



Raumati shoreline. Photo by Duncan Thomson.

Raumati coastal hazards

SUMMARY

Key findings

- Assuming that existing seawalls are not replaced in the future or alternative protection measures implemented, the Raumati shoreline is projected to be susceptible to coastal erosion over the next 30, 50 and 100 years.
- Based on the number of private land parcels potentially affected, Raumati is considered to be the most vulnerable area to coastal erosion along the Kāpiti Coast.
- Due to the higher land elevation, Raumati is less susceptible to coastal flooding except for around the Wharemauku Stream mouth under all RSLR projections, and for lower lying areas around the stormwater network under the highest RSLR scenario (1.65 m RSLR in 100 years).

Raumati coastal environment

Raumati coastal processes are influenced by the shape of the coast at Paraparaumu which extends west of the rest of the shoreline in a large delta shape. This acts as a natural barrier to longshore sediment transport, reducing the sediment supply to the Raumati shoreline. As result, the beach has experienced periodic large-scale erosion in significant storms. People have responded by building a near continuous line of ad hoc public and private coastal protection structures (seawalls) since at least 1955. Many of these structures failed in subsequent storms (e.g. 1976) as shown in photo A, and have since been rebuilt. These structures vary in length, type, and age but are mostly rock or timber seawalls (B). Ground levels behind Raumati Beach are generally high, and above future extreme relative sea level rise (RSLR) water levels, except for some low-lying areas around stream mouths such as Wharemauku Stream (C).

Coastal hazards

Present-day erosion and flood hazards

The present-day erosion hazard is what could occur in an extremely large storm (which has a 1% chance of occurring each year in the immediate/near future), and if the existing protection structures failed, as shown in photo A. Along the Raumati shoreline, this would 'most likely' result in 16 to 24 m of erosion.

Mapping shows the Raumati shoreline is not susceptible to flooding from the same sized event, but some locations are susceptible to local surface flooding from wave run-up.



A. Coastal erosion behind failed structures on Rosetta Road following a significant storm in 1976.



B. Structures along Old Coach Road.



C. Wharemauku Stream.



Future coastal erosion hazard

Future projections take into account the presence of current protection structures up to their estimated remaining life (10–30 years). After this it is assumed that the structures are not replaced, alternative protection measures are not implemented, and the beach reverts to a natural system.

Under these assumptions the Raumati shoreline is projected to erode across all timeframes under all RSLR scenarios.

Raumati Beach

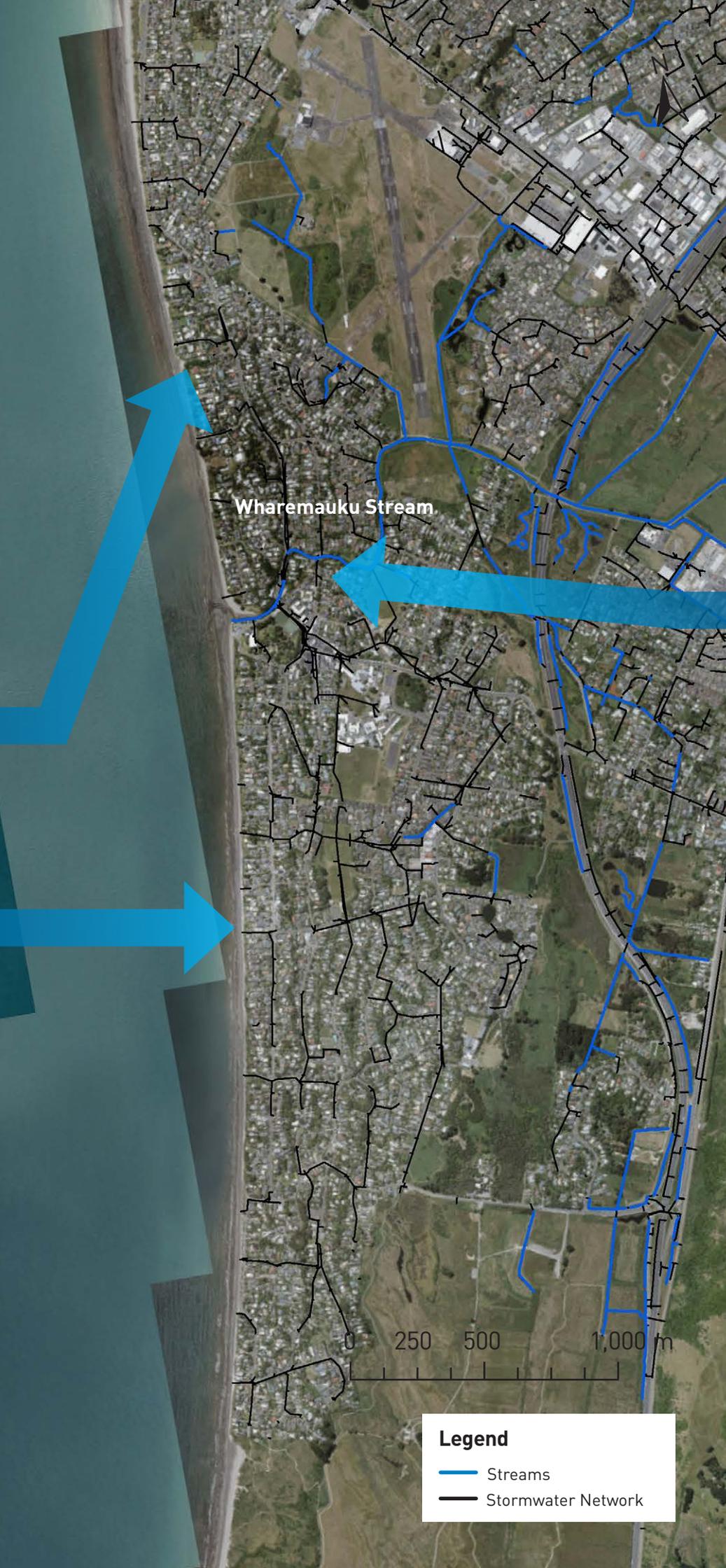
Projected to erode:

- 27 to 47 m by 2050
- 34 to 75 m by 2070
- 53 to 167 m by 2120

Raumati South

Projected to erode:

- 38 to 54 m by 2050
- 53 to 94 m by 2070
- 95 to 219 m by 2120



Wharemauku Stream



Future coastal flood hazard

Along the Raumati shoreline, flooding could occur along the Wharemauku Stream and from the stormwater network which drains into local streams and the sea. Stormwater outfalls to the sea also provide potential flooding pathways to some lower lying areas in the dune ridge along the coastline.

0.4 m and 0.65 m RSLR

The area around the mouth of the Wharemauku Stream becomes susceptible to inundation in these two scenarios. The remainder of the Raumati shoreline remains unaffected except for smaller stormwater catchments which drain directly to the sea or to the Wharemauku Stream.

1.65 m RSLR

Along the Wharemauku Stream the mapping shows an increased area susceptible to both direct inundation from the stream and through the stormwater network – Matatua Road for example – as far upstream as the stormwater ponds on either side of the Kāpiti Expressway. Elsewhere along the coastline the area susceptible to flooding through stormwater outfalls to the sea increases.

Legend

- Streams
- Stormwater Network



Vulnerability

For council infrastructure, a water supply bore and 24 coastal stormwater outlets located along the Raumati shoreline are vulnerable to the coastal erosion hazard within the next 30 years. A considerable length of council road also intersects with the 'most likely' shoreline projections under all RSLR scenarios: 850–900 m by 2050, 850–1375 m by 2070, and 1500–3700 m by 2120. A large number of private land parcels

intersect with the 'most likely' projected future shoreline position within each timeframe: 269–329 in the next 30 years depending on the RSLR scenario, 308–429 within 50 years; and 406–939 within 100 years.

For flooding, the Raumati Road evacuation route is not vulnerable in an extremely large storm until a high RSLR scenario in 2120.



How these hazards have been assessed for Raumati

Coastal science experts from Jacobs assessed the susceptibility and vulnerability of coastal erosion and flooding hazards across the entire Kāpiti District.

Government guidance recommends councils include the high [RCP8.5H+] scenario to stress-test adaptation options, and future-proof 'greenfield' developments (new suburbs and towns) and major infrastructure.

Coastal erosion

The components used to calculate a potential coastal erosion distance along the Raumati coastline include:

- the natural long-term trend of the shoreline movement (i.e. eroding, growing, or stable)
- the amount of erosion which could occur as a direct result of the rise in sea levels compared to land level (termed the Relative Sea Level Rise (RSLR)) over time frames of 30, 50, and 100 years
- short-term storm erosion from an extremely large storm which has approximately a 1% chance of occurring in each year, based on observations from the September 1976 storm, and

- erosion from dunes restabilizing to their natural stable slope following a large storm.

Jacobs used a 'probabilistic approach' to tie likelihoods to the erosion distances calculated for each scenario of RSLR. The 'most likely' range of shoreline positions has a 33–66% chance of occurring. The 'unlikely' shoreline position is where there is a 10% chance that the erosion would reach or be greater than this position.

Coastal flooding

To assess the coastal flood hazard for Raumati, Jacobs mapped the area which is susceptible to flooding by a large storm tide which has a 1% chance of occurring in any year. The maps show the flooding that could occur at the present time and in the future, for RSLR scenarios of +0.4 m; +0.65 m; +0.85 m; 1.25 m and +1.65 m. Jacobs used a simple 'bathtub' approach, where all land below the storm tide water level is mapped as susceptible to flooding, regardless of connection to the sea. The maps also show areas which could be affected by additional flooding due to wave run-up overtopping the dunes.



Full report at kapiticoast.govt.nz/coastal-science