

# 6. Coastal hazard adaptation actions

## Dauan

### Community overview

Community	English name	Cluster	Type
Dauan	Mt Cornwallis	Northern	Continental volcanic and granitic rock island

Dauan is one of three islands in the northern cluster of Torres Strait islands (Saibai, Boigu and Dauan). Dauan is under 5 km<sup>2</sup> in size, with a population of 131 people (ABS 2021) living towards the northern edges of the island. The majority of the township is focussed on the north eastern side of the island, protected from ocean waves by Saibai to the east and Papua New Guinea (PNG) to the north. Dauan is a steep island, rising to 295 m above sea level and mainly comprising granitic rock. The properties on the island are generally located in comparatively low-lying areas along the coastal fringe. The islands key infrastructure is generally sufficiently distanced from the beach such that risk due to coastal hazards is minimal.

Some of the key infrastructure in the Dauan township include:

- Helipad
- Regional council office
- State Primary School (years prep to 7)
- Health centre with permanent nurse
- Two grocery stores
- Sporting Facilities - Outdoor Sport Field, basketball court.
- Guesthouse (six rooms)
- Council workshop/ compound
- Water plant reservoirs/ filtration collection wells
- Power station
- Barge ramp
- Pier (small craft and passengers only)



## Risk

increasing within the planning horizon of this strategy. Erosion is a greater risk with some assets located in erosion prone areas.




### Coastal hazards risk profile for Dauan from present day to 2100

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

## Adaptation response

A strategic adaptation response has been developed for Dauan 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 Dauan is to “monitor” through observing changes to individual asset’s capacity to withstand hazards and reviewing risk, with the approach being implemented in the present day and into 2050. By 2100, 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.

### Adaptation response profile for Dauan

Present day	2050	2100
<p><b>Monitor</b> (look and learn)</p> 	<p><b>Monitor</b> (look and learn)</p> 	<p><b>Actively manage</b></p> 

## Adaptation pathways and priority actions

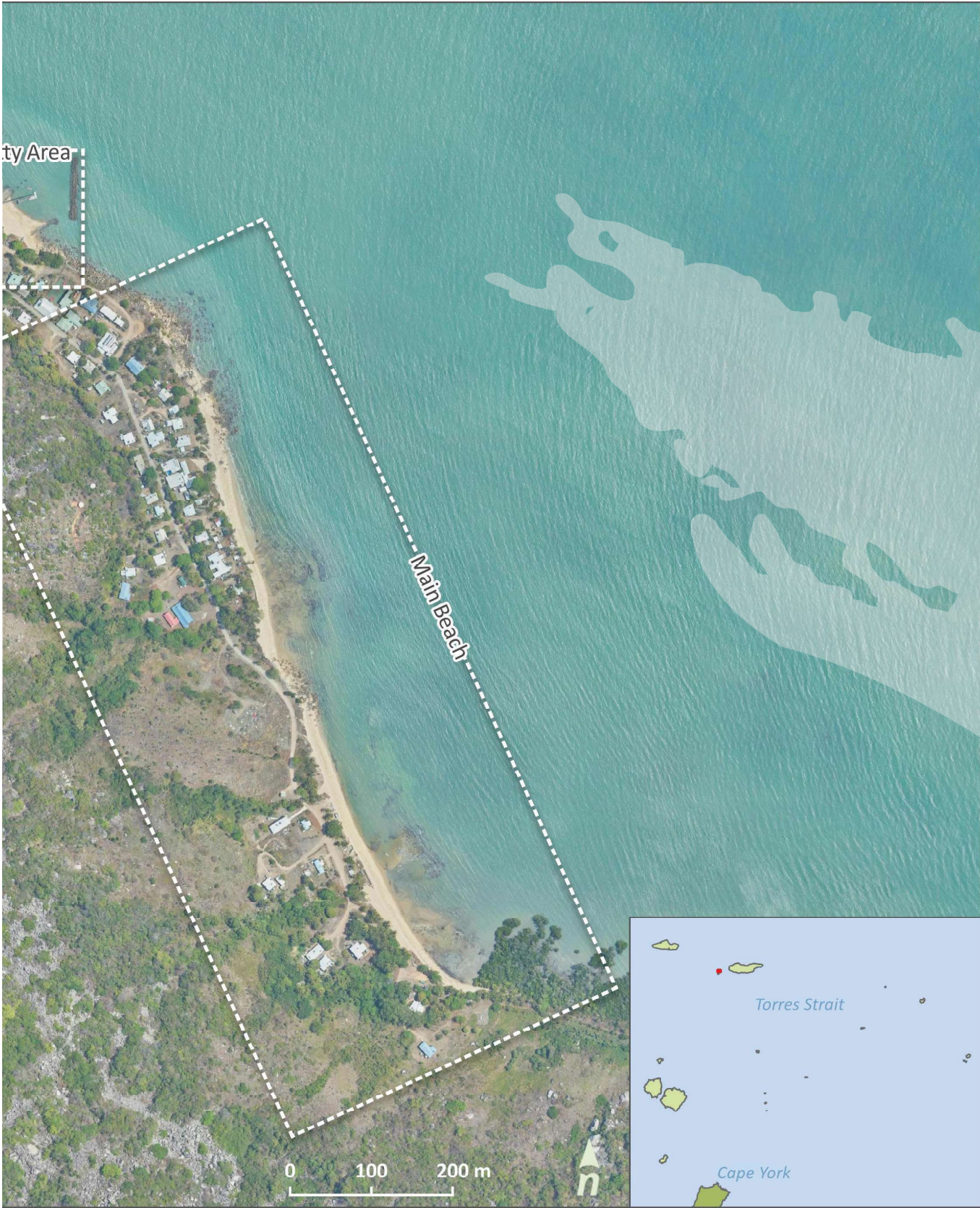
Key Management Areas (KMAs) have been defined based on which areas are most at risk, as well as feedback from community leaders and are mapped below. Tailored adaptation pathways for each key management area on Dauan are presented in the following pages.

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 Dauan 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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### MAIN BEACH

#### Overview of assets and values at risk

- The beach in front of the township transitions from a small bay to the south into an exposed beach towards the northern end.
- A rock outcrop separates the northern and southern sections of beach.
- Houses generally begin to the north of the rock outcrop, where some erosion has been experienced and residents have used available material to try and reinforce the beach to varying degrees of success.
- There is an informal seawall located at the southern half of the main beach.
- The community identified some areas that were affected by coastal hazards, where the damage is predominately from stormwater runoff scouring out beaches and streams.



#### Pathway description

At Dauan Island’s Main Beach, initial adaptation actions involve active dune management using vegetation management techniques. As trigger points are reached, the adaptation pathway will transition into an active management approach where existing seawalls and revetments can be upgraded and gaps filled to enhance coastal defences. If needed, new seawalls or revetments can be built to provide further protection. As time progresses, the community should lead ongoing custodianship and monitoring with the option to revisit the option of relocating or redesigning assets. In the meantime, the community should avoid new development in hazard-prone areas.

Dauan – Main Beach				Present Day	2050	2100
— Prepare	Ongoing monitoring and review	Pause and review adaption actions		Monitor (look and learn)	Monitor (look and learn)	Actively manage
→ Implement	Trigger for an additional action	Abandon existing action and seek alternative pathway				
⋮ Transition	Start implementing					
Key management area adaptation actions and pathway						
Nature based coastal management		Dune management				
Coastal engineering		New seawall or revetment				
		Seawall or revetment upgrade and filling gaps				
Transition		Relocate assets				
		Redesign for resilience				

## JETTY AREA

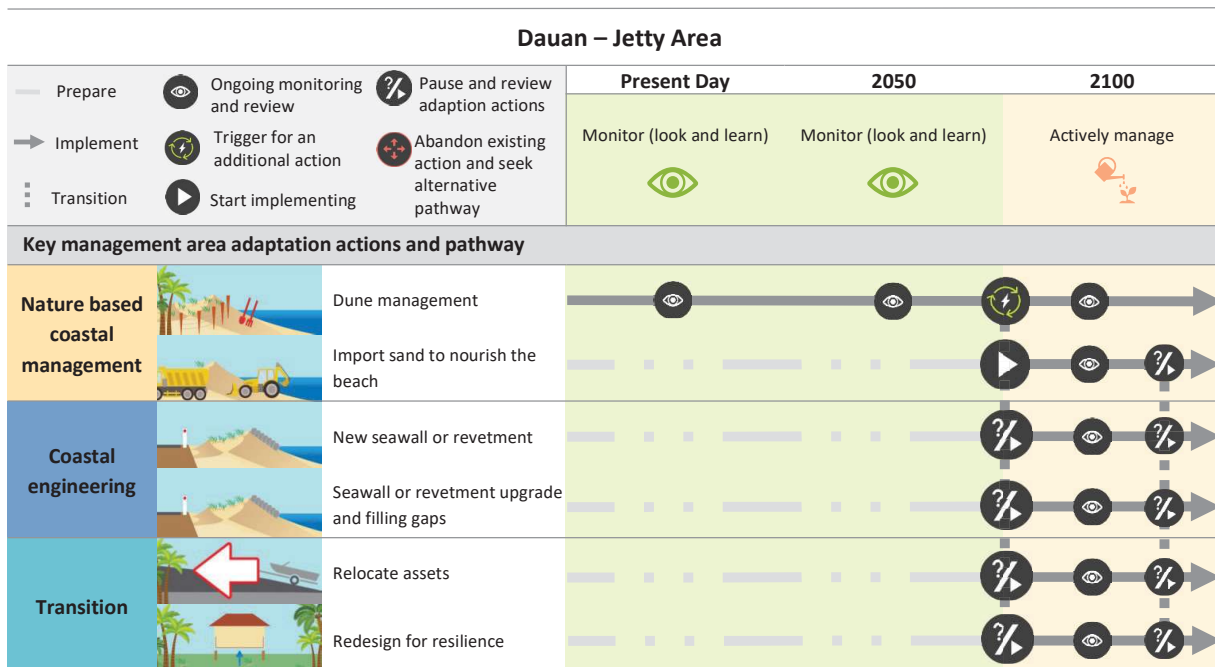
### Overview of assets and values at risk

- The jetty area has two small bays, separated by the barge ramp.
- The beaches do not experience significant erosion, except for scour from stormwater runoff.
- There is a low profile groyne of unknown design at the south end of the bay leading out to an offshore detached breakwater of unknown design. The breakwater is in place to reduce the prevailing short period easterly wave activity affecting jetty and barge operations.
- The study found the area could be subject to future inundation.
- There are service buildings which may be inundated during high tides, permanent inundation or storm tides in the future.
- The jetty may be occasionally inundated with higher sea levels and is within the coastal erosion zone.



### Pathway description

For the Jetty Area on Dauan Island, initial adaptation actions involve active dune management using vegetation management techniques. As trigger points are reached, the adaptation pathway will transition into an active management approach. At this stage the community can import sand to nourish the beach. If needed, existing seawalls and revetments can be upgraded and gaps filled to enhance coastal defences or new seawalls and revetments can be built to provide further protection. As time progresses, the community should lead ongoing custodianship and monitoring with the option to revisit the option of relocating or redesigning assets. In the meantime, the community should avoid new development in hazard-prone areas..



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### HELIPAD AREA

#### Overview of assets and values at risk

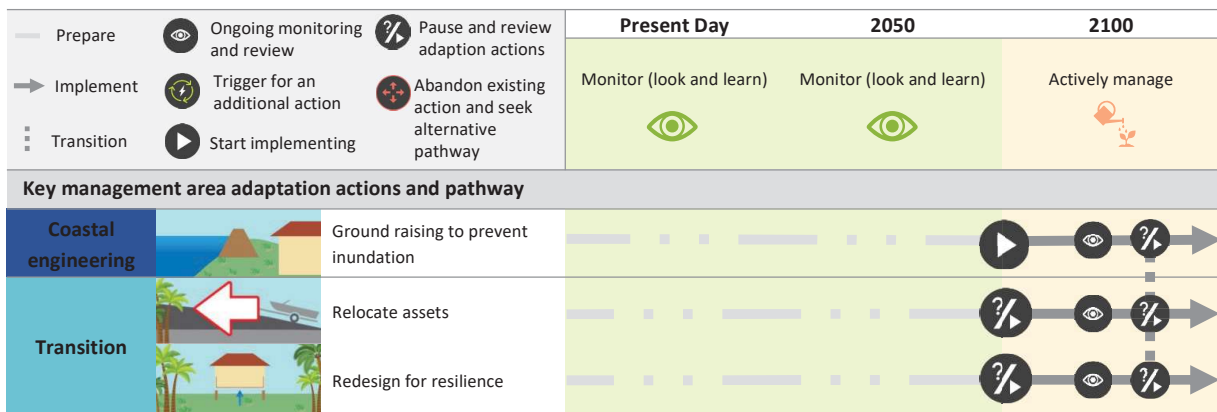
- The study found this area could be vulnerable to coastal hazards.
- This area is unlikely to experience erosion however there's potential for inundation at the cemetery.



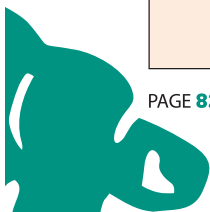
#### Pathway description

The initial adaptation pathway for the Helipad Area on Dauan Island is to “monitor” the hazards and prepare for future risks. As trigger points are reached, the adaptation pathway will transition into an active management approach. Ground raising can be implemented at three strategic locations to prevent inundation. As time progresses, the community should lead ongoing custodianship and monitoring with the option to revisit the option of relocating or redesigning assets. In the meantime, the community should avoid new development in hazard-prone areas.

#### Dauan – Helipad Area



Dauan Community Action Plan		Indicative cost
<b>1. Council-wide initiatives to enhance custodianship (Priority actions to be implemented within 10 years, and ongoing)</b>		
1.1. Community stewardship		
Dauan.1.1a	See Council wide actions. Consider how these actions can be effectively used in Dauan.	
1.2. Education and knowledge sharing		
Dauan.1.2a	See Council wide actions. Consider how these actions can be effectively used in Dauan.	
1.3. Monitoring		
Dauan.1.3a	See Council wide actions. Consider how these actions can be effectively used in Dauan.	
Dauan.1.3b	Partnering with a university institution and utilising citizen science for monitoring undertake an investigation into the drivers of sand accumulation in mangrove and offshore areas.	\$



Dauan Community Action Plan		Indicative cost
<b>2. Planning updates (Priority actions to be implemented within 10 years, and ongoing)</b>		
2.1. Land use planning		
Dauan2.1a	See Council wide actions. Consider how these actions can be effectively used in Dauan.	
Dauan2.1b	Consider re-establishment of a stone quarry to provide materials for coastal protection throughout the Torres Strait	\$\$
2.2. Disaster planning		
Dauan2.2a	See Council wide actions. Consider how these actions can be effectively used in Dauan.	
<b>3. Resilient built environment (Priority actions to be implemented within 10 years, and ongoing)</b>		
3.1. Maintaining and improving infrastructure		
Dauan3.1a	See Council wide actions. Consider how these actions can be effectively used in Dauan.	
Dauan3.1b	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 Main Beach KMA.	\$\$
<b>4. Nature based coastal management (see adaptation pathways for timing)</b>		
4.1 Dune, mangrove and reef protection and enhancement		
Dauan4.1a	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		
Dauan4.2a	Explore potential for a living shoreline to establish mangroves in front of the road leading to the Helipad Area KMA.	\$\$
4.3 Beach nourishment		
Dauan4.3a	Monitor beach profiles in the Jetty Area KMA and, if extensive erosion occurs, consider small scale beach nourishment or sand scraping to enhance degraded dunes in front of key assets. Supplement with dune restoration and access management, see action Dauan4.1.a	\$\$
<b>5. Coastal engineering (see adaptation pathways for timing)</b>		
5.2 Structures to dissipate energy offshore		
Dauan5.2a	Explore option for an additional breakwater in front of the Jetty to protect from NE winds/waves	\$\$\$
5.3 Last line of defence structures		
Dauan5.3a	As part of the adaptation pathway in the Jetty Area and Main Beach KMAs, consider the construction of a coastal protection structure to protect exposed houses. This action should not occur before Dauan3.1b, Dauan4.1a and Dauan4.3a are considered.	\$\$\$





## 6. Coastal hazard adaptation actions

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"> <li>· Geomorphic assessment</li> <li>· Hydrodynamic modelling</li> <li>· Shoreline Erosion Management Plan.</li> </ul> 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"> <li>· Approval conditions for lots of undeveloped land, and</li> <li>· Implications for future development approvals and conditions.</li> </ul>	\$	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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Adaptation theme	Adaptation option	Action ID	2023 Priority strategic actions (completed within 5 – 10 years)	Indicative cost	Timing	Priority
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

