

North East Victoria - Adapting to a low water future: Review of municipal documents.

Prepared for the North East Greenhouse Alliance



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Disclaimer

While every attempt has been made to make this information as accurate as possible, the North East Greenhouse Alliance and its members and contributing organisations and the author assume no legal responsibility for decisions based on the contents of this document.

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Summary of opportunities and recommendations

The following recommendations have been made in the body of the document.

Section A (Pages 12-20)

Topic: Gaps identified

1. Councils should monitor the progress of the Engineers Australia ARR Revision Project
2. Councils should consider advocating for end user representation on the technical committee or other committees of this project, if not this has not already occurred.
3. Councils with North East Water and the North East Catchment Management Authority should propose that the North East be a pilot project for aspects of the project
4. The region should invite representatives of the Engineers Australia Project Team to address municipalities on the project, benchmarks and outcomes
5. Councils should ensure that there is no duplication in research or modelling that has already been undertaken as part of the ARR Revision project.
6. Staff should confirm the status of the CSIRO *Urban Stormwater: Best Practice Environmental Management Guidelines* and whether this has been upgraded or background documents and technical documents have superseded this work.
7. Councils should request that the Victorian Planning Scheme be amended to address rapidly changing levels in flooding and other planning impacts due to climate change, to assist municipalities reduce current and future risks.
8. Councils should request that the Victorian Planning Scheme section 13.01 be expanded to consider inland climate change impacts.
9. Councils should request a single point of information for all flooding information be made readily available to councils and the public.
10. As Planning Schemes are reviewed councils should ensure that the most recent version of documents are included as referenced documents.

Topic: Constraints

1. Councils should identify opportunities to identify what skills and resources are needed within the organisations to increase the capacity and resilience of staff and councillors to manage during rapid change.
2. Councils should, wherever possible, include an administrative loading into funding submissions.
3. Councils should consider refusing funding if related conditions provide onerous restrictions.
4. Councils should consider jointly funding a fund raising position to expand the sources of funding of councils and municipalities.

Topic: Opportunities for Change

1. Councils should recognize that dealing with climate change is a core activity that cuts across and impacts all elements of council businesses.
2. Where not already established, staff should develop measurement and reporting on water and energy consumption of council operations publicly and on a regular basis.
3. For every plan and strategy, councils should apply a template of questions that identify how the documents and its recommendations have considered, managed and reduced risks associated with climate change.
4. For every plan and strategy, councils should apply a template of questions that identify how the documents and its recommendations have considered, and identified, opportunities arising from adaptation and mitigation of climate change.
5. All reports going to Council seeking endorsement or approval, should include a statement from officers how they and/or the consultants have addressed the issue of climate change risk and opportunity.
6. Councils should identify a senior executive staff member who will be responsible to ensure this work occurs, and include this activity as part of their key performance indicator.
7. Councils allocate to an individual Councillor or Councillors a responsibility to champion this activity and provide support to staff as one of their portfolios of responsibilities.
8. Councils should share, monitor and document progress in this cultural change as part of the development of increased capacity within Councils and the community.

Section B (pages 31 – 62)

Topic: Surface Water Supply and Quality

1. Councils should consider their recreation strategies, park strategies and facilities management in a proactive manner to address the risk of ongoing, severe water reductions, and to develop both contingency planning and alternative approaches to facility and asset management
2. Councils should review their current emergency management plans for drought and consider which of these activities should be transferred into standard operating procedures.

Topic: Groundwater Supply and Quality

1. Councils should act to obtain a better knowledge of groundwater resources in partnership with other agencies.
2. Council to collaborate with other agencies to encourage an improved groundwater monitoring network.
3. Councils in conjunction with agencies, including CFA, should map all bores for potential sources of water for fire fighting and water supplies.

Topic: Stormwater Management

1. It is strongly recommended that no future planning on storm water or flooding be undertaken without firstly assessing and considering existing plans and strategies.
2. Councils should revisit in a consistent way the existing Stormwater Plans and assess whether they are still relevant, and whether any of the recommendations can be carried out.
3. As reviews of Planning Schemes are undertaken, councils should revisit the management options in the Stormwater Plans and include management recommendations where appropriate.
4. Councils may wish to workshop funding opportunities as a group and prioritise spending for storm water infrastructure.
5. Councils should keep a watching brief on state government approaches to WSUD and potential opportunities for funding.
6. It is recommended that the state government review its storm water design standards and update them to reduce risks for future developments.

Topic: Flooding

1. There should be a clear discussion about risks facing councils – legal, reputational and financial risks where flood studies have been undertaken and not incorporated into the Planning scheme.
2. Councils should as a priority incorporate existing flood studies as an overlay in Planning Schemes.
3. Councils as a group should select two or three existing flood models for an urban area where a Council is under development pressure and remodel taking into account latest information on rainfall and its changes under climate change to quantify the changes and risks.

4. Councils to liaise with NECMA and other partners to improve flood prediction.
5. Councils and partners should be more explicit in education programmes that flood plains are for flooding and reduce future (housing and building) development in these areas.
6. Councils should, in consultation with NECMA, identify areas that could benefit from the improved accuracy of mapping of the land subject to inundation.
7. Councils and partners should provide information as part of the “welcome package” and resource guide for rural properties on flood risks and preparedness for emergencies.
8. Councils and partners should undertake a review of all infrastructure costs and other costs to municipalities for the recent flooding events.
9. Councils should work with insurers to identify benefits of alternative strategic approaches, including “Betterment”.
10. Acting as a group, councils should present a case to state and federal government outlining the need for “Betterment” when replacing infrastructure affected by flooding.
11. Councils in consultation with partners, should identify a hierarchy of risks to infrastructure for council, state and interstate assets to identify where Betterment would be best applied.

Topic: Climate Change Planning and Co-ordination

1. Councils should revisit existing plans and strategies as the Planning Schemes and Council Plans are reviewed to consider the appropriateness of including additional documents as referred documents. For example, Heatwave Plans
2. Referred documents and incorporated documents should be reviewed and amended to reflect the latest document produced. Drafts should not be included within the planning schemes.
3. Planning Schemes should be amended to incorporate flood overlays to better protect against risks.
4. Planning schemes should be reviewed to include more clearly the language of risk and management of risk, for example in relation to future flooding and development, and availability of water.
5. Planning Schemes should include clearer monitoring standards that address climate change risks.

Topic: Carbon Pricing

1. Councils should review the progress of the Greenhouse Action Plans against targets
2. Councils should actively monitor energy consumption and prices.
3. Councils should include a standing item in reporting on a quarterly basis about energy consumption, comparing year to year progress
4. Council should keep a watching brief about opportunities arising from carbon legislation
5. Councils should seek to take advantage of carbon pricing opportunities including generation of renewable energy and carbon sequestration offsets.

Topic: Economic Development

1. Councils' economic development units should increase the capacity of businesses by running workshops for dealing with business interruption (contingency planning).
2. If not already in place, councils should develop business interruption plans for municipal operations.
3. As economic development strategies are developed and renewed, specifically address managing risks associated with climate change for existing businesses.
4. As economic development strategies are developed and renewed, specifically address opportunities associated with climate change for existing and new businesses.

Topic: Tourism

1. As tourism strategies are prepared or renewed they should draw on a rigorous examination of what the impacts were of recent (drought, fire and flood) events, and use these as a base case for extrapolating future risks, and reducing them.
2. As tourism strategies are developed and renewed, councils should require the strategies to specifically address climate change risks and opportunities.

Topic: Recreation and Amenity

1. Councils should shift from considering drought management as an emergency response to a risk management item.
2. Councils should revisit sustainable water use plans and consider how well they manage in a period of continuing low water availability.
3. Working with the community, councils should consider in advance which facilities it shall not maintain in future reduced water periods.
4. Councils should continue to reflect their more recent approaches on managing for heat and integrated community wellbeing when revising other strategies.

Section A: Overview

1 Introduction

This report is an element of Phase 3 of the Project: North East Victoria - Adapting to a Low Water Future¹. The North East Greenhouse Alliance received funding from the Federal Government under its *Strengthening the Basin Communities*, a component of Water for the Future.

This work builds on previous phases of the project, and in particular the risk assessment and adaptation planning. Through workshops and consultation, high priority risks were identified². These were then the basis of further workshops to develop an adaptation plan.

In all, eight priority groupings of risks that were in the extreme or high risk categories were identified. The eight groups are: surface water supply and quality; groundwater supply and quality; stormwater and flood management; policy and planning; economic development; recreation and amenity; emergency services and environment.

This report looks at work already undertaken by the five municipalities in the context of the risks and adaptation measures identified. The brief was to: examine existing reports; analyse reports; identify whether Climate change had been addressed as part of the assumptions; and make recommendations in consultation with the municipalities.

In undertaking this work, the emphasis has been to not duplicate material, and to try and add value to Councils' work.

It should be noted that this is a snapshot of the current reports. There would be benefit of reviewing municipal plans and strategies again in five years to track changes.

2 Structure of the report

There are three sections:

- An overview
- An in-depth analysis of the result of reviewing council documents, based on the priority risk groupings identified in Phase 2 and
- A summary of the review of Council documents, by Council.

¹ This report represents 'C3-P1 Revision of Plans and Strategies' within the larger project.

² These are outlined in the draft report [Adapting to a Low Water Future: Climate Change Risk Assessment and Adaptation Plan](#).

3 Approach taken

Part of the brief for the project was to:

- *Identify plans and strategies that are impacted by reduced water availability or increased frequency and severity of rainfall events.*
- *Confirm which plans and strategies are to be revised following Phase 2 Risk workshop in consultation with NEGHA Executive Officer and the Project Steering Group.*
- *Identify gaps in each plan i.e. where climate change and water availability assumptions may be inadequate*
- *Recommend a method to include adequate assumptions in existing plans and strategies...*

This report was developed with input from staff of the five municipalities involved in the project, as well as the Steering Committee and Technical Committee members of the North East Greenhouse Alliance.

Discussions were held with staff and subsequently documents from each municipality were provided, read and reviewed. The proposed approach was considered and endorsed by the Steering Committee. Drafts of reports have been reviewed in workshops. Suggested changes and clarifications have been incorporated into this report.

A series of plans and strategies have been reviewed to examine whether climate change has been addressed in the documents. While the emphasis of the project has been on water issues, a broad collection of documents have been reviewed, and other aspects of climate change have been also considered.

Existing plans and strategies examined have included for each council (where available):

- Planning Scheme
- Council Plan
- Community Vision
- Healthy Communities Plan
- Heatwave Plan
- Recreation Plan
- Economic Development Plan
- Tourism Plan

Other plans unique to individual Councils have also been examined. The detailed review of these plans is included in Section C.

3.1 Relationship with other Phases of the project

There is a linkage between this work and Phase 2 of the project. Phase 2 incorporated a risk assessment for the organisations including municipalities, water authorities and state

government representatives. There were two main sections: a risk assessment, and then identification of adaptation actions that addressed the highest ranking risks that had been identified. Phase 2 also included a series of workshops and follow-up consultations.

This Phase 3 report has used the outputs from the draft report from Marsden Jacobs to organise topics, and as a way of organising the workshops with municipal staff. As such the topics in this report are organised to address the highest ranking risks identified in Phase 2 in the following order:

- Surface Water Supply and Quality
- Groundwater Supply and Quality
- Stormwater management and Flood management
- Policy and Planning
- Economic Development
- Recreation and Amenity
- Emergency Services and
- Environment

It should be noted that while Phases 1 and 2 of this project addressed a number of institutions, the brief for this aspect of Phase 3 specifically addresses municipalities only.

4 Risk, climate change and municipalities

One of the issues for discussion is who “does” climate change? Who is responsible for mitigation of climate change: both reducing emissions and therefore reducing the severity of climate change, and who “does” adaptation, dealing with changes arising from climate change? In some of the documents examined, there are statements that climate change is the responsibility of the federal government. While the policy settings at the federal level are important, they cannot be relied upon to sort out issues. Not least of which because the federal level is so heavily politicised and there is a struggle to get anything done on the climate change area, that creates real problems for local government.

At the State government level, there are also challenges. In Victoria, the State Planning Policy Framework includes a section on climate change: s13.01. While Climate Change Impacts has a section on coastal inundation and erosion (s13.01-1), there is no comparative section on inland impacts. This makes it more difficult for Councils to have a consistent, state wide approach for planning and action to adapt to the increased risks of climate change.

So, while at the federal and state jurisdictions there is a lack of direction and clarity in quite a number of areas, municipalities have to deal with the realities of accelerating change and risk and the consequences for the decisions that they make.

Climate change amplifies risk. What has been striking in the workshops in Phase 2 of this project is that many of the issues that have been identified as extreme *future* risks for municipalities are already being addressed by municipalities.

2010 and 2011 were demanding times in the North East. Many years of drought which sorely tested resources of municipalities and the community, affected the economic viability of businesses, and the resilience of communities turned in a period of months to a period where there were large floods. Flooding occurred in late November 2010, again in December 2010, and in February 2011 in some areas. In areas flooding hit newly repaired infrastructure and damaged the same areas. In this period, municipalities faced considerable bills as well as disruption to the “normal” services that are provided by staff.

While dealing with the existing challenges to deliver services and address the needs of their communities, it can be argued that municipalities are the face of managing adaptation to climate change.

5 Language and risk

During the review of existing plans undertaken as part of this part of the project, documents were examined to identify whether climate change was considered as part of the approach taken. While more detailed outcomes will be discussed in Section B, there are a number of observations.

A number of municipalities make reference to climate change within their core documents: the Planning Scheme, Council Plan and any related vision piece. However in some cases it is absent. What is striking about this, for example in the case of Towong, is that there can be highly innovative practices that demonstrate leadership and innovation and appear to be models for adaptation, but the terms “climate change” and “greenhouse” do not appear³.

Where there are highly innovative programs that have a community benefit of making communities more resilient and able to adapt to climate change, is an absence of language an issue? Towong clearly frames many of their innovative and excellent programs as economic development initiatives. It may be that for some communities or councillors, terminology such as ‘climate change’ is a negative that gets in the way of action. Changing the language may help to get actions passed through Council.

This is a more confronting story however if the language is not used, nor actions undertaken. In fact it is argued that the decisions that Councils make on a regular basis

³ This is for both the Planning Scheme MSS, and for the Council Plan.

either assist communities to deal with these issues, or increase the risks, and costs, to the community. The use of the risk framework and talking within Council and within communities about managing risk can reduce the emotions and assist to a shift to proactive action.

This issue was discussed at length in the workshops with staff. There are pluses and minuses about avoiding the “c” word and focussing on the language of risk. One issue is the target audience. The target audience for this report are the members of the NEGHA, and councillors and staff in particular. Where Councils have been using the risk concept, have well developed risk management plans, and are clear about the inter-relationship of risk management and insurance premiums, using risk language can make sense. The general public however may not have a clear sense of risk, and as one staff member put it “people’s eyes glaze over”.

The Commissioner of Environmental Sustainability has in recent workshops raised the term “co-benefits”. Actions that mitigate climate change: for example reducing energy consumption, have a benefit of both reducing costs and reducing greenhouse gas emissions. This is an approach that could also be used.

It is argued that at a minimum, risk assessment arising from climate change needs to be discussed with communities, while work is underway to reduce the risks for both municipalities and communities.

6 Councils and water.

The role of municipalities in relation to water is different in Victoria than in other States, particularly NSW. The reform program of the Kennett period, in 1993, saw the responsibilities for providing water and wastewater services taken from the management of individual municipalities and placed to regionally based water authorities⁴. In North East Victoria, the role of providing water and sewerage services is largely the responsibility of North East Water (NEW). At the same time, the traditional river management authorities underwent significant change and eventually the Catchment Management Authorities were established. In the North East, this role is largely by the North East Catchment Management Authority while some activities are undertaken by the neighbouring Gippsland Catchment Management Authority, a direct outcome for the size and geographical range of the municipalities.

⁴ For more details, see N. Martin, Corporatisation as a means of improving water quality. The Experience in Victoria, Australia, 2002.

Municipalities therefore do not have the same day to day management of water infrastructure, flooding and catchment management planning processes that occurred up to the 1990's, and still occur in other States.

Municipalities however do have significant water related roles. These include: making decisions related to development, through the planning process; as well as maintaining and developing infrastructure for stormwater management; providing an important role in emergencies including flooding; and maintaining and replacing council owned assets that may be damaged through, for example, flooding events. These include roads, bridges, footpaths, retention ponds, and stormwater systems. Municipalities also use water and own and develop their own infrastructure for maintaining recreation facilities and assets such as playing fields, and assist in providing services to their own facilities and the community through periods of drought. In effect, municipalities are at the forefront of delivering and mitigating the impacts of flood and drought.

7 Adding value to Council's work

Over a number of years, municipalities have expanded their roles. In some cases this has been as a result of requirements of the State government. Table 1 outlines the reports that have been identified in discussion with staff that relate to this project, and the impetus for the reports.

In addition from mandated additional roles, Councils can also take up initiatives. Some examples are also included in the table.

Table 1: Background to report types.

Type	Why	Who Funded?	Comment
Planning Schemes	<p>The <i>Planning and Environment Act 1987</i>, (the Act) is the legislative basis of Victoria's planning system.</p> <p>Local government's role in carrying out its functions, as council has two roles:</p> <p style="padding-left: 40px;">As the 'planning authority', a council sets strategic policy framework for its municipality and initiates change to the planning scheme</p> <p style="padding-left: 40px;">As the responsible authority, a council administers the planning scheme for its municipality and makes decisions on individual applications for a planning permit⁵.</p>	Each Council : core business	<p>Victorian Planning Provisions (VPPs provide the basis for all statutory land use controls in Victoria. In place since October 1996.</p> <p>The Victoria Planning Provisions (VPP) comprise the land use zoning controls and definitions applied to all land in Victoria through local government planning schemes. Each council, as a Planning Authority, prepares a planning scheme which is a strategic policy based document.</p> <p>The Scheme contains two policy sections: State Planning Policy Framework (SPPF) - prepared by the Victorian Government / Minister for Planning; Local Planning Policy Framework (LPPF) - prepared by the council and approved by the Minister for Planning⁶.</p>

⁵ Municipal Association of Victoria, [Land Use Planning](#)

⁶ MAV, *ibid*

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Type	Why	Who Funded?	Comment
Council Plans	Required by State Government by 30 June in the year following a general election. Before adoption of Council Plan, council must give public notice and invite public submissions ⁷ .	Core business	Includes: Strategic objectives of council; Strategies for achieving those objectives over the next four years; A strategic resource plan; strategic indicators for monitoring the achievement of the objectives.
Strategic Resource Plans- Required by State Government as part of the Council Plan	It describes the resources required to achieve the strategic objectives in the Council Plan.	Core business	A Strategic Resource Plan must always cover the resource needs for at least the next four years and must be adopted by 30 June each year. A Strategic Resource Plan must include: Standard Statements describing the financial resources required for the next four financial years; and Statements describing the non-financial resources required for the next four financial years. Statements describing non-financial resources generally address future staffing requirements and may also address infrastructure and information technology needs ⁸ .
Type	Why	Who Funded?	Comment
2030 Vision	Initiative of some councils.	Internal funding	Some Councils have explicit

⁷ Department of Planning and Community Development, Guide to Local Government

⁸ Department of Planning and Community Development, *ibid.*

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			community consultation plans called 2030 Vision. Others may have different consultation models.
Floodplain Management Plan	When adopted by Council can be used as a floodplain overlay which helps to manage development.	Various funding sources, including Catchment Management Authority (CMA)	Provides a blueprint for how local Council and the North East CMA will manage a defined floodplain. Majority are for rural areas.
Stormwater Management Plan - Quality	Encouraged by State Government around 2002.	EPA initially. limited funding available for implementation.	Focus is on water quality. Most projects in North East undertaken by ID&A or successor EarthTech. The exceptions are Wangaratta and Wodonga who used Parsons Brickenhoff. All plans were developed in accordance with Best Practice Environmental Management Guidelines (CSIRO, 1999).
Sustainable Water Use Plan	“A Sustainable Water Use Plan is a valuable water management and conservation tool. It identifies where council uses water, how much water is used and it identifies actions for council to reduce their water consumption” ⁹ .	DSE funded. Launched in 2005 by State Government and provided funding of up to \$10,000	For activities of Council, to reduce water use, not of community. Councils that have sites that consume more than 10ML per annum are also required to complete a site specific 'Water Management Action Plan' (waterMAP). WaterMAPs are a mandatory requirement under Victoria's Permanent Water Saving Plans. To minimise overlap between waterMAP and Sustainable Water

⁹ Office of Water, [Sustainable Water Use Plans](#) .

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Type	Why	Who Funded?	Comment
Healthy Communities' Plan	Required by State Government under the Public Health and Wellbeing Act 2008: "Public health and wellbeing Bill 2008 reframes the role of health planning and clearly establishes a legislative mandate for Councils to broaden wellbeing and link to land use and Council planning." ¹¹		Use Plans requirements, the council can work with their local water corporation to align the two plans ¹⁰ . Required under the Act to provide information about: What the community looks like How healthy we are and what health issues we face What Council is going to do in the next four years to address issues and improve our health Who Council is going to work with to achieve better health outcomes and How Council is going to monitor the performance of the plan. (Source: Towong p3)
Heat Plan	Required by State Government. Considering impact of Climate Change on Human Health. Heatwave Plan for Victoria 2009-2010	State government provided (statewide) \$1.99 million to develop heat wave plans ¹²	
Tourism Strategy	May be undertaken by Councils.	Generally internal funding although assistance may be	

¹⁰ Office of Water *Ibid.*

¹¹ Alpine Shire Liveability Plan, p7.

¹² Jan Bowman, **Considering the impacts of climate change on human health, wellbeing and municipal public health planning**, presentation to National Environment Conference: *Transitioning to a climate resilient future* in Melbourne on the 15 – 16 April 2010.

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Type	Why	Who Funded?	Comment
Economic Development Strategy	May be undertaken by Councils.	Generally internal funding	
Environment Strategy	May be undertaken by Councils	Generally internal funding	
Greenhouse Action Plans	May be undertaken by Councils		Developed often in partnership with ICLEI – Local Governments for Sustainability

8 Gaps identified

8.1 Gaps in State government approaches

The brief was to focus on the municipal documents but some gaps have also been identified at a statewide level. It would provide assistance to Councils if the State government took the initiative to fill these gaps and reduce the amount of duplication of work that otherwise may need to take place.

The planning processes of Councils are a key activity and have immediate and long term consequences for the community. Planning schemes have both incorporated and referred documents.

“Incorporated documents are essential to the proper functioning of the planning scheme and decision-making... These incorporated documents must be taken into account by responsible authorities in decision-making and can only be amended by the Minister.¹³

Reference documents provide background information to assist in understanding the context within which a particular policy or provision has been framed. Reference documents have only a limited role in decision-making as they are not part of the planning scheme. They do not have the status of incorporated documents or carry the same weight.¹⁴”

Appendix A and Appendix B list all of the incorporated and referred documents in the Planning Schemes of the municipalities.

8.1.1 Australian Rainfall and Run-off (ARR)

A critical incorporated report is the Australian Rainfall and Run-off – A Guide to flood estimation, Volume 1¹⁵ (ARR). This material “is a key source of technical information in Australia for designing infrastructure to withstand the impact of extreme rainfall, flooding and storm surge”¹⁶.

¹³ Department of Infrastructure, Incorporated and Referenced Documents, 2000. P 1 Available at http://www.dpcd.vic.gov.au/data/assets/pdf_file/0015/41712/928_VPP_Inc_and_Ref_doc.pdf,

¹⁴ Department of Infrastructure, 2000 p3

¹⁵ Institution of Engineers, Australian Rainfall and Run-off – A Guide to flood estimation, Volume 1, Australia, Reprinted edition, 2001.

¹⁶ Engineers Australia, Australian Rainfall and Runoff Revision Project available at <http://www.engineersaustralia.org.au/ieaust/index.cfm?44EFEEF4-D50A-BC6D-258F-1DC32BF04011>

Engineers Australia is currently revising this report and associated documents. The project is to take 4 years and the majority of the 21 projects will incorporate adaptation and consideration of the effects of climate change¹⁷.

A review of the steering committee membership and technical committee membership does not show a relationship to the end users, including municipalities.

It is critical that municipalities and their partners including North East Water monitor this work, ensure that it occurs as quickly as possible, and not duplicate the research and modelling. This should be done through all avenues including the Municipal Association of Victoria, and the Hume Regional Managers Forum. A possible opportunity is to propose that the North East and the participating Councils be included as case studies or pilots to obtain relevant information quickly.

It is also noted that a number of the other incorporated documents are also quite old and may not take into account the impact of increased rainfall events, or prolonged dry periods.

Many of the referred documents in the Planning Schemes are now also quite dated.

8.1.2 CSIRO Urban Stormwater Best Practice

A critical document used to design storm water systems is well overdue for updating, to take into account increased intensity rainfall events. The: *CSIRO Urban Stormwater: Best Practice Environmental Management Guidelines*, is dated from 1999, and appears simply to have been reproduced in a digitised form without updating. This document was the basis of all of the stormwater plans undertaken by the councils (see also Section B).

8.1.3 Flooding

Flooding is also an area that needs clarification. There needs to be some thought about more accurately defining and describing a 100 year event. This was discussed during workshops. Planners and engineers may have a very precise understanding of the approach and the definition of a 1 in 100 year event. However this is less clear to staff not intimately involved in the design process, or the public.

“Flood maps outside the metropolitan area have been prepared across most of Victoria. They were developed as part of a comprehensive mapping project undertaken in the late 1990s which has been incorporated into the Victoria Flood Database. The maps show the 1 in 100 year flood extent where known and also floodway areas”¹⁸.

¹⁷ Engineers Australia, *Australian Rainfall and Runoff Revision Project*, page 1.

¹⁸ Office of Water, <http://www.water.vic.gov.au/environment/floodplains/planning>, accessed 20 June 2011.

The flooding events of January 2011 have been identified as the largest on record in many parts of the State¹⁹.

If the definition changes according to the number of major floods over time, which then can change the level, how does Councils incorporate the moving target? Should the level be date defined, for example, based on the 2010, 1 in 100 year flood as included in maps? Or, should there be a policy that there needs to be an additional buffer included to manage the risk of severe inundation, analogous to the coastal climate policy that has been developed (s13.01-1 of the State Planning Policies). Finally, if it is not clear to staff in Councils what is meant by the 1 in 100 year flood event, there is even less chance of explaining this risk to the public, including purchasers of land. There is a significant time gap between mapping of events and incorporation into Plans. The Flood Victoria website states that:

“The Land Use Planning page on the *Our Water, our Future* website, provides access to planning control information and related guidelines, and may provide additional flood map information, known as Victoria Flood Data, that is not yet contained within Council Planning Schemes. It is recommended that this additional flood mapping should be checked.”

It is unlikely a property purchaser would know where to find this important information.

To summarise, at the state level, it appears that there are gaps in information, availability of information, and explanations of increased risks dealing with current inundation. There does not appear to be a clear mechanism to speedily reflect the changed impact of intense rainfall events for the public and municipalities.

8.2 Council Strategies and Plans

Detailed comments on plans, including recommendations, are included in Section B. However there are a few observations that can be made.

There have been a wide range of plans and strategies developed over time. A key question is what happens once they are developed. Are they monitored and reports made back to track performance? Are the recommendations linked into key areas of the Council operations and staff allocated a role to deliver the outcomes? If that doesn't happen, good recommendations and impetus is lost, and money wasted. Stormwater plans are a good example.

As Councils are reviewing their Planning Schemes and updating other documents, this is an opportunity to include a clearer statement about the risks facing communities in relation to climate change. A number of municipalities have foreshadowed major reviews in the near future.

¹⁹ Office of Water, Victorian Floods 2011 available at <http://www.water.vic.gov.au/environment/floodplains/victorian-floods-january-2011>

8.3 Opportunities and Recommendations

1. Councils should monitor the progress of the Engineers Australia ARR Revision Project
2. Council should consider advocating for end user representation on the technical committee or other committees of this project, if not this has not already occurred.
3. Councils with North East Water and the North East Catchment Management Authority propose that the North East be a pilot project for aspects of the project
4. The region invite representatives of the Engineers Australia Project Team to address municipalities on the project, benchmarks and outcomes
5. Councils ensure that there is no duplication in research or modelling that has already been undertaken as part of the ARR Revision project.
6. Staff should confirm the status of the CSIRO *Urban Stormwater: Best Practice Environmental Management Guidelines* and whether this has been upgraded or background documents and technical documents have superseded this work.
7. Councils should request that the Victorian Planning Scheme be amended to address rapidly changing levels in flooding and other planning impacts due to climate change, to assist municipalities reduce current and future risks.
8. Councils request that the Victorian Planning Scheme section 13.01 be expanded to consider inland climate change impacts.
9. Councils request a single point of information for all flooding information be made readily available to councils and the public.
10. As Planning Schemes are reviewed ensure that the most recent version of documents are included as referenced documents.

9 Constraints

Capacity for work within municipalities, as well as other regional bodies, is strained by existing resources and demands. Events such as drought, fire and flooding has stretched both resources and energy of staff within councils to continually adapt to the changing goalposts. Climate change magnifies the risks and demands being placed on both people and resources.

In discussions with staff, it is appears that there is a need to provide opportunities for both staff and elected councillors to take stock, and to identify what skills and resources are needed *within the organisations* to increase their capacity and resilience. While there can be well developed capacity and development programs in place for the community, there is

also a need to provide support for staff and councillors who are managing in periods of considerable stress and change.

Funding continues to be a challenge for municipalities. Each of the five Councils operates under constraints imposed by legislation, the size of the population of the municipality and therefore its rate base, and conversely the very large geographical size of the municipality. This means that there are considerable demands on the budget, and in “normal” times Council can struggle to maintain infrastructure particularly roads and bridges.

Table 1, above, provides an example of the expanding demands placed by the state on to municipalities. This has included requirements for stormwater management plans (2002 onwards), healthy communities’ plans and heat plans.

Funding initiatives of both the state and federal government can have significant adverse impacts. As an example, grant funding may be available but have strings attached that the funds cannot be used by municipalities to engage staff, only to hire consultants. This can be a major constraint to municipalities, as considerable energy and staff resources may be needed for project management and administration. For example, when staff is stretched to manage existing workloads exacerbated by events such as flood and fire, it can be nearly impossible to be able to put thinking time into overseeing a project, or being involved as a pilot for a project.

Grant funds may not allow staff to build capacity within organisations. There can also be a capacity gap between city and rural councils that grant funds often widen. As an example, the original four year program for stormwater quality required stormwater management plans to be in place before applying for infrastructure funds. While a large number of city councils had these plans already in place they were able to quickly access additional external funding for infrastructure.

As noted by one workshop participant, anticipating trends in government policy and funding and building regional skills and awareness is crucial to rural councils being successful in obtaining external funding.

Other options that should be considered include an administrative loading in all external funding, to assist with administrative requirements. Another is to change the focus of funding, and reduce reliance on state and federal funding if these have become onerous with the related conditions. A third option is to seek funding from other sources, or assist other community groups to source additional funding to achieve objectives.

While there may be other sources of funding available for municipalities, including federal and philanthropic funding, it is often difficult for staff within their existing workloads to both identify funding, and to develop successful applications. As such, it is recommended that Councils consider jointly funding a fund raising position, to seek to expand the sources

of funding of municipalities and councils. If a dedicated position whose funding was shared across the municipalities was funded from internal sources, then the investment could be quickly recouped if one or two additional grants or sources of funds were achieved.

9.1 Opportunities and recommendations

1. Councils should identify opportunities to identify what skills and resources are needed within the organisations to increase the capacity and resilience of staff and councillors to manage during rapid change.
2. Councils should, wherever possible, include an administrative loading into funding submissions.
3. Councils should consider refusing funding if related conditions provide onerous restrictions.
4. Councils should consider jointly funding a fund raising position to expand the sources of funding of councils and municipalities.

10 Opportunities for change

Municipalities are often under rated in terms of the importance they have in initiating and generating change. A report in the UK, the Egan Review looking at what was needed for sustainable communities, identified the importance of local government:

“Of the one hundred or so occupations, we identified a significant number as ‘core’ occupations – people who spend almost all of their professional time in activities to do with planning, delivering and maintaining sustainable communities. These are the built environment professionals – planners, architects, urban designers, etc – and decision makers and influencers – staff from local, regional and central government, developers and investors, staff from voluntary and community associations.”²⁰

The decisions Councils make have a major impact on the communities now and in the future. A challenge for councils is to be strategic and consistent in their decisions. Resource constraints and ever expanding roles complicate their approach.

In workshops an issue raised was how to build climate change adaptation into the culture of the organisations. During the workshops, it was observed that a number of areas of Council operations, for example emergency management, had been seen to be a bit peripheral to the

²⁰ Egan Review: Skills for Sustainable Communities,
<http://www.communities.gov.uk/documents/communities/pdf/152086.pdf>

risks identified with this project, and climate change in general. That view changed as more discussions took place.

In some respects, one of the major benefits of this project is the way that there can be cross discussion within organisations, and across different organisations. Different municipalities have tried various approaches that others can learn from. There may also be opportunities for a group project rather than individual municipalities duplicating approaches.

Recent regional approaches, particularly the Hume Strategy, could assist Councils in this area.

A challenge for municipalities is to generate cross organisational discussions that help to identify opportunities to minimise risk and capture opportunities in the future. A number of organisations have 'green teams' that have a focus on increasing environmental performance of the organisations. In some cases these have developed as an outcome of Greenhouse Action Plans, which focus on greenhouse mitigation. Green teams are an example where people from different parts of an organisation can learn together how the organisation works and where change can be accelerated.

A key technique is to have targets, measurements and reporting. Measuring and reporting show progress. Indicators can include: quantities of water consumed; quantity of reused water applied to (or used in) facilities; amount of water collected from municipality buildings; quantity of third pipe installations in new developments; the number of stormwater systems installed; amount of energy consumed; renewable energy generated; kilometres travelled; bike racks installed and so on. Practical measurements can be very powerful if they are reported regularly to Councils as standing items, and made public against goals on a regular basis.

Less common are targets that can be considered for reports and strategies. For every report and strategy produced by Councils, there needs to be a template of questions applied. Examples include: Does this strategy consider risks that are highlighted by climate change? Have we considered in this strategy what would happen if there were consistent shortages of water? Have we considered in this economic development policy what will happen to businesses if there is another major bush fire? What happens in emergency management if there is a 50% reduction in water availability for three years? All of these reports need to be considered as they are due for renewal through the lens of managing and reducing risk due to climate change.

The other aspect when updating reports and strategies is to look for the opportunities: what can we do differently to harness the opportunities arising from mitigating and adapting to climate changes? As we review our Planning Scheme are there areas that can be identified for active recreation within areas that modelling shows may be future flood ways? Can we, as part of Council approaches, generate renewable energy through methane coming off land

waste sites? Can we generate income from carbon capture through our parkland management? Can we assist the community reduce their water usage through design and capture of stormwater? Can we increase the resilience of our businesses by developing a four seasons tourist approach rather than just snow related activities?

Some of these approaches are already occurring. The challenge is to make risk and opportunity related to climate change adaptation a core business value. It is therefore recommended that at a senior executive level within Councils this ongoing, consistent approach to the review of strategies and plans be included as a key performance indicator. In addition, it is recommended that on a regular basis whenever there is a report or strategy developed, as an item to Council, the staff report on how they have addressed the issues of climate change risk and opportunity within the report. It is also recommended that Councils identify an individual Councillor or Councillors who are allocated the responsibility to champion this activity and provide support to staff as one of their portfolios of responsibilities.

It is also recommended that Councils share, monitor and document progress in this cultural change as well as less successful approaches as part of the development of increased capacity within Councils and the community.

10.1 Opportunities and Recommendations

1. Councils should recognize that dealing with climate change is a core activity that cuts across and impacts all elements of council businesses.
2. Where not already established, staff should develop measurement and reporting on water and energy consumption of council operations publicly and on a regular basis.
3. For every plan and strategy, councils should apply a template of questions that identify how the documents and its recommendations have considered, managed and reduced risks associated with climate change.
4. For every plan and strategy, councils should apply a template of questions that identify how the documents and its recommendations have considered, and identified opportunities arising from adaptation and mitigation of climate change.
5. For all reports going to Council seeking endorsement or approval, should include a statement from officers how they and/or the consultants have addressed the issue of climate change risk and opportunity.
6. Councils should identify a senior executive staff member who will be responsible to ensure this work occurs, and include this activity as part of their key performance indicators.
7. Councils should allocate to an individual Councillor or Councillors a responsibility to champion this activity and provide support to staff as one of their portfolios of responsibilities.
8. Councils should share, monitor and document progress in this cultural change as part of the development of increased capacity within Councils and the community.

Section B: An analysis of existing council plans and strategies based on priority risk groupings.

Introduction

This section is organised to reflect the approach undertaken by Marsden and Jacobs in Phase 2 of the project. The nature of both risk assessment and climate change means that there can be both overlap and repetition. Wherever possible this has been avoided, using pointers to other sections of this report where appropriate.

1 Risk category: Surface Water Supply and Quality

The risk assessment process in Phase 2 of the project identified surface water supply from unregulated surface water as an extreme current risk. This risk has been one that the water authorities, North East Water (NEW), Goulburn Murray Water (GMW), and Councils, have had to deal with over the last nine years of drought.

1.1 Constraints to access to water

There are a range of responsibilities for provision of water. NEW have very clear service delivery obligations for towns for which they supply water. The review of the Planning Schemes for each Council has identified access to water as one of the major constraints to development for communities, and in some cases tourism and industry.

Councils are currently facing constraints in access to water, both ground water and surface water. A significant number of communities and towns are experiencing problems meeting existing demands for water, sewerage and storm water management.

- Indigo identifies the need to augment water and sewerage supplies to meet expected population increases and to reduce environmental degradation²¹.
- The Towong Planning Scheme identifies water and associated infrastructure as an issue for both towns and villages: a limited number of towns have both reticulated water and water and sewerage infrastructure, and those existing systems need augmentation and upgrading²².
- There are a number of areas in Wangaratta that are identified as having limitations on expansion or further development due to water issues. The lack of reticulated water and sewerage is identified as one of the limiting factors for Rural Townships and Settlements, tourism expansion in rural townships, industry and business and particularly in the North Wangaratta industrial areas²³.

²¹ Shire of Indigo Planning Scheme, S 21.01-2 p 2, S21.02, p1)

²² Shire of Towong Planning Scheme, S21.05, p1)

²³ Rural City of Wangaratta Planning Scheme: s21.07, pp2 &3, s21.08, p1 and s21.09, p1

- The City of Wodonga makes reference to Bonegilla and notes that urban development `will be supported in Bonegilla and only in circumstances where reticulated sewerage and drainage services are provided`²⁴.

One conclusion that might be drawn from this review is that under existing conditions, municipalities have difficulty servicing all of the current demands for water for communities, tourism and industry. There are identified currently unmet infrastructure needs. It also means that councils have existing current risks in relation to water and pollution.

There is an opportunity as the infrastructure is developed to meet these current needs to factor in increasing risk and to design for water variability. There should be, in effect, design for greater variability and less water availability.

1.1.1 Management during drought

The role of councils during periods of drought includes:

- Providing access to physical water resources for example through providing emergency bores
- Provision of social support through community development programs
- Evaluating current activities on council owned and/or managed properties and resources.

Table 2 lists the water use plans undertaken by councils to review their own activities.

²⁴ City of Wodonga Planning Scheme s21.09-5 p4

Table 2: Sustainable Water Use Plans

Sustainable Water Use Plan		
Alpine Shire Sustainable Water Use Plan	November 2006. Written by Stuart Robertson and Cameron Alexander	Establishes corporate reduction rate of 40% from base year of 2000/01 by the year 2015. Main water consuming activities were irrigation of public space and playing fields, water used in public facilities and in caravan parks. Explicit reference to climate change.
Indigo Sustainable Water Use Plan	2006	Established corporate reduction target of 20% water consumption by 2015.
Towong	Not applicable.	Water Use Plan to be developed.
Wangaratta Sustainable Water Use Plan	To Council 21 November 2006	Consumption reduction target of 35% has been set from the base year 2000-1 to lower consumption levels by 2015. Outlines 6 objectives, including monitoring. Included detailed inventory of uses. Main water consuming activities included irrigation of open spaces and playing fields, water use within the public swimming pool facilities and the maintenance of reserves ²⁵ . Explicit reference to global warming and climate change.
Wodonga Sustainable Water Use Plan	Provided to Council for information only.	Includes an inventory of use on Council operations. Developed as a consequence of request from North East Water to develop a 10% reduction in water consumption in recreation areas during water restriction periods. Plan establishes a 10% reduction on 2005/6 base year levels by 2012 with the key target area starting with parks and gardens. Explicit reference to climate change.

1.2 Potential Gaps

There is a relationship between development and water provision. One issue is whether there should be a greater nexus between all types of development and water availability. Who has the responsibility to say no to development if there is insufficient water, for example on rural blocks?

The drought highlighted issues with Council management of water for their own facilities, and related amenity issues within towns. Councils managed to change approaches and operations in reaction to the ongoing drought, sometimes in reaction to urgent situations. Obviously both North East Water and Goulburn Murray Water were involved in many of these discussions.

²⁵ Rural City of Wangaratta Sustainable Water Use Plan Draft., 2006. piv

However, these actions tended to be reactive, and were in response to emergency situations when water availability became critical.

In workshop discussion with staff it was considered that there needed to be a shift to more proactive planning for these events. This is also addressed in the section on recreation.

1.3 Opportunities and Recommendations

1. Councils should consider their recreation strategies, park strategies and facilities management in a proactive manner to address the risk of ongoing, severe water reductions, and to develop both contingency planning and alternative approaches to facility and asset management
2. Councils should review their current emergency management plans for drought and consider which of these activities should be transferred into standard operating procedures.

2 Risk category: Ground Water Supply and Quality

2.1 Potential Gaps

Discussions in Phase 2 of the project identified risks associated with groundwater supply: that the reduced capacity of groundwater affects accessibility; that there was not a clear understanding of the groundwater picture on sustainable yield under climate change scenarios; and there were risks that regulators would limit extraction of groundwater and the impact of poor groundwater quality on water supply. In relation to groundwater quality there was increased incidence of poor groundwater quality impacts on water supplies.

It can be argued that these are long term existing problems that have been made more urgent due to the drought. These are current risks that need to be managed. Similar risks were being identified during the period where salinity mapping and groundwater issues were being identified, but the urgency (and funding) related to salinity dropped off as water tables reduced because of less rainfall.

It is therefore argued that a better knowledge of groundwater resources, a clearer understanding of the movement of groundwater and interaction with surface water, an improved monitoring network and education are actions that would help municipalities address their existing risks. Climate change amplifies these existing risks, and can turn manageable risks into emergency reactions.

For example, the sinking of emergency bores for communities to have access to water supplies for stock watering and domestic use was triggered by ongoing drought conditions.

There is an opportunity for Councils to consider in a more proactive manner the groundwater resource: its size, quality and accessibility in advance so that risks can be reduced. Likewise, if not already undertaken, mapping of all bores for their potential water sources for bush fire fighting and for water supply, could be part of a proactive risk management strategy.

2.2 Opportunities and Recommendations

1. Councils should act to obtain a better knowledge of groundwater resources in partnership with other agencies.
2. Councils should collaborate with other agencies to encourage an improved groundwater monitoring network.
3. Councils should map all bores in conjunction with agencies, including CFA, for potential sources of water for fire fighting and water supplies.

3 Risk category: Stormwater and Flood Management

3.1 Stormwater management

Stormwater management was identified as a high risk as part of risk assessment process. Stormwater management plans were undertaken by Councils around 2002 onwards in response to requirements from EPA. EPA funded the development of the reports, but not all plans were adopted or implemented. The focus of the work was on water quality: to reduce the impact of the receiving waters from stormwater in urban areas.

EPA currently refers to best practice on their website as the CSIRO *Urban Stormwater: Best Practice Environmental Management Guidelines*. This guideline was produced in 1999 and subsequently electronically published in 2006²⁶. The reports produced in NE draw on the CSIRO guideline for their development.

It should be noted that the storm water reports included both infrastructure and management options. A number of the management options included suggestions for changes to be incorporated within Planning Schemes. An example is in the Alpine Stormwater Plan. 'Planning' recommended actions include:

- "Clarify/confirm arrangements for internal referrals
- Develop stormwater guidelines for new development
- Adopt standard conditions for planning permits
- Promote water sensitive urban design approach

²⁶ Note: this document is discussed in more detail in Section A.

- Update corporate plan to reference stormwater plan
- Update MSS to reference stormwater policies within LPPF”²⁷

Similar recommendations are within other stormwater plans. When reviews of Planning Schemes are underway, this is an opportunity to revisit these plans and incorporate the recommendations.

Table 3: Stormwater Management Plans

What	When published and or adopted	Comment
Alpine Shire Stormwater Management Plan - Draft	February 2004. Earth Tech Engineering Pty Ltd.	No information available as to implementation. Capital costs of \$426,000 and ongoing cost of \$33,000 identified.
Indigo Stormwater Management Plan Executive Study, Volume 1 and 2	2002. Written by ID&A.	No information re implementation. Capital costs \$1,307,000 and ongoing cost of \$84,500 identified. Copies available on web at http://www.indigoshire.vic.gov.au/What_We_Do/Greener_living/Water
Towong Stormwater Management Plan Volume 1 and Volume 2.	March 2002. Written by ID&A	Not implemented. Capital costs \$649,000 and ongoing maintenance costs of \$60,000 identified.
Rural City of Wangaratta Stormwater Management Plan Volume 1 and Volume 2	2004. Written by Parsons Brinckerhoff. Implementation plan endorsed by Council 1 April 2003.	Costs years 1-4 were identified as \$352,000 for “Reactive Management Strategies” and \$3,000 for year 1 of management frameworks, with no costs determined in this area for following years.
Wodonga Stormwater Management Plan – Volume 1 and 2	January 2004. Written by Parsons Brinckerhoff. Not adopted by Council.	Costs year 1-5 were identified as \$1,617,000 for “Reactive Management Strategies” and \$2,000 for year 1 of management frameworks, with no costs determined in this area for following years.

3.1.1 Potential gaps:

EPA best practice for urban storm water refers to guidelines which were developed in 1999 and appear not to be updated.

²⁷ Earth Tech for Alpine Shire, Stormwater Management Plan Executive Summary, draft, February 2004, P 10

The risk assessment processes used in development of storm water plans did not address increased intensity of storm events and subsequent risk: both a quantity and quality issue.

Inquiries have identified that currently there is no update of the Guidelines, nor of the standards for storm water.

Discussions have identified that a major problem was that the recommendations proposed works and identified costs, but no or very limited funding was available to implement actions. This continues to be a constraint.

3.1.2 Integrated approaches - WSUD

There was some discussion at the workshops whether there needed to be integration of planning and management of both flooding and stormwater management.

An option currently being promoted by Melbourne Water is a target based Water Sensitive Urban Design (WSUD).

“Water sensitive urban design (WSUD) has been described as the integration of urban planning and development with the management, protection and conservation of the water cycle as a whole. WSUD involves integrated design and management of the urban water cycle, incorporating water supply, wastewater, stormwater and ground water management, urban design and environmental protection...

Traditionally, urban water management has been separately considered in terms of potable water, stormwater, wastewater and catchment management. However, more holistic concepts such as WSUD, Integrated Water Management (IWM) and “water sensitive cities” require an integrated approach to all parts of the urban water cycle.”²⁸

Councils should be aware that there has been some suggestion that the approaches outlined in the Melbourne Water document – including setting of targets and a strategic approach, may become a higher priority for the state. This may provide a funding opportunity for strategically assessing existing plans and to identify prioritise for implementation.

WSUD is included in a number of the current Planning Schemes. Wodonga, for example, states for White Box Rise Estate: “The development will adopt and apply principles of water sensitive urban design, and as part of the development, prepare and implement a water conservation strategy to council’s satisfaction”²⁹ The language for the features of the Leneva Structure Plan is less forceful: “ Features of the Leneva Structure Plan

²⁸ Melbourne Water, Developing a Strategic Approach to WSUD Implementation. Guidelines for Councils2011 p9

²⁹ Wodonga Planning Scheme Municipal Strategic Statement 21.10-07 page 6

include...Incorporation of sustainable development principles and recognition of the need to apply the principles of water sensitive urban design.”³⁰

Some elements of WSUD, particularly the treatment of stormwater, is already compulsory for developers. A challenge for municipalities is that the more innovative elements of WSUD are not necessarily able to be enforced. As such, these have to be developed in consultation and negotiation with developers, and the water authority. Developers may not see the benefit of incorporating approaches that help to minimise future risk for the owners of properties.

The governance part of this project (Phase 3) looks to address some of these issues³¹.

Retrofitting of WSUD into existing developments raises other issues. The stormwater management plans outlined in Table 3 (above) focussed on existing systems and identified opportunities to improve water quality. The approach did not take into account the impacts of climate change including prolonged dry periods and intense rainfall events. As noted previously, there is a need to target future retrofitting projects to ensure that problems are not magnified downstream.

At the same time there are good reasons to implement WSUD approaches, it is not clear how rainfall variability and climate change will impact of the systems being developed and implemented. This was discussed in the workshops. There may need to be changes in designs so that high intensity rainfall events bypass stormwater treatment systems, while they still operate effectively in dry periods.

3.1.3 Opportunities and Recommendations

1. It is strongly recommended that no future planning on storm water or flooding be undertaken without firstly assessing and considering existing plans and strategies.
2. Councils should revisit in a consistent way the existing Stormwater Plans and assess whether they are still relevant, and whether any of the recommendations can be carried out.
3. As reviews of Planning Schemes are undertaken, councils should revisit the management options in the Stormwater Plans and include management recommendations where appropriate.
4. Councils may wish to workshop funding opportunities as a group and prioritise spending for storm water infrastructure.
5. Councils should keep a watching brief on state government approaches to WSUD and potential opportunities for funding.
6. It is recommended that the state government review its storm water design standards and update them to reduce risks for future developments.

³⁰ Wodonga Planning Scheme Municipal Strategic Statement 21.10-08 page 7.

³¹ For more details, see Wodonga City Council tender 511019 on behalf of the NEGHA

3.2 Flooding

The North East Catchment Management Authority (North East CMA) has a comprehensive role in relation to flood plain management in the North East

“What is floodplain management?”

Floodplain management involves the management of land use and the environment in areas subjected to flooding. Floodplain management plans need to incorporate several main issues and address each of these individually; economic, infrastructure, resource management risk management, flood emergency and land use.

Key floodplain management activities in the North East include:

- Improved flood mapping and land use planning controls;
- Advise councils on individual planning applications associated with floodplains and river health;
- Collecting of new and historic flood information;
- Develop and implement floodplain management plans;
- Manage and maintain specific flood works;
- Assist in flood warning process;
- Declare 100 year ARI (Average Recurrence Intervals) flood levels for building and planning purposes³²

The North East CMA acts as a referral agency for flooding issues, as noted in the first two points above. In these cases, Council may refer to the North East CMA for comment on a proposed development, such as a subdivision. North East CMA may recommend either unconditional approval, approval subject to conditions related to flooding (e.g. floor levels) or refusal.

The tools for this assessment are described in the Victorian Planning Provisions (VPP) and additional flood studies that have been developed for flood sensitive areas. These may then incorporated into the Planning Scheme of a municipality, subject to Council support.

Flood studies are developed using historical information, consultation with landholders, maps and flood photography. Modelling can also be used. Recently, for example, after flooding in September 2010 and December 2010, North East CMA

³² North East CMA at <http://www.necma.vic.gov.au/OurPrograms/FloodplainManagement.asp> accessed 1 March 2011.

used aerial photography and onsite marking to help identify flood levels and use this information to improve flood maps.

The flood studies generate maps outlining the extent of the 1 in 100 year flood levels being generated. These can lead to a Floodway Overlay³³ and a Land Subject to Inundation Overlay³⁴. If Council adopts these into the Planning Scheme all proposed development within these overlays must consider the impact of flooding.

In theory, new habitable buildings within the Floodway Overlay are prohibited and are discouraged within the Land Subject to Inundation Overlay.

3.2.1 Potential Gaps

Issues that this process raises include:

1. Are all the major flood studies relevant for urban areas complete?
2. Where they are complete, have the outcomes been incorporated into Planning Schemes?
3. Do the existing flood studies take into account or make reference to Climate Change impacts?

Table 4 addresses these questions (see below)

4. Have the existing flood models been used to identify future inundation areas under changed rainfall events?
5. Are the tools that referred to in Planning Schemes adequate to address increased risks?
6. When there is a flood event that has an impact on infrastructure, can the replacement infrastructure be upsized to reduce the risk in the future?

³³ Floodway Overlay is the area with the highest risk and/or deep inundation in a 1 in a 100 year flood event.

³⁴ Land Subject to Inundation Overlay is the area with a lesser flood risk or shallow depth of flooding.

Table 4 summarises flood study and Planning Scheme information.

Table 4: Flood studies completed by area

Municipality	Flood Study undertaken/by whom	In Planning Scheme?	Refer to CC impacts?
Alpine	Wallace Drive Flood Study (1999)	No	No
	Myrtleford (2000)	No	No
	Upper Ovens 2002	No	No
	Harrietville (2003)	No	No
Indigo	Chiltern (2006)	No	No
Towonga	Mitta Mitta Below Dartmouth (2006)	No	No
Wangaratta	Wangaratta FPM Study (1998)	Yes	No
	Ovens floodplain (between Whorouly and Wangaratta) (2003)	Yes	No
	King River (2004)	Yes	No
	King River Tributaries (2004)	Yes	No
	15 Mile Creek (2006)	Yes	No
	House Creek and Huon Creek (2002)	Yes	No
Wodonga	Felltimber Creek Flood Study (2004)	Yes	No
	Lower Kiewa Flood Study (2005)		
	Jack in the Box Creek (2006)	Yes	No
	Middle Creek Flood Study (not yet completed)	Yes	No

3.2.1.1 Impacts on urban flooding using existing modelling

Have the existing flood models been used to identify future inundation areas under changed rainfall events?

The short answer is no. Recent work has been undertaken on the impacts of climate change on urban flooding using existing flood models for Melbourne. An outcome of recent research into future rainfall intensity was applied to existing flood models in the Melbourne area³⁵.

This work has implications for catchments outside of Melbourne:

“While results varied from catchment to catchment typical results from this analysis indicated the 2070 1 in 5 year design Annual Recurrence Interval (ARI) event was equivalent to the present 1 in 10 ARI event and the 2070 1 in

³⁵ Pedruco, Philip and Watkinson, Rod The Impacts of Climate Change on Urban Flooding in the Melbourne Area Using Existing Flood Models available at http://melbournewater.com.au/content/library/drainage-and-stormwater/flood_management/ viewed 9 Feb 2011.

100 ARI event was equivalent to the 1 in 300 year ARI event. In addition to providing information on return periods the hydraulic model showed increases in the extent of inundation.

The results have important implications on future planning, management and infrastructure. They suggest we may need to revise our infrastructure design standards and some areas currently considered appropriate for development may be vulnerable in the future.³⁶

There is value in applying the same techniques to a selection of urban areas where there is an existing flood study *and* considerable additional pressure for development. The outcome could assist Council in decision making process to identify at risk lands and reduce future liabilities.

An issue that should be considered is: who does the modelling work and pays for it? Given existing pressures on councils duplication should be avoided wherever possible.

3.2.2 Discussion

Councils may face an increased risk of legal challenge in the future if decisions are made that allow development in areas subject to flooding. This is often a contentious issue, as council relies heavily on its rate base, and more properties provide more base income. However under climate change scenarios the increased frequency and intensity of rain events can lead to major floods and inundation more often. These will impose costs to owners and councils to repair buildings and infrastructure. Increased development in these areas could be an increased cost to municipalities, rather than a rate revenue stream.

Councils also face increased insurance premiums as an outcome of increased flooding and inundation

3.2.2.1 Tools in planning schemes

Are the tools that referred to in Planning Schemes adequate to address increased risks?

Within the Planning schemes are both State and local provisions. It is noticeable that the State provision on climate change, (13.01) is vacant. While the state government

³⁶ Pedruco, Philip and Watkinson, Rod, *ibid* page 1

has some well developed framework established for coastal areas, the same attention has not been paid to other areas, including rural and regional areas.

One of the consequences of this is that it is more difficult for CMAs and others to address flood and inundation planning issues. The issue of levees, as an example, is a long term vexed issue that has an impact in rural areas (changes in flood flows having an impact on neighbours and downstream; potential for breakages causing major unexpected flooding), and in some cases in urban areas.

The major tool for planning is the flood overlay (see process outlined in 10.2). However, current flood overlays do not take into account climate change impacts, including modelling of high intensity events.

As a minimum, it would appear reasonable for the flood plans that have been developed to be incorporated into Planning Schemes. This would provide more leverage to Councils to refuse inappropriate developments, as well as to provide support for any Appeals for development decisions in floodways or areas subject to inundation. As with the modelling issue raised above, there is benefit in having a strategic approach to trialling new approaches.

There can be considerable improvement in the current flood data transfer maps without the need for detailed flood studies. As such, there is an opportunity for the CMA working with councils to improve the accuracy of the extent of land subject to inundation.

3.2.2.2 Replacement Infrastructure

When there is a flood event that has an impact on infrastructure, can the replacement infrastructure be upsized to reduce the risk in the future?

Councils are investing considerable resources to replace infrastructure damaged in flooding events. Recent experience has been that there have been intense rainfall events in a short period which has led to big flood peaks causing considerable damage.

Repairs to flood events can be covered through insurance. However, the usual pattern is that Councils need to undertake the repair work and incur costs immediately, while reimbursement may take up to a year or more. Recent experience in the North East and elsewhere has shown work that has been repaired from one event being damaged in a very short time by another.

In addition to cost, there are resource availability issues as people and plant, including contractors, becomes fully engaged and it can be difficult to undertake necessary repairs in a timely fashion.

A structural problem is that insurance payments will only address replacing like for like. An alternative is, as opportunities arise, for example replacing culverts washed out by flooding, to increase capacity or build in mitigation work that reduces impacts in a peak period. This has been described as “betterment”.

The benefit is that future impacts from flooding can be reduced by increasing capacity. However there are some planning issues that need to be addressed before such work can take place. These include: the identification of the locations that would benefit most from “betterment”; ensuring that it does simply transfer a problem from one location to another; and having reasonably advanced specifications and designs available so that work can take place quickly and effectively.

This implies a review of assets damaged by flooding on a consistent basis; developing a hierarchy of assets that should be a focus of resources for betterment, as well as identifying potential funding sources and financial instruments to facilitate rapid and effective action. The aim is to reduce future risk, minimise the need for reworking, and reduce overall costs to insurance companies and councils alike.

As a first step in this process, if not already undertaken, there should be a review of the infrastructure costs and other costs to council, for the last series of flooding events. As well, discussion should be taking place with insurance bodies to identify potential premium increases and benefits of an alternative strategic approach.

It is also suggested that the development of a hierarchy of risks to infrastructure should be taken at both Council and regional level. There may be examples where a risk to non council assets, such as the Hume Highway or railway, would mean that timetables for “betterment” should be modified.

3.2.3 Opportunities and Recommendations

1. There should be a clear discussion about risks facing councils – legal, reputational and financial risks where flood studies have been undertaken and not incorporated into the Planning scheme.
2. Councils should as a priority incorporate existing flood studies as an overlay in Planning Schemes.
3. Councils as a group should select two or three existing flood models for an urban area where a council is under development pressure and remodel taking into account latest information on rainfall and its changes under climate change to quantify the changes and risks.
4. Councils to liaise with NECMA and other partners to improve flood prediction.
5. Councils should be more explicit in education programmes that flood plains are for flooding and reduce future (housing and building) development in these areas.
6. Councils should, in consultation with NECMA, identify areas that could benefit from the improved accuracy of mapping of the land subject to inundation.
7. Councils and partners should provide information as part of the “welcome package” and resource guide for rural properties on flood risks and preparedness for emergencies.
8. Councils should undertake a review of all infrastructure costs and other costs to municipalities for the recent flooding events.
9. Councils should work with insurers to identify benefits of alternative strategic approaches, including “Betterment”.
10. Acting as a group, councils should present a case to state and federal government outlining the need for “Betterment” when replacing infrastructure affected by flooding.
11. Councils should develop a hierarchy of risks to infrastructure for council, state and interstate assets to identify where betterment would be best applied.

4 Risk category: Policy and Planning

4.1 *Climate Change Planning and Co-ordination*

As discussed earlier, there is a considerable lack of co-ordination and consistency in planning and management at both the Federal and State level. The lack of planning is a risk for Councils as they need to be reactive to changes generated by policy of state and federal governments.

However, as noted earlier, municipalities have an integral role in adaptation to climate change due to their position as leaders and their impact on the landscape and communities through decisions that they make.

A detailed review of the Planning Schemes for each council is included in Section C of this work. A number of general observations can be made.

A number of the schemes are quite old and are due for review. This provides an excellent opportunity to consider the risks already discussed, and more clearly include them within the planning scheme.

Planning Schemes have a monitoring section (for example 21.13 in the Wangaratta Planning Scheme) and these should be analysed both for consistency, and to identify opportunities for changing framework by measuring different outcomes.

Some monitoring includes for example the number of planning permits decided per annum under delegation by officers, and by council and by appeal³⁷. Wodonga has a monitoring action: “implementation of sustainable development principles and protection of waterways” to be monitored by “Analysis of key projects to assess their level of energy and resource consumption”³⁸. There is an opportunity to link more clearly the outcomes of risk analysis and implementation and the development process within the monitoring section. An example might be: Key Element: Diversifying sources of water. This may be monitored by: the proportion of households with water tanks connected; the proportion of developments with recycled water/stormwater used in public spaces. It would also be interesting to see if any of the monitoring and measuring values included in Greenhouse Action plans could also be incorporated into the monitoring section of the Planning Schemes.

Some questions raised in reviewing the monitoring sections of the Planning schemes are whether the monitoring takes place, and who is receiving and using the material. Another question is whether there is an opportunity for a consistent set of monitoring elements that could be included in all of the plans could be developed, and whether these could also be linked to other strategic regional plans such as the Hume Regional Strategy.

All Planning Schemes include a listing of Referenced documents (for example S21.07 in Indigo Planning Scheme) and incorporated documents (S. 81 of Indigo). A detailed listing of these for these is included in Appendix 1 and 2. A number of the Schemes refer to outdated documents within the list of incorporated documents. As a minimum, these should be updated to reflect the most recent version of material.

³⁷ Towong Planning Scheme, S 21.08, p1

³⁸ Wodonga Planning Scheme S21.14, p1

Table 5: Planning Schemes overview

What	When published/adopted	Reviewed since? Due for major review?	Comment.
Planning Schemes			
Alpine Planning Scheme	Commenced 9 Sep 1999	Amended throughout	Clear articulation of Planning Scheme to 2030 Community Vision. Council Plan identifies need to review and update Alpine Planning Scheme. Available at web at http://planningschemes.dpcd.vic.gov.au/alpine/home.html
Indigo Planning Scheme	Commenced 28 Jan 1999	Amended throughout	Cross reference to corporate plan but not 2030 vision piece. Available at web on http://planningschemes.dpcd.vic.gov.au/indigo/home.html
Towong Planning Scheme	Commenced 8 July 1999	Amended throughout	Not explicitly referring to the community vision. Available at web at http://planningschemes.dpcd.vic.gov.au/towong/home.html
Wangaratta Planning Scheme	Commenced 25 Feb 1999.	21 sep 2006 Complete review of the Planning Scheme Major review 19 Jun 2008.	Clear articulation of Planning Scheme to Community Vision and Council Plan. Available through web at http://planningschemes.dpcd.vic.gov.au/index.html
Wodonga Planning Scheme	Commenced 9 September 1999		No explicit reference to current Council Plan Available at web at http://planningschemes.dpcd.vic.gov.au/wodonga/home.html

A detailed review of all Planning Schemes is included in Section C.

Table 6: Council Plans Overview

What	When published/adopted	Reviewed since?	Comment.
Council Plans			
Alpine Shire Council Plan 2009-2013 (2010 Update)		Updated 2010	Clear articulation with key directions of 2030 community visions. Makes reference explicitly to developing local voices shaping our future climate change action plans. Available at http://www.alpineshire.vic.gov.au/files/Council/Alpine Shire Council Plan 2009-2013 2010 web.pdf
Indigo Shire Council Plan 2010 - 2013	2010?	Unclear	Identifies climate change as a key area of focus in Mayor introduction. Not as clear in contents. Consultation took place through 2009 prior to update. No reference to a 2030 process. However did include 'Place at the Table' award winning consultation process. Unclear from document dates of updates.
Towong Shire Council Plan 2009-2013		Revised 26 July 2010	Available at web at http://www.towong.vic.gov.au/Page/page.asp?Page_Id=471&h=0
Rural City of Wangaratta Council Plan 2009-2013		Adjusted 2010	Available at web at http://www.wangaratta.vic.gov.au/CA256B5800826065/page/About+Council-Public+Documents?OpenDocument&1=100-About+Council~&2=525-Public+Documents~&3=~
Wodonga Council Plan 2009-2013	Adopted June 2010		Available at web at http://www.wodonga.vic.gov.au/council/documents/Downloads.asp?whichcategory=145&AreaID=6&sortorder=Alpha

A detailed review of all Council Plans is included in Section C.

4.1.1 Opportunities and Recommendations

1. Councils should revisit existing plans and strategies as the Planning Schemes and Council Plans are reviewed to consider the appropriateness of including documents as referred documents for example, Heatwave Plans.
2. Referred documents and incorporated documents should be reviewed and amended to reflect the latest document produced. Drafts should not be included within the planning schemes.
3. Planning Schemes should be amended to incorporate flood overlays to better protect against risks.
4. Planning schemes should be reviewed to include more clearly the language of risk and management of risk, for example in relation to future flooding and development, and availability of water.
5. Planning Schemes should include clearer monitoring standards that address climate change risks.

4.2 Carbon Pricing

Councils and communities face increasing costs associated with energy. Carbon pricing as a proportion of the price of energy is far less of an issue than dealing with considerable costs imposed by the need to respond to the outcome of the bushfire royal commission, the need to upgrade aging infrastructure, including transmission lines, and the need for investments in infrastructure, including power generation.

The reality is that the carbon price will be a very small proportion of the overall costs of energy faced by municipalities.

A number of municipalities have engaged in proactive approaches and established Greenhouse Action Plans. Typically, these are modelled on a five step process. Integral is identifying existing production of greenhouse gases for both the municipal operations and for the community. Typically, those who have gone this route will set targets, and identify actions to reduce generation of carbon dioxides equivalents. This may involve energy conservation and the use of alternative carbon free or neutral technologies.

An advantage for municipalities who have undertaken these Greenhouse Action Plans is that they should be able to have a very good handle on both quantities and costs of energy being consumed, and monitor changes in prices and consumption over time.

Table 7: Greenhouse Action Plans

Municipality	When Published/Adopted	Comment
Alpine Shire Greenhouse Local Action Plan	April 2006	Included support from the Cities for Climate Change Program (ICLEI). Target of 20% reduction in corporate emissions on 2003 levels by 2010 and 20% reduction in community emissions on 2003 levels by 2010.
Indigo Shire Council Greenhouse Action Plan	April 2009	Included support from the Cities for Climate Change Program (ICLEI). Target of 20% reduction in corporate and community greenhouse gas emissions from 2005/2009 levels by 2016
Towong	Not applicable	
Rural City of Wangaratta	Not applicable	Does not have a Greenhouse Action Plan but Council has adopted a target.
City of Wodonga	December 2006	Included support from the Cities for Climate Change Program (ICLEI). Target of 10% reduction in corporate emission on 2000 levels by 2010 and 10% reduction in community emissions on 1996 levels by 2010

4.2.1 Opportunities and Recommendations

1. Councils review the progress of the Greenhouse Action Plans against targets
2. Councils actively monitor energy consumption and prices.
3. Councils include a standing item in reporting on a quarterly basis about energy consumption, comparing year to year progress
4. Council keep a watching brief about opportunities arising from carbon legislation
5. Councils seek to take advantage of carbon pricing opportunities including generation of renewable energy and carbon sequestration offsets.

5 Risk category: Economic development

5.1 Industry

The discussions in workshops on economic development and risks that businesses have faced during the period of prolonged drought, and then fires was startling. From a risk point of view, businesses and those who supported the businesses had been grappling with the lack of water as a business risk for many years. Some of the issues included assisting businesses to continue during periods of emergency: for example when towns were nominated as being affected by fire or during a severe fire risk period, customers did not arrive.

Discussions on climate change and businesses within council strategies tend to focus on risks to businesses in the future and therefore can be generalised. Businesses have already been dealing with threats that would lead to closures: droughts, fires and floods being recent examples. The reality is that municipalities and businesses are already dealing with these types of risks, but that they are likely to be amplified with climate change.

Both Wangaratta and Wodonga have economic development plans, while a number are also being developed in other municipalities. Table 8 below summarises the references to climate change. In reviewing the economic development plans available, there is recognition of climate change in a number. These are usually couched in terms such as managing the impacts of a reduction in water.

It is argued that there is currently a significant gap in the approach taken in current economic development approaches. This has been identified in work undertaken for the Regional Development Victoria.³⁹ Every time a potential business comes to economic development units there is an opportunity to assist the business to have a sounder business footing by addressing resource and management issues. The summary concept, not new, is that good environmental practice is good business. In a time of increasing risk, covering all bases such as developing highly water efficient and energy efficient premises, as one example, is argued to be a business imperative.

Energy costs and water availability (to name just a couple) are increasingly threats to business. As such, there is an opportunity for municipalities and economic development units to be more proactive in assisting businesses to increase their resilience and ability to manage with these changes. Again, these are existing risks that are now increasing. Under future climate change scenarios, these risks expand.

³⁹ Narelle Martin, Environment Assessment Tool, Lessons learnt, July 2010.

Economic development statements are not restricted to formally titled “Economic Development Plans” of course. For example, Indigo Council Plan under Objective 3.3 *Encourage and facilitate appropriate economic growth and employment opportunities* is “identify business and economic development opportunities and threats that can be addressed by Council”⁴⁰. It is unclear if these include business threats exacerbated because of drought or climate change e.g. loss of business because of fire events.

While councils in co-operation with RDV and other organisations have been running business contingency planning, these do not appear to be reflected within current plans and strategies.

It should be noted that there are considerable resources available to assist businesses deal with energy and water issues for example, programs through VECCI, the Municipal Association of Victoria (MAV), Victorian Employers Chamber of Commerce and Industry (VECCI), Sustainability Victoria, and Carbon Compass.

Contingency Planning for businesses

Indigo Shire received funding from Regional Development Victoria to develop a program to assist businesses who had been disrupted by the fires. Consultants were engaged to draw up a template, which were then used in a series of workshops with businesses.

When the project was initiated, the impetus had been the impact of fires. At the time of the workshops, the same businesses were dealing with the impact of loss of income because of flooding.

Workshops were held in each of the four towns: Rutherglen, Beechworth, Yackandandah and Chiltern. Feedback from businesses was that different language was needed: people did not understand “contingency planning”: perhaps terminology such as “business interruption” would have helped.

Further details are available from Leanne Bussell, Shire of Indigo.

Discussion at workshops considered the risks associated with economic development, climate change and tourism.

There is an increasing linkage between tourism and wineries, with cross promotions and the positioning of tourism with food and wine. The wine industry faces particular risks associated with climate change. The different varieties of grapes need a very specific band of temperature to be able to produce quality grapes. Changes in temperature of one or two

⁴⁰ Shire of Indigo Council Plan, page 24.

degrees during the growing season will mean grape varieties may need to be relocated or different varieties planted. Other challenges include smoke taint and availability of water.

Brown Brothers is an example of a business that has recognised these risks. Brown Brothers recently purchased a winery and vineyards in Tasmania to reduce the risks associated with climate change.

Alpine resorts are another example of a business model that is particularly vulnerable to climate change. Again, some resorts are looking to spread their risks by developing a four seasons approach, looking to expand visitor numbers throughout the year. One opportunity for alpine areas is to identify that they can be “cool resorts” during intense summer periods when temperatures can be very high elsewhere.

Municipalities through their economic development strategies and tourism strategies can assist businesses to consider their business risk and identify other opportunities.

Table 8: Economic Development Strategies Overview

Economic Development Strategy		
Alpine Council	N/A	Need for Economic Development Strategy identified in Alpine Shire Council Plan to be developed and implemented with the strategy to be adopted in June 2012. Also note identified need to respond to challenges of sustainability by developing an implementation plan for integrated economy model by June 2011 ⁴¹ .
Indigo	N/A	No economic development plan.
Towong	N/A	No economic development plan.
Wangaratta Unlimited Economic Development Strategy	April 2008/ Revised in-house September 2009	Climate change is identified as one of the critical issues and challenges over the next 10 years: “Managing the environment, climate change, natural resource shortages” (page 8) but no further reference to Climate change in document.
Wodonga Economic Development Strategy	February 2011	There is no discussion of water availability and energy costs as a potential business risk. There is no reference to climate change within the document. Available at http://www.wodonga.vic.gov.au/council/documents/images/Economic_Development_Strategy_2011_-_2013.pdf

Further details of economic development plans are included in Section C.

⁴¹ Alpine Shire Council Plan, p23.

5.1.1 Opportunities and Recommendations

1. Councils' economic development units should increase the capacity of businesses by running workshops for dealing with business interruption (contingency planning).
2. If not already in place, develop business interruption plans for municipal operations.
3. As economic development strategies are developed and renewed, councils should specifically address managing risks associated with climate change for existing businesses.
4. As economic development strategies are developed and renewed, councils should specifically address opportunities associated with climate change for existing and new

5.2 Tourism

The high priority risks identified in Phase 2 included decline in viability of regional tourism sector, and the impact of tourism by the increase of code red days⁴². While many of the comments outlined for economic development also apply to tourism, tourism is affected more immediately by the impacts of fire and floods, and fire warning days.

Table 9 summarises tourism strategies available. More detailed comments are available in Section C. In some cases, climate change is identified as an opportunity, recognising that while water may be more limited, relative to other areas there will be sufficient water to draw newcomers.

Again, these fire and flood impacts are current risks, and have had to be dealt with in quick succession recently. Other risks for the tourism industry not considered are the impacts of the rise in transport costs, through the rise in the fuel costs, and how that may translate into business opportunities or costs.

Again, strategies that are due for preparation or renewal would benefit by a more rigorous examination of what the impacts were of recent events, and use these as a base case for extrapolating future risks, and reducing them.

One observation is that there are some excellent models that are being implemented, for economic and environmental sustainability, that also address climate change risks. There may be an opportunity in the future to pitch tourism around a centre of practical excellence in alternative energy/ innovative approaches. Likewise, in an environment of more constrained carbon, walking trails and bike trails can be attractions as low impact tourism opportunities.

⁴² Marsden and Jacobs, Revised summary of Proposed Actions, page 10

Table 9: Tourism Strategies Overview

Tourism Strategy		
What	When published /adopted	Comments
Alpine Region Strategic Tourism Plan	February 2009	As referred to in Alpine Shire Council Plan. Identifies opportunities for tourism because of climate change (p21 plan) Also refers to Climate Change p22 of Council plan as an opportunity.
Indigo	Not applicable	No tourism strategy at this stage
Towong Tourism Strategy 2010-2013	2010	Prepared by EC3 Global. Some reference to climate change.
Wangaratta Tourism Industry Strategic Plan	January 2010	3 year plan identifies tourism trends including reference to climate change.
Wodonga	Not applicable	No tourism strategy at this stage. Tourism draft likely to go to Council in latter 2011.

Further details on Tourism Strategies are included in Section C.

5.2.1 Opportunities and Recommendations

1. As tourism strategies are prepared or renewed they should draw on a rigorous examination of what the impacts were of recent (drought, fire and flood) events, and use these as a base case for extrapolating future risks, and reducing them.
2. As tourism strategies are developed and renewed, councils should require the strategies to specifically address climate change risks and opportunities.

5.3 Recreation and Amenity

This priority risk factor in Phase 2 identified degradation of playing fields and golf courses, and reduced community access to waterways for recreation as current high risk issues⁴³. Amenity high risk issues included degradation of parks, gardens and streetscapes,; and increased frequency and/or severity of water restrictions.

Councils have needed to address many of these issues in practical ways through the ongoing drought. Restrictions in water and access to water meant that municipalities had to seek additional water, which some cases was refused. This lead to rethinking of water needs to maintain ovals, and consideration of which recreation areas or asset such as trees, would have access to watering.

⁴³ Marsden and Jacobs, Revised summary of Proposed Actions, page 11.

The drought also led to the state government requiring additional planning and changes by municipalities. Examples are the Healthy Communities Plans and Heat Wave Plans. Some of these are still being developed by municipalities.

In these later plans, typically developed in 2009-10 there tends to be a changed focus which more explicitly makes connections between place, climate and liveability issues.

Healthy Communities plans are required by State Government under the Public Health and Wellbeing Act 2008: “Public health and wellbeing Bill 2008 reframes the role of health planning and clearly establishes a legislative mandate for Councils to broaden wellbeing and link to land use and Council planning.”⁴⁴

The Towong Shire Council Healthy Communities is “looking to plan in advance to make informed decisions around social, economic or physical environments that directly affect the health and wellbeing of all communities”.⁴⁵

Table 10: Healthy Communities Plans

Healthy Communities Plan		
What	When published/adopted	Comment.
Alpine Liveability Plan 2009 Municipal Health and Wellbeing Plan	2009	Strategic framework for community wellbeing. Explicit connections between sustainability and climate change.
Indigo		No information available
Towong Healthy Communities Plan 2009-2013	Adopted 2 November 2009	Funded internally. Identifies social economic and physical environments that affect health. Explicit outline of climate change.
Rural City Of Wangaratta Community Wellbeing Plan	Adopted 19 October 2010	Plan for the whole community, not just municipal action. One of four key themes to address resilience when faced with climate change.
City of Wodonga Community Wellbeing Plan	Currently in draft form. Due for sign off by June 2011.	Identifies social, economic and environment approaches. 3 actions identified under climate change.

Further details on Community plans are included in Section C.

⁴⁴ Alpine Shire Liveability Plan, p7.

⁴⁵ Shire of Towong Healthy Communities Plan 2009-13, p3.

Table 11: Heat Plans

Heat Plans		
What	When published/adopted	Comment.
Alpine		No information available
Indigo		No information available.
Towong Heatwave Plan	Adopted 2 November 2009	Funded by a grant of \$20,000. To be reviewed each summer and update <i>Heatwave Plan</i> every four years.
Heatwave Response Plan Rural City of Wangaratta	Adopted 20 October 2009	Explicit acknowledgement of climate change impacts (page 13)
City of Wodonga Heat Plan		No information available

Further details on Heat Plans are included in Section C.

Some councils are now considering developing more of a contingency model for managing recreation facilities, particularly those that use substantial amounts of water, and street scapes and gardens. There has been an increased recognition of the health bonus that comes with well established gardens and trees. For example, Wangaratta makes explicit the relationship between drought, fire and wellbeing: *“The prolonged drought has had a significant impact on many residents which is not only economic; the drought has impacted on life style including loss of social and recreational activities like sport, recreational activities and gardening. ...During the drought, there have been a number of severe bushfires and this together with predictions of increased fire risk, has increased many residents sense of insecurity.”*⁴⁶

There is a relationship between the recreation facilities and amenity values maintained by councils and the water strategies outlined earlier. Discussions with staff have highlighted some of the issues that arose with these strategies.

Again, it should be reiterated that councils have been already dealing with loss of water and managing during drought. The Sustainable Water Use Plans were specifically addressing these issues in a reactive manner. In the context of climate change and risk, one question raised was whether the plans are robust in a period of climate change? For example, if the plans were about getting off potable water and using alternative supplies (such as reused water) then the approach was still using water, for example to keep an oval green. With climate change then those sources of water may not be available.

An alternative approach is to shift from thinking about drought and water restrictions in the context of an emergency. Water availability is no longer an emergency but an identified,

⁴⁶ Rural City of Wangaratta Wellbeing Plan 2010-2013, p21

continuing and growing risk. Therefore there should be a change an approach to more proactive planning. For example, if there were water restrictions for two years in five, what would that mean for services offered by Council and what approach should be taken? The Alpine Shire is discussing water use and developing an open space strategy: what facilities should be not maintained? There are considerable benefits in having that discussion and planning in advance.

It would also be useful to work with the community on this changed approach to a more proactive contingency process. There is a delicate balancing act faced by Councils. The reality is that municipalities and communities have been dealing with drought and fire and reduced water availability for many years. Revising recreation and amenity assets with a view to not providing water for maintenance, or using different sources of water, will need to be balanced with the need to maintain community health and resilience.

It is noted that these more recent documents may not be referenced in Planning Schemes or cross referenced to Council Plans. Reviews and updates of these latter plans provide an opportunity to integrate more of Council activities and directions, possibly through being identified as referenced or incorporated documents.

5.3.1 Opportunities and recommendations

1. Councils should shift from considering drought management as an emergency response to a risk management item.
2. Councils should revisit sustainable water use plans and consider how well they manage in a period of continuing low water availability.
3. Working with the community, councils should consider in advance which facilities it shall not maintain in future reduced water periods.
4. Councils should continue to reflect their more recent approaches on managing for heat and integrated community wellbeing when revising other strategies.

6 Risk category: Emergency Services

6.1 Preparation

The priority risks identified through the adaptation workshops is the increase and frequency of code red days, and the reduced availability of water for emergency services, especially fire fighting⁴⁷.

This is obviously a current risk. A number of the recommendations arising from these issues in the adaptation workshops looked at updating Council's internal processes to more clearly

⁴⁷ Marsden and Jacobs, Revised summary of Proposed Actions, March 2011, pp12 and 13.

build in responses to code red days to emergency plans. It is not intended to duplicate the suggestions arising from the adaptation workshop for emergency services. However, many of the suggestions outlined above in the sections on economic development including the need for contingency planning for businesses, also apply.

Councils already deal with this risk. Challenges include adapting the language in emergency management plans to code red days, making linkages with tourism and economic contingency plans, as well as the various heat plans that have been established.

7 Risk Category: Environment

7.1 Catchment Health

The priority risks identified in this section include: a loss or change in composition of native vegetation (including in-stream vegetation); an increase in invasive weed species; decreased water reliability in both unregulated and regulated systems; reduction in shallow groundwater recharge; and increased frequency of poor water quality⁴⁸.

Many of the strategies and plans associated with catchment health are of a regional or state basis. “The North East Regional Catchment Strategy 2004 provides a framework for catchment protection in the region, using a ‘triple bottom line’ approach to achieve environmental, social and economic outcomes. Catchment and waterway objectives are assisted by the *North East River Health Strategy 2004* and the document *Water Quality Guidelines for North Eastern Victoria*”⁴⁹.

It is noted that the North East Regional Catchment Strategy is due for revision in 2011-12. This provides an opportunity to more clearly link the outcomes of the NEGHA project and the Hume Strategy into the Catchment Strategy.

Within the North East Region there is a significant proportion of public land. 90% of land in the Alpine Shire is in public land. 70% of Towong is public land including State and National Parks. Indigo and Wangaratta also have significant areas of public land.

Municipalities manage these risks in partnership with other organisations. Many of the discussions and recommendations outlined throughout this document: surface water supply and quality, groundwater supply and quality, recreation and amenity to name a few, also have impacts on both water quantity and quality. Thus reducing water consumption, changing water sources, becoming more efficient included in many of the risk minimisation approaches already outlined will also have a positive impact on water biota and water quality.

⁴⁸ Marsden and Jacobs, *Revised Summary of Proposed Actions*, 9 March 2011 pp 14 and 15.

⁴⁹ Wangaratta Planning Scheme clause 21.10 p1

Municipalities have an important role in managing their own land, including reserves and roadways, to improve vegetation management and reduce weed infestation. However, their role as decision makers in relation to planning may have the greatest impact on managing these risks identified for catchment health.

8 Discussion

A consistent theme that has emerged from this research and consultation is that municipalities have been working on the issues that have been identified within this project for many years. Often however the actions or plans and strategies have not been framed within a risk context, nor have there been always clear linkages to climate change. Some municipalities have used the term climate change and greenhouse gases within Planning Schemes and Council Plans, while others have depended on terms such as economic and environmental sustainability.

It also appears that there is often a dating issue at play. More recent documents can be much more explicit about the interconnectedness of risk and climate change. Older documents, such some Planning Schemes, would benefit from updating of the MSS and the referred documents to more accurately reflect the changing knowledge base and plans associated with risk, and climate change.

While all councils have undertaken mandated plans and strategies, some have taken additional strategic approaches, as outlined in Table 12.

Table 12: Plans unique to particular Council

What	Who Commissioned/Authors	When published or adopted	Comment
Towong Shire – Zero Energy Estate Feasibility Study	Towong Shire	Final Version produced 15 March 2010	Feasibility plan is looking at a zero energy estate.
Alpine Shire and Towong Shire Report for Climate Change Risk Assessment and Adaptation Planning	Alpine Shire, Towong Shire, North East Greenhouse Alliance/ GHD	May 2010	Workshop based process November 2009 and February 2010. Recommendations for both Councils for internal and external activities.
Wangaratta Framework for An Environmental Sustainability Strategic Plan	Wangaratta staff	Framework document adopted 17 Nov 2009	Provides discussion about development of Environmental Sustainability Strategic Plan, not the Plan itself.
Indigo Shire Council Environment Strategy	Indigo Shire Council	December 2009	Detailed environmental strategic plan.

These documents represent models that may be considered by other municipalities as they review and consider their future strategies. It reminds us that there is considerable leadership and innovation within the region.

9 Conclusion

Municipalities have a significant role to mitigate and adapt to climate change in their own operations and with their communities. They do this in a difficult political climate with a confused state and federal policy position. There are also significant unknowns about climate change and the level of changes that need to be dealt with over time.

This uncertain and problematic picture changes when we think instead about managing issues that councils currently deal with, and deal with risk. In the recent past Councils have operated and dealt with an extended drought, multiple fires, extreme heat periods and floods. They have had to manage these factors in an emergency setting, and often a reactive manner. In addition, municipalities and communities are facing increased economic

pressures associated with increased water and energy costs, and fuel costs. All of these factors are current.

Councils have processes and tools currently at their disposal to address these issues. As documents in all aspects of councils operations are reviewed as part of normal business: Planning Schemes, Council Plans, Economic Development Plans, Sustainability and Environment plans, Tourism plans to name a few, Councils have an opportunity to be explicit about how they will manage risk in a proactive manner. Building- in this concept will help to change both corporate culture, and assist communities to act despite uncertainties. It becomes a no regrets approach.

Section C: Document review

1 Introduction

This material supported workshops held with staff of the five councils who are part of the project: Alpine Shire Council, Indigo Shire Council, Towong Shire Council, Rural City of Wangaratta, and the City of Wodonga.

Part of the brief for this aspect of the project was to:

- *Identify plans and strategies that are impacted by reduced water availability or increased frequency and severity of rainfall events.*
- *Confirm which plans and strategies are to be revised following Phase 2 Risk workshop in consultation with NEGHA Executive Officer and the Project Steering Group.*
- *Identify gaps in each plan i.e. where climate change and water availability assumptions may be inadequate*
- *Recommend a method to include adequate assumptions in existing plans and strategies...*

This section summarises the outcome of the first three parts of the brief. A series of plans and strategies have been reviewed to examine whether climate change has been addressed in the documents. While the emphasis of the project has been on water issues, a broad collection of documents have been reviewed, and other aspects of climate change have been also considered.

The following is a summary of documents reviewed, by Council. For each, the documents were examined to see whether they made reference to climate change and management of aspects of climate change. Part of the rationale for the review is that these documents both reflect the view of the Councils, and drives their internal processes. Of the documents, the Planning Scheme and Council Plan have a direct relationship to the directions and decisions made by Councils.

While the initial reviews did not address Greenhouse Action Plans, feedback from workshop participants suggested that these should also be examined.

The councils are listed by alphabetical order.

2 Alpine Shire Council

2.1 *Alpine Planning Scheme*

Incorporates Alpine Shire 2030 Community Vision (amendment 20/01/2011 C15). The vision is for “a diverse population of 20,000 based around principal centres of Bright, Myrtleford and Mount Beauty”. There are eight key directions of the 2030 Vision ‘and these are supported by objectives that acknowledge the need for balanced development that protects and strengthens the unique social, cultural and environmental needs of the shire’ (MSS Clause 21.02 Page 1). The directions are:

- Unspoilt natural environment
- Sympathetic and balanced development
- Economic Prosperity
- Identity and character of out towns, villages and rural communities
- Services and facilities
- Linkages between communities
- Strong and safe communities and
- Sustaining the vision.

A review of s21.03 of the MSS shows no reference to climate change. Water is raised in the latter part of the document: pages 40 on. Page 40 talks of need for the appropriate provision of water supply for fire hazard management for developments, while page 41 addresses special water supply catchment areas which have significant value for urban water supplies.

Two items identified for further investigation include:

- “work with the relevant Catchment Management Authorities to identify the appropriate planning tools to address catchment and water issues.
- Discuss with the Catchment Management Authorities the contents and extent of application of an Environmental Significance Overlay to be applied to all waterways.” (page 42)

Water is also addressed in relation to rural land with the need “to encourage the use of alternative effluent systems and reduce the reliance on septic tanks as a means to reducing the risk of contamination of water.” (page 46)

Within the Dinner Plain Village Masterplan, there is recognition of environmental buffer zones around the Alpine bog and water bore areas. (page 51).

Incorporated and Reference documents.

A list of incorporated documents is included in Appendix A. A list of reference documents is included in Appendix B.

2.2 Alpine Shire Council: Council Plan 2009-2013 (2010 update)

The Plan is aligned with the key directions of the Alpine Shire 2030 Community Vision and has five themes: Leadership, Community, Place, Economy and Environment. Explicit cross references to the community vision are included throughout the Council Plan.

The Alpine Shire Council Plan incorporates a number of references to climate change and actions to reduce greenhouse impacts.

Climate change is identified under sections on leadership, place and economy and environment. Within Leadership, an initiative includes the development of the 'Local Voices Shaping our Future Climate Change Action Plan' (page8). In Place, climate change is identified as one of four significant challenges identified: dealing with the effects of climate change and natural disasters (page 16).

In Economy, the Plan identifies climate change as both a significant environmental consideration and also "an opportunity in an economic sense" (page 21). In relation to tourism, Council "will actively work with residents and investors to promote the reduction of their carbon footprint" (page21). Council also identifies opportunities with greater water security than many other locations (page 22).

In the theme of Environment, the first challenge identified is 'responding effectively to a changed and changing climate" (page 25). The plan notes the introduction of the Greenhouse Local Action Plan in 2006, with greenhouse gas emissions reduction targets for council operations and the community, and also for reduction of corporate water consumption. There is also discussion on strategies to respond to the effects of climate change. This includes working with Towong Shire Council (pages 25 and 26).

The strategies identified include actions on an Environment policy, identifying projects and buildings for both water conservation and energy efficient design, reviewing the Alpine Shire Greenhouse Plan and developing and implementing a climate change risk Assessment (page 26).

Risk assessment is also picked up as a municipality action in the context of leadership, the need for a continuous improvement plan and risk management (pages 9 and 10).

Water issues addressed in the Council Plan include reference to water sensitive urban design in the context of sustainable development (page 16), and in relation to environmental sustainability already noted above.

2.3 Alpine Shire 2030 Community Vision 2010 Review

The Vision has evolved from a draft Vision document in late 2004 and early 2005, and a revision in 2010, with a consultation process through February 2010.

The document states that “The Vision is based on the principles (or values) which people hold dear. These principles are the test for new developments and directions. They are fundamental to creating the future feeling, look and energy of the Alpine Shire” (page 4).

Climate change and greenhouse reduction are identified an action, including implementing recommendations from the June 2010 citizens jury (page 11).

The need for more efficient use of scarce resources is identified, including the energy and the use of grey water (page 12). This is linked to a new Planning Scheme developed to meet future challenges in terms of sustainable development and rural land use.

Pursuing alternative sustainable energy sources (pages 15 and 18) is identified in a couple of sections, along with electronic vehicles, and the discouragement of cars (page 20).

Challenges identified in the process included leadership: Need to communicate risk and crisis management objectives and sustainability principles clearer. Need to lead by example in energy saving and water saving. (page 25).

However, on page 27 is the statement “Climate change is the responsibility of higher levels of government.”

2.4 Alpine Liveability Plan 2009

The Liveability Plan identifies a strategic framework for community wellbeing for the next 4 years. It identifies “liveability in its simplest terms is where people can enjoy a quality of life they desire through maintaining health and well being” (page 2. This document was formally known as the Municipal Public Health and Wellbeing Plan (page 3). A key aspect is not just health from personal clinical perspective but more widely, with the natural, built, social and economic environments in which we live, based on the notion that balance between environments promotes good wellbeing.” (page 3)

Sustainability is identified as a liveability outcome, with explicit reference to climate change (page 12).

This is expanded (page 13) in relation to sustainability and climate change. “Alpine Shire must ensure that it is a regional leader in sustainable activities, climate change adaptation, water and energy and that we participate, facilitate and drive sustainable change management activities across the Northeast Region of Victoria.”

Page 14 addresses community resilience. A strategic objective is to “strengthen the capacity and resilience of communities to enable them to adapt to the impacts that a changing climate will have on the environment, the economy, culture and society...”

Section 9.3 Sustainable Health and Social Planning includes as its policy statement: “Council is committed to being an active participant in regional wellbeing activities relating to climate change and community sustainability.”

Available at web on <http://www.alpineshire.vic.gov.au/files/2010AlpineLiveabilityPlan2009-finalnov2009.pdf>

2.5 Sport and Leisure Strategy Review Revised Draft Issues and Actions Alpine Shire.

First report was produced in 1996. Second report produced in 2003. The purpose of the document is “to outline the key issues for Alpine Shire concerning recreation, reserves and play, and establish goals and actions for the next five years” (page 2). This document continues to be a draft only.

Note that the report refers to bike trails as a leisure and recreation activity, not as a transportation option, which it could easily be.

2.6 Tourism Plan

Alpine Shire does not currently have a tourism plan

3 Indigo Shire Council

3.1 Indigo Planning Scheme

The MSS identifies the historic nature of the Shire. Considerable attention within the Planning Scheme relates to maintaining the heritage basis of the Shire.

Water and sewerage supplies are identified as needing augmentation to meet expected population increases. (21.01-3, page 2) and to reduce environmental degradation (21.02, page 1).

The Planning Scheme also refers to encouragement of land uses which are environmentally and ecologically sustainable.

A review of s21.03 of the MSS shows no reference to climate change. Climate change and greenhouse terms are not used within large sections of the document, for example in the vision (21.03). Sustainable development is referred to in the vision: “The vision for the Indigo Shire embraces the concept of a prosperous community with a diversified economy integrated within a sustainable and productive natural resource base” This vision “reflects the commitment of the Shire to the principles of ecologically sustainable development “(21.03-1 page 1).

The relationship with the Planning Scheme and Corporate Plan is discussed. The indigo MSS draws “on the following principles enshrined within the Corporate Plan: Preservation of heritage and historical features of the Shire; Recognition of cultural diversity and equality of opportunity; Conservation of the natural environment; Maintenance of the rural identity and atmosphere of rural towns; Effective planning for the future; and Sustainable economic development through supporting agriculture, tourism and business opportunities (21.03 – 02 p2). The Corporate Plan referred to is the 1998-2001 Corporate Plan.

Considerable emphasis is placed on encouraging sustainability by diversifying the agriculture and economic base. The Planning Scheme argues that the concept of a uniform minimum size is “not appropriate to the Shire. Indeed much of the Shire already comprises lots less than 40ha as a result of the subdivisions made during the gold rush era. Further subdivisions in the rural area, particularly new lots less than 40ha, should facilitate productive use of land and ensure sustainable practices in respect of the resource base”. (21.04-2-1, page 24). It is not clear how this is achieved.

Elsewhere there is specific reference to encouraging the Renewable Energy and Rendering facility in Barnawartha (21.04, page 25).

Water issues are identified in relation to the need for infrastructure, and flooding and inundation. The importance of water resources is recognised, with issues of maintaining water quality, and flooding and drainage identified. (21-04-3-1 pages 29, 30 and 31).

Flooding and Drainage is covered in section 21-04.3-3, pages 33-27. Approximately 15% of the area will flood at some time, and strategies include consideration the impact of flooding on all new use and development in flood prone areas, along with other strategies (page 35). While the planning scheme identifies the need for local floodplain development plans for a number of areas, these have not yet been developed.

Rural drainage issues (page 35) and storm water management (page 36) are also identified as issues in the Planning Scheme.

It should be noted that the website for Indigo Shire Council notes the following for the planning scheme:

“Indigo’s revised Municipal Strategic Statement: This provides key policy background and a platform for development. It identifies Climate Change as a specific issue and is linked with the key objectives and strategies”. However this is not currently reflected in the official Planning Scheme on the Victorian Planning Scheme web site, which is dated 2006.

Incorporated and Reference documents.

A list of incorporated documents is included in Appendix A. A list of reference documents is included in Appendix B.

It is noted that there are a considerable number of older referenced documents, including number of draft documents within the Indigo Planning Scheme.

3.2 Indigo Shire Council Plan 2010 - 2013

The message from the Mayor, Mr Gaffney identifies climate change as one of five key areas to focus on in the next four years: Financial sustainability, sound management of council’s assets; effective delivery of essential services to the community and a sense of community and connectivity between and amongst the Shire’s townships are the other four elements.

Other sections include addressing storm water master plans (page 21), implementing actions from the Stormwater Management Strategy (page 28), continue the implementation of the Indigo Strategic Water Use Plan (page 29). The section on Developing Sustainable Communities has a number of goals including: Ensure key sustainability principles are incorporated across all Council activities; Ensure Land Use Planning Scheme meets the needs of sustainable growth; and work in partnership with our communities to adopt and implement sustainable building design and lifestyle practices (page 30).

Under Objective 3.3 Encourage and facilitate appropriate economic growth and employment opportunities is “identify business and economic development opportunities and threats that can be addressed by Council” (page 24). It is unclear if these include business threats exacerbated because of climate change e.g. loss of business because of fire events.

Climate change is referred to in actions under objective 4.7 “Recognise and plan for the effects of changing environmental conditions” (page 36).

3.3 Community Vision

A community engagement process took place as part of the development of the Council Plan 2009-12. This included a series of community driven “dinner table conversations in the five major towns, called *A Place at the Table* (page 9 of Council Plan). There was also a community survey undertaken. To date, a separate vision document outcome has not been identified.

3.4 Indigo Shire Recreation Plan

Volume 1 of the Municipal Recreation Plan: Strategy and Actions does not make reference to climate change throughout the document. Produced in February 2008, it does pick up on some issues that relate to adapting to climate change.

Four Recreation service principles are identified. These include: Encouraging participation; Maximising choice and opportunity; Enhancing sustainability and Maintaining Equity (page 8). In the Enhancing Sustainability, “Council will seek to minimise the consumption of potable water and energy, and maximise opportunities to recycle and reuse water and energy in recreation facilities and infrastructure” (page 8).

These principles are elaborated in relation to water and shade issues. For example, there is suggestions that Council identify opportunities to support and promote more water reuse and recycling to assist club and ground sustainability and also address lack of shade for spectators at sporting grounds (page 25). Specific recommendations are also included within the Strategies and actions in Focus area 7. Action 37 (high priority) is to “support developments at recreation reserves that promote sharing, maximise facility use, enhance sustainability and encourage greater community participation”. Action 38 (medium priority) is “work toward an overall reduction in the demand for potable water at sports grounds and recreation reserves” (page 39).

3.5 Economic Development Action Plan

Not yet developed by Council. To be developed in next six months or so.

3.6 Indigo Shire Council Environmental Strategy

Written in 2009, the Environment Strategy was developed with advice provided by the Council’s Environment Advisory Committee. The Strategy states that the “the role of local government in management of the environment should be considered in the context of Natural Resources Management (NRM)” (page 2). It notes the changing role of local government from a focus on infrastructure and social functions to an expanded role that may include management of the local environment, in areas such as community education, green house gas abatement, climate change adaptation as well as NRM in the planning system (page 2).

The Strategy identifies threats including that natural values are threatened by likely changes to climate.

There are nine stated goals of the strategy. There are four key strategy directions: using resources efficiently; protecting and enhancing natural and municipal assets; regulating for liveability; and supporting and resourcing the community. Each of these strategies has a

stated rationale, statement of outcomes' links to existing council documents' statement of major encompassing themes and an action matrix (page 10).

Climate change adaptation is addressed in protecting and enhancing natural and municipal assets (page 20) with a series of actions (2.1.1 to 2.1.3.) (page 23). Other aspects of the document address elements of climate change mitigation and adaptation. Under the key strategy for regulating for liveability there are action 3.3.1 advocates supporting the implementation of sustainable building design above minimum requirements (page 31).

4 Towong Shire Council

4.1 Towong Planning Scheme

The Towong Planning Scheme cross references to the 2006-2010 Council Plan to identify the vision for the Shire: "By 2010 we will be a World Class small Council and Towong Shire will be the ideal place to live".

The Planning Scheme and the planning vision is explicit about the need to balance economic growth with challenges of environmental enhancement and sustainable development.

Of the six elements of Council's vision, three directly relate to sustainability:

Our Environment "To ensure that the Shire is a place of pure attraction by integrating sustainable management resource management into all of our business activities"; Planning for the Future " To develop a strategic and sustainable long-term land use direction for the Shire based on an integrated approach to the natural and built environment; and Economic and Tourism Development "To expand long-term employment and economic opportunities whilst continuing to maintain and promote our environment and the Pure lifestyle the Shire offers". (21.03 p1)

Water and associated infrastructure is identified as an issue for both towns and villages. A limited number of towns have both reticulated water and water and sewerage infrastructure, and those existing systems need augmentation and upgrading (21.05 p1). Water quality supply issues can arise in Corryong from Nariel Creek. Long term growth and development of Bellbridge requires additional water, sewerage and storm water infrastructure (page 3) while lack of infrastructure contributes to the pollution of Lake Hume, Mitta Mitta River and the Murray River (21.05 p3).

Access to water, improvement of water infrastructure, management of wastewater and storm water recurs throughout the discussion of settlement in the MSS.

The key issues identified in the MSS (Clause 21.06-07) identifies natural disasters e.g. flooding fire and drought and a range of other activities including preservation and

enhancement of biodiversity of the Shire, protection of agricultural land and so on, but does not mention the term climate change.

The Planning Scheme identifies the importance of landuse planning “as an important tool in minimising future impacts of flooding. Through careful planning, landuse and development on flood prone land can be made compatible with the flood risk and the natural storage and environmental functions of the floodplains” (21-06 p1).

In the Municipal Strategic Statement (Clause 21.06 – 02) is the statement “The North East Catchment Management Authority is responsible for floodplain management in the region”. However, the flood study undertaken on the Mitta Mitta below Dartmouth in 2006 has not been incorporated into the Planning Scheme.

Within the overview of the economy, agricultural production is discussed. “The Shire’s reliance on the now declining agricultural sector has been further affected by the climatic conditions of the past decade and the occurrence of a prolonged drought and major bushfires” (21.07 -1 p1). The Scheme is also explicit about the economic challenges: “The need to offset the retention of the landscape and plan for change to provide for the communities expectation of economic diversity will provide the Shire with a challenge as it addresses the need to diversify whilst retain the “PURE, clean, green environmental image espoused in the Council Plan (21.07 p1).

Throughout the MSS, climate change is not discussed.

Note also that in the Council Plan for 2009-2013 revised July 2010, the Mayor notes that Towong has undertaken a review of the Towong Planning Scheme and are currently preparing and amendment to be submitted for the Minister of Planning for approval.

Incorporated and Reference documents.

A list of incorporated documents is included in Appendix A.A list of reference documents is included in Appendix B.

4.2 Towong Council Plan

There is no explicit reference to the terms climate change adaptation or mitigation throughout the Council Plan. However a number of actions are consistent with leading edge activity in climate change mitigation and adaptation.

Page 4: Investigate new/additional funding streams with a view to reducing reliance on rate revenue and grant funding.

Our Environment includes the goal “continue to deliver positive economic and environmental outcomes through innovation in renewable energy and sustainable development” (Page 5).

Planning for our Future includes “undertake Municipal Strategic Statement Review “ to be completed by 2012. (Page 6)

Economic and Tourism Development includes the statement “Develop an innovative residential estate that demonstrates world’s best practice in environmental sustainability” (page 7). The Zero Energy Estate Feasibility Study is an outcome of this (see below). This section also has references to agribusiness profitability and sustainability, and profitability within businesses.

4.3 Towong Shire – Zero Energy Estate Feasibility Study

This feasibility plan is looking at a development which is carbon neutral with a focus on energy. It also looks at water consumption, waste management water and waste water management and infrastructure.

4.4 Towong Settlement Strategy 2010

While it has a quite extensive discussion of climate change on the Shire on pp20-25 (Volume 1 Part 1 - Background paper)there does not appear to be discussion on climate change impacts re the settlement strategy.

4.5 Towong Shire Council Healthy Communities Plan 2009-2013

“Looking to plan in advance to make informed decisions around social, economic or physical environments that directly affect the health and wellbeing of all communities” (page 3).

The report provides a profile of community in plain language. For example, “While our sense of community is very strong, we are less accepting of cultural, lifestyle and socio economic diversity than other areas of Victoria” (page 6).

Explicit outline of changing climate is included (page 9).

Available on web at

<http://www.towong.vic.gov.au/Page/Download.asp?name=HealthyCommunitiesPlan2009-2013.pdf&size=1258483&link=../Files/HealthyCommunitiesPlan2009-2013.pdf>

4.6 *Towong Heatwave Plan 2009*

“The plan is underpinned by a long term approach by Towong Council in partnership with the North East Greenhouse Alliance and neighbouring shires, to reduce the scale of climate change and decrease its overall impact on the local environment.” (page 3).

Includes explicit description about expected impacts of climate change (page 7).

4.7 *Towong Tourism Strategy 2010 – 2013*

Written by EC3 Global “an international tourism and environmental management organisation”.

Document makes reference to Climate change. Page 12 in relation to nature based tourism trends identifies trends/concerns re carbon emissions on long haul air travel (page 12); the need for environmentally sustainable experiences and the like. On page 40 one of the threats identified in the SWOT analysis is “awareness of climate change”

Strategic context is that the tourism strategy aims to align the future development and promotion of the Shire with the broader regional and state -wide tourism approach while recognising the unique character of the region...(page 9).

5 Rural City of Wangaratta

5.1 *Rural City of Wangaratta Planning Scheme*

There is a close relationship between the *Planning Scheme*, the *Wangaratta Community Vision - Shaping the Future* and the *Rural City of Wangaratta Council Plan 2004-2008*. The *Vision* is explicitly referred to within the Municipal statement (21.03).

The term “climate change” has not been identified in the document. “Greenhouse” gets a mention in context of reduction of greenhouse gas emissions (see below 21.10).

Strategic directions are grouped under 7 main issues (21.04):

- Rural use and Agriculture
- Urban development and central activities area
- Rural townships and settlements
- Industry and business
- Economic development and tourism
- Environment management and heritage
- Infrastructure and community.

In the section on Rural Land Use and Agriculture in relation to water supplies, “subdivision and housing in rural areas can lead to difficulties in funding, provision and maintenance of services such as roads, electricity and water supply.” (21.05, page 1).

There are a number of areas in Wangaratta that are identified as having limitations on expansion or further development due to water issues. The lack of reticulated water and sewerage is identified as one of the limiting factors for Rural Townships and Settlements (21.07, pp2 and 3), tourism expansion in rural townships (21.08, p1), industry and business and particularly in the North Wangaratta industrial areas (21.09, p1).

Under environmental management and heritage there is expansive discussion on catchment, waterways and water supply. Within ‘other environmental issues’ is explicit statement re greenhouse gas emissions: “enhance the municipality’s image as a liveable and environmentally sustainable area through the reduction of greenhouse gas emissions in planning for future land use and development”. (21.10, page 4)

Within the strategic directions for infrastructure area number of items related to reticulated sewerage and water supply, improving the effectiveness of drainage systems and a direction to “encourage and provide water sensitive urban design and water reuse to achieve sustainable development principles” (21.11, page 3).

There is also within the *Planning Scheme* statements about energy and water efficiency in the built form (21.6 page 3), and the use of a triple bottom line benchmark within a fully integrated town centre. (22.02-1 page 1)

Incorporated and Reference documents.

A list of incorporated documents is included in Appendix A. A list of reference documents is included in Appendix B.

5.2 Rural City of Wangaratta Council Plan 2009-2013 Adjusted 2010.

Climate change is included in a range of the Council plan. Key Strategic Activity 2.12 under Governance is “To minimise risk as a way of providing a safer public and work place environment”. Action 2.2.3 is to “Develop a risk management approach to identify the impacts of climate change on core and non-core Council Business (page 10).

Item 3.2 is to apply a triple bottom line approach to the assessment of new initiatives – social, environmental and financial sustainability. (3.2, page 11).

Community wellbeing addresses the capacity of the community to be self supporting and resilient. It is not couched in terms of climate change. Key Strategic Activity 1.1 “to support

our communities to be more resilient” seems to be more focussed more on social resilience while Activity 1.4 addresses “support community in times of crisis”.

Under Infrastructure and Planning there are a number of references to climate change including investigate the impacts of climate change on land use planning and develop options for overcoming drainage deficiencies within the urban areas (3.1.8 and 3.1.10 page 26).

Climate change and sustainability issues are well covered in the area of Environmental sustainability with actions such as “support community based climate change and sustainability initiatives” (2.1.5) Establish Council leadership as a sustainability and environmental steward (Objective 3). Key Strategic activity 4.2 is to assist the community to proactively respond to climate change.

5.3 Rural City of Wangaratta Community Vision

The Vision for the municipality is a long term community-created approach for land use planning until the year 2030. The vision is for an integrated approach that includes social, economic and environmental considerations. Core components of this vision are that the municipality and community will:

- Be a vibrant, diverse and secure place to live
- Facilitate a growing and sustainable economy and employment base
- Preserve and enhance our heritage and environment.

Areas of focus include: Arts, culture and education; Assets and infrastructure; Community services and youth; corporate services; environmental management; sport and recreation; and tourism and economic development.

5.4 Rural City of Wangaratta Community Wellbeing Plan 2010-2013

This document identifies that the plan is for the whole community, not just municipal action.

There are 4 sections – Council’s role, health promotion, life stages and other aspects of well being.

One of the key themes identified is “to continue to develop strategies to strengthen communities and support individuals to be resilient when faced with the challenges of economics and climate change” (page 16).

Page 21 makes explicit the relationship of drought and fire and wellbeing. “The prolonged drought has had a significant impact on many residents which is not only economic; the drought has impacted on life style including loss of social and recreational activities like

sport, recreational activities and gardening. ...During the drought, there have been a number of severe bushfires and this together with predictions of increased fire risk, has increased many residents sense of insecurity.” (page 21) A council action linked to this is to “Review Council’s Drought Response Strategy to address issues associated with the social impact of climate change.” (Page 23.)

This sense of vulnerability and not feeling safe and secure is also referred to on pages 41 and 43 in the context of community safety. One identified council action is to “identify risks associated with a changing climate and actions to address these” (page 43).

Available at web on <http://www.wangaratta.vic.gov.au/CA256B5800826065/page/Listing-Policy-Community+Wellbeing+Plan?OpenDocument&1=590-Publications~&2=300-Policies+%26+Strategies~&3=~&REFUNID=EC532F600AEEF3EDCA2577C800116A1F~>

5.5 Rural City of Wangaratta Heatwave Response Plan. Adopted 20 October 2009. Amended 18 November 2009.

Heatwave response plan was developed for the 2009/10 summer. Explicit recognition of climate change and potential impacts on health and infrastructure is included. It includes recommendations that the Plan be managed by Councils Environmental Health Unit; and that the plan be endorsed as a sub-plan of Council’s Municipal Emergency Management Plan. It also recommends that the plan be incorporated into other key council plans including the Council Plan, Community Wellbeing Plan and Municipal Strategic Statement, and that the plan be reviewed annually.

Heatwave response plan available at [http://www.wangaratta.vic.gov.au/CA256B58007E652E/Lookup/Heatwave/\\$file/HeatWavePlan191109.pdf](http://www.wangaratta.vic.gov.au/CA256B58007E652E/Lookup/Heatwave/$file/HeatWavePlan191109.pdf)

5.6 Wangaratta Economic Development Strategy 2008-11. Revised September 2009.

The Strategy was prepared by the Regional Development Company and revised in-house in September 2009. Vision is “the Rural City of Wangaratta is a well planned regional hub which is socially and environmentally sustainable.”

An environmental scan that took place in 2007 identified changes and trends. These were clustered under five headings: Environment, Technology, social, economic and political (changes). Within the environmental cluster, drought and water issues, climate change and sustainable development was identified.

An important statement is on page 6: “We are not about economic development at any cost, we are about sustainable development”.

A critical issue and challenge identified over the next 10 years was: managing the environment, climate change natural resource shortages. (page8).

Note action 1.1.6 is to “monitor sustainability within industry and business sector through relevant benchmarking” (page 13).

There is no specific discussion on risk management although the strategy has a general approach on supporting both existing and new business enterprises.

5.7 2010-2013 Rural City of Wangaratta Tourism Industry Strategic Plan

3 year plan takes into account key themes from 2030 Community Vision and industry’s own vision. It was produced in January 2010. Market analysis identifies three tourism trends to watch that relates to climate change, petrol prices and carbon impacts as:

- Climate change and increasing awareness of our impact upon the environment will heighten interest in nature based and eco-tourism
- Petrol price continues to escalate
- Impact on environment by travel could become an issue as more people choose carbon neutral activities (page 5).

However the strategies in the document do not address these trends. The SWOT analysis also does not identify business risk because of impact of fires, floods and the like. Key Strategy 5 is to “Preserve and enhance the natural and built environment to capitalise on its tourism appeal” (page 18). The actions are infrastructure based, including streetscape improvement. It also seeks to support Parks Victoria to develop and promote the Warby Range/Ovens River National Park.

Available on web at

[http://www.wangaratta.vic.gov.au/CA256B58007E652E/Lookup/PublicDocuments/\\$file/Tourism-Industry-Strategic-Plan-2010-2013.pdf](http://www.wangaratta.vic.gov.au/CA256B58007E652E/Lookup/PublicDocuments/$file/Tourism-Industry-Strategic-Plan-2010-2013.pdf)

6 City of Wodonga

6.1 Wodonga Planning Scheme

Municipal Statement dated 11/12/2008. Focus on Wodonga Growth Strategy “which demonstrates how Wodonga will cater for urban growth beyond 2050.” (Clause 21.01, p 1)

One of the major themes is the protection and maintenance of environmental assets including Lake Hume, surrounding hill sides, the Murray River and Kiewa River Floodplains and other waterways and floodplains (21.01, p 2).

Wodonga Growth Strategy shows residential growth will occur south east of Wodonga in the Middle Creek Valley. “Through the Leneva Structure Plan, the council has completed a plan for what is equivalent to another city accommodating 70,000 in the spectacular setting of Middle Creek” (21.01, p 3).

Section 21-03 provides the context for the Planning Scheme. There is no reference to environment, climate change or energy in this section. Water is mentioned in the context of Lake Hume providing a water storage facility for irrigators and downstream users (p2).

Climate change is identified as an issue within the strategic issues. “There is recognition that future growth in Wodonga needs to respond to the challenges of climate change, scarcity of water, energy consumption and the building of a cohesive community” (21.05.12, p 3).

The key strategic principles refer to sustainable development, and that the environment “and its resources will be managed in a practical and sustainable manner” (21.06-03 p1).

The six key elements of the Framework identified are: Regional co-operation; Environment and Natural Resources; Future Urban and Residential Use; Economic Development; Infrastructure; and Social.

In relation to regional co-operation, there is reference to preparation of a Sustainable land management plans and supporting the Regional Parklands of Wodonga by “directing off-sets for ‘net gain’ and carbon off-sets to the regional parklands” (21.08-3 p5).

The section on environment and natural resources does not refer climate change, energy or greenhouse gas emissions. It does have a focus on catchment management, and the position of Wodonga as a major component of the Murray-Darling Basin. It states that “the position of Wodonga in the upper catchment of the Murray will be respected at a local level through the implementation of Urban Stormwater Best Practice Management Guidelines and Water Sensitive Urban Design Engineering Procedures, Stormwater Technical Manual” (21.09-1 p1).

Floodplains are identified as significant natural landscapes for Albury Wodonga. “The encroachment of urban areas onto the floodplains will be restricted.”(21.09-1 p1) This

section also identifies the need for buffers to all major waterways for all urban developments.

Lake Hume is identified as an important area. Septic systems outside of Bonegilla are identified, and urban development “will be supported in Bonegilla and only in circumstances where reticulated sewerage and drainage services are provided” (21.09-5 p4).

In ‘Future urban and residential use’ there is discussion on the need for sustainable neighbourhoods. “Through this next planning period, it is proposed to lead positive change by providing a more solid basis to the design approach to the design applied for new residential estates and an insistence that residential development achieves good community building outcomes. Integral to this triple bottom line approach is the adoption of sound urban design principles in the planning process”(21.10 p1).

There is an explicit statement on energy conservation in this process: “New development should embrace the need to conserve energy and resources, demonstrating consideration of opportunities to save water, utilise solar energy opportunities and recycle materials on site. New development proposal will be required to provide a sustainability report outlining how the proposal has considered and will apply principles of ecological sustainable development (21.19-2 p2).

The section on economic development does not discuss climate change, energy, greenhouse gas implications or water. Sustainability is in the context of “Albury Wodonga's strategic location on the Hume corridor between Sydney and Melbourne in a quality lifestyle and environmental region provides sustainable growth potential for Wodonga” (21.11 p1).

Water and wastewater systems are discussed in detail in 21.12-03. “The council supports North East Water in the implementation of initiatives for the better use and reuse of water. This includes additional infrastructure in existing areas and in new developments for the future supply of reclaimed water for non-potable reuse.” (21.12-03 p5).

Within the Social section, there is some comment on public transport and recognition that public transport is marginalised. “future development will be planned in a manner that promotes the use and viability of public transport” (21-13-06 p3).

Incorporated and Reference documents.

A list of incorporated documents is included in Appendix A. A list of reference documents is included in Appendix B.

6.2 Wodonga Council Plan 2009-2013

Compared to some other plans, the early sections of this document appear more focussed as a marketing tool with the reference to the community and consultation emerging on page 16 onwards. However, once that part of the document is reached it outlines an extensive community consultation program held over 2008/9 with over 4000 citizens having input. This helped establish a Wodonga in 2033 Vision (pages 19 – 22).

The Vision includes reference to being expert in the development and use of local renewable energy sources; new developments built to new environmental standards to achieve a significant reduction in energy and water use per capita; and retrofitting of older and community facilities to meet highest of environmental standards (page 20).

The Council Plan then outlines five “pillars of wellbeing”: Vibrant people, communities and neighbourhoods; A strong and resilient economy; a well-built, well-maintained and well-protected community; An inclusive and culturally rich city; and a democratic and engaged community. Of these there is a reference to a shade strategy in the first pillar (page 24); a note to attract green industries to Wodonga (page 26) in the economic pillar and encourage businesses to operate in a socially and environmentally responsive manner (page 27); while pillar five identifies risk management as a strategy. (page 33).

Within Pillar Three, *A well-built, well-maintained and well-protected community* there is a range of actions and strategies relating to environmental strategies. This includes actions to achieve high standards within council services and facilities including energy efficiency, alternative energy and ‘develop planning policies that encourage energy efficient practices such as storm water reuse, solar energy reuse, reuse of wastewater in subdivisional design and construction’ (page 28). There are also a number of priorities and actions identified to “encourage community participation in reducing CO2 emissions throughout the community (page 28). Actions for the council’s open spaces include implement a reclaimed water supply network for us within public open space (page 29).

A key strategic indicator for 2010 – 2011 is to “report to council on the progress with investigations into the opportunities to use renewable energy to reduce the cost of living” (page 30).

6.3 Healthy Communities Plan

Currently in draft form. Discussed with staff but written draft not reviewed.

6.4 City of Wodonga Economic Development Strategy 2011-2013 February 2011

Key focus of the Economic Development Strategy is “growing, creating and maintaining Wodonga’s Economic base in a sustainable manner” (Page 1).

The ‘economic development vision’ refers to Vision 2033, developed in 2008 and is incorporated and outlined in the Council Plan (see above). The Economic Development Strategy also cross references to the second pillar of Wodonga Council Plan 2009-13, and then provides a focus on pillar two: strong and resilient economy.

An analysis of key strengths, challenges and opportunities was undertaken for the Economic Development Strategy. In an analysis of challenges is “unchecked economic growth and urban development could compromise liveability and the local environment” while one opportunity is to “encourage the development of alternative energy use sources” (page 8).

There is no discussion of water availability and energy costs as a potential business risk. There is no reference to climate change within the document. It is not covered, for example in business attraction and retention. Pages 14 and 15 include some very general statements for a key action “provide support and information on the development of innovative and sustainable business practices” (page 14) and “attract private investment from the sustainable resources and ‘green industry’ sector”.

6.5 Wodonga Tourism Plan

Wodonga does not have a tourism plan at this stage.

Appendix A: Incorporated documents within Planning Schemes

All citations in this table reflect the incorporated documents listed in each of the Planning Schemes.

- A** Alpine Shire Council
I Indigo Shire Council
T Towong Shire Council
Wa Rural City of Wangaratta
Wo City of Wodonga

Incorporated documents	A	I	T	Wa	Wo
Code of practice for timber production 2007	√	√	√	√	√
Victorian code for cattle feedlots, August 1995	√	√	√	√	√
Guidelines for Environment Management – Septic Tanks Code of Practice, Publication 891, Environment Protection Authority, March 2003	√	√	√	√	√
Private Tennis Court Development Code of Practice – Revision 1, March 1999	√	√	√	√	√
Code of Practice for Fire Management on Public Lands (Department of Sustainability and Environment, Revision No 1, 2006)	√	√	√	√	√
Code of Practice, Piggeries, Department of Planning and Housing and Department of Food and Agriculture, 1992	√	√	√	√	√
Building in bushfire prone areas – CSIRO & Standards Australia May 1993	√	√	√	√	√
Local Government Planning Guide for Dry Land Salinity – Department Conservation and Natural Resources, 1995	√	√	√	√	√
Construction Techniques for Sediment Pollution Control, Environment Protection Authority May 2001	√	√	√	√	√
Apiary Code of Practice, May 1997	√	√	√	√	√
A ‘Good Neighbour’ Code of Practice for a Circus or Carnival, October 1997	√	√	√	√	√
A Code of Practice for Telecommunications Facilities in Victoria, July 2004	√	√	√	√	√
Australian Standard AS/NZS 2890.1:2004, Parking Facilities – Off-street car parking, Standards Australia 1989.	√	√	√	√	√
Australian Standard AS/NZS 2890.2 – 1989, Off-street parking Part 2: Commercial Vehicles Facilities, Standards Australia 1989.	√	√	√	√	√

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Incorporated documents	A	I	T	Wa	Wo
Australian Standard AS2890.5 – 1993, Parking Facilities Part 5: On-street parking, Standards Australia 1993	√	√	√	√	√
Australian Standard AS2890.5 – 1993, Parking Facilities Part 3: Bicycle parking facilities, Standards Australia 1993	√	√	√	√	√
Pavement Design – A guide to the Structural Design of Road Pavements, Austroads, (AP -17/92)	√	√	√	√	√
Guide to Traffic Engineering Practice, Part 6 – Roundabouts, Austroads, 1993)AP-11.6/93)	√	√	√	√	√
Guide to Traffic Engineering Practice, Part 13 – Pedestrians, Austroads, 1995 (AP-11.13/95)	√	√	√	√	√
Guide to Traffic Engineering Practice, Part 14 – Bicycles, Austroads, 1990 (AP-11.14/99)	√	√	√	√	√
Design Vehicles and Turning Path Templates, Austroads, 1995)AP – 34/95)	√	√	√	√	√
Australian Rainfall and Run-off – A Guide to flood estimation, Volume 1, The Institution of Engineers, Australia, Reprinted edition 2001	√	√	√	√	√
Australian/New Zealand Standard AS/NZS1158.1.1:1997, Road lighting, Part 1.1: Vehicular Traffic (Category V) lighting – Performance and installation design requirements. Standards Australia/ Standards New Zealand 1997	√	√	√	√	√
Australian/New Zealand Standard AS/NZS1158.3.1:1999, Road lighting, Part 3.1: Pedestrian Area (Category P) lighting – Performance and installation design requirements. Standards Australia/ Standards New Zealand 1999	√	√	√	√	√
Guide to residential Streets and Paths, Cement and Concrete Association of Australia, 2004 (C&CCA T51 – 2004)	√	√	√	√	√
Victorian Code for Broiler Farms 2009	√	√	√	√	√
Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria, March 2011	√	√	√	√	√
Victoria’s Native Vegetation Management – A Framework for Action , August 2002	√	√	√	√	√
Activity Centres and Principal Public Transport Network Plan, 2010	√	√	√	√	√
Growth Area Framework Plans, Department of Sustainability and Environment, September 2006.	√	√	√	√	√
Australian Standard AS2021-2000, Acoustics – Aircraft Noise Intrusion – Building Siting and Construction, Standards Australia International Ltd, 2000			√	√	

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Incorporated documents	A	I	T	Wa	Wo
Bogong Power Development Project Environmental Impact Assessment, July 2005	√				
Classified National Trust Landscapes Applying to the Shire of Indigo 1998		√			
Indigo Shire Heritage Study 2002		√			
Wodonga Retained Environmental Network Strategy, September 2006					√
Wodonga Central Business area Parking Precinct Plan – April 2003					√
83-85 Thomas Mitchell Drive, Wodonga, August 2009					√
216-230 Castle Creek Road, Wodonga, September 2010					√
Precinct Plan for Eastern Huon Hill and Surrounding Floodplain, Regeneration Solutions – March 2007 (minor amendments made July 2009)					√
Native Vegetation Precinct Plan for the Riverside Development at Killara, Regeneration Solutions (December 2009)					√

Appendix B: Reference Documents within Planning Schemes

All citations in this table reflect the referral documents listed in each of the Planning Schemes. No changes to ensure consistency in layout have been attempted.

- A** Alpine Shire Council
I Indigo Shire Council
T Towong Shire Council
Wa Rural City of Wangaratta
Wo City of Wodonga

Reference Documents	A	I	T	Wa	Wo
Albury Wodonga Region Planning Strategy 1991		√	√		√
Albury Wodonga the Gateway to Growth (Macroplan 1998)					√
Alpine High Country Tourism Strategic Plan, IER Pty Ltd November 1995	√				
Alpine Shire 2005 Residential Land Review, August 2006	√				
Alpine Shire 2030 Community Vision, June 2005	√				
Alpine National Park Management Plan, DCE, September 1992	√				
Alpine Shire Economic Development Strategy 1996-1999	√				
Alpine Shire Strategic Land Use Plan, John Bennett and Bernie Ebbs, 1996	√				
An Assessment of the Versatility of Agricultural Land in the Rural City of Wangaratta Department of Natural Resources and Environment, April 2000				√	
Beechworth Historical Reconstruction Study 1976		√			
Beechworth Urban Design and Landscape Guidelines 1998		√			
Bushfires – Living with Australia’s Natural Heritage, Country Fire Authority in association with the Geography Teachers Association of Victoria Inc., 1995			√		
Bright Future: Urban Design Framework, Hassell, 2003	√				
Bonegilla Structure Plan, City of Wodonga, July 2003					√
City of Wodonga Corporate Plan 2006-10 (City of Wodonga 2006)					√
CFA Planning Conditions and Guidelines for Subdivisions 1991		√			
CFA Design and Siting Guidelines 1987		√			

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Reference Documents	A	I	T	Wa	Wo
Chiltern Conversation Study 1981		√			
Code of Practice for Timber Production, Department of Natural Resources and Environment, Revision Two, 1996			√		
Community Profile for Alpine Shire, Insight Social & Health Research, 2008	√				
Community Wellbeing Plan 1999				√	
Cultural Services Strategy 2004				√	
Design and Siting Guidelines – Bushfire Protection for Rural Houses, Ministry for Planning and Environment and Country Fire Authority, 1990	√				
Design and Siting Guidelines – Bushfire Protection for Rural Houses, Ministry for Planning and Environment and Country Fire Authority, 1989			√		
Disability Action Plan 1999				√	
Draft Code of Practice for Fire Management in Plantations, Country Fire Authority, 1996	√		√		
Draft North East Salinity Strategy 1997		√			
Draft Ovens Basin Water Quality Strategy 1998		√			
Draft Upper North East Victoria Water Quality Strategy 1998		√			
East Gippsland Regional Catchment Strategy, East Gippsland Catchment and Land Protection Boards, June 1997	√				
Floodplain Management in Australia, Best Practice Principles and Guidelines, CSIRO, SCARM Report 73, 2000			√		
Gateway Master Plan-Plan Review, Coomes Consulting Group, August 2002					√
Glenrowan Masterplan, Chris Dance Land Design et. Al 2002				√	
Guidelines for Environmental Management – Septic Tanks Code of Practice, Environment Protection Authority, Publication 891, March 2003					
Great Alpine Road B500 – Wangaratta to Bairnsdale Management Study, 2004	√				
Great Alpine Road – Roadside Management Plan Wangaratta to Omeo, 1999	√				
Guidelines for the protection of water quality, North East Planning Referrals Committee 2001			√		
Healthy Lifestyles in a Healthy Community An Integrated Approach to Municipal Health Planning 1997					√
Indigo Heritage Study (Stage 1) Vols. 1 & 2 1998		√			
Indigo Heritage Study 2002		√			
Indigo Tourism Board Business Plan 1999/2000		√			

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Reference Documents	A	I	T	Wa	Wo
Indigo Shire Corporate Plan 1998-2001		√			
The Illustrated Burra Charter 1992		√			
Kiewa – Tangambalanga Structure Plan Report 2006		√			
Lake Hume Development Strategy (Discussion Paper 1994)					√
Lake Sambell Planning Design and Landscape Manual 1998		√			
Land Capability Report – An investigation into wastewater disposal in certain towns/areas of Towong Shire, LWMP Consultants, June 2002			√		
Landscape Planning and Conservation in North East Victoria, National Trust (Victoria), 1977	√				
Landscape and Townscape Study Method – A Case Study – Bright, Centre for Environmental Studies, University of Melbourne, 1978.	√				
Legends, Wine and High Country Regional Tourism Plan, Tourism Victoria, 1997	√	√			
Linking Victoria, Roads Corporation	√				
Leneva Structure Plan (EDAW 1998)					
Management Prescriptions for Plantation Establishment, Harvesting and Cartage, Towong Shire Council, 1998.			√		
Master Plan and Structure Plan for the Ovens River/Faithfull Street Precinct, MacroPlan Cox 2001				√	
Master Plan for the Wangaratta Water Supply System 2004					
Mount Beauty Master Plan EDAW Gillespies Aust., 2003	√				
Mount Beauty/Tawonga South Master Plan, Geoff Sanderson & Assoc, 1998	√				
Municipal Fire Prevention Plan, Alpine Shire	√				
Myrtleford Framework Plan 1990, John Bennett and Associates, 1990	√				
Myrtleford Master Plan Study, Gillespies, 2001	√				
Myrtleford Townscape Study, Michael Nunez, 1990	√				
North East Regional Catchment Strategy, North East Catchment Management Authority , 2004	√		√	√	√
North East Regional Catchment Strategy,1997		√			
North East Regional Landcare Plan, Landcare Victoria, June 1993	√				
North East Regional River Health Strategy, North East Catchment Management Authority, 2006.	√				√
North East River Health Strategy				√	
(Draft) North East Salinity Strategy, North East Catchment and Land Protection Board, December 1997	√				

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Reference Documents	A	I	T	Wa	Wo
North East Salinity Strategy, Department of Natural resources and Environment, December 2007, endorsed by the Victorian State Government, December 1999			√		
North East Victoria Review: Final report, Local Government Boards, October 1997	√				
NSW Dept of Planning Murray Regional Plan No. 2 – Riverine Land 1993		√			
(Draft) Ovens Basin Water Quality Strategy, North East Catchment Management Authority, June 1998	√				
Ovens River Catchment Floods, Department of Natural Resources and Environment 1993	√				
Planning Conditions and Guidelines for Subdivisions, Country Fire Authority, 1991	√		√		
Regional Floodplain Strategy and Regional Rural Drainage Management Strategy, North East Catchment Management Authority, February 2000			√		
Restructure Plans for Towong Shire, Urban and Regional Planning Consultants, December 2002			√		
Review of Buffer Distances Surrounding Wastewater Treatment Facilities, Urban & Regional Planning 2001			√		
Review of Rural Living Opportunities (Albury Wodonga Regional Planning Committee March 1993)					√
Rural City of Wangaratta Council Plan 2004-2008				√	
Rural City of Wangaratta Heritage Study, Urban Heritage Precincts, C & MJ Doring Pty Ltd June 2000				√	
Rural City of Wangaratta Municipal Land Strategy, June 2004				√	
Rural City of Wangaratta Roadside Management Strategy, July 2003				√	
Rutherglen Residential Lands Study 2005		√			
Rural Towns Development Program 2003				√	
Regional Victoria in Fact, 1996 Census Statistics for Victoria's Local Government Areas, Department of Infrastructure, VGPS, 1997	√				
Rural City of Wodonga Statement of Policy in Respect to Developer Contributions, 1994.					√
Shire of Bright Conservation Planning Study, Centre for Environmental Studies, University of Melbourne, December 1976	√				
Shire of Bright Local Conservation Strategy, August 1994	√				

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Reference Documents	A	I	T	Wa	Wo
Shire of Bright - Rural Land Mapping Project, Town and Country Planning Board, 1980	√				
Shire of Myrtleford – Rural Land Mapping Project, Town and Country Planning Board, 1978	√				
Shire of Towong Rural Living Development Guidelines Appendix 1			√		
Shire of Yackandandah Rural Living Area Structure Plans – Yackandandah surrounds, Osborne’s Flat/Allans Flat 1992		√			
Significant Landscape Register, National Trust of Australia (Victoria)			√		
Soil and Water Management Guidelines for Subdivision, Albury, Hume and Wodonga Councils, undated			√		
Sustainability Your Future in Balance (Albury Wodonga Region Planning Committee)					√
Snowy Valleys Way Touring Route, 2001			√		
Timber Industry Road Evaluation Study (TIRES) – Funding Needs Analysis of Local Roads Servicing the Timber Industry of North East Victoria 2006-2010	√				
Towards a Victorian Private Forestry Strategy, Private Industry Taskforce, 1997	√				
Township of Rutherglen Heritage Study 1994		√			
United Shire of Beechworth Rural Living Area Structure Plans – Baarmutha & Wooragee 1992		√			
Upper North East Water Quality Strategy, North East Catchment Management Authority, 2001			√		
Wangaratta Community Vision - Shaping our future				√	
Wangaratta Urban Design Framework, Cox Sanderson Ness Architects, MacroPlan, EnviroPlan and Wilde & Woollard, 2000				√	
Wastewater Forward Development Plan for Bright – Porepunkah, Final Report, Kellog Brown & Root Pty Ltd, 2005	√				
Wastewater Forward Development Plan for Myrtleford, Final Report, Kellog Brown & Root Pty Ltd, 2005	√				
Water Plan 2, North East Water, 2008	√				
Water Supply and Demand Strategy, PBJ & Associates, 2007	√				
Water Supply Master Plan for Mount Beauty, Final Report, BECA Pty Ltd, 2004	√				
Water Quality Guidelines for Northeastern Victoria				√	
Wodonga Central Area Car Parking Strategy, Ratio Consultants, April 2003					√

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Reference Documents	A	I	T	Wa	Wo
Wodonga CBA Strategic Planning Report – Master Plan 2006 and associated Urban Design Guidelines, August 2007					√
Wodonga Retained Environment Network, A threatened Species and Habitat Conservation Strategy, Albury Wodonga Corporation and City of Wodonga, September 2006					√
Yackandandah Historic Building Study 1986		√			
Yackandandah Urban Design and Landscape Guidelines 1998		√			

References

@leisure, Alpine Shire Recreation Strategy Review: Issues and Actions, Alpine Shire, 2003.

Alpine Shire, Alpine Shire Planning Scheme Available at web at
<http://planningschemes.dpcd.vic.gov.au/alpine/home.html>

Alpine Shire Council, Council Plan 2009-2013 (2010 Update), Alpine Shire, 2010.

Alpine Shire Council, Alpine Shire 2030 Community Vision, 2010 Review, Adopted 7 September 2010.

Alpine Shire, (Helen Vay), Alpine Shire Liveability Plan 2009, Municipal Public Health and Wellbeing Plan, Alpine Shire Council. 2009.

Alpine Shire (Thompson, Lorraine and Alexander, Cameron), Alpine Shire Greenhouse Local Action Plan, April 2006. Alpine Shire Council.

Bowman, Jan, *Considering the impacts of climate change on human health, wellbeing and municipal public health planning*, presentation to National Environment Conference: Transitioning to a climate resilient future in Melbourne on the 15 – 16 April 2010. Available at
<http://www.mav.asn.au/CA256C2B000B597A/ListMaker?ReadForm&1=45-Events~&2=10-Major+Events~&3=27-National+Environment+Conference~&V=Listing~&K=TOC+National+Environment+Conference~&REFUNID=EB1E93CACB290FF5CA25769400038CD4~&Count=10~> Accessed 8 February 2011

City of Wodonga, Economic Development Strategy 2011 – 2013, City of Wodonga. February 2011.

City of Wodonga, Wodonga Council Plan 2009-2013 Incorporating the City of Wodonga Strategic Resource Plan Adopted by Wodonga Council June 2010.

City of Wodonga, Greenhouse Action Plan, City of Wodonga, December 2006.

CSIRO, Urban Stormwater: Best Practice Environmental Management Guidelines. 1999, online publishing 2006. Available at
http://www.publish.csiro.au/?act=view_file&file_id=SA0601019.pdf. Accessed 8 February 2010.

Department of Infrastructure, Incorporated and Referenced Documents, 2000. Available at
http://www.dpcd.vic.gov.au/data/assets/pdf_file/0015/41712/928_VPP_Inc_and_Ref_doc.pdf. Accessed 20 June 2011.

Department of Planning and Community Development, Guide to Local Government at <http://www.dpcd.vic.gov.au/localgovernment/guide-to-local-government/planning-and-finance/planning-and-budgeting> , Accessed 21 March 2011

Earth Tech for Alpine Shire, Stormwater Management Plan Executive Summary, Draft, February 2004.

EC3 Global, Towong Shire Tourism Strategy 2010-2013 ‘Experience the Thundering Hooves of a High Country Adventure’, 2010.

The Egan Review: Skills for Sustainable Communities, Crown Copyright, 2004. Available at <http://www.communities.gov.uk/documents/communities/pdf/152086.pdf>

Engineers Australia, Australian Rainfall and Runoff Revision Project Message from the Chair, available at <http://www.engineersaustralia.org.au/ieaust/index.cfm?44EFEEF4-D50A-BC6D-258F-1DC32BF04011> Accessed 30 May 2011.

Indigo Shire Council, Indigo Planning Scheme, Available at web on <http://planningschemes.dpcd.vic.gov.au/indigo/home.html>

Indigo Shire Council, Indigo Council Plan, Available on web at http://www.indigoshire.vic.gov.au/Your_Council/Council_Plan

Indigo Shire Council, Greenhouse Action Plan, Indigo Shire Council, April 2009.

Institution of Engineers, Australian Rainfall and Run-off – A Guide to flood estimation, Volume 1, Australia, Reprinted edition, 2001

Marsden Jacob Associates, Regional Development Company, Adapting to a Low Water Future Climate Change Risk Assessment, North East Greenhouse Alliance, 2011.

Melbourne Water, Developing a Strategic Approach to WSUD Implementation Guidelines for Councils, February 2011.

Marsden and Jacobs, Revised summary of Proposed Actions, Workshop outcomes for North East Greenhouse Alliance March 2011.

Martin, Narelle, Environment Assessment Tool Lessons Learnt, Regional Development Victoria and Department of Sustainability and Environment, July 2010.

Martin, Narelle, North East Victoria – Adapting to a Low Water Future. Phase 3: Revision of Existing Council Plans and Strategies: Background (part b) (draft) For NEGHA, May 2011.

Martin, Narelle, “Corporatization as a means of Improving Water Quality. The Experience in Victoria, Australia” in Hrudey, Steve E. (ed.) Drinking Water Safety: A Total Quality Management Approach. Proceedings of the International Conference on Water and Health.

September 23-25, 2002, Ottawa, Ontario. Institute for Risk Research, University of Waterloo, Waterloo, Ontario Canada. Page 225 – 236.

Municipal Association of Victoria, Land Use Planning Available at <http://www.mav.asn.au/CA256C2B000B597A/page/Policy+&+Projects-SHP+Land+Use+Planning-SHP+Planning+System?OpenDocument&1=55-Policy+&+Projects~&2=92-SHP+Land+Use+Planning~&3=10-SHP+Planning+System>, Accessed 9 Feb 2011

North East Catchment Management Authority at <http://www.necma.vic.gov.au/OurPrograms/FloodplainManagement.asp> . Accessed 1 March 2011.

North East Catchment Management Authority Regional Floodplain Management Strategy Review 2009 “Flooding Challenges in a Changing Climate” 2009.

Office of Water, Landuse Planning, Available at <http://www.water.vic.gov.au/environment/floodplains/planning>, accessed 20 June 2011

Office of Water, Sustainable Water Use Plans, available at <http://www.water.vic.gov.au/saving/towns/water-use-plans>, viewed 25 March 2011

Office of Water, Victorian Floods 2011, available at <http://www.water.vic.gov.au/environment/floodplains/victorian-floods-january-2011>
Accessed 24 June 2011.

Parson Brickerhoff, Stormwater Management Plan, Rural City Of Wangaratta.

Pedruco, Philip and Watkinson, Rod The Impacts of Climate Change on Urban Flooding in the Melbourne Area Using Existing Flood Models available at http://melbournewater.com.au/content/library/drainage-and-stormwater/flood_management/ Accessed 9 Feb 2011

The Regional Development Company, Economic Development Strategy 2008-2011 Revised in-house September 2009. Wangaratta Unlimited.

Roberton, Stuart and Alexander, Cameron, Alpine Shire Sustainable Water Use Plan, Alpine Shire.2006. Available at [http://www.alpineshire.vic.gov.au/Page/Download.asp?name=Sustainable Water Use Plan.pdf&size=5327694&link=../Files/Sustainable Water Use Plan.pdf](http://www.alpineshire.vic.gov.au/Page/Download.asp?name=Sustainable+Water+Use+Plan.pdf&size=5327694&link=../Files/Sustainable+Water+Use+Plan.pdf)

Rural City of Wangaratta, Rural City of Wangaratta Wellbeing Plan 2010-2013.

Rural City of Wangaratta, Wangaratta Planning Scheme at <http://planningschemes.dpcd.vic.gov.au/index.html>

Rural City of Wangaratta, Community Wellbeing Plan 2010-2013, Approved at Council Meeting 19 October 2010.

Rural City of Wangaratta, 2010 -2013 Tourism Industry Strategic Plan January 2010, Rural City of Wangaratta.

Rural City of Wangaratta, Heatwave Response Plan, Adopted 20 October 2009. Amended 18 November 2009.

Rural City of Wangaratta, Sustainable Water Use Plan 2006 Final Draft, Approved at Council Meeting 21 November 2006.

Rural City of Wodonga, Wodonga Planning Scheme at <http://planningschemes.dpcd.vic.gov.au/index.html>

Towong Shire Council, Healthy Communities' Plan 2009-13, Towong Shire Council. 2009.

Towong Shire Council, Council Plan 2009-2013 Revised 26 July 2010, Towong Shire Council, 2010. Available at web at http://www.towong.vic.gov.au/Page/page.asp?Page_Id=471&h=0

Towong Shire, Towong Shire – Zero Energy Estate Feasibility Study, Towong Shire Council.2010.

Towong Shire Council, Towong Planning Scheme. Available at web at <http://planningschemes.dpcd.vic.gov.au/towong/home.html>

Towong Shire Council, Towong Heatwave Plan, Towong Shire Council. 2009.

Wangaratta Rural Council, Framework for an Environmental Sustainability Strategic Plan, Minutes of the ordinary meeting, 17 November 2009 .pp 55 – 59.

Wodonga Planning Scheme, Available at web at <http://planningschemes.dpcd.vic.gov.au/wodonga/home.html>