

6. Coastal hazard adaptation actions

Mer

Community overview

Community	English name	Cluster	Type
Mer	Murray	Eastern	Continental volcanic and granitic rock island

Mer is located in the eastern island cluster and has a population of approximately 406 people (ABS, 2021). The volcanic island is just over 4 km² in size, with the maximum elevation of the island over 200 m above sea level. As the island is volcanic in nature the majority of the island is elevated above +5 m AHD, however the township is generally located along the coastal strip below this level and is therefore exposed to coastal hazards. While the township is positioned on the coastal fringe, significant infrastructure (the aerodrome) and newer construction of key infrastructure (the school) is generally inland. Other key infrastructure includes public utilities (electricity, water, waste).

Seasonal Sager winds approach the island from the south-east between May and December. The positioning of the main township in the lee of the highest peak (a ridgeline that is the remnants of a volcanic crater) means that they are relatively sheltered from the south easterly winds. There is a fringing reef surrounding much of the

island, the most notable exception being in the area adjacent to the south-westerly extent of the township. There are two large islands to the south-west which offer additional protection from wind generated waves.

Key infrastructure on Mer includes:

- Airport
- Regional council office
- State school (years Pre-prep to year 7), with large sporting oval
- Health centre with two permanent nurses
- IBIS grocery store
- Large facilities from old school
- Motel
- Water plant reservoirs/ filtration collection wells
- Power station
- Barge ramp



Risk

The Mer community is currently considered low risk from inundation coastal hazards, and high risk from erosion. The risk from inundation does not significantly increase within the planning horizon of this strategy. The risk from erosion remains high, mainly due to the proximity of assets to the erodible sections of coast.

Coastal hazards profile for Mer from present day to 2100

Mer Risk Profile	Present Day	2050	2100
Open coast erosion	High	High	High
Tidal inundation	Low	Low	Medium
Storm tide inundation	Low	Medium	Medium

Adaptation response

A strategic adaptation response has been developed for Mer to guide decision making over multiple planning horizons from present day to 2100. Based on the risk assessment and risk profiles for each hazard across the planning horizons, the adaptation response for Mer is to “monitor” through observing changes to individual asset’s capacity to withstand hazards and reviewing risk. By 2050, increased risk will trigger the adaptation response to actively manage identified risks, through a range of initiatives including education, nature based and structural engineering solutions. The active management adaptation approach will continue being implemented in 2100..

Adaptation response profile for Mer

Present day	2050	2100
Monitor (look and learn) 	Actively manage 	Actively manage 

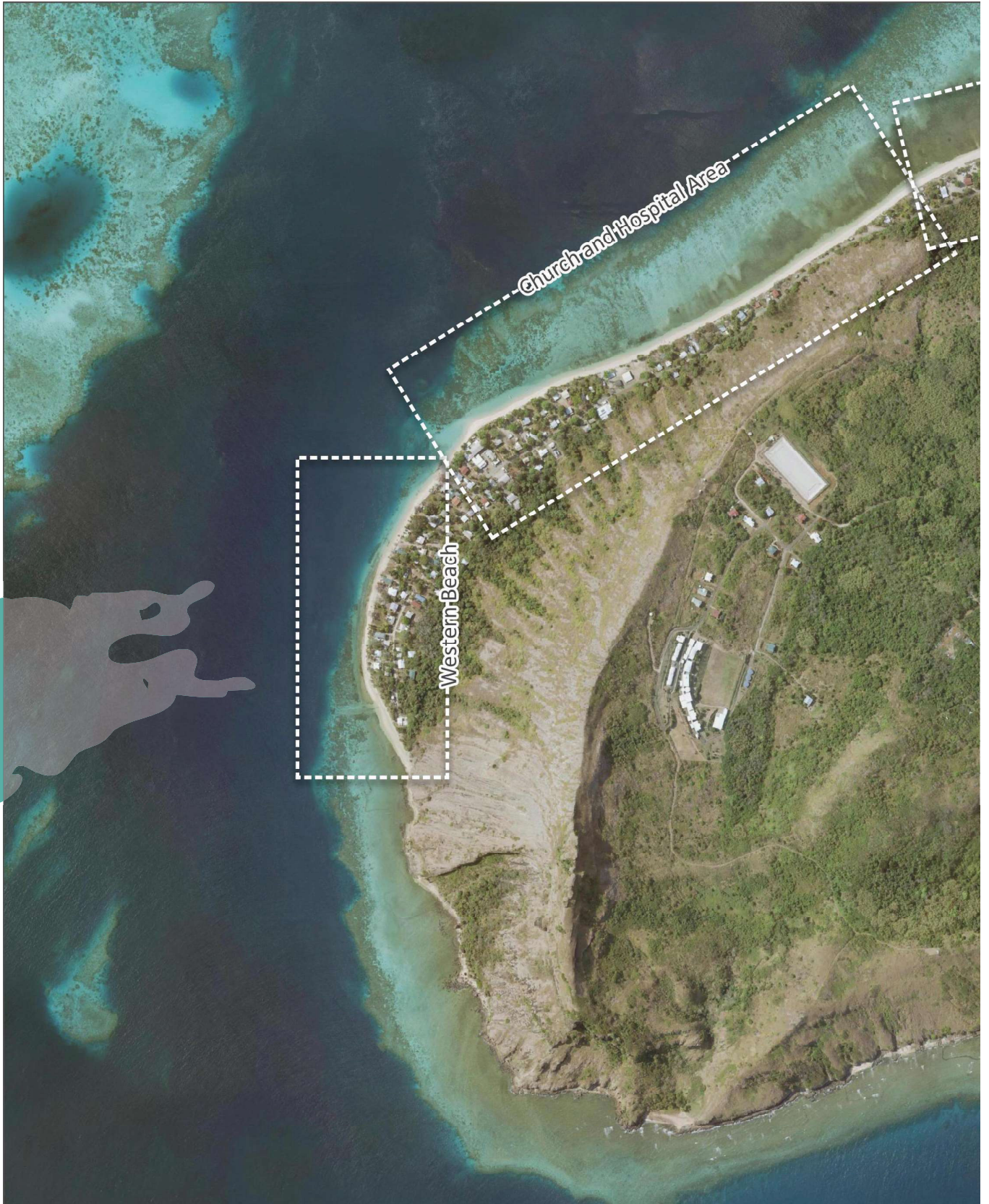
Adaptation pathways and priority actions

Key Management Areas (KMAs) have been defined based on which areas are most at risk, as well as feedback from community leaders and are mapped below. Tailored adaptation pathways for each key management area on Mer are presented in the following pages.

Building on the outcomes of the risk assessment, adaptation response, and input from community leaders, specific priority adaptation actions have been developed to protect and enhance assets and coastal values in the Mer community, as well as enhance community stewardship and improve decision-making. These actions are designed to progress the community along its adaptation pathways.



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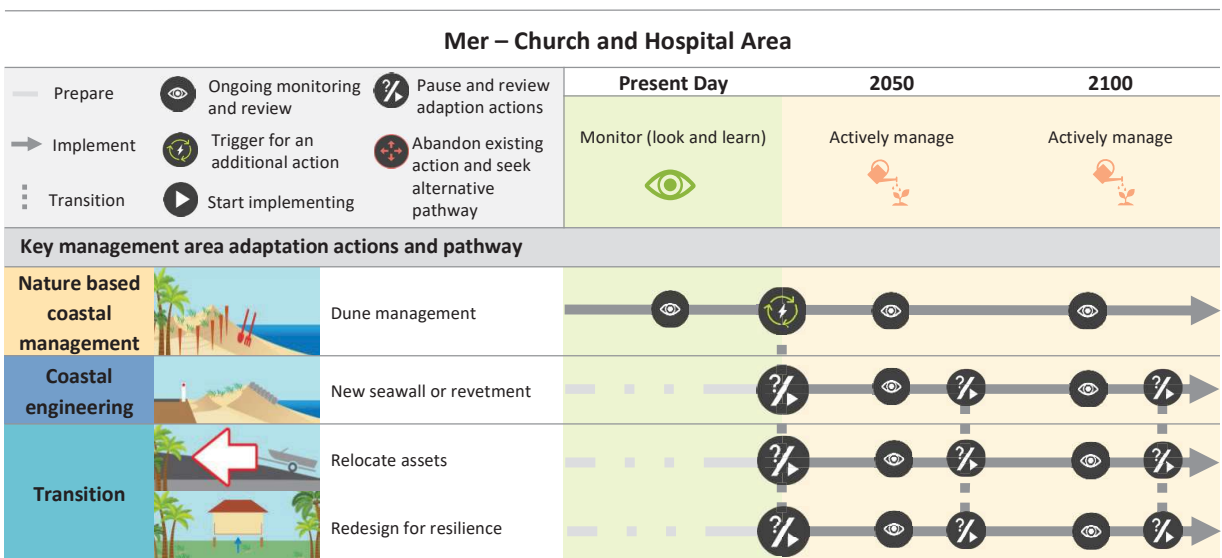
CHURCH AND HOSPITAL AREA

Overview of assets and values at risk

- In the past there has been evidence of wave over wash, over the beach berm in front of the church.
- The study found this area was at further risk of inundation from sea level rise and storm tide as well as coastal erosion.

Pathway description

In the Church and Hospital Area of Mer, the adaptation pathway begins with dune management. As trigger points are reached, the community can actively manage coastal hazards by constructing new seawalls or revetments to further protect the area from both erosion and inundation, redesigning assets for resilience, or relocating assets out of hazard areas. Moving forward, the community will need to decide whether to continue to maintain and upgrade any new protection structures, relocate or redesign assets. Input into this decision will involve consideration of sea level rise, and island geomorphology and sediment dynamics. Ongoing custodianship and monitoring should be maintained, avoiding new development in hazard-prone areas.



NORTH EAST BEACH

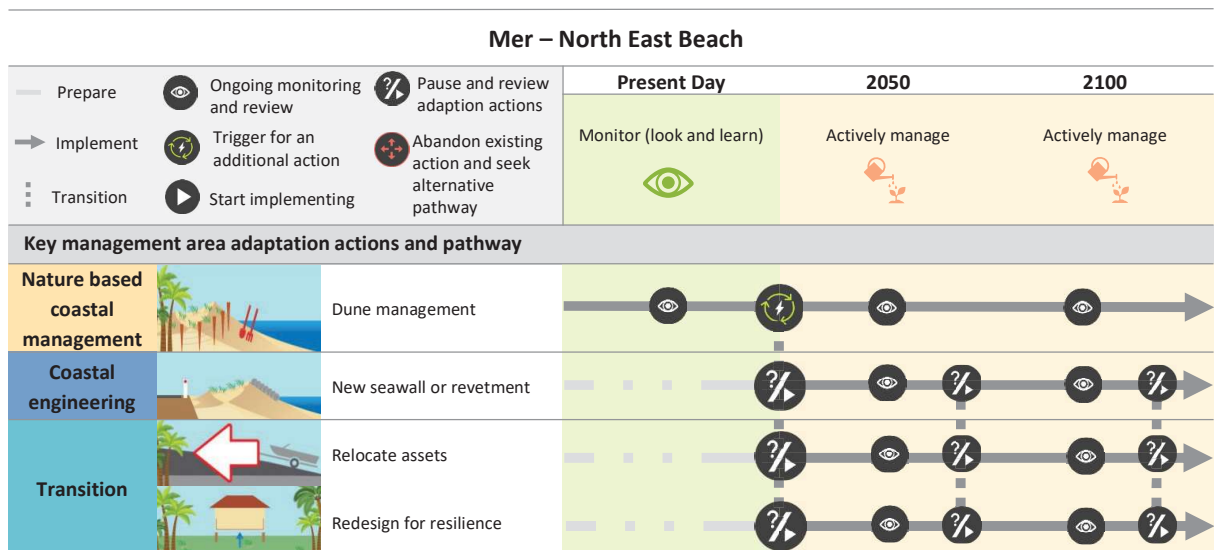
Overview of assets and values at risk

- It was identified that several areas had evidence of existing erosion or may become prone to erosion in the future, which may impact the cemetery and homes in that area.
- The north-eastern end of the community has several residences that are experiencing coastal erosion. The erosion is believed to be caused by the currents moving around the island, causing sediment movement back towards the cusped spit in the centre of the northern beach.
- Residents have used available materials to attempt to protect the beach from erosion. There is evidence of underlying rock as the sand level has dropped and this may act as a barrier to further erosion or may exacerbate the existing erosion in the future depending on its exposure and extent.



Pathway description

At Mer's north east beach, the adaptation pathway begins with dune management. As trigger points are reached, the community can actively manage coastal hazards by constructing new seawalls or revetments to further protect the area, redesigning assets for resilience, or relocating assets out of hazard areas. Moving forward, the community will need to decide whether to continue to maintain and upgrade any new protection structures, relocate or redesign assets. Input into this decision will involve consideration of sea level rise, and island geomorphology and sediment dynamics. Ongoing custodianship and monitoring should be maintained, avoiding new development in hazard-prone areas.



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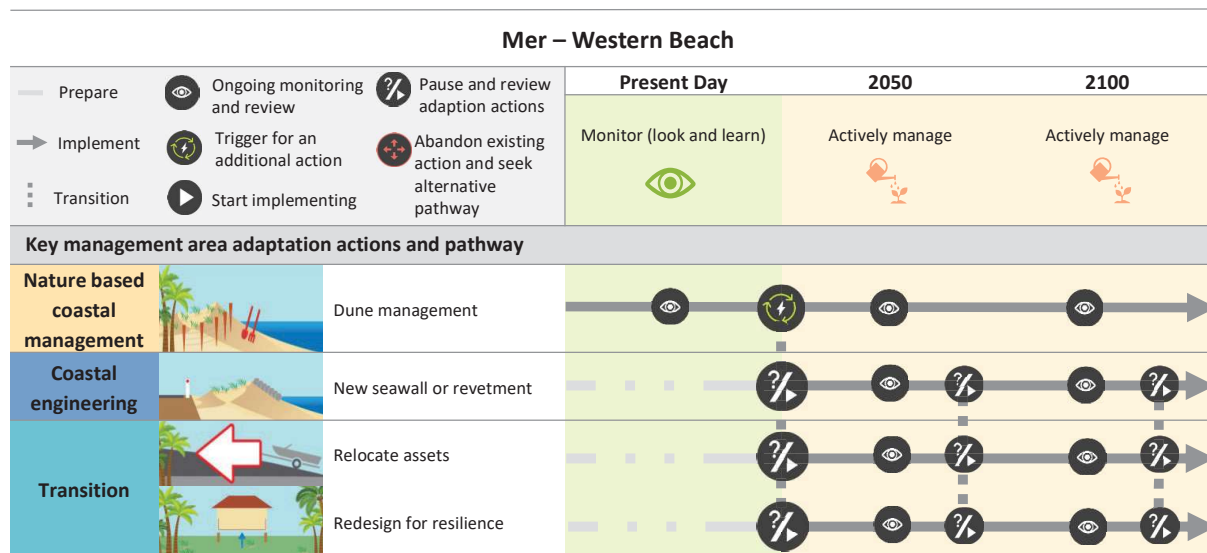
WESTERN BEACH

Overview of assets and values at risk

- The beach between the barge ramp and the desalination plant drops quickly into a deep channel and does not have a reef fringe in this location.
- There have been several attempts by locals to use available materials to create informal barriers on the beach to slow erosion.
- The beach also has a rock platform exposed at lower tides.
- The desalination plant is close to the foreshore and has no protection. This is critical community infrastructure within the coastal erosion zone.

Pathway description

For the western beach of Mer, the adaptation pathway begins with dune and foreshore management. Specific critical assets such as the desalination infrastructure may require engineered protection structures. As trigger points are reached, the community can actively manage coastal hazards by constructing new seawalls or revetments to further protect the area, redesigning assets for resilience, or relocating assets out of hazard areas. Moving forward, the community will need to decide whether to continue to maintain and upgrade any new protection structures, relocate or redesign assets. Input into this decision will involve consideration of sea level rise, and island geomorphology and sediment dynamics. Ongoing custodianship and monitoring should be maintained, avoiding new development in hazard-prone areas.



Mer Community Action Plan		Indicative cost
1. Council-wide initiatives to enhance custodianship (Priority actions to be implemented within 10 years, and ongoing)		
1.1. Community stewardship		
Mer1.1a	See Council wide actions. Consider how these actions can be effectively used in Mer.	
1.2. Education and knowledge sharing		
Mer1.2a	See Council wide actions. Consider how these actions can be effectively used in Mer.	
1.3. Monitoring		
Mer1.3a	See Council wide actions. Consider how these actions can be effectively used in Mer.	
2. Planning updates (Priority actions to be implemented within 10 years, and ongoing)		
2.1. Land use planning		
Mer2.1a	See Council wide actions. Consider how these actions can be effectively used in Mer.	
Mer2.1b	Develop a "Priority Asset Relocation and Redesign Strategy" involving significant community consultation and input. This should identify potential new settlement zone on Masig where a staged relocation of assets can occur. This plan should explore the opportunity for a "Floating Community", or an "Above Water Community".	\$\$
2.2. Disaster planning		
Mer2.2a	See Council wide actions. Consider how these actions can be effectively used in Mer.	
3. Resilient built environment (Priority actions to be implemented within 10 years, and ongoing)		
3.1. Maintaining and improving infrastructure		
Mer3.1a	See Council wide actions. Consider how these actions can be effectively used in Mer.	
Mer3.1b	Consider relocation or redesign for resilience of buildings (in line with the Resilient Housing and Development Guidelines and Designs from action C3.1c) exposed to erosion in the Western Beach, Church and Hospital, and North East Beach KMAs.	\$\$
4. Nature based coastal management (see adaptation pathways for timing)		
4.1 Dune, mangrove and reef protection and enhancement		
Mer4.1a	Identify degraded dunes in all Key Management Areas. Protect and enhance them using local knowledge and Zaget Torateti, including the use of native dune plants, and other stabilising vegetation. Manage access for an appropriate time period to allow vegetation to establish.	\$
4.2 Living shorelines		
Mer4.2a	Explore feasibility of an artificial reef to enhance fringing reef resilience, bolstering natural sediment supply and dissipating wave energy.	\$\$
4.3 Beach nourishment		
Mer4.3a	Monitor beach profiles around the island and consider beach nourishment to enhance degraded dunes in front of key assets. Supplement with dune restoration and access management, see action Mer4.1a	\$\$
5. Coastal engineering (see adaptation pathways for timing)		
5.3 Last line of defence structures		
Mer5.3a	As part of the adaptation pathway in the Western Beach, Church and Hospital, and North East Beach KMAs, consider the construction of a coastal protection structure to protect exposed assets. This action should not occur before Mer3.1b, Mer4.1a and Mer4.3a are considered.	\$\$\$



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Adaptation theme	Adaptation option	Action ID	2023 Priority strategic actions (completed within 5 – 10 years)	Indicative cost	Timing	Priority
1. Council-wide initiatives to enhance custodianship	1.1. Community stewardship	C1.1a	Establish a coastal resilience officer position within Council who will have responsibility over implementing the Zenadth Kes CHAS. This position will support Council's Climate Change Adaptation and Environment Committee and work closely with communities, across council and with other state and commonwealth agencies, streamlining and facilitating collaboration and effective implementation of adaptation actions.	\$\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.1. Community stewardship	C1.1b	Seek co-funding/resources for further initiatives through grants and stakeholder partnerships.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.1. Community stewardship	C1.1d	Promote coastal custodianship in the youth and future generations with community coast care events. These should weave in cultural knowledge and the idea of Zagat Torateti. They can also include art, communication, and science programs focused on coastal resilience.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.1. Community stewardship	C1.1e	Establish and implement a dune and foreshore protection and maintenance program incorporating Zagat Torateti, access management, and community education. Support local communities in implementing this program.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.1. Community stewardship	C1.1f	Develop a dune and wetland vegetation seed bank for vegetation restoration efforts, involving Traditional Owners, Indigenous Land and Sea Rangers and schools.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.2. Education and knowledge sharing	C1.2a	Develop a Zenadth Kes CHAS - Communication and Engagement Strategy. This will support Council in working with communities to raise awareness of and implement their Community Adaptation Plans. This will use creative and innovative communication channels, leveraging emerging community leaders and content creators. It will outline the appropriate level and protocols of engagement and consultation needed for a range of adaptation actions. Ideally, this communication and engagement strategy should not stand alone but be integrated with Council's existing engagement policies and practices so that its relevance for all current and future development and supporting community resilience is continuously acknowledged.	\$	Ongoing	High

Adaptation theme	Adaptation option	Action ID	2023 Priority strategic actions (completed within 5 – 10 years)	Indicative cost	Timing	Priority
1. Council-wide initiatives to enhance custodianship	1.2. Education and knowledge sharing	C1.2b	Develop locally and culturally appropriate educational materials about coastal processes, climate change, monitoring and adaptation with a focus on nature based management and innovative and island-appropriate design and development. Integrate these materials into the implementation of the Zenadth Kes CHAS - Communication and Engagement Strategy (action C1.2a).	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.2. Education and knowledge sharing	C1.2c	Work with organisations like the TSRA, CSIRO, Universities, Non-Profits, and the Torres Strait Climate Centre of Excellence to support further research and innovation into coastal hazard and climate change adaptation.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.2. Education and knowledge sharing	C1.2d	Continue to advance partnerships and collaboration with Traditional Owners to further consider needs and aspirations for Aboriginal and Torres Strait Islander People in coastal hazard adaptation.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.2. Education and knowledge sharing	C1.2e	Promote cross-sector partnerships and initiatives to enhance resilience and strategic adaptation for transport infrastructure, including boating infrastructure.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3a	Develop a tailored integrated monitoring and reporting program to inform future adaptation. Incorporates actions C1.3b-h.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3b	Undertake drone survey (elevation and aerial imagery) monitoring of beaches.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3c	Undertake underwater coral reef surveys to map the extent and condition. Explore the use of photogrammetry to create detailed 3D models of reefs.	\$\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3d	Establish a network of water level gauges throughout the TSIRC regions. Train community members to operate and maintain them.	\$\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3e	Undertake regular coastal protection structure condition assessments.	\$	Ongoing	High

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1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3f	Establish a monitoring program for sites of cultural significance that measures indicators such as spiritual/social value, archaeological value, physical condition, and protection of sites.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3g	Establish a system of Citizen Science photo monitoring points (CoastSnap, Fluker Post or similar) at beaches in the area.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3h	Create a platform/process with Council for monitoring data storage and management	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3i	Undertake detailed sediment supply and transport studies for coral cay islands and lagoons.	\$\$	Within 5 years	Medium
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3j	Review and further examine the sediment dynamics around TSIRC communities and the shoreline including: <ul style="list-style-type: none"> · Geomorphic assessment · Hydrodynamic modelling · Shoreline Erosion Management Plan. Linked to C1.3i	\$	Ongoing	High
2. Planning updates	2.1. Land use planning	C2.1a	Submit updated Erosion Prone Area layers to State Government for formal update to the existing State-wide mapping.	\$	Immediate	High
2. Planning updates	2.1. Land use planning	C2.1b	Use the updated Erosion Prone Area and storm tide mapping and outcomes of the Zenadth Kes CHAS in current and future Planning Scheme and Master Plan updates to inform decisions on development areas and strategic land use planning.	\$	Ongoing	High
2. Planning updates	2.1. Land use planning	C2.1c	Consider implications (within Council) of the Strategy for future development approvals and conditions, including: <ul style="list-style-type: none"> · Approval conditions for lots of undeveloped land, and · Implications for future development approvals and conditions. 	\$	Ongoing	High
2. Planning updates	2.2. Disaster management	C2.2a	Use the updated Erosion Prone Area and storm tide mapping, risk assessment and economic implications to update the TSIRC Local Disaster Management Plan. Ensure local community input is used to inform the updated plan.	\$	Within 5 years	Medium
2. Planning updates	2.2. Disaster management	C2.2b	Review the long-term adequacy of evacuation and shelter facilities and evacuation routes, including evacuation by land and sea.	\$	Ongoing	High

Adaptation theme	Adaptation option	Action ID	2023 Priority strategic actions (completed within 5 – 10 years)	Indicative cost	Timing	Priority
3. Resilient built infrastructure	3.1. Increasing infrastructure resilience	C3.1a	Review at-risk infrastructure (from CHAS data outputs) and embed risks into current asset management plans/Master Plan (this could include 'betterment' at critical asset refurbishment/renewals points).	\$	Ongoing	High
3. Resilient built infrastructure	3.1. Increasing infrastructure resilience	C3.1b	Review access road renewals and upgrades (prioritisation), and upgrade design requirements and timing of upgrades.	\$	Ongoing	High
3. Resilient built infrastructure	3.1. Increasing infrastructure resilience	C3.1c	Produce "Resilient Housing and Development Guidelines and Designs" tailored to the Torres Strait Islands. This should cater to all island types. Community knowledge holders, elders and leaders should be heavily consulted for this process.	\$\$	Ongoing	High
3. Resilient built infrastructure	3.1. Increasing infrastructure resilience	C3.1d	Consult with utility providers on future services and upgrades, and implications of coastal hazard areas.	\$	Ongoing	High
3. Resilient built infrastructure	3.1. Increasing infrastructure resilience	C3.1e	Audit stormwater assets in areas subject to erosion and inundation, and develop plan to upgrade in line with refurbishment/renewals points.	\$\$	Ongoing	High
3. Resilient built infrastructure	3.2. Relocate infrastructure	C3.2a	Develop "Priority Asset Relocation and Redesign Guidelines" to assist communities in developing island specific relocation strategies. Community knowledge holders, Elders, other leaders and young people should be heavily consulted for this process. Factors to consider include: Approvals Native Title Hazards Master Plan Town Planning	\$	Immediate	High

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4. Nature-based coastal management	4.1. Dune, mangrove and reef protection and enhancement	C4.1a	Support local communities in re-establishing, rehabilitating, or protecting coastal dunes	\$	Ongoing	High
4. Nature-based coastal management	4.1. Dune, mangrove and reef protection and enhancement	C4.1b	Support local communities in re-establishing, rehabilitating, or protecting mangroves	\$	Ongoing	High
4. Nature-based coastal management	4.1. Dune, mangrove and reef protection and enhancement	C4.1c	Support local communities in re-establishing, rehabilitating, or protecting coral reefs	\$	Ongoing	High
4. Nature-based coastal management	4.1. Dune, mangrove and reef protection and enhancement	C4.1d	Scope the feasibility and priority locations for natural reef enhancement activities, requiring comprehensive knowledge of the latest scientific findings and methodologies to ensure effective implementation and multiple benefit outcomes.	\$\$	Within 5 years	Medium
4. Nature-based coastal management	4.2. Living shorelines	C4.2a	Develop a detailed "Living Shorelines Design and Implementation Plan" to prioritise and support the communities where a living shoreline has been determined as a feasible option.	\$\$	Within 5 years	Medium
4. Nature-based coastal management	4.2. Living shorelines	C4.2b	Develop a detailed "Artificial Reef Design and Implementation Plan" to prioritise and support the communities where an artificial reef has been determined as a feasible option.	\$\$	Within 5 years	Medium
4. Nature-based coastal management	4.3. Beach nourishment	C4.3a	Develop a detailed "Beach Nourishment Design and Implementation Plan" to prioritise and support the communities where beach nourishment or sand management has been determined as a feasible option.	\$\$	Within 5 years	Medium

Adaptation theme	Adaptation option	Action ID	2023 Priority strategic actions (completed within 5 – 10 years)	Indicative cost	Timing	Priority
5. Coastal engineering	5.1. Structures to reduce coastal hazards	C5.1a	Continue to implement the Seawall Project.	\$\$\$	Ongoing	High
5. Coastal engineering	5.1. Structures to reduce coastal hazards	C5.1b	Continue to monitor and maintain existing coastal and flood protection structures.	\$\$\$	Ongoing	High
5. Coastal engineering	5.1. Structures to reduce coastal hazards	C5.1c	Audit coastal and flood protection assets, and develop plan to upgrade where needed.	\$	Ongoing	High

