

# Sydney Coastal Councils Group Inc.

CAP Projects Overview

Assessment and Decision Frameworks for Seawall Structures

Demonstrating Climate Change Adaptation of Interconnected Water Infrastructure

Prioritising Coastal Adaptation Development Options for Local Government

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Executive Officer



# Coastal Adaptation Pathways Program

- Invested \$4.5 million to demonstrate effective approaches to adaptation in the coastal zone. (13 projects across the country)
- Aim to partner with decision-makers in the coastal zone to explore and demonstrate decision or investment pathways that can build resilience to the increasing risks from future climate impacts.
- Objectives of the projects:
  - demonstrate the utility of flexible pathways that incorporate future climate risk and adaptation actions into decision-making
  - establish the key partnerships that will position communities in the longer term to drive the reform required to manage climate change risks
  - provide leadership in new approaches to cost-effectively manage legacy asset risk
  - enhance the adaptive capacity of governments, communities and infrastructure and service providers through engagement in developing planning for future options.



**Australian Government**  
**Department of Climate Change  
and Energy Efficiency**





# SCCG PROJECTS

Assessment and Decision frameworks for existing Seawalls  
Demonstrating Climate Change Adaptation of Interconnected Water Infrastructure  
Prioritising Coastal Adaptation and Development Options for Local Government

**Assessment and Decision Frameworks for Seawall Structures**




2011

**Synthesis Report**






Coastal Adaptation Decision Pathways Project (CAP)

**Demonstrating Climate Change Adaptation of Interconnected Water Infrastructure.**



2011

**Final Report**



Coastal Adaptation Decision Pathways Project (CAP)

**Prioritising Coastal Adaptation Development Options for Local Government**



2012

**Final Report**



2012

**November**



Coastal Adaptation Decision Pathways Project (CAP)

## Assessment and Decision Frameworks for Seawall Structures



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Coastal Adaptation Decision Pathways Project (CAP)



### What is the problem:

Existing protection works exist in many locations where construction details are unknown and level of protection not well understood.

Local Government must determine DAs without adequate knowledge of the level of protection provided now and in the future.

Conflict between coastal managers and communities

Climate change complications – extreme conditions will change; structures will deteriorate with time and sea level rise will increase overtopping.

# Assessment and Decision Frameworks for Seawall Structures



2012



## Project Aims

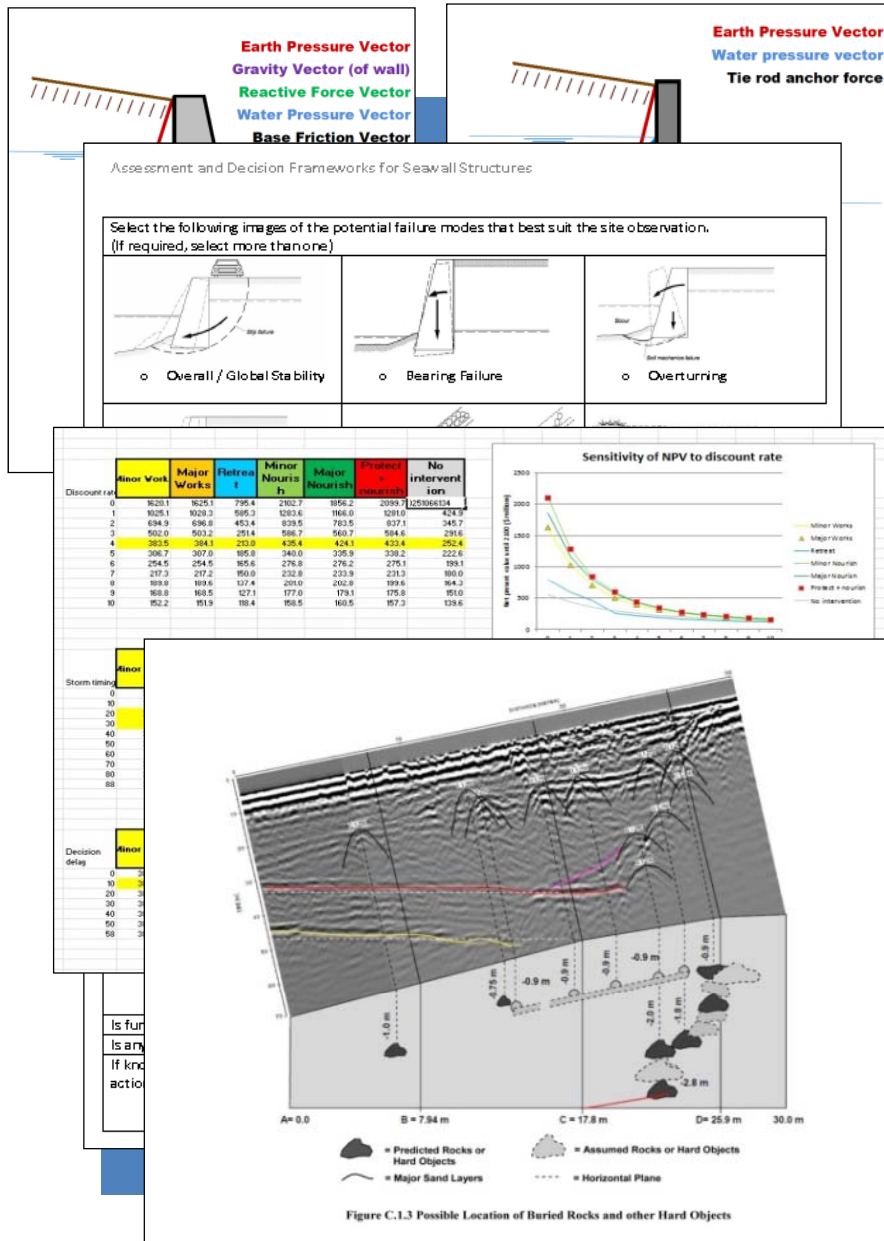
The project assists Local and State Governments to evaluate the robustness and condition of existing seawalls for coastal climate change protection and outline possible options for the future (upgrades / alternative strategies).



Coastal Adaptation Decision Pathways Project (CAP)







## Project Outputs:

- Literature Review
- Geotechnical Report
- Worksheets to evaluate seawall condition
- Advice on methods to assess seawall stability and structure
- Financial tools to assist in project planning for seawalls / alternatives
- Case studies of existing seawalls

(Bilgola, Clontarf)

## Assessment and Decision Frameworks for Seawall Structures



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 Australian Government  
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 EYDNEY COASTAL  
COUNCILS GROUP

Coastal Adaptation Decision Pathways Project (CAP)

## What's next?:

Seawall owners / managers (Councils / agencies) using the templates.

Partner trialling the use of the economic evaluation tool to improve economic inputs to planning and decision making.

# Demonstrating Climate Change Adaptation of Interconnected Water Infrastructure.



2012



Coastal Adaptation Decision Pathways Project (CAP)

## Aim:

To undertake the necessary research to develop information, guidance and capacity building activities to ensure that organisations responsible for managing water infrastructure are able to implement appropriate asset management systems in a changing climate.



Office of Environment & Heritage



## Demonstrating Climate Change Adaptation of Interconnected Water Infrastructure.



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Coastal Adaptation Decision Pathways Project (CAP)

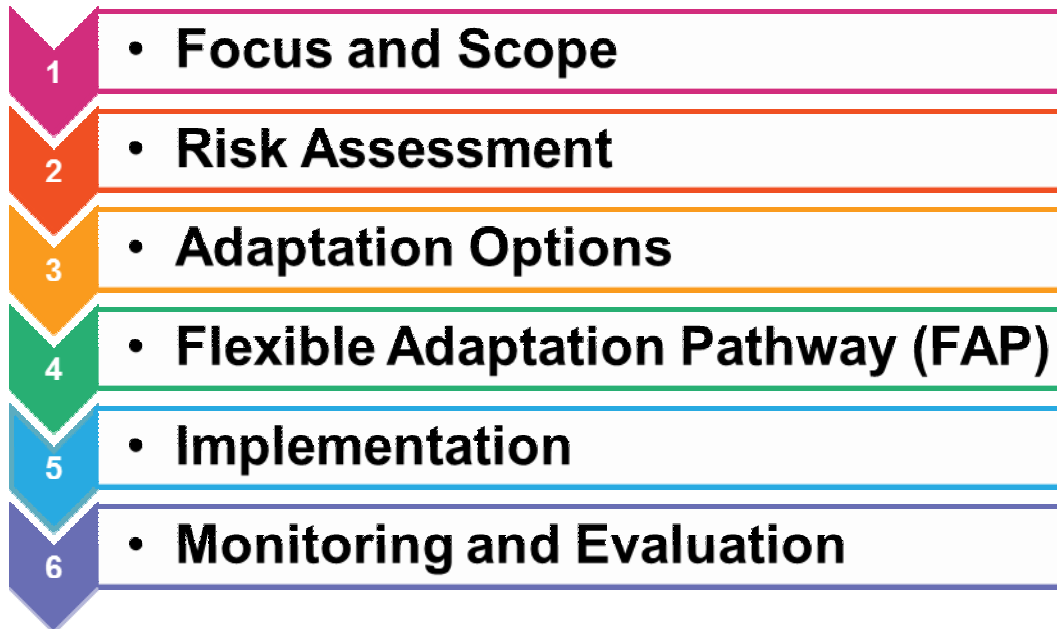
## Outcomes:

Assessment of climate change impacts on water supply and adaptation of interconnected water infrastructure


An Adaptation Resource Centre and User Guide to assist water infrastructure managers develop adaptation measures for water infrastructure

Illustrative case studies of an Infrastructure Vulnerability Assessment Framework to local, state and national stakeholders



# The Framework



# Interactive PDF



- 1 Focus and Scope**
- 2 Risk Assessment**
- 3 Adaptation Options**
- 4 Flexible Adaptation Pathway (FAP)**
- 5 Implementation**
- 6 Monitoring and Evaluation**

Interactive PDF

client  
**Sydney Coastal Councils Group**  
**Sydney Water**  
**Office of Environment & Heritage**

project  
**Demonstrating Climate Change Adaptation for Interconnected Water Infrastructure**

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Overview

- 1** Focus and Scope
- 2** Risk Assessment
- 3** Adaptation Options
- 4** Flexible Adaptation Pathway (FAP)
- 5** Implementation
- 6** Monitoring and Evaluation

References

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Additional documents

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Print Report

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Office of Environment & Heritage

**Overview**

This interactive PDF has been developed to help water infrastructure providers in decision making for adaptation of interconnected water infrastructure via a six stage decision making framework. The interactive PDF is part of a suite of five documents which comprise the synthesis report for this project. The synthesis report consists of the following documents:

**Part 1 – Overview:** This section provides an overview of the study, the general objectives and the issues and challenges facing interconnected water infrastructure managers in the context of climate change. It also provides a summary of key findings.

**Part 2 – User Guide:** This section is designed to be read in conjunction with the interactive PDF. It provides a summary of each stage of the framework including what the stage involves, why it is important and brief explanation as to how it is to be completed.

**Part 3 – Interactive PDF (iPDF):** The iPDF guides decision makers for interconnected water infrastructure through a six stage decision making framework. The iPDF provides users with a series of inputs, tools and approaches, outputs and evaluation requirements to enable the development and implementation of an effective and efficient Flexible Adaptation Pathway.

**Part 4 – Case Studies:** This section provides details of how the approach was adopted on five case studies and highlights lessons learnt.

**Part 5 – Background Information:** This section provides a greater technical level of detail on how the framework was adopted and why it is relevant for interconnected water infrastructure. In addition, case study learnings and global practice examples are provided.





# User Guide



## Step 6 – Review climate change projections

As a project team decide which climate change projections, climate change projection periods and event frequencies to use. Key considerations are:

- Will the scope include a number of climate change scenarios or will these be limited to a worst case scenario, or government agreed projections?

Note that the greater the range of projections considered, the more robust the final outcome will be. The number of projections will also be limited by time and budget.



Climate change projection reference sources can be found in the iPDF.

- What time scales are relevant to the assets or planning systems?

To assist in this stage consider the long term planning timeframes of the organisation(s).



Referring back to the aims of the project may help to identify which timescales and climate change projections are important to the project.



Often impacts of the current 1 in 100 year ARI event are well understood as these are used to set local flood zones and coastal hazard zones. However, for climate change adaptation the impacts during ALL events including the less intense but more frequent events (such as the 1 in 20 year ARI events) are important.

Considering just the 1 in 100 year ARI event may be a good way to start the project and to understand the order of magnitude of the potential impact. Smaller more frequent events (such as 1 in 20 year ARI) could be added to the scope later.

The output of this step is an agreed set of climate change projections.

## Step 7 – Define problem

Problem definition is an important step in this first stage. Using the information gathered in Step 1 to Step 5, consider holding a problem definition workshop and inviting the identified stakeholders.



An example 'Kick-off Workshop Agenda' can be found in the iPDF.

The aim of this workshop is to:

- Confirm the drivers for the project.
- Identify any additional stakeholders.



# Tools and Resources

Table 1 Overview of IFLU

Stage	Overview	Inputs	Tools	Outputs	Evaluation
1. Focus and Scope	<ul style="list-style-type: none"> <li>Step 1 – Identify project aims and desired outcomes</li> <li>Step 2 – Develop project plan</li> <li>Step 3 – Identify scope and dependency</li> <li>Step 4 – Invite others to participate</li> <li>Step 5 – Review climate variables and climate events</li> <li>Step 6 – Review climate change projections</li> <li>Step 7 – Define problem</li> <li>Step 8 – Gather data identified</li> </ul>	<ul style="list-style-type: none"> <li>Organisational drivers</li> <li>Potential stakeholders</li> <li>Project team structure</li> <li>Previous climate change studies</li> <li>Potential assets, areas and impacts</li> <li>Ownership and responsibility of assets/services</li> <li>Possible climate change parameter(s)</li> <li>Existing plans, policies, strategies, studies</li> <li>Relevant legislative requirements</li> </ul>	<ul style="list-style-type: none"> <li>Stakeholder Identification Plan</li> <li>Impact Screening Matrix</li> <li>Kick-off Workshop Agenda</li> </ul>	<ul style="list-style-type: none"> <li>Agreed aim and desired outcome for project</li> <li>Project plan</li> <li>Asset register</li> <li>Register of relevant stakeholders</li> <li>Completed impact screening matrix</li> <li>Agreed climate change projections</li> <li>Definition of problem</li> <li>Data and information repository</li> </ul>	Checklist
2. Risk Assessment	<ul style="list-style-type: none"> <li>Step 1 – Review data and information</li> <li>Step 2 – Identify suitable risk assessment approach</li> <li>Step 3 – Identify attitudes to risk and risk thresholds</li> <li>Step 4 – Identify current likelihood of climate events</li> <li>Step 5 – Identify future likelihood of event(s) occurring with climate change</li> <li>Step 6 – Identify method to evaluate consequences</li> <li>Step 7 – Evaluate consequences</li> <li>Step 8 – Evaluate risk</li> <li>Step 9 – Compare risk against risk thresholds</li> </ul>	<ul style="list-style-type: none"> <li>Asset data and information</li> <li>Legal and corporate requirements</li> <li>Social context and community expectations</li> <li>Climate change projections</li> </ul>	<ul style="list-style-type: none"> <li>Climate Change Risk Assessment Techniques</li> <li>Publicly Available Calculators</li> <li>Guidance to Estimate Intangible Health Impacts of Flooding</li> </ul>	<ul style="list-style-type: none"> <li>Understanding of data</li> <li>Agreed risk assessment approach</li> <li>Description of risk thresholds, understanding of how risk attitudes may change over time, and process for monitoring changes</li> <li>Description of current likelihood</li> <li>Description of future likelihood</li> <li>Agreed method to evaluate different consequences</li> <li>Evaluation of consequences for range of events</li> <li>Quantified or qualified overall risk</li> <li>Comparison of risk level with risk thresholds over projection period, and where it is exceeded</li> </ul>	Checklist
3. Adaptation Options	<ul style="list-style-type: none"> <li>Step 1 – Identify potential adaptation options</li> <li>Step 2 – Identify 'real options'</li> <li>Step 3 – Check for maladaptation</li> <li>Step 4 – Identify barriers and adaptive capacity building options</li> <li>Step 5 – Refine adaptation options</li> <li>Step 6 – Evaluate effectiveness of options</li> <li>Step 7 – Nominate efficiency evaluation criteria</li> <li>Step 8 – Evaluate efficiency of options</li> <li>Step 9 – Test efficiency and effectiveness under multiple climate change scenarios</li> </ul>	<ul style="list-style-type: none"> <li>Technical knowledge and expertise</li> <li>Community expectations</li> <li>Stakeholder views and capacity</li> <li>Barriers to adaptation</li> <li>Capital costs</li> <li>Operational costs</li> <li>Lost opportunity costs</li> <li>Effectiveness of various options</li> <li>Understanding of risk thresholds</li> </ul>	<ul style="list-style-type: none"> <li>Adaptation Options</li> <li>Real Options</li> <li>Climate Change Risk Assessment Techniques</li> </ul>	<ul style="list-style-type: none"> <li>Broad list of adaptation options</li> <li>Understanding of how options could be staged to improve flexibility</li> <li>Refined list of adaptation options which excludes maladaptation</li> <li>List of barriers, potential strategies to overcome them, and adaptive capacity building adaptation options</li> <li>Detail for options relating to timing, size and extent</li> <li>Level of risk reduction, comparison with risk threshold and bundled options</li> <li>Set of criteria to evaluate efficiency</li> <li>Ranking of each option by efficiency</li> <li>Performance under different climate change scenarios</li> </ul>	Checklist
4. Flexible Adaptation Pathway (FAP)	<ul style="list-style-type: none"> <li>Step 1 – Identify and evaluate 'no regrets' options to implement now</li> <li>Step 2 – Review complementarity of other options</li> <li>Step 3 – Identify trigger points for options to implement later</li> <li>Step 4 – Prepare Flexible Adaptation Pathway (FAP)</li> <li>Step 5 – Undertake scenario testing</li> </ul>	<ul style="list-style-type: none"> <li>Opinions of relevant stakeholders</li> <li>Adaptation options and barriers (outputs of Adaptation Options stage)</li> <li>Timing, thresholds and trigger points</li> <li>Pre-work – feasibility studies, planning approval, business case approval, etc.</li> <li>Lead in and run-up time for adaptation options</li> </ul>	<ul style="list-style-type: none"> <li>No regrets options</li> <li>Flexible adaptation example</li> <li>Simplified Flexible Adaptation Pathway example</li> <li>Climate Change Risk Assessment Techniques</li> </ul>	<ul style="list-style-type: none"> <li>List of 'no regrets' options and risk reduction potential</li> <li>List of potential adaptation pathways</li> <li>List of options to be implemented at some point in time, trigger points and considerations for decision makers</li> <li>Visual representation of FAP</li> <li>Understanding of how FAP will be implemented, and opportunities to improve FAP</li> </ul>	Checklist
5. Implementation	<ul style="list-style-type: none"> <li>Step 1 – Review Flexible Adaptation Pathway (FAP)</li> <li>Step 2 – Agree governance for works</li> <li>Step 3 – Prepare business case (if required)</li> <li>Step 4 – Identify funding opportunities</li> <li>Step 5 – Implement adaptation option</li> </ul>	<ul style="list-style-type: none"> <li>Outputs from Flexible Adaptation Pathway stage</li> <li>Governance structures</li> <li>Potential funding requirements</li> </ul>	<ul style="list-style-type: none"> <li>Agenda for project governance plan</li> <li>Business case guidelines</li> <li>Community and Stakeholder Engagement Plan template</li> <li>Details of funding mechanisms and models</li> </ul>	<ul style="list-style-type: none"> <li>Stakeholder agreement on implementation task</li> <li>Project governance plan</li> <li>Completed and approved business case</li> <li>Agreement on how funding will be obtained</li> <li>Actual deliverable</li> </ul>	Checklist
6. Monitoring and Evaluation	<ul style="list-style-type: none"> <li>Step 1 – Monitor to define problem</li> <li>Step 2 – Monitor risk attitudes and risk thresholds</li> <li>Step 3 – Monitor climate change projections</li> <li>Step 4 – Monitor social, physical and economic factors</li> <li>Step 5 – Monitor and evaluate adaptation options</li> </ul>	<ul style="list-style-type: none"> <li>Initial objectives and scope</li> <li>Climate change projections</li> <li>Risk attitudes</li> <li>Community expectations</li> <li>Baseline data</li> <li>Stakeholder actions</li> </ul>	<ul style="list-style-type: none"> <li>SCCG Environmental Monitoring</li> <li>Results Based Management (RBM)</li> <li>Logical Framework Matrix</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring and evaluation program to define problem</li> <li>Monitoring and evaluation program for risk threshold over time</li> <li>Monitoring and evaluation program for climate change projections</li> <li>Monitoring and evaluation program for social, physical and economic factors</li> <li>Monitoring and evaluation program for adaptation options</li> </ul>	Checklist



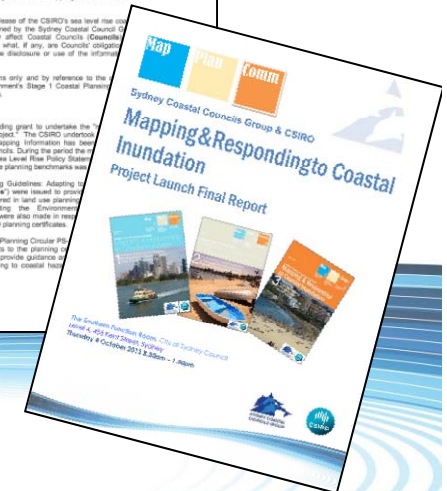
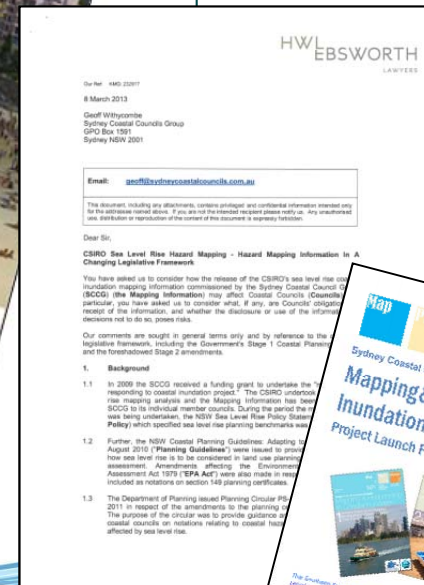
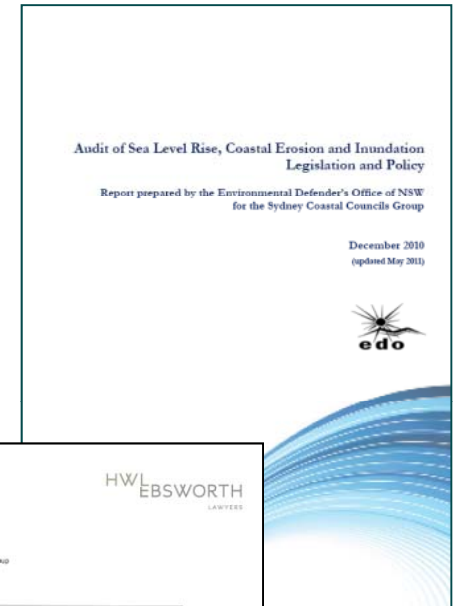
# Prioritising Coastal Adaptation Development Options for Local Government



Coastal Adaptation Decision Pathways Project (CAP)



# Mapping and Responding to Coastal Inundation



National Research  
**FLAGSHIPS**  
Climate Adaptation



# QUESTIONS / COMMENTS ?

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