Takutai Kāpiti.

Northern Adaptation Area

Shortlisted Adaptation Pathways – Community Presentation

CAP Community Feedback session - 1 July 2023

Ōtaki Baptist Church, 2 Te Manuao Road, Ōtaki

Information compiled by: Takutai Kāpiti Technical Advisory Group (KCDC, GWRC, Mitchell Daysh, Jacobs)

Decisions made by the Coastal Advisory Panel

Takutai Kāpiti.

What we want to share with you today

1 Karakia and Welcome

2 Meet the CAP

3 **Presentation: The CAP's Decision-Making Journey (so far)**
- Background – Takutai Kāpiti
- Preferred Adaptation Pathways for the Northern Adaptation Area (NAA)

4 **Questions** (15 mins)

5 **Your Input:** Response to Adaptation Pathways (NAA)
- Check out the Information Stations
- Choose your Preferred Adaptation Pathways for the NAA
- Submit your preferred NAA Adaptation Pathways feedback
- Keeping up to date: Newsletter sign up

6 Closing

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Phase 1 : Inputs

A. Team

- Coastal Advisory Panel (CAP)
- Technical Advisory Group (TAG)
- Kāpiti Coast District Council

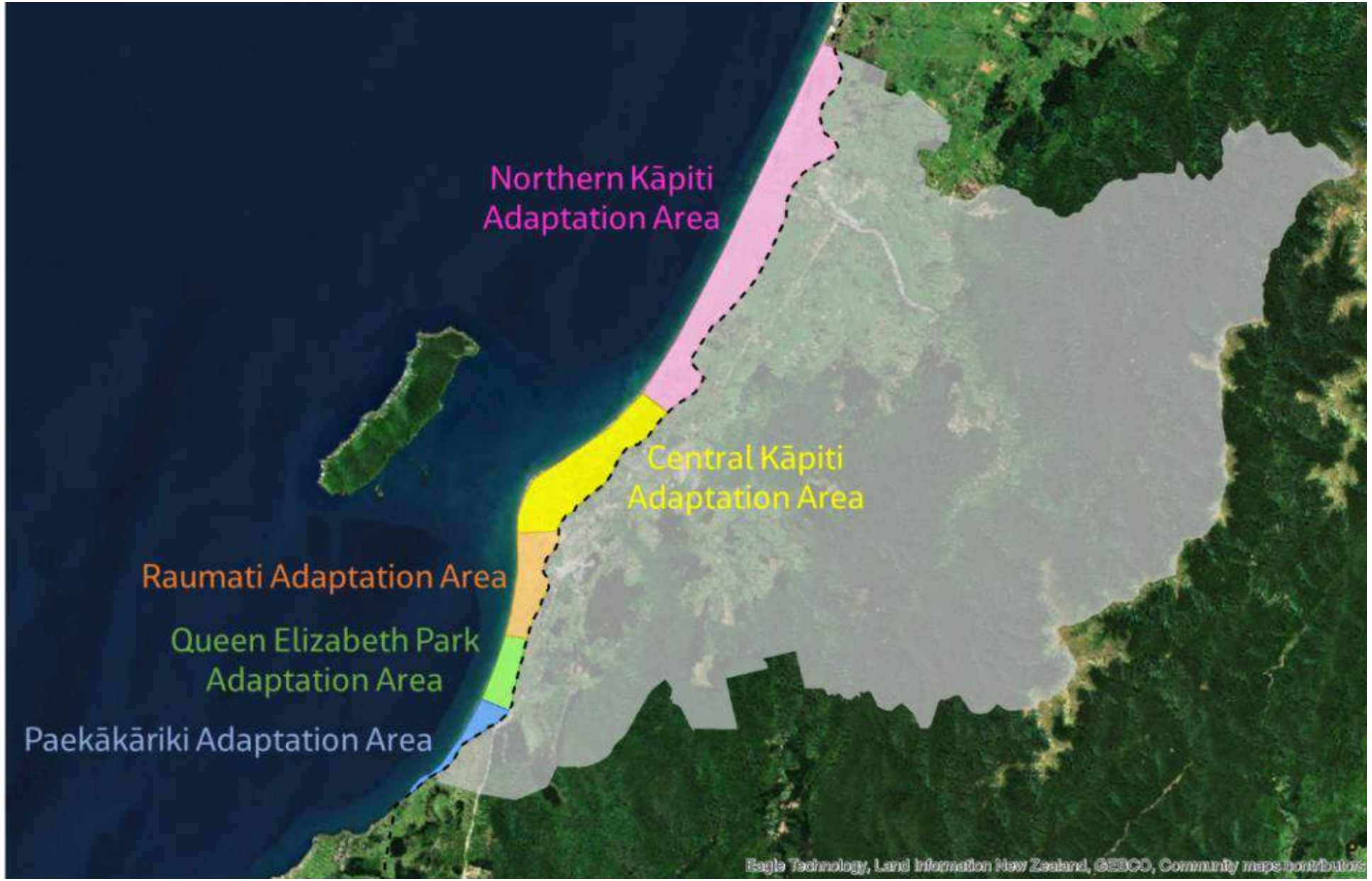
B. Technical Reports: 2 Volumes

1. Methodology — Completed (2020)

2. Hazard and Susceptibility Assessment — Completed (2022)

   (Whole district)

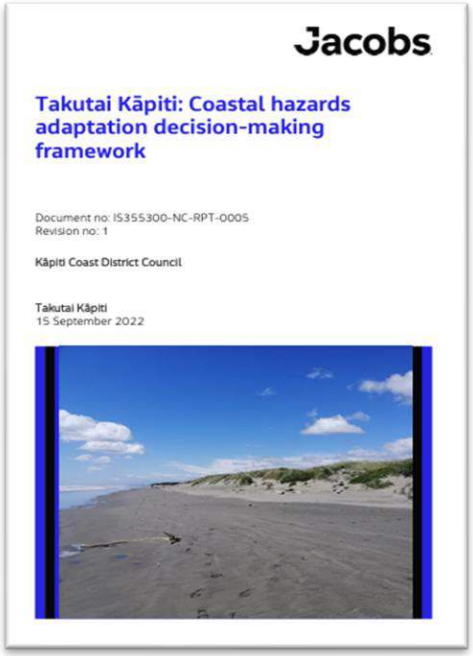
Phase 1: Define Adaptation Assessment Areas



Phase 2:
Decision Making Process

Same steps followed for each Adaptation Area

Decision Making Framework

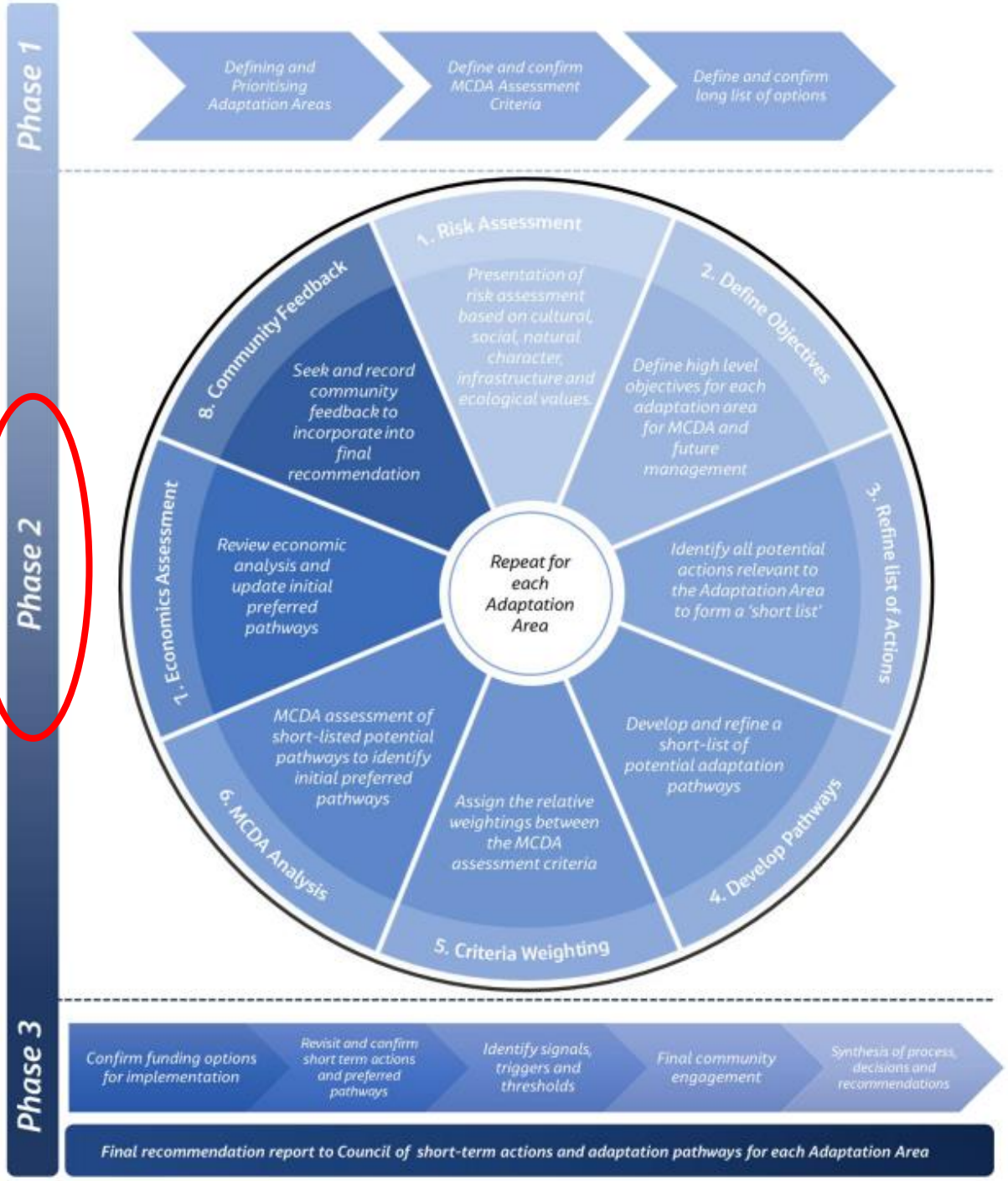

Jacobs

Takutai Kāpiti: Coastal hazards adaptation decision-making framework

Document no: IS355300-NC-RPT-0005
Revision no: 1

Kāpiti Coast District Council

Takutai Kāpiti
15 September 2022



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NAA Community Engagement

CAP, supported by the Kāpiti Coast District Council Coastal team, undertook a series of community meetings in the Northern Adaptation area. These were advertised, and approximately 300 responses received.

CAP engagement included:

- Ōtaki Library meet and greet (June 2022)
- Te Horo Country market (June 2022)
- Rangatahi session (31 August 2022)
- Ōtaki Expo (24 September 2022)
- Ōtaki community engagement workshop (24 September 2022)
- Online survey: Have Your Say (September 2022 – March 2023)
- Local newspaper survey: Ōtaki Mail (March 2023)
- Series of Ngā Hapū o Ōtaki wananga (April – June 2023)

Engagement:

Kāpiti Community

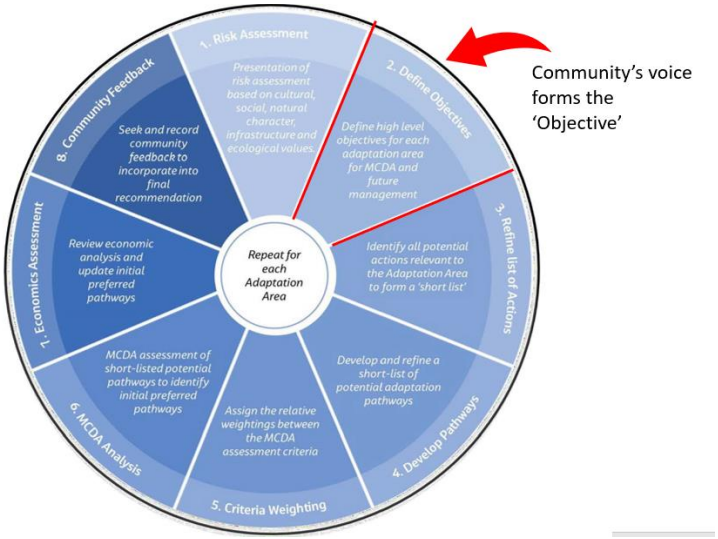
Decision making: Step 2 : Define Objectives

Community Objective: Northern Adaptation Area

"Secure long-term coastal resilience through nature-based adaptation solutions, where possible, that:

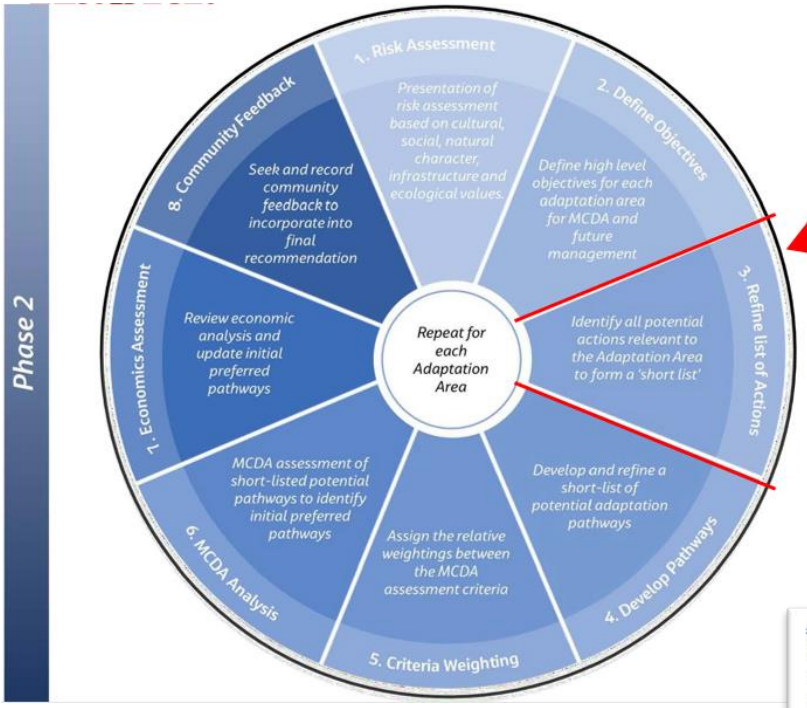
- maintains safe access to the beach;
- maintains food basket values (mahinga kai);
- provides flexibility for the community to respond to increasing sea level rise risks over time."

Phase 2

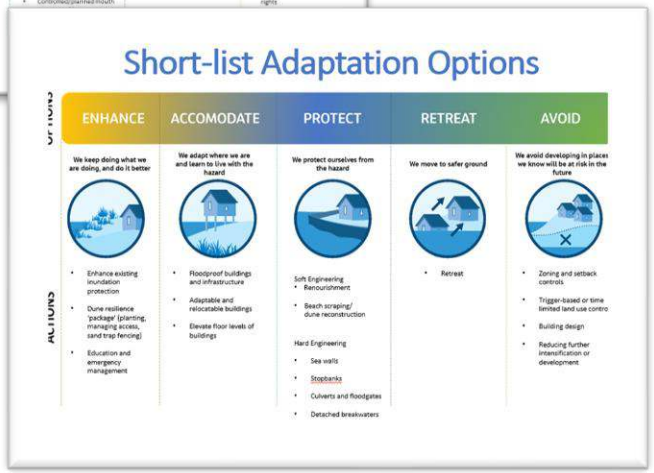


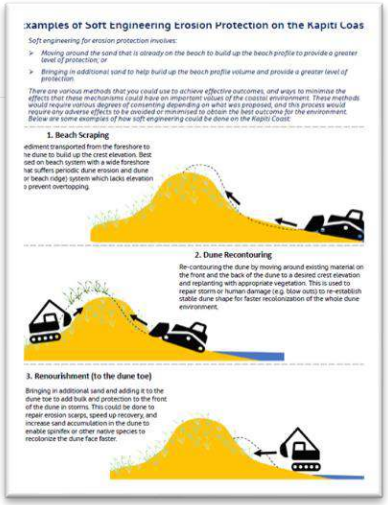
Decision making: Step 3 - Refine List of Actions

Identifying Adaptation Options for the Northern Adaptation Area



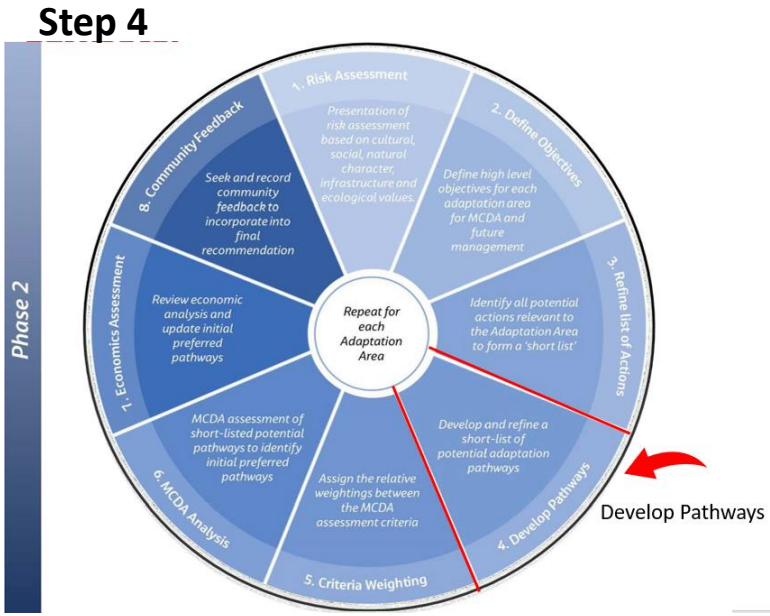
Short list of adaptation actions





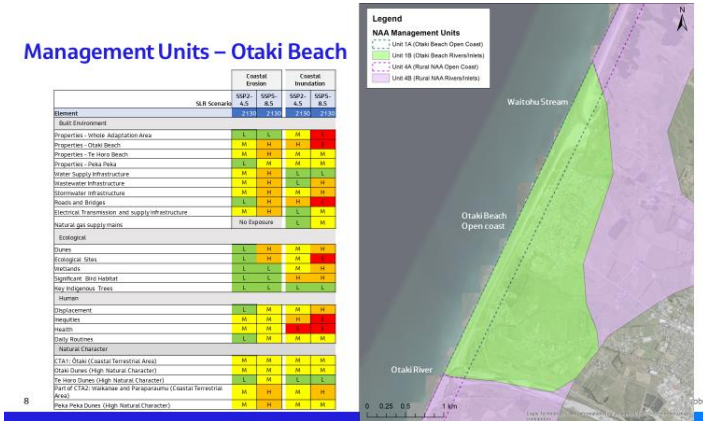
Decision making: Step 4 - Develop Pathways

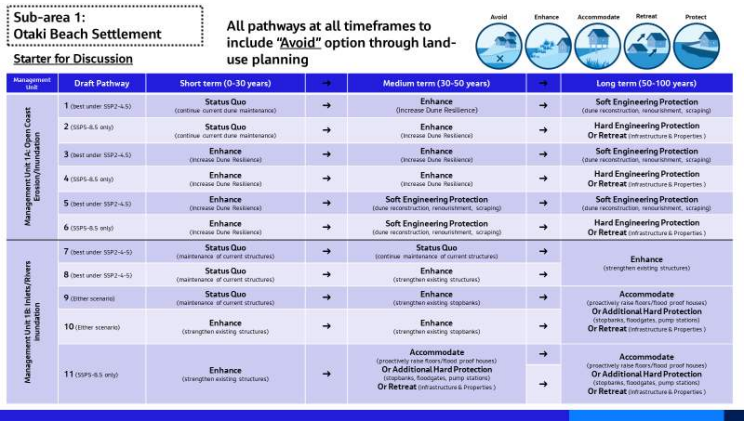
Adaptation Options - Northern Adaptation Area



- Undertake Coastal Hazard Risk Assessments
  Considering:
  - short-, medium- and long-term timeframes
  - two sea-level rise scenarios - SSP2-4.5 & SSP5-8.5
  - impacts on:
    - Built Environment
    - Human
    - Ecology
    - Natural Character
    - Cultural Values

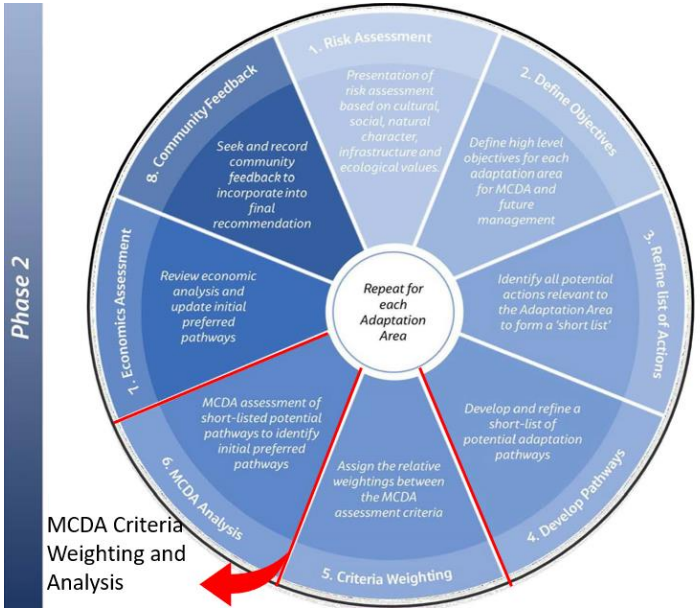
- Apply findings of risk assessment to inform a range of possible adaptation options:





Decision making: Steps 5 and 6 - MCDA Criteria Weighting and Analysis

Steps 5 and 6

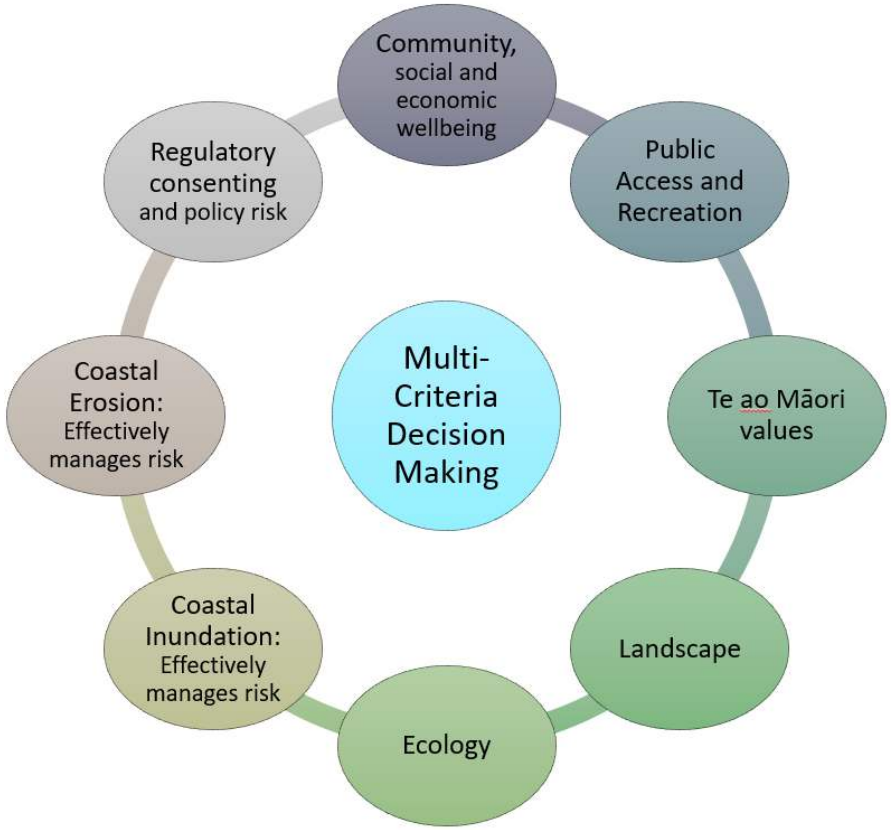


- CAP consider information and found consensus on preferred pathways for the Northern Adaptation Areas (subunits).

- Technical Advisory Group present findings to the Coastal Advisory Panel (CAP)

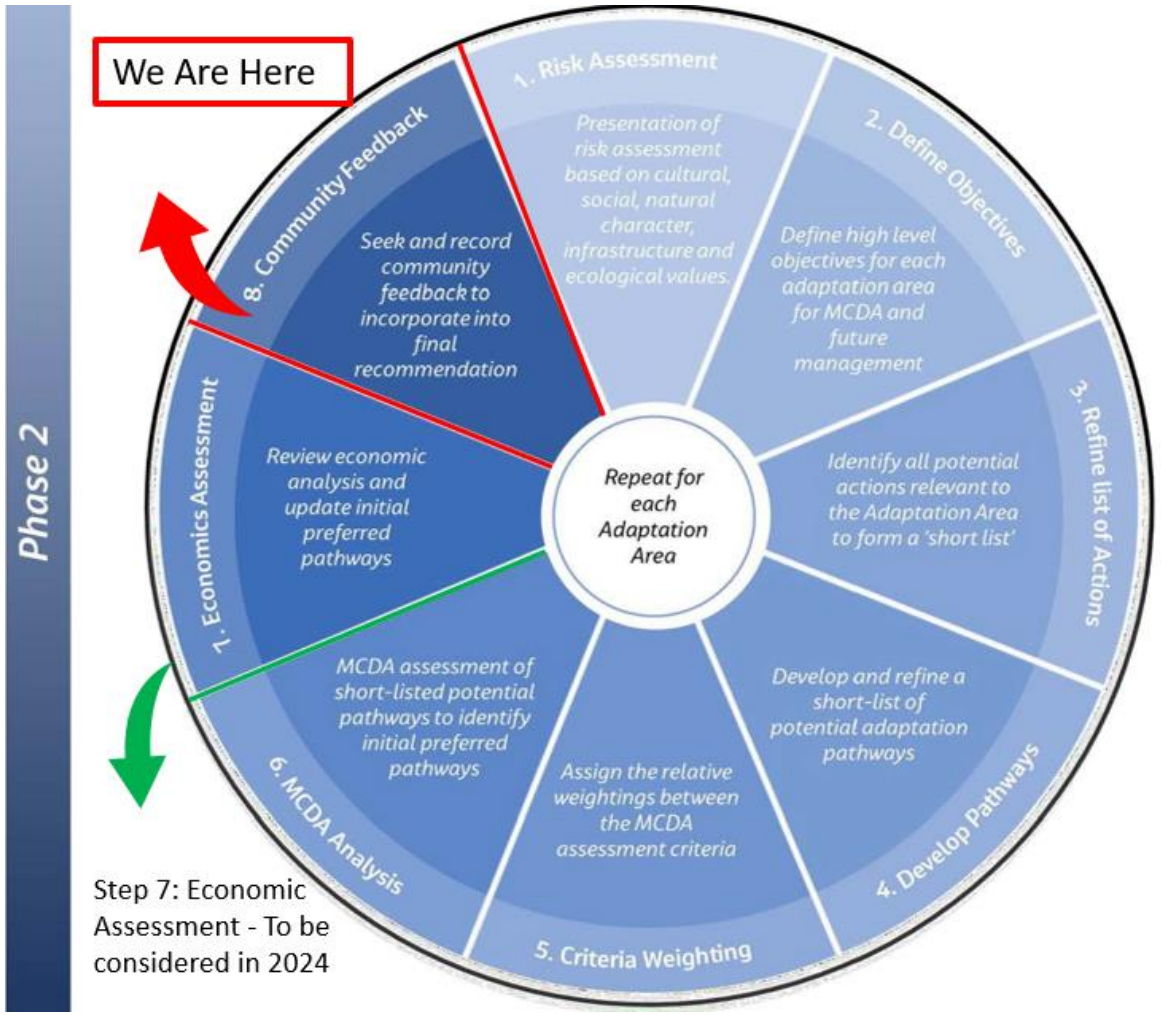
  Consider:

  - MCDA Criteria over the short-, medium- and long-term timeframes
  - two sea-level rise scenarios - SSP2-4.5 & SSP5-8.5



Decision making: Step 8 - Community Feedback

Step 8



- Coastal Advisory Panel (CAP) seek and record community feedback on NAA Adaptation Pathways
- CAP will incorporate feedback into final recommendations to Council

CAP's Preferred Pathways

Northern Adaptation Area - Initial Preferred Pathways

Northern Adaptation Area Management Units

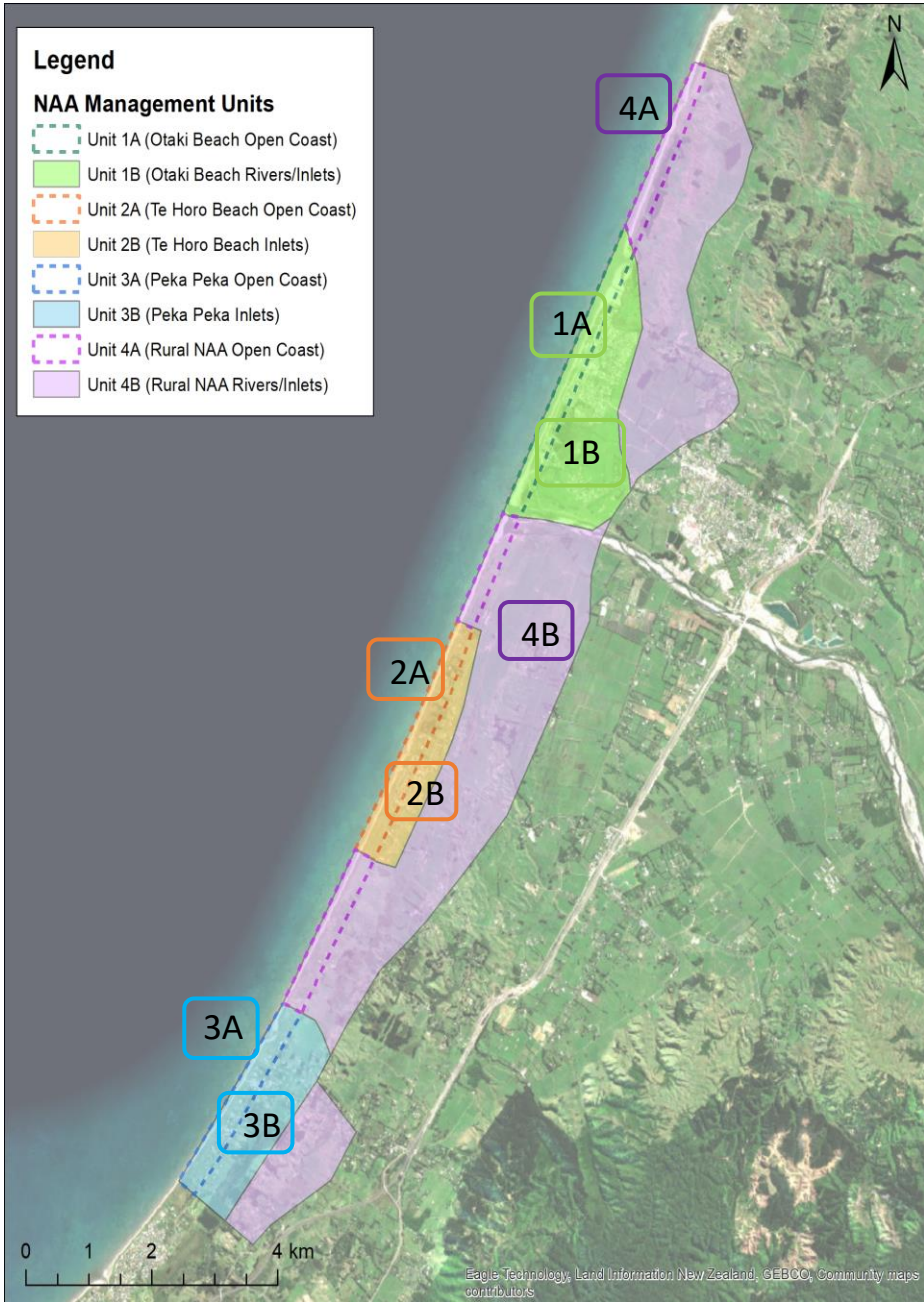
The NAA is separated into four sub-areas:

- Ōtaki Beach (Unit 1)
- Te Horo Beach (Unit 2)
- Peka Peka Beach (Unit 3)
- Rural Northern Adaptation Area (Unit 4)

Each sub-area has two ‘management units’ based on the coastal hazard source:

A = Erosion

B = Inundation



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Adaptation Pathways Feedback

Northern Adaptation Area

AVOID

All pathways at all timeframes include “Avoid” option through land-use planning. CAP will be covering this further later in the project.

How to Read the Adaptation Area Pathway Sheets

Adaptation option type

NB: Signals and triggers determined by CAP to transition from one action to the next – to do April 2024.

Refers to specific adaptation action
NB: Some pathway options comprise of more than one adaptation action.

Number of potential dwellings at risk
(*Range indicates the lower SSP2-4.5 and higher SSP5-8.5 scenario; no range if the same number of properties is affected for each scenario)*

Explanatory technical notes

Map of area - with legend

2130 predicted shoreline at SSP5 8.5 (33-66%) – with no adaptation actions

Unit 1A: Preference 1 *MCDA Score : 87*

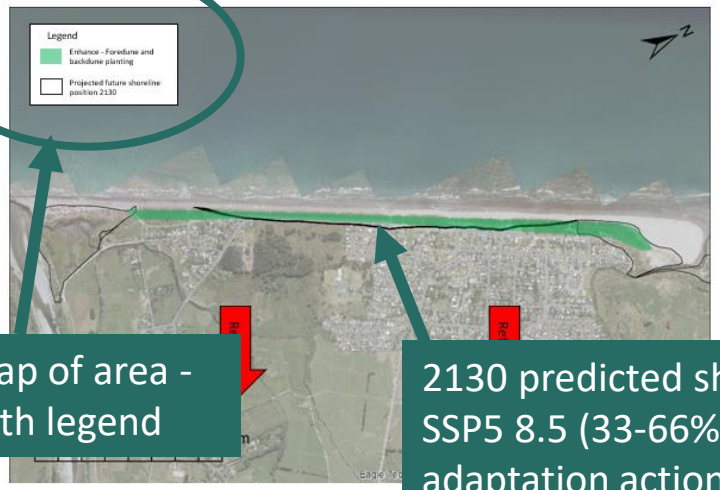
Northern Adaptation Area Pathways

Management Unit: **1A: Ōtaki Beach Open Coast**

Pathway: **F**

2050 – 14 Properties at risk of erosion
2070 – 14 Properties at risk of erosion
2130 – 14-39 Properties at risk of erosion

Short term	Medium term	Long term
Enhance [3,4] Increase dune resilience by foreshore and backshore planting	**Enhance** [3,4] Increase dune resilience by foreshore and backshore planting	**Retreat** [8] Proactively moving people out of the way of the hazard.



Notes:
Extensive foredune and backdune planting over the **short term** with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

This is continued over the **medium term** where efforts to enhance the dune system are increased, and this approach is undertaken until a trigger is met, and this approach is no longer effective at managing the erosion risk.

At this point, beachfront properties exposed to the hazard would undergo managed retreat and be relocated away from the hazard.

20

Overview of CAP's Preferred Pathways for Erosion

Pathways are the same for:

- Unit 1A: Ōtaki Beach
- Unit 2A: Te Horo Beach
- Unit 3A: Peka Peka Beach

MCDA Ranking	Short term	→	Medium Term	→	Long Term	Pathway number
1	Enhance	→	Enhance	→	Retreat	PW-5
2	Enhance	→	Soft Engineering Protection	→	Retreat	PW-4
3	Enhance	→	Enhance	→	Soft Engineering Protection	PW-1

Pathways are different for:

- Unit 4A: Rural

MCDA Ranking	Short term	→	Medium Term	→	Long Term	Pathway number
1	Status Quo	→	Enhance	→	Enhance	PW-1
2	Status Quo	→	Enhance	→	Soft Engineering Protection	PW-3
3	Enhance	→	Enhance	→	Soft Engineering Protection	PW-2

COASTAL ADAPTATION OPTIONS : EROSION (UNITS: 1A, 2A, and 3A)

ENHANCE

We maintain and improve what we are already doing

Dune and / or Wetland Resilience (# 3)

Examples:

- Wind trap fencing
- Planting
- Managed dune access
- Managed coastal wetlands

Education and Emergency Management (#4)

PROTECT

We keep the hazard away

Beach Nourishment
(Soft Engineering # 9)

RETREAT

We move away from the hazard

Proactively moving properties or infrastructure away from the hazard (# 8)

Examples:

- Land acquisitions
- Buyouts
- Land swaps
- Lease backs
- Future interests

Preferred Pathways for Unit 1A: Ōtaki Beach – Open Coast (Erosion)

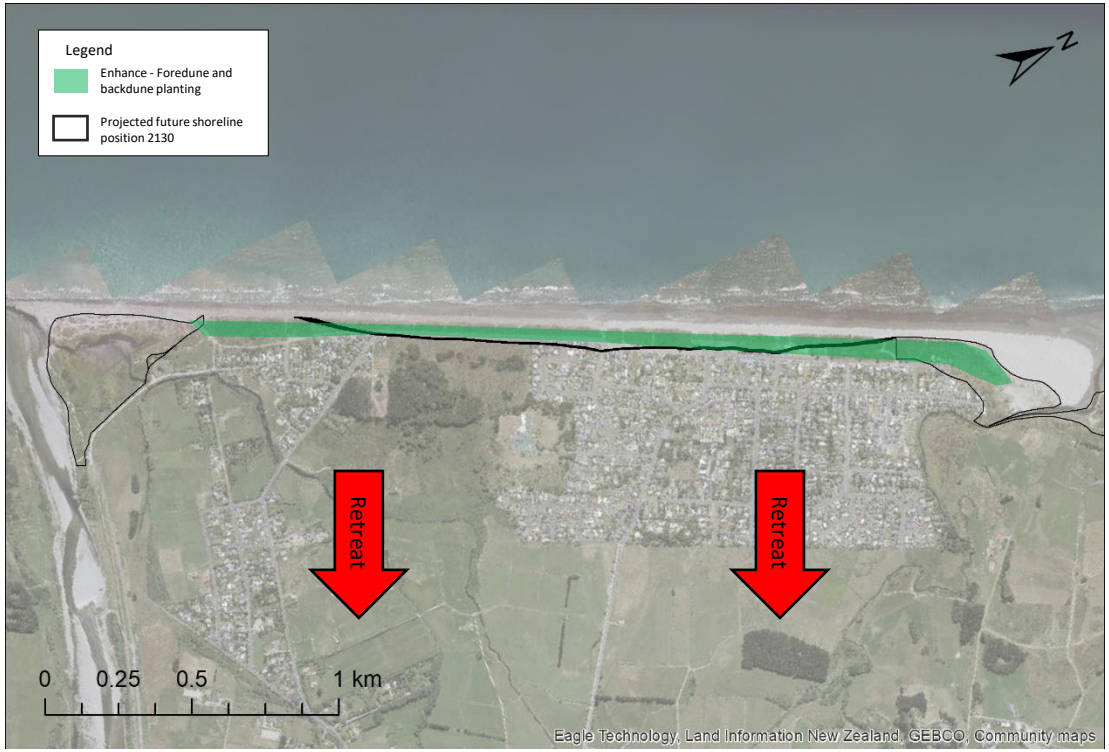
Unit 1A	Ōtaki Beach – Open Coast (Erosion)						
MCDA Ranking	Short term	→	Medium Term	→	Long Term	MCDA Score	Pathway number
1	Enhance	→	Enhance	→	Retreat	87	PW-5
2	Enhance	→	Soft Engineering Protection	→	Retreat	74	PW-4
3	Enhance	→	Enhance	→	Soft Engineering Protection	69	PW-1

Management Unit:	**1A: Ōtaki Beach Open Coast**

Pathway:	**5**

2050 – 14 Properties at risk of erosion
2070 – 14 Properties at risk of erosion
2130 – 14-39 Properties at risk of erosion

Short term	Medium term	Long term
Enhance [3,4]	**Enhance** [3,4]	**Retreat** [8]
Increase dune resilience by foreshore and backshore planting →	Increase dune resilience by foreshore and backshore planting →	Proactively moving people out of the way of the hazard.



Notes:

Extensive foredune and backdune planting over the **short term** with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

This is continued over the **medium term** where efforts to enhance the dune system are increased, and this approach is undertaken until a trigger is met, and this approach is no longer effective at managing the erosion risk.

At this point, beachfront properties exposed to the erosion hazard would undergo managed retreat and be proactively relocated away from the hazard.

Management Unit:	**1A: Ōtaki Beach Open Coast**

Pathway:	**4**

2050 – 14 Properties at risk of erosion
2070 – 14 Properties at risk of erosion
2130 – 14-39 Properties at risk of erosion

Short term	Medium term	Long term

Enhance [3,4]

Increase dune resilience by foreshore and backshore planting

→

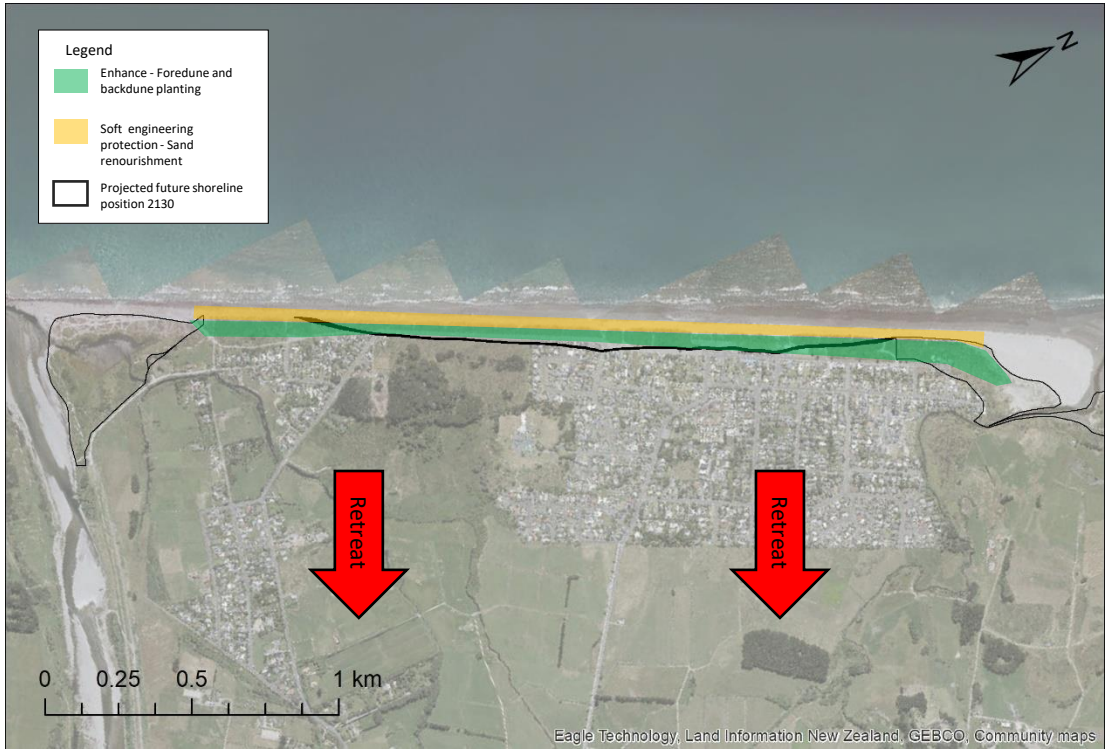
Soft Engineering Protection [9]

Importing sand and distributing it on the foreshore to supply more bulk to the beach profile.

→

Retreat [8]

Proactively moving people out of the way of the hazard.



Notes:

Extensive foredune and backdune planting over the **short term** with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

Over the **medium term**, as sea levels rise and erosion of the dune system becomes more extensive, imported sand would be distributed along the foredune to add volume to the beach and reduce erosion. Additional replenishments and dune maintenance would be undertaken as required.

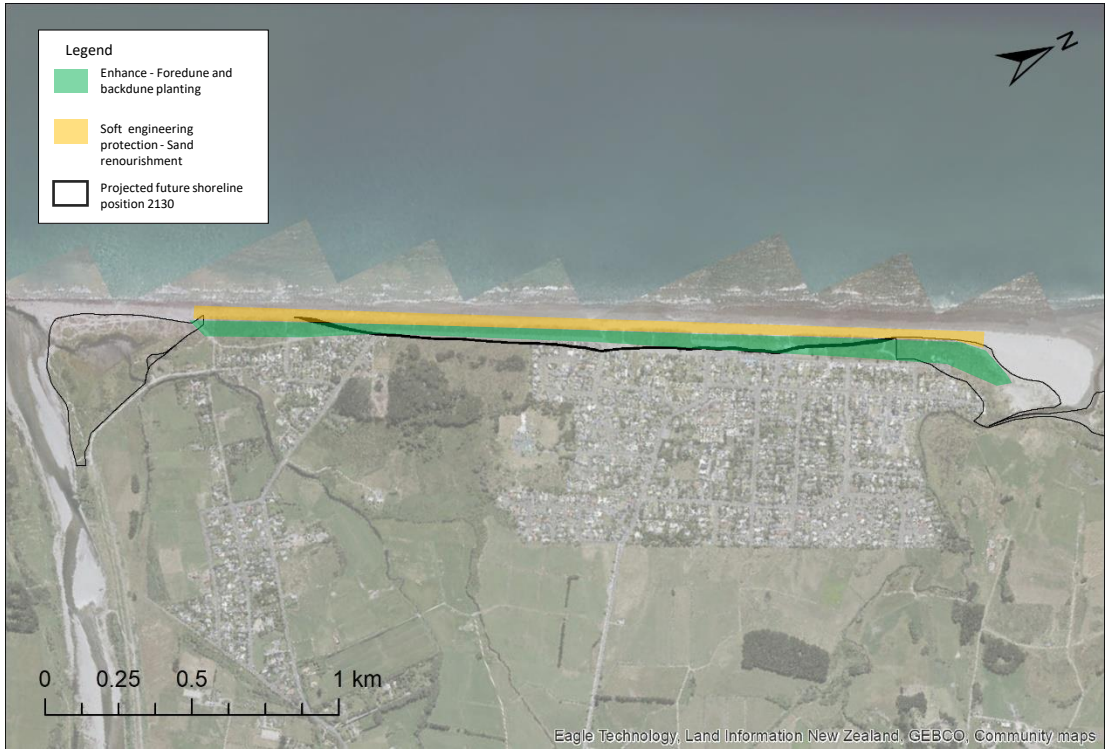
When soft engineering is no longer cost effective, beachfront properties exposed to the erosion hazard would undergo managed retreat and be proactively relocated away from the hazard.

Management Unit:	**1A: Ōtaki Beach Open Coast**

Pathway:	**1**

2050 – 14 Properties at risk of erosion
2070 – 14 Properties at risk of erosion
2130 – 14-39 Properties at risk of erosion

Short term	Medium term	Long term
Enhance [3,4]	**Enhance** [3,4]	**Soft Engineering Protection** [9]
Increase dune resilience by foreshore and backshore planting →	Increase dune resilience by foreshore and backshore planting →	Importing sand and distributing it on the foreshore to supply more bulk to the beach profile.



Notes:
Extensive foredune and backdune planting over the **short-medium term** with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

As sea levels rise and erosion of the dune system becomes more extensive, imported sand would be distributed along the foredune to add volume to the beach and reduce erosion. Additional replenishments and dune maintenance would be undertaken as required to maintain dune volumes which provide sufficient protection.

Overview of CAP's Preferred Pathways for Inundation

Pathways are the same for:

- Unit 1B: Ōtaki Beach
- Unit 2B: Te Horo Beach
- Unit 3B: Peka Peka Beach

MCDA Ranking	Short term	→	Medium Term	→	Long Term	Pathway number
1	Enhance	→	Accommodate	→	Retreat	PW-3
2	Enhance	→	Additional Hard Protection	→	Retreat	PW-2
2	Enhance	→	Accommodate	→	Additional Hard Protection	PW-1

Pathways are different for:

- Unit 4B: Rural

MCDA Ranking	Short term	→	Medium Term	→	Long Term	Pathway number
1	Status Quo	→	Enhance	→	Accommodate	PW-1
2	Accommodate	→	Accommodate	→	Retreat	PW-2

COASTAL ADAPTATION OPTIONS : INUNDATION (UNITS: 1B, 2B, and 3B)

ENHANCE

We maintain what we are already and improve doing

Enhance existing Inundation Protection *(# 2)*
Examples:
- Upgrade stopbanks
- Upgrade stormwater management

Dune and / or Wetland Resilience *(# 3)*
Examples:
- Wind trap fencing
- Planting
- Managed dune access
- Managed coastal wetlands

ACCOMMODATE

We live with the hazard

Elevate Floor Levels of Buildings *(# 7)*

RETREAT

We move away from the hazard

Proactively moving properties or infrastructure away from the hazard *(# 8)*
Examples:
- Land swaps acquisitions
- Buyouts
- Lease backs
- Future interests

PROTECT

We keep the hazard away

Additional Hard Protection
- Stopbanks *(# 12)*
- Culverts and Flood Gates *(# 13)*
- Pump Stations *(# 15)*

Preferred Pathways for Unit 1B: Ōtaki Beach – Rivers/Inlets (Inundation)

Unit 1B	Ōtaki Beach – Rivers / Inlets (Inundation)						
MCDA Ranking	Short term	→	Medium Term	→	Long Term	MCDA Score	Pathway number
1	Enhance	→	Accommodate	→	Retreat	**83**	PW-3
2 (tied)	Enhance	→	Additional Hard Protection	→	Retreat	**62**	PW-2
2 (tied)	Enhance	→	Accommodate	→	Additional Hard Protection	**62**	PW-1

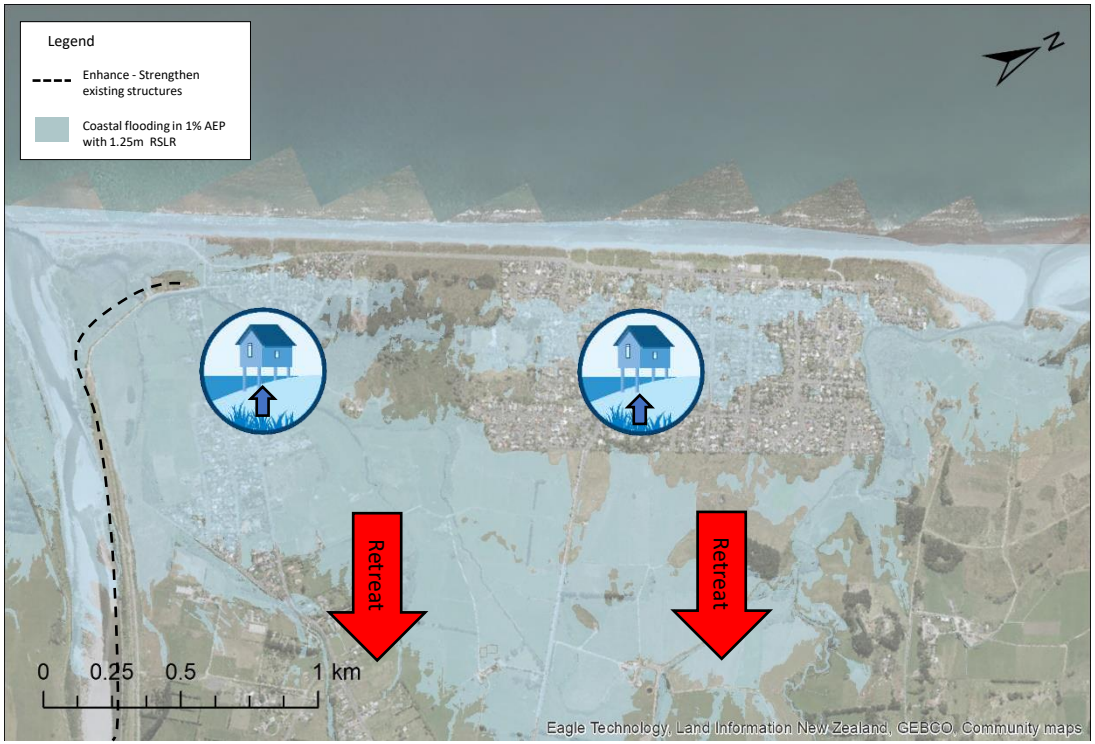
Unit 1B: Preference 1 MCDA Score = 83

Northern Adaptation Area Pathways

2050 – 220 Properties at risk of inundation
2070 – 281-355 Properties at risk of inundation
2130 – 546-653 Properties at risk of inundation

Management Unit:	**1B: Ōtaki Beach River/Inlets**	Pathway:	**3**

Short term	Medium term	Long term
Enhance [2,3]	**Accommodate** [7]	**Retreat** [8]
Strengthen existing stopbanks and structures, enhance wetlands. →	Pro-actively raise floors of homes which could be flooded. →	Proactively moving people out of the way of the hazard.



Notes:

Over the **short term**, upgrades and maintenance of existing infrastructure to manage the short-medium term flood risk for the settlement. This could include enhancing existing stopbanks, increasing drainage capacity of the existing stormwater outfalls. Enhance coastal wetlands through effective planting and management.

Over the **medium term**, dwellings where the flood risk is not being effectively managed through the broader flood protection scheme would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded. Although dwellings would be protected, access to properties and services may still be impacted.

As sea levels continue to rise, dwellings with inundation risks that are no longer effectively being managed through the broader flood protection scheme or raised floor levels would be retreated away from the hazard.

Management Unit:	**1B: Ōtaki Beach River/Inlets**	Pathway:	**2**

2050 – 220 Properties at risk of inundation
2070 – 281-355 Properties at risk of inundation
2130 – 546-653 Properties at risk of inundation

Short term	Medium term	Long term
Enhance [2,3]	**Additional Hard Protection** [12, 13, 15]	**Retreat** [8]
Strengthen existing stopbanks and structures, enhance wetlands. →	Installation of floodgates, pump stations and stopbanks to prevent sea water entering the settlements →	Proactively moving people out of the way of the hazard.

Notes:

Over the **short term**, upgrades and maintenance of existing infrastructure to manage the **short-medium term** flood risk for the settlement. This could include enhancing existing stopbanks, increasing drainage capacity of the existing stormwater outfalls. Enhance coastal wetlands through effective planting and management.

Over the **medium term**, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the seafront, or via the stormwater network.

As sea levels continue to rise, where the flood protection scheme is no longer effective in managing the risks to coastal inundation, dwellings at risk would be retreated away from the hazard.

Management Unit:	**1B: Ōtaki Beach River/Inlets**	Pathway:	**1**

2050 – 220 Properties at risk of inundation
2070 – 281-355 Properties at risk of inundation
2130 – 546-653 Properties at risk of inundation

Short term	Medium term	Long term

Enhance [2,3]

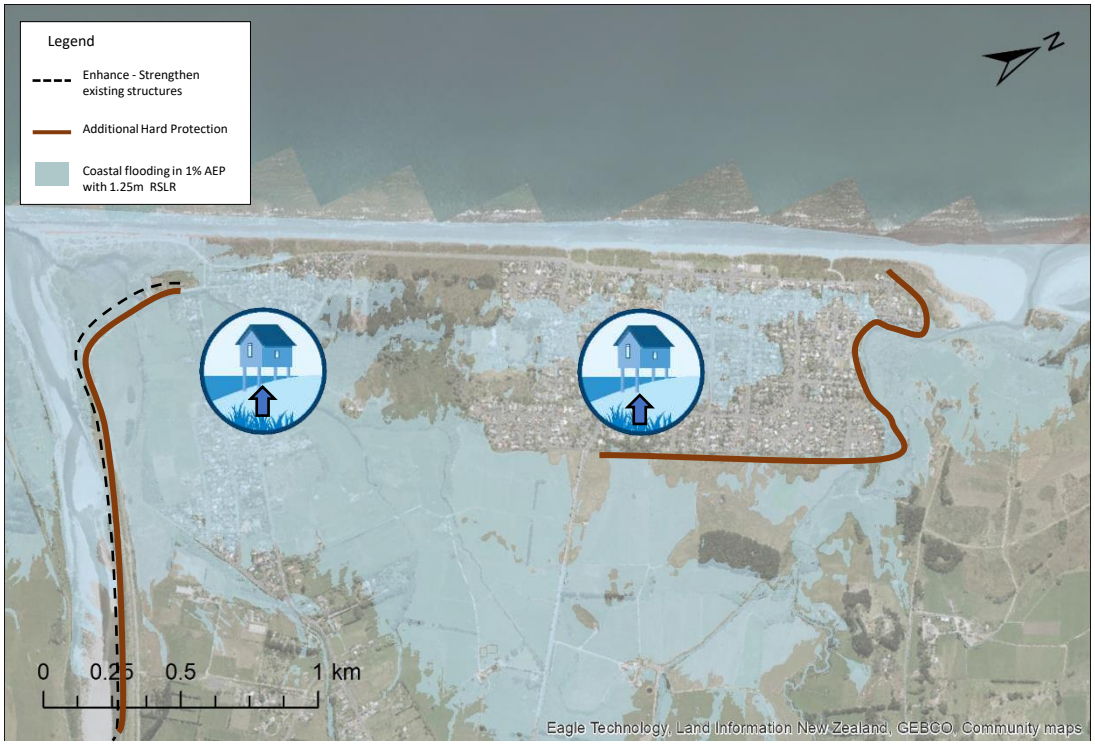
Strengthen existing stopbanks and structures, enhance wetlands.

Accommodate [7]

Pro-actively raise floors of homes which could be flooded.

Additional Hard Protection [12, 13, 15]

Installation of floodgates, pump stations and stopbanks to prevent sea water entering the settlements



Notes:

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Over the **medium term**, dwellings where the flood risk is not being effectively managed through the broader flood protection scheme would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded. Although dwellings would be protected, access to properties and services may still be impacted.

Over the **longer term**, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the seafront, or via the stormwater network.

Preferred Pathways for Unit 2A: Te Horo Beach – Open Coast (Erosion)

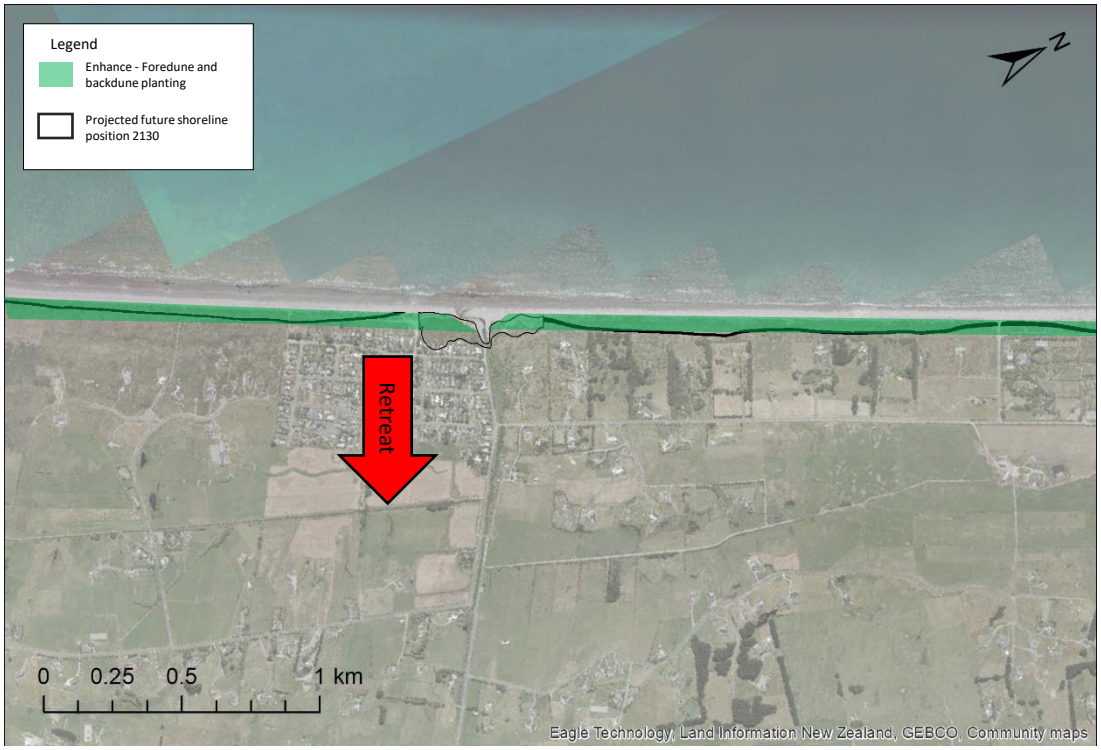
Unit 2A	Te Horo Beach – Open Coast (Erosion)						
MCDA Ranking	Short term	→	Medium Term	→	Long Term	MCDA Score	Pathway number
1	Enhance	→	Enhance	→	Retreat	87	PW-5
2	Enhance	→	Soft Engineering Protection	→	Retreat	74	PW-4
3	Enhance	→	Enhance	→	Soft Engineering Protection	69	PW-1

Management Unit:	**2A: Te Horo Beach Open Coast**

Pathway:	**5**

2050 – 14 Properties at risk of erosion
2070 – 14 Properties at risk of erosion
2130 – 14-18 Properties at risk of erosion

Short term	Medium term	Long term
Enhance [3,4]	**Enhance** [3,4]	**Retreat** [8]
Increase dune resilience by foreshore and backshore planting →	Increase dune resilience by foreshore and backshore planting →	Proactively moving people out of the way of the hazard.



Notes:

Extensive foredune and backdune planting over the **short term** with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

This is continued over the **medium term** where efforts to enhance the dune system are increased, and this approach is undertaken until a trigger is met, and this approach is no longer effective at managing the erosion risk.

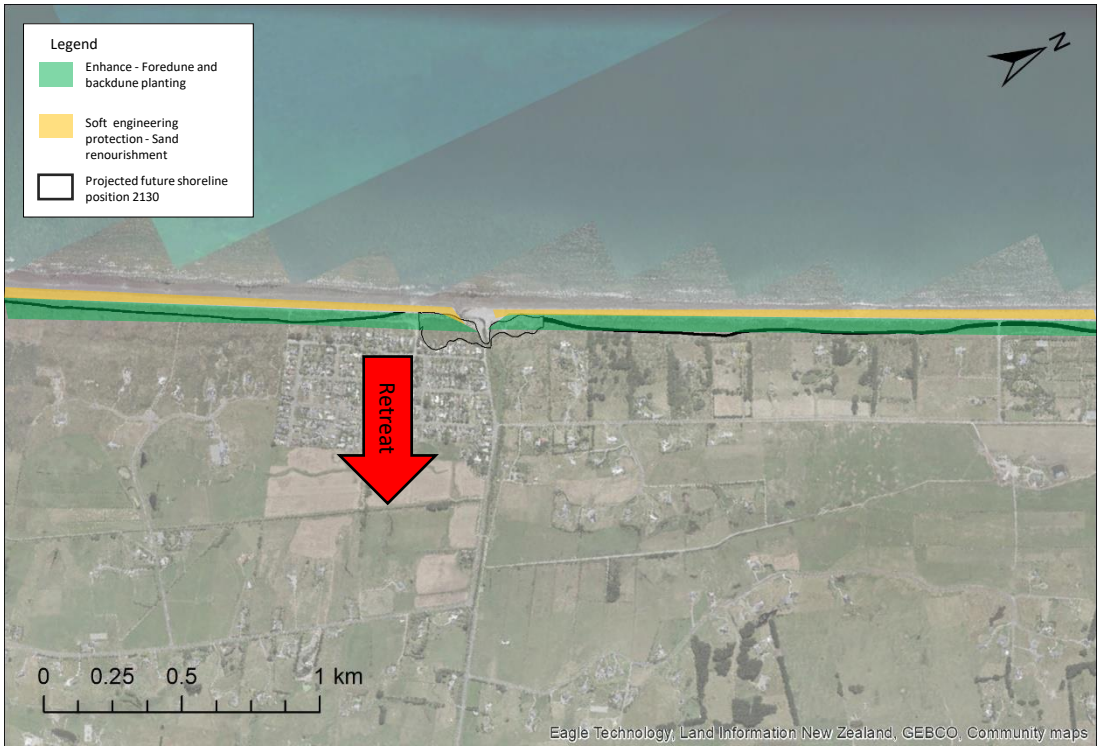
At this point, beachfront properties exposed to the erosion hazard would undergo managed retreat and be proactively relocated away from the hazard.

Management Unit:	**2A: Te Horo Beach Open Coast**

Pathway:	**4**

2050 – 14 Properties at risk of erosion
2070 – 14 Properties at risk of erosion
2130 – 14-18 Properties at risk of erosion

Short term	Medium term	Long term
Enhance [3,4]	**Soft Engineering Protection** [10]	**Retreat** [8]
Increase dune resilience by foreshore and backshore planting	Importing sand and distributing it on the foreshore to supply more bulk to the beach profile.	Proactively moving people out of the way of the hazard.



Notes:

Extensive foredune and backdune planting over the **short term** with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

Over the **medium term**, as sea levels rise and erosion of the beach becomes more extensive, beach scraping would be undertaken along the gravel beach to increase the crest elevation and reduce erosion as a result of overtopping.

When soft engineering is no longer cost effective at maintaining the shoreline, beachfront properties exposed to the erosion hazard would undergo managed retreat and be proactively relocated away from the hazard.

Management Unit:	**2A: Te Horo Beach Open Coast**

Pathway:	**1**

2050 – 14 Properties at risk of erosion
2070 – 14 Properties at risk of erosion
2130 – 14-18 Properties at risk of erosion

Short term	Medium term	Long term
Enhance [3,4]	**Enhance** [3,4]	**Soft Engineering Protection** [10]
Increase dune resilience by foreshore and backshore planting →	Increase dune resilience by foreshore and backshore planting →	Beach scraping to increase crest elevation and reduce over-washing

Notes:
Extensive foredune and backdune planting over the **short-medium term** with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

As sea levels rise and erosion of the beach becomes more extensive, beach scraping would be undertaken along the gravel beach to increase the crest elevation and reduce erosion as a result of overtopping.

Preferred Pathways for Unit 2B: Te Horo Beach –Rivers / Inlets (Inundation)

Unit 2B	Te Horo Beach – Rivers / Inlets (Inundation)						
MCDA Ranking	Short term	→	Medium Term	→	Long Term	MCDA Score	Pathway number
1	Enhance	→	Accommodate	→	Retreat	83	PW-3
2	Enhance	→	Additional Hard Protection	→	Retreat	64	PW-2
2	Enhance	→	Accommodate	→	Additional Hard Protection	64	PW-1

Management Unit:	**2B: Te Horo Beach River/Inlets**	Pathway:	**3**

2050 – 63 Properties at risk of inundation
2070 – 87-98 Properties at risk of inundation
2130 – 130-152 Properties at risk of inundation

Short term	Medium term	Long term

Enhance [2,3]

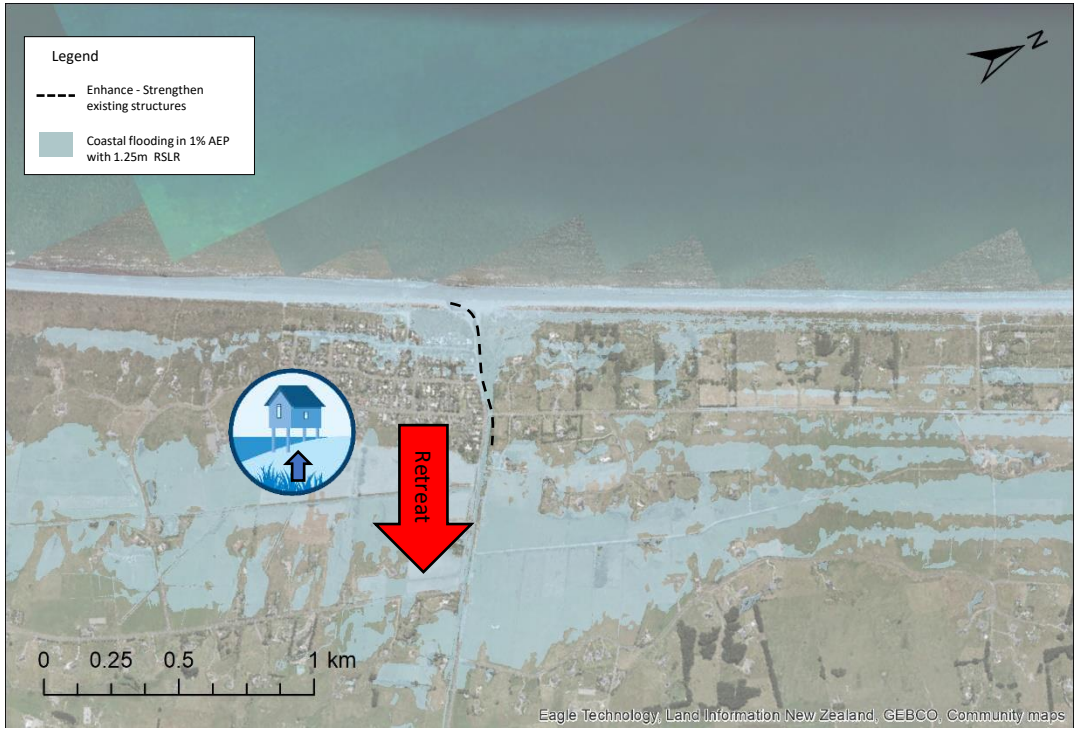
Strengthen existing stopbanks and structures, enhance wetlands.

Accommodate [7]

Pro-actively raise floors of homes which could be flooded.

Retreat [8]

Proactively moving people out of the way of the hazard.



Notes:

Over the **short term**, upgrades and maintenance of existing infrastructure to manage the **short-medium term** flood risk for the settlement. This could include enhancing existing bunds, increasing drainage capacity of the existing stormwater outfalls. Enhance coastal wetlands through effective planting and management.

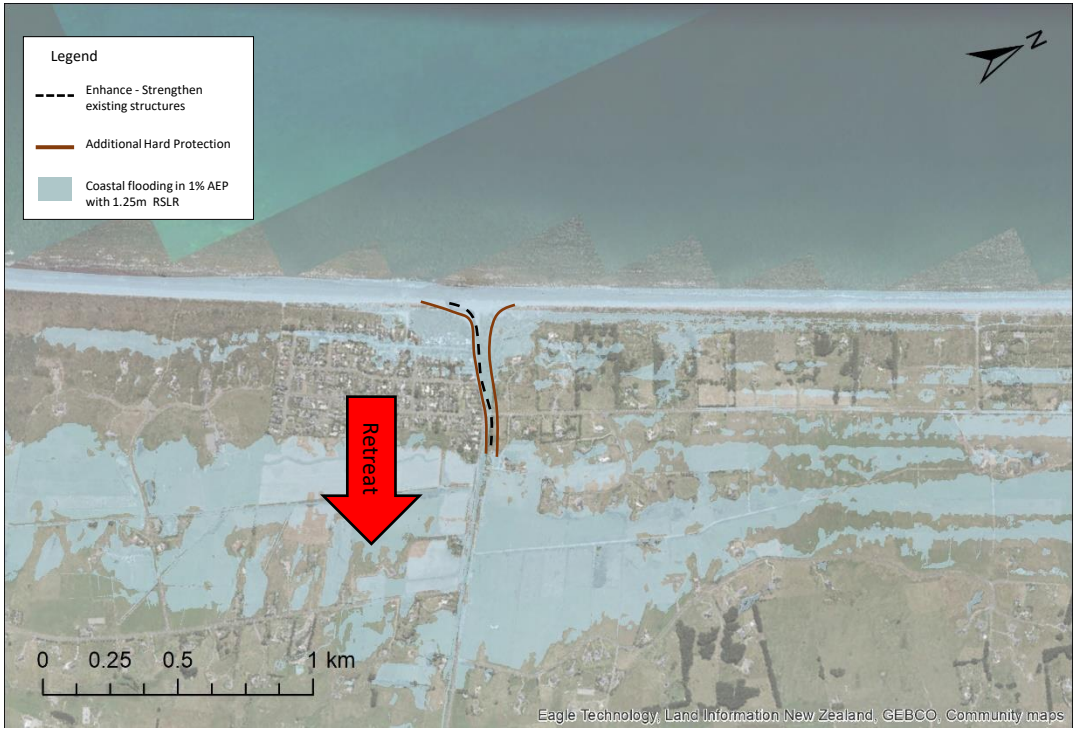
Over the **medium term**, dwellings where the flood risk is not being effectively managed through the broader flood protection scheme would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded. Although dwellings would be protected, access to properties and services may still be impacted.

As sea levels continue to rise, dwellings with inundation risks that are no longer effectively being managed through the broader flood protection scheme or raised floor levels would be retreated away from the hazard.

2050 – 63 Properties at risk of inundation
2070 – 87-98 Properties at risk of inundation
2130 – 130-152 Properties at risk of inundation

Management Unit:	**2B: Te Horo Beach River/Inlets**	Pathway:	**2**

Short term	Medium term	Long term
Enhance [2,3]	**Additional Hard Protection** [12, 13, 15]	**Retreat** [8]
Strengthen existing stopbanks and structures, enhance wetlands. →	Installation of floodgates, pump stations and stopbanks to prevent sea water entering the settlements →	Proactively moving people out of the way of the hazard.



Notes:

Over the **short term**, upgrades and maintenance of existing infrastructure to manage the short-medium term flood risk for the settlement. This could include enhancing existing bunds, increasing drainage capacity of the existing stormwater outfalls. Enhance coastal wetlands through effective planting and management.

Over the **medium term**, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the seafront, or via the stormwater network.

As sea levels continue to rise, where the flood protection scheme is no longer effective in managing the risks of coastal inundation, dwellings at risk would be retreated away from the hazard.

Management Unit:	**2B: Te Horo Beach River/Inlets**	Pathway:	**1**

2050 – 63 Properties at risk of inundation
2070 – 87-98 Properties at risk of inundation
2130 – 130-152 Properties at risk of inundation

Short term	Medium term	Long term

Enhance [2,3]

Strengthen existing stopbanks and structures, enhance wetlands.

→

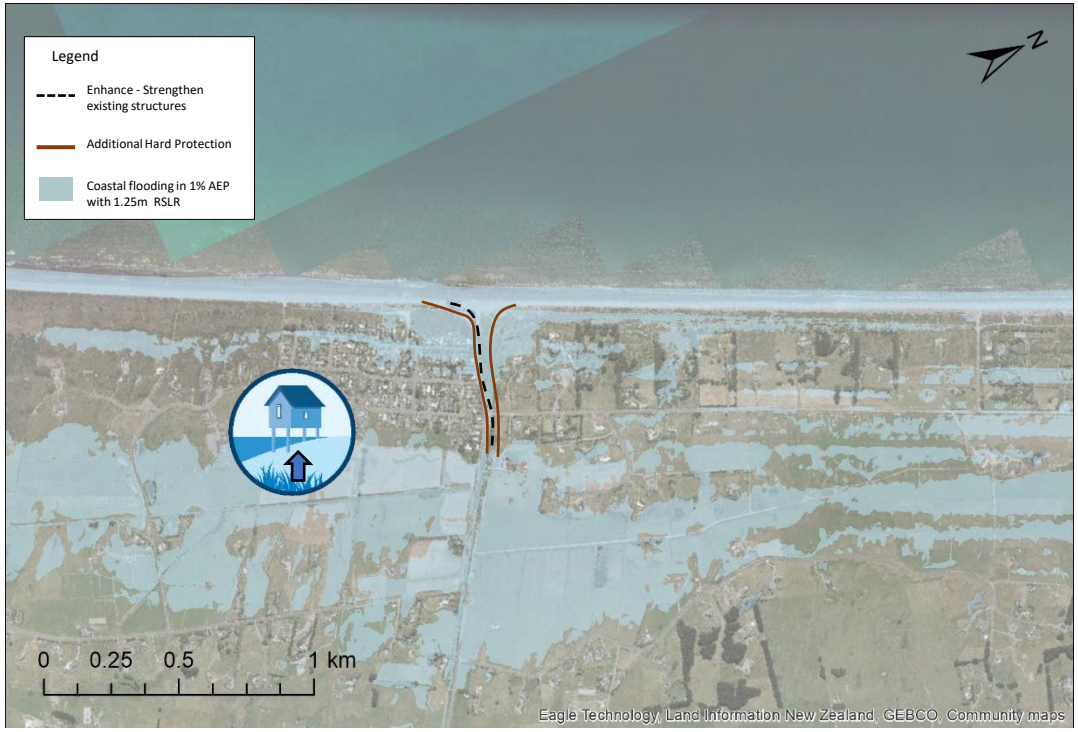
Accommodate [7]

Pro-actively raise floors of homes which could be flooded.

→

Additional Hard Protection [12, 13, 15]

Installation of floodgates, pump stations and stopbanks to prevent sea water entering the settlements



Notes:

Over the **short term**, upgrades and maintenance of existing infrastructure to manage the short-medium term flood risk for the settlement. This could include enhancing existing bunds, increasing drainage capacity of the existing stormwater outfalls. Enhance coastal wetlands through effective planting and management.

Over the **medium term**, dwellings where the flood risk is not being effectively managed through the broader flood protection scheme would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded. Although dwellings would be protected, access to properties and services may still be impacted.

Over the **longer term**, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the beach, or via the stormwater network.

Preferred Pathways for Unit 3A: Peka Peka Beach – Open Coast (Erosion)

Unit 3A	Peka Peka Beach – Open Coast (Erosion)						
MCDA Ranking	Short term	→	Medium Term	→	Long Term	MCDA Score	Pathway number
1	Enhance	→	Enhance	→	Retreat	87	PW-5
2	Enhance	→	Soft Engineering Protection	→	Retreat	74	PW-4
3	Enhance	→	Enhance	→	Soft Engineering Protection	69	PW-1

Management Unit:	**3A: Peka Peka Open Coast**

Pathway:	**5**

2050 – 0 Properties at risk of erosion
2070 – 0 Properties at risk of erosion
2130 – 9-33 Properties at risk of erosion

Short term	Medium term	Long term
Enhance [3,4]	**Enhance** [3,4]	**Retreat** [8]
Increase dune resilience by foreshore and backshore planting →	Increase dune resilience by foreshore and backshore planting →	Proactively moving people out of the way of the hazard.

Notes:

Extensive foredune and backdune planting over the **short term** with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

This is continued over the **medium term** where efforts to enhance the dune system are increased, and this approach is undertaken until a trigger is met, and this approach is no longer effective at managing the erosion risk.

At this point, beachfront properties exposed to the erosion hazard would undergo managed retreat and be proactively relocated away from the hazard.

Management Unit:	**3A: Peka Peka Open Coast**

Pathway:	**4**

2050 – 0 Properties at risk of erosion
2070 – 0 Properties at risk of erosion
2130 – 9-33 Properties at risk of erosion

Short term	Medium term	Long term

Enhance [3,4]

Increase dune resilience by foreshore and backshore planting

→

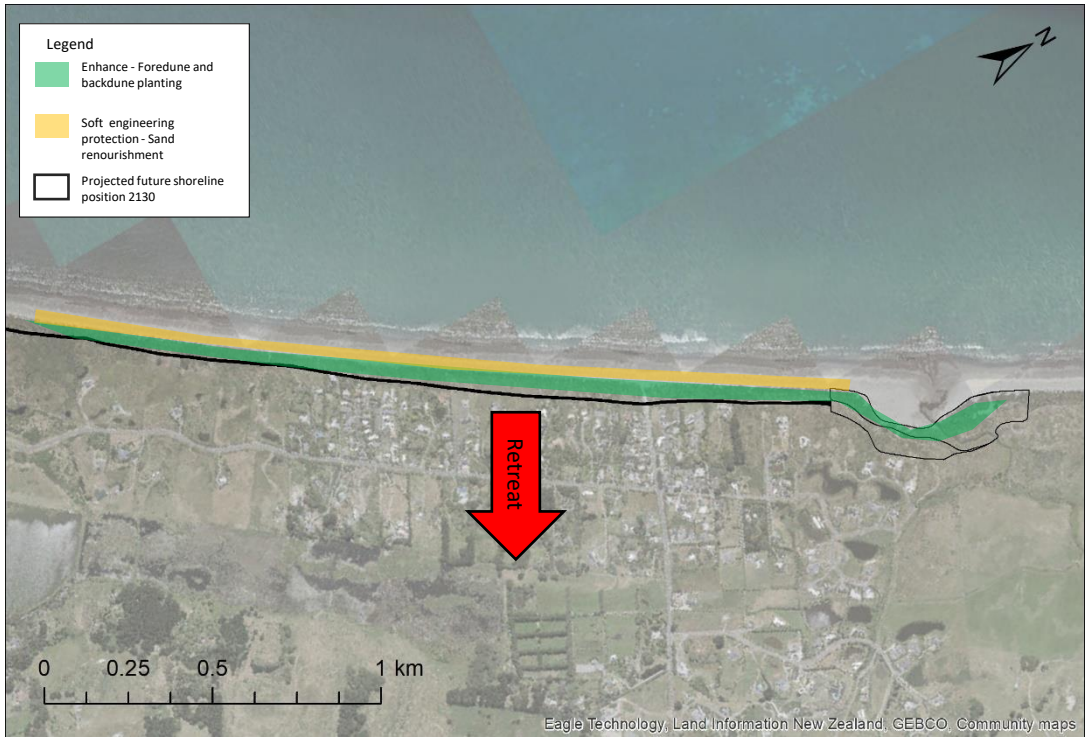
Soft Engineering Protection [9]

Importing sand and distributing it on the foreshore to supply more bulk to the beach profile.

→

Retreat [8]

Proactively moving people out of the way of the hazard.



Notes:

Extensive foredune and backdune planting over the **short term** with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

Over the **medium term**, as sea levels rise and erosion of the dune system becomes more extensive, imported sand would be distributed along the foredune to add volume to the beach and reduce erosion. Additional replenishments and dune maintenance would be undertaken as required.

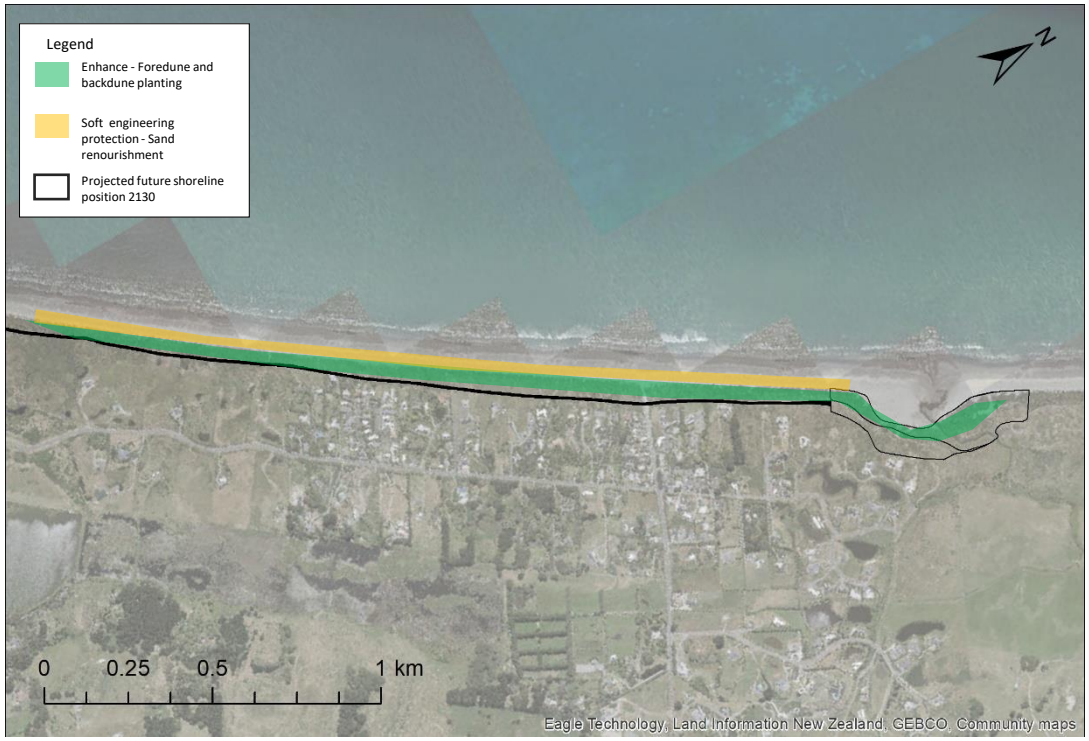
When soft engineering is no longer cost effective, beachfront properties exposed to the erosion hazard would undergo managed retreat and be proactively relocated away from the hazard.

Management Unit:	**3A: Peka Peka Open Coast**

Pathway:	**1**

2050 – 0 Properties at risk of erosion
2070 – 0 Properties at risk of erosion
2130 – 9-33 Properties at risk of erosion

Short term	Medium term	Long term
Enhance [3,4]	**Enhance** [3,4]	**Soft Engineering Protection** [9]
Increase dune resilience by foreshore and backshore planting →	Increase dune resilience by foreshore and backshore planting →	Importing sand and distributing it on the foreshore to supply more bulk to the beach profile.



Notes:
Extensive foredune and backdune planting over the **short-medium term** with weed and pest control to enhance the existing dune system, and to provide good protection in storms and faster recovery.

As sea levels rise and erosion of the dune system becomes more extensive, imported sand would be distributed along the foredune to add volume to the beach and reduce erosion. Additional replenishments and dune maintenance would be undertaken as required to maintain dune volumes which provide sufficient protection.

Preferred Pathways for Unit 3B: Peka Peka Beach – Rivers / Inlets (Inundation)

Unit 3B	Peka Peka – Rivers / Inlets (Inundation)						
MCDA Ranking	**Short term**	→	**Medium Term**	→	**Long Term**	**MCDA Score**	**Pathway number**
1	Enhance	→	Accommodate	→	Retreat	**85**	PW-3
2	Enhance	→	Additional Hard Protection	→	Retreat	**66**	PW-2
3	Enhance	→	Accommodate	→	Additional Hard Protection	**64**	PW-1

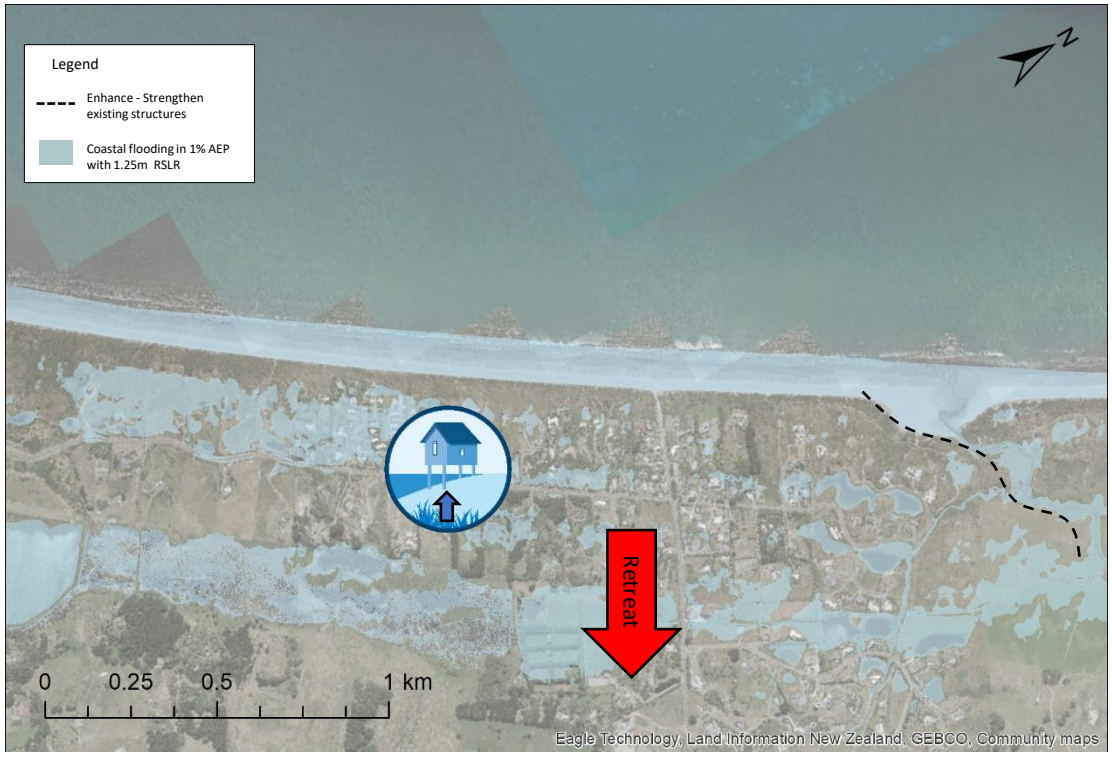
Unit 3B: Preference 1 MCDA Score = 85

Northern Adaptation Area Pathways

2050 – 96 Properties at risk of inundation
2070 – 131-145 Properties at risk of inundation
2130 – 171-206 Properties at risk of inundation

Management Unit:	**3B: Peka Peka River/Inlet**	Pathway:	**3**

Short term	Medium term	Long term
Enhance [2,3]	**Accommodate** [7]	**Retreat** [8]
Strengthen existing stopbanks and structures, enhance wetlands. →	Pro-actively raise floors of homes which could be flooded. →	Proactively moving people out of the way of the hazard.



Notes:

Over the **short term**, upgrades and maintenance of existing infrastructure to manage the short-medium term flood risk for the settlement. This could include enhancing existing bunds, increasing drainage capacity of the existing stormwater outfalls, and enhancement of coastal wetlands through effective planting and management.

Over the **medium term**, dwellings where the flood risk is not being effectively managed through the broader flood protection scheme would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded. Although dwellings would be protected, access to properties and services may still be impacted

As sea levels continue to rise, dwellings with inundation risks that are no longer effectively being managed through the broader flood protection scheme or raised floor levels would be retreated away from the hazard.

2050 – 96 Properties at risk of inundation
2070 – 131-145 Properties at risk of inundation
2130 – 171-206 Properties at risk of inundation

Management Unit:	**3B: Peka Peka River/Inlet**	Pathway:	**2**

Short term	Medium term	Long term
Enhance [2,3]	**Additional Hard Protection** [12, 13, 15]	**Retreat** [8]
Strengthen existing stopbanks and structures, enhance wetlands. →	Installation of floodgates, pump stations and stopbanks to prevent sea water entering the settlements →	Proactively moving people out of the way of the hazard.

Notes:

Over the **short term**, upgrades and maintenance of existing infrastructure to manage the short-medium term flood risk for the settlement. This could include enhancing existing bunds, increasing drainage capacity of the existing stormwater outfalls, and enhancing coastal wetlands through effective planting and management.

Over the **medium term**, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the seafront, or via the stormwater network.

As sea levels continue to rise, where the flood protection scheme is no longer effective in managing the risks of coastal inundation, dwellings at risk would be retreated away from the hazard.

Unit 3B: Preference 3 MCDA Score = 64

Northern Adaptation Area Pathways

Management Unit:	3B: Peka Peka River/Inlet	Pathway:	1

2050 – 96 Properties at risk of inundation
2070 – 131-145 Properties at risk of inundation
2130 – 171-206 Properties at risk of inundation

Short term	Medium term	Long term

Enhance [2,3]

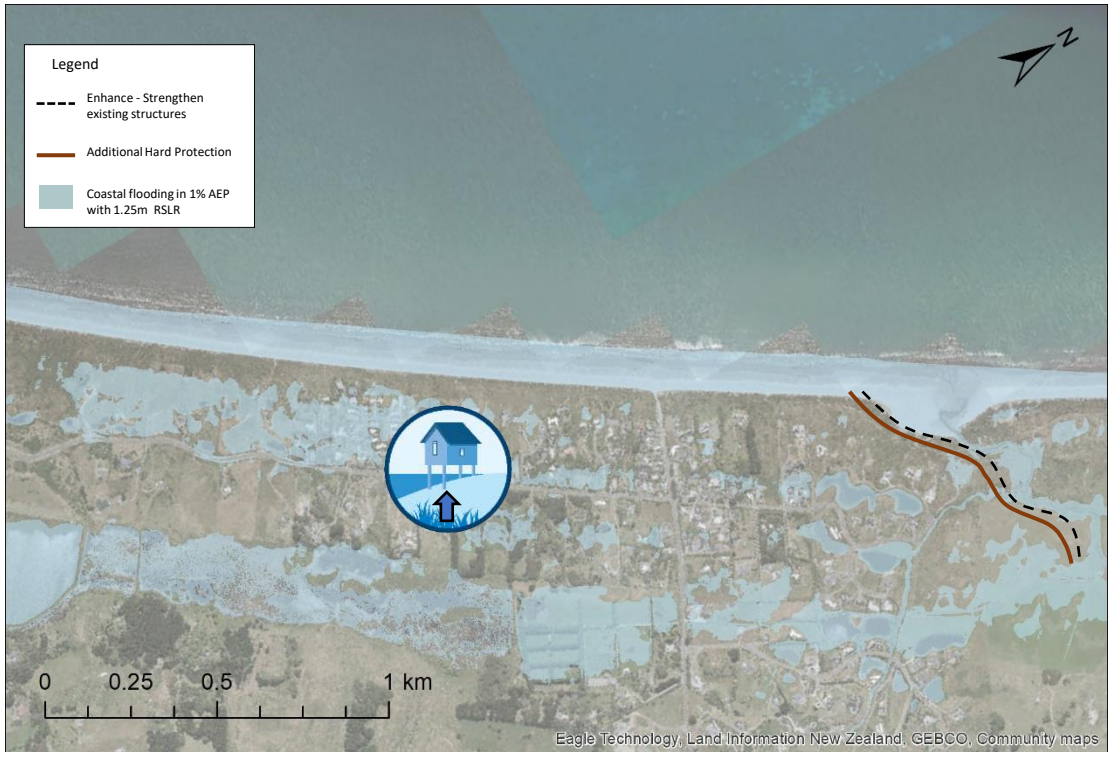
Strengthen existing stopbanks and structures, enhance wetlands.

Accommodate [7]

Pro-actively raise floors of homes which could be flooded.

Additional Hard Protection [12, 13, 15]

Installation of floodgates, pump stations and stopbanks to prevent sea water entering the settlements



Notes:

Over the **short term**, upgrades and maintenance of existing infrastructure to manage the short-term flood risk for the settlement. This could include enhancing existing bunds, increasing drainage capacity of the existing stormwater outfalls, and enhancing coastal wetlands through effective planting and management.

Over the **medium term**, dwellings where the flood risk is not being effectively managed through the broader flood protection scheme would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded. Although dwellings would be protected, access to properties and services may still be impacted.

Over the **longer term**, feasibility of increased hard protection schemes would be investigated and installed to manage coastal water entering the settlement via low lying waterways, overtopping the beach, or via the stormwater network.

Preferred Pathways for Unit 4A: Rural – Open Coast (Erosion)

Unit 4A	Rural – Open Coast (Erosion)						
MCDA Ranking	Short term	→	Medium Term	→	Long Term	MCDA Score	Pathway number
1	Status Quo	→	Enhance	→	Enhance	72	PW-1
2	Status Quo	→	Enhance	→	Soft Engineering Protection	60	PW-3
3	Enhance	→	Enhance	→	Soft Engineering Protection	50	PW-2

COASTAL ADAPTATION OPTIONS : EROSION (UNITS: 4A - Rural)

STATUS QUO

Do Nothing New

Do Nothing New *(# 1)*
- Continue maintaining existing dunes and infrastructure to its present day level of service

ENHANCE

We maintain and improve what we are already doing

Dune and / or Wetland Resilience *(# 3)*

Examples:
- Wind trap fencing
- Planting
- Managed dune access
- Managed coastal wetlands

Education and Emergency Management *(#4)*

PROTECT

We keep the hazard away

Beach Nourishment
I.e. Soft Engineering (# 9)

Management Unit:	**4A: Rural NAA Open Coast**

Pathway:	**1**

2050 – 9 Properties at risk of erosion
2070 – 9 Properties at risk of erosion
2130 – 9 Properties at risk of erosion

Short term	Medium term	Long term
Status Quo[1]	**Enhance[3,4]**	**Enhance[3,4]**
No additional changes to current management of the erosion hazard	Increase dune resilience by foreshore and backshore planting	Increase dune resilience by foreshore and backshore planting

Notes:

Over the **short term**, undertake no additional changes to the current management of the erosion hazard in rural areas, and continue to monitor any changes in risk.

As sea level rise continues and greater risk is identified, extensive foredune and backdune planting over the **short-medium term** with weed and pest control to enhance the existing dune system, and provide good protection in storms and faster recovery, and slow the rate of erosion on the open coast.

Management Unit:	**4A: Rural NAA Open Coast**

Pathway:	**3**

2050 – 9 Properties at risk of erosion
2070 – 9 Properties at risk of erosion
2130 – 9 Properties at risk of erosion

Short term	Medium term	Long term
Enhance[3,4] Increase dune resilience by foreshore and backshore planting	**Enhance[3,4]** Increase dune resilience by foreshore and backshore planting	**Soft Engineering Protection[9,10]** Beach renourishment and beach scraping.

Notes:
Undertake foredune and back dune planting over the **short-medium term** with weed and pest control to enhance the existing dune system, and provide good protection in storms and faster recovery, and slow the rate of erosion on the open coast.

When dune enhancement mechanisms are no longer managing the erosion risks, undertake beach renourishment (or scraping on gravel beaches) to further reduce the rate of erosion.

Management Unit:	**4A: Rural NAA Open Coast**

Pathway:	**2**

2050 – 9 Properties at risk of erosion
2070 – 9 Properties at risk of erosion
2130 – 9 Properties at risk of erosion

Short term	Medium term	Long term

Status Quo[1]

No additional changes to current management of the erosion hazard

Enhance[3,4]

Increase dune resilience by foreshore and backshore planting

Soft Engineering Protection[9,10]

Beach renourishment and beach scraping.

Notes:

Over the **short term**, undertake no additional changes to the current management of the erosion hazard in rural areas, and continue to monitor any changes in risk.

As sea level rise continues and greater risk is identified, extensive foredune and back dune planting over the **short-medium term** with weed and pest control to enhance the existing dune system, and provide good protection in storms and faster recovery, and slow the rate of erosion on the open coast.

When dune enhancement mechanisms are no longer managing the erosion risks, undertake beach renourishment (or scraping on gravel beaches) to further reduce the rate of erosion.

Preferred Pathways for Unit 4B: Rural – Rivers / Inlets (Inundation)

Unit 4B	Rural – Rivers / Inlets (Inundation)						
MCDA Ranking	Short term	→	Medium Term	→	Long Term	MCDA Score	Pathway number
1	Status Quo	→	Enhance	→	Accommodate	69	PW-1
2	Accommodate	→	Accommodate	→	Retreat	64	PW-2

COASTAL ADAPTATION OPTIONS : INUNDATION (UNITS: 4B - Rural)

STATUS QUO

Do Nothing New

Do Nothing New (# 1)

Continue maintaining existing dunes and infrastructure to its present-day level of service

ENHANCE

We maintain and improve what we are already doing

Enhance existing Inundation Protection *(# 2)*
Examples:
- Upgrade stopbanks
- Upgrade stormwater management

Dune and / or Wetland Resilience *(# 3)*
Examples:
- Wind trap fencing
- Planting
- Managed dune access
- Managed coastal wetlands

ACCOMMODATE

We live with the hazard

Elevate Floor Levels of Buildings *(# 7)*

Unit 3B: Preference 1 MCDA Score = 69

Northern Adaptation Area Pathways

Management Unit:	**4B: Rural NAA River/Inlets**	Pathway:	**1**

2050 – 86 Properties at risk of inundation
2070 – 99-106 Properties at risk of inundation
2130 – 135-176 Properties at risk of inundation

Short term	Medium term	Long term

Status Quo[1]

No additional changes to current management of the inundation hazard

→

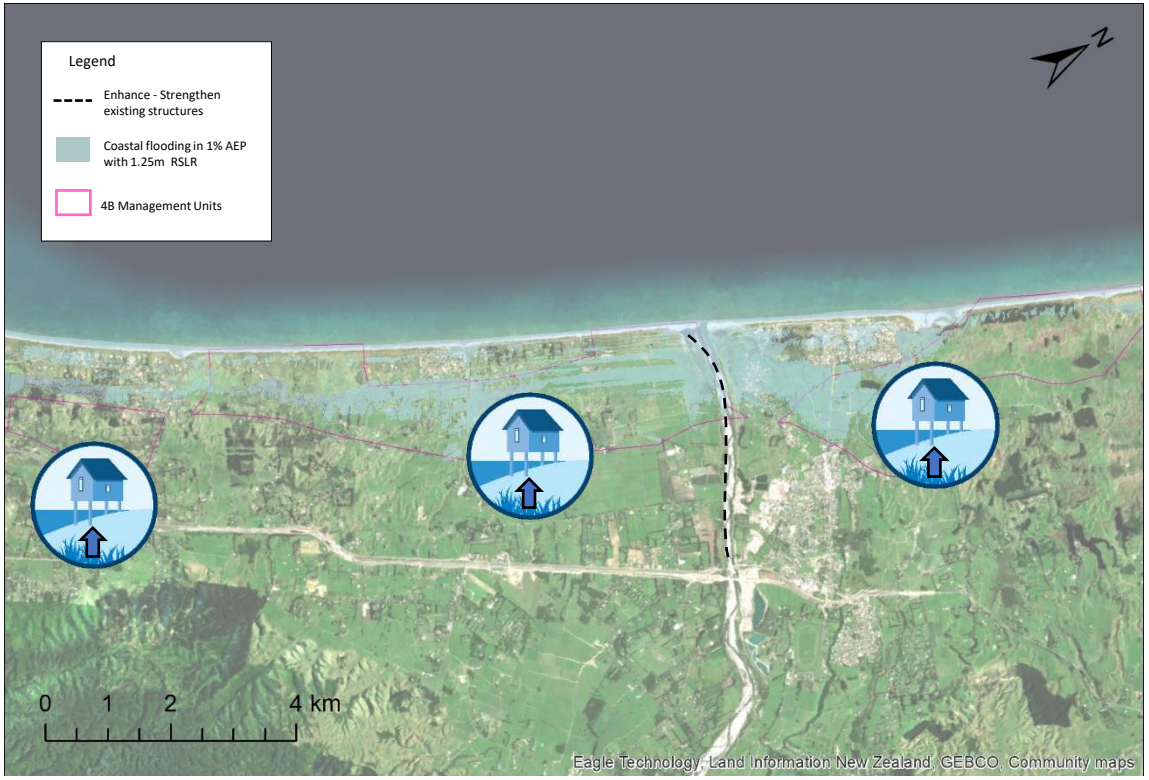
Enhance[2,3]

Strengthen existing stopbanks and structures, enhance wetlands.

→

Accommodate[7]

Pro-actively raise floors of houses susceptible to flooding.



Notes:

Over the **short term**, undertake no additional changes to the current management of the flood hazard in rural areas, and continue to monitor any changes in risk.

Over the **medium term** as SLR increases, strengthen stopbanks and stormwater networks to manage the flood risk across the wider rural area. Enhance coastal wetlands through effective planting and management.

Over the **long-term**, dwellings at risk of frequent and deep flooding that can not be managed through the wider protection scheme would be proactively raised so floor levels were above projected water levels in large storms to avoid being flooded. Although dwellings would be protected, access to properties and services may still be impacted.

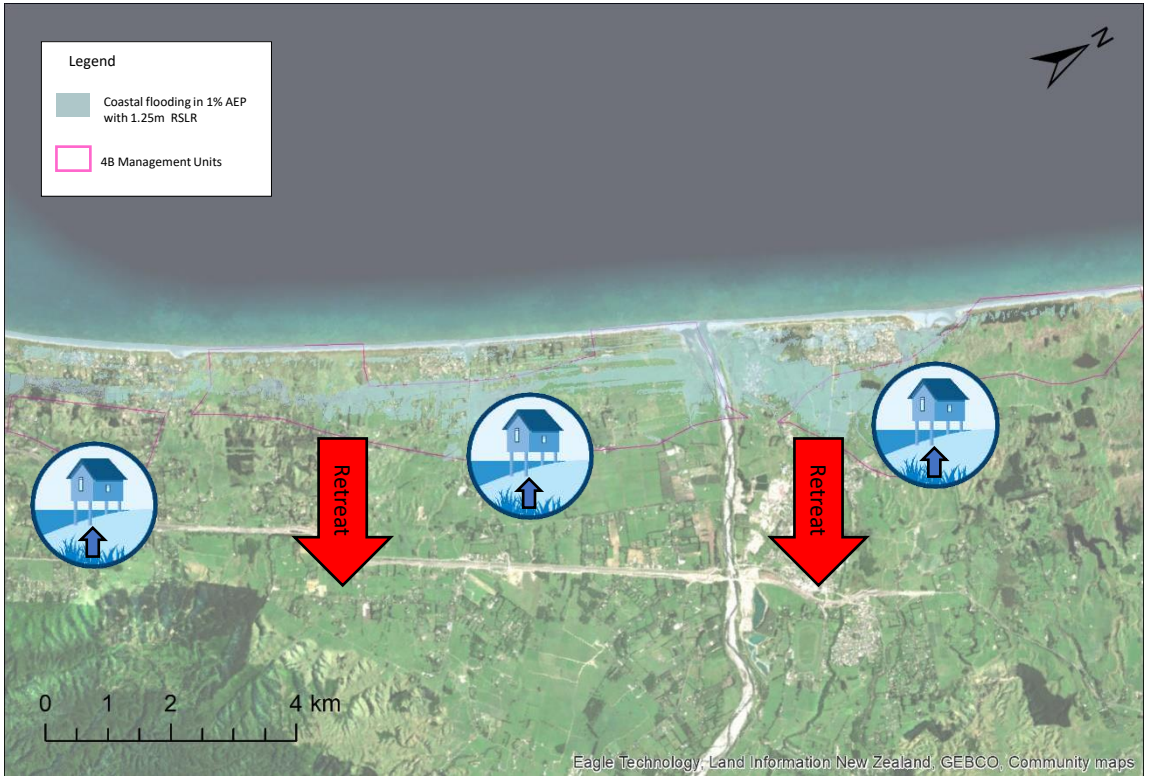
Unit 4B: Preference 2 MCDA Score = 64

Northern Adaptation Area Pathways

Management Unit:	4B: Rural NAA River/Inlets	Pathway:	2

2050 – 86 Properties at risk of inundation
2070 – 99-106 Properties at risk of inundation
2130 – 135-176 Properties at risk of inundation

Short term	Medium term	Long term
Accommodate[7]	**Accommodate**[7]	**Retreat**[8]
Pro-actively raise floors of houses susceptible to flooding. →	Pro-actively raise floors of houses susceptible to flooding. →	Proactively retreat infrastructure and properties



Notes:

Over the **short-medium term**, dwellings that were impacted by frequent and deep flooding would have floor levels proactively raised about projected flood levels with SLR. Although dwellings would be protected, access to properties and services may still be impacted.

Over a **longer timeframe** as SLR accelerates, dwellings where the flood risk was no longer effectively being managed via accommodation options would be proactively retreated away from the flood hazard.

Overview of CAP's Preferred Pathways

		MCDA Ranking	Short term	→	Medium Term	→	Long Term	MCDA Score	Pathway number
Erosion	Unit 1A: Ōtaki Beach	1	Enhance	→	Enhance	→	Retreat	87	PW-5
	Unit 2A: Te Horo Beach	2	Enhance	→	Soft Engineering Protection	→	Retreat	74	PW-4
	Unit 3A: Peka Peka Beach	3	Enhance	→	Enhance	→	Soft Engineering Protection	69	PW-1
Inundation	Unit 1B: Ōtaki Beach	1	Enhance	→	Accommodate	→	Retreat	85	PW-3
	Unit 2B: Te Horo Beach	2	Enhance	→	Additional Hard Protection	→	Retreat	66	PW-2
	Unit 3B: Peka Peka Beach	3	Enhance	→	Accommodate	→	Additional Hard Protection	64	PW-1
Erosion	Unit 4A: Rural	1	Status Quo	→	Enhance	→	Enhance	72	PW-1
		2	Status Quo	→	Enhance	→	Soft Engineering Protection	60	PW-3
		3	Enhance	→	Enhance	→	Soft Engineering Protection	50	PW-2
Inundation	Unit 4B: Rural	1	Status Quo	→	Enhance	→	Accommodate	69	PW-1
		2	Accommodate	→	Accommodate	→	Retreat	64	PW-2

Overview of CAP's Preferred Pathways

Erosion Units	MCDA Ranking	Short term		Medium Term		Long Term	Pathway number
Unit 1A: Ōtaki Beach	1	Enhance	→	Enhance	→	Retreat	PW-5
Unit 2A: Te Horo Beach	1	Enhance	→	Enhance	→	Retreat	PW-5
Unit 3A: Peka Peka Beach	1	Enhance	→	Enhance	→	Retreat	PW-5
Inundation Units							
Unit 1B: Ōtaki Beach	1	Enhance	→	Accommodate	→	Retreat	PW-3
Unit 2B: Te Horo Beach	1	Enhance	→	Accommodate	→	Retreat	PW-3
Unit 3B: Peka Peka Beach	1	Enhance	→	Accommodate	→	Retreat	PW-3

Note: Rural Units have different Adaptation Pathways to the settlements

Unit 4A: Rural (Erosion)	1	Status Quo	→	Enhance	→	Enhance	PW-1
and							
Unit 4B: Rural (Inundation)	1	Status Quo	→	Enhance	→	Accommodate	PW-1

Takutai Kāpiti.

Adaptation Pathways Feedback
Northern Adaptation Area

Next Steps

NAA Pathway Feedback:
- CAP will consider the community feedback

Early April 2024:
- CAP will incorporate the following for the whole District
  - Economic assessment of pathways (Step 7 of Decision-Making Framework)
  - Signals, triggers and thresholds (Phase 3)

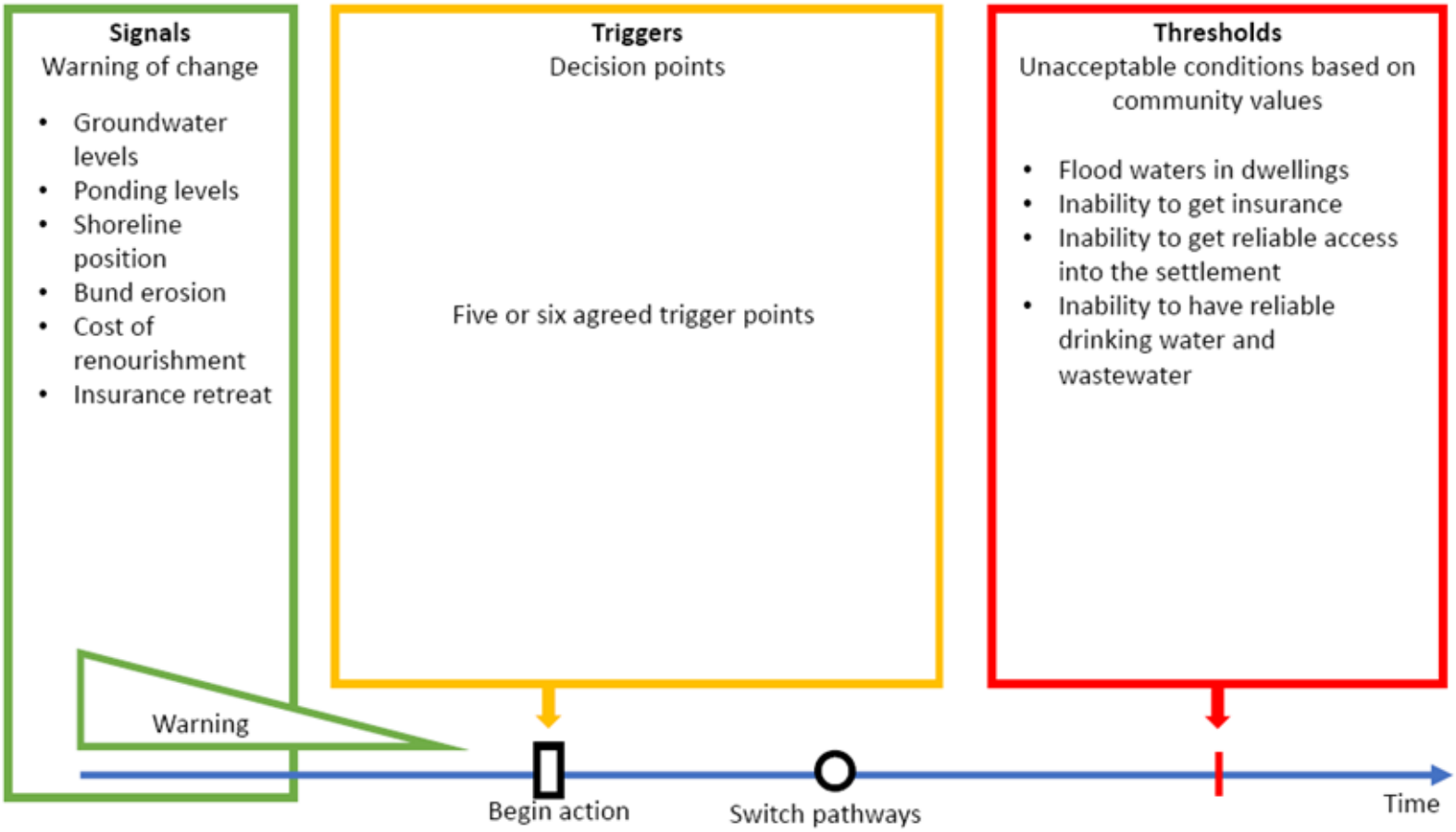
Mid-April 2024:
- CAP will present final recommendations to community at a District-wide event

Late May 2024:
CAP Recommendation Report presented to Council

Switch Points for Moving to Next Action on Pathway

= Signals and triggers determined by CAP to transition from one action to the next.

Note: This process will be covered in the 3 April 2024 CAP workshop for whole Kāpiti Coast District.



Source: Hurunui District Council. *Example of symbols for adaptation pathways.*

MITCHELL DAYSH

RESULTS OF DECISION MAKING

Westshore

(example of completed decision cycle)

Step 7: Economic Assessment

Westshore Coastal Unit Example

Unit D: Westshore												
Pathway	**Short term**	→	**Medium term**	→	**Long term**	**MCDA Score**	**MCDA ranking**	**Cost + Loss[1] ($m)**	**Cost + Loss[1] ranking**	**VFM[2] ($'000/ point)**	**VFM[2] ranking**	**Short Term build costs[3] ($m)**
PW 1	Renourishment	→	Managed Retreat	→	Managed Retreat	65	1	91.6	6	1392	6	13.26 (0.71 / yr)
PW 2	Renourishment	→	Renourishment + Control Structures	→	Managed Retreat	60	2	53.2	5	839	5	13.26 (0.71 / yr)
PW 3	Renourishment	→	Renourishment + Control Structures	→	Renourishment + Control Structures	51	4=	25.2	1	387	1	13.26 (0.71 / yr)
PW 4	Renourishment	→	Renourishment + Control Structures	→	Sea wall	54	3	28.9	2	432	2	13.26 (0.71 / yr)
PW 5	Renourishment + Control Structures	→	Renourishment + Control Structures	→	Sea wall	51	4=	29.0	3	459	3	16.17 (1.09 / yr)
PW 6	Sea wall	→	Sea wall	→	Sea wall	47	5	31.2	4	546	4	21.96 (1.59 / yr)
PW 9	Renourishment + Control Structures		Renourishment + Control Structures		Renourishment + Control Structures	--	--	25.3	--	--	--	--

Takutai Kāpiti.

Adaptation Pathways Feedback

Northern Adaptation Area

Questions ?

Adaptation Pathways Feedback

Northern Adaptation Area

We want to know what you think these pathways

Option 1: Take a Pathway Feedback Form

- Please rank your pathway preferences & submit your feedback

Option 2: Go online and HAVE YOUR SAY

- Feedback is open until Sunday 23 July 2023

Keep Up To Date

Takutai Kāpiti Website
Have Your Say
Sign up to Takutai Kāpiti Newsletter

More information

Brochure (take away)