

Climate Change Adaptation toolkit



A comprehensive guide to planning for Climate Change Adaptation in three steps.

- TOOL 1** Exploring the Risk Context **TOOL 2** Developing Adaptation Actions **TOOL 3** Screening for Climate Change Interactions



About this toolkit

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Introduction

Purpose of this toolkit

In 2011, the City of Greater Geelong released its Climate Change Adaptation Strategy and Roadmap to respond to the impacts of climate change. It was recognised that traditional decision-making tools are designed to cope with a limited range of scenarios and linear problems – making them less effective in planning for climate change. The Climate Change Adaptation Toolkit has been developed to facilitate robust decision-making processes and to integrate climate change adaptation across the organisation.

The Toolkit aims to support organisations to:

- integrate adaptation and support effective and efficient risk management
- be more responsive to climate change shocks and trends
- maintain standards of service delivery in the face of more extreme conditions
- make effective and consistent decisions regarding climate change
- form linkages across different work areas, internally and externally
- incorporate uncertainty into decision making
 - make adaptation decisions that work across a range of future scenarios
 - build flexibility into adaptation actions.

Who should use it

Tools 1 and 2 support the development and refining of an adaptation strategy, by exploring risk context, and developing adaptation actions that remain viable under the widest range of probable climate futures.

Tool 3 complements existing decision-making processes by providing a methodology for incorporating climate change issues into the planning and design of initiatives.

Each tool can be used in isolation and the Toolkit is **free for download and use**.

The Toolkit was developed with the City of Greater Geelong for use by local Council and as a result includes examples relating specifically to a local Council context. However, aspects of the Toolkit will be applicable to a wider range of organisations and sectors, and each of the included tools can readily be adapted to specific local and organisational contexts.

Assumed preparatory work

The Toolkit assumes your organisation has already undertaken some form of a climate change risk assessment. The most utilised risk framework used by local governments in Australia is the guide developed by the Department of the Environment and Heritage, Australian Greenhouse Office (AGO) in 2006¹. The guide helps local government integrate climate change impacts into risk management and other strategic planning activities. The guide is aligned with the Australian and New Zealand Standard / International Standards Organisation ISO 31000:2009 Risk Management Principles and Guidelines (formerly AS/NZS 4360).

The common steps in a risk-based assessment are:

1. Establish the risk context
2. Identify and describe the risk
3. Analyse the risk
4. Evaluate the risk
5. Decide on the treatment.

The risk assessment process using the ISO 31000 methodology will produce a list of risks that have been prioritised based on a risk matrix using likelihood and consequence criteria. The criteria should specify 'priority risks', that is, those considered most important and/or pressing. The priority risks identified through a risk assessment process can serve as inputs for the Toolkit process, including taking the risks through a more detailed risk exploration process.

Toolkit overview

The Toolkit comprises three tools:

1. **Exploring the Risk Context:** explores a range of priority climate risks previously identified to be explored in detail. Tool 1 explores interactions with other stressors (social, economic and environmental) and assists decision makers to avoid being paralysed by uncertainty inherent in climate projections.
2. **Developing Adaptation Actions:** provides a process for identifying, exploring, evaluating and prioritising adaptation options. Tool 2 provides opportunities to develop a range of potential adaptation actions and test these against several future scenarios.
3. **Screening for Climate Change Interactions:** outlines a screening process to identify potential interactions with climate change risks and adaptation actions, when developing new projects and strategies. Tool 3 helps organisations embed climate change adaptation considerations into decision making processes.

¹ AGO, 2006, Climate Change Impacts and Risk Management, A Guide for Business and Government Available at: <http://www.climatechange.gov.au/community/~media/publications/local-govt/risk-management.ashx>, accessed 14/08/12.

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TOOL

1

Exploring the Risk Context



Risk name: _____

- (1) Who or what will be affected by the risk? Consider what system, asset or group of individuals will be affected? What is the attribute that may be affected? What is the boundary of the risk?

- (2) What is causing the risk?

- (3) Why is the organisation exposed to the climate change risk?

- (4) Are there any assets, communities or locations particularly sensitive to the risk?

- (5) Does the risk affect the organisation's objectives/obligations/strategic directions? If yes, describe.

- (6) What is the time period of the risk?

- (7) Does the risk potentially reinforce or exacerbate existing social disadvantage or inequalities? If yes, describe.

- (8) Are there already preventative measures in place that would help deal with the risk (either implemented by the organisation or another entity)? Describe. Where relevant, how have they performed?

- (9) Is the organisation prepared for or capable of dealing with the risk impacts now? Describe.

- (10) Linkages – which other organisation/departments/community groups/sectors have either responsibility for or an interest in this risk? Should joint management be considered?

- (11) How often should this risk or class of risks be reviewed?

ACTIVITY 2: UNCERTAINTY OVERLAY

Question	Category/ Description of uncertainty	Does it need to be resolved?	Can it be resolved?	What are the implications of the uncertainty on the risk?	Plan of action
Who or what will be affected by the risk?		Yes / No			
What is causing the risk?		Yes / No			
Why is the organisation exposed to the climate risk?		Yes / No			
Are there any assets, communities or locations particularly sensitive to the risk?		Yes / No			
Does the risk affect the organisation's objectives/ obligations/strategic directions?		Yes / No			
What is the time period of the risk?		Yes / No			
Does the risk potentially reinforce or exacerbate existing social disadvantage or inequalities?		Yes / No			
Are there already preventative measures in place that would help deal with the risk ?		Yes / No			
Is the organisation prepared for or capable of dealing with the risk impacts now?		Yes / No			
Linkages – what other organisation, departments, community groups, sectors have either responsibility for or an interest in this risk?		Yes / No			
How often should this risk or class of risks be reviewed?		Yes / No			

Outcome

■ Does this uncertainty result in re-prioritisation of risk?

Yes ☐ No ☐

If 'yes', what is required?

■ Does uncertainty mean additional research or work needs to occur?

Yes ☐ No ☐

If 'yes', what is required?

ACTIVITY 3: PROBLEM STATEMENT

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TOOL

2

Developing
Adaptation Actions

TOOL

2

Developing Adaptation Actions

**PROBLEM
STATEMENT**

ACTIVITY 1

Brainstorming
Adaptation
Actions

ACTIVITY 2

Exploring an
Adaptation
Action

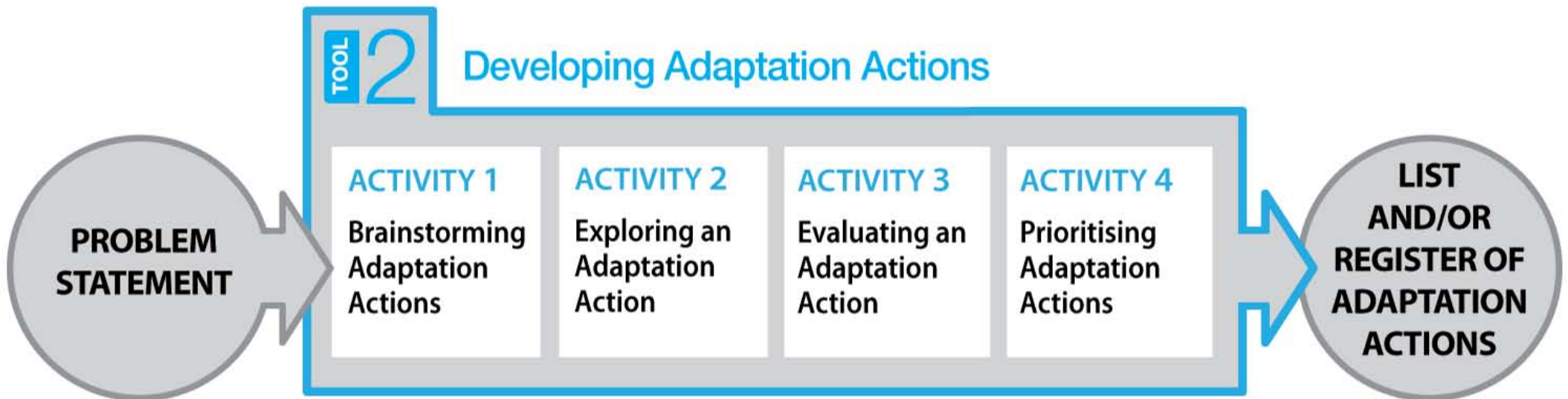
ACTIVITY 3

Evaluating an
Adaptation
Action

ACTIVITY 4

Prioritising
Adaptation
Actions

**LIST
AND/OR
REGISTER OF
ADAPTATION
ACTIONS**



Consider...

- the point of intervention: can we reduce exposure, reduce sensitivity or increase our adaptive capacity?
- the potential methods of intervention. For example: accepting impacts, loss prevention, behaviour modification.

ACTIVITY 2: EXPLORING AN ADAPTATION ACTION

TOOL 2

Risk name: _____
Adaptation action: _____

Exploring adaptation actions

(1) What is the organisation's control or responsibility over any or all aspects of the adaptation action?

(2) Does the action 'lock in' outcomes? Are the outcomes robust under different futures?*

(3) Describe the assumptions that underpin the effectiveness of the adaptation action? How reliable are the assumptions in light of future uncertainty?*

(4) Describe the equity implications of the adaptation action*

(5) How will the adaptation action interact or respond to other stressors and trends?*

(6) Is there an event that should trigger the implementation of the adaptation action? What is that event?

(7) What are the barriers, if any, to implementing or adopting the action?*

(8) Describe the high level benefits of the adaptation action. Describe the high level costs of the action. Do the potential costs outweigh the potential benefit?

(9) Describe the drivers behind making a decision whether to implement this adaptation action.*

(10) Does the adaptation action demonstrate the key properties of a robust adaptation action?*

1. Remain viable under the widest range of probable climate futures.

☐

2. Be insensitive to broken assumptions.

☐

3. Increase flexibility and preserve option value (where possible).

☐

4. Maximise their value when planned as part of a portfolio of actions.

☐

5. Build resilience and redundancy into both physical, organisational and social systems.

☐

6. Be implemented within planned budgets or based on evidence that is good enough to justify budget/revenue increases

☐

* recommend using scenarios to assist in answering these questions

ACTIVITY 3: EVALUATING AN ADAPTATION ACTION

TOOL 2

Select one

(a) Implement immediately

☐

(b) Conduct a further assessment to determine feasibility

☐

(c) Return to earlier stages of this process and obtain basic information on the risk or the adaptation action

☐

(d) Redesign action

☐

(e) Defer adaptation action for future implementation

☐

Briefly justify your selection:

TOOL 2

Action - describe the adaptation action to be implemented

Relevant implementation/timing considerations or other notes

Designate responsibility for implementation/monitoring

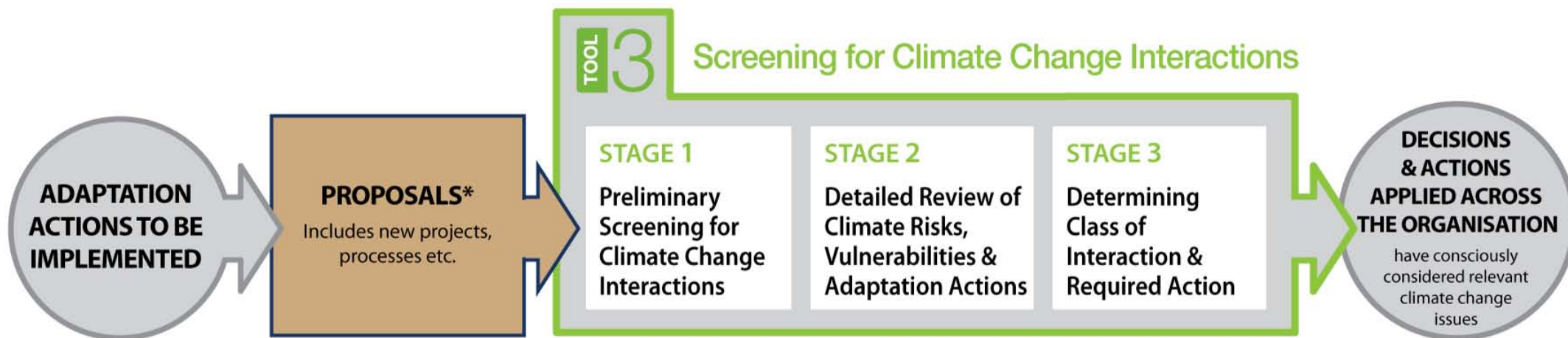
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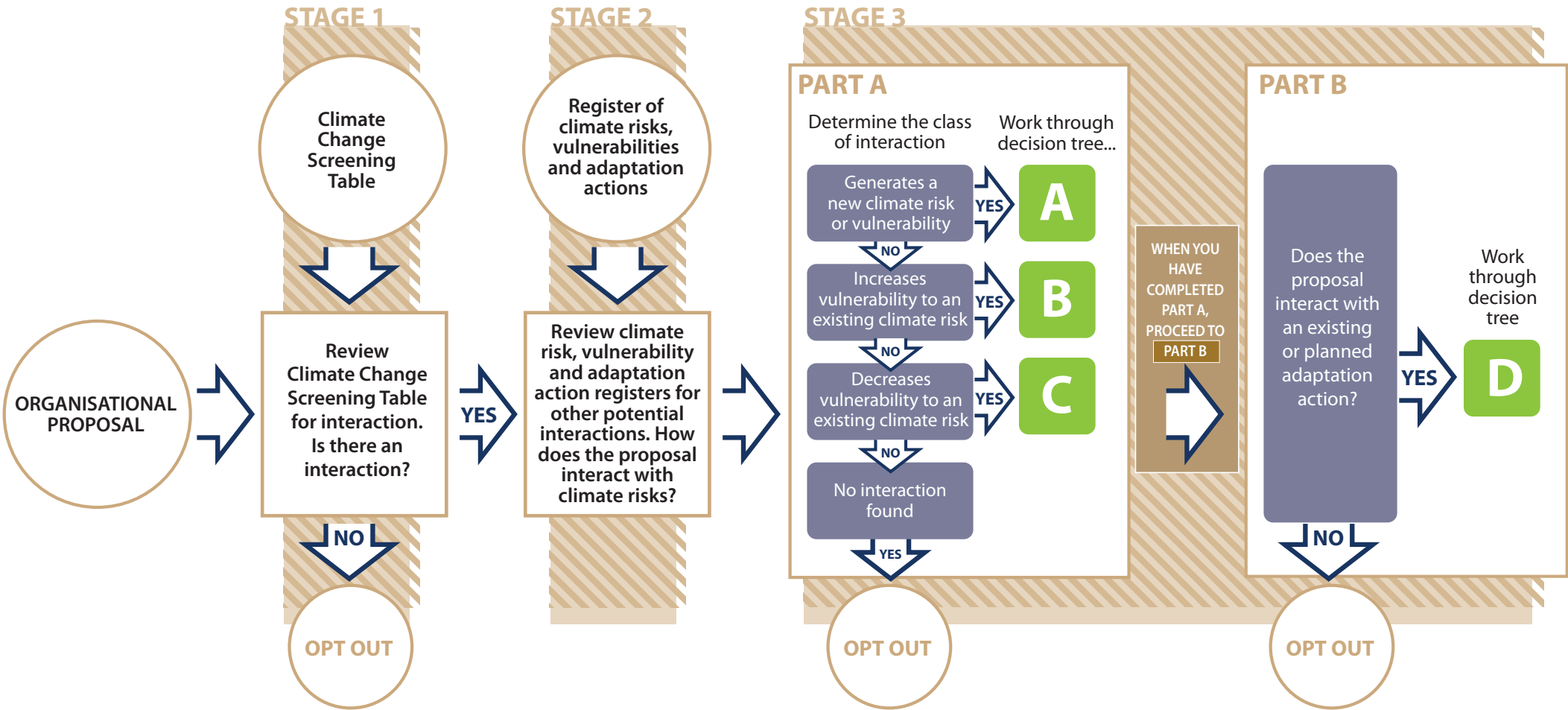
TOOL

3

Screening for
Climate Change
Interactions



* This term has been specifically defined for the purposes of this Toolkit. Refer to the glossary for definition.

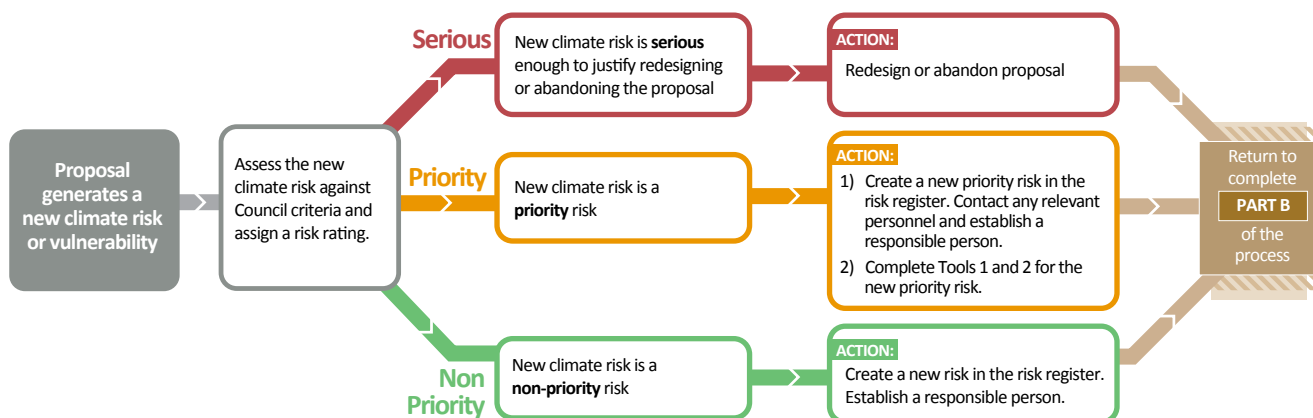


Aspect	Description	Examples of risk sources/vulnerability		Examples of Council adaptation actions
Coastal Planning	<p>Coastal planning is the most pressing climate change priority, given the region's 'soft' erodible beaches and exposed housing stock.</p> <p>The risks that this area embodies not only relate to current and future planning decisions, but also challenging issues relating to the impact on existing developments and property rights.</p>	<p>Location: infrastructure developments, residential & business properties (existing or new) at risk of physical damage or loss from events such as inundation, storm surges, erosion of 'soft' shorelines</p> <p>Planning: changes to planning tools due to climate change</p> <p>Costs: increased cost to maintain coastal shorelines and infrastructure within coastal areas</p>	<p>Insurance: increased cost or inability to obtain insurance for residential and business properties</p> <p>Council responsibility: community expectations to protect private assets or liability associated with approval of inappropriately located developments.</p>	<p>» Seek new information and guidance relating to impacts of climate change on coastal developments & ensure planning tools incorporate climate change in planning decisions</p> <p>» Advocate and implement community initiatives to build understanding & awareness of planning implications of climate change</p> <p>» Examine long term sea level rise options from defence structures to relocation</p>
Asset Management	<p>Council has responsibility for assets ranging from buildings, to local roads, to drainage systems. Asset management is an area where Council is particularly exposed to climate change risks.</p> <p>Depending on their location, assets are potentially exposed to extreme weather events as well as other long term processes such as coastal erosion, sea level rise and drought.</p>	<p>Planning: changing operating conditions included in the planning and building of new infrastructure (such as asset location, design, construction materials, operational costs, asset life)</p> <p>Asset integrity: frequency of condition assessments, preventative maintenance, physical damage from climate events</p>	<p>Design: 'fit for purpose', change to design standards, codes, urban heat island effect</p> <p>Asset failure: Council liability, cost to clean Costs: to maintain and operate existing assets under changed climate conditions</p>	<p>» Understand current decision making tools and procedures to ensure consistent and robust approach for approval of upgrades / retrofits/ new assets</p> <p>» Understand current research and technology improvements, operational standards and materials adopted by Council</p> <p>» Conduct asset surveys to understand exposure to changed climatic conditions</p> <p>» Understand liability and insurance issues</p>
Emergency Management	<p>Council has a Municipal Emergency Management Plan (MEMP) to protect communities and assist them to recover from the impacts of emergency situations such as floods, fires and storms.</p> <p>As the frequency and intensity of these events increases under climate change, there will be additional burdens placed on the MEMP and Council's role within it.</p>	<p>Resources: Increased frequency and severity of emergency events & impact on personnel</p> <p>Planning: Adequacy of MEMP to respond to climate related emergencies</p> <p>Budgets: Increased impact to respond and recover</p>	<p>Volunteers: Increased burden placed on emergency response personnel</p> <p>Psychological: impact on local community, Council employees, volunteers</p> <p>Community expectations: Role of council to respond to emergency events whilst maintaining service delivery</p>	<p>Ensure MEMP is adequate</p> <p>Allocate resources to ensure appropriate preparedness, response and recovery from an emergency</p> <p>Ensure coordinated approach to emergency response and recovery by working with other agencies & emergency volunteers</p>
Vulnerable People	<p>Council already plays an active role in caring for vulnerable groups in the community. These groups are likely to be worse affected when exposed to climate change.</p> <p>This may place additional demands upon Council services and generate the need for new services.</p>	<p>Resources: Increased expectation and demand on Council resources to support vulnerable people (e.g. during emergency response & recovery, increased impact from urban island effect)</p> <p>Community welfare: Vulnerability of most vulnerable people exacerbated, through increased costs, increased exposure, lack of insurance etc., new vulnerable groups emerge</p>	<p>Psychological/Health: impact on local community, Council employees, volunteers from stress, extreme weather, isolation, lack of support networks, increased mortality</p> <p>Budgets: Increased impact to respond and recover, and support vulnerable people</p> <p>Community expectations: Role of council to support vulnerable people</p>	<p>» Understand and track vulnerable people</p> <p>» Educate & assist vulnerable groups to prepare for climate change</p> <p>» Establish procedures to assist vulnerable people in climate-related emergencies</p> <p>» Ensure Council policies and programmes do not unnecessarily or disproportionately impact vulnerable groups</p>
Open Space	<p>Open space provides multiple social, environmental and economic benefits to the community such as providing recreation, education and tourism opportunities.</p> <p>Much of this open space will be placed under stress by climate change, creating additional resourcing burdens for Council.</p>	<p>Biodiversity: Loss of vegetation and changes in condition</p> <p>Community welfare: Loss of green spaces condition & availability</p> <p>Resources: Increased demand on Council personnel to maintain condition of open space environments, prevent impacts from urban island effect</p> <p>Budgets: Demand on budgets to respond to changed conditions e.g. not enough water/too much water</p>	<p>Psychological/Health: impact on local community, Council employees, volunteers to loss of vegetation & changed conditions of open space, recreational facilities, extreme weather</p> <p>Liability: Increased frequency or severity of injuries to community members using sporting fields or public open spaces that have a deteriorated condition</p>	<p>» Continue to provide recreational opportunities for residents through all seasons</p> <p>» Cost-effectively maintain all open sporting fields and passive open space areas to an adequate standard</p> <p>» Incorporate climate change scenarios in long term plans and budgets</p> <p>» Consider water requirements, benefits of trees, opportunities to create resilient open spaces in face of drought and extreme weather events.</p>
Biodiversity	<p>The City of Greater Geelong is physically diverse and contains many different ecosystems, a significant proportion of which contain endangered or significant species.</p> <p>Climate change impacts have the potential to significantly impact the region's biodiversity, through affecting ecosystem resilience and shifting appropriate habitat ranges.</p>	<p>Biodiversity: Loss of vegetation, loss of integrity of local ecosystems, changes in condition</p> <p>Community welfare: Loss of green spaces, significant vegetation, increase in invasive species, loss of amenity</p> <p>Resources: Increased demand on Council personnel to maintain condition of open space environments</p>	<p>Budgets: Demand on budgets to respond to changed conditions e.g. not enough water/too much water</p> <p>Psychological/Health: impact on local community, Council employees, volunteers, tourists to loss of vegetation & changed conditions of open space environments</p>	<p>» Understand and build knowledge in the distribution of species and their vulnerabilities</p> <p>» Build resilience of biodiversity & open space areas through collaboration with various interest groups</p> <p>» Educate community about biodiversity & its maintenance</p> <p>» Consider creation of adaptation corridors to allow species to adapt and migrate naturally</p> <p>» Consider biodiversity when reducing fuel loads</p>
Building Community Engagement	<p>Community has a large role to play in adaptation. To facilitate working together and to optimise the benefits of the relationship between Council and the community, the broader community needs to understand Council's role in managing and promoting adaptation, and Council needs to understand community needs and concerns.</p>	<p>Council Roles/Responsibility: New situations and conditions resulting in community requiring assistance, co-ordinated response & management from other agencies & pressure from other levels of Government, not clear definition of roles and responsibility for a particular crisis or problem</p>	<p>Community expectation: changed conditions resulting in community pushing Council beyond resources, power and capability</p> <p>Resources: increased pressure on resources to respond to new situations, community expectations</p>	<p>» Understand established lines of responsibility in relation to particular risks, including other responsible agencies/authorities</p> <p>» Understand role in preparing for and responding to climate change</p> <p>» Build community awareness of Council's role</p> <p>» Build relationships with agencies/authorities/community groups to gain feedback on the Climate Change Adaptation Strategy, communicate uncertainties, explore scenarios to identify areas of confusion or overlap in responsibilities.</p>

A

DECISION TREE

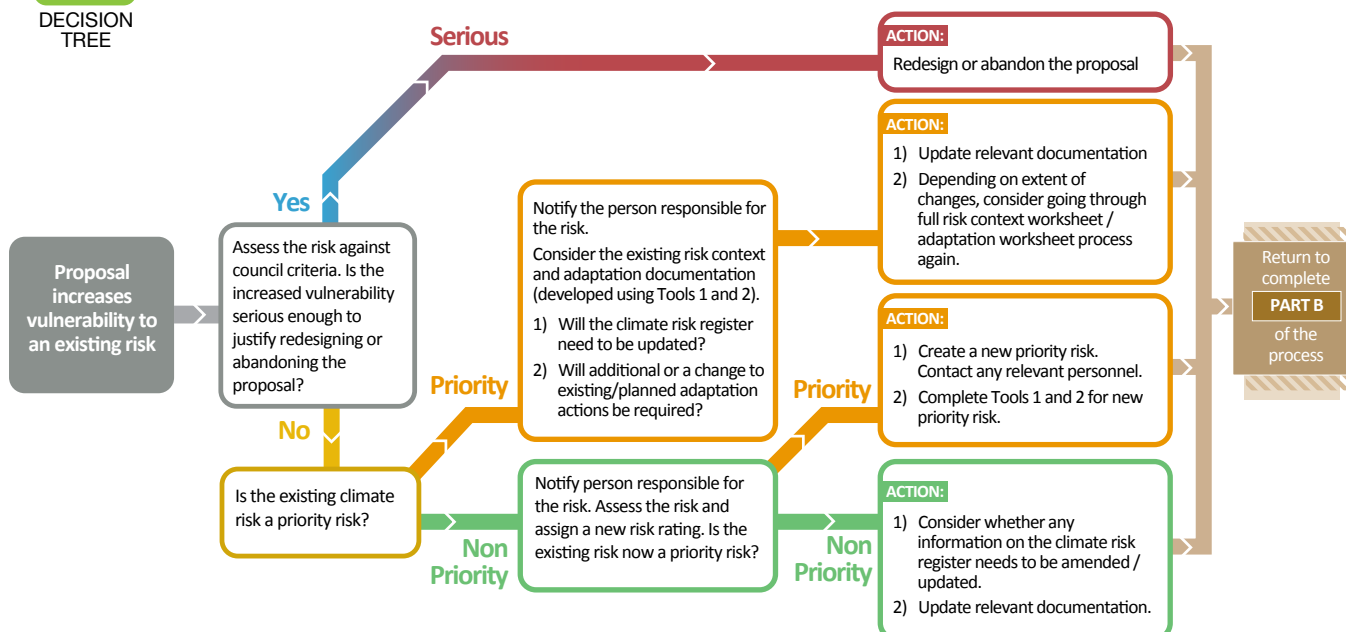
Proposal generates a new climate risk or vulnerability



B

DECISION TREE

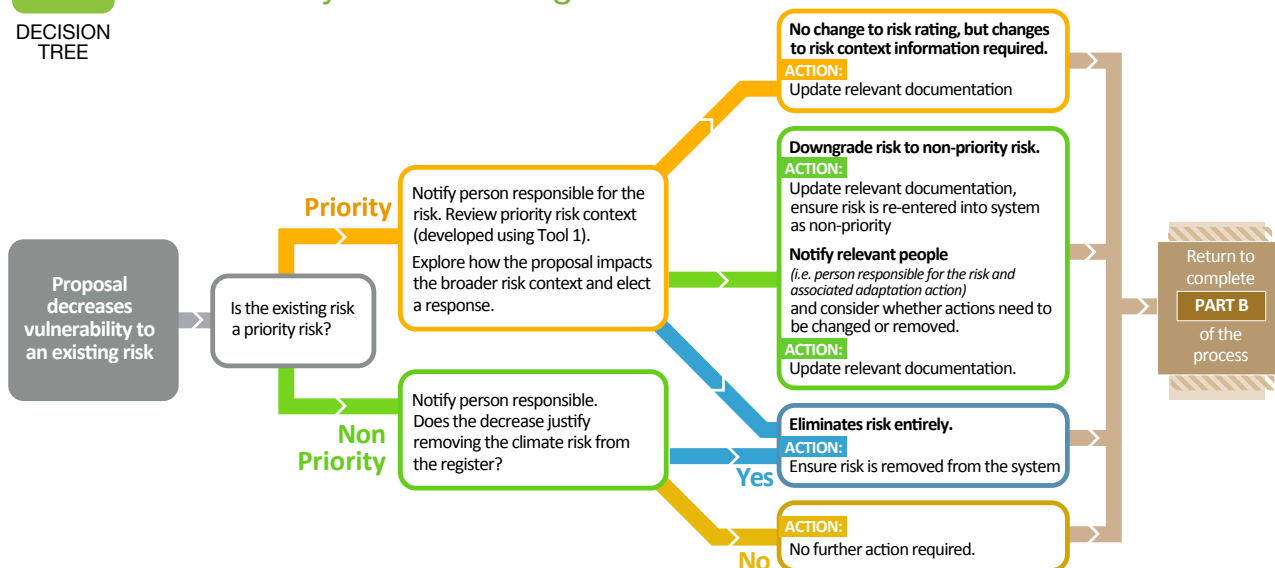
Proposal increases vulnerability to an existing risk





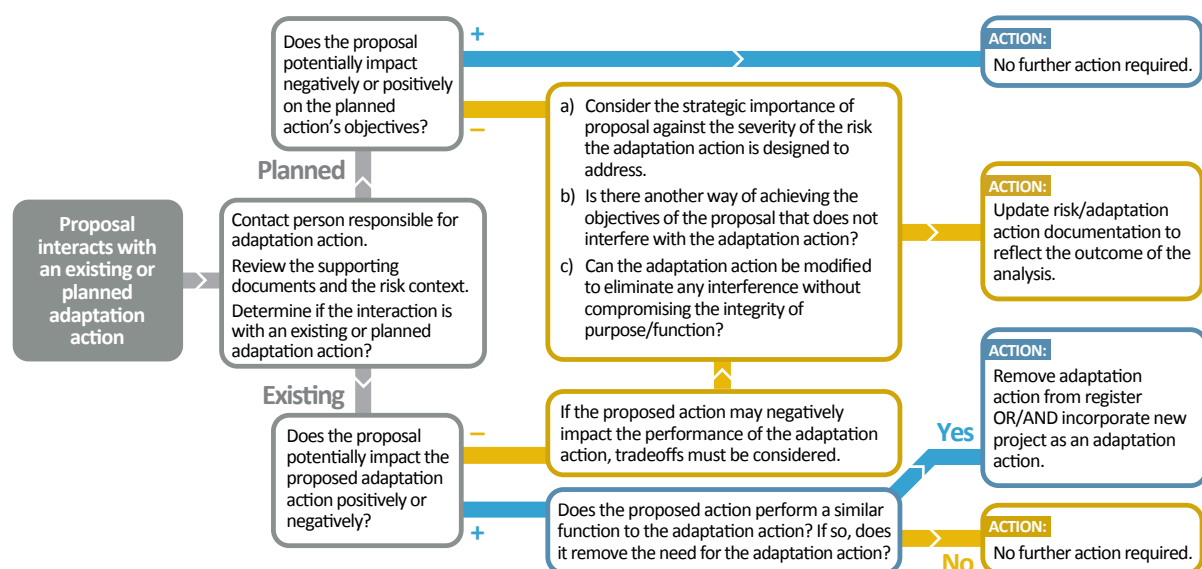
DECISION TREE

Proposal decreases vulnerability to an existing risk



DECISION TREE

Proposal interacts with an existing or planned adaptation action






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