



Town of Cottesloe

Town of Cottesloe Local Climate Change Adaptation Action Plan

2011-2016

Aim

To develop an action plan that sets out priorities and timelines for the Town of Cottesloe to manage and adapt to the localised impacts from human enhanced climate change.

Background

Adapting to the unavoidable impacts of climate change, which is caused by greenhouse gas emissions released by human activities, is a responsibility that the Town takes seriously. The Town commissioned a *Vulnerability of the Cottesloe Foreshore to the Potential Impacts of Climate Change Report* in 2008, which was completed by independent consultants, Coastal Zone Management. A Risk Treatment Plan is being implemented to determine how the impacts of climate change will affect the physical coastal environment and the implications for existing infrastructure. As a participant of the Western Suburbs Regional Organisation of Councils (WESROC) the Town also completed a *WESROC Climate Change Risk Assessment and Adaptation Report (2010)* to determine regional impacts from climate change. These reports provide an excellent basis for the Town to adapt to the high priority risks from climate change.

The WESROC Climate Change Risk Assessment and Adaptation Report (WCCRAAR) was also completed by Coastal Zone Management. Participating councils in the project were the Town of Cottesloe, the Town of Mosman Park, the Town of Claremont, the City of Nedlands, the Shire of Peppermint Grove, the City of Subiaco, and the Town of Cambridge.

The primary objectives of the project were to:

- Identify the potential future impacts of climate change in the WESROC region and the associated risks to participating councils.
- Develop a regional plan for action.
- Review activities undertaken by WESROC members to mitigate greenhouse gas emissions.

(WESROC 2010, p iii)

A Regional Climate Change Adaptation Action Plan (Regional Plan) is being developed by the regional Climate Change Project Group, which is made up of senior representatives from each of the participating councils. The Manager of Development Services is Cottesloe's representative. The Regional Plan aims to achieve regional adaptation actions across the western suburbs region.

WCCRAAR also provided individual risk treatments for each of the participating members to identify adaptation actions that need to be addressed independently. This *Climate Change Local Adaptation Action Plan: 2011-2016* (the Plan) sets out the local adaptation actions that were recommended for the Town of Cottesloe (the Town) to protect and maintain key assets and service delivery areas from the impacts of human enhanced climate change.

Climate Scenario

Climate change projections in the WCCRAAR were based upon the Intergovernmental Panel on Climate Change (IPCC 2007) A1 FI climate change scenario for the year 2070 (50th percentile). This scenario is the upper climate change scenario developed through the IPCC Special Report on Emission Scenarios (IPCC 2000). “FI” stands for an envisaged “fossil intensive” future global economy. The anticipated changes for Perth (see Table 1) under this scenario include:

- An increase in annual temperature of 2.7°C and approximate doubling of the days over 35°C.
- A decline in annual rainfall of approximately 20%;
- Increase in the mean sea level of 0.33 m; and
- Decrease in the number but increase in the intensity of extreme events (CSIRO 2007).

Climate Variable	Annual	Summer	Autumn	Winter	Spring
Temperature (°C)	+2.7	+2.9	+2.7	+2.3	+2.9
No. of days over 35°C (currently ≈ 28 days)	53.8				
Rainfall (%)	-19	-12	-12	-22	-27
Potential Evaporation	+7	+6	+9	+16	+6
Wind Speed	-1	+8	+6	-14	-3
Relative Humidity	-2.0				
Solar Radiation	+1.4				

Table 1. Climate Change projections for key climate variables for Perth, based on the A1FI climate change scenario for 2070 (50th percentile) (CSIRO 2007), source: WCCRAAR (2010).

Projected Impacts of Climate Change

Due to the magnitude and variety of impacts projected from climate change the Town recognizes that all three levels of government need to commit and cooperate to successfully adapt to the impacts of climate change. Appendix A provides a more detailed list of the projected impacts of climate change for the Cottesloe area.

Risk Assessment

A list of key asset and service delivery areas (KASDA) was developed to ensure that the impacts from climate change were aligned to key asset and service delivery areas across all member councils:

- General Options (G)
- Infrastructure and Property Services (IPS)
- Planning (PPD)
- Health and Community Services (H)
- Emergency Management (EM)
- Recreational Services (R)
- Natural Resource Management (NRM)

The risks and consequences of the projected climate change impacts upon KASDA were classified through a risk matrix as being a Low; Medium; High; or Extreme priority for each participating council.

The key climate change risks identified for the WESROC region are:

- Threat to infrastructure adjacent to coast and estuarine foreshore from erosion and inundation and from extreme storm events.
- Impact of climate changes on management and maintenance of infrastructure, drainage and wastewater networks.
- Impact of extreme weather events and increased range of vector-borne diseases on community health and the emergency response.
- Impact of climatic changes on natural resource management, including biodiversity of native bushland areas and landscaped gardens and environmental water quality.

The 'Extreme' risks identified for the Cottesloe area are:

- Environmental water quality: Changes in groundwater levels, flood plains and increased peak flows leading to decline in water quality.
- Vector Management (Mosquitoes): Increase in geographical range and seasonality of vector-borne diseases and the possibility for an expansion of receptive zones.

Adaptation Options

Adaptation options are measures that can be taken to adapt to the projected impacts from climate change. Often adaptation options are categorized into two groups:

1. Options that build adaptive capacity (often the first step).
2. Options that deliver adaptation action.

Adaptation Actions

Adaptation actions are specific tasks to complete the adaptation option. These actions can have one of six approaches:

- Spread risk – geographical diversification;
- Structural/technological/engineering solutions or changed practices;
- Regulatory/institutional changes to prevent, or mitigate effects through legislation and planning;
- Avoidance: avoid or exploit changes in risk;
- Research; and
- Education.

The Town is participating in the regional Climate Change Project Group to oversee implementation of the regional adaptation actions from WCCRAAR (2010).

Adaptive Management

Adaptive management involves putting in place small, flexible, incremental changes based on regular monitoring and revision of plans using the information available at the time. Adaptive management contrasts markedly with highly limiting alternative approaches, such as relying on one-off large scale treatments.

Prioritising Adaptation Actions

Risk analysis was used to select the best adaptation options. Adaptation actions were prioritised (see Table 2 below) based upon the following criteria:

1. Treating or managing the priority climate change risks; and
2. Having limited barriers to implementation.

Financial barriers were often the most significant barrier identified for the Town of Cottesloe.

Adaptation Action Classification	Recommended Response
Important and Easy	Take Action Now
Important but Tricky	Begin to Remove Barriers
Not so Important but Easy	Take Action when Opportunity Presents
Too Hard for Now	Take Action to Remove Barriers and Enhance Opportunities when Opportunity Presents

Table 2. Strategy for Implementing Adaptation Actions

Climate Change Mitigation

The Town of Cottesloe is also addressing climate change through mitigation activities such as purchasing Green Power, offsetting vehicle fleet emissions and actively reducing greenhouse gas emissions through the carbon neutral project. The Town of Cottesloe aims to be carbon neutral, with no net emissions from operations by 2015.

Local Adaptation Action Plan

The Plan lists the adaptation actions (see Table 3 below) that the Town must implement to prepare for the impacts of climate change on key assets and service delivery areas. The adaptation actions are ranked in accordance with the classification applied through the prioritization analysis (Table 2). This allows the Town to identify *Important and Easy* actions for immediate implementation and begin the appropriate steps for all other adaptation actions.

Monitoring and Review

This Plan will be monitored annually to determine progress against the adaptation actions for the Town.

A major review will be undertaken in 2013-2014 to identify future action that may be needed. This review will coincide with a major review of WCCRAAR and will take into account any changes to climate change action at a regional scale. The climate change risk treatment strategy should be reviewed as part of the planned monitoring and review cycle.

Area	Option ID	Adaptation Option	Adaptation Action	2011/ 2012	2012/ 2013	5 years	Responsibility Area	Task Completed
Adaptation options that are "Important and Easy" for the Town of Cottesloe: "Take Action Now"								
General	G01	Ensure quality and validity of information services for decision making	1. Review most recent climate change information at a regional and local scale as it becomes available	x			MES/ Sustainability Officer	√
			2. Communicate state-of-knowledge regarding climate change and climate related risks across all local government departments	x			MES/ Sustainability Officer	
			3. Regularly review existing and potential technology that may assist adaptation actions.		x		MES/ Sustainability Officer	√
			4. Maintain open dialogue with relevant state/federal departments on climate change adaptation	x			MES/ Sustainability Officer	
	G02	Disseminate information on implications of identified risks of climate change within the WESROC region to relevant authorities/agencies	1. Present outcomes of the study to key stakeholders; including state and local government.	x			MES/ Sustainability Officer/ Coast Care Officer	
	G03	Educate and involve the community with climate change and adaptation activities	1. Create a community awareness and participation program to disseminate results of the current study.		x		Sustainability Officer/ Coast Care Officer	
	G04	Communicate with key service providers to facilitate 'shared care' approach to the management of the impacts of climate change on key services within the WESROC region	For example, contact Watercorp requesting information on the implications for council if their facilities are damaged.	x			MES/ Sustainability Officer	
	Sub-Total Adaptation Actions				5	2	0	

Area	Option ID	Adaptation Option	Adaptation Action	2011/ 2012	2012/ 2013	5 years	Responsibility Area	Task Completed
Adaptation options that are "Important and Easy" for the Town of Cottesloe: "Take Action Now"								
General	G05	Establish/strengthen relationships with community groups to facilitate monitoring activities, raise awareness and participate in adaptation strengthening activities	1. Educate the community about the increased pressure of providing stabilised dunes and foreshores.	x			MES/ Community Development Officer/ Sustainability Officer/ Coast Care Officer	√
	G06	Strengthen the profile of climate change and capacity building within local government.	1. Disseminate climate change information and new knowledge within each member Council	x			MES/ Sustainability Officer	
			2. Adopt the WALGA declaration on climate change within each Council.	x			CEO	In prep.
			3. Decrease the 'silo' nature of climate change management within Council through development of planning strategies that mainstream climate change adaptation across departments.	x			CEO/ Management	
			4. Undertake targeted capacity building programs and review resourcing to address climate change	x			CEO/ Management	
	G07	Incorporate climate change scenarios into policy and decision making processes (Council wide)	1. Review management plans, guidelines and other decision making tools to ensure climate change is incorporated into planning and decision-making.	x			CEO/ Management/ Sustainability Officer	
			2. Identify gaps in current decision making frameworks and develop strategies to incorporate climate change	x			CEO/ Management/ Sustainability Officer	In prep.
Sub-Total Adaptation Actions				12	2	0		3

Area	Option ID	Adaptation Option	Adaptation Action	2011/ 2012	2012/ 2013	5 years	Responsibility Area	Task Completed
Adaptation options that are "Important and Easy" for the Town of Cottesloe: "Take Action Now"								
General	G07	Incorporate climate change scenarios into policy and decision making processes (Council wide)	3. Undertake literature review of the effectiveness of implementing updated frameworks in line with scheduled climate change risk assessments and adaptation planning	x			CEO/ Management/ Sustainability Officer	
	G09	Review insurance coverage of Council assets and liability	1. Broaden insurance cover to better protect Council from sudden clean-up costs.	x			CEO/ Management	
			2. Review policies, procedures and current levels of insurance coverage.	x			CEO/ Management	
			3. Awareness campaigns to at risk businesses, preparation and insurance.	x			CEO/ Management	
Planning	PPD02	Modify Council planning approval process	1. Update planning policies to promote environmental design features (e.g. passive solar design, walkable community)		x		MDS	
			2. Promote erosion and flood risk management through water sensitive urban design at the planning and assessment stages.		x		MDS	
			3. Progressively incorporate higher design standards into asset management plans and rolling capital works programs			x	MDS	
Sub-Total Adaptation Actions				16	4	1		3

Area	Option ID	Adaptation Option	Adaptation Action	2011/ 2012	2012/ 2013	5 years	Responsibility Area	Task Completed
Adaptation options that are "Important and Easy" for the Town of Cottesloe: "Take Action Now"								
Planning	PPD02	Modify Council planning approval process	4. Modify local planning requirements for major developments, to put the onus on developers to provide geotechnical information to support decision making.			x	MDS	
Infrastructure and Property Services	IPS02	Monitor changes in infrastructure condition (i.e. roads, buildings, transport and lighting) so that any modification occurs prior to failure.	1. Investigate opportunities for regional resource sharing arrangements across the WESROC region	x			MES	√ Ongoing
			2. Improve record keeping to allow historical condition tracking (i.e. access to monitoring records).	x			MES	√ Ongoing
			3. Identify areas requiring immediate attention/ongoing monitoring (align to integrated monitoring strategy)	x			MES	
			4. Identify alternative options should the existing infrastructure be impacted upon in order to maintain services and connections		x		MES	
			5. Incorporate planned activities within an approved budget framework.	x			MES	
Sub-Total Adaptation Actions				20	5	2		5

Area	Option ID	Adaptation Option	Adaptation Action	2011/ 2012	2012/ 2013	5 years	Responsibility Area	Task Completed
Adaptation options that are "Important and Easy" for the Town of Cottesloe: "Take Action Now"								
Infrastructure and Property Services	IPS03	Improve storm water capture and reuse	1. Investigate drainage improvements at known flash flood points of transport system, and advocate similar actions outside WESROC boundaries	x			MES	
			2. Improve asset inventory to allow best practice design of stormwater infiltrations. In some cases, current records of side entry pits and underground stormwater pipe networks are not well recorded			x	MES	
			3. Investigate management strategies and implement most effective strategies to manage stormwater outfalls (e.g. nutrient stripping gross pollutant traps)	x			MES	
			4. Continue upgrading stormwater infrastructure using water sensitive urban design methods and modelling that caters for climate change			x	MES	
Sub-Total Adaptation Actions				22	5	4		5

Area	Option ID	Adaptation Option	Adaptation Action	2011/ 2012	2012/ 2013	5 years	Responsibility Area	Task Completed
Adaptation options that are "Important but Tricky" for the Town of Cottesloe: "Take Action Now – Begin to Remove Barriers"								
Planning	PPD01	Incorporate climate change scenarios into policy and decision making processes (planning specific)	1. Lengthen council strategic planning horizons		x		MDS/ Sustainability Officer	
			2. Revise planning guidelines for habitable floor levels to better protect future development		x		MDS/ MES/ Sustainability Officer	
Natural Resource Management	NRM06	Enhance coastal and estuarine foreshore management	1. Investigate funding opportunities to implement management works in the foreshore zone.	x			MES/ Coast Care Officer	
			2. Include proactive protective measures in the Town Planning Scheme; i.e. installation of gross pollutant traps on stormwater pipe outlets	x			CEO/ Management	
Sub-Total Adaptation Actions				24	7	4		5

Area	Option ID	Adaptation Option	Adaptation Action	2011/ 2012	2012/ 2013	5 years	Responsibility Area	Task Completed
Adaptation options that are "Not so Important but Easy" for the Town of Cottesloe: "Take Action when Opportunity Presents"								
Infrastructure and Property Services	IPS01	Review the structural integrity of existing defence structures	1. Consult with the DoT to gather feedback on the review of existing coastal defence structures (undertaken in 2009) - This information will inform additional adaptation planning along the coast	x			MES	
			2. Review existing coastal and riverine areas for valuable infrastructure.	x			MES	
			3. Develop programme of works to upgrade existing defence structures.		x		MES	
	IPS04	Review and amend design specifications for new developments (retrofitting existing developments and provisions for new developments)	1. Design new low cost and relocatable access pathways and fencing		x		MES	
			2. Review and amend building design specifications to reduce vulnerability to climate change, ie reduce reliance on air-conditioning; improve water use, increase service lifetime.			x	MDS	
			3. Investigate and implement standards to reduce sensitivity of inflexible infrastructure		x		MDS	
	IPS05	Review geotechnical information and establish information gaps and needs	1. Request detailed geotechnical information from service providers in format suitable for review and analysis in Council	x			MES	√
			2. Develop Terms of Reference for Geotechnical works along the Coastal zone		x		MDS/ MES	
Sub-Total Adaptation Actions				27	11	5		6

Area	Option ID	Adaptation Option	Adaptation Action	2011/ 2012	2012/ 2013	5 years	Responsibility Area	Task Completed
Adaptation options that are "Not so Important but Easy" for the Town of Cottesloe: "Take Action when Opportunity Presents"								
Infrastructure and Property Services	IPS05	Review geotechnical information and establish information gaps and needs	3. Source Funding for Geotechnical works along the Foreshore, in partnership with state government.	x			MES	√
			4. Commission Geotechnical investigations at required locations		x		MES	√
	IPS07	Investigate opportunities to improve waste collection, management, reuse and recycling	1. Community education in waste minimisation	x			Principal Environmental Health Officer/ Sustainability Officer	√ Ongoing
			2. Explore increasing the percentage difference between a 120L and 240L bin waste service fee	x			Principal Environmental Health Officer/ Sustainability Officer	
			3. Investigate the feasibility of regional resource sharing agreements	x			Principal Environmental Health Officer/ WMRC	
	IPS08	Investigate opportunities for increased waste-water re-use and recycling	1. Investigate opportunities for a management system to register properties that have grey-water systems			x	MCCS/ Principal Environmental Health Officer/ Sustainability Officer	
Emergency Management	EM01	Review and update disaster planning and management	1. Request information (from LEMC) on the step-by-step actions that would be required in a disaster situation. For example, evacuation measures, informing businesses of risk etc	x			MCS/ MES	
			2. Identify alternative options should the existing building and infrastructure be impacted upon in order to maintain services and connections			x	MCS/ MES	
Sub-Total Adaptation Actions				32	12	7		9

Area	Option ID	Adaptation Option	Adaptation Action	2011/2012	2012/2013	5 years	Responsibility Area	Task Completed
Adaptation options that are "Not so Important but Easy" for the Town of Cottesloe: "Take Action when Opportunity Presents"								
Emergency Management	EM01	Review and update disaster planning and management	3. Identify major sources and locations of clean up expenses in member Councils following major events.			x	MCS/ MES	
			4. Identify priority adaptations to mitigate clean up expense in balanced consideration of other risks, and incorporate in a regional action plan.		x		MCS/ MES	
Health and Community Services	H01	See G03 and G06	1. Educate the community and local government staff on health related impacts of climate change			x	MES/ Principal Environmental Health Officer/ Sustainability Officer	
	H02	Modify work practice to reduce community and staff vulnerability to the impacts of climate change	1. Implement policy for outdoor work programs, that considers the potential health impacts of working in higher temperatures	x			MES/ Human Resources/ Works Supervisor	
	H03	Monitor key determinants effecting human health.	1. Investigate opportunity for regional monitoring program and liaise with Department of Health to ensure alignment between programs	x			Principal Environmental Health Officer	
			2. Upgrade information storage databases, develop a special needs database, increase management of vectors (mosquitoes).	x			Principal Environmental Health Officer	
Sub-Total Adaptation Actions				35	13	9		9

Area	Option ID	Adaptation Option	Adaptation Action	2011/2012	2012/2013	5 years	Responsibility Area	Task Completed	
Adaptation options that are “Not so Important but Easy” for the Town of Cottesloe: “Take Action when Opportunity Presents”									
Recreational Services	R01	Investigate opportunities to enhance water management	1. Promote water efficient landscaping, including community education on the importance of species selection with respect to water regimes	x			MES/ Sustainability Officer	√ Ongoing	
			2. Investigate alternative water supply options, i.e. rain water tanks, aquifer storage and recovery, grey water and groundwater and grass types; and liaise with Dept of Water to provide an inventory of private property bores.	x			MES/ Sustainability Officer		
	R02	Investigate opportunities to maintain adequate public open space/landscaped areas and street trees	1. Facilitate advertising of clubs at local schools and events				Sustainability Officer		
			2. Identify land that may be allocated as public open space, if required, or made available for clubs to use (i.e. school ovals)	x			MES/ Coast Care Officer/ Sustainability Officer		
			3. Educate the community on climate change and anticipated changes in open space				MES/ Coast Care Officer/ Sustainability Officer		
			4. Investigate alternative species that have higher resilience to the effects of climate change				MES/ Works Supervisor/ Coast Care Officer		
	R03	Monitor change in public open space (in particular, coastal erosion and condition of recreational facilities)	See NRM03	x			MES/ Works Supervisor/ Coast Care Officer		
	Sub-Total Adaptation Actions				39	13	9		10

Area	Option ID	Adaptation Option	Adaptation Action	2011/2012	2012/2013	5 years	Responsibility Area	Task Completed
Adaptation options that are "Not so Important but Easy" for the Town of Cottesloe: "Take Action when Opportunity Presents"								
	R04	Allocate resources to support maintenance and provision of recreational facilities	1. Improve staffing structure where possible		x		CEO/ Management	
			2. Implement documented cross departmental annual inspections		x		MES	
Natural Resource Management	NRM01	Review current plans and strategies to incorporate local climate change impacts into NRM plans	1. Review natural area and coastal management plans, in light of outputs of the climate change risk assessment, to ensure that they incorporate the potential effects of climate change.			x	MES/ Coast Care Officer/ Sustainability Officer	
			2. Develop thresholds for unacceptable change in consultation with key stakeholders and the community		x		MES/ Coast Care Officer/ Sustainability Officer	
			3. Incorporate thresholds for unacceptable change into NRM plans and strategies		x		MES/ Coast Care Officer/ Sustainability Officer	
			4. Continue to provide financial and executive support for WESROC Greening Plan	x			CEO/ MES	
	NRM02	Increase community awareness of the potential impacts of climate change to encourage private land conservation	See G03		x		Coast Care Officer/ Sustainability Officer	
NRM03	Establish coastal and/or estuarine monitoring program	1. Establish extent of current monitoring regimes to determine existing monitoring programs and ensure that all existing information is collated to inform gap analysis to identify target areas for future monitoring.		x		Coast Care Officer/ Sustainability Officer		
Sub-Total Adaptation Actions				40	19	10		10

Area	Option ID	Adaptation Option	Adaptation Action	2011/2012	2012/2013	5 years	Responsibility Area	Task Completed
Adaptation options that are "Too Hard for Now" for the Town of Cottesloe: "Take Action to Remove begin to remove barriers)								
Natural Resource Management	NRM04	Protect species/ecosystems through active management controls, as appropriate				x	MES/ Coast Care Officer/ Sustainability Officer	
Total Adaptation Actions			Grand Total = 70	40	19	11		10

Table 3. List of Climate Change Adaptation Options for the Town of Cottesloe.

Resolution No.:
 Adoption Date: TBC 2011
 Review Date: 2013/2014

References

CSIRO (2007). Climate Change in Australia – Technical Report 2007.
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Appendix A: Projected Impacts of Climate Change

Coastal Areas

Potential impacts of climate change on the coastal zone are largely associated with sea level rise and changes in wind and wave climates. The specific climate change impacts experienced along the coastline of the study area may include:

- Displacement of coastal lowlands;
- Increased coastal erosion;
- Increased flooding;
- Salinisation of surface and groundwater;
- Increased pollutant loadings in surface water from increased run off;
- Damage to coastal protection works and other infrastructure;
- Loss of amenity;
- Loss of coastal habitats; and
- Impacts on biodiversity.

Due to their exposure, coastal dunes are constantly impacted by wind, rainfall, sea level and temperature conditions. An increase in mean sea level and other climate changes will increase the exposure of flora and fauna to the erosive forces. In addition, sediment transport processes may alter, thus modifying erosion and accretion processes along the coast. Finally, the protection currently afforded by offshore reefs, such as the Cottesloe Reef, is likely to decrease as sea levels rise and their buffering capacity is reduced.

The projected increase in sea surface temperature means that reef areas in the study area will be subject to greater heat stress likely to impact on ecology:

- Reef organisms have a narrow temperature range tolerance;
- Coral bleaching associated with increased temperature of sea water; and
- Implications/effects through the food chain.

Increased dissolved carbon dioxide in sea water may increase the productivity of sea grasses but negatively effect coral formation.

The exact nature and extent of impacts is dependant on the susceptibility of areas along the coast.

Built Environment

In light of predicted climate changes, revising planning and development approvals may need to be considered. New buildings and community spaces may need to meet higher water and energy efficiency standards, and the possibility of litigation and legal costs associated with revised planning decisions would also need to be considered.

In addition, waste collection and management issues could be exacerbated for local councils due to climate changes. With higher temperatures, more frequent waste collection may need to be considered to reduce health risks.

The potential consequences to local government from climate change impacts on the built environment include:

- Higher infrastructure maintenance costs, including estuarine and coastal foreshore infrastructure.
- Increased costs associated with replacing damaged or destroyed infrastructure.
- Additional engineering and construction costs to increase resilience in coastal and estuary foreshore development.
- Increased pressure on existing emergency response capability.
- Increased community pressure to deal with increased demand for water and power.
- Increased costs in maintaining council assets.
- Need to revise approach to planning and planning approvals, including potential mitigation and legal costs.
- Increased demand for waste collection and management of landfill sites.

Community

Climate change impacts are likely to challenge thinking about resource use, as well as provision and maintenance of public facilities. Changes are likely to include:

- Changes to more frequent use of native vegetation in landscaping.
- Algal blooms may reduce river use for recreation, which may increase pressures on the coast.
- Hot weather will deter the community from time spent outside.
- Health risks associated with climate change (temperature related death; mosquito borne diseases).

All of the projected impacts listed in Appendix A have been taken from WCCRAAR (WESROC 2010).