The soil nails comprised of a grouted rod reinforced with a steel bar installed into drilled holes within the slope ranging from 5-9m in length
- Reinforced shotcrete facing
- Reno mattresses for erosion protection
- Future resilience - 50yr design life
- Heavily engineered landscape



Next Steps

- Design and construction of an asset protection structure
- Reinstatement of the Hamilton Gardens Irrigation Supply
- Implementation of Asset Improvements