

A coastal landscape featuring a sandy beach in the foreground, waves breaking on the shore, and a vast, cloudy sky. The sky is filled with soft, white clouds against a pale blue background. The beach is scattered with some debris and rocks. The water is a light blue-green color.

Weipa Town Authority

COASTAL HAZARD

ADAPTATION STRATEGY



ACKNOWLEDGMENT OF COUNTRY

We respectfully acknowledge the Traditional Owners of Weipa, the Alngith, Anathangayth, Wik-Waya, Peppan, Thanakwithi and Wathyn First Nations people. We pay respect to their Elders, past, present, and emerging and acknowledge their continued connection to the land and waters of this area.

We acknowledge all Aboriginal and Torres Strait Islander peoples as the traditional custodians of this Country. We recognise and honour their ancient cultures, and their connection to land, sea and community.



INPUT FROM ADJOINING COMMUNITIES

The local authority boundaries for Weipa, Mapoon and Napranum are highly irregular and residents and visitors of the region often traverse these boundaries to utilise different areas of the coast.

To maximise efficiency and knowledge sharing, Weipa Town Authority (WTA), Mapoon Aboriginal Shire Council and Napranum Aboriginal Shire Council have collectively prepared Coastal Hazard Adaptation Strategies (CHAS) for their respective areas of management. This approach supports a greater appreciation of community values and use of the entire coastline in the region, irrespective of Council boundaries. The responses received during engagement activities identify that community members from Weipa, Napranum and Mapoon utilise the coast in all these areas in similar ways – particularly for recreational activities such as camping, fishing and recreational driving along the beach.

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Source: Cairns Post

1.0 INTRODUCTION

Weipa Town Authority (WTA), with the support of the QCoast2100 program, has developed a Coastal Hazard Adaptation Strategy. This Strategy will help us to better understand emerging coastal hazard risks and proactively manage the impacts of those risks on our community, environment, cultural values, infrastructure, liveability and essential services. This Strategy is designed to strengthen our community's resilience to the impacts of coastal hazards, and create a pathway for a sustainable future.

Weipa is home to a unique landscape, history and people. The coastal region is made up of estuaries and sandy beaches with well-defined but low profile dune systems, often fronted by wide, shallow nearshore areas.

Our coastal landscape is always changing, being shaped by natural processes like wind, tides and currents and changing sea levels. The continual cycles of sand loss (erosion), rebuilding (accretion) of the shoreline, and flooding of coastal areas by sea water during king tides and storms are all part of these natural processes. These processes are referred to as coastal hazards when they have the potential to negatively impact on infrastructure, access, services, our lifestyle and the economy.

Building the resilience of our coastline and community is one of our top priorities. To achieve this, we need to understand how our coast is being affected by coastal hazards today and how our coast might change in the future under the influence of a changing climate. We can then proactively plan, prepare and respond to those coastal hazard risks over time.

This Strategy has been informed by the best available science and was a collaborative effort with members of our community, who have shared their experiences and knowledge to help us understand what is important to them.

CONTEXT & APPROACH

This Strategy has been developed under QCoast2100, a state-wide coastal hazard adaptation program supported by the Queensland Government and Local Government Association of Queensland (LGAQ). QCoast2100 assists Councils to proactively plan for long-term coastal resilience and minimise the risk of coastal hazards to communities and valuable assets such as roads, utilities, parks, natural areas and heritage places.

PURPOSE

The Strategy is a risk and change management initiative. It provides an understanding of current and future coastal hazard risks, including how the coast might change or be impacted in the future, and what we can do to proactively plan, prepare, and respond to these risks over time to improve our resilience to coastal hazards.

This strategy outlines the:

- coastal values of the region;
- current and future coastal hazard risks, nominally to the year 2100;
- short, medium and long-term actions to avoid, reduce and adapt to the social, cultural, economic, and environmental risks associated with coastal hazards; and
- recommended approaches to consider in managing our coastline.

The Strategy is underpinned by extensive stakeholder input and the best available science, engineering, and economic studies. It forms the foundation to strengthen the resilience of our coast and community and facilitates informed decision-making.

We all have a role to play in maintaining our resilience to coastal hazards and this document is the start of a broader discussion to assist all of us when responding to the impacts of a changing coast.

PROCESS

The Strategy was developed through an eight-phase process as outlined in the *QCoast2100 Minimum Standards and Guidelines*. The process has included technical studies and engagement. The outputs of this work have:

- Identified existing coastal hazard exposure and how this exposure may change in the future under the influence of rising sea levels;
- Assessed the vulnerability of and risk to natural and built assets through a comprehensive spatial analysis process;
- Identified priorities by distinguishing between urgent and future risks;
- Engaged with the community to understand preferred approaches to adaptation and develop potential approaches to adapt to coastal hazards;
- Assessed the viability of adaptation approaches through stakeholder engagement and multi-criteria analysis; and
- Informed the development of implementation planning (timing, staging and sequencing) of preferred adaptation options over time.

Figure 1. CHAS structure - phases and engagement touch points

- Engagement touch points with stakeholders and community





ALIGNING WITH OUR CORPORATE STRATEGIES

The Strategy is a non-statutory document that provides a high-level plan for the future management of coastal hazards through to 2100 and involves identifying regionally focused priority areas and actions. The identification of more detailed localised planning and the implementation of physical works will occur through annual operational programs such as asset management and shoreline erosion management planning.

Just like our coastal environment, the Strategy will evolve as new information, observations and technologies become available. The Strategy will be reviewed periodically to align it with leading practice and community expectations.

The Strategy, and supporting technical work, form an important part of WTA's long-term planning and strategic framework and will inform and influence a range of other WTA strategies, plans, policies, and future decision making. Key Authority documents that should be updated (where required) to align with, integrate and embed coastal hazard risk considerations from the Strategy include:

- The Weipa Planning Scheme 2019
- Local Disaster Management Plan 2019
- WTA Operational Plan July 2021 - June 2022
- Storm Surge Shelter Management Operational Plan 2019
- Evacuation Facility Management Plan 2019
- Local Government Infrastructure Plan

2.0 WHY DO WE NEED A STRATEGY?

Our coastal zone is dynamic and always changing. Many of us are familiar with coastal change having observed beach erosion, shifting sands and periodic inundation of low-lying areas from high tides and storm events. These natural processes are referred to as coastal hazards when they impact on how we use and enjoy our coastal areas.

Coastal hazard impacts can occur quickly during significant storm events or develop slowly, over several years in response to long term natural coastal processes. These impacts can result in temporary or permanent changes to our coastline, affecting our region's natural beauty and places of cultural and ecological significance as well as our community's infrastructure – our roads, services, drainage, homes, businesses and utilities.

The extent of coastal land vulnerable to coastal hazards, as well as the consequences of these coastal hazards, are expected to increase in the future as sea levels rise. Climate change is also expected to increase the severity, frequency and risk associated with coastal hazards over time. This Strategy focuses on three coastal hazards that affect our coastline – storm tide inundation, coastal erosion and sea level rise.

STORM TIDE INUNDATION:

Storm tide is the temporary water level that results from the combination of normal tides and a storm surge from severe weather such as cyclones or strong winds. If a storm surge coincides with higher tides, the resulting storm tide and waves can submerge the open coastline or inundate land behind the open coastline through the overflow of waterways, estuaries and drains that connect to the ocean.

and cultural assets could be affected by storm tide inundation in the years to come including (but not limited to) the Volunteer Marine Rescue shed and adjacent public toilet block at Evans Landing, Albatross Bay Resort site, Kumrumja Centre site, parkland immediately upstream (east) of Rocky Point boat ramp, and a sewer pump station near Awonga Point.

Our coast is vulnerable to storm tide inundation along our low-lying sandy foreshores and wetlands. Several of Weipa's important environmental and social

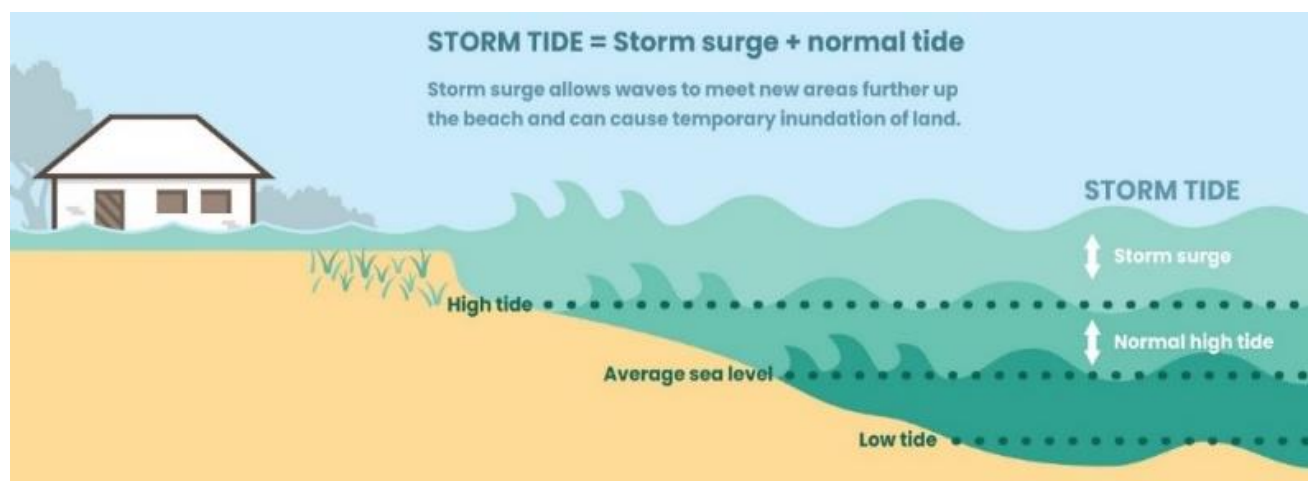


Figure 2. Storm-tide inundation process

COASTAL EROSION:

Coastal erosion is the temporary or permanent loss of coastal land, beaches or dunes by wave or wind action, tidal currents, water flows or sea level rise. Coastal erosion is often associated with extreme weather such as coastal storms, but many coastal foreshores also naturally undergo cycles of erosion and accretion (build up) over weeks and years.

Natural assets at risk of coastal erosion in Weipa include parkland areas, Trunding Creek, and the beach, dune and / or wetland areas at Kumrumja Beach, Nanum Beach and between Rocky Point and Awonga Point which contains vegetation and habitats of state environmental significance. Tourist accommodation sites and community assets including the Albatross Bay Resort, Weipa Caravan Park site, Western Cape Cultural Centre site, Weipa Aquatic Centre and Kumrumja Centre are also exposed to erosion hazards now or in the future.

Key services and infrastructure vulnerable to erosion hazards between now and 2100 include Andoom Road and the Rio Tinto railway line, sewerage network, Awonga Wastewater Treatment Plant and associated access road and pump stations. Over the long-term, sea-level rise is expected to exacerbate slow-onset coastal erosion along Weipa's beaches.

SEA LEVEL RISE:

Sea level rise is not a distinct process causing impact on its own, but rather, increases the extent of land subject to other coastal processes (including tidal inundation, coastal inundation, coastal erosion and shoreline recession)¹.

A projected rise in mean (average) sea level of 0.8 metres by the year 2100 has been adopted as a planning benchmark by the Queensland Government based on climate modelling. If effective coastal adaptation strategies are not implemented, this increase could result in permanent sea water inundation of low-lying areas and exposure of the places we love and value such as our beaches, parks, important community infrastructure like roads and drainage, and private assets.

In Weipa, the beach and dune systems along Rocky Point and Nanum Beaches are at high risk from sea-level rise in the future. In addition, several key assets are projected to be exposed to sea level rise between now and 2100 including the Volunteer Marine Rescue Shed, access to the Awonga Wastewater Treatment Plant, and the Rocky Point boat ramp, its road access (Marina Road) and the adjacent parkland. The accommodation site east of Rocky Point is also at extreme risk from sea level rise.



Figure 3. Process of coastal erosion and sea level rise

¹ Insurance Council of Australia (2021), *Climate Change Impact Series: Actions of the Sea and Future Risks*.



3.0 OUR COAST

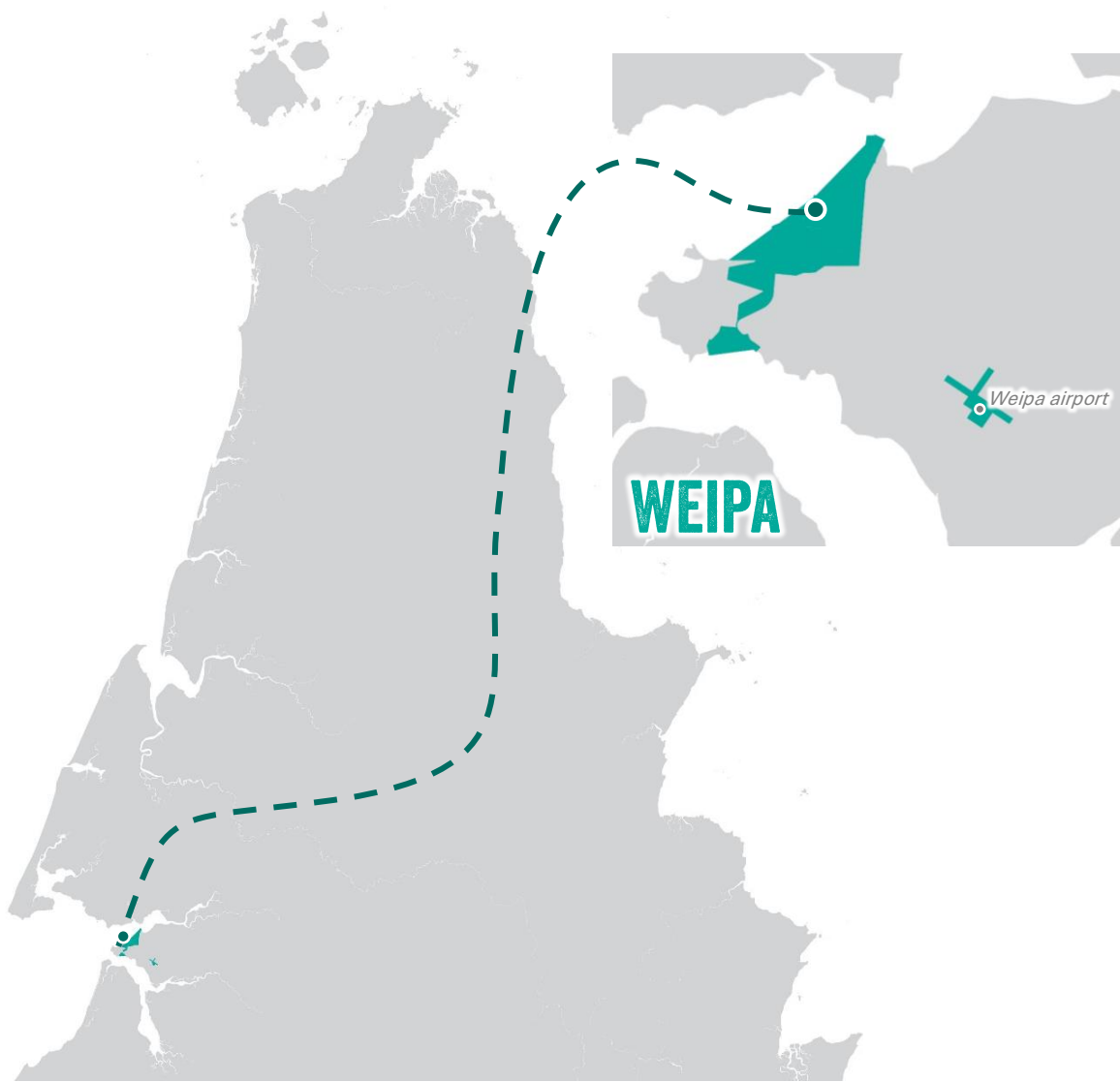
Weipa is a vibrant and dynamic coastal community located on Albatross Bay on the west coast of Cape York. Covering an area of nearly 1,100ha, Weipa spans approximately 6km in length, extending from the Mission River in the north to the Embley/Hey River estuary to the south. The wide mouth of the bay also exposes the town's western shorelines to waves and storm tides penetrating the Bay from the open coast.

Weipa town sits around 200km south of Australia's northern tip and about 800km north-west of Cairns. Extremely rich in bauxite, the town was established as the administrative centre for Comalco's (now Rio Tinto) Weipa bauxite mining operation. Infrastructure developed to service the community such as water supply, sewerage, stormwater and roads are essentially owned by Rio Tinto but managed by Weipa Town Authority (WTA).

Since the town developed in conjunction with mining leases and activities, the administrative town boundaries do not strictly align to areas now regarded by the community as being part of Weipa.

The town is split into 2 distinct areas – the northern suburbs of Rocky Point, Trunding and Nanum which are predominantly housing and administrative, and the southern suburb of Evans Landing, which is industrial and contains Port services.

The town is serviced by Weipa airport, which is located approximately 7 km south-east of the main township. Although part of the WTA area, it is surrounded by Cook Shire. In addition, the mining operations at Weipa are presently serviced by port facilities in Evans Landing. The land parcels used for port activities are leased from the State Government and operated by North Queensland Bulk Ports (NQBP), however the infrastructure on those land parcels is the property of Rio Tinto.





Source: Camp Weipa

OUR STORY

The Western Cape York Peninsula region is home to many Traditional Owner groups whose country heritage goes back thousands of years. Weipa is the traditional and spiritual homeland of the Alngith First Nations people, who have cared for the land and sea of this ancient landscape for thousands of years. In addition to the Alngith people, the Anathangayth, Wik-Waya, Peppan, Thanakwithi and Wathyn Traditional Owner groups are near neighbours of Weipa.

The placename Weipa comes from the word Waypa (or Waypundun), meaning 'fighting ground' in the nhangayth language. It was the name of the Presbyterian mission established on Spring Creek (approximately 28 kilometres east of today's Weipa). The name was reassigned to the Jessica Point area on the lower reaches of the Embley River when the mission was relocated in 1933.

The Weipa mining township was developed by Comalco in 1964-1967. At this time, the Queensland Government decided to name the new town Weipa North, and the former mission at Jessica Point became Weipa South. As the years went by, the Weipa South community increasingly used the name Napranum, or 'meeting place of the people.' Weipa South was formally gazetted as Napranum in 1990. Weipa North is now known as Weipa.

The coastline along the western Cape continues to be inextricably linked to our community's culture and identity, and is integral to the livelihoods, customs and spiritual beliefs of Aboriginal and Torres Strait Islander peoples.

Many of our culturally significant areas are located close to, on, or within the beach and estuarine waterways and continued access to these areas is critical for community well-being.

Weipa Town Authority acknowledges that the traditional knowledge systems and practices of First Nations People are a major resource for, and integral to, adapting to climate change. This Strategy seeks to integrate such knowledge with existing coastal practices and technical information to increase the effectiveness of coastal hazard adaptation.



OUR COASTAL LANDSCAPE

With over 7km of coastline, our coastal landscape is one of our most valuable natural assets. Sandy beaches, wetlands, estuarine waterways, sand flats, rocky outcrops and mangrove areas characterise much of our coastal zone, along with residential settlements.

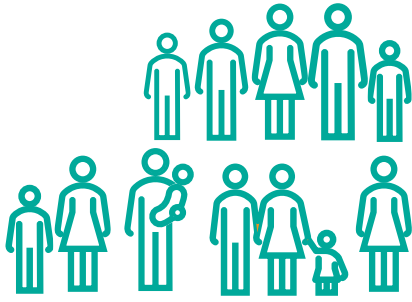
Our natural foreshores, beaches and coastal vegetation support important habitat areas for our native plants and animals. Weipa is home to over 950 species of animals, plants and fungi including 23 rare or threatened plant species; and 824 native wildlife species². Approximately 6% of our region comprises wetland habitat.

Trunding Creek, and the beach, dune and wetland areas at Nanum Beach and between Rocky Point and Awonga Point contain vegetation and habitats of state environmental significance.

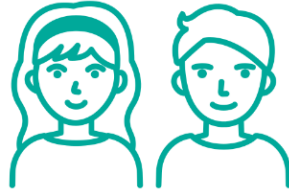
The coastal landscape and natural areas support a variety of places that hold special cultural, environmental and economic values to residents and visitors.

²Department of Environment and Science (2013), *Weipa Local Government Area — facts and maps*, *WetlandInfo*, accessed 19 September 2023. Available at: <https://wetlandinfo.des.qld.gov.au/wetlands/facts-maps/lga-weipa/>

COMMUNITY SNAPSHOT



4,097 PEOPLE IN 2021³



**MEDIAN AGE OF
30 YEARS³**



19.9%

**POPULATION IDENTIFY AS
ABORIGINAL OR TORRES
STRAIT ISLANDER³**



1.4%

**ANNUAL GROWTH RATE
OVER THE PAST 10 YEARS⁴**



192

BUSINESSES⁵



21.2%

**POPULATION WAS
BORN OVERSEAS³**

Weipa is a rich, culturally diverse town, home to approximately 4,097 people. The region has three main residential areas; Rocky Point, Trunding, Nanum and a light industrial area, Evans Landing.

Weipa's coastal landscape has cultural, social and economic significance for the local community who value its ongoing protection and sustainability. Important environmental features of the Weipa coastline include:

- diverse coastal landscapes including sandy beaches and estuaries;
- highly ecologically significant freshwater and intertidal wetlands, seagrass and mangrove forests; and
- endangered or vulnerable wildlife (terrestrial and marine) who depend on the ocean and coastal zone for food, breeding and protection.

Locals and tourists alike value easy access to water-based activities and the natural, unspoiled environment that can be enjoyed along the coastline and around waterways and estuaries.

Eco, cultural, adventure and fishing experiences are our main tourism drivers and intrinsically linked to our coastal environment. In 2019, there were 25 tourism businesses within Weipa and a total spend of \$1,044 per trip for domestic overnight travelers⁶. There were approximately 1,247 local jobs, with approximately 140 people⁴ employed within a hospitality or tourism related industry (retail trade; accommodation and food services; rental, hiring and real estate services; arts and recreation services).

Some of our favourite ways to use coastal places are boating and fishing and foreshore recreational activities such as camping and beach driving. As a result, coastal dependent infrastructure, particularly supporting recreational activities, is important for maintaining our community's way of life and encouraging our tourism industry.

Our response to coastal hazards today will have a direct impact on the strength of businesses, confidence in investment, lifestyle opportunities and attractiveness of visiting or living on the coast in the future.

³ Australian Bureau of Statistics (2023), *2021 Census All persons QuickStats: Weipa Statistical Areas Level 2*, accessed 19 September 2023. Available at: <https://abs.gov.au/census/find-census-data/quickstats/2021/315011403>

⁴ Queensland Government Statistician's Office, Queensland Treasury (2023), *Queensland Regional Profiles: Resident Profile: Weipa (T) LGA (ASGS 2021)*

⁵ Australian Bureau of Statistics (2023), *Region Summary: Weipa*, accessed 12 September 2023. Available at: <https://dbr.abs.gov.au/region.html?lyr=lga&rgn=37300>

⁶ Tourism Research Australia (2019), Local Government Area Profiles. Available at <https://www.tra.gov.au/en/regional/local-government-area-profiles.html>

4.0 BUILDING RESILIENCE TOGETHER

Looking after our coast now and into the future is a shared responsibility which involves everyone – local, Queensland and Australian governments, Traditional Owners, business owners, property owners, residents and the broader community.

To develop the Strategy, we reached out to the community and industry stakeholders, business and tourism groups, and WTA Members through a range of engagement activities. This process helped us to understand key features, locations, experiences and values associated with the coast to inform and frame our plan for the future.

Engagement feedback highlights that our coastal environment underpins a diversity of environmental, social and cultural values, and supports lifestyle and recreational opportunities unique to Weipa. Easy access to the coast for recreational activities such as boating, camping, diving and fishing is an extremely important lifestyle value for residents and visitors alike. We appreciate the natural coastal environment and connecting with nature.

All input and feedback received has assisted in shaping the direction of technical investigations underpinning the Strategy and the identification of priority adaptation actions for Weipa.

OUR COASTAL VALUES:



Protecting beaches and foreshore areas



Respecting and protecting the cultural connections between land, sea and people



Beaches and foreshore areas for recreational activities including fishing, camping, driving and hunting.



A healthy coastal environment including coastal vegetation, mangroves, and water quality.



Providing continued access to coastal areas (including vehicles)

COMMUNITY VALUES ENGAGEMENT

FEBRUARY 2021



2 conversations with community groups



4 meetings with Traditional Owner/ Indigenous interest groups



7 survey responses

ADAPTATION APPROACHES ENGAGEMENT

NOVEMBER 2021



25 people engaged at pop up



44 comments recorded at pop-up activity



6 Targeted conversations with key stakeholder groups



1 social media post

FEEDBACK ON DRAFT COASTAL ADAPTATION PLAN

NOVEMBER 2023



34 people engaged at pop up



Project update sent to **4** key stakeholders



1 social media post

OUR COASTAL VULNERABILITIES:

Our community has experienced the following changes to coastal areas:

- Erosion from uncontrolled beach access
- Recreational driving impacts on animal habitat and nesting areas
- Coastal and stormwater erosion creating noticeable, permanent changes to sandy beaches
- Removal or uprooting of coastal vegetation
- Infrastructure and dredging causing changes to our beaches

5.0 UNDERSTANDING THE RISK FROM COASTAL HAZARDS

We all have special places, features, qualities or memories of the coast that are important to us for different reasons – social, economic environmental, cultural or personal. These elements of the coast are at risk when coastal hazards threaten to impact them. Risks can be either direct (e.g. road inundation) or indirect (e.g. inundation that isolates a community) and can be assessed across a range from low to extreme risk.

To identify current and future risks along our coast, we need to first understand the impacts of coastal hazards, including the areas affected and what the impacts are on our special places and important infrastructure. Coastal hazard modelling was used to assess the risk resulting from coastal hazards to our assets, key community values and our natural and urban areas over time. To determine risk, we followed the process outlined below:

1

Modelling exposure to coastal hazards

Updating WTA's existing coastal hazard mapping based on the best available science.

2

Identifying assets and community values

Identifying land and assets along our coast that are exposed to coastal hazard and engaging with the community to understand what values (social, economic, environmental) should be considered as part of the strategy.

3

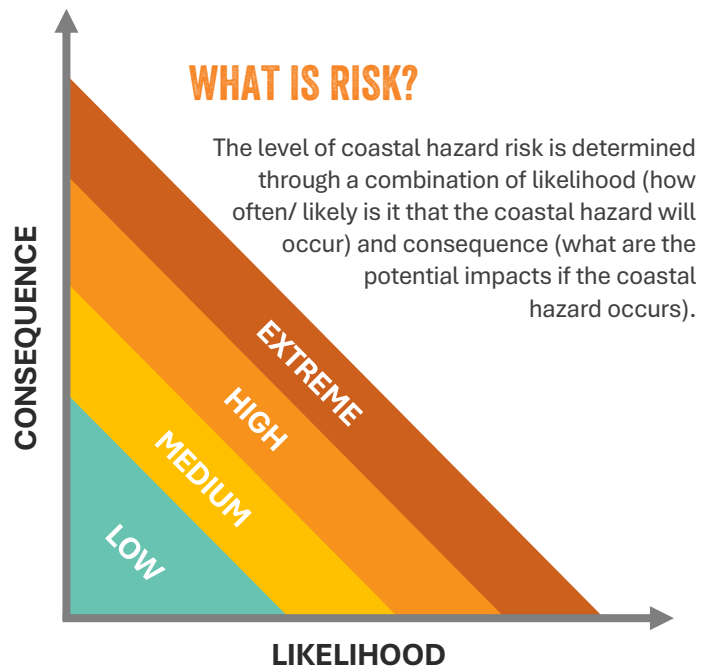
Calculating and mapping risk

Calculating the level of risk (low, medium, high, extreme) that coastal hazards pose to our community assets and values now and in the future.

4

Evaluating risk

Understanding what a tolerable/ acceptable level of risk is and if there are any controls or mitigating actions currently in place to minimise risk.



RISK ASSESSMENT PROCESS

The outcome sought by risk-based planning is not to diminish development potential in coastal hazard risk areas, but rather, to better inform the planning process and create clear visibility on locations across the coast with lower and higher exposure to coastal hazard risks. This ensures:

- more vulnerable or sensitive land uses are in less hazardous or lower risk areas;
- a proactive long-term approach for maintaining or reducing the exposure of existing and future coastal settlements to existing and future unacceptable risks;
- the resilient design of infrastructure and development in appropriate locations where the risk can be managed to an acceptable level; and
- a coordinated response with emergency management and other coastal hazard adaptation approaches.

Being aware of an increasing risk profile means we have time to prepare, respond and implement adaptation actions now and over the coming decades to mitigate reactive responses and avoid impacts before they occur.



WHAT AREAS AND ASSETS ARE AT RISK FROM COASTAL HAZARDS?

Coastal hazards have the potential to negatively impact our community, infrastructure, essential services and lifestyle today and long into the future.

The coastal location of our community makes us increasingly exposed to coastal hazards over time. This strategy focuses on our coastal areas including Awonga Point, Rocky Point, Kumrumja, Nanum Beach and Evans Landing.

The beach and dune systems along Kumrumja and Nanum Beaches are at high risk from erosion now and into the future. These beaches are also at high risk from sea level rise in the future, with Nanum Beach at extreme risk by 2100.

Andoom Road at Awonga Point is at extreme risk from erosion, with the adjacent railway line at extreme risk from 2050 onwards. This level of risk is largely attributed to the isolation of the Mapoon community and the Andoom mine areas that would result from damage to these assets.

Important sewerage assets are at extreme risk from all hazards, particularly sewer pump stations and the Awonga Point wastewater treatment plant site by 2100, although impacts on road access to this facility are a high risk from present day onwards.

The accommodation site east of Rocky Point is at high to extreme risk from erosion and extreme risk from sea level rise from 2050 onwards.

Tourist accommodation facilities close to Nanum Beach are at extreme risk from erosion, particularly under future climates.

Boat ramp facilities at Rocky Point and Evans Landing and strategic port land at Evans Landing are at extreme risk from erosion. Other important assets progressively at risk from erosion include the Kumrumja Centre site, adjacent car park and the Weipa Aquatic Centre.

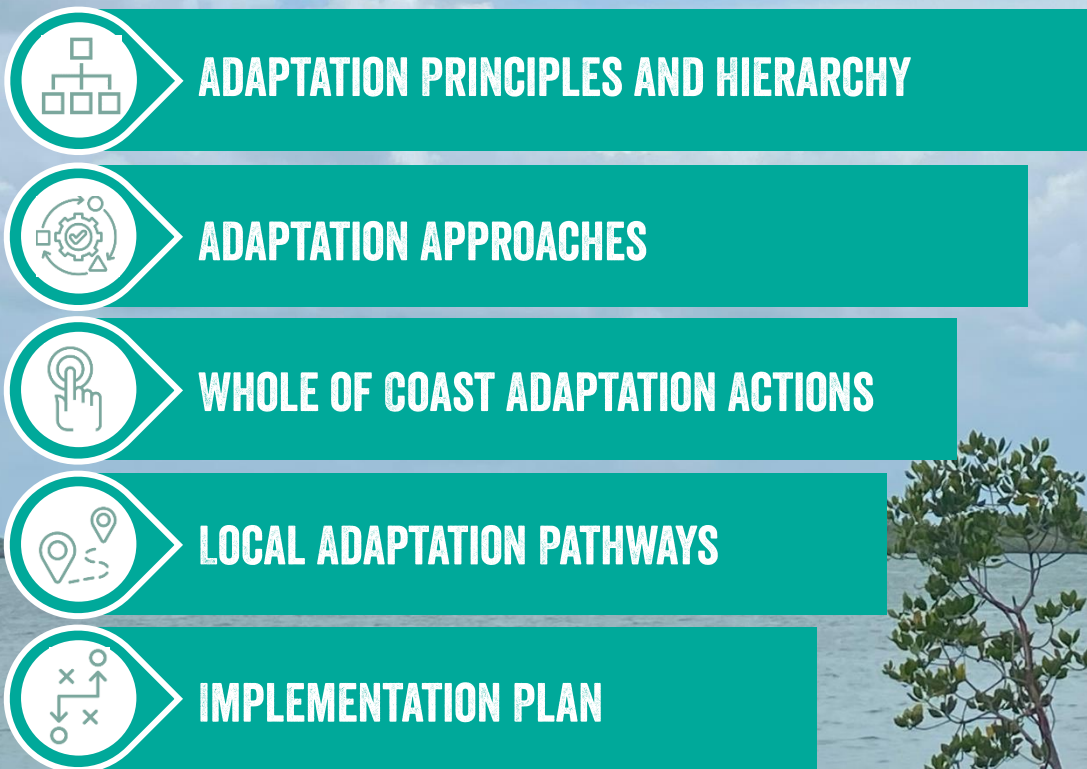
The Volunteer Marine Rescue Shed at Evans Landing is at extreme risk from sea level rise and associated erosion from 2100 onwards.

6.0 OUR STRATEGY FOR BUILDING A RESILIENT COAST

Across Australia and internationally, coastal land managers are taking a strategic approach to managing the risk of coastal hazards and enhancing the resilience of our coastal zones. A tailored approach has been developed to guide decision making on identifying and selecting adaptation responses across Weipa's coastal areas.

Adaptation principles, whole of coast actions and local adaptation pathways have been developed to guide how we manage the risks from coastal hazards and enhance the resilience of our coastal areas and community. This is essential to ensure our communities today, as well as future generations, can continue to enjoy our coast and valued lifestyle.

OUR STRATEGY IS MADE UP OF THE FOLLOWING COMPONENTS:



OUR ADAPTATION PRINCIPLES

The development of this strategy and its implementation are underpinned by a set of principles and a hierarchy of preferred broad types of adaptation approaches (“adaptation hierarchy”).

These principles have been developed based on best practice coastal hazard risk management, technical findings and community input which provided key insight into what types of adaptation responses the community thinks are acceptable to manage the projected impacts of coastal hazards.

The principles provide a foundation for considering the suitability of different adaptation actions and supporting consistent decision making for the implementation of the Strategy. The principles also establish WTA’s key responsibilities and the limits of these responsibilities.

The principles underpinning adaption in Weipa are:

1

Adaptation pathways retain and enhance the unique and iconic coastal identity, qualities and character of the western Cape coastal region.

5

Physical adaptation responses compliment their surroundings and achieve multiple public benefits. Fitting in with ‘place’ is important.

2

We build community awareness of risk and promote partnerships and collective action by involving stakeholders and our community when implementing adaptation pathways.

6

Future investment in community assets and infrastructure is ‘risk informed’ – we avoid investing in long design life or costly community assets and infrastructure in higher risk areas and transition our priority assets out of higher risk areas.

3

We prioritise adaptation responses in higher risk areas to keep people safe and limit future land use exposure in areas of unacceptable or intolerable risk.

7

Adaptation options comply with environmental regulations to protect natural coastal processes, ecological processes and wildlife habitats.

4

We prioritise natural and soft solutions over hard engineering solutions where practicable.

OUR ADAPTATION HIERARCHY

There are many actions we can use to respond to coastal hazards. These range from natural solutions like revegetation, to engineered solutions like seawalls, to relocating assets out of vulnerable areas.

Together with the Adaptation Principles, our Adaptation Hierarchy helps us to choose which action/s will work best at a particular place or point in time. The most appropriate adaptation action is based on the values to be protected in a certain location as well as the social, environmental and economic costs of the options.

Overall, consultation feedback indicated a stronger preference for more natural solutions (i.e. foreshore and mangrove revegetation) or planning responses over hard engineering solutions and last line of defence structures (like seawalls and groynes). As a result, natural responses which enhance the resilience of at-risk coastal areas will be prioritised in the short term over hard structures.

OUR ADAPTATION HIERARCHY



The hierarchy of preferred adaptation approaches, in order of highest to lowest preference is:



1. AVOID

Avoid placing new development in areas affected by coastal hazards.



2. RESTORE AND ENHANCE

Reinstate and enhance degraded natural coastal ecosystems – like stabilizing and revegetating coastal dunes and wetlands.



3. ACCOMMODATE

Maintain existing land uses but make existing and future buildings and infrastructure more resilient – build things ‘higher and stronger’ – and evacuation planning.



4. RETREAT

Withdraw, relocate or abandon existing buildings, structures and infrastructure in high-risk areas; let coastal ecosystems expand landward as sea levels rise.



5. PROTECT

Protect priority shorelines, infrastructure, and buildings from erosion and inundation through soft (beach nourishment) or hard (structures like seawalls or groynes) engineering solutions.

OUR ADAPTATION PATHWAYS APPROACH

Pinpointing the timing of when coastal hazards may occur, or the rate of coastal change can be challenging. Adaptation planning using the pathways approach supports flexibility by allowing options to be adapted to changes in circumstances (e.g. new technology and knowledge) and community values, aspirations and risk appetite over time ⁷.


Adaptation pathways involve a sequence of adaptation actions (or combination of actions) to be implemented over time. When an adaptation action is implemented, it is used until it is no longer effective or viable to manage the risk or extent of change, at which time another option is used. This is called a “trigger point.”

Due to the deep uncertainty and complexity associated with climate change, it is unlikely that only one adaptation action will be sufficient to respond to coastal hazard risk and exposure now and in the future. An adaptation pathway approach allows decision makers to keep their options open, with the ability to change the timing of planned actions based on active monitoring of coastal hazard risks and associated triggers. This allows adaptation to be responsive and iterative, avoiding premature decisions that have the potential to prevent Weipa Town Authority from implementing other, more effective options in the future.

The Strategy includes a range of adaptation actions that should be implemented across the whole coast, as well as some more specific, local adaptation pathways for key areas to support community values and address local risks.

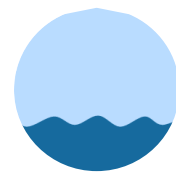
Adaptation actions and local adaptation pathways have been prepared based on short, medium and long-term priorities which are linked to projected sea level rise and indicative coastal hazard extent mapping for three planning timeframes – present day, 2050 (0.3m sea level rise) and 2100 (0.8m sea level rise).

Local adaptation pathways and their associated actions will continue to be refined based on the best available science and community attitudes. Key factors we must consider when responding to coastal hazards and selecting suitable adaptation actions include:



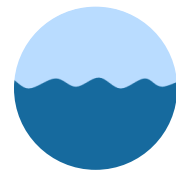
TRIGGER POINTS

“Trigger points” are linked to a change in hazard exposure or associated risk. The implementation of actions relies on regular monitoring of coastal areas to understand when trigger points are approaching or have been reached. Trigger points can also be used in locations where hazards are not yet occurring but are likely to occur in the future.



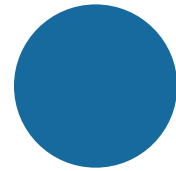
SHORT TERM

Current coastal hazard risk
(0-0.3m sea level rise)



MEDIUM TERM

Coastal hazard risks around 2050
(0.3 m sea level rise)



LONG TERM

Coastal hazard risks around 2100
(0.8m sea level rise)



MAXIMISING BENEFITS

Protecting what the community values about the coast and maximizing community benefit.



COST

Adaptation can be very expensive. We need to focus on low-cost solutions (like revegetation) wherever we can and be strategic about where and when we invest in high-cost shoreline protection.



TIMING

Identifying what needs protection now and in the future.



PROTECTING SPECIAL PLACES & ASSETS

Protecting important assets should not be at the expense of what we value and love.

⁷ NCCARF (2017), CoastAdapt: Climate change and sea-level rise based on observed data. Available at: <https://coastadapt.com.au/>

ADAPTATION APPROACHES

Four adaptation approaches have been developed for Weipa. Each approach contains a suite of adaptation actions which form the basis for our response to coastal hazard risk across different areas of our coast (local adaptation pathways).

1 Maintain and improve

The Maintain and Improve approach involves the continued use of a place or asset where the current coastal hazard risk profile is low. Actions underpinning this approach often include activities and programs which are already being undertaken such as community awareness raising, active management of natural areas and ecosystems and emergency response. Key to all approaches is regular monitoring to understand the extent of coastal change at the local level, and to identify when additional actions should be implemented.

While 'Maintain' actions do not always directly reduce or remove the risk of coastal hazards, they are important to build and strengthen the natural resilience of our coast and community over time. If, over time, the risk profile is observed to increase (as indicated by local trigger points), then the adaptation response may shift to **modify**.

2 Avoid

This approach seeks to avoid placing new development or assets in areas affected by coastal hazards. This may be achieved through appropriate land use planning and asset management. The preference is to ensure land uses in coastal hazard areas reflect the level of risk for coastal hazard impacts, while also being a use that maximises the economic, social, and environmental value to the region.

Any new development / infrastructure that is placed in coastal hazard areas will need to align with the *State Planning Policy 2017* and relevant approval requirements including necessary mitigation measures.

3 Modify

The Modify approach uses physical measures to accommodate and mitigate against coastal hazard risks to an acceptable or tolerable level. These actions include various engineering (soft and hard) options and hazard resilient design measures to protect or upgrade assets and reduce the impacts of coastal hazards.

If, over time, monitoring indicates the risk profile is increasing (as indicated by local trigger levels), and the modify option is no longer effective or efficient to accommodate or mitigate coastal hazards, then the adaptation response may shift to **planned transition**.

4 Planned Transition

The Planned Transition approach involves making a strategic decision to relocate assets from specific areas that have very high or intolerable exposure to coastal hazards and/or mitigation becomes infeasible (due to economic or other factors). This approach is intended to facilitate change in how we use and manage land in high or extreme risk areas and may involve a range of policy responses to reflect more 'risk-appropriate' land uses in hazard areas.

ADAPTATION ACTIONS

An adaptation action is a recommended response to assist in mitigating the impacts from coastal hazards. A range of adaptation actions have been developed to support a strategic approach to coastal hazard adaptation across the Weipa coast and to achieve the goals and aspirations of the community. Adaptation actions have been developed for the whole of Weipa, as well as some specific coastal locations to support key community values and adequately address the local risk profile.

COASTAL HAZARD ADAPTATION				
Adaptation response	REGION-WIDE ADAPTATION ACTIONS		LOCAL ADAPTATION PATHWAYS	
	Maintain & Improve	Avoid	Modify	Planned Transition
Adaptation options	Monitoring and planning initiatives to enhance adaptive capacity		Full suite of adaptation actions	
Timing	All timeframes		Refer to adaptation pathways	

A program of priority actions has been informed by an initial screening of options, as well as a multi-criteria analysis and high-level site-specific impact assessment. Specific adaptation actions we have explored with our community and stakeholders include:

1 Maintain and improve

Maintain and Improve adaptation actions apply to all coastal areas within Weipa. These actions often encompass “common sense” measures, some of which are already being undertaken by WTA, the community and other organisations. Maintain and Improve adaptation actions are fundamental to the success of the Strategy and underpin the implementation of all adaptation pathways.



Monitoring

Monitoring allows us to observe how coastal areas and their risk profiles change over time. This helps to determine if our current adaptation pathway is appropriate and effective or needs adjusting (i.e. a trigger point has been reached and an additional or alternative adaptation action is required).

Monitoring also improves our understanding of coastal processes and coastal hazards over time and can be used to support hazard and risk refinement. It covers a wide variety of activities and may involve examining the beach profile and conditions, mangrove/ dune vegetation extents and recession rates, dune stability, frequency of damage to beach access and other infrastructure, asset condition, frequency of tidal inundation, number of properties impacted by hazard events and habitat health, connectivity and availability etc.



Community awareness, education and partnerships

Building community understanding and awareness of coastal hazards and adaptation is essential for the successful implementation of this Strategy. Developing opportunities for community involvement in programs and activities which promote climate change adaptation, such as dune and wetland restoration and monitoring activities, can enhance stewardship of the coastline and assist in capacity building, while benefiting from traditional knowledge. It can also improve the community’s resilience by empowering them to make informed choices about where and what to invest in.

Community awareness requires strong relationships between all levels of government, Traditional Owners, business, industry and the community, as well as ongoing education, information and messaging about coastal hazards, risks, monitoring and adaptation. It can be promoted through targeted coastal hazard campaigns and communications materials including signage, events, newsletters and social media.



Enhance coastline and habitat resilience

Supporting and strengthening our natural coastal processes and ecosystems including native habitats, dune and wetlands areas can improve the protective function of coastal landforms and vegetation and assist in mitigating the risks associated with coastal hazards. Enhancing coastline resilience can also improve amenity and create opportunities to involve and educate the community to naturally manage coastal hazard risks and support monitoring activities. Using nature-based responses is preferred over hard engineering works but may require some hard engineering support for establishment.

Ecosystem management can be achieved through habitat management programs such as dune revegetation and planting within and around wetlands and waterways. Particular consideration will be given to beach access management (discouraging unnecessary or informal pedestrian and vehicle access and formalising appropriate public paths) and the protection and management of turtle and shorebird nesting areas.



Emergency response (e.g. evacuation planning)

Monitoring and early warning systems, including evacuation strategies and community engagement, are essential mechanisms which can assist in keeping the community safe. WTA, State Emergency Service, volunteers and local disaster management groups play a lead role in our emergency response. WTA's Disaster Management Plan provides information on preparation, response and recovery to potential coastal hazard events.

2 Avoid

Avoid adaptation actions seek to prevent the development of new 'high value' or 'long-life' assets in areas at high risks from coastal hazards.



Planning responses

Implementing land use planning responses that are appropriate for the level of risk in coastal hazard areas enables informed, risk based decision making. Land use and development policy, zoning and development controls will be used to maintain the current risk profile in areas of acceptable and tolerable risk. Likewise, in coastal hazard areas where the risk is high or intolerable, land use planning tools will be used to reduce or avoid increasing the future risk exposure of people, buildings, community facilities and infrastructure.

Planning responses will build on current planning scheme requirements and may also involve the use of development controls such as coastal setbacks and planning processes such as master planning or trigger-based development approvals.

Particular focus will be on avoiding locating future vulnerable uses and people (e.g. new homes or accommodation) and reducing the future intensity of uses within high risk coastal hazard areas.



Hazard avoidance for new and replacement community infrastructure

Over time, WTA or community infrastructure may come to the end of its design life (regardless of exposure to coastal hazard) and need to be replaced or upgraded to meet community needs.

Where this happens, it is important that care is taken to avoid locating new important community infrastructure with a long design life in hazard areas. This adaptation action may involve progressively locating the footprint of replacement infrastructure further landward (if appropriate or technically possible).

While planning a new asset, asset owners should consider its design life and location in relation to coastal hazards. Monitoring will be important to determine when an asset's relocation may be socially and economically acceptable.

3 Modify

Modify adaptation actions actively seek to alter our coastal environment through a range of engineering (soft and hard) options and hazard resilient design measures to protect assets and reduce coastal hazard risks affecting people and property.

While modify adaptation actions can reduce risk, it is important we think about the potential impacts or “flow on effects” these actions may have on amenity, beach access and ecological processes.



Coastal engineering (soft)

Soft engineering solutions can assist in protecting our beaches, foreshores, and riverfront areas from coastal hazards. Examples include:

- Dune construction and restoration – improving the function of existing coastal dunes or artificially constructing new dunes using imported sand from inactive sand sources.
- Beach nourishment – maintaining existing beaches and dunes by manually placing extra sand on the beach from inactive sand sources.
- Beach scraping – stabilising dunes and minimising further dune slumping by manually pushing a thin layer of sand from the beach face (above high tide) towards the dunes (usually immediately following storm erosion).

These actions are intended to complement the existing function of our natural coastal areas and should only be implemented where and when it is environmentally appropriate to do so.



Coastal engineering (hard)

Hard engineering solutions can assist in protecting areas adjacent to foreshores and creek banks from coastal hazards. Examples include:

- Seawalls / scour protection – a rock or concrete wall or embankment constructed parallel to the beach or along the banks of a waterway to stop coastal erosion and limit inundation.
- Levees / dykes – an artificial barrier, often constructed of vegetation covered earth, to prevent inundation of landward areas.
- Groynes and artificial headlands – an artificial barrier constructed perpendicular to the beach to trap and hold beach sediments and increase beach width.
- Tide gates – permanent artificial barriers across narrow waterways to stop elevated water levels from moving to upstream areas.

Some of these approaches can be used in conjunction with ecosystem-based or soft-engineering responses.



Modify infrastructure and implement hazard resilient design

This action involves the continued use of our infrastructure, buildings and assets in areas where the coastal hazard risk is tolerable. Where any new or upgraded infrastructure or built assets are being developed, they should reflect hazard resilient design or be constructed to accommodate impacts.

Our key services such as our roads, water supply, electricity and telecommunications should be designed to remain operational during and after a coastal hazard event. This can be achieved by considering potential coastal hazards during the infrastructure design process and actions such as raising land levels, modifying drainage networks or building on piles to increase the height of building floor levels, reducing exposure to temporary inundation.

Asset management and maintenance decisions should be informed by a complete understanding of coastal hazard risks. Asset owners must consider implications for the design life and resilience of assets to coastal hazards.

4 Planned Transition

In some specific places, if the coastal hazard risk profile is very high, and/or mitigation becomes impractical (due to economic or other factors), a strategic decision may be made to relocate or reposition assets.

Planned transition is often a costly, last resort option. It may occur gradually over time or, in some cases, as a rapid action in response to a threshold trigger or event.



Relocate important infrastructure and assets at risk

Critical WTA or community assets, infrastructure and buildings that are in coastal hazard areas may be relocated to lower-risk areas or outside of the coastal hazard area when they reach the end of their useful life or need significant renovation to improve resilience (if the asset has a long-life design).

Monitoring will be important to determine when relocation may be socially and economically acceptable.



Accept the risk and embrace coastal processes

Embracing coastal processes without further intervention may be the most viable option in some instances. This includes:

- Accepting the loss of land affected by coastal hazards on unprotected shorelines.
- Allowing coastal dunes and habitats to migrate landward without intervention and accept there may be damage to or loss of infrastructure.









REGION-WIDE ADAPTATION ACTIONS

This strategy includes a range of region-wide adaptation actions which are relevant to all coastal areas and seek to build on existing coastal hazard mitigation mechanisms and regulation. These adaptation actions fall within the 'Maintain and Improve' and 'Avoid' responses and are intended to be implemented over the short to medium term and continued over the lifetime of the strategy. Monitoring, as well as ongoing community education, will be fundamental to the implementation of all adaptation pathways.

Across Weipa, some key measures have already been implemented to manage present day coastal hazard risks and protect our coastal environment. These include, but are not limited to:

- land use planning responses embedded in the *Weipa Planning Scheme 2019* which seek to mitigate and avoid coastal hazard risks.
- coastal protection measures in the asset maintenance program.

Region-wide adaptation actions include:

REGION WIDE ADAPTATION ACTIONS		TIMING BASED ON SEA LEVEL RISE		
		SHORT TERM 0m	MED TERM 0.3m	LONG TERM 0.8m
MAINTAIN AND IMPROVE				
	Monitoring	●	●	● →
	Community awareness, education and partnerships	●	●	● →
	Enhance coastline and habitat resilience	●	●	● →
	Emergency response (e.g. evacuation planning)	●	●	● →
AVOID				
	Hazard avoidance for new and replacement community infrastructure	●	●	● →
	Planning responses	●	●	● →

LOCAL ADAPTATION PATHWAYS

Each locality is different and requires a unique set of adaptation pathways to respond to coastal hazards, support key community values and address the risk profile over time.

In addition to adaptation actions which apply to the whole of the Weipa coast, we have begun considering local adaptation pathways to support key community values, respond to the local risk profile and reflect best practice principles for coastal hazard risk management.

The actions seek to reflect that the community has a very strong connection to the land and sea interface, with many culturally important areas located close to, on or within the beach and estuarine waterways. Continued access to these areas is critical for community well-being.

The focus of the CHAS is on the coastal areas of Weipa, namely:

- Awonga Point
- Awonga Point to Rocky Point
- Rocky Point
- Kumrumja
- Nanum Beach
- Evans Landing



AWONGA POINT

Awonga Point is the southern landing point for the road and rail connection north to Mapoon and the Andoom mine site. These critical assets are vulnerable to coastal erosion hazards, and are already partially protected by a seawall.

The adjacent wastewater treatment plant site is exposed to current and future erosion and inundation hazards. Impacts are initially confined to site access and the fringes of the site, eventually affecting the treatment ponds. Options considered for this site comprise upgrading infrastructure over time as it is replaced, protecting the site with an armoured bund, and relocating the facility, all of which involve notable capital expenditure.

It is noted that the facility is already approaching capacity, and evaporation capacity is limited during times of freshwater inflows. For these reasons a high-level 'impact assessment' was undertaken for this location to confirm the preferred adaptation pathway.

AWONGA POINT TO ROCKY POINT

The area between Awonga Point and Rocky Point is largely undeveloped and is of environmental significance. Sewer Pump Station A is located in this area and is at risk from storm tide inundation, erosion and sea level rise hazards from 2100 onwards. The adaptation response for this pump station is linked to the adaptation response for the wastewater treatment plant at Awonga Point. If the treatment plant is relocated, this pump station would be decommissioned.

ROCKY POINT

Rocky Point is home to one of Weipa's two public boat ramps and is adjoined by community parkland and a town accommodation area. The boat ramp, road access (Marina Road) and adjacent parkland are at risk from erosion and sea level rise.

Upgrades to or extension of the existing scour protection

infrastructure around the boat ramp in this area is the preferred response, combined with modifications to the road level to mitigate against sea level rise inundation.

The accommodation site upstream of the boat ramp has been identified for redevelopment – this provides the opportunity to consider coastal hazards as part of the master planning process to avoid issues associated with future impacts.

KUMRUMJA

Immediately downstream of Rocky Point boat ramp lies Kumrumja (Rocky Point). Facing west, this very popular beach is the closest to the majority of our community and the administrative centre of Weipa.

The rocky escarpment backing the beach contains a popular park with a community entertainment and gathering space (Kumrumja Centre), the WTA administrative offices, library, aquatic centre and associated parking areas.

Although the built infrastructure is well elevated above storm tide levels, the lower slopes are vulnerable to erosion, and there is evidence of previous informal erosion protection attempts in amongst the outcropping natural rock.

Low key approaches on the beach are preferred in this area to improve amenity and maintain the natural feel of the beach.

NANUM BEACH

Nanum Beach is located centrally along Weipa's western shoreline. Bisected by Trunding Creek, our town's two main tourist accommodation sites are close to the beach, with the Albatross Bay Resort at the northern end, and the Weipa Caravan Park at the southern end of the beach.

These areas are separated by a large area of undisturbed, environmentally significant land.

All areas are vulnerable to erosion, with sea level rise posing high risks to the beach and dune by 2050 and environmental area by 2100.

While the preferred response for the environmentally significant area is to allow natural processes to take place, at the two developed sites avoidance of new infrastructure in hazard areas and low-key management approaches are preferred, followed by natural intervention approaches.

Upstream along Trunding Creek, important sewerage, water supply and road assets are at extreme risk from erosion. The installation of scour protection on an as-needs basis is the preferred response at these locations.

EVANS LANDING

The shoreline along Evans Landing is already heavily modified, largely due to historical port activities.

While strategic port land is still situated in the area, it is interspersed with other important community assets, including the very popular Evans Landing Boat Ramp, the Volunteer Marine Rescue Shed, and the Western Cape Cultural Centre.

Where sites do not have existing revetments* or infrastructure close to the shoreline, it is preferred that risks to future development are avoided using development setbacks or hazard resilient infrastructure.

Where infrastructure is already close to the shoreline (e.g. boat ramp facility), upgrades of or lateral extensions to existing revetments* are preferred. At the Volunteer Marine Rescue site, upgrading the level of the road fronting the facility may be required to manage impacts from future sea level rise in the long term. However, the need for this will be dependent on whether the facility is still in this location by that time.

** Revetments are sloping structures built on embankments or shorelines to absorb and dissipate the energy of waves to reduce coastal erosion.*

OUR ASSETS AT RISK

AWONGA POINT TO ROCKY POINT

Sewer Pump Station A is located in this area and is at risk from storm tide inundation, erosion and sea level rise hazards from 2100 onwards. Areas of undeveloped land environmental significance exist in these areas and may become increasingly exposed to hazards.

Assets at risk:



AWONGA POINT

The road and rail connection north to Mapoon and the Andoom mine site are vulnerable to coastal erosion hazards. The adjacent wastewater treatment plant site is also exposed to current and future erosion and inundation. This facility is already approaching capacity.

Assets at risk:



ROCKY POINT

The boat ramp, road access (Marina Road) and adjacent parkland are at risk from erosion and sea level rise.

Assets at risk:



NANUM BEACH

Albatross Bay Resort, the Weipa Caravan Park are vulnerable to erosion and beach and dune areas are at high risks of sea level rise. Undisturbed, environmentally significant land is at high risk from sea level rise by 2100. Upstream along Trunding Creek, important sewerage, water supply and road assets are at extreme risk from erosion.

Assets at risk:



KUMRUMJA

The lower slopes of the rocky escarpment backing the beach are vulnerable to erosion.

Assets at risk:



EVANS LANDING

At Evans Landing there are notable areas of strategic port land at extreme risk from erosion and sea level rise. These risks affect land and buildings fringing the waterfront including important community assets such as the Volunteer Marine Rescue Shed.

Assets at risk:



What could be affected?

-  Marine/boating facilities
-  Utility infrastructure
-  Culturally significant
-  Community facilities
-  Environmental significance
-  Recreation areas and infrastructure
-  Roads and access
-  Beach & dune areas

LOCAL ADAPTATION PATHWAYS

The table below outlines the adaptation pathway and triggers for Weipa’s coastal areas in response to local coastal hazards and risks over time under a changing climate.

LOCAL ADAPTATION ACTIONS	TIMING BASED ON SEA LEVEL RISE		
	SHORT TERM 0M	MID TERM 0.3M	LONG TERM 0.8M
AWONGA POINT			
Region-wide actions			
Seawall to protect road and rail assets			
Hazard resilient design for new/ upgraded wastewater treatment plant			
Seawall to protect wastewater treatment plant			
Relocate wastewater treatment plant			
AWONGA POINT TO ROCKY POINT			
Region-wide actions			
Allow foreshore recession			
Hazard resilient design for new/ upgraded wastewater pump station			
Relocate wastewater pump station			
ROCKY POINT			
Region-wide actions			
Development master planning of accommodation area (needed by 2050 onwards)			
Adapt existing protection structures to offer higher level of protection to boat ramp			
Seawall to protect public assets (parkland)			
Hazard resilient design for new/ upgraded public infrastructure (road access)			
KUMRUMJA			
Region-wide actions			
Active dune and habitat management including vegetation planting and management			
Beach scraping			
Small scale beach nourishment			
Hazard resilient design for new/ upgraded public infrastructure			
Seawall to protect public assets			

LOCAL ADAPTATION ACTIONS

TIMING BASED ON SEA LEVEL RISE
 SHORT TERM 0M MID TERM 0.3M LONG TERM 0.8M

NANUM BEACH

Region-wide actions



Active dune and habitat management including vegetation planting and management



Site specific planning tools – Coastal building lines/ development setbacks



Hazard resilient design for new/ upgraded private infrastructure



Beach scraping



Allow foreshore recession (environmental area)



Small scale beach nourishment



EVANS LANDING

Region-wide actions



Site specific planning tools – Coastal building lines/ development setbacks



Hazard resilient design for new/ upgraded private infrastructure



Adapt existing protection structures to offer higher level of protection



Revetment to protect assets



Raise land levels

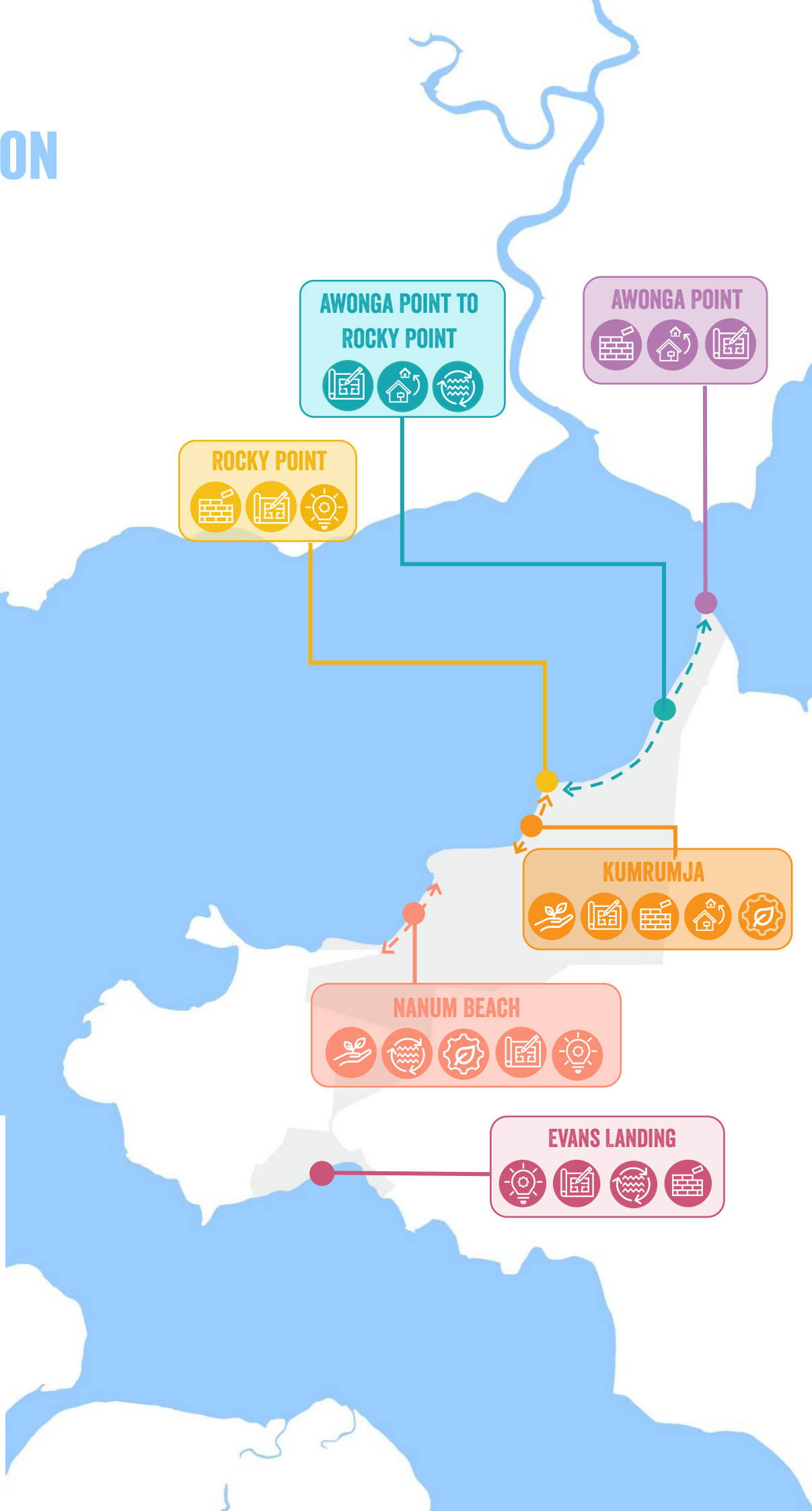


Relocate important infrastructure



*Options require further consideration and are subject to further detailed site investigations, business case, funding commitments, detailed design, and statutory approvals. The lead up time is intended to be a trigger to provide sufficient time for further consideration and detailed investigations/funding commitments and approvals to be obtained.

LOCAL ADAPTATION ACTIONS



Adaptation actions

-  Enhance coastline and habitat resilience
-  Coastal engineering (soft)
-  Coastal engineering (hard)
-  Modify infrastructure and implement hazard resilient design
-  Accept the risk and embrace coastal processes
-  Relocate important infrastructure and assets at risk
-  Planning response

IMPLEMENTATION PLAN

A summary of implementation actions for region-wide strategic adaptation responses is provided in the Table below. The implementation plan focuses on short term actions to be delivered over the next decade.

STRATEGIC ADAPTATION ACTION

INDICATIVE PRIORITY IMPLEMENTATION ACTIONS (TO BE IMPLEMENTED WITHIN 5-10 YEARS)

MAINTAIN AND IMPROVE



Monitoring

Monitoring is essential for improving our understanding of coastal hazards and how coastal areas and their risk profiles change over time. This helps to determine if our current adaptation pathway is appropriate and effective or our response needs adjusting (i.e. a trigger point has been reached and an additional or alternative adaptation action is required).

- Seek State and Federal Government funding to develop a Weipa based Ranger program to deliver education and training opportunities and ensure beach monitoring and the protection of culturally significant sites.
- Connect to the Land and Sea Ranger program in Napranum and Mapoon for regional alignment.
- Establish and initiate a formal beach monitoring program.
- Establish a photo monitoring program, to capture images of key sites and locations to assist in monitoring key changes across the coast (beach profile, mangrove/ dune vegetation extents, high water mark, flood extent).
- Source existing elevation and aerial imagery to further support coastal monitoring and analysis of changes to coastal environments over time.
- Work with Rangers program to document key measures for each cultural heritage site including spiritual/social value, archaeological value, physical condition, and protection measures.
- Develop protocols and a step-by-step procedure for when key cultural significant sites are exposed due to coastal processes.
- Register and document the frequency and location of habitat management activities such as dune revegetation and planting within and around wetlands and waterways.
- Connect to existing elevation and aerial imagery collection to monitor changes in the beach profile over time and support reporting needed to inform adaptive management and the next planning scheme review.*
- Undertake geotechnical investigation along face of Kumrumja escarpment to confirm extent of rock layer.



Enhance coastline and habitat resilience

Supporting and strengthening our natural coastal processes and ecosystems including native habitats, dune and wetlands areas, can improve the protective function of coastal landforms and vegetation and assist in mitigating the risks associated with coastal hazards. Particular consideration will be given to beach access management (removing unnecessary or informal pedestrian and vehicle access and formalising appropriate public paths) and the protection and management of turtle and shorebird nesting areas.

- Identify priority management areas and develop a WTA endorsed plan for ecosystem management. The plan should focus on Nanum Beach and Kumrumja.
- Identify opportunities to facilitate access needs while reducing disturbance to dune and coastal systems through fencing, signage, and providing defined/formalised access points and walkways/boardwalks in the most appropriate locations.

STRATEGIC ADAPTATION ACTION

INDICATIVE PRIORITY IMPLEMENTATION ACTIONS (TO BE IMPLEMENTED WITHIN 5-10 YEARS)



Emergency response (e.g., evacuation planning)

Early warning systems, including evacuation strategies and community engagement, are important mechanisms which can assist in keeping the community safe. WTA, State Emergency Service, volunteers and local disaster management groups play a lead role in our emergency response and keeping the community safe. WTA's Disaster Management Plan provides information on preparation, response and recovery to potential coastal hazard events.

- Review and update the joint Weipa Local Disaster Management Plan with updated coastal hazard mapping and embed risk outcomes in emergency management and response planning.*
- Monitor frequency and nature of emergency management responses and call outs.



Community awareness, education and partnerships

Building community understanding and awareness of coastal hazard adaptation is critical to the successful implementation of this Strategy. Being 'risk aware' can enhance stewardship of the coastline and assist in capacity building. It can also improve the community's resilience by empowering them to make informed choices about where and what to invest in.

WTA will strongly advocate for collaboration and partnerships with other stakeholders and community to share information and responsibility in delivering adaptation actions.

- Develop a standing agenda item for Local Disaster Management Group meetings to discuss the findings and implementation of the Strategy as well as ongoing monitoring and reporting activities.
- Develop an engagement and communication plan, informed by Council's resources, budget and priority needs regarding information capture. The plan will facilitate knowledge sharing of hazards, adaptation and the role of coastal habitats and structure how information is shared between Council, external organisations and the community.
- Explore opportunities within WTA to build internal capacity, understanding and awareness of coastal hazards, their impacts and implications for Authority assets and operations.
- Identify new and existing networks to share and promote knowledge sharing and understanding of coastal hazard risks and adaptation – particularly with other nearby Councils such as Napranum Aboriginal Shire Council and Mapoon Aboriginal Shire Council.
- Seek co-funding/resources for further initiatives through grants and stakeholder partnerships.
- Leverage from existing key stakeholder groups (Traditional Owners, Rio Tinto, research agencies and community) to form a coastal working group to collaboratively advise on the management of coastal hazards within Weipa.*
- Promote coastal custodianship in the youth and future generations with community coast care events.*
- 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.*
- Promote cross-sector partnerships and initiatives to enhance resilience and strategic adaptation for transport infrastructure, including boating infrastructure.*
- Promote resilient homes within the community.

STRATEGIC ADAPTATION ACTION

INDICATIVE PRIORITY IMPLEMENTATION ACTIONS (TO BE IMPLEMENTED WITHIN 5-10 YEARS)

Avoid



Hazard avoidance for new and replacement community infrastructure

Where the coastal hazard risk is tolerable, we can continue the ongoing use of infrastructure, buildings and assets.

Where any new or upgraded infrastructure or built assets are being developed, they should reflect hazard resilient design or be constructed to accommodate coastal hazard impacts.

- Review at-risk infrastructure based on current and future coastal hazard risks and embed risks into current asset management plans.
- Advocate with Rio Tinto on future upgrades around port infrastructure with respect to coastal hazard impacts.
- Undertake a sand sourcing investigation to inform the feasibility of nourishment activities.



Planning and technical responses

Land use planning establishes certainty and clear expectations around development. WTA will ensure its planning framework and land use controls only allow for risk appropriate land uses in hazard areas. Land use planning will build on current planning scheme requirements to reduce or avoid increasing the future risk and exposure of people, buildings, community facilities and infrastructure through the implementation of setbacks, hazard resilient design requirements and minimum floor planning levels.

- Integrate coastal hazard mapping and considerations into current and future planning schemes and all strategic planning processes to inform strategic land use planning.
- Work with State Government to obtain recognition of the erosion hazards assessed in this document as declared Erosion Prone Areas.
- Consider updated hazard mapping and risk assessment outcomes when deciding on new land use and development in hazard areas as part of the development assessment process.

* Collaboration with other agencies and organisations required for implementation

WHAT'S NEXT?

GOVERNANCE

Everyone has a role to play in maintaining and developing a resilient coastal community. While Weipa Town Authority (WTA) is primarily responsible for implementing adaptation actions relating to WTA-managed public infrastructure and assets, successful adaptation will require collaboration and partnerships between WTA, Federal and State Government agencies, Traditional Custodians, businesses, community organisations, private landowners and residents.

WTA's ongoing role as the Strategy facilitator will involve informing, observing, planning and acting on coastal hazard management by:

- Data gathering and undertaking on-the-ground monitoring of areas affected by coastal hazards to understand changes and inform the implementation of adaptation options.
- Monitoring WTA managed assets affected by coastal hazards as part of operational management programs.
- Informing the community through information sharing and education.
- Updating the *Weipa Planning Scheme 2019* to reflect the outcomes of the Coastal Hazard Adaptation Strategy and coastal hazard mapping which will provide policy guidance and planning controls for land use and development.
- Providing resilient community infrastructure and implementing adaptation actions to protect, maintain and manage WTA owned land, assets and infrastructure.

It is important to note that WTA is not responsible for managing coastal hazard impacts on areas not owned or managed by WTA or non-WTA owned public assets or property. Asset owners/entities are responsible for maintaining their assets in the context of relevant State and WTA policy and statutory requirements.

IMPLEMENTATION

An implementation plan will be prepared to guide how WTA will embed the Strategy across WTA business areas, programs and processes. The implementation plan will provide details on:

- WTA plans, policies, strategies, and processes to be updated or created to support action delivery.
- Indicative timeframes for delivery of whole of coast and locality-based actions
- Governance, processes, and resourcing.
- Monitoring and evaluation approaches.
- Partnership and collaboration opportunities with the community, stakeholders, other levels of government and external infrastructure providers.

REVIEW AND UPDATE

This Strategy will be reviewed regularly to inform land use and infrastructure planning and ensure technical information remains up to date. The strategy review process should consider:

- The success of actions delivered to date is based on factors such as the reduction and management of coastal hazard risk and community and stakeholder awareness, feedback and attitudes.
- New information and knowledge about climate change and coastal hazard risks including updated technical information (coastal hazard modelling, risk assessment, monitoring data or changes to coastal hazard indicators).
- Updates to State and/or Federal legislation, planning and policy frameworks relating to coastal hazards and their management



RESOURCES

Department of Environment and Heritage Protection (2013). Coastal hazard technical guide: Determining coastal hazard areas. Available at https://www.qld.gov.au/_data/assets/pdf_file/0025/67462/hazards-guideline.pdf

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Local Government Association of Queensland, Department of Environment and Heritage Protection (2016), *Developing a Coastal Hazard Adaptation Strategy: Minimum Standards and Guideline for Queensland Local Governments*. Available at <https://www.qcoast2100.com.au/downloads/file/55/minimum-standards-and-guideline>

BMT (2018), NCCARF (2017), *CoastAdapt: Climate change and sea-level rise based on observed data*. Available at: <https://coastadapt.com.au/>

Mapoon and Napranum Aboriginal Shire Councils and Weipa Town Authority Coastal hazard Risk: Scoping Study. Report by BMT for Napranum Aboriginal Shire Council, Weipa Town Authority and Mapoon Aboriginal Shire Council.

BMT (2021), *Napranum Aboriginal Shire Council, Weipa Town Authority, Mapoon Aboriginal Shire Council – Coastal Hazard Adaptation Strategy Phase 4: Asset Exposure to Hazards*. Report by BMT for Napranum Aboriginal Shire Council, Weipa Town Authority and Mapoon Aboriginal Shire Council.

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BMT (2022), *Coastal Hazard Adaptation Strategy Phase 6: Options for Adaptation*. Report by BMT for Napranum Aboriginal Shire Council, Weipa Town Authority and Mapoon Aboriginal Shire Council.

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