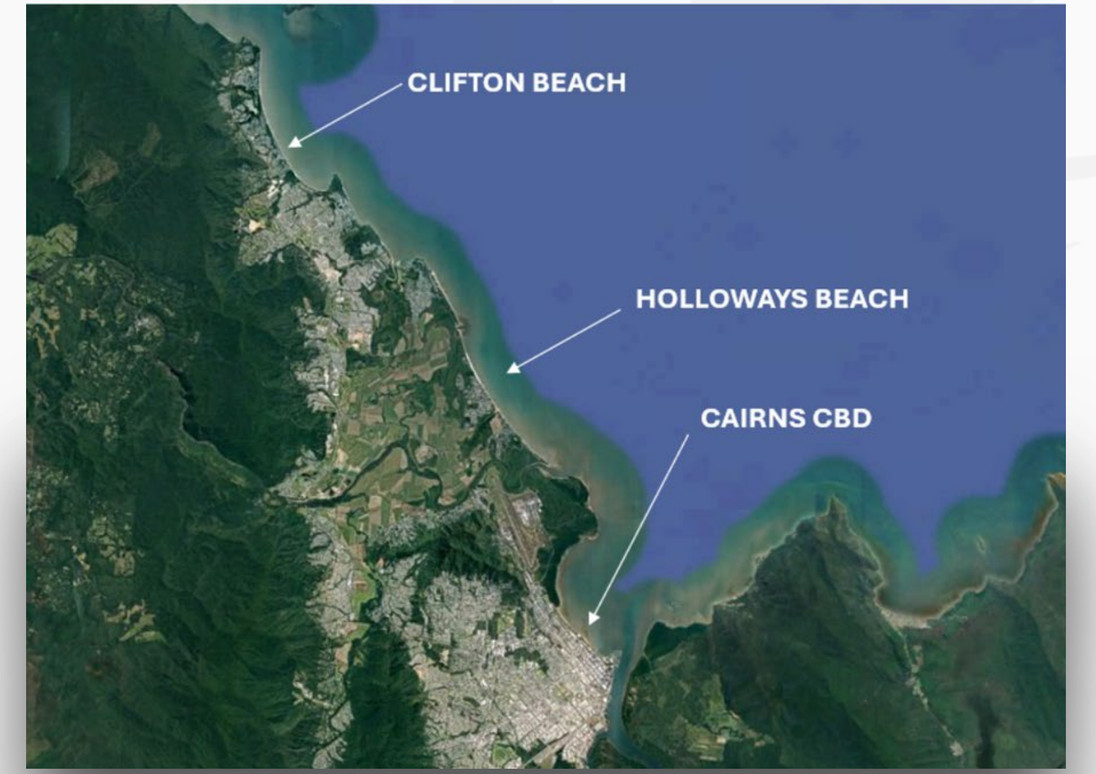
Holloways & Clifton Beach Coastal Resilience Works

Sam King | International Coastal Management

Holloways & Clifton Beaches

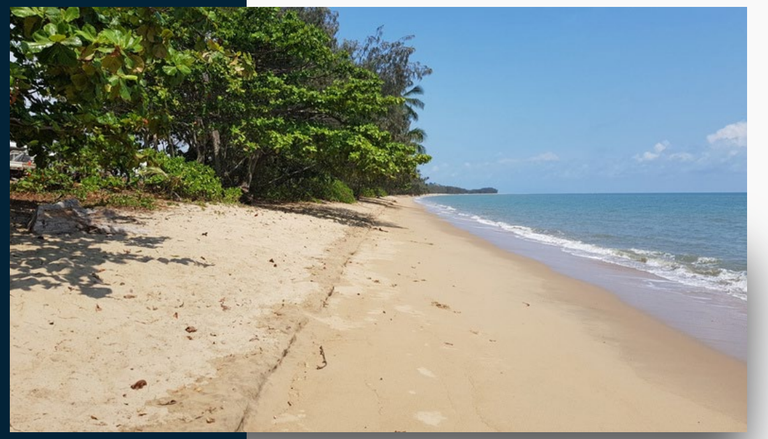
Coastal zones face increasing pressures

- Coastal erosion
- Storm tide inundation (cyclonic and non -cyclonic)
- Sea level rise & Climate Change



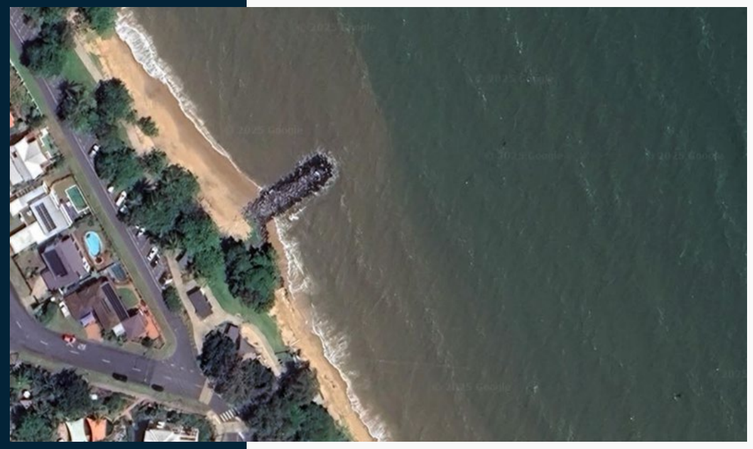
Our Cairns Coast: Adapting for the Future

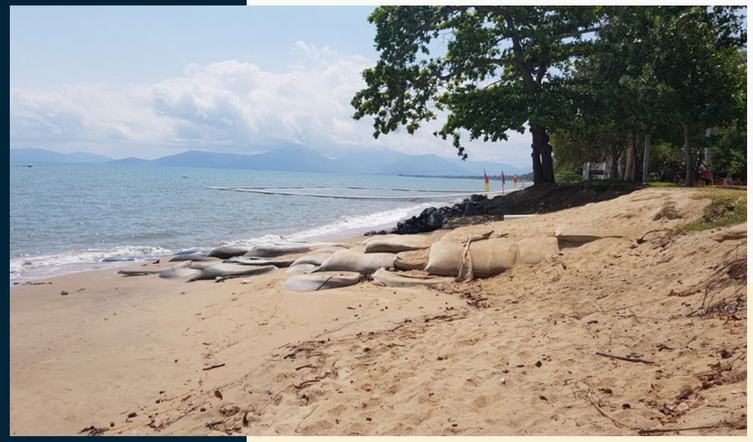
- Better understand the coastal changes (hazards) we can expect to see, what areas are at risk and what this means for our community, our businesses and our infrastructure;
- Plan for resilience by identifying what actions we need to take – and when – to avoid or reduce these impacts;
- Take a coordinated approach to coastal planning and adaptation across the region.



Holloways Beach

Located about 10 km north of Cairns, experiencing significant coastal erosion over the years





Holloways Beach

Located about 10 km north of Cairns, experiencing significant coastal erosion over the years

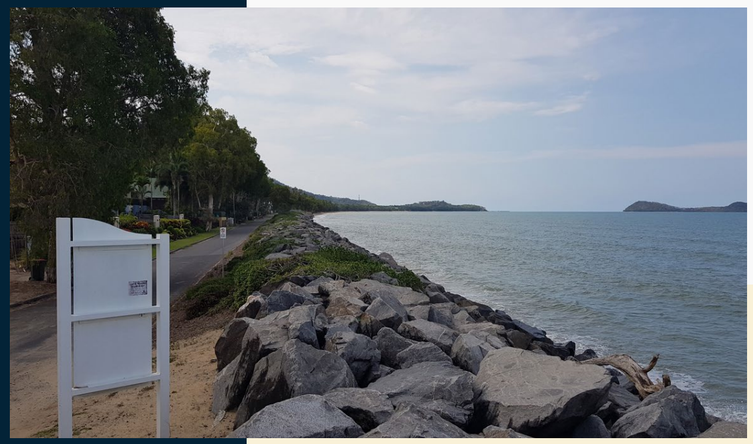
Previous coastal works

- Rock revetment seawall
- Geotextile sandbag groyne
- Sand nourishment (on the upper beach)
- Rock groyne

Holloways Beach

Clifton Beach

Located about 23 km north of Cairns, experienced persistent shoreline recession resulting in a loss of dunes



Clifton Beach

Located about 23 km north of Cairns, experienced persistent shoreline recession resulting in a loss of dunes

Previous coastal works

- 550m long rock seawall
- Development along Kewarra Beach is setback from the shoreline
- Beach nourishment

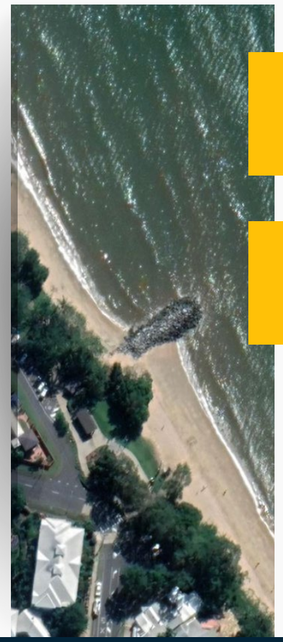
Clifton Beach

Further Council Works

- Continued to add sand at Holloways Beach and Clifton Beach -> high cost and unpredictability of how long the sand will stay in place
- Developed a new Shoreline Erosion Management Plan
- A Sand Sourcing Study to see how much sand is available and where it can be secured for the purpose of beach nourishment.
- **Recommended small groynes to complement beach nourishment and hold sand in target areas as required**

Potential Coastal Solutions

Groynes can be effec tive for controlling erosion, but also have downsides:



- Downdrift erosion shadow
- Obstruction of alongshore beach access

Community Feedback (as part of CHAS development) led to the consideration of 'softer' options:

- Better preservation of beach amenity
- Reduction of downdrift impacts
- Mimic natural rock formations
- Improve coastal resilience
- Reduce frequency of nourishment

The Holloways and Clifton Beach Erosion Management Project

Primary Design Objectives

- Maximise beach nourishment activities
- Stabilise the beach and reduce shoreline erosion
- Reduce downdrift erosion impacts
- Preserve the visual beach aesthetic
- Maintain alongshore beach access and ecological corridors
- Minimise disturbances to coastal vegetation
- **Ability to adapt to sea level rise and climate change impacts**

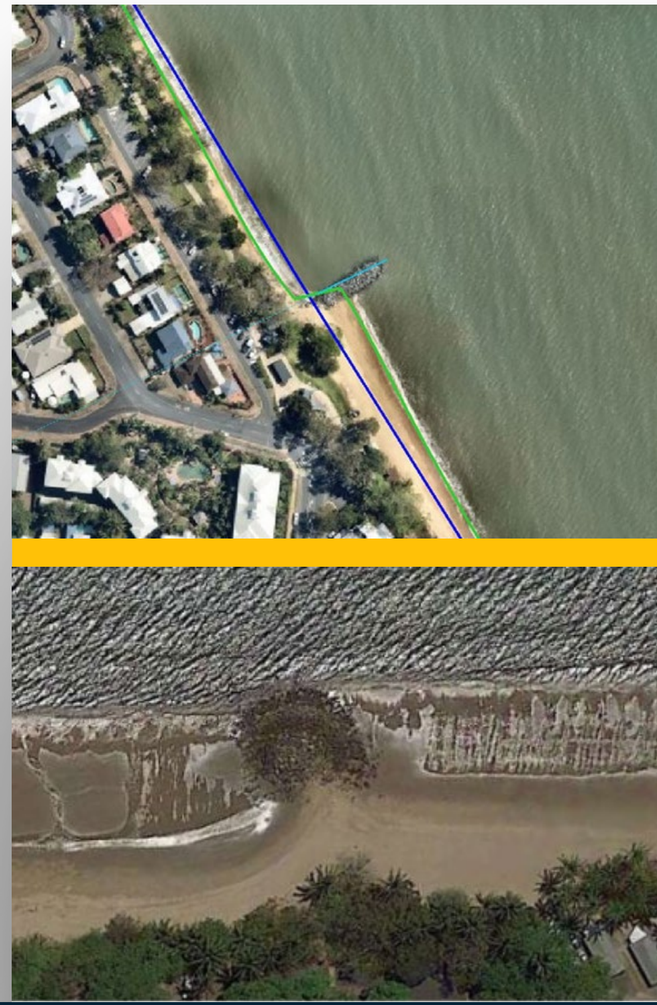
High Priority Area at Holloways Beach

High Priority Area at Clifton Beach

Initial Options Considered

A range of potentially suitable options were evaluated, including:

- Short emerged groynes (as recommended by the SEMP)
- Low-crested groynes
- Nearshore breakwaters
- Artificial reefs
- Offshore emerged breakwaters



Selected Option: Nearshore Breakwaters

Options assessment against key project objectives included GenCade numerical model to assess shoreline responses.

Nearshore Breakwaters provided the greatest net cost -benefit to both beaches.

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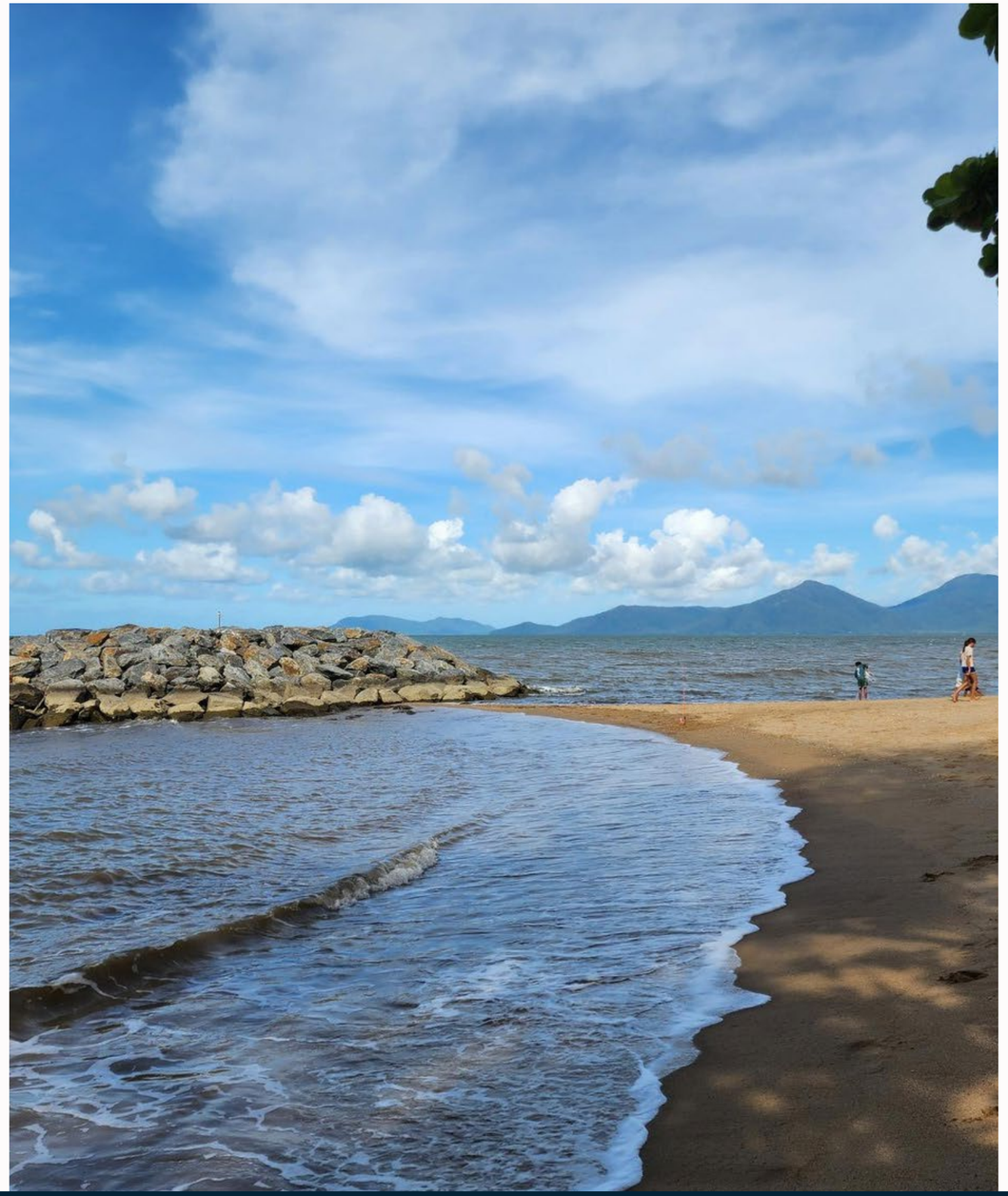


Designed influence the incident wave field to promote a ‘soft’ sand groyne in the lee and encourage updrift beach stability while allowing for increased bypassing at higher tides and storms.

Located on the wide -low tide shelf present at the site and constructed from the beach.

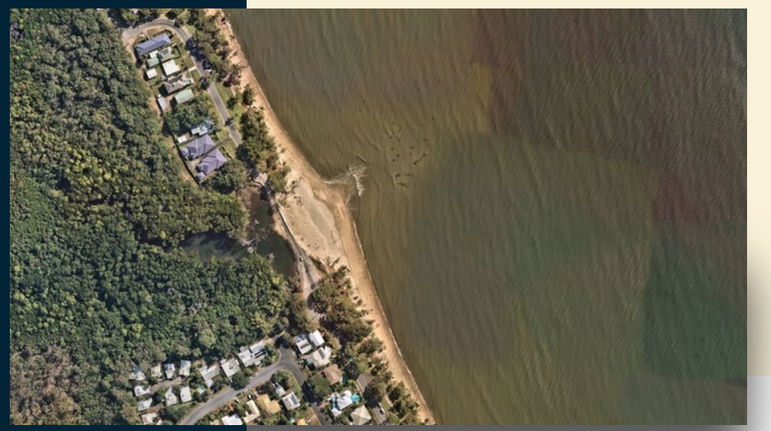
Particularly suitable for Far North Queensland beach profiles.

1st
of its kind in Queensland

Ellis Beach Structure

Holloways Breakwater Field

Clifton Breakwater Field



Tropical Cyclone Jasper

Brought heavy rain and record flooding to Far North Queensland (Dec 2023)

- Flooding of the Barron River breached Casuarina Street at Holloways Beach, flushing 20,000m³ - 30,000m³ of material offshore.
- Loss of access road to residential properties, parkland, public assets and impacts to the littoral system.
- Post-TC formation of large salient as the breach recovered

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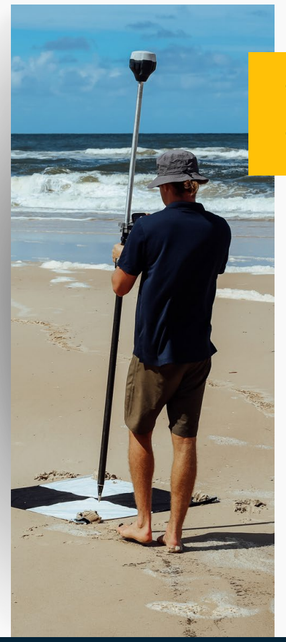
9 June 2024 (Google Earth)

30 September 2024 (Nearmap)

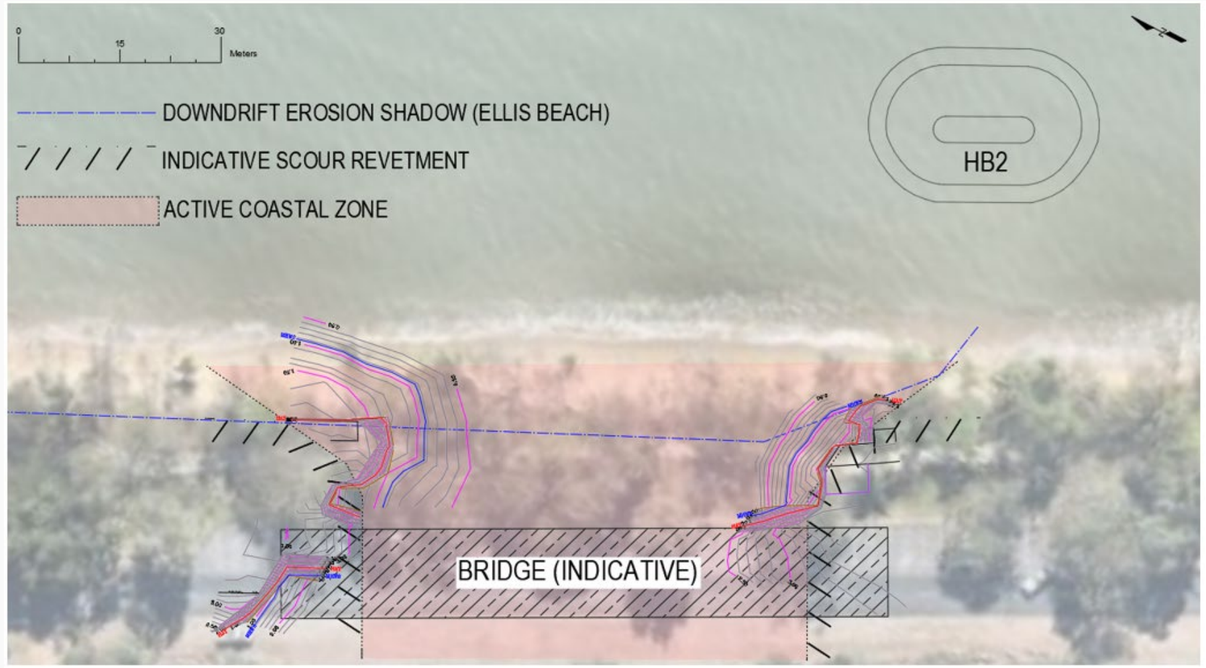
Post TC Design Review

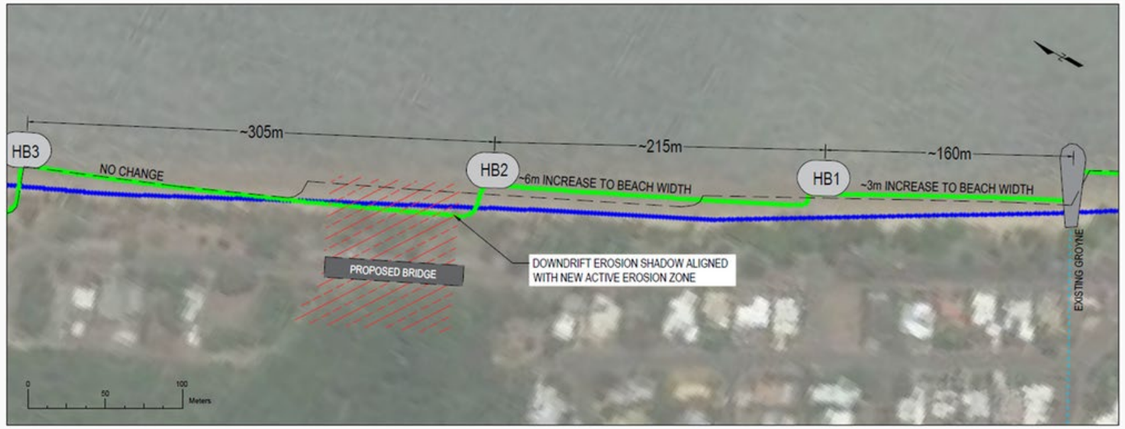
Essential to review the breakwater design to accommodate dynamic coastal situation and planned management of the breach.



- Plan to construct a permanent bridge with the intention of allowing for future breaches to relieve flooding.
- Middle breakwater relocated to south (updrift) of the breach such that potential downdrift impacts overlap with the new active coastal zone.
- Essential that breakwaters had a low risk of future interactions with flood outflows.

Post TC Design Review





Construction

Constructed from beach with a temporary rock track to provide high -tide access to the breakwater.

Construction Program (subject to change):

- Holloways Beach - commenced September 2024, expected completion May 2025
- Clifton Beach - works underway from May - October 2025.

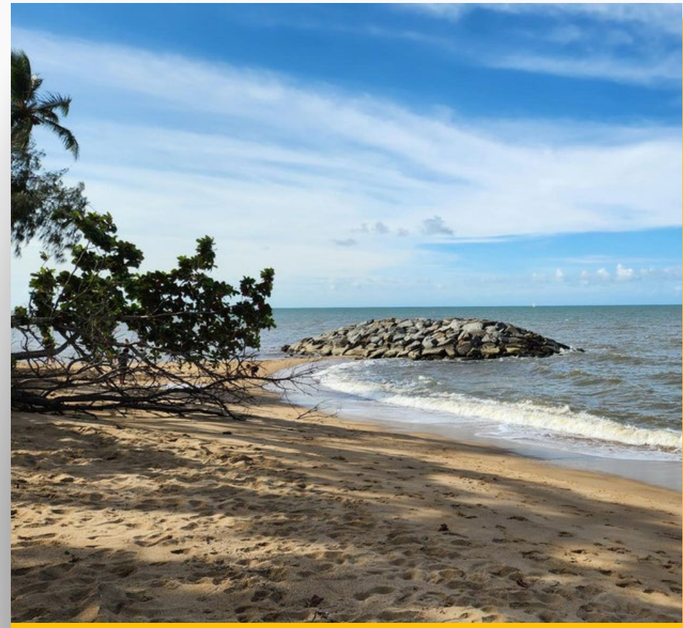
Limited sand nourishment supply due to TC-Jasper impacts

Monitoring

Preliminary Results (April 2025)

- **Increase in beach width:** 20m to 25m in the lee of breakwaters, 8m to 10m between breakwaters
- **Tombolo formation:** Soft groyne effect at most tides; at higher tides, water bypasses over the tombolo, reducing downdrift erosion
- No erosion scarps present along the high -priority beach
- Structures maintain beach access and ecological corridors
- Positive response to wider sandy areas in the protected lee

Ongoing monitoring by Cairns Regional Council



Monitoring

Monitoring

Monitoring

Monitoring

BEFORE
(POST-TC JASPER 2023)

AFTER
2025

Future Considerations

The projec t demonstrates a successful approach to balancing:

- Coastal resilience
- Beach stability
- Community and environmental values

- The scalable and adaptable m odelcan be applied to FNQ beaches,
- Future reviews to refine and optim ise the approach based on real-world data

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