

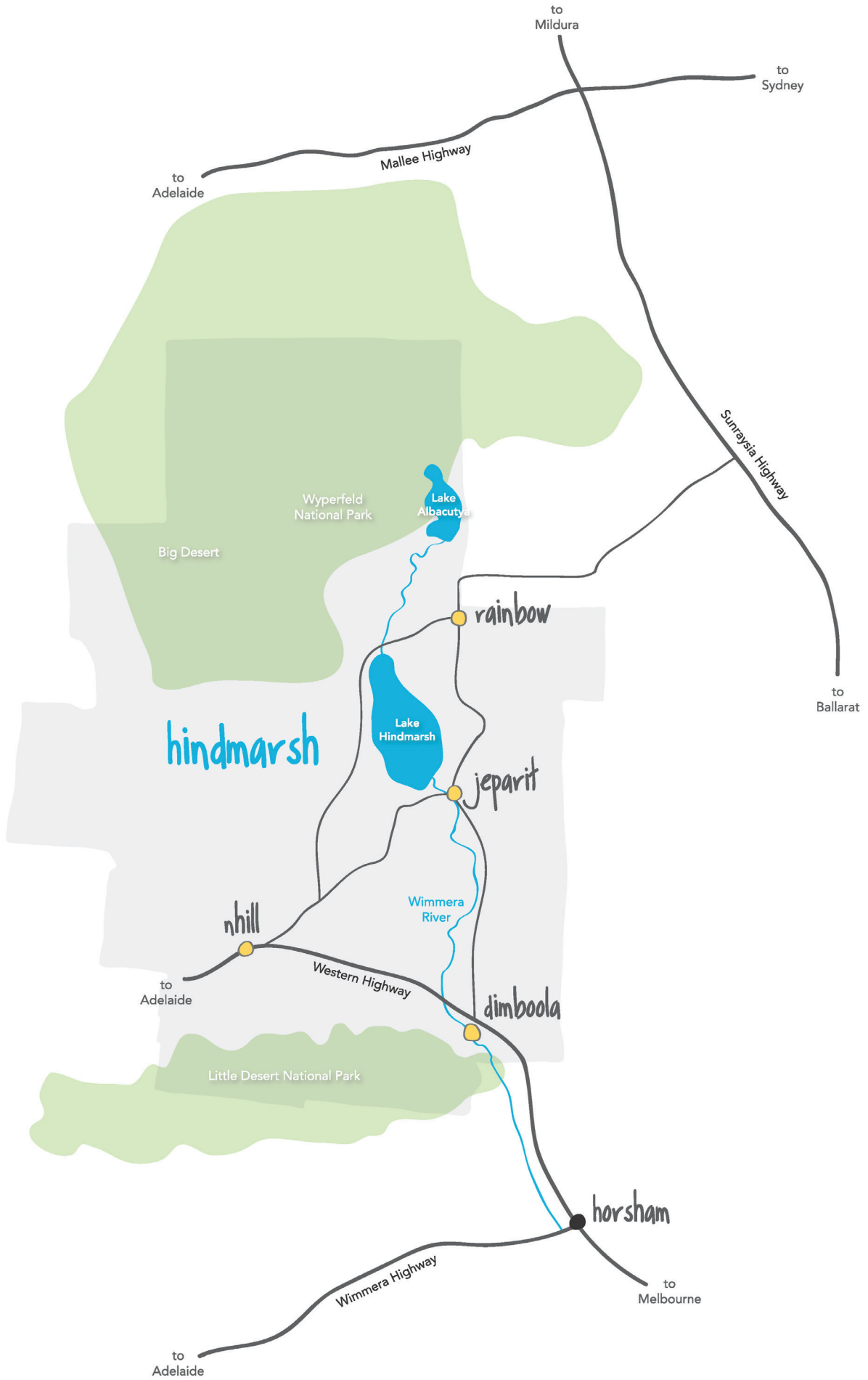
Hindmarsh Shire Council

Climate Change Adaptation



Incorporating
Climate Change Adaptation Strategy
Township Climate Change Adaptation Strategy
Integrated Water Management Plan
Economic Development Position Paper

JULY 2012



Mayor's Foreword

For the greater part of the early 2000's Eastern Australia experienced a devastating drought which had a severe impact on hundreds of towns, thousands of businesses and tens of thousands of residents. However in a dramatic turn of events, Mother Nature then turned her attention from providing little or no rain to too much, causing a lot of the same communities who had experienced the drought to be inundated with flood waters in 2010 and 2011.

Irrespective of whether these extreme weather conditions are the result of natural or human-induced climate change, one thing is certain, we are all going to be impacted by a changing climate into the future.

Following successful funding from the Australian Government's Strengthening Basin Communities program, Hindmarsh Shire Council has undertaken a planning project to integrate climate change adaptation into Council's future planning and processes.

The Hindmarsh Shire Council Climate Change Adaptation study focused on the assessment of climate change on the Shire's built, economic, social and environmental infrastructure resulting in four plans being established:

- Hindmarsh Climate Change Adaptation Strategy
- Township Climate Change Adaptation Plan
- Integrated Water Management Plan
- Economic Development Position Paper

Long term planning for the impacts of a changing climate, reduced water availability and extreme weather events are vital to ensure the viability and sustainability of the communities within Hindmarsh Shire and the broader region. The issues raised and addressed in these plans have been drawn from residents of the broader Hindmarsh community, specific stakeholders and consultative groups. Outcomes derived from the plans will ensure that Hindmarsh Shire is well positioned to manage a changing climate.

I can assure you that Council will be taking a proactive approach towards opportunities as they arise, and I would like to thank all Hindmarsh Shire residents who contributed to the establishment of these plans.



Cr Cliff Unger
Mayor, Hindmarsh Shire Council
July 2012





Hindmarsh Shire

Climate Change Adaptation Strategy

Final Report

May 2012



**Australian Government
Strengthening Basin Communities Program**



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Executive Summary

Introduction

Communities across the Murray-Darling Basin face significant challenges in dealing with the impacts of climate change and reduced water availability. Hindmarsh Shire received funding from the Australian Government *Strengthening Basin Communities* program to undertake a project to integrate climate change adaptation into Hindmarsh Shire Council planning and to facilitate regional adaptation. The study assessed the implications of climate change upon the Shire's built, economic, social and environmental infrastructure.

This Climate Change Adaptation Strategy is one of four reports produced as part of the project. An Integrated Water Management Plan, Township Climate Change Adaptation Plan and Economic Development Position Paper have also been developed.

The purpose of the Climate Change Adaptation Strategy is to:

- Help Council and stakeholders understand the impacts of climate change in the region
- Identify the risks and opportunities climate change and reduced water availability present for the region
- Clarify Council's role and scope for taking action on these issues
- Identify measures Council can adopt to address risks and act on opportunities.

The focus of the strategy is the impact of climate change and reduced water availability across four main themes:

1. The Hindmarsh economy
2. Utilities infrastructure – transport, water and energy
3. Community infrastructure – parks, gardens, halls, libraries and other Council buildings
4. Council capacity to meet the needs of its community as the climate and water availability changes.

Climate change in Hindmarsh

Generally, Hindmarsh's future climate is expected to be drier and hotter than it is today, with an increased frequency and intensity of extreme events. The number of frosts is expected to decline, while hot days and droughts are expected to increase. Rainfall intensity is expected to increase, however, as total rainfall is expected to decline, runoff captured for consumptive uses is expected to decline.

Key risks

The key risks to Hindmarsh posed by climate change and reduced water availability were identified as:

Regional economy

- Reduced agricultural and manufacturing productivity
- Population decline and reduced regional employment

Utilities infrastructure

- Increased road construction and maintenance costs
- Increased frequency of stormwater flooding

Community infrastructure

- Lack of continuity of water supply for recreation and sporting facilities, parks and gardens
- Increase in infrastructure maintenance costs and costs of recovery from extreme events
- Increased demands on community volunteers for emergency response and recovery
- Need for community refuges is not being adequately met by Council buildings

Council capacity

- Increased demand for Council services and declining Council income
- Increased difficulty in recruiting and retaining Council staff
- Providing a safe work environment for staff
- Reduced community capacity and resilience

Consultation and review of existing strategies and programs identified the following key actions.

Key actions

To prepare for climate change and reduced water availability, the Strategy proposes the following set of actions for Council:

Action	Description
Regional economy	
RE-1 Research development and extension	Continue to advocate and provide strategic support to Department of Primary Industry and industry groups such as Birchip Cropping Group for on-going research and development that will assist the agricultural industry adapt to the changing climate
RE-2 Streamlining of planning permit approvals	Continue implementation of processes to streamline assessment of planning permit applications including educating and encouraging landholders and businesses to bring proposals to a pre-application meeting
RE-3 Economic Development Strategy	Develop an Economic Development Strategy based on the findings of the Economic Development Position Paper
Utility infrastructure	
UI – 1 Review and update the Road Asset Management plan	Embed consideration of climate change risks in development of the next road asset management plan
	Continue to investigate alternative sealed road pavement mixes that are more resistant to temperature extremes. Incorporate findings into the Road Asset Management plan
	Investigate alternative unsealed road gravel mixes and treatments that are more resistant to temperature extremes and surface runoff. Incorporate findings into the Road Asset Management plan
	Review the road hierarchy to incorporate consideration of climate change impacts and particularly recent flood events e.g. road closures, road safety, to minimise the risk of isolated townships
UI-2 Stormwater Drainage Study	Council complete development and begin implementation of the Stormwater Drainage Study
	Develop and implement a community communication and engagement strategy to assist in the implementation of the Stormwater Drainage Study

Action	Description
Community infrastructure	
CI-1 Integrated water management planning	Adopt and implement the Hindmarsh Integrated Water Management plan
CI-2 Stormwater flood prevention	Confirm responsibility for maintenance of levy banks in Jeparit Where Council is the responsible authority develop a levy management plan that considers: <ul style="list-style-type: none"> – Ongoing maintenance requirements and costs – Management during flooding – Risks to levy integrity and capacity from increased frequency of flooding and increased flood heights – Community engagement and communication
	Adopt and implement the Hindmarsh Stormwater Drainage Study
CI-3 Review of Council buildings and assets	Embed consideration of climate change risks in the review and development of Council building maintenance programs
	Incorporate the findings of climate change risks on Council buildings in the annual review of insurance cover
CI-4 Township emergency management planning	Adopt and implement the Hindmarsh Township Climate Change Adaptation Plan
CI-5 Contingency planning	Identify critical Council systems required during emergencies and determine the adequacy of power reserves and back up power supplies during power outages.
	Assess capacity of emergency management centres and critical Council buildings to receive back up electricity supply from generators.
CI-6 Municipal emergency management planning	Incorporate the findings of the Township emergency management planning into the Municipal Emergency Management Plan
Council Capacity	
CC-1 Incorporate climate change and water availability scenarios into Council assets management plans	Council staff review and analyse current asset management plans under a range of climate change and water availability scenarios e.g. <ul style="list-style-type: none"> – Stormwater drainage capacity maintenance – Road construction and design – Building maintenance, upgrade and design
CC-2 Embedding climate change and water availability risk assessment	Climate change and water availability scenarios should be regularly updated and considered in the analysis of future asset management plans and broader Council planning
CC-3 Community engagement	As part of future service delivery planning, review services in some towns and/or consolidating services to a smaller number of towns
	Incorporate findings of the Department of Planning and Community Development, Role and Function of Small Towns and Settlements Project in to future service delivery planning
	Undertake community engagement to communicate Council's adaptation and sustainability projects to demonstrate leadership and educate the community
	Undertake community engagement to communicate Council's challenges in maintaining service delivery and invite community discussion on choices and options
CC-4	Liaise with major businesses, service providers and neighbouring municipalities to develop packages offering employment opportunities with Council for couples

Action	Description
Recruitment	and families
	Continue to utilise the Victorian Traineeship programs to address Council skill shortages
	In conjunction with other municipalities and major businesses, develop a Skills Match program to assist in matching skills and employment opportunities
CC-5 Outsourcing	Continue to identify services that can be delivered by contractors or consultants for services that cannot be provided in-house and require high quality outputs delivered to specified timeframes
CC-6 Contingency planning	Review the Business Continuity Plan for indoor staff that considers extreme weather events and power outages

The actions identified in the of the Hindmarsh Township Climate Change Adaptation Plan, Integrated Water Management Plan and the Economic Development Position Paper are summarised here.

Township Climate Change Adaptation Plan

A number of risks associated with climate change were common across the four main townships, including:

- Poor understanding by town residents of emergency response procedures
- Decline in volunteers and increasing demands on volunteers for emergency response and recovery
- Decline in town amenity and community infrastructure such as sports grounds, recreation facilities and parks and gardens.

The key actions identified to address these risks included:

- Community engagement
- Community action planning
- Recruitment planning
- Implementation of the Integrated Water Management plan

The detailed actions include:

Action	Description
Emergency response	
ER-1 Community engagement	Work with Township Committees to ensure that there is a general understanding of: <ul style="list-style-type: none"> ▪ Roles and responsibilities of agencies and individuals during emergencies ▪ Contact details for various emergencies
	Work with Township Committees to ensure that new residents in towns understand emergency response procedures in their town and contact details.
ER-2 Community action planning	As part of the review of the township Community Action Plans consider: <ul style="list-style-type: none"> ▪ Confirm cool areas for use during heatwaves as per the Hindmarsh Heatwave Plan ▪ Confirm status of refuges for other extreme events including bushfire and flood
	Work with the Rainbow community and VicRoads to consider if a road can be upgraded to provide continued access during flood
Volunteerism	
V-1 Recruitment plan	Work with CFA and SES to develop a recruitment plan targeted at new migrants to towns. This may include consideration of language and cultural barriers to volunteering
Town amenity sport and recreation	
TASR-1 Integrated Water Management	Adopt and implement the Draft Integrated Water Management Plan

A number of town specific actions were also identified.

Integrated Water Management Plan

The risk assessment undertaken as part of the wider Hindmarsh Climate Change Adaptation project, identified the following priority risks with regard to Council water use:

- Continuity of service provision including providing sports grounds and recreation facilities and maintaining town amenity during periods of water shortages.

The Plan has also noted the:

- Potential for Council water costs to rise in the future
- The importance of Council to demonstrate best practice with regard to water management

A number of initiatives were identified for reducing Council water use and improving water management practices:

Monitoring

A regular audit of Council water use is required to enable monitoring of water use, identification of leakages, over-usage and opportunities for improvement.

Action	Description
Monitoring -1	Map irrigation systems and include it on Council's asset management system.
Monitoring -2	Ensure there are sufficient water meters (and sub-meters) in place to account for water use at various sites.
Monitoring -3	Keep records of monthly water use at various sites. Ask tenants to keep records and submit an annual report.
Monitoring -4	Install water meters on all Council bores used for roadside watering
Monitoring -5	Review of all water use data annually in conjunction with GMMW accounts. Correlate water usage with meter reads to detect leaks and over-usage.

Turf, lawn and garden management

Turf, lawns and gardens are substantial users of water. There are a number of opportunities to reduce water use by changing or modifying current management practices

Action	Description
Management -1	Convert irrigation systems from manual to automatic and where possible introduce night watering
Management -2	Conduct irrigation audits for main sites to confirm that sprinklers are operating efficiently,
Management -3	Consider subsurface irrigation and alternative species for areas that currently have high water use but are located where there is low impact on amenity
Management 4	In conjunction with sporting groups and committees of management, document watering regimes to be followed during water restrictions including consideration of: <ul style="list-style-type: none"> ▪ Reducing the area of certain reserves being irrigated ▪ Ceasing irrigation entirely on some reserves
Management -5	Use deep mulches on garden beds and revegetated areas to reduce evaporation

Swimming pools

Council has already undertaken works on some pools to reduce water use. The Rainbow pool is known to have leaks and was a substantial user of water in 2011

Action	Description
Pools-1	Assess the cost of repairing leaks in Rainbow pool
Pools-2	Conduct drawdown tests in winter as a means of estimating pool leakage.

Council buildings

Water use in Council buildings is relatively modest. There are opportunities to improve water use efficiency, mainly with end-of-life replacements of appliances and fittings.

Action	Description
Buildings-1	<p>End of life replacement with water efficient appliances and facilities in Council buildings</p> <ul style="list-style-type: none"> ▪ Use of dual flush toilets ▪ Water efficient urinals ▪ Water saving shower heads at pool and sports ground change rooms ▪ Water efficient kitchen appliances ▪ Flow restrictors and aerators on replacement taps

Education and awareness

A number of committees of management and community groups manage sporting and recreation facilities on behalf of Council. There are opportunities to work with these groups to improve management practices and improve water use efficiency.

Action	Description
Education-1	Work with community groups and committees of management to review irrigation management of sports grounds and reserves to identify opportunities for improvement and reducing water costs.

Economic Development Position Paper

The Hindmarsh Council Plan identified the development and implementation of an Economic Development Strategy as its priority action to achieve its first objective of a diverse economy. Given the economic development framework the Shire is operating within, it is essential that the purpose and role of this strategy be clearly identified to ensure the Strategy achieves the desired outcome with efficient use of the available resources.

A suggested role for the Economic Development Strategy would be to act as a signpost document, bringing together the existing initiatives, at both a regional and local level, and clearly articulating the Council's priorities and how it will utilise these initiatives to achieve those priorities. There are four themes that encompass the core role of Council in economic development, they are:

1. **Supporting a regional process** - This theme should:

- Describe the Council's commitment to the Regional Strategic Plan and Regional Development Australia processes and how Council intends to engage with and contribute to these processes
- Describe Council's commitment, engagement and contribution to the Wimmera Development Association and Wimmera Manufacturing and Industry Group
- Recognise these regional processes as the most appropriate vehicle to achieve the bigger picture strategic priorities, which will benefit the whole region and the Shire.

2. **Advocating for regional priorities** - This theme should:

- Recognise that a number of Hindmarsh priorities are already acknowledged as regional priorities within the Regional Strategic Plan
- Identify a clear role for Council to advocate for their priorities to become regional priorities
- Describe the process by which Council will achieve this.

3. **Meeting local needs** - This theme should:

- Identify the key priorities for local economic development within the Community Action Plans
- Describe how the Council will develop and implement projects to meet these priorities
- Recognise and plan for improved service provision to meet business needs, e.g. infrastructure, community services.

4. **Facilitating local opportunities** - This theme should:

- Develop a process to identify local opportunities that are not already covered in the Community Action Plans, or Regional Strategic Plan
- Recognise and prioritise Council's role as an advocate for these and other local projects
- Identify Council's capacity to facilitate project development, which might include getting the project recognised as a priority within a Community Action Plan, the Council Plan or the Regional Plan.

It was recommended that an Economic Development Strategy be developed based on the findings of the Economic Development Position Paper with a specific focus on:

- Advocating and supporting regional economic development strategies and initiatives
- Advocating for Hindmarsh priorities to be considered regional priorities
- Attracting and retaining professional and skilled labour

1 Introduction

1.1 Background

1.1.1 Strengthening Basin Communities

Communities across the Murray-Darling Basin face significant challenges in dealing with the impacts of climate change and reduced water availability. The CSIRO Sustainable Yield studies point unambiguously to a future with less inflows into river systems and reductions in water available for extractive uses.

Local government can play an important role in helping their communities understand and plan for the changes that reduced water availability will bring. The Australian Government has committed \$200 million from its *Water for the Future* fund to establish the *Strengthening Basin Communities* program. Under this program local governments in the Murray-Darling Basin have been allocated grants to:

- Assist them in community-wide planning for a future with less water
- Invest in water savings initiatives including cost effective water infrastructure that meets the needs of communities now and into the future.

The aim of this project is to integrate climate change adaptation into Hindmarsh Shire planning and to facilitate regional adaptation through:

- Assessing the implications of climate change upon the Shire's built, economic, social and environmental infrastructure
- Engaging the private sector and community in climate change adaptation and decision-making.

1.1.2 Hindmarsh region

Hindmarsh Shire is located in the Wimmera Southern Mallee region (Figure 1-1) on the main transport route between Melbourne and Adelaide. It covers an area of approximately 7,400 square kilometres making it one of the largest municipalities in Victoria. It supports a working population of 2,700 with a total population of around 6,000 persons¹. The town of Nhill is the main service centre in the municipality with Dimboola, Jeparit and Rainbow the other major towns.

Employment in Hindmarsh is dominated by agriculture (28%), health care and social assistance (16%) retail trade (9%) manufacturing (7%) and transport (7%) with agricultural produce underpinning much of the manufacturing sector e.g. milling, silo manufacture.

The regional economy, underpinned as it is by agriculture, is therefore highly climate dependent.

¹ <http://profile.id.com.au/Default.aspx?id=343&pg=138&gid=10&type=enum> (accessed 12.12.2011)



Figure 1-1: Location of Hindmarsh Shire within the Wimmera Southern Mallee region²

1.2 The strategy

1.2.1 Purpose

The Climate Change Adaptation Strategy provides an integrated response to the challenges of climate change and reduced water availability for Hindmarsh Shire.

The purpose of the strategy is to:

- Help Council and stakeholders understand the impacts of climate change in the region
- Identify the risks and opportunities climate change and reduced water availability present for the region
- Clarify Council's role and scope for taking action on these issues
- Identify measures Council can adopt to address risks and act on opportunities.

1.2.2 Development

The strategy was developed in four main stages:

- Project scoping – to ensure an optimal program that meets the needs of Council and the funding agency
- Risk assessment – to identify the significant risks to the region from climate change and reduced water availability and any controls that exist to mitigate them
- Further analysis and consultation – to identify and develop management actions to adapt or mitigate the risks posed by climate change and reduced water availability

² Regional Development Victoria (2011) Wimmera Southern Mallee Strategic Directions

- Strategy development – to compile the findings and assign roles and responsibilities for implementation.

The list of stakeholders consulted during the risk assessment and further analysis and consultation stages is provided in Appendix 1. A Project Steering Committee comprising representatives from Hindmarsh Shire and Grampians Wimmera Mallee Water (GWMW) oversaw the strategy development. The members of this committee are outlined in Appendix 2.

1.2.3 Scope

The focus of the strategy is the impact of climate change and reduced water availability across four main themes:

1. The Hindmarsh economy
2. Utilities infrastructure – transport, water and energy
3. Community infrastructure – parks, gardens, halls, libraries and other Council buildings
4. Council capacity to meet the needs of its community as the climate and water availability changes.

The scope was established following a review of existing policies and programs and the objectives of the *Strengthening Basins Communities* program.

The *Strengthening Basin Communities* program has a particular focus on planning for the impacts of climate change and reduced water availability and adaptation actions to address these impacts. Climate change mitigation strategies e.g. greenhouse gas emission reduction and waste management, were therefore considered to be outside the project scope.

The impacts of climate change and reduced water availability in Hindmarsh will mainly affect six sectors of the economy or areas of public administration:

- The agriculture sector, with flow-on impacts for the value adding and manufacturing sector
- Environment and biodiversity
- Development infrastructure (water, energy, transport, telecommunications)
- Community infrastructure such as parks and gardens, sporting and recreation facilities and building
- The health sector
- Emergency planning and management.

A review of current State, regional and local plans, policies and programs relevant to Hindmarsh found that:

- Health and emergency management are being dealt with adequately at both the state and the local level
- The biodiversity of the region is well considered and being planned for through Federal and State Government, regional and community projects (e.g. Department of Sustainability and Environment and Wimmera Catchment Management Authority)

- There are a number of Federal and State Government and industry programs and policies (e.g. Department of Primary Industry, Grains Research and Development Corporation, Birchip Cropping Group) that are assisting the region's agriculture sector to adjust.

However, there has been limited planning for the impacts of climate change and reduced water availability on:

- The local economy, should the agricultural sector change
- Local development and utilities infrastructure (energy, water, sewerage, roads and rail lines) and private buildings
- Local community infrastructure including buildings, parks and gardens
- Council's capacity to meet the needs of its community in response to these impacts.

1.2.4 Structure of the strategy

The strategy is organised into three sections:

1. The current and projected changes in climate and water availability for the Hindmarsh region (section 2)
2. The significant risks and actions to adapt to or mitigate the impacts of climate change and reduced water availability across the four areas of: Regional economy, Utilities infrastructure, Community infrastructure and Council capacity (sections 2, 4, 5 and 6 respectively)
3. The implementation of the strategy over the coming months and years, including who will be responsible and when actions will be carried out (section 7).

To begin implementation of this Climate Change Adaptation Strategy, a number of associated reports and strategies were prepared as part of this wider Hindmarsh *Strengthening Basins Communities* project, outlined in Figure 1-2 below

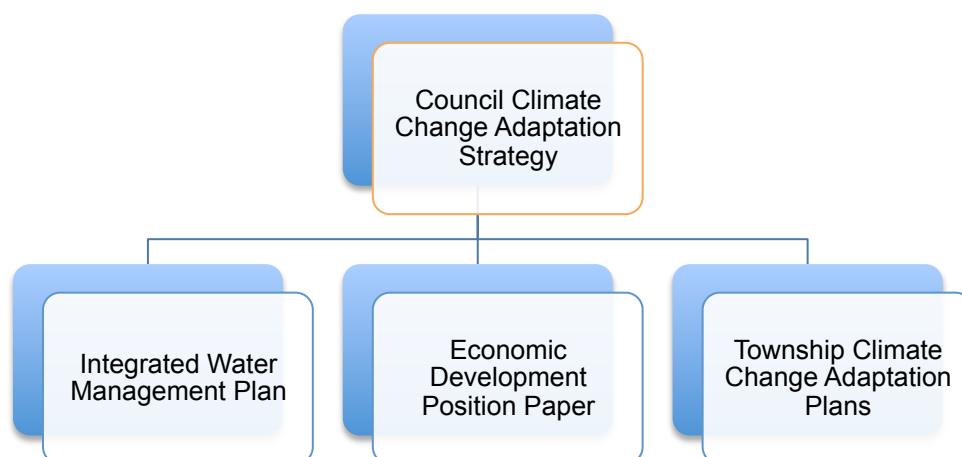


Figure 1-2: Outputs of the Strengthening Basin Communities project

2 Climate change and reduced water availability in Hindmarsh

2.1 Introduction

The Wimmera has been identified as the one of the most exposed regions to climate change in Victoria because of its relatively undiversified economy and large reliance on agriculture³. The predicted changes in climate in the Hindmarsh region are warmer and drier conditions on average, with an increase in frequency and severity of hot and wet extremes.

Climate change, extreme weather events and reduced water availability is discussed below and expanded on in Appendix 3. The dryland agricultural climate change modelling undertaken as part of this project is detailed in Appendix 4.

2.2 Changes to climate variables

Hindmarsh climate in 2030

The predicted changes in climate variables, relative to 1990 climate averages for the Hindmarsh region are shown in **Table 2-1**.

Relative to 1990 climate averages, by 2030 the Hindmarsh climate will be more like that of present day Ouyen and Wentworth with average annual temperatures around 0.8°C warmer but the greatest increases are expected in summer (0.9°C). The number of hot days (days over 30°C) is also expected to increase. Reductions in the total average annual rainfall of around 4% are expected, with the greatest reductions occurring in spring (7%).

Although average annual and seasonal total rainfall is expected to decline, the intensity of heavy daily rainfall (99th percentile) is likely to rise in most seasons. Fewer rain-days (>1 mm) are projected increasing the incidence of drought. Increases in potential evaporation and reductions in relative humidity are expected to contribute to drier conditions.

Small increases (0.7%) in solar radiation are expected. There will be little change in average wind speeds, but any decreases are most likely to occur in autumn.

Hindmarsh climate in 2070

Relative to 1990 climate averages, by 2070 further increases in temperature are expected, even under a lower emissions growth scenario (1.3°C). Under a higher emissions growth scenario, these increases double (2.6°C). At the same time, the number of hot days will continue to increase. Rainfall totals will continue to drop. Under both lower and higher emissions growth, warming is likely to be greatest in the summer, while greatest reductions in rainfall are likely to occur in the spring. Conditions will become increasingly drier as potential evaporation continues to increase and relative humidity decreases. Changes in wind speed will continue to be negligible.

³ Department of Premier and Cabinet (2009) Victorian Climate Change Green Paper, Melbourne

Table 2-1: Change in climate variables in the Hindmarsh region under a median climate change scenario to 2030

	Wimmera ⁴		Central Mallee ⁵		New Hindmarsh climate will be similar to
	Average	Range	Average	Range	
Temperature (°C)	+0.8	0.6 to 1.1	+0.9	0.6 to 1.2	Wentworth
Rainfall (%)					
Annual	-4	-9 to +1	-4	-10 to +2	Ouyen
Spring	-7	-15 to no change	-7	-18 to +2	Ouyen
Summer	-2	-11 to +10	-1	-12 to +12	Ouyen
Autumn	-2	-9 to +6	-1	-10 to +8	Ouyen
Winter	-4	-13 to +1	-5	-16 to +2	Ouyen
Rainfall intensity	+0.6	-8.8 to +14.8	-0.3	-9.6 to +15.6	Southern coastal NSW
Number of rainy days	-6	-19 to -1	-7	-20 to -1	Ouyen
Potential evaporation (%)	+2	1 to 5	+2	no change to +5	Northern Mallee
Relative humidity (%)	-0.7	-1.4 to -0.1	-0.7	-1.5 to no change	Northern Mallee
Solar radiation (%)	+0.7	0.1 to 1.4	+0.5	-0.1 to +1.3	Wentworth
Frosts ⁶ (#)	23	27 to 20	10	13 to 8	Mildura
Hot days (#)					
Over 30°C	58	55 to 61	90	86 to 95	Ouyen
Over 35°C	21	19 to 23	37	35 to 40	Ouyen
Over 40°C	4	3 to 4	9	8 to 10	Ouyen

2.3 Extreme weather events

Climate change is likely to change the frequency and intensity of extreme weather events such as the heatwaves, drought, floods and storms in the Hindmarsh region (Figure 2-1). The number of extreme hot days and heavy precipitation has increased since 1950⁷. For example, the wettest two-year period on record occurred from 2010 to 2011. This included above average and ‘very much above average’ rainfall in the Hindmarsh region, as shown in Figure 2-2. Climate models project a higher frequency of hot days and heavy rain events throughout the 21st century.

⁴ DSE (2008) Climate Change in the Wimmera, Victorian Climate Change Adaptation Program, Melbourne

⁵ DSE (2008) Climate Change in the Mallee, Victorian Climate Change Adaptation Program, Melbourne

⁶ Days where the minimum temperature falls to 2°C or less

⁷ IPCC (2012) Summary for Policymakers. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 1-19.

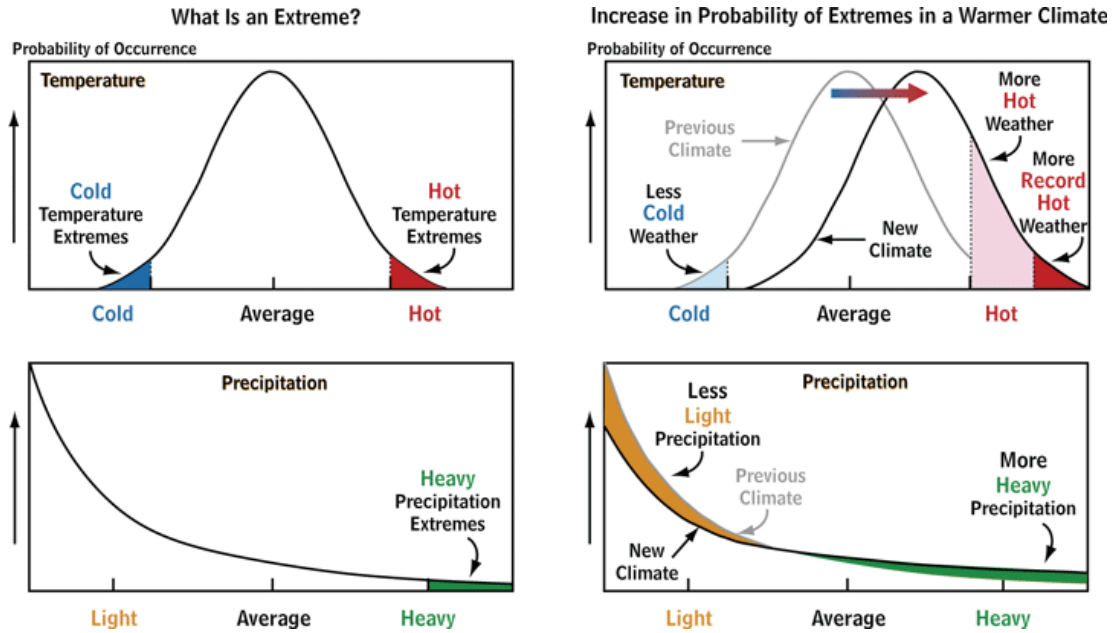


Figure 2-1: Influence of shift in average temperature and rainfall to extreme events

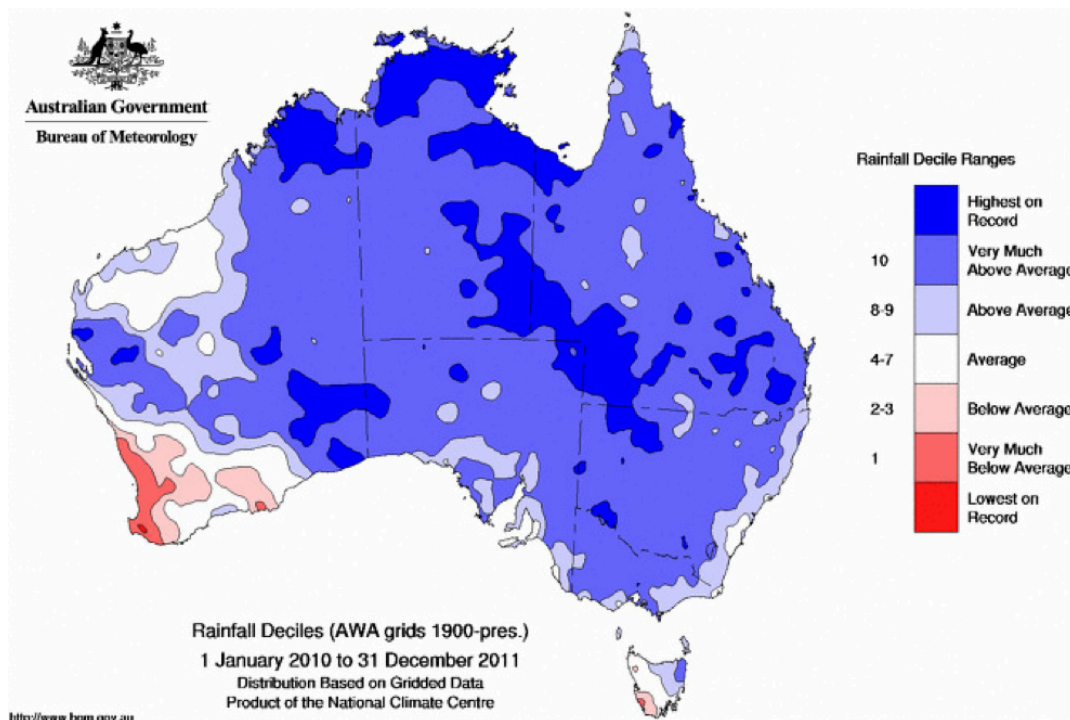


Figure 2-2: Australian rainfall deciles for the two years, January 2010 to December 2011⁸

⁸ Bureau of Meteorology (2012) Australia's wettest two-year period on record; 2010–2011. National Climate Centre, Special Climate Statement 38

Days with frost⁹ are projected to decline by around 12 days per year and there is the potential for the timing of frosts to change and for frosts to become more severe. Days of extreme heat and the number of hot days are projected to increase.

By 2030, increases in potential evaporation and reductions in relative humidity are expected to contribute to drier conditions. Fewer rain days (>1mm) are projected, increasing the incidence of drought. At the same time, small increases in solar radiation are expected. Bushfire risk is also expected to increase.

Analysis of recent (last 15 years) extreme weather events allows the practical assessment of the current vulnerability to climate variability in the Hindmarsh Shire, which is an appropriate starting point for the preparation of an adaptation strategy.

The assessment involves describing aspects of storms (rain, hail and wind), floods, heatwaves and droughts. The impacts of recent extreme weather events are shown in Table 2-2.

⁹ where the minimum temperature falls to 2°C or less and in severe cases below -2°C

Table 2-2: Recent extreme events and their impact in the Hindmarsh region

Weather event	Date	Weather detail	Impact	Consequence	Responsible organisations	Staff time and resources	Impact on service or operations	Estimated cost
Storm	March 2010	62 mm, with 3 mm per minute	Damage to houses from rainfall intensity	Water entering houses caused by reduced capacity of drains and structural integrity compromised (e.g. hole in roof)	SES Hindmarsh Shire Council (community buildings)	Over a fortnight to secure, clean up, and longer to repair Additional aid of Interstate emergency crews needed		Total cost to Victoria greater than \$200 million
		Strong winds up to 156 km/h	Wind damage to houses and businesses		SES Hindmarsh Shire Council (community buildings)	Over a fortnight to clean up and longer to repair Additional aid of Interstate emergency crews needed 850 emergency calls received		
Flood	January 2011	Wimmera River breaches banks at Dimboola and Jeparit	Houses and businesses damaged at Dimboola and Jeparit Infrastructure damage Road closures	19 houses inundated in Jeparit Dimboola weir damaged Western Highway was closed at Dimboola due to flooding Damage to Dimboola-Jeparit road	SES	Sandbagging and clean up	Residents unable to live in homes temporarily. Assessment and repair of Dimboola weir	Total cost to Victoria was \$350 million
Heatwave	February 2009	Hottest day of 45°C, with five days of temperatures over 40°C	Heat stress on local residents	A number of elderly (65+ years) and young (<5 years) people affected by heat	Local aged care facilities GPs and hospitals	Increase in number of heat related cases in the health care sector	Increased pressure on aged care facilities	Total cost to Victoria was \$100 million over seven days
Drought	~1998 to 2009	Severe reduction in average rainfall. Rainfall reduction between 2001-08 and 1961-1990 mean was: <ul style="list-style-type: none"> ▪ Nhill -17.7% ▪ Dimboola -31% ▪ Jeparit -14.2% ▪ Rainbow -17.9% 	Reduced farm income Financial pressure and family strain Reduced urban water storages	Reduced regional gross value of agricultural production (GVAP) Increased farmer suicide rates Increased urban and rural water scarcity	DAFF DPI DHS Farmers Water authorities (GWM Water)	Government drought relief packages Mental health assistance	Increased pressure on welfare services Reduced irrigation allocation Urban water restrictions	Downward impact on GDP growth of 1.0 percentage point between 2001-02 and 2002-03
Bushfires	February 2009	Temperature was mid to high 40°C and winds were in excess of 100 km/h	Damage to properties and infrastructure	Three houses, several sheds and the Dimboola Brigade unit were destroyed	CFA DSE Hindmarsh Shire Council SES	CFA and SES volunteer crews	Displacement of residents Lack of access due to road closures	Total cost to Victoria was \$4.4 billion

2.4 Water availability

2.4.1 Stream flow and run off

Increases in temperature and evaporation coupled with declines in rainfall and relative humidity are likely to cause reductions in runoff and therefore less water captured for irrigation and other consumptive uses (Table 2-3).

Table 2-3: Water balance for the Wimmera region to 2030¹⁰

Scenario	Description	Rainfall	Runoff	Evapo transpiration
A	'Wet': Base case, continuation of historical climate (1895 to 2006)	403mm	16mm	387mm
B	'Dry': Continuation of recent climate (1997 to 2006)	-13%	-51%	-
C	'Median': Median climate change by 2030 (similar to the IPCC A1B scenario, used in GWM Water supply demand strategy)	-6%	-17%	-5%

2.4.2 The Basin Plan

As required under the *Water Act 2007*, the Murray Darling Basin Authority is developing a plan for the management of water resources in the Murray-Darling Basin (the Basin Plan). The Basin Plan will contain recommended sustainable diversion limits, which limits on the surface water that can be taken from the Basin's water resources for consumptive use (urban and irrigation). The Basin Plan will commence in 2012 with a stock take in 2015 to see how much water has been recovered. Victoria, and all other Basin states, will be required to implement any reductions in diversions by 2019.

A total of 75 GL has been recovered in the Wimmera-Avoca catchment to 30 September 2011. Given this, 23 GL still needs to be recovered in the Wimmera to meet local environmental water needs¹¹. The water recovered in the Wimmera region will help to improve the health of the lower Wimmera River, Lake Hindmarsh and Lake Albacutya.

As the Wimmera River is disconnected the catchment will not contribute to the shared downstream environmental water needs of the Murray.

2.4.3 Consumptive purposes

The Grampians Water supply system is the only regional surface water source in Hindmarsh. The system, owned and operated by GWMWater, supplies most of the eastern part of the Shire. Nhill is currently not supplied from this source. The system has seen great changes over the past decade with the construction of the Wimmera Mallee Pipeline, a closed pipe system replacing a leaky, earthen channel system. This has resulted in increased security of water supply to around 93%.

¹⁰ CSIRO (2007) Water Availability in the Wimmera; A report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project, Canberra, page 35

¹¹ Murray Darling Basin Authority (2011) The Draft Basin Plan: Catchment by Catchment, page 26

Nhill has relied upon groundwater for its urban supply for many years but in order to supply water that meets drinking water guidelines for hardness, GMMWater intends to connect the Nhill urban supply to the surface water via a pipeline for treated (or untreated) water from Dimboola. Untreated groundwater will remain an option for less sensitive uses in Nhill, such as industry and irrigation of open spaces.

3 Regional economy risks and adaptation

Summary

Climate change, and in particular a potential increase in the severity and frequency of extreme events during spring and late summer and increase in the number of hot days, poses risks to the regional economy in two main areas:

- Reduced agricultural and manufacturing productivity
- Population decline and reduced regional employment.

There are a number of State and Federal government policies to reduce the risk to agriculture and manufacturing. The Wimmera Southern Mallee Regional Strategic Plan provides principles for economic development, population, liveability and service provision. The Wimmera Development Association supports and develops existing local businesses, and promotes economic development opportunities to investors within and outside the region. Currently Council do not have an Economic Development Strategy but an Economic Development Position Paper was prepared as part of this study.

This Adaptation Strategy proposes Council:

- Advocate for continued research, development and extension to assist agriculture to adapt to climate change
- Continue to streamline planning permit approvals assessment
- Implement the findings of the Economic Development Position Paper

3.1 Introduction

Sixty two percent of all business enterprises in Hindmarsh are in the agriculture sector. Gross value of agricultural production was worth approximately \$127 million in 2006. Agriculture is also the biggest employer in the Shire¹².

The introduction of the Wimmera Mallee Pipeline is expected to provide opportunities for growth and diversification of agriculture and value adding. The secure, quality water supply is a boost to business development and an opportunity for diversification to reduce vulnerability to drought.

Value adding to agricultural production currently includes duck processing, grain milling and cereal processing. The Shire has a strong 'industry cluster' in silo and grain handling equipment. Three businesses in the Shire manufacture silos and field bins and have a large share of the south eastern Australian market.

The risk assessment and further analysis identified priority risks to Hindmarsh as a result of climate change and reduced water availability:

¹² Australian Bureau of Statistics (<http://www.abs.gov.au/AUSSTATS/abs@nrp.nsf/Latestproducts/225102980Industry12005-2009?opendocument&tabname=Summary&prodno=225102980&issue=2005-2009&num=&view=>) accessed 19.10.2011

Agricultural and manufacturing productivity

- Increased severity and frequency of extreme events during spring and early summer reduces agricultural and manufacturing productivity and associated transport
- Timeliness of introducing changes to farm practices and manufacturing to adapt to changed climate is slowed by drawn out planning permit approval processes
- Increased number of hot days reduces the capacity of manufacturing employees to work safely and thus, leads to operations shutting down with subsequent productivity losses
- Increased flooding reduces the reliability of transport to get to work, get supplies in, produce out, thus affecting productivity

Regional employment and population decline

- Changing climate (reduced average rainfall and increase maximum temperature) accentuates small town population decline, reducing labour availability and capacity to attract skilled labour due to reduced liveability and services
- Increased severity and frequency of extreme events reduces the community's resilience and capacity to recover and cope, which may accentuate population decline.

Actions to address town amenity, liveability and preparedness for emergencies, which are linked to regional employment, population decline and liveability are addressed elsewhere in this strategy and the Integrated Water Management Plan and Township Climate Change Adaptation Plan.

3.2 Agricultural and manufacturing productivity

3.2.1 Description of risk

Climate change and reduced water availability can reduce agricultural and manufacturing productivity in a number of ways. The climate variables, impacts and implications are outlined in Figure 3-1.

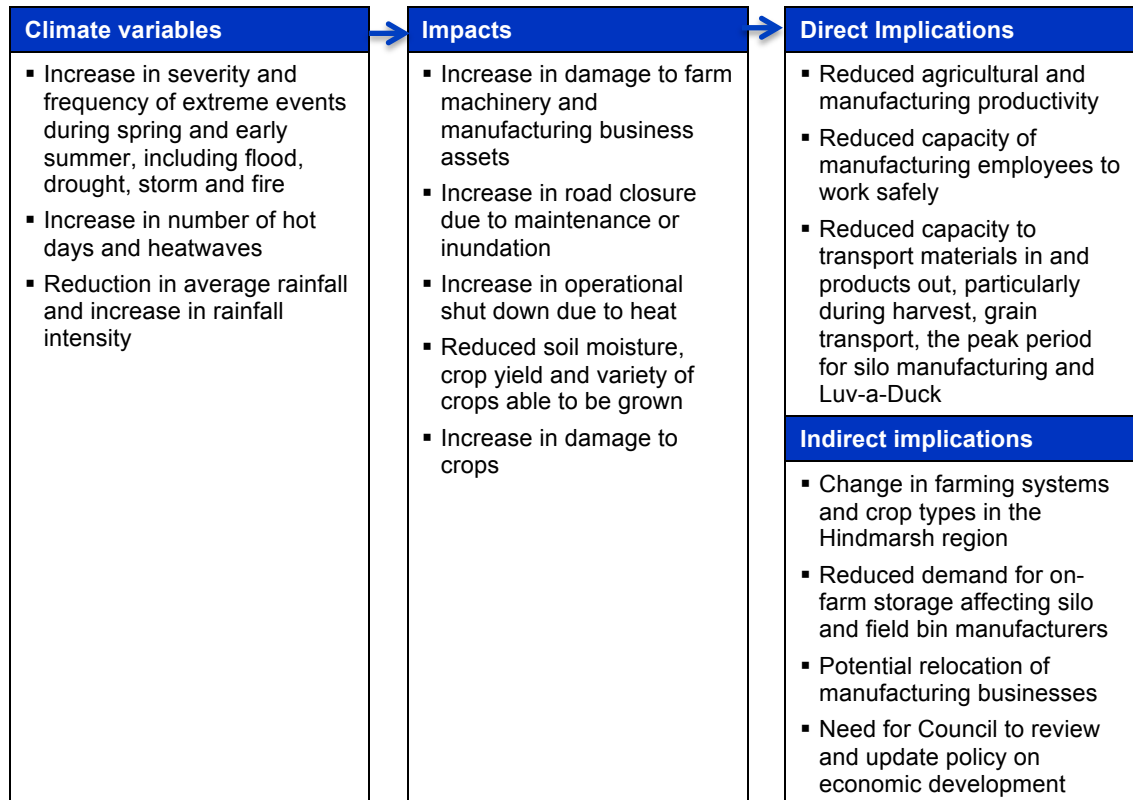


Figure 3-1: Climate variables, impacts and implications

3.2.2 Current policies and programs

Current policies and programs aimed at adapting to changes in climate are summarized here.

Agriculture

The *Future Farming Strategy* is a Victorian Government initiative to enable farms throughout the state to become more productive, competitive and sustainable in order to respond to change and gain access to highly competitive domestic and international markets.

The Commonwealth Government, through the Department of Agriculture, Fisheries and Forestry (DAFF) *Australia's Farming Future*, is investing heavily in research into how on-farm emissions can be reduced and what adaptation practices will reduce the impacts of climate change. Additionally, it is exploring how some practices affect soil carbon sequestration and trying to establish a consistent measurement methodology with the aim of providing incentives for land managers.

The *Carbon Farming Initiative* has been developed by the Commonwealth Government to give landholders access to domestic voluntary and international carbon markets. It includes:

- A mechanism for approving carbon abatement activities and registering the associated carbon credits
- Arrangements for fast-tracking the development of methods to robustly measure the carbon sequestered or emissions reduced in projects.

The Wimmera Development Association (WDA) undertook an industry audit of the Wimmera grains industry in 2007. This project was an initiative of the Region's Grains Industry Cluster Group, which was formed by representatives of Industry, Government and the WDA to identify and develop suitable projects within the context of the State Government's Regional Innovation Clusters Program (RICP).

The audit and analysis found that:

- It was estimated that 17% of the grain produced in the region was processed within the region
- The region had a higher cropping intensity than other comparable cropping regions within Australia
- The region had a competitive advantage in pulses because of the higher yields achieved and wider range of pulse crops grown, and that this advantage had led to pulses being the largest value-added crop in the region
- The transport and storage sector was the major employer within the grain processing industry.

Current research and development projects include:

Department of Primary Industries (DPI)

- The Australian Grains Free Air Carbon dioxide Enrichment (AGFACE) experiment

Birchip Cropping Group (BCG)

- Yielding benefits through partnerships – Water Use Efficiency (WUE) (GRDC BWD00012)
- Developing climate change resilient cropping and mixed cropping/grazing businesses in Australia (DAFF1)
- Australian farm group demonstrating adaptive practices to minimise the impact of climate change on farm viability (GRDC BWD00019)
- Achieving enterprise balance to increase profit, reduce risk and improve WUE in low rainfall areas (Low Rainfall Collaboration Group: Profit and Risk)
- Grain & Graze 2 (GRDC BWD00018)

Current agricultural changes in the Wimmera have been focussed on maximising productivity in a varying climate (i.e. more adaptable and flexible systems) over the past ten years of drought rather than a major shift in farming enterprises. However, there has been accelerated adoption of minimum tillage and other best practice management that have shown their value during this period.

Manufacturing

The Wimmera Manufacturing and Industry Group is the region's key support for developing and growing the manufacturing and export sectors in the region. Through forums, workshops, networking events and professional development opportunities, the Group helps businesses gain a competitive edge by keeping them abreast of the latest industry developments. The Group has a strong focus on export; encouraging businesses to explore the possibility of global trading through field trips and seminars with export leaders. The Group also has a strong commitment to promoting manufacturing as an attractive career option. The group is auspiced by the WDA and comprises membership mainly from the Horsham Rural City, Hindmarsh, Northern Grampians, West Wimmera and Yarriambiack municipalities.

Current operational changes in response to changing climate in the manufacturing sector in the Hindmarsh region include:

- Manufacturing businesses allow their employees to work flexible hours and start and finish earlier during hot periods. There are also stop work triggers for hot days, for example 37°C for silo manufacturers, to manage heatwaves
- Luv-a-Duck have installed evaporative coolers in all their hatcheries and sheds to respond to heatwaves and have back up generators installed for power outages.

Planning permit approvals

Changes to farm practices or manufacturing businesses in response to climate change may require a planning permit e.g. construction of sheds, water supply connections. Council has a two-week planning permit cycle, which means that a planning permit application that has provides all the relevant information for Council to assess and make a decision on the permit generally takes around two weeks from lodgement of the planning permit application. However, many permit applications are delayed because not all information is provided. Council has been implementing an education program to encourage development proponents to organise a pre-application meeting with Council so that the proposal can be discussed and feedback provided on the information required for assessment.

3.2.3 Proposed actions

To adapt to and mitigate the risk of reduced agricultural and manufacturing productivity, the Strategy proposes:

- Research, development and extension (RD&E)
- Streamline assessment of development proposals

These actions and the recommended role of Council are described in Table 3-1.

Table 3-1: Adaptation actions – agricultural and manufacturing productivity

Action	Description	Hindmarsh role	Other relevant agencies	Links to other actions or strategies
RE-1 Research development and extension	Continue to advocate and provide strategic support to DPI and industry groups such as BCG for on-going research and development that will assist the agricultural industry adapt to the changing climate	Advocate	DPI BCG Wimmera Conservation Farming Association Victorian No-Till Farmers Association Landcare	Wimmera Southern Mallee Regional Strategic Plan – Strategic Direction 1
RE-2 Streamlining of planning permit approvals	Continue implementation of processes to streamline assessment of planning permit applications including educating and encouraging landholders and businesses to bring proposals to a pre-application meeting	Lead	Neighbouring councils	

3.3 Regional employment and economic development

3.3.1 Description of risk

Climate change and reduced water availability poses a risk to regional employment and population in a number of ways. The climate variables, impacts and implications are outlined in Figure 3-2.

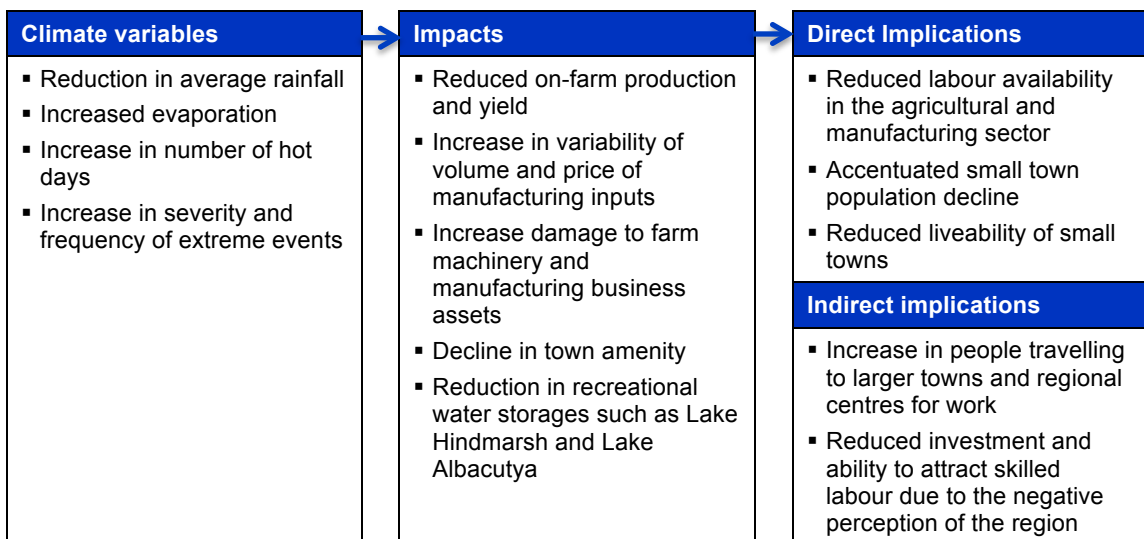


Figure 3-2: Climate variables, impacts and implications

3.3.2 Current policies and programs

Current policies and programs aimed at adapting to changes in climate are summarized here.

The Hindmarsh Council Plan 2009-2013 identifies economic sustainability as one of its five strategic objectives. The strategies listed to meet this objective are:

- Establish a Regional Tourism Association
- Promote and assist realisation of opportunities from the Wimmera Mallee Pipeline. The planning and construction of the Wimmera Mallee Pipeline to secure water supplies for the region
- Identify and pursue information technology opportunities for business and the community
- Support and promote sustainable agriculture
- Support and promote the existing transport industries in the Shire
- Match people, their skills and available jobs to improve employment and recruitment within the Shire
- Develop and implement an Economic Development Strategy for the Shire
- Advocate for the future of small rural towns.

Wimmera Southern Mallee Regional Strategic Plan¹³ includes a statement of desired future (five years) development of the region, a description of the region's population and major drivers of change, the plan's goals, strategic directions and areas for action, and the governance and implementation of the plan. This plan aims to address the region-wide risks identified in this project, including population decline, community resilience and provision of services.

The *Grampians Region Strategic Directions* was developed by the Grampians Regional Development Australia (RDA) Committee. The Grampians Region covers both the Wimmera Southern Mallee and Central Highlands 'sub regions'. Thus, one of the first actions of the RDA was to endorse the Regional Strategic Plans already developed within each of these 'sub regions'. As a result, the RDA strategic directions incorporate those already articulated above for the Wimmera Southern Mallee.

The Wimmera Development Association (WDA) policies and strategies include the Regional Growth Plan, which aims to share resources in planning in the Wimmera Southern Mallee region. The refugee settlement program funded by Department of Immigration & Citizenship aims to build networks and set up referrals at the regional level, and is currently running some key neighbourhood pilot programs in Nhill¹⁴.

The recovered water from the Wimmera Mallee Pipeline (WMP) will be allocated to stressed river systems, water recreation and economic development respectively with 20 GL available for new economic growth¹⁵. Farmers will have the opportunity to diversify into new value-added stock and horticulture enterprises, such as growing tomatoes in greenhouses.

Hindmarsh Economic Development Position Paper

The Hindmarsh Economic Development Position Paper was developed as a sub-component of this Strengthening Basin Communities study. The position paper includes:

¹³ RMCG (2010) Wimmera Southern Mallee Regional Plan, Regional Strategic Planning Initiative, report prepared for Wimmera Development Association

¹⁴ pers. comms. Jo Bourke, WDA, November 2011

¹⁵ Department of Sustainability and Environment (2011) Western Region Sustainable Water Strategy, Melbourne

- An overview of the key sectors of the Hindmarsh Shire economy, the priority risks to the economy from climate change and the current adaptation measures
- An outline of the current economic development framework at a regional and local level that Hindmarsh Shire is operating within
- A recommended approach for how best Hindmarsh Shire can take advantage of the existing framework to facilitate economic development within the Shire.

The paper found that there are well-established organisations and processes focusing on the bigger picture strategic priorities, which are of benefit to the whole of the region, including Hindmarsh. Thus, it is critical that Hindmarsh plays an active role within this framework to ensure that the outcomes achieved are maximised through collaborative action. There is also an important role for Hindmarsh in advocating for their priorities to become regional priorities.

There are also local priorities and opportunities specific to Hindmarsh that could be incorporated into a future Economic Development Strategy.

3.3.3 Proposed actions

To adapt to and mitigate the risk of reduced regional employment and population the Strategy proposes that Council:

- Develop an Economic Development Strategy based on the findings of the Economic Development Position Paper with a specific focus on:
 - Advocating and supporting regional economic development strategies and initiatives
 - Advocating for Hindmarsh priorities to be considered regional priorities
 - Attracting and retaining professional and skilled labour

These actions and the recommended role of Council are described in Table 3-2.

Table 3-2: Adaptation actions – regional employment and population

Action	Description	Hindmarsh role	Other relevant agencies	Links to other actions/strategies
RE-3 Economic Development Strategy	Develop an Economic Development Strategy based on the findings of the Economic Development Position Paper	Lead	WDA RDV	Wimmera Southern Mallee Regional Strategic Plan

4 Utilities infrastructure risks and adaptation

Summary

Climate change, and in particular a potential increase in the incidence of extreme weather events such as storms and heatwaves poses two key risks to utilities infrastructure and services:

- Increased road construction and maintenance costs
- Increased frequency of stormwater flooding

VicRoads has policies and programs in place to reduce the risk of increased road construction and maintenance costs. However, Council has yet to consider the range of impacts climate change will have on road construction and maintenance or stormwater capacity and management.

The strategy proposes Council take a leadership role to:

- Review and update the Road Asset Management Plan
- Develop a Stormwater Drainage Study

4.1 Introduction

Utilities infrastructure includes major infrastructure used to deliver core services to the region such as electricity, transport, water and communications. Services are delivered by a range of providers, including:

- Urban water supply and wastewater services: Grampians Wimmera Mallee Water
- Rural water storage and distribution, including the Wimmera Mallee Pipeline: Grampians Wimmera Mallee Water
- Stormwater management: Hindmarsh Shire
- Electricity transmission, distribution and supply: SP Ausnet, PowerCor
- Telecommunications, landline and mobiles: Telstra, Optus
- Roads: VicRoads for major roads, council for minor roads
- Railways: VicTrack

The risk assessment and further analysis identified priority risks to Hindmarsh as a result of climate change and reduced water availability:

- Increased frequency of high intensity rainfall and flooding and higher summer temperatures increases road damage resulting in higher construction and maintenance costs of roads
- High intensity rainfall leads to increased frequency of rainfall events when runoff exceeds stormwater drainage capacity resulting in localised stormwater flooding.

4.2 Increased road construction and maintenance costs

The Hindmarsh Shire Council maintains approximately 3,200 km of roadways including sealed, unsealed and earth formed roads. The State and Federal Government, through VicRoads, control a number of roads within the Shire¹⁶.

Roads in Hindmarsh are divided into three categories:

- Highways, wholly owned and maintained by VicRoads including Western Highway and Borung Highway
- Arterial roads, wholly owned and maintained by VicRoads including Birchip Rainbow Rd, Dimboola Rainbow Rd, Hopetoun Rainbow Rd, Jeparit Warracknabeal Rd, Nhill Harrow Rd, Nhill Jeparit Rd, Nhill Netherby Rd, Nhill, Yanac Rd, Warracknabeal Rainbow Rd
- A number of streets within towns are also under the control of VicRoads, including (but not limited to), Broadway and Lorquon Rd, Jeparit, High St, Horsham Road and Lloyd St Dimboola, Nelson St and Victoria St, Nhill. Taverner St, Rainbow
- Local roads, owned and maintained by Council include:
 - Sealed local roads
 - Unsealed local roads (gravel and earth).

In 2012, Hindmarsh commenced a trial of a number of road surface mixes for both sealed and unsealed roads to assess their resilience to climate extremes, durability, safety and cost effectiveness. This will be ongoing and the findings incorporated into the review of the next Road Asset Management plan.

¹⁶ Hindmarsh Shire Council website. Accessed 14.12.2011 http://www.hindmarsh.vic.gov.au/Page/page.asp?Page_Id=153&h=0

4.2.1 Description of risk

Climate change and reduced water availability can increase the construction and maintenance costs of roads in a number of ways. The climate variables, impacts and implications are outlined in Figure 4-1.

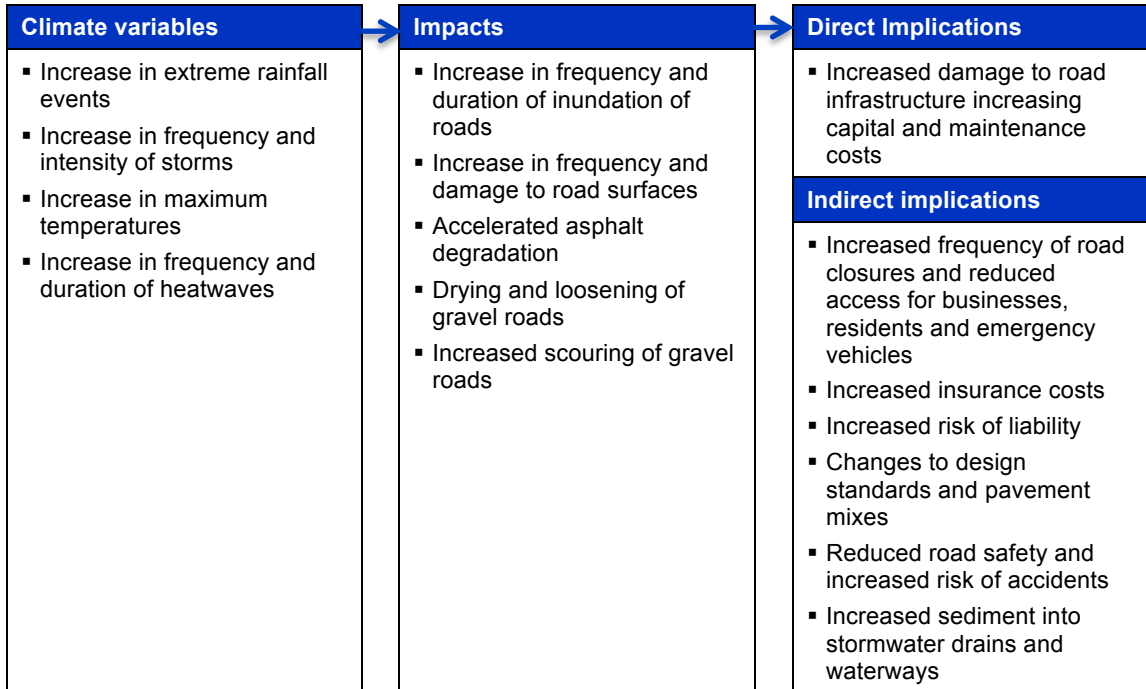


Figure 4-1: Climate variables, impacts and implications

4.2.2 Current policies and programs

Current policies and programs aimed at adapting to changes in climate are summarized here.

VicRoads

VicRoads has an on-going works management program to maintain roadways. This is subject to review to reflect new priorities of:

- Adjustments to the road mix to reflect high ambient temperatures
- Arrangements to access and purchase water as required to contribute to road construction projects
- Active management of dead trees to reduce risks from blockages following high winds.

Council

Council has a road's hierarchy for the purpose of establishing corporate policies, goals and strategies for improving and maintaining the local road network. The roads hierarchy sets out the desirable aims of Council within the constraints of the available budget. The *Road Asset Management plan (2004) – Infrastructure Roads and Bridges* provides a review of costs of maintaining the road and bridge assets.

4.2.3 Proposed actions

The main area requiring further action is reviewing road design and construction and the road maintenance program. To adapt to and mitigate the risk of higher road construction and maintenance costs, the Strategy proposes:

- Review of road construction
- Review of road hierarchy.

These actions and the recommended role of Council are described in Table 4-1.

Table 4-1: Adaptation actions – increased road construction and maintenance costs

Action	Description	Hindmarsh Shire role	Other relevant agencies	Links to other actions/strategies
UI – 1 Review and update the Road Asset Management plan	Embed consideration of climate change risks in development of the next road asset management plan	Lead	VicRoads	
	Continue to investigate alternative sealed road pavement mixes that are more resistant to temperature extremes. Incorporate findings into the Road Asset Management plan	Lead	VicRoads	
	Investigate alternative unsealed road gravel mixes and treatments that are more resistant to temperature extremes and surface runoff. Incorporate findings into the Road Asset Management plan	Lead	Neighbouring councils	
	Review the road hierarchy to incorporate consideration of climate change impacts and particularly recent flood events e.g. road closures, road safety, to minimise the risk of isolated townships	Lead	VicRoads	Wimmera Southern Mallee Regional Strategic Plan – Strategic Direction 6 Community Action Plans Township Climate Change Adaptation Plan

4.3 Increase in frequency of stormwater flooding

All *household* stormwater drains, including maintenance of the drains, are the responsibility of the property owner. Household stormwater drains are the section of drainage that lies within the property boundaries and up to the connection to the Council drainage system.

Council is responsible from the legal point of discharge. The legal point of discharge is the drain connection at the point where the water from the property reaches a Council drain, kerb and channel gutter or constructed Right of Way.

The stormwater drainage system also includes assets on public land or associated with public assets e.g. stormwater drain through Nhill school, culverts associated with the railway line.

In 2011, high intensity rainfall events caused localised stormwater flooding in Dimboola, Nhill and Rainbow.

4.3.1 Description of risk

Climate change and reduced water availability increases the risk of stormwater flooding in a number of ways. The climate variables, impacts and implications are outlined in Figure 4-2.

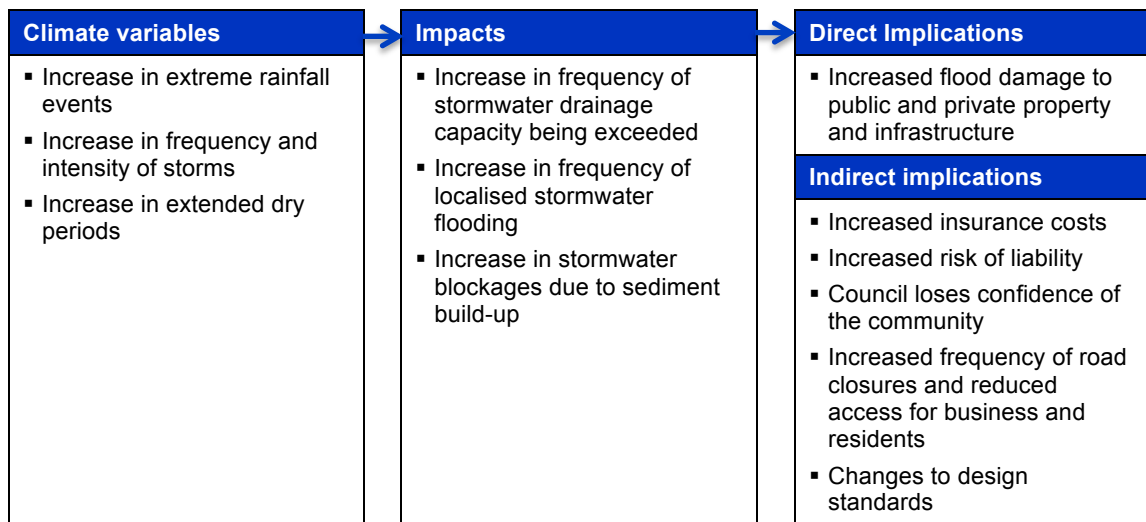


Figure 4-2: Climate variables, impacts and implications

4.3.2 Current policies and programs

Current policies and programs aimed at adapting to changes in climate are summarized here.

Council does not have a stormwater management plan. There is a lack of clarity regarding responsibility for maintenance of some stormwater assets including household drainage and drainage associated with public assets such as the drain through the Nhill school and culverts and drains beneath the railway line.

In March 2012, Council has commissioned the development of a Stormwater Drainage Study that has the following objectives:

- Scope and document the drainage issues in Nhill, Dimboola, Rainbow and Jeparit
- Develop a prioritised drainage capital improvement program
- Develop a drainage maintenance program (including a hierarchy of drainage maintenance needs)
- Review and update Council drainage policy that may include, but not limited to, consideration of planning scheme controls and ownership of and responsibility for drainage assets.

The Study is due for completion in July 2012

4.3.3 Proposed actions

To adapt to and mitigate the risks posed by increased frequency of stormwater flooding, the strategy proposes that:

- Council complete development and begin implementation of the Stormwater Drainage Study
- Council communicate its initiative and the implementation timeframes to the community, particularly those impacted by the 2010 / 2011 floods,

Table 4-2: Adaptation actions – increase in frequency of stormwater flooding

Action	Description	Hindmarsh Shire role	Other relevant agencies	Link to other actions/strategies
UI-2 Stormwater Drainage Study	Council complete development and begin implementation of the Stormwater Drainage Study	Lead	GWMW Wimmera Catchment Management Authority (WCMA)	Hindmarsh Integrated Water Management plan
	Develop and implement a community communication and engagement strategy to assist in the implementation of the Stormwater Drainage Study	Lead		Hindmarsh Township Climate Change Adaptation plan

5 Community infrastructure risks and adaptation

Summary

Climate change, and in particular a potential increase in the severity and frequency of extreme events and reduced average rainfall poses four main risks to community infrastructure:

- Lack of continuity of water supply for recreation and sporting facilities, parks and gardens
- Increase in infrastructure maintenance costs and costs of recovery from extreme events
- Increased demands on community volunteers for emergency response and recovery
- Need for community refuges is not being adequately met by Council buildings.

Risks posed by climate changes to water supply and management of Council's water use is dealt with in the Hindmarsh Integrated Water Management plan. The plan includes consideration of watering of recreation facilities, parks and gardens, adoption of water use efficiency measures and assessment of alternative water supply options¹⁷.

Risks posed by increased frequency of extreme events and demands on community volunteers for response and recovery as well as the adequacy of community buildings to act as refuges during extreme events is dealt with in detail in the Hindmarsh Township Climate Change Adaptation Plan¹⁸.

Council needs to ensure adequate insurance and finance is available to respond to and recover from extreme events, and consider the impacts of climate change in the Municipal Emergency Management Plan (MEMP).

The strategy proposes that Council:

- Adopt and implement the Hindmarsh Integrated Water Management plan
- Undertake stormwater flood prevention
- Adopt and implement the Hindmarsh Township Climate Change Adaptation Plan
- Undertake contingency planning for Council systems during power outages
- Incorporate the findings of township emergency planning into the Municipal Emergency Management Plan

5.1 Introduction

Community infrastructure includes parks; gardens, halls, libraries and other council owned and operated buildings. Community infrastructure in Hindmarsh includes:

- Shire Offices (4): Shire offices are located in each of the four townships. This stems from the time before amalgamation of the former Shire of Dimboola and Lowan to form the Shire of Hindmarsh

¹⁷ RMCG (2012) Draft Hindmarsh Integrated Water Management Plan

¹⁸ RMCG (2012) Draft Hindmarsh Township Climate Change Adaptation Plan

- Community Halls (~10): many of the public halls in the smaller communities are owned by Council but run by local committees of management. Council works in partnership with these groups to maintain the facilities
- Recreation Reserves (4): Davis Park in Nhill, Rainbow Recreation Reserve, Sir Robert Menzies Park in Jeparit and Dimboola Recreation Reserve
- Public Parks (3): Jaypex and Goldsworthy Park in Nhill and the central Federal St gardens in Rainbow
- Solar heated swimming pools (4): Nhill, Dimboola, Jeparit and Rainbow open from November to March
- Senior Citizens centres (4): All of the four Shire towns have Senior Citizens facilities only the ones in Dimboola, Jeparit and Nhill are owned by Council but managed by their users, whereas Rainbow is sharing their facilities with the local RSL branch
- Kindergartens: Operate in each of the four major towns. Wimmera Uniting Care provides children's services from Council owned premises in Clarence Street, Nhill, Hindmarsh Street, Dimboola, Darts Ave, Rainbow and Hindmarsh Street, Jeparit
- Schools (9): Nhill St Patrick's School, Nhill Lutheran School, Nhill College, Dimboola Lutheran School, Dimboola Primary School, Dimboola Memorial Secondary College, Jeparit Primary School, Rainbow Primary School, Rainbow Secondary School (included in evacuation component of MEMP)
- Libraries (2): Dimboola and Nhill as well as the mobile library visiting Rainbow and Jeparit are operated by the Wimmera Regional Library Corporation.

The risk assessment and further analysis identified priority risks to Hindmarsh as a result of climate change and reduced water availability:

Continuity of water supply for recreation, sporting facilities, parks and gardens

- Increased frequency of drought means that there will be increased frequency of periods when sports grounds, recreation facilities and parks and gardens cannot be watered impacting on town amenity and sporting and recreation activities

Increase in recovery and maintenance costs

- Increased severity and frequency of extreme events increases damage to recreation buildings e.g. basketball stadium, girl scouts, rowing club
- Increased severity and frequency of extreme events increases reliance on external funding for recovery of recreation and community buildings
- Increased severity and frequency of extreme events increases maintenance costs to council buildings and assets e.g. halls, swimming pools.

Declining volunteerism

- Increased severity and frequency of extreme events increases reliance on volunteers in the community for emergency response and recovery.

Community refuges for extreme events

- Increased severity and frequency of extreme events increases the reliance on council buildings as refuges.

5.2 Continuity of water supply

Council water use, including on sports grounds, recreation facilities and parks and gardens and continuity of water supply during periods of reduced water availability has been considered in detail as part of the Hindmarsh Integrated Water Management Plan.

Action	Description	Hindmarsh Shire role	Other relevant agencies	Links to other actions / strategies
CI-1 Integrated water management planning	Adopt and implement the Hindmarsh Integrated Water Management plan	Lead	GWMWater	Township Climate Change Adaptation Plan

5.3 Increase in recovery and maintenance costs

5.3.1 Description of risk

Climate change and reduced water availability can increase recovery and maintenance cost of community infrastructure in a number of ways. The climate variables, impacts and implications are outlined in Figure 5-1.

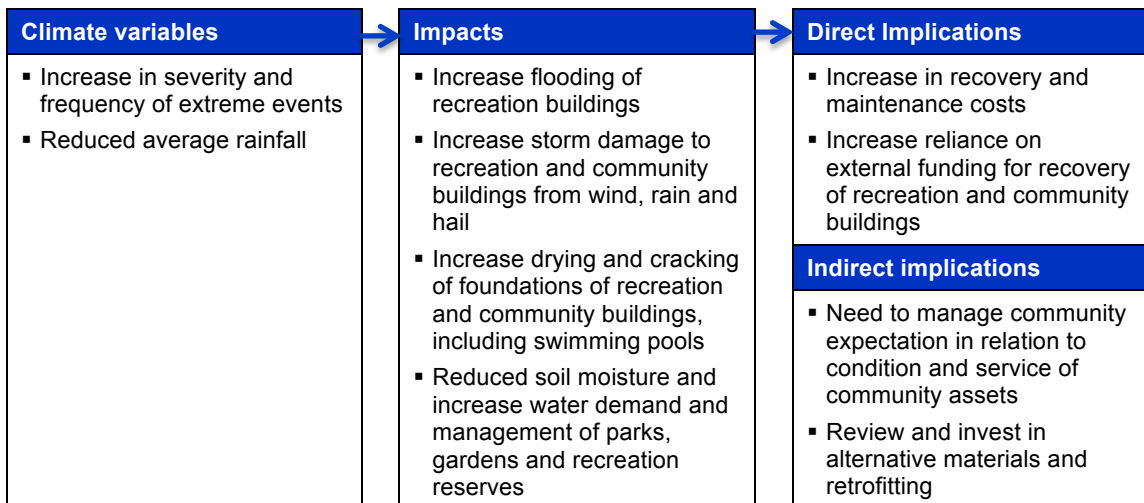


Figure 5-1: Climate variables, impacts and implications

5.3.2 Current policies and programs

Insurance policies are taken out for council buildings and assets. Insurance costs for the whole of Council are rising slightly, totaling \$210,097 in 2009 and \$211,518 in 2010¹⁹.

¹⁹ Hindmarsh Shire Council (2010) Annual report, note 13, page 63

Funding is available from the State Government National Disaster Financial Assistance, or Federal Government funding initiatives such as Australian Government Disaster Recovery Payment (AGDRP) and Natural Disaster Relief and Recovery Arrangements (NDRRA).

The current community infrastructure maintenance and renewal budget for open space, recreation and buildings is outlined in the table below.

Table 5-1: Council community infrastructure expenditure for the year ended June 30 2010²⁰

Capital works area	Actual 2010 (\$)	Budget 2010 (\$)	Variance (\$)	%
Open space/recreation	-	194,430	194,430	100.00
Buildings	533,938	217,990	(315,948)	(144.94)
Total capital works	533,938	412,420	121,518	(22.76)

Explanations of the variance in community infrastructure expenditure above are as follows:

- Open space/recreation: Budget for \$127,500 for Nine Creeks Reserve is Carried forward to next year due to delays with Cultural Heritage Management Plan.
- Buildings: This variance is largely due to the spending \$40,000 on NMCC, \$31,870 Public Toilets - Dimboola and \$28,000 Front of Office Building Paving. All of these projects were not budgeted for in 2009-2010 and brought forward from 2008-2009.

5.3.3 Proposed actions

To adapt to and mitigate the risk of increase in recovery and maintenance costs, the Strategy proposes:

- Stormwater flood prevention
- Review of Council buildings and assets

These actions and the recommended role of Council are described in Table 5-2.

Table 5-2: Adaptation actions – increase in recovery and maintenance costs

Action	Description	Hindmarsh Shire role	Other relevant agencies	Links to other actions / strategies
CI-2 Stormwater flood prevention	Confirm responsibility for maintenance of levy banks in Jeparit Where Council is the responsible authority develop a levy management plan that considers: <ul style="list-style-type: none"> ▪ Ongoing maintenance requirements and costs ▪ Management during flooding ▪ Risks to levy integrity and capacity from increased frequency of flooding and increased flood heights ▪ Community engagement and communication 	Lead	WCMA GWMW	
	Adopt and implement the Hindmarsh Stormwater Drainage Study	Lead	VicRoads VicTrack	

²⁰ Hindmarsh Shire Council (2010) Annual Report, page 41

Action	Description	Hindmarsh Shire role	Other relevant agencies	Links to other actions / strategies
CI-3 Review of Council buildings and assets	Embed consideration of climate change risks in the review and development of Council building maintenance programs	Lead		
	Incorporate the findings of climate change risks on Council buildings in the annual review of insurance cover			

5.4 Declining volunteerism

Increased severity and frequency of extreme events increases reliance on volunteers in the community for emergency response and recovery. This is dealt with in detail in the Township Climate Change Adaptation Plan

Action	Description	Hindmarsh Shire role	Other relevant agencies	Links to other actions/strategies
CI-4 Township emergency management planning	Adopt and implement the Hindmarsh Township Climate Change Adaptation Plan	Lead	CFA SES	Hindmarsh Heatwave Strategy Hindmarsh MEMP

5.5 Extreme event impacts and management

5.5.1 Description of risk

Climate change and reduced water availability poses a risk to community volunteers and the provision of council assets in a number of ways. The climate variables, impacts and implications are outlined in Figure 5-1.

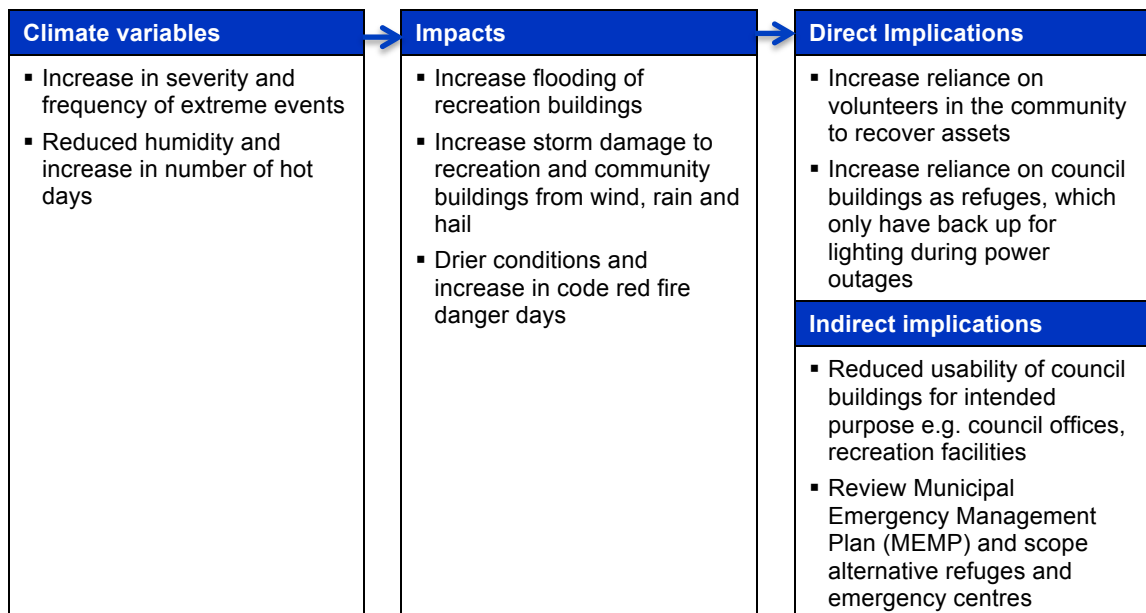


Figure 5-2: Climate variables, impacts and implications

5.5.2 Current policies and programs

Current policies and programs used to manage the changes in climate are detailed below.

- The council refuge policy outlined in the Municipal Emergency Management Plan (MEMP). Primary sites include Nhill Memorial Community Centre, Rainbow Civic Centre, Jeparit Memorial Hall, Jeparit Community Pavilion and the Dimboola Sports Stadium²¹. A suitability analysis for different extreme events needs to be undertaken for these sites, based on the lessons learnt during the January 2011 floods. Current Municipal Emergency Coordination Centres (MECC) include Nhill SES Unit, while the alternative MECC is located at the Municipal Building in Jeparit²²
- Recent extreme weather events have lead to a review of the MEMP and the appropriateness of community refuges, relief centres and MECC operation and locations. This process is currently being undertaken within council
- Current insurance policies taken out for council building and assets. As mentioned previously, insurance costs for the whole of Council are rising slightly, totaling \$210,097 in 2009 and \$211,518 in 2010²³
- External recovery funding for extreme events e.g. flood (Victorian Business Flood Recovery Fund), fire
- Current volunteer base to assist council in responding to extreme events²⁴. However, during consultation it was found that there was a reliance on a small number of key personnel to volunteer and respond to most extreme events
- Back up power generators for lighting only in council buildings.

5.5.3 Proposed actions

To adapt to and mitigate the risk of increased reliance on volunteers and the provision of council assets, the Strategy proposes:

- Adopt and implement the Draft Hindmarsh Township Climate Change Adaptation Plan
- Contingency planning
- Revise Municipal Emergency Management Plan (MEMP).

These actions and the recommended role of Council are described in

Table 5-3.

²¹ Hindmarsh Shire Council (2011) Municipal Emergency Management Plan, Appendix D – Emergency Relief Centres, page 76

²² Hindmarsh Shire Council (2011) Municipal Emergency Management Plan, Appendix B – Municipal Emergency Coordination Centre Standard Operating Procedures, page 70

²³ Hindmarsh Shire Council (2010) Annual report, note 13, page 63

²⁴ Hindmarsh Shire Council (2011) Municipal Emergency Management Plan, Part 6 – Recovery Arrangements, pages 34, 36, 50, and Appendix G – Council Volunteer Registration Form, page 100

Table 5-3: Adaptation actions – volunteerism and provision of council assets

Action	Description	Hindmarsh Shire role	Other relevant agencies	Links to other actions/strategies
CI-5 Contingency planning	Identify critical Council systems required during emergencies and determine the adequacy of power reserves and back up power supplies during power outages.	Lead		Hindmarsh Risk Register Hindmarsh MEMP
	Assess capacity of emergency management centres and critical Council buildings to receive back up electricity supply from generators.	Lead	CFA SE	Hindmarsh MEMP
CI-6 Municipal emergency management planning	Incorporate the findings of the township emergency management planning into the MEMP	Lead	CFA SES	Hindmarsh Heatwave Strategy Hindmarsh Township Climate Change Adaptation Plan

6 Council capacity risks and adaptation

Summary

Climate change, in particular extreme events such as storms, floods and drought and an increase in the number of heatwaves, poses key risks to Council capacity:

- Increased demand for Council services and declining Council income
- Increased difficulty in recruiting and retaining Council staff
- Providing a safe work environment for staff
- Reduced community capacity and resilience.

Risks posed by climate change and reduced water availability on community capacity and resilience are dealt with in detail in the Draft Hindmarsh Township Climate Change Adaptation plan.

The Strategy proposes that Council:

- Incorporate climate change and water availability scenarios into Council asset management plans
- Embed climate change and water availability risk assessment into future planning
- Consider and implement alternative service delivery models
- Undertake community engagement on Council plans and strategies to adapt to climate change

6.1 Introduction

Council capacity includes its financial capacity to deliver services, its staff on whom the quality and continuity of service delivery depends, its policies, management plans and processes that guide decision making and implement Council directions.

The risk assessment and further analysis identified priority risks to Hindmarsh as a result of climate change:

- Increased frequency of extreme events and changes to climate will increase demand for Council services including asset management, community health and emergency management
- Climate change will exacerbate population trends resulting in reductions in Council income while costs to deliver services increase
- Climate change impacts will exacerbate the current difficulty in recruiting and retaining Council staff
- Increased summer temperatures and heatwaves will increase frequency when staff work conditions do not meet Occupational Health and Safety standards
- Community capacity and resilience will be challenged by climate change due to the combination of small and ageing populations, increased extreme events and dependence

on volunteers for community events and activities as well as emergency response and recovery.

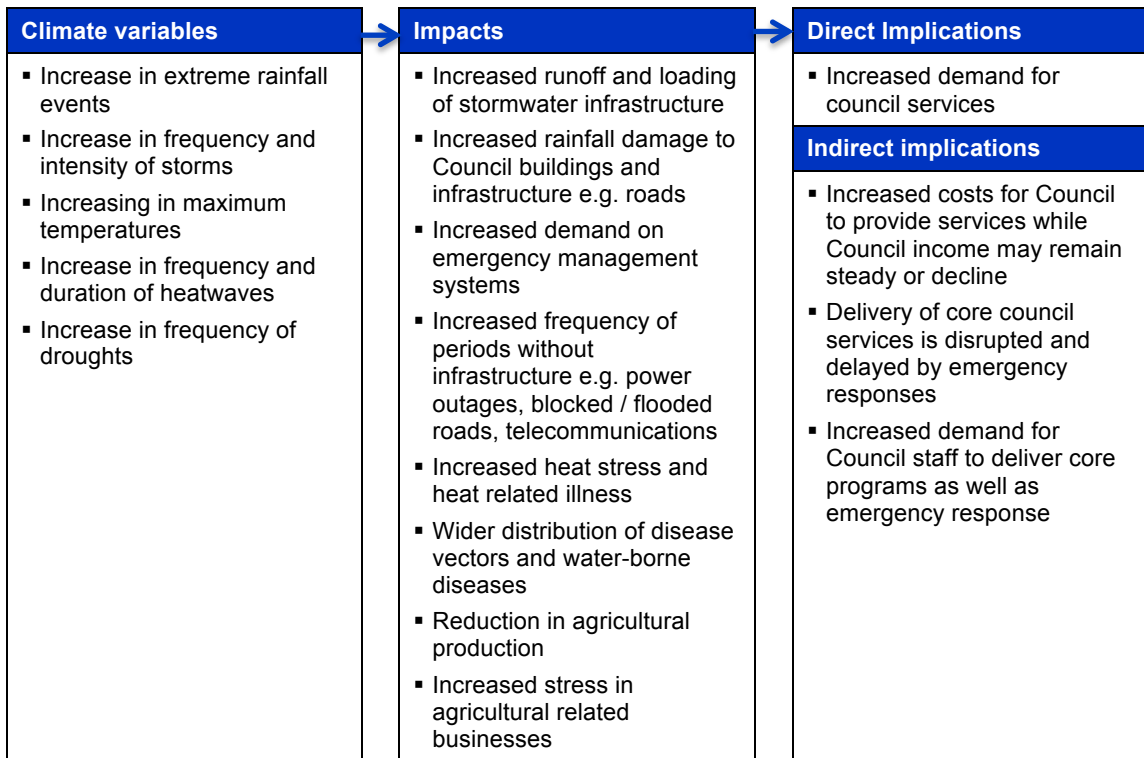
6.2 Increased demand for council services

Council provides a wide range of services to its community, many of which will be impacted by climate change. Council services include:

- Emergency management
- Environmental health services
- Caravan parks and camping grounds
- Maternal and child health
- Medical officer
- Public toilet cleaning and maintenance
- Pre-school services
- Senior citizen services
- Meals on wheels
- Home care services
- Home maintenance
- Youth services
- Waste collection and disposal
- Building services
- Tourist information
- Commerce and tourism promotion
- Swimming Pools
- Waste collection and disposal
- Corporate services to enable the organisation to deliver services
- Footpath maintenance
- Street cleaning
- Immunisation
- Recreation reserves
- Parks and gardens
- Street lighting
- Road maintenance and renewal
- Aerodrome maintenance
- School crossing maintenance
- Tree lopping, maintenance and replacement
- Bridge maintenance
- Drainage maintenance
- Business unit activities to meet the needs of residents
- Local roadside maintenance
- Health education
- Saleyard services
- Quarries
- Library services
- Planning services

6.2.1 Description of risk

Climate change and water availability can increase the demand for council services in a number of ways. The climate variables, impacts and implications are outlined in the following diagram.



6.2.2 Current policies and programs

The Hindmarsh Shire Council Plan²⁵ is a strategic plan that outlines Council's vision and strategic objectives for the next five years. While it describes a number of the challenges facing Hindmarsh, it does not specifically address climate change. Many of the strategic actions do complement the actions outlined in this Adaptation Strategy.

A number of other Council strategies are yet to consider and identify appropriate responses to climate change including:

- Municipal Fire Prevention Plan
- Municipal Public Health plan
- Hindmarsh Shire Council Heatwave Plan.

The Wimmera Mallee Sustainability Alliance outlined the following high priority actions in its White Paper²⁶:

- Work with relevant stakeholders to achieve community resilience and positive outcomes for health and well being by defining indicators, targets and developing programs
- Identify the specific needs for extreme event planning.

The Hindmarsh Shire Budget²⁷ seeks to balance the needs and demands of the community with the financial capacity of Council to fund these needs through rates. The budget continues to be faced with the challenges of:

²⁵ The Hindmarsh Shire Council Plan 2011 – 2015. Revised August 2011

²⁶ Wimmera Mallee Sustainability Alliance: Towards sustainability in the Wimmera Southern Mallee White Paper 2011 – 2014

- A very low rate base, with rates revenue comprising only 38% of total revenue compared to the average of 49% for other rural councils
- Population decline, which spreads the rate load across fewer individuals
- An ageing population, which generally has a lower income, less capacity to pay rates and a high demand on council services
- The majority of the land in the municipality is agricultural land, which has generally maintained its value, but agricultural income is highly variable and frequently the agricultural community has reduced capacity to pay rates.

Hindmarsh is one of the lowest rating municipalities in Victoria. Council requires an annual rate increase of 4% to keep pace with rising costs of delivering current services. Council is therefore very reliant on Federal and State Government grants to augment the income from rates to maintain service delivery and to enable it to undertake major capital projects. Around 48% of council operating revenue in 2010/2011 budget comprised grants from Government.

The expected change in demand for services arising from climate change will impact on the Council budget as it has limited capacity to absorb increased costs or increase rate income to cover increased costs. In the longer term there may need to be an adjustment to the delivery level of some services provided by Council to ensure that it can meet its financial obligations. Council will need to communicate these issues with its community and provide opportunity for input into decision making regarding changes to services provision.

The Draft Integrated Water Management Plan has identified opportunities to reduce water use and costs through implementation of more water efficient management practices and using alternative lower cost sources of water.

6.2.3 Proposed actions

To adapt to and mitigate the risk of increased demand for Council services, the Strategy proposes:

- Incorporate climate change and water availability scenarios into asset management plans
- Embed climate change and water availability risk assessment into all future planning
- Alternative models of service delivery
- Community engagement.

These actions and the recommended role of Council are described in Table 6-1.

²⁷ Hindmarsh Shire Council Budget 2001 - 2012

Table 6-1: Adaptation actions – increased demand for Council services

Action	Description	Hindmarsh Shire role	Other relevant agencies	Links to other actions/strategies
CC-1 Incorporate climate change and water availability scenarios into Council assets management plans	Council staff review and analyse current asset management plans under a range of climate change and water availability scenarios e.g. – Stormwater drainage capacity maintenance – Road construction and design – Building maintenance, upgrade and design	Lead		Council Plan
CC-2 Embedding climate change and water availability risk assessment	Climate change and water availability scenarios should be regularly updated and considered in the analysis of future asset management plans and broader Council planning	Lead		Council Plan
CC-3 Community engagement	As part of future service delivery planning, review services in some towns and/ or consolidating services to a smaller number of towns	Lead	MAV Neighbouring Councils	Council Plan Township plans
	Incorporate findings of the DPCD Role and Function of Small Towns and Settlements Project in to future service delivery planning	Lead	DPCD	Township plans
	Undertake community engagement to communicate Council's adaptation and sustainability projects to demonstrate leadership and educate the community	Lead		Township Climate Change Adaptation Plan
	Undertake community engagement to communicate Council's challenges in maintaining service delivery and invite community discussion on choices and options	Lead		Township Climate Change Adaptation Plan

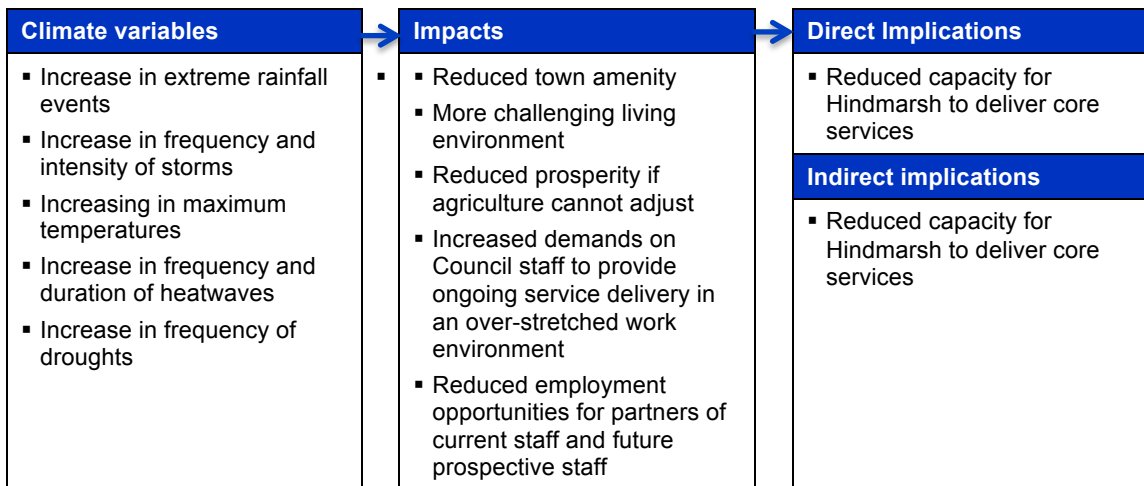
6.3 Recruiting and retaining staff

6.3.1 Description of risk

Recruiting and retaining Council staff is an existing challenge for Hindmarsh. This can be attributed to a range of factors including:

- Remote location
- Opportunities for career development in a relatively small organisation
- Few employment opportunities for partners of Council staff and prospective employees.

Climate change may further exacerbate this issue as the future climate causes impacts on the liveability and amenity of towns and prosperity of the region (and people's perceptions of Hindmarsh).



6.3.2 Current policies and programs

Hindmarsh has addressed this issue by sharing professional staff with neighbouring municipalities.

6.3.3 Proposed actions

To adapt to and mitigate the risk of recruiting and retaining Council staff, the Strategy proposes:

- Integrated recruitment packages
- On the job training and development
- Outsourcing.

Action	Description	Hindmarsh Shire role	Other relevant agencies
CC-4 Recruitment	Liaise with major businesses, service providers and neighbouring municipalities to develop packages offering employment opportunities with Council for couples and families	Lead	WDA
	Continue to utilise the Victorian Traineeship programs to address Council skill shortages	Lead	WDA
	In conjunction with other municipalities and major businesses, develop a Skills Match program to assist in matching skills and employment opportunities	Lead Advocate	WDA Other municipalities
CC-5 Outsourcing	Continue to identify services that can be delivered by contractors or consultants for services that cannot be provided in-house and require high quality outputs delivered to specified timeframes	Lead	MAV

6.4 Providing and safe and healthy working environment for staff

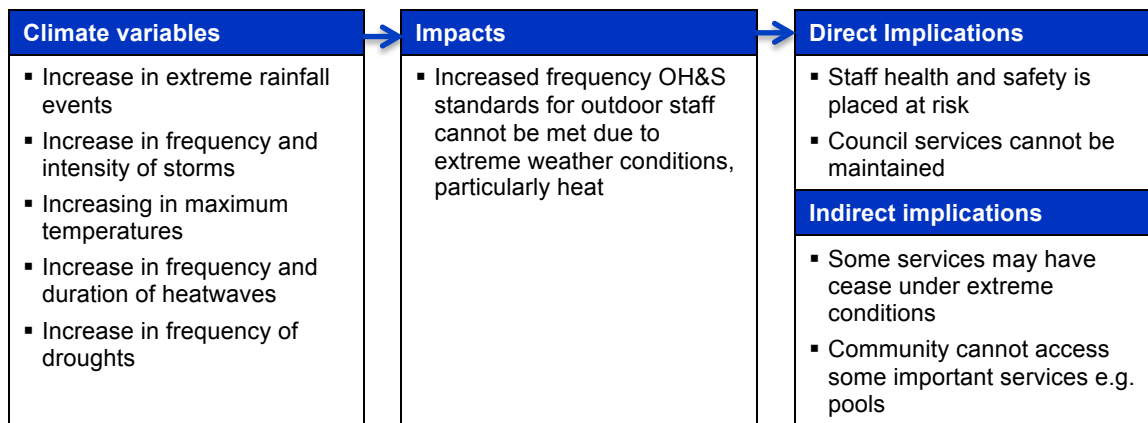
6.4.1 Description of risk

Extreme weather events, particularly heatwaves can challenge the provision of existing services. Examples noted during the consultation included:

- Heatwaves creating work conditions for outdoor staff that do not comply with OH&S standards
- Power outages resulting in loss of air-conditioning in Council buildings.

OH&S issues are a consideration for all staff working in hot conditions. Of particular concern is the well-being of pool staff during heatwaves. It is important that staff can continue to operate the pool in very hot conditions, as the pool is an important heat refuge, as are some Council buildings.

Climate change and water availability can impact on the health and wellbeing of Council staff and delivery of Council services in a number of ways. The climate variables, impacts and implications are outlined in the following diagram.



6.4.2 Current policies and programs

Council has a number of measures in place to provide a safe and healthy working environment for staff:

- Upgrade of the main Shire office in Nhill
- Alternative work arrangements for outdoors staff based on a Hazardous Environmental Conditions Policy which applies for heat, wind, storms etc. that ensure that staff are not placed at risk during extreme weather events and allows for flexible work hours and rearrangement of work schedules
- The Business Continuity Plan does not deal explicitly with indoor staff during extreme weather events and power outages.

6.4.3 Proposed actions

To adapt to and mitigate the risk of providing and safe and health work environment for staff, the strategy proposes contingency planning to assess the work places and work arrangement of outdoors staff.

Table 6-2: Adaptation actions – increased demand for Council services

Action	Description	Hindmarsh Shire role	Other relevant agencies	Links to other actions / strategies
CC-6 Contingency planning	Review the Business Continuity Plan for indoor staff that considers extreme weather events and power outages	Lead		

7 Strategy implementation and renewal

7.1 Introduction

Effective implementation of the Hindmarsh Climate Change Adaptation Strategy will require the impacts of climate change to be considered across Council business. There are four main avenues for implementation of the actions proposed in this strategy:

- Incorporation into Council's annual plans as part of the regular cycle of review
- Seek funding from State or Federal governments as a stand-alone project
- Undertaken in partnership with a regional body or agency
- Advocate to a regional, State or Federal agency.

7.2 Timelines and responsibilities

Table 7-1 outlines the climate change adaptation actions, responsibility within Council for implementation and implementation timeframes.

Actions highlighted in green are project ready or underway and can be undertaken within current budget.

Table 7-1 Climate change adaptation actions, responsibility and timeframe for implementation

Action	Description	Responsibility within Hindmarsh	Implementation timeframe	Project ready	Budget impact	Implementation steps
Regional economy						
RE-1 Research development and extension	Continue to advocate and provide strategic support to DPI and industry groups such as BCG for on-going research and development that will assist the agricultural industry adapt to the changing climate	Community Development	Underway and ongoing	Yes	Budget neutral	Adopt this Climate Change Action Plan
RE-2 Streamlining of planning permit approvals	Continue implementation of processes to streamline assessment of planning permit applications by educating and encouraging landholders and businesses to bring proposals to a pre-application meeting	Infrastructure services	Underway and ongoing	Yes	Budget neutral	Develop material for the Shire website explaining the planning permit application process and the importance of a pre-application meeting
RE-3 Economic Development Strategy	Develop an Economic Development Strategy based on the findings of the Economic Development Position Paper	Community Development	2 years	Yes	Budget allocation or grant will be required	Adopt this Climate Change Action Plan and Economic Development Position Paper Seek grant from RDV to develop an Economic Development Strategy or budget allocation. Prepare a Project Brief based on the recommendations of the Economic Development Position Paper

Action	Description	Responsibility within Hindmarsh	Implementation timeframe	Project ready	Budget impact	Implementation steps
Utility infrastructure						
UI – 1 Review and update the Road Asset Management plan	Embed consideration of climate change risks in development of the next road asset management plan	Infrastructure Services	3 years	Yes	Budget neutral	Incorporate climate change into the risk assessment as part of review of next Road Asset Management Plan
	Continue to investigate alternative sealed road pavement mixes that are more resistant to temperature extremes. Incorporate findings into the Road Asset Management plan	Infrastructure Services	3 years	Commenced	Budget allocated	Complete trials. Undertake a cost analysis, including consideration of the findings of the review of the road hierarchy. Incorporate findings into the next review of the Road Asset Management Plan
	Continue to investigate alternative unsealed road gravel mixes and treatments that are more resistant to temperature extremes and surface runoff. Incorporate findings into the Road Asset Management plan	Infrastructure Services	3 years	Commenced	Budget allocated	Complete trials. Undertake a cost analysis, including consideration of the findings of the review of the road hierarchy. Incorporate findings into the next review of the Road Asset Management Plan
	Complete the review the road hierarchy to incorporate consideration of climate change impacts and particularly recent flood events e.g. road closures, road safety, to minimise the risk of isolated townships	Infrastructure Services	3 years	Commenced	Budget allocated	Collate data e.g. traffic numbers, road closures due to flood etc. Include in review of road hierarchy

Action	Description	Responsibility within Hindmarsh	Implementation timeframe	Project ready	Budget impact	Implementation steps
UI-2 Stormwater Drainage Study	Council complete development and begin implementation of the Stormwater Drainage Study	Infrastructure Services	1 year	Commenced	Budget allocated	Council Adopt the Hindmarsh Stormwater Drainage Study Begin implementation using allocated budget for 2012/13
	Develop and implement a community communication and engagement strategy to assist in the implementation of the Stormwater Drainage Study	Infrastructure Services	1 year	Commenced	Budget allocation required	Council Adopt the Hindmarsh Stormwater Drainage Study and develop an engagement strategy based on strategy priorities and recommendations.
Community infrastructure						
CI-1 Integrated water management planning	Adopt and implement the Hindmarsh Integrated Water Management plan	Infrastructure Services	3 years		A mix of actions to be funded from Council budget and grants	Adopt IWMP Review actions to be undertaken within Council budget and incorporate into the work programs Apply for grant funding.
CI-2 Stormwater flood prevention	Confirm responsibility for maintenance of levy banks in Jeparit	Infrastructure Services	1 year	Commenced	Budget neutral	
	Where Council is the responsible authority develop a levy management plan that considers: <ul style="list-style-type: none"> – Ongoing maintenance requirements and costs – Management during flooding – Risks to levy integrity and capacity from increased frequency of flooding and increased flood heights – Community engagement and communication 	Infrastructure services	3 years			Develop project plan depending on the outcome of previous task

Action	Description	Responsibility within Hindmarsh	Implementation timeframe	Project ready	Budget impact	Implementation steps
CI-3 Review of Council buildings and assets	Develop a risk register for all Council buildings that includes consideration of climate change	Infrastructure Services	1 year	Yes	Budget Neutral	Build into annual maintenance program of Council buildings and assets
	Include consideration of the findings of the risk register and adequacy of insurance cover in the development of Council buildings maintenance programs.	Infrastructure Services	1 year	Yes	Budget neutral	
CI-4 Township emergency management planning	Adopt and implement the Hindmarsh Township Climate Change Adaptation Plan	Community Development	1 year	Yes	Budget allocated	
CI-5 Contingency planning	Identify critical Council systems required during emergencies and establish the adequacy of power reserves and back up during power outages.	Corporate Management	1 year	Yes	Budget neutral	Establish internal working group
	Assess capacity of emergency management centre and critical Council buildings to receive back up electricity supply from generators.	Corporate Management	1 year	Yes	Budget neutral	Establish internal working group
CI-6 Emergency management planning	Incorporate the findings of the Township emergency management planning into the MEMP	Infrastructure Management	2 years	Yes	Budget neutral	Include findings in the next review of the MEMP

Action	Description	Responsibility within Hindmarsh	Implementation timeframe	Project ready	Budget impact	Implementation steps
Council capacity						
CC-1 Incorporate climate change and water availability scenarios into Council assets management plans	Council staff review and analyse current asset management plans under a range of climate change and water availability scenarios e.g. <ul style="list-style-type: none"> Stormwater drainage capacity maintenance Road construction and design Building maintenance, upgrade and design 	Infrastructure Management	Ongoing	Yes	Budget neutral	Make climate and extreme event data available to project staff. Include a risk assessment as part of the review of asset management plans.
CC-2 Embedding climate change and water availability risk assessment	Climate change and water availability scenarios should be regularly updated and considered in the analysis of future asset management plans and broader Council planning	Infrastructure Management	Ongoing	Yes	Budget neutral	
CC-3 Community engagement	As part of future service delivery planning, review services in some towns and/ or consolidating services to a smaller number of towns	Lead	Ongoing	Yes	Budget neutral	Incorporate into development of Community Action Plans
	Incorporate findings of the DPCD Role and Function of Small Towns and Settlements Project in to future service delivery planning	Lead	DPCD	Yes	Budget neutral	
	Undertake community engagement to communicate Council's adaptation and sustainability projects to demonstrate leadership and educate the community	Lead	Ongoing	Yes	Budget allocation required	Incorporate into development of Community Action Plans
	Undertake community engagement to communicate Council's challenges in maintaining service delivery and invite community discussion on choices and options	Lead	Ongoing	Yes	Budget allocation required	Incorporate into development of Community Action Plans

Action	Description	Responsibility within Hindmarsh	Implementation timeframe	Project ready	Budget impact	Implementation steps
CC-4 Recruitment	Liaise with major businesses, service providers and neighbouring municipalities to develop packages offering employment opportunities with Council for couples and families	Lead and advocate	1 year and ongoing	No	Budget neutral	Advocate to WDA, Regional Managers forum
	Continue to utilise the Victorian Traineeship programs to address Council skill shortages	Lead	Ongoing	Yes	Budget neutral	
	In conjunction with other municipalities and major businesses, develop a Skills Match program to assist in matching skills and employment opportunities	Lead	2 years	No	Budget allocation required	Set up internal working group to develop a project plan and begin liaison with other Councils.
CC-5 Outsourcing	Continue to identify services that can be delivered by contractors or consultants for services that cannot be provided in-house and require high quality outputs delivered to specified timeframes	Lead	Ongoing	Yes	Budget neutral	
CC-6 Contingency planning	Review the Business Continuity Plan for indoor staff that considers extreme weather events and power outages	Lead	1 year	Yes	Budget neutral	

7.3 Integration with existing council plans and strategies

The existing council plans and strategies that require updating with content from this plan are outlined in Table 7-2 below.

Table 7-2: Integration with existing council plans and strategies

Council operation area	Existing plan	Content inclusion
Built asset management	Asset Management Plans	<ul style="list-style-type: none"> Account for increase in extreme events and infrastructure damage e.g. rainfall intensity, wind storms. Agreed level of service from community infrastructure given available annual maintenance budget
Natural asset management	Environmental Strategy	<ul style="list-style-type: none"> Confirm role of council in natural asset management
	Roadside Management Strategy	<ul style="list-style-type: none"> Include increased threat of pest and disease incursion in roadside vegetation Alter weed-spraying schedule to suit varying temperature and rainfall by season Update native plant schedules to more heat/drought tolerant varieties
	Waste Management Strategy	<ul style="list-style-type: none"> Account for increase in temperature and rainfall intensity at landfill sites
Economic development	Economic Development Position Paper (part of this project)	<ul style="list-style-type: none"> Incorporate agricultural modelling and socio-economic data from climate scenarios into future Economic Development strategic work
Community development	Heatwave Plan	<ul style="list-style-type: none"> Update early warning systems for vulnerable populations Review community heat refuges and ensure close proximity to vulnerable populations Update ABS data in relation to vulnerable populations
	Municipal Emergency Management Plan	<ul style="list-style-type: none"> Update early warning systems with climate scenario data Ensure access and operation of community refuges Community education campaign to increase awareness of emergency operating procedures
	Hindmarsh Recreation Strategy	<ul style="list-style-type: none"> Update with findings from <i>Securing Water Access for Sporting Reserves Within Hindmarsh Shire</i> report (2010) Update with actions from the Integrated Water Management Plan
	Township Community Action Plans	<ul style="list-style-type: none"> Update with information from the Township Climate Change Adaptation Plan
	Opportunities for All Ages: The Shire of Hindmarsh Positive Ageing Plan	<ul style="list-style-type: none"> Update with content from the <i>Heatwave Plan</i> in relation to vulnerable elderly population Update ABS data in relation to vulnerable populations
	Y-Z: A Youth Action Driven Strategy for the Shire of Hindmarsh	<ul style="list-style-type: none"> Engage youth in the region in relation to climate change and reduced water availability Update youth ABS data Consider this report in community infrastructure planning
Council capacity	Council Plan	<ul style="list-style-type: none"> Incorporate Strengthening Basin Communities project vision and community objectives Update the role of council in relation to climate change

Council operation area	Existing plan	Content inclusion
		and reduced water availability
	Municipal Strategic Statement	<ul style="list-style-type: none"> ▪ Incorporate Strengthening Basin Communities project vision and community objectives

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- Wimmera Mallee Sustainability Alliance: Towards sustainability in the Wimmera Southern Mallee White Paper 2011 – 2014

Appendix 1: Consultation List

Name	Position	Organisation
Regional Economy		
Marc Amos	Regional Development Manager	Regional Development Victoria
Jo Bourke	Executive Director	Wimmera Development Association
Cr David Colbert	Councillor	Hindmarsh Shire Council
Julie Conway	Manager	Mid West Milling
Jeff Fritsch	Manager	Ahrens Sherwell
Colin Kemp	Project Officer	Wimmera Development Association
Phil King	Director of Community Development	Hindmarsh Shire Council
Wayne Lovett	Councillor and Regional Tourism Representative	Hindmarsh Shire Council
Cr Ron Lowe	Councillor	Hindmarsh Shire Council
Dean Miller	Chief Executive Officer	Hindmarsh Shire Council
John Millington	Community Relations	Luv-a-Duck
Bob Stokes	Manager	Jeparit supermarket
Cr Cliff Unger	Councillor	Hindmarsh Shire Council
Michael Versluis	Operations Manager	Luv-a-Duck
Wayne Warwick	Manager	Campbells Silos
Fiona Werner	Business Officer	Hindmarsh Shire Council
Development infrastructure		
Bill Mundy		Telstra
Community Infrastructure		
J Grover	Community Development Coordinator	Hindmarsh Shire
Wayne Schulze	Contracts Manager	Hindmarsh Shire
Council capacity		
Dean Robertson	Sustainability Officer	Hindmarsh Shire
Iestyn Hocking	Climate Change Adaptation Officer	Hindmarsh Shire

Appendix 2: Project Steering Committee Members

Name	Position	Organisation
Phil King	Director Community Development	Hindmarsh Shire Council
Douglas Gowans	Director Infrastructure Services	Hindmarsh Shire Council
Iestyn Hosking	Climate Change Adaptation Officer	Hindmarsh Shire Council
Dean Robertson	Sustainability Officer	Wimmera Mallee Sustainability Alliance
Bernie Dunn	Natural Resource Planner	Grampians Wimmera Mallee Water

Appendix 3: Climate change and water availability in Hindmarsh

The predicted changes in climate in the Hindmarsh region are warmer and drier conditions on average, with an increase in frequency and severity of hot and wet extremes.

Average temperature and rainfall

The future climate in Hindmarsh is predicted to be hotter and drier than it is today. The Wimmera region has warm to hot summers with an average temperature of around 27 - 30°C. In winter, average temperatures are between 13 - 15°C and frosts are common.

During the last decade (1998 to 2007) average annual temperatures in the region were only 0.1°C warmer than the 30 year (1961 to 1990) average. Average daily maximum temperatures increased by 0.6°C, however daily minimum temperatures decreased by 0.3°C. Summer shows the greatest increase in average temperature (0.4°C), while maximum temperatures increased the most in spring and summer (0.7°C). Minimum temperatures decreased in all seasons.

There has been a marked decline in the region's rainfall over the past decade. Between 1998 and 2007 the region's average rainfall was 16% below the 1961 to 1990 average. Decreases were greatest in winter and spring, while average summer rainfall actually showed a small increase. There were 11 fewer rainy days each year.

Table A3-1: Current annual and seasonal temperature and rainfall in the Wimmera region (1961 to 1990)²⁸

	Average daily temperature (°C)	Average daily maximum temperature (°C)	Average daily minimum temperature (°C)	Average rainfall (mm)
Annual	14.6	21.1	8.1	490
Autumn	13.9	20.5	7.3	137
Winter	20.3	28.5	12.2	76
Spring	15.2	21.5	8.8	113
Summer	9.0	13.9	4.1	165

By 2030, under the medium climate change emissions scenarios, the annual temperature over Australia is expected to have warmed by about 1.0°C relative to 1990. Average annual temperatures in the Wimmera region are projected to be around 0.8°C warmer and rainfall is expected to decline by on average 4% with the greatest reductions expected in spring and winter (Table A3-2).

²⁸ Department of Sustainability and Environment (2008) Climate Change in the Wimmera, Victorian Climate Change Adaptation Program, Melbourne

Table A3-2: Projected changes to annual and seasonal temperatures and rainfall in the Wimmera region relative to 1990²⁸

	2030 (medium emission scenario)	
	Average temperature (°C)	Average rainfall (%)
Annual	+0.8°C (0.6 to 1.1°C)	-4%
Autumn	+0.8°C (0.5 to 1.2°C)	-2%
Winter	+0.7°C (0.4 to 1.0°C)	-4%
Spring	+0.8°C (0.5 to 1.2°C)	-7%
Summer	+0.9°C (0.6 to 1.3°C)	-2%
	2070 (high emissions scenario)	
Annual	+2.6°C (1.8 to 3.7°C)	-12%
Autumn	+2.6°C (1.7 to 3.8°C)	-5%
Winter	+2.2°C (1.4 to 3.2°C)	-13%
Spring	+2.7°C (1.8 to 3.9°C)	-21%
Summer	+2.9°C (1.8 to 4.3°C)	-7%

Extreme weather events

Changes to average temperature, rainfall and evaporation will have long term consequences for the region. The impacts of climate change are more likely to be felt through changes to extreme events such as the number of hot days, number of frosts and rainfall intensity.

Extreme temperatures

Spring frosts can cause reductions in crop yield and quality. Crops are most susceptible between the ear-emergence and grain filling stages of development, which generally occurs September and early October. Hot days²⁹ can cause heat stress in stock and in extreme cases mortality. Heatwaves (successive hot days) are also a leading cause of human mortality in the developed world, particularly in the very young and elderly.

Between 1998 and 2007, the average annual number of days over 30°C increased (by six days) as did the number of days over 35°C (by five days). During this same period, there were 14 more cold nights (minimum temperature below 5°C) and 12 additional frosts per year. This may be a result of changes in cloud cover associated with the drought.

Days with frost³⁰ are projected to decline by around 12 days per year. Days of extreme heat are projected to increase (Table A3-3).

²⁹ Classified as maximum daily temperatures over 32°C or in severe cases over 36°C

³⁰ Days where the minimum temperature falls to 2°C or less and in severe cases below -2°C

Table A3-3: Historical and projected average days of extreme temperatures in Wimmera²⁸

	Historical (days/annum)	Projected (2030) (days/annum)
Frosts	35	23 (27 to 20)
Over 30°C	51	58 (55 to 61)
Over 35°C	17	21 (19 to 23)
Over 40°C	3	4 (2 3 to 4)

Droughts

The south-east of Australia has experienced three serious droughts over the last 120 years, namely the Federation drought (~1897 to 1902), the WWII drought (~1936 to 1945), and the recent Millennium drought (~1997 to 2009). However, the recent dry period has been more severe than any other experienced over the last 120 years.

Throughout the current dry period Australia's broadacre annual productivity declined by one percent per annum between 2000/01 and 2007. In comparison, annual productivity grew at two percent per annum between 1977/78 and 2000/01³¹.

By 2030, increases in potential evaporation and reductions in relative humidity are expected to contribute to drier conditions, while fewer rain days (>1mm) are projected, increasing the incidence of drought. At the same time, small increases in solar radiation are expected.

Table A3-4: Projected changes annual and seasonal evaporation, relative humidity and solar radiation for the Wimmera region relative to 1990 (medium emissions scenario)²⁸

	2030		
	Potential evaporation (%)	Relative humidity (%)	Solar radiation (%)
Annual	+2% (1 to 5%)	-0.7% (-1.4 to -0.1%)	+0.7% (0.1 to 1.4%)
Spring	+2% (no change to +5%)	-1.0% (-1.8 to -0.2%)	+1.0% (0.1 to 2.1%)
Summer	+2% (no change to +5%)	-0.6% (-1.7 to +0.1%)	+0.4% (-0.2 to +1%)
Autumn	+4% (2 to 6%)	-0.5% (-1.5 to +0.4%)	+0.3% (-0.5 to +1.3%)
Winter	+6% (1 to 13%)	-0.5% (-2.0 to -0.3%)	+1.4% (-0.4 to +3.7%)

Storms and floods

Hindmarsh has experienced a number of significant storms, particularly unseasonal summer storms in the past 12 months that has resulted in localised stormwater flooding as well as riverine flooding.

Flooding in Hindmarsh can occur as a result of localised heavy rain as well as prolonged heavy rain in the upstream catchment of the Wimmera River. Flooding has impacted on housing, shops, livestock loss and crop damage, waterlogging and erosion of farm land and

³¹ Nossal & Yu Sheng (2010) Productivity growth: Trends, drivers and opportunities for broadacre and dairy industries, Australian commodities, Vol 17 no 1, March quarter 2010, Australian Bureau of Agriculture and Resource Economics, Canberra

increased threat of pest and disease incursion and damage to fences. Hail and wind can cause damage to buildings, disrupt power supply and traffic due to fallen trees.

Although average annual and seasonal rainfall is expected to decline, the intensity of rainfall is expected to rise in most seasons (Table A3-5).

Table A3-5: Projected percentage change in heavy rainfall intensity (99th percentile) and number of rainy days (>1mm) for Horsham per year relative to 1990 (medium emissions scenario)²⁸

	2030	
	Rainfall intensity	Number of rainy days
Annual	+0.6% (-8.8 to +14.8%)	-6% (-19 to -1%)
Spring	+2.0% (-16.1 to +16.6%)	-9% (-29% to -1%)
Summer	+1.0% (-22.6% to +29.3%)	-6% (-21% to no change)
Autumn	+1.5% (-1.8 to +19.8%)	-4% (-20 to 2%)
Winter	+0.2% (-9.9 to +23.8%)	-7% (-16% to no change)

Water available for consumption

Surface water

The Grampians Water supply system is the only regional surface water source in Hindmarsh. The system, owned and operated by GWMWater, supplies most of the eastern part of the Shire. Nhill is currently not supplied from this source. The Grampians system comprises:

- Reservoirs such as Bellfield, Wartook and Rocklands that harvest runoff water from the mains streams as they leave the Grampians Mountains
- An extensive network of pipes to distribute the bulk raw water to farmers and townships
- Treatment facilities and urban reticulation mains.

This system has seen great changes over the past decade, primarily due to:

- Construction of the Wimmera Mallee Pipeline comprising a network of large and small underground pipelines that replaced a leaky, earthen channel system with a closed pipe system
- Introduction of a bulk water entitlement³² that explicitly shares the available water amongst the various consumptive users and the environment.

The reliability of supply is much improved due to the reduced channel losses, and townships connected to this system can expect to only be restricted once every ten years on average, as is discussed later in this report. The ability to trade entitlement and allocation also potentially allows customers to manage the reliability of their supplies.

This system supplies water to Dimboola, Jeparit and Rainbow. The township of Nhill is likely to be connected to this system within the next five years.

³² http://www.water.vic.gov.au/_data/assets/pdf_file/0005/54509/BE-Wimmera--and--Glenelg---Glenelg-Conversion-Order-2004---consolidated-version.pdf

Groundwater

The western part of Hindmarsh overlies very good groundwater reserves, however the dissolved minerals contained in the water can make it unsuitable for some sensitive uses.

Nhill has relied upon groundwater for its urban supply for many years but in order to supply water that meets drinking water guidelines for hardness, GMMWater intends to connect the Nhill urban supply to the surface water via a pipeline for treated (or untreated) water from Dimboola.

Untreated groundwater will remain an option for less sensitive uses in Nhill, such as industry and irrigation of open spaces. If coupled with treatment to remove salt (desalination), then groundwater is a reliable water supply option for the western part of the shire.

Proposed Basin Plan

As required under the *Water Act 2007*, the Murray Darling Basin Authority is developing a plan for the management of water resources in the Murray-Darling Basin (the Basin Plan). The Basin Plan will contain recommended sustainable diversion limits, which limits on the surface water that can be taken from the Basin's water resources for consumptive use (urban and irrigation). The Basin Plan will commence in 2012 with a stock take in 2015 to see how much water has been recovered. Victoria, and all other Basin states, will be required to implement any reductions in diversions by 2019.

A total of 75 GL has been recovered in the Wimmera-Avoca catchment to 30 September 2011. Given this, 23 GL still needs to be recovered in the Wimmera to meet local environmental water needs³³. The water recovered in the Wimmera region will help to improve the health of the lower Wimmera River, Lake Hindmarsh and Lake Albacutya.

As the Wimmera River is disconnected the catchment will not contribute to the shared downstream environmental water needs of the Murray.

³³ Murray Darling Basin Authority (2011) The Draft Basin Plan: Catchment by Catchment, page 26

Appendix 4: Dryland Agriculture Climate Change Modelling

Overview

This appendix outlines the modelled changes in dryland agricultural yields under the three climate change scenarios, 'wet', 'dry' and 'median', for the Hindmarsh Shire region. Climate change will have impacts not only on agriculture, but also flow on impacts in the business and manufacturing sector that rely on these agricultural communities.

The appendices:

- Outlines the changes in wheat yields in Nhill, Dimboola, Jeparit and Rainbow
- Describes the current relativity of the changes in yields to other locations
- Provides an outline of what this means for changes in crop types
- Outlines the assumptions of the modelling and the global climate model (GCM) used.

Climate change scenarios

To ensure consistency with the most recent and comprehensive information of water availability in the Wimmera catchment, the following climate change scenarios from the CSIRO Sustainable Yields Project have been used in the socio-economic modelling:

- Scenario A ('wet'): Continuation of historical climate (1895 to 2006)
- Scenario B ('dry'): Continuation of recent climate (1997 to 2006)
- Scenario C ('median'): Median climate change by 2030 (similar to the IPCC A1B scenario, used in GWM Water supply demand strategy).

Changes in yield

This section provides charts on the changes in wheat yield in Nhill, Dimboola, Jeparit and Rainbow under the three climate change scenarios.

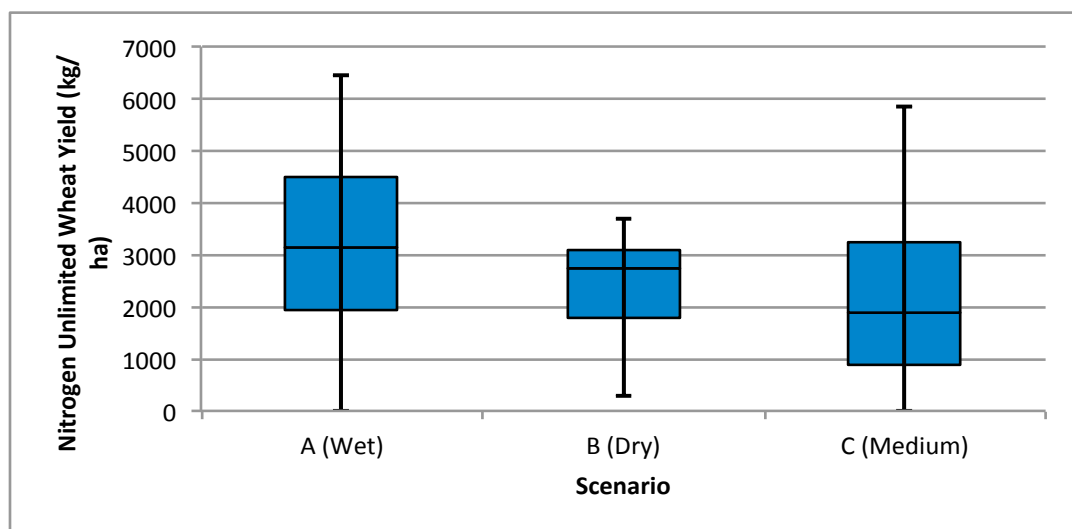


Figure A4-7-1: Changes in wheat yield under the three climate change scenarios in Nhill

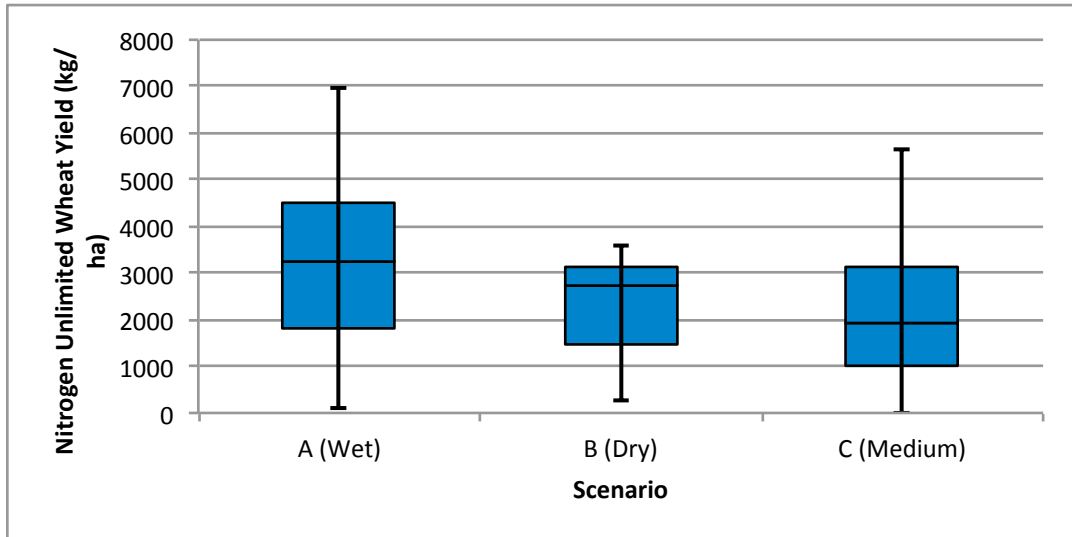


Figure A4-7-2: Changes in wheat yield under the three climate change scenarios in Dimboola

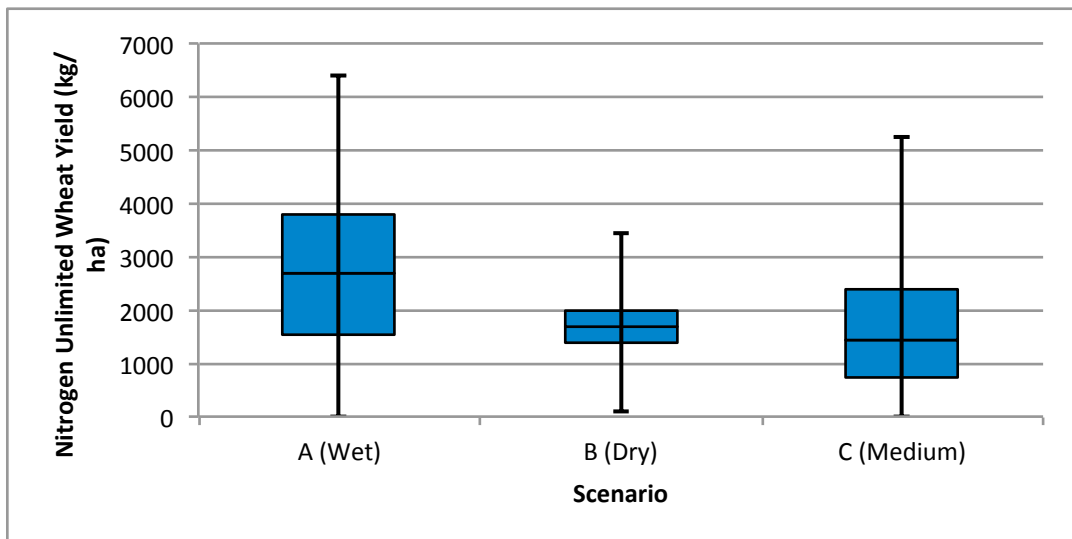


Figure A4-7-3: Changes in wheat yield under the three climate change scenarios in Jeparit

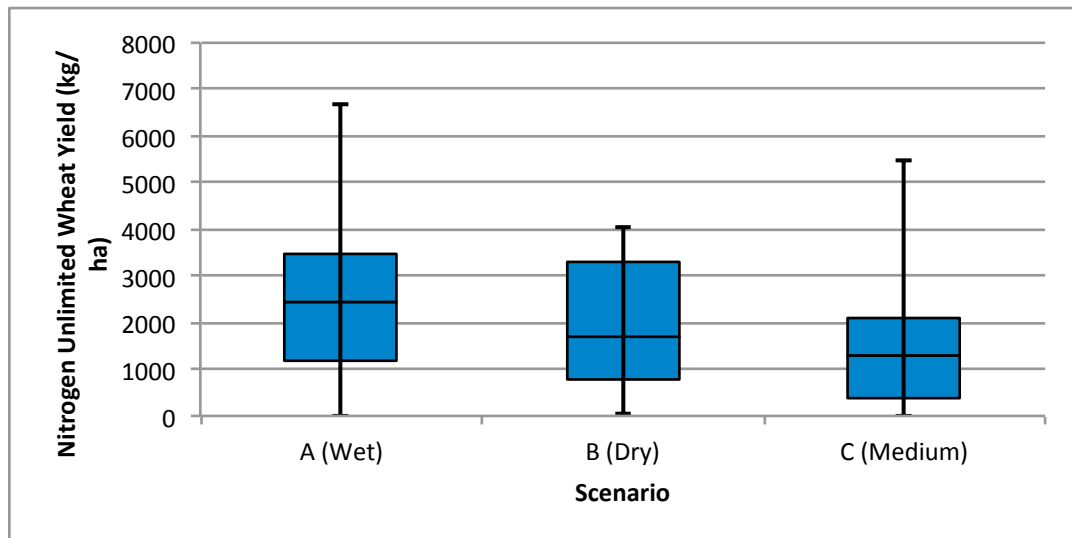


Figure A4-7-4: Changes in wheat yield under the three climate change scenarios in Rainbow

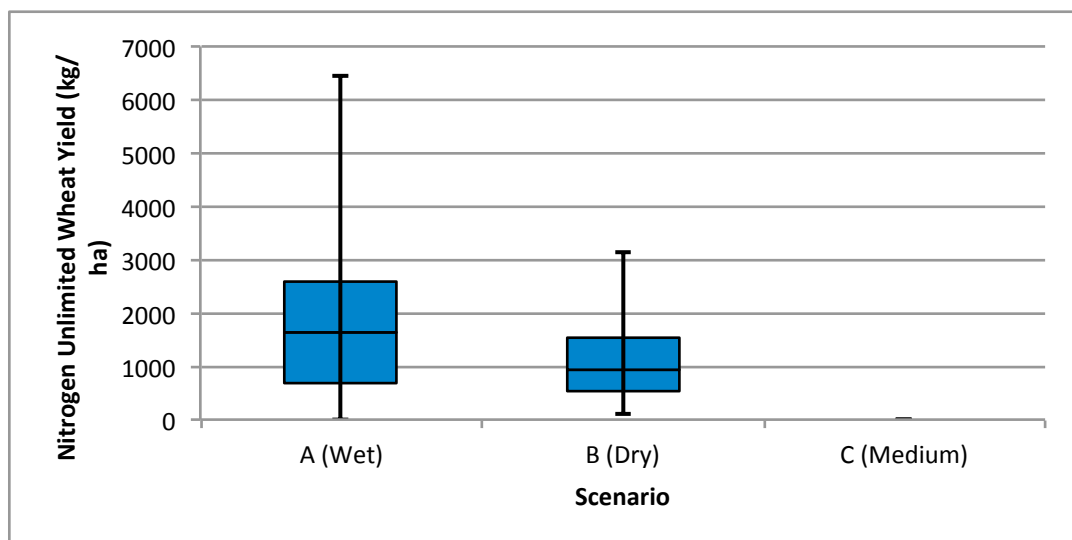


Figure A4-7-5: Changes in wheat yield under the three climate change scenarios in Speed

Note: modelling was only undertaken for Speed for the 'wet' and 'dry' scenarios to compare to the other four main towns in the Hindmarsh Shire region.

Relativity of changes in yield

Analysis of the charts in section 2 raises the following key points:

- Under Scenario B ('dry') Nhill and Dimboola production becomes similar to the historic yields of Rainbow
- Under Scenario C ('medium') Nhill and Dimboola production becomes slightly better than the historic yields of Speed
- Under Scenario B ('dry') Jeparit production becomes similar to the historic yields of Speed

- Under Scenario C ('medium') Jeparit production becomes similar to the historic yields of Speed or the yields in Rainbow from 1997 to 2006 (Scenario B)
- Under Scenario B ('dry') Rainbow production becomes similar to the historic yields of Speed
- Under Scenario C ('medium') Rainbows production becomes similar to the yields in Speed from 1997 to 2006 (Scenario B).

Changes in crop types

The changed climatic conditions are unlikely to exclude oilseeds and pulses completely. What it will mean is that the opportunity to grow them becomes less frequent. Pulses and oilseeds will be grown when the summer provides significant soil moisture or the crop has been fallowed the year before.

The other implication for pulse and oilseed production is that they won't necessarily be used for grain production. It is possible that the pulse and oilseeds could be used for grazing or hay/silage purposes. This still allows some income from the crops while still providing the necessary break from cereals.

Assumptions of modelling

Agricultural Production Systems sIMulator (APSIM)

The assumptions used in the simulation are as follows:

- A mid season wheat variety was used (Yitpi)
- Yield Potential is Nitrogen (N) unlimited
- A moderate clay with a medium water holding capacity was used for all sites
- Sowing rule: Crops were sown when a rainfall event of 25mm was received over three days and the soil moisture was greater than 15mm. If these conditions were not met in a season it was sown on the 15th of June
- Atmospheric CO₂ in Scenario C was assumed to be 450ppm
- Atmospheric CO₂ in Scenario A and B was 350ppm
- Scenario C Emissions scenario A1B
- Global Climate Model CSIRO Mark 3.5 (details below).

Global Climate Model

- Model Name: CSIRO: CSIRO Mk3.5
- Climate Change in Australia (2007)
- Model Name (Number): CSIRO-MK3.5 (6)
- Host organisation: Commonwealth Scientific and Industrial Research Organisation (CSIRO)
- Country of origin: Australia

- Atmospheric and ocean model attributes Atmosphere: 18 vertical levels, horizontal resolution 1.8° lat/long, approximately 200 km between gridpoints
- Ocean: 31 vertical levels, horizontal resolution matching the atmospheric model, but 100 km resolution in the tropics to enhance the simulation of the El Niño Southern Oscillation.

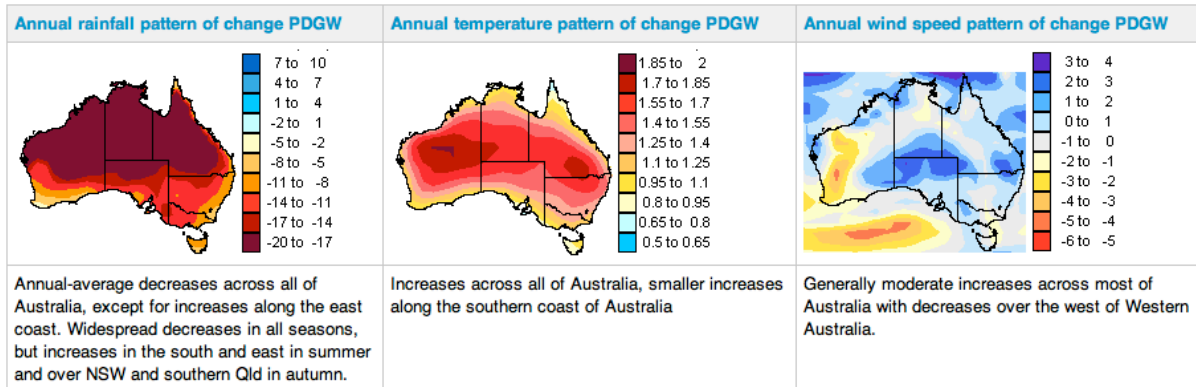


Figure A4-6: Outline of the CSIRO Mk3.5 Global Climate Model used



Hindmarsh Shire

Township Climate Change Adaptation Plan

Final Report

May 2012



**Australian Government
Strengthening Basin Communities Program**



RMC
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Executive Summary

Introduction

Communities across the Murray-Darling Basin face significant challenges in dealing with the impacts of climate change and reduced water availability. Hindmarsh Shire received funding from the Australian Government *Strengthening Basin Communities* program to undertake a project to integrate climate change adaptation into Hindmarsh Shire Council planning and to facilitate regional adaptation. The study assessed the implications of climate change upon the Shire's built, economic, social and environmental infrastructure.

This Township Climate Change Adaptation Strategy is one of three strategies produced as part of the project. An Integrated Water Management Plan and Hindmarsh Climate Change Adaptation Plan have also been developed.

The purpose of the Township Climate Change Adaptation Strategy is to:

- Outline climate change at a local and regional level in relation to reduced water availability and extreme events.
- Identify the impacts of climate change on the towns of Dimboola, Jeparit, Nhill and Rainbow.
- Identify opportunities to reduce the climate change impacts identified.

Climate change in Hindmarsh

Generally, Hindmarsh's future climate is expected to be drier and hotter than it is today, with an increased frequency and intensity of extreme events. The number of frosts is expected to decline, while hot days and droughts are expected to increase. Rainfall intensity is expected to increase, however as total rainfall is expected to decline, runoff captured for consumptive uses is expected to decline.

Community workshops

Workshops were held in Dimboola, Jeparit, Nhill and Rainbow with interested members of the community. The workshops took the following format:

1. Explanation of the project purpose
2. Discussion of predicted future climate scenarios in Hindmarsh
3. Impacts of past extreme weather events on the town
4. Potential impacts of climate change on Community Action Plans
5. Adaptation actions to mitigate these impacts

Key risks

The workshops identified a number of common risks associated with climate change including:

- Poor understanding by town residents of emergency response procedures
- Decline in volunteers and increasing demands on volunteers for emergency response and recovery

- Decline in town amenity and community infrastructure such as sports grounds, recreation facilities and parks and gardens.

Key actions

The key actions identified to address these risks included:

- Community engagement
- Community action planning
- Recruitment planning
- Implementation of the Integrated Water Management plan

The detailed actions include:

Action	Description
Emergency response	
ER-1 Community engagement	Work with Township Committees to ensure that there is a general understanding of: <ul style="list-style-type: none"> ▪ Roles and responsibilities of agencies and individuals during emergencies ▪ Contact details for various emergencies
	Work with Township Committees to ensure that new residents in towns understand emergency response procedures in their town and contact details.
ER-2 Community action planning	As part of the review of the township Community Action Plans consider: <ul style="list-style-type: none"> ▪ Confirm cool areas for use during heatwaves as per the Hindmarsh Heatwave Plan ▪ Confirm status of refuges for other extreme events including bushfire and flood
	Work with the Rainbow community and VicRoads to consider if a road can be upgraded to provide continued access during flood
Volunteerism	
V-1 Recruitment plan	Work with CFA and SES to develop a recruitment plan targeted at new migrants to towns. This may include consideration of language and cultural barriers to volunteering
Town amenity sport and recreation	
TASR-1 Integrated Water Management	Adopt and implement the Draft Integrated Water Management Plan

A number of town specific actions were also identified.

The actions identified in the of the Hindmarsh Climate Change Adaptation Plan, Integrated Water Management Plan and the Economic Development Position Paper are summarised here.

Hindmarsh Climate Change Adaptation Strategy

The purpose of the Climate Change Adaptation Strategy is to:

- Help Council and stakeholders understand the impacts of climate change in the region
- Identify the risks and opportunities climate change and reduced water availability present for the region
- Clarify Council's role and scope for taking action on these issues
- Identify measures Council can adopt to address risks and act on opportunities.

The focus of the strategy is the impact of climate change and reduced water availability across four main themes:

1. The Hindmarsh economy
2. Utilities infrastructure – transport, water and energy
3. Community infrastructure – parks, gardens, halls, libraries and other Council buildings
4. Council capacity to meet the needs of its community as the climate and water availability changes.

The key risks to Hindmarsh posed by climate change and reduced water availability were identified as:

Regional economy

- Reduced agricultural and manufacturing productivity
- Population decline and reduced regional employment

Utilities infrastructure

- Increased road construction and maintenance costs
- Increased frequency of stormwater flooding

Community infrastructure

- Lack of continuity of water supply for recreation and sporting facilities, parks and gardens
- Increase in infrastructure maintenance costs and costs of recovery from extreme events
- Increased demands on community volunteers for emergency response and recovery
- Need for community refuges is not being adequately met by Council buildings

Council capacity

- Increased demand for Council services and declining Council income
- Increased difficulty in recruiting and retaining Council staff
- Providing a safe work environment for staff
- Reduced community capacity and resilience

Consultation and review of existing strategies and programs identified the following key actions.

To prepare for climate change and reduced water availability, the Strategy proposes the following set of actions for Council.

Action	Description
Regional economy	
RE-1 Research development and extension	Continue to advocate and provide strategic support to DPI and industry groups such as BCG for on-going research and development that will assist the agricultural industry adapt to the changing climate
RE-2 Streamlining of planning permit approvals	Continue implementation of processes to streamline assessment of planning permit applications including educating and encouraging landholders and businesses to bring proposals to a pre-application meeting
RE-3 Economic Development Strategy	Develop an Economic Development Strategy based on the findings of the Economic Development Position Paper
Utility infrastructure	
UI – 1 Review and update the Road Asset Management plan	Embed consideration of climate change risks in development of the next road asset management plan
	Continue to investigate alternative sealed road pavement mixes that are more resistant to temperature extremes. Incorporate findings into the Road Asset Management plan
	Investigate alternative unsealed road gravel mixes and treatments that are more resistant to temperature extremes and surface runoff. Incorporate findings into the Road Asset Management plan
	Review the road hierarchy to incorporate consideration of climate change impacts and particularly recent flood events e.g. road closures, road safety, to minimise the risk of isolated townships
UI-2 Stormwater Drainage Study	Council complete development and begin implementation of the Stormwater Drainage Study
	Develop and implement a community communication and engagement strategy to assist in the implementation of the Stormwater Drainage Study
Community infrastructure	
CI-1 Integrated water management planning	Adopt and implement the Hindmarsh Integrated Water Management plan
CI-2 Stormwater flood prevention	Confirm responsibility for maintenance of levy banks in Jeparit Where Council is the responsible authority develop a levy management plan that considers: <ul style="list-style-type: none"> – Ongoing maintenance requirements and costs – Management during flooding – Risks to levy integrity and capacity from increased frequency of flooding and increased flood heights – Community engagement and communication
	Adopt and implement the Hindmarsh Stormwater Drainage Study
CI-3 Review of Council buildings and assets	Embed consideration of climate change risks in the review and development of Council building maintenance programs
	Incorporate the findings of climate change risks on Council buildings in the annual review of insurance cover
CI-4 Township emergency management planning	Adopt and implement the Hindmarsh Township Climate Change Adaptation Plan

Action	Description
CI-5 Contingency planning	Identify critical Council systems required during emergencies and determine the adequacy of power reserves and back up power supplies during power outages.
	Assess capacity of emergency management centres and critical Council buildings to receive back up electricity supply from generators.
CI-6 Municipal emergency management planning	Incorporate the findings of the Township emergency management planning into the MEMP
Council Capacity	
CC-1 Incorporate climate change and water availability scenarios into Council assets management plans	Council staff review and analyse current asset management plans under a range of climate change and water availability scenarios e.g. <ul style="list-style-type: none"> – Stormwater drainage capacity maintenance – Road construction and design – Building maintenance, upgrade and design
CC-2 Embedding climate change and water availability risk assessment	Climate change and water availability scenarios should be regularly updated and considered in the analysis of future asset management plans and broader Council planning
CC-3 Community engagement	As part of future service delivery planning, review services in some towns and/or consolidating services to a smaller number of towns
	Incorporate findings of the DPCD Role and Function of Small Towns and Settlements Project in to future service delivery planning
	Undertake community engagement to communicate Council's adaptation and sustainability projects to demonstrate leadership and educate the community
	Undertake community engagement to communicate Council's challenges in maintaining service delivery and invite community discussion on choices and options
CC-4 Recruitment	Liaise with major businesses, service providers and neighbouring municipalities to develop packages offering employment opportunities with Council for couples and families
	Continue to utilise the Victorian Traineeship programs to address Council skill shortages
	In conjunction with other municipalities and major businesses, develop a Skills Match program to assist in matching skills and employment opportunities
CC-5 Outsourcing	Continue to identify services that can be delivered by contractors or consultants for services that cannot be provided in-house and require high quality outputs delivered to specified timeframes
CC-6 Contingency planning	Review the Business Continuity Plan for indoor staff that considers extreme weather events and power outages

Integrated Water Management Plan

The risk assessment undertaken as part of the wider Hindmarsh Climate Change Adaptation project, identified the following priority risks with regard to Council water use:

- Continuity of service provision including providing sports grounds and recreation facilities and maintaining town amenity during periods of water shortages.

The Plan has also noted the:

- Potential for Council water costs to rise in the future
- The importance of Council to demonstrate best practice with regard to water management

A number of initiatives were identified for reducing Council water use and improving water management practices:

Monitoring

A regular audit of Council water use is required to enable monitoring of water use, identification of leakages, over-usage and opportunities for improvement.

Action	Description
Monitoring -1	Map irrigation systems and include it on Council's asset management system.
Monitoring -2	Ensure there are sufficient water meters (and sub-meters) in place to account for water use at various sites.
Monitoring -3	Keep records of monthly water use at various sites. Ask tenants to keep records and submit an annual report.
Monitoring -4	Install water meters on all Council bores used for roadside watering
Monitoring -5	Review of all water use data annually in conjunction with GMMW accounts. Correlate water usage with meter reads to detect leaks and over-usage.

Turf, lawn and garden management

Turf, lawns and gardens are substantial users of water. There are a number of opportunities to reduce water use by changing or modifying current management practices

Action	Description
Management -1	Convert irrigation systems from manual to automatic and where possible introduce night watering
Management -2	Conduct irrigation audits for main sites to confirm that sprinklers are operating efficiently,
Management -3	Consider subsurface irrigation and alternative species for areas that currently have high water use but are located where there is low impact on amenity
Management 4	In conjunction with sporting groups and committees of management, document watering regimes to be followed during water restrictions including consideration of: <ul style="list-style-type: none"> ▪ Reducing the area of certain reserves being irrigated ▪ Ceasing irrigation entirely on some reserves
Management -5	Use deep mulches on garden beds and revegetated areas to reduce evaporation

Swimming pools

Council has already undertaken works on some pools to reduce water use. The Rainbow pool is known to have leaks and was a substantial user of water in 2011

Action	Description
Pools-1	Assess the cost of repairing leaks in Rainbow pool
Pools-2	Conduct drawdown tests in winter as a means of estimating pool leakage.

Council buildings

Water use in Council buildings is relatively modest. There are opportunities to improve water use efficiency, mainly with end-or-life replacements of appliances and fittings.

Action	Description
Buildings-1	<p>End of life replacement with water efficient appliances and facilities in Council buildings</p> <ul style="list-style-type: none"> ▪ Use of dual flush toilets ▪ Water efficient urinals ▪ Water saving shower heads at pool and sports ground change rooms ▪ Water efficient kitchen appliances ▪ Flow restrictors and aerators on replacement taps

Education and awareness

A number of committees of management and community groups manage sporting and recreation facilities on behalf of Council. There are opportunities to work with these groups to improve management practices and improve water use efficiency.

Action	Description
Education-1	Work with community groups and committees of management to review irrigation management of sports grounds and reserves to identify opportunities for improvement and reducing water costs.

Economic Development Position Paper

The Hindmarsh Council Plan identified the development and implementation of an Economic Development Strategy as its priority action to achieve its first objective of a diverse economy. Given the economic development framework the Shire is operating within, it is essential that the purpose and role of this strategy be clearly identified to ensure the Strategy achieves the desired outcome with efficient use of the available resources.

A suggested role for the Economic Development Strategy would be to act as a signpost document, bringing together the existing initiatives, at both a regional and local level, and clearly articulating the Council's priorities and how it will utilise these initiatives to achieve those priorities. There are four themes that encompass the core role of Council in economic development:

1. **Supporting a regional process** - This theme should:

- Describe the Council's commitment to the Regional Strategic Plan and Regional Development Australia processes and how Council intends to engage with and contribute to these processes
- Describe Council's commitment, engagement and contribution to the Wimmera Development Association and Wimmera Manufacturing and Industry Group
- Recognise these regional processes as the most appropriate vehicle to achieve the bigger picture strategic priorities, which will benefit the whole region and the Shire.

2. **Advocating for regional priorities** - This theme should:

- Recognise that a number of Hindmarsh priorities are already acknowledged as regional priorities within the Regional Strategic Plan
- Identify a clear role for Council to advocate for their priorities to become regional priorities
- Describe the process by which Council will achieve this.

3. **Meeting local needs** - This theme should:

- Identify the key priorities for local economic development within the Community Action Plans
- Describe how the Council will develop and implement projects to meet these priorities
- Recognise and plan for improved service provision to meet business needs, e.g. infrastructure, community services.

4. **Facilitating local opportunities** - This theme should:

- Develop a process to identify local opportunities that are not already covered in the Community Action Plans, or Regional Strategic Plan
- Recognise and prioritise Council's role as an advocate for these and other local projects
- Identify Council's capacity to facilitate project development, which might include getting the project recognised as a priority within a Community Action Plan, the Council Plan or the Regional Plan.

It was recommended that an Economic Development Strategy be developed based on the findings of the Economic Development Position Paper with a specific focus on:

- Advocating and supporting regional economic development strategies and initiatives
- Advocating for Hindmarsh priorities to be considered regional priorities
- Attracting and retaining professional and skilled labour

1 The Hindmarsh Townships Climate Change Adaptation Plan

1.1 Purpose of the plan

The purpose of the Hindmarsh Townships Climate Change Adaptation Plan is to assist the community understand, plan and prepare for the potential impacts of climate change and a future with less water.

The objectives of the plan are to:

- Outline climate change at a local and regional level in relation to reduced water availability and extreme events.
- Identify the impacts of climate change on the towns of Dimboola, Jeparit, Nhill and Rainbow.
- Identify opportunities to reduce the climate change impacts identified.
- Outline an implementation and renewal process, including roles and responsibilities, timelines, and monitoring and review.

The plan is designed to complement the existing Community Action Plans that have been prepared for each town and contribute to the revision of these Community Action Plans in the future.

1.2 The Strengthening Basin Communities project

Hindmarsh Shire received funding from the Commonwealth Government's Strengthening Basin Communities program to assist the Hindmarsh community plan for the effects of climate change and reduced water availability. Council has engaged businesses, industry, government agencies, utilities and townships through a range of workshops to assess the risks posed to Hindmarsh by a changing climate and identify options for managing these risks into the future.

The aim of this project is to integrate climate change adaptation into Hindmarsh Shire Council's planning and to facilitate regional adaptation through:

- Assessing the implications of climate change upon the Shire's built, economic, social and environmental infrastructure and assets.
- Engaging agencies, the private sector and the community in climate change adaptation and decision-making.

1.3 Other outputs of the project

The Hindmarsh Township Climate Change Adaptation Plans is part of a broader suite of outputs of the Strengthening Basin Communities project, as outlined in Figure 1-1.

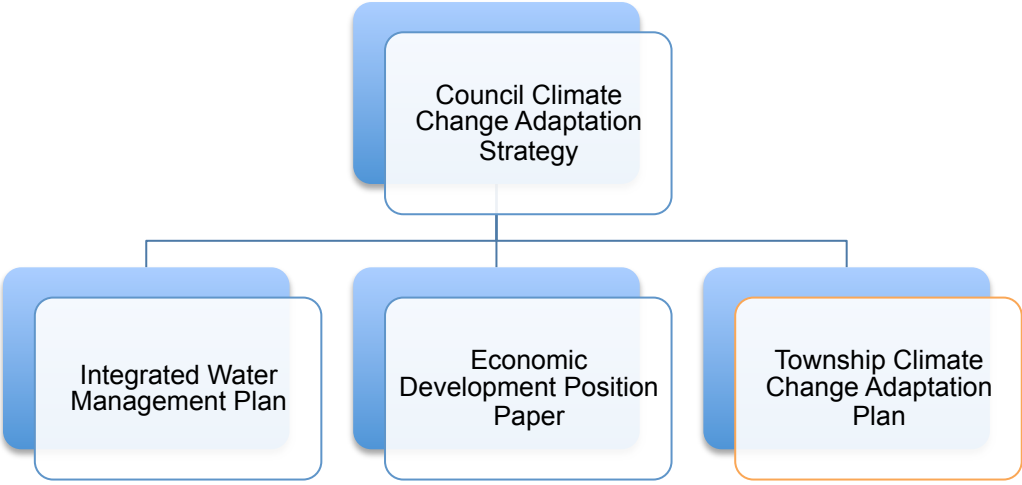


Figure 1-1: Outputs of the Strengthening Basin Communities project

2 Climate Change in Hindmarsh

2.1 Regional overview

The Wimmera region has been identified as the one of the most exposed regions to climate change in Victoria because of its relatively undiversified economy and large reliance on agriculture¹. The predicted changes in climate in the Hindmarsh region are warmer and drier conditions on average, with an increase in frequency and severity of hot and wet extremes

The predicted changes in climate variables for the Hindmarsh region are shown in **Table 2-1** below.

Table 2-1: Change in climate variables in the Hindmarsh region under a median climate change scenario to 2030

	Wimmera ²		Central Mallee ³		New Hindmarsh climate will be similar to
	Average	Range	Average	Range	
Temperature (°C)	+0.8	0.6 to 1.1	+0.9	0.6 to 1.2	Wentworth
Rainfall (%)					
Annual	-4	-9 to +1	-4	-10 to +2	Ouyen
Spring	-7	-15 to no change	-7	-18 to +2	Ouyen
Summer	-2	-11 to +10	-1	-12 to +12	Ouyen
Autumn	-2	-9 to +6	-1	-10 to +8	Ouyen
Winter	-4	-13 to +1	-5	-16 to +2	Ouyen
Rainfall intensity	+0.6	-8.8 to +14.8	-0.3	-9.6 to +15.6	Southern coastal NSW
Number of rainy days	-6	-19 to -1	-7	-20 to -1	Ouyen
Potential evaporation (%)	+2	1 to 5	+2	no change to +5	Northern Mallee
Relative humidity (%)	-0.7	-1.4 to -0.1	-0.7	-1.5 to no change	Northern Mallee
Solar radiation (%)	+0.7	0.1 to 1.4	+0.5	-0.1 to +1.3	Wentworth
Frosts ⁴ (#)	23	27 to 20	10	13 to 8	Mildura
Hot days (#)					
Over 30°C	58	55 to 61	90	86 to 95	Ouyen
Over 35°C	21	19 to 23	37	35 to 40	Ouyen
Over 40°C	4	3 to 4	9	8 to 10	Ouyen

¹ Department of Premier and Cabinet (2009) Victorian Climate Change Green Paper, Melbourne

² DSE (2008) Climate Change in the Wimmera, Victorian Climate Change Adaptation Program, Melbourne

³ DSE (2008) Climate Change in the Mallee, Victorian Climate Change Adaptation Program, Melbourne

⁴ Days where the minimum temperature falls to 2°C or less

2.2 Water availability scenarios

CSIRO⁵ reported that water extraction from the Wimmera has dramatically affected the volumes of water entering Lake Hindmarsh and Lake Albacutya. Rainfall, runoff and evapotranspiration are predicted to decline due to climate change from the current base case, as shown in Table 2-2.

Table 2-2: Water balance for the Wimmera region to 2030⁵

Scenario	Description	Rainfall	Runoff	Evapotranspiration
A	Base case	403mm	16mm	387mm
B	'Dry': Continuation of recent climate (1997 to 2006)	-13%	-51%	-
C	'Median': Median climate change by 2030 (similar to the IPCC A1B scenario, used in GWM Water supply demand strategy)	-6%	-17%	-5%

2.3 Extreme events

Climate change is likely to change the frequency and intensity of extreme weather events such as heatwaves, drought, floods and storms in the Hindmarsh region (Figure 2-1).

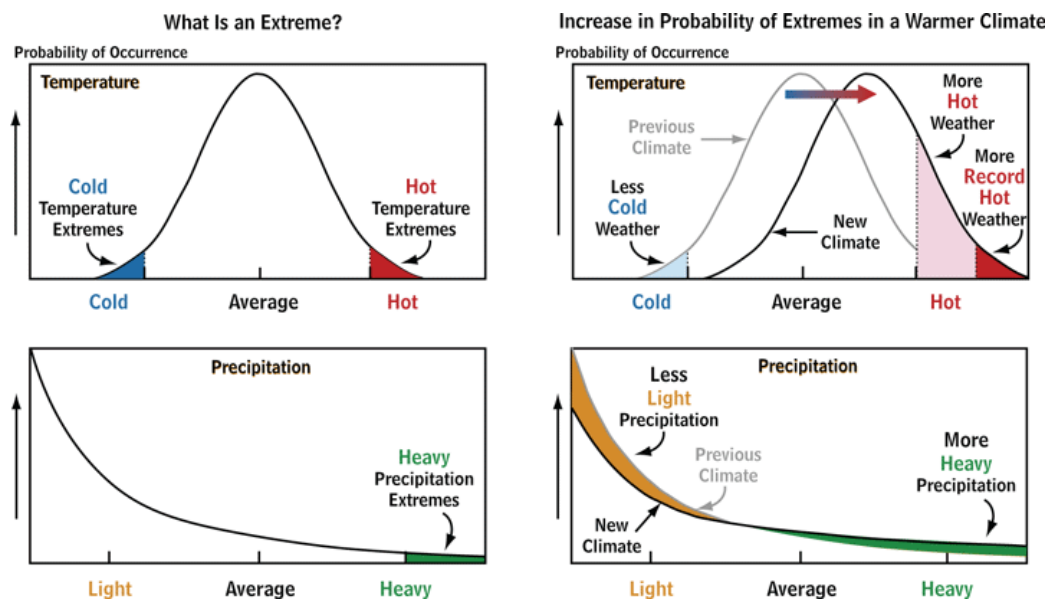


Figure 2-1: Influence of shift in average temperature and rainfall to extreme events

The number of extreme hot days and heavy precipitation has increased since 1950⁶. For example, the wettest two-year period on record occurred from 2010 to 2011. This included above average and 'very much above average' rainfall in the Hindmarsh region, as shown in Figure 2-2. Climate models project a higher frequency of hot days and heavy rain events through the 21st century.

⁵ CSIRO (2007) Water Availability in the Wimmera; A report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project, Canberra, page 35

⁶ IPCC (2012) Summary for Policymakers. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 1-19.

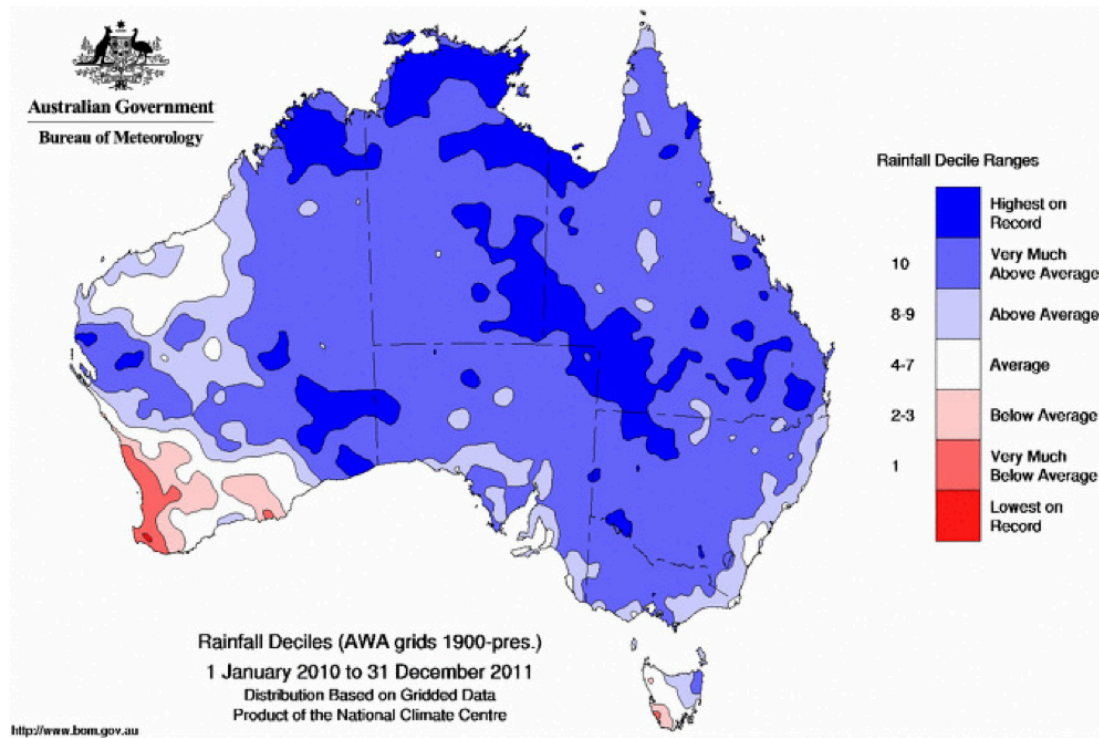


Figure 2-2: Australian rainfall deciles for the two years, January 2010 to December 2011⁷

Days with frost⁸ are projected to decline by around 12 days per year. However, there is the potential for the timing of frosts to change as well as for frosts to become more severe. Days of extreme heat and the number of hot days are projected to increase.

By 2030, increases in potential evaporation and reductions in relative humidity are expected to contribute to drier conditions, while fewer rain days (>1mm) are projected, increasing the incidence of drought. At the same time, small increases in solar radiation are expected. Bushfire risk is also expected to increase.

⁷ Bureau of Meteorology (2012) Australia's wettest two-year period on record; 2010–2011. National Climate Centre, Special Climate Statement 38

⁸ Days where the minimum temperature falls to 2°C or less and in severe cases below -2°C

3 Township workshops

Workshops were held in Dimboola, Jeparit, Nhill and Rainbow with interested members of the community during February and March 2012. The workshops took the following format:

1. Explanation of the project purpose
2. Discussion of predicted future climate scenarios in Hindmarsh
3. Impacts of past extreme weather events on the town
4. Potential impacts of climate change on Community Action Plans
5. Adaptation actions to mitigate these impacts

4 Impacts and adaptation actions

4.1 Impacts on the community from recent extreme events

Analysis of recent (last 15 years) extreme weather events allows the practical assessment of the current vulnerability to climate variability in the Hindmarsh Shire, which is an appropriate starting point for the preparation of an adaptation plan. This technique, called back casting, was used in community workshops in each town to identify experiences and lessons from a social, economic and environmental perspective.

The assessment involves describing the impacts storms (rain, hail and wind), floods, heatwaves and droughts, how the community was impacted, how they responded and what has changed as a result. The discussion also considered how the community could be better prepared in the future. The impacts of recent extreme weather events on the four towns are documented in Appendix 1. There were common themes in all four towns including:

- Emergency response
- Volunteerism
- Town amenity, sport and recreation

4.2 Emergency response

Communication

A common theme was confusion as to which organisation is in charge during emergencies following extreme weather events e.g. many thought that Council takes the lead during these emergencies with many people contacting the Hindmarsh Shire seeking assistance or emergency information. In towns without an SES unit, the CFA was called upon to provide emergency response for activities that were outside its area of responsibility and creating liability and OH&S issues for its members.

There are well-developed emergency management plans that detail roles and responsibilities. It is clear though that many in the community are not aware of them, who to contact for assistance and what level of assistance to expect. New migrants, including people moving to the country from the city as well as overseas migrants are especially vulnerable.

Refuges

There was some confusion around the refuges from extreme events reflecting the different types of refuges that may be required but also the publicity following the 2009 Black Saturday bushfires and the release of the Victorian Bushfire Royal Commission Report around provision of refuges or Neighbourhood Safer Places – Places of Last Resort (NSP-PLR). A number of issues regarding refuges were raised:

- There is an expectation that each town will have a NSP-PLR
- There was a view that there will be one building that will be the refuge for all extreme events

- Other than using the hospital as a refuge for the elderly in heatwaves, there was not a clear understanding of where people would go during a flood or bushfire.

Contingency planning

Some extreme events, particularly flooding may result in communities being isolated for extended periods of time e.g. Rainbow in January 2011. The impacts on the community ranged from annoyances (e.g. children not being able to get to school) to significant (e.g. not being able to travel to work, fresh food supplies for the town) to critical (e.g. not being able to evacuate the very ill or injured). Hospitals have emergency response procedures in place.

4.2.1 Current policies and programs

Management of emergencies arising from extreme weather events is the subject of Federal and State legislation and a number of regional and local strategies and plans. In Hindmarsh a number of plans have been prepared for management and response to emergencies including:

- Municipal Emergency Management Plan
- Draft Municipal Fire Management Plan 2012-2015
- Heatwave Plan 2011

4.2.2 Proposed actions

To assist the townships to adapt to risks associated with increased frequency of extreme events and need for emergency response, the Strategy proposes:

- Community engagement
- Community action planning

Table 4-1: Adaptation actions – emergency response

Action	Description	Hindmarsh Shire role	Other relevant agencies	Links to other actions/strategies
ER-1 Community engagement	Work with Township Committees to ensure that there is a general understanding of: <ul style="list-style-type: none"> ▪ Roles and responsibilities of agencies and individuals during emergencies ▪ Contact details for various emergencies 	Lead	Township committees	Municipal Emergency Response Plan
	Work with Township Committees to ensure that new residents in towns understand emergency response procedures in their town and contact details.	Lead	Township committees	Municipal Emergency Response Plan
ER-2 Community action	As part of the review of the township Community Action Plans consider: <ul style="list-style-type: none"> ▪ Confirm cool areas for use 	Lead	Township committees	Hindmarsh Heatwave Plan

Action	Description	Hindmarsh Shire role	Other relevant agencies	Links to other actions/strategies
planning	during heatwaves as per the Hindmarsh Heatwave Plan <ul style="list-style-type: none"> Confirm status of refuges for other extreme events including bushfire and flood 			
	Work with the Rainbow community and VicRoads to consider if a road can be upgraded to provide continued access during flood	Lead	VicRoads Rainbow Township Committee	Road Asset Management Plan

4.3 Volunteerism

Emergency response organisation such as the SES and CFA are dependent on volunteers. For a range of reasons, recruiting new volunteers to these organisations is difficult. With the likelihood of increased frequency of extreme events there may be an increased load on these volunteers. There is a significant level of concern regarding the sustainability of these organisations and their capacity to serve the community with declining membership.

There has been a body of social research looking at reasons why many emergency response organisations are facing declining numbers. While this research may identify ways to engage and recruit new members, the reality for Hindmarsh is that with an ageing and declining population, this will be increasingly difficult.

4.3.1 Current policies and programs

CFA and SES both conduct their own volunteer recruitment programs.

4.3.2 Proposed actions

To assist the townships to manage risks associated with declining numbers of volunteers in emergency response organisation, the Strategy proposes:

- Recruitment plan focused on new migrants

Table 4-2: Adaptation actions – volunteerism

Action	Description	Hindmarsh Shire role	Other relevant agencies	Links to other actions/strategies
V-1 Recruitment plan	Work with CFA and SES to develop a recruitment plan targeted at new migrants to towns. This may include consideration of language and cultural barriers to volunteering	Lead	CFA SES	

4.4 Town amenity, sport and recreation

Town amenity and watering of parks and gardens and the caravan parks during the summer months and extended dry periods is highly valued by the community. The gardens provide refuges during heatwaves and improve the liveability and amenity of the town and its

attractiveness to visitors. Maintaining a green and attractive garden in the caravan parks was seen as critical to ensuring patronage.

Sport is an important part of the social life and contributes to the liveability of each town. It was noted that sport played an important role during drought periods; relieving stress, providing a distraction from the grind of getting through the drought and bringing people together to support each other. Securing the water supply for sports grounds during drought periods was seen therefore as being vitally important.

Pools were also considered to be very important assets during drought. Securing the water supply as well as providing protection and shade around the pool were considered to be important.

4.4.1 Current policies and programs

An integrated water management plan has been developed as part of this Strengthening Basin Communities project outlining a range of measures including:

- Identifying water supplies for community recreation and sporting grounds as well as parks and gardens
- Metering of water usage
- Introduction of water use efficient management practices for turf, lawns and gardens

4.4.2 Proposed actions

To assist the townships adapt to risks associated with climate change and the impacts on town amenity the Strategy proposes that the Integrated Water Management plan be adopted and implemented.

Table 4-3: Adaptation actions – town amenity, sport and recreation

Action	Description	Hindmarsh Shire role	Other relevant agencies	Links to other actions/strategies
TASR-1 Integrated Water Management Plan	Adopt and implement the Hindmarsh Integrated Water Management Plan	Lead	GWMWater	Integrated Water Management Plan

5 Impacts on Community Action Plan priorities

5.1 Introduction

Community action plans have been developed for Dimboola, Jeparit, Nhill and Rainbow. The impacts of climate change on the implementation of these actions plans were discussed as part of the climate change risk workshops. These impacts should be considered during the renewal of the community action plans.

5.2 Dimboola

The impact of climate change on the Dimboola Community Action Plan is outlined in Table 5-1. The impacts consider the experiences and lessons learnt from recent extreme events and the likely changes to average climate variables.

Table 5-1 Impact of climate change on Dimboola Community Action Plan priorities

Priority description	Climate variable	Climate change impact
1. Category: Sports, Recreation & Leisure Improvements, beautification and clean up of the Wimmera River and establishment of walking and bicycle tracks in adjacent public lands	Reduced rainfall and runoff Drought	Reduced attractiveness of river environs
2. Category: Events and Promotion Establishment of highway visitor information centre and improvements to highway signage	Not impacted by climate change, however, reduced rainfall and runoff and drought	Reduced town amenity and vitality
3. Category: Business & Industry Improvements and developments to Riverside Caravan Park, Dimboola	Flood	Caravan park and its facilities are very flood prone
9. Category: Community Wellbeing Establishment of a retirement village	Heatwaves	Not aware of a refuge for the vulnerable during heatwaves

Other comments

The workshop also raised a number of other issues, some of which are not climate related but were considered important by the workshop participants:

- Issues
 - Vacant buildings
 - Population decline
 - Management of the weir
 - Erosion of river bank from water craft

- Bushfire risk
- Ageing population
- Ideas
 - Attract small businesses to utilise vacant shops
 - Grants to assist householders replace energy inefficient appliances

5.3 Jeparit

The impact of climate change on the Jeparit Community Action Plan is outlined in Table 5-2. The impacts consider the experiences and lessons learnt from recent extreme events and the likely changes to average climate variables.

Table 5-2: Impact of climate change on Jeparit Community Action Plan priorities

Priority description	Climate variable	Climate change impact
<p>1. Category: Community Infrastructure</p> <p>Developments and improvements to the tennis courts, swimming hole and caravan park precinct including the establishment of a new combined tennis club and angling club clubrooms.</p>	<ul style="list-style-type: none"> ▪ Reduced average rainfall 	<ul style="list-style-type: none"> ▪ Reduced water availability to maintain tennis courts and caravan park. ▪ It was noted that the tennis court surfaces and amenity are well maintained.
<p>2. Category: Community Infrastructure</p> <p>Developments and improvements to camping facilities and amenities around Lake Hindmarsh, with a particular emphasis on the Four Mile Beach camping and picnic ground.</p>	<ul style="list-style-type: none"> ▪ Reduced average rainfall ▪ Reduced run-off ▪ Increased evaporation 	<ul style="list-style-type: none"> ▪ Reduced patronage at the caravan park and subsequent spend in town. There were very few tourists during the drought.
<p>3. Category: Events & Promotion</p> <p>The establishment of an annual event or festival to either replace or revitalise the once popular Easter Weekend Fishing competition.</p>	<ul style="list-style-type: none"> ▪ Reduced average rainfall ▪ Wind storms 	<ul style="list-style-type: none"> ▪ 'Live at the Lake' festival was used as an example. ▪ Reduced water in Lake Hindmarsh will make it difficult to attract people for the event, and may lead to the decline of the ski club and yacht club. ▪ Fire issues with fire works in high winds ▪ Dust storms caused by high winds may deter camping by Lake Hindmarsh.
<p>4. Category: Business & Industry</p> <p>The utilisation of empty shop windows for displays and promotion of produce, events etc.</p>	<p>None identified</p>	<ul style="list-style-type: none"> ▪ Small town and small shop fronts limits the number of alternative uses. For example, a new take away shop in town is converting an old house rather than using an empty shop front, which has worked out cheaper. ▪ It was noted that this is an issue in some of the larger regional centres such as Horsham.
<p>5. Category: Environment</p> <p>To undertake a beautification program and participate in a general clean up around the town and surrounds possibly in conjunction with Clean Up Australia Day</p>	<ul style="list-style-type: none"> ▪ Increased number of hot days ▪ Reduced average rainfall 	<ul style="list-style-type: none"> ▪ Reduced capacity of school children to be involved in Science Watch water testing and river clean up days. ▪ Reduced soil moisture to establish new amenity plantings in town. It was noted that the entrance to Jeparit

Priority description	Climate variable	Climate change impact
		from Horsham would benefit from more trees.
<p>6. Category: Community Infrastructure Erection of security fencing and shade sails at the public playground in Broadway Street</p>	<ul style="list-style-type: none"> ▪ Increased number of hot days ▪ Increased number of heatwaves 	<ul style="list-style-type: none"> ▪ Reduced usability of the public playground equipment. ▪ It was noted that the picnic tables, BBQ and skate park currently have shade structures.
<p>7. Category: Community Infrastructure Erection of shade sails and access improvements at swimming pool</p>	<ul style="list-style-type: none"> ▪ Increased number of hot days ▪ Increased number of heatwaves 	<ul style="list-style-type: none"> ▪ Synthetic turf installed around the pool can reach 70-80°C, which could reduce usability of the pool surrounds during peak periods.

5.4 Nhill

The impact of climate change on the Nhill Community Action Plan is outlined in Table 5-3. The impacts consider the experiences and lessons learnt from recent extreme events and the likely changes to average climate variables.

Table 5-3: Impact of climate change on Nhill Community Action Plan priorities

Priority description	Climate variable	Climate change impact
<p>1. Nhill Business Alive (Category: Business & Industry) Incentives for through traffic to stop – facilities 7 days a week / A place that sells food, coffee and light meals 7 days a week / weekend café</p>	<ul style="list-style-type: none"> ▪ Heat ▪ Reduced rainfall ▪ Drought 	<ul style="list-style-type: none"> ▪ Reduced town amenity ▪ Lack of shade and attractive place for people to stop
<p>2. Integrated Nhill Water Plan (Category: Environment) Integrated water plan for Nhill encompassing permanent water in the Lake, retention of existing groundwater system, upkeep of drainage, system to and from the Lake, retention of groundwater use for domestic purposes in town but limit use for irrigation</p>		<ul style="list-style-type: none"> ▪ The switch from bore water to GWMWater Pipeline water in households will increase the water costs unless there is a change of watering habits.
<p>7. Retention and attraction of volunteers (Category: Community Wellbeing) Look after existing volunteers, encourage younger people to volunteer, revitalise service clubs. Promote more volunteers</p>	<ul style="list-style-type: none"> ▪ Increase in extreme events 	<ul style="list-style-type: none"> ▪ Recruitment of new volunteers is difficult ▪ Membership of CFA and SES have remained static for 20 years

Other comments

- Issues
 - Bore water for recreation and sporting facilities and parks and gardens is vital to maintain these facilities both for Nhill and the wider community during drought and also to maintain the town amenity and encourage tourists to stop in the town
 - There are around 60 Karen families in Nhill attracted by work opportunities. Many of the adults have poor to very poor English language skills.
 - New migrants to Nhill attracted by affordable housing have little involvement in town activities.
 - The shopping strip needs revitalising
 - The Nhill lake is very important to the town and wider community as a place to cool off, relax and socialise
- Ideas - Develop and implement outreach programs for the Karen community to improve language skills, engage in community activities and volunteer programs e.g. Church services in Karen language, community gardens to grow preferred foods.

5.5 Rainbow

The impact of climate change on the Rainbow Community Action Plan is outlined in Table 5-4. The impacts consider the experiences and lessons learnt from recent extreme events and the likely changes to average climate variables.

Table 5-4: Impact of climate change on Rainbow Community Action Plan priorities

Priority description	Climate variable	Climate change impact
Category: Sports, Recreation & Leisure Water harvesting for Recreation Reserve and other sporting / community assets	<ul style="list-style-type: none"> ▪ Reduced rainfall ▪ Drought 	<ul style="list-style-type: none"> ▪ Sports grounds become unplayable
Category: Environment Maintaining Federal Street aesthetics	<ul style="list-style-type: none"> ▪ Reduced rainfall ▪ Drought 	<ul style="list-style-type: none"> ▪ Reduced township amenity
Category: Development Infrastructure Maintain road networks linking regional and local towns	<ul style="list-style-type: none"> ▪ Flood 	<ul style="list-style-type: none"> ▪ Town is isolated during floods ▪ People cannot leave the town and supplies cannot enter town

Other comments

- Issues
 - Culverts and drains require regular maintenance by householders to prevent stormwater blockages

6 Implementation

6.1 Integration with Council Climate Change Adaptation Strategy

The Hindmarsh Township Climate Change Adaptation Plan is integrated with the Hindmarsh Shire Council Climate Adaptation Strategy, the Integrated Water Management Plan and the Economic Development Position Paper developed as part of the Strengthening Basin Communities project.

6.2 Monitoring and review

The Hindmarsh Township Climate Change Adaptation Plan should be monitored and reviewed in conjunction with the Community Action Plan timeframes.

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Appendix 1 Impacts of recent extreme events

Table 6-1: Recent extreme events and their impact in Jeparit

Weather event	Date	Weather detail	Physical impact	Community impact	Economic impact	Environmental impact
Storm	March 2010	62 mm, with 3 mm per minute. Strong winds up to 156 km/h.	Damage to houses from rainfall intensity. Wind damage to houses and businesses.			<ul style="list-style-type: none"> ▪ Dust storm due to drying winds in combination with low soil moisture due to the drought caused loss of top soil and sand blasting of vegetation.
Flood	January 2011	Wimmera River breaches banks at Dimboola and Jeparit.	Houses and businesses damaged at Dimboola and Jeparit. Infrastructure damage. Road closures.	<ul style="list-style-type: none"> ▪ Supermarket shelves were stripped due to the uncertainty of how long the town would be cut off by flood waters. ▪ Uncertainty and stress faced by residents due to the 'unknown' nature of the flood and how long it would last. ▪ Assumption of roles and responsibilities of Council in providing back up generators did create some confusion e.g. Holden's property 	<ul style="list-style-type: none"> ▪ 17 to 19 homes in Natimuk were inundated. 	<ul style="list-style-type: none"> ▪ Some semi-septic systems that were submerged on properties overflowed and created a contamination and public health issues.
Heatwave	February 2009	Hottest day of 45°C, with five days of temperatures over 40°C.	Heat stress on local residents.	<ul style="list-style-type: none"> ▪ Older farmers unable to work outside ▪ Fire risk from people undertaking slashing or spreading manure too thick. 	<ul style="list-style-type: none"> ▪ Basic operation and maintenance of businesses unable to occur due to 30 days over 30°C. ▪ Reduced productivity, "we couldn't work past nine in the morning even if we wanted to." 	

Drought	~1998 to 2009	Severe reduction in average rainfall. Rainfall reduction between 2001-08 and 1961-1990 mean was: Nhill -17.7% Dimboola -31% Jeparit -14.2% Rainbow -17.9%	Reduced farm income. Financial pressure and family strain. Reduced urban water storages.	<ul style="list-style-type: none"> ▪ Reduced socialising due to the increase commitments at home/on-farm and having to travel further for sporting events. ▪ Minyip post office shut down, which was a key element of the community. ▪ Exacerbated small town decline due to cumulative effective of drought coupled with extreme events, for example 3 shops shut in short succession, whereas this may have taken 6-12 months to happen anyway. 	<ul style="list-style-type: none"> ▪ Spend in local shops declined because people were saving money if the drought got worse or they didn't have it. ▪ Question of family business versus profitability was an issue. "Businesses would pop up from people moving interstate and would go bust in six months." ▪ Increase in de-stocking and farm amalgamation, "the big got bigger and the relocated or retired." ▪ Increase in local business cost which forced customers to larger regional centres such as Nhill and Horsham, "people won't pay twenty dollars for a six pack." 	<ul style="list-style-type: none"> ▪ Change in growing conditions for canola around Jeparit and Minyip, "we can base that on the height of the canola and the last good season we had was nineteen ninety six." ▪ Increase stress and loss of amenity plantings which reduced the amenity of the town.
Bushfires	February 2009	Temperature was mid to high 40°C and winds were in excess of 100 km/h.	Damage to properties and infrastructure.	<ul style="list-style-type: none"> ▪ Power outages and high temperatures place elderly at risk due to lack of air conditioning, this increased the strain on council buildings as refuges. ▪ Reduced capacity of residents to pay electricity bills due to high prevalence of social welfare and unemployment. 	<ul style="list-style-type: none"> ▪ Current bushfire class action against Powercor may increase insurance premiums and electricity bills for residents. 	

Table 6-2: Recent extreme events and their impact in Dimboola

Weather event	Date	Weather detail	Physical impact	Community impact	Economic impact	Environmental impact
Storm	March 2010	62 mm, with 3 mm per minute. Strong winds up to 156 km/h.	Damage to houses from wind and rainfall intensity Flooding of homes	Confusion as to who was in charge		
Flood	January 2011	Wimmera River breaches banks at Dimboola and Jeparit.	Weir damaged and causes scouring of land around the weir	Caravan park closed Highway closed so people couldn't travel to work Football club, rowing club rooms inundated	Highway closed so no traffic through town Highway closed so people couldn't travel to work Caravan lark closed for three months	Lots of trees came down, waterlogging damage to trees, erosion of river bank Sewerage outflow to creeks
Heatwave	February 2009	Hottest day of 45°C, with five days of temperatures over 40°C.	Heat stress on locals	No identified refuge for heatwaves		
Drought	~1998 to 2009	Severe reduction in average rainfall. Rainfall reduction between 2001-08 and 1961-1990 mean was: Nhill -17.7% Dimboola -31% Jeparit -14.2% Rainbow -17.9%	Reduced farm production Reduced water levels in water storages	School grounds withered	Reduced farm income Financial pressure and family strain Reduced tourism	

Table 6-3: Recent extreme events and their impact in Nhill

Weather event	Date	Weather detail	Physical impact	Community impact	Economic impact	Environmental impact
Storm	March 2010	62 mm, with 3 mm per minute. Strong winds up to 156 km/h.	Little damage in Nhill, more damage in Gerang Gerung			Swamp filled in 24 hours
Flood	January 2011	Wimmera River breaches banks at Dimboola and Jeparit.	No damage in Nhill			
Heatwave	February 2009	Hottest day of 45°C, with five days of temperatures over 40°C.	Heat stress on locals	Pool was used as a refuge People bunkered down in their homes Increased stress levels	Increased use of lakes as refuges can bring people to the town	
Drought	~1998 to 2009	Severe reduction in average rainfall. Rainfall reduction between 2001-08 and 1961-1990 mean was: Nhill -17.7% Dimboola -31% Jeparit -14.2% Rainbow -17.9%	Reduced farm production Reduced water levels in water storages	Depopulation rate increased School and church numbers didn't change but there were fewer extracurricular activities as families could not afford additional costs People were very stressed Sports grounds in Nhill were important and were used by other communities during drought as they are watered with bore water Sport was important as a stress release and to bring people together	Reduced financial capacity and viability of farming community and town businesses Luv-a-Duck is critical to the town	

Table 6-4: Recent extreme events and their impact in Rainbow

Weather event	Date	Weather detail	Physical impact	Community impact	Economic impact	Environmental impact
Storm	March 2010	62 mm, with 3 mm per minute. Strong winds up to 156 km/h.	Town was OK More damage in the surrounding area – fallen trees		Frequent power outages (4-16hours) due to dust on transformers Hospital has 18 hour backup	
Flood	January 2011	Wimmera River breaches banks at Dimboola and Jeparit.	No deliveries for a few months Limited bus access (school) in extreme wet No SES in town so support is minimal Sodden roads decreases road safety	Outlying buildings impacted Pipe blockages in town resulted in significant cross flows through town Confusion over who is responsible for maintaining the levy Evacuation of injured or sick was very difficult due to lack of road access or other alternatives	Community was isolated and couldn't get to employment in other towns and supplies couldn't get in to town affecting sales at the supermarket	Weed spread following floods
Heatwave	February 2009	Hottest day of 45°C, with five days of temperatures over 40°C.	Heat stress on locals	No designated refuge Elderly are brought together at the hospital		
Drought	~1998 to 2009	Severe reduction in average rainfall. Rainfall reduction between 2001-08 and 1961-1990 mean was: Nhill -17.7% Dimboola -31% Jeparit -14.2% Rainbow -17.9%	Reduced farm production Reduced water levels in water storages			



Hindmarsh Shire

Integrated Water Management Plan

Final Report

May 2012



**Australian Government
Strengthening Basin Communities Program**



RMC

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Executive Summary

Introduction

Communities across the Murray-Darling Basin face significant challenges in dealing with the impacts of climate change and reduced water availability. Hindmarsh Shire received funding from the Australian Government *Strengthening Basin Communities* program to undertake a project to integrate climate change adaptation into Hindmarsh Shire Council planning and to facilitate regional adaptation. The study assessed the implications of climate change upon the Shire's built, economic, social and environmental infrastructure.

This Integrated Water Management Plan is one of three strategies produced as part of the project. A Climate Change Adaptation Strategy and Township Climate Change Adaptation Plan have also been developed.

The purpose of this Plan is to act as a strategic document providing direction and actions for sustainable water management within Council operations across the four main towns: Nhill, Dimboola, Jeparit and Rainbow. A particular focus of the plan is to identify Council facilities and services that are high water users and identify opportunities to reduce potable water consumption.

For the purposes of this document, the following definition of integrated water management, as defined by CSIRO for its Water for a Healthy Country Flagship Program, has been adopted.

"Integrated Water Management is a holistic approach to water management that aims to optimise the use of all water resources, including drinking water, sewerage, stormwater and groundwater. It considers the water cycle as a whole, and how each of the water systems can be integrated to provide more sustainable economic, social and environmental outcomes."

Local governments, such as Hindmarsh, are only directly responsible for some aspects of integrated water management. Other stakeholders in water management in the region include Grampians Wimmera Mallee Water (GMMWater), Wimmera Catchment Management Authority, Department of Sustainability and Environment and the Environment Protection Authority. Roles and responsibilities of the various stakeholders are set out in legislation, strategies and plans.

Water resources in Hindmarsh

Water supply in Hindmarsh falls into the following categories: regional surface water, groundwater and alternative supplies such as recycled wastewater, greywater reuse and rainwater capture. The regional surface water is managed by GMMWater and supplies most of the eastern part of the Shire, Nhill is currently not supplied from this source. The implementation of the Wimmera Mallee Pipeline has significantly increased the security of the water supply to around 93%.

The western part of Hindmarsh overlies very good groundwater reserves, however the dissolved minerals contained in the water can make it unsuitable for some sensitive uses. Nhill has relied upon groundwater for its urban supply for many years however GMMWater intends to connect the Nhill urban supply to the surface water in the near future. Groundwater will remain an option for some Council and sporting facility uses not requiring a potable supply.

Hindmarsh Water Use

Hindmarsh water usage averages around 65 ML/year of potable water from urban water supply systems operated by GMMWater. Of Council's total water use:

- Almost 60% of the water is used for irrigation of parks, gardens and sports grounds
- Irrigation and swimming pools together account for over 80% of Council's water use
- Of the total water use, 56% is used in Nhill
- Of the total water use, 40% is used for irrigation in Nhill.

Evaluation of sustainable water use options

Surface water security is higher than in the past. Therefore for Council assets not subject to water restrictions e.g. municipal swimming pools, alternative water sources will generally not be required. Due to the high costs of potable water, it should be offset where possible with groundwater. Stormwater collection is generally not compatible with offsetting potable water use. Rainwater collection will generally not be suited to offsetting potable water use of Council assets due to the large quantities of water required to be stored

Actions to reduce potable water use

An audit of each Council water-using asset was undertaken to review historic water use trends and document the source of water for each asset and current management practices

The audit identified opportunities for improved water management and options for use of alternative water sources including a response to the priority risk with regard to Council water use of continuity of service provision including providing sports grounds and recreation facilities and maintaining town amenity during periods of water shortages. Finally the potential for Council water costs to rise in the future and the importance of Council to demonstrate best practice with regard to water management has been noted

Council wide initiatives

The risk assessment undertaken as part of the wider Hindmarsh Climate Change Adaptation project, identified the following priority risks with regard to Council water use:

- Continuity of service provision including providing sports grounds and recreation facilities and maintaining town amenity during periods of water shortages.

This IWMP has also noted the:

- Potential for Council water costs to rise in the future
- The importance of Council to demonstrate best practice with regard to water management

A number of initiatives have been identified for reducing Council water use and improving water management practices:

Monitoring

A regular audit of Council water use is required to enable monitoring of water use, identification of leakages, over-usage and opportunities for improvement.

Action	Description
Monitoring -1	Map irrigation systems and include it on Council's asset management system.
Monitoring -2	Ensure there are sufficient water meters (and sub-meters) in place to account for water use at various sites.

Action	Description
Monitoring -3	Keep records of monthly water use at various sites. Ask tenants to keep records and submit an annual report.
Monitoring -4	Install water meters on all Council bores used for roadside watering
Monitoring -5	Review of all water use data annually in conjunction with Grampians Wimmera Mallee Water accounts. Correlate water usage with meter reads to detect leaks and over-usage.

Turf, lawn and garden management

Turf, lawns and gardens are substantial users of water. There are a number of opportunities to reduce water use by changing or modifying current management practices

Action	Description
Management -1	Convert irrigation systems from manual to automatic and where possible introduce night watering
Management -2	Conduct irrigation audits for main sites to confirm that sprinklers are operating efficiently,
Management -3	Consider subsurface irrigation and alternative species for areas that currently have high water use but are located where there is low impact on amenity
Management 4	In conjunction with sporting groups and committees of management, document watering regimes to be followed during water restrictions including consideration of: <ul style="list-style-type: none"> ▪ Reducing the area of certain reserves being irrigated ▪ Ceasing irrigation entirely on some reserves
Management -5	Use deep mulches on garden beds and revegetated areas to reduce evaporation

Swimming pools

Council has already undertaken works on some pools to reduce water use. The Rainbow pool is known to have leaks and was a substantial user of water in 2011

Action	Description
Pools-1	Assess the cost of repairing leaks in Rainbow pool
Pools-2	Conduct drawdown tests in winter as a means of estimating pool leakage.

Council buildings

Water use in Council buildings is relatively modest. There are opportunities to improve water use efficiency, mainly with end-or-life replacements of appliances and fittings.

Action	Description
Buildings-1	End of life replacement with water efficient appliances and facilities in Council buildings <ul style="list-style-type: none"> ▪ Use of dual flush toilets ▪ Water efficient urinals ▪ Water saving shower heads at pool and sports ground change rooms ▪ Water efficient kitchen appliances ▪ Flow restrictors and aerators on replacement taps

Education and awareness

A number of committees of management and community groups manage sporting and recreation facilities on behalf of Council. There are opportunities to work with these groups to improve management practices and improve water use efficiency.

Action	Description	Timeframe
Education-1	Work with community groups and committees of management to review irrigation management of sports grounds and reserves to identify opportunities for improvement and reducing water costs.	2 years

The actions identified in the of the Hindmarsh Climate Change Adaptation Plan, Township Climate Change Adaptation Plan and the Economic Development Position Paper are summarised here.

Hindmarsh Climate Change Adaptation Strategy

The purpose of the Climate Change Adaptation Strategy is to:

- Help Council and stakeholders understand the impacts of climate change in the region
- Identify the risks and opportunities climate change and reduced water availability present for the region
- Clarify Council's role and scope for taking action on these issues
- Identify measures Council can adopt to address risks and act on opportunities.

The focus of the strategy is the impact of climate change and reduced water availability across four main themes:

1. The Hindmarsh economy
2. Utilities infrastructure – transport, water and energy
3. Community infrastructure – parks, gardens, halls, libraries and other Council buildings
4. Council capacity to meet the needs of its community as the climate and water availability changes.

The key risks to Hindmarsh posed by climate change and reduced water availability were identified as:

Regional economy

- Reduced agricultural and manufacturing productivity
- Population decline and reduced regional employment

Utilities infrastructure

- Increased road construction and maintenance costs
- Increased frequency of stormwater flooding

Community infrastructure

- Lack of continuity of water supply for recreation and sporting facilities, parks and gardens
- Increase in infrastructure maintenance costs and costs of recovery from extreme events
- Increased demands on community volunteers for emergency response and recovery
- Need for community refuges is not being adequately met by Council buildings

Council capacity

- Increased demand for Council services and declining Council income
- Increased difficulty in recruiting and retaining Council staff
- Providing a safe work environment for staff
- Reduced community capacity and resilience

Consultation and review of existing strategies and programs identified the following key actions.

To prepare for climate change and reduced water availability, the Strategy proposes the following set of actions for Council.

Action	Description
Regional economy	
RE-1 Research development and extension	Continue to advocate and provide strategic support to Department of Primary Industry and industry groups such as Birchip Cropping Group for on-going research and development that will assist the agricultural industry adapt to the changing climate
RE-2 Streamlining of planning permit approvals	Continue implementation of processes to streamline assessment of planning permit applications including educating and encouraging landholders and businesses to bring proposals to a pre-application meeting
RE-3 Economic Development Strategy	Develop an Economic Development Strategy based on the findings of the Economic Development Position Paper
Utility infrastructure	
UI – 1 Review and update the Road Asset Management plan	Embed consideration of climate change risks in development of the next road asset management plan
	Continue to investigate alternative sealed road pavement mixes that are more resistant to temperature extremes. Incorporate findings into the Road Asset Management plan
	Investigate alternative unsealed road gravel mixes and treatments that are more resistant to temperature extremes and surface runoff. Incorporate findings into the Road Asset Management plan
	Review the road hierarchy to incorporate consideration of climate change impacts and particularly recent flood events e.g. road closures, road safety, to minimise the risk of isolated townships
UI-2 Stormwater Drainage Study	Council complete development and begin implementation of the Stormwater Drainage Study
	Develop and implement a community communication and engagement strategy to assist in the implementation of the Stormwater Drainage Study
Community infrastructure	
CI-1 Integrated water management planning	Adopt and implement the Hindmarsh Integrated Water Management plan
CI-2 Stormwater flood prevention	Confirm responsibility for maintenance of levy banks in Jeparit Where Council is the responsible authority develop a levy management plan that considers: <ul style="list-style-type: none"> – Ongoing maintenance requirements and costs – Management during flooding – Risks to levy integrity and capacity from increased frequency of flooding and increased flood heights – Community engagement and communication
	Adopt and implement the Hindmarsh Stormwater Drainage Study
CI-3 Review of Council buildings and assets	Embed consideration of climate change risks in the review and development of Council building maintenance programs
	Incorporate the findings of climate change risks on Council buildings in the annual review of insurance cover
CI-4 Township emergency management planning	Adopt and implement the Hindmarsh Township Climate Change Adaptation Plan

Action	Description
CI-5 Contingency planning	Identify critical Council systems required during emergencies and determine the adequacy of power reserves and back up power supplies during power outages.
	Assess capacity of emergency management centres and critical Council buildings to receive back up electricity supply from generators.
CI-6 Municipal emergency management planning	Incorporate the findings of the Township emergency management planning into the Municipal Emergency Management Plan
Council Capacity	
CC-1 Incorporate climate change and water availability scenarios into Council assets management plans	Council staff review and analyse current asset management plans under a range of climate change and water availability scenarios e.g. – Stormwater drainage capacity maintenance – Road construction and design – Building maintenance, upgrade and design
CC-2 Embedding climate change and water availability risk assessment	Climate change and water availability scenarios should be regularly updated and considered in the analysis of future asset management plans and broader Council planning
CC-3 Community engagement	As part of future service delivery planning, review services in some towns and/or consolidating services to a smaller number of towns
	Incorporate findings of the Department of Planning and Community Development Role and Function of Small Towns and Settlements Project in to future service delivery planning
	Undertake community engagement to communicate Council's adaptation and sustainability projects to demonstrate leadership and educate the community
	Undertake community engagement to communicate Council's challenges in maintaining service delivery and invite community discussion on choices and options
CC-4 Recruitment	Liaise with major businesses, service providers and neighbouring municipalities to develop packages offering employment opportunities with Council for couples and families
	Continue to utilise the Victorian Traineeship programs to address Council skill shortages
	In conjunction with other municipalities and major businesses, develop a Skills Match program to assist in matching skills and employment opportunities
CC-5 Outsourcing	Continue to identify services that can be delivered by contractors or consultants for services that cannot be provided in-house and require high quality outputs delivered to specified timeframes
CC-6 Contingency planning	Review the Business Continuity Plan for indoor staff that considers extreme weather events and power outages

Township Climate Change Adaptation Plan

A number of risks associated with climate change were common across the four main townships, including:

- Poor understanding by town residents of emergency response procedures
- Decline in volunteers and increasing demands on volunteers for emergency response and recovery
- Decline in town amenity and community infrastructure such as sports grounds, recreation facilities and parks and gardens.

The key actions identified to address these risks included:

- Community engagement
- Community action planning
- Recruitment planning
- Implementation of the Integrated Water Management plan

The detailed actions include:

Action	Description
Emergency response	
ER-1 Community engagement	<p>Work with Township Committees to ensure that there is a general understanding of:</p> <ul style="list-style-type: none"> ▪ Roles and responsibilities of agencies and individuals during emergencies ▪ Contact details for various emergencies <p>Work with Township Committees to ensure that new residents in towns understand emergency response procedures in their town and contact details.</p>
ER-2 Community action planning	<p>As part of the review of the township Community Action Plans consider:</p> <ul style="list-style-type: none"> ▪ Confirm cool areas for use during heatwaves as per the Hindmarsh Heatwave Plan ▪ Confirm status of refuges for other extreme events including bushfire and flood <p>Work with the Rainbow community and VicRoads to consider if a road can be upgraded to provide continued access during flood</p>
Volunteerism	
V-1 Recruitment plan	Work with CFA and SES to develop a recruitment plan targeted at new migrants to towns. This may include consideration of language and cultural barriers to volunteering
Town amenity sport and recreation	
TASR-1 Integrated Water Management	Adopt and implement the Draft Integrated Water Management Plan

A number of town specific actions were also identified.

Economic Development Position Paper

The Hindmarsh Council Plan identified the development and implementation of an Economic Development Strategy as its priority action to achieve its first objective of a diverse economy. Given the economic development framework the Shire is operating within, it is essential that the purpose and role of this strategy be clearly identified to ensure the Strategy achieves the desired outcome with efficient use of the available resources.

A suggested role for the Economic Development Strategy would be to act as a signpost document, bringing together the existing initiatives, at both a regional and local level, and clearly articulating the Council's priorities and how it will utilise these initiatives to achieve those priorities. There are four themes that encompass the core role of Council in economic development, they are:

1. **Supporting a regional process** - This theme should:

- Describe the Council's commitment to the Regional Strategic Plan and Regional Development Australia processes and how Council intends to engage with and contribute to these processes
- Describe Council's commitment, engagement and contribution to the Wimmera Development Association and Wimmera Manufacturing and Industry Group
- Recognise these regional processes as the most appropriate vehicle to achieve the bigger picture strategic priorities, which will benefit the whole region and the Shire.

2. **Advocating for regional priorities** - This theme should:

- Recognise that a number of Hindmarsh priorities are already acknowledged as regional priorities within the Regional Strategic Plan
- Identify a clear role for Council to advocate for their priorities to become regional priorities
- Describe the process by which Council will achieve this.

3. **Meeting local needs** - This theme should:

- Identify the key priorities for local economic development within the Community Action Plans
- Describe how the Council will develop and implement projects to meet these priorities
- Recognise and plan for improved service provision to meet business needs, e.g. infrastructure, community services.

4. **Facilitating local opportunities** - This theme should:

- Develop a process to identify local opportunities that are not already covered in the Community Action Plans, or Regional Strategic Plan
- Recognise and prioritise Council's role as an advocate for these and other local projects
- Identify Council's capacity to facilitate project development, which might include getting the project recognised as a priority within a Community Action Plan, the Council Plan or the Regional Plan.

It was recommended that an Economic Development Strategy be developed based on the findings of the Economic Development Position Paper with a specific focus on:

- Advocating and supporting regional economic development strategies and initiatives
- Advocating for Hindmarsh priorities to be considered regional priorities
- Attracting and retaining professional and skilled labour

1 Introduction

1.1 Background

Strengthening Basin Communities

Communities across the Murray-Darling Basin face significant challenges in dealing with climate change and its impacts on reduced water availability. The CSIRO Sustainable Yield studies point unambiguously to a future with less inflows into river systems and reductions in water available for extractive uses.

The Australian Government also recognises the central role that local government plays in local communities. Local councils have the front line responsibility for developing plans to take account of the impact of climate change and demonstrate a 'reasonable response' to this process.

As a result, the Australian Government has committed \$200 million from its *Water for the Future* fund to establish the *Strengthening Basin Communities* program. Under this program local governments in the Murray-Darling Basin have been allocated grants to:

- Assist them in community-wide planning for a future with less water
- Invest in water savings initiatives including cost effective water infrastructure that meets the needs of communities now and into the future.

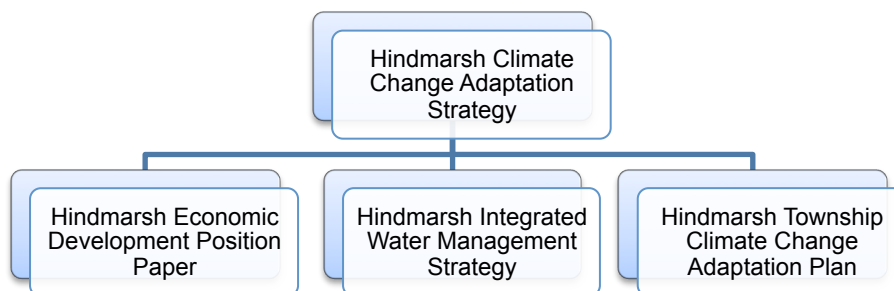
Hindmarsh Shire Council, with funding from the Strengthening Basins Community program, has undertaken a comprehensive community planning exercise to integrate climate change across Council business and to facilitate regional adaptation through:

- Assessing the implications of climate change upon the Shire's built, economic, social and environmental infrastructure development
- Engaging the private sector and community in climate change adaptation and decision-making.

The project culminated in the development of a number of inter-related reports:

- Hindmarsh Climate Change Adaptation Strategy
- Hindmarsh Economic Development Position Paper
- Hindmarsh Township Climate Change Adaptation Plan
- Hindmarsh Integrated Water Management Plan

The relationship between the strategies is outlined in the following diagram.



Hindmarsh Climate Change Adaptation Strategy

The Climate Change Adaptation Strategy provides an integrated response to the challenges of climate change and reduced water availability for Hindmarsh Shire. The purpose of the strategy is to:

- Help the Council and stakeholders understand the impacts of climate change in the region.
- Identify the risks and opportunities climate change and reduced water availability present for the region.
- Clarify the Council's role and scope for taking action on these issues.
- Develop measures the Council can adopt to address risks and act on opportunities.

The focus of the strategy is the impact of climate change and reduced water availability across four main themes:

5. The Hindmarsh economy
6. Utilities infrastructure – transport, water and energy
7. Community infrastructure – parks, gardens, halls, libraries and other council buildings
8. Council capacity to meet the needs of its community as the climate and water availability changes.

1.2 Purpose of this integrated water management plan

The purpose of this Plan is to act as a strategic document providing direction and actions for sustainable water management within Council operations across the four main towns listed in Table 2-1. A particular focus of the plan is to identify Council facilities and services that are high water users and identify opportunities to reduce potable water consumption.

The Integrated Water Management Plan (IWMP) responds to the challenges of climate change and future reduced water availability and security of supply. In addition, the IWMP incorporates recent developments impacting on water management. These changes include:

- Regulatory and policy – water restrictions and other State Government water management requirements have forced Council and the community to improve water management and reduced water consumption
- Economic – the costs of water will rise in association with reduced supply and costs of replacing and upgrading infrastructure
- Technological – changing technologies and approaches in the areas of water reuse and recycling provides opportunities for offsetting potable water use
- Sectoral – there is a greater community expectation on local government to improve its management practices and use of resources.

The ongoing development and periodic review of the Plan is crucial to maintain a continuous improvement and best environmental management approach to water management.

1.3 Document structure

This IWMP is structured in the following way:

- Context – responsibilities of Council and other agencies
- Water supplies – summary of the various water supplies in the Shire
- Council's water use – summary of water use by Hindmarsh Shire
- Evaluation of sustainable water use options – from Council's perspective
- Implementation plan.

2 Hindmarsh Shire

The Shire of Hindmarsh is situated in central North West Victoria, south of the Mallee and north of the Grampians and about 350 kilometres northwest of Melbourne. It covers an area of 7,527 square kilometres and has a population of 6,200. Although Hindmarsh Shire is the sixth largest municipality in Victoria in area, it has the fifth smallest population. The four main urban localities and their population are shown in Table 2-1.

The major industry is agriculture, based largely on grain and sheep production, but in recent years has diversified into oilseeds and legumes. The shire also includes substantial areas of national park.

Table 2-1 Main urban centres in Hindmarsh Shire

Town	Population	Households ¹
Dimboola	1,800	800
Nhill	1,900	860
Jeparit	600	280
Rainbow	500	330

¹ Hindmarsh Shire Environmental Strategy, 2010-2013.

3 Principles of sustainable water management in Hindmarsh

3.1 Definition of integrated water management

Integrated water management can mean many things and there is no standard industry definition for the term. For the purposes of this document, the following definition of integrated water management, defined by CSIRO for its Water for a Healthy Country Flagship Program, has been adopted.

“Integrated Water Management is a holistic approach to water management that aims to optimise the use of all water resources, including drinking water, sewerage, stormwater and groundwater. It considers the water cycle as a whole, and how each of the water systems can be integrated to provide more sustainable economic, social and environmental outcomes.”

This definition recognises that to ensure efficient water use, water supply, wastewater and stormwater should no longer be planned for and delivered by completely independent and separate entities. This plan will consider all water resources and then focus on those aspects of integrated water management that relate to the activities and responsibilities of the Shire of Hindmarsh.

A number of sustainable water management principles will underpin Council decision-making and the actions outlined in the IWMP.

- Whole of water cycle approach – recognises that water storage and supply, wastewater treatment and disposal, stormwater capture and disposal if managed in a more integrated way will deliver better outcomes in terms of water quality as well as wider ecological benefits, improved security of supply and resilience of communities in times of reduced water availability and reduced costs of water management to the organisations and communities.
- Water sensitive urban design – aims to improve the links between urban built form, the landscape and the urban water cycle and includes consideration of water conservation, stormwater treatment and /or re-use and water recycling as part of urban design. This can include structural elements such as rainwater and stormwater capture and re-use as well as non-structural elements such as building regulation and education
- Fit for use – matching water supplies of different qualities with appropriate uses can provide cost effective options to reduced potable water use e.g. stormwater capture for watering parks and gardens
- Community benefit – Council is required to make choices as to the allocation of water resources between different uses. This will be influenced by water restrictions and cost. In times of reduced availability, Council will need to consider how to equitably use the available water and ensure the greatest community benefit.

4 Policy Context

Local governments, such as Hindmarsh, are only directly responsible for some aspects of integrated water management. This chapter outlines the context within which Hindmarsh operates and can expect to have influence with regard to water management. The “implications” for integrated water management are set out at the end of each section.

4.1 Roles and responsibilities for water supply

The roles and responsibilities of the various agencies as they relate to integrated water management planning in Hindmarsh are summarised in table:

Table 4-1 Agencies and their water management responsibilities

Agency	Responsibilities with respect to Integrated Water Management
Council	<ul style="list-style-type: none"> ▪ Public open space. ▪ Recreation facilities. ▪ Public buildings. ▪ Urban stormwater drainage. ▪ Roads and road reserves. ▪ Town planning, sustainable living and economic development.
Grampians Wimmera Mallee Water	<ul style="list-style-type: none"> ▪ Drinking water. ▪ Wastewater (sewerage). ▪ Stock & domestic water. ▪ Groundwater. ▪ Recycled water.
Wimmera Catchment Management Authority	<ul style="list-style-type: none"> ▪ Regional and riverine flooding. ▪ Natural resource management.
Department of Sustainability & Environment	<ul style="list-style-type: none"> ▪ Public land. ▪ Strategic water policy.
Environment Protection Authority	<ul style="list-style-type: none"> ▪ Environmental monitor

4.2 State Government

State Government has produced a number of strategies relating to managing the state’s water resources. This includes *Securing Our Water Future Together- Victorian Government White Paper (2004)* and *The Next Stage of the Government’s Water Plan (2007)*.

Western Region Sustainable Water Strategy

The *Western Region Sustainable Water Strategy (2011)* was developed by the Department of Sustainability and Environment and identifies potential challenges for water management and opportunities to secure water resources for the next 50 years. It outlines policies and actions to ensure sustainable water supply and management over that period. Actions and strategies recommended for the north-west sub-region and particularly relevant to Hindmarsh include:

- Managing extraction from groundwater reserves with negligible recharge
- Revising urban water supply-demand strategies

- Management of the Upper Wimmera River
- Investing in integrated catchment management to improve waterways

There are also a number of actions and strategies that will be implemented across the western region and are considered relevant to this study:

- Monitoring and tracking water use outside the entitlement framework
- Developing more responsive local management plans
- Developing statutory management plans where needed
- Improving information sharing about climate variability and risks
- Promoting water conservation and efficiency
- Investigating the potential to harvest high flows
- Extending the reticulated supply network
- Improving opportunities for water trading
- Encouraging fit-for-purpose use alternative water supplies
- Aligning groundwater management boundaries to aquifer systems
- Strategic groundwater resource assessments
- Promoting water conservation and efficiency
- Encouraging fit-for-purpose use of alternative water supplies
- Updating water supply-demand strategies
- Review of the Victorian Uniform Drought Water Restriction Guidelines and Permanent Water Savings Rules
- Facilitating integrated water planning

4.3 State Government Legislation

Water Act 1989

The *Water Act 1989* is the primary piece of legislation for water management in Victoria. The Act has the following purposes:

- Re-state, with amendments, the law relating to water in Victoria
- Provide for the integrated management of all elements of the
- Terrestrial phase of the water cycle
- Promote the orderly, equitable and efficient use of water resources
- Make sure that water resources are conserved and properly managed for sustainable use for the benefit of present and future Victorians
- Maximise community involvement in the making and implementation of arrangements relating to the use, conservation or management of water resources
- Eliminate inconsistencies in the treatment of surface and groundwater resources and waterways
- Provide better definition of private water entitlements and the entitlements of Authorities

- Foster the provision of responsible and efficient water services suited to various needs and various consumers
- Provide recourse for persons affected by administrative decisions
- Provide formal means for the protection and enhancement of the environmental qualities of waterways and their in-stream uses
- Provide for the protection of catchment conditions.

Environment Protection Act (1970)

The Environment Protection Act 1970 (EP Act) is the primary environmental legislation in Victoria. The purpose of the Act is to “*create a legislative framework for the protection of the environment in Victoria having regard to the principles of environment protection.*” The Act aims to prevent pollution and environmental damage by setting environment quality objectives and establishing programs to meet them. The Act encourages sustainable use and holistic management of the environment and a consultative and cooperative approach to environment protection.

The EP Act includes general requirements relating to discharges to air, land, water and groundwater, and control of noise, litter and wastes. Specific requirements for these are addressed in detail under the relevant State Environment Protection Policies.

State Environment Protection Policy (Waters of Victoria)

The principal State Environment Protection Policy (SEPP) for managing Victoria’s waterways is “Waters of Victoria” (WOV). The SEPP aims to provide a coordinated approach for the protection and where necessary rehabilitation of the health of Victoria’s water environments. As required under the EP Act the SEPP includes:

“The uses and clause of the water environment that the community wants to protect (beneficial uses);

The objectives and indicators that describe the environmental quality required to protect the beneficial uses; and

Guidance to communities, business and government agencies to protect and rehabilitate water environments (attainment program)”

The attainment program sets out the key responsibilities of various agencies and organization in implementing actions to meet environmental quality objectives. Councils have a range of responsibilities that impact on surface waters including the planning and approval of sustainable land use, domestic wastewater, urban stormwater and floodplain management.

In carrying out these responsibilities, municipal councils should “work with the EPA, catchment management authorities and other protection agencies to ensure that municipal planning schemes, statutory approvals and municipal programs are consistent with the SEPP and regional catchment strategies and help to protect beneficial uses “.

Further, a goal of Council shall be “to ensure that land use planning decisions and approvals consider the capability of land to sustain the use, that stormwater and domestic wastewater management is improved and that sediment runoff from unsealed roads is reduced”.

The SEPP also outlines responsibilities of community members to “*manage their activities to minimise direct impacts on surface waters and to efficiently use natural resources to avoid the generation of waste and wastewater*”.

Best Practice Management Guidelines For Urban Stormwater

Urban stormwater, stormwater drains and wetlands need to be designed and managed according to the principles as set out in the “Best Practice Management Guidelines for Urban Stormwater” manual and the Municipal Stormwater Management Plan.

The purpose of the Guidelines is to protect stormwater quality to ensure that...“the environmental values and beneficial uses of the receiving water are sustained and enhanced.”

Stormwater management is based on three principles:

- Preservation of existing valuable elements of the stormwater system, such as wetlands, natural channels and streamside vegetation.
- Source control to limit changes to quality and quantity of stormwater at the source.
- Structural controls such as treatment techniques to detention basins to improve water quality and control streamflow discharges.

The environmental objectives of the SEPPs form the targets for stormwater management and there are several ways to ensure that these objectives can be met:

- Monitoring water quality against receiving waters
- Modeling to determine treatment requirements
- Averaged values of typical stormwater quality compared to receiving water and SEPP objectives.

Victorian State Government Policy for Urban Stormwater

Future stormwater harvesting projects need to be assessed within the current government policy and rules stated in the Central, Northern and Western Sustainable Water Strategies for allocating stormwater in urban areas. The Government adopts the following allocation rules for stormwater in urban areas:

- If stormwater is flowing to the sea via a drain, all of the storm water may be harvested.
- If stormwater is flowing to a stream from an existing development, assume up to 50 per cent of existing stormwater can be harvested for consumptive use and 50 per cent is reserved for the environment. If there is a scheme to harvest more than 50 per cent of the resource a study is required to assess the implications for the environment

4.4 Grampians Wimmera Mallee Water

Statutory responsibility for drinking water supply and sewerage vests in regional water corporations. Grampians Wimmera Mallee Water (GMMWater) provides these services to communities in Hindmarsh. GMMWater have prepared a number of strategies that consider the water needs of the region.

Water Supply Demand Strategy, 2012

GWMWater is obliged to prepare a water supply demand strategy (WSDS) and review it every five years. The DSE has prepared guidelines explaining the requirements of a WSDS.

A WSDS is a 50-year strategic assessment of demands and supply, usually focussed on urban supply systems, but because the GWM system is integrated, a single integrated plan has been prepared for the whole Grampians/Wimmera supply region.

GWMWater submitted a draft WSDS to DSE in November 2011 and the final strategy is due to be completed by March 2012. A summary paper was presented to the GWMWater board in December 2011. In summary, the key points relevant to this IWMP are:

- This is the first supply/demand strategy since completion of the Wimmera Mallee Pipeline, so modelling has been done to include this significant change to the regional water distribution system.
- Various climate scenarios were examined – historic, median climate change to 2030 and 2060, and return to dry (Millennium Drought).
- The agreed service level (AGL) that GWMWater strives for is that “urban unrestricted demand will be met in 93 years out of 100 years under the historic climate scenario”.
- The minimum service level (MSL) is the level of service during a water shortage when the AGL cannot be met. The proposed MSL is that “GWMWater will meet at least 50% of unrestricted demand in years when restrictions are imposed”.
- Urban systems can be supplied at the AGL under all climate scenarios except the “return to dry”.
- The WSDS identified the following relevant key emerging items:
 - In some towns water losses can be significant and GWMWater will prepare an action plan to address these
 - The Wartook system (that is the sole supply for Horsham and Natimuk urbans) has a significant supply deficit under the median and return to dry climate scenarios because these demands are solely reliant on this one reservoir. Possible responses will be investigated over the next few years
 - Runoff into Lake Bellfield and Lake Wartook will not be as severely impacted by climate change compared to the average Wimmera Catchment.

The reliability of supply from the Grampians storages is very good, but some of the savings achieved through piping the system might be largely offset by reduced inflows under the worst climate scenarios.

Water supply to Dimboola, Rainbow and Jeparit (and ultimately Nhill), which are supplied from the Bellfield system, are currently more secure than the Horsham supply, but investigations and works will likely take place over the next few years to improve supply to Horsham.

GWMWater will continue to focus on demand management including behavioural research to understand customer water use behaviour, attitudes to water efficiency and “bounce back” from restrictions.

Essential Services Commission Water Plan (2013-2018)

Like all urban water corporations, GMMWater must submit a Water Plan for the 2013-2018 pricing period which will set out the operating and capital costs over that period, the expected levels of demand and the proposed tariffs for the various water and sewer services.

Nhill Integrated Water Plan (Draft), June 2009, GMMWater

In 2009 GMMWater prepared a draft integrated water plan for Nhill. The plan was never finalised but its development did help GMMWater to decide to connect Nhill to the Grampians system.

The draft plan provides very good background information that has been incorporated into this IWMP where appropriate. The draft integrated plan can be summarised as follows:

- Future **potable drinking** water supply will be from the Wimmera Mallee Pipeline system
- Private **rainwater** tanks continue to be used to supplement the potable supply
- **Groundwater** bores be retained for town parks and gardens, community recreational and school recreational facilities
- Reallocate any spare **recycled water** once the existing Nhill wastewater treatment site has been remediated. Options include: irrigation at the cemetery gardens or racecourse, environmental flows to Nhill swamp and irrigation of firewood plantations
- The priority for **stormwater** use from the Nhill township and surrounds should remain supply to the Nhill Lake and overflow into Nhill swamp. Also that the quality of stormwater should be improved
- Develop enhanced **community education** programs with an emphasis on efficient and effective external household use.

This will be a useful resource for considering options for offsetting potable water use in Nhill.

GMMW Water restrictions policy

In times of reduced water availability, GMMWater may introduce water restrictions. The water restriction levels are based on the Victorian Government's uniform four-stage restriction policy. The water restrictions apply to the use of water drawn from GMMWater reticulated urban water supply systems. They do not apply to the use of water drawn from other sources including rainwater and greywater.

These restrictions apply to water use by Council. A full description of the water restrictions as they apply to Council are provided in [Appendix 2](#) and summarized in Table 4-2. With regard to continuity of service provision by Council:

- At Stage 1, Stage 2 and Stage 3 permission is required to fill existing pools
- At Stage 3 there would be no watering of some playing surfaces and all lawn areas.
- At Stage 4 permission is required to fill and top up existing pools and there would be no watering of playing surfaces, lawn areas and sporting grounds.

This IWMP should therefore consider opportunities to provide alternative water sources during times when water use is restricted to maintain continuity of Council services.

Table 4-2 Summary of impact of water restrictions on Council services

Stage	Swimming pools and spas	Public gardens, sports grounds and school grounds
1	Permission is required to fill existing Council pools. Top up with hand held hose	Unless a Water Conservation Plan has been approved, watering times are restricted
2	Permission is required to fill existing Council pools. Top up with hand held hose	Unless a Water conservation Plan has been approved, watering times are restricted
3	New pools cannot be filled Permission is required to fill existing Council pools. Top up with bucket or watering can	No watering of lawn areas. Watering times of gardens are restricted. No watering of non-exempt playing surfaces Watering times for exempt surfaces is restricted
4	New pools cannot be filled Permission in writing from GWMWater is required to top up existing pools	No watering of lawn areas. Watering of gardens by bucket only No watering of sports grounds or playing surfaces

4.5 Wimmera Catchment Management Authority

The prime responsibilities of Wimmera CMA are the health of land and water in the Wimmera catchment and the promotion of sustainable and productive land use practices. This is achieved through local programs that identify and address improvements in the region's natural assets. This includes:

- Rehabilitating waterways & wetlands
- Improving native vegetation management
- Providing environmental education
- Develop land capability & resource mapping
- Working with volunteer and community groups, such as Waterwatch and Landcare
- Undertaking salinity research & development
- Facilitating floodplain management
- Promoting practices that improve soil health

Thee roles of CMAs in relation to floodplain management are to:

- Develop, oversee and, where appropriate, implement regional floodplain management strategies, which integrate local floodplain management issues and prioritise the development of urban and rural floodplain management plans within the region.
- Support and facilitate the implementation of regional land use planning measures to reduce the growth of flood risk and flood damages and, in particular, to provide input to planning schemes, respond to planning referrals, provide flood advice and help resolve planning issues.
- Support and facilitate the implementation of regional flood warning systems.
- Maintain and enhance regional flood information and coordinate monitoring of significant flood events.

- Monitor and report on regional flood management performance.
- Advise Government on regional flood management priorities.
- The CMAs also have major functions with regard to waterway management and regional rural drainage management.

4.6 Role of Hindmarsh in water conservation and management

Local governments such as Hindmarsh, are not directly responsible for water supply or management. Statutory responsibility for drinking water supply and sewerage vests in regional water corporations. Grampians Wimmera Mallee Water (GMMWater) provides these services to communities in Hindmarsh.

While not directly responsible for water supply, council does have responsibilities for economic development and community well being, so is a major stakeholder in integrated water management. In addition, Hindmarsh buys water to irrigate sports fields and open spaces, Council-owned toilets, public buildings and depots.

Council has responsibilities for stormwater drainage, but these responsibilities usually confine themselves to minimising damage from localised flooding and as part of its road maintenance program. Council's interest in stormwater does not typically extend to the harvesting of stormwater, however this IWMP will consider the options for using stormwater for to replace potable water use on sports ground or open space.

While riverine flooding and associated town planning and flood warnings are the responsibility of the Wimmera Catchment Management Authority, Council has an interest and a stake in river and floodplain management, but is not primarily responsible for this function.

In summary, Council's roles in relation to integrated water management are to:

- Demonstrate responsible water use and conservation through its own actions and operations.
- Encourage residents and businesses to implement responsible water conservation.
- Lobby other agencies to ensure they take care of their responsibilities, such as GMMWater to provide reliable and affordable water supplies, the Wimmera CMA to manage riverine flooding and VicRoads to manage stormwater runoff from major roads.

4.7 Council policies and plans

Council has a number of plans and strategies linked to integrated water management.

Hindmarsh Planning Scheme

The Vision is for a Shire where:

- There is a significant level of community pride and a high degree of partnership and shared responsibility between the Council and the community
- The key towns have distinct characters and identities and provide a range of economic and community opportunities which meet the needs of the community
- People can live in a safe and healthy environment

- The economy is founded on agricultural production based on diversification and improved production and other value adding activities
- Activities are economically and socially sustainable, and are also compatible with the conservation and enhancement of the environment
- There is diversity in the economic base, through the establishment of new industries together with the continuing expansion of tourism, recreation and leisure opportunities
- The significant natural landscapes, environmental features and places of heritage significance are valued, protected and enhanced for their conservation and leisure potential for future generations.

The MSS outlines the following objectives important to achieving the Shire vision.

- To maintain sustainable communities throughout the Shire.
- To support economic growth through both the retention and development of agricultural activities and through the development of new activities which are economically, environmentally and socially sustainable.
- To maintain a viable and sustainable agricultural industry to ensure the future well being of the Shire and its residents.
- To facilitate the sustainable development of the Shire through careful management of its physiographic features.
- To protect and manage water resources to ensure the long term sustainability of the Shire.
- To promote and enhance the roles of the main towns as the service and business centres for the Shire and as a focus for communities.
- To maintain the existing provision and standard of community services in a manner which is both economically and socially sustainable.
- To provide infrastructure services to meet the needs of the community in a cost effective manner.

The Hindmarsh Planning Scheme provides strategic support to the principles of integrated water management

Hindmarsh Environmental Strategy²

The environmental strategy identifies “water” as the number one, key environmental theme. *“Water is a finite resource, we must find ways to use less, to recycle and reuse water, to use smaller shower heads and to plant native gardens that can deal with less water.”*

The environmental strategy identifies four “water goals”:

- Conserve water in Council operations through the implementation of sustainable water use practices.
- Increase the understanding and ownership by Councillors and Council staff of sustainable water use practices.

² Hindmarsh Shire (2010) Hindmarsh Environmental Strategy 2010-2013

- Increase the awareness and understanding of sustainable water use in all sectors of the community.
- Encourage and assist the uptake of sustainable water use by all sectors of the community.

The two highest priority water actions were:

- Need to reduce water consumption:
 - Education campaign on re-use, reduce and recycle.
 - Provide energy saving packs to home care clients.
- Integrated water plans for all towns:
 - Nhill Integrated Water Plan underway by June 2009 and complete by June 2010.
 - Work with GWM Water to initiate integrated water plans for Dimboola, Jeparit and Rainbow by December 2011.
 - Complete public consultation for the Nhill Integrated Water Plan by December 2009.
 - Develop a sustainable water program for Nhill including reuse and conservation by December 2010.

Council already has a strong policy commitment to the principles underpinning sustainable water use. The environmental strategy is a key driver for the preparation of this IWMP for the four main towns – Nhill, Dimboola, Rainbow and Jeparit. Council recognises that IWM is a shared responsibility between Council and GWMWater.

WMSA Sustainability White Paper³

The mission of the Wimmera Mallee Sustainability Alliance (WMSA) is to improve sustainability, reduce net emissions of greenhouse gases, minimise energy use, water use and waste. The white paper predicts climate change will lead to the following implications for water:

- Decreased rainfall and increased evaporation could result in less water availability.
- Efficiency of water use will become increasingly important.
- Recent (2011) flooding was caused by extreme weather events, which are likely to become more frequent. This may impact on the timing of rainfall, for example, rather than getting rainfall throughout the winter and spring, rain may fall in large summer events.

In the white paper, the alliance nominates “Water Allocation and Sustainable Use” as a high priority issue and commits to the following ongoing actions:

- Participate in policy and planning for water harvesting and consumption to ensure the sustainable and beneficial outcomes for the whole community (High priority).
- Work with relevant agencies and stakeholders to implement sustainable water practices, and to reduce water consumption by Councils, agencies, business, industry and the community (ongoing) (Medium priority)
- Propose amendments to planning schemes to improve sustainable water use by 2012 (Medium priority).

³ Wimmera Mallee Sustainability Alliance (2011) Sustainability White Paper

- Provide a letter of support for extensions to the Wimmera Mallee Pipeline resulting in sustainable water use by 2011 (Medium priority).

The actions identified in the WMSA white paper align well with the IWM objectives and reinforce the importance of Council as an active participant in water policy and planning along with a commitment for Council to use water wisely.

Hindmarsh Shire Recreation Strategy⁴

The recreation strategy provides a very comprehensive analysis of sporting needs in the shire. Recommendations related to water include:

- Water recycling programs - It is recommended that Council see as a high priority the investigation, development and implementation of comprehensive system that catches; stores; recycles and shandy's water for use at major township reserves.
- Development and re-establishment of Lakes - It is recommended that Council recognise the drought's impact on both its society and its economy through the removal of lake based recreation and where possible support for township committees should be provided for the redevelop specific water areas.
- Jeparit Recreation Reserve - It is recommended that in line with earlier recommendations, a "shandy system" drawn off stored tank water, using a large settling tank, should be investigated.

The strategy identifies many specific gaps in the recreation facilities and presents a wide range of ideas generated from township forums. Interestingly, however, lack of water is not identified as a standout problem when considered amongst other challenges facing recreation in the Shire.

The recommendations from the recreation strategy make an important distinction between using water to irrigation recreation areas, as opposed to using water bodies for water-based recreation. The latter is not addressed in this IWMP. The strategy provides some good examples of water recycling and local harvesting schemes that can be evaluated in this IWMP.

Stormwater Drainage Study – *in preparation*

A number of localised flood events have occurred in the Shire over the last 18months that have had significant impacts on residents and businesses. In seeking to prevent future flooding, it has become apparent that there are a number of inter-related stormwater drainage issues including:

- Localised flash flooding and long term inundation associated with under or non-performing stormwater drainage
- Scouring of open earth drains
- Poor maintenance of drains
- Confusion over ownership and responsibility for some drains.

Council has embarked on a comprehensive stormwater drainage study that will

- Scope and document the drainage issues in Nhill, Dimboola, Rainbow and Jeparit.

⁴ Garry Henshall & Associates (2005) Hindmarsh Shire Recreation Strategy

- Develop a prioritised drainage capital improvement program.
- Develop a drainage maintenance program.
- Review and update Council drainage policy that may include, but not limited to, consideration of planning scheme controls and ownership of and responsibility for drainage assets.

The findings of the drainage study will have implications for recommendations arising from this Integrated Water Management Plan.

Securing Water Access for Sporting Reserves within Hindmarsh Shire⁵

A comprehensive assessment of the water needs for the sports grounds in the main four towns was undertaken in 2010. It provides a good assessment of the current state of the irrigated grass playing surfaces, options for water supply and assessed options for improved management. The recommended strategy for each sporting reserve is shown in Table 4-3.

The options were ranked using evaluation criteria that placed high weight on operating costs (as these are borne by the sporting clubs) and lower weight on capital costs (since these can usually be covered by grants). Consequently, options for supply from the GWMWater system ranked low (due to the ongoing water charges) and stormwater options appear to be quite favourable. This approach will not necessarily select the option that has lowest overall lifecycle cost, nor is it recognised industry evaluation.

No hydrologic analysis is provided to demonstrate that the stormwater schemes can work, although it is noted that working schemes already exist in some centres, particularly the community-based scheme in Rainbow.

While the report provides excellent background information and description of options, further evaluation work would be needed before investments could be made. Before any schemes could be implemented, it will be necessary to prepare more detailed concept designs of stormwater collection facilities and analyse the hydrologic and hydraulic capacity to demonstrate that the yield can be obtained and ensure that all infrastructure and operating costs are included and realistically estimated, and that land tenure and ownership of assets and ongoing operations are made clear.

⁵ ALS Laboratory Group (2010) Securing Water Access for Sporting Reserves within Hindmarsh Shire

Table 4-3 Recommended strategies for sporting reserves (from Table 1, 5)

Club	ALS Recommended strategies (in ranked order)	Strategies implemented by Hindmarsh
Dimboola	Introduce drought tolerant turf	Kikuyu and couch
	Install sub-surface irrigation – subject to a site assessment	Pop-up spray irrigation is in place. Subsurface irrigation is not considered necessary.
	Continue to use groundwater and river diversion when water quality is acceptable (salt levels in the Wimmera River can vary greatly)	Priority supply for Dimboola recreation area and caravan park is: <ol style="list-style-type: none"> 1. River diversion is still used as first priority. 2. Groundwater is pumped from a bore on the west of the river near the rifle range to tanks then used to water football ground and caravan park 3. Urban supply is used as a back up supply.
	Install stormwater collection to dilute groundwater and river water or to replace these sources	Not implemented and not considered as viable as other sources.
Jeparit	Introduce drought tolerant turf	Good turf in place.
	Install a large rainwater tank and connect nearby roofs	Completed. 2 x 50 kL tanks installed, enough for two waterings of the oval
	Install sub-surface irrigation – subject to a site assessment	Automated pop-up spray irrigation is in place. Subsurface irrigation is not considered necessary.
	Continue with river diversion when water available and quality is acceptable (salt levels in the Wimmera River can vary greatly)	River diversion and rainwater tanks are the main supply. Emergency bore, located at Depta, can also be used as a backup.
	Develop a stormwater collection system	Not implemented and not considered as viable as other sources.
Nhill	Install a large rainwater tank and connect nearby industrial roofs	Not implemented and not considered as viable as other sources.
	Install sub-surface irrigation when current irrigation system is up for renewal – subject to a site assessment	Pop-up sprinklers installed in 2009. Subsurface irrigation is not considered necessary.
	Develop an urban stormwater collection system	Stormwater from the town is already reused at Nhill Lake, which is considered a priority for use of this water.
	Continue using urban water – sourced from bore (no capital costs)	Hindmarsh Shire has negotiated a dual supply system such that, once the reticulated supply is converted over to the Grampians System (2012/13), separate distribution systems will be installed to reticulate local groundwater for irrigating open spaces such as the football ground and school. The agreement between the Shire and GWMWater includes the ability to flush with urban water 4 times per year.

Club	ALS Recommended strategies (in ranked order)	Strategies implemented by Hindmarsh
Rainbow	Improve existing stormwater collection system – line various earthen channels	Channels have not been lined. High cost of lining channels means that it is unlikely that they will be in the future.
	Install sub-surface irrigation – subject to a site assessment	Not implemented and not considered viable.
	Develop the connections between all of the existing stormwater systems to allow for multiple storage options and increased reliability of water supply to Rainbow's sporting reserves	An alternative, more cost effective option to expanding the stormwater system would be to supply recreation areas and open space irrigation demands direct with raw water from the Wimmera Mallee Pipeline, rather than treated water through the urban system. GWMWater is considering the policy implications of this type of supply.
All grounds	Install water meters, record irrigation volumes, rainfall and storage levels regularly to quantify application rates	Generally speaking record keeping and information about the management of irrigation areas is poor. One reason for this is that the tenants (principally the football clubs) control the irrigation, so Council does not operate the irrigation systems. Clubs do pay for the excess water they use, so there is an incentive for them to irrigate efficiently, but there is little incentive or requirement to keep good records. Water is used not just to grow grass, but also to soften the soil for player safety.
	Consider independent turf management advice as part of a Council wide initiative for sports reserves	Not undertaken
	Consider producing an annual report for the Council on turf management, soil tests, ground issues and water application volumes for the year to help track each grounds progress.	Not undertaken

4.8 Conclusions

There are a number of stakeholders with specific roles and responsibilities for management of water. Hindmarsh Council has specific management roles including:

- Managing water consumption in delivering Council services including parks and gardens, recreation and sporting facilities and building management.
- Drainage management – management of urban stormwater and minor road drainage has implications for stormwater quality management
- Sustainability education – Council can influence and support improved water management be demonstrating best practice and conducting education programs with community committees responsible for management of sports and recreation facilities
- Planning and building – Council is responsible for administering and enforcing planning and building policy and regulation and thereby influence water consumption and stormwater management

- Local laws – Council has local laws that cover environmental and asset protection to reduce stormwater pollution

A review of water management on sporting and recreational facilities identified a number of opportunities for improving water use efficiency.

5 Water supplies

5.1 Introduction

Water supply in Hindmarsh falls into the following categories:

- Regional surface water.
- Groundwater.
- Alternative supplies.

This chapter discusses each of these supplies as they relate to integrated water management.

5.2 Regional surface water

The Grampians Water supply system is the only regional surface water source in Hindmarsh. The system, owned and operated by GMMWater, supplies most of the eastern part of the Shire (Figure 5-1). Nhill is currently not supplied from this source. The Grampians system comprises:

- Reservoirs such as Bellfield, Wartook and Rocklands that harvest runoff water from the main streams as they leave the Grampians Mountains.
- An extensive network of pipes to distribute the bulk raw water to farmers and townships.
- Treatment facilities and urban reticulation mains.

This system has seen great changes over the past decade, primarily due to:

- Construction of the Wimmera Mallee Pipeline comprising a network of large and small underground pipelines that replaced a leaky, earthen channel system with a closed pipe system.
- Introduction of a bulk water entitlement⁶ that explicitly shares the available water amongst the various consumptive users and the Environmental Water Holder.

The reliability of supply is much improved due to the reduced channel losses, and townships connected to this system can expect to only be restricted once every ten years on average, as is discussed later in this report.

This system supplies water to Dimboola, Jeparit and Rainbow. The township of Nhill is likely to be connected to this system within the next five years.

⁶ http://www.water.vic.gov.au/__data/assets/pdf_file/0005/54509/BE-Wimmera--and--Glenelg---Glenelg-Conversion-Order-2004--consolidated-version.pdf

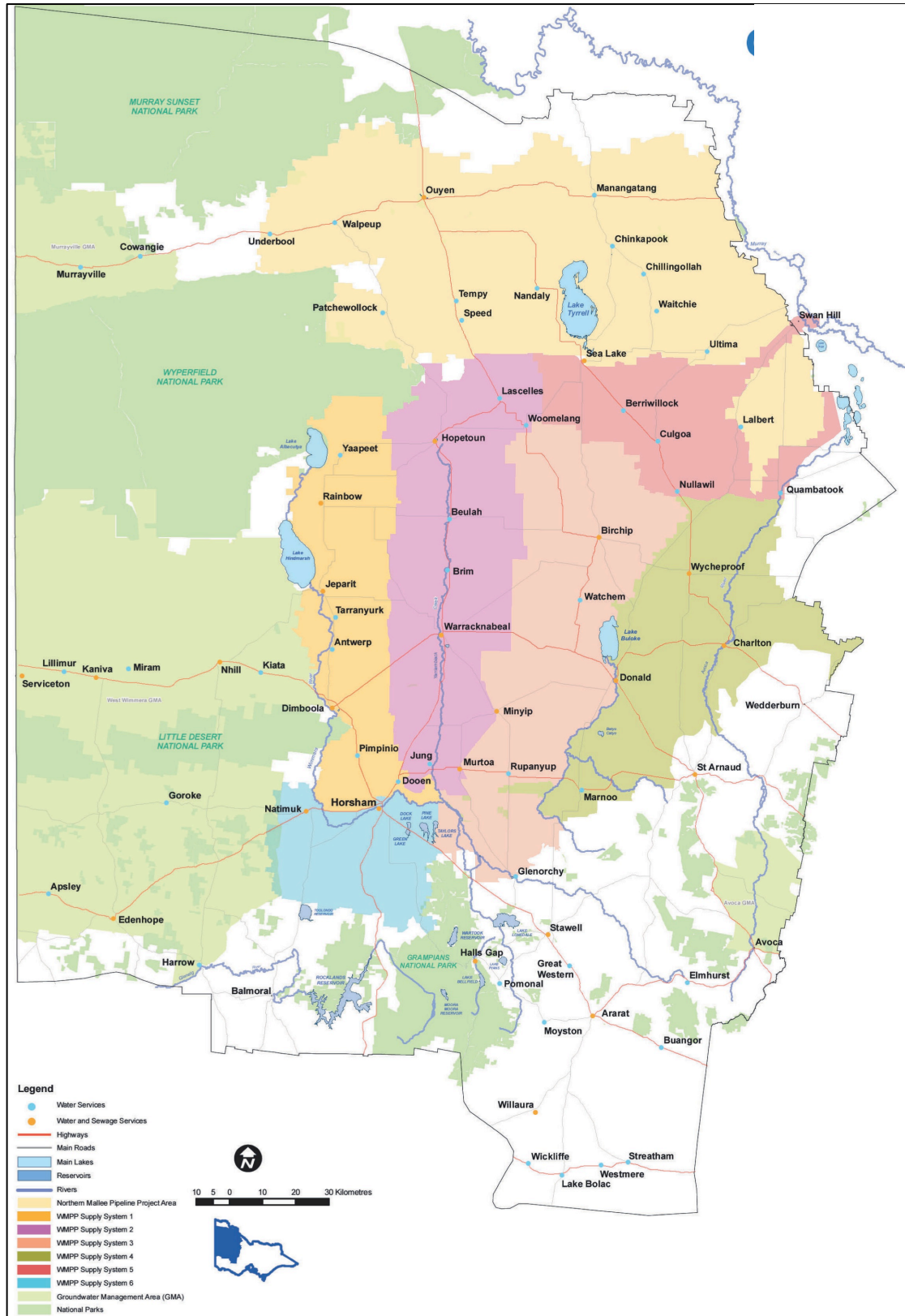


Figure 5-1 Grampians Wimmera Mallee Water regional surface water and groundwater supply⁷

⁷ <http://www.gmwwater.org.au> accessed 6.2.2012

5.3 Groundwater

The western part of Hindmarsh overlies very good groundwater reserves, however the dissolved minerals contained in the water can make it unsuitable for some sensitive uses.

Nhill has relied upon groundwater for its urban supply for many years but in order to supply water that meets drinking water guidelines for hardness, GMMWater intends to connect the Nhill urban supply to the surface water via a pipeline for treated (or untreated) water from Dimboola.

Untreated groundwater will remain an option for less sensitive uses in Nhill, such as industry and irrigation of open spaces. If coupled with treatment to remove salt (desalination), then groundwater is a reliable water supply option for the western part of the shire.

Groundwater in Hindmarsh currently falls in to four separate groundwater management areas. The Wester Region SWS⁹ notes that the management of these and six other groundwater management areas will in future be managed under one West Wimmera Groundwater Management Strategy. Under this Strategy, groundwater in Nhill will be located within the Northern groundwater management zone.

It will be important that Hindmarsh Shire engages in the development of the West Wimmera Groundwater Management Strategy as groundwater is likely to be an important alternative water source in times of low surface water supply.

5.4 Alternative water supplies

The main groundwater and regional surface water supply systems in Hindmarsh have met most of the water needs of the shire in the past. Various alternative water supplies also exist and, where they are fit for purpose and cost effective, could potentially supplement these main supplies. Some alternative supplies are more secure and reliable than the Grampians system (such as non-rainfall dependant options like recycled water and grey water), but others (such as stormwater harvesting) are useful supplements during normal climate seasons but may not yield well during very dry times when water from the Grampians could also be limited.

Alternative supplies to be considered in this integrated water management plan include:

- Stormwater harvesting
- Recycled wastewater reuse
- Rainwater tanks
- Neighbourhood grey water systems and sewer mining
- Onsite grey water systems
- Demand management
- Education and awareness

5.5 Conclusions

There are a number of sources of water available for use by Council. In considering future water supply for Council, particularly new, alternative supplies, the capital cost as well ongoing management costs and security of water supply will be important.

6 Hindmarsh Shire Water Use and Management

6.1 Introduction

Hindmarsh takes delivery of approximately 64 ML/year of potable water from urban water supply systems operated by GWMWater. A breakdown of the main sites and their average and historical use are shown in Appendix 1.

This chapter analyses this water use to provide a picture of what Council uses its water for, where and how much that water costs.

6.2 Use by sector and town

Table 6-1 summarises the annual water use broken down according to use for each town. This indicates that:

- Almost 60% of the water is used for irrigation of parks, gardens and sports grounds.
- Irrigation and swimming pools together account for over 80% of Council's water use.
- Of the total water use, 56% is used in Nhill.
- Of the total water use, 40% is used for irrigation in Nhill.

To put this water use by Council in perspective Table 6-2 shows the total water use in the four main towns for 2010/2011. This illustrates that Hindmarsh Shire's demand represents about 10% of the total demand in each of these towns.

Table 6-1 Average annual water use (ML) by Hindmarsh by town and major use

	Commercial	Irrigation	Other	Public buildings	Swimming pools	Public toilets	Total
Nhill	3.1	25.1		1.3	3.3	2.7	35.4
Dimboola		7.9		0.6	5.8	0.5	14.8
Rainbow		0.5			5.1		5.6
Jeparit	0.5	3.0			0.7	0.3	4.6
Other			2.9				2.9
Total	3.6	36.6	2.9	1.8	14.9	3.5	63.3

Table 6-2 Total water consumption (ML) for 2010/2011⁸ in each town

Town	Industrial and concessional	Non-residential and Municipal	Residential	Total
Dimboola	3	30	104	137
Jeparit	1	11	28	40
Nhill	6	181	204	391
Rainbow	17	14	41	72
Total	27	236	377	640

⁸ GWMWater Annual Report 2010/2011

6.3 Water costs

Water tariffs vary according to the level of treatment. Dimboola and Rainbow have fully treated drinking water and the current charge is \$1.45/kL. Jeparit and Nhill are currently classed as untreated supplies and the tariff for Nhill is \$0.81/kL (groundwater source) and \$1.32/kL for Jeparit (channel/pipeline supplied).

Table 6-3 shows that Hindmarsh pays approximately \$70,000 per year in volumetric water charges. The table highlights the impact of cheaper water in Nhill with 56% of water usage accounting for 42% of the total water costs.

Once Nhill is connected to the Wimmera system, the unit price of water and total water costs could be expected to rise. This will impact on total water costs to council e.g. if the unit price increased from \$810 to \$1,450 per ML (the price of water in Dimboola) there would be a net increase in Council water costs of around \$23,000 per year.

Water supplied from the Grampians system is similar in price or cheaper than other towns in Victoria, but can be expensive when irrigating large areas. For example, the annual irrigation demand for sports grounds is between 8 and 10 ML/ha, and the Dimboola Reserve is almost 2 ha, so peak year cost is up to \$20k.

Table 6-3 Hindmarsh Shire's average annual volumetric water charges (\$/y) by town

	Total water use (ML/year)	Unit cost of water (\$/ML)	Total water cost (\$/year)
Nhill	35.4	\$810	\$28,694
Dimboola	14.8	\$1,450	\$21,403
Rainbow	5.6	\$1,450	\$8,131
Jeparit	4.6	\$1,320	\$6,037
Other	2.9	\$1,450	\$4,203
Total	63.3		\$68,468

6.4 Future water availability

In the preparation of the Western Sustainable Regional Water Strategy, an analysis was undertaken of the impact of future climate scenarios on water availability compared to the long term average. The impact on the Wimmera-Avon system from which Hindmarsh is supplied is summarised in Table 6-4. This indicates that under the highest climate change impact scenario streamflow will be reduced to 52% of the long term average, compared to the 77% reduction in streamflow experienced in the 1997 to 2009 drought. GWMWater is currently developing water supply and demand strategies and local management strategies based on these future climate scenarios that will provide more detailed understanding of future supply and demand for both surface and groundwater in Hindmarsh.

It will be important that Hindmarsh engage closely in the development of these strategies to ensure that that future water supply risks are understood and that opportunities to augment water supply for Council use are considered.

Table 6-4 Predicted streamflow impacts for the Wimmera-Avon river basin relative to the historic long term average⁹

		Predicted streamflow impacts relative to the historic long term average
Scenario A	Potential low climate change impact scenario	-12%
Scenario B	Potential medium climate change impact scenario	-32%
Scenario C	Potential high climate change impact scenario	-52%

6.5 Current water saving initiatives

Table 6-5 provides a summary of Council assets currently using alternative water supplies to offset potable water use as well as other water saving initiatives relevant to Council water use.

Table 6-5 Summary of Council assets currently using alternative water supplies and other water saving initiatives

Supply	Council assets currently using alternative supplies
Stormwater harvesting	Community stormwater harvesting in Rainbow
Recycled wastewater reuse	None – fully committed to other assets
Rainwater tanks	Installed at a number of sporting reserves
Neighbourhood grey water systems and sewer mining	None
Onsite grey water systems	None
Demand management	None

6.6 Risks for Council assets

The risk assessment undertaken as part of the wider Strengthening Basin Communities project identified a number of risks relevant to this IWMP. In particular, the risk assessment found that climate change and reduced water availability poses a risk to the continuity of water supply to sport and recreational facilities, parks and gardens in Hindmarsh.

Climate change and reduced water availability poses a number of risks to continuity of water supply, predominately in relation to parks, gardens and recreation reserves. The climate variables, impacts and implications are outlined in Figure 6-1 below.

⁹ Department of Sustainability and Environment (2011) Western Region Sustainable Water Strategy

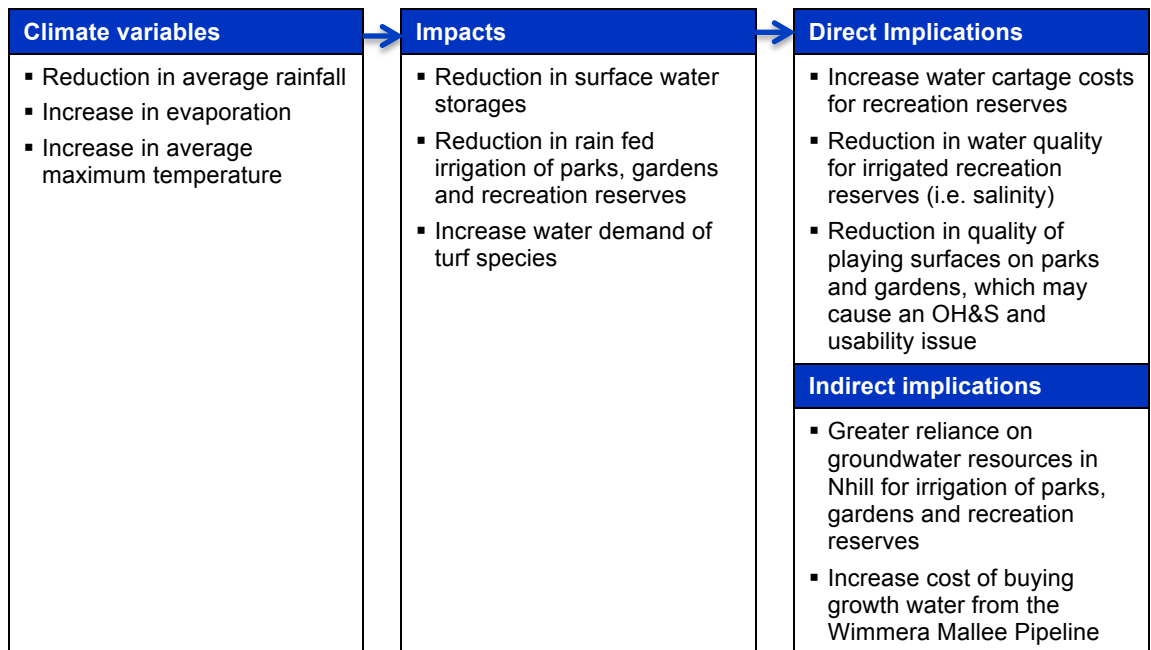


Figure 6-1: Climate variables, impacts and implications

Council implemented a number of initiatives to improve water use efficiency in response to reduced water availability during the drought. The following changes to recreation, parks and garden management have been implemented by Council:

- The watering regimes for some recreation, parks and gardens have been changed to night time scheduling when it is cooler.
- Carting water to priority sports grounds and garden on a needs basis.
- Use of recycled water for irrigation of amenity horticulture from the Grampians Wimmera Mallee Water wastewater treatment plant in some areas.
- Drought tolerant grass species have been planted at some ovals and parks e.g. Kikuyu in Nhill.
- Installation of synthetic playing services on hockey fields and tennis courts.
- Planning and construction of the Wimmera Mallee Pipeline to secure water supplies for the region.

6.7 Conclusions and recommendations

Hindmarsh is located in an arid area, but the water supplied by GWMWater relatively cheaply meets Council's needs. While the volume tariff in Hindmarsh is low compared to other areas in Victoria, it is likely that the price of water will increase over time. Future climate scenarios indicate that water availability will reduce in the longer term. This poses significant risks for sporting and recreational facilities as well as town amenity.

This IWMP will focus on reducing potable water use by Council to reduce ongoing water costs and to adapt to a future with less water.

7 Evaluation of sustainable water use options

7.1 Introduction

This section provides a qualitative description of the various water savings options for Hindmarsh Shire and evaluates the strength and weaknesses of each in a qualitative way. Implicit in the analysis is a quantitative evaluation of the cost of each supply (c/kL) and the relative reliability of the source.

7.2 GWMWater Surface supply

The Grampians supply is one of the most secure in Victoria. The historic yields from the catchment are usually very reliable, but as seen in recent times it is vulnerable during a sequence of very dry years. Piping the system has reduced distribution losses but much of the saved water has transferred to environmental and so does not drastically improve reliability to towns and farms.

Some additional water has been made available for consumptive use and is being sold by auction. The additional “Growth” water has the same reliability. GWMWater has no plans to allow urban customers, including Council, to trade, carry over or receive special allocations. Water for Council use will be restricted in line with GWMWater policy during times of reduced water availability.

Water supplied from the Grampians system is similar in price or cheaper than other towns in Victoria, but can be expensive when irrigating large areas – eg. the annual irrigation demand is between 8 and 10 ML/ha, and the Dimboola Reserve is almost 2 ha, so peak year cost is up to \$20k.

The urban system supplies water under pressure and does not need any additional infrastructure such as storage, pumping or treatment.

Even in the worst drought, GWMWater aims to supply 50% of demand, but the means of doing this is typically by restricting outdoor irrigation, which represents Council’s main water uses.

Implications

- For outdoors and irrigation use, town water can be expensive
- There is no guarantee of supply during extended dry times and Council green spaces are important

Directions for this IWMP

- Investigate options to reduce potable water use in swimming pools and irrigation of Council assets
- Investigate options to maintain services during periods of low water availability
- Investigate the opportunity for Council to gain credits by using groundwater and implementing water saving measures in exchange for exemption from some restrictions during very dry times.

7.3 Groundwater

Nhill has access to a very reliable groundwater supply, but the salinity is moderate to high. Utilisation of groundwater for open space irrigation in Nhill has multiple benefits – it saves Council paying GMMWater charges, it reduces demand on the Grampians water system.

Groundwater is less viable at Dimboola and not viable at Rainbow or Jeparit.

Implications

- Continued use of groundwater on parks and gardens to reduce use of piped supply by Council

7.3.1 Recycled water

The recycled water in the four towns is already fully committed to other uses. Recycled water use is therefore not an option.

7.4 Stormwater collection

A community run stormwater collection schemes is in place in Rainbow and has been quite successful. However, because stormwater collection relies on rainfall and storage they tend to fail at the same time as the potable town supply due to low rainfall and high evaporation. They therefore have limited capacity to improve supply security. Storage dams and tanks, pumping and operations costs are also very high.

The Rainbow scheme relies on “free” community time and private infrastructure (dams) which makes it attractive compared to a scheme that included all true costs.

Stormwater collection in wetlands has been used elsewhere to reduce pollution to rivers and lakes and to slow stormwater flow and reduce the pressure on drainage systems. This may be an effective tool for managing flooding from drainage and will therefore be considered as part of the Hindmarsh Drainage Study (currently underway).

If using stormwater during normal years could be used to gain a credit or exemption from restrictions during dry times, then this may increase the attractiveness of this option.

Implications

- Collecting and using stormwater to satisfy irrigation demands during normal seasons might be viable if GMMWater would give credits for the savings in the form of exemptions during dry times.

7.5 Roof collection

GMMWater suggest that roof water should be used for non-potable purposes such as toilet flushing, washdown of yards and vehicle washing. Council has installed tanks to make use of collected roof water to reduce demand on the Grampians system at a number of sports grounds. Due to the high water demand for sports grounds, there is generally only enough stored water for one or two waterings. The tanks can also be used to store water carted from other sources and therefore can be useful during periods of water restriction.

Roof collection can also be used to offset potable water use in toilets. However, this amounts to a very small proportion of Council's total water use. Roof collection should therefore be targeted to Council facilities that have the potential to collect rainwater to meet on-site requirements or in excess of their own requirements.

Implications

- Existing roof water systems should be retained.

7.5.1 Education and awareness

GWMWater is responsible for and has plans to undertake considerable education and awareness programs to encourage efficient water use. Council should therefore focus its education and awareness on:

- Council water use and management
- Community groups running facilities on behalf of Council

This will demonstrate Council's commitment to improved water management and also reduced Council and community water costs

Directions for this IWMP

- Education and awareness targeted at Council water use

7.5.2 Improved management e.g. changing irrigation systems, turf

Whatever source of supply is being used, irrigating efficiently makes financial sense. The ALS sporting reserves study highlights some initiatives worthy of follow through. Where they can be justified through reduced water bills or operating costs, improved turf and irrigation systems should be employed.

7.6 Conclusions

The evaluation of sustainable water use options for Hindmarsh Shire water use found the following:

- Surface water security is higher than in the past. Therefore for Council assets not subject to water restrictions e.g. municipal swimming pools, alternative water sources will generally not be required.
- Due to the high costs of potable water, it should be offset where possible with groundwater.
- Stormwater collection is generally not compatible with offsetting potable water use
- Rainwater collection will generally not be suited to offsetting potable water use of Council assets due to the large quantities of water required to be stored

8 Actions to reduce potable water use

8.1 Audit of Council water using assets

An audit of each Council water-using asset was undertaken to:

- Review historic water use trends
- Document the source of water for each asset and current management practices

The output of the audit is documented in Table 9-2. Representatives from Council and GMMWater reviewed the audit. The review discussed and identified opportunities for improved water management and options for use of alternative water sources. The outputs of the review are documented in Table 9-3 and summarised in 8.3.

8.2 Priority areas

The risk assessment undertaken as part of the wider Hindmarsh Climate Change Adaptation project, identified the following priority risks with regard to Council water use:

- Continuity of service provision including providing sports grounds and recreation facilities and maintaining town amenity during periods of water shortages.

This IWMP has also noted the:

- Potential for Council water costs to rise in the future
- The importance of Council to demonstrate best practice with regard to water management

8.3 Council wide initiatives

A number of initiatives have been identified for reducing Council water use and improving water management practices:

8.3.1 Monitoring

A regular audit of Council water use is required to enable monitoring of water use, identification of leakages, over-usage and opportunities for improvement.

Action	Description	Timeframe
Monitoring -1	Map irrigation systems and include it on Council's asset management system.	3 years
Monitoring -2	Ensure there are sufficient water meters (and sub-meters) in place to account for water use at various sites.	1 year
Monitoring -3	Keeping records of monthly water use at various sites. Ask tenants to keep records and submit an annual report.	Ongoing
Monitoring -4	Install water meters on all bores	1 year
Monitoring -5	Review of all water use data annually in conjunction with GMMW accounts. Correlate water usage with meter reads to detect leaks and over-usage.	Ongoing

8.3.2 Turf, lawn and garden management

Turf, lawns and gardens are substantial users of water. There are a number of opportunities to reduce water use by changing or modifying current management practices

Action	Description	Timeframe
Management -1	Convert irrigation systems from manual to automatic and where possible introduce night watering	2 years
Management -2	Conduct irrigation audits for main sites to confirm that sprinklers are operating efficiently,	Ongoing
Management -3	Consider subsurface irrigation and alternative species for areas that currently have high water use but are located where there is low impact on amenity	Ongoing
Management 4	In conjunction with sporting groups and committees of management, document watering regimes to be followed during water restrictions including consideration of: <ul style="list-style-type: none"> ▪ Reducing the area of certain reserves being irrigated ▪ Ceasing irrigation entirely on some reserves 	Ongoing
Management -5	Use deep mulches on garden beds and revegetated areas to reduce evaporation	Ongoing

8.3.3 Swimming pools

Council has already undertaken works on some pools to reduce water use. The Rainbow pool is known to have leaks and was a substantial user of water in 2011

Action	Description	Timeframe
Pools-1	Assess the cost of repairing leaks in Rainbow pool	1 year
Pools-2	Conduct drawdown tests in winter as a means of estimating pool leakage.	Ongoing

8.3.4 Council buildings

Water use in Council buildings is relatively modest. There are opportunities to improve water use efficiency, mainly with end-or-life replacements of appliances and fittings.

Action	Description	Timeframe
Buildings-1	End of life replacement with water efficient appliances and facilities in Council buildings <ul style="list-style-type: none"> ▪ Use of dual flush toilets ▪ Water efficient urinals ▪ Water saving shower heads at pool and sports ground change rooms ▪ Water efficient kitchen appliances ▪ Flow restrictors and aerators on replacement taps 	Ongoing

8.3.5 Education and awareness

A number of committees of management and community groups manage sporting and recreation facilities on behalf of Council. There are opportunities to work with these groups to improve management practices and improve water use efficiency.

Action	Description	Timeframe
Education-1	Work with community groups and committees of management to review irrigation management of sports grounds and reserves to identify opportunities for improvement and reducing water costs.	2 years

9 Strategy Implementation and Renewal

9.1 Timelines and responsibilities

Table 9-1 outlines the climate change adaptation actions, responsibility within Council for implementation and implementation timeframes

Table 9-1 Climate change adaptation actions, responsibility and timeframe for implementation

Action	Description	Work undertaken internally / externally	Implementation timeframe	Project ready	Budget impact	Funding source (internal / external)	Implementation steps
Monitoring							
Monitoring -1	Map irrigation systems and include it on Council's asset management system.	Internal	3 years	Further work	Additional budget required	Internal	Nhill will commence in 2013. Utilise engineering students and maintenance staff.
Monitoring -2	Ensure there are sufficient water meters (and sub-meters) in place to account for water use at various sites.	Internal	3 years	Further work	Additional budget required	Internal	Following the mapping of irrigation systems identify where additional meters are required, prepare costings and include in works program.
Monitoring -3	Keeping records of monthly water use at various sites. Ask tenants to keep records and submit an annual report.	Internal	Ongoing	Underway	Additional budget required	Internal	GWMW reading meters, need to read sub-meters avoids metering fee
Monitoring -4	Install water meters on all Council bores used for roadside watering	Internal	2 years	Underway	Additional budget required	Internal	Keeping bores after main switch in Nhill as back-up to be metered, as well as road side

Action	Description	Work undertaken internally / externally	Implementation timeframe	Project ready	Budget impact	Funding source (internal / external)	Implementation steps
							watering bores (up to 6). Cost of \$5,000-\$10,000 per bore
Monitoring -5	Review of all water use data annually in conjunction with GMMW accounts. Correlate water usage with meter reads to detect leaks and over-usage.	Internal	Ongoing	Commenced	Neutral	Internal	Currently look at accounts for anomalies outside seasonal variations. Integrate with existing review mechanisms.
Management							
Management -1	Prioritise and cost irrigation system conversion by site to apply for and obtain further funding	Internal	Underway	Yes	Additional funding required	External;	
	Convert irrigation systems from manual to automatic and where possible introduce night watering						
Management -2	Conduct irrigation audits for main sites to confirm that sprinklers are operating efficiently,	Internal	Ongoing	Yes	Neutral	Internal	Part of ongoing process
Management -3	Following irrigation audits, and prioritisation and costing of irrigation system conversion, consider subsurface irrigation and alternative species for areas that currently have high water use but low impact on amenity	Internal	Ongoing	Further work	Additional funding required	External	Part of annual works program
Management 4	In conjunction with sporting groups and committees of	Internal	Ongoing	Yes	Neutral	Internal	Apply to GMMW for exemptions and

Action	Description	Work undertaken internally / externally	Implementation timeframe	Project ready	Budget impact	Funding source (internal / external)	Implementation steps
	management, document watering regimes to be followed during water restrictions including consideration of: <ul style="list-style-type: none"> ▪ Reducing the area of certain reserves being irrigated Ceasing irrigation entirely on some reserves						allocations during water restrictions
Management -5	Use deep mulches on garden beds and revegetated areas to reduce evaporation	Internal	Ongoing	Yes	Neutral	Internal	Currently being undertaken. Incorporate into annual works program.
Pools							
Pools-1	Assess the cost of repairing leaks in Rainbow pool	Internal	1 year	Further work required	Additional funding required	Internal	Assess cost and review prioritisation of asset provision based on service level and water availability.
Pools-2	Conduct drawdown tests in winter as a means of estimating pool leakage.	Internal	Ongoing	Yes	Budget neutral	Internal	Incorporate into annual works program.
Buildings							
Buildings-1	End of life replacement with water efficient appliances and facilities in Council buildings <ul style="list-style-type: none"> ▪ Use of dual flush toilets ▪ Water efficient urinals ▪ Water saving shower heads at pool and sports 	Internal	Ongoing	No	Budget neutral	Internal	Confirm what has already been completed through an audit.

Action	Description	Work undertaken internally / externally	Implementation timeframe	Project ready	Budget impact	Funding source (internal / external)	Implementation steps
	<p>ground change rooms</p> <ul style="list-style-type: none"> ▪ Water efficient kitchen appliances <p>Flow restrictors and aerators on replacement taps</p>						
Education							
Education -1	<p>Work with community groups and committees of management to review irrigation management of sports grounds and reserves to identify opportunities for improvement and reducing water costs.</p>	Internal	2 years	Yes	Neutral	Internal	<p>Undertake a review of reserves and associated user agreements through annual works program to assist decision-making.</p> <p>Rainbow and Nhill currently being reviewed.</p> <p>Conflict between species selection and sporting groups that needs to be managed.</p>

Table 9-2 Current management

Town	Asset	Meter no.	Annual water use 2011 (ML/year)	Description	Impact of water restrictions	Primary water source	Secondary water source	Current water management measures in place
Nhill	Davis Park	143826	11	Sports oval used for football, cricket and increasingly hockey, soccer and other sports	None if using groundwater	Groundwater+ 4 flushes annually from urban supply	Urban supply	Automatic pop-up irrigation system
Dimboola	Swimming pool	128491	5.8	50 m pool Pool top up and lawns	Approval required from GWMWater to top up at Stage 4 Lawn areas not watered at Stage 3 and Stage 4	Urban supply	None	Major leak repaired in 2010
Dimboola	Recreation reserve	128497	5.6	Bowling green, tennis courts, caravan park, rowing club	None if able to utilise river and groundwater	River diversion	Groundwater	Summer grasses, some kikuyu Watering with impact sprinklers. Synthetic bowling green. Unclear how much water is used because not separately metered.
	Football oval	128496	1.5	Football oval	None if able to utilise river and groundwater	River diversion	Groundwater	Automatic pop-up sprinklers
Rainbow	Swimming pool	146330	5.1	25m pool Known to have leaks	Approval required from GWMWater to top up at Stage 4 Lawn areas not watered at Stage 3	Urban supply	None	
Nhill	Jaypex Park	144706	3.7	Playground Watering lawns	Hand watering Stage 1 and Stage 2 No watering Stage 3 and Stage 4	Urban supply	None	Watering with impact sprinklers, automated night-time watering.
Nhill	Swimming pool	144792	3.3	25m pool	Approval required from GWMWater to top up at Stage 4 Lawn areas not watered at Stage 3 and Stage 4	Urban supply	None	Leaks repaired 2011
Nhill	Saleyards and pound	144466	2.7	Wash down of dog pound	None	Urban supply	None	Unexplained high use
Jeparit	Recreation reserve	140779	2.1	Lawns	Hand watering Stage 1 and Stage 2 No watering Stage 3 and Stage 4	Urban supply	None	
Nhill	Centenary Drive	144701	2	Median strip	Hand watering Stage 1 and Stage 2 No watering Stage 3 and Stage 4	Urban supply	None	
Nhill	90 Victoria St		1.9	Median Strip	Hand watering Stage 1 and Stage 2 No watering Stage 3 and Stage 4	Urban supply	None	
Nhill	Infant Welfare Centre	143770	0.6	Toilets	None	Urban supply	None	
Nhill	Goldsworthy Park	144703	1.7	Lawns	Hand watering Stage 1 and Stage 2 No watering Stage 3 and Stage 4	Urban supply	None	
Nhill	Goldsworthy Park Public Toilets	144704	1.5	Toilet flushing	None	Urban supply	None	Refurbished in 2002 with a significant drop in water use
Nhill	Parks and gardens	144705	1.3	Lawns	Hand watering Stage 1 and Stage 2 No watering Stage 3 and Stage 4	Urban supply	None	
Nhill	Nelson St carpark	144309	0.9	Median strip	Hand watering Stage 1 and Stage 2 No watering Stage 3 and Stage 4	Urban supply	None	
Nhill	Jaypex parks public toilets	144707	0.9	Toilet flushing	None	Urban supply	None	
Dimboola	Bicentennial park	128689	0.8	Lawns	Hand watering Stage 1 and Stage 2 No watering Stage 3 and Stage 4	Urban supply	None	
Jeparit	Swimming pool	140787	0.7	20m x 8m	Approval required from GWMWater to top up at Stage 4 Lawn areas not watered at Stage 3 and Stage 4	Urban supply	None	
Dimboola	Old Shire Hall	128565	0.6	Toilets	None	Urban supply	None	

Town	Asset	Meter no.	Annual water use 2011 (ML/year)	Description	Impact of water restrictions	Primary water source	Secondary water source	Current water management measures in place
Rainbow	Caravan Park	146307	0.5	Toilets, showers, grounds	None	Urban supply	None	
Dimboola	Public toilets near AMP	128484	0.5	Toilets	None	Urban supply	None	
Nhill	Hospital car park	144308	0.5	Median strip lawn	Hand watering Stage 1 and Stage 2 No watering Stage 3 and Stage 4	Urban supply	None	
Nhill	Saleyards and truckwash	144286	0.4	Wash down of trucks		Urban supply	None	
Nhill	Victoria St carpark	144770	0.3	Public toilets	None	Urban supply	None	
Jeparit	Recreation reserve	140778	0.3	Public toilets	None	Urban supply	None	
Jeparit	Broadway	140528	0.3	Median strip	Hand watering Stage 1 and Stage 2 No watering Stage 3 and Stage 4	Urban supply	None	
Jeparit	Cement works	128527	0.3	Council depot	Hand watering Stage 1 and Stage 2 No watering Stage 3 and Stage 4	Urban supply	None	
Nhill	Nhill Lake	143720	0.3	Public toilets	None	Urban supply	None	
Jeparit	Caravan Park	140801	0.2	Toilets, showers, grounds	None	Urban supply	None	
Nhill	Shire Office	144370	0.2	Toilets, showers,	None	Urban supply	None	

Table 9-3 Recommended management

Town	Asset	Water sources			Rationale	Management recommendations
		Primary	Secondary	Tertiary		
Nhill	Davis Park	Groundwater (with urban water flushing)	Urban	Not required	Groundwater is the cheapest and most reliable option. If groundwater is not viable in the longer term, urban water supplied from the Wimmera Mallee pipeline is considered the most reliable and cost effective back up.	Monthly recording of water use Install timers on sprinklers Night watering Annual irrigation audit
Dimboola	Swimming pool	Urban supply	Not required	Not required	Municipal pools not subject to water restrictions and cost effective alternative water sources not available Current urban water supply from the Wimmera Mallee pipeline is considered very reliable.	Monitor seasonal water use to pick up leakages Timers on sprinklers Use dual flush toilets and water efficient urinals and showers in all end-of-life replacements
Dimboola	Recreation reserve	Diversion from Wimmera River	Groundwater / urban	Urban	Diversion from the Wimmera River is the cheapest and less saline than groundwater. Groundwater shandied as required with urban water could be used during water restrictions to maintain critical areas If groundwater is not viable in the longer term, water supplied from the Wimmera Mallee pipeline is considered the most reliable and cost effective back up.	Install separate meters for bowling club, tennis club, caravan park and rowing club Monthly recording of water use Provide water use information to clubs to adjust water management Convert to more drought tolerant grass species Install timers on sprinklers Annual irrigation audits Use dual flush toilets and water efficient urinals and showers in all end-of-life replacements
Rainbow	Swimming pool	Urban supply	Not required	Not required	Municipal pools not subject to water restrictions and cost effective alternative water sources are not available Current urban water supply from the Wimmera Mallee pipeline is also considered very reliable.	Conduct drawdown test to establish leakage rates Determine cost of leakage repair Consult with community on options for future pool use Timers on sprinklers Use dual flush toilets and water efficient urinals and showers in all end-of-life replacements
Nhill	Jaypex Park	Groundwater	Urban	Not required	Groundwater is the cheapest and most reliable option. If groundwater is not viable in the longer term, urban water supplied from the Wimmera Mallee pipeline is considered the most reliable and cost effective back up.	Install automatic watering system preferably sub-surface drip irrigation Drought tolerant grasses or shrubs Night time watering Annual irrigation audits
Nhill	Swimming pool	Urban supply	Not required	Not required	Municipal pools not subject to water restrictions and cost effective alternative water sources not available Current urban water supply from the Wimmera Mallee pipeline is considered very reliable.	Monitor seasonal water use Timers on sprinklers
Nhill	Saleyards and pound	Urban supply	Not required	Not required		Undertake assessment of irrigation system to establish source high use
Jeparit	Recreation reserve	Urban supply			Only reliable option as groundwater too saline and river flows too unreliable	Install automatic watering system preferably sub-surface drip irrigation Night time watering Annual irrigation audits
Nhill	Centenary Drive	Groundwater	Not required	Not required	Groundwater is the cheapest and most reliable option. If groundwater is not viable in the longer term, water supplied from the Wimmera Mallee pipeline is considered the most reliable and cost effective back up.	Install automatic watering system preferably sub-surface drip irrigation Night time watering Annual irrigation audits
Nhill	90 Victoria St	Groundwater	Not required	Not required	Groundwater is the cheapest and most reliable option. If groundwater is not viable in the longer term, water supplied from the Wimmera Mallee pipeline is considered the most reliable and cost effective back up.	Install automatic watering system preferably sub-surface drip irrigation Night time watering Annual irrigation audits
Nhill	Goldsworthy	Groundwater	Urban	Not required	Groundwater is the cheapest and most reliable option.	Install automatic watering system preferably sub-surface drip irrigation

Town	Asset	Water sources			Rationale	Management recommendations
		Primary	Secondary	Tertiary		
	Park				If groundwater is not viable in the longer term, urban water supplied from the Wimmera Mallee pipeline is considered the most reliable and cost effective back up.	Night time watering Annual irrigation audits Drought tolerant grasses and shrubs
Nhill	Goldsworthy Park Public Toilets	Urban supply	Not required	Not required		Use dual flush toilets and water efficient urinals and showers in all end-of-life replacements
Nhill	Parks and gardens	Groundwater	Not required	Not required	Groundwater is the cheapest and most reliable option. If groundwater is not viable in the longer term, water supplied from the Wimmera Mallee pipeline is considered the most reliable and cost effective back up.	Install automatic watering system preferably sub-surface drip irrigation Night time watering Annual irrigation audits
Nhill	Nelson St carpark	Groundwater	Not required	Not required	Groundwater is the cheapest and most reliable option. If groundwater is not viable in the longer term, water supplied from the Wimmera Mallee pipeline is considered the most reliable and cost effective back up.	Install automatic watering system preferably sub-surface drip irrigation Night time watering Annual irrigation audits
Nhill	Jaypex parks public toilets	Urban	Not required	Not required	Groundwater is the cheapest and most reliable option. If groundwater is not viable in the longer term, water supplied from the Wimmera Mallee pipeline is considered the most reliable and cost effective back up.	Use dual flush toilets and water efficient urinals and showers in all end-of-life replacements
Dimboola	Bicentennial park	Diversion from Wimmera River	Groundwater / urban	Urban	Diversion from the Wimmera River is the cheapest and less saline than groundwater. Groundwater shandied as required with urban water could be used during water restrictions to maintain critical areas If groundwater is not viable in the longer term, water supplied from the Wimmera Mallee pipeline is considered the most reliable and cost effective back up.	Install separate meters for bowling club, tennis club, caravan park and rowing club Monthly recording of water use Provide water use information to clubs to adjust water management Convert to more drought tolerant grass species Install timers on sprinklers Annual irrigation audits
Jeparit	Swimming pool	Urban	Not required	Not required	Water use is low Cost of alternatives not justified	Annual monitoring as a check for leakages or significant changes to use
Dimboola	Old Shire Hall	Urban	Not required	Not required		Use dual flush toilets and water efficient urinals and showers in all end-of-life replacements
Rainbow	Caravan Park	Urban	Not required	Not required		
Dimboola	Public toilets near AMP	Urban	Not required	Not required		
Nhill	Hospital car park	Groundwater	Not required	Not required	Convert to groundwater	Install automatic watering system preferably sub-surface drip irrigation Night time watering Annual irrigation audits Drought tolerant grasses and shrubs
Nhill	Saleyards and truckwash	Groundwater	Not required	Not required		
Nhill	Victoria St carpark	Urban	Not required	Not required	Water use is low Cost of alternatives not justified	Use dual flush toilets and water efficient urinals in all end-of-life replacements
Jeparit	Recreation reserve	Urban	Not required	Not required		
Jeparit	Broadway	Urban	Not required	Not required		Drought tolerant grasses and shrubs
Jeparit	Cement works	Urban	Not required	Not required	Explore option for installing tank to offset potable use	
Nhill	Nhill Lake	Urban	Not required	Not required		Use dual flush toilets and water efficient urinals in all end-of-life replacements
Jeparit	Caravan Park	Urban	Not required	Not required		
Nhill	Shire Office	Urban	Not required	Not required	Explore option for installing tank to offset potable use	Use water efficient appliances, dual flush toilets and water efficient urinals and showers in all end-of-life replacements

Appendix 1: Water use from GMMWater System

GMMWater provided water meter data from 1995 to 2011 and these were reconciled with account numbers and site descriptions provided by Hindmarsh Shire. Two summary tables are presented in this Appendix.

Table A1 shows each water meter as a line item, ranked from highest average annual use to lowest. Points to note:

- The total average annual usage by Hindmarsh Shire is 63.5 ML.
- The six highest use sites use 50% of the water and the next nine highest use 30% of the water.
- The highest uses are: irrigation of recreation areas, parks and streetscapes and swimming pools.

Table A1 Hindmarsh Shire – Summary of water taken from GMMWater.

Item	Hindmarsh Account Number	Description from hard copy sheet provided by Hindmarsh Shire	Address from GMMWater's system	Status	GMMWater Property ID	Total (ML) 1995 to 2011	% of Total	Cumulative total (ML)	Cumulative % of total	Annual average (ML/y)	% of Average annual	Cumulative average annual (ML)	Cumulative % of average annual	Group's proportion of water use
1	233650	Davis Park, Nhill	Recreation Reserve, 17A Davis Avenue, NHILL VIC 3418	Active	143826	176.4	19%	176	19%	11.0	17%	11	17%	50%
2	206462	Swimming Pool, Dimboola	Lloyd Street, DIMBOOLA VIC 3414	Active	128491	99.4	11%	276	30%	5.8	9%	17	27%	
3	206468	Recreation Reserve, Dimboola	Lloyd Street, DIMBOOLA VIC 3414	Active	128497	66.8	7%	343	38%	5.6	9%	22	35%	
4	243307	Swimming Pool, Rainbow	Swimming Pool, Park Street, RAINBOW VIC 3424	Active	146330	71.0	8%	414	46%	5.1	8%	28	43%	
5	234621	Jaypex Park, Nhill	Victoria Street, NHILL VIC 3418	Active	144706	59.9	7%	473	52%	3.7	6%	31	49%	
6	234715	Swimming Pool, Nhill	Whitehead Avenue, NHILL VIC 3418	Active	144792	49.5	5%	523	58%	3.3	5%	35	54%	
7	234343	Saleyards & Pound, Nhill	Check Meter, Nelson Street, NHILL VIC 3418	Active	144466	13.4	1%	536	59%	2.7	4%	37	59%	30%
8	220941	Recreation Reserve, Jeparit	Recreation Reserve, Sands Avenue, JEPARIT VIC 3423	Active	140779	36.3	4%	573	63%	2.1	3%	39	62%	
9	234616	Centenary Drive Lawns, Nhill	Nature Strip, Victoria Street, NHILL VIC 3418	Active	144701	32.6	4%	605	67%	2.0	3%	41	65%	
10	234685	??	89 Victoria Street, NHILL VIC 3418	Active	144770	23.0	3%	628	69%	1.9	3%	43	68%	
11	234618	Goldsworthy Park, Nhill	Victoria Street, NHILL VIC 3418	Active	144703	26.4	3%	655	72%	1.7	3%	45	71%	
12	206467	Recreation Reserve, Dimboola	Football Oval, Lloyd Street, DIMBOOLA VIC 3414	Active	128496	17.0	2%	672	74%	1.5	2%	47	73%	
13	234619	Public Toilets, Goldsworthy Park, Nhill	Victoria Street, NHILL VIC 3418	Active	144704	23.3	3%	695	77%	1.5	2%	48	76%	10%
14	234620	Parks and Gardens, Nhill	Victoria Street, NHILL VIC 3418	Active	144705	18.0	2%	713	79%	1.4	2%	49	78%	
15	233730	Closed	20 Fraser Street, NHILL VIC 3418	Closed	143891	9.4	1%	722	80%	1.3	2%	51	80%	
16	234186	Nelson Street Carpark, Nhill	Median Strip, Nelson Street, NHILL VIC 3418	Active	144309	15.1	2%	738	81%	0.9	1%	52	81%	
17	234622	Public Toilets, Jaypex Park, Nhill	Victoria Street, NHILL VIC 3418	Active	144707	13.5	1%	751	83%	0.9	1%	53	83%	
18	206661	Bicentennial Park, Dimboola	Mcdonald Street, DIMBOOLA VIC 3414	Active	128689	13.4	1%	764	84%	0.8	1%	53	84%	
19	220949	Swimming pool, Jeparit	Swimming Pool, 19 Sands Avenue, JEPARIT VIC 3423	Active	140787	8.3	1%	773	85%	0.7	1%	54	85%	5%
20	233584	Infant Welfare Kinder, Nhill	9 Clarence Street, NHILL VIC 3418	Active	143770	8.5	1%	781	86%	0.7	1%	55	86%	
21	234247	Shire office, Nhill	92 Nelson Street, NHILL VIC 3418	Active	144370	7.9	1%	789	87%	0.6	1%	55	87%	
22	220678	Broadway Street Park, Jeparit	Broadway, JEPARIT VIC 3423	Active	140528	9.7	1%	799	88%	0.6	1%	56	88%	
23	206536	Old Shire hall, Dimboola	97-101 Lloyd Street, DIMBOOLA VIC 3414	Active	128565	6.6	1%	805	89%	0.6	1%	56	89%	
24	243280	Caravan Park, Rainbow	Railway Street, RAINBOW VIC 3424	Active	146307	9.1	1%	815	90%	0.5	1%	57	90%	
25	206455	Public Toilets near AMP Building, Dimboola	Lloyd Street, DIMBOOLA VIC 3414	Active	128484	7.0	1%	822	90%	0.5	1%	57	90%	5%
26	234185	Hospital car park, Nhill	Nelson Street, NHILL VIC 3418	Active	144308	7.2	1%	829	91%	0.5	1%	58	91%	
27	234158	Saleyards & truckwash, Nhill	Mckenzie Avenue, NHILL VIC 3418	Active	144286	3.8	0%	833	92%	0.4	1%	58	92%	
28	234617	Victoria Street Carpark, Nhill	Nature Strips, Victoria Street, NHILL VIC 3418	Active	144702	5.6	1%	838	92%	0.3	1%	59	92%	
29	220940	Public Toilets, Recreation Reserve, Jeparit	Oval Toilets, Sands Avenue, JEPARIT VIC 3423	Active	140778	5.0	1%	843	93%	0.3	1%	59	93%	
30	233652	Public Toilets, Davis Park, Nhill	Toilets, Davis Park, 17C Davis Avenue, NHILL VIC 3418	Active	143828	4.8	1%	848	93%	0.3	1%	59	93%	
31	220677	??	Broadway, JEPARIT VIC 3423	Active	140527	5.1	1%	853	94%	0.3	0%	60	94%	5%
32	220936	Cement works, Jeparit	Depot/Cement Works, 60 Roy Street, JEPARIT VIC 3423	Active	140774	5.1	1%	858	94%	0.3	0%	60	94%	
33	233528	Nhill Lake, Nhill	Cnr Towns Lane, Campbell Street, NHILL VIC 3418	Active	143720	2.6	0%	861	95%	0.3	0%	60	95%	
34	203067	??	Ca Pt 11 Banu Bonyit	Active	107416	1.0	0%	862	95%	0.3	0%	60	95%	
35	220965	Caravan Park, Jeparit	Caravan Park, Peterson Avenue, JEPARIT VIC 3423	Active	140801	4.2	0%	866	95%	0.2	0%	61	95%	
36 to 87	Various	Various	Balance of various minor meter reads			42.3	5%	908	100%	2.9	0.0	64	100%	5%
Totals						908.1	100%			63.5	100%			100%

Table A2 shows the raw annual data for each GWMWater metered site billed to Hindmarsh Shire. Points to note include:

- Annual usage peaked in 2002 at over 90 ML/year.
- Recent annual usage has steadied in the 50 ML to 70 ML per year range.

Table A2 Hindmarsh Shire - Annual water taken from GWMWater

Item	Hindmarsh Account Number	Description from bill (copy sheet provided by Hindmarsh Shire)	Address from GWMWater's system	Status	GWMWater Property ID	1995 (kL)	1996 (kL)	1997 (kL)	1998 (kL)	1999 (kL)	2000 (kL)	2001 (kL)	2002 (kL)	2003 (kL)	2004 (kL)	2005 (kL)	2006 (kL)	2007 (kL)	2008 (kL)	2009 (kL)	2010 (kL)	2011 (kL)
1	233650	Davis Park, Nhll	Recreation Reserve, 17A Davis Avenue, NHILL VIC 3418	Active	143826	-	20,611	5,789	11,007	11,091	11,871	14,400	9,863	9,801	8,721	16,483	12,261	11,809	14,057	9,171	9,439	
2	206462	Swimming Pool, Dimboola	Lloyd Street, DIMBOOLA VIC 3414	Active	128491	-	10,708	7,128	6,760	6,723	4,616	6,105	7,980	4,786	4,888	4,829	5,206	5,822	5,693	5,943	6,110	6,093
3	206468	Recreation Reserve, Dimboola	Lloyd Street, DIMBOOLA VIC 3414	Active	128497	-	-	-	-	3,392	11,286	11,517	4,557	4,151	7,417	2,822	2,578	2,097	5,942	4,675	6,336	
4	243307	Swimming Pool, Rainbow	Swimming Pool, Park Street, RAINBOW VIC 3424	Active	146330	-	-	-	5,101	5,708	6,543	10,712	5,022	5,009	5,501	6,091	4,989	5,397	4,689	3,298	2,966	
5	234621	Jaypex Park, Nhll	Victoria Street, NHILL VIC 3418	Active	144706	-	4,028	2,608	2,511	2,036	3,992	6,906	4,249	4,582	3,524	6,080	4,055	4,648	4,491	3,387	2,814	
6	234715	Swimming Pool, Nhll	Whitehead Avenue, NHILL VIC 3418	Active	144792	-	-	4,493	3,175	2,600	4,111	4,302	3,579	2,894	3,456	5,115	5,541	3,724	2,803	2,595	1,112	
7	234343	Saleyards & Pound, Nhll	Check Meter, Nelson Street, NHILL VIC 3418	Active	144466	-	-	-	-	-	-	-	-	-	-	-	679	5,445	2,870	2,427	1,943	
8	220941	Recreation Reserve, Jeparit	Recreation Reserve, Sands Avenue, JEPARIT VIC 3423	Active	140779	-	3,119	3,066	5,177	1,978	2,077	4,605	954	649	3,942	2,937	2,654	251	239	5	920	3,770
9	234616	Centenary Drive Lawns, Nhll	Nature Strip, Victoria Street, NHILL VIC 3418	Active	144701	-	2,559	1,940	2,489	1,484	2,497	2,503	2,852	2,051	1,711	3,215	2,039	2,699	1,719	1,812	1,075	
10	234685	??	89 Victoria Street, NHILL VIC 3418	Active	144770	-	-	-	-	-	4,563	1,501	1,352	717	2,128	4,658	2,780	2,414	629	676	1,630	
11	234618	Goldsworthy Park, Nhll	Victoria Street, NHILL VIC 3418	Active	144703	-	3,082	1,973	1,959	1,976	2,269	1,131	1,588	1,489	2,596	3,571	2,090	2,163	242	-	288	
12	206467	Recreation Reserve, Dimboola	Football Oval, Lloyd Street, DIMBOOLA VIC 3414	Active	128496	-	-	-	-	-	-	5,111	1,794	1,548	4,369	1,304	351	831	378	1,000	310	
13	234619	Public Toilets, Goldsworthy Park, Nhll	Victoria Street, NHILL VIC 3418	Active	144704	-	1,497	795	2,507	1,319	1,448	3,774	2,120	1,346	1,106	1,315	1,130	1,947	1,035	916	1,000	
14	234620	Parks and Gardens, Nhll	Victoria Street, NHILL VIC 3418	Active	144705	-	-	-	-	1,359	1,092	3,267	1,170	1,012	825	765	800	1,642	720	3,128	2,186	
15	233730	Closed	20 Fraser Street, NHILL VIC 3418	Closed	143891	-	9,002	2	241	-	179	-	-	-	-	-	-	-	-	-	-	
16	234186	Nelson Street Carpark, Nhll	Median Strip, Nelson Street, NHILL VIC 3418	Active	144309	-	708	389	436	374	1,404	2,426	1,465	617	1,315	839	1,101	1,079	1,136	917	899	
17	234622	Public Toilets, Jaypex Park, Nhll	Victoria Street, NHILL VIC 3418	Active	144707	-	73	1,373	1,841	868	558	2,621	621	394	783	675	393	872	1,108	625	676	
18	206661	Bicentennial Park, Dimboola	Mcdonald Street, DIMBOOLA VIC 3414	Active	128689	-	1,325	1,579	1,413	2,059	1,245	264	382	457	369	889	49	1	1	2	740	2,641
19	220949	Swimming pool, Jeparit	Swimming Pool, 19 Sands Avenue, JEPARIT VIC 3423	Active	140787	-	-	-	-	-	879	1,454	1,094	610	814	675	519	688	570	457	516	
20	233584	Infant Welfare Kinder, Nhll	9 Clarence Street, NHILL VIC 3418	Active	143770	-	-	-	-	361	515	1,369	704	620	544	662	886	877	647	670	676	
21	234247	Shire office, Nhll	92 Nelson Street, NHILL VIC 3418	Active	144370	-	-	-	-	303	1,571	505	289	2,502	1,383	200	180	206	249	215	261	
22	220678	Broadway Street Park, Jeparit	Broadway, JEPARIT VIC 3423	Active	140528	-	571	836	487	314	36	35	477	1,342	1,543	1,621	1,534	63	-	79	680	120
23	206536	Old Shire hall, Dimboola	97-101 Lloyd Street, DIMBOOLA VIC 3414	Active	128565	-	-	-	-	475	663	311	314	298	669	856	614	848	636	541	389	
24	243280	Caravan Park, Rainbow	Railway Street, RAINBOW VIC 3424	Active	146307	-	1,605	1,547	1,801	475	444	352	592	355	403	217	126	95	173	191	215	488
25	206455	Public Toilets near AMP Building, Dimboola	Lloyd Street, DIMBOOLA VIC 3414	Active	128484	-	134	184	469	442	368	245	607	505	509	538	876	1,007	515	288	285	
26	234185	Hospital car park, Nhll	Nelson Street, NHILL VIC 3418	Active	144308	-	235	224	149	81	111	124	110	88	103	596	1,206	1,328	1,296	1,093	477	
27	234158	Saleyards & truckwash, Nhll	Mckenzie Avenue, NHILL VIC 3418	Active	144286	-	-	-	-	-	-	-	657	1,085	880	404	54	210	157	157	188	
28	234617	Victoria Street Carpark, Nhll	Nature Strips, Victoria Street, NHILL VIC 3418	Active	144702	-	388	244	743	514	960	515	503	331	239	315	170	87	80	211	264	
29	220940	Public Toilets, Recreation Reserve, Jeparit	Oval Toilets, Sands Avenue, JEPARIT VIC 3423	Active	140778	-	-	1,033	111	543	768	568	159	267	571	69	61	98	62	501	150	
30	233652	Public Toilets, Davis Park, Nhll	Toilets, Davis Park, 17C Davis Avenue, NHILL VIC 3418	Active	143828	-	32	338	725	170	459	595	386	295	756	426	154	100	86	145	110	
31	220677	??	Broadway, JEPARIT VIC 3423	Active	140527	-	926	1,358	1,233	997	109	-	1	193	145	7	1	110	11	-	-	
32	220936	Cement works, Jeparit	Depot/Cement Works, 60 Roy Street, JEPARIT VIC 3423	Active	140774	-	470	260	349	382	375	324	467	201	331	216	180	380	311	276	251	304
33	233528	Nhll Lake, Nhll	Cnr Towns Lane, Campbell Street, NHILL VIC 3418	Active	143720	-	-	-	-	-	-	-	-	4	4	10	31	130	644	699	418	665
34	203067	Ca Pt 11 Banu Bonyit	Ca Pt 11 Banu Bonyit	Active	107416	-	-	-	-	-	-	-	-	-	-	-	-	22	330	652	30	
35	220965	Caravan Park, Jeparit	Caravan Park, Peterson Avenue, JEPARIT VIC 3423	Active	140801	-	408	316	447	654	415	115	376	249	165	186	145	52	75	123	245	181
36 to 87	Various	Various	Balance of various minor meter reads			-	943	2,556	3,947	4,508	2,879	3,703	5,134	2,144	2,180	3,307	2,237	1,320	1,601	1,728	2,049	2,038
	Totals					-	20,075	60,995	42,999	51,554	47,292	73,610	92,220	55,435	56,182	64,139	69,837	53,731	60,986	55,494	51,185	52,320

Appendix 2: Water restrictions

Stage	Public use			
	Swimming Pools	Ponds of lakes	Public garden, sports ground or school ground	Fountain or Water Feature
1	<ul style="list-style-type: none"> ▪ Approval from GMMWater is required for a new or existing pool or spa with a capacity greater than 2000 litres or more to be filled. ▪ An existing pool or spa may only be topped up by a hand-held hose fitted with a trigger nozzle, or by a watering can or bucket. 	<ul style="list-style-type: none"> ▪ A new pond or lake may only be filled with the written permission of GMMWater. ▪ An existing pond or lake may only be topped up by a hand-held hose fitted with a trigger nozzle or a watering can or bucket 	<ul style="list-style-type: none"> ▪ Unless a Water Conservation Plan approved by GMMWater applies, gardens and grounds may only be watered using: <ul style="list-style-type: none"> – a manual watering system operating between the hours of 6am and 10am, and 8pm and midnight on alternate days*. – an automatic watering system operating within the hours of midnight and 8am on alternate days*. – a hand-held hose fitted with a trigger nozzle, a watering can or bucket at any time. 	<ul style="list-style-type: none"> ▪ A fountain or water feature may only be operated if it recirculates water used, and is filled or topped up by a hand-held hose fitted with a trigger nozzle or by a watering can or bucket.
2	<ul style="list-style-type: none"> ▪ Approval from GMMWater is required for a new or existing pool or spa with a capacity greater than 2000 litres or more to be filled. ▪ An existing pool or spa may only be topped up by a hand-held hose fitted with a trigger nozzle, or a watering can or bucket filled either by a hand-held hose fitted with a trigger nozzle or directly from a tap. 	<ul style="list-style-type: none"> ▪ A new pond or lake may only be filled with the written permission of GMMWater. ▪ An existing pond or lake may only be filled or topped if it sustains aquatic fauna or bird life, and approval from GMMWater is obtained. 	<ul style="list-style-type: none"> ▪ Unless a Water Conservation Plan approved by GMMWater applies, gardens and grounds may only be watered using: <ul style="list-style-type: none"> ▪ a manual watering system operating between the hours of 6am and 10am, and 8pm and midnight on alternate days*. ▪ an automatic watering system operating within the hours of midnight and 4am on alternate days*. ▪ a hand-held hose fitted with a trigger nozzle, a watering can or bucket at any time. 	<ul style="list-style-type: none"> ▪ A fountain or water feature may only be operated if it recirculates water used ▪ A fountain or water feature must not be filled or topped up

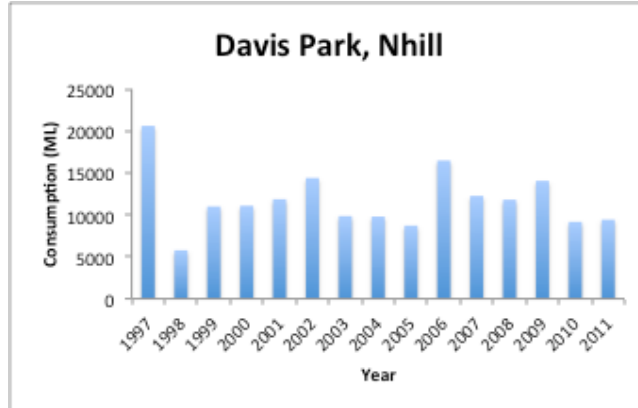
<p>3</p>	<ul style="list-style-type: none"> ▪ A new pool or spa, regardless of capacity must not be filled ▪ Approval from GMMWater is required for an existing pool or spa with a capacity greater than 2,000 litres or more to be filled. An existing pool or spa may only be topped up by a watering can or bucket filled directly from a tap 	<ul style="list-style-type: none"> ▪ A new pond or lake must not be filled ▪ An existing pond or lake may only be filled if it sustains aquatic fauna or bird life, and approval from GMMWater is obtained 	<ul style="list-style-type: none"> ▪ Lawn areas must not be watered at anytime ▪ A garden area may only be watered using <ul style="list-style-type: none"> – a manual dripper watering system or hand-held hose operating between the hours of 6am and 8am, and 8pm and 10pm on watering days*. – an automatic watering system operating within the hours of midnight and 4am on watering days*. – A watering can or bucket at any time. – No other sprinkler system is allowed ▪ Watering not permitted on non-exempt playing surfaces ▪ Exempt playing surfaces may be watered by manual dripper systems and hand held hoses between 6am and 10am and 8 pm to midnight, or by automated watering system which operates between midnight and 8am as needed on watering days 	<ul style="list-style-type: none"> ▪ A fountain or water feature may only be operated if it recirculates water used ▪ A fountain or water feature must not be filled or topped up
<p>4</p>	<ul style="list-style-type: none"> ▪ A new municipal pool or spa must not be filled ▪ An existing municipal pool or spa must not be topped up unless approved by GMMWater in writing 	<ul style="list-style-type: none"> ▪ A new pond or lake must not be filled ▪ An existing pond or lake may only be filled if it sustains aquatic fauna or bird life, and written permissions has been received from GMMWater 	<ul style="list-style-type: none"> ▪ Lawn areas must not be watered at any time. ▪ Gardens may be watered by bucket or watering can filled directly from a tap ▪ No part of a sports ground may be watered at any time ▪ Playing surfaces must not be watered at any time 	<ul style="list-style-type: none"> ▪ A fountain or water feature of any volume must not be filled or topped up or operated.

Appendix 3: Water use trends

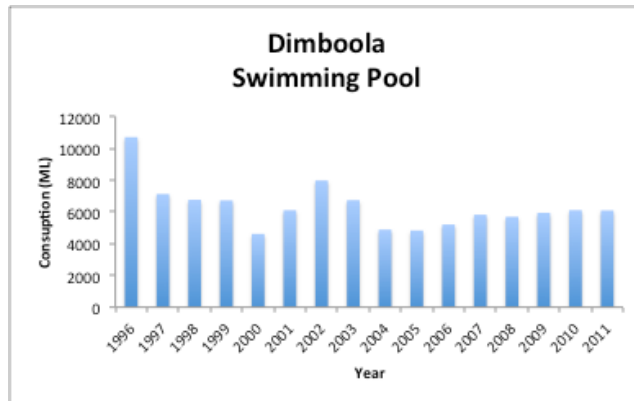
Meter No

Trend in water use

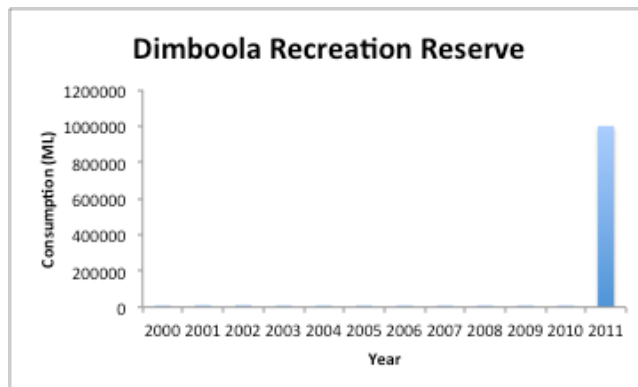
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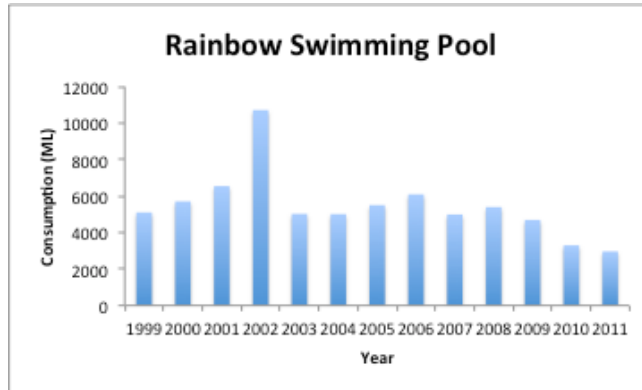
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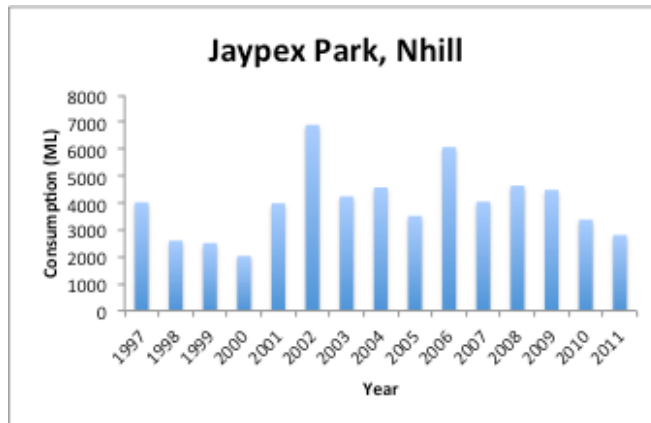
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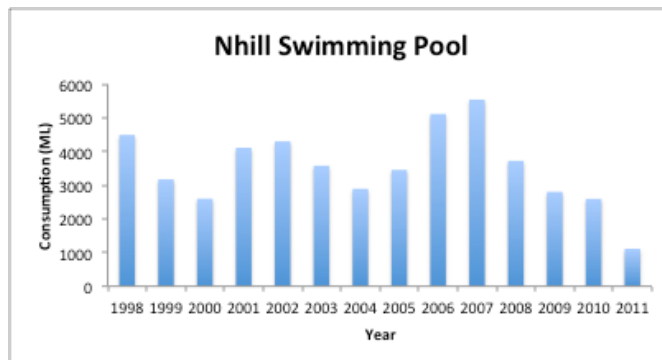
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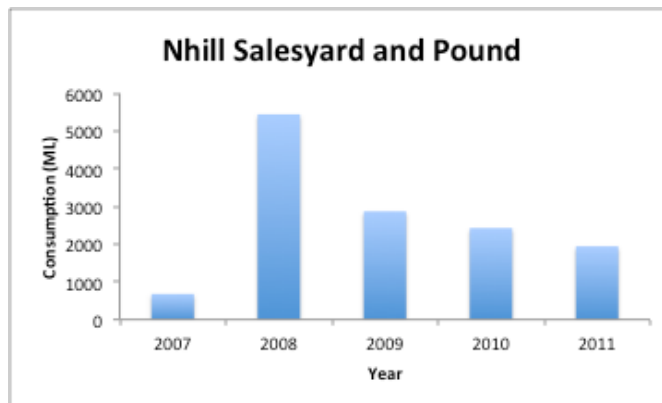
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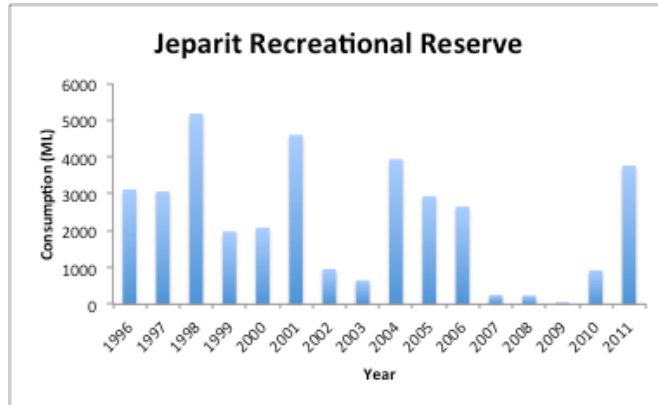
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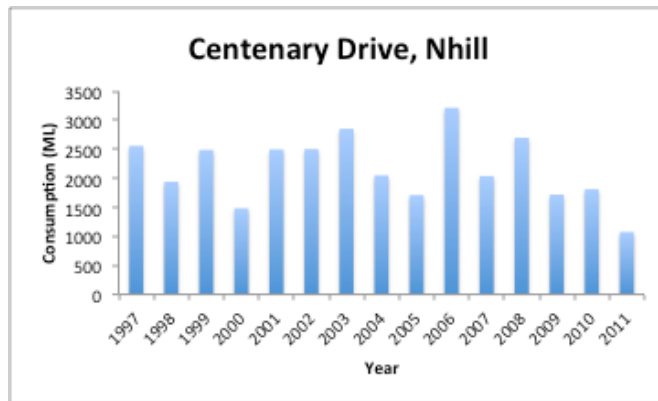
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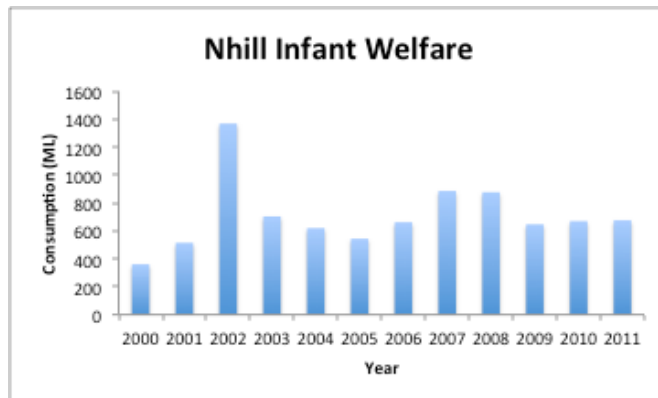
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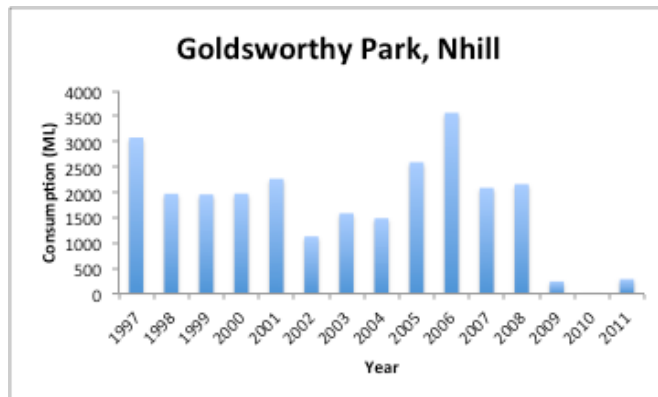
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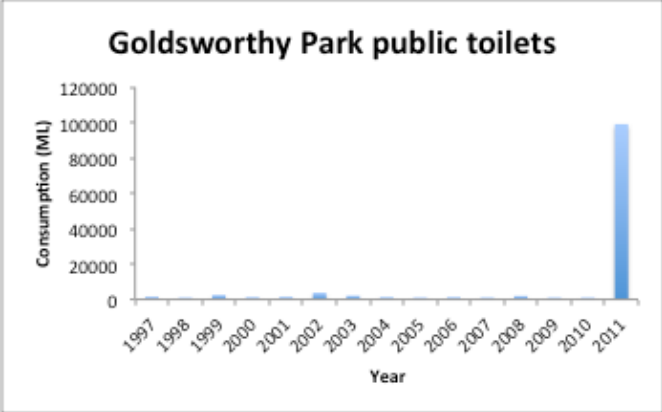
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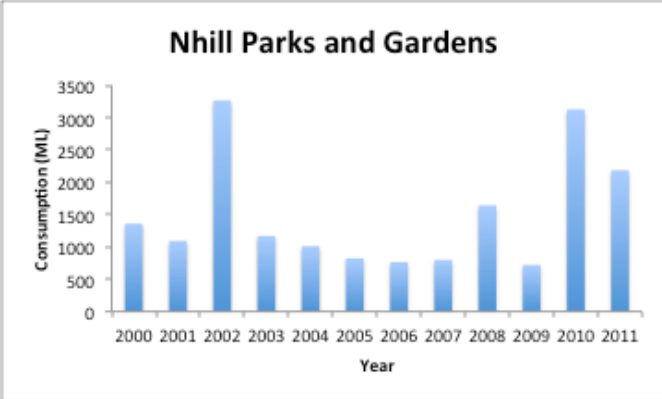
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Hindmarsh Shire

Economic Development Position Paper

Final Report

May 2012



**Australian Government
Strengthening Basin Communities Program**



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Executive Summary

Introduction

Communities across the Murray-Darling Basin face significant challenges in dealing with the impacts of climate change and reduced water availability. Hindmarsh Shire received funding from the Australian Government *Strengthening Basin Communities* program to undertake a project to integrate climate change adaptation into Hindmarsh Shire Council planning and to facilitate regional adaptation. The study assessed the implications of climate change upon the Shire's built, economic, social and environmental infrastructure.

This Economic Development Position Paper is one of three strategies produced as part of the project. A Hindmarsh Climate Change Adaptation Strategy, Integrated Water Management Plan and Township Climate Change Adaptation Plan have also been developed.

Following a review of existing regional and local plans, policies and programs, it was decided that this project will focus on the impact of climate change and reduced water availability across the following four areas:

- The regional economy
- The local development infrastructure
- The local community infrastructure
- Council's capacity to meet the needs of its community.

This position paper is designed to address the first of these four focus areas, i.e. the regional economy, by providing a recommended approach for the development of an economic development strategy for the Hindmarsh Shire.

The Hindmarsh Council Plan identified the development and implementation of an Economic Development Strategy as its priority action to achieve its first objective of a diverse economy. Given the economic development framework the Shire is operating within, it is essential that the purpose and role of this strategy be clearly identified to ensure the Strategy achieves the desired outcome with efficient use of the available resources.

A suggested role for the Economic Development Strategy would be to act as a signpost document, bringing together the existing initiatives, at both a regional and local level, and clearly articulating the Council's priorities and how it will utilise these initiatives to achieve those priorities.

There are four themes that encompass the core role of Council in economic development, they are:

1. Supporting a regional process - This theme should:

- Describe the Council's commitment to the Regional Strategic Plan and Regional Development Australia processes and how Council intends to engage with and contribute to these processes
- Describe Council's commitment, engagement and contribution to the Wimmera Development Association and Wimmera Manufacturing and Industry Group
- Recognise these regional processes as the most appropriate vehicle to achieve the bigger picture strategic priorities, which will benefit the whole region and the Shire.

2. Advocating for regional priorities - This theme should:

- Recognise that a number of Hindmarsh priorities are already acknowledged as regional priorities within the Regional Strategic Plan
- Identify a clear role for Council to advocate for their priorities to become regional priorities
- Describe the process by which Council will achieve this.

3. Meeting local needs - This theme should:

- Identify the key priorities for local economic development within the Community Action Plans
- Describe how the Council will develop and implement projects to meet these priorities
- Recognise and plan for improved service provision to meet business needs, e.g. infrastructure, community services.

4. Facilitating local opportunities - This theme should:

- Develop a process to identify local opportunities that are not already covered in the Community Action Plans, or Regional Strategic Plan
- Recognise and prioritise Council's role as an advocate for these and other local projects
- Identify Council's capacity to facilitate project development, which might include getting the project recognised as a priority within a Community Action Plan, the Council Plan or the Regional Plan.

It was recommended that an Economic Development Strategy be developed based on the findings of the Economic Development Position Paper with a specific focus on:

- Advocating and supporting regional economic development strategies and initiatives
- Advocating for Hindmarsh priorities to be considered regional priorities
- Attracting and retaining professional and skilled labour.

The actions identified in the Township Climate Change Adaptation Plan, Integrated Water Management Plan and the Climate Change Adaptation Strategy are summarised here.

Hindmarsh Climate Change Adaptation Strategy

The purpose of the Climate Change Adaptation Strategy is to:

- Help Council and stakeholders understand the impacts of climate change in the region
- Identify the risks and opportunities climate change and reduced water availability present for the region
- Clarify Council's role and scope for taking action on these issues
- Identify measures Council can adopt to address risks and act on opportunities.

The focus of the strategy is the impact of climate change and reduced water availability across four main themes:

1. The Hindmarsh economy
2. Utilities infrastructure – transport, water and energy
3. Community infrastructure – parks, gardens, halls, libraries and other Council buildings
4. Council capacity to meet the needs of its community as the climate and water availability changes.

The key risks to Hindmarsh posed by climate change and reduced water availability were identified as:

Regional economy

- Reduced agricultural and manufacturing productivity
- Population decline and reduced regional employment

Utilities infrastructure

- Increased road construction and maintenance costs
- Increased frequency of stormwater flooding

Community infrastructure

- Lack of continuity of water supply for recreation and sporting facilities, parks and gardens
- Increase in infrastructure maintenance costs and costs of recovery from extreme events
- Increased demands on community volunteers for emergency response and recovery
- Need for community refuges is not being adequately met by Council buildings

Council capacity

- Increased demand for Council services and declining Council income
- Increased difficulty in recruiting and retaining Council staff
- Providing a safe work environment for staff
- Reduced community capacity and resilience

Consultation and review of existing strategies and programs identified the following key actions.

To prepare for climate change and reduced water availability, the Strategy proposes the following set of actions for Council.

Action	Description
Regional economy	
RE-1 Research development and extension	Continue to advocate and provide strategic support to Department of Primary Industry and industry groups such as Birchip Cropping Group for on-going research and development that will assist the agricultural industry adapt to the changing climate
RE-2 Streamlining of planning permit approvals	Continue implementation of processes to streamline assessment of planning permit applications including educating and encouraging landholders and businesses to bring proposals to a pre-application meeting
RE-3 Economic Development Strategy	Develop an Economic Development Strategy based on the findings of the Economic Development Position Paper
Utility infrastructure	
UI – 1 Review and update the Road Asset Management plan	Embed consideration of climate change risks in development of the next road asset management plan
	Continue to investigate alternative sealed road pavement mixes that are more resistant to temperature extremes. Incorporate findings into the Road Asset Management plan
	Investigate alternative unsealed road gravel mixes and treatments that are more resistant to temperature extremes and surface runoff. Incorporate findings into the Road Asset Management plan
	Review the road hierarchy to incorporate consideration of climate change impacts and particularly recent flood events e.g. road closures, road safety, to minimise the risk of isolated townships
UI-2 Stormwater Drainage Study	Council complete development and begin implementation of the Stormwater Drainage Study
	Develop and implement a community communication and engagement strategy to assist in the implementation of the Stormwater Drainage Study
Community infrastructure	
CI-1 Integrated water management planning	Adopt and implement the Hindmarsh Integrated Water Management plan
CI-2 Stormwater flood prevention	Confirm responsibility for maintenance of levy banks in Jeparit Where Council is the responsible authority develop a levy management plan that considers: <ul style="list-style-type: none"> – Ongoing maintenance requirements and costs – Management during flooding – Risks to levy integrity and capacity from increased frequency of flooding and increased flood heights – Community engagement and communication
	Adopt and implement the Hindmarsh Stormwater Drainage Study
CI-3 Review of Council buildings and assets	Embed consideration of climate change risks in the review and development of Council building maintenance programs
	Incorporate the findings of climate change risks on Council buildings in the annual review of insurance cover
CI-4 Township emergency management planning	Adopt and implement the Hindmarsh Township Climate Change Adaptation Plan

Action	Description
CI-5 Contingency planning	Identify critical Council systems required during emergencies and determine the adequacy of power reserves and back up power supplies during power outages.
	Assess capacity of emergency management centres and critical Council buildings to receive back up electricity supply from generators.
CI-6 Municipal emergency management planning	Incorporate the findings of the Township emergency management planning into the Municipal Emergency Management Plan
Council Capacity	
CC-1 Incorporate climate change and water availability scenarios into Council assets management plans	Council staff review and analyse current asset management plans under a range of climate change and water availability scenarios e.g. <ul style="list-style-type: none"> – Stormwater drainage capacity maintenance – Road construction and design – Building maintenance, upgrade and design
CC-2 Embedding climate change and water availability risk assessment	Climate change and water availability scenarios should be regularly updated and considered in the analysis of future asset management plans and broader Council planning
CC-3 Community engagement	As part of future service delivery planning, review services in some towns and/or consolidating services to a smaller number of towns
	Incorporate findings of the Department of Planning and Community Development Role and Function of Small Towns and Settlements Project in to future service delivery planning
	Undertake community engagement to communicate Council's adaptation and sustainability projects to demonstrate leadership and educate the community
	Undertake community engagement to communicate Council's challenges in maintaining service delivery and invite community discussion on choices and options
CC-4 Recruitment	Liaise with major businesses, service providers and neighbouring municipalities to develop packages offering employment opportunities with Council for couples and families
	Continue to utilise the Victorian Traineeship programs to address Council skill shortages
	In conjunction with other municipalities and major businesses, develop a Skills Match program to assist in matching skills and employment opportunities
CC-5 Outsourcing	Continue to identify services that can be delivered by contractors or consultants for services that cannot be provided in-house and require high quality outputs delivered to specified timeframes
CC-6 Contingency planning	Review the Business Continuity Plan for indoor staff that considers extreme weather events and power outages

Township Climate Change Adaptation Plan

A number of risks associated with climate change were common across the four main townships, including:

- Poor understanding by town residents of emergency response procedures
- Decline in volunteers and increasing demands on volunteers for emergency response and recovery
- Decline in town amenity and community infrastructure such as sports grounds, recreation facilities and parks and gardens.

The key actions identified to address these risks included:

- Community engagement
- Community action planning
- Recruitment planning
- Implementation of the Integrated Water Management plan

The detailed actions include:

Action	Description
Emergency response	
ER-1 Community engagement	Work with Township Committees to ensure that there is a general understanding of: <ul style="list-style-type: none"> ▪ Roles and responsibilities of agencies and individuals during emergencies ▪ Contact details for various emergencies
	Work with Township Committees to ensure that new residents in towns understand emergency response procedures in their town and contact details.
ER-2 Community action planning	As part of the review of the township Community Action Plans consider: <ul style="list-style-type: none"> ▪ Confirm cool areas for use during heatwaves as per the Hindmarsh Heatwave Plan ▪ Confirm status of refuges for other extreme events including bushfire and flood
	Work with the Rainbow community and VicRoads to consider if a road can be upgraded to provide continued access during flood
Volunteerism	
V-1 Recruitment plan	Work with CFA and SES to develop a recruitment plan targeted at new migrants to towns. This may include consideration of language and cultural barriers to volunteering
Town amenity sport and recreation	
TASR-1 Integrated Water Management	Adopt and implement the Draft Integrated Water Management Plan

A number of town specific actions were also identified.

Integrated Water Management Plan

The risk assessment undertaken as part of the wider Hindmarsh Climate Change Adaptation project, identified the following priority risks with regard to Council water use:

- Continuity of service provision including providing sports grounds and recreation facilities and maintaining town amenity during periods of water shortages.

The Plan has also noted the:

- Potential for Council water costs to rise in the future
- The importance of Council to demonstrate best practice with regard to water management

A number of initiatives were identified for reducing Council water use and improving water management practices:

Monitoring

A regular audit of Council water use is required to enable monitoring of water use, identification of leakages, over-usage and opportunities for improvement.

Action	Description
Monitoring -1	Map irrigation systems and include it on Council's asset management system.
Monitoring -2	Ensure there are sufficient water meters (and sub-meters) in place to account for water use at various sites.
Monitoring -3	Keep records of monthly water use at various sites. Ask tenants to keep records and submit an annual report.
Monitoring -4	Install water meters on all Council bores used for roadside watering
Monitoring -5	Review of all water use data annually in conjunction with Grampians Wimmera Mallee Water accounts. Correlate water usage with meter reads to detect leaks and over-usage.

Turf, lawn and garden management

Turf, lawns and gardens are substantial users of water. There are a number of opportunities to reduce water use by changing or modifying current management practices

Action	Description
Management -1	Convert irrigation systems from manual to automatic and where possible introduce night watering
Management -2	Conduct irrigation audits for main sites to confirm that sprinklers are operating efficiently,
Management -3	Consider subsurface irrigation and alternative species for areas that currently have high water use but are located where there is low impact on amenity
Management 4	In conjunction with sporting groups and committees of management, document watering regimes to be followed during water restrictions including consideration of: <ul style="list-style-type: none"> ▪ Reducing the area of certain reserves being irrigated ▪ Ceasing irrigation entirely on some reserves
Management -5	Use deep mulches on garden beds and revegetated areas to reduce evaporation

Swimming pools

Council has already undertaken works on some pools to reduce water use. The Rainbow pool is known to have leaks and was a substantial user of water in 2011

Action	Description
Pools-1	Assess the cost of repairing leaks in Rainbow pool
Pools-2	Conduct drawdown tests in winter as a means of estimating pool leakage.

Council buildings

Water use in Council buildings is relatively modest. There are opportunities to improve water use efficiency, mainly with end-or-life replacements of appliances and fittings.

Action	Description
Buildings-1	<p>End of life replacement with water efficient appliances and facilities in Council buildings</p> <ul style="list-style-type: none"> ▪ Use of dual flush toilets ▪ Water efficient urinals ▪ Water saving shower heads at pool and sports ground change rooms ▪ Water efficient kitchen appliances ▪ Flow restrictors and aerators on replacement taps

Education and awareness

A number of committees of management and community groups manage sporting and recreation facilities on behalf of Council. There are opportunities to work with these groups to improve management practices and improve water use efficiency.

Action	Description
Education-1	Work with community groups and committees of management to review irrigation management of sports grounds and reserves to identify opportunities for improvement and reducing water costs.

1 Economic Development

1.1 Strengthening Basin Communities project

This project is funded through the planning component of the *Strengthening Basin Communities* program and has a particular focus on planning for the impacts of climate change and reduced water availability and adaptation actions to address these impacts.

The aim of this project is to integrate climate change adaptation into Hindmarsh Shire Council's planning and to facilitate regional adaptation through:

- Assessing the implications of climate change upon the Shire's built, economic, social and environmental infrastructure and assets
- Engaging agencies, the private sector and the community in climate change adaptation and decision-making.

Following a review of existing regional and local plans, policies and programs, it was decided that this project will focus on the impact of climate change and reduced water availability across the following four areas:

- The regional economy
- The local development infrastructure
- The local community infrastructure
- Council's capacity to meet the needs of its community.

1.2 This position paper

This position paper is designed to address the first of these four focus areas, i.e. the regional economy, by providing a recommended approach for the development of an economic development strategy for the Hindmarsh Shire. It is one of four key outputs of the project (refer to Figure 1), including an Integrated Water Management Plan and individual Township Adaptation Plans, which are all subsidiaries of the overall Council Climate Change Adaptation Strategy.

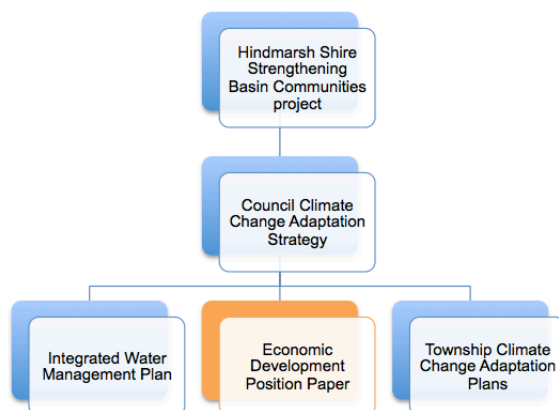


Figure 1: Outputs of the Strengthening Basin Communities project

The paper includes:

- An overview of the key sectors of the Hindmarsh Shire economy, the priority risks to the economy from climate change and the current adaptation measures
- An outline of the current economic development framework at a regional and local level that Hindmarsh Shire is operating within
- A recommended approach for how best Hindmarsh Shire can take advantage of the existing framework to facilitate economic development within the Shire.

1.3 The role of council

Along with the state and federal governments, local government plays an important role in facilitating local economic development and prosperity. Lennon and O'Neil (2003)¹ noted that while there are a number of expectations of local government, there is no clearly defined constitutional law to state what its powers and responsibilities are in regards to economic development facilitation.

Nevertheless, local government is a key player in its local (and regional) economy in a number of ways:

- It spends money on development infrastructure that facilitates business and community activity and sustains environmental quality (e.g. roads, drains, parks, and gardens)
- It provides important community services that support economic activity and promote the health and well-being of the local population. These assist in social cohesion and the development of local identity (e.g. child care, recreation services, aged care)
- It is an effective partner in the early stages of project development through its role in development approvals (e.g. planning, building and health)
- It is often the point of contact for local businesses and the community in relation to day-to-day concerns that affect the immediate environment for business production and quality of life (e.g. local land use conflicts and their resolution, lobbying other spheres of government for attention to problems outside the Council's responsibility, providing information on changes to regulations, housing controls).

Other roles of local government that directly relate to economic development include:

- Managing a coordinated approach to economic development among relevant organisations, e.g. funding submissions, advocacy and lobbying activities
- Supporting a conducive business environment, e.g. 'soft' and 'hard' infrastructure; local strategic planning, such as industrial land use; efficient local development approvals and regulatory environment; addressing local inhibitors to business development
- Facilitating local investment, business and employment growth, and attracting new investment, e.g. promoting the area to new visitors and residents, attracting new business investment
- Providing, collating and acting as a referral point for locally relevant information.

¹ S. Lennon & W. O'Neil (2003) Facilitating Regional Economic Development - Local Government Perceptions and What it Can Do. Paper presented to the ANZSRAI 27th Annual Conference

2 Hindmarsh Shire Snapshot

2.1 Overview of key sectors

Sixty two percent of all business enterprises in Hindmarsh are in the agriculture sector. Gross value of agricultural production was worth approximately \$127 million in 2006². Agriculture is also the biggest employer in the Shire (Figure 2, Figure 3).

Agricultural land covers a large part of the Shire and is a major source of employment and wealth. The introduction of the Wimmera Mallee Pipeline provides opportunities for growth, diversification and value adding. The secure, quality water supply is a boost to business development and an opportunity for diversification to reduce vulnerability to drought.

Value adding to agricultural production currently includes duck processing, grain milling and cereal processing. The Shire has a strong 'industry cluster' in silo and grain handling equipment. Three businesses in the Shire manufacture silos and field bins and have a large share of the south eastern Australian market.

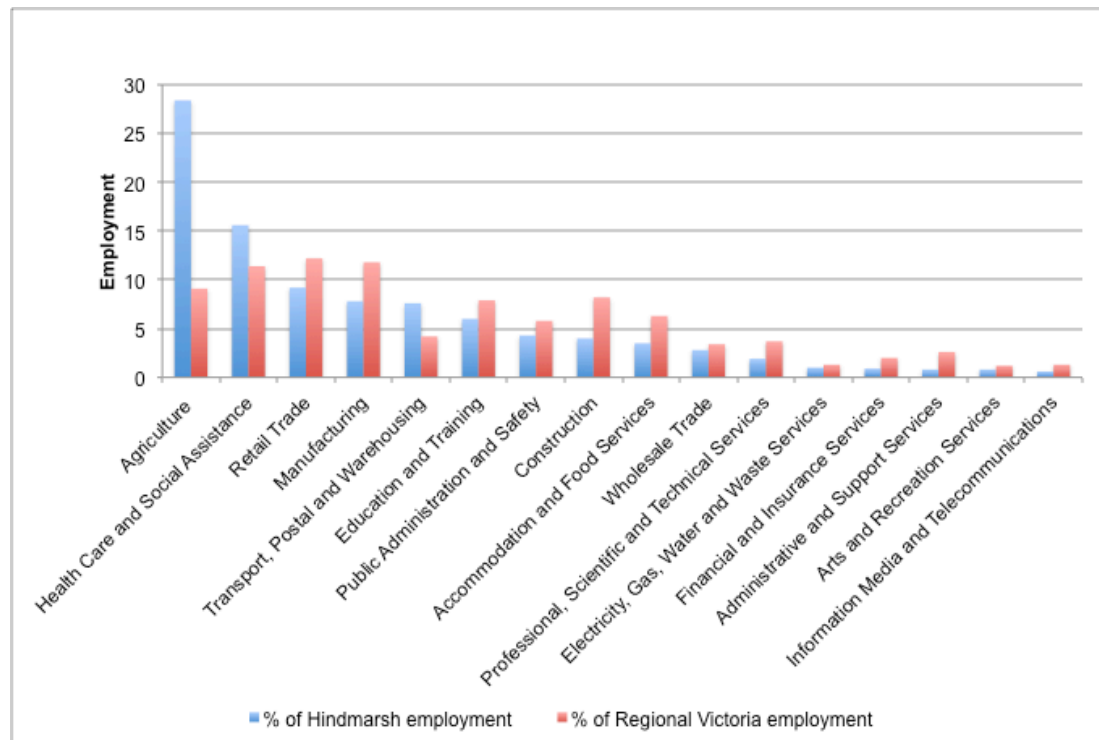


Figure 2: Percentage employment by industry sector in Hindmarsh and Regional Victoria

The tourism business sector has been emerging more strongly in recent years. Hindmarsh Shire Council in conjunction with Buloke, West Wimmera and Yarriambiack Shire Councils, are in the process of establishing a Regional Tourism Group, which will further highlight and capitalise on the Shire's unique environmental assets and pioneer heritage. In 2010 there were 18 hotels / motels, two caravan parks and a visitor hostel.

² Australian Bureau of Statistics (<http://www.abs.gov.au/AUSSTATS/abs@nrp.nsf/Latestproducts/225102980Industry12005-2009?opendocument&tabname=Summary&prodno=225102980&issue=2005-2009&num=&view=>) accessed 19.10.2011

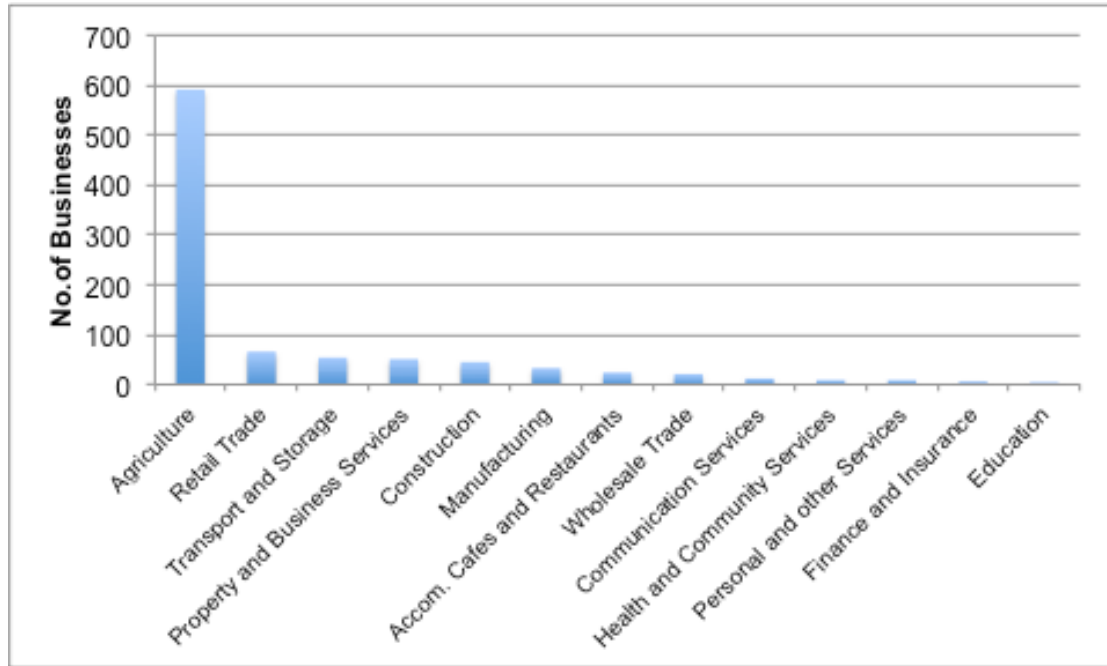


Figure 3: Number of businesses in Hindmarsh by industry sector

Workers in Hindmarsh are primarily residents of Hindmarsh with workers also coming from the Horsham, Yarriambiack and West Wimmera local government areas. The work location of Hindmarsh residents confirms this connectedness to the wider region with Hindmarsh residents travelling to work in Horsham, Yarriambiack and West Wimmers local government areas (Table 2-1).

Table 2-1: Where workers in Hindmarsh live and where Hindmarsh residents work, 2006³

Where Hindmarsh workers live	
LGA	Percentage
Hindmarsh	90.7
Horsham	4.5
Yarriambiack	1.8
West Wimmera	1.5
Northern Grampians	0.3
Bayside	0.2
Southern Grampians	0.2
Monash	0.1
Melbourne	0.1
Glenelg	0.1
Boroondara	0.1
Ballarat	0.1
Ararat	0.1

Where Hindmarsh residents work	
LGA	Percentage
Hindmarsh	82.0
Horsham	5.8
Yarriambiack	1.5
West Wimmera	1.1
Monash	0.2
Wyndham	0.1
Northern Grampians	0.1
Moreland	0.1
Melbourne	0.1
Hobsons Bay	0.1
Hepburn	0.1
Greater Shepparton	0.1
Greater Dandenong	0.1

³ Victorian Local Government Association (2010)

2.2 Economic development in a changing climate

2.2.1 Outcomes of consultation

A key part of the Strengthening Basin Communities project was consultation with key government, business and industry stakeholders within the Shire. This included individual interviews with business operators. This consultation identified the key risks to the economy posed by climate change, the impact of extreme weather events and the current adaptation measures in place.

2.2.2 Priority risks

The priority risks to Hindmarsh Shire as a result of climate change and reduced water availability were identified as:

Agricultural and manufacturing productivity

- Increased severity and frequency of extreme events during spring and early summer reduces agricultural and manufacturing productivity and associated transport
- Increased number of hot days reduces the capacity of manufacturing employees to work safely and thus, leads to operations shutting down with subsequent productivity losses
- Increased flooding reduces the reliability of transport to get to work, get supplies in, produce out and cope with personally, thus affecting productivity.

Regional employment, population and liveability

- Changing climate (reduced average rainfall and increase maximum temperature) accentuates small town population decline, reducing labour availability, liveability and services
- Increased severity and frequency of extreme events reduces the community's resilience and capacity to recover and cope, which may accentuate population decline.

Non-climate related risks

- Skilled labour availability and retention for manufacturing businesses in the region e.g. Luv-a-Duck, silo manufacturers
- Attracting and retaining professional employees due to issues such as availability of suitable housing stock, employment opportunities for partners or other family members
- The price and availability of inputs for manufacturing businesses, including steel for the silo manufacturers and quality of grain for the millers.

Climate risks are comparable to non-climate risks due to the reliance of the economy and businesses on agriculture. For example, a poor harvest means there is less demand for on-farm storage from the silo manufacturers perspective, or there is less input of quality grain for the millers.

2.2.3 Impact of extreme weather events

Extreme weather events would cause a tipping point in operations and/or viability of businesses if:

- The duration and timing of extreme events were to increase during spring and early summer, which coincides with harvest, grain transport, the peak period for silo manufacturing and Luv-a-Duck and associated transport
- Road closures and detours caused by flooding, such as the floods in November 2010 and January 2011, were to become more frequent and longer (e.g. greater than a week) disrupting the freight of products in and out of the region and increasing freight costs due to longer routes. They also impact on visitor numbers and business from passing traffic on the highway for retail and hospitality businesses
- Increased frequency and length of heatwaves trigger stop work procedures in manufacturing business during peak period (i.e. September to November). It is the succession of hot days rather than a hot day occurring in isolation that poses the greatest risk
- Succession of poor seasons for the agriculture industry similar to the previous ten years of drought. For example, the recent drought significantly reduced productivity in combination with other climate related events (e.g. hot springs, timing and intensity of frosts). Although the industry in the region has displayed resilience in the previous drought, this could cause a shift to more livestock and a reduction in the variety of crops that could be grown e.g. reduction in pulse growing seasons and shift to Mallee growing conditions.

2.2.4 Current adaptation measures

Current measures used to manage the changes in climate are detailed below.

- Wimmera Southern Mallee Regional Strategic Plan⁴ includes a statement of desired future (five years) development of the region, a description of the region's population and major drivers of change, the plan's goals, strategic directions and areas for action, and the governance and implementation of the plan. This plan aims to address the region-wide risks identified in this project, including population decline, community resilience and provision of services
- Wimmera Development Association (WDA) policies and strategies include the Regional Growth Plan, which aims to share resources in planning in the Wimmera Southern Mallee region. The refugee settlement program funded by Department of Immigration & Citizenship aims to build networks and set up referrals at the regional level, and is currently running some key neighbourhood pilot programs in Nhill (pers. comms. Jo Bourke, WDA, November 2011)
- Planning and construction of the Wimmera Mallee Pipeline to secure water supplies for the region
- Agricultural changes in the Wimmera have been focussed on maximising productivity in a varying climate (i.e. more adaptable and flexible systems) over the past ten years of drought rather than a major shift in farming enterprises. However, there has been

⁴ RMCG (2010) Wimmera Southern Mallee Regional Plan, Regional Strategic Planning Initiative, report prepared for Wimmera Development Association

accelerated adoption of minimum tillage and other best practice management that have shown their value during this period

- Manufacturing businesses allow their employees to work flexible hours and start and finish earlier during hot periods. There are also stop work triggers for hot days, for example 37°C for silo manufacturers, to manage heatwaves
- Luv-a-Duck have installed evaporative coolers in all their hatcheries and sheds to respond to heatwaves, and have back up generators installed for power outages
- Rainbow supermarket has installed water misters on the outside of the building near the refrigeration intake to reduce the strain on the cooling systems, and reduce the risk of overheating and breakdown.

3 Economic development framework

3.1 Setting the agenda

The framework for setting priorities and influencing policies of regional economic development is already well developed in the Hindmarsh Shire's region.

The Shire of Hindmarsh is located within the Wimmera Southern Mallee subregion, which has a well-developed Regional Strategic Plan, which has been endorsed by the Shire, its neighbouring municipalities and the Victorian State Government. The Shire is also a member of the Wimmera Development Association, which provides executive support to the regional planning process.

Regional economic development is supported by the Commonwealth Government through Regional Development Australia (RDA), which is closely aligned to the Regional Strategic Plan via the Grampians RDA.

This framework sets the agenda and it is critical that Hindmarsh Shire is fully engaged in these processes to maximise outcomes for the local and regional community. Thus, this section of the paper outlines the current economic development framework at a regional and local level that Hindmarsh Shire is operating within.

3.2 Regional economic development

3.2.1 Regional Strategic Plan

The Wimmera Southern Mallee Regional Strategic Plan was developed as part of a statewide regional planning approach - Regional Strategic Planning Initiative (RSPI).

This plan includes:

- A statement of desired future (five years) development of the region.
- A description of the region's population and major drivers of change.
- The plan's goals, strategic directions and areas for action for:
 - Economic growth, infrastructure, education and training
 - Water, natural resources and sustainability
 - Community well-being
 - Settlements and land use planning
- The governance and implementation of the plan.

The plan identifies a series of areas for action for each goal. Many of the actions however will contribute to other goals due to the linkages between the region's economy, environment and community well-being. Refer to appendix 1 for a list of these actions and their specific relevance to Hindmarsh Shire.

The plan identifies a changing climate as one of the key drivers of change within the region and the first strategic direction identified to strengthen the region's economy is strengthen

the farming sectors capacity to prosper in a changing climate. The intended outcome of this strategic direction is research and development of new plant varieties and farming systems and improved short and long-term information, which will equip the agricultural sector to adapt to the climate as it changes while enhancing its production capacity.

Thus, many of the challenges and opportunities for economic development within the Hindmarsh Shire are similar to those across the region and are best dealt with at a regional level.

3.2.2 Regional Growth Plan

The Regional Growth Plan will provide a regional land use planning response to the strategic directions and principles established by the Regional Strategic Plan.

Strategic planning projects and development frameworks already undertaken by councils will be significant inputs into the Growth Plan. The Growth Plan will use these inputs and build on existing knowledge to inform short-term regional actions and articulate longer-term direction for the region over the next 30 years.

As a result, the Growth Plan will inform local strategic planning and future public and private investment. Thus, it will serve as a critical reference to assist Council undertake the key economic development role of setting a conducive business environment by providing an appropriate land use strategy and an efficient regulatory and planning approval process.

3.2.3 Grampians Regional Development Australia (RDA) Committee

The Grampians RDA Committee was established in late 2009 by the Commonwealth and State Governments. It is an independent advisory body with voluntary community, business and local government members. Its goal is to support economic and social development in the Grampians region by providing strategic advice to the Commonwealth and State Governments on regional planning, economic and social issues, and job creation.

The Grampians Region covers both the Wimmera Southern Mallee and Central Highlands 'sub regions'. Thus, one of the first actions of the RDA was to endorse the Regional Strategic Plans already developed within each of these 'sub regions'. As a result, the RDA strategic directions incorporate those already articulated above for the Wimmera Southern Mallee.

The establishment of the RDA further enhances the role of the Regional Strategic Plan in setting priorities for economic development in the region.

3.2.4 Wimmera Development Association

The Wimmera Development Association (WDA) is the peak economic development organisation for the Wimmera Southern-Mallee region. Its role is to support and further develop existing local businesses, and promote economic development opportunities to investors within and outside the region. The WDA also provides a vital link between industry and government, lobbying for improved regional infrastructure, and attracting major investment projects to benefit the local economy.

The WDA is responsible for the implementation of the Wimmera Southern Mallee Regional Plan on behalf of the region. It also auspices a number of other initiatives, including the PowerCor Wimmera Business Awards, Leadership Wimmera, the Regional Skilled Migration Strategy and the Wimmera Manufacturing and Industry Group.

Hindmarsh Shire, along with West Wimmera Shire, Yarriambiack Shire and Horsham Rural City Council are the core members of the WDA. Thus, Hindmarsh Shire should seek to fully utilise the WDA to fulfil its charter both within the region and locally within Hindmarsh Shire.

3.2.5 Wimmera Manufacturing and Industry Group

The Wimmera Manufacturing and Industry Group (WMIG) is the region's key support for developing and growing the manufacturing and export sectors in the region. The WMIG has received strong support from the State Government, which has allowed for a range of planned initiatives for these industries in the region.

Through forums, workshops, networking events and professional development opportunities, the Group helps businesses gain a competitive edge by keeping them abreast of the latest industry developments. The Group has a strong focus on export; encouraging businesses to explore the possibility of global trading through field trips and seminars with export leaders. The Group also has a strong commitment to promoting manufacturing as an attractive career option. The group is auspiced by the Wimmera Development Association and comprises membership mainly from the Horsham Rural City, Hindmarsh, Northern Grampians, West Wimmera and Yarriambiack municipalities.

3.2.6 Utilising the existing framework

It is quite clear from the description of the current economic development framework in the region that there are well-established organisations and processes focusing on the bigger picture strategic priorities, which are of benefit to the whole of the region, including Hindmarsh Shire. Thus, it is critical that Hindmarsh Shire plays an active role within this framework to ensure that the outcomes achieved are maximised through collaborative action. There is also an important role for the Council to play in advocating for their priorities to become regional priorities.

3.3 Local economic development

3.3.1 Council plan

The Hindmarsh Shire Council Plan contains four key result areas, which reflect the priorities of Council and provide a framework for implementing, reporting and monitoring. The four key result areas are:

- Competitive and Innovative Economy
- Community Liveability
- Built and Natural Environment
- Our People, Our Processes.

Council's mission for the Competitive and Innovative Economy key result area is:

To foster a thriving and diversified local economy where economic growth is encouraged and supported.

The Council has identified seven strategic objectives relevant to this mission. They are:

- A diverse economy
- A community that embraces innovative and sustainable energy solutions
- A thriving Wimmera Mallee Tourism industry
- Modern and affordable information and communication technology throughout the municipality
- Thriving, resilient, diverse and economically viable towns
- Transport infrastructure that supports the needs of our communities and businesses
- Public spaces, open space and appealing tourism facilities that promote visitation and meet visitors' needs.

The Council Plan is closely aligned to the Wimmera Southern Mallee Regional Strategic Plan, which is an excellent first step in ensuring alignment with the existing economic development framework, as outlined in section 3.2.6 above.

3.3.2 Community Action Plans

Community Action Plans have been developed for each of the four towns (Nhill, Dimboola, Jeparit and Rainbow) within the Shire of Hindmarsh.

The plans were developed following a number of community activities including mapping of the area's physical, natural, lifestyle, people, business and community assets and a Community Planning Workshop in each town. The local residents, who attended these workshops, identified and prioritised projects and initiatives for the future direction of each town.

These Community Action Plans will be utilised by local residents, community groups and organisations and the Hindmarsh Shire Council as a reference tool for strategic planning and implementation of projects and initiatives.

Thus, these plans are also vehicle for the planning and co-ordination of economic development projects at a local level.

3.3.3 Feedback from business and stakeholders

During the consultation associated with the *Strengthening Basin Communities* project, business operators were asked a number of generic questions about the role of Hindmarsh Shire in economic development, and the specific projects and/or actions it should take to facilitate economic development within the Shire.

The responses to these questions would indicate that local businesses desire the Shire to focus on doing its core business well, i.e. create a conducive business environment. Specific issues raised were:

- The timely processing of planning approvals
- Road maintenance, curbing and channelling works
- The provision of important social services, such as housing, childcare and education, especially for new arrivals to the community.

Thus, Council's core business activities should be recognised as providing a significant contribution to economic development and prioritised as such.

Attracting and retaining professionals is difficult for Council but also service providers such as hospitals, aged care and schools and other businesses. Some of the issues that contribute to recruitment are a shortage of suitable housing and employment opportunities for partners and other family members. An opportunity exists for Council to act as a liaison between major employers within and outside the municipality to develop recruitment packages identifying employment opportunities that match partner skills and with estate agents to identify suitable housing.

Attracting and retaining skilled labour is also a challenge. Ensuring appropriate settlement support and services, for example housing, childcare and education were identified as issues in attracting skilled migrants and refugee workers on 457 Visas.

3.3.4 Meeting the community's needs

Similar to the regional economic development framework, Council has successfully undertaken several initiatives at a local level, which have positioned it well to understand the community's economic development needs.

Thus, it is important that Council utilise the frameworks (Council Plan, Community Action Plans) it has already developed to facilitate economic development at a local level. The Community Action Plans, in particular, have identified the community's needs and a number of local opportunities that Council and the community can partner to develop. The economic development strategy should recognise and incorporate these.

4 Recommended approach

4.1 Council's role in facilitating economic development

The role of local government in facilitating economic development was outlined in section 1.3. In summary, it is about creating a conducive business environment by:

- The development and maintenance of appropriate infrastructure
- The provision of community services
- Efficient management of development approvals
- Co-ordinating multi-agency activities and projects
- Facilitating local investment and attracting new investment
- Providing, collating and acting as a referral point for locally relevant information.

The regional and local economic development framework is well developed, as explained in the preceding sections. The Hindmarsh Shire Council has played an important role in developing the regional framework and initiating the local framework. Thus, it should now seek to utilise it to fulfil its role in facilitating economic development.

4.2 The purpose and role of an Economic Development Strategy

The Council Plan has identified the development and implementation of an Economic Development Strategy as its priority action to achieve its first objective of a diverse economy.

Given the economic development framework the Shire is operating within, it is essential that the purpose and role of this strategy is clearly identified to ensure the Strategy achieves the desired outcome with efficient use of the available resources.

A suggested role for the Economic Development Strategy would be to act as a signpost document, bringing together the existing initiatives, at both a regional and local level, and clearly articulating the Council's priorities and how it will utilise these initiatives to achieve those priorities.

4.3 Proposed framework

It is apparent from the review of the existing economic development framework in section 3 that there are four themes that encompass the core role of Council in economic development (as outlined in section 1.3 and summarised in section 4.1 above).

They are:

5. Supporting a regional process
6. Advocating for regional priorities
7. Meeting local needs
8. Facilitating local opportunities.

4.3.1 Supporting a regional process

This theme should:

- Describe the Council's commitment to the RSP and RDA processes and how Council intends to engage with and contribute to these processes
- Describe Council's commitment, engagement and contribution to the WDA and WMIG
- Recognise these regional processes as the most appropriate vehicle to achieve the bigger picture strategic priorities, which will benefit the whole region and the Shire.

4.3.2 Advocating for regional priorities

This theme should:

- Recognise that a number of Hindmarsh priorities are already acknowledged as regional priorities within the RSP (refer to appendix 2)
- Identify a clear role for Council to advocate for their priorities to become regional priorities
- Describe the process by which Council will achieve this.

4.3.3 Meeting local needs

This theme should:

- Identify the key priorities for local economic development within the Community Action Plans
- Describe how the Council will develop and implement projects to meet these priorities
- Recognise and plan for improved service provision to meet business needs, e.g. infrastructure, community services.

4.3.4 Facilitating local opportunities

This theme should:

- Develop a process to identify local opportunities that are not already covered in the Community Action Plans, or RSP
- Recognise and prioritise Council's role as an advocate for these and other local projects
- Identify Council's capacity to facilitate project development, which might include getting the project recognised as a priority within a Community Action Plan, the Council Plan or the Regional Plan.

4.4 Implementation

Develop an Economic Development Strategy based on the findings of the Economic Development Position Paper with a specific focus on:

- Advocating and supporting regional economic development strategies and initiatives
- Advocating for Hindmarsh priorities to be considered regional priorities
- Attracting and retaining professional and skilled labour

4.5 Application of the proposed framework

The proposed framework has been applied to the Council's economic development objectives and strategies in Appendix 1 to demonstrate how Council should think about its role in economic development. Half of the strategies listed require Council to support regional processes for them to be achieved, thus demonstrating the importance of this approach to achieving Council's economic development objectives.

Appendix 1: Application of the proposed framework to the Council Plan

What we will achieve	How we will achieve this	Regional		Local	
		Support a regional process	Advocate for regional priorities	Meet local needs	Facilitate local opport.
1.1 A diverse economy	1.1.1 Develop and implement an Economic Development Strategy for the Shire that, among other things:				
	▪ Identifies business opportunities related to renewable energy				
	▪ Explores and promotes opportunities from the Pipeline and a potable water supply				
	▪ Investigates business development opportunities resulting from our transport links; eg the Nhill Trailer Exchange				
	▪ Investigates opportunities to increase locally accessible post-secondary education and training opportunities				
	▪ Supports existing businesses to reach their full potential				
1.2 A community that embraces innovative and sustainable energy solutions	1.2.1. Facilitate a demonstration pyrolysis plant in Nhill, using municipal waste to produce diesel, and effectively reducing waste management costs, the amount of waste going to landfill, and our carbon footprint				
	1.2.2 Consider distributed energy generation for Shire towns using solar, waste and biomass, wind and geothermal sources, subject to available funding				
	1.2.3 Renewable energy trial program for Council infrastructure, subject to available funding				
1.3 A thriving Wimmera Mallee Tourism Industry	1.3.1 Support the development of the new Wimmera Mallee Regional Tourism Association (WMRTA) with representation from the local tourism associations in the Shires of Hindmarsh, Buloke, Yarriambiack and West Wimmera to form the foundations of sustainable tourism growth				
	1.3.2. Seek funding for a regionally cooperative approach to tourism marketing across the Wimmera Mallee region to leverage the benefits from visitors to the region				
	1.3.3 Support the branding projects of the WMRTA and the Hindmarsh Tourism Association				

What we will achieve	How we will achieve this	Regional		Local	
		Support a regional process	Advocate for regional priorities	Meet local needs	Facilitate local opport.
	1.3.4 Foster locally significant community-driven events and festivals that stimulate tourism growth in the region				
1.4 Modern and affordable information and communication technology throughout the municipality	1.4.1 Work with other councils and stakeholders to position the Shire well for an early rollout of the National Broadband Network and for the pursuit of targeted information technology opportunities				
1.5 Thriving, resilient, diverse and economically viable towns	1.5.1 Active involvement in Rural Councils Victoria and the Wimmera Development Association				
	1.5.2 Explore options that attract visitors to our towns, commencing with Dimboola				
1.6 Transport infrastructure that supports the needs of our communities and businesses	1.6.1 Develop and implement a Master plan for the Nhill Aerodrome to strengthen its capacity to support the community, emergency services and aviation requirements				
	1.6.2 Advocate for and explore flexible and responsive public transport, and freight transport				
	1.6.3 Continue Council's representation on transport related external working groups				
1.7 Public spaces, open space and appealing tourism facilities that promote visitation and meet visitor needs	1.7.1 Review and upgrade current caravan and camping accommodation in the Shire				
	1.7.2 Construction of Nhill Aviation Heritage Centre to promote Nhill's unique aviation heritage and link to a regional tourism trail, subject to available funding				

Appendix 2: Hindmarsh priorities within the Regional Strategic Plan

Legend:

- Green – specific to Hindmarsh Shire
- Yellow – beneficial to Hindmarsh Shire
- Red – specific to other municipalities
- Blue – specific to this project

Areas for Action	Suggested Lead Agency (& collaborating partners)
SD1: Strengthen the Farming Sector's Capacity to Prosper in a Changing Climate	
▪ Analysis of the impacts of different climate change scenarios on the future productivity of the region to enable communities, the industry and individual businesses to plan for the range of eventualities	DPI (Industry groups, local governments, WMSA)
▪ Use scenario analysis information in AgFutures projects (and other relevant projects) to improve farmer understanding of what climate change will mean for them and expand the number of communities participating in AgFutures	DPI (DPCD)
▪ Grains Innovation Park and Birchip Cropping Group expand research and development of frost, drought and disease resistant plant varieties and sustainable farming systems	DPI / BCG (GRDC & industry groups)
▪ Support farming sector to adapt enterprises to make best use of water provided through the Wimmera Mallee Pipeline	DPI (Industry groups)
▪ Promote opportunities for new agricultural investment appropriate to water resource availability and land capability	DPI (WDA, local government)
▪ Provide weather watch radar in the Wimmera Southern Mallee to enable more timely and effective on-farm operations	Bureau of Meteorology
▪ Development of R&D partnerships with the new Centre for AgriBiosciences to ensure access to leading scientists, technology and facilities to progress regional priorities for agricultural R&D	DPI (Industry groups)
SD2: Build the region's nature based and outback tourism industry	
▪ Development of local tourism associations in the Shires of Hindmarsh, Buloke, Yarriambiack and West Wimmera to form the foundations for sustainable tourism growth	Local Government (Tourism Victoria)
▪ A regionally cooperative approach to tourism marketing across the Wimmera Southern Mallee to leverage the benefits from visitors to the Grampians	Local Government (Grampians Regional Tourism Organisation)
▪ Strengthen alignment between Tourism Victoria's Regional Tourism Marketing Plan and tourism industry development needs in the Wimmera Southern Mallee	WDA (Local government, Tourism Victoria)
▪ Development of the Grampians Long-Distance Icon	Parks Victoria

Walk to strengthen the Grampians as a destination for nature-based tourism	(Local Government, tourism groups)
▪ Infrastructure provision in Halls Gap, Wartook Valley and Natimuk/Mount Arapiles to service existing tourism demand.	Local Government
▪ Assist tourism businesses in fire-prone areas to re-focus their Promotion and business development	RDV (Tourism groups, Tourism Victoria)
▪ Foster locally significant community-driven events and festivals that stimulate tourism growth in the region	RDV (Local Government)
SD3: Facilitating Industry Clusters and Building on Regional Strengths	
▪ Expand the focus of the Wimmera Grains Cluster to incorporate industry leadership, marketing and business development	WDA (Grains Cluster businesses)
▪ Foster export development opportunities through the Wimmera Manufacturers Network	WDA (Manufacturing businesses)
▪ Support sustainable development of the gold and mineral sands mining industries	DPI (DSE, local government, industry)
▪ Investigate business development opportunities associated with freight transport and other compatible industries at the Wimmera Intermodal Freight Terminal, the Nhill Trailer Exchange and other towns	WDA (Local government, industry)
▪ Position the region to capitalise on business growth and development opportunities from the Wimmera Mallee Pipeline	WDA (GWMWater, Local government, RDV)
▪ Develop a regional promotion and branding strategy to reposition external perceptions of the region and promote the region as a place to live, work and invest	RDV (Local Government)
SD4: Innovative and Sustainable Energy Solutions	
▪ Establish a demonstration of distributed energy generation at Nhill, using local sources of energy to supply the Nhill Hospital, Luv-A-Duck, local silo manufacturers and Lowan Wholefoods	RDV (Sustainability Victoria, WDA, Hindmarsh Council, WMSA)
▪ Distributed energy generation considered for other towns (population <1,000) using solar, wastes and biomass, wind and geothermal sources	RDV (WMSA, local government)
▪ Seek clear and efficient approvals processes to enable small, local generation businesses easier access to the distribution network	DPI (WDA)
▪ Provide incentives and training for local businesses and energy efficiency practitioners to improve energy efficiency in the region and free up existing supply capacity	Sustainability Victoria (WMSA, WDA & RDV)
SD5: Broadband and mobile phone coverage standards enable the whole region to be competitive and liveable	
▪ Develop a regionally supported approach to drive improvement in broadband and mobile phone coverage in the Wimmera Southern Mallee for towns with populations less than 1,000	WDA (local government, key community and business organizations)
▪ Wimmera Southern Mallee ICT Plan development and implementation	Grampians RDA Committee (WDA, local government)
▪ Develop innovative local ICT solutions through	Local government

community planning initiatives	
SD6: Transport infrastructure supports the needs of the region's industries and communities	
▪ Development of a <i>Western Victoria Regional Freight Strategy</i> that plans for changes in demand from the agricultural, forestry and mining industries	VicRoads (Local governments)
▪ Successful implementation, marketing and operation of the Wimmera Intermodal Freight Terminal	Horsham RCC (RDV, WDA)
▪ Progress Western Highway bypass at Horsham to improve amenity and safety of Horsham and freight transport efficiency	VicRoads (Horsham RCC)
▪ Duplication of the Western Highway to the South Australian border to provide a safe road transport corridor through the region	VicRoads (WDA, Local Government)
▪ Assessment of the social, environmental and economic value of connecting the Wimmera Southern Mallee and Melbourne via fast passenger train service	DoT (DPCD)
▪ Upgrade of the north-south runway at Horsham aerodrome and assessment of potential for commercial passenger service	RDV (Horsham Rural City Council)
▪ The Transport Connections Program be expanded significantly to provide appropriate and accessible services in all towns	DoT (DPCD)
▪ Maintain the capacity of the region's aerodrome network to support emergency services and other aviation requirements	DoT
SD7: Provide access to a comprehensive and contemporary range of learning programs from K-12, regardless of location	
▪ Rationalise learning programs offered by individual schools and expand access via use of ITC and shared teaching resources	DEECD
▪ Attract and train trainers from within the local community to develop and deliver locally relevant learning programs	DEECD, ACE
▪ Build collaborative partnerships between training providers to foster and encourage alternative models of training provision in small communities	WSM LLEN, DEECD (Local Government, ACE, TAFE, private RTOs, industry)
▪ Develop the ACE sector as a viable pathway between school and TAFE/University	DEECD, ACE
▪ Extend access to Community VCAL to all communities	WSM LLEN, DEECD (Local Government, industry)
SD8: Increase locally accessible post secondary education and training opportunities.	
▪ Review impact of State Government policy, <i>Securing Jobs for your Future - Skills for Victoria</i> , on the delivery of post secondary education and training in 'thin' markets, eg. Wimmera Southern Mallee	Skills Victoria (UB, WorkCo/Longerenong & other regional providers)
▪ Seek Government, industry and community support to increase course offerings at existing campuses within the Wimmera Southern Mallee	UB, WorkCo/Longerenong (Skills Victoria, ACE, WSM LLEN, Local Government, industry)
▪ Develop outreach programs to extend delivery of course offerings to those communities beyond the existing campuses	UB, WorkCo / Longerenong, (WSM LLEN, ACE, Local Government, industry)
SD9: Attract and retrain workers to meet immediate workforce needs.	

<ul style="list-style-type: none"> Retain and expand the <i>Wimmera Southern Mallee Skilled Migration Initiative</i> 	WDA (Local Government)
<ul style="list-style-type: none"> Retain and expand the <i>Rural Skills Connect – Wimmera Initiative</i> 	WDA and Local Government) (RDV)
SD10: Sustainable Management and Use of Water	
<ul style="list-style-type: none"> Ensure the process for establishing equitable water share of the available water supply in the Wimmera Southern Mallee enables wide community input 	GMMWater
<ul style="list-style-type: none"> Review the bulk entitlement shares for all water users in the Wimmera Southern Mallee 	DSE (GMMWater, Wimmera CMA)
<ul style="list-style-type: none"> Develop a water trading system for consumptive entitlements that will facilitate economic development by encouraging use for high value production 	GMMWater (DSE)
<ul style="list-style-type: none"> Invest in research into the risks and localised impact of climate change on the water supply and the interaction between groundwater and surface water in the Wimmera Southern Mallee 	DSE (GMMWater)
<ul style="list-style-type: none"> Prepare Integrated Water Management Plans for priority communities of the Wimmera Southern Mallee 	GMMWater (Local Government, DSE, WCMA)
SD11: A Healthy Catchment	
<ul style="list-style-type: none"> Support development of biolinks in Wimmera Southern Mallee to improve extent and quality of native vegetation 	Wimmera CMA (DSE)
<ul style="list-style-type: none"> Support of the Landcare networks and groups to help achieve catchment management objectives 	Wimmera CMA (DSE, DPI)
<ul style="list-style-type: none"> Support for Landcare groups and networks as well as farmers and farmer industry groups to promote awareness and adoption of improved land management activities 	Wimmera CMA (DSE, DPI)
<ul style="list-style-type: none"> Maintain and enhance condition of flagship areas in the Wimmera Southern Mallee 	Parks Victoria (DSE, Wimmera CMA)
SD12: A Community Living More Sustainably	
<ul style="list-style-type: none"> Strengthen regional understanding of climate change and associated risks to enable communities and institutions to develop mitigation and adaptation responses 	WMSA (Local Government, state government)
<ul style="list-style-type: none"> Support implementation of Local Government Sustainability Accords 	Local Government (WMSA, Sustainability Victoria, DSE)
<ul style="list-style-type: none"> Embed climate change information and understanding into local community planning processes 	WMSA (Local Government)
SD13: Strengthening local communities	
<ul style="list-style-type: none"> Review the capacity of volunteers to service community needs and consider additional volunteer support programs. Assess whether reliance on volunteers is sustainable in future and the need for innovative models of volunteering. 	DPCD (Wimmera Volunteers Inc. Local Government)
<ul style="list-style-type: none"> Support the on-going delivery of the Wimmera Community Leadership Program and alumni network to contribute to the region 	RDV (WDA)
<ul style="list-style-type: none"> Community planning and development be undertaken 	Local governments

in Wimmera Southern Mallee communities with populations less than 1000 to improve local community outcomes.	(DPCD, DHS, DEECD)
▪ Youth issues of crime, road trauma and public order addressed through multi-agency approaches	DoJ, DHS, Victoria Police (Local Government)
▪ Support the continued development of arts and cultural activities throughout the region	Local Government (Arts Victoria)
▪ Develop a regional housing strategy to address need for appropriate housing choice, availability and affordability	Local Government (RDV, DPCD, DHS)
SD14: Health and community services delivery responds to population change.	
▪ Engage in the development of the Wimmera Health Services Plan to ensure local community issues and needs are communicated effectively.	Department of Health (Health sector, Local governments)
▪ Expand the DHS service hubs program to identified priority towns	DHS (other government agencies)
▪ Community planning and development be undertaken in Wimmera Southern Mallee communities with populations less than 1000 to improve local community outcomes.	Local governments (DPCD, DHS, DEECD)

Appendix 3: Consultation

Name	Title	Organisation
Marc Amos	Regional Development Manager	Regional Development Victoria
Jo Bourke	Executive Director	Wimmera Development Association
Cr David Colbert	Councillor	Hindmarsh Shire Council
Julie Conway	Manager	Mid West Milling
Jeff Fritsch	Manager	Ahrens Sherwell
Colin Kemp	Project Officer	Wimmera Development Association
Phil King	Director of Community Development	Hindmarsh Shire Council
Wayne Lovett	Councillor and Regional Tourism Representative	Hindmarsh Shire Council
Cr Ron Lowe	Councillor	Hindmarsh Shire Council
Dean Miller	Chief Executive Officer	Hindmarsh Shire Council
John Millington	Community Relations	Luv-a-Duck
Bob Stokes	Manager	Jeparit supermarket
Cr Cliff Unger	Councillor	Hindmarsh Shire Council
Michael Versluis	Operations Manager	Luv-a-Duck
Wayne Warwick	Manager	Campbells Silos
Fiona Werner	Business Officer	Hindmarsh Shire Council



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