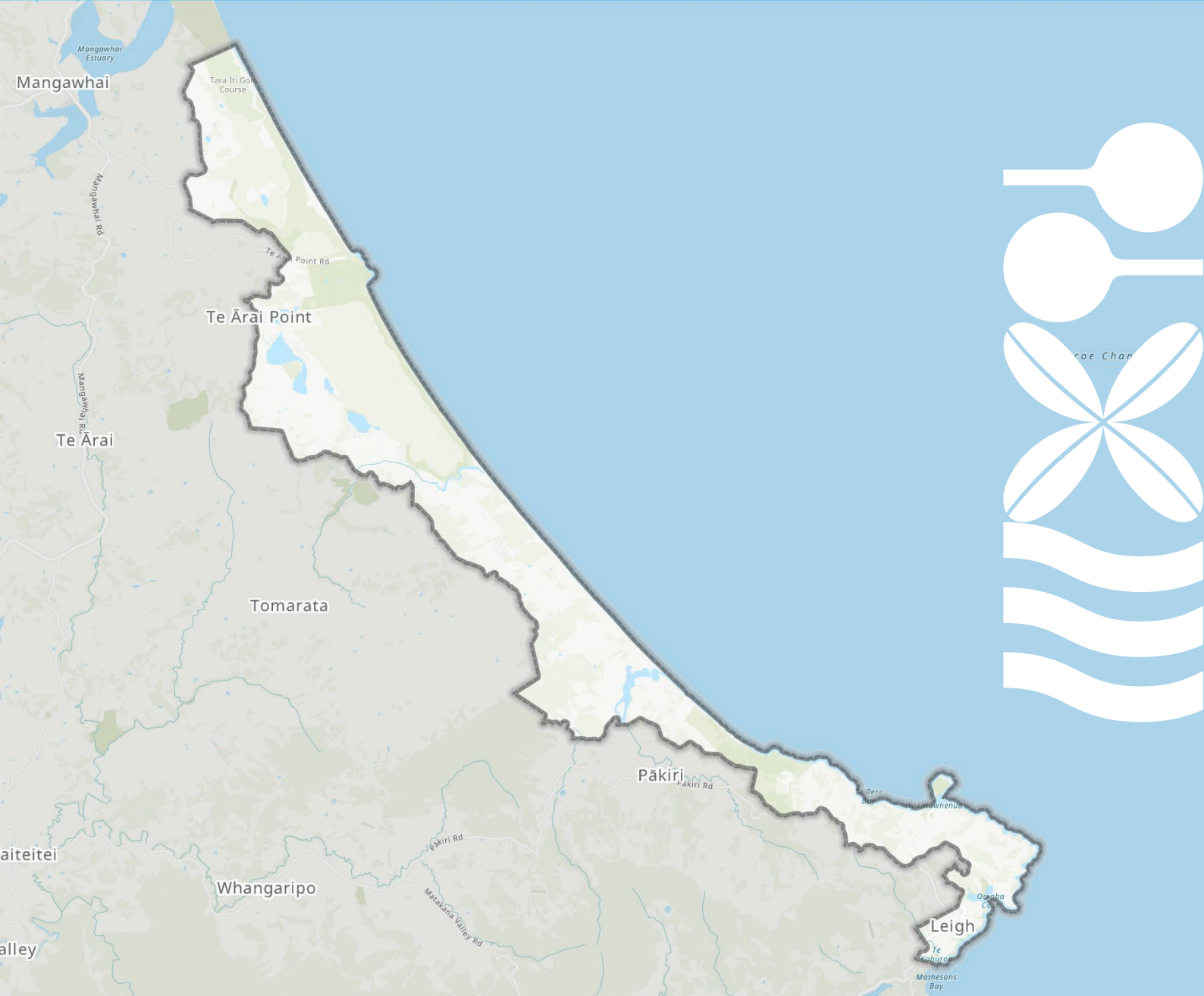




DRAFT for Engagement

Draft Shoreline Adaptation Strategies: Pākiri to Mathesons Bay

Shoreline Adaptation Plan

October 2024 DRAFT

2024



DRAFT Draft Shoreline Adaptation Strategies: Pākiri to Mathesons Bay

October 2024

Auckland Council

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Front Cover image

Shoreline Adaptations Plan area overview map for Pākiri to Mathesons Bay / Te Kohuroa. Prepared for Auckland Council by Tonkin + Taylor 2023.

DRAFT for Engagement

Contents

Glossary	i
1.0 The Shoreline Adaptation Plan programme.....	1
1.1 Purpose and use of this document	1
1.2 Shoreline adaptation plan programme purpose and scope	1
1.3 Auckland Council-owned land and assets	2
1.4 Limitations.....	4
2.0 Pākiri to Mathesons Bay / Te Kohuroa Context and overview	5
2.1 Pākiri to Mathesons Bay / Te Kohuroa SAP area overview	5
2.2 Units and stretches	7
2.3 Natural hazards and climate change.....	10
2.3.1 Sea-level rise	10
2.3.2 Coastal inundation	11
2.3.3 Coastal erosion	12
2.3.4 Catchment flooding	14
2.3.5 Other natural hazards	16
2.4 Adaptation strategies and timeframes	16
2.5 Next steps.....	17
Unit 1: Te Ārai North	19
DRAFT Adaptation strategy summary stretch 1.1	22
Unit 2: Te Ārai South	24
DRAFT Adaptation strategy summary stretches 2.1 to 2.3	26
Unit 3: Pākiri	28
DRAFT Adaptation strategy summary stretches 3.1 to 3.5	30
Unit 4: North Leigh & Cape Rodney	33
DRAFT Adaptation strategy summary stretches 4.1 to 4.2	34
Unit 5: Leigh and Mathesons Bay Te Kohuroa	37
DRAFT Adaptation strategy summary stretches 5.1 to 5.8	39
3.0 References & Bibliography	41

Figures

Figure 2-2-1: Unit areas for Pākiri to Mathesons Bay / Te Kohuroa.....	6
Figure 2- 2-2: Coastal inundation areas for Pākiri to Mathesons Bay / Te Kohuroa	12
Figure 2- 2-3: Coastal instability and erosion susceptibility for Pākiri to Mathesons Bay / Te Kohuroa, ...	14
Figure 2- 2-4 Flood Plain areas 1% AEP hazard	15
Figure 2-5: Te Ārai Drainage District	20

Glossary

Annual Exceedance Probability (AEP)	The probability of an event occurring in any given year. For example, the 1% AEP has a 1% chance of being met or exceeded in any given year.
AVD-46	Auckland Vertical Datum – 1946 was the mean sea level established in 1946 and used to define the zero datum for land development.
Biodiversity focus area (BFA)	An area of ecological significance prioritised by Auckland Council for conservation actions.
Coastal Marine Area	The coastal marine area is defined as the area of sea from the line of Mean High Water Springs (MHWS) to 12 nautical miles off the coast.
Fetch	The length of an area of the harbour, estuary or sea in which waves are generated by wind, measured in the direction of the wind.
Highest Astronomic Tide (HAT)	The highest tidal level that can be predicted to occur under average meteorological conditions and any combination of astronomical conditions.
Mean High Water Springs (MHWS)	The average of high levels of spring tide.
Significant Ecological Areas	Identified areas of significant indigenous vegetation or significant habitats of indigenous fauna located either on land or in freshwater environments or in the coastal marine area.

1.0 The Shoreline Adaptation Plan programme

Tāmaki Makaurau, Auckland, is a coastal city, bounded to the east and west by the South Pacific Ocean and the Tasman Sea. The region has around 3,200 km of dynamic coastline and encompasses three major harbours: the Kaipara, Manukau and Waitematā. Due to its location, much of the city's urban development and supporting infrastructure is concentrated in coastal areas and exposed to coastal processes such as erosion and inundation. These natural processes are considered hazards when they impact on things or locations of value. Climate change related to greenhouse gas emissions is contributing to rising sea levels, which have a range of impacts including increasing the frequency and magnitude of coastal hazard events. In 2021, Auckland Council began developing a series of area-based Shoreline Adaptation Plans (SAPs) as the first step for the SAP programme in achieving a resilient future for Auckland's coasts.

1.1 Purpose and use of this document

The purpose of this document is as a community consultation document.

This document does not represent a complete draft of a finalised Shoreline Adaptation Plan for Pākiri to Mathesons Bay / Te Kohuroa. It has been prepared solely to enable the community engagement process for the development of the Pākiri to Mathesons Bay / Te Kohuroa Shoreline Adaptation Plan (SAP) area.

The draft document provides a foundation to guide an understanding of the preliminary recommendations for adaptation strategies (across three timeframes) informed by the technical inputs of the Coastal Management Team within the Engineering, Assets & Technical Advisory department of Auckland Council.

1.2 Shoreline adaptation plan programme purpose and scope

SAPs are non-statutory, strategic documents that support the sustainable management of Auckland Council-owned coastal land and assets (including but not limited to, reserves, coastal defence structures and public facilities), over the next 100 years.

These plans consider the potential impacts of coastal erosion, coastal inundation, rainfall flooding, and climate-change (including sea-level rise). They seek to provide an adaptive planning approach that responds to the changing nature of Auckland's coastal environment, asset and infrastructure owners' requirements, and the needs and values of local iwi and local communities.

This ‘first generation’ (Series 1) of plans have been developed in response to the *Coastal hazards and climate change guidance* from the Ministry for the Environment¹. SAP area plans provide a ‘roadmap’ for changing coastal management strategies over time (over three timeframes) which can be further developed to implement Dynamic Adaptive Policy Pathways. The SAP area plans’ development process also ensures consultation and the initiation of an opportunity for collaboration with mana whenua and communities to develop and implement the strategies identified in the SAP area plans. While this ‘series’ of SAP reports applies specifically to Auckland Council-owned land and assets, the programme acknowledges the need for holistic ‘systems’ thinking both in relation to coastal management and adaptation. The draft reports represent the initial technical recommendations ahead of the development of the full SAP report for the Pākiri to Mathesons Bay / Te Kohuroa area ahead of further community engagement and detailed engagement with programme partners.

1.3 Auckland Council-owned land and assets

Auckland Council-owned assets are summarised in the table below. They primarily include road networks and regional park land, including park infrastructure such as toilets and small buildings. Within Unit 5, there are several civic buildings and club facilities. Auckland Council land and assets are identified in each unit map at the commencement of each unit-based section of this report.

Type	Description
Auckland Council land	• Regional parks: Pākiri; Te Ārai • Local parks: Sec 1 SO 67266, Pakiri Block Rd, Pākiri; Te Ārai Forestry South; Slipper Lake Reserve; Tomarata Dune Lakes Reserve; Greenwood Road Pākiri; Omaha Blk Access Road Espl Reserve; Lax Reserve; Leigh Hall Grounds; Leigh Cemetery (crown owned); Reserve behind 227 Leigh Road-Temp; Totara Road Esplanade Leigh; Cumberland Street Reserve; Harbour View Road Coastal Reserve; Kendale Reserve; Leigh Domain; Leigh Harbour Cove Walkway; Leigh Library and Grounds (community library collaboration with Auckland Council); Leigh Village Reserve; Leigh Wharf Reserve; Mathesons Bay Reserve; Spray Crescent Reserve; Wonderview Rd/Cotterell St Espl
Auckland Council community facilities	• Toilets: Te Ārai Regional Park car park; Tomarata Dune Lakes Reserve; Te Ārai forestry south car park; Pākiri car park; Goat Island car park; Leigh Wharf Reserve; Mathesons Bay Reserve • Buildings: Ranger office, workshop (Te Ārai Regional Park); hay barn (Pākiri Regional Park); Leigh Tennis Club, Leigh Bowling Club, Leigh Hall, Leigh Library • Park assets: Playground (Mathesons Bay Reserve); swimming pontoon (Mathesons Bay Reserve); skate park (Cumberland Street Reserve) • Walking tracks: Te Araroa (Te Ārai and Pākiri beach sections), Leigh Coastal Path, Omaha Cove
Water assets and infrastructure	• Pump sheds: Te Ārai Regional Park; Pākiri Regional Park; M Greenwood Road
Transport infrastructure	• Boat ramps: Hauraki Road (Leigh) and Tomarata Lake • Roads: numerous; as identified in each unit area

¹ Ministry for the Environment (2024). Coastal Hazards and Climate Change – Guidance for Local Government



1.4 Limitations

The SAP Series 1 reports are strategic documents which set a high-level direction for shoreline management and the assets within those areas. It is important to note there are limitations to the scope of these plans:

- They are not developed with the intention of applying directly to privately-owned land and/or assets within the wider SAP area.
- As the focus is on Auckland Council-owned land and assets, they are developed with limited consideration of third-party land, assets, interests and values.
- Draft adaptation strategies are selected using technical knowledge and understanding of coastal management. Analysis is supported by the best available information as set out in this report and supporting reports.
- They do not consider site-specific options assessments for what may be delivered in implementing each of the adaptive strategies.
- They do not consider any site or parcel-specific legal mechanisms, covenants or requirements or identify specific conditions or actions associated with individual resource consents (such as consents for coastal structures or discharge consents associated with water infrastructure).

2.0 Pākiri to Mathesons Bay / Te Kohuroa Context and overview

2.1 Pākiri to Mathesons Bay / Te Kohuroa SAP area overview

This SAP area extends from the Northern Auckland Region boundary at Te Ārai to Mathesons Bay/ Te Kohuroa & Leigh. Situated in the outer Hauraki Gulf, it is the most exposed section of coast on the Auckland mainland east coast, subject to high wave-energies from the Pacific Ocean. This coastline extends approximately 47 km.

The underlying geology of this coastline comprises of Waitemata Group at the southern end at Cape Rodney, and Holocene sediments extending to the north. The northern approximately 20 km length of this coastline is characterised by the dynamic high-energy white sand beaches of Te Ārai and Pakiri; these beaches separated by the rocky headland of Te Ārai Point. The sand is primarily Holocene sediments from the ancestral Waikato River mouth, with sediment also derived from shell production.

Te Ārai and Pakiri Beaches are backed by large transgressive dune systems, which while relatively intact, have historically been impacted by forestry activities and dune reconstruction. These beaches, and dune systems, go through cycles of coastal erosion and accretion in response to wave climate, with influence from weather patterns such as El Nino or La Nina events. A number of stream mouths discharge onto these beaches. These are highly dynamic environments, influenced by both beach dynamics and the receiving catchments. Natural sand dune ecosystems within this unit are unique and nationally significant; these environments are home to tūturiwhatu (New Zealand dotterel), tōrea pango (variable oystercatcher), taranui (Caspian tern) and some of only a few of the sites where critically endangered species are found, including the tara iti (New Zealand fairy tern), native skinks and katipo spider.

The Cape Rodney and Leigh coastline is characterised by rocky cliffs, intertidal shore platforms, and smaller, steeper pocket beaches of coarser grained sand. Omaha Cove (Leigh Harbour) is a relatively small sheltered harbour characterised by muddy to sandy sediments. Mathesons Bay is characterised by a dynamic larger pocket beach. A number of small rocky islands are present just offshore, including the larger Goat Island at Cape Rodney.

As a north-easterly facing coastline, it is sheltered from Auckland's predominant south-westerly winds. However, this coastline is open to extensive fetch exposures from the north to southeast angles. As a result, the coastline is frequently exposed to moderate to high wave energies, with periodic larger events resulting in significant wave heights of 3 m or larger. This includes longer period swell events generated from some distance away, to more localised shorter period storm waves generated by strong onshore winds. These events can cause episodic erosion of the dune face.

Omaha Cove is sheltered from the open exposure wave energies. Mathesons Bay is also significantly sheltered, however is exposed to low to moderate wave-energies during large events from the east to southeast angles.

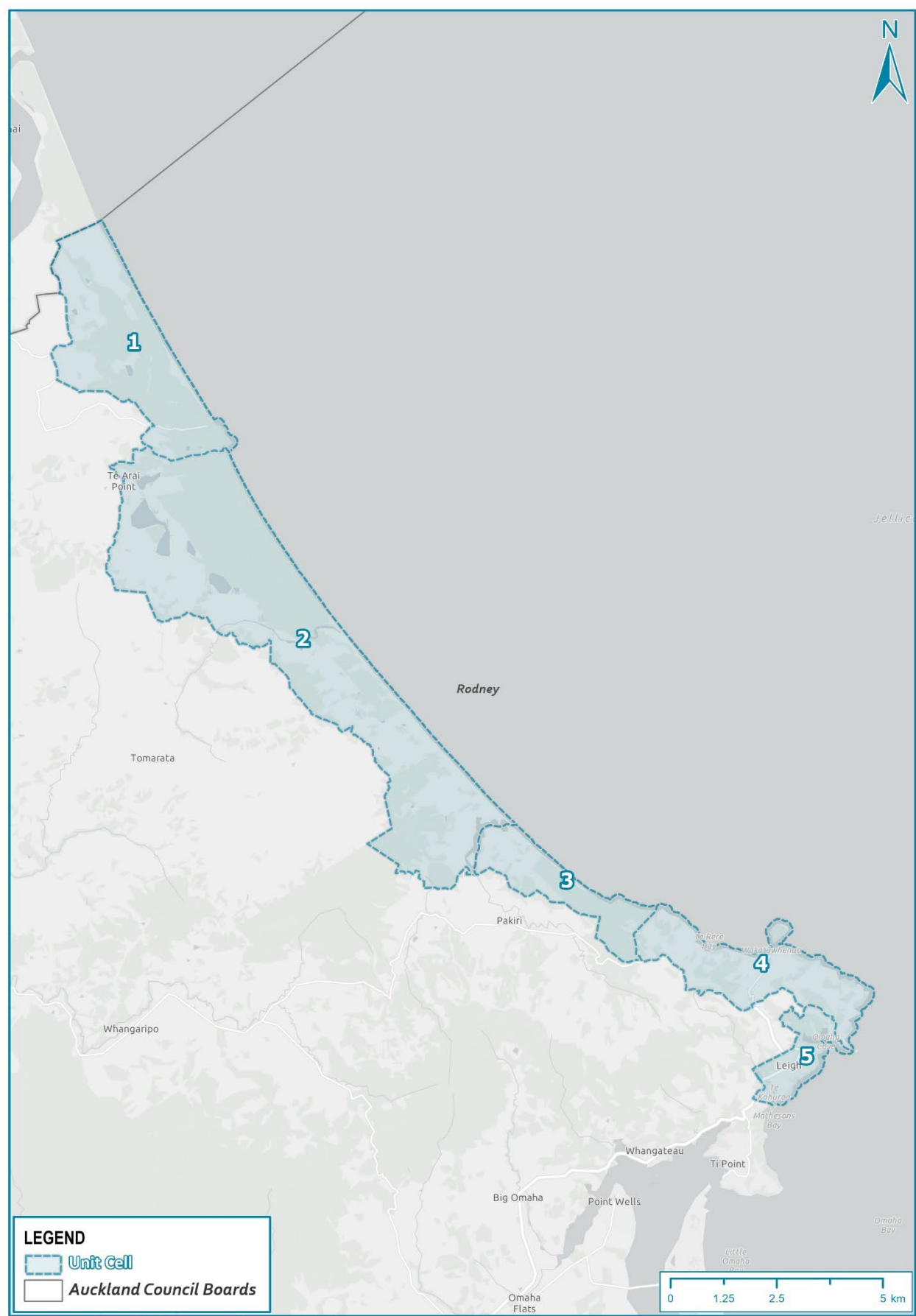


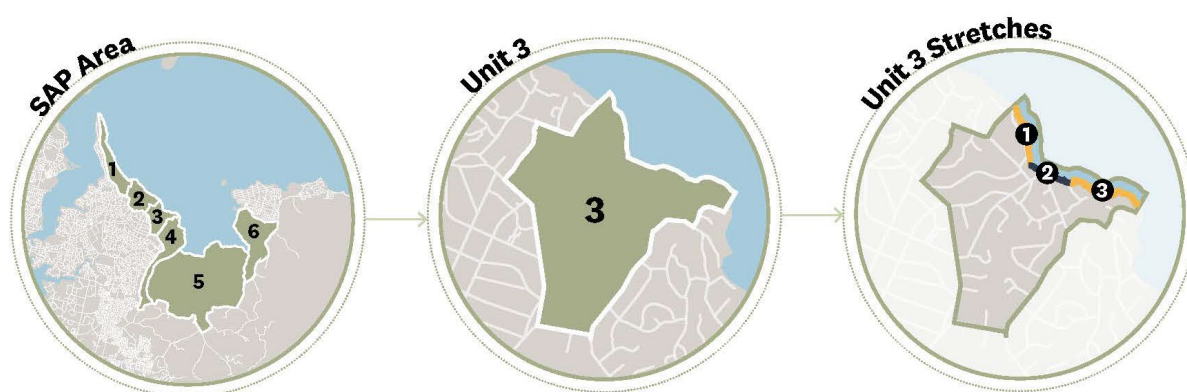
Figure 2-2-1: Unit areas for Pākiri to Mathesons Bay / Te Kohuroa

2.2 Units and stretches

The Pākiri to Mathesons Bay / Te Kohuroa SAP area is divided into 5 separate unit areas to enable a more detailed and comparative view of how risk from coastal hazards is attributed across the SAP area.

The landward extent of the unit areas is reflective of the potential coastal hazardscape (inundation and erosion) and the interaction with catchment flood hazards. These areas have then been mapped to a property boundary or geographics feature.

Within each unit, smaller coastal ‘stretches’ have been identified based on coastal processes, the presence of Auckland Council-owned land and asset location, public-land boundaries, and infrastructure considerations. A stretch is the smallest scale at which the SAP plans apply bespoke adaptation strategies.



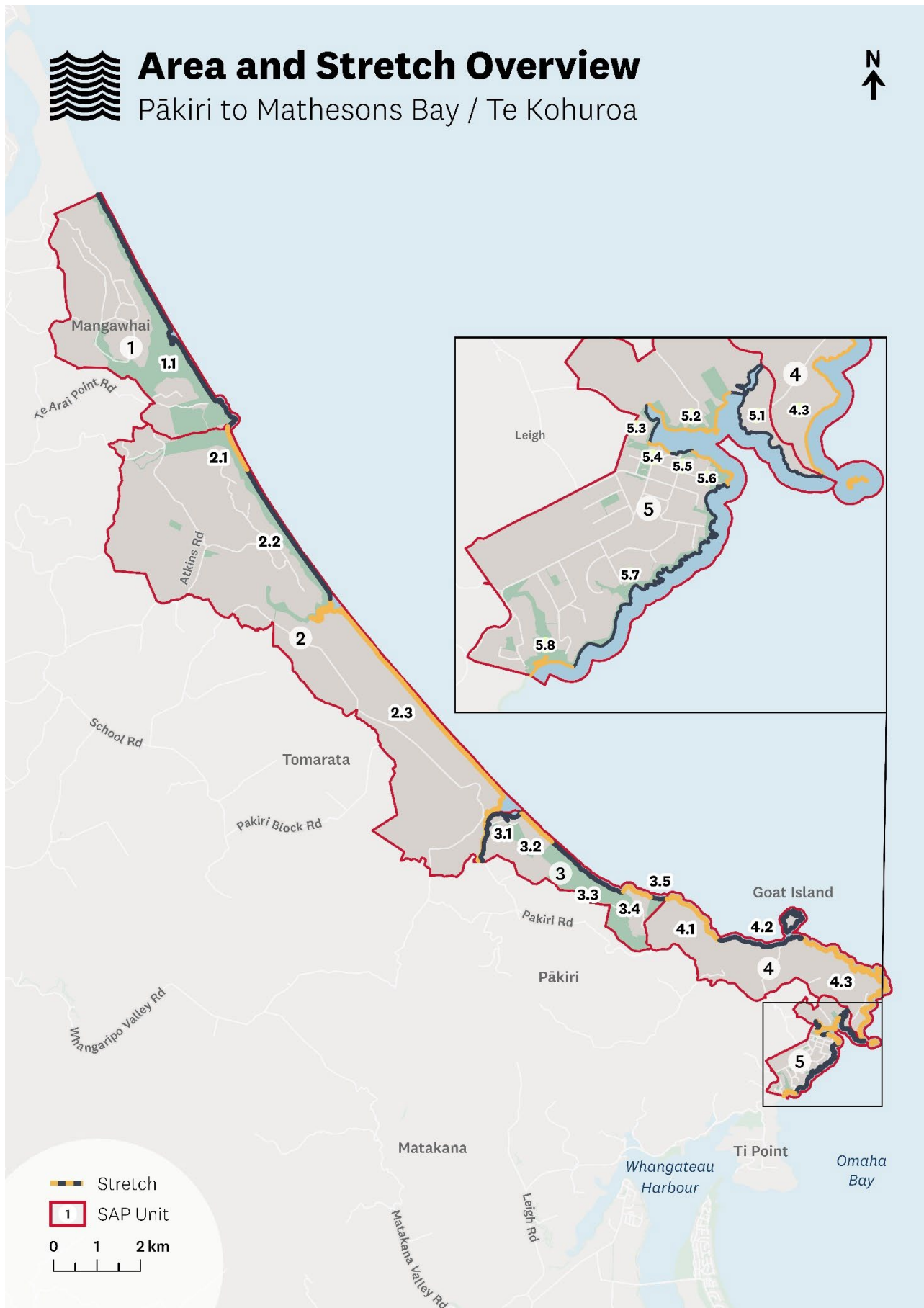
Unit		Stretches
Unit 1	Te Ārai North	1.1 Te Ārai
Unit 2	Te Ārai South	2.1 Forestry access 2.2 Ngaroto Dune Lakes 2.3 Pākiri & Rahuikiri marginal strips
Unit 3	Pākiri	3.1 Pākiri River Road (Pākiri North) 3.2 Taumata A & B Blocks 3.3 Pākiri Regional Park (central) 3.4 Pākiri private land 3.5 Pākiri Regional Park (south)
Unit 4	North Leigh & Cape Rodney	4.1 Te Rere Bay 4.2 Leigh & Te Hawere- a- Maki (Goat Island) 4.3 Cape Rodney

Unit		Stretches
Unit 5	Leigh to Mathesons Bay Te Kohuroa	5.1 Omaha Cove 5.2 Leigh scenic reserves 5.3 Central areas of (Crown-owned) Leigh Harbour Cove walkway 5.4 Ferndale Avenue recreational reserve (Leigh Harbour Cove walkway south) 5.5 Leigh wharf 5.6 Harbour View Point 5.7 Leigh to Mathesons Bay (eastern coastline) 5.8 Mathesons Bay Te Kohuroa



Area and Stretch Overview

Pākiri to Mathesons Bay / Te Kohuroa



2.3 Natural hazards and climate change

This SAP report considers natural hazards relating to sea-level rise, catchment flooding, coastal inundation, coastal erosion and land instability. Other hazard types, including inland land instability, drought, tsunami and wildfires, are not within the scope of this assessment. Risks from low probability but high potential impact events, such as volcanic, tsunami, and earthquake events, are also not addressed through land-use planning. Instead, they are addressed through emergency management measures put in place by groups such as Auckland Emergency Management (Civil Defence).

Natural processes, such as coastal inundation and erosion, become hazards when they have the potential to negatively impact things of value. Tāmaki Makaurau / Auckland is frequently affected by natural hazard events and is likely to experience more frequent and severe events in the future due to climate change. Sea-level rise will increase the zone of exposure. For shoreline areas with assets and infrastructure, or cultural heritage sites near the coastal edge (including recreational and environmental areas), the impacts of coastal hazards can be significant.

For this work, the following timeframes are used to evaluate how the risk of coastal inundation, erosion and instability and sea-level rise adversely impacting the coast may change over time as a result of climate change, noting that projected conditions may occur sooner or later depending upon rates of climate change:

- Short-term, 2021-2050
- Medium-term, 2051-2080
- Long-term, 2081-2130.

2.3.1 Sea-level rise

Sea level influences how coastal processes interact with the landward edge, and can significantly impact the exposure of assets and facilities. As the climate changes and sea levels rise, this rise, combined with coastal storm surge (discussed further under coastal inundation below), will dictate the frequency and magnitude of future coastal inundation events. Over time, sea-level rise will alter the position of mean high-water spring levels and the land-sea interface.

The NZ SeaRise: *Te Tai Pari O Aotearoa Programme* (NZ SeaRise, 2024) has completed sea-level rise projections for the New Zealand coastline. This is based on Intergovernmental Panel on Climate Change (IPCC) Assessment Report 6 (AR6) projections and including climate-ocean responses, earth crustal, gravitational changes and vertical land movement (VLM) specific to New Zealand. The combination of projected sea-level rise and vertical land movement results in relative sea-level rise indicating more localised changes in sea level.

Ministry for the Environment guidance recommends using the high-end emission scenarios SSP5-8.5 for coastal planning (Ministry for the Environment, 2024). This is because the world has been on a high-emissions trajectory over the past few decades, and the physical interactions at play that drive sea-level rise operate on very long timeframes (decadal to centuries). This means that there is a certain amount of sea-level rise that is 'locked in' for the future because of this long timeframe, but the timeline of this is uncertain. There is uncertainty on future emissions and planetary tipping

points, which would mean the ‘expected’ sea-level rise might happen on a faster timescale than is expected (Ministry for the Environment, 2024). Table 2-1 below sets out MfE’s projections for the years in which absolute sea-level rise could be reached for a central location in New Zealand.

Table 2-1: Summary of approximate year when absolute sea-level rise (SLR) heights could be reached using the recommended projections for a central location in Aotearoa New Zealand (Source: Ministry for the Environment, 2024)

SLR (metres)	Year achieved for SSP5 -8.5 H+ (83 rd percentile)	Year achieved for SSP5 -8.5 (median)	Year achieved for SSP3-7.0 (median)	Year achieved for SSP2-4.5 (median)	Year achieved for SSP1-2.6 (median)
0.2	2035	2040	2045	2045	2050
0.3	2050	2055	2060	2060	2070
0.4	2055	2065	2070	2080	2090
0.5	2065	2075	2080	2090	2110
0.6	2070	2080	2090	2100	2130
0.7	2080	2090	2100	2115	2150
0.8	2085	2100	2110	2130	2180
0.9	2090	2105	2115	2140	2200
1.0	2095	2115	2125	2155	>2200
1.2	2105	2130	2140	2185	>2200
1.4	2115	2145	2160	>2200	>2200
1.6	2130	2160	2175	>2200	>2200
1.8	2140	2180	2200	>2200	>2200
2.0	2150	2195	2200	>2200	>2200

2.3.2 Coastal inundation

Coastal inundation is the flooding of low-lying coastal land that is normally dry, due to elevated sea levels. Extreme high sea-water levels (commonly referred to as storm tides) are a result of storm surge. Storm surge occurs due to relatively low atmospheric pressure (the “inverted barometer” effect of 1 cm rise in sea level per 1 hPa fall in pressure) combined with water level set-up at the coast from onshore or alongshore winds. When king tides (the highest spring tides that occur over the year) occur, the risk of coastal inundation is greatest. In the future, present-day temporary coastal inundation extents (e.g. during storms) will become permanent inundation as what is presently dry land will become intertidal due to sea-level rise.

A coastal inundation event with 1% Annual Exceedance Probability (AEP) (1% probability of occurring in any given year) has been considered in the short term, with no sea-level rise. In the medium term, 0.5 m of sea-level rise will increase the depth and extent of coastal inundation for the places that are

exposed in the short term. The frequency of coastal inundation events is predicted to increase over time. In the long-term, 1.0 m of sea-level rise will further increase the depth and extent of coastal inundation for the places exposed in the short and medium term. Some areas that were not previously exposed, may now be exposed to coastal inundation. These maps are available through Auckland Council's Geomaps tool online.

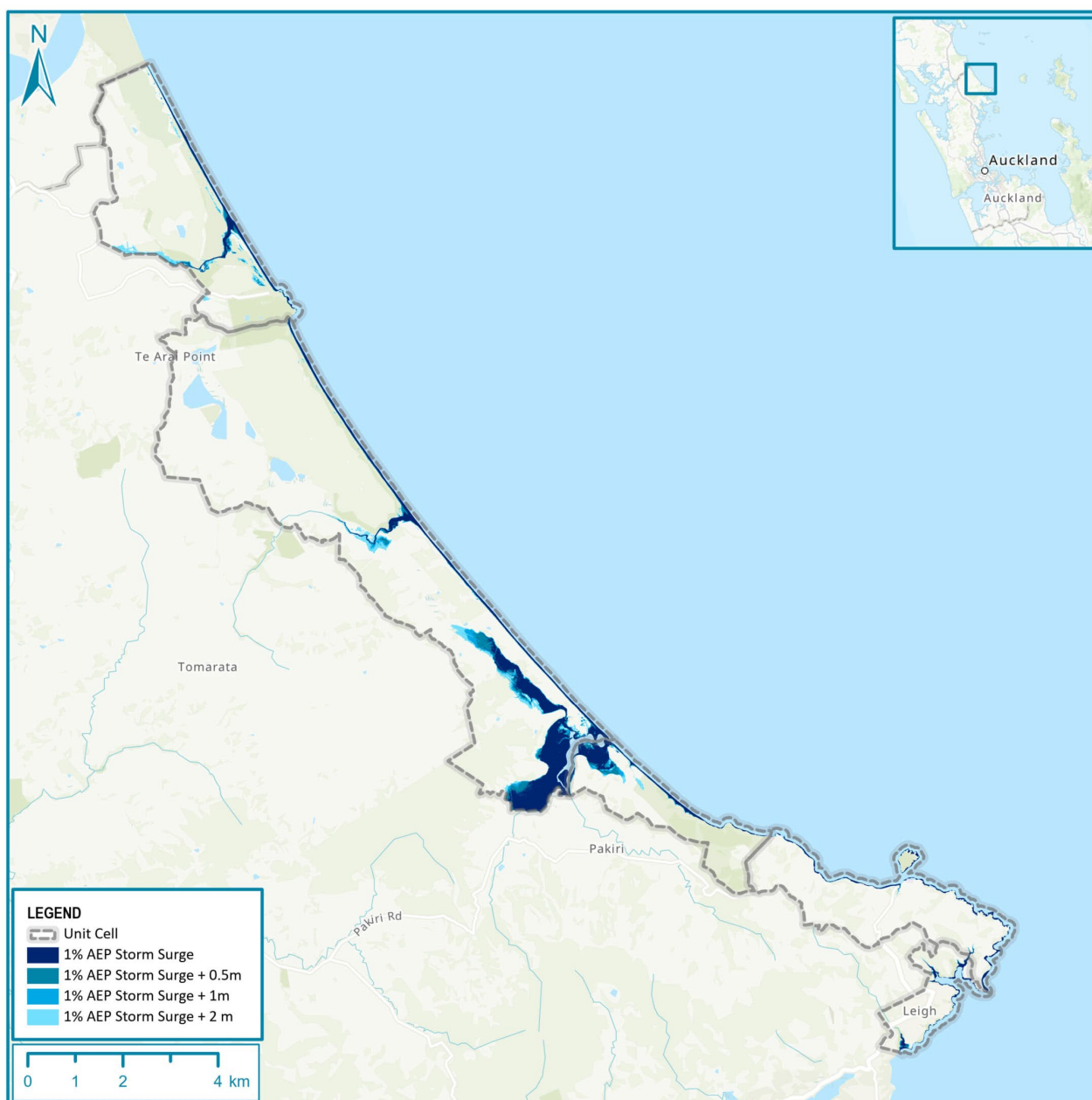


Figure 2- 2-2: Coastal inundation areas for Pākiri to Mathesons Bay / Te Kohuroa (prepared by T+T for Auckland Council 2023) based on Auckland Council coastal inundation mapping (Carpenter, N., Roberts, R., & Klinac, P. (2020). Auckland's exposure to coastal inundation by storm-tides and waves.)

2.3.3 Coastal erosion

Coastal erosion is the process by which natural forces remove material from the land causing the coastline to gradually move inland over time. It is a complex process caused by factors such as wave energy, changes to sediment availability and land use, and sea-level rise. Although some types of

shorelines (e.g. beaches) may undergo short-term periods or episodes of erosion and then recover (i.e. build out again), other types of shorelines (e.g. cliffs) continuously erode with no cycle of recovery. Coastal instability is the movement of land (typically as a landslide) resulting from the loss of support caused by coastal erosion.

Areas Susceptible to Coastal Instability and Erosion (ASCIE) have been mapped using IPCC Assessment Report 5 (AR5) climate change scenarios (RCP emission trajectories), and LiDAR data. In the short-term (2050), RCP4.5 has been used, whereas in the medium-term (2080), and long-term (2130), the RCP8.5 emission scenario has been used. The ASCIEs are shown as a line, representing the distance (in metres) landward of the current coastline that is predicted to be susceptible to coastal instability and erosion, for a given time. These maps are available through Auckland Council's Geomaps tool online.

Areas with higher exposure to erosive forces are more at risk to coastal instability and erosion, where waves interact directly with cliff faces (e.g. no beach) or where cliffs are steep with little vegetation cover. As sea-level rise occurs, waves will interact with a larger portion of the cliff and slope instability and erosion along the coast are expected to increase. Evaluation of projected shorelines in this report considers predicting Auckland's exposure to coastal instability and erosion, (see Technical Report (Roberts, 2020)), as well as site-specific understanding based on recent observations. If observational trends change, this assessment of cliff erosion would require updating.

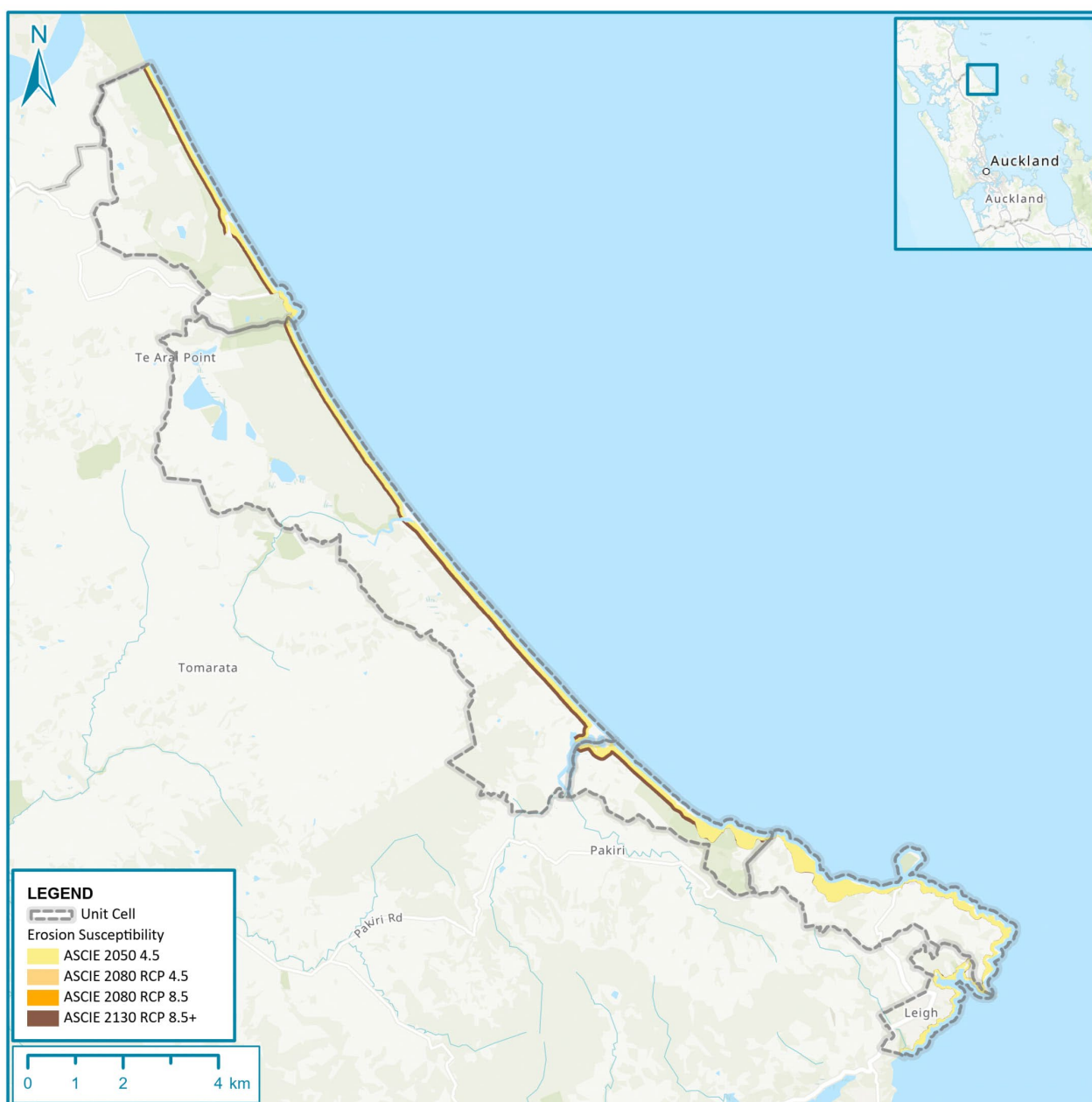


Figure 2- 2-3: Coastal instability and erosion susceptibility for Pākiri to Mathesons Bay / Te Kohuroa, prepared by T+T for Auckland Council (2023) based on Roberts, R., N. Carpenter and P Klinac (2020). Predicting Auckland's exposure to coastal instability and erosion, Auckland Council, technical report TR2020/021

2.3.4 Catchment flooding

Flooding, as a result of extreme rainfall when the drainage capacity of the natural and/or built environment systems cannot cope, is a natural occurrence and is Auckland's most commonly occurring natural hazard. The flooding event with the highest probabilistic risk is a 1 % AEP event (1% probability of occurring in any given year), because an event of such intensity is likely to result in more severe consequences than flooding events that are more common but of lesser intensity.

Auckland Council's web-based portal GeoMaps (Natural hazard theme) models the spatial extent of potential flooding. The maps, developed at catchment scale, indicate areas – flood plains, flood prone areas, flood sensitive areas, and overland flow paths - which may be affected by a rainfall event

2.3.5 Other natural hazards

In addition to coastal inundation, coastal instability, coastal erosion, and flooding, Auckland is affected by a number of natural hazards that occur less frequently. Wildfire, volcanic activity, tsunami, earthquakes, severe wind (such as cyclones), and tornadoes are other notable but less frequently occurring natural hazards that may impact Auckland. This report does not specifically consider risks from any of these aforementioned hazards in the development of these DRAFT adaptation strategies.

2.4 Adaptation strategies and timeframes

Adaptation strategies are then assigned to each coastal 'stretch' over three timeframes:

- Short term (0-20 years) 2021-2050
- Mid term (20-60 years) 2051-2080
- Long term (60-100 years) 2081-2130.

The adaptation strategies are described below and are applicable to all Auckland Council-owned land and assets and may respond to more than one hazard risk, e.g. coastal erosion, coastal inundation and catchment flood risks may all be relevant considerations in some coastal areas.

Strategy name	Summary	What does this mean?
Hold the line	The coastal edge is fixed at a certain location.	• Defence of the coastal edge may be through nature-based options (e.g. beach nourishment) or engineered hard structures (e.g. sea walls). • Nature-based options are the preferred method where possible, but in most cases, engineered hard structures would be required. • An identified use or service is maintained within its existing location, e.g. a road is maintained in a fixed location or parks' land uses are maintained in an existing location. • This approach could result in losing some intertidal areas or beach space due to preventing landward realignment of the coast in response to sea-level rise.
Limited intervention	Maintaining and managing existing assets, uses and land.	• Repair and maintenance of existing protection structures, apply a best practice approach to the consideration of coastal hazards and catchment flooding, assuming an adaptive approach for asset design. • Works may support localised realignment of individual assets. Maintain uses or assets within a general area, not in a fixed location. • Does not support a fixed coastline.

Strategy name	Summary	What does this mean?
Adaptation priority area	Further adaptation planning is required to manage risks to Auckland Council-owned land and assets.	- Further engagement with multiple partners, communities and stakeholders will be required to ensure risk from coastal hazards can be managed and other values maintained. - Assets and land uses may be relocated or realigned from hazard areas to reduce risk to assets/activities and maintain identified values (ecological, cultural, recreational etc). assets may be designed to accommodate hazard impacts and localised protection and risk mitigations may be implemented for some land uses or asset types. - Relocation is planned and undertaken proactively over time. - Planning to protect, retreat, relocate, accommodate risk or avoid risks is responsive to community, cultural and ecological opportunities needs and aspirations. - Supports opportunity for nature-based solutions, and maintenance of coastal values.
No active intervention	Natural processes are allowed to continue. Pro-active management of risk to Auckland Council land and assets is not identified, unless specified.	- Includes no investment in the provision or maintenance of any hazard protection structures associated with coastal hazards and flood protection (does not apply to the management of land stability or subsidence or other hazard risk management). - This strategy is identified for areas of the coastline where Auckland Council-owned land and assets are not identified as exposed/vulnerable to coastal hazard and catchment flooding risk. - Does not preclude the management of risk if required.

2.5 Next steps

The draft strategies and supporting notes included in this document are designed to inform and enable feedback through the further engagement process.

Once the engagement process is closed, all feedback will be reviewed and analysed. This will then inform the development of final community objectives, which are applicable to all areas within the SAP and be considered in the decision-making framework. Unit and stretch-specific feedback on the adaptation strategies will be considered alongside feedback and advice from asset owners, mana whenua and technical experts. This information will then be used to support a review of the draft strategies, including utilising a decision-making framework, to confirm selection of the final strategies.

The final Shoreline Adaptation Plan will include guidance notes to support implementation and may refer to key values, features and considerations. These notes may also reference feedback received through this engagement process.



Unit 1

Pākiri to Mathesons Bay / Te Kohuroa



Unit 1: Te Ārai North

Unit 1 is located within the northern area of the Auckland region, within the Rodney Local Board area. The northern boundary of the unit corresponds to the northern-most boundary of the Auckland region (Te Ārai Beach) including the coastal areas of Te Ārai Regional Park, culminating to the south of Te Ārai Point. This unit extends for approximately 6 km in length. The coastline forms part of the Te Ārai Point Regional Park and is characterised by the high-energy beach backed by the large transgressive dune system, with a stream discharging across the beach face part way up the beach. Te Ārai Point headland at the southern end of this unit is characterised by rocky and vegetated coastal cliffs.

The main public beach access point carpark is located at the southern end of Te Ārai Beach behind the sand dunes. A further public carpark associated with beach access is located at the northern end of this unit, at the end of Pacific Road behind the sand dunes. Low-density residential development occurs behind the frontal dunes. Residential property boundaries are set back approximately 160 m from the seaward dune toe, with the vegetated frontal dunes of Auckland Council Reserve. Te Ārai Links golf course backs the dunes at the northern end.

The frontal dune system is vegetated in native spinifex and pingao which plays a key role in natural sand trapping, dune building, and mitigating wind erosion. Te Ārai Beach and the dune system is dynamic in response to coastal processes, going through cycles of erosion and accretion. Dune restoration work and planting has occurred along the Te Ārai sand dunes. This includes dune restoration involving removal of pest and non-native vegetation, including established pine trees that were present. There are defined pedestrian accessways through the dunes from the main carpark arrival point. Vehicle access onto the beach is restricted with a locked access gate at the southern carpark. There are no existing coastal protection structures, e.g. seawalls, for erosion management along this section of coastline.

The stream mouth can occasionally block or narrow. This has been manually opened in the past, to reduce potential inundation upstream or ponding at the mouth. This unit includes an area identified as part of the Ta Ārai Drainage District, from the legacy Rodney District Drainage District under which Auckland Council has a role supporting the maintenance and management of private waterways and stormwater infrastructure in this area. This includes a discharge to the coast within this unit.

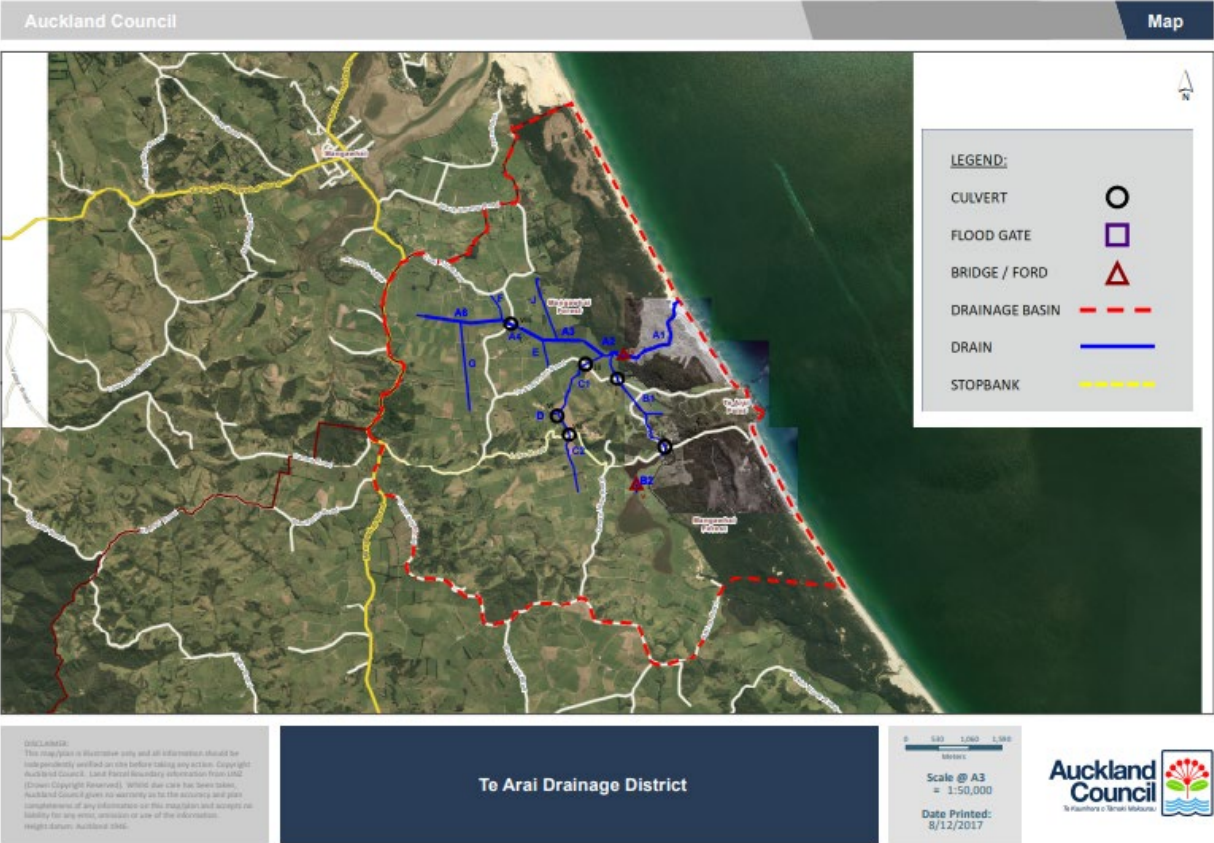
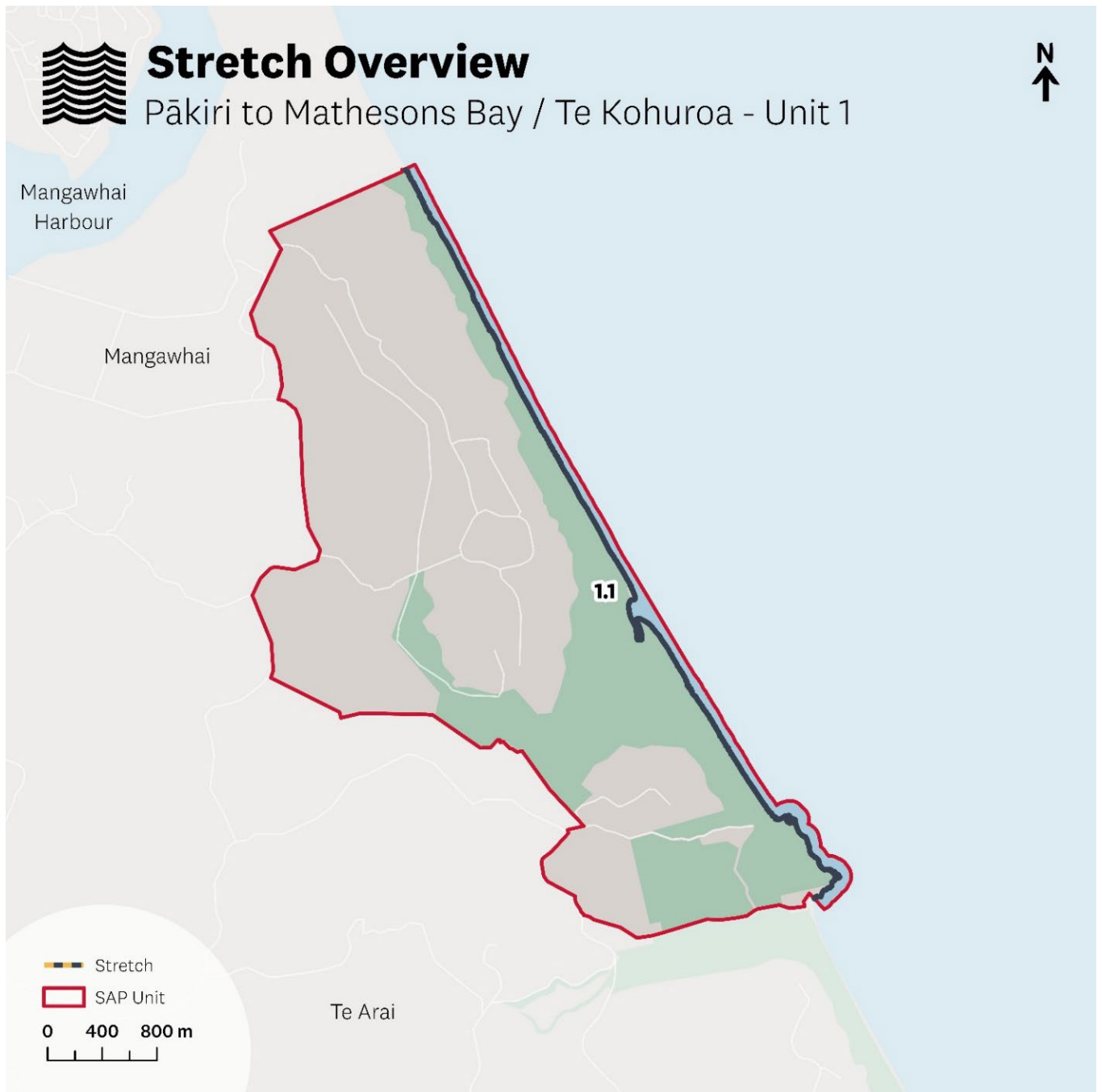


Figure 2-5: Te Ārai Drainage District



DRAFT Adaptation strategy summary stretch 1.1

Stretch	Terms (years)			Explanatory notes
	Short (0-20)	Medium (20-60)	Long (60-100+)	
1.1: Te Ārai Commencing at the boundary with the Northland Region/ Kaipara District, this stretch commences at the northern boundary of the Regional Park and culminates to the south of the point and the end of the Regional Park landholding.	Li	LI	LI	Limited intervention is identified to reflect the management intentions of the Regional Park's Management Plan, including dune planting. Localised retreat or realignment of assets such as car parking areas at the southern end of the beach and in the middle beach area can be accommodated within the Regional Park area. This stretch includes the Te Ārai Drainage District which is one of limited remaining areas of rural Auckland where Auckland Council provides ongoing stormwater management services to private landowners.



Unit 2

Pākiri to Mathesons Bay / Te Kohuroa



- Unit boundary
- Regional park
- Informal recreation park
- Auckland Council owned land
- Boat ramp
- Community buildings

0 500m 1km

Unit 2: Te Ārai South

Unit 2, located within the Rodney Local Board area, commences south of Te Ārai Point and extends approximately 11 km south including the northern end of Pākiri Beach, culminating at the Pākiri River mouth.

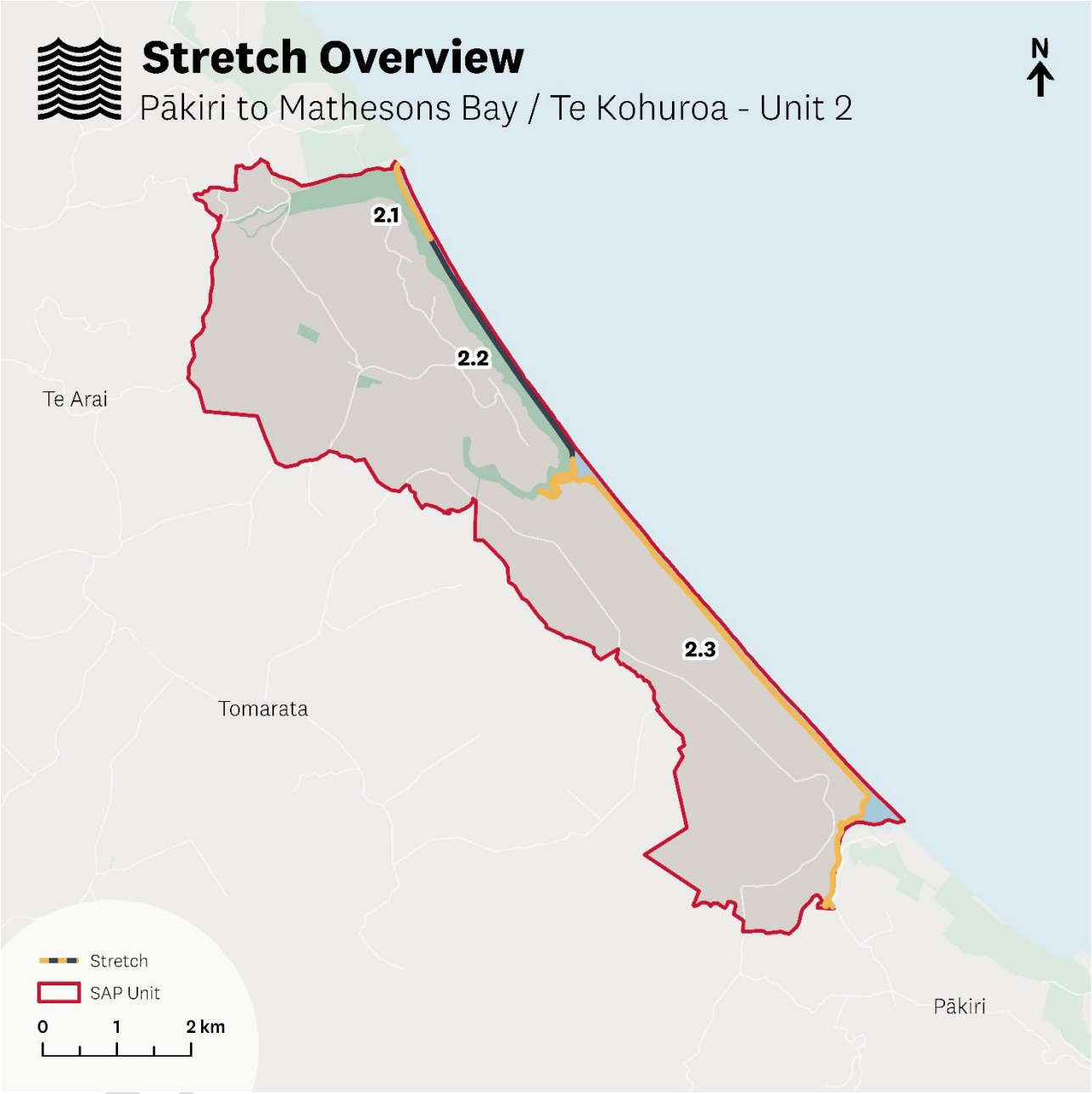
The coastline is characterised by the high-energy beach backed by a large transgressive dune system, with the Pohutawa Stream discharging across the beach face part way up the beach, and the larger Pākiri River Te Awa Pākiri mouth at the southern end of this unit. The Pākiri River mouth position is highly dynamic in response to coastal processes and rainfall. The frontal dune system is vegetated in native spinifex and pingao which play a key role in natural sand trapping, dune building, and mitigating wind erosion. Dune restoration work and planting has historically occurred along the Pākiri Beach sand dunes. Dune restoration has involved significant removal of pest and non-native vegetation, including established pine trees that were present amongst the dunes. Defined pedestrian accessways through the dunes from the main carpark arrival point will continue to be maintained and managed. Pākiri Beach is dynamic in response to coastal processes, going through cycles of erosion and accretion.

Public access to the beach is available at the northern end at the 'forestry access' via the public carpark. This is also referred to as the Te Ārai South recreational hub and the Regional Parks Management Plan identifies the development of a spatial plan for this area. There was, historically, a vehicle access point onto the beach from the carpark at the northern end of this unit. In 2024 this was closed, and a dune restored at this access point preventing vehicle access onto the beach in this location.

This unit also includes three regionally significant dune lakes (Tomarata, Spectacle and Slipper). These lakes are home to threatened plant species and provide habitat for cryptic wetland birds, Black mudfish and other species. A boat ramp provides access to Tomarata Lake and is a popular recreational destination.

At the southern end of the unit, the Pākiri River mouth occasionally blocks or narrows, resulting in a lagoon forming above high tide. This can result in flooding or inundation, and amenity issues associated with reduced access and odour. Auckland Council can mechanically open the river mouth (under an existing resource consent) if deemed necessary, most recently being undertaken in February 2024. There are no existing coastal protection structures, e.g. seawalls, for erosion management along this section of coastline.

Low-density residential development is occurring behind the frontal dunes, with residential property boundaries set back in the order of 150 m plus from the seaward toe of the frontal dunes. The beach is backed by a substantial dune system along its length, ranging in widths of approximately 150 m to over 350 m. As part of the Regional Park acquisition, Auckland Council is entitled to a park of a minimum width of 100 m between mean highwater springs mark and the landward side of the residential development. This includes the ability to move the park boundary should coastal erosion impact the width of the park, through further acquisition of an open space area, providing for the transgressive movement of the dunes within this area of the beach.



DRAFT Adaptation strategy summary stretches 2.1 to 2.3

Stretch	Terms (years)			Explanatory notes
	Short (0-20)	Medium (20-60)	Long (60-100+)	
2.1: Forestry access From the south of the Te Ārai Point area, culminating to the south of the forestry area adjacent to the end of Te Ara Ruru hau Tairua access road.	LI	LI	LI	Limited intervention is reflective of the management intentions in the Regional Parks Management Plan and the ongoing management of risk through location of assets, management of accessways and support for nature-based defence in the form of the dune system.
2.2: Ngaroto Dune Lakes Commencing in the north adjacent to Te Ara Ruru hau Tairua access road end and culminating in the south at the northern side of Pohutawa Stream (south of Tomarata Lake).	LI	LI	LI	Limited intervention is reflective of the management intentions in the Regional Parks Management Plan and the ongoing management of risk through location of assets, management of accessways and support for nature-based defence in the form of the dune system.
2.3: Pākiri & Rahuikiri marginal strips Commencing at the northern side of Pohutawa Stream mouth, to the northern side of Pākiri River (Te Awa Pākiri) in the south (boundary of the unit area).	LI	LI	LI	There is no Auckland Council-owned land located along the coastal edge of this stretch. Rahuikiri Road, located west of the private land holdings is identified as being exposed to catchment flood hazards and coastal inundation (through the Pākiri River inlet) in the mid to long term with sea-level rise. Limited intervention responds to the current management of the stream mouth and signals the need for further management of risk to roading connections.



Unit 3

Pākiri to Mathesons Bay / Te Kohuroa



- Unit boundary
- Regional park
- Auckland Council owned land
- Community buildings

0 500m 1km

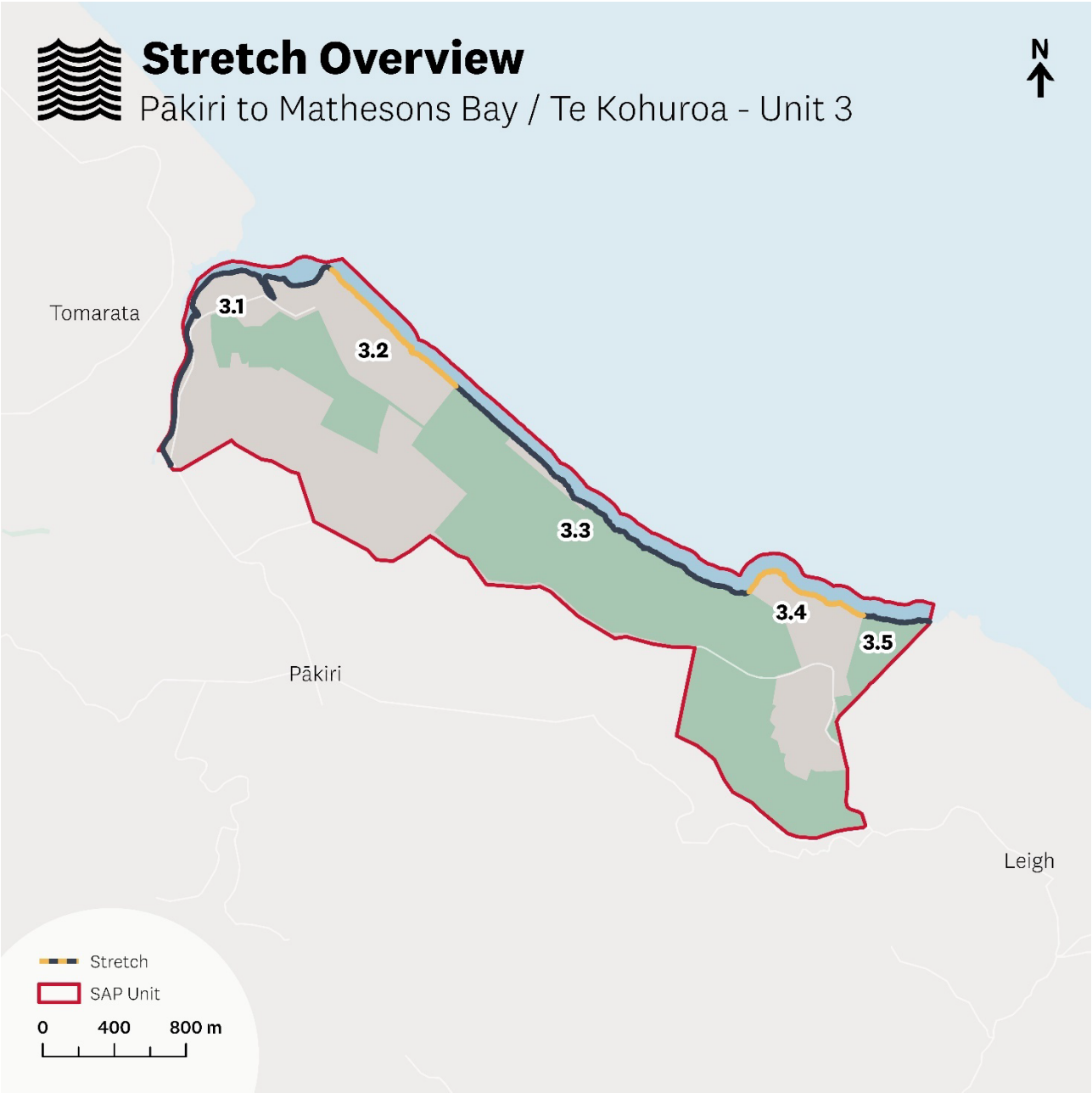
Unit 3: Pākiri

This unit is located within the Rodney Local Board area. Unit 3 is approximately 4 km in length and extends from the Pākiri River mouth, to the southern boundary of Pākiri Regional Park; the southern extent of this coastline forming part of Pākiri Regional Park. Significant areas of this unit are in private ownership, including Taumata A and B blocks in Māori ownership. To the north of the park boundary there is a private commercial campground, accessed from Pākiri River Road adjoining the park directly onto Pākiri Beach. The adaptation strategies identified are not applicable to apply to privately-owned land although this doesn't preclude support for managing risk to ecological and cultural values within these areas.

The coastline is characterised by the high-energy beach backed by the large dune system, with rocky shore platforms backed by vegetated coastal cliffs at the southern end. The beach is backed by a dune system along its length, although of a narrower width than the dune systems to the north along Pākiri Beach, backed by steeply rising topography where regenerative planting has occurred. The frontal dune system is vegetated in native spinifex and pingao which play a key role in natural sand trapping, dune building, and mitigating wind erosion, providing critical habitat for threatened and endangered species. Pākiri Beach is dynamic in response to coastal processes, going through cycles of erosion and accretion.

In places, small streams discharge onto the beach face. Dune restoration work and planting has historically occurred along this section of Pākiri Beach. There are no existing coastal protection structures, e.g. seawalls, for erosion management along this section of coastline.

Pedestrian access to the beach can be gained via Pākiri Regional Park, from Pākiri River Road, utilising an area of parks and DoC land for access to the coastal area. Access and the management of this to the coastal areas is an identified priority in the Regional Parks Management Plan.



DRAFT

DRAFT Adaptation strategy summary stretches 3.1 to 3.5

Stretch	Terms (years)			Explanatory notes
	Short (0-20)	Medium (20-60)	Long (60-100+)	
3.1: Pākiri River Road (Pākiri North) Includes the northern most area of the unit, commencing at Pākiri River inlet and including the coastline south, culminating adjacent to the end of Pākiri River Road. This stretch includes Pākiri River Road and associated park facilities. Located landward of the road is an area of regional park land.	LI	APA	APA	Limited intervention in the short term responds to the need to manage risk from catchment and coastal flooding to Pākiri River Road and the associated park facilities located within this stretch. Adaptation priority in the mid to long term is reflective of the risk to roading and park assets and the need to manage risk to these areas of Auckland Council-owned land while responding to the identified ecological, cultural and social sites and values located within this stretch. Note: Access to the coast and the management of uses and impacts on neighbouring landholdings is identified as a priority in the regional parks management plan. Significant cultural sites and ecological values (and habitats) are located within this stretch.
3.2: Taumata A & B Blocks Commencing to the south of the Pākiri River Road access including the coastline south to the Regional Park boundary.	NAI	NAI	NAI	No active intervention is identified due to there being no identified Auckland Council-owned land and assets exposed to coastal hazards located within this stretch.
3.3: Pākiri Regional Park (central) Commencing at the northern boundary of where the Regional Park landholding meets the coast and including the park south to the roading connection of M Greenwood Road. Note: This stretch includes a section of coast (Pākiri Beach marginal strip) in Crown ownership managed by DoC.	LI	LI	LI	Limited intervention across all times frames is reflective of the exposure of the park areas to coastal inundation and potential susceptibility to coastal erosion over time. The strategy is reflective of the need to implement the management intentions of the Regional Parks Management Plan, provide for coastal management in the form of dune planning and continuing to manage risk to roading assets which may be impacted (located further landward from the coasts) by catchment flooding.
3.4: Pākiri private land This stretch includes a section of coast located between the two areas of regional park which adjoin the coast.	NAI	NAI	NAI	No active intervention is identified due to there being no identified Auckland Council-owned land and assets exposed to coastal hazards located within this stretch.

Stretch	Terms (years)			Explanatory notes
	Short (0-20)	Medium (20-60)	Long (60-100+)	
3.5: Pākiri Regional Park (south) This stretch includes the southern portion of the park and culminates at the southern extent of the Regional Park.	NAI	NAI	NAI	No active intervention does not preclude the implementation of the Regional Park's Management Plan, noting that this southern portion of coastline is a rocky shoreline and as such, coastal processes will impact this section of the coast differently to the sandy coast of central areas of the park.



Unit 4

Pākiri to Mathesons Bay / Te Kohuroa



Unit 4: North Leigh & Cape Rodney

This unit is located within the Rodney Local Board area. It includes approximately 7 km of open indented coastline, extending from the southern boundary of Pākiri Regional Park, to the small headland at the northern entrance to Omaha Cove.

This coastline is characterised by a rocky foreshore with small coarse sand pocket beaches, backed by coastal cliffs. Te Hawere a Maki (Goat Island) is located on the northern side of this unit. This section of coastline is periodically exposed to medium to high wave-energies, with fetch exposures from the north around to southeast angles. The Leigh Recreation Reserve section of this unit (Goat Island Marine Reserve) is exposed to the north to northeast angled fetch, with the southeastern facing section of this unit more exposed to the east to southeast angled fetch.

Due to instability of the cliff at the Leigh Recreation Reserve / Goat Island Marine Reserve access point, planting on the upper cliff face and behind the cliff crest has occurred, along with minor landward realignment of the cliff edge fencing. This is located on DoC landholdings, noting that Auckland Council collaborates with DoC in the management of assets and land in this location.

The majority of this coastline is in private and Māori ownership, however public access to the coast is available from the Leigh Recreation Reserve off Goat Island Road, providing land access to the marine reserve.



DRAFT Adaptation strategy summary stretches 4.1 to 4.2

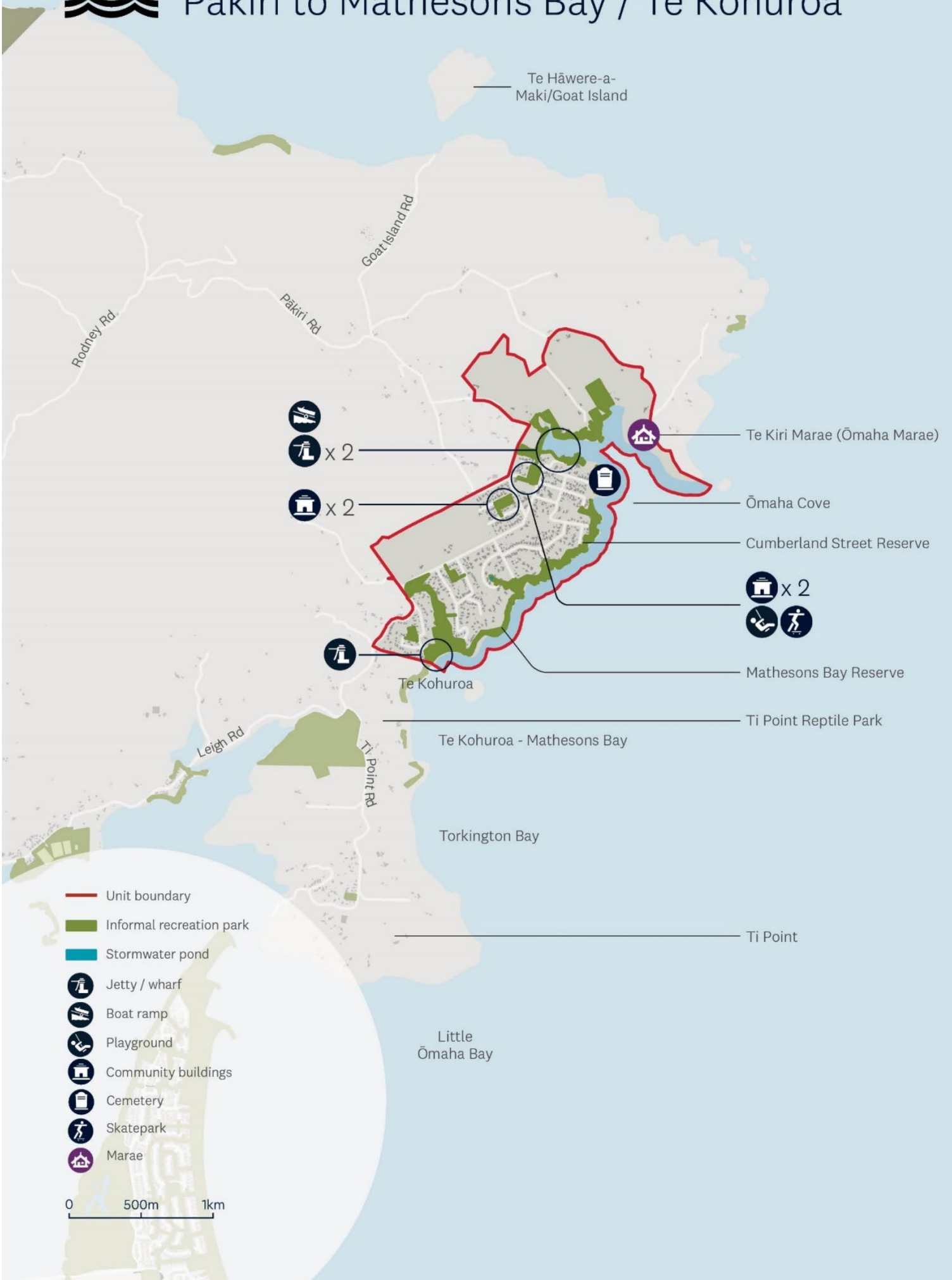
Stretch	Terms (years)			Explanatory notes
	Short (0-20)	Medium (20-60)	Long (60-100+)	
4.1: Te Rere Bay Commencing south of the Regional Park boundary extending south and culminating the western side of the esplanade reserve at Te Rere Bay.	NAI	NAI	NAI	No active intervention is reflective of the limited land and assets exposed to coastal hazards within this coastal stretch.

Stretch	Terms (years)			Explanatory notes
	Short (0-20)	Medium (20-60)	Long (60-100+)	
4.2: Leigh & Te Hawere- a-Maki (Goat island) Commencing in the west with the area of esplanade reserve in the western side of Te Rere Bay and including the J Greenwood Road (unformed) road end and coastline west to western end of the unnamed access road servicing the University of Auckland facility.	LI	LI	APA	Limited intervention is identified to reflect the need to manage risk to assets which Auckland Council supports the maintenance of and the roading assets and management of beach access structures. Within this stretch, no coastal protection structures are envisaged, limited intervention refers to the design, location and management of access to manage risks to assets and uses. In the long term, adaptation priority is identified in relation to the potential erosion susceptibility and the inundation risks to the road end, coastal access and carpark areas. Noting also the provision of access to private landholdings to the east.
4.3: Cape Rodney Commencing east of the University of Auckland facilities at the end of the unnamed access road, including the coast east to Pane Tiki Island Point.	NAI	NAI	NAI	No active intervention is reflective of the limited land and assets exposed to coastal hazards within this coastal stretch.



Unit 5

Pākiri to Mathesons Bay / Te Kohuroa



Unit 5: Leigh and Mathesons Bay | Te Kohuroa

Unit 5 is located within the Rodney Local Board area. The approximately 5 km long indented coastline of this unit extends from Omaha Cove/Leigh Harbour around to Mathesons Bay.

Omaha Cove & Leigh (stretches 5.1 to 5.6)

Omaha Cove is a sheltered, small harbour, with upper arms that connect to fresh-water streams. The cove's shoreline is a mix of rocky intertidal area backed by vegetated coastal cliffs, with sandy to muddy intertidal flats.

A large concrete seawall is present along the southern shoreline of the cove, retaining the road and connecting to the public wharf and boat ramp. A rock seawall is present along the Omaha Cove western shoreline, adjacent to Leigh Harbour Cove Walkway. The structural condition of the concrete seawall at Omaha Cove is monitored to guide ongoing maintenance requirements.

Cape Rodney Road provides access to the Cape Rodney area and Omaha Marae, traversing a portion of the inlet from the coast. Mount Pleasant Drive, Tenetahi and Pakiri Roads are generally set back from the coastal edge.

Access to the coast for boat launching is provided via Hauraki Road, while Harbourview, Cumberland and Cotteral are perpendicular to the coast. This unit includes numerous reserve areas such as the Leigh Scenic Reserve and the Leigh Harbour Cove Walkway which has been impacted by the 2023 storm events.

Leigh to Mathesons Bay Te Kohuroa (stretch 5.7)

The coastline from Omaha Cove to Mathesons Bay is characterised by rocky intertidal platforms backed by vegetated coastal cliffs, with the Mathesons Bay Reserve extending part way around the cliff top.

Coastal access points and park amenities are located in several sections of the coastline within this area of the unit, including the Harbour View, Wonderview Road and Cotterell Street Esplanade reserves. Access to the coast for a range of recreational activities is highly valued by the community and visitors to this area. The Leigh cemetery (Crown land) is also located within this area of the unit.

Mathesons Bay Kohuroa (stretch 5.8)

Mathesons Bay is a sandy pocket beach.

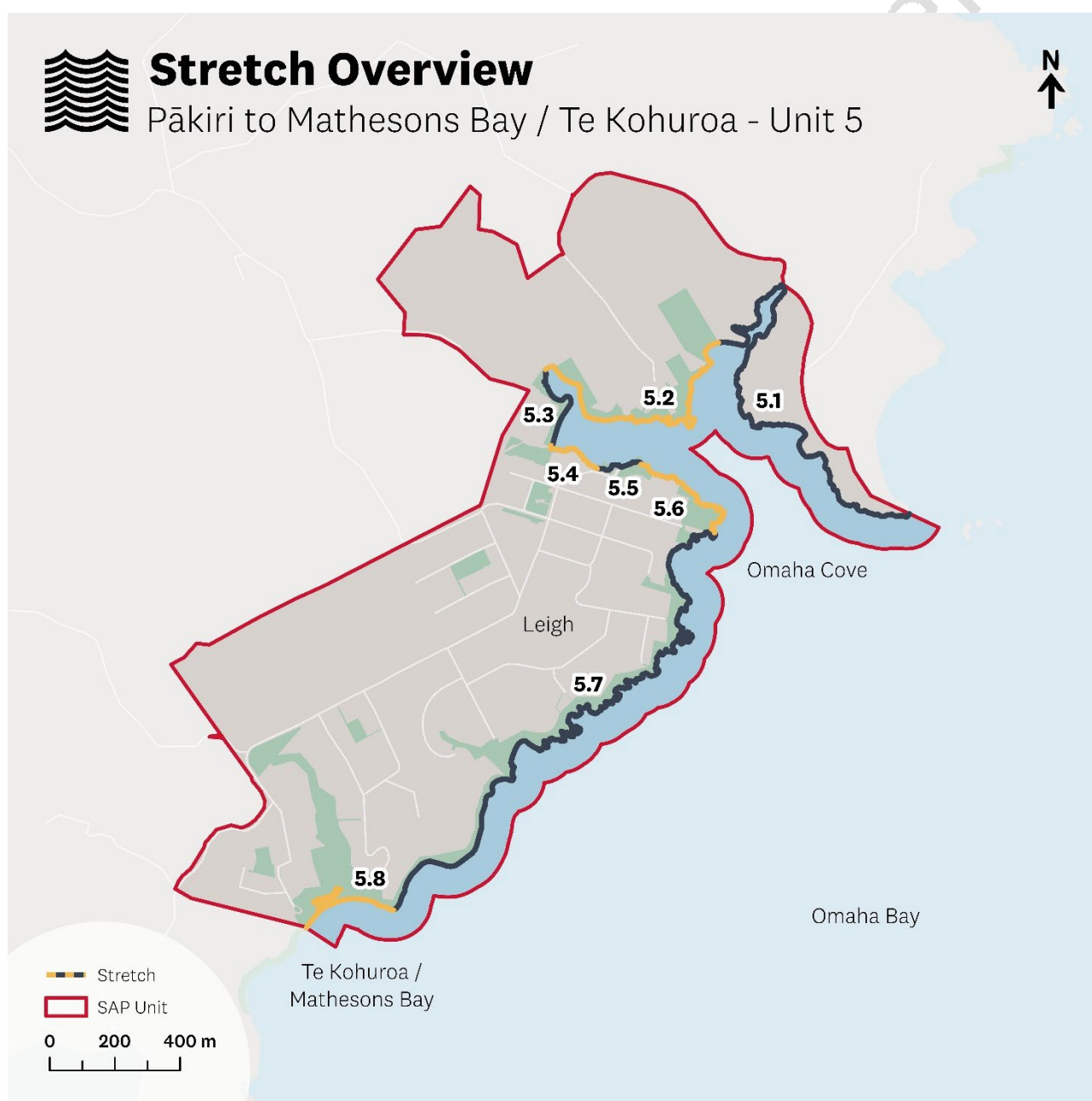
Rock rip-rap armours the eastern end, and gabion basket armoring extends along the backshore at the western end, extending from the true right bank of the Kahuroa Stream that discharges across the beach face. Further rock armoring is present at the bay's western end along the road embankment and where a smaller stream discharges onto the beach face.

Previously, dune planting was established along the unarmoured section of reserve adjacent to Grand View Road carpark. The stream that discharges across the beach face in the middle of the bay periodically blocks or constricts at the mouth. This results in elevated water levels immediately

upstream, which can become contaminated due to bird use. Auckland Council mechanically opens the stream mouth to allow it to discharge to the beach when required.

Dune planting and sand can be eroded during storm events. Historically, the beach has recovered from such erosion events and the re-establishment of dune planting may be considered. Following the coastal storm events of 2023, the rock revetment at Mathesons Bay was damaged prompting future maintenance work.

Mathesons Bay Te Kahuroa is a highly valued beach with connections to the wider network of accessways and amenities within the Mathesons Bay area. Mathesons Bay is also accessed from both the east and west via Grand View Road and Mathesons Bay Road, with road ends culminating in proximity to the coast.



DRAFT Adaptation strategy summary stretches 5.1 to 5.8

Stretch	Terms (years)			Explanatory notes
	Short (0-20)	Medium (20-60)	Long (60-100+)	
5.1: Omaha Cove Commencing at the northern extent of this unit (adjacent to Panetiki Island) and culminating to the north of the scenic reserve landholdings and walkway.	NAI	LI	LI	No active intervention in the short term reflects the limited land and assets located within this stretch. Limited intervention in the mid to long term reflects the need to manage risks to road access to the Marae and private landholdings at Cape Rodney. No coastal protection structures are envisaged in relation to protection of Auckland Council coastal land within this stretch.
5.2: Leigh Scenic Reserves Commencing at the northern boundary of the scenic reserves and culminating in the southern side of the inlet.	LI	LI	LI	Limited intervention relates to the management of risk to Auckland Council assets (pathways, foot bridge and associated coastal structures) located within the DoC-owned reserve areas. No coastal protection is envisaged, management of risk through design and location of accessways is preferred.
5.3: Central areas of (Crown-owned) Leigh Harbour Cove walkway Commencing south of the northern bridge and culminating to the north to Ferndale Avenue Reserve.	NAI	NAI	NAI	No active intervention is reflective of the land ownership in this stretch, noting the presence of limited assets, accessways and connections. Subject to management arrangements, strategies can be updated to respond to the need to manage risk in this stretch. This strategy does not preclude actions being taken, as required to manage risk.
5.4: Ferndale Avenue Recreational Reserve (Leigh Harbour Cove walkway south). Commencing at and including the foot bridge and the southern side of the inlet including the shoreline east to the Leigh Boat ramp.	LI	LI	LI	Limited intervention provides for the management of risk to Auckland Council-owned and maintained structures located within this coastal stretch, noting that some management agreements may require formalisation and areas of informal access on private and third-party land may exist in places within this coastal stretch.
5.5: Leigh wharf Commencing at the boat ramp area and including the shoreline east, culminating at the eastern extent of the wharf area and associated protection structures.	HTL	HTL	HTL	Hold the line is reflective of the importance of this harbour access connection and engineered structures providing coastal access and wharf facilities. Inundation risk may increase over time and management of safe use of facilities with sea level rise will require further consideration.

Stretch	Terms (years)			Explanatory notes
	Short (0-20)	Medium (20-60)	Long (60-100+)	
5.6: Harbour View Point Commencing to the east of the Leigh wharf area and culminating adjacent to Harbour View Road and reserve end.	NAI	LI	LI	No active intervention in the short term is reflective of the identified coastal hazard susceptibility. In the mid to long term, if coastal erosion and instability extents are realised, the management of risk to uses within the cemetery and associated reserves will be required in collaboration with landowners.
5.7: Leigh to Mathesons Bay (eastern coastline) Commencing adjacent to Harbour View Road accessway including the open coast south to the point North of Mathesons Bay.	LI	LI	LI	Limited intervention is identified to provide for the management of risk to assets located within this coastal stretch. Management of risk through design and location of structures and accessways is preferred in order to provide for the management of safe access to the coast and coastal vantage points. Key access points are identified at Harbourview and Wonder View Road.
5.8: Mathesons Bay Te Kohuroa Commencing at the point north east of the embayment and culminating at the southern end of the reserve landholding.	HTL	LI	AP	Hold the line in the short term provides for the continued management of risk to piped infrastructure, park assets and road ends. This may be achieved through hard engineering and the use of nature-based approaches such as dune planting. Management of the stream mouth and upper catchment flood risk is also identified as an ongoing risk management action. Limited intervention in the mid term identifies that existing management actions may be necessary with increasing sea-level rise, while further consideration of the location and design of some assets may be required to respond to inundation risk. In the long-term, inundation risks and the multiple assets and values associated with the bay identify the need to consider further adaptation of uses to maintain values.

3.0 References & Bibliography

Carpenter, N., Roberts, R., & Klinac, P. (2020). *Auckland's exposure to coastal inundation by storm-tides and waves*. Auckland Council. <https://knowledgeauckland.org.nz/media/2070/tr2020-024-auckland-s-exposure-to-coastal-inundation-by-storm-tides-and-waves.pdf>

Roberts, R., N. Carpenter and P Klinac (2020). Predicting Auckland's exposure to coastal instability and erosion, Auckland Council, technical report TR2020/021, December 2020

<https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/topic-based-plans-strategies/parks-sports-outdoor-plans/regional-parks-management-plans/docsrpmpmaps/16-map-te-Ārai-regional-park.pdf>

<https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/topic-based-plans-strategies/parks-sports-outdoor-plans/regional-parks-management-plans/docsrpmpmaps/10-map-pakiri-regional-park.pdf>

<https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/topic-based-plans-strategies/parks-sports-outdoor-plans/regional-parks-management-plans/Documents/regional-parks-management-plan-2022.pdf>

https://www.tearawhiti.govt.nz/assets/Treaty-Settlements/FIND_Treaty_Settlements/Ngati-Manuhiri/DOS_documents/Ngati-Manuhiri-Deed-of-Settlement-Schedule-Documents-21-May-2011.pdf

<https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/our-plans-strategies/topic-based-plans-strategies/parks-sports-outdoor-plans/rodneyparkmanagementplan/rodney-local-park-management-plan-volume-2-warkworth.pdf>

<https://www.tiakitamakimakaurau.nz/discover-tamaki-makaurau/learn-about-your-area/bfa-te-arai-dunes/>