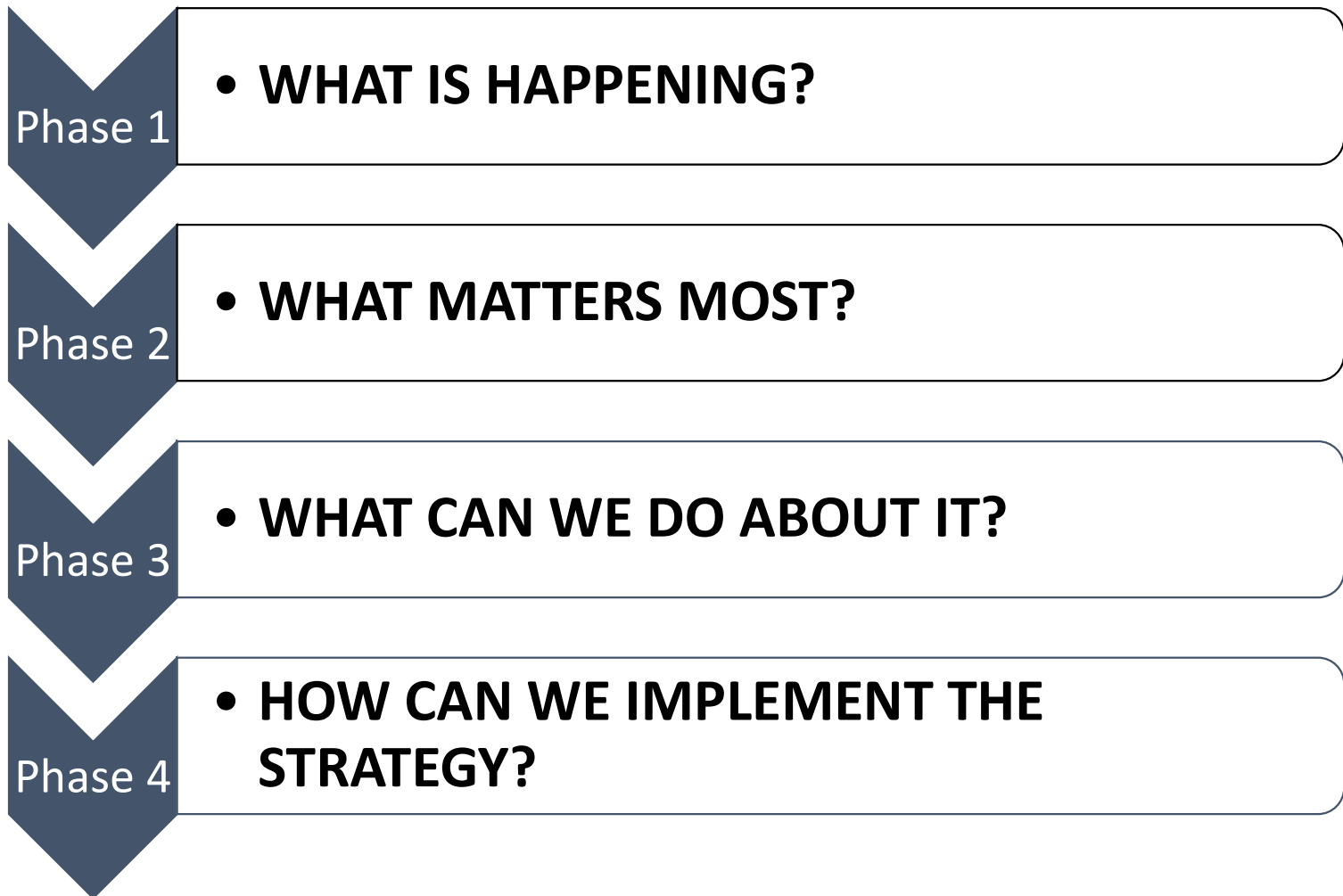




COASTAL CONVERSATIONS

GORE BAY
13 May 2023

Summary



Jacobs

**Hurunui District Coastal Adaptation
Short Listed Options**

Document no: IZ128301-0001-NM-RPT-0003
Revision no: 0

Hurunui District Council

Hurunui District Coastal Hazards
25 October 2022



**JED RIVER AND
BUXTON CREEK MOUTH:
ISSUES AND OPTIONS**

Hurunui District Council
April 2023



**An investigation into the
physical processes
controlling the dynamics of
the Jed/Buxton estuary**

In progress



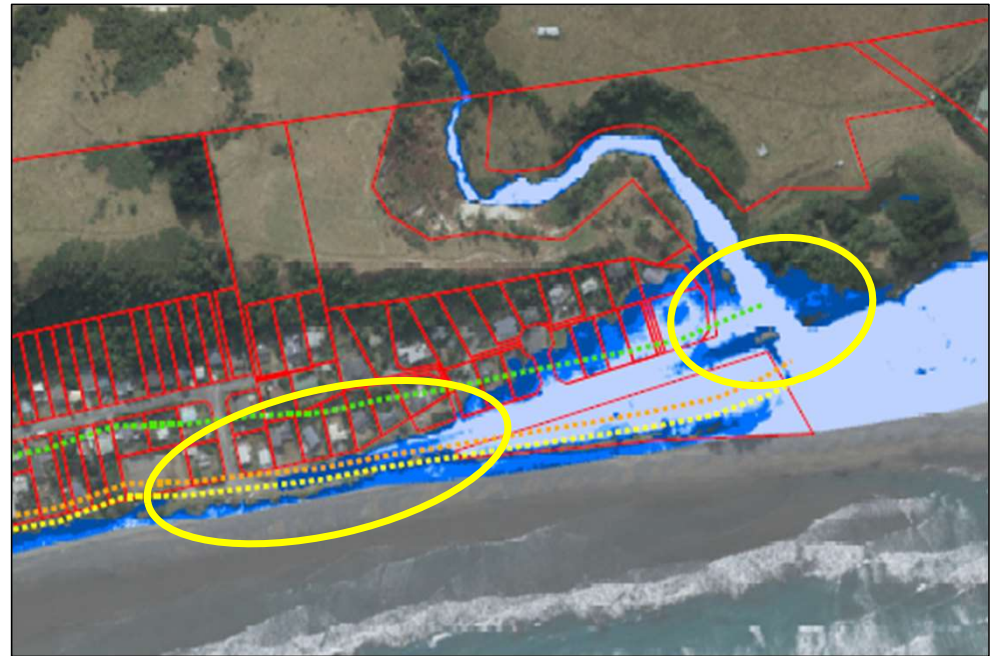
Phase one: What is happening?



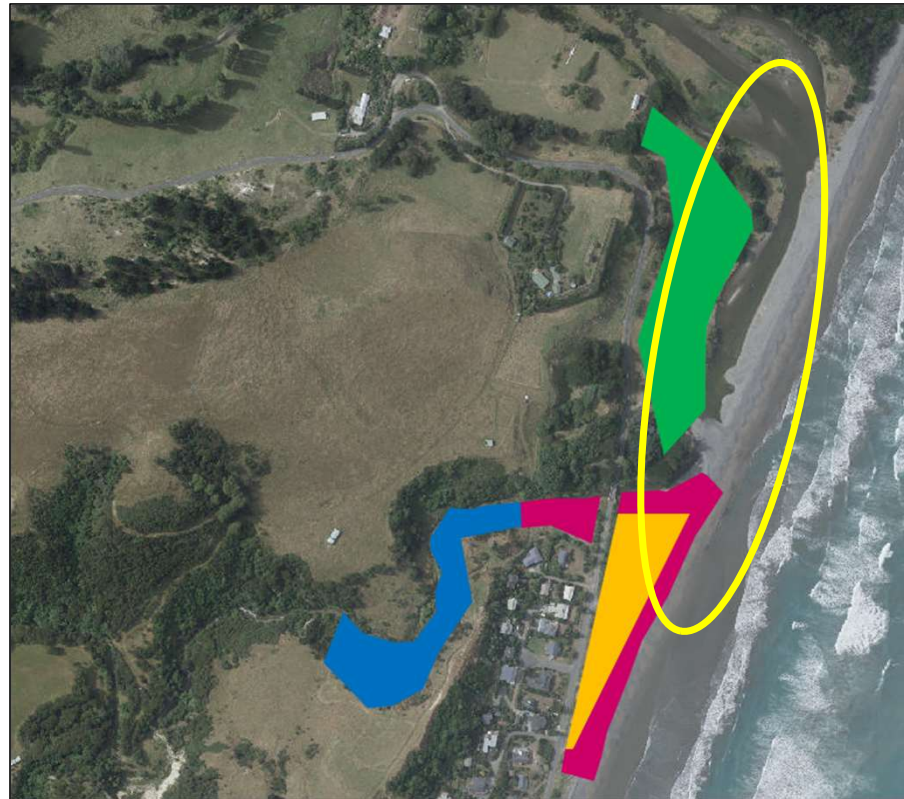
Issue one – erosion affecting private properties



Issue two – vehicle access at risk



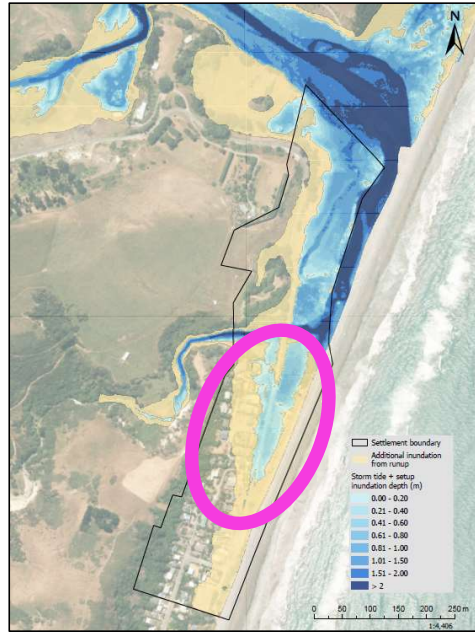
Issue three – erosion of the Jed Buxton Mouth area



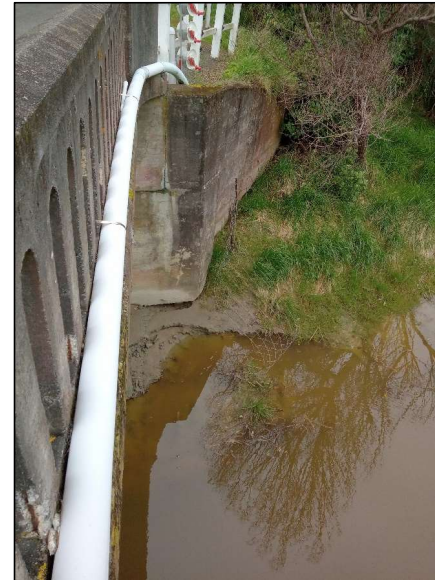
The issues



Erosion of land



Nuisance flooding



Scouring of bridge foundations

Logistical challenges of opening mouth

Area is culturally significant

Area is ecologically significant

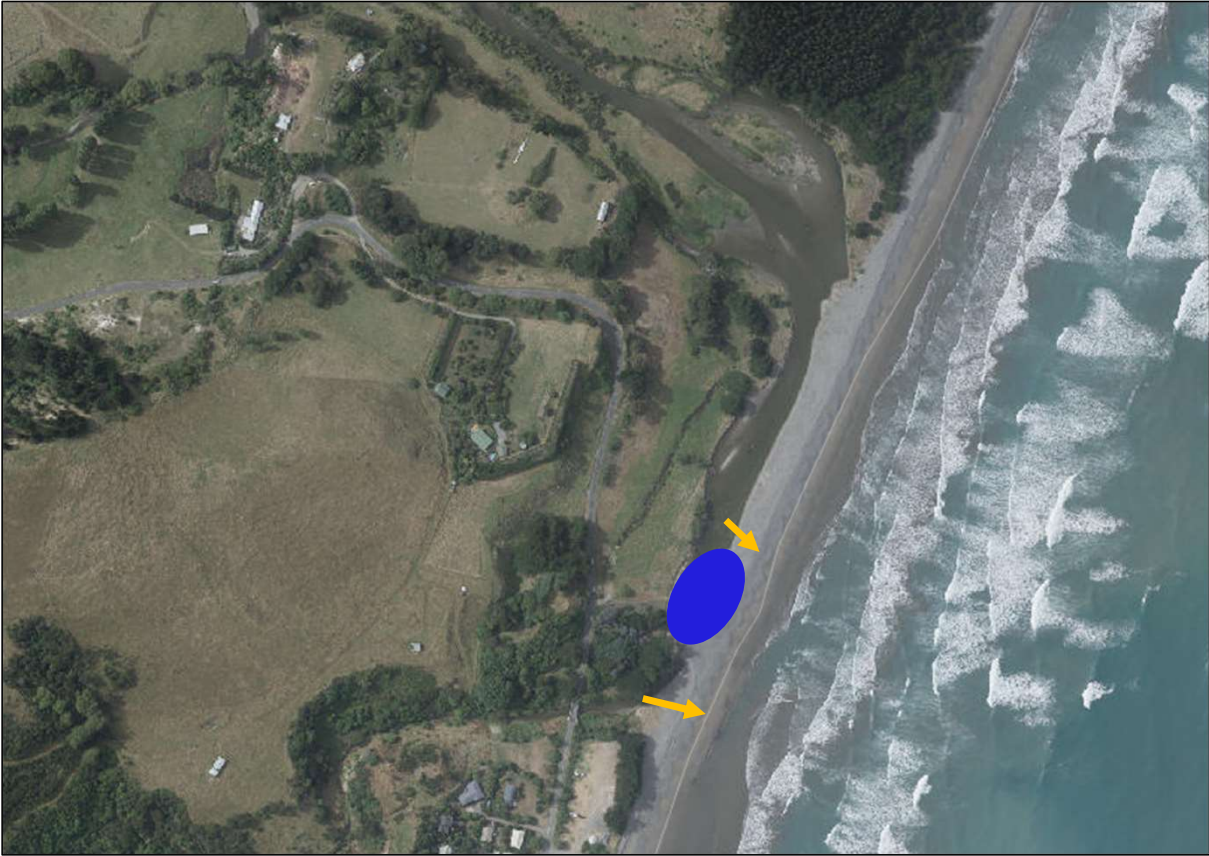
Legislation and planning

Funding

Option 1: Manual opening of the Jed River Mouth



Option 2: Separate the Jed River Mouth and the Buxton Creek Mouth



Option 3: Protection of the bridge abutments



Option 4: Protection works along the Buxton Camp



Option 5: Protection as part of a whole of Gore Bay coastline approach



Key

- Protection works required because roads are vulnerable in the next 30-50 years
- Protection works desirable around the Buxton Reserve to prevent erosion issues,
- Council-owned reserves
- Private property

AN INVESTIGATION INTO THE PHYSICAL PROCESSES CONTROLLING THE DYNAMICS OF THE JED/BUXTON ESTUARY

Laura Somerville



RESEARCH QUESTIONS

(1) What long-term (decadal scale) changes are observed in the position of the lagoon and outlet channel and what interacting processes control its variability?

(2) What is the cycle of morphological change occurring in response to individual storm events?



METHODS



AERIAL IMAGERY



RIVER FLOW DATA



WAVE
HINDCASTING



SFM AND HIGH-
RESOLUTION
REPEAT LIDAR



WATER LEVEL
MONITORING



EROSION PINS



TRAIL CAMS

NEXT STEPS:

- Fieldwork:
 - Site visits and community engagement
 - Establish sites for loggers, erosion pins, and trail cams
 - Deploy these before winter storms
 - Do some initial (pre-storm) surveying of the beach
- Desktop and data analysis:
 - Analysis of historic wave/river conditions and changes in mouth channel position.



THANK YOU FOR LISTENING!



PLEASE CONTACT: LAURA SOMERVILLE
THE UNIVERSITY OF CANTERBURY
EMAIL: LSO38@UCLIVE.AC.NZ



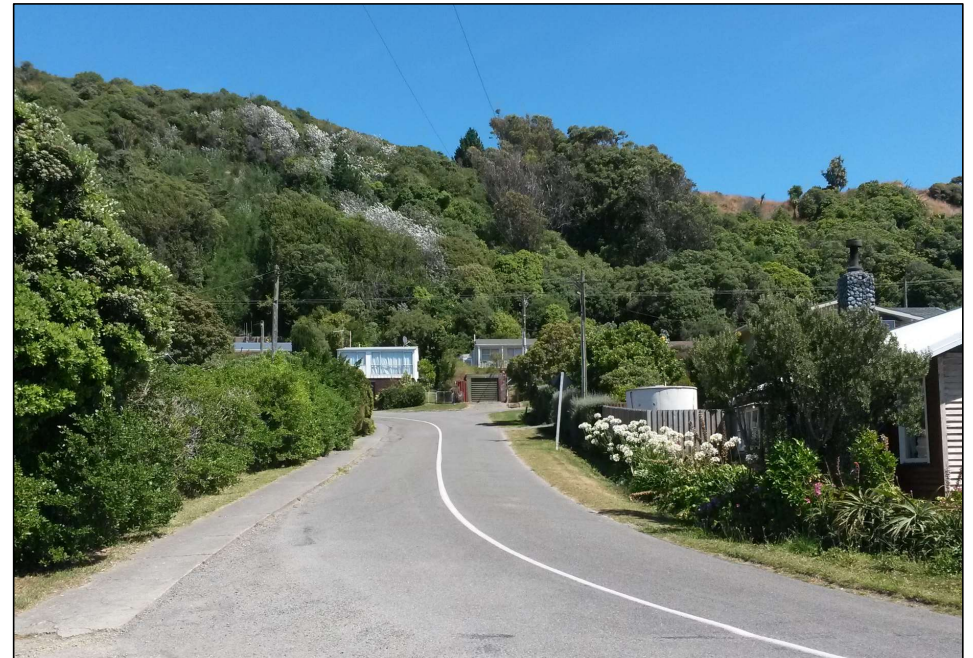
Next steps?



Issue two – road access



Issue three – private properties



Short-listed Options for Gore Bay

Engineering (hard/soft) Options:

1. Dune and behind beach vegetation enhancement – Northern Settlement (500 m)
2. Beach scraping on seaward side of beach (whole 1.3 km of settlement frontage)
3. Rock revetment (400 m along Cathedral Road and 300 m along Gore Bay Road)
4. Interlocking concrete seawall (400 m along Cathedral Road and 300 m along Gore Bay Road)
5. Raising floor levels
6. Waterproofing buildings

Planning Options

7. Maintaining District Plan
8. Avoid future development
9. Relocatable buildings
10. Managed retreat (incremental)
11. Managed retreat (community)

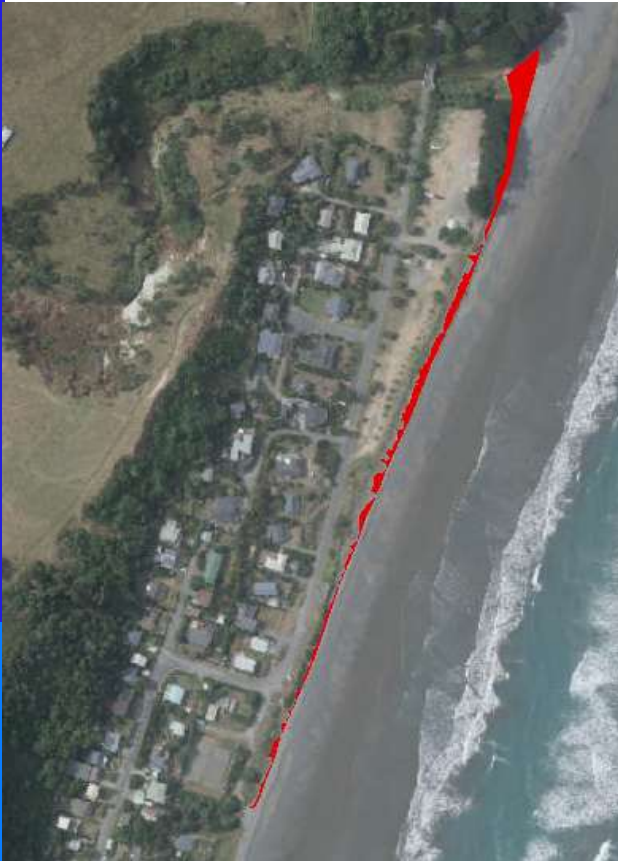
Timber poles

Description:

- A backstop timber wall at the landward limit of where it is acceptable for the beach to retreat to at some time in the future.
- Normal beach processes would continue in the intervening years, with the wall slowly becoming exposed until it was acting as a fully functional protection structure holding the shoreline in place.
- Over time the timber breaks down in the beach system.
- Approximately \$4.6 million.



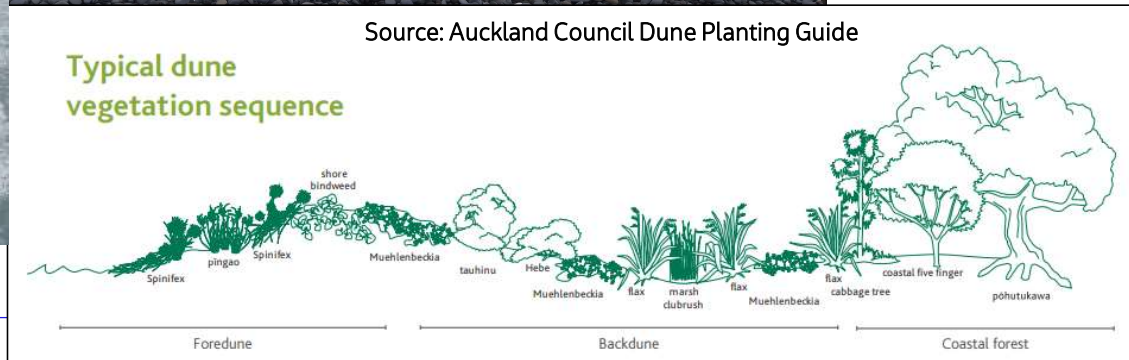
Dune and behind beach vegetation enhancement



Description:

- Potential short-term option to reduce storm erosion at the northern end of the settlement and help protect the road.
- Not recommended along Cathedral Road at the southern end of the settlement as it is understood that community attempts to enhance back beach planting along this section has not been successful due to a lack of beach width and elevation resulting in plantings frequently being washed out by wave run-up.
- Potential to be a community-led project and reduce the cost.
- Approx \$40,000

Source: Auckland Council Dune Planting Guide



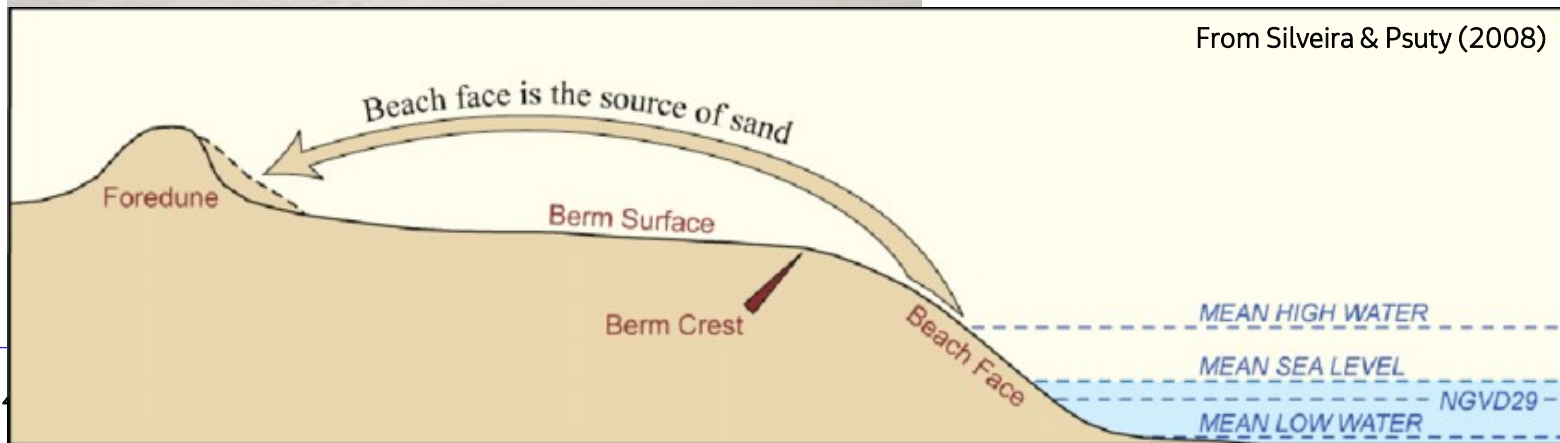
Beach scraping on seaward side of beach (whole 1.3 km of settlement frontage)



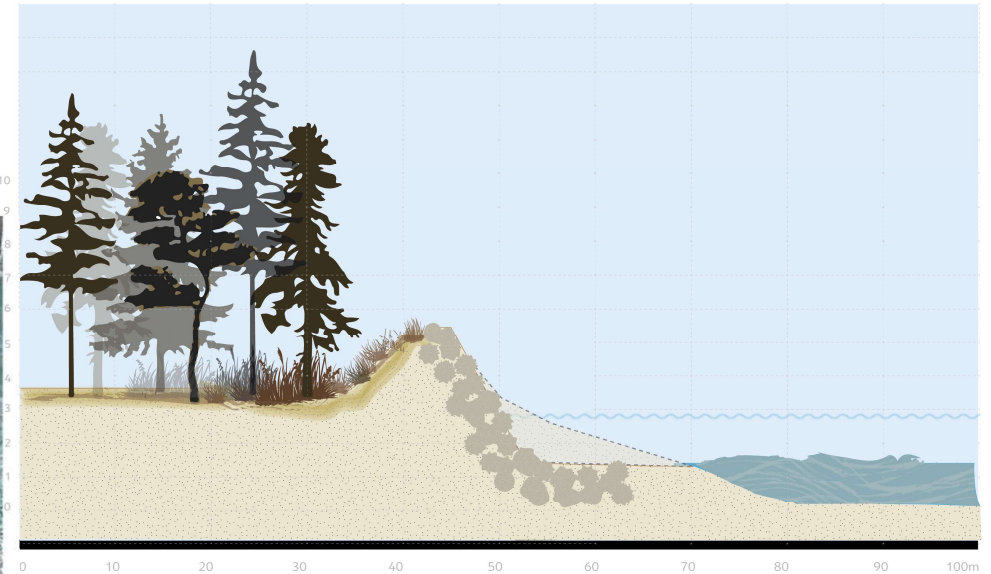
From Voice of Byron (2017)

Description:

- A short-term soft engineering approach of periodic beach scraping by bulldozer involving relocating beach sediment from the foreshore to the crest to build up the crest elevation and backshore volume of the beach profile to provide better storm protection.
- Could be applied to whole beach frontage of the settlement (1.3 km Cathedral Road to Buxton Creek) on an as required basis when there is a lack of volume on the upper beach, and a surplus of sediment on the foreshore.
- Approximately \$100,000 each time, likely to be needed every 5 years.



Rock revetment



Description:

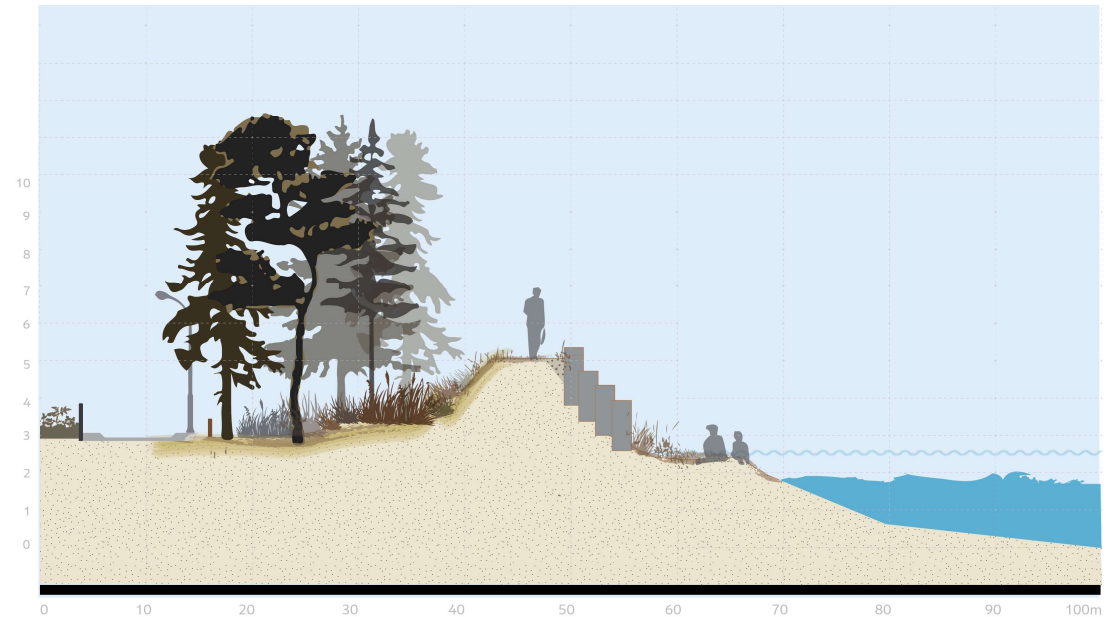
- A medium-term protection option of placed armoured rock to a designed slope and crest elevation to (1) protect the elevated bank edge from erosion at its toe, and (2) reduce wave overtopping with SLR over a 50-year period (present day + 0.5 m SLR).
- The revetment would be sloped against the current bank, with sufficient rock size, core material and area of land behind to adapt the structure to increase the structure to protect for higher levels of SLR if required.
- The revetment restricted to protecting key access roads for 400 m along Cathedral Road and for 300 m along Gore Bay Road
- Approximately \$12 million

Interlocking concrete seawall



Description:

- A medium-term protection option of interlocking concrete units forming a vertical or tiered seawall up to a designed elevation which could (1) protect the elevated bank edge from erosion at its toe, and (2) reduce wave overtopping with SLR over a 50-year period (present day + 0.5m SLR).
- The wall would be located against the current bank, and could be adapted to protect for 100 years of SLR (present day + 1 m SLR) if required.
- Approx \$7 million



Site specific solutions: Raising Floor Levels or waterproofing buildings



- Raising the floor levels of the house to protect the interior and its contents from damage in a flood event.
- It was estimated that the cost of raising a house may be up to the ratings cost of the house (Capital RV of the house)

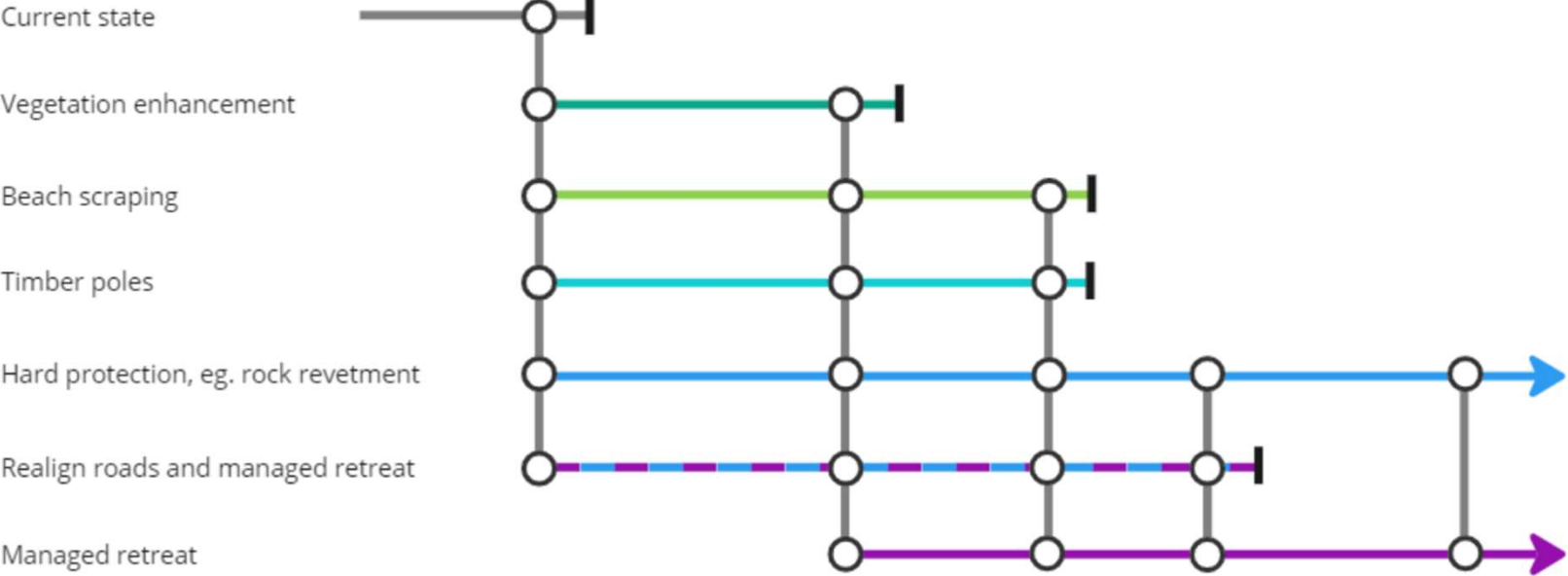


- Localised bunds or walls, modification to stormwater networks, using waterproof materials (e.g. membranes), or providing on site storage around individual buildings.
- Approx \$50,000 per household

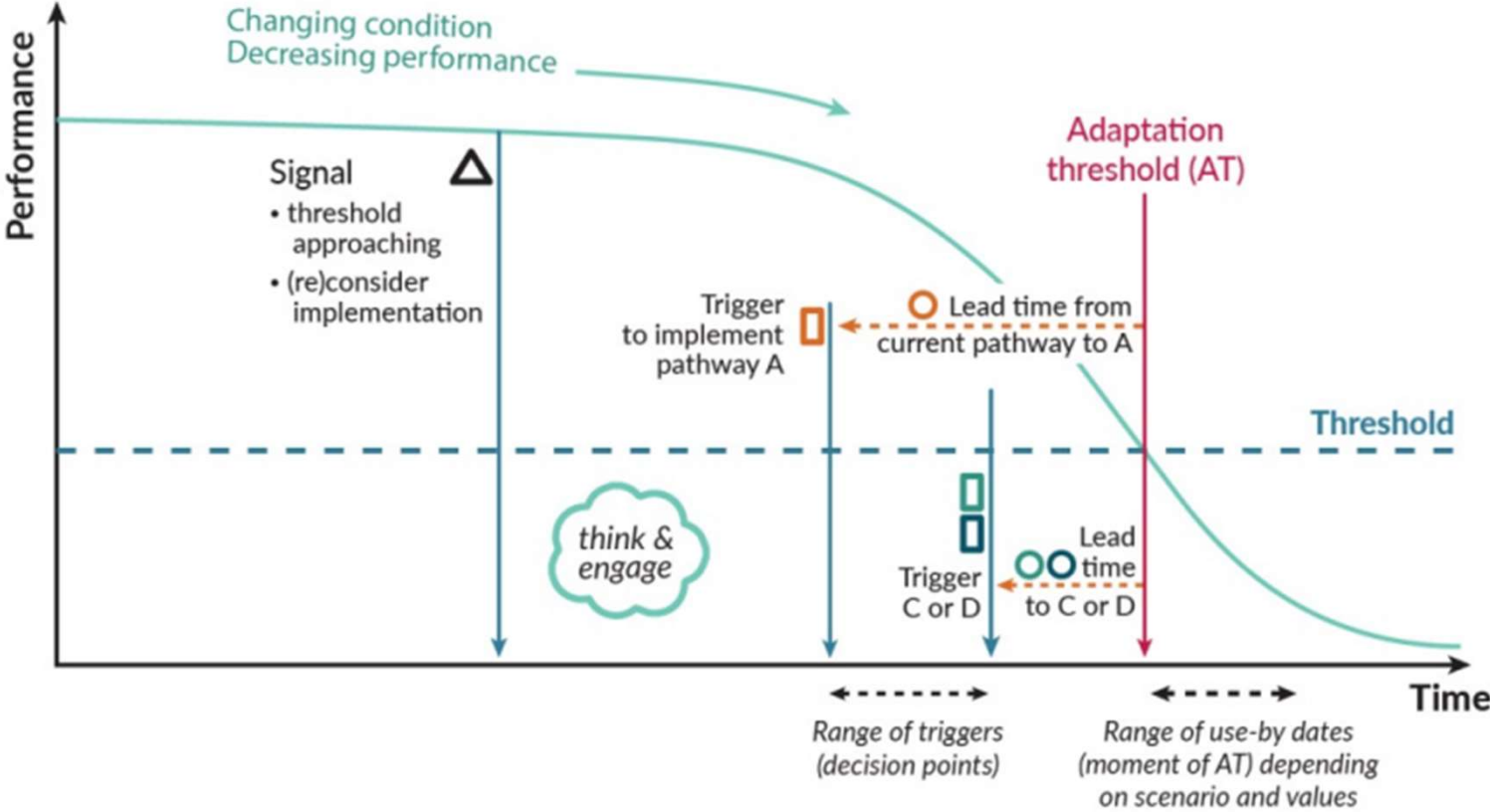
Planning Options

- **Maintaining District Plan**
 - Based on the natural turnover of houses being rebuilt to district plan flood levels
 - Low cost
- **Avoid future development**
 - Does not protect existing development, but prevents an increase in assets within the hazard areas.
 - Low cost
- **Relocatable buildings**
 - All new development must be built to be relocated in the future
 - Low cost
- **Managed retreat (incremental)**
 - Properties retreated as the hazard reaches their property
- **Managed retreat (community)**
 - All community is retreated together once threshold is reached (e.g. loss of road)

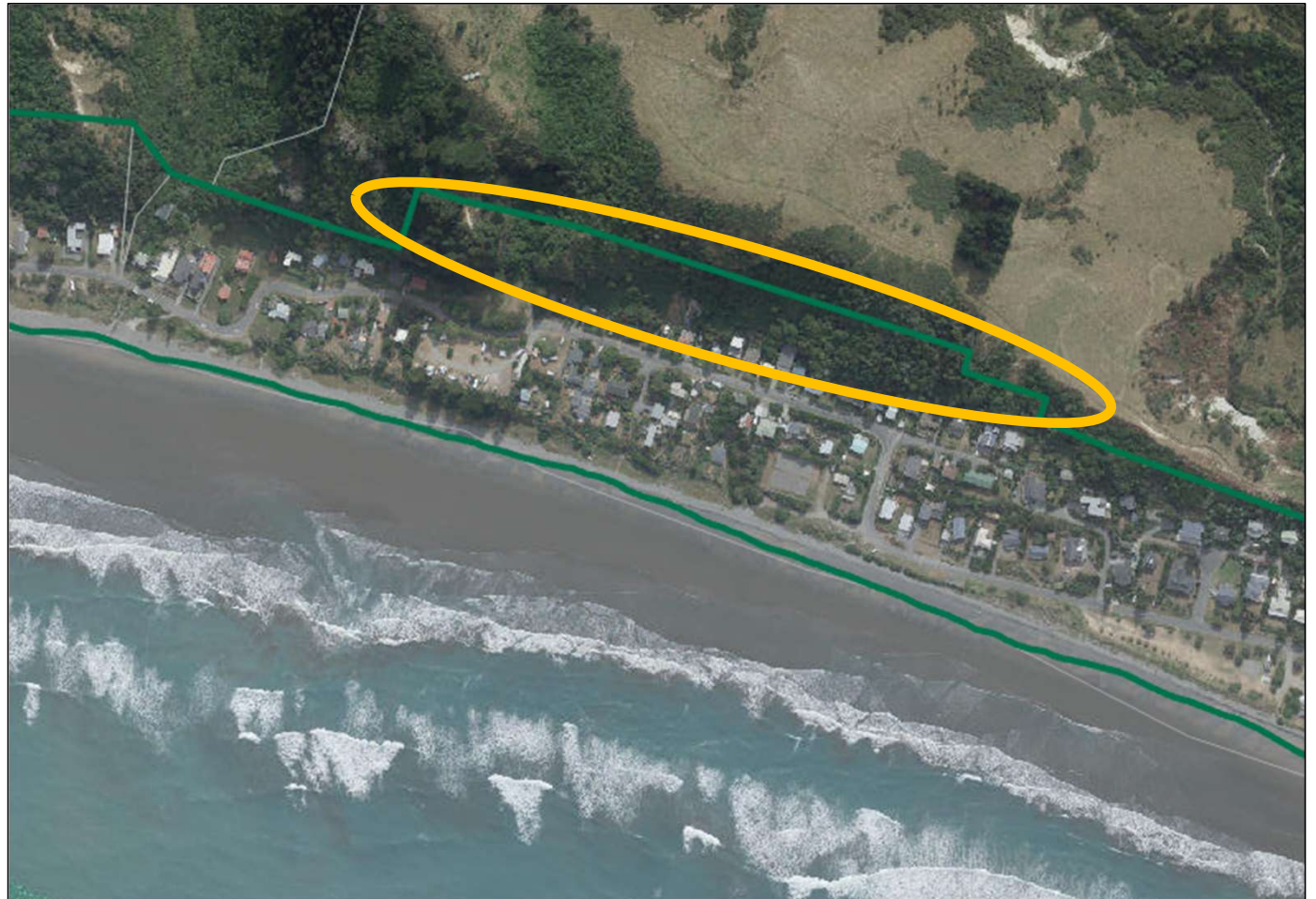
DRAFT Options



Implementation



Slope issues?



Questions and Next Steps

