REGIONAL
CLIMATE CHANGE
INITIATIVE

REGIONAL STRATEGY

ADAPTING TO A CHANGING COASTLINE IN TASMANIA

OUR COASTLINE IS BEAUTIFUL!

It stretches more than 3260 km's across the 10 municipal areas from the Denison Rivulet, Glamorgan Spring Bay to Port Davey, in the Huon Valley, comprising over 40% of Tasmania's coastline. It is diverse with embayments, estuaries, open back shorelines, rocky coastlines, coastal cliffs and offshore islands that are exposed to the Indian Ocean and the Tasman Sea.

Whilst much loved by our communities, climate change is magnifying natural coastal processes, including inundation and erosion which can cause considerable damage to private and public property, industries and infrastructure. Increasingly, communities expect Councils to take a 'climate' lead in providing solutions and taking action, as well as seeking to transfer or share risk, associated with hazards and impacts. These coastal impacts, and the public's expectations, present significant challenges to local government, including potential increase in exposure to litigation, if they are not appropriately managed.

The southern Tasmanian coastal Councils recognise these challenges and that we all have a role to play in managing them. Our coastal strategy is a first step in supporting Councils to understand their role and formalize pathways for caring and protecting our coastline and coastal communities for current and future generations.

Mayor Alex Green

Chair
Southern Tasmanian Councils Authority

Deputy Lord Mayor Helen Burnet

Deputy Chair Southern Tasmanian Councils Authority
Chair Regional Climate Change Initiative

Acknowledgment

In recognition of the deep history and culture, the southern Tasmanian councils acknowledge the Tasmanian Aboriginal people as the Traditional Custodians of this land. We acknowledge the determination and resilience of the Palawa people of Tasmania who have survived invasion and dispossession and continue to maintain their identity, culture and rights.

We recognise that we have much to learn from Aboriginal people today, who represent the world's oldest continuing culture. We pay our sincere respects to Elders past and present and to all Aboriginal people living in and around southern Tasmania.

CONTENTS

Coastal access and revegetation works at Nutgrove Beach (Hobart).

1.0 INTRODUCTION

This 'Regional Strategy for Adapting to a Changing Coastline in Tasmania' will help Councils to employ a strategic approach to existing or potential hazards on the coastline that threaten harm to public and natural assets, infrastructure, people or property.

Coastal hazards such as inundation and erosion occur as the result of natural coastal processes. These hazards are magnified by a warming climate and rising sea levels.

This Strategy was developed by a collaboration between specialist coastal consultants[1] and the Southern Tasmanian Councils Authority's (STCA) climate program, with members representing ten coastal Councils in southern Tasmania. The Tasmanian Government (Renewables, Climate and Future Industries Tasmania and Natural Resources and Environment Tasmania), the Local Government Association of Tasmania and the Port Arthur Historic Site Management Authority were consulted in development and provided support and feedback input for consideration by the committee.

A central feature of the Strategy is that a risk management approach is recommended for helping communities adapt to a changing coastline, as this is best practice in coastal management. To apply the risk management framework to development and use in the coastal zone on public and private land and to guide the decisions that are made, coastal issues should be viewed through the lens of a suite of Principles that are outlined in this Strategy document. These Principles are also a central feature of the Strategy.

1 Impact Solutions International and BMT Commercial Australia P/L

Browns River Mouth – Kingston.

1.1 COASTAL USES

The diagram below presents a hypothetical coastline showing features subject to coastal hazards. These are numbered and described in the key. Urbanised Councils typically share many of these coastal features.

Figure 1. Represented here are some of the coastal issues that may arise.

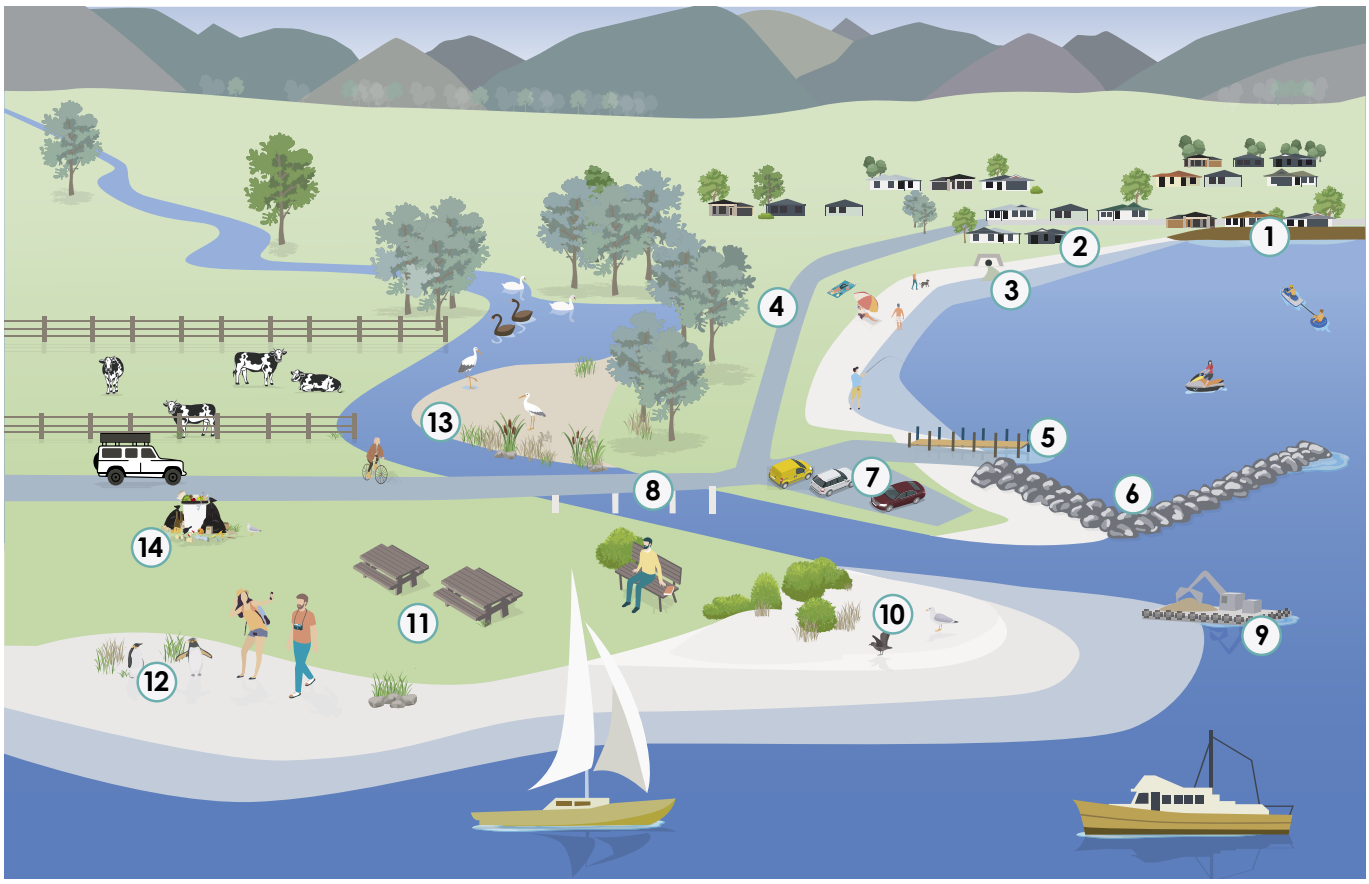


Table 1: Key to Figure 1	
1. Dwellings and other structures on erodible cliffs	**8.** Bridges and river/estuary crossings
2. Dwellings and other structures vulnerable to beach erosion and inundation	**9.** Managing sand movement and accumulation with dredging
3. Stormwater outlets and other linear infrastructure	**10.** Erodible soft sediment spits and habitat
4. Roads vulnerable to inundation, erosion and saltwater intrusion	**11.** Public facilities such as picnic grounds and BBQs
5. Jetties and other public and private structures. Historical features and infrastructure	**12.** Foreshore and dune flora and fauna
6. Engineered hard structures including breakwaters and sea walls	**13.** River sediments and wetlands vulnerable to erosion
7. Public infrastructure including boat ramps, car parks	**14.** Litter and other illegal waste dumping

1.2 RISK MANAGEMENT

Risk management essentially involves a repeating cycle of identifying risks, hazards and vulnerabilities, identifying then evaluating solutions, preparing action plans, implementing actions and monitoring results. Outcomes from the risk management process described in this Strategy can be incorporated into existing Council corporate risk registers.

Tasmanian Case Study

Example of assessing risk

Raspins Beach forms the western shore of Prosser Bay immediately north of Orford on Tasmania's east coast. The entire beach is a low-lying sandy shore. Due to erosion in the last 3 to 4 decades, the beach has receded over 100 metres, and at the northern end is now within 50m of the Tasman Highway.

In past decades, the highway has flooded when king tides, low pressure systems and strong easterly swells, winds and rain combine. While the highway remains at risk, the construction of a rock revetment, together with diverting the Prosser River mouth away from the beach has significantly reduced the incidence of flooding. This essential transport corridor will, however, continue to increase in vulnerability through the 21st century and beyond.

HIGHWAY •••••

High band (Red)	area vulnerable to sea-level rise by 2050 from the mean high tide, rounded up to the nearest 100 mm.
Medium band (Orange)	area vulnerable to a 1% AEP storm event in 2050 rounded up to the nearest 100mm plus 300 mm added for freeboard.
Low band (Yellow)	area vulnerable to a 1% AEP storm event in 2100 rounded up to the nearest 100mm plus 300 mm added for freeboard.

AEP = Annual Exceedence Probability

A risk management approach to helping communities adapt to changes such as a warming climate and sea level rise on the coastline and more generally, in the coastal zone, requires understanding the vulnerability of an area, asset or activity, and identifying where any actions should be focused. The assessment of risk can lead to identifying and implementing measures that help communities adapt to changes.

A risk assessment leads to many optional solutions for responding to risks. With stakeholder and community involvement, these options are assessed and can be used to develop local coastal hazard plans. These local coastal hazard plans outline what actions will be implemented – for example, re-vegetating dunes, replacing sand on beaches, or more cost intensive hard engineering solutions such as sea walls and groynes. Retreat and relocation are also options. Note that in some cases a deliberate action will be to take no action.

Various tools and approaches are used to help select options appropriate for the risk tolerance of Council, stakeholders and community. The 'CoastAdapt'[2] on line decision making tool is the recommended strategy to use at this point. This comprehensive tool was commissioned by the Australian government to support coastal managers to adapt to rising sea levels and a warming climate. Cost benefit analysis and multi criteria analysis are another two examples of tools that can be used to help make necessary decisions. Other decision making tools have been identified and are described in more detail in CoastAdapt.

The output from these approaches is used to develop coastal hazard plans. The plans should identify clear objectives, actions, responsibilities and performance indicators.

In the "Take Action" phase of the risk management cycle, a critical aspect is attracting funding or finance for actions.

The "Monitor and evaluate" phase helps identify actions that have achieved the desired objectives, and those that have not. This allows new information to be applied and planning processes to be revised if needed.

Each step of the process needs governance, resources, and engagement that supports the process within and outside the organisation. The risk management cycle can be followed again and again as many times as needed to continually improve plans if desired.

A detailed description of how to apply risk management to help communities adapt to changes on the coastline is provided in Section 3.

2 National Climate Change Adaptation Research Facility (NCCARF) CoastAdapt online decision support framework **www.coastadapt.com.au** There are 10 information manuals covering the scientific and technical information of the many disciplines involved in coastal adaptation.

2.0 PRINCIPLES

The ten coastal Councils in southern Tasmania and specialist coastal consultants developed the Principles collaboratively.

The Principles reflect the knowledge and expertise of local government policy makers and resource managers with direct experience in developing or applying knowledge about adapting to climate change impacts on the coastline.

The committee and working group (the Regional Climate Change Initiative group of the Southern Tasmanian Councils Authority) was informed by the principles employed by the State Government which manages Crown land in the coastal zone.

Section 2 outlines each Principle, gives an example of how each Principle might be applied, and provides some context for why each is relevant to managing a changing coastline.

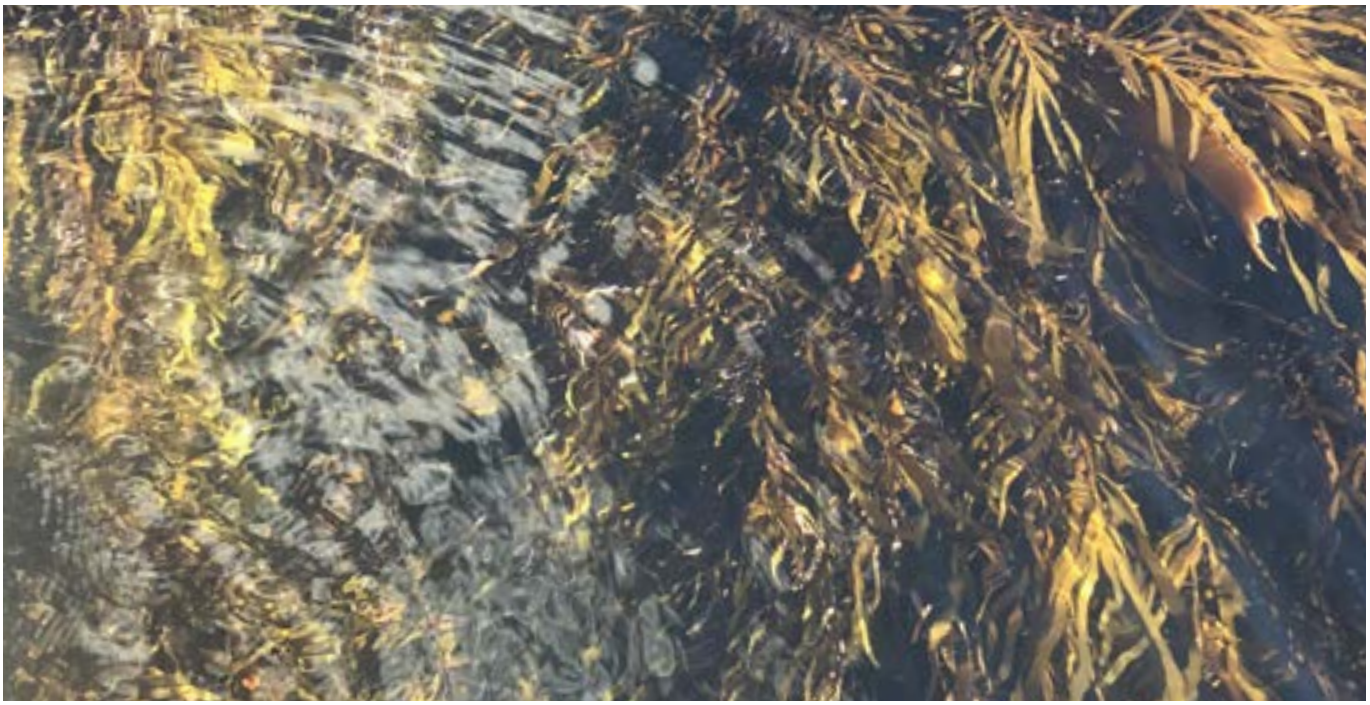
Tasmanian Government Principles

The Department of Natural Resources and Environment Tasmania Principles for Managing Coastal Hazards (https://nre.tas.gov.au/about-the-department/managing-coastal-hazards) which currently include the following principles, among others:

- The Crown does not have, nor does it accept, specific future obligations to repair or reduce the impacts of natural coastal hazards on private property;

and

- The Crown does not accept obligations to repair or reduce the impacts of natural coastal hazards on any non-Government owned or managed assets sited on public land.



Erosion of dunes at Roches Beach impacting public access infrastructure 2022 requiring urgent action by the Council to repair.
© Bruce Gibbs

2.1 PUBLIC SAFETY

1(a) Human safety is paramount. Areas of unacceptable risk should be identified and exposure to risk minimised or if risk is unavoidable, identify retreat pathways.

1(b) The community will be provided with up-to-date climate change and coastal hazards information to inform decision making and to provide opportunities to participate in response planning.

To apply Principles 1(a) and 1(b) in making practical decisions, Councils can ask and answer the following questions:

Is this area identified as medium to high hazard on the LISTmap, the Tasmanian Government's Land Information System Tasmania website?

Are there facilities or structures in this area which are used by the public? Are they safe and maintained?

What actions can be taken to alert the public to risk, reduce risk, and if necessary discourage, limit or prohibit access?

Are coastal risks and hazards across the municipality identified, quantified, mapped and monitored?

Have private property owners been informed of the hazards identified for their land and assets?

The Principle has been applied when Council determines the responses, to the questions, meet the intent of the Principle, and these are documented and actioned.

Context for this Principle

Ensuring the safety of people must be the primary concern in managing coastal hazards. Coastal land managers must warn and protect people from a range of hazards, including dangerous water conditions (large swells and rough seas, currents and undertows, pollution), unstable landforms (such as cliff edges), and inundation. Community education through signs, excluding access, and siting and design of access and public and private infrastructure must all be considered on a case-by-case basis.

2.2 PRIVATE PROPERTY

2.2 (a) Private property owners occupy coastal areas at their own risk.

2.2 (b) Property owners are responsible for managing risks to their property from coastal hazards in accordance with relevant policies and regulations and based on expert coastal advice.

2.2 (c) Where private coastal protection works are undertaken by property owners, beneficiaries should pay.

To apply Principles 2.2 (a), 2.2 (b) and 2.2 (c) as part of making practical decisions about managing coastal risks, Councils can ask and answer the following questions:

Have property owners been informed of their responsibility for the risk they face?

Have property owners been informed that Council and the Crown accept no obligation to fund the repair of damage from erosion, inundation or extreme climate events?

Have private landowners been made aware of Council's policies applying to their property and any relevant knowledge supporting these policies?

The Principle has been applied when Council determines the responses, to the questions, meet the intent of the Principle, and these are documented and actioned.

Context for this Principle

Coastal hazards are a financial issue to manage. For example, insurance is an increasingly large budget item, and climate risks are increasing the costs of insurance. Addressing coastal hazards on public land adds a resourcing demand to the organisation.

Private sector financing will be required to address the challenges of climate change.

2.3 LOCAL GOVERNMENT

2.3 (a) Councils should actively monitor coastal risks and hazards within their municipal areas.

2.3 (b) Councils are responsible for the management and cost of coastal hazard impacts on their own assets and services.[3]

2.3 (c) Councils are not responsible for the cost of coastal hazard impacts on private property, or on private assets located on public land.

2.3 (d) Access to public coastal land will not be available to private property owners for coastal protection works, except where significant public benefit is demonstrated.

To apply Principles 2.3 (a), 2.3 (b), 2.3 (c) and 2.3(d) when making practical decisions, Councils can ask and answer the following questions:

Have property owners been informed that access to public coastal land will not be available to private property owners for coastal protection works, except where significant public benefit is demonstrated?

Does Council have an inventory of their coastal hazards and risks?

Does Council have an estimate of potential costs from the impact of hazards on Council owned assets and services?

The Principle has been applied when Council determines the responses, to the questions, meet the intent of the Principle, and these are documented and actioned.

3 Services' include natural values and associated ecosystem and social services (e.g., public amenity of natural areas).

Context for this Principle

Where coastlines are already experiencing erosion, pressure from landowners and the community to create hard engineered defences can be intense. Experience from around the world suggests that the high costs of such action are rarely justified, and the defences are rarely successful in the long term. Also, these structures can result in the loss of beaches which impacts the values of the broader community. Protecting high value urban, city and commercially important foreshores can be an exception. Ecosystem based responses involve the management of ecosystems and their services to reduce the vulnerability of human communities to the impacts of climate change. These responses provide lower cost natural solutions by increasing coastal resilience to erosion, and they can buy time to look at the range of longer-term options including retreat. Soft solutions are those which do not cause any long-lasting effects and which can easily be removed or changed. Sand bagging provides a temporary solution and can be removed or shifted. These soft engineered solutions should be considered first.

The challenge of hard engineered solutions.

Stakeholders who live or work on the coastal fringes such as beachfronts or estuarine foreshores often put pressure on Councils or the Crown to take hard engineered structural approaches such as sea walls or levees to address erosion and inundation problems. Apart from these being costly to design and construct, many hard-engineered solutions result in consequences to other stakeholders. Examples include transferring the risk to other places or stakeholders which can occur if one home or a small area is protected, or the loss of beach which often follows construction of a sea wall. Importing sand by pumping or trucking, for example, creates very high ongoing maintenance costs. It is important to understand these unintended consequences before progressing to such options.

2.4 LEGAL RISK AND ADAPTATION

2.4 (a) Coastal legal risks can be identified, managed and reduced but can't be avoided.

2.4 (b) Well developed policy and action now will minimise the risk of legal challenges and liability in the future.

To apply Principles 2.4 (a) and 2.4 (b) as part of making practical decisions about managing coastal risks, Councils can ask and answer the following questions:

Does Council have a coastal asset register?

Does Council understand the legal risks presented by sea level rise?

Does Council have policies and plans in place that address coastal legal risks?

The Principle has been applied when Council determines the responses, to the questions, meet the intent of the Principle, and these are documented and actioned.

Context for this Principle

As coastal decision-makers, Councils and other planning authorities need to identify functions and decisions that may give rise to legal risk around climate change adaptation and identify how to manage these legal risks. Information Manual 6 prepared by CoastAdapt specifically introduces the coastal legal risk issues and this is the recommended resource for assessing legal risk. This Section provides a very brief summary of the Manual.

Risk of legal challenge – decisions with climate change implications.

They can be managed by early decision-making and action, based on the best science and consideration of all issues, including both legal and factual/scientific uncertainty.

Legal risk can arise from:

- Strategic planning
- Public release of hazard risk information
- Failure to release hazard risk information
- Approval of new development
- Construction and maintenance of protective infrastructure
- Approval of private coastal protection works.

There is a risk of public-law litigation brought by citizens challenging the decisions of government officials. These may involve appeals to planning tribunals that consider the merits of the original decision and either uphold, vary or replace the decision. Where merit appeals are not available, limited rights of judicial review may enable citizens to challenge the decision-making process or the criteria applied. If successful, these challenges result in the decision being sent back to the original decision-maker for re-determination; they do not directly result in a decision being overturned or changed.

The other risk of litigation is based on private law rights, under the law of negligence and nuisance. Such actions may be brought where a decision or careless action or inaction results in loss. These cases are brought by the individuals who have suffered loss such as property damage and/or reduced property values. This loss (and the right to sue) sometimes occurs many years – even decades - after the decision. If the Council or other authority is found to owe them a duty of care, and to have breached that duty, the outcome of such actions is a liability to compensate for the loss caused.

To minimise climate legal risk, international and Australian experience suggests that early and proactive decision-making based on the best available science is important. The CoastAdapt Information Manual 6 'Legal Risk and Adaptation' is a very useful resource as it describes seven probable scenarios and the factors that a Council must consider for managing risk in each situation.

The CoastAdapt coastal climate risk management tool is recommended to support coastal managers with making decisions about adapting to coastal hazards. An example from CoastAdapt is provided over page to show how the tool can be used to support practitioners to make decisions in this space.

Practical Scenario[4]

Considerations for protective coastal responses

What is the action/decision to be made? A group of coastal landholders has asked Council to construct a seawall to protect their properties.

Background

The state government has released hazard mapping indicating areas likely to be inundated under sea-level rise. A group of concerned citizens has approached Council, as their properties are zoned as having a sea-level rise risk. They have requested that Council construct a seawall to protect their properties.

What is the decision-maker's power/authority?

The Fictional Government Act provides that the local government has the power to do anything that is necessary or convenient for the good rule and local government of its local government area.

Is there factual certainty?

Council seeks advice from its in-house engineer, who confirms that the properties are likely to be affected by sea-level rise. The engineer also advises Council that a seawall may protect those properties but may also exacerbate erosion for properties located further along the coast. It is also in an area of high wave energy, and the seawall will therefore need expensive ongoing maintenance.

Is there legal certainty?

Council seeks advice from its in-house lawyer, who advises that Council does not have an obligation to construct a seawall. However, it will have an ongoing obligation to maintain a seawall if one is constructed. The lawyer also advises that Council may be the subject of legal proceedings in negligence or nuisance from the neighbouring landholders if erosion is exacerbated and damages their properties.

Outcome

Council declines to construct a seawall. Council advises the property owners that they may apply for development approval to construct the seawall at their own cost, but that they will need to prove that the seawall will not impact on neighbouring landholders. The property owners will also be subject to ongoing management obligations. Council also decides to adopt a strategy for future seawall development and include it in its plan.

CoastAdapt Information Manual 6 'Legal Risk and Adaptation' describes 6 other probable scenarios:

Scenario 1: Should a Council undertaking strategic planning review include newly released state hazard information?

Scenario 2: Assessing a development application for a large mixed-use coastal development

Scenario 3: Assessing a development application for 100 residential lots

Scenario 4: Council provision of infrastructure – upgrade of stormwater

Scenario 5: Provision of infrastructure – stormwater upgrade and community concerns

Scenario 7: Development approval for protective infrastructure (community-built seawall).

Councils can use these Scenarios and the Coast Adapt Information Manual 6 as an entry into the necessary process of understanding their coastal legal risk.

See: **https://coastadapt.com.au/sites/default/files/information-manual/IM06_Legal_Risk.pdf**

4 Bell-James, K, Baker-Jones, M., Barton E. 2017: Legal risk. A guide to legal decision making in the face of climate change for coastal decision makers. CoastAdapt Information Manual 6, 2nd edn, National Climate Change Adaptation Research Facility.

Changing Coastal Hazard Management

Graham Howard (pictured 2012) designed and supervised the construction of the Kingston Beach Seawall in 1960 after a catastrophic coastal erosion event that saw over 30,000 cubic meters of sand lost from the beach.

The Kingston Beach seawall, above, was constructed in the 1960s in response to severe erosion from a storm. At the time it was considered good practice for managing coastal erosion. Current day best practices use natural 'soft' engineered solutions such as beach nourishment, sand bagging, beach replenishment and dune rehabilitation that can be seen in the recent Tyndall Beach coastal protection works, below.

Soft engineering works comprising of plantings of native coastal species and low scale revetments to stabilise dune at the mouth of Browns River, Tyndall Beach 2021.

2.5 COASTAL MANAGEMENT AND PLANNING

2.5 (a) Coastal hazard planning is enhanced where there is consultation between relevant levels of government, the private sector, community and other key stakeholders.

2.5 (b) Planning provisions (such as Local Provisions Schedule; Specific Area Plans) can be used so coastal hazard management plans are prepared in areas identified as risky or hazardous, and can then be applied to statutory planning decisions.[5]

2.5 (c) A pathway of adaptive responses to coastal hazards, informed by up-to date climate science should be adopted and intervention by humans in natural processes should be minimised.

2.5 (d) Public access and community services should be maintained wherever possible where consistent with the Principles of public safety, risk and financial considerations.

2.5 (e) When Councils make decisions based on the projected asset life of infrastructure, they must factor the risks of coastal sea level rise hazards in the calculation of asset life.

2.5 (f) Intensification of use or development should be avoided in public coastal hazard areas managed by Councils unless significant public benefit is demonstrated.

To apply Principles 2.5 (a) to 2.5 (f) as part of making practical decisions about managing coastal risks, Councils can ask and answer the following questions:

Has Council identified coastal areas already subject to hazard and areas likely to become hazardous under climate change projections over this century?

Are provisions available so Council planners can assess development applications that relate to intensification of use or development in coastal hazard areas in a manner consistent with the Principle?

Are Council planners and managers aware of these areas to include relevant issues in their decision making?

Is there a process in place to add to this knowledge as new data emerges?

Have vulnerable Council infrastructure assets been identified (present and future), and has a strategy to replace protect, or relocate them been developed based on the life of the asset, risk scenarios both present and anticipated, and identification of alternative locations?

Have local hazard management plans been developed for identified coastal areas?

Were relevant stakeholders consulted as part of developing these management plans?

Have owners of land in hazardous coastal areas been informed of Council policies towards rebuilding, extending, modernising existing dwellings or building new dwellings?

Have real estate agents, property valuers, financial institutions and insurance companies been made aware of these policies, and is there a mechanism to inform prospective buyers?

The Principle has been applied when Council determines the responses, to the questions, meet the intent of the Principle, and these are documented and actioned.

5 Formal development planning resources and tools include Planning Schemes, Codes, and Coastal Hazards Mapping

Sandbags provide interim protection for 65 metres of coastline at Coningham Beach in Kingborough Council.

Context for this Principle

Good coastal zone planning can help avoid new development in hazardous areas and identify where development or infrastructure is appropriate. Innovative design and construction methods can be used to help accommodate changed conditions.

Coastal land use and development is guided by the requirements of the State Coastal Policy 1996, Regional Land Use Strategies, the Tasmanian Planning Scheme (or other interim Schemes), along with associated Local Area Provisions and Special Area Plans with their supporting Codes and hazard maps.

Landowners can seek development approval for coastal protection works, such as sea walls. Any such application is subject to specific planning rules under the Codes, however structures on the mobile fore-dune are prohibited.

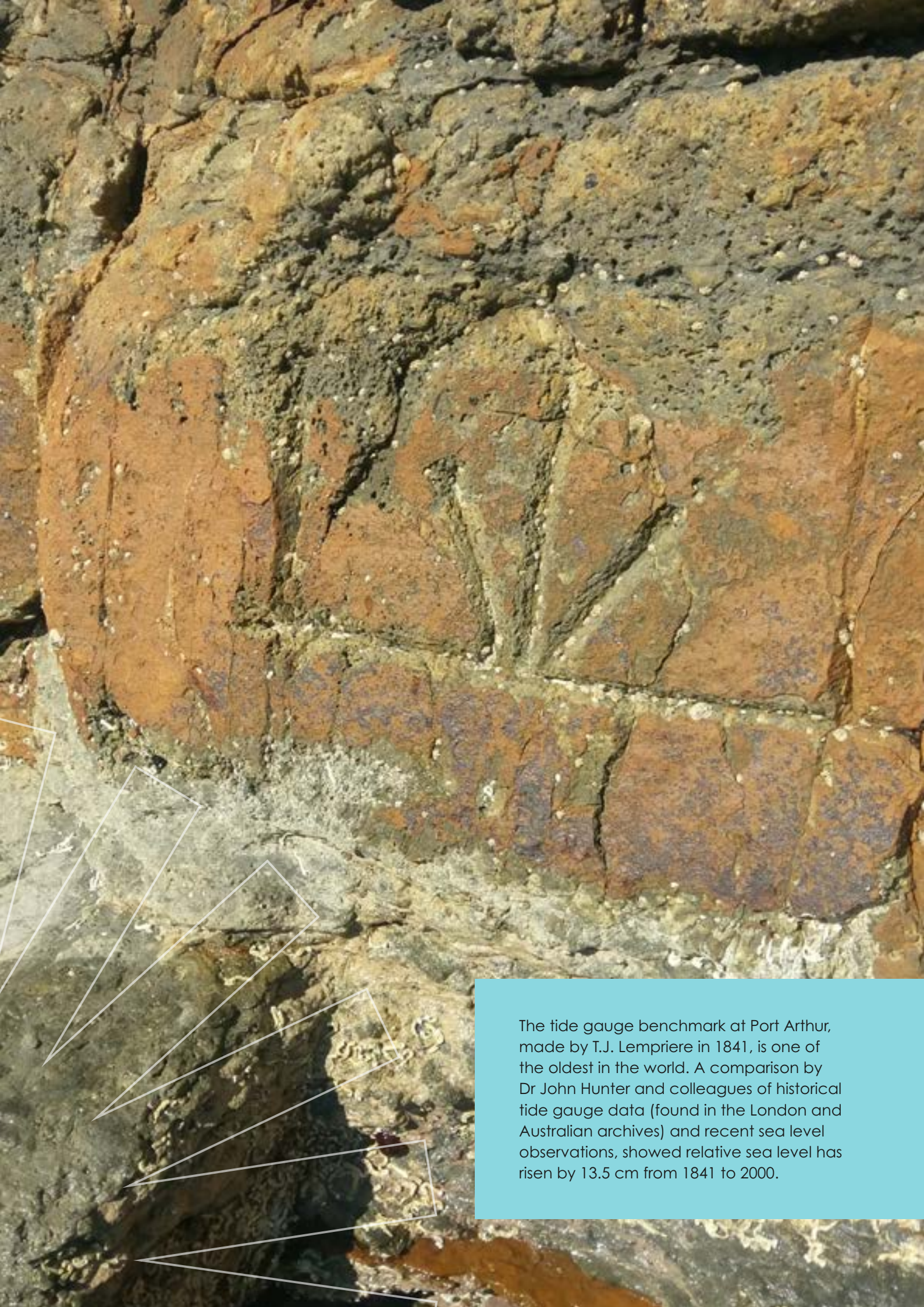
There are Codes for coastal erosion and inundation. The hazard maps that support the Codes show zones of high, medium and low hazard. Any development application for coastal protection works within hazard areas must meet relevant performance criteria to be approved.

All planning authorities have access to the Codes and associated hazard maps. These are used to guide decisions about individual applications for land use and development in the coastal hazard area.

In situations where an application to develop a protection structure on public land managed by Council or the Crown is proposed, Council or Crown consent is required. When the Codes are triggered for proposed coastal protection works, advice from specialist coastal engineering consultants is required to address the high risk of impacts on neighbours or natural assets such as a beaches.

Extensive national and international experience with sea walls has demonstrated that wave energy concentrates below and at the ends of a structure. The erosion is not prevented but instead moves to the next vulnerable area.

The specialist's report must demonstrate that proposed coastal protection structures will not increase erosion risk to adjacent land or public infrastructure. Additionally, arrangements need to be made to meet the cost of construction and ongoing maintenance of the coastal protection works.



The tide gauge benchmark at Port Arthur, made by T.J. Lempriere in 1841, is one of the oldest in the world. A comparison by Dr John Hunter and colleagues of historical tide gauge data (found in the London and Australian archives) and recent sea level observations, showed relative sea level has risen by 13.5 cm from 1841 to 2000.

2.6 COASTAL VALUES

2.6 (a) The importance of ecological and cultural values, including Aboriginal heritage, will be recognised when responding to coastal hazards.

2.6 (b) Coastal hazards management will consider the impact of any action or inaction on ecological and heritage values. This requires sound contemporary understanding of the values present and an integrated approach to managing them and the hazard

2.6 (c) Understanding climate change impacts to Aboriginal sites and landscapes will require input from Aboriginal Heritage Tasmania to gain access to data that may not be publicly available and to ensure a culturally appropriate response and compliance with legislative requirements.

To apply Principles 2.6 (a), 2.6 (b), and 2.6 (c) as part of making practical decisions about managing coastal risks, Councils can ask and answer the following questions:

Are the full range of values present and their susceptibility to climate change well-understood, without further investigation?

Given the values present, is the Council fully informed of all relevant State and Federal policies and protections? If permits are required, have they been obtained?

Has consideration been given to the possible adverse effects of hazards management on the values and how adverse effects can avoided or mitigated?

The Principle has been applied when Council determines the responses, to the questions, meet the intent of the Principle, and these are documented and actioned.

Context for this Principle

People of Tasmania cherish coastal environments for complex and dynamic values. They are home to rare, and threatened ecosystems; tangible and evocative connections to the Aboriginal use and custodianship of the land and sea; and the later layers of historic heritage places.

While some coastal ecosystems can naturally retreat if suitable land is available, the majority of these values are uniquely tied to coastal place and many climate change adaptation approaches cannot be applied to them: they cannot be replaced, they cannot be moved, and they cannot be elevated. This creates particular challenges for management, because the range of options is limited and likely to require location specific responses rather than generalised solutions.

Aboriginal and cultural heritage expertise and advice can be sought from a range of Government Agencies, including Department of Natural Resources and Environment; Department of Premier and Cabinet, and Government Business Enterprises such as the Port Arthur Historic Site Management Authority.

Information on the heritage and ecological values of an area is mapped on various overlays available on LISTmap.

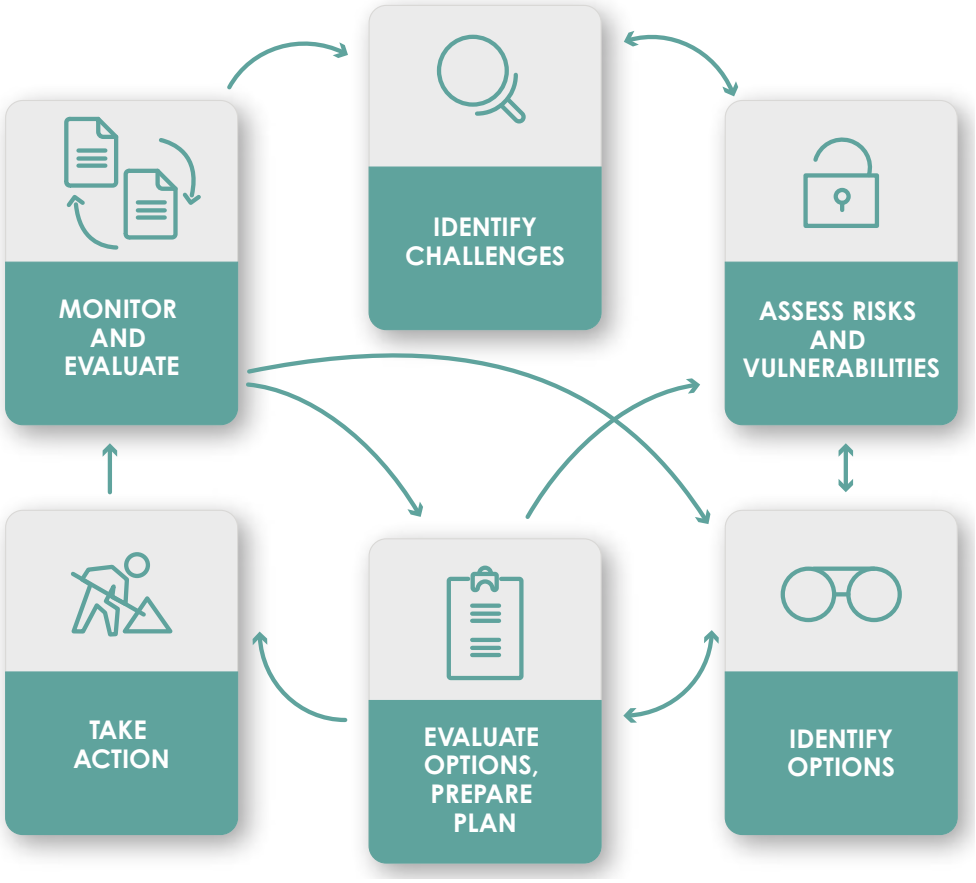
3.0 RISK MANAGEMENT PROCESS

Current global leading practice in climate change adaptation recommends taking a risk-based approach. Understanding and managing risk are key elements incorporated in the principles for adaptation. Risk based approaches to adaptation include understanding the vulnerability of an area, asset or activity, and delves further into understanding why this vulnerability matters and where any actions should be focussed.

The following six-step iterative framework can be followed to help understand and manage coastal hazards. An important consideration of adaptation is that the framework can be completed in ways that meet the purpose of each Council. Those that are starting their adaptation journey are able to scan through the process fairly rapidly, getting an idea of the scale of the challenge, and the level of detail and investment that is required to address the issue they face. Others may have a better overview of the issue in their area or have greater exposure and may wish to follow the process in more detail from the outset. Additional support for undertaking risk management can be found in the online tool 'CoastAdapt' – the section titled Risk Assessment.

The risk management framework recommended in this Strategy is one that is consistent with the international risk standard. It is presented in the figure below:

Figure 2. Risk management framework, consistent with ISO31000 (Palutikof, Rissik, Webb et al. 2019)



6 CoastAdapt National Climate Change Adaptation Research Facility **www.coastadapt.com.au**

3.1 IDENTIFY CHALLENGES

This is a critical step in adaptation planning. By getting the framing right for the challenge, Councils will set themselves up for success in the short and medium term. The iterative nature of the risk framework enables this to be revisited regularly in response to new knowledge, as coastal risks change, or as the needs of stakeholders change.

This initial step is focused on developing a clear understanding of what Council is trying to achieve, and clearly defining the area and scale that will be the focus of adaptation.

Once defining the scale and extent of the plan, it is important to establish a vision and goals for the adaptation challenge. At this early stage this supports engagement with stakeholders and demonstrates leadership from Council.

A component of this first stage is to get appreciation of the magnitude of the challenge being faced. This can be done by undertaking a first pass risk screening. Risk screening can be done following a desk-top approach and does not require a detailed understanding of climate effects on the area. Use expert opinion, simple maps, figures and climate change projections to determine whether you have a climate challenge to address (a first-pass risk screening). Guidance can be obtained from the links to on-line resources provided in Section 5 of this Strategy.

By understanding where risks may be present and what may be affected, you are able to fine tune and prioritise the approach for the next steps in the risk assessment. This includes understanding what detailed information may be required and also which internal and external stakeholders should be involved.

Establishing governance and organisation structures that ensure Council is able to achieve its goals is also important at this early stage. Resourcing the process properly and ensuring that the process is supported throughout the organisation means that staff involved will be empowered to act appropriately and effectively across the organisation and that relevant sections are involved.

Undertake internal and external engagement to ensure that you have strong support within and outside of your organisations. It is important to set up processes that enable engagement to be continual throughout the process.

At this stage of the risk management process it may be necessary to establish an internal business case to ensure that resources are made available to support the process. The information gathered in this step is essential for supporting the business case.

3.2 DETERMINE VULNERABILITY AND RISK

This step of the process involves determining the vulnerability and eventually the risk that your Council area and assets face from the effects of climate change. It is important that this is done using an approach for your risk assessment and reporting that is fit for the challenge faced and for the purpose of your organisation, and that will support adaptation planning and action.

The need to communicate with internal and external stakeholders remains essential. This includes communicating the results of the first-pass risk screening to your internal and external stakeholders and using the results and discussion to narrow down your focus to areas that are most at risk. At this stage you are able to undertake a second pass risk assessment. The second pass risk assessment includes understanding the vulnerability of your Council area, organisation and community to coastal hazards.

At this stage it is necessary to gather existing data about coastal risks and in some cases to develop new information if none is available. There are several useful national and state data bases which may be enough and these should be accessed and reviewed before proceeding with new data collection. Council and other assets should be mapped as this will help with a risk assessment approach. Determining the vulnerability of your organisation, assets and community requires gaining an understanding of the adaptive capacity of each of these attributes.

The second pass risk assessment can be based on any new information that is gathered or developed such as updated sea-level rise mapping. Existing information, maps and stakeholder and expert knowledge can also be used to support the second-pass risk assessment.

Internal and external stakeholder engagement should be used to identify consequence scales for the risk assessment. It is also important to use existing consequence scales from Council's risk register or any disaster risk assessment frameworks which may be applied in Council. It is useful to consider risks in a number of categories such as economic risk, social risk and environmental risk.

Further information on risk assessment approaches and access to tools and supporting information can be obtained using the links provided in Section 5.

If any major risks are identified in the risk workshop, a deeper understanding may be required in key areas. This may require further investment to get refined data to support more detailed work and satisfy concerned stakeholders. It is important to communicate the results of the risk assessment with decision makers to discuss what can be done to address the issues that have been identified. At this stage it is useful to understand the legal risks of not addressing the identified risk.

Stakeholder engagement continues to be an important exercise at this stage.

3.3 IDENTIFY OPTIONS

Once the risk assessment has been undertaken it is possible to identify adaptation options that address climate change risks. In identifying options consideration should be given to options which address climate change, but which also address other existing pressures, although it is also necessary to identify options that may address the climate change risk alone. Option identification should include reassessment of options and strategies from existing strategies and plans within Council, helping to determine whether they are still relevant under a changing climate.

It is important to recognise that different options will be needed to address different climate related pressures, different assets and that these will vary between localities. Maps and spreadsheets can be useful in helping to link options selected to the specific risks they will address.

It is important to consider suites of different options which may be able to be undertaken together. These may include policy and planning options, community capacity building options, ecosystem-based adaptation options etc. It is also important to recognise the potential for having sequences of options, enabling you to take a pathways approach and avoid unnecessary expenditure and adverse side-affects from your actions. Such sequences may include initially using cheaper ecosystem-based options such as dune restoration and enhancement through replanting. Once these options stop working more engineering and cost intensive solutions may be necessary (e.g. beach nourishment), and ultimately perhaps the need for sea-walls to be constructed or options such as relocation to be considered.

The Principles presented in section 2 should be key considerations when selecting options.

3.4 EVALUATE OPTIONS AND MAKE A PLAN

In the previous stage Council, together with its stakeholders will have identified a series of possible options to address coastal risks. These options now form the basis of a strategy or plan. Options need to be evaluated and prioritised in conjunction with stakeholders using tools and approaches that help you to select options appropriate for the risk tolerance of your organisation and its stakeholders.

Approaches such as Cost Benefit Analysis (CBA) and Multi Criteria Analysis are useful tools that can help to prioritise options or suites of options. They can help to ensure that prioritised options make the most economic sense and deliver what is needed/wanted by stakeholders. Using the output from these approaches a plan can be developed that list the options and identifies thresholds at which options will be implemented.

The plan should include clear objectives for each of the options and list performance indicators. It should also identify potential barriers to action and establish mechanisms to overcome them.

Always try to select options that will allow you to keep your options open (i.e. do not commit to something that cannot be changed or built on if required).

Identify suitable indicators to assess performance of options and determine how best, and most cost effectively these can be monitored. It is important to consider the

benefits or negative impacts that each option may have on community, environment etc. This will help to determine the level of engagement that may be required before an option can be implemented. The plan should:

- Identify thresholds and trigger levels when actions should be taken
- Identify people/groups responsible for actions
- Include review points when plan will be updated.

It is important to note that in some cases a deliberate action will be not to take any action. If this is the case, the process through which you arrived at this decision should be clearly documented.

Once the strategy or plan is developed, appropriate endorsement procedures should be followed to ensure it is supported at all levels of Council. This may require establishing processes for community consultation. This will support implementation of the plan.

3.5 TAKE ACTION

Once a plan or strategy is developed and signed off by Council and stakeholders, the plan or strategy can be implemented. Supporting activities may be developing specific business cases for actions or suites of actions, collecting additional data where required, influencing the implementation of other plans, and overcoming any barriers to action.

A critical aspect of implementation is attracting funding or finance for actions. Some adaptation options will be expensive and approaches which help obtaining the necessary funds is critical. This may include identifying and approaching potential funders (e.g. State and Commonwealth Government) but may also involve working with the private sector to develop partnerships.

Collaborations and partnerships which support implementation of plans will be essential and can include partnerships with community groups, with other organisations such as NRM groups etc.

3.6 MONITOR AND EVALUATE

The last stage of the iterative cycle is to measure and evaluate adaptation plans. This helps to determine which adaptation actions are not achieving desired outcomes and need to be changed, but importantly also helps with accountability of projects.

Monitoring also helps to identify when an action is no longer effective for the degree of change that is happening, and a new action or suite of actions is required.

Over time it is important to reflect on what is being achieved, whether aspects of the planning process should be revisited, especially if new knowledge and information has become available.

Internal and external reporting of progress is essential. Consideration should be given to how best to do this and what level of detail is required. This may be an important element of community engagement and capacity building.

Following the monitoring and evaluation, the whole adaptation risk management cycle should be followed again in a way that fits the purpose of Council and which is aimed at continually improving the strategy or plan or adjusting it as new lessons are learned.

Coastal protection works at Nutgrove Beach, Hobart, to enable dune stabilization with coastal vegetation.

4.0 ENABLERS AND DECISION MAKING

4.1 ENABLERS

Identifying, planning for and managing risks requires more than simply following risk assessment guidance. It requires barriers to be removed and enablers to be installed, including:

- Leadership – Council and Executive leaders need to drive the process and inspire adaptation action by their organisations
- Governance – Effective governance structures to support adaptation planning and action
- Resources – Adaptation planning and implementation needs to be supported by adequate and targeted financial resources and experienced, equipped and committed personnel
- Learning and improvement – Council must commit to continual monitoring, evaluation, review and response, to ensure the long-term success of communities managing coastal hazards and adapting to a changing coastline.

Case Study

Supporting Council climate cooperation and collaboration

Natural coastal processes occur within and across municipal Council boundaries. Cooperation and collaboration between Councils supports the building of a community of practice from lessons learned and experience accumulated. Also, actions taken by one Council to manage coastal hazards may impact another Council's coastal assets, infrastructure people or property. The STCA's climate program, the Regional Climate Change Initiative (RCCI), supports Council cooperation and collaboration, not only in coastal matters but also across the following areas:

- **Council leadership:** as the tier of government closest to communities, lead and share knowledge across Tasmanian Councils and communities to: build capacity, avoid duplication and advocate to State and Federal Government, research sector and peak organisations
- **corporate (Council) emissions reduction:** reducing energy use and emissions which Councils are responsible for across their buildings, fleet and services
- **community emissions reduction:** supporting programs to influence households, businesses and community groups to reduce emissions and energy use and realise cost savings
- **corporate (Council) adaptation:** increase the capacity of Councils to protect and future proof their assets and services against intensified natural hazards; reduce exposure to potential liability in decisions making; and minimise financial risks from the increased natural disasters and to the transition to a low carbon economy.
- **community (municipal / regional) adaptation:** assist and facilitate community building resilience and adaptive capacity by providing information on local climate change risks to enable informed decision making and risk assessment

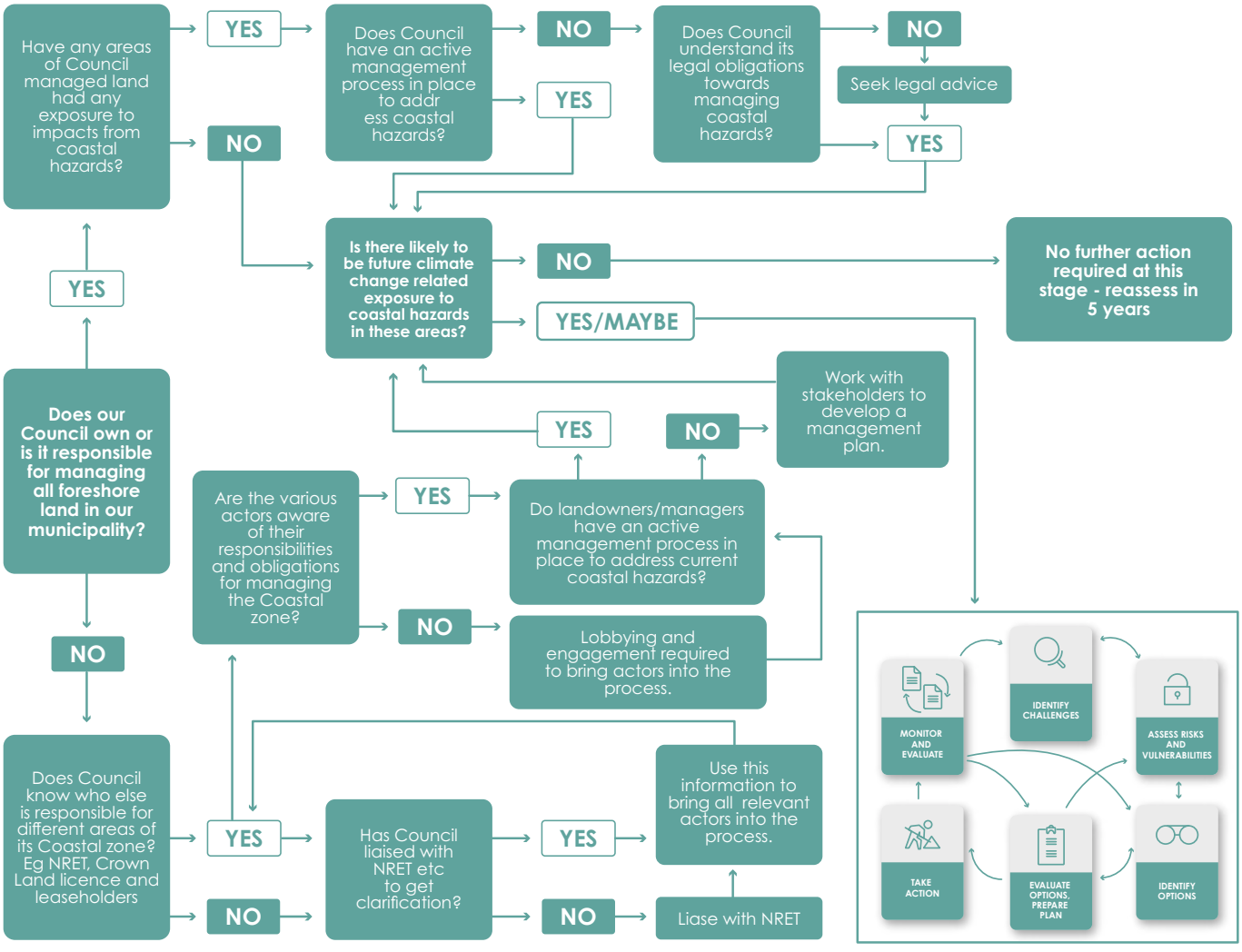
4.2 DECISION MAKING PATHWAYS

A simple process can be followed to determine Council's exposure and possible responses. This process is most appropriate for Councils beginning their adaptation journey. Those with more mature processes may find the flow diagram useful only to verify their system.

The process is summarised in the following flow diagram which is intended to support Councils when working through challenges which they face on the coast. The process provides guidance on actions Councils should take to get clarification on their ownership and responsibilities on the coast, and what they should do in response. Ultimately the process leads Councils to the need to undertake a climate risk management assessment and to develop an appropriate coastal hazards management plan.

It should be noted that this process will not be useful for councils which have mature, well developed adaptation management processes in place, and who have done the required assessments to drive them. It is more likely to be useful to those who are beginning to get to grips with the impact and management of coastal hazards.

Decision Making Pathways diagram



5.0 SUPPORTING RESOURCES

The Tasmanian Government has undertaken a series of initiatives to support local government to better understand and manage the risks associated with coastal hazards, as follows:

- Tasmanian State Coastal Policy 1996. (Note legislative requirement when considering coastal matters).
- Department of Premier and Cabinet (DPAC) Mitigating Natural Hazards through Land Use Planning and Building Control Coastal Hazards Technical Report 2016.
- Department of Premier and Cabinet (DPAC) Tasmanian Coastal Adaptation Pathways Program.
- Department of Premier and Cabinet (DPAC) Coastal Hazards Management for Existing Settlements and Values project.
- NRET Managing Coastal Hazards *nre.tas.gov.au/about-the-department/managing-coastal-hazards*
- Tasmanian Coastal Works Manual; Page, L., Thorp, V. (2010) Tasmanian Coastal Works Manual: A best practice management guide for changing coastlines; Department of Primary Industries, Parks, Water and Environment.

There are a number of state and national resources which can be used to support climate adaptation planning in local government. Resources include:

- CoastAdapt is a resource that was developed by the National Climate Change Adaptation Research Facility at Griffith University. It was funded by the Commonwealth and has a focus on delivering a range of information to support coastal users to adapt to climate change. It also includes the C-CADS (Coastal Climate Change Decision Support) Framework which provides comprehensive guidance and resources to support risk-based adaptation planning. *www.CoastAdapt.com.au*
- Regional Climate Change Adaptation Project (RCCAP) *http://www.dpac.tas.gov.au/divisions/climatechange/what_you_can_do/local_government/local_government_adaptation/local_government_adaptation_planning_resources/corporate_adaptation_planning*
- The resources to the Tasmanian Coastal Adaptation Planning are also located here *http://www.dpac.tas.gov.au/divisions/climatechange/what_you_can_do/local_government/local_government_adaptation/local_government_adaptation_planning_resources/community-based_coastal_adaptation_planning*
- Climate Change in Australia is a resource developed by CSIRO and the Bureau of Meteorology. It provides climate change projection data, excellent reports and guidance that can be used to underpin climate change adaptation. *www.Climatechangeinaustralia.gov.au*
- For analysis of complex physical climate risk see XDI (*https://xdi.systems*).
- Coastal Risk Australia enables users to assess the extent of sea-level rise at their scale of interest. This is a user-friendly resource which can help assess risk. It is based on bathtub modelling and there is uncertainty associated with it which is explained on the site. *www.Coastalriskaustralia.com.au*
- Climate Compass was developed by CSIRO and various contributors in Australia and funded by the Commonwealth Government. It was designed to support Commonwealth Departments to address climate risk and has also been used by large infrastructure operators. *www.Climatecompass.gov.au*
- Adapt NRM was developed by CSIRO and NCCARF and includes guidance to support NRM groups to update their NRM plans to reflect a climate affected future. It was designed to help move NRM groups forward without changing their direction and momentum. *www.AdaptNRM.csiro.au*
- Impact of sea level rise on coastal natural values in Tasmania, (DPIPWE 2015).

6.0 ACKNOWLEDGEMENTS

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REGIONAL
CLIMATE CHANGE
INITIATIVE

Regional Strategy - Adapting to a changing coastline in Tasmania has been prepared under the auspices of the Southern Tasmanian Councils Authority, Regional Climate Change Initiative by the 12 Councils of southern Tasmania: Brighton, Clarence City, Central Highlands, Derwent Valley, Glamorgan Spring Bay, Glenorchy City, Hobart City, Huon Valley, Kingborough, Sorell, Southern Midlands and Tasman.

It was endorsed by the STCA Board on 23 May 2022.

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