What are the current costs associated with the maintenance and operation of critical infrastructure on Saibai Island?

Design Area and Project Opportunity: 6.2: ICT - Remote monitoring and diagnostics
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Tutorial Number and Zone: Tutorial 2, Blue Zone

Project opportunity brief

Often, engineering solutions installed in remote locations can be challenging to access regularly and promptly, particularly in the wet season. It is often expensive and time consuming for technicians to understand when preventative maintenance is required at one site and how this should be scheduled relative to other sites. In addition, a critical challenge for appropriate design is the sheer cost of mobilising technical expertise to site to resolve system breakdowns in a timely manner. In this design area, teams may work to develop an online/offline remote monitoring and diagnostics tool that can be used to simplify and/or or improve the efficiency of operation and maintenance programs for infrastructure, such as communication technologies, pumps, treatment plants, battery systems, lighting, and other infrastructure.

Background

Saibai is a small island only 4 km south of Papua New Guinea in the Torres Strait, legally a territory of Queensland, Australia. Due to the low and flat geography of the island, the small community that lives there is disproportionally affected by climate change, especially due to the rise in sea levels causing regular tidal flooding (Torres Strait Island Regional Authority, 2021, p. 55; Torres Strait Island Regional Council, n.d.). The islanders themselves do not produce enough profit for the the island to be self-sustaining, and a common source of income on the island is the welfare program Centrelink (Dev. S., n.d.). This, combined with the fact that the island community is small and the damage caused by enviromental changes is disproportionally severe, means that the Torres Strait Island Regional Council is dependent on State and Federal Government funding, which it receives in the form of grants and subsidies (Torres Strait Island Regional Council, 2023).

Infrastructure of Saibai Island

Critical infrastructure is physical and information infrastructure that is critical to maintain social or economic wellbeing. A disruption to any type of critical infrastructure can have large impacts on the people that rely on it every day. The *Security of Critical Infrastructure Act 2018* (Australia) (s 8D) defines critical infrastructure sectors as those that relate to water and sewage, communications, energy, health care, food, and transport, among others. The critical infrastructure of Saibai Island includes a health centre, sewer infrastructure, electricity infrastructure, waste facilities, and water supply infrastructure. Much of the critical infrastructer on Saibai Island is without redundancy, and all of the island's critical infrastructure is in areas prone to storm tide floods, putting all critical infrastructure on Saibai Island at risk (Torrest Strait Island Regional Council, 2018). If any of these pieces of critical infrastructure were to be damaged during the common floods, it could cause significant harm to the community living on the island. Issues with sewage infrastructure could cause waste transport to back up and communications problems would disconnect the islanders from the internet and prevent external communication. Most of the island is powered by generators, and damage to the energy infrastructure could leave the entire island without electricity wich is used to boil water for safety, store food and more. Damage to the health infrastructure could prevent treatment of otherwise commonly treated diseases or even prevent treatment of much more dangerous diseases or injuries, requiring transportation to other islands. Many of these life-dependent pieces of infrastructure depend on each other, and the individual

problems of infrastructure damage in one area can be exponentially exasperated by damage to infrastructures in other areas, such as damage to both water supply and energy infrastructure, potentially resulting in unsafe drinking water that cannot be sanitised by boiling. Due to the nature of the floods on Saibai Island, when one piece of infrastructure is damaged due to flooding, several other pieces of infrastructure will be too (CoastAdapt, 2017). This can cause humanitarian crises on the island until critical infrastructure can be repaired. The tendency for several pieces of infrastructure to be damaged in the same floods also the issue of which infrastructure should be prioritised for repair, which may introduce further costs.

Cost of infrastructure maintenance

The worsening effects of climate change in recent years, as well as global supply chain challenges and infrastructure reaching the end of its life-cycle, whether due to sustained damage or wear and tear, has caused the cost of maintenance, repairs, and replacement of infrastructure to explode, as evident by recent Torres Strait Island Regional Council Annual Reports (2021; 2022; 2023). The cost of repair and maintenance across the Torres Strait has increased from 2.5 million dollars in 2021, to 5.9 million dollars in 2023, a more than two-fold increase in the span of 2 years. In 2020, 960 thousand dollars went to Saibai alone, not factoring in engineering projects that spanned several islands, and this number is only growing in size much like the TSIRC maintenance budget (Torres Strait Island Regional Council, 2020).

As climate change worsens, the global temperatures continue to rise, the permafrost of the arctic and antarctic ice caps continue to melt, the sea levels continue to rise and the Torres Strait Islands continue experiencing worsening floods, storms and other environmental disasters, the cost associated with repairing and maintaining the infrastructure on Saibai Island will only grow unless drastic measures are taken to prevent these environmental issues from ravaging the islands in this area. Massive investment is required for preventative infrastructure such as seawalls to prevent annual flooding, whose cost may be too great in the eyes of those investing.

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Appendix 1: Sources

CoastAdapt. (2017). *Adapting to sea-level rise in the Torres Strait.*

Summary

The Torres Strait is a region of national and international significance for its cultural and environmental values. The region faces a number of climate change risks, most notably the impacts of progressive sea-level rise. Coastal erosion and inundation have been pressing issues for a number of communities for many years. This case study examines the process led by the Torres Strait Regional Authority (TSRA) in partnership with state agencies, the Torres Strait Island Regional Council (TSIRC), and researchers to examine coastal risks and develop adaptation responses. Sea-level rise impacts in the Torres Strait extend beyond considerations of infrastructure and planning. For some communities their entire island is at risk with implications for their identity, culture and rights as Traditional Owners.

Keywords

Torres Strait, sea-level rise, erosion, inundation

Context

This case study examines the process led by the Torres Strait Regional Authority (TSRA) in partnership with state agencies, the Torres Strait Island Regional Council (TSIRC), and researchers to examine coastal risks and develop adaptation responses.

The Torres Strait is home to 18 island communities situated on 17 islands in the strait between Cape York and Papua New Guinea (PNG) (see Figure 1). Approximately 7000 people live in the region; the majority of these are Torres Strait Islanders, the Traditional Owners of much of the land and sea territory, and Kaurareg Aboriginal people, the Traditional Owners of the inner islands just north of Cape York.

The region is of national importance for a number of reasons. It is home to a unique Indigenous island culture, it is the only part of Australian territory to border another nation (PNG), it is on an international shipping route, and it plays a strategic role in state and national biosecurity operations. The Torres Strait is of national and international significance in relation to its environmental values: the largest dugong population in the world, largest continuous seagrass meadows in the world, significant population of green turtles, highly diverse and pristine coral reefs that are the northern extreme of the Great Barrier Reef ecosystem, and extensive and diverse mangrove communities.

Dev. S. (n.d.). *Notes on an interview with Sai Rupa Dev.*

Notes on an interview with Sai Rupa Dev (EWB)

Sai led a team to Saibai Island to scope the brief for the EWB challenge. These are notes taken from the interview. These notes may be useful in developing your persona and determining what life on the island would be like.

Cost of living

There is only one grocery store, so there is not much to buy. The grocery store is only open on weekdays. Most groceries and items purchased on the island use cards.

The cost of living is really expensive, and the food is not fresh. For example:

- $32 taco kit,
- $10 for an up and go,
- $13/kilo cucumbers
- $9/kilo for tomatoes that are past their best.

Although Saibai is not a dry area, there was little evidence of drinking.

All food is shipped in from Cairns

Economy

Centrelink support quite common. Local people do not like to admit this, but Centrelink is often the main source of money. This makes it difficult to go to other islands.

Many Saibai residents are - https://saltymonkeys.com.au/ - passionate about deep sea diving and scuba diving. Keen to teach others about sea culture. They would like to develop a sustainable approach that take care of the waterways.

Tourism is not an option as there is not enough space. Sai stayed in Council accommodation when she was there.

Climate change

Security of Critical Infrastructure Act 2018

No. 29, 2018

Compilation No. 6

Compilation date:	20 October 2023
Includes amendments up to:	Act No. 76, 2023
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About this compilation

This compilation

This is a compilation of the *Security of Critical Infrastructure Act 2018* that shows the text of the law as amended and in force on 20 October 2023 (the ***compilation date***).

The notes at the end of this compilation (the ***endnotes***) include information about amending laws and the amendment history of provisions of the compiled law.

Uncommenced amendments

The effect of uncommenced amendments is not shown in the text of the compiled law. Any uncommenced amendments affecting the law are accessible on the Register (www.legislation.gov.au). The details of amendments made up to, but not commenced at, the compilation date are underlined in the endnotes. For more information on any uncommenced amendments, see the Register for the compiled law.

Application, saving and transitional provisions for provisions and amendments

If the operation of a provision or amendment of the compiled law is affected by an application, saving or transitional provision that is not included in this compilation, details are included in the endnotes.

Editorial changes

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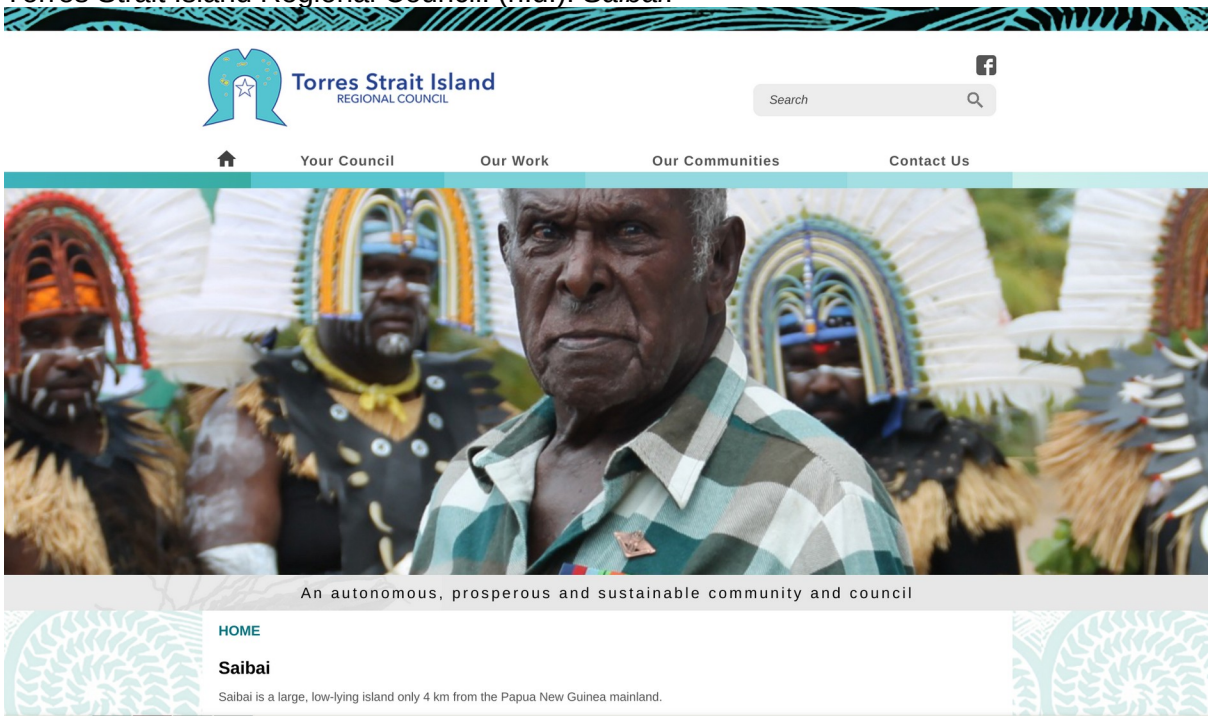

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SC2.13 Saibai Island maps

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Torres Strait Island Regional Council

Statement of Financial Position

For the period July 2019 to June 2029

Model 1 – Same Service Level - Internal Tenancy Management until 1 July 2023 then Housing Authority Arrangement - Confirmed sources of capital funding

	Budget Review 30 June 2019 $'000	Original Budget 30 June 2020 $'000	Forecast 30 June 2021 $'000	Forecast 30 June 2022 $'000
Current assets				
Cash assets and cash equivalents	58,512	35,181	31,169	34,896
Inventories	284	284	284	284
Receivables	565	446	458	470
Prepayments	72	72	72	72
Other current assets	366	366	366	366
Total current assets	**59,799**	**36,349**	**32,349**	**36,088**
Non-current assets				
Property, plant and equipment	878,567	903,049	868,263	826,042
Intangible assets	156	251	240	236
Capital works in progress	19,258	-	-	-
Other non-current assets	9,870	9,870	9,870	9,870
Total non-current assets	**907,851**	**913,170**	**878,374**	**836,148**
Total assets	**967,650**	**949,519**	**910,722**	**872,236**
Current liabilities				
Trade and other payables	1,906	2,006	1,083	1,097
Borrowings	63	68	37	-
Provisions	1,144	-	-	-
Total current liabilities	**3,113**	**2,075**	**1,120**	**1,097**
Non-current liabilities				
Loans	105	37	-	-
Provisions	5,298	6,442	6,442	6,442
Total non-current liabilities	**5,403**	**6,479**	**6,442**	**6,442**
Total liabilities	**8,517**	**8,554**	**7,562**	**7,539**
Net community assets	**959,133**	**940,965**	**903,161**	**864,697**
Community equity				
Asset revaluation reserve	413,836	413,836	413,836	413,836
Retained surplus (deficiency)	545,297	527,129	489,324	450,861
Total community equity	**959,133**	**940,965**	**903,161**	**864,697**

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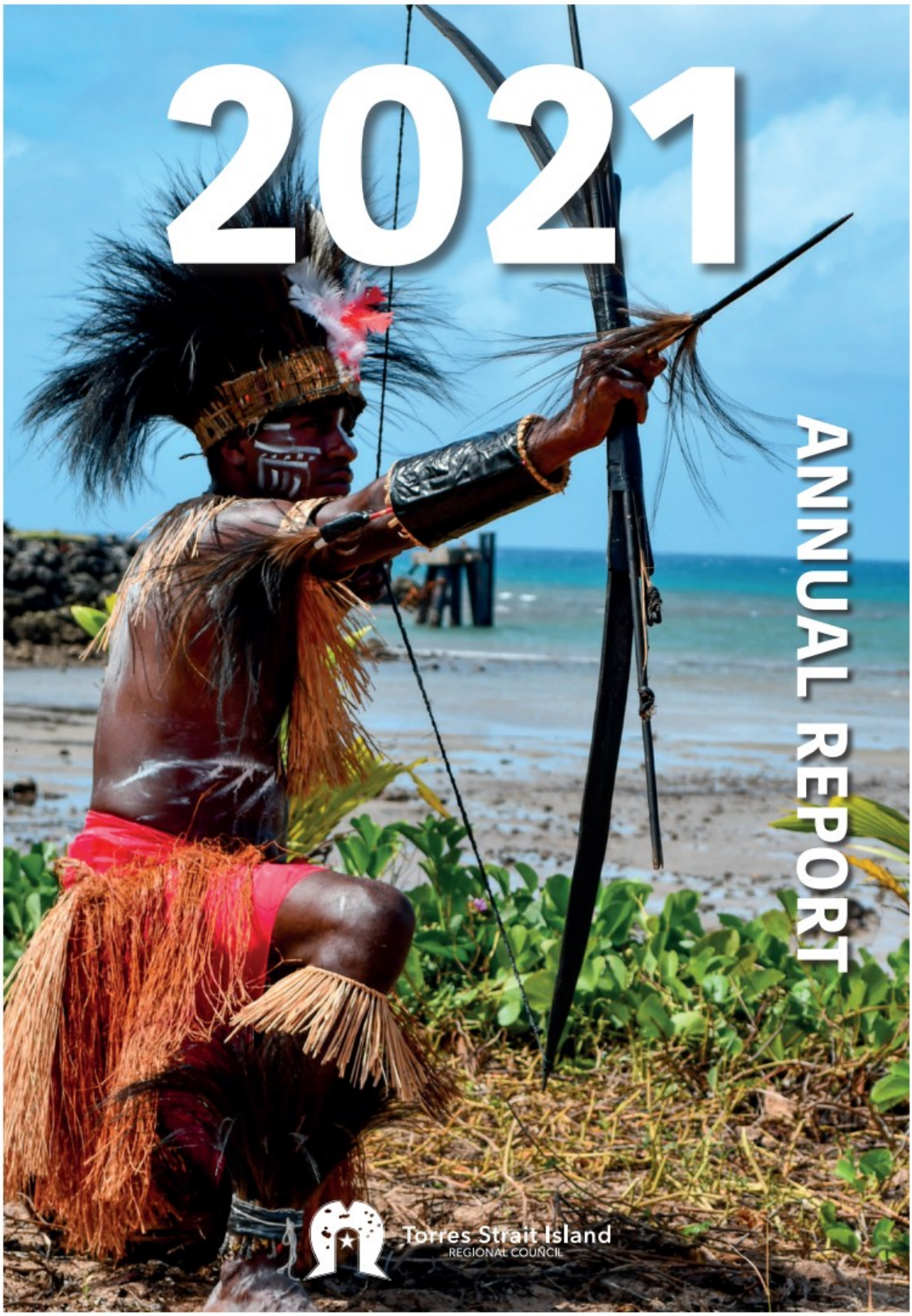

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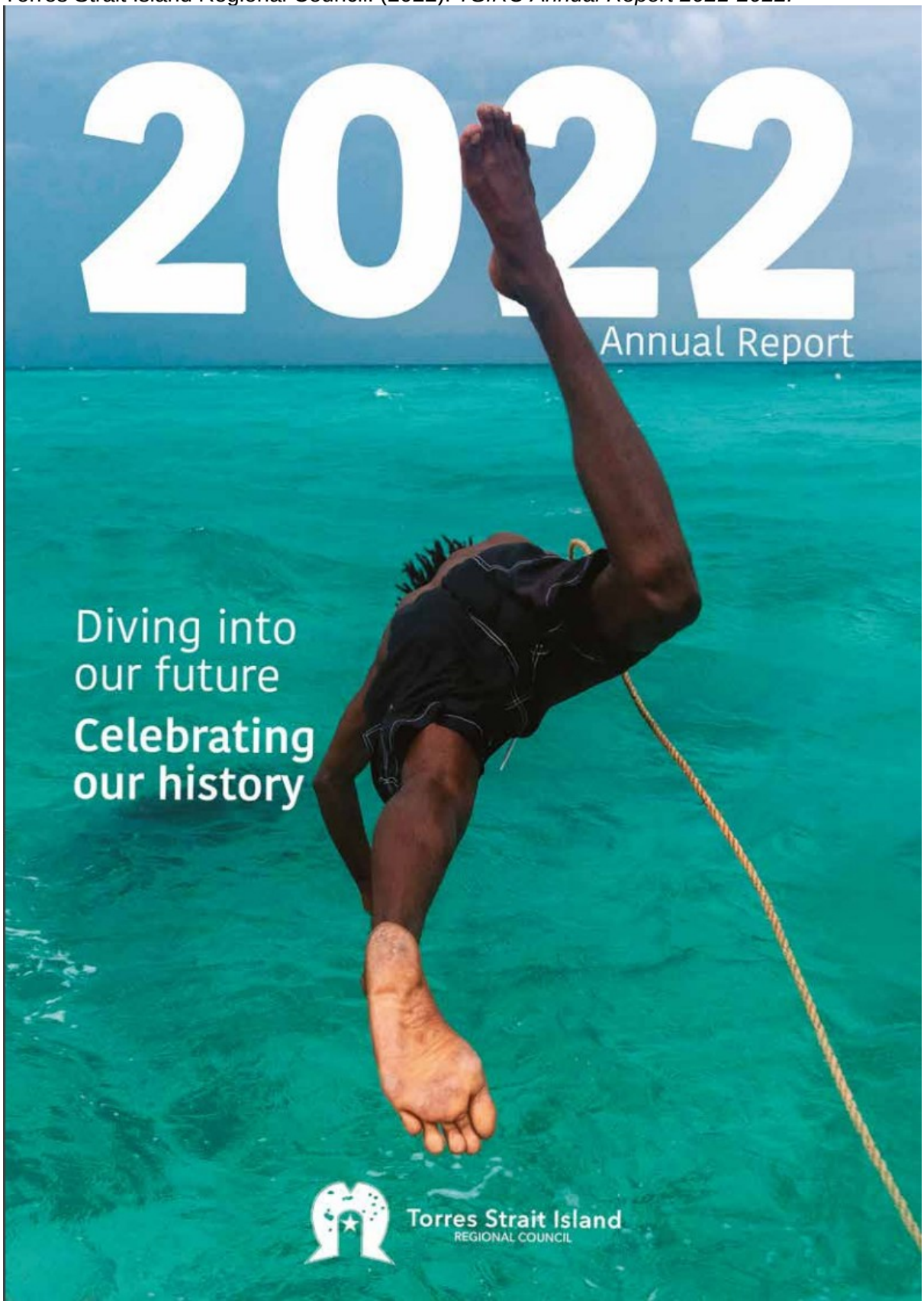

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