QCoast Forum #10

From Risk to Resilience: Cairns' Coastal Adaptation Journey

Sophie Barrett – Coordinator Sustainability
Terrence Jeppesen - Senior Engineer Stormwater & Waterways

12 November 2026



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Acknowledgment of Country

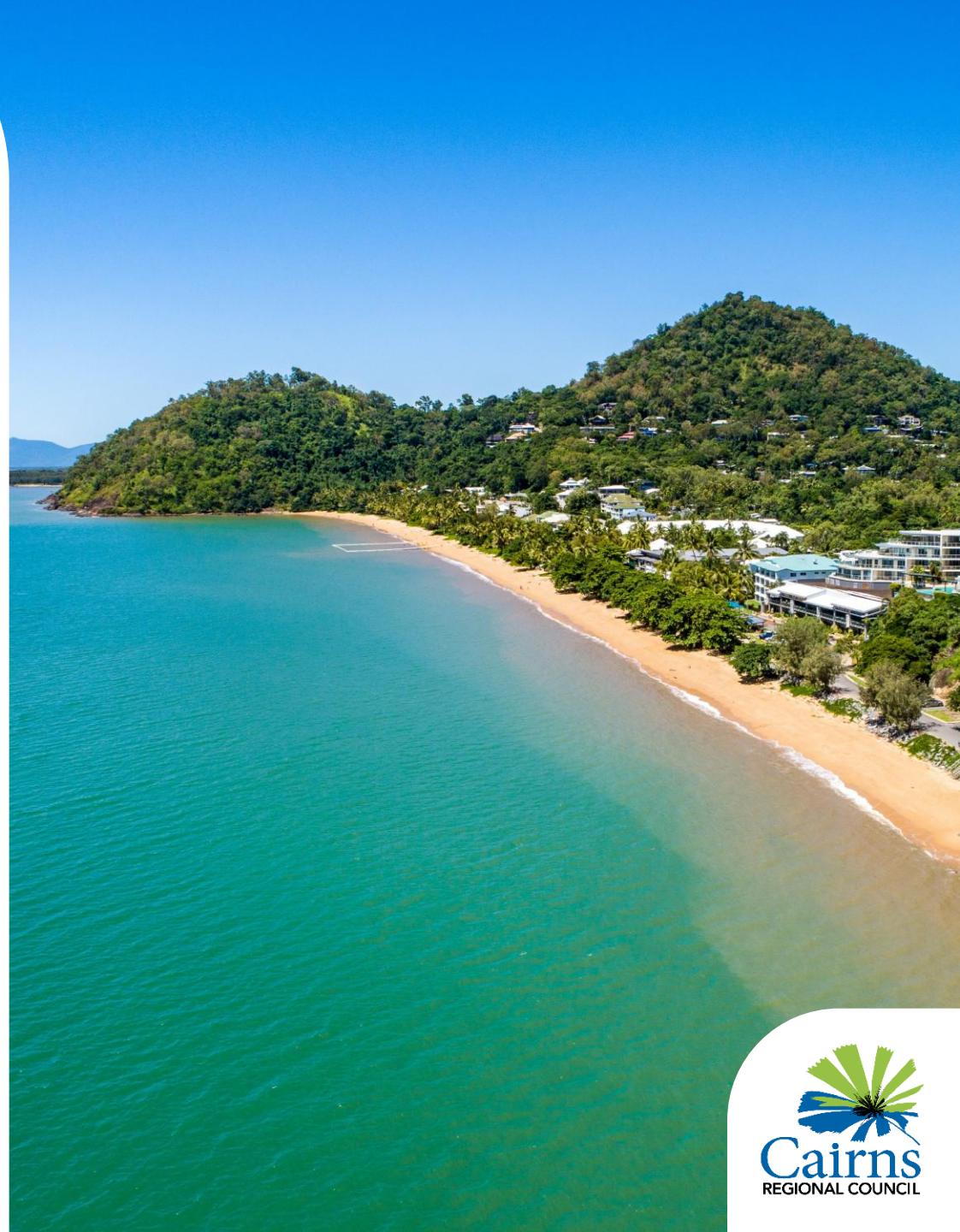
Cairns Regional Council acknowledges the First Peoples within our region who are the Traditional Custodians of this country: the Djabugay; Yirriganydji; Bulawai; Gimuy Walubara Yidinji; Mandingalbay Yidinji; Gunggandji; Dulabed and Malanbara Yidinji; Wanyurr Majay; Mamu and NgadjonJii peoples.

We pay respect to Elders past, present and future and extend that respect to all other Aboriginal and Torres Strait Islander Australians within our region.

Planning to address Coastal Hazards following the CHAS

Sophie Barrett

Coordinator Sustainability



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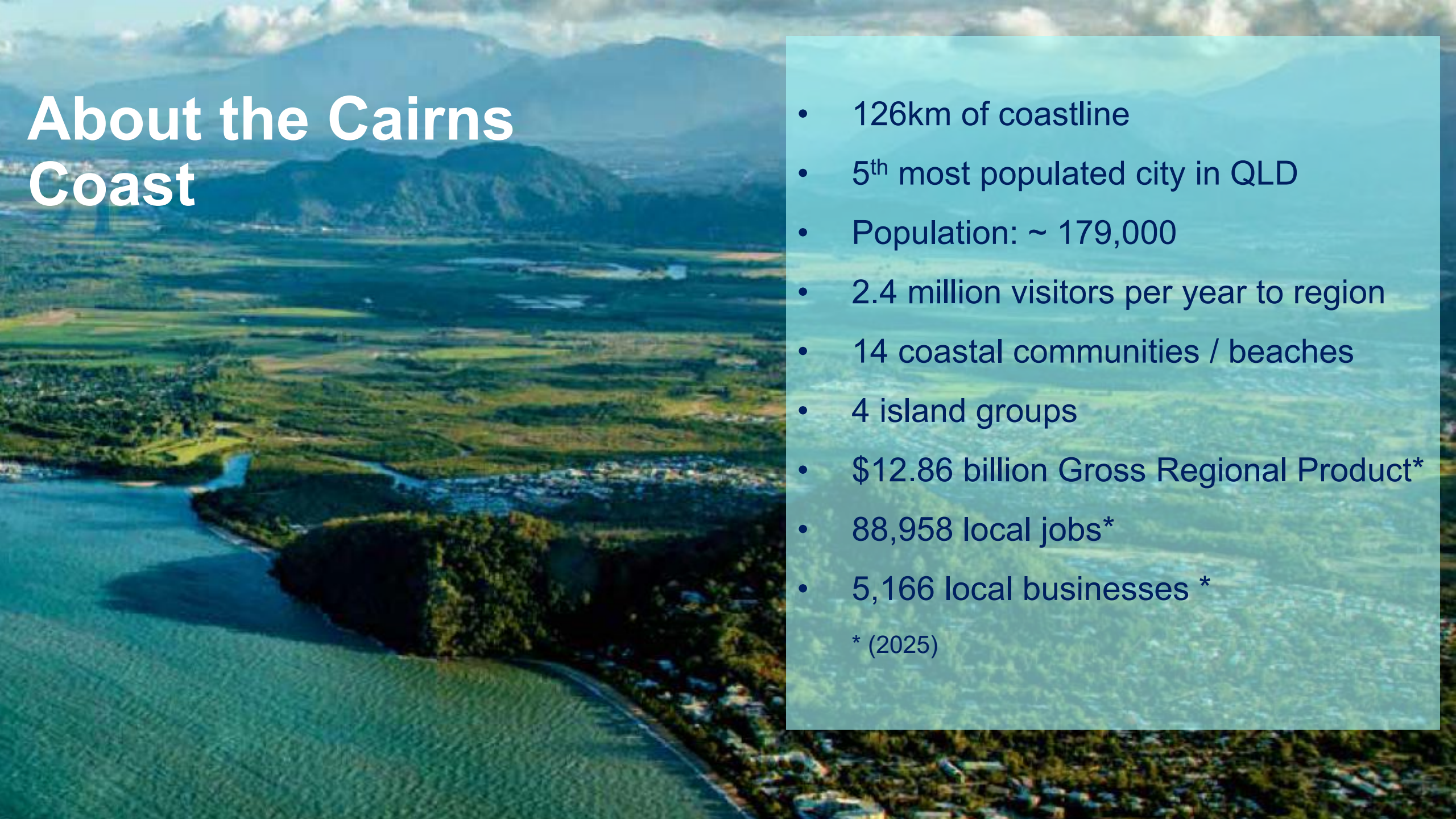


About the Cairns Coast

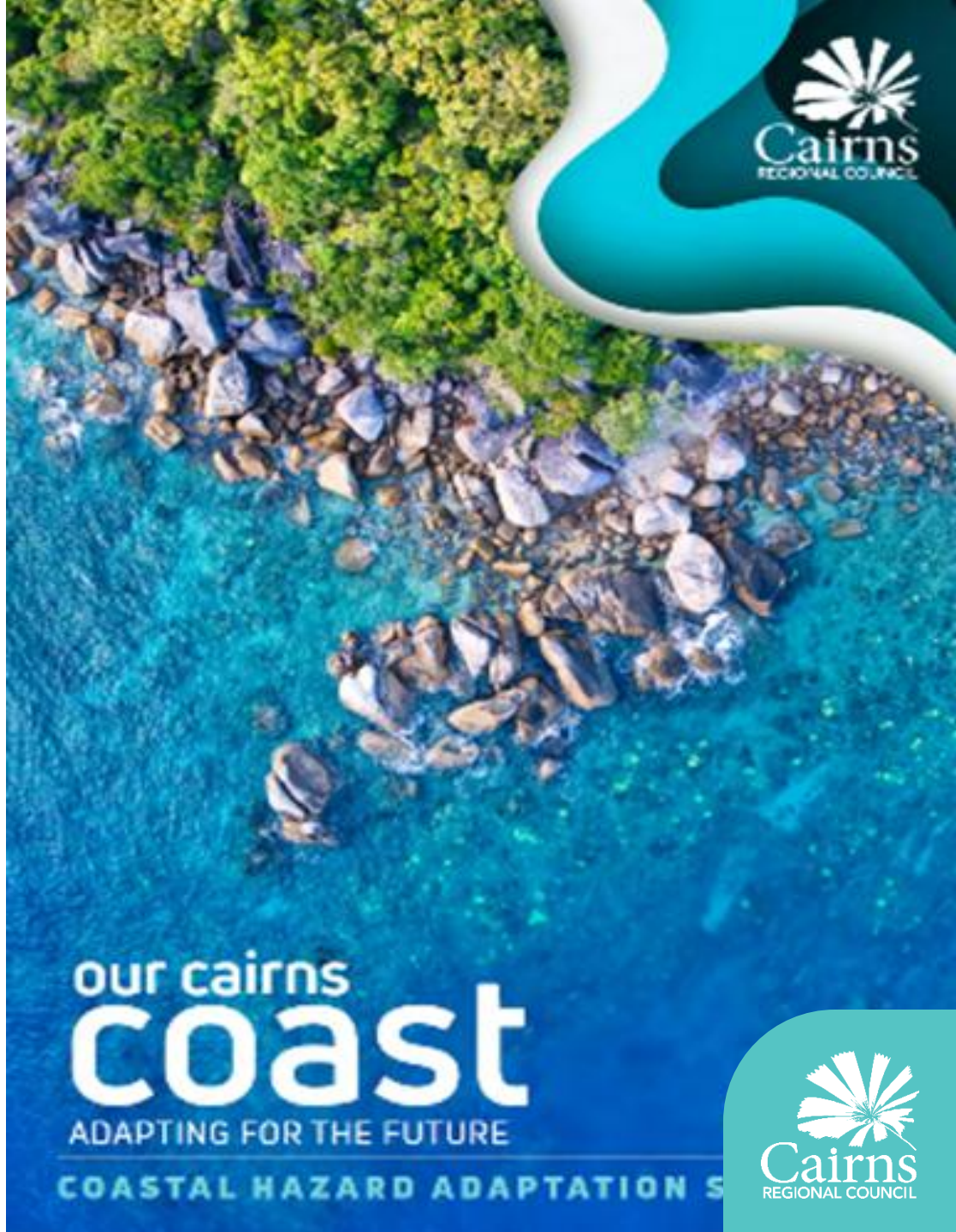
- 126km of coastline
- 5th most populated city in QLD
- Population: ~ 179,000
- 2.4 million visitors per year to region
- 14 coastal communities / beaches
- 4 island groups
- $12.86 billion Gross Regional Product*
- 88,958 local jobs*
- 5,166 local businesses *

* (2025)

Coastal Hazards Adaptation Strategy

Priority Actions Years 1-5

- *Integrate Coastal Hazard Risks into Growth Strategy and Planning Scheme*
- *Establish a Monitoring Program*
- *Develop Local Adaptation Plans for at-risk communities*
- *Integrate CHAS into Strategic Asset management and Shoreline Erosion Monitoring Plan (SEMP)*
- *Collaborate with Stakeholders and other Councils for joint approaches to Coastal Adaptation*



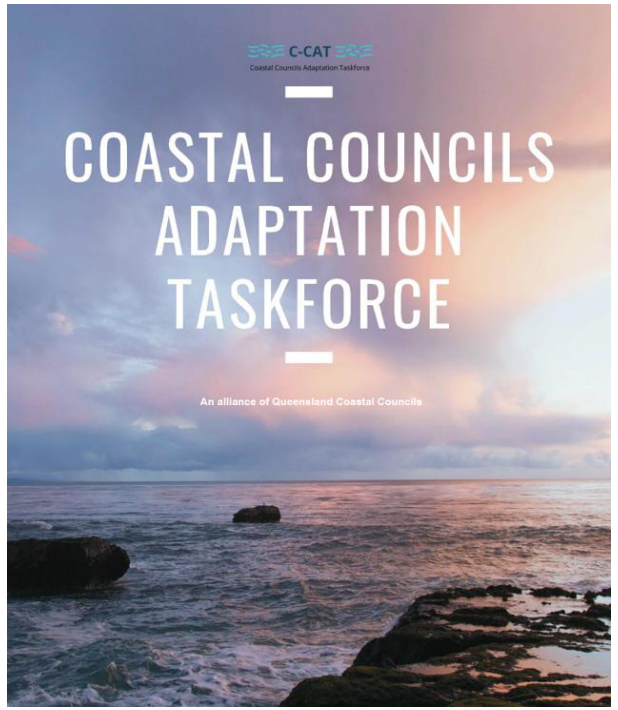
Coastal Councils Adaptation Taskforce (C-CAT)

Alliance of four coastal Queensland councils

Shared purpose: strengthening resilience to coastal hazards through collaboration and shared learning

Funded by member councils, coordinated through CCRC

Implements CCRC CHAS: Employs an adaptation officer to support joint delivery of adaptation actions & managing the CHAS working group



C-CAT
Coastal Councils Adaptation Taskforce

C-CAT Officer GWEN LEWIS Gwenllian.Lewis@ccrc.qld.gov.au

C-CAT Projects



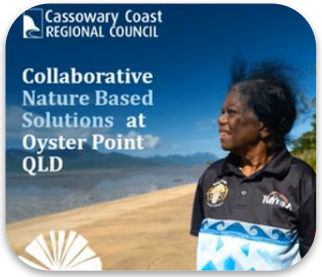
Private Property Guidelines

- A clear position for Councils and landowners on private property
- Outlines Responsibilities & Coordinated Approach
- Application and approval process
- Legal advice - reviewed



Coastal Management Policy

- Developing policy around Coastal Hazard Management



Nature-based solutions

- Report on NBS – QCoast
- Pilot – Cassowary Coast @ Oyster Point
- Case study



Professional Development

- UAV training and Coastal Drone surveys
- Information Sharing - Partnerships
- Coastal Training

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C-CAT: QCoast Coastal Monitoring Project

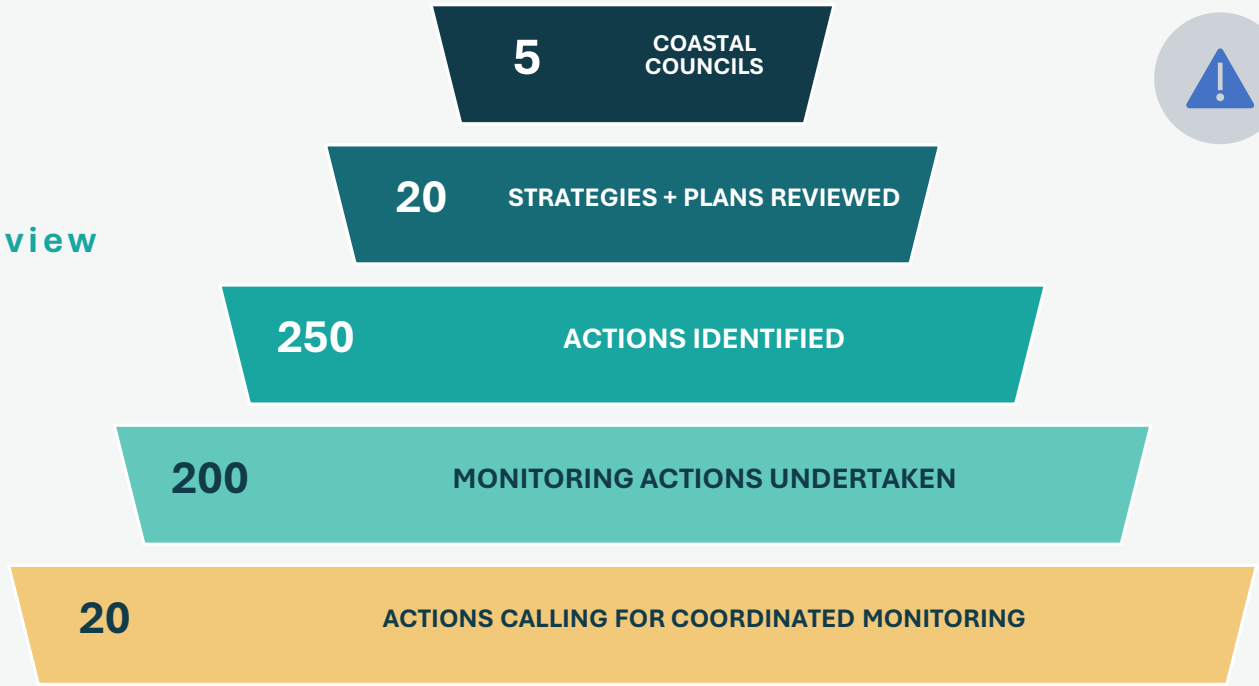
QCoast - $150,000 to develop transferable monitoring model, facilitating regional collaboration

Inform proactive coastal management, allowing councils to shift from reactive responses to proactive planning and adaptive management.

Support the council's CHAS by integrating the tailored monitoring data into risk assessments and long-term planning

Demonstrates the value of working collaboratively: sharing methods and learnings through C-CAT, each council benefits -project doesn't lock us into a single method or tool

Initial Review



GAP

- Need for an overall plan to pull together information, technology, and monitoring required for each site and council area.
- Need for easily accessible information in a central location which can be shared across departments.

C-CAT: Pilot - Monitoring systems

THE COORDINATED PILOT

Seven pilot streams will test the tools, methods and capability needed for a fit-for-council monitoring program. Frequency and consistency of data collection to be established.



01 Data foundation

Shared data storage and standard operating procedures, and quality control deployable across Councils.



02 Standardisation of procedures

Compare survey approaches, frequency, local costs and data outputs. E.g. Drone surveys



03 CoastSnap benchmarking

Assess historical use and usability of existing CoastSnap sites.



04 Survey frequency optimisation

Test fixed coastal cameras and optimise collection frequency of beach monitoring.



05 Nearshore Data Collection

Test practical and cost implications of short-duration monitoring devices of waves and currents e.g wave buoys.

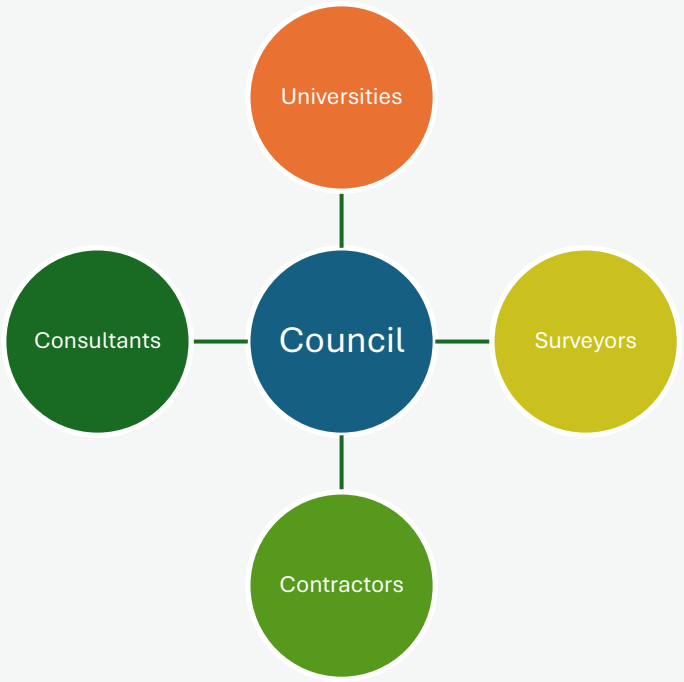


06 Vegetation Mapping

Build capability in remote sensing and coastal vegetation survey and mapping.

07 Partnership Capability

Collaboration opportunities for monitoring between Councils, Universities and consultants



Investigate a fit-for-council monitoring roadmap and platform informed by the review and real-world pilot results.

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Closed Landfill Sites – Assessing Coastal Risk

- QCoast Funded Project
- Assessment of Coastal closed landfills – managed sites
- Sporting fields and recreational areas built on historic landfills that were poorly managed at the time of operation – partially or not currently managed.
- The need to investigate the risk to the environment and public health from exposure of these sites to both sea level rise and increases in storm surges was identified as a priority activity in the CHAS.



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WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

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Coastal Inundation Risk Analysis- Closed Landfill Sites

Table 1 Risk Analysis

	2020	2040	2060	2080	2100
Portsmith	M7	M8	H10	H11	H11
Yorkeys Knob	H9	H11	H11	H11	H11
Machans Beach	L6	M7	H9	H9	H9
White Rock	L5	L5	M8	H10	H10
Endeavour Park	L5	M7	H9	H10	H10
Aeroglen	L5	L6	M8	M8	H9
Mann St	L7	L7	H9	H9	H9
Barlow Park	L4	L4	M7	M7	M7
Cairns Esplanade	H9	H9	H11	H11	H11
Holloways Beach	M7	M8	H10	H10	H10

- Yorkey's Knob highest risk rating due to significant coastal erosion mitigated by vegetation but needs ongoing management
- Cairns Esplanade high risk of coastal erosion near to Trinity Inlet and along Esplanade (construction rubble)
- All closed landfill sites reach a risk rating by 2100 except Barlow Park

Options to manage risk

- **Monitoring** – The continuous or episodic monitoring, treatment and reporting associated with the management of landfill waste
- **Treatment** – Treatment of landfill waste and decontamination post-disaster clean-up and partial treatment of waste or Enhanced Landfill Mining to reduce landfill toxicity.
- **Protection** – Protection of waste –may include raising bund walls to defend the landfill's perimeter (waste encapsulation via a coastal levee) or filling the top of the landfill site (protection via reclamation).
- **Removal** – Landfill waste material removal

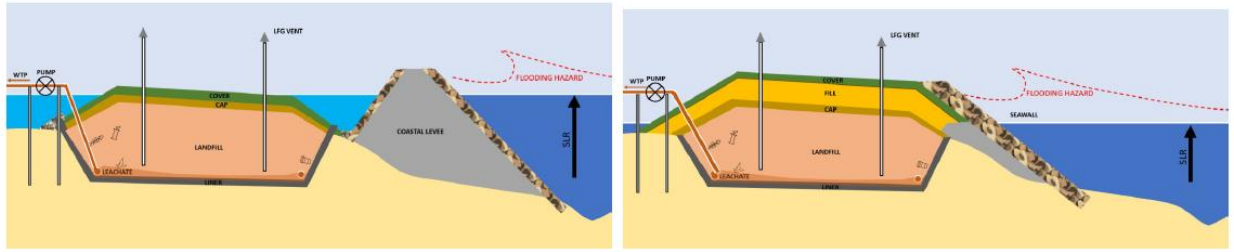

Figure 3 Conceptual design diagram for bunding option (left) and reclamation (right)

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Planning for Coastal Hazards

CBD and Central Cairns Master Mitigation and Adaptation Plan



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A city at risk or opportunity?



Cairns City and Saltwater Creek Catchment Map circa 1952



CHAS Coastal Hazard Mapping 2100

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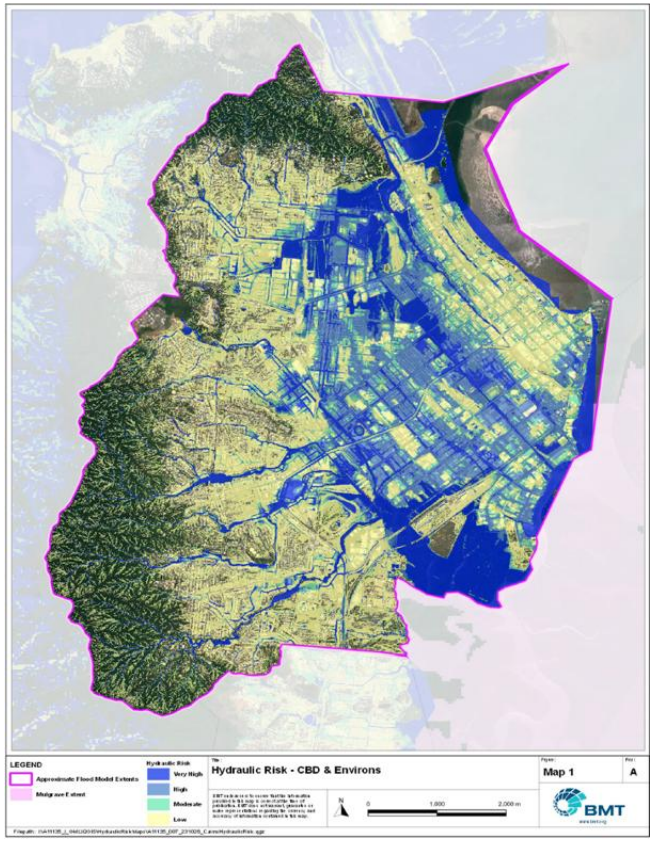
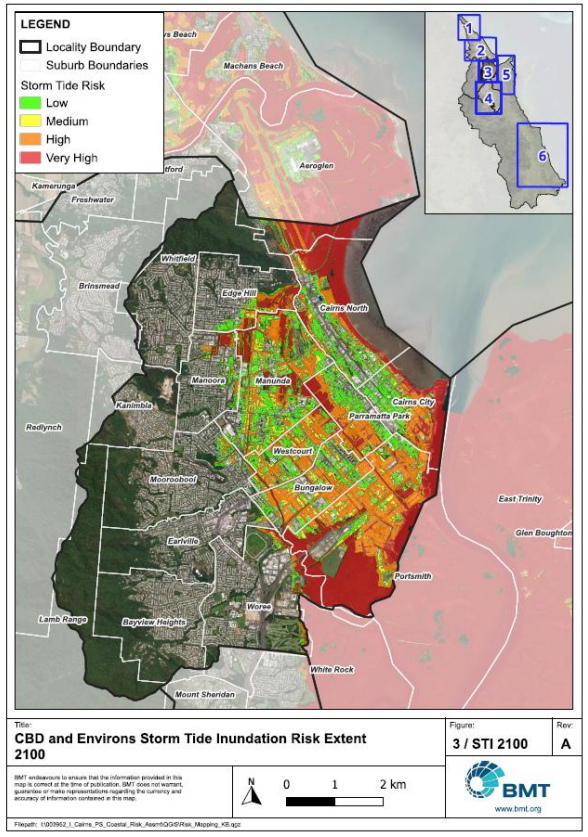
CBD and City Risk Assessment 2100

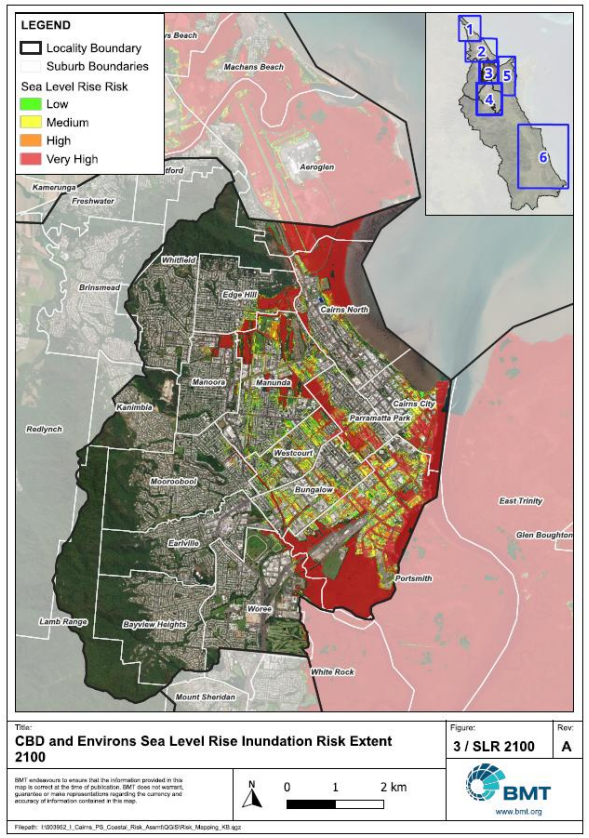
Risk of flooding and coastal hazards at 2100



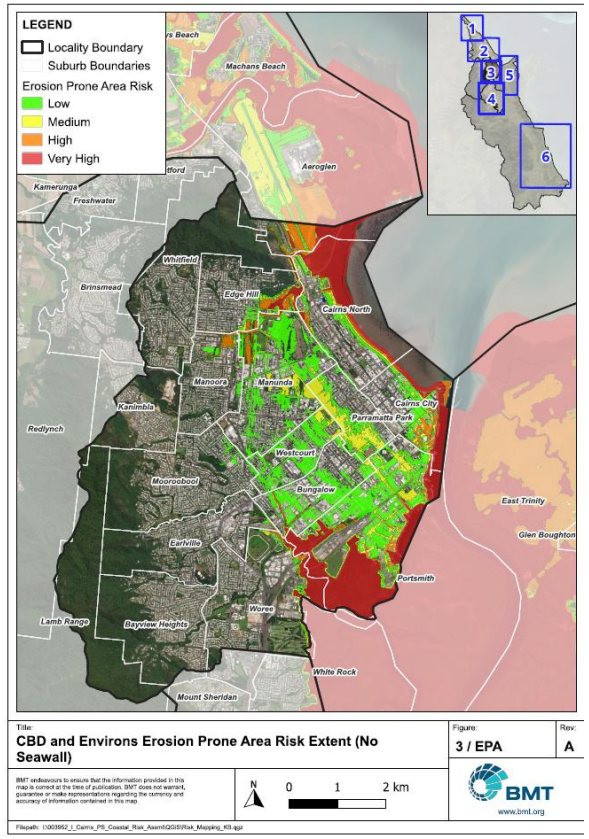
FLOOD



STORM TIME



SEA LEVEL RISE



EROSION (no seawalls)

- The area receives flood and overland flow water from steep terrain, into the low-lying and largely flat CBD.
- The low-lying area and elevated surrounds increase vulnerability to both flood and to sea level rise which is already occurring during king tide events. Proximity to estuarine areas exposes Cairns to permanent loss of land to coastal erosion.
- These hazards compound, making solutions complex and unable to be addressed by a single solution.

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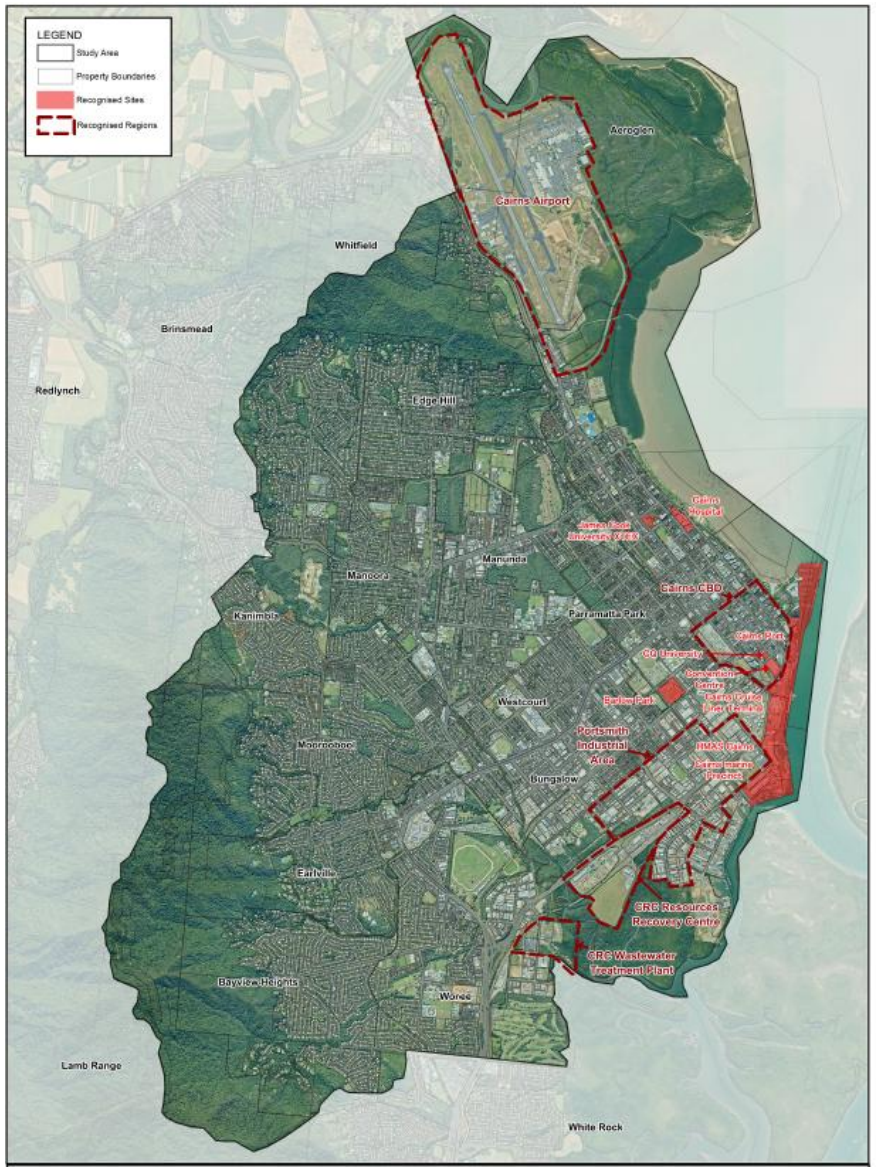
Why is it important?



$1B

Cairns Hospital precinct

$42M+ $387M

Cairns Marine Precinct

$250M

HMAS Cairns wharf

$176M

Convention Centre expansion

$115M

Airport & Aviation Precinct

$77.5M

CQUniversity CBD campus

$91M

Barlow Park Comm Games

- Major Residential Growth Area
- CBD
- Industrial Area

Critical Community Infrastructure – Wastewater and Resource Recovery





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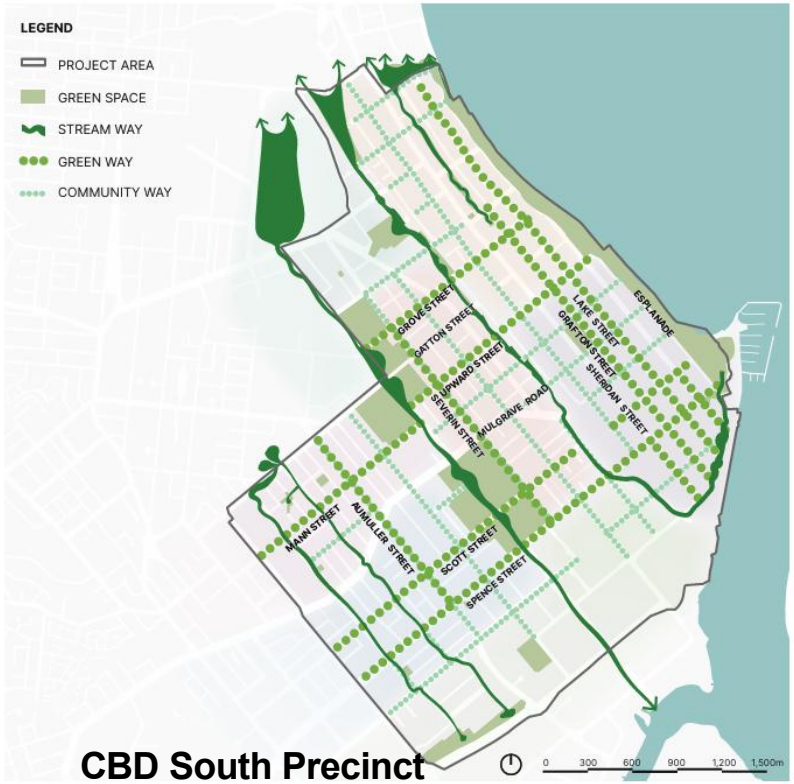
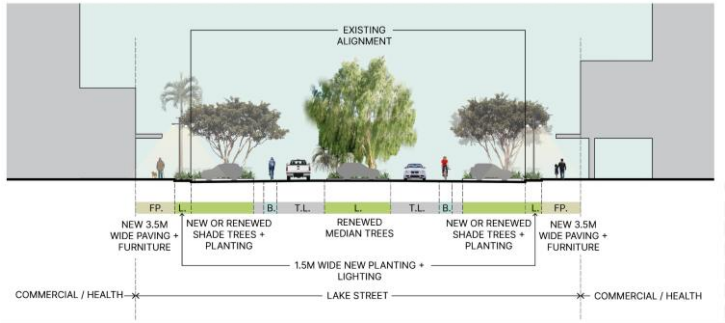
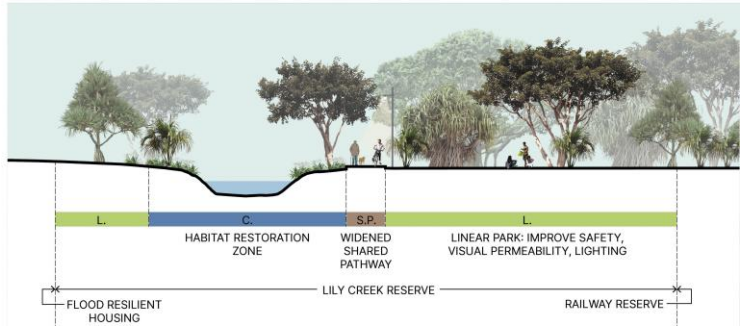
City Precincts: Masterplan

Connectors: A lattice of cool green streets and public spaces through **Greenways and Streamways**

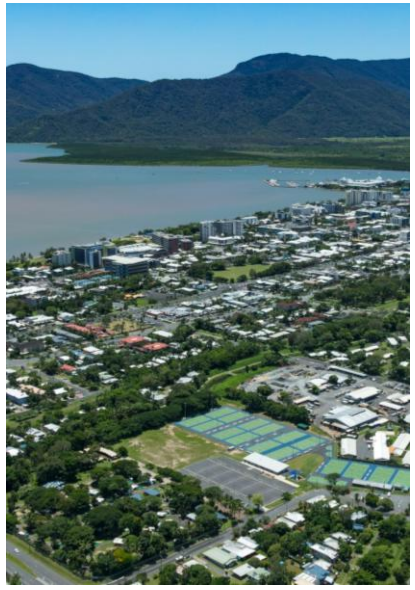
Supporting 3 major precincts



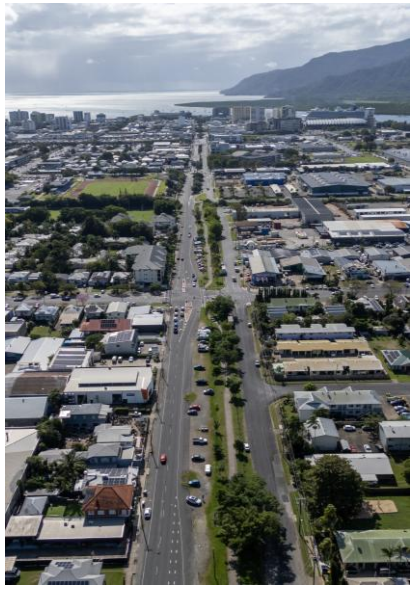




Health + Innovation Precinct



Major Events Precinct



CBD South Precinct





From Evidence to Shared Delivery

1	**Align stakeholders**	Council, Ports North, Cairns Airport, Queensland Health, Defence, state agencies, business, tourism, universities and Traditional Owners.
2	**Integrate evidence**	Collate hazard, asset, land-use, growth and project studies into a shared base case and identify critical gaps.
3	**Test and prioritise**	Model scenarios and options, assess feasibility and cost-benefit, and select a preferred settlement-scale pathway.
4	**Embed and deliver**	Translate the pathway into funding-ready precinct plans, statutory planning, a 10-year capital program and longer-term investment pipeline.



A staged, investment-ready pipeline of priority projects

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Planning Scheme Amendment – All Hazards

- To support and encourage well-located and well-designed development in Cairns
- To keep the Planning Scheme up to date and operating effectively in the interim while it is being reviewed and a new Planning Scheme is prepared



- To appropriately update the available information and provisions relating to flooding, land slide, coastal and bushfire hazards

Assess Risks & develop policy responses

Fit for purpose risk assessments
Policy responses

Prepare Planning Scheme Amendments

Prepare major amendment package based on policy responses

Examine Zoning Changes

Zoning check for intolerable risk & FAAR
Prepare natural hazard overlay codes for flooding, coastal hazards, bushfire and landslide

Consult the Community

Release draft amendment for consultation / feedback

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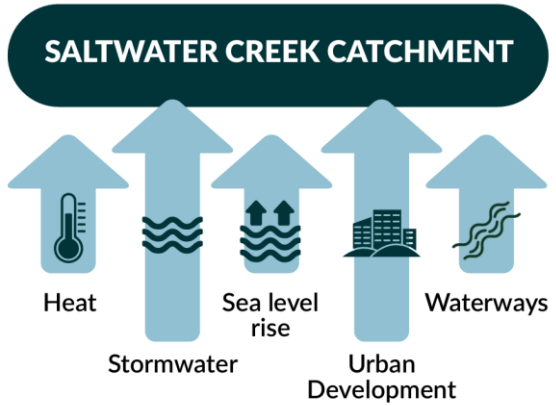
Integrated Catchment Planning

Saltwater Creek Catchment Resilience Masterplan







Pressures impacting the catchment

The Saltwater Creek Catchment faces growing climate resilience challenges driven by:

- Increasing flood risks and extreme weather events
- Coastal hazards (storm tide, coastal erosion, sea level rise)
- Saltwater intrusion – saltwater and freshwater wetlands
- Urban heat and loss of green space
- Cumulative development pressures
- Biodiversity and habitat fragmentation
- Declining water quality
- Community Vulnerability

What capabilities, relationships, and resources does the catchment and the community need to thrive despite future shocks and uncertainties?

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Saltwater Creek Catchment Plan – Priority projects

1 Centenary Lakes

LOCAL ADAPTATION PLAN AND WETLANDS REMEDIATION

Timing: >3 years

Stakeholders

Lead: Cairns Regional Council

Partners: Queensland Government, Reef 2050 Plan, Reef guardian Councils, NRM and environmental groups, Traditional Custodians, Community groups.

Funding Options*

Project Scoping: $200,000 - $300,000
Design Development: $200,000 - $300,000
Delivery and Implementation: $4M-$6M

*Funding source subject to future budget availability and Grant opportunities e.g. Reef 2050, Reef Guardian Councils etc. Project can be staged and delivered over time.

Overview

Centenary Lakes, a vital wetland ecosystem in Cairns, faces threats from sea-level rise, saltwater intrusion and poor drainage, leading to impacts such as degraded habitat, poor water quality and fish kills. Detailed local adaptation planning and implementation and wetland restoration could help improve the resilience of this area including enhancing the flood storage and flood management role of the wetlands. This project aims to restore the wetlands ecological functions, enhance biodiversity, develop cultural connections and improve water quality to the Great Barrier Reef (GBR).

Key Issues

- **Climate Change & Water Management:** Rising sea levels (saltwater intrusion), flooding, and poor drainage impact habitat health.
- **Fish Health:** Fish kills, restricted fish movement due to barriers such as causeways and weirs.
- **Pests & Weeds:** Invasive plants (e.g. Singapore Daisy and Guinea Grass) disrupt ecosystems.
- **Community health:** Mosquitoes and sandflies population can cause health issues
- **Cultural Heritage:** Need for Indigenous cultural mapping to guide restoration.

Opportunities

- **Climate Adaptation:** Future-proofing wetlands against environmental risks, carbon sequestration through blue-carbon generation.
- **Habitat Restoration & Water quality:** Deepening lakes, improving tidal flow, and regenerating salt marsh. Filtering and improving water quality to the GBR.
- **Infrastructure & Biodiversity:** Installing fish ladders, enhancing drainage, and increasing riparian vegetation and shade.
- **Cultural & Community Benefits:** Strengthening Traditional Owner partnerships, community asset and ecotourism attraction. Support delivery of cultural heritage and recreational opportunities of Saltwater Creek and Lily Creek.

2 Jensen Street Parklands

RIPARIAN RESTORATION, COMMUNITY ACTIVATION AND HEAT MANAGEMENT

Timing: 5 years

Stakeholders

Lead: Cairns Regional Council

Partners: Queensland Government, Reef 2050 Plan, Reef Guardian Councils, NRM and Environmental Groups, Traditional Custodians, Community Groups, residents and schools.

Funding Options*

Project Scoping: $100,000 - $150,000 (exl. GST)
Design Development: $150,000-$200,000 (exl. GST)
Delivery and Implementation: $2M-$3M (exl. GST)

*Funding source subject to future budget availability and Grant opportunities e.g. Reef 2050, Reef Guardian Councils etc. Project can be staged and delivered over time.

Overview

Jensen Street Parkland is an underutilised park and open space in the suburb of Manoora. The Saltwater Creek section that runs alongside the park has been modified into natural drainage, with low habitat value, a small part vegetated with mangroves and the rest of the section is devoid of native riparian vegetation. There are opportunities to activate the park and rehabilitate the creeks to a natural state through creek restoration, habitat restoration, water quality improvement and nature-based recreational opportunities. There are also opportunities to strengthen collaboration with Traditional Custodians to foster community engagement and stewardship of the parks and Saltwater Creek.

Key Issues

- **Climate Change & Water Management:** Rising sea levels (saltwater intrusion), flooding, and poor drainage and water quality impact habitat health.
- **Fish Health:** Fish kills, lack of fish refuges, restricted fish movement due to barriers such as causeways and weirs.
- **Weeds:** Invasive plants disrupt ecosystem's function.
- **Community health:** mosquitoes and sandflies over population causing community health concerns.

Opportunities

- **Climate Adaptation:** Flood resilience through channel deepening/widening, improving the soil water absorption within the parkland, urban greening and increasing canopy cover to mitigate increasing urban heat impacts.
- **Habitat Restoration & Water quality:** Riparian restoration, habitat rehabilitation and creek widening and naturalisation. Investigate sewerage pump stations and review water quality indicators to design improvements.
- **Infrastructure & Biodiversity:** Fish micro habitat, fish passage and movement through leaky weirs, fish ladders, and increasing riparian vegetation and shade, active transport and pathway connections, improve safety, consider adding nature elements to playground.
- **Cultural & Community Benefits:** Strengthening Traditional Custodian partnerships, incorporating interpretation and stories into spaces, community greening and activation of parklands e.g. nature playground and outdoor nature classroom, community gardens.

3 Catchment Water Quality Improvement

STORMWATER INFLOW AND INFILTRATION MANAGEMENT

Timing: 5 years

Stakeholders

Lead: Cairns Regional Council

Partners: Queensland Government, Reef 2050 Plan, Reef Guardian Councils, Community

Funding Options*

$300,000 – $500,000 (exl. GST)

*Funding source subject to future budget availability and Grant opportunities e.g. Reef 2050, Reef Guardian Councils etc.

Overview

Within the Saltwater Creek catchment, the risk of inflow and infiltration (I/I) is assessed as high, with flows treated at the Northern Wastewater Treatment Plant (NWWTP). Despite extensive relining efforts within sewer catchments, several sub-catchments continue to perform poorly during wet weather, resulting in overflows through Emergency Relief Overflow Structures (EROS).

Industry knowledge suggests that up to 60–70% of I/I in public sewerage systems may originate from private property connection mains. While property owners are responsible for rectifying defects on private connections, there is limited incentive for them to undertake repairs upon Council request.

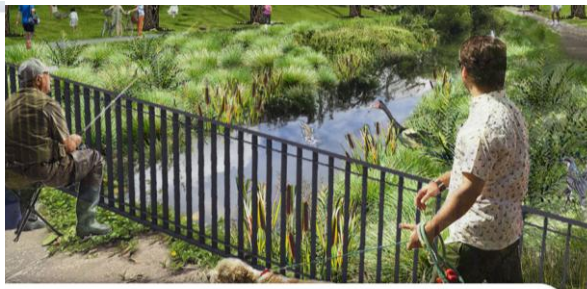
The project will involve identifying defects on private property and subsequent rectification in a total of 100 locations within high-risk areas serviced by the NWWTP. The aim is to eliminate unwanted inflows of rainwater and stormwater and infiltration of groundwater into the sewerage system.

Key Issues

- **Waterway Health:** Degradation due to pollutant inflows resulting from sewer overflows.
- **Customer Impact:** Frequent spills in high inflow areas result in a high volume of customer complaints.

Opportunities

- **Water Quality:** Reduce sewage discharge into waterways and maintain compliance with licence conditions issued by the Department of Environment, Tourism, Science and Innovation (DETSI).
- **Infrastructure Efficiency:** Lower network pumping and treatment costs at NWWTP, and extended lifespan of existing sewer assets.
- **Community Relations:** Reduction in customer complaints with anticipated reduced sewage overflow events.



4 Lily Creek – Blue Green Corridor Project

RIPARIAN CORRIDOR, WATER QUALITY IMPROVEMENT, COMMUNITY ACTIVATION AND HEAT MANAGEMENT

Timing: 5 years

Stakeholders

Lead: Cairns Regional Council

Partners: Queensland Government, Reef 2050 Plan, Reef Guardian Councils, NRM and Environmental Groups, Traditional Custodians, Community Groups, residents and schools.

Role of Council: Project Manager

Funding Options*

Project Scoping: $150k - $200k (exl. GST)
Design Development: $150-$200k (exl. GST)
Delivery and Implementation: $3M - $5M (exl. GST)

*Funding source subject to future budget availability and Grant opportunities e.g. Reef 2050, Reef Guardian Councils etc. Project can be staged and delivered over time.

* City Precincts Lily Creek Streamway Project scope and pricing as per City Precincts Plan.

Overview

The Lily Creek corridor is a strategically important green link with opportunities to improve this connectivity corridor to promote active travel by providing a safe, cool, shaded, and walkable link into the city and future city precincts housing activation areas. Lily Creek is a sub-catchment of Saltwater Creek, located just north of the Cairns CBD. It is a tidal waterway that runs south to north, starting at corner of Florence Street and Water Street (along the railway lines) before joining Saltwater Creek at the Botanic Gardens Precinct and then emptying into the Great Barrier Reef Lagoon. It is highly impacted by urban runoff, and in some parts highly modified to carry stormwater away. Despite this, the creek provides important environmental functions including habitat refuges for the local birdlife, fish habitat and urban greening. The creek has been modified significantly in some parts and functions as an urban stormwater infrastructure. An active transport loop along the creek is popular for recreational activities as well as city commuters.









Part 2: Addressing hazards on the Cairns Coast

Terrence Jeppesen

Senior Engineer Stormwater & Waterways



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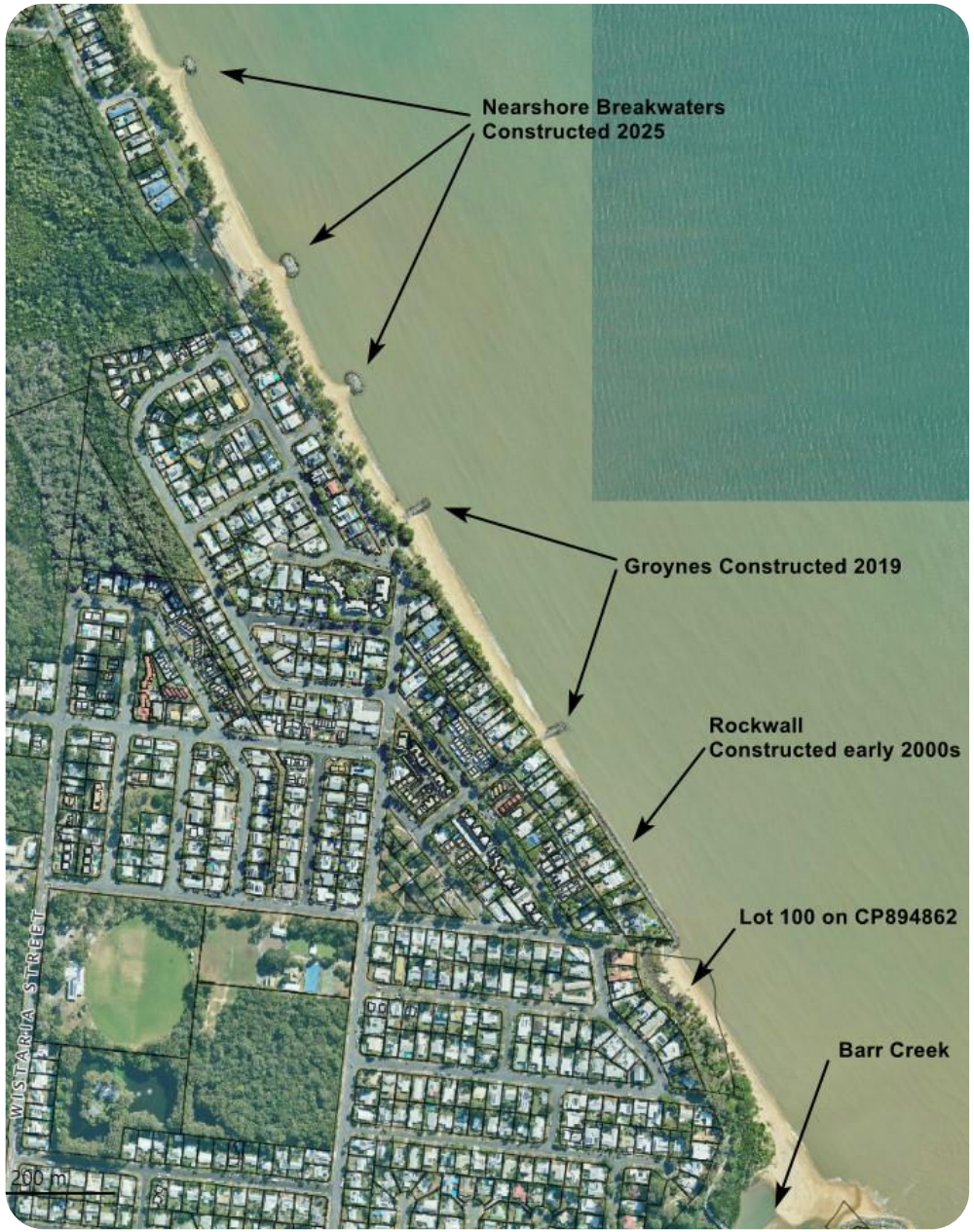
Existing protection: different structures







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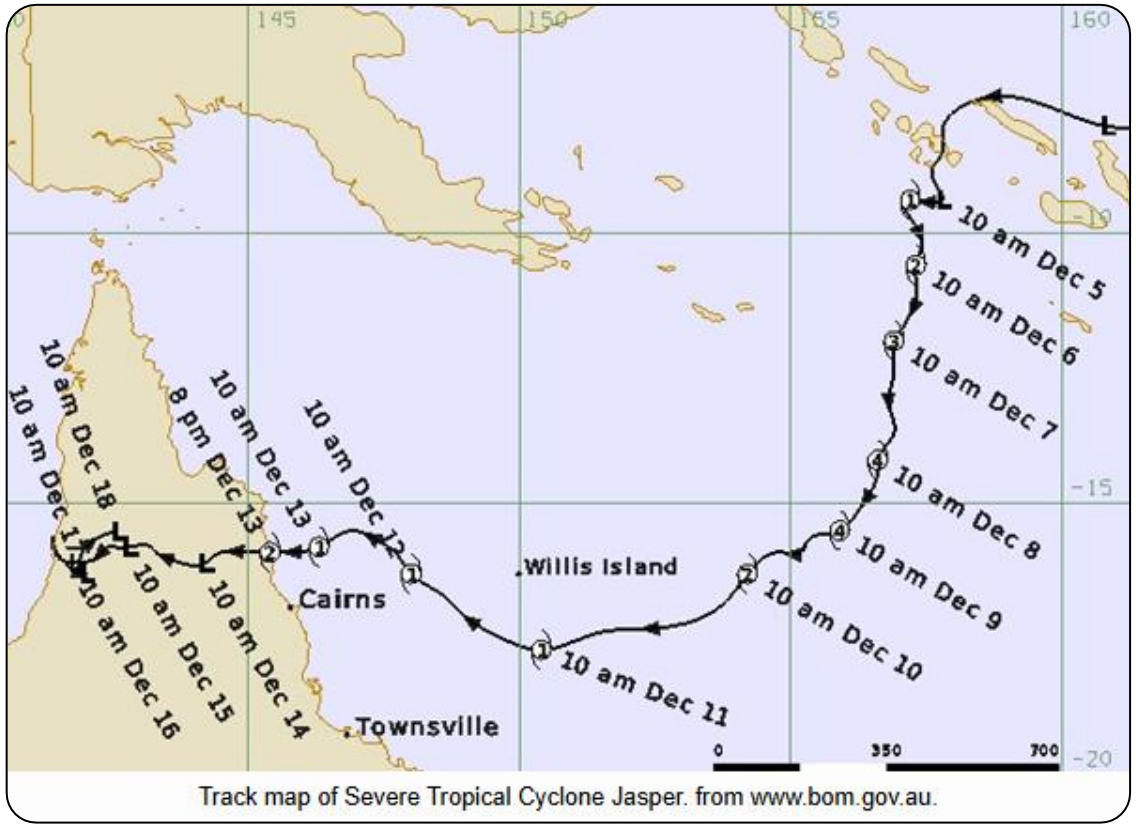
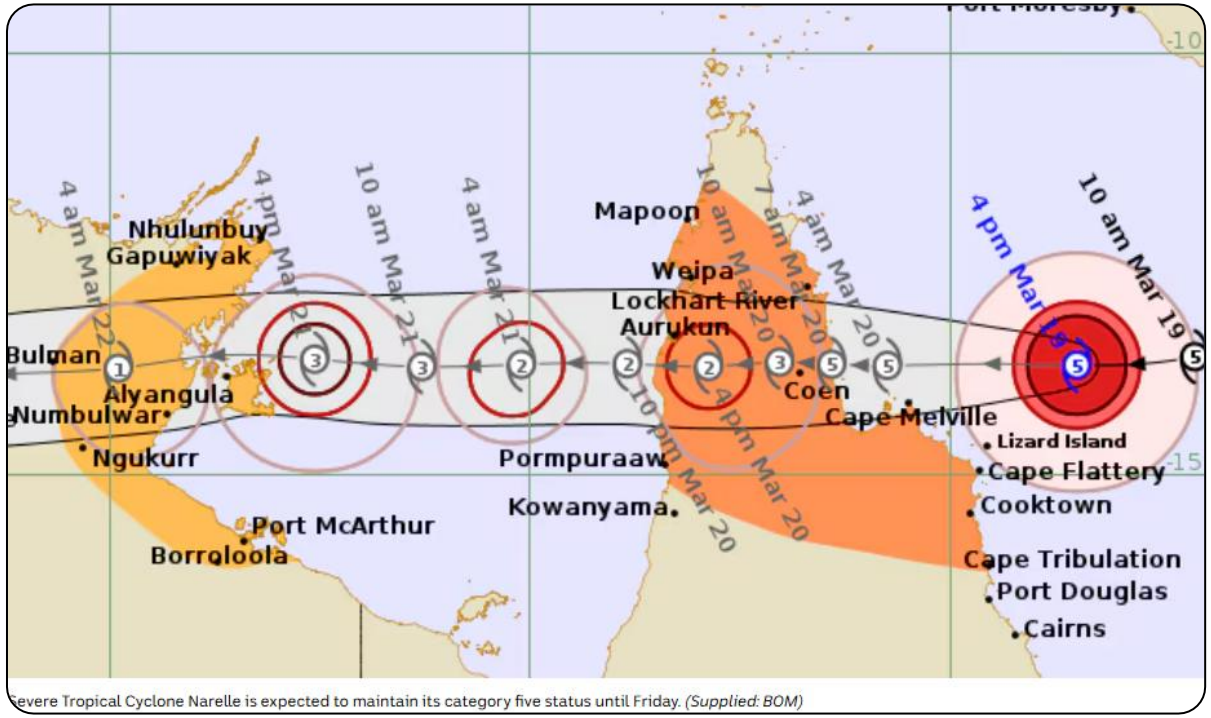
Two tracks – different consequences



Track map of Severe Tropical Cyclone Jasper. from www.bom.gov.au.



Severe Tropical Cyclone Narelle is expected to maintain its category five status until Friday. *(Supplied: BOM)*

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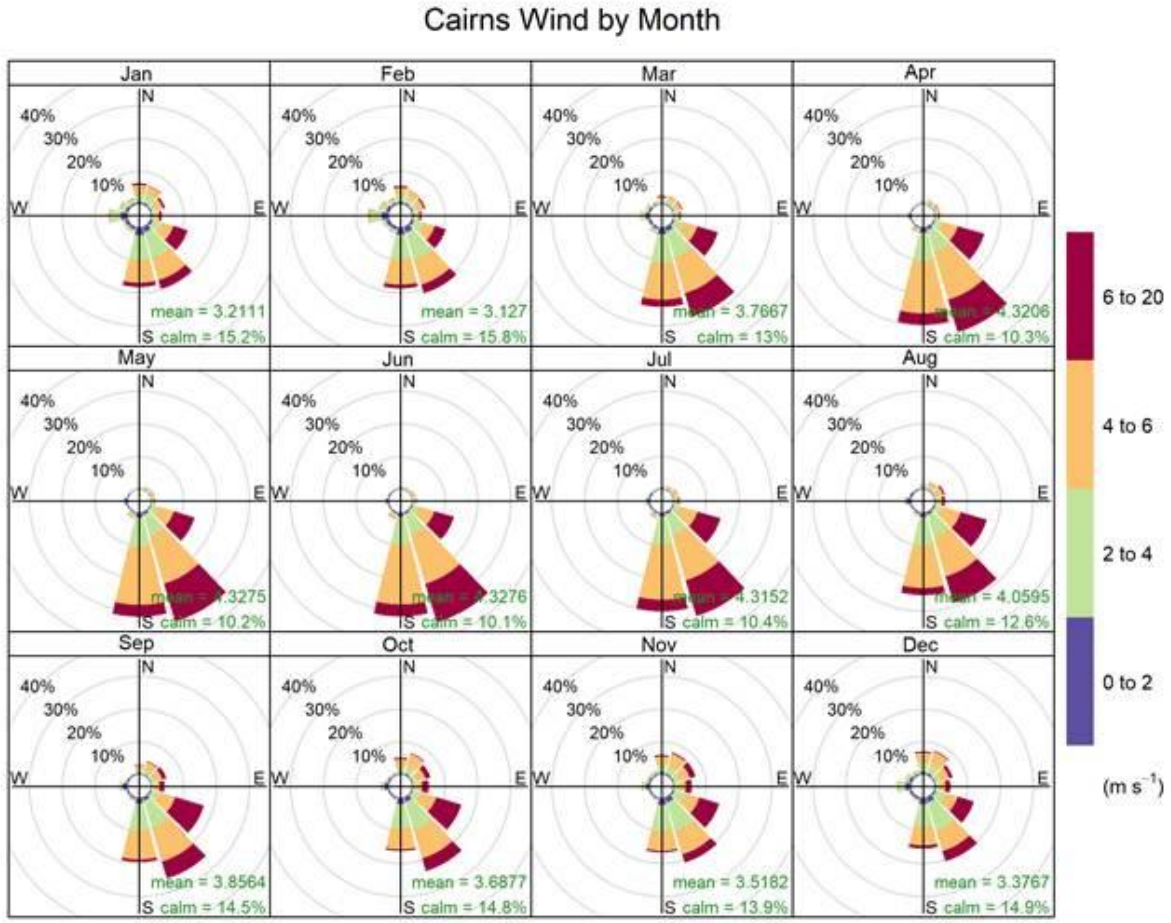
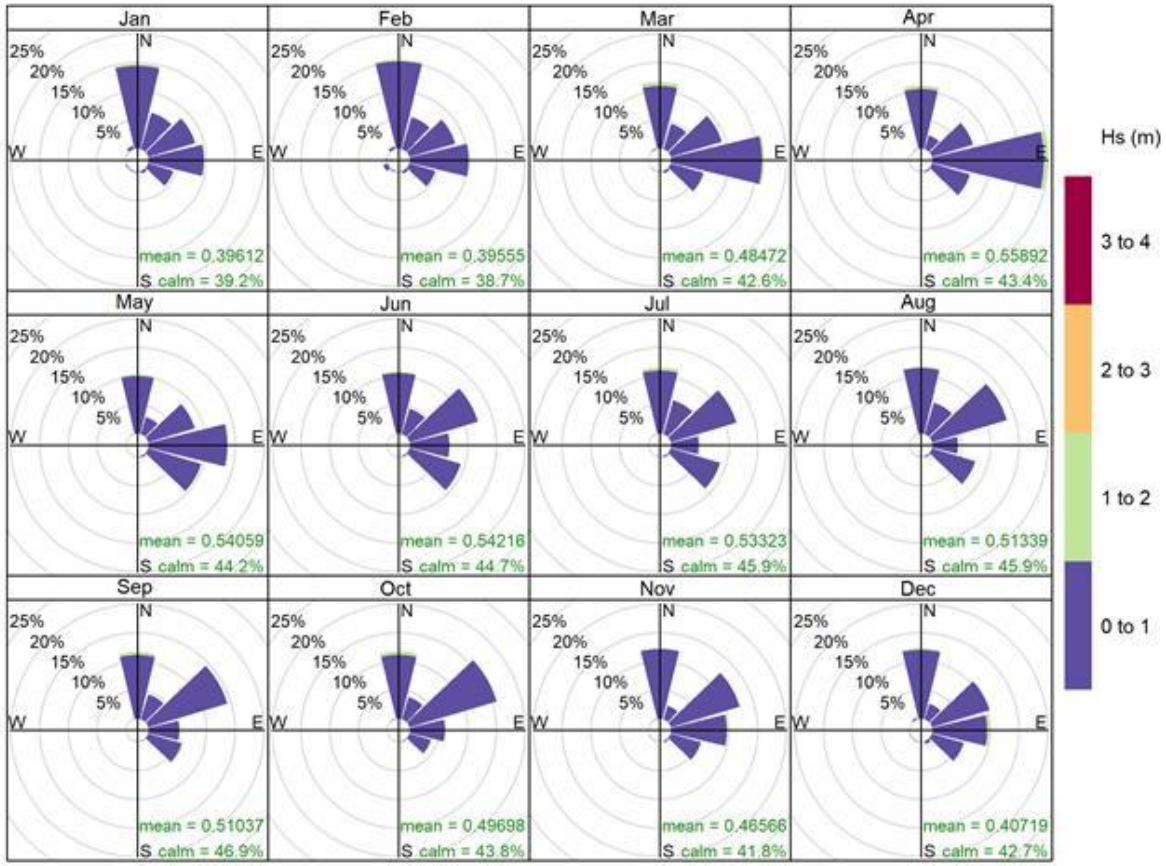
Windrose & waverose diagrams for Cairns





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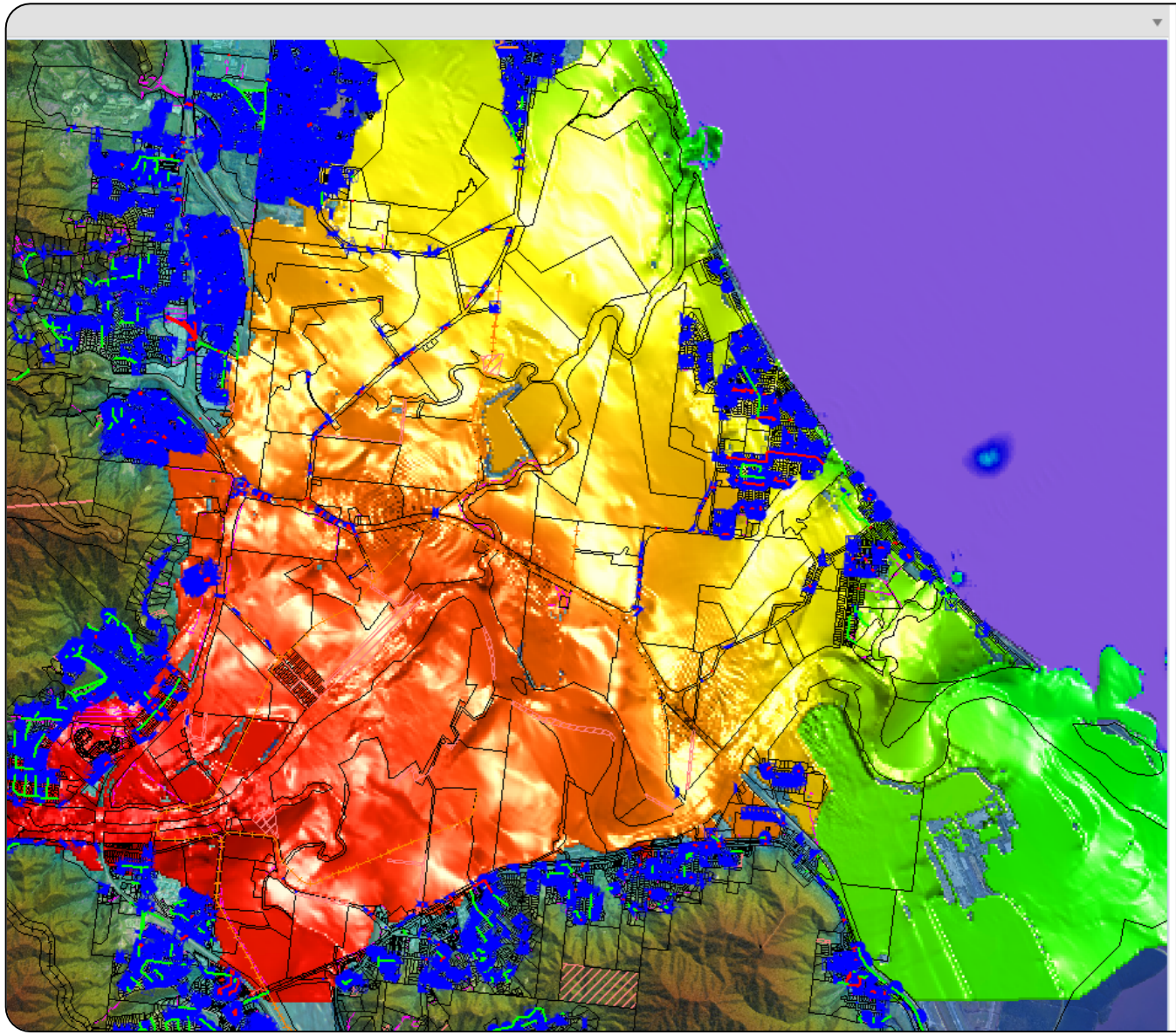
TC Jasper and 1% AEP Flooding Extent





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TC Jasper Impacts (Dec-2023)








- The Barron River peaked at 4.4m, well above the 1977 record of 3.8m
- 6,800 m^3/s of water passed the river gauge at Myola
- 2.2 m of rainfall was recorded in the Cairns catchment
- Treated water supply fell to 3% (equating to two hours of normal consumption)
- 941 properties damaged by flood waters
- 100-metre temporary causeway built in five days to reconnect 55 isolated homes at Holloways Beach

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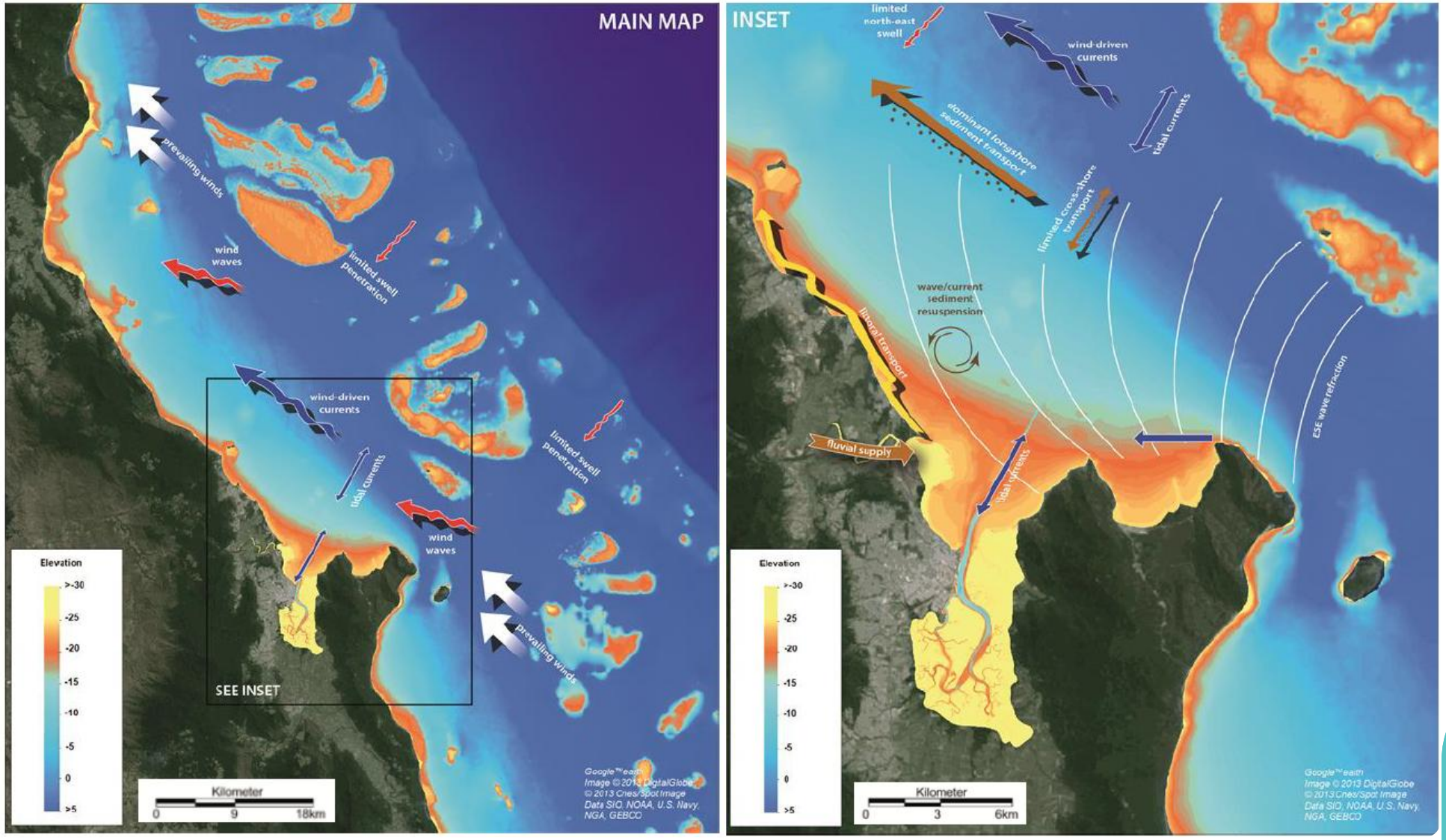
TC Narelle: distant cyclone – local problem

Description	Wed 18-Mar-2026 High Tide	Thu 19-Mar-2026 High Tide
Time	8:51pm	9:26pm
Tide Height	2.81	2.87
Significant Wave Height	<1m	~2m
Maximum Wave Height	~1.5m	>3m
Wave Period	~4s	~12s
Wave Direction	E	NNE

Coastal Processes & Causes of Erosion



TC Narelle Impacts (Mar-2026)



Foreshores and Beaches:

- Significant coastal erosion and beach damage occurred at Palm Cove, Ellis Beach, and Holloways Beach.

Roads and Footpaths:

- Coastal roads and concrete footpaths were littered with storm debris.

On 19 March 2026, Council received a petition signed by 104 residents and community members requesting urgent action to address ongoing coastal erosion at Holloways Beach, particularly near Barr Creek. Concerns raised include accelerated shoreline recession, loss of mature coastal vegetation, saltwater intrusion into former wetland areas, and the effectiveness of existing protection measures.

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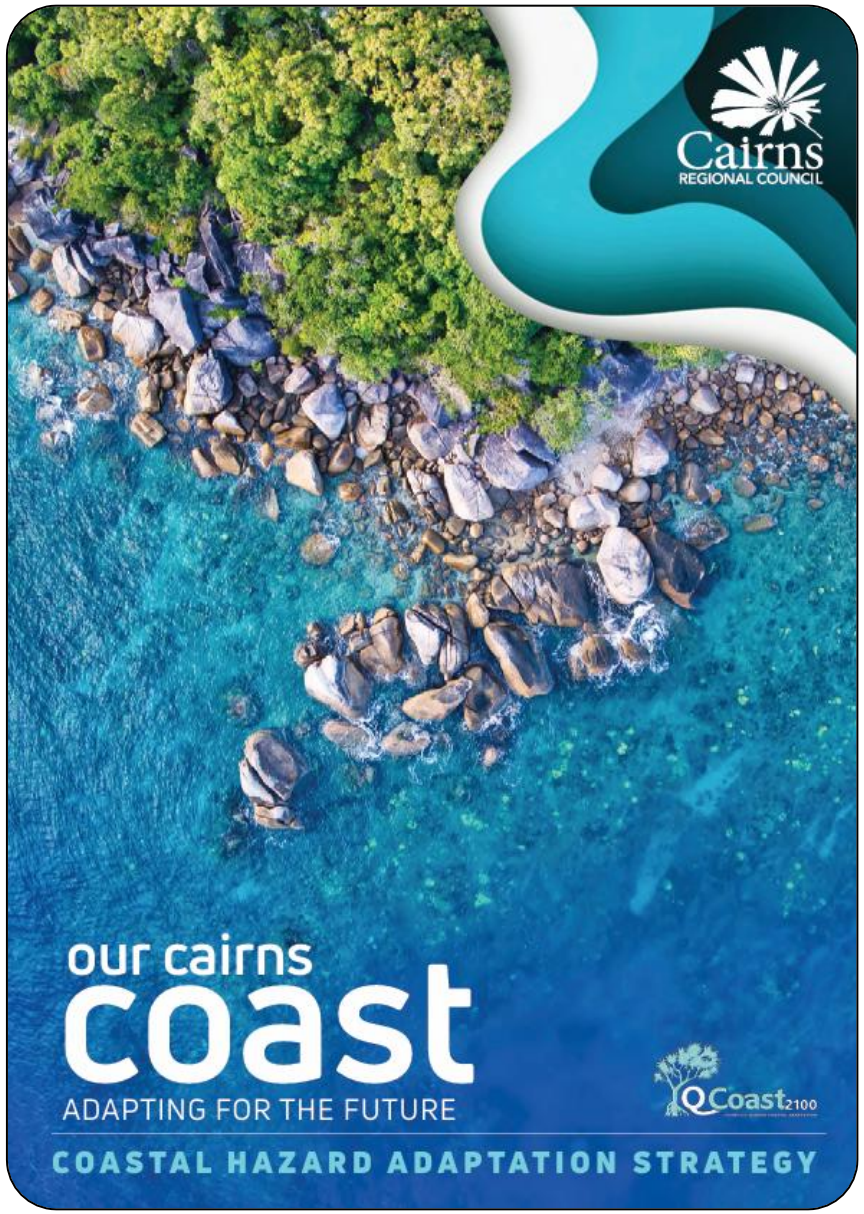
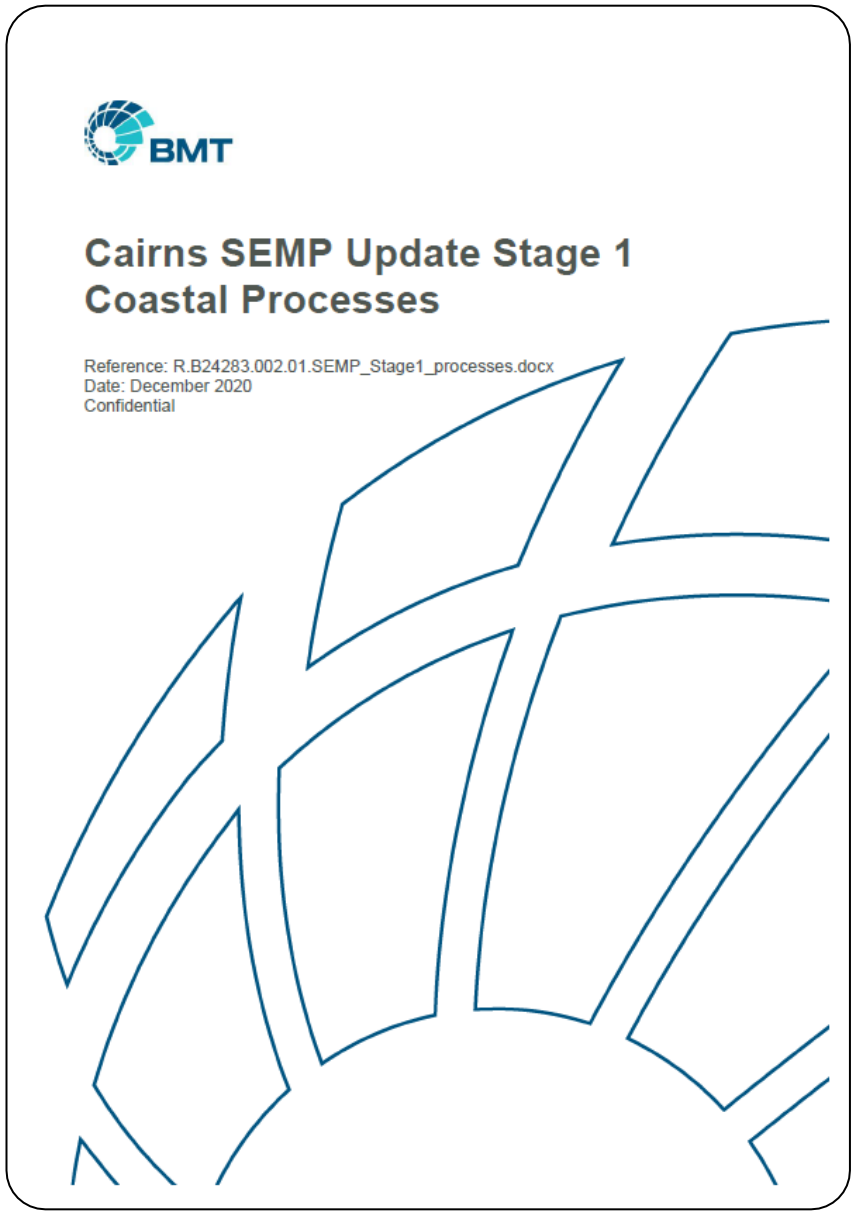
Where to next?





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Thank you! Any questions?

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