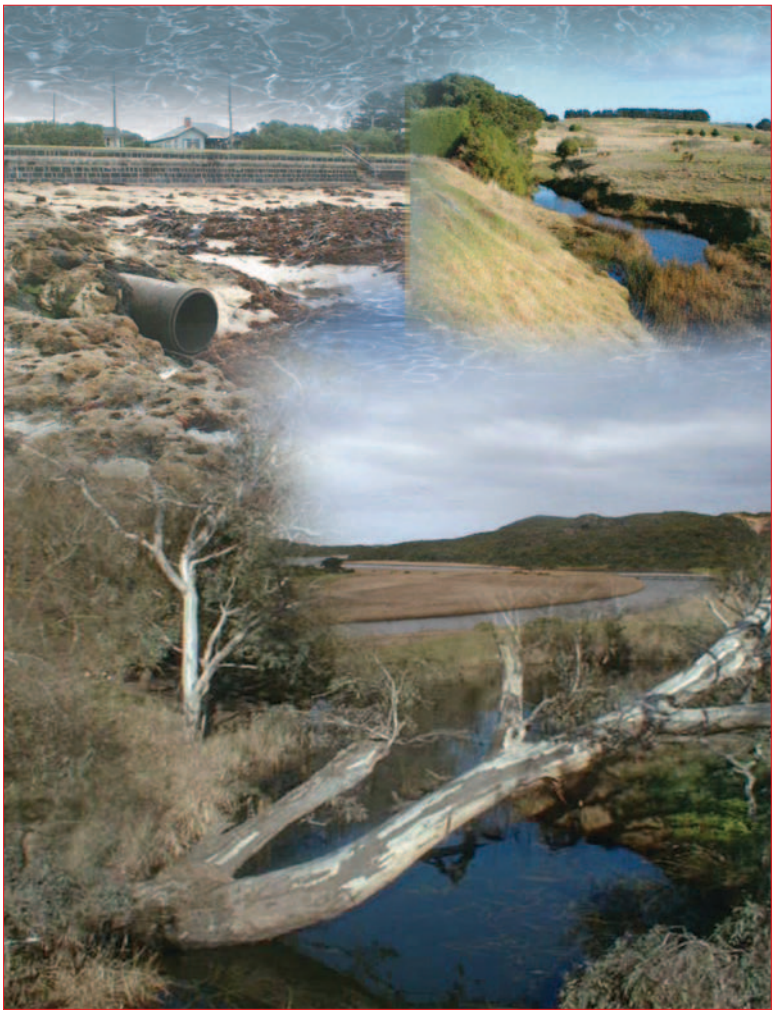
Corangamite Stormwater Management Plan

Volume 2: Background Information



Corangamite SHIRE

KBR

CORANGAMITE STORMWATER MANAGEMENT PLAN

Volume 2: Background Information

Prepared for:

CORANGAMITE SHIRE
Manifold Street, Camperdown, Victoria 3260

Prepared by:

Kellogg Brown & Root Pty Ltd
ABN 91 007 660 317
441 St Kilda Road, Melbourne, Victoria 3004
Telephone (03) 9867 5911, Facsimile (03) 9820 0136

16 April 2003

MEN250-G-GC-005, Rev. 0

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DOCUMENT STATUS RECORD

Project Number MEN250

Sheet 1 of 1

Project title Corangamite Stormwater Management Plan

Client Corangamite Shire

Document title Volume 2: Background Information

Document type Report

Document code MEN250-G-GC-005 **First issue date** 16 April 2003

This sheet records the issue and revisions of the document. If only a few revisions are made, only the new or revised pages are issued.
For convenience, the nature of the revision is briefly noted under 'Remarks', but these remarks are not part of the document.

Revision code	Date revised	Chapter/section/page revised, plus any remarks	Signatures		
			Originator	Checked	Approved
0	16/04/03	Final issue to client	FB	CS	CS

CONTENTS

1 Introduction

The Shire of Corangamite in association with the Corangamite Catchment Management Authority (CCMA), the Glenelg-Hopkins Catchment Management Authority (GHCMA) and the Environment Protection Authority of Victoria (EPA) has prepared the Corangamite Stormwater Management Plan to improve the quality of urban stormwater discharged into local waterways.

1.1 WHAT IS THE PURPOSE OF THE CORANGAMITE STORMWATER MANAGEMENT PLAN?

The aim of the Corangamite Stormwater Management Plan is to 'identify actions to improve the environmental management of urban stormwater and protect the environmental values and beneficial uses of receiving environments'. It identifies urban activities that may adversely affect water quality and sets in place strategies to protect water quality and beneficial uses from stormwater runoff. The strategies include:

- *Reactive strategies:* developed in response to current threats and activities that have been identified as posing a priority risk to stormwater quality.
- *Management strategies:* developed to enhance existing management practices and in doing so avoid future adverse impacts on stormwater.

With its focus on protecting water quality, the Corangamite Stormwater Management Plan does not seek to overcome hydraulic issues such as the capacity of the drainage system and flooding. In developing the recommendations to improve water quality, care has been undertaken to ensure that such actions do not cause flooding or drainage problems.

The Corangamite Stormwater Management Plan establishes a common understanding and integrated approach between Council, various government agencies and the community to the protection of urban stormwater quality in the Shire.

1.2 WHAT AREAS DOES THE CORANGAMITE STORMWATER MANAGEMENT PLAN COVER?

The Plan addresses stormwater issues in the receiving waterways in the towns of Camperdown, Cobden, Darlington, Derrinallum, Lismore, Noorat, Port Campbell, Princetown, Simpson, Skipton, Terang and Timboon.

1.3 WHY PREPARE A STORMWATER MANAGEMENT PLAN?

Stormwater includes rainfall collected from roofs as well as road run-off, wash-down water and all other water that discharges into the drainage network, rivers, streams, creeks and lakes. Unlike sewage, stormwater is not generally treated before being discharged to local waterways.

Urban development can have a significant impact on stormwater. The clearing of land and the use of impervious surfaces can increase run-off and stormwater flows, which can also lead to erosion and sedimentation. The accidental and deliberate discharge of various pollutants from residential, commercial and industrial areas as well as from roads and other areas can flow into local drains and waterways. Their individual and cumulative impacts can have a major effect on water quality.

Improved stormwater management is critical in minimising the discharge of pollutants into local waterways. It can be achieved through structural works to capture pollutants and treat runoff (e.g. wetlands, gross pollutant traps and other physical works). It can also be achieved through non-structural measures designed to prevent stormwater being polluted (e.g. the use of planning controls to manage development, revised management practices, community education programmes and other measures).

1.4 WHAT IS THE FORMAT OF THE CORANGAMITE STORMWATER PLAN?

The Corangamite Stormwater Management Plan comprises two volumes:

- *Volume 1:* summarises the objectives of the Plan, along with the process used to develop the Plan, and the key issues identified during the preparation of the Plan. It also contains detailed recommendations to improve stormwater quality and management throughout the municipality.
- *Volume 2*: provides additional information, including a detailed analysis of stormwater threats, waterway values, priorities and various options to improve urban stormwater quality throughout the municipality. Volume 2 also contains supporting appendices.

This is Volume 2 of the Corangamite Stormwater Management Plan.

1.5 WHO HAS BEEN INVOLVED IN THE PREPARATION OF THE CORANGAMITE STORMWATER MANAGEMENT PLAN?

The Corangamite Stormwater Management Plan has been prepared by Kellogg Brown & Root Pty Ltd (KBR) under the supervision of a Steering Committee comprising representatives of Council, CCMA, GHCMA and EPA. A Project Working Group was also established to act as a reference group, providing input on local issues and management opportunities.

A list of participants is contained in Appendix B.

2 Stormwater planning

The Corangamite Stormwater Management Plan has been prepared in a climate of heightened stormwater awareness and the need to protect water quality from the adverse impacts of urban development. It complements Landcare and other successful initiatives and helps improve overall catchment management by focussing on the water quality in urban areas.

2.1 THE STORMWATER INITIATIVES

Following concerns about stormwater quality, EPA, Melbourne Water and the Municipal Association of Victoria (MAV) formed the Victorian Stormwater Committee. This resulted in the development of stormwater agreements, a number of pilot municipal stormwater plans and the Best Practice Environmental Management Guidelines for Stormwater, published by the CSIRO.

Based on the success of the pilot programme, Melbourne Water encouraged metropolitan councils to prepare their own stormwater plans in accordance with the guidelines by providing funding and technical support to the development of the plans.

In 2000, the State Government established the Victorian Stormwater Action Program (VSAP) and appointed the Victorian Stormwater Advisory Committee to oversee the program. A sum of $22.5 million has been allocated to aid in the development and implementation of municipal stormwater plans throughout Victoria.

VSAP is also supporting the completion of various strategic projects, including those set out in Table 2.1 to further advance best practice environmental measures for urban stormwater management. It is anticipated that additional projects will be undertaken in 2002 and 2003.

Table 2.1 Strategic stormwater projects

Project and proponent	Project details
Model Planning Provisions Association of Bayside Councils	This project involves a review of existing planning controls and approaches used by various Melbourne Bayside Councils and the development of model planning provisions to better deal with stormwater quality issues.
Construction Contracts LGPro	This project is a pilot programme working with a number of Councils to review and then develop best practice stormwater protection for construction works, road works and landscaping.
Water Sensitive Urban Design Melbourne Water and Urban Land Corporation	This project involves an investigation of community attitudes to water sensitive urban design with the results to be used to promote innovation and more environmentally friendly outcomes in housing.

Table 2.1 continued

Project and proponent	Project details
Performance of non-structural measures Melbourne Water et al	This project involves the establishment of monitoring protocols and evaluation methods for non-structural treatments (e.g. community awareness, planning controls, legislative controls and enforcement campaigns) to determine their effectiveness.
Performance of GPTs Melbourne Water et al	This project involves the establishment of monitoring protocols and on ongoing evaluation of GPTs and similar products to determine their effectiveness. The project also involves the establishment and maintenance of a web site to provide Councils and other stakeholders with independent advice on the performance of the various products available on the market.
Moonee Ponds Creek Litter Initiative Moreland City Council *et al*	This project involves a coordinated litter management programme across state and local agencies through the integrated use of planning, source and structural controls to reduce litter in Moonee Ponds Creek.
SWMP Review EPA and MAV	This project involves a review of existing plans to identify issues and areas of commonality between plans and recommendations that could be implemented on a State or regional basis to improve efficiencies in the development and implementation of SWMPs.

2.2 COMPLEMENTARY PROGRAMMES

Various Federal, State and Local government initiatives have been undertaken to improve water quality, including the preparation of State Environment Protection Policies, regional catchment strategies, catchment action plans, local action plans and the nutrient reduction strategy. The need to improve stormwater quality features prominently in such plans along with the recommendations for Councils to prepare their own stormwater plans.

In addition to the above, various initiatives have been undertaken to heighten community awareness of stormwater issues, including the production of community education material and television advertisements by Melbourne Water and EPA. They also include community Waterwatch and stream health programmes, which collate data on water quality while also improving community awareness of waterway issues, and industry programmes.

2.3 STATE ENVIRONMENT PROTECTION POLICY

The *Environment Protection Act 1970* was established to create a legislative framework for the protection of the environment, through the functions of EPA. The Act sets out eleven principles of environmental protection; of particular relevance to stormwater quality are those of the precautionary principle, the principle of shared responsibility, wastes hierarchy, and integrated environmental management.

One of the mechanisms available to EPA in discharging its responsibilities under the Act is the declaration of State Environment Protection Policies (SEPP), such as *Waters of Victoria*, gazetted in 1988. This SEPP seeks to protect water environments by providing agreed environmental outcomes and strategic directions to assist in ongoing protection. A key component of a SEPP is the establishment of the level of environmental quality required to protect the 'beneficial uses' of the environment (such as the use of water for drinking, recreation or supply of fish). This level of environmental quality is established in a SEPP as a water quality objective, along with related water quality indicators and an attainment program for meeting those objectives. Schedule B of the SEPP provides specific water quality indicators and objectives relevant to each segment of the environment. For example, *E. coli* levels are to be at all times less than 1,000 organisms/100 mL for general surface waters.

Waters of Victoria directs appropriate authorities (in their development and administration of planning schemes) to ensure that land use is planned and managed in such a way that polluted run off, from specific sites and within the catchment as a whole, is reduced as far as practicable (Clause 34). This SEPP also makes reference to the control of diffuse source pollution indicating that control measures such as the elimination or treatment of sources of contaminated runoff or changes to land use or land management practices as listed below, shall be applied where practicable. Specific land management practices highlighted by the SEPP relevant to urban stormwater control include; land disturbance and erosion, drainage and road construction.

This SEPP therefore gives general direction to plan and manage land use implications in relation to urban stormwater quality control. The Victorian Stormwater Action Program builds on this regulatory direction, as well as the Victorian government's 'Greener Cities' policy, to facilitate the development of Stormwater Management Plans by local government.

3 Methodology

A risk-based approach has been used to prepare the Corangamite Stormwater Management Plan. It has involved the identification of key issues and values and overall management issues. Recommendations have been developed in response to the priority areas of concern.

3.1 HOW HAS THE CORANGAMITE STORMWATER MANAGEMENT PLAN BEEN PREPARED?

The Corangamite Stormwater Management Plan has been prepared in accordance with the revised version of Chapter 3 of the *Best Practice Environmental Management Guidelines—Urban Stormwater* (Melbourne Water, 2000). The process is summarised in Figure 3.1.

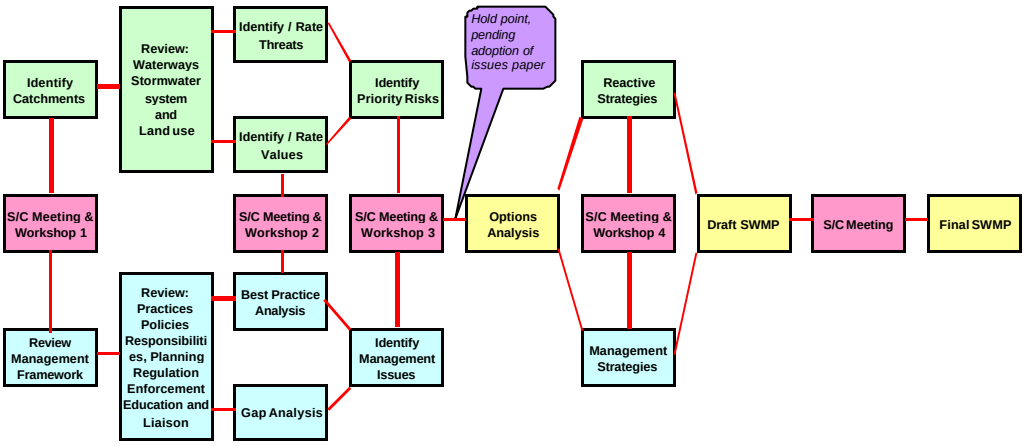

Figure 3.1
THE PROCESS

Initially, the process involved the identification of drainage catchments and a review of the current land use activities and stormwater management arrangements. The values of the waterways and threats to water quality, along with gaps in existing management were then identified, agreed and prioritised. Various options were explored in order to develop site specific (i.e. reactive) strategies and more general (i.e. management) strategies. These strategies were then agreed with Council, CCMA, GHCMA and EPA and developed into the final Corangamite Stormwater Management Plan.

The preparation of the Corangamite Stormwater Management Plan relied on the use of existing information (refer Appendix B for a list of documents reviewed), consultation with representatives of Council, CCMA, GHCMA and EPA and other agencies, field inspections and regular liaison with the Steering Committee and Project Working Group. A list of references utilised during the preparation of the Corangamite Stormwater management Plan is contained in Appendix A.

3.2 WHAT TYPES OF RECOMMENDATIONS ARE MADE IN THE PLAN?

The aim of best practice stormwater planning is to avoid threats through the adoption of various source control techniques. Where the threat cannot be avoided, the focus moves to minimising the impact within the system through the use of structural controls and ultimately to managing the residual impacts:

- Source controls often involve changes in human behaviour by avoiding threats through land use planning controls, regulations, community education and the adoption of operational practices designed to minimise the environmental impacts of various activities.
- Structural controls involve the building or installation of treatment measures to manage flows and remove pollutant loads.
- Where pollutant loads remain too high, it may then become necessary to build wetlands, install floating litter traps and or restrict the use of the waterway.

Two types of strategies have been developed in response to the priority management issues endorsed by Council, CCMA, GHCMA and EPA:

- Reactive Management Strategies have been developed in response to current threats that relate to priority management issues.
- Management Framework Strategies have been developed in response to deficiencies identified in the management framework.

The basic management components of reactive management strategies include:

- education and awareness (e.g. targeted literature, stormwater management education workshops, signage and community group consultation);
- structural treatment measures (e.g. gross pollutant traps, trash racks, grass swales, porous pavements, wetlands and sewer overflow improvements);
- source controls (e.g. improved waste collection, roof water diversion and waterway rehabilitation and revegetation, designed to control pollutants at the source);
- site-specific strategies and plans (e.g. sediment and erosion control plans, and zoning provisions);
- information and data collection (e.g. to support, reinforce and supply feedback on the effectiveness of the management measures);
- regulation and enforcement (e.g. enforcement will support the successful implementation of many of the management measures).

The management strategies focus more on operational and institutional issues associated with how Council and other stakeholders respond to stormwater issues.

The process for developing the strategies involved consideration of the priority issues as well as discussion with representatives from Council and other stakeholders responsible for the various actions and the use of a three part process to assess whether they are cost effective and feasible.

4 Municipal profile

The Corangamite Stormwater Management Plan addresses stormwater issues in the main settlements within the Shire of Corangamite.

4.1 WHAT ARE THE KEY CHARACTERISTICS OF THE SHIRE?

Corangamite Shire is located in the south west of Victoria, approximately 200 km from Melbourne. The Shire is located in the Western Districts and covers an area of approximately 4,600 km^2, extending from Skipton in the north, to the coast of the Southern Ocean in the south. The Woady Yaloak River, Lake Corangamite, Scoullers Road and the Gellibrand River form the eastern boundary while the Curdies River, Ayresford Road and Mount Emu Creek form the western boundary. Corangamite Shire is bounded by the Shire of Moyne in the west, Colac Otway and Golden Plains Shires in the east and the Ararat and Pyrenees Shires in the north (refer Figure 4.1).

The Shire has a population of approximately 18,000 people with the main towns being Camperdown, Terang and Cobden, followed by Skipton, Noorat, Darlington, Timboon, Simpson, Port Campbell, Princetown, Derrinallum and Lismore. These are the urban areas for which the Plan is being prepared.

The Shire is predominantly rural in nature, with large areas of productive agricultural land. Northern areas are used mainly for grazing of sheep and cattle, with some cropping. In the south, dairying is the major agricultural activity and milk production constitutes approximately 60 per cent of the Shire's total agricultural production (Corangamite Municipal Strategic Statement, 2002).

Corangamite Shire contains a number of commercial centres, the largest being in the Shire's population centre of Camperdown. Smaller rural service centres exist in the other urban areas.

A number of major roads traverse the Shire including the Glenelg Highway in the north, the Great Ocean Road in the south and the Hamilton and Princes Highways in the centre. Roads of regional importance include the Camperdown-Lismore Road, Timboon-Port Campbell Road, Terang-Mortlake Road, Camperdown-Cobden Road and Cobden-Port Campbell Road.

While the larger towns are sewered, a number of the smaller towns are unsewered. The Municipal Strategic Statement (MSS) identifies the availability of infrastructure as an important issue, with Council's vision statement acknowledging the role of Council in planning and facilitating economic and social development to enhance quality of life for its citizens while securing a sustainable environment.

The topography of the Shire is variable and includes large expanses of flat plains in the northern area, within which the internationally significant Western District Lakes occur. There are also several volcanic cones in the centre and undulating hills close to the coastline. The coast itself is a spectacular mix of escarpments and estuary beaches and features the renowned Twelve Apostles rock formations and the Port Campbell National Park.

A key challenge for the Shire, as identified in the Corangamite MSS, is the need for Council to balance its desires and obligations to protect environmental values with its desire to encourage growth in the tourism industry and to maintain a profitable agricultural industry. The Plan focuses on the urban areas and will provide an important vehicle for integrating catchment management principles into the planning scheme, local laws, Council operations and various residential, commercial, industrial and building practices throughout the municipality.

The Stormwater Management Plan is one of a number of Council initiatives that is designed to meet these challenges and the Council's overall vision for the municipality.

4.2 WHERE ARE THE WATERWAYS AND CATCHMENTS?

Important waterways within the Shire include the Gellibrand and Curdies Rivers, and Mount Emu, Port Campbell, Browns Waterholes, Kennedy's, Powers, Latrobe and Cobden Creeks. Many lakes in the Shire are part of the internationally significant Ramsar listed Western District Lakes. The Western District Lakes consist of Lakes Corangamite, Gnarpurt, Terang, Colongulac, Bookar and Milangil within Corangamite Shire, and Lakes Beeac, Cundare and Murdeduke outside the Shire boundary. Other lakes in the area include Purrumbete, Gnotuk and Bullen Merri. The Southern Ocean is an important water body that forms the southern boundary of the Shire.

Figure 4.2 shows the main waterways within the Shire, while Table 4.1 provides a summary of the waterways relevant to the study areas.

4.3 REGIONAL CONTEXT

The waterways of Corangamite Shire are part of the Glenelg Hopkins and Corangamite catchment management authority regions, and part of several river basins, including the Hopkins Basin, Otway Coast Basin and Lake Corangamite Basin. Some of the waterways pass through several shires and ultimately drain to the Southern Ocean (refer to Figure 4.1). Accordingly, while the Plan is being developed for the key urban settlements within the municipality, it also has regard to broader regional issues and strategies.

Both agricultural and urban land uses have impacted on water quality in the local waterways. In response to these and other issues, various Federal, State and Local government initiatives have been undertaken to improve water quality. Examples of such initiatives include state wide policies such as the various State Environment Protection Policies (SEPP) and associated codes of practice (e.g. *SEPP Waters of the Western District Lakes*), the Victorian Coastal Strategy 2002, and the Strategic Directions Statement for Victoria's Ramsar Sites. Local initiatives include the Western District Lakes Ramsar Site Strategic Management Plan; the Corangamite and Glenelg-Hopkins Catchment Nutrient Management Plans; and the Corangamite Draft Waterway Health Strategy. The need to protect and improve water quality and stormwater quality features in such documents, along with recommendations for Councils to prepare municipal stormwater management plans.

The Corangamite Stormwater Management Plan has regard for other catchment strategies and issues and should be integrated and implemented with regard to current plans and catchment strategies to ensure that both local and regional water quality objectives are achieved. The Shires of Moyne, Colac Otway, Golden Plains and Ararat have all either prepared or are in the process of preparing Stormwater Management Plans, offering opportunities for cooperation and integration of strategies and programmes.

Table 4.1 The waterways

Waterway	Description
Western District Lakes *(Lake Colongulac, Lake Tooliarook, Lake Gnarpurt and Lake Corangamite)*	The Western District Lakes region is a Ramsar listed wetland area of international significance providing habitat for water birds. The lakes are important for breeding and as a refuge during drought conditions. Important species supported by the lakes include the Freckled Duck, Australasian Shoveler, Banded Stilts, Great Crested Grebe and Eurasian Coots. The lakes listed under the site that occur within Corangamite Shire are Lakes Gnarpurt, Terang, Colongulac, Bookar and Milangil. The lakes occur on the Western Basalt Plains topography and drain much of the surrounding land. The surrounding land use is predominantly rural, with cropping and grazing the major activities. Some of the Lakes (e.g. Lake Gnarpurt) are important to the local eel fishing industry. Lake Gnarpurt and Lake Tooliarook eventually drain to Lake Corangamite.
Gellibrand River	The Gellibrand River is part of the Otway Coast basin. Its headwaters are within the forested Otway Ranges in Colac Otway Shire, and the river flows through this region and out onto coastal plain topography before entering Corangamite Shire and forming the boundary between the two shires for part of its length. Within Corangamite Shire, land use adjacent to the river is mainly rural and includes activities such as dairying and cropping. The river discharges into the Southern Ocean at Princetown, where the river forms a large estuarine area, and is an important area for fish breeding, spawning and nursery purposes. The river has a particularly significant assemblage of native freshwater fish and is the best Blackfish habitat in Victoria. At the mouth of the river, land use consists of conservation zones, with the Port Campbell National Park on the west and the Otway National Park in the east.
Mount Emu Creek	Mount Emu Creek is part of the Hopkins River basin and is the western most water body in the Shire, forming the boundary between Corangamite and Moyne Shires for part of its length. The creek's headwaters are near Lake Burrumbeet and it flows in a south-westerly direction past the towns of Skipton, Darlington and Terang and eventually discharges into the Hopkins River. The creek flows through volcanic plains terrain where land uses are predominantly rural and include activities such as grazing of sheep and cattle and cropping. The water quality in the upper to middle reaches is generally considered good and a population of platypus is present in the creek.
Browns Waterholes/ Mundy Gully Creek	Browns Waterholes has its headwaters to the north of Lismore near Mingay, while Mundy Gully Creek originates near Bradvale. The two waterways converge just south of Lismore and eventually discharge into Lake Gnarpurt. The waterways flow through volcanic plains topography and the land adjacent to them is subject to rural land uses. Browns Waterholes is a chain-of-ponds system, reverting to a series of waterholes in the drier months. The system provides an important drought refuge for several fish and macroinvertebrate species.
Kennedys Creek	Kennedys Creek is an ephemeral creek that has its headwaters just south of the Simpson township and flows in a westerly direction to discharge into Cooriemungle Creek, which discharges in turn to the Curdies River. The creek flows over coastal plain topography where land use is predominantly rural.
Port Campbell Creek	Port Campbell Creek has its headwaters north of Port Campbell township and flows south through coastal plains topography to discharge into the Southern Ocean at Port Campbell. Surrounding land use is rural with a range of dairying and cropping activities occurring.
Powers Creek	Powers Creek originates to the south-east of Timboon and flows through the township in a north-westerly direction before discharging to the Curdies River. The creek flows through coastal plains topography where land uses are mainly rural and dairying is common.
Cobden Creek	Cobden Creek has its headwater north of the Cobden township. It is ephemeral for much of its length, becoming a semi-permanent stream south of the township. It flows into Cobden township and through the Cobden Lake before eventually discharging into the Curdies River.
Curdies River	Curdies River has its headwaters near Lake Purrumbete. It flows through the Shire in a south-westerly direction before discharging into the Curdies Inlet, which is open to the Southern Ocean at Peterborough. The inlet is an important estuarine habitat for spawning, migration and nursery activities of fish species. Land use along the river is rural with much of the adjacent land being pasture.
Southern Ocean	The Southern Ocean forms the southern boundary of Corangamite Shire and is the discharge point of the Curdies and Gellibrand Rivers and Port Campbell Creek. The ocean is an important tourism feature within the Shire and adjacent land use is predominantly conservation zone (i.e. Port Campbell and Otway National Parks).

Table 4.2 The study catchments

Catchment	Description
Camperdown	Camperdown is the largest population centre within the municipality, with approximately 3,153 people. Land use is made up of a combination of residential areas, a commercial precinct focused along the Princes Highway, isolated areas of industrial activity and a range of open space types (formal and informal). Camperdown's urban stormwater drains via three urban waterways to Lake Colongulac which is a Ramsar listed wetland and forms part of the Western District Lakes network. The lake is recognised as being ecologically, scientifically and hydrologically important. Camperdown's urban area is serviced by a reticulated sewerage system and a combination of piped and open drain stormwater systems.
Cobden	Cobden is the third largest population centre within the municipality, with approximately 1,408 people. Land use consists of residential and rural residential areas. The commercial area is concentrated around Lavers Hill-Cobden Road/Curdies Road. There are also a number of industries within the town, including Bonlac Dairy Foods and a newly developed industrial estate. Open space areas include Cobden Lake, areas along Cobden Creek and formal open space areas such as recreation ovals. Cobden is serviced by reticulated sewerage.
Darlington	Darlington has a small population of approximately 249 people. There are no industrial land uses and a very limited commercial area. Darlington's stormwater drains to Mount Emu Creek. The town is not serviced by a reticulated sewerage system.
Derrinallum	Derrinallum has a small population of approximately 265 people. Land uses include a small area of residential, a small commercial area along the Main Street and an industrial area that primarily services the surrounding agricultural industry. The town's stormwater drains to Lake Tooliarook. Open space areas include a number of formal and informal areas, including schools, recreation parks and ovals. The town is not serviced by reticulated sewerage. Septic systems are aging within the town.
Lismore	Lismore has a small population. Land uses include residential, commercial along either side of High Street and areas of industrial. Open space areas include both formal and informal areas (e.g. Grimwade Park recreation area and the golf course). The town's stormwater drains to Browns Waterholes which in turn drains to Mundy Gully Creek and then into Lake Gnarpurt. There is no reticulated sewerage infrastructure within this town.
Noorat	Noorat has a small population, with approximately 249 people. Noorat has a small residential area and a limited commercial and industrial area, with the main industries and commercial areas being located in nearby Terang. Noorat also has a recreation area. Noorat drains to groundwater via the Noorat school natural soakage. The town is not serviced by reticulated sewerage.
Port Campbell	Port Campbell has a small population, with approximately 281 people. Land use in the town consists of a residential area (permanent and seasonal), a commercial area focused around Lord Street which services local requirements and tourist business (e.g. restaurants, cafes, accommodation); there are no industrial land uses within the town. Open space areas are primarily informal (e.g. foreshore reserve, caravan park backing onto Port Campbell Creek). Port Campbell's urban area drains to the Southern Ocean either directly, or via Port Campbell Creek.
Princetown	Princetown has a small population, with approximately twenty people. The town has a very small residential area, with no future plans of growth. Similarly, there is no industrial land use within the town and a very small commercial area. Open space is limited to a recreation reserve near the Gellibrand River. The town's stormwater drains to the Gellibrand River then into the Southern Ocean. There are approximately 10 to 12 buildings in the town, all of which are on septic systems. A bore located in the reserve provides water.
Simpson	Simpson has a small population of approximately 250–300 people. Land use consists of residential areas, a commercial area concentrated around Gondain Street and a small industrial estate located on the northern outskirts of the town which primarily services the surrounding agricultural industry. The town's urban stormwater drains to Storage Dam which in turn drains to Kennedys Creek. The town has a sewerage system and reticulated water supply.

Table 4.2 continued

Catchment	Description
Skipton	Skipton has a small population, with approximately 453 people. The land use is a combination of residential and rural residential land use. The commercial area is concentrated around Montgomery Street (Glenelg Highway). There are a number of industries, including an eel farm. The town's stormwater drains directly to Mount Emu Creek, which is ecologically significant. Skipton's urban area is not currently serviced by a reticulated sewerage system. There are plans in the near future to introduce a modified sewerage treatment system.
Terang	Terang is the second largest population centre within the municipality, with approximately 1,867 people. Land use is a combination of rural and rural residential, with a commercial area concentrated along High Street. There are also a number of industrial sites within and surrounding the town. There are a range of open space areas, the more formal spaces being focused around Lake Terang (dry). The majority of Terang's urban area (generally north of the highway) drains to Pejark Drain which in turn drains to Mount Emu Creek. Some stormwater south of the highway also drains to Lake Terang; however this is regularly pumped out. Terang's urban area is serviced by reticulated sewerage. Terang has its own sewerage treatment plant. The stormwater system is a combination of open swale drains and underground piped drains. Overall, there is a need for further information with regard to Terang's stormwater system.
Timboon	Timboon has a small population, with approximately 690 people. Land uses consist of residential, a commercial area focused around Timboon-Curdie-Vale Road, open space areas and a small portion of industrial land use, primarily servicing the dairying industry. The town's stormwater drains directly to Powers Creek which in turn drains to Port Campbell Creek. Both creeks are of ecological significance. New reticulated sewerage infrastructure has recently been installed by South West Water to reduce reliance on septic tanks.

5 Values

The key goal of the Corangamite Stormwater Management Plan is to protect and enhance the values of the waterways. A range of values have been identified, including environmental, amenity, cultural, stormwater and economic values.

5.1 WHAT IS A WATERWAY VALUE?

The principal values to be protected by the Corangamite Stormwater Management Plan are as described in Table 5.1.

Table 5.1 Typical values

Value category	Specific types	Description
Environmental	In-stream habitat	In-stream ecological values based on water quality, habitat quality and diversity, flora and fauna species, extent of invasion by exotic species and general in-stream condition and stability.
	Riparian habitat/flora	Waterway condition and ecological values based on extent and quality of remnant (native) vegetation, weed infestation and stability of riparian zone.
Amenity	Recreational amenity	Public access and utilisation for passive and active recreation including shared tracks, formal linkages, utilisation for activities involving primary and secondary contact, extent of open space, facilities such as car parks and picnic areas, continuity of open space and visual attractiveness.
	Visual/landscape amenity	Aesthetic appreciation of the natural and built environment including consideration of natural and man made structures, landscapes and places of importance, visual access and relationships to adjacent facilities.
Cultural	Indigenous cultural heritage	Places and sites of Indigenous Heritage value such as artefact scatters, landscape and places of significance (e.g. relating to story telling), ceremonial sites (e.g. Bora rings), campsites, shell middens and trails.
	European cultural heritage	Places and sites of European Heritage value, possibly including sites of pioneering significance, historical buildings and infrastructure, trails and transport routes.
Stormwater	Flood and conveyance	Contribution to protection against flooding including consideration of waterway capacity, designated floodwalls and flood protection infrastructure (e.g. levees).
	Water quality treatment	Contribution to water quality management (including stormwater). This may include existing wetlands or other infrastructure that has been developed to improve water quality.
Economic	Property and tourism	Property value associated with proximity to water and tourist destinations. These may include values associated with visual amenity, access and enjoyment.
	Extraction and use	Other economic benefits associated with receiving waters (e.g. water supply for irrigation and stock use).

5.2 HOW HAVE THE VALUES BEEN ASSESSED?

Based on the results of the literature review, field inspections and consultation process, the waterways have been assessed in accordance with the values set out in Table 5.1.

The values were assessed in terms of their local and regional significance. Where a value is considered very important to the local community it is given the same rating as if it was considered very important to the region, irrespective of its regional significance. In this way both local and regional values have been considered equally.

Consideration has been given to potential values to cover those instances where a change in conditions may improve the environmental, amenity or economic values of a waterway.

5.3 WHAT ARE THE MOST IMPORTANT VALUES?

Waterway values are summarised in Table 5.2 and described in Appendix C. The high and very high values are described in Table 5.3 and are shown in Figure 5.1. They include:

- *Environment (In-stream habitat):* the waterways provide important in-stream habitat for a variety of species. For example Lake Colongulac and Lake Gnarpurt are both Ramsar listed wetlands, recognised for their scientific, ecological and hydrological values. Similarly, Mount Emu Creek is an important habitat for a range of fish species and for platypus in Skipton. Lake Tooliarook is identified in the Corangamite Planning Scheme as being environmentally significant. The Gellibrand River near Princetown is an important estuarine environment, providing habitat to twelve native fish species.

- *Environment (Riparian habitat):* the waterways provide important corridors for a range of flora, fauna and avifauna. The riparian habitat values surrounding Lake Colongulac, Curdies River (downstream of Cobden), Lake Gnarpurt, Port Campbell Creek and Powers Creek/Curdies River near Timboon all have very high ratings. In addition, Mount Emu Creek, Lake Tooliarook and the Gellibrand River also have riparian habitat which is of high value.

- *Amenity (Recreation):* there are a range of passive and active recreational opportunities presented by the waterways and their immediate surrounds which are of significant value to the local and regional communities of Corangamite Shire. Extensive pathways exist along a number of waterways, particularly along Powers Creek, Lake Terang and Cobden Lake with plans to introduce additional pathways to other waterways, such as to Lake Colongulac from Camperdown. Other key uses of waterways throughout the municipality include for swimming, fishing, boating and water skiing. Other important features include the coastal areas of Port Campbell and Princetown, which provide a range of fishing and boating opportunities, and passive recreational activities such as walking.

- *Amenity (Landscape):* the waterways and their environs provide an important natural landscape feature in an urban and rural context. Port Campbell Creek and the Southern Ocean at Port Campbell are good examples of the role of waterways in enhancing the visual character of the town's urban environment, with much of the town's recreational and development activities taking advantage of close proximity to the water. Similarly, Cobden Lake in Cobden and Storage Dam in Simpson provide an important landscape feature to the towns. Mount Emu Creek, as it flows through Skipton and Darlington, also provides a significant landscape resource. The Gellibrand River and Latrobe Creek's estuarine environment provides a significant landscape element for Princetown.

- *Cultural (Indigenous):* the waterways within the municipality are historically important to the indigenous community, particularly as a food and water source. For example, Noorat was an important meeting location for the local indigenous community, similarly Lake Colongulac, Lake Tooliarook and Mount Emu Creek were important water sources.

- *Stormwater (Conveyance):* a number of the receiving waterways perform an important role as the primary receiver of urban stormwater, in addition a number of the waterways also perform a flood conveyance role.

- *Economic (Property and tourism):* the urban environment is enriched by the proximity of the waterways. This is particularly evident in coastal areas such as Port Campbell and Princetown. Anecdotal evidence indicates that the land values around the waterways within coastal areas such as Port Campbell are enhanced by their proximity to the water. Similarly, a number of the waterways serve as attractions for visitors. Lake Colongulac, Cobden Lake and Powers Creek also provide a tourism resource.

Table 5.2 Summary values

		Catchments											
		Camperdown	Cobden	Darlington	Derrinallum	Lismore	Noorat	Port Campbell	Princetown	Simpson	Skipton	Terang	Timboon
Environmental	In-stream habitat	VH	H	VH	H	VH	N	H	VH	M	VH	M	H
	Riparian habitat	VH	VH	H	H	VH	N	VH	H	M	H	M	VH
Amenity	Recreation	H	H	L	H	L	N	VH	H	L	M	H	H
	Landscape	H	H	M	M	L	N	VH	H	H	H	H	M
Cultural	Indigenous heritage	H	M	M	H	H	M	VH	H	L	M	M	M
	European heritage	M	M	M	L	M	N	H	M	L	M	M	M
Stormwater	Conveyance	L	H	H	H	H	H	M	M	H	H	M	H
	Water treatment	L	M	L	L	L	M	L	L	H	L	L	L
Economic	Property and tourism	H	H	M	M	M	N	VH	H	M	M	M	H
	Extraction and use	H	H	N	M	M	M	M	H	L	H	L	L

Note:

VH = Very High

H = High

M = Medium

L = Low

N = Non-existent/negligible

Table 5.3 Key values within each catchment

Catchment	Rating	Values
Camperdown	Very High	*Environment (In-stream habitat):* 'Lake Colongulac is considered to be of international significance for its ecological and hydrological values and rarity of species. Lake Colongulac is a high value wetland for its waterbird populations. The lake is also significant as a drought refuge. (Australian Heritage Commission, 2002). 'Although the lake is not considered to be a modified ecosystem, it is not in good condition when compared to other lakes in the district (Australian Heritage Commission, 2002) 'Fish species recorded in the lake are Eel (*Anguilla australis*) and Common Minnow (*Galaxias maculatus*)'. The lake is 'semi-permanent and has only dried out during periods of continued low rainfall. The water level is subject to seasonal variations. The salinity level of the brackish water reflects changes in water volume with no well-defined seasonal patterns. The lake has a high pH and is constantly turbid' (Australian Heritage Commission, 2002). Lake Colongulac eventually drains to Lake Corangamite which is also Ramsar listed and is of very high ecological significance. *Environment (Riparian habitat):* Lake Colongulac has a variety of riparian habitats including bays, spits, cliffs and islands. The Plains Wanderer, an endangered ground dwelling bird has been found at the site (Environment Australia) as well as the endangered Hairy tail (*Ptilotus erubescens*). The lake is now surrounded by grazing land with no significant stands of remnant vegetation remaining. A small margin of salt-tolerant species occurs at some sites and cypress windbreaks and scattered plantings of Sugar Gum occur in areas around the lake, similarly Boxthorn grows in hedgerows and on part of the lake's perimeter' (Australian Heritage Commission, 2002). The Western District Lakes Protection and Rehabilitation programme has fenced and revegetated a significant area of Lake Colongulac's foreshore and the project is expected to continue.
	High	*Amenity (Recreation):* Lake Colongulac provides a passive recreation resource, particularly in terms of nature/bird watching, photography etc. This is enhanced by the significance of the lake as a Ramsar listed wetland. Access to the lake however is generally limited. The Camperdown Strategic Development Plan (December 2001) refers to the opportunity to 'develop a network of walking and cycling trails from Camperdown to Lake Colongulac wetlands and develop a trail with picnic areas around the lake'. Lake Colongulac is used for limited recreational activities such as sightseeing and duck hunting. The lake was stocked with fish until 1973. 'Mature eel are caught for local and international markets when the lake is in good condition' (Australian Heritage Commission, 2002). *Amenity (Landscape):* Lake Colongulac is located approximately 4 km north of Camperdown. 'Pollution in the lake has resulted in a decrease in the number and diversity of native flora and fauna, eutrophication and diminished recreational and aesthetic appeal. Concern is centred on the possible health risks associated with high *E. coli* levels, the maintenance of the aesthetic quality of the lakes and the avoidance of excessive biostimulation from high levels of nutrients' (Australian Heritage Commission, 2002). *Cultural (Indigenous):* it is highly likely that Lake Colongulac played an important role in terms of Aboriginal cultural heritage, particularly with regard to it being a food and water source. Its relatively low salinity compared with other lakes, increased its importance as a drinking water and fishing resource (McNiven, 1998). The Western District Lakes region was of importance to the Djargurd Wurrung and Guildjan people for reliable water sources and food resources. Overall, more than forty-eight sites of archaeological significance have been listed within the Western District Lakes Ramsar sites, many of these near Lake Colongulac (DNRE, 2002), including instances of skeletal remains (McNiven, 1998).

Table 5.3 continued

Catchment	Rating	Values
		Economic (Property and tourism): the lake does not currently provide a significant contribution to the enhancement of urban property, primarily due to the distance of the lake from urban areas. However, the lake does provide a significant landscape resource to the surrounding rural environment. From a tourism perspective, the lake does not function as a key tourism resource. There are however, plans to investigate possible eco-tourism related opportunities near the lake, particularly related to the lake's significance as a Ramsar listed wetland. *Economic (Extraction and use):* there is currently minimal water extraction or use of Lake Colongulac. The lake is used for commercial eel harvesting. Some water is drawn from the lake for agricultural/horticultural purposes.
Cobden	Very High	*Environment (Riparian habitat):* the riparian zone of the Curdies River (just downstream of Cobden) has been cleared of native vegetation down to the banks and now consists of introduced pasture with some willows and blackberries. The riparian zone of Cobden Creek near the pool and through the golf course has been cleared of native vegetation and consists of introduced grasses with some willows and occasional remnant trees. Bank vegetation is considered poor on both the Curdies River and Cobden Creek (Waterwatch data). There is generally grassland either side of the creek with a combination of continuous/discontinuous riparian tee tree cover on one side and sparse vegetation on the other side (Water Victoria, 1989). While riparian values near Cobden may not be high, the downstream riparian habitat values of the Curdies River are of high significance.
	High	*Environment (In-stream habitat):* the Curdies River provides an important estuarine habitat at the mouth (Corangamite RCS), particularly for migratory wading birds (e.g. Australasian Bitterns and the Hooded Plover). It is important for spawning, nursery and migratory activities of fish (Corangamite Region Catchment Condition Report, 1996). In-stream habitat is considered poor in Cobden Creek (near pool and golf course) and in the Curdies River (just downstream of Cobden) (Waterwatch data). It is likely that the in-stream habitat value of Cobden Lake is minimal. The lake is a source of community concern, particularly in terms of its aesthetic quality and general health. *Amenity (Recreation):* Cobden Lake provides a central recreation reserve with facilities for picnics, BBQs etc. Cobden Creek flows through it. The Cobden Lake (Rotary Park) was developed by the community in 1872. Cobden Lake has been identified by the community and Council as a significant stormwater 'hotspot' issue, particularly in terms of accumulating litter and leaf matter in the lake. *Amenity (Landscape):* Cobden Lake is strategically located within the middle of the residential area of Cobden, with a reserve/open space area located around the periphery of the lake. On occasion the amenity of the lake has been a cause of community concern (i.e. water discolouration). *Stormwater (Conveyance):* Cobden Lake forms part of the town's stormwater drainage system. A number of residential areas, roads etc drain directly into the lake and ultimately into Cobden Creek. The lake performs a storage role. Cobden Creek is the receiving waterway for a range of areas including residential areas, the recreation reserve etc. *Economic (Property and tourism):* it is considered likely that property values would be positively influenced by their proximity to the lake and creek (to a lesser extent). *Economic (Extraction and use):* sections of the Curdies River are used for eel harvesting. The Curdies River provides a regular source of water for stock and irrigation of pastures, enabling a thriving dairy industry. There has been past use of Cobden Lake for water extraction associated with road construction.

Table 5.3 continued

Catchment	Rating	Values
Darlington	Very High	*Environment (In-stream habitat):* Mount Emu Creek through Darlington has had sightings of platypus. The Index of Stream Condition, rates water quality as high (8/10) and macroinvertebrate diversity as high (9/10), however overall the reach is considered to be in moderate condition (Victorian Water Resources Data Warehouse). 'Water quality with respect to dissolved oxygen is generally moderate in the upper half of the creek' (Water Victoria, 1989). The creek and its surrounding environs are covered by an Environmental Significance Overlay (ESO1) under the Corangamite Planning Scheme which identifies Mount Emu Creek, along with a number of other waterways within the Shire as being significant and notes that 'water bodies play an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'.
	High	*Environment (Riparian habitat):* the quality of the riparian zone of Mount Emu Creek is considered moderate (5/10) by Index of Stream Condition assessment and overall the reach near Darlington is considered to be in moderate condition (Victorian Water Resources Data Warehouse). The creek and its surrounding environs are covered by ESO1 as discussed above. *Stormwater (Conveyance):* Mount Emu Creek is an important part of the local drainage system. The town's urban area drains directly to the creek. As the town develops, the creek's importance to the drainage system will increase. Mount Emu Creek is one of the major tributaries of the Hopkins River Basin; the creek drains the east area of the Basin. Nearly half of the mean annual flow of the Hopkins River is contributed to by the creek.
Derrinallum	Very high	Nil.
	High	*Environment (In-stream habitat):* Lake Tooliarook receives nutrient loads from the surrounding agricultural land uses and other sources. The lake has experienced blue–green algal blooms. The lake and its surrounding environs are covered by an Environmental Significance Overlay (ESO1) as discussed above. *Environment (Riparian habitat):* the lake and its surrounding environs are covered by ESO1 as discussed above. *Amenity (Recreation):* the lake is stocked with Rainbow Trout and other species valued for recreational fishing (Corangamite Region Catchment Condition Report, 1996). The lake is also popular for water-skiing and fishing. *Cultural (Indigenous):* it is highly likely that Lake Tooliarook played an important role in terms of Aboriginal cultural heritage, particularly with regard to it being a food source. The lake would have been an important freshwater resource during the winter–spring rainy season, given it has lower salinity than some other lakes during this time (McNiven, 1998). The Western District Lakes region was of importance to the Djargurd Wurrung and Guildjan people for reliable water sources and food resources. More than forty-eight sites of archaeological significance have been identified within & near the Western District Ramsar sites (DNRE, 2002). *Stormwater (Conveyance):* Lake Tooliarook eventually drains to Lake Gnarpurt and Lake Corangamite particularly during wet seasons, however this has not occurred recently. Lake Tooliarook performs an important role as the primary receiver of stormwater from Derrinallum.

Table 5.3 continued

Catchment	Rating	Values
Lismore	Very High	*Environment (In-stream habitat):* Lake Gnarpurt is part of the Ramsar listed Western Lakes District. The lake supports a large number and diversity of waterbirds including the Shelduck, Pink-eared Duck, Great Crested Grebe and Freckled Duck. Waterbird movement between Lakes Gnarpurt and Corangamite is common and Lake Gnarpurt is an important refuge in times of drought. The lake is moderately saline and shows seasonal variation in salinity (Australian Heritage Commission, 2002). Lake Gnarpurt is not subject to high nutrient levels or nutrient growths (Australian Heritage Commission, 2002). The lake and its surrounding environs are covered by Environmental Significance Overlay—Schedule 1 (ESO1). Browns Waterholes is a chain-of-ponds system, which is of importance due to the lack of such systems still existing (many have been drained). The creek supports many locally important species such as Gudgeon, Minnow, Pygmy Perch, Mudeye and shrimp. Browns Waterholes has experienced some in-habitat loss associated with unnatural disturbance due to flood/drainage works and riparian vegetation loss. 'The water quality of Browns Waterholes is degraded due to the presence of elevated nutrients, elevated turbidity, elevated conductivity due to agricultural drainage works, stock access, natural processes, urban drainage and salinity' (CCMA, 2002). *Environment (Riparian habitat):* there are no significant stands of remnant vegetation remaining around Lake Gnarpurt as the surrounding land has been cleared for agriculture' (Australian Heritage Commission, 2002). However, the Western District Lakes Protection and Rehabilitation project has fenced and revegetated a significant section of the lake's foreshore and the project will continue in the future. 'The inaccessibility of Lake Gnarpurt enhances its value for waterbird conservation and scientific study. However, habitat value has been reduced as a result of general human disturbances such as clearing of vegetation down to the lake margin.' (Australian Heritage Commission, 2002). There are fragmented sections of riparian habitat along Browns Waterholes. Riparian tree cover and adjacent land use along Mundy Gully Creek is generally cultivated both sides, with sparse riparian tree cover (Water Victoria, 1989), however, Mundy Gully Creek and Browns Waterholes have both had revegetation and fencing works undertaken. The lake and its surrounding environs are covered by ESO1 as described previously. Browns Waterholes has experienced riparian vegetation loss due to stock, historical clearing and salinity' (CCMA, 2002).
	High	*Cultural (Indigenous):* it is highly likely that Lake Gnarpurt and Browns Waterholes played an important role in terms of Aboriginal cultural heritage, particularly with regard to it being a food source. The Western District Lakes region was of importance to the Djargurd Wurrung and Guildjan people for reliable water sources and food resources. More than forty-eight sites of archaeological significance have been listed within and near the Ramsar listed sites (DNRE, 2002). *Stormwater (Conveyance):* Lake Gnarpurt is located in an enclosed drainage basin approximately 27 km north-east of Camperdown. The lake performs an important role as the primary receiver of stormwater from the town of Lismore. Mundy Gully Creek flows into the lake. Lake Gnarpurt drains to Lake Corangamite during particularly wet seasons.
Noorat	Very High	Nil.
	High	*Stormwater (Conveyance):* the Noorat School natural soakage receives all urban stormwater from the town and then drains to groundwater. The groundwater system drains to Lake Keilambete.

Table 5.3 continued

Catchment	Rating	Values
Port Campbell	Very High	*Environment (Riparian habitat):* the Port Campbell National Park extends approximately 1.5 km upstream from the mouth on either side of the Port Campbell Creek and contains important remnant examples of coastal heath riparian habitat (Parkweb, July 2002). The Port Campbell Creek/wetlands area is a known habitat for the Swamp Harrier and a breeding area of the water rat (Project Working Group, 13/08/02). Along Port Campbell Creek there is 'riparian vegetation loss due to stock and historical clearing' (CCMA, 2002). *Amenity (Recreation):* ocean fishing is an important recreational opportunity with surf fishing a popular pastime (Corangamite Region Catchment Condition Report, 1996). Fishing is also popular in Port Campbell Creek where bream and yellow-eyed mullet can be caught. *Amenity (Landscape):* Port Campbell beach area and Port Campbell Creek contribute significantly to the landscape character of Port Campbell. Port Campbell's built environment is focused around the water. Port Campbell Creek is identified in the planning scheme as being covered by a Significant Landscape Overlay (SLO1) as it contains significant estuarine, intertidal and aquatic environments. *Cultural (Indigenous):* it is highly likely that the Port Campbell coastal area is of high Aboriginal cultural heritage significance. *Economic (Property and tourism):* the beach area and Port Campbell Creek is readily accessible and visible from a range of vantage points within town. There are a number of businesses (restaurants, accommodation etc.) that have frontage/views over the water. Port Campbell Caravan Park backs onto Port Campbell Creek. Port Campbell is one of the municipality's most significant tourist attractions. Approximately 2 million people visit the Great Ocean Road annually, with the 12 Apostles being the most popular Victorian tourist attraction outside of Melbourne. A number of significant tourism facilities have been planned or constructed in the Port Campbell area over the last twelve months. A master plan that will provide for the future location of facilities, new pedestrian facilities and potentially building regulations, is currently being developed for Port Campbell.
	High	*Environment (In-stream habitat):* within Port Campbell Creek, approximately 200 m from the town centre (land leased by South West Water) there is a section of particularly dense in-stream phragmites which is important for bird breeding in general and in particular for the Swamp Harrier, a locally significant species (Parks Victoria, July 2002). 'Port Campbell Creek has experienced in-stream habitat loss due to unnatural disturbance (i.e. flooding/drainage works and riparian vegetation loss)' (CCMA, 2002). The creek also has 'degraded water quality due to elevated nutrients and turbidity due to agricultural drainage works and stock' (CCMA, 2002). *Cultural (European):* Port Campbell is an historically significant town, it was first discovered in 1845 by Charles Latrobe, the chief surveyor and superintendent of the Port Phillip district, the area was originally a safe inlet for unloading supplies from sailing vessels. Settlers began to clear the surrounding land for grazing and other agricultural pursuits. Port Campbell is now a popular stop for visitors to the Shipwreck Coast and the Great Ocean Road. The waterways of the area provide a strong cultural focus for the community and tourists.

Table 5.3 continued

Catchment	Rating	Values
Princetown	Very High	*Environment (In-stream habitat):* the Gellibrand River provides important estuarine habitat (Corangamite RCS). It is important for spawning, nursery and migratory activities of fish and invertebrates and is of high value because it contains twelve species of native fish including four species of galaxis (Corangamite Region Catchment Condition Report). Phragmites occurs in the stream and provides important bird nesting areas (Parks Victoria). The river and its surrounding environs are covered by an Environmental Significance Overlay, Schedule 1, that identifies the river, along with a number of other waterways within the Shire as being 'significant water bodies playing an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'.
	High	*Environment (Riparian habitat):* the mouth of the river is bordered by the Port Campbell National Park on the west and the Otway National Park on the east. Both parks contain important examples of remnant coastal heath habitat, predominantly a mix of Coastal Beard Heath and Coast Wattle. The coastal riparian zone is important habitat for the nationally significant Hooded Plover (Park website). The national park extends approximately 400 m upstream on the east side and 200 m on the west side, upstream of which the riparian zone is predominantly cleared for agricultural purposes and introduced pastures occur down to the water's edge. The river and its surrounding environs are covered by an Environmental Significance Overlay (ESO1) which identifies the river, along with a number of other waterways as being significant and notes that 'water bodies play an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'. The Latrobe Creek riparian zone includes significant stands of Wooly Tea Tree. *Amenity (Recreation):* the river estuary is important for recreational fishing, particularly for bream and yellow eye mullet (Corangamite Region Catchment Condition Report, 1996). *Amenity (Landscape):* given the location of Princetown, it has panoramic views across the river valley. The Gellibrand River is identified in the Corangamite Planning Scheme as being a significant estuarine, intertidal and aquatic environment. *Cultural (Indigenous):* it is highly likely that the river estuary is of Aboriginal cultural heritage significance. 'Prior to white settlement, the area around Princetown supported a considerable Aboriginal population. A range of archaeological sites containing artefacts and shell middens have been recorded in the area' (Princetown Strategic Development Plan, April 2001). *Economic (Property and tourism):* Princetown is located on a topographic high point, it therefore has commanding views across the valley, with clear views across the estuarine environment as the river joins with the LaTrobe Creek and feeds into the Southern Ocean. 'Tourism is becoming increasingly important due to Princetown's unique wetlands and location within the Great Ocean Road tourism region.' (Princetown Strategic Development Plan, April 2001). *Economic (Extraction and use):* the Gellibrand River provides an important fishing resource, in particular, it is important for eel harvesting.
Simpson	Very High	Nil
	High	*Amenity (Landscape):* Storage Dam is an attractive 'lake' feature. It is one of the first features visible upon entering the town. The Lake Apex project has resulted in an attractive landscape feature for the town focused around the dam. *Stormwater (Conveyance):* Storage Dam performs an important role as the receiver of stormwater from Simpson. *Stormwater (Water treatment):* it is likely that the Storage Dam performs a treatment role. There is evidence of structural (hard and soft) measures to promote the dam's role as a wetland to filter contaminants entering the dam from the stormwater drain that flows into the dam.

Table 5.3 continued

Catchment	Rating	Values
Skipton	Very High	*Environment (In-stream habitat):* Platypus have been recorded in Mt Emu Creek near the town. The Index of Stream Conditions assessment rates water quality as high (8/10) and macroinvertebrate diversity as high (9/10), however overall the reach is considered to be in moderate condition (Victorian Water Resources Data Warehouse). 'Water quality with respect to dissolved oxygen is generally moderate in the upper half of the creek' (Water Victoria, 1989). The creek and its surrounding environs are covered by Environmental Significance Overlay, Schedule 1 (ESO1) which identifies the creek, along with a number of other waterways within the Shire as being 'significant water bodies playing an important part in the ecology of the Shire and they need to be protected from inappropriate land use and development'.
	High	*Environment (Riparian habitat):* the quality of the riparian zone along Mount Emu Creek is considered moderate (5/10) by Index of Stream Condition assessment (Victorian Water Resources Data Warehouse). Land use either side of the creek is cultivated with either continuous/discontinuous riparian tree cover or sparse tree cover along the creek (Water Victoria, 1989). The creek and its surrounding environs are covered by ESO1 which identifies the creek, along with a number of other waterways as being significant and notes that 'water bodies play an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'. Significant lengths of riparian zone have been, or are going to be, revegetated. *Amenity (Landscape):* Mount Emu Creek and its immediate environs are readily visible from a number of vantage points within the town. This is aided by the location of the town in a valley. Given the close proximity of the creek to the urban area and ready access to the creek, its landscape contribution is significant. *Stormwater (Conveyance):* Mount Emu Creek is an important part of the local drainage system. The town's urban area drains directly to the creek. As the town develops, the creek's importance to the drainage system will increase. Mount Emu Creek is one of the major tributaries of the Hopkins River Basin; the creek drains the east area of the Basin. Nearly half of the mean annual flow of the Hopkins River is contributed to by the creek. *Economic (Extraction and use):* water from the Mount Emu Creek is used by the eel farm.
Terang	Very High	Nil.
	High	*Amenity (Recreation):* Pejark Drain itself is not a major focus for recreational activities (although the golf course is near the urban waterway), however, Pejark Drain drains to Mount Emu Creek, which provides a passive recreational resource for nature watching, walking etc. Lake Terang (dry) provides a central focus to the town's recreational activities and open space areas. There are a number of sporting facilities that utilise the lake area, including an equestrian club, bowling club, croquet, cricket oval etc. *Amenity (Landscape):* Pejark drain does not contribute significantly to the landscape quality of the area, however Lake Terang (dry) represents a significant focus of the town's community facilities (e.g. sporting resources).
Timboon	Very High	*Environment (Riparian habitat):* Powers Creek at Timboon has some important riparian habitat that is utilised by Yellow-bellied Gliders. Although there are occasional remnant trees the vast majority of the riparian zone has been cleared for agricultural purposes and consists of introduced pasture species. The entire length of the creek and its immediate environs are identified under a vegetation protection overlay (VPO1) of the Corangamite Planning Scheme.

Table 5.3 continued

Catchment	Rating	Values
	High	Environment (*In-stream habitat*): Powers Creek immediately downstream of Timboon township provides valuable in-stream habitat, although within Timboon itself the creek has less in-stream habitat value. Powers Creek has 'degraded water quality due to elevated nutrients and turbidity due to wastewater effluent, industrial land use, urban stormwater, stock and agricultural drainage works' (CCMA, 2002). Amenity (*Recreation*): Powers Creek is easily accessible due to its proximity to the urban area of Timboon. There is currently an open space/reserve area along the creek edge which is used for passive recreation uses such as walking, BBQs and picnics, and the rail trail provides another recreational opportunity. There is a walking trail through the reserve area. *Stormwater (Conveyance):* Powers Creek is the receiving waterway for a number of areas within Timboon, including residential areas, industrial land uses, commercial areas etc, as such it forms an important part of the local drainage system. *Economic (Property and tourism):* Powers Creek provides an important natural feature within the town. The creek is generally buffered from the surrounding residential areas by a vegetated area. The rail trail and the golf course mean the creek has a role as a tourism resource.

6 Stormwater threats

Urban development can have a major impact on stormwater. The Corangamite Stormwater Management Plan aims to identify activities that pose the greatest threat to stormwater quality.

6.1 WHAT IS A STORMWATER THREAT?

A stormwater threat is an activity or land use with the potential to damage the receiving environment, via impacts to stormwater quantity or quality. Common stormwater threats are described in Table 6.1.

Table 6.1 Typical threats

Threat	Cause	Key pollutants and impacts
Residential land use runoff	Atmospheric deposition and build-up from traffic, washing cars, fertiliser application, poor waste management (domestic refuse), lawn clippings and vegetation.	Increased flow, sediment, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals, pesticides and surfactants.
Industrial land use runoff	Atmospheric deposition and build-up from traffic, poor waste management, accidental spills and illegal discharges.	Increased flow, sediment, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals, pesticides and surfactants.
Commercial land use runoff	Atmospheric deposition and build-up from traffic, poor waste management practices.	Increased flow, sediment, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals and surfactants.
Major road runoff	Atmospheric and vehicular deposition and accumulation.	Sediment, litter, trace metals, hydrocarbons and increased flows.
Residential development	Poor sediment and erosion control, uncontrolled wash down of equipment, deposition of sediment, vehicles and spills from construction process (e.g. concreting).	Sediments, nutrients and increased flows.
Building site runoff (lot scale)	Poor management of building site waste and materials.	Sediment and litter.
Unstable and degraded waterways	Poorly controlled stock and recreational access, weed infestation, damage from waterway works, development encroachment, vegetation loss, and eroded and unstable riparian zones.	Sediment, nutrients and oxygen depleting material.
Flow modification	Extraction of water for agricultural purposes.	Reduced flows.
Markets and events	Poor waste management (litter and commercial waste), illegal discharges, atmospheric deposition and build up from traffic and wind blown litter.	Oxygen depleting material, pathogens, sediments, nutrients, litter and surfactants.

Table 6.1 continued

Threat	Cause	Key pollutants and impacts
Upstream inflows	Runoff from upstream catchments, entering via creeks and waterways.	Sediment, nutrients, litter and pathogens, fertiliser and chemicals.
Open space runoff (e.g. golf course and sporting grounds)	Wash off of nutrients (fertilisers) and litter from public gardens, parks, sporting facilities, golf courses and discharge of poor quality water from ornamental lakes.	Nutrients, litter, oxygen depleting materials and fertiliser.
Landfill and contaminated sites	Runoff or leaching from landfills and contaminated sites.	Oxygen depleting material, pathogens, sediments, nutrients, litter, trace metals, hydrocarbons and toxicants.
Septic and sewer	Infiltration and overflow from sewerage systems and septic tanks.	Oxygen depleting material, pathogens and nutrients.
Docks and wharves	Runoff from wharf areas including atmospheric deposition, spilt raw product, erosion from unsealed areas and accidental spills.	Sediment, raw product (oxygen depleting materials), oils and greases, trace metals and toxic substances.
Pests	Weed invasion and feral pests, including carp.	Sediment, nutrients and oxygen depleting material.
Rural residential	Runoff from unmade roads and septic tanks.	Sediment, nutrients and oxygen depleting material.
Rural	Runoff from unmade roads, septic tanks and intensive activities such as poultry sheds, landscape suppliers etc.	Sediment, nutrients and oxygen depleting material.

Source: Chapter 3, Best Practice Environmental Management Guidelines (2000).

6.2 HOW HAVE THE WATERWAY THREATS BEEN ASSESSED?

The threats to water quality have been identified based on the results of the literature review, field inspections and the consultation process.

A stormwater threat is considered to be an activity or land use with the potential to damage the receiving environment, via impacts to stormwater quantity or quality. Common stormwater threats are set out in Table 6.1.

The threats have been identified based on activities that are currently having an impact on stormwater, or that have the potential to impact on stormwater, including those situations where management approaches may already be in place to minimise the risk. This is important as it is necessary to maintain current management practices and to identify new practices.

In order to identify the priorities, the threats have been rated as Very High, High, Moderate, Low or Non-existent/Not applicable. The ratings are based on the quantity, type and frequency of the pollutant load generated.

6.3 WHAT ARE THE MAIN STORMWATER THREATS?

Water quality threats are summarised in Table 6.2 and described in Appendix D. The high and very high threats are described in Table 6.3 and are shown in Figure 6.1. They include:

- *Industrial:* the municipality's industrial areas are primarily focused around servicing the agricultural land uses within the municipality. Most of the towns studied as part of the stormwater management plan have some form of industrial land use. There are a number of large scale industries including a range of industries in Camperdown, Bonlac Foods in Cobden and Pivot Fertiliser in Timboon and Skipton, all with the potential to threaten stormwater quality.
- *Major roads:* a number of major roads traverse the Shire including the Princes Highway, Glenelg Highway, the Great Ocean Road and the Hamilton Highway. Roads of regional importance include the Camperdown-Lismore Road, Timboon-Port Campbell Road, Terang-Mortlake Road, Camperdown-Cobden Road and Cobden-Port Campbell Road. Given the volumes, types of traffic and quality of these roads, there is a threat presented, in the form of atmospheric deposits and load spillages. A number of the towns provide a truck stop over function, which in turn leads to increased threats associated with litter and other forms of pollution.
- *Upstream inflows:* the municipality has a large agricultural sector, which includes dairy and grazing (sheep and cattle). These land uses may present a potential threat in terms of increased nutrient and sediment levels entering the waterways further upstream.
- *Septic and sewer:* Camperdown, Cobden, Terang, Timboon, Simpson and Port Campbell are sewered, the remaining towns are unsewered. Issues associated with septic and sewerage leakage and grey water discharge have been identified as a potential threat to urban stormwater quality.
- *Pests:* most receiving waterways within the municipality are experiencing some degree of threat from both weed and animal pests.

Table 6.2 Waterway threats

Threats	Catchments											
	Camperdown	Cobden	Darlington	Derrinallum	Lismore	Noorat	Port Campbell	Princetown	Simpson	Skipton	Terang	Timboon
Residential	VH	H	L	L	L	L	M	L	M	L	H	M
Industrial	VH	H	L	M	M	M	L	N	M	H	H	H
Commercial	VH	L	L	M	L	M	H	M	M	M	M	H
Major roads	VH	M	M	L	H	M	H	L	M	M	H	M
Land development	L	M	L	L	L	L	VH	M	L	H	L	H
Building sites	M	M	M	M	M	M	H	M	M	M	M	M
Unstable waterways	H	H	M	M	M	N	H	L	M	M	M	L
Flow modification	H	M	L	L	H	L	M	L	M	L	H	L
Markets and events	M	M	M	M	M	M	M	M	M	M	M	M
Upstream inflows	M	M	L	L	M	L	H	H	H	M	H	H
Open space	M	M	L	M	M	L	M	L	L	M	M	H
Landfills etc.	L	L	N	M	N	L	L	N	L	N	N	L
Septic and sewer	L	L	H	H	H	VH	M	M	L	H	M	L
Docks and wharves	N	N	N	N	N	N	H	N	N	N	N	N
Pests	L	M	M	M	M	L	M	M	M	M	M	H
Rural residential	M	M	M	L	M	M	L	L	L	M	M	M
Rural	L	H	L	M	L	L	H	H	H	M	H	H

Note:

VH = Very High *H = High*

M = Medium *L = Low*

N = Non-existent/negligible

Table 6.3 Key threats

Catchment	Rating	Threat
Camperdown	Very High	*Residential:* Camperdown is the primary population centre within the Shire, with a population of approximately 3,153 people (1996 census). A field survey indicates that the residential areas are generally clean, however there is still a potential source of contaminants associated with lawn clippings (green waste), vehicle deposits (sealed roads), dog faeces, washing cars and garden fertiliser application. Dumping of residential rubbish along the shoreline of Lake Colongulac is a problem (DNRE, 2002). Leaf litter from ornamental deciduous trees in residential areas impacts on waterways through increased nutrients. *Industrial:* there are a number of industrial areas within and surrounding the town. Areas zoned Industrial 1 include precincts on the south-west corner of Bowen and Manifold Streets which is the disused Bonlac Factory. The site is now used for a number of small industries, including a cheese making business, rural supplies business and is the location of the town's effluent treatment plant. There is also an industrial estate to the immediate north of the town and to the west of the saleyards. This has a number of industries which may present a potential threat, including a concrete products business, a number of small service industries and a stock feed factory. The Camperdown saleyards are located on the north-side of the Camperdown Railway Station. The site is substantial in area and includes a large hard stand truck parking area, cattle yards and a truck wash facility. Saleyards effluent is currently pumped to the treatment plant at the old Bonlac factory and then spread onto farmland. Previously the treated effluent was being pumped to Lake Colongulac. There is the potential for effluent to discharge to Medarook Creek during storm events. The Council depot facility is located in Camperdown-Ballarat Road. Likely activities within this site include vehicle and machinery maintenance, fuel/chemical storage etc. *Commercial:* Camperdown is the main commercial, industrial and administrative centre of the Shire. The town functions as a service centre for the only growing dairy district in Victoria (Camperdown Strategic Development Plan, December 2001). The commercial area is concentrated along either side of Manifold Street/Princes Highway. Whilst the commercial area appears to be generally clean, this is aided by the absence of outdoor dining facilities; and bins strategically placed along the street. There are also a number of car parks throughout the centre which present a potential source of grease, litter etc. Major car parking areas include at the rear of the IGA supermarket and along Manifold Street. Leaves from deciduous trees blocking side entry pits in the commercial area has been noted by Council as an issue, contributing to the anaerobic condition of Medarook Creek.

Table 6.3 continued

Catchment	Rating	Threat
		Major roads: there are a number of major roads, including Princes Highway (Manifold Street) and Camperdown-Ballarat Road/Leura Street which pass through the town. These roads carry a substantial amount of traffic, including truck movements associated with the surrounding agricultural industry (for example, dairy, cattle, sheep, fertiliser, and timber). Load spills associated with the truck movements is not a significant issue. The larger trucks currently utilise the Caltex petrol station, parking both directly in front of the petrol station and across the road (near one of the main stormwater outlet drains—within approximately 50 m). There is evidence of litter (food wrappers, cigarette butts etc.) which not only accumulate on the grassed area where the trucks park, but further afield where they are blown by prevailing south-westerly winds. There is currently one small bin available for rubbish in this area, which regularly overflows. There is also the potential for grease, atmospheric deposits, wash from livestock trucks etc accumulating in this area. Given the amount and type of traffic using the major roads, and the role of Camperdown as a 'stopover' town, major roads and their associated activity pose a potential risk to urban stormwater quality.
	High	*Unstable waterways:* there are three main stormwater discharge points for Camperdown's urban area which discharges into urban waterways near Greens Street and the railway line, near the Caltex petrol station and opposite the entry to the saleyards. An inspection of each of these urban waterways indicates that they are all experiencing some degree of erosion associated with flows and poor soil capability. It is likely that the instability of the urban waterways receiving stormwater may present a source of contaminants, particularly in terms of sediments. *Flow modification:* stormwater drainage to Lake Colongulac is via three open earthen drains. The Lake performs an important role as the receiver of stormwater from Camperdown's urban area.
Cobden	Very High	Nil.
	High	*Residential:* Cobden is the third largest town in the Shire. The town has a population of 1,408 (8.3% of the Shire in 1996) (Cobden Strategic Development Plan, December 2001). Residential land use is set out in a grid pattern, characterised by wide tree lined streets. The town is serviced by a reticulated water and sewerage scheme and is supplied with natural gas. Field surveys indicate that the residential areas are generally clean, however there is still a potential source of contaminants associated with lawn clippings, vehicle deposits (sealed roads), dog faeces, washing cars and garden fertiliser application. A large portion of Cobden's residential area drains to Cobden Lake, resulting in high sediment and pollutant loads and high leaf litter input from nearby vegetation (Ecological Engineering, 2002). *Industrial:* the town has a number of industries which are primarily focused around servicing the surrounding agricultural activities. Major industries include the Bonlac Dairy Foods factory for the production of dry milk powder for UHT milk, which is one of the largest dairy factories in the southern hemisphere. There is also Ausfeed which produces stockfeed. There are a number of smaller 'light' industries including the Shell petrol station, Tyrepower, CFA complex etc. An industrial estate has recently been developed by Council in Clarke Street, opposite the Bonlac Factory. The estate has approximately fifteen lots. The estate will drain to Cobden Lake. Given the size (potential future industrial development) and concentration of industry within the town, the industrial areas present a potential threat in terms of spills, truck movements, storage of chemicals etc to urban stormwater quality. Bonlac re-use all of their waste through discharging it to an on-site treatment plant and then irrigating their own land.

Table 6.3 continued

Catchment	Rating	Threat
		Unstable waterways: the CCMA Draft Waterway Health Strategy notes that some sections of the Curdies River and its tributaries are experiencing erosion and degradation. *Rural:* the area surrounding the town is rural. Issues typically associated with rural areas (such as nutrients, fertilisers, etc.) may present a potential source of contaminants. As the size of the rural catchment draining to the Curdies River is substantial and the agricultural activities quite intensive, there is a greater risk to the waterways from rural land use runoff.
Darlington	Very High	Nil.
	High	*Septic and sewer:* Darlington is not serviced by a reticulated sewerage system or stormwater system. Therefore septic systems (aging) and grey water represent a significant threat to urban stormwater quality.
Derrinallum	Very High	Nil.
	High	*Septic and sewer:* the town is not serviced by a reticulated sewerage system. Septic systems are aging within the town which may present a potential source of contaminants. There is also evidence of grey water issues present in the town.
Lismore	Very High	Nil.
	High	*Major roads:* the major road through Lismore is the Hamilton Highway (High Street), with the Camperdown-Lismore Road entering the township from the south. Hamilton Highway carries truck traffic, particularly associated with the surrounding agricultural industry. Whilst, truck spillages were not noted as occurring (although 2–3 truck accidents have occurred above Browns Waterholes), there is still the potential given the volumes of traffic moving through the town and the role of Lismore as a stopover point for through traffic. *Flow modification:* Lismore's urban stormwater is collected via a combination of open swale and piped stormwater drains and discharged at two points into Browns Waterholes. This concentrated discharge of high volumes of water has an impact on the chain-of-ponds system, which generally receives smaller volumes at a slower rate. The creek has not been modified to accommodate the stormwater flows. As a result of drainage works, Lake Gnarpurt has an artificially lowered outlet, reducing its natural water level (DNRE, 2002). *Septic and sewer:* there is no reticulated sewerage infrastructure within this town. During the field inspections, grey water discharge was noted at a number of locations within the town.
Noorat	Very High	*Septic and sewer:* Noorat does not currently have a reticulated sewerage system.
	High	Nil.
Port Campbell	Very High	*Land development:* the MSS notes that 'Port Campbell is the only settlement that is experiencing population growth and future residential growth needs to be carefully managed to ensure that it does not encroach on the towns landscape setting and tourist appeal'. The MSS also notes the need 'to minimise stormwater impacts from urban development'.

Table 6.3 continued

Catchment	Rating	Threat
	High	*Commercial:* the commercial area of Port Campbell is focused along Lord Street, between Morris and south of Cairns Street. The commercial area includes a range of retail outlets, for example a supermarket, pharmacy, a number of restaurants/cafes, clothing/tourist stores, motels and other accommodation facilities (backpackers, camping ground). A number of the restaurants provide outdoor dining facilities. The field inspection indicates that the commercial areas are generally clean. Port Campbell provides an important tourist facility, particularly in terms of tourist accommodation, weekender accommodation, holiday houses etc. As such during the peak holiday seasons, the commercial area would experience increased pressures, particularly in terms of car parking, dining, accommodation and therefore the potential for increased litter and contaminants entering the waterways. *Major roads:* the major road passing through the town is the Great Ocean Road (Lord Street). This road would experience significant pressures during the holiday season. *Building sites:* building activity will be associated with land development activity within the town, and infill development. During the field inspection, building activity was taking place along Lord Street, near the Southern Ocean Motor Inn. T here was evidence of spoil (soil, gravel etc.) accumulating on the road, either from being washed off during periods of high rain fall or from vehicles entering and exiting the site. Given the topography and nature of the soils in the area, contamination of stormwater associated with building sites represents a potentially significant issue. At the time of the field inspections, litter trap infrastructure and landscaping works had recently been undertaken within close proximity to the beach, resulting in significant amounts of earth works. This type of activity close to the waterways presents a potential source of contaminants. *Unstable waterways:* landslips occur in this area, which may contribute to increased sediments and nutrients entering the creek, similarly stock access to the waterways is a further threat. *Upstream inflows:* upstream inflows from agricultural areas may pose a threat to the waterway by introducing high levels of nutrients and sediment. *Docks and wharves:* there is a wharf within the bay from which commercial abalone, crayfish, fishing charters and scenic tours operate. The boats are lowered into the Southern Ocean by a crane. The wharf is also used for recreational fishing. *Rural:* the area surrounding Port Campbell is national park, however there are also rural areas, generally used for dairy. This represents a potential source of contaminants in terms of upstream inflows.
Princetown	Very High	Nil.
	High	*Upstream inflows:* 'domestic cattle enter the Park in a number of areas where fences have not been erected or adequately maintained' (DNRE, June 1996) Given the proximity of the town to rural areas it is highly likely that nutrients associated with agricultural land uses are entering the waterways. Some upstream townships are unsewered and may impact on waterways, as may logging activities upstream. *Rural:* 'Domestic cattle enter the Park in a number of areas where fences have not been erected or adequately maintained' (DNRE, June 1996). Given the proximity of the town to rural areas it is highly likely that nutrients associated with agricultural land uses are entering the waterways.

Table 6.3 continued

Catchment	Rating	Threat
Simpson	Very High High	Nil. *Upstream inflows:* upstream inflows from agricultural areas may pose a threat to the receiving waterways by introducing high levels of nutrients and sediment. *Rural:* the area surrounding the town is rural. Issues typically associated with rural areas (such as nutrients, fertilisers, etc.) may present a potential source of contaminants.
Skipton	Very High High	Nil. *Industrial:* there is an eel factory located within close proximity to the creek. The factory processes a large amount per year. There are a number of industries within the town including a BP petrol station, Pivot fertiliser and a number of agricultural related service industries. There is also a Council depot located near the corner of Curdie Vale Road and McLeod Street. *Land development:* development in Skipton is limited by topographic and servicing constraints (Skipton Strategic Development Plan, December 2001). There is currently minimal land development taking place within the town, however there has been a recent increase in pressure for residential and rural residential development given its close proximity to Ballarat (40 minute drive away). *Septic and sewer:* houses currently have on-site effluent disposal systems. An extensive investigation and associated consultation project has been undertaken by Central Highlands Water. A modified conventional sewerage system will be installed in the town during 2002. The provision of new water and sewerage systems will meet the towns' current and future health and environmental needs as well as improve the development potential of the town.
Terang	Very High	Nil. *Residential:* Terang is the secondary population centre within the Shire, with a population of approximately 1,867 people (1996 census). Residential land use and development is located to the north and west of the town centre following a traditional grid pattern. The field survey indicates that the residential areas are generally clean, however they still present a potential source of contaminants associated with lawn clippings, vehicle deposits (sealed roads), dog faeces, washing cars and garden fertiliser application. *Industrial:* there are a number of industrial areas within and surrounding the town. The industrial area located on the corner of Depot and Peterborough Streets contains a number of industries that may present a potential threat to urban stormwater quality. Examples of such industries include Moloney's Produce (stockfeed and grain storage and distribution), Wallace Industries, Windmill Agricultural, John Deere, Bushman Tanks, Ridleys AgriProducers and McVilley's Supasound. Terang also has a timber treatment works facility, a number of petrol/service stations and related mechanical trades. The MSS notes that Council will 'encourage further industrial development at the industrial estate and along Peterborough Road' and 'provide the industrial estate as a key location for low impact industrial use and development.' Given the types of industries within the town, it is likely that they would present a threat to urban stormwater quality.

Table 6.3 continued

Catchment	Rating	Threat
		Major roads: there are a number of major roads passing through the town, including the Princes Highway (High Street) and Terang-Mortlake Road (Thomson Street). The roads' traffic load appears to be primarily related to the surrounding agricultural industry and support businesses (i.e. trucks). There is a substantial amount of through truck traffic, particularly along Princes Highway. During the field inspections, it was noted that Council are undertaking some road construction/maintenance activity within town. This type of road maintenance activity is a potential source of contaminants. Deciduous street trees in commercial areas may also pose a threat to waterways through inputs of nutrients. *Flow modification:* Lake Terang is currently being pumped. Pejark Drain is an open drain which receives stormwater from the northern area of the town which drains to Mount Emu Creek. *Upstream inflows:* given the topography of the surrounding land of Terang, it is highly likely that upstream inflows associated with agricultural land use (for example, the dairy industry) may be entering the stormwater system. *Rural:* the area surrounding the town is rural. Issues typically associated with rural areas (such as nutrients, fertilisers, etc.) may present a potential source of contaminants.
Timboon	Very High	Nil.
	High	*Industrial:* dairying and its various support industries (artificial breeders, milking machine providers and repairers and milk transporters) are the major industry in the district. The area is experiencing growth in the manufacturing industries, with the production and distribution of treated pine and other rural products. Examples of industries within and surrounding the town include, Pivot, Timboon Motorcycles, Flood Wash—Dairy Cleaning System etc. There is land zoned Industrial 1 in Bailey Street. Given the types of industries present in the town, it is considered a possibility that these areas may present a potential threat to urban stormwater quality. Timboon is also serviced by a sewerage treatment plant. There are also a number of industries setting up in residential areas (e.g. builders, plumbers, storage) which are strictly licensed. *Commercial:* the town's commercial area is concentrated around Timboon-Curdie Vale Road. A large portion of the commercial area backs onto Powers Creek. Businesses within the commercial precinct are typical of many of the Shire's towns, including an IGA supermarket, bakery, takeaway shop, pharmacy, surf shop, Martin's Timber & Hardware etc. There is also construction taking place within the commercial area of three new retail stores (pharmacy, cafe/restaurant and one vacant). It would appear that stormwater or grey water drains directly into Powers Creek which is located to the rear of the commercial properties. Given the concentration of commercial activity, within close proximity to Powers Creek and topographic nature of the town, the commercial areas present a potential threat to the quality of urban stormwater. *Land development:* there is limited land development activity taking place within Timboon. Timboon has a residential land supply in excess of 210 years with an average of 6 houses being constructed per year. The number of private dwellings increased from 278 in 1981 to 325 in 1996. Approximately, 13.2% of these dwellings are vacant (Timboon Strategic Development Plan, April 2001).

Table 6.3 continued

Catchment	Rating	Threat
		Upstream inflows: given the close proximity of Timboon to surrounding rural land uses, in particular dairy, it is highly likely that contamination is occurring from upstream inflows (e.g. nutrients, fertiliser, and sediment). *Open space:* there are a number of formal and informal open space areas within the town, including a linear reserve that was formerly the Camperdown to Timboon railway line. There is also a recreation complex, swimming pool, tennis courts, golf course, children's playgrounds etc. Some of these open space areas are located within close proximity to the creek (for example, the swimming pool, and the Timboon and District Memorial park). The MSS notes the Council intend to 'develop Powers Creek area in the centre of town as a pleasant parkland with park seats and creek improvements. Provide a link from the flora and fauna reserve to the swimming pool to shops to railway.' There are also a number of schools with open space areas within the town. Given the proximity of open space areas (including car parking areas), the memorial park, swimming pool etc to Powers Creek, there is an increased potential for contamination of the waterways. *Pests:* weeds, both agricultural and environmental, are a problem throughout the Shire, particularly along waterways where dispersal is helped by the flow. The waterways are a hotspot for weeds such as willows and Cape Ivy. *Rural:* the area surrounding the town is rural. Issues typically associated with rural areas (such as nutrients, fertilisers, etc.) may present a potential source of contaminants.

7 Priority risks

Stormwater priorities have been determined using a risk based methodology that correlates the threats and values in order to identify the level of risk and the priorities within each catchment.

7.1 WHAT IS A STORMWATER PRIORITY?

A stormwater risk is any situation where an activity (i.e. threat) may prejudice quality. Once the risks have been determined, they can be ranked in order to identify stormwater priorities based on the values of the waterways and the threats to water quality.

7.2 HOW WERE THE PRIORITIES DETERMINED?

The priority risk assessment has utilised the threats and values ratings agreed with the Steering Committee and Project Working Group, as outlined in the preceding sections of this report. The threats and values have been multiplied and then a sensitivity factor applied to better correlate the impacts of the threats on particular values. In doing so, the sensitivity factor considers the sensitivity of each value to changes in stormwater (i.e. increased flows, sediments, nutrients, litter, oxygen depleting substances, hydrocarbons, pathogens, metals, pesticides, and surfactants) and the likelihood of each threat to generate such impacts.

The sensitivities were each assigned a rating using the same scale that was used to rate the threats and values (i.e. 1 = Low, 2 = Moderate, 3 = High, 4 = Very High).

The risks have been calculated as follows to determine the priorities:

$$Risk = Value \times Threat \times Sensitivity$$

Based on the above, the maximum score possible (representing the highest risk) is '64'. Priorities have been determined as set out in Table 7.1.

Table 7.1 Risk ratings

Risk rating	Threat
48 or 64	Very High Priority
32 or 36	High Priority
24 or 27	Moderate Priority
< 24	Low Priority

Figure 7.1 depicts the risk assessment process. The process was used to determine the priorities in each catchment.

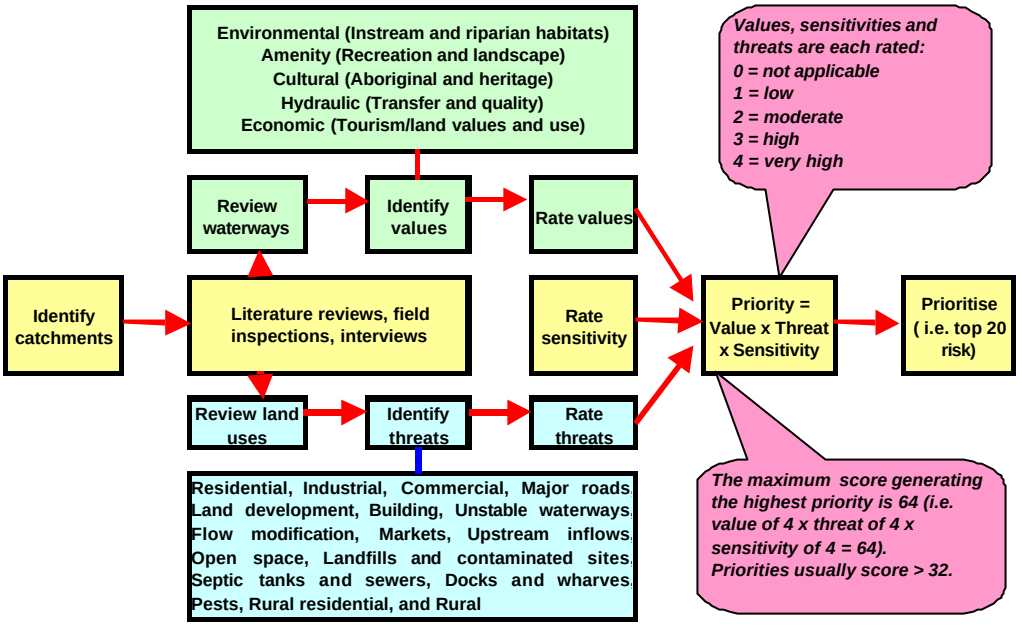

Figure 7.1
THE RISK ASSESSMENT PROCESS

7.3 WHAT ARE THE RISKS?

For each sub-catchment, the combination of specific threats, values and their sensitivities have been computed in order to determine individual risks. Table 7.2 provides a summary of the high and very high risks (i.e. those that scored a risk rating of 32 to 64). Detailed calculations are contained in Appendix E.

In summary:

- the highest risk scenarios are industrial land use and major roads impacting on the in-stream and riparian habitat values at Camperdown;
- industrial land use is the dominant threat, resulting in very high risks to in-stream habitat and extraction and use in Camperdown and to in-stream habitat in Skipton. It also poses a high risk to recreation and riparian habitat values in Camperdown; in-stream habitat and extraction and use values in Cobden; extraction and use values in Skipton; and in-stream habitat values at Timboon and Lismore;
- other priority risks include major roads with two very high and eight high risks, septic and sewer with three very high and three high risks and pests with six high risks.

The major beneficiaries of improved water quality are in-stream habitat, riparian habitat, recreational and extraction/use values. A large number of the identified risks relate to stormwater impacts on conveyance functions, landscape values and other characteristics that are less susceptible to changes in water quality. Accordingly the risks have been recast in Section 7.3 with a focus on water quality values.

Table 7.2 High and very high risks

Risk	Catchment	Threat	Value(s)
VERY HIGH RISK			
64	Camperdown	Industrial	In-stream habitat
64	Camperdown	Major roads	In-stream habitat and riparian habitat
48	Camperdown	Industrial	Extraction/use
48	Camperdown	Major roads	Riparian habitat
48	Darlington	Septic/sewer	In-stream habitat
48	Lismore	Major roads	In-stream habitat
48	Lismore	Septic/sewer	In-stream habitat
48	Port Campbell	Land development	Recreation
48	Port Campbell	Unstable waterways	Landscape
48	Skipton	Industrial	In-stream habitat
48	Skipton	Septic/sewer	In-stream habitat
HIGH RISKS			
36	Camperdown	Residential	Recreation
36	Camperdown	Industrial	Recreation, landscape and property and tourism
36	Camperdown	Major roads	Recreation and landscape
36	Camperdown	Commercial	Landscape
36	Camperdown	Unstable waterways	In-stream habitat and landscape
36	Camperdown	Flow modification	In-stream habitat
36	Cobden	Industrial	In-stream habitat and extraction/use
36	Cobden	Unstable waterways	Landscape
36	Derrinallum	Septic/sewer	In-stream habitat
36	Lismore	Major roads	Riparian habitat
36	Lismore	Flow modification	In-stream habitat
36	Port Campbell	Commercial	Landscape
36	Port Campbell	Major roads	In-stream habitat, riparian habitat and recreation
36	Port Campbell	Land development	In-stream habitat
36	Port Campbell	Building sites	Recreation
36	Port Campbell	Unstable waterways	Recreation
36	Port Campbell	Upstream inflows	Recreation
36	Port Campbell	Docks/wharves	In-stream habitat
36	Port Campbell	Rural	Recreation
36	Princetown	Upstream inflows	In-stream habitat
36	Princetown	Rural	In-stream habitat
36	Skipton	Industrial	Extraction/use
36	Skipton	Land development	In-stream habitat and conveyance

Table 7.2 continued

Risk	Catchment	Threat	Value(s)
36	Timboon	Industrial	In-stream habitat
36	Timboon	Land development	Conveyance
36	Timboon	Open space	Riparian habitat
36	Timboon	Pests	In-stream habitat and riparian habitat
32	Camperdown	Residential	Riparian habitat
32	Camperdown	Industrial	Riparian habitat
32	Camperdown	Commercial	In-stream habitat and riparian habitat
32	Darlington	Major roads	In-stream habitat
32	Darlington	Pests	In-stream habitat
32	Lismore	Industrial	In-stream habitat
32	Lismore	Pests	In-stream habitat
32	Port Campbell	Land development	Riparian habitat, landscape, conveyance and property and tourism
32	Port Campbell	Pests	Landscape
32	Princetown	Septic/sewer	In-stream habitat
32	Princetown	Pests	In-stream habitat
32	Skipton	Major roads	In-stream habitat
32	Skipton	Pests	In-stream habitat

7.4 WHAT ARE THE PRIORITIES?

As the focus of a stormwater management plan is on improving stormwater quality by reducing pollutant loads to local waterways all of the high and very high risks have been recast with a focus on water quality values (e.g. in-stream habitat, riparian habitat, recreation and other values). Table 7.3 provides a summary of the water quality priorities.

Table 7.3 Water quality priorities

Risk	Catchment	Threat	Value(s)
VERY HIGH RISK			
64	Camperdown	Industrial	In-stream habitat
64	Camperdown	Major roads	In-stream habitat and riparian habitat
48	Camperdown	Residential	In-stream habitat
48	Camperdown	Industrial	Extraction/use
48	Darlington	Septic/sewer	In-stream habitat
48	Lismore	Major roads	In-stream habitat
48	Lismore	Septic/sewer	In-stream habitat
48	Port Campbell	Land development	Recreation
48	Skipton	Industrial	In-stream habitat
48	Skipton	Septic/Sewer	In-stream habitat

Table 7.3 continued

Risk	Catchment	Threat	Value(s)
HIGH RISKS			
36	Camperdown	Residential	Recreation
36	Camperdown	Industrial	Recreation
36	Camperdown	Major roads	Recreation
36	Camperdown	Unstable waterways	In-stream habitat
36	Camperdown	Flow modification	In-stream habitat
36	Cobden	Industrial	In-stream habitat and extraction/use
36	Derrinallum	Septic/sewer	In-stream habitat
36	Lismore	Major roads	Riparian habitat
36	Lismore	Flow modification	In-stream habitat
36	Port Campbell	Major roads	In-stream habitat, riparian habitat and recreation
36	Port Campbell	Land development	In-stream habitat
36	Port Campbell	Building sites	Recreation
36	Port Campbell	Unstable waterways	Recreation
36	Port Campbell	Upstream inflows	Recreation
36	Port Campbell	Docks/wharves	In-stream habitat
36	Port Campbell	Rural	Recreation
36	Princetown	Upstream inflows	In-stream habitat
36	Princetown	Rural	In-stream habitat
36	Skipton	Industrial	Extraction/use
36	Skipton	Land development	In-stream habitat
36	Timboon	Industrial	In-stream habitat
36	Timboon	Open space	Riparian habitat
36	Timboon	Pests	In-stream habitat and riparian habitat
32	Camperdown	Residential	Riparian habitat
32	Camperdown	Industrial	Riparian habitat
32	Camperdown	Commercial	In-stream habitat
32	Darlington	Major roads	In-stream habitat
32	Darlington	Pests	In-stream habitat
32	Lismore	Industrial	In-stream habitat
32	Lismore	Pests	In-stream habitat
32	Port Campbell	Land development	Riparian habitat
32	Princetown	Septic/sewer	In-stream habitat
32	Princetown	Pests	In-stream habitat
32	Skipton	Major roads	In-stream habitat
32	Skipton	Pests	In-stream habitat

The priority risks, which pose a very high risk to water quality, include:

- *Industrial land use:* discharges from industrial areas pose a very high risk to in-stream habitats and extraction and use values in the receiving waters of Camperdown (Lake Colongulac) and Skipton (Mount Emu Creek). They also pose a high risk to recreation and riparian habitat values in Lake Colongulac; a high risk to in-stream habitat values in Cobden's receiving waterways; a high risk to extraction and use values in Mount Emu Creek in Skipton and Cobden Lake in Cobden, and in-stream habitat values in Timboon (Powers Creek); Lismore (Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek); and Cobden (Cobden Lake).

- *Major roads:* runoff from major roads creates a significant threat to stormwater quality in the Shire of Corangamite. It presents a very high risk to in-stream habitat and riparian habitat and a high risk to recreation values in Lake Colongulac, Camperdown. Major road runoff also presents a very high risk to in-stream habitat values and a high risk to riparian habitat values in Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek). Similarly, major roads present a high risk to in-stream habitat, riparian habitat and recreation values in Port Campbell's receiving waterways (Port Campbell Creek and the Southern Ocean). Mount Emu Creek's in-stream habitat values in both Darlington and Skipton are threatened by a high risk from major road runoff.

- *Septic and sewer:* septic and sewer seepage presents a significant threat to a number of towns within the municipality, particularly those that are unsewered. Septic and sewer seepage results in a very high risk to in-stream habitats in the receiving waters associated with Darlington (Mount Emu Creek), Lismore (Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek) and Skipton (Mount Emu Creek). They also pose a high risk to in-stream habitats in the receiving waters below Derrinallum (Lake Tooliarook) and Princetown (Gellibrand River and LaTrobe Creek). One of the major contributing factors to problems related to septic and sewer seepage relates to non-compliance of existing systems. This is closely related to Council's resourcing constraints on conducting the necessary inspections and enforcement actions.

- *Land development:* land development poses a very high risk to recreation values and a high risk to in-stream and riparian habitat values in Port Campbell Creek and Southern Ocean at Port Campbell. Similarly, land development activity in Skipton presents a high risk to in-stream habitat values of Mount Emu Creek.

- *Residential:* residential land use poses a very high risk to in-stream habitat and high risk to recreation and riparian habitat values in Lake Colongulac, Camperdown.

In addition to the above, the following generate high water quality risks:

- *Unstable waterways:* unstable waterways present a high risk to in-stream habitat values in Lake Colongulac, Camperdown; recreation values of Port Campbell Creek and the Southern Ocean in Port Campbell; and landscape values of Cobden Lake in Cobden.
- *Flow modification:* flow modification in waterways/drains feeding Lake Colongulac and the lake itself, Lismore (Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek) present a high risk to in-stream habitat values in both waterways.
- *Building sites:* runoff from building sites poses a high risk to recreation values in Port Campbell Creek and the Southern Ocean in Port Campbell.
- *Upstream inflows:* inflows from tributaries higher up the catchments pose a high risk to recreation values of receiving waterways in Port Campbell (Port Campbell Creek and the Southern Ocean), and to in-stream habitat values in the Gellibrand River and LaTrobe Creek near Princetown.
- *Docks and wharves:* docks and wharves in Port Campbell present a high risk to in-stream habitat values in Port Campbell Creek and the Southern Ocean.
- *Rural:* rural land use activity near Port Campbell presents a high risk to recreation values in Port Campbell Creek and Southern Ocean and in-stream habitat values in the Gellibrand River and LaTrobe Creek near Princetown.
- *Open space:* open space areas in Timboon present a high risk to riparian habitat values of Powers Creek.
- *Pests:* pests present a high risk to in-stream and riparian habitat values in Powers Creek in Timboon and a high risk to in-stream habitat values of Mount Emu Creek (Darlington) and Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek (Lismore) and Gellibrand River and LaTrobe Creek near Princetown. One of the key issues related to pests is the removal of willows.

The water quality priorities can be consolidated around, a common set of threats as summarised in Table 7.4.

Table 7.4 Priority management issues

Major threat	Values	Catchments
Industrial	In-stream habitat	Camperdown, Skipton, Cobden, Timboon, Lismore
	Recreation	Camperdown
	Riparian habitat	Camperdown
	Extraction and use	Camperdown, Cobden, Skipton
Major roads	In-stream habitat	Camperdown, Lismore, Port Campbell, Darlington, Skipton
	Recreation	Camperdown, Port Campbell
	Riparian habitat	Camperdown, Lismore, Port Campbell
Septic and sewer	In-stream habitat	Darlington, Lismore, Skipton, Derrinallum, Camperdown, Princetown
Pests	In-stream habitat	Timboon, Darlington, Lismore, Princetown, Skipton
	Riparian habitat	Timboon
Land development	In-stream habitat	Port Campbell, Skipton
	Riparian habitat	Port Campbell
	Recreation	Port Campbell
Residential	In-stream habitat	Camperdown
	Riparian habitat	Camperdown
	Recreation	Camperdown
Commercial	In-stream habitat	Camperdown
	Riparian habitat	Camperdown
Unstable waterways	In-stream habitat	Camperdown
	Recreation	Port Campbell
Flow modification	In-stream habitat	Camperdown, Lismore
Upstream inflows	In-stream habitat	Princetown
	Recreation	Port Campbell
Rural	In-stream habitat	Princetown
	Recreation	Port Campbell
Building sites	Recreation	Port Campbell
Open space	Riparian habitat	Timboon
Docks and wharves	In-stream habitat	Port Campbell

8 Reactive strategies

Reactive management strategies have been developed to address the major threats to environmental values that were identified through the risk assessment process. The strategies contain specific actions that represent the most cost effective and feasible means of managing priority issues, and will be underpinned by more long-term management framework changes.

8.1 WHAT ARE THE STRATEGIES?

Based on the priorities, a series of recommendations have been developed and incorporated into reactive management strategies for:

- *Industrial land use:* education and awareness campaigns, including environmental improvement programmes, supplemented by demonstration projects. In addition, enforcement activities should reduce unlawful and accidental discharges from industrial areas into the Shire's drains and waterways. Lake Colongulac (Camperdown) and Cobden Lake (Cobden) present a potential focus for projects, particularly in terms of a community education/monitoring campaign that focuses on educating local industry on the importance of minimising contaminants entering the urban waterways and then into the Lakes. Given the proximity of both of these lakes to population centres, they present an opportunity for model projects to be developed.

- *Major roads*: liaison with VicRoads regarding road construction, maintenance and Water Sensitive Urban Design (WSUD); enforcement of water quality protection measures required by contractors; and an education campaign targeting drivers of pollutant emitting vehicles should result in major roads having less impact on stormwater quality. Council in association with VicRoads and the Victoria Police can implement combined strategies to address these issues.

- *Septic and sewer*: liaison with South West Water and Central Highlands Water to ensure areas to be sewered are addressed as soon as possible and education of residents regarding the need to maintain and, where appropriate, update their septic systems should result in septic discharges and leakage having less impact on local waterways. A targeted campaign addressing non-compliance should be investigated in association with a review of resourcing requirements within Council to achieve desired objectives. From a regional perspective there may be an opportunity for a programme of regular inspections of septic systems to be developed (based on a similar approach adopted by the Country Fire Authority for checking smoke detectors).

- *Pests*: education and awareness campaigns should continue to specifically target landholders with waterway frontage; continued commitment to relevant sections of Council's Roadside Environment Management Plan (e.g. pest plants), the CCMA's Waterway Health Strategy (e.g. willow control) and the CCMA's and GHCMA's Regional Catchment Strategies (e.g. pest plant control); targeted eradication programmes; and lobbying for greater enforcement of the *Catchment and Land Protection Act 1994* should result in a decline in the extent of waterways affected by pest plants. There may also be an opportunity for community education on weeds that threaten waterways.

- *Land development:* education and awareness programmes targeting erosion, litter, sediment control and chemical runoff as well as encouragement of WSUD and BPEM for stormwater and active enforcement of permit controls and EMP requirements should result in land development having less impact on local waterways. Opportunities to develop Shire specific guidelines could be investigated, in association with more specific standard permit conditions that relate specifically to managing urban stormwater, particularly during construction, earthworks etc.

- *Residential:* community education programmes should result in reduced pollutants from green waste, paint, oil and runoff from vehicle washing entering the drains and a reduction in dumping of residential waste. As an example there may be an opportunity for a feasibility study to be undertaken for Lake Colongulac (Camperdown) that investigates treatment train measures for drains entering the lake, in association with a community education campaign timed with cleaning of any litter traps. Opportunities to develop existing strong relationships between Council and local schools (for example, Camperdown Secondary College) for monitoring could form part of this initiative.

- *Commercial:* education and awareness campaigns, including environmental improvement programmes, supplemented by enforcement activities should reduce the volume of litter from commercial areas entering the Shire's drains and waterways.

- *Unstable waterways*: education campaigns alerting landholders to the benefits of vegetated and stock free riparian zones; support of Landcare groups and continued implementation of stabilisation strategies developed through the CMAs should result in an improvement in the condition of unstable waterways.

- *Flow modification*: research into the issues caused by flow modification (e.g. changed hydrological regimes, loss of aquatic habitat, flooding) can guide Council and other authorities in the appropriate management of waterways.

- *Upstream inflows:* the development of regional networks with upstream and adjacent Councils should result in the development of cooperative initiatives to reduce regional stormwater pollution problems.

- *Rural*: education of landholders regarding best practice land management practices for chemical use, irrigation and vegetation of riparian zones, as well as a review of the effects of unmade roads may lead to a reduction in the impact of rural land use runoff on the local waterways.
- *Building sites:* the development of a local law specifically targeting building sites could lead to a reduction in sediment and litter runoff from building sites while development guidelines and enhanced planning controls should result in more environmentally friendly projects incorporating water sensitive urban design.
- *Open space*: a review of chemical and water use in open space maintenance activities with the view to reducing usage, as well as contractor education regarding best practice maintenance methods and a review of plantings to include native species, can all reduce the impact that open space use has on water bodies.
- *Docks and wharves*: development of management plans for relevant sites (e.g. the wharf at Port Campbell) and education of wharf users highlighting the potential impacts that their activities can have on the Southern Ocean should result in wharf areas having less impact on waterways and the coast.

The strategies are documented in Appendix G.

It is recognised that there is some duplication between strategies (e.g. most refer to the need to develop and distribute educational material). It is also recognised that there are numerous actions and that it would be improbable to expect that they could all be undertaken in the first year.

In response to the above, an overall implementation programme has been developed that consolidates some of the actions, provides timelines for when actions should occur and integrates the reactive strategies with the management strategies. The programme is presented in Appendix I.

8.2 HOW HAVE THE STRATEGIES BEEN DEVELOPED?

A three-stage process was used to identify and screen the actions for each strategy. It is the same process as that described in the revised Chapter 3 Guidelines.

8.2.1 Management action screening

A range of generic actions was initially considered for each strategy to eliminate management actions that are not considered to be applicable to the specific stormwater threat. Table 8.1 lists a range of generic management actions that were considered as part of the screening process.

Table 8.1 Generic management actions

Type		Strategy element	Treatment capabilities						
			Gross pollutants	Coarse sediment	Medium sediment	Fine sediment	Attached pollutants	Dissolved pollutants	Flow retention
Education and awareness		Targeted literature/guideline development and distribution	*	*	*	*	*	*	*
		Stormwater management education workshops	*	*	*	*	*	*	*
		Demonstration projects showing Best Practice	*	*	*	*	*	*	*
		Individual/organisation consultation	*	*	*	*	*	*	*
		Media release	*	*	*	*	*	*	*
		Signage	*	*	*	*	*	*	*
		Landcare, community and special interest group consultation	*	*	*	*	*	*	*
		Business stakeholder groups and committees	*	*	*	*	*	*	*
Structural treatment measures	Primary	Drainage entrance treatments (e.g. side entry pit traps)	✓	✓	✓	✓			
		In-line devices	✓	✓	✓	✓			
		Self-cleaning screens	✓	✓	✓	✓	✓		
		Floating traps	✓						
		Sediment traps		✓	✓	✓	✓		
	Secondary	Filter strips	✓	✓	✓	✓	✓	✓	
		Swales	✓	✓	✓	✓	✓	✓	✓
		Oil and grease baffles	✓	✓	✓	✓	✓		
		Porous pavements	✓	✓	✓	✓	✓	✓	
		Stormwater infiltration measures	✓	✓	✓	✓	✓	✓	
		Extended detention structures (basins)	✓	✓	✓	✓	✓	✓	✓
	Tertiary	Artificial wetlands	✓	✓	✓	✓	✓	✓	✓
Source controls		Rainwater storage and reuse (tanks)							✓
		Street sweeping	✓	✓	✓				
		Waste and refuse collection	*	*	*	*	*	*	*
		Waterway rehabilitation and revegetation	*	*	*	*	*	*	*
		Roof water diversion	*	*	*	*	*	*	*
Site specific strategies and plans		Site specific SWMPs	*	*	*	*	*	*	*
		Site specific sedimentation and erosion control plans	*	*	*	*	*	*	*
		Waste management program development	*	*	*	*	*	*	*
		Water quality management strategy	*	*	*	*	*	*	*
		Waterway management strategy development	*	*	*	*	*	*	*
		Spill prevention and containment plans	*	*	*	*	*	*	*

Table 8.1 continued

Type	Strategy element	Treatment capabilities						
		Gross pollutants	Coarse sediment	Medium sediment	Fine sediment	Attached pollutants	Dissolved pollutants	Flow retention
Information and data collection	Litter audits	*	*	*	*	*	*	*
	Monitoring (stormwater, in-stream ecology, flow)	*	*	*	*	*	*	*
Regulation and enforcement	Financial incentives	*	*	*	*	*	*	*
	Audit and inspection	*	*	*	*	*	*	*
	Infringement notification and fines	*	*	*	*	*	*	*

It should be noted that an indication of treatment capabilities has not been provided for elements in the categories of Education and Awareness, Site Specific Strategies and Plans, Information and Data Collection, Regulation and Enforcement and some Source Control Elements. Implementation of elements in these categories is likely to lead to a reduction in all of the pollutant types indicated. However, specific measurement of performance is difficult.

The results of the screening are shown in Table 8.2.

Table 8.2 Element screening results—Summary of possible management elements

Element type	Strategy elements	Industrial runoff	Commercial runoff	Upstream inflows	Building site runoff	Major road runoff	Residential runoff	Landfills	Pests
Education and awareness									
	Targeted literature/guideline development	✓	✓		✓	✓	✓		✓
	Stormwater management education workshops	✓	✓		✓				
	Demonstration projects showing best practice	✓	✓		✓	✓	✓		
	Individual/organisation consultation	✓	✓	✓	✓	✓	✓	✓	
	Media release	✓	✓		✓	✓	✓		✓
	Signage		✓						
	Community and special interest group		✓			✓	✓	✓	
	Business stakeholder groups and committees	✓	✓	✓	✓	✓			
	Training of relevant Council officers	✓	✓		✓	✓			✓
	Commercial runoff abatement competition/awards	✓	✓						

Table 8.2 continued

Element type	Strategy elements	Industrial runoff	Commercial runoff	Upstream inflows	Building site runoff	Major road runoff	Residential runoff	Landfills	Pests
Structural treatment measures—Primary									
Drainage entrance treatments	Side entry pits		✓					✓	
In-line types	Litter collection baskets, boom diversion, systems, release nets, track racks, gross pollutant traps, return flow litter basket, drainage inlet traps, hydraulically operated trash racks, circular screens, downwardly inclined screens, floating debris traps, sediment settling basins and ponds circular settling tanks, hydrodynamic separators	✓	✓	✓	✓	✓		✓	✓
Structural treatment measures—Secondary									
Pre-entrance types,	Filter strips, Grass swales, Triple interceptor pits, Porous pavements, Oil and grease baffles	✓				✓		✓	✓
Structural treatment—Tertiary	Artificial wetlands			✓		✓	✓	✓	
Source controls		✓							
	Rainwater storage and reuse tanks						✓		
	Street sweeping		✓		✓	✓			
	Waste and refuse collection	✓	✓				✓		
	Waterway rehabilitation and re-vegetation								
	Roof water Diversion	✓					✓		
	Domestic waste and recycling collection						✓		
	Drain maintenance		✓			✓	✓		
	Unloading and loading areas	✓	✓						
	Construction activity				✓	✓			
	Unsealed road maintenance	✓							
Site specific strategies and plans									
	Environmental Management Plan including: site specific SWMP's, site specific sediment and erosion control plans	✓			✓	✓			
	Waste Management Programme Development	✓	✓		✓				
	Spill prevention and containment plans	✓	✓		✓				

Table 8.2 continued

Element type	Strategy elements	Industrial runoff	Commercial runoff	Upstream inflows	Building site runoff	Major road runoff	Residential runoff	Landfills	Pests
Information and data collection									
	Litter audits		✓				✓		✓
	Evaluating the stormwater management programme	✓	✓	✓	✓	✓	✓		
Regulation and enforcement									
	Financial incentives						✓		
	Audit and inspection	✓	✓		✓				
	Infringement notification and fines	✓	✓		✓	✓	✓		

8.2.2 Management action opportunity assessment

Following the initial screening the actions were developed in more detail. This included the identification of specific locations for structural measures, description of the specific nature of non-structural measures (including programs and plans), advantages and disadvantages of each opportunity and estimates of capital and ongoing (maintenance) costs.

8.2.3 Management strategy formulation

It is important that proposed actions are cost effective and can be implemented and supported by Council in accordance with its management framework and resourcing capabilities. To ensure that the most suitable management actions have been selected each action was assessed using a number of criteria to provide a comparative measure of cost effectiveness based on the following equation:

$$\text{Cost effectiveness} = \frac{CapitalCost + (OngoingCost \times Lifecycle)}{EffectiveLifecycle \times \%AreaTreated \times Effectiveness \times Feasibility \times Multiple\ Benefit}$$

Table 8.3 provides further details on the evaluation criteria that were used.

Table 8.3 Management action evaluation criteria

Criteria/Indicator	Description	Measure or unit
COST INDICATORS		
Capital cost	Cost associated with construction of a structural measure or development/implementation of a non-structural measure. Capital cost reflects the standard implementation cost based on past experience or indicative values provided in the BPEM Guidelines.	Dollars ($)
Ongoing or maintenance cost	The cost associated with ongoing maintenance, implementation or review of the management element opportunity	Dollars ($)/year
Lifetime	Life cycle or implementation time for measure or program	Years
Total cost	Total life cycle cost for proposed management element opportunity	Dollars ($)
PERFORMANCE INDICATORS		
Effective life	Period of effectiveness for measure. For structural measures, this is generally taken to be equivalent to the measures lifetime. For certain education and awareness activities this may be slightly longer as effectiveness may extend beyond the duration of the program	Years
% area treated	Percentage of the threats catchment areas which will be treated by the particular measure	%
Effectiveness	The effectiveness of the management element opportunity	Negligible–Very High
Implementation feasibility	The feasibility of implementing a particular management element within the given site constraints or management framework	Negligible–Very High
Multiple benefit	Secondary benefits associated with developing and/or implementing a particular element. For example, application of the measure in other areas (e.g. literature for industrial operations) or secondary benefits such as recreational amenity (e.g. artificial wetlands)	Negligible–Very High

Criteria relating to effectiveness, implementation feasibility and multiple benefits have been rated on a scale of 0 to 1, based on: Very Low (0.05), Low (0.3), Moderate (0.5), High (0.7) or Very High (0.9). The effectiveness score is based on the information provided in the *Urban Stormwater Best Practice Environmental Management Guidelines*. Table 8.4 presents the suggested correlation between qualitative and quantitative values.

Table 8.4 Quantitative values for assessment criteria

	Treatment effectiveness	
Qualitative indicator value	Best Practice Environmental Management guidelines	Adopted value
Very Low (negligible)	0% to 10%	5%
Low	10% to 40%	30%
Moderate	40% to 60%	50%
High	60% to 80%	70%
Very High	80% to 100%	90%

The cost effectiveness scores have been used to rank and compare various options with the lower scores reflecting the most cost effectives options.

Having determined the most cost-effective option within each strategy, the options have been collated with details provided on the nature of the actions, their estimated costs and responsibility for implementation.

The results of the assessment are incorporated in Appendix G.

8.3 WHAT DO THE STRATEGIES RECOMMEND?

The strategies contain a range of recommendations:

- education and awareness (e.g. targeted literature, stormwater management education workshops, signage and community group consultation);
- structural treatment measures (e.g. gross pollutant traps, trash racks, grass swales, porous pavements, wetlands and sewer overflow improvements);
- planning and regulation (e.g. development standards, permit conditions, local laws and enforcement);
- source controls (e.g. improved waste collection, roof water diversion and waterway rehabilitation and revegetation, designed to control pollutants at the source);
- site specific strategies and plans (e.g. sediment and erosion control plans);
- information and data collection (e.g. to support, reinforce and supply feedback on the effectiveness of the management measures).

The recommendations have been coded to enable cross referencing. Each recommendation has a three or four digit alphanumeric code. The first letter indicates the threat being addressed whereas the second letter indicates the type of action as described in Table 8.5. The subsequent characters (i.e. numbers) provide an individual recommendation number.

Appendix G contains the reactive management strategies.

Table 8.5 Strategy codes

Threats		Action type	
R	Residential	E	Education and awareness
I	Industrial	S	Structural treatment
C	Commercial	C	Source control
S	Septic and sewers	P	Planning and regulation
L	Landfills	M	Site management
E	Markets and events	I	Information
B	Land development and building sites		
M	Main roads		
U	Up-stream inflows		
P	Pests		
W	Unstable waterways		

EXAMPLES	
RE	Residential threat with an education and awareness recommendation
RS	Residential threat with a structural treatment recommendation
RC	Residential threat with a source control recommendation
RP	Residential threat with a planning and regulation recommendation
RM	Residential threat with site management recommendation

9 Management framework review

There appears to be a reasonably high level of stormwater awareness within Council, although there are a number of areas in which current management approaches could be enhanced.

9.1 WHAT DOES THE MANAGEMENT REVIEW CONSIDER?

A review of Council's management procedures was undertaken in order to understand the function and components of Council's management framework as it relates to stormwater management. Relevant documents were reviewed and Council staff were interviewed. The aim was to identify existing practises, and to identify any potential gaps in current arrangements. The review involved consideration of stormwater practices and other practices that could have a positive or negative impact on stormwater.

The review considered a range of factors including those set out in Table 9.1.

Table 9.1 Management considerations

Area	Factors reviewed
Responsibilities	Agencies, Council departments
Corporate policies and knowledge	Environmental management, environmental data, Council expertise.
Planning matters	Strategic planning, statutory planning, approvals process, subdivision and development standards.
Regulatory matters	Local laws, enforcement.
Education	Community education and awareness, staff education, contractor education.
Advocacy	State Government, CMA, adjacent councils, industry groups.
Operational issues	Stormwater devices, contracts management, waste management, street cleansing, open space.

Corangamite Shire Council has shown considerable initiative in progressing stormwater and waste management issues within the Shire. To continue with this task for stormwater quality, a package of tools can be applied, informed by the analysis of management issues below. A guiding principle in the ongoing formulation of the stormwater management plan should be to embrace simple, integrated, and cost effective strategies which best fit with the direction and ability of the Council to continue to manage environmental management objectives for the Shire.

9.2 WHAT ARE THE MANAGEMENT ISSUES?

9.2.1 Who is responsible for stormwater quality management?

The responsibility for the management of urban stormwater quality within the Shire is shared between a number of Council departments, various external agencies and community groups.

Within Council, responsibilities are shared between the engineering, planning, environment, waste management and local laws areas. Outside Council, organisations having some level of responsibility include Corangamite Catchment Management Authority, Glenelg-Hopkins Catchment Management Authority, Environment Protection Authority Victoria, Parks Victoria, South West Water, the Department of Natural Resources and Environment, VicRoads, and the South West Regional Waste Management Group. A discussion of key stakeholder roles and responsibilities is contained in Appendix F.

The municipality contains several community groups. They include a number of Landcare and Committee of Management groups, for example the Lismore Land Protection Group and the Powers Creek Reserve Committee of Management in Timboon. These groups have, and continue to play, a major role in the development of strategies and helping to maintain the Shire's waterways. In addition, Camperdown College and Cobden Secondary College are proactive in implementing environmental management programmes and other initiatives. For example, Camperdown College recently hosted a wetlands conference and Cobden College undertakes a range of recycling programmes.

The successful management of the waterways and an improvement in water quality is dependent upon a strong sense of cooperation and a clear understanding of responsibilities. There is the need for greater levels of cooperation between responsible agencies and a more integrated approach to stormwater management in order to provide greater clarity in terms of responsibilities. In addition, there is a need to clearly delineate areas of responsibility along waterways. This is particularly important for community groups who are undertaking works along waterways.

It is suggested that Council:

- identify a 'champion' unit within Council to lead the stormwater quality management process. The champion unit could build on existing community relationships through educational institutes, Committee of Management groups, Landcare groups etc.;
- establish a reference group to act as a forum to achieve a more integrated approach to stormwater management (e.g. extend the Project Working Group beyond the project);
- review management responsibilities for all waterways.

9.2.2 What level of commitment and knowledge does Council have to stormwater management?

The Council has made a clear commitment to stormwater quality management through the development of this plan. Council has also demonstrated its environmental commitment through the implementation of numerous waterway rehabilitation and improvement programmes and through the strong support given to the development of the Environmental Management Plan (EMP) as part of Local Agenda 21. In addition, Council has prepared the Corangamite Waste and Litter Education Strategy 1999–2001; a Roadside Management Plan (Draft), and in association with other organisations Council has contributed to the preparation of the South West Sustainability Blueprint.

There is an opportunity to include references to stormwater quality management and to support implementation of strategies to address urban stormwater issues within each of the documents.

At a corporate level, the Corangamite Shire Corporate Plan 2001–2004 notes one of its five strategic objectives as being to 'lead in our environment management practices'. The plan sets out clear strategies and associated actions to achieve this objective. These are:

- continue to enhance waste minimisation through 'successfully implementing the Waste Management Strategy and Waste Minimisation Program by continuing green waste collection, waste minimisation and community education;
- to preserve and enhance native vegetation and care for the environment by: developing a Roadside Management and Conservation Plan and a Street Tree Strategy; addressing salinity and water quality issues within available resources; developing an Environmental Management Plan with reference to Local Agenda 21 and working with Catchment Management Authorities, Landcare Groups and the community on conservation projects and education.

Council does not collect, maintain or manage environmental data on stormwater, except as part of specific site investigations. The only source of data is from the Corangamite Water Watch programme, of which Council is a strong supporter.

Council staff have a general awareness of issues relating to urban stormwater quality and staff from environmental and engineering services in particular are knowledgeable about WSUD. However, there appears to be the need to increase the level of stormwater knowledge, particularly in regard to best practice in urban stormwater management and management of stormwater infrastructure (e.g. wetlands).

The successful management of the waterways, and an improvement in water quality, is dependent on Council and other stakeholders having both the commitment to protect stormwater quality and access to the knowledge that is required to ensure best practice in urban stormwater management. While Council has already demonstrated a commitment to achieving this goal, there is the need for Council and other stakeholders to reinforce their commitment and ensure that they have suitable trained staff so that the goals are met.

It is suggested that Council:

- make specific reference to the importance of the Corangamite Stormwater Management Planning and associated initiatives in the Corporate Plan;
- maintain an ongoing commitment to stormwater quality improvement by reflecting such commitments in its Corporate Plan, the Environmental Management Plan, the Roadside Management Strategy, the South West Sustainability Blueprint and associated policies;
- reflect effective stormwater management in Council decision making and in environmental and infrastructure policies;
- remain informed of water quality conditions and the location of data;
- act as a conduit of water quality information between the local community, the CCMA, GHCMA and EPA;
- monitor stormwater trends and the success of various programmes including VSAP sponsored projects and the outcomes of the Plan;
- train staff in best practice urban stormwater quality management.

9.2.3 How effective is the existing planning framework?

The Corangamite Planning Scheme, through the Local Planning Policy Framework and the MSS, does make reference to the importance of environmental issues including the protection of remnant vegetation and fauna habitat, protection of significant landscapes, management of salinity and erosion and catchment management. Part of the Corangamite Shire's vision is to work for the sustainable development of the Shire based on *'sustainable management and protection of natural resources of soil, water, flora, fauna and ecosystems'*. Within the strategic framework plan it is recognised that the absence of reticulated sewerage systems in several of the townships within the shire is an issue for residential development. The Port Campbell Strategic Framework has listed the minimisation of stormwater impacts from urban development as a strategy.

There is an opportunity through the review of the MSS, to include more detailed reference to urban stormwater quality issues and include key outcomes from the plan in the 'Objectives and Strategies' section of each clause.

There are a number of policies within the Local Planning Policy Framework which have direct relevance to the stormwater planning. These are:

- Clause 22.01-1, Urban Growth Boundaries: this policy notes that it is important to accommodate urban development within the main township areas that have or will have reticulated infrastructure such as water, sewerage and stormwater drainage. It lists ensuring that all urban areas are provided with reticulated water, sewerage, power, stormwater and all-weather roads as an objective.
- Clause 22.01-2, House Lot Excision: this policy notes that waste water discharges to the environment should be reduced to the maximum extent that is reasonable and practicable.

- Clause 22.01-3, Residential Infrastructure: the objective of this policy is to 'ensure that all existing and future forms of residential development, including low density residential development, is serviced with reticulated sewerage (when available), water, electricity and drainage' and to 'ensure that environment and water quality downstream of urban development is not affected'. The policy notes that infrastructure in towns should be developed to lessen pollution of watercourses, water catchments of the river systems and surrounding agricultural land.
- Clause 22.02-1, Catchment and Land Protection: this policy provides for that impacts on soil, water, flora, fauna, air and ecosystems to be considered in the assessment of use and development proposals.
- Clause 22.02-4, Wetland Areas: this policy recognises that wetland areas provide important environmental functions such as water filtration and states that preference will be given to maintaining the environmental integrity of wetlands and protecting their foreshore, drainage, habitat, landscape, filtration and storage functions.

Opportunities exist for Council to strengthen its strategic planning approach through amendments to the Planning Scheme, including the introduction of a local policy and additional clauses in the MSS. While this will provide a sound strategic base for decision making, it will need to be supplemented through the development of design guidelines for residential, industrial and commercial areas and permit conditions to ensure best practice approaches are applied throughout the municipality.

The protection of water quality against the adverse impacts of future development is largely dependent on Council's ability to encourage best practice approaches to development through its planning framework.

It is suggested that Council:

- amend the MSS and LPPF of the Planning Scheme to provides specific reference to stormwater quality issues and the need to manage development and runoff to avoid any detrimental impacts on the Shire's waterways;
- distribute planning guidelines for best practice stormwater management for residential, commercial and industrial areas, including quality protection and on-site re-use options;
- encourage water-sensitive urban design in both private and public projects;
- develop more specific planning conditions relating to water sensitive urban design and the control of construction sites with regard to such issues as proper waste management, on-site collection and treatment of runoff;
- consider the outcomes of the various planning projects (e.g. 'Model planning provisions for stormwater management', 'Monitoring and evaluation of non-structural stormwater measures' and 'Knox water sensitive urban design guidelines') when reviewing planning practices in the Shire of Corangamite.

9.2.4 What regulations do council have to protect stormwater?

Local laws and enforcement

Local law enforcement is undertaken by the Public Safety and Amenities Unit. Council relies on the *Litter Act 1987* to address littering issues within the Shire. The majority of Corangamite's local laws address issues relating to stock, such as control of stock while droving. The objectives of Livestock Local Law No. 2 are to 'minimise any damage to road pavements, formations, drainage, vegetation and surrounding areas arising from livestock'. There are no local laws that address sediment and waste control from construction and building sites or the deposition of dog faeces and local laws currently play no role in planning enforcement. Dumping of rubbish is a rare occurrence within the Shire and Council's two Local Laws officers are predominantly engaged in addressing stock issues.

Due to resourcing issues, the local laws officers take a reactive rather than a proactive approach to local law enforcement, however the community and the local laws officers have expressed interest in a more proactive approach to enforcement.

The value of any regulatory control relies in the will of the agency to administer it. Accordingly, if Council is committed to the protection and improvement of its waterways, it must provide the resources necessary to enforce the regulations. However, in doing so efficiencies can be achieved through cooperative programmes (e.g. joint initiatives with EPA), targeting hot spots (e.g. land development areas and construction sites) and by undertaking joint education and enforcement programmes.

It is suggested that Council:

- develop a local law and/or advocate for changes to the *Building Act 1993* that deal specifically with the environmental management (including sediment control) of building and construction sites;
- review resourcing requirements to ensure an adequate level of enforcement;
- undertake targeted education and enforcement programmes, possibly with the EPA, in problem areas (e.g. commercial centres, industrial areas and construction sites).

9.2.5 What awareness raising programmes exist?

Education and awareness programmes can play a major role in protecting and improving water quality. There is still a reasonably high level of ignorance within the community on stormwater issues, which has led to television commercial and other awareness programmes by Melbourne Water and EPA. While these programmes are raising community awareness, there is still the need to supplement them at the local level.

Council and various agencies and community groups have embarked on a number of initiatives. However, until recently they have been highly localised reaching only a limited part of the community, for example, drain stencilling in Port Campbell and the Wetlands conference which targeted school children. It is important that stormwater be a key element of such initiatives and that all facets of community are included in some form of education campaign.

Notwithstanding a high level of environmental commitment among Council staff, there appears to be the need to improve Council knowledge particularly in the area of best practice stormwater management and requirements for new developments. There is also the need to ensure that outdoor staff are trained in environmental management to minimise the discharge of sediment, green waste, chemicals etc. into local drains.

In the past there has only been a limited focus on improving environmental and stormwater awareness among key groups (e.g. developers, builders and residents).

Community awareness is at the forefront in minimising the threats and activities that could pollute the Shire's waterways. In many cases, simple changes in behaviour can vastly reduce stormwater pollution.

It is suggested that Council:

- incorporate stormwater messages in Council's broader environmental education campaigns;
- develop guidelines for best practice stormwater management for existing and developing residential areas, building and construction sites and commercial areas and industrial areas;
- undertake targeted awareness campaigns (e.g. residential, commercial and building sectors) in key areas;
- consider undertaking pilot/demonstration environmental improvements projects with a focus on stormwater in at least two key areas (i.e. a shopping centre and a residential area);
- support community groups in the implementation of local community action programmes;
- consider undertaking joint awareness programmes with adjacent municipalities that share a common waterway (for example, Mount Emu Creek);
- Cobden Lake presents an ideal opportunity for a community education campaign that is integrated with the cleaning of the litter traps, monitoring etc. Given the central location of the lake to Cobden and high degree of visibility and close proximity to Camperdown, there is an opportunity for any projects related to the Lake to be show-case example of best practice environmental management of urban stormwater.

9.2.6 Does Council's existing operational regime reflect best practice?

There are stormwater treatment infrastructure measures installed in Port Campbell (i.e. seven litter traps). Through the development of the SWMP, opportunities to evaluate their effectiveness and identify other opportunities for their use should be investigated.

Council operates an extensive waste management and street-cleansing programme. Council does not provide hard or green waste collections, although these items can be disposed of at the local transfer stations.

Corangamite Shire, through the Waste Management Operations Strategy, is committed to the overall direction of the South West Regional Waste Management Plan, 1999 (Corangamite Shire Waste and Litter Education Strategy 1999–2001). There are five transfer stations operating within the Shire, these are operating at Port Campbell, Timboon, Simpson, Derrinallum and Skipton. The transfer stations operate on an 8 hour week basis and are fully supervised during operation hours. The Shire has a new regional landfill in Naroghid. The landfill is a state of the art landfill implementing best practice in waste management. The Corangamite landfill is a regional landfill utilised by other Council areas. Landfills have been closed at Port Campbell, Timboon, Simpson, Derrinallum, Noorat and Skipton.

Recycling in all towns is available using Council's contracted service. A local service club via a Council contractual agreement provides Skipton's recycling collection. Materials collected include glass, paper, aluminium and plastics. In 1998 the Corangamite domestic garbage collection served 4,605 tenements and collected 7,592 t of waste and an estimated 1,078 t of recyclables. This accounts for 62 per cent of the Shire's residents. Camperdown, Cobden, Noorat, Port Campbell, Simpson, Terang and Timboon have a weekly recyclables collection (glass, paper, cardboard, aluminium and plastics).

Council standards require staff and contractors to operate in a manner that does not cause environmental harm. Notwithstanding this, sediments, green waste, mulch and other contaminants from Council work sites often enter the drains and waterways. The problem is not simply confined to Council operations with many examples of sediment and other wastes from excavation and general road works in the road reserve being washed into nearby drains. This problem is common throughout the municipality.

With regard to problems associated with septic and sewer seepage, one of the main contributing issues is non-compliance of systems. Closely related to this, is the need for additional Council resources to enable effective monitoring and enforcement of regulations.

It is suggested that Council:

- monitor recycling and garbage collections to minimise the volumes of litter that may be entering the drains and integrate this with a community education campaign;
- monitor the material collected through the waste collection and cleansing processes and use these results, and the results of the litter basket audits, to modify practices to increase their effectiveness and to provide feedback to the community;
- amend Council contracts and operational procedures to include the requirements for best practice standards on sediment and litter control;
- consider the outcomes from the LGPro project involving the development of model contract conditions for construction works;
- encourage electricity, power, water, telecommunication and other organisations such as VicRoads to use best practice measures to control sediment and litter from works areas;

- encourage Council to review its operations with regard to maintenance activities, for example removing grass clippings on roadway verges after mowing. This also applies to residential areas, where grass clippings are left on nature strips as opposed to be properly composted.

9.2.7 Does Council advocate for and develop associations when developing strategies to address stormwater management?

Council has not previously sought funding for stormwater related projects. Council has a number of existing associations with adjoining Councils (for example, the environment officers from adjoining municipalities meet, as do the planning officers within the region). There may be opportunities to identify common stormwater management issues with neighbouring municipalities; develop regional strategies; and identify funding opportunities with other Councils. In addition, there may be an opportunity to tap into other agencies programmes, particularly those of the EPA, CCMA and GHCMA.

Council has demonstrated a clear commitment to sourcing funding to support environmental projects, examples include:

- the Cobden Lake project funded by CCMA to improve water quality and stormwater treatment capabilities of the lake.
- Stewart Park in Skipton, received funding from the Glenelg Hopkins CMA for the construction of a platypus viewing platform near Mount Emu Creek;
- tree planting/habitat link for Mount Leura, near Camperdown;
- purchasing recycling services through funding provided by EcoRecycle Victoria;
- funding through the Coast and Clean Seas funding for the installation of litter traps in Port Campbell.

It is suggested that Council:

- consider the establishment of joint working groups for the waterways that form or flow over the municipal boundary, including Mount Emu Creek (with the Shire of Moyne) and Gellibrand (within the Shire of Colac-Otway);
- develop regional strategies with neighbouring municipalities;
- identify funding opportunities with other Councils;
- monitor and implement, as appropriate, State and regional stormwater initiatives of EPA, Melbourne Water, Department of Infrastructure etc;
- actively participate in strategic projects that are being funded through VSAP;
- encourage EPA and/or Melbourne Water to develop simple guidelines for best practice stormwater management for residential, commercial and industrial areas, including quality protection and on-site re-use options;
- encourage EPA, Melbourne Water, Building Control Commission and the building industry to develop environmental management guidelines (including sediment and litter control) for building and construction sites;

- encourage EPA, Melbourne Water, Building Control Commission and the building industry to implement a programme to improve environmental awareness and minimise environmental impacts (including stormwater impacts) of the building and construction industry;
- recognise, and promote, that effective stormwater management is a shared responsibility with opportunities existing at various levels from individual on-site initiatives (typically by individual property owners) to local area programmes (typically led by Council) and larger regional initiatives (typically led by the CCMA's). An integrated relationship in the planning of measures between these levels and between relevant agencies is required;
- seek the cooperation and commitment of other stakeholders to achieve stormwater improvements throughout the municipality.

9.3 WHAT ARE THE MANAGEMENT FRAMEWORK STRATEGIES?

In response to the identified issues, management strategies have been developed around the following themes:

- policy and commitment
- operations/planning and regulation
- education
- advocacy
- information.

The management framework strategies are presented in Appendix H.

10 Implementation plan

The implementation framework provides recommendations for effectively implementing the Corangamite Stormwater Management Plan. It has been prepared based upon the outcomes of the management framework review, and in consultation with the Council and Project Working Group.

10.1 HOW WILL THE PLAN BE MANAGED?

There is the need to identify a Council department with overall responsibility for the coordination of stormwater initiatives and the implementation of the Corangamite Stormwater Management Plan.

A small implementation committee could be formed with representatives from key Council units and other stakeholders to help coordinate activities and increase the opportunity for ownership of the Corangamite Stormwater Management Plan. The brief of the committee would be to ensure the implementation of the Plan takes place, is coordinated across relevant units of council, and provides a forum for raising issues in terms of the Corangamite Stormwater Management Plan's implementation.

10.2 HOW WILL THE PLAN BE INTEGRATED?

The success of this plan will be dependent on the commitment and ongoing integration of activities within Council and with relevant government agencies and service providers. The ongoing involvement of key members from those agencies currently represented on the Project Working Group, supplemented with other agencies as relevant may form a useful mechanism to ensure integration and effective implementation of the Corangamite Stormwater Management Plan over time.

10.3 HOW WILL THE PLAN BE MONITORED?

The Corangamite Stormwater Management Plan provides a framework for achieving more effective stormwater management. While priority actions have been identified, it is envisaged that they may change over time due to changing circumstances. Accordingly, Council and other stakeholders should review and update priority actions on an annual basis in accordance with budget planning activities and the progressive success of the Corangamite Stormwater Management Plan.

Ultimately, the success of the Corangamite Stormwater Management Plan can be measured through improved water quality and healthier waterways. Water quality improvement could be achieved through the use of 'end of pipe' approach such as the installation of gross pollutant traps and similar technologies adjacent to the waterways. However, such solutions fail to remove the threat and only hide poor stormwater management practices. True success will come through the removal of the threats and an emphasis on source control approaches to protect water quality.

Having regard to the above, the success of the Corangamite Stormwater Management Plan will be demonstrated by:

- *Commitment:* as evidenced by the adoption and implementation of the Stormwater Management Plan by Corangamite Shire Council, CCMA, GHCMA, EPA and other key stakeholders.
- *Sensitive stormwater design:* as evidenced by the increased use of water sensitive urban design in the design of new development and projects in both the private and public sectors.
- *Good development practice:* as evidenced by effective on-site environmental management and a reduction in the volumes of soil, litter, particulates, and other wastes from construction sites entering the stormwater system.
- *Community awareness:* as evidenced by ongoing improvements in community awareness of stormwater, reduced littering and an increase in on-site detention and the use of stormwater.
- *Good commercial and industrial practice:* as evidenced by reductions in dumping, the overflow of garbage bins and the accidental and deliberate discharge of wastes and contaminated run off to stormwater.
- *Management and coordination:* as evidenced by regular meetings of the Corangamite Stormwater Management Committee and a commitment of all Council departments and external agencies to the achievement of effective stormwater management.
- *Water quality:* as evidenced by improved stormwater quality being discharged into local waterways.

The above provide a set of measures against which the success of the Corangamite Stormwater Management Plan can be assessed. However, the opportunity exists for the Council, in conjunction with the community, to take these guidelines further and develop a set of key performance criteria against which the results of the Plan can be assessed in the context of broader environmental goals for the municipality. The success of the Corangamite Stormwater Management Plan can only be judged by monitoring the outcomes of implementation. As these outcomes may be difficult to detect in terms of direct physical evidence, it would be prudent to establish specific objectives and milestones that will facilitate benchmarking and review of the implementation process. Milestones should relate to the priority of specific risk and to:

- achieving improvements in specific receiving values that are currently threatened (particularly in relation to the implementation of specific management measures); or
- reductions in specific risks, in terms of both magnitude and exposure, in relation to the implementation of specific management measures.

10.4 WHAT FUNDING IS AVAILABLE?

A substantial funding commitment is required to successfully implement the Corangamite Stormwater Management Plan. The Council has a number of mechanisms through which it can source internal and external funding for stormwater management within the Shire. These include levying rates, user charge schemes, government grants and partnership agreements.

Some potential sources are listed below:

- EPA is coordinating the Victorian Stormwater Action Program (VSAP), for which there is $22.5 million allocated over a three year period to 2003, to improve the environmental management of urban stormwater in Victoria. Funding assistance is to be matched by local governments on a dollar for dollar basis for priority projects identified in stormwater management plans. This includes the provision of funding for structural management initiatives such as litter traps. EPA is also a source of educational material. VSAP funding may be available for a further year in 2004 pending State Government decisions.
- EcoRecycle Victoria works with sixteen Regional Waste Management Groups, which are the key stakeholders in the delivery of most of EcoRecycle Victoria's programmes. In particular they provide a planned basis for implementing best practice in addressing waste and recycling materials.
- EcoRecycle provides a number of funding opportunities. These include:
  - funding support to develop comprehensive facilities to collect, sort, treat and dispose of residuals and implement best practice in transfer station and landfill design and operation;
  - kerb-side development programme: provides funding assistance to councils for the implementation of best practice elements for household waste reduction to landfill;
  - commercial and industrial: provides funding to support the reduction in commercial and industrial waste generated and disposed to landfill;
  - litter infrastructure: assists councils in the purchase of litter trap equipment;
  - regional education officers: employment of officers through the regional waste management groups who coordinate and promote a strategic approach to waste and litter education based on the 'Becoming Waste Wise' model;

- resource recovery and waste management facilities: provide support funding for facilities that improve the efficiency and environmentally sustainable collection, transportation, recycling and disposal of material waste and residuals;
- public place and events: to support the development of infrastructure systems;
- sponsorships: provides some sponsorships for industry awards to encourage waste minimisation and resource management;
- litter prevention and control: provides funding to Councils for the establishment of litter prevention task forces;
- community grants: as part of Waste Wise Community Participation Programme, funding is provided to Regional Waste Management Groups to assist local initiatives by community organisations to minimise waste and litter.

- Federal and State government funding of community education programmes. Key programmes include Waterwatch Australia, Landcare and the Natural Heritage Trust.
- The *Planning and Environment Act* 1987, Part 3B, Development Contributions, provide a mechanism for local government to set up a development contributions plan for the imposition of a development infrastructure levy and or the imposition of a community infrastructure levy in relation to the development of land in the area which the plan applies. This process is applicable in new development situations only.

It is envisaged that most actions will be funded through a variety of sources. In addition to funding opportunities set out above, some of the recommendations may be implemented through community driven schemes. These include community fund raising, corporate sponsorship and in-kind contribution in the form of labour and equipment to undertake works.

Some of the government grants that could be applied to the Corangamite Stormwater Management Plan's implementation strategies (or complimentary strategies identified by the community) would require community groups to be in the lead role in preparing applications for funding and managing the implementation of projects.

Community based strategies may be seen as advantageous to the community in terms of capacity building, incorporation and recognition of local knowledge and expertise, influence and ownership of problem identification and solutions.

10.5 PROGRAMMING

Significant cost savings could be achieved by integrating the actions and undertaking similar actions simultaneously. A suggested integrated implementation plan is presented in Appendix I.

If the actions were integrated and a part-time officer appointed to assist with the implementation of plan, then the total estimated costs to implement the plan would be in the order of:

Year 1: $A363,800

Year 2: $A258,500

Year 3: $A268,500

The above costs exclude internal Council costs and recommendations that will be funded through other programmes. They also exclude grants and partnership funding that may be available to Council.

Neither detailed cost estimates nor designs have been prepared as part of the Corangamite Stormwater Management Plan. Accordingly, all the costs contained herein should be considered indicative figures only. KBR does not accept any responsibility for the accuracy of the costs.

As with any plan of this duration it should be reviewed, preferably on an annual basis, so that it continues to reflect priorities that may change from time-to-time in response to changing circumstances. On this basis, the implementation programme should be considered an indicative programme and treated as a 'living' document to ensure that it continues to reflect contemporary stormwater issues, including advances in best practice procedures for the management of stormwater in the Shire of Corangamite.

10.6 CONCLUSION

The Corangamite Stormwater Management Plan will assist in improving the quality of urban stormwater discharged into local waterways. It has involved a process of identifying the values of waterways and the threats that pose a risk to water quality. From these tasks, the Corangamite Stormwater Management Plan proposes reactive and management strategies plus an implementation programme to assist Council in its delivery of better stormwater quality outcomes for the future.

Appendix A

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Appendix B

PARTICIPANTS

Appendix B
Participants

STEERING COMMITTEE	
Paul Samaratunge	Corangamite Shire Council
Neil Haydon	Corangamite Shire Council
Kath Gosden	Corangamite Shire Council
Heather Adams/Tracey Walker	Corangamite Catchment Management Authority/Department of Natural Resources and Environment
Leigh Smith	Glenelg Hopkins Catchment Management Authority
Cynthia Crowe	Environment Protection Authority Victoria
Richard Curwell	VicRoads
PROJECT WORKING GROUP	
Paul Samaratunge	Corangamite Shire Council
Neil Haydon	Corangamite Shire Council
Heather Adams/Tracey Walker	Corangamite Catchment Management Authority/Department of Natural Resources and Environment
Leigh Smith	Glenelg Hopkins Catchment Management Authority
Cynthia Crowe	Environment Protection Authority Victoria
Richard Curwell	VicRoads
Brenda Skene	Corangamite Waterwatch
Lyall Bond	The Lismore Land Protection Group
Mick Foley	Parks Victoria
Kath Gosden	Corangamite Shire Council
Terry Binder	Corangamite Shire Council
Ken Bunning	Power Creek Committee of Management
Kevin Kittel	Corangamite Shire Council
CONSULTANTS	
Craig Smith	Kellogg Brown & Root Pty Ltd
Fiona Banks	Kellogg Brown & Root Pty Ltd
Michelle Ezzy	Kellogg Brown & Root Pty Ltd

Appendix C

VALUES

VALUES		CATCHMENTS											
		Camperdown	Cobden	Darlington	Derrinallum	Lismore	Noorat	Port Campbell	Princetown	Simpson	Skipton	Terang	Timboon
Environment	In-stream habitat	4	3	4	3	4	0	3	4	2	4	2	3
	Riparian habitat	4	4	3	3	4	0	4	3	2	3	2	4
Amenirty	Recreation	3	3	1	3	1	0	4	3	1	2	3	3
	Landscape	3	3	2	2	1	0	4	3	3	3	3	2
Cultural	Indigenous	3	2	2	3	3	2	4	3	1	2	2	2
	European	2	2	2	1	2	0	3	2	1	2	2	2
Stormwater	Conveyance	1	3	3	3	3	3	2	2	3	3	2	3
	Water Treatment	1	2	1	1	1	2	1	1	3	1	1	1
Economic	Property & Tourism	3	3	2	2	2	0	4	3	2	2	2	3
	Extraction & Use	3	3	0	2	2	2	2	3	1	3	1	1

Camperdown		VALUES	RATING
Environment	In-stream habitat	Lake Colongulac is considered to be of international significance for its ecological and hydrological values and rarity of species. Lake Colongulac is a high value wetland for its waterbird populations. The Lake is also significant as a drought refuge. (Australian Heritage Commission, 2002). 'Although the lake is not considered to be a modified ecosystem it is not in good condition when compared to other lakes in the district (Australian Heritage Commission, 2002) 'Fish species recorded in the Lake are Eel (*Anguilla australis*) and Common Minnow (*Galaxias maculatus*)'. The Lake is semi-permanent and has only dried out during periods of continued low rainfall. The water level is subject to seasonal variations. The salinity level of the brackish water reflects changes in water volume with no well-defined seaonal patterns. The Lake has a high pH and is constantly turbid (Australian Heritage Commission, 2002). Lake Colonculac eventually drains to Lake Corangamite which is also Ramsar listed and is of very high ecological significance.	4
	Riparian habitat	Lake Colongulac has a variety of riparian habitats including bays, spits, cliffs and islands. The Plains Wanderer, an endangered ground dwelling bird has been found at the site (Environment Australia) as has the endangered Hairy tail (*Ptilotus erubescens*). The Lake is now surrounded by grazing land with no signficant stands of remnant vegetation remaining. A small margin of salt-tolerant species occurs at some sites ... and cypress windbreaks and scattered plantings of Sugar Gum occur in areas around the lake, similarly Boxthorn grows in hedgerows and on part of the Lake's perimeter (Australian Heritage Commission, 2002). The Western District Lakes Protection and Rehabilitation program has fenced and revegetated a significant area of Lake Colongulac's foreshore and the project is expected to continue.	4
Amenirty	Recreation	Lake Colongulac provides a passive recreation resource, particularly in terms of nature/bird watching and photography. This is enhanced by the significance of the lake as a Ramsar listed wetland. Access to the Lake however is generally limited. The Camperdown Strategic Development Plan (December 2001) refers to the opportunity to 'develop a network of walking and cycling trails from Camperdown to Lake Colongulac wetlands and develop a trail with picnic areas around the lake'. Lake Colongulac is used for limited recreational activities such as sightseeing and duck hunting. The Lake was stocked with fish until 1973. Mature eel are caught for local and international markets when the Lake is in good condition (Australian Heritage Commission, 2002).	3
	Landscape	Lake Colongulac is located approximately 4 km north of Camperdown. Pollution in the Lake has resulted in a decrease in the number and diversity of native flora and fauna, eutrophication and diminished recreational and aesthetic appeal. Concern is centred around the possible health risks associated with high E.coli levels, the maintenance of the aesthetic quality of the lakes and the avoidance of excessive biostimulation from high levels of nutrients' (Australian Heritage Commission, 2002).	3
Cultural	Indigenous	It is highly likely that Lake Colongulac played an important role in terms of Aboriginal cultural heritage, particularly with regard to it being a food and water source. Its relatively low salinity compared with other lakes increased its importance as a drinking water and fishing resource (McNiven, 1998). The Western District Lakes region was of importance to the Djargurd Wurrung and Guildjan people for reliable water sources and food resources. Overall, more than 48 sites of archaeological significance have been listed within the Western District Lakes Ramsar sites, many of these near Lake Colongulac (DNRE, 2002), including instances of skeletal remains (McNiven, 1998).	3
	European	The Lake is of signficance to the community as an important ecological resource, particularly given its significance as a Ramsar weltand. In addition, the lake has historically provided a resource for birdwatching and duckhunting.	2
Stormwater	Conveyance	Lake Colongulac is part of a closed drainage system (endorheic) formed by shallow water-filled depressions (Australian Heritage Commission, 2002). Lake Colongulac performs a role as a receiver of flood waters and stormwater via Medarook Creek. Lake Colongulac eventually drains to Lake Corangamite.	1
	Water Treatment	The creeks and lake perform no known water treatment role. South West Water had a licence to discharge treated wastewater to Lake Colongulac up until 1/1/2002. All treated wastewater now goes to a reuse system at Lake Bookar.	1
Economic	Property & Tourism	The Lake does not currently provide a significant contribution to the enhancement of urban property, primarily due to the distance of the lake from urban areas. However, the lake does provide a significant landscape resource to the surrounding rural environment. From a tourism perspective, the lake does not function as a key tourism resource. There are however, plans to investigate possible eco-tourism related opportunities near the lake, particularly related to the lake's significance as a Ramsar listed wetland.	3
	Extraction & Use	There is currently minimal water extraction or use of Lake Colongulac. The lake is used for commercial eel harversting. Some water is drawn from the lake for agricultural/horticultural purposes.	3

Cobden		VALUES	RATING
Environment	In-stream habitat	The Curdies River provides an important estuarine habitat at the mouth (Corangamite RCS), particularly for migratory wading birds (e.g. Australasian Bitterns and the Hooded Plover). It is important for spawning, nursery and migratory activities of fish (Corangamite Region Catchment Condition Report, 1996). In-stream habitat is considered poor in Cobden Creek (near pool and golf course) and in the Curdies River (just downstream of Cobden) (Waterwatch data). It is likely that the in-stream habitat value of Lake Cobden is minimal. The Lake is a source of community concern, particularly in terms of its aesthetic quality and general health.	3
	Riparian habitat	The riparian zone of the Curdies River (just downstream of Cobden) has been cleared of native vegetation down to the banks and now consists of introduced pasture with some willows and blackberries. The riparian zone of Cobden Creek near the pool and through the golf course has been cleared of native vegetation and consists of introduced grasses with some willows and occasional remnant trees. Bank vegetation is considered poor on both the Curdies River and Cobden Creek (Waterwatch data). There is generally grassland either side of the creek with a combination of continuous/discontinuous riparian tree cover on one side and sparse vegetation on the other side (Water Victoria, 1989). While riparian values near Cobden may not be high, the downstream riparian habitat values of the Curdies River are of high significance.	4
Amenirty	Recreation	Cobden Lake provides a central recreation reserve with facilities for picnics and BBQ's. Cobden Creek flows through the lake. The Cobden Lake (Rotary Park) was developed by the community in 1872. Cobden Lake has been identified by the community and Council as a significant stormwater 'hotspot' issue, particularly in terms of accumulating litter and leaf matter in the lake.	3
	Landscape	Cobden Lake is strategically located within the middle of the residential area of Cobden, with a reserve/open space area located around the periphery of the lake. On occasion the amenity of the lake has been a cause of community concern (ie. Water discolouration etc)	3
Cultural	Indigenous	It is likely that Cobden Creek and Curdies River are of Aboriginal cultural heritage significance, particularly as a congregation area.	2
	European	Cobden is an historically signficant town. There are a number of buildings and trees listed on the National Trust Register, the Register of the National Estate and on the Victorian Heritage Register. In this sense the creek and lake's heritage significance may be associated with their role within the town generally. The lake and creek have important cultural associations for the local and broader communities. For example, the park and lake environment provide a recreational and landscape focus to the town, the park being constructed in 1872 by the community. In addition, the intrinsic value of the lake and creek to the local community is significant, particularly in terms of its role as a natural resource within close proximity to the town.	2
Stormwater	Conveyance	Cobden Lake forms part of the town's stormwater drainage system. A number of residential areas and roads drain directly into the lake and ultimately into Cobden Creek. The lake performs a storage role. Cobden Creek is the receiving waterway for a range of areas including residential areas and the recreation reserve.	3
	Water Treatment	It is likely that Cobden Lake would perform a treatment role in settling of sediments. It is considered unlikely that the creek and river would perform a significant treatment role.	2
Economic	Property & Tourism	It is considered likely that property values would be positively influenced by their proximity to the Lake and creek (to a lesser extent).	3
	Extraction & Use	Sections of the Curdies River are used for eel harvesting. The Curdies River provides a regular source of water for stock and irrigation of pastures, enabling a thriving dairy industry. There has been past use of Cobden Lake for water extraction associated with road construction.	3

Darlington		VALUES	RATING
Environment	In-stream habitat	Mount Emu Creek through Darlington has had sightings of platypus. The Index of Stream Condition, rates water quality as high (8/10) and macroinvertebrate diversity as high (9/10), however overall the reach is considered to be in moderate condition (Victorian Water Resources Data Warehouse). 'Water quality with respect to dissolved oxygen is generally moderate in the upper half of the creek' (Water Victoria, 1989). The creek and its surrounding environs are covered by an Environmental Significance Overlay (ESO1) under the Corangamite Planning Scheme which identifies Mount Emu Creek, along with a number of other waterways within the Shire, as being significant and notes that 'waterbodies play an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'.	4
	Riparian habitat	The quality of the riparian zone of Mount Emu Creek is considered moderate (5/10) by Index of Stream Condition assessment and overall the reach near Darlington is considered to be in moderate condition (Victorian Water Resources Data Warehouse). The creek and its surrounding environs are covered by ESO1 which identifies the creek, along with a number of other waterways as being significant and notes that ' waterbodies play an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'.	3
Amenirty	Recreation	Mount Emu Creek as it passes through the urban area of Darlington provides primarily a passive recreation resource (e.g. open space areas, picnics, BBQ's etc).	1
	Landscape	Mount Emu Creek and its immediate environs are readily visible from a number of vantage points within the town. This is aided by the location of the town in a valley.	2
Cultural	Indigenous	It is highly likely that the creek played an important role in terms of Aboriginal cultural heritage, particularly with regard to it being a food source. Mount Emu Creek became an important water resource in the area during dry times, and Aboriginal populations would migrate from lake areas to the creek to utilise the water (Mc Niven, 1998).	2
	European	Darlington is an historically signficant town. There are a number of buildings and trees listed on the National Trust Register, the Register of the National Estate and on the Victorian Heritage Register. In this sense the creek's heritage significance may be associated with its role within the town generally. The creek has important cultural associations for the local and broader communities. Examples of items listed by the National Trust, include Stony Point (house) on Mount Emu Creek, which as been preserved virtually intact; and Darlington Bridge over Mount Emu Creek which is considered to be historically, scientifically and aesthetically significant at a State level.	2
Stormwater	Conveyance	Mount Emu Creek is an important part of the local drainage system. The town's urban area drains directly to the creek. As the town develops, the creek's importance to the drainage system will increase. Mount Emu Creek is one of the major tributaries of the Hopkins River Basin, the creek drains the east area of the Basin. Nearly half of the mean annual flow of the Hopkins River is contributed to by the creek.	3
	Water Treatment	Mount Emu Creek and its tributaries have no known water treatment function.	1
Economic	Property & Tourism	Mount Emu Creek provides an important natural feature within the town. The creek's current and future potential contribution to the local tourism industry is considered to be minimal.	2
	Extraction & Use	There is no known extraction and use associated with the creek within Darlington.	0

Derrinallum		VALUES	RATING
Environment	In-stream habitat	Lake Tooliarook receives nutrient loads from the surrounding agricultural land uses and other sources. The lake has experienced blue-green algal blooms. The lake and its surrounding environs are covered by an Environmental Significance Overlay (ESO1) under the Corangamite Planning Scheme which identifies the lake, along with a number of other waterways within the Shire as being significant and notes that 'waterbodies play an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'.	3
	Riparian habitat	The lake and its surrounding environs are covered by ESO1 which identifies the lake, along with a number of other waterways as being 'significant waterbodies playing an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'.	3
Amenirty	Recreation	The lake is stocked with Rainbow trout and other species for recreational fishing (Corangamite Region Catchment Condition Report, 1996). The lake is also popular for water-skiing and fishing.	3
	Landscape	The lake is located out of the main urban area of Derrinallum. The lake is picturesque and contributes to its surrounding rural area's landscape significance. However, it's contribution to the landscape amenity/quality of the urban area of Derrinallum is not significant given the lake's distance from Derrinallum's urban area.	2
Cultural	Indigenous	It is highly likely that Lake Toolirook played an important role in terms of Aboriginal cultural heritage, particularly with regard to it being a food source. The lake would have been an important freshwater resource during the winter-spring rainy season, given it has lower salinity than some other lakes during this time (McNiven, 1998). The Western District Lakes region was of importance to the Djargurd Wurrung and Guildjan people for reliable water sources and food resources. More than 48 sites of archaeological significance have been listed across the Western District Ramsar sites (DNRE, 2002).	3
	European	Derrinallum is an historically significant town. It has a range of buildings and other structures listed. Including the Larra Homestead, Larra Stables and Mount Elephant. There is also a cultural association with Lake Toolirook as a recreational and landscape feature.	1
Stormwater	Conveyance	Lake Tooliarook eventually drains to Lake Gnarpurt and Lake Corangamite particularly during wet seasons, however this has not occurred recently. Lake Tooliarook performs an important role as the primary receiver of stormwater form Derrinallum.	3
	Water Treatment	The lake performs no known water treatment role.	1
Economic	Property & Tourism	The Lake is located some distance from the urban area of Derrinallum, therefore its contribution to the town's landscape quality is minimal. It does however, contribute to the 'natural landscape' where is it located within a rural context.	2
	Extraction & Use	Lake Tooliarook is used for eel farming and water extraction. Derrinallum sources its domestic water supply from Donalds Hill Reserve, near Camperdown.	2

Lismore		VALUES	RATING
Environment	In-stream habitat	Lake Gnarpurt is part of the Ramsar listed Western Lakes District. The lake supports a large number and diversity of waterbirds including the Shelduck, Pink-eared Duck, Great Crested Grebe and Freckled Duck. Waterbird movement between Lakes Gnarpurt and Lake Corangamite are common and Lake Gnarpurt is an important refuge in times of drought. The lake is moderately saline and shows seasonal variation in salinity (Australian Heritage Commission, 2002). Lake Gnarpurt is not subject to high nutrient levels or nutrient growths (Australian Heritage Commission, 2002). The lake and its surrounding environs are covered by Environmental Significance Overlay - Schedule 1 (ESO1) which identifies the lake, along with a number of other waterways within the Shire as being 'significant waterbodies playing an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'. Browns Waterholes is a chain-of-ponds system, which is of importance due to the lack of such systems still existing (many have been drained). The creek supports many locally important species such as Gudgeon, Minnow, Pygmy perch, Mudeye and shrimp.	4
	Riparian habitat	There are no significant stands of remnant vegetation remaining around Lake Gnarpurt as the surrounding land has been cleared for agriculture (Australian Heritage Commission, 2002). However, the Western District Lakes Protection and Rehabilitation project has fenced and revegetated a significant section of the Lake's foreshore and the project will continue in the future. The inaccessibility of Lake Gnarpurt enhances its value for waterbird conservation and scientific study. However, habitat value has been reduced as a result of general human disturbances such as clearing of vegetation down to the lake margin (Australian Heritage Commission, 2002). There are fragmented sections of riparian habitat along Browns Waterholes. Mundy Gully Creek is generally cultivated both sides, with sparse riparian tree cover (Water Victoria, 1989), however, Mundy Gully Creek and Browns Waterholes have both had revegetation and fencing works undertaken. The lake and its surrounding environs are covered by ESO1 which identifies the lake, along with a number of other waterways within the Shire as being significant and notes that waterbodies play an important part in the ecology of the Shire and need to be prot	4
Amenirty	Recreation	The lake is used for eel fishing (Environment Australia) (Corangamite Region Catchment Condition Report, 1996). Recreational activities at the Lake are fairly limited due to poor access to the area. Prominent activities include bird watching and duck hunting. Browns Waterholes is not readily used for recreational purposes.	1
	Landscape	Lake Gnarpurt is located approximately 10 kilometres south-east of Lismore. Given the significant distance of the lake from the urban area of Lismore and the lack of ready access to the lake, its landscape contribution is limited. Browns Waterholes winds its way through the northern area of the town. It's immediate surrounds are visible from a range of vantage points throughout the town, the Lismore Caravan Park has views across the creek area.	1
Cultural	Indigenous	It is highly likely that Lake Gnarpurt and Browns Waterholes played an important role in terms of Aboriginal cultural heritage, particularly with regard to it being a food source. The Western District Lakes region was of importance to the Djargurd Wurrung and Guildjan people for reliable water sources and food resources. More than 48 sites of archaeological significance have been listed in the Ramsar site (DNRE, 2002).	3
	European	There is a cultural association with the Browns Waterholes, Mundy Gully Creek and Lake Gnarpurt.	2
Stormwater	Conveyance	Lake Gnarpurt is located in an enclosed drainage basin approximately 27 kilometres north-east of Camperdown. The lake performs an important role as the primary receiver of stormwater from the town of Lismore. Mundy Gully Creek flows into the Lake. Lake Gnarpurt drains to Lake Corangamite during particularly wet seasons.	3
	Water Treatment	Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek perform no known water treatment role.	1
Economic	Property & Tourism	The Lismore Caravan park is within close proximity to Browns Waterholes and takes advantage of views across the waterway's immediate environs.	2
	Extraction & Use	There is no known extraction and use associated with Browns Waterholes Creek. The lake is used for eel fishing (EA) (Corangamite Region Catchment Condition Report, 1996).	2

Noorat		VALUES	RATING
Environment	In-stream habitat	Not relevant as the town's stormwater drains to the Nooarat School natural soakage then into groundwater.	0
	Riparian habitat	Not relevant as the town's stormwater drains to the Nooarat School natural soakage then into groundwater.	0
Amenirty	Recreation	Not relevant as the town's stormwater drains to the Nooarat School natural soakage then into groundwater.	0
	Landscape	Not relevant as the town's stormwater drains to the Nooarat School natural soakage then into groundwater.	0
Cultural	Indigenous	Noorat was one of the most important inter-group meeting places in the Western District (McNiven, 1998).	2
	European	Not relevant as the town's stormwater drains to the Noorat School natural soakage then into groundwater.	0
Stormwater	Conveyance	The Noorat School natural soakage receives all urban stormwater from the town and then drains to groundwater. The groundwater system drains to Lake Keilambete.	3
	Water Treatment	It is considered unlikely that the natural soakage would perform a significant role in water treatment, with the exception of extraction of solids through the natural soakage process.	2
Economic	Property & Tourism	Not relevant as the town's stormwater drains to the Noorat School natural soakage then into groundwater.	0
	Extraction & Use	Noorat sources its domestic water supply from the Otway Coast Basin. It has a water service basin. There is significant pumping of the aquifer for agricultural uses.	2

Port Campbell		VALUES	RATING
Environment	In-stream habitat	Within Port Campbell Creek, approximately 200m from the town centre (land leased by South West Water) there is a section of particularly dense in-stream phragmites which is important for bird breeding in general and in particular for the Swamp Harrier, a locally significant species (Parks Victoria). 'Port Campbell Creek has experienced in-stream habitat loss due to unnatural disturbance (ie. flooding/drainage works and riparian vegetation loss)' (CCMA, 2002). The creek also has degraded water quality due to elevated nutrient levels and turbidity due to agricultural drainage works and stock (CCMA, 2002).	3
	Riparian habitat	The Port Campbell National Park extends approximately 1.5km upstream from the mouth on either side of the Port Campbell Creek and contains important remnant examples of coastal heath riparian habitat (Parkweb). The Port Campbell creek/wetlands area is a known habitat for the Swamp Harrier and a breeding area of the water rat (Project Working Group). Along Port Campbell Creek there is 'riparian vegetation loss due to stock and historical clearing' (CCMA, 2002).	4
Amenirty	Recreation	Ocean fishing is an important recreational opportunity with surf fishing a popular passtime (Corangamite Region Catchment Condition Report, 1996). Fishing is also popular in Port Campbell Creek where bream and yellow-eyed mullet can be caught.	4
	Landscape	Port Campbell beach area and Port Campbell Creek contribute significantly to the landscape character of Port Campbell. Port Campbell's built environment is focused around the water. Port Campbell Creek is identified in the planning scheme as being covered by an Significant Landscape Overlay (SLO1) as it contains significant estuarine, intertidal and aquatic environments.	4
Cultural	Indigenous	It is highly likely that the Port Campbell coastal area is of high Aboroginal cultural heritage significance.	4
	European	Port Campbell is an historically signficant town, it was first discovered in 1845 by Charles Latrobe, the chief surveyor and superintendent of the Port Phillip district, the area was originally a safe inlet for unloading supplies from sailing vessels. Settlers began to clear the surrounding land for grazing and other agricultural pursuits. Port Campbell is now a popular stop for visitors to the Shipwreck Coast and the Great Ocean Road. The waterways of the area provide a strong cultural focus for the community and tourists.	3
Stormwater	Conveyance	Port Campbell beach and Port Campbell Creek are the receiving waterways for stormwater from the Port Cambell area. There has been seven litter traps installed at the major stormwater outlets from Port Campbell.	2
	Water Treatment	Port Campbell Creek would play a limited water treatment role.	1
Economic	Property & Tourism	The beach area and Port Campbell Creek is readily accessible and visible from a range of vantage points within town. There are a number of businesses (restaurants, accommodation etc) that have frontage/views across the water. Port Campbell Caraven Park backs onto the creek. Port Campbell is one of the municipality's most significant tourist attractions. Approximately 2 million people visit the Great Ocean Road annually, with the Twelve Apostles being the most popular Victorian tourist attraction outside of Melbourne. A number of significant tourism facilities have been planned or constructed in the Port Campbell area over the last 12 months. A Master Plan that will provide for the future location of facilities, new pedestrian facilities and potentially building regulations, is currently being developed for Port Campbell.	4
	Extraction & Use	The ocean is used for commercial fishing with Port Campbell home to a small fleet (Corangamite Region Catchment Condition Report, 1996). Port Campbell's domestic water supply is from groundwater supplies.	2

Princetown		VALUES	RATING
Environment	In-stream habitat	The Gellibrand River provides important estuarine habitat (Corangamite RCS). It is important for spawning, nursery and migratory activities of fish and invertebrates and is of high value because it contains 12 species of native fish including four species of galaxis (Corangamite Region Catchment Condition Report). Phragmites occur in the stream and are important bird nesting areas (Parks Victoria). The river and its surrounding environs are covered by Environmental Significance Overlay - Schedule 1, which identifies the river, along with a number of other waterways within the Shire as being 'significant waterbodies playing an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'.	4
	Riparian habitat	The mouth of the river is bordered by the Port Campbell National Park on the west and the Otway National Park on the east. Both parks contain important examples of remnant coastal heath habitat, predominantly a mix of Coastal Beard Heath and Coast Wattle. The coastal riparian zone is important habitat for the nationally significant Hooded Plover (Park website). The national park extends approximately 400m upstream on the east side and 200m on the west side, upstream of which the riparian zone is predominantly cleared for agricultural purposes and introduced pastures occur down to the water's edge. The river and its surrounding environs are covered by an Environmental Significance Overlay (ESO1) which identifies the river, along with a number of other waterways, as being significant and notes that 'waterbodies play an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'. The Latrobe Creek riparian zone includes significant stands of Wooly Tea Tree.	3
Amenirty	Recreation	The river estuary is important for recreational fishing, particularly for bream and yellow eye mullet (Corangamite Region Catchment Condition Report, 1996).	3
	Landscape	Given the location of Princetown, it has panoramic views across the river valley. The Gellibrand River is identified in the planning scheme as being a significant estuarine, intertidal and aquatic environment.	3
Cultural	Indigenous	It is highly likely that the river estuary is of Aboriginal cultural heritage significance. 'Prior to white settlement, the area around Princetown supported a considerable Aboriginal population. A range of archaeological sites containing artefacts and shell middens has been recorded in the area' (Princetown Strategic Development Plan, April 2001).	3
	European	White settlers occupied the area during the 1860's. Due to lack of roads, the Gellibrand River was important for the transportation of goods by boat. Princetown was orginally gazetted as a series of Crown Allotments encompassing land on both sides of the Serpentine Creek (now called Latrobe Creek). The area has an early tourism history. Holiday makers were attracted to Princetown for fishing and relaxation and three guesthouses were operative in the area by the end of the 19th century' (Princetown Strategic Development Plan, April 2001).	2
Stormwater	Conveyance	The Gellibrand River receives stormwater from Princetown. The estuary system plays an important flood mitigation role for the area.	2
	Water Treatment	The River and its tributaries have no known water treatment function.	1
Economic	Property & Tourism	Princetown is located on a topopgraphic high point, it therefore has commanding views across the valley, estuarine environment as the river joins with the LaTrobe Creek and feeds into the Southern Ocean. 'Tourism is becoming increasingly important due to Princetown's unique wetlands and location within the Great Ocean Road tourism region.' (Princetown Strategic Development Plan, April 2001).	3
	Extraction & Use	The Gellibrand River provides an important fishing resource, in particular, it is important for eel harvesting.	3

Simpson		VALUES	RATING
Environment	In-stream habitat	Stormwater from Simpson drains to Kennedys Creek and eventually to the Gellibrand River. Although in-stream habitat values may not be high in the vicinity of Simpson, the Gellibrand River provides important habitat to a range of aquatic species, particularly in the lower reaches and the estuary.	2
	Riparian habitat	Kennedys Creek and the Gellibrand River have a cleared riparian zone in the vicinity of Simpson, however the lower reaches have good stands of remnant riparian zone.	2
Amenirty	Recreation	Simpson has a range of recreational facilities, however they are not dependent on Storage Dam.	1
	Landscape	Storage Dam is an attractive 'lake' feature. It is one of the first features visible upon entering the town. The Lake Apex project has resulted in an attractive landscape feature for the town focused around the dam.	3
Cultural	Indigenous	The waterways in the area are known to have Aboriginal cultural significance however it is not known specifically if Kennedys Creek has important cultural sites.	1
	European	Storage Dam would be unlikey to be of historical signifcance, however it is likely to be culturally significant to the town as an attractive water feature within the town.	1
Stormwater	Conveyance	Storage Dam performs an important role as the receiver of stormwater from Simpson.	3
	Water Treatment	It is likely that the Storage Dam performs a treatment role. There is evidence of structural (hard and soft) measures to promote the dam's role as a wetland to filter contaminants entering the dam from the stormwater drain that flows into the dam.	3
Economic	Property & Tourism	Storage Dam is accessible from the road. There is also a small reserve/playground area located near the lake. The waterbody would perform a very localised role as a picturesque venue for through traffic stopping over. Given its location, it is considered unlikely that the dam would positively influence property values.	2
	Extraction & Use	There is no known extraction or use associated with the dam.	1

Skipton		VALUES	RATING
Environment	In-stream habitat	Mount Emu Creek has platypus living in the vicinity of the town. The Index of Stream Conditions assessment rates water quality as high (8/10) and macroinvertebrate diversity as high (9/10), however overall the reach is considered to be in moderate condition (Victorian Water Resources Data Warehouse). 'Water quality with respect to dissolved oxygen is generally moderate in the upper half of the creek' (Water Victoria, 1989). The creek and its surrounding environs are covered by Environmetnal Significance Overlay - Schedule 1 (ESO1) which identifies the creek, along with a number of other waterways within the Shire as being 'significant waterbodies playing an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'.	4
	Riparian habitat	The quality of the riparian zone along Mount Emu Creek is considered moderate (5/10) by Index of Stream Condition assessment (Victorian Water Resources Data Warehouse). Land use either side of the creek is cultivated both sides with either continuous/discontinuous riparian tree cover or sparse tree cover along the creek (Water Victoria, 1989). The creek and its surrounding environs are covered by ESO1 which identifies the creek, along with a number of other waterways, as being significant and notes that 'waterbodies play an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'. Significant lengths of riparian zone have been, or are going to be, revegetated.	3
Amenirty	Recreation	Mount Emu Creek as it passes through the urban area of Skipton provides primarily a passive recreation resource. Stewart Park contains picnic facilities, pathways, and a platypus viewing platform.	2
	Landscape	Mount Emu Creek and its immediate environs are readily visible from a number of vantage points within the town. This is aided by the location of the town in a valley. Given the close proximity of the creek to the urban area and ready access to the creek, its landscape contribution is significant.	3
Cultural	Indigenous	It is highly likely that the creek played an important role in terms of Aboriginal cultural heritage, particularly with regard to it being a food source. Mount Emu Creek became an important water resource in the area during dry times, and Aboriginal populations would migrate from lake areas to the creek to utilise the water (Mc Niven, 1998).	2
	European	Skipton is an historically signficant town. There are a number of buildings and trees listed on the National Trust Register, the Register of the National Estate and the Victorian Heritage Register, for example, the Courthouse Livington Street is listed and has frontage to the creek. In this sense the creek's heritage significance may be associated with its role within the town generally. The creek has important cultural associations for the local and broader communities. For example, Stewart Park represents a significant community resource. Funding was recently sourced to construct a viewing platform for platypus. In addition, the intrinsic value of the creek to the local community is significant, particularly in terms of its role as a natural resource within close proximity to the town.	2
Stormwater	Conveyance	Mount Emu Creek is an important part of the local drainage system. The town's urban area drains directly to the creek. As the town develops, the creek's importance to the drainage system will increase. Mount Emu Creek is one of the major tributaries of the Hopkins River Basin, the creek drains the east area of the Basin. Nearly half of the mean annual flow of the Hopkins River is contributed to by the creek.	3
	Water Treatment	The creek and its tributaries have no known water treatment function.	1
Economic	Property & Tourism	Mount Emu Creek provides an important natural feature within the town. Stewart Park represents a tourism feature, particularly in terms of its natural values (ie. Platypus habitat). The creek is generally buffered from the surrounding residential areas by a vegetated area, therefore it's impact on property values would be minimal and it is not considered to have significant tourism value.	2
	Extraction & Use	Water from the Mount Emu Creek is used by the eel farm.	3

Terang		VALUES	RATING
Environment	In-stream habitat	The Index of Stream Condition Assessment (ISC)1999 notes that the physical form (i.e. bed and bank stability) is moderate, as is water quality, however the diversity of macroinvertebrates present was high. Overall the reach was considered in poor condition (Victorian Water Resources Data Warehouse). Lake Terang and its surrounding environs are covered by Environmental Significance Overlay - Schedule 1 (ESO1) which identifies the creek, along with a number of other waterways as being 'significant waterbodies playing an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'.	2
	Riparian habitat	Assessment under the ISC shows the riparian zone of Mount Emu Creek downstream of Terang is in poor condition, scoring only 3/10 (Victorian Water Resources Data Warehouse). The lake and its surrounding environs are covered by ESO1 which identifies the creek, along with a number of other waterways as being 'significant waterbodies play an important part in the ecology of the Shire and need to be protected from inappropriate land use and development'.	2
Amenirty	Recreation	Pejark Drain itself is not a major focus for recreational activities (although the golf course is near the drain), however, the drain discharges to Mount Emu Creek, which provides a passive recreational resource for nature watching and walking. Lake Terang (dry) provides a central focus to the town's recreational activities and open space areas. There are a number of sporting facilities that utilise the lake area, including an equestrian club, bowling club, croquet and cricket oval.	3
	Landscape	Pejark drain does not contribute significantly to the landcape quality of the area, however Lake Terang (dry) represents a significant focus of the town's community facilities (e.g.sporting resources etc). The area may be the site of a wetland in the future.	3
Cultural	Indigenous	It is unlikely that Pejark Drain is of Aboriginal cultural heritage significance, however it is likely that both Lake Terang (dry) and Mount Emu Creek are of Aboriginal cutlural heritage significance. Mount Emu Creek became an important water resource in the area during dry times, and Aboriginal populations would migrate from lake areas to the creek to utilise the water (Mc Niven, 1998).	2
	European	Terang is an historically signficant town. There are a number of buildings and trees listed on the National Trust Register, the Register of the National Estate and on the Victorian Heritage Register. In this sense the waterways' heritage significance may be associated with their role within the town generally. Examples of items listed, include the Terang Railway Station, a number of significant trees and an urban conservation area within Terang is listed with the National Trust. In addition, the waterways are culturally significant as a passive and active recreational resource within close proximity to the town.	2
Stormwater	Conveyance	Pejark Drain, Mount Emu Creek and Lake Terang (dry) form part of the town's stormwater drainage system.	2
	Water Treatment	The creek and its tributaries have no known water treatment function.	1
Economic	Property & Tourism	Property values would be positively influenced by their proximity to the Lake and creek (to a lesser extent).	2
	Extraction & Use	There is no known extraction and use value associated with either the lake or creek.	1

Timboon		VALUES	RATING
Environment	In-stream habitat	Powers Creek immediately downstream of Timboon township provides valuable in-stream habitat, although within Timboon itself the creek has less in-stream habitat value. Powers Creek has 'degraded water quality due to elevated nutrients and turbidity due to wastewater effluent, industrial land use, urban stormwater, stock and agricultural drainage works' (CCMA, 2002).	3
	Riparian habitat	Powers Creek at Timboon has some important riparian habitat that is utilised by Yellow-bellied gliders. Although there are occasional remnant trees the vast majority of the riparian zone has been cleared for agricultural purposes and consists of introduced pasture species . The entire length of the creek and its immediate environs are identified under a Vegetation Protection Overlay (VPO1) of the Corangamite Planning Scheme.	4
Amenirty	Recreation	Powers Creek is easily accessible due to its proximity to the urban area of Timboon. There is currently an open space/reserve area along the creek edge which is used for passive recreation uses such as walking, BBQ's and picnics, and the rail trail provides another recreational opportunity. There is a walking trail through the reserve area.	3
	Landscape	The creek and its immediate environs provide an important landscape resource to the town. A number of recreation areas (ie. the pool, picnic grounds, reserves etc) have frontage to the Powers Creek	2
Cultural	Indigenous	It is likely that Powers Creek and Curdies River are of Aboriginal cutlural heritage significance.	2
	European	Timboon is an historically signficant town. There are a number of buildings and trees listed on the National Trust Register, the Register of the National Estate and the on the Victorian Heritage Register. In this sense the creeks' heritage significance may be associated with their role within the town generally. Examples of items listed include the Timboon Railway Reserve, Digneys Bridge and Trestle Railway Bridge. The creek has important cultural associations for the local and broader communities (e.g. the trestle bridge and the rail trail). For example, the reserve area along Powers Creek is run by a Committee of Management who have undertaken a number of activites along the creek. In addition, the intrinsic value of the creek to the local community is significant, particularly in terms of its role as a natural resource within close proximity to the town.	2
Stormwater	Conveyance	Powers Creek is the receiving waterway for a number of areas within Timboon, including residential areas, industrial land uses and commercial areas, as such it forms an important part of the local drainage system.	3
	Water Treatment	The creek and its tributaries have no known water treatment function.	1
Economic	Property & Tourism	Powers Creek provides an important natural feature within the town. The creek is generally buffered from the surrounding residential areas by a vegetated area. The rail trail and the golf course mean the creek has a role as a tourism resource.	3
	Extraction & Use	There is currently no extraction or use of Powers Creek or Port Campbell Creek.	1

Appendix D

THREATS

	CATCHMENTS											
THREATS	Camperdown	Cobden	Darlington	Derrinallum	Lismore	Noorat	Port Campbell	Princetown	Simpson	Skipton	Terang	Timboon
Residential	4	3	1	1	1	1	2	1	2	1	3	2
Industrial	4	3	1	2	2	2	1	0	2	3	3	3
Commercial	4	1	1	2	1	2	3	2	2	2	2	3
Major Roads	4	2	2	1	3	2	3	1	2	2	3	2
Land Development	1	2	1	1	1	1	4	2	1	3	1	3
Building Sites	2	2	2	2	2	2	3	2	2	2	2	2
Unstable Waterways	3	3	2	2	2	0	3	1	2	2	2	1
Flow Modification	3	2	1	1	3	1	2	1	2	1	3	1
Markets & events	2	2	2	2	2	2	2	2	2	2	2	2
Upstream Inflows	2	2	1	1	2	1	3	3	3	2	3	3
Open Space	2	2	1	2	2	1	2	1	1	2	2	3
Landfills etc	1	1	0	2	0	1	1	0	1	0	0	1
Septic & Sewer	1	1	3	3	3	4	2	2	1	3	2	1
Docks & Wharves	0	0	0	0	0	0	3	0	0	0	0	0
Pests	1	2	2	2	2	1	2	2	2	2	2	3
Rural Residential	2	2	2	1	2	2	1	1	1	2	2	2
Rural	1	3	1	2	1	1	3	3	3	2	3	3

Camperdown	THREATS	RATING
Residential	Camperdown is the primary population centre within the Shire, with a population of approximately 3,153 people (1996 census). A field survey indicates that the residential areas are generally clean, however there is still a potential source of contaminants associated with lawn clippings (green waste), vehicle deposits (sealed roads), dog faeces, washing cars and garden fertilizer application. Dumping of residential rubbish along the shoreline of Lake Colongulac is a problem (DNRE, 2002). Leaf litter from ornamental deciduous trees in residential areas impacts on waterways through increased nutrients. Overall the residential areas are not considered to present a significant threat to urban stormwater quality.	4
Industrial	There are a number of industrial areas within and surrounding the town. The disused Boblac Factory site is now used for a number of small industries, including a cheese making business, rural supplies business and is the location of the town's effluent treatment plant. There is an industral estate to the north of the town and to the west of the saleyards. This has a number of industries which may present a threat including a concrete products business, a number of small service industries and a stock feed factory. The Camperdown saleyards are located on the northside of the Camperdown Railway Station. The site includes a large hard stand truck parking area, cattle yards & a truck wash facility. There is potential for effuent to dishcharge to Medarook Creek during storm events. Effuent is currently pumped to a treatment plant and then spread onto farmland. Previously the treated effluent was being pumped to Lake Colongulac.The Council depot facility is located in Camperdown-Ballarat Road. Likely activities within this site include vehicle and machinery maintenance, fuel/chemical storage.	4
Commercial	Camperdown is the main commercial, industrial and administrative centre of the Shire. The town functions as a service centre for the only growing dairy district in Victoria (Camperdown Strategic Development Plan, December 2001). The commercial area is concentrated along either side of Manifold Street/Princes Highway. Whilst the commercial area appears to be generally clean, this is aided by the absence of outdoor dining facilities; and bins strategically placed along the street. There are also a number of car parks throughout the centre which present a potential source of grease, litter etc. Major car parking areas include at the rear of the IGA supermarket and along Manifold Street. Leaves from deciduous trees in the commercial area blocking side entry pits has been noted by Council as an issue, contributing to the anaerobic condition of Medarook Creek.	4
Major Roads	There are a number of major roads, including Princes Highway (Manifold Street) and Camperdown-Ballarat Road/Leura Street which pass through the town. These roads carry a substantial amount of traffic, including truck movements associated with the surrounding agricultural industry. Load spills associated with truck movements is not a significant issue. The larger trucks currently utilise the Caltex petrol station, parking both directly in front of the petrol station and across the road (within approximately 50 metres of the main stormwater outlet drain). There is evidence of litter (food wrappers, cigarette butts etc) on the grassed area where the trucks park and further afield where it is blown by prevailing winds. There is currently one small bin available for rubbish in this area, this regularly overflows. There is the potential for vehicle pollutants (e.g.grease, atmospheric deposits) to accumulate in this area. Given the amount and type of traffic using the roads, and the role of Camperdown as a 'stopover' town, major roads pose a potential risk to urban stormwater quality.	4
Land Development	The MSS notes that Camperdown has a significant residential and industrial land supply. 'With a declining population being a widespread issue within the Shire, consolidation and improvements to existing urban, commercial and industrial precincts is required, before any expansion of established precincts is considered. Camperdown at present has an urban land supply of approximately 200 years' (MSS, 1999). Council indicated that there is presently some pressure for one acre lots on the land located in the LDRZ, generally west of Bowen Street and south of Park Street. Given the current and projected lack of land development activity/pressure, this is not considered to present a significant to urban stormwater quality. Sensitive urban design and siting is becoming more important, with the community generally more aware of its application.	1
Building Sites	Similar issues to land development. There is minimal building activity taking place within the town. As such building sites and their associated threats are not considered to present a significant threat to urban stormwater quality in Camperdown. However it may become a threat in the future.	2

Unstable Waterways	There are three main stormwater outlets for Camperdown: near Greens Street & the railway line; near the Caltex petrol station; and opposite the entry to the saleyards. An inspection of each of these open drains indicates that they are all experincing some degree of erosion associated with flows and soil capability. It is likely that the instability of the drains receiving stormwater may present a source of contaminants.	3
Flow Modification	Stormwater drainage to Lake Colongulac is via three open earthern urban waterways. The Lake performs an important role as the receiver of stormwater from Camperdown's urban area.	3
Markets & events	Camperdown holds a number of regular markets and events throughout the year which may present a potential source of contaminants to urban stormwater (eg. litter, increased vehicular movements etc). Key activities include the Monthly Craft Markets (held along Mainfold Street), Heritage Market Day, the Vintage Motorsport Weekend, the Leura Festival, Artists in the Park (held in the Botanic Gardens) and the Agricultural Show. Whilst adressed under the 'Industrial' category, the Camperdown saleyards also presents a potential source of contaminants to urban stormwater. In addition, Camperdown also hosts a number of regular sporting events (for example, football, netball, etc).	2
Upstream Inflows	Camperdown is serviced by a combination of underground drains and open/swale drains. There is the potential for surrounding agricultural land uses (eg. Dairying, horse agistment, hobby farms) to present a source of upstream contaminants, particularly in areas that have open drains. Upstream inflows from agricultural areas may pose a threat to the waterways by introducing high levels of nutrients and sediment.	2
Open Space	There are a number of open space areas, including the open space area in the median strip along Manifold Street/Princes Highway and the Botanical Gardens. There are also a range of more formal open space areas including the football ground, cricket ground, netball courts, tennis and basketball courts. 'Parks and gardens are a feature of Camperdown. There are many tree-lined streets ...' (Camperdown Strategic Development Plan, December 2001). Council currently mows and manages the gardens, disposing of greenwaste. Council indicated that the street tree leaves present a seasonal issue (blocking drains) for which a targeted management campaign (including additional sweeping and cleaning) is in place.	2
Landfills etc	Camperdown is serviced by a centralised landfill facility at nearby Naroghid. The transfer station is located outside of the urban area of Camperdown. A disused landfill is located on the Princes Highway outside of town to the east.	1
Septic & Sewer	All properties within the study area of Camperdown are connected to reticulated sewerage. There is some evidence of pipes cracking and possible cross contamination of the stormwater and sewerage systems. The sewerage system is currently being upgraded. Council indicated that there may be illegal stormwater connections to sewerage. The current stormwater system is old and cracking.	1
Docks & Wharves	Not relevant to this town.	0
Pests	Weeds, both agricultural and environmental, are a problem throughout the Shire, particularly along waterways where dispersal is helped by the flow. Key pest types include aram lily and desert ash, environmental weeds that can cause blockage of the drainage system. Boxthorn provides habitat for rabbits which are contributing to localised soil erosion on the banks of Lake Colongulac (DNRE, 2002).	1
Rural Residential	Overall the town has experienced little pressure for rural residential development. There is land to the west, east and north of town that is zoned Low Density Residential (LDRZ) which has a minimum lot size of 4000 square metres. Council indicated that there has been some pressure for development in these areas for 1 acre lots. There are rural residential properties surrounding the periphery of town that are serviced by septic systems which may present a potential contamination source. Similarly, horse and cattle agistment on these properties may also present a potential threat to urban stormwater quality.	2
Rural	The stormwater exits the town via three open earthen urban waterways which pass through agricultural land (primarily dairy). There is the potential that as water flows towards the lake it may pick up contaminants (nutrients, fertiliser etc) associated with agricultural land use either side of the stormwater drainage channel. Given the nature of the drainage system and proximity to agricultural land uses, it is likely that this may present a source of contaminants to stormwater from the town before it reaches the lake.	1

Cobden	THREATS	RATING
Residential	Cobden is the third largest town in the Shire. The town has a population of 1,408 (8.3% of the Shire in 1996) (Cobden Strategic Development Plan, December 2001). Residential land use is set out in a grid pattern, characterised by wide tree lined streets. The town is serviced by a reticulated water and sewerage scheme and is supplied with natural gas. Field surveys indicate that the residential areas are generally clean, however there is still a potential source of contaminants associated with lawn clippings, vehicle deposits (sealed roads), dog faeces, washing cars and garden fertilizer application.	3
Industrial	The town has a number of industries which are primarily focused around servicing the surrounding agricultural activities. Major industies include the Bonlac Dairy Foods factory for the production of dry milk powder for UHT milk, which is one of the largest dairy factories in the southern hemisphere. There is also Ausfeed which produces stockfeed. There are a number of smaller 'light' industries including the Shell petrol station, Tyrepower, CFA complex etc. An industrial estate has recently been developed by Council in Clarke Street, opposite the Bonlac Factory. The estate has approximately 15 lots. Given the size (potential future industrial development) and concentration of industry within the town, the industrial areas present a potential threat in terms of spills, truck movements, storage of chemicals etc to urban stormwater quality. Bonlac re-use all of their waste through discharging it to an on-site treatment plant and then irrigating their own land.	3
Commercial	The commercial area of town is concentrated around Lavers Hill-Cobden Road/Curdies Street. The commercial facilities include a range of convenience shops (e.g. supermarkets, general stores etc) and higher order retail & service businesses (e.g. clothing stores, antiques etc). The commercial areas of town appear to be generally clean and free of litter. The MSS notes the need to 'consolidate commercial development between Silvestor, Parrot, Walker and Adam Streets with the focus on Curdie and Victoria Streets between Walker and Victoria Steets'. Overall, given the mix of businesses in the commercial area and their management, this land use type is not considered to present a significant threat to urban stormwater quality.	1
Major Roads	The major roads running through these towns are limited, they include: Camperdown-Cobden Street/Nelyon Street and Lavers Hill Road/Curdies Street. The roads are serviced by a combination of kerb & channel and open swale drains. They carry a range of traffic types including, trucks and cars. The road and their immediate surrounds appear to be generally free of litter. A potential 'hotpsot' area may be along Camperdown-Cobden Road, where it crosses Cobden Creek near Cobden Lake.	2
Land Development	There is limited (if any) land development taking place within the town. The town has extensive areas zoned for residential development with a land supply of approximately 255 years (Cobden Strategic Development Plan, December 2001). Land development is not considered to present an immediate or future significant threat to urban stormwater quality. The MSS notes future plans 'to further extend Apex Park'.	2
Building Sites	In keeping within the lack of land development taking place within the town, there is minimal (if any) building activity. Therefore building activity does not currently/potentially affect urban stormwater quality.	2
Unstable Waterways	The CCMA Draft Waterway Health Strategy notes that some sections of the Curdies River and its tributaries are experiencing erosion and degradation.	3
Flow Modification	Cobden Lake and Cobden Creek perform an important role as the receiving waterways for stormwater.	2
Markets & events	There are no markets within Cobden (ie. saleyards, fresh produce market etc). Occasionally the town will host shows or festivals. however, it is not considered that these would present a significant threat due to their small scale and infrequency. There are a number of annual events held within the town, including the Cobden Arts Show which is held at the Cobden Masonic Lodge Hall, the Cobden Spring Festival which is organised by the Cobden Chamber of Commerce and the New Years Eve Celebration which is held at various sites in Cobden. Cobden hosts a number of regular sporting events throughout the year.	2

Upstream Inflows	The surrounding areas upstream of the town include a range of agricultural activities, in particular the dairy industry. These are likely to present a source of increased nutrients into the waterways and sedimentation, respectively.	2
Open Space	The town has a range of formal and informal open space areas, including Cobden Golf Club (9 hole golf course) which the Cobden Creek flows through; and Cobden Lake (Rotary Park) which was developed by the community in 1872. Cobden Lake has been identified by the community and Council as a significant stormwater 'hotspot', particularly in terms of accumulating litter and leaf matter in the lake. The park provides a setting for picnics, BBQ's and other passive recreational activities. Tandarook Botanical Park, which was developed by the community at the site of an old rubbish tip, provides a recreation resource for picnics, BBQs and public amenities. The old Cobden racecourse development is noted in the Cobden Strategic Development Plan as a 'major recreational and tourism attraction'. The complex has facilities including the Cobden Miniature Railway, Cobden Pioneer Dairy Park, a go-cart track, a BMX track and an 18-hole minigolf course. The concentration and type of open sapce areas and their proximity to the waterways present a potential threat.	2
Landfills etc	The disused landfill at the site of the Tandarook Botanical Park has a clay cap but not a clay liner and is not monitored.	1
Septic & Sewer	Cobden is serviced by reticulated sewerage. There are no known issues related to the sewerage system.	1
Docks & wharves	Not relevant to this town.	0
Pests	Weeds, both agricultural and environmental, are a problem throughout the Shire, particularly along waterways where dispersal is helped by the flow. A significant length of the Cudies River experiences willow problems and is listed as a medium priority for willow removal works by the CCMA (CCMA, 2000). Blackberries are also a problem along the Curdies River and Cobden Creek.	2
Rural Residential	Surrounding the perimeter of the town are some rural residential properties which typically have a house, gravel driveway, animals (horses, sheep, cows etc). These properties present a potential source of contaminants, particularly in terms of their septic systems, animal litter, property maintenance (eg. mowing, fertilisers etc).	2
Rural	The area surrounding the town is rural. Issues typically associated with rural areas (such as nutrients, fertilisers, etc) may present a potential source of contaminants. As the size of the rural catchment draining to the Curdies River is substantial and the agricultural activities quite intensive, there is a greater risk to the waterways from rural land use runoff.	3

Darlington	THREATS	RATING
Residential	Darlington has a small population and whilst the residential areas appear to be in a generally good state, there is still a potential source for lawn clippings, vehicle deposits (sealed roads), dog faeces, washing cars and garden fertilizer application. The MSS notes that Council seeks to 'promote and support a compact urban form, which fully utilises existing and peripheral vacant residential areas ... and that it wants to limit future urban development to low density residential development and promote a compact town form for new residential development'.	1
Industrial	There is no industrial land uses within Darlington, with the exception of the CFA facility and speedway.	1
Commercial	Darlington contains a limited amount of commercial land use. Council indicated that stormwater from Mount Elephant Hotel, which is located near Mount Emu Creek, flows directly into the creek.	1
Major Roads	There are no major roads, stopping areas or service stations near Darlington.	2
Land Development	There is currently minimal pressure for land development within the town.	1
Building Sites	There is currently minimal building activity taking place within the town.	2
Unstable Waterways	This area is noted for its unstable soils (Wastewater Strategy 2001)	2
Flow Modification	Flow modification is not considered to be a significant issue.	1
Markets & events	There are no markets within this catchment.	2
Upstream Inflows	Upstream inflows from agricultural areas may pose a threat to the waterway by introducing high levels of nutrients and sediment.	1
Open Space	There is an open space/recreation area to the north of town which may present a potential source of contaminants in terms of litter.	1
Landfills etc	No landfills within this town.	0
Septic & Sewer	Darlington is not serviced by a reticulated sewerage system or stormwater system. Therefore septic systems (aging) and grey water represent a significant threat to urban stormwater quality.	3
Docks & Wharves	Not relevant to this town.	0
Pests	Weeds, both agricultural and environmental, are a problem throughout the Shire, particularly along waterways where dispersal is helped by the flow.	2
Rural Residential	There are rural residential properties surrounding the town, which may present a potential source of contaminants.	2
Rural	The area surrounding the town is rural. Issues typically associated with rural areas (such as nutrients, fertilisers, etc) may present a potential source of contaminants.	1

Derrinallum	THREATS	RATING
Residential	Derrinallum has a small population of approximately 265 people (1.6% of the Shire's population). Whilst the residential areas appear to be in a generally good state, there is still a potential source for lawn clippings, vehicle deposits (sealed roads), dog faeces, washing cars and garden fertilizer application. The MSS notes that Council seeks to 'promote and support a compact urban form, which fully utilises existing and peripheral vacant residdenital areas ... infill residential development to be encouraged on vacant land within teh town boundaries, with vacant land to the west of town, adjacent to the Hamilton Highway to be retained for future residential use'.	1
Industrial	There are minimal industrial land uses in Derrinallum. Industries that are present in town service the surrounding agricultural industry (e.g. Morrison Brothers All Produce, which stocks agricultural chemicals, stock feed etc). There are no manufacturing industries within the town. There is no industrial zone in the town, however there is a VicRoads depot which is the base for numerous contractural works (e.g. railways and Telstra staff)	2
Commercial	The town has a small retail sector on the Main Street service road running parallel to the Hamilton Highway. The commercial area is typical of similar towns, with convenience type retail outlets.	2
Major Roads	Hamilton Highway (Main Street) passes through the centre of the town's urban area.	1
Land Development	The MSS notes that the town 'has an urban land supply of approximately 400 years, with an average of 1 building permit being issued for a dwelling over the last 6 years.' There is currently no land development taking place, with minimal development predicted to take place in the near future.	1
Building Sites	In keeping with the limited (if any) land development activity within the town, there is no building activity taking place within the town.	2
Unstable Waterways	Lake Tooliarook experiences some erosion, however it is generally stable. Stormwater is piped to Lake Tooliarook	2
Flow Modification	The creek has not been modified to collect stormwater flows.	1
Markets & events	There are no markets held within the town. With regard to events, there are a number of sporting activities, a range of activities at Mount Elephant, for example the annual Volcanic Bonfires event held during October on mountains across the region and the Music on the Mount concert is held on Mount Elephant. The concert attracts aprpoximately 600 people from across the district.	2
Upstream Inflows	Upstream inflows from agricultural areas may pose a threat to the lake by introducing high levels of nutrients and sediment.	1
Open Space	There are a number of formal and informal open space areas within the town (e.g. the football oval, netball courts, tennis courts, Derrinallum P-12 College, bowling club, and a recreation park etc). There is evidence of litter sourced from the college entering stormwater drains and accumulating on neighbouring properties. A field inspection indicates that the litter is primarily plastics, bottles and food packaging.	2
Landfills etc	The town has its own waste transfer station.	2
Septic & Sewer	The town is not serviced by a reticulated sewerage system. Septic systems are aging within the town and may present a potential source of contaminants. There is also evidence of grey water issues present in the town.	3
Docks & Wharves	Not relevant within this town.	0
Pests	Weeds, both agricultural and environmental, are a problem throughout the Shire, particularly along waterways where dispersal is helped by the flow.	2
Rural Residential	Derrinullum has a number of rural residential properties surrounding the town which may present a potential source of contaminants.	1
Rural	Blue-green algal blooms in Lake Toolirook - probably associated with increased nutrient loads from surrounding rural properties.	2

Lismore	THREATS	RATING
Residential	Lismore has a small population of approximately 323 people (Lismore Strategic Development Plan, April 2001). There is no reticulated sewerage infrastructure. During the field inspections there was evidence of residential grey water entering the stormwater system. In addition to the problem of grey water contamination, residential areas are a potential source of lawn clippings, vehicle deposits (sealed roads), dog faeces, washing cars and garden fertilizer application. Residential areas area considered to represent a potential source of contaminants. Dumping of residential rubbish along the shoreline of Lake Gnarpurt is a problem (DNRE, 2002).	1
Industrial	Lismore has a small industrial estate located on the western edge of town, typically containing rural service industries. Industries include Remco Wool Exports, J&D Autos and two petrol stations. These areas appear to be in good order and present minimal potential threat to urban stormwater quality.	2
Commercial	Lismore provides a service centre role to the surrounding hinterland (including Derrinallum). The township contains important community health services. The town's small commercial and retail sector is located on either side of High Street (Hamilton Highway). The southern side of the highway includes a local service road. Other small businesses are located in Heriot Street. Examples of typical businesses within the town include the Blue Yabbie Cafe, antiques store, Woolrack Store and Lismore Hotel. The commercial areas appear to be clean and generally free of litter. The town provides a 'stop-over' point for tourist/through traffic. Overall, the commercial areas of Lismore are not considered to present a significant threat to urban stormwater quality.	1
Major Roads	The major road through Lismore is the Hamilton Highway (High Street), with the Camperdown-Lismore Road entering the township from the south. Hamilton Highway carries truck traffic, particularly associated with the surrounding agricultural industry. Whilst truck spillages were not noted as occuring (although 2-3 truck accidents have occured above Browns Waterholes), there is still the potential for this given the volumes of traffic moving through the town and the role of Lismore as a stopover point for through traffic.	3
Land Development	There is minimal (if any) land development activity taking place within the town. The land supply for housing is approximately 345 years (Lismore Strategic Development Plan, April 2001). Therefore, land development activity is not considered to present a significant threat to urban stormwater quality.	1
Building Sites	In keeping with the lack of land development activity, building activity is not considered to be a significant issue. For example, there has been an average of only three building permits issued per year over the last six years. (Lismore Strategic Development Plan, April 2001)	2
Unstable Waterways	Browns Waterholes appear to be generally stable, this is aided by the fencing off of the waterholes from stock access. Mundy Gully Creek, near its discharge point to Lake Gnarpurt, is listed as a high priority area for bed and bank stabilisation works (CCMA, 2000).	2
Flow Modification	Lismore's urban stormwater is collected via a combination of open swale and piped stormwater drains and discharged at two points into Browns Waterholes. This concentrated discharge of high volumes of water has an impact on the chain-of-ponds system, which is generally receives smaller volumes at a slower rate. The creek has not been modified to accommodate the stormwater flows. As a result of drainage works, Lake Gnarpurt has an artificially lowered outlet, reducing its natural water level (DNRE, 2002).	3

Markets & events	There are no markets held within the town. Key events include the Coffee Stop Weekends which are coordinated by the Lismore Lions Club on public holidays and long weekends, the Classic Motor Cycle Championships, which is an annual two day event held at the old showgrounds, and the Lismore Rodeo. The event attracts many visitors. Given the periodic increase in visitors to the town for the events, there may be a period where threats to urban stormwater are increased (ie. litter, mechnical repairs associated with the motorcycles, land degradation associated with the bike activities etc). Lismore hosts a number a number of regular sporting events throughout the year.	2
Upstream Inflows	The surrounding area upstream of Lismore includes a range of agricultural activities (e.g. grazing, diary, sheep etc) and timber production (logging and sawmilling by the Bradvale company). These are likely to present a source of increased nutrients into the waterways and sedimentation, respectively. In 1999 Lake Gnarpurt experienced an algal bloom, resulting in significant damage to the eel industry (DNRE, 2002).	2
Open Space	The town contains a number of formal and informal open space areas, including the Grimwade Park recreation area, which is located on the eastern edge of town adjacent to Brown's Waterholes, and the public swimming pool. The park includes a play ground, historic farm machinery & steam train, a picnic area & a scenic walk along boardwalks parallel to the waterholes. Other open space areas include the Lismore Community Centre and sportsground (football, netball, cricket, squash etc), swimming pool, 9-hole golf course located near the old town reservoir (the golf course drains to the reservoir), caravan park and bowling greens. Given the close proximity of Grimwade Park to the creek and the concentration of activities in this area, they may present a potential threat to urban stormwater quality.	2
Landfills etc	Not relevant to this town.	0
Septic & Sewer	There is no reticulated sewerage infrastructure within this town. During the field inspections, grey water discharge was noted at a number of locations within the town.	3
Docks & Wharves	Not relevant to this town.	0
Pests	Weeds, both agricultural and environmental, are a problem throughout the Shire, particularly along waterways where dispersal is helped by the flow. There are number of weed species found along drainage lines/road reserves (e.g. nut grass, buffalo grass, Cuicui, Phlaris and desert ash). Animal pests include foxes and rabbits. Pest plants, such as Boxthorn, provide habitat for rabbits which are causing localised erosion on the banks of Lake Gnarpurt (DNRE, 2002).	2
Rural Residential	Lismore's urban area is surrounded by a combination of rural and rural residential properties. These properties may present a potential source of contaminants.	2
Rural	The area surrounding the town is rural. Issues typically associated with rural areas (such as nutrients, fertilisers, etc) may present a potential source of contaminants.	1

Noorat	THREATS	RATING
Residential	Noorat has a small population of approximately 249 people (1.5% of the Shire's population). Whilst the residential areas appear to be in generally good state, they are still a potential pollutant source for lawn clippings, vehicle deposits (sealed roads), dog faeces, washing cars and garden fertilizer application. The MSS notes that Council seeks to 'promote and support a compact urban form, which fully utilises existing and peripheral vacant residential areas' and that it wants to 'limit future urban development to low density residential development and promote a compact town form for new residential development'.	1
Industrial	Noorat has limited commercial services. Mount Noorat Freighters and a scoria quarry are the biggest industries in town. The main industries are located in nearby Terang. There is the Nationwide Artificial Breeders facility at the old butter factory which sells primarily rural supplies. It stocks fertilisers, chemicals and has a bulk petrol store facility. Molan's gravel quarry is located within close proximity to the township.	2
Commercial	Noorat has limited commercial services. The main retail services are located in nearby Terang. The commercial area comprises facilities typical of many small towns in the area. Typical facilties include the hotel, post office, general store and petrol station.	2
Major Roads	There are a number of roads that pass through the town, including Terang-Mortlake Road, Glenmormiston Road, McKinnons Bridge - Noorat Road and The Sisters-Noorat Road (Framlingham Road). These roads do not appear to carry significant volumes of traffic. Therefore they do not present a significant threat to urban stormwater quality.	2
Land Development	There is limited land available for housing development, mainly because vacant land within the township is not for sale (Noorat Strategic Development Plan, December 2001). The Plan also notes that 'the proximity of Noorat to Terang is also giving rise to pressure for subdivision and development between the two towns'.	1
Building Sites	Whilst there is demand for residential land development, due to the lack of residential land available on the market, building site activity has been traditionally very limited.	2
Unstable Waterways	Not relevant to this town, stormwater drains to scoria drain within school ground.	0
Flow Modification	Flow modification is not considered to be a significant issue.	1
Markets & events	Noorat hosts a number of recreation activities at the Recreation Reserve. Other key community events include the Noorat Show (which attracts approximately 4000 people); Noorat Dog Show; Fun, Food and Fitness Festival; Noorat Christmas Carols; and the Noorat Spring Fair. These events may pose a threat to stormwater quality.	2
Upstream Inflows	Upstream inflows from agricultural areas may pose a threat to the waterway by introducing high levels of nutrients and sediment.	1
Open Space	There are small areas of passive open space within the town, however none would pose a significant threat to stormwater quality.	1
Landfills etc	There is a rehabilitated landfill north of the town.	1
Septic & Sewer	Noorat does not currently have reticulated sewerage.	4
Docks & Wharves	Not relevant to this town.	0
Pests	Weeds, both agricultural and environmental, are a problem throughout the Shire, particularly along waterways where dispersal is helped by the flow.	1
Rural Residential	There are some areas of rural residential development around the periphery of the town which may present a potential source of contaminants(e.g. animal keeping).	2
Rural	The area surrounding the town is rural. Issues typically associated with rural areas (such as nutrients, fertilisers, etc) may present a potential source of contaminants.	1

Port Campbell	THREATS	RATING
Residential	Port Campbell has a small population of 281 people (MSS, 1999). The residential zoned areas are serviced by reticulated water, sewerage and drainage. Whilst the residential areas appear to be in generally good state, they are still a potential source of pollutants in the form of lawn clippings, vehicle deposits (sealed roads), dog faeces, washing cars and garden fertilizer application. The MSS notes that Council seeks to 'consolidate urban development within the existing urban boundary to maximise the efficient use of existing water, sewerage and drainage infrastructure and to promote a compact town form of residential use and development based on the existing grid pattern'.	2
Industrial	There is no industrial activity within Port Campbell.	1
Commercial	The commercial area of Port Campbell is focused along Lord Street, between Morris and south of Cairns Street. The commercial area includes a range of retail outlets, for example a supermarket, pharmacy, a number of restaurants/cafes, clothing/tourist stores, motels and other accommodation facilities (backpackers, camping ground). A number of the restaurants provide outdoor dining facilities. The field inspection indicates that the commercial areas are generally clean. Port Campbell provides an important tourist facility, particularly in terms of tourist accommodation, weekender accommodation and holiday houses. As such during the peak holiday seasons, the commercial area would experience increased pressures, particularly in terms of car parking, dining and accommodation and therefore the potential for increased litter and contaminants entering the waterways.	3
Major Roads	The major road passing through the town is the Great Ocean Road (Lord Street). This road would experience significant pressures during the holiday season.	3
Land Development	The MSS notes that 'Port Campbell is the only settlement that is experiencing population growth and future residential growth needs to be carefully managed to ensure that it does not encroach on the towns landscape setting and tourist appeal'. The MSS also notes the need 'to minimise stormwater impacts from urban development'.	4
Building Sites	Building activity will be associated with land development activity within the town, and infill development. During the field inspection, building activity was taking place along Lord Street, near the Southern Ocean Motor Inn. There was evidence of spoil (soil, gravel etc) accumulating on the road, either from being washed off during periods of high rain fall or from vehicles entering and exiting the site. Given the topography and nature of the soils in the area, contamination of stormwater associated with building sites represents a potentially significant issue. At the time of the field inspections, litter trap infrastructure and landscaping works had recently been undertaken within close proximity to the beach, resulting in significant amounts of earth works. This type of activity close to the waterways presents a potential source of contaminants.	3
Unstable Waterways	Landslips occur in this area, which may contribute to increased sediments and nutrients entering the creek, similarly stock access to the waterways is a further threat.	3
Flow Modification	There have been no flow modifications to the creek.	2
Markets & events	Port Campbell hosts the Back to Point Surf Competition on Easter Weekend, a treasure hunt on the Australia day weekend, and also has regular markets along Lord Street over summer, which have the potential to impact on waterways through increased traffic volumes and possibly through poor waste management. There are also Parks Victorian Interpretation activities and Coast Action programs over summer, which are not expected to impact on the waterways.	2
Upstream Inflows	Upstream inflows from agricultural areas may pose a threat to the waterway by introducing high levels of nutrients and sediment.	3
Open Space	There are open space areas fronting onto the Port Campbell forehsore area. These areas consist generally of large expanses of grassed area, with picnic facilities. There is also a caravan park which has frontage to Port Campbell Creek.	2

Landfills etc	There is a transfer station, that was previously a landfill, located near the new water tank at the top of town. The site is not monitored as it was closed before the EPA rquirements for monitoring were in place.	1
Septic & Sewer	Port Campbell has both reticulated sewerage and stormwater. There are no known issues associated with the sewer system. A small number of blocks within town are on septic systems.	2
Docks & Wharves	There is a wharf within the bay from which commercial abalone, crayfish, fishing charters and scenic tours operate. The boats are lowered into the Southern Ocean by a crane. The wharf is also used for recreational fishing.	3
Pests	Weeds, both agricultural and environmental, are a problem throughout the Shire, particularly along waterways where dispersal is helped by the flow.	2
Rural Residential	There are some rural residential properties surrounding Port Campbell, however these are unlikely to present a significant threat.	1
Rural	The area surrounding Port Campbell is national park, however there are also rural areas, generally used for dairy. This represents a potential source of contaminants interms of upstream inflows.	3

Princetown	THREATS	RATING
Residential	Princetown has a small population of approximately 20 people residing permanantly in the town (Princetown Strategic Development Plan, April 2001). The Princetown Strategic Development Plan notes that residents in the town are either permanent residents, non-resident property owners who come to Princetown during weekends and holidays, or the adjacent farming community that uses the town as a service and social centre. Given the small amount of residential land use within and surrounding the town, residential land use is not considered to present a significant threat.	1
Industrial	There is no industrial land use within the town.	0
Commercial	The town has a very small commercial sector that provides services for the local community and tourists. Retail premises include a general store and the Talk of the Town Restaurant (provides restaurant, bar, takeaway food and cabin accommodation). There is a small gravel car parking area outside these premises.	2
Major Roads	There are no major roads passing through Princetown's 'urban' area.	1
Land Development	There is no land development taking place within Princetown, and there is unlikely to be any pressure for land development in the near future. 'Many allotments are vacant and some are unsuitable for development because they are either on flood prone land or are close to the wetlands and Gellibrand River and may have a negative impact on water quality and riparian vegetation if development were to occur' (Princetown Strategic Development Plan, April 2001). Similarly 'allotments to the west of Latrobe Creek, abutting Port Campbell National Park, are generally unsuitable for development becuase they are not supported by infrastructure and the land is environmentally sensitive coastal dune system.' The current size of many blocks is unsustainable for septic systems.	2
Building Sites	In keeping with the absence of land development, there was no building activity noted at the time of visiting the town, and is is considered unlikely that there will be pressure for future building activity.	2
Unstable Waterways	The area close to the coast does experience landslips. Similarly stock access to waterways can result in the instability of waterways.	1
Flow Modification	Not considered to be a significant issue.	1
Markets & events	There are 'no celebratory community events' within the town' (Princetown Strategic Development Plan, April 2001)	2
Upstream Inflows	Domestic cattle enter the Park in a number of areas where fences have not been erected or adequately maintained' (DNRE, June 1996). Given the proximity of the town to rural areas it is highly likely that nutrients associated with agircultural land uses are entering the waterways. Some upstream townships are unsewered and may impact on waterways, as may logging activities upstream.	3
Open Space	There is a recreation reserve on the eastern site of the Gellibrand River, which is the sole community facility in Princetown.	1
Landfills etc	There is no landfill within the town.	0
Septic & Sewer	There are approximately 10 to 12 buildings in the town. The buildings have septic sewerage systems and a bore at the recreation reserve provides water to some households.	2
Docks & Wharves	Not relevant to this town.	0
Pests	Weeds, both agricultural and environmental, are a problem throughout the Shire, particularly along waterways where dispersal is helped by the flow. There are a number of plant pests affecting the river and waterways. Widespread weeds include Blackberry and Ragwort, which are subject to annual control works. Other environmental weeds include Coast Tea-tree and Coast Wattle, and other isolated occurrences such as Candle Plant and Buffalo Grass'(DNRE, June 1996). Animal pests include Brown Trout, foxes, rabbits and cats.	2
Rural Residential	There are some rural residential properties surrounding the periphery of the town. These may present a threat in terms of animal deposition and septic tanks.	1
Rural	Domestic cattle enter the Park in a number of areas where fences have not been erected or adequately maintained (DNRE, June1996). Given the proximity of the town to rural areas it is highly likely that nutrients associated with agircultural land uses are entering the waterways.	3

Simpson	THREATS	RATING
Residential	Simpson has a small population of approximately 250-300 people. Demographic census data is not readily available for the area (Simpson Strategic Development Plan, December 2001). Simpson is a very young town, being established in the 1960's and 1970's. Most of the roads within the town are bitumen and kerb and channel. Whilst the residential areas appear to be in generally good state, they are still a potential source of pollutants such as lawn clippings, vehicle deposits (sealed roads), dog faeces, washing cars and garden fertilizer application.	2
Industrial	There is a small industrial estate located on the northern outskirts of town, which is occupied by rural service and processing industries. 'Simpson has approximately twelve established businesses in town, some servicing the agricultural industry for example, a dairy processing plant (which has its own waste water system) and stock food processer' (Simpson Strategic Development Plan, December 2001). There is also a petrol station.	2
Commercial	The commercial area of Simpson is concentrated around Gondain Street. Typical businesses include two hardware stores, two takeaway stores, a supermarket, a hotel/motel and backpackers accommodation.	2
Major Roads	The major road passing through the town is the Lavers Hill-Cobden Road. Most of the roads within the town are bitumen and kerb and channel.	2
Land Development	There is currently minimal (if any) land development taking place within Simpson. Simpson has 'ample toom for future housing development with an urban land supply in excess of 150 years' (Simpson Strategic Development Plan, December 2001).	1
Building Sites	There is currently no building activity taking place within the town.	2
Unstable Waterways	Agricultural activities occurring at the waters edge may potentially destabilise waterways.	2
Flow Modification	Storage Dam is the primary receiving waterway for stormwater.	2
Markets & events	There are no markets within the town, however football matches are a large event and may impact on the waterways (e.g. litter, cars etc).	2
Upstream Inflows	Upstream inflows from agricultural areas may pose a threat to the receiving waterways by introducing high levels of nutrients and sediment.	3
Open Space	There are a number of open space areas including Heytesbury Historic Park and the recreation reserve. These are unlikley to present a significant threat to urban stormwater.	1
Landfills etc	There is an old landfill approximately 2km south of the town which is now the site of a new transfer station. No monitoring of the old landfill site is taking place.	1
Septic & Sewer	The town has a sewerage system and reticulated water supply.	1
Docks & Wharves	Not relevant to this town.	0
Pests	Weeds, both agricultural and environmental, are a problem throughout the Shire, particularly along waterways where dispersal is helped by the flow.	2
Rural Residential	There are some rural residential properties which may pose a minimal threat to stormwater quality.	1
Rural	The area surrounding the town is rural. Issues typically associated with rural areas (such as nutrients, fertilisers, etc) may present a potential source of contaminants.	3

Skipton	THREATS	RATING
Residential	Skipton has a small population of approximately 453 people or 2.7% of the Shire (Skipton Strategic Development Plan, December 2001). Whilst the residential areas appear to be in a generally good state, they are still a potential source of pollutants such as lawn clippings, vehicle deposits (sealed roads), dog faeces, washing cars and garden fertilizer application. A number of streets in Skipton are not sealed which may contribute runoff (gravel etc) into the stormwater system.	1
Industrial	There is an eel factory located within close proximity to the creek. The factory processes a large amount of eel per year. There are a number of industries within the town including a BP petrol station, Pivot fertiliser and a number of agricultural related service industries. There is also a Council depot located near the corner of Curdie Vale Road and McLeod Street.	3
Commercial	The commercial area of Skipton is concentrated along Montgomery Street (Glenelg Highway). Typical commercial premises include general store, hotel and butcher. The commercial area appears to be generally free of litter and in good order.	2
Major Roads	The Glenelg Highway is the major road running through Skipton. This road carries a range of traffic, including truck traffic.	2
Land Development	Development in Skipton is limited by topographic and servicing constraints (Skipton Strategic Development Plan, December 2001). There is currently minimal land development taking place within the town, however there has been a recent increase in pressure for residential and rural residential development given its close proximity to Ballarat (40 minute drive away).	3
Building Sites	Similar issues to land development. There is likely to be future pressure for building activity in response to pressures associated with subdivision.	2
Unstable Waterways	Mount Emu Creek appears to be generally stable and is mostly fenced off from stock.	2
Flow Modification	There is minimal flow modification to Mount Emu Creek, although land clearing has led to an increase in the amount of water draining to the creek and in the intensity with which it enters the creek.	1
Markets & events	There are no markets held within Skipton. There are however a number of events, including the Skipton Music Hall Night which is an annual event; the Skipton Rose Festival which has been held since 1995; and Homestead Open Days. These events are not likely to present a significant threat to urban stormwater quality. Skipton hosts a number of regular sporting events through the year.	2
Upstream Inflows	Given the close proximity of the rural land uses to the town, it is likely that contaminants from agricultural land uses will be entering the creek upstream of the town.	2
Open Space	There are a number of formal and informal open space areas within Skipton, including Stewart Park which has pathways and picnic facilities.	2
Landfills etc	There is a closed landfill near the town that is not monitored.	0
Septic & Sewer	Houses currently have on-site effluent disposal system. An extensive investigation and associated consultation project has been undertaken by Central Highland Water. A modified coventional sewerage system will be installed in the town during 2002. The provision of new water and sewerage systems will meet the towns' current and future health and environmental needs as well as improve the development potential of the town.	3
Docks & Wharves	Not relevant within this town.	0
Pests	Weeds, both agricultural and environmental, are a problem throughout the Shire, particularly along waterways where dispersal is helped by the flow. Desert ash is prevalent along the waterway.	2
Rural Residential	Skipton has a number of rural residential properties surrounding the town. There is also land zoned LDRZ off Smythe Road.	2
Rural	The area surrounding the town is rural. Issues typically associated with rural areas (such as nutrients, fertilisers, etc) may present a potential source of contaminants.	2

Terang	THREATS	RATING
Residential	Terang is the secondary population centre within the Shire, with a population of approximately 1,867 people (1996 census). Residential land use and development is located to the north and west of the town centre following a traditional grid pattern. The field survey indicates that the residential areas are generally clean, however they still present a potential source of contaminants associated with lawn clippings, vehicle deposits (sealed roads), dog faeces, washing cars and garden fertilizer application.	3
Industrial	There are a number of industrial areas within and surrounding the town. The industrial area located on the corner of Depot & Peterborough Streets contains a number of industries that may present a potential threat to urban stormwater quality. Examples of such industries include Moloney's Produce (stockfeed & grain storage and distribution), Wallace Industries, Windmill Agricultural, John Deere, Bushman Tanks, Ridleys AgriProducers and McVilley's Supasound. Terang also has a timber treatment works facility, a number of petrol/service stations and related mechanical trades. The MSS notes that Council will 'encourage further industrial development at the industrial estate and along Peterborough Road' and 'provide the industrial estate as a key location for low impact industrial use and development.' Given the types of industries within the town, it is likely that they would present a threat to urban stormwater quality.	3
Commercial	The commercial area is concentrated along High Street, between Lyons and Strong Streets. 'There has been some small business decline over recent years, which is evident by the number of vacant shops in the retail sector' (Terang Strategic Development Plan, April 2001) This area is zoned Business 1. It includes a range of convenience and service related businesses, including two supermarkets, a chemist, a butcher, two hotels, a newsagency, computer sales etc. There are currently no outdoor dining facilities. There is an area along Princes Highway, on the east side of Dow Street, which is zoned Business 4. This area includes a number of support industries to agriculture, including stockpiling of rural supplies and garden supplies. Overall the commercial area of the town appears to be free of litter. The main potential sources of stormwater contanimants associated within the commercial area may be associated with cars parking areas (atmospheric deposits, oils, grease etc). Terang railway station maybe a source of litter.	2
Major Roads	There are a number of major roads passing through the town, including the Princes Highway (High Street) and Terang-Mortlake Road (Thomson Street). The roads' traffic loads appears to be primarily related to the surrounding agricultural industry and support businesses (ie. trucks). There is a substantial amount of through truck traffic, particularly along Princes Highway. During the field inspections, it was noted that Council are undertaking some road construction/maintenance activity within town. This type of road maintenance activity is a potential source of contaminants. Deciduous street trees in commercial areas may also may also pose a threat to waterways through inputs of nutrients.	3
Land Development	The MSS notes that 'Terang has a residential land supply of 16 years, however future development is limited due to inundation, landscape and servicing constraints'. There is currently little land development taking place within the township. With regard to the management of future urban development, the MSS notes that the 'preferred growth corridors for future urban development are to be infill residential development before allowing any further rezoning of land for residential development; residential development to the south o fthe railway line; low density residential development to the west of the town/Princes Highway; and vacant land to the east of the town to be retained for future residential use, subject to the supply of water and sewerage.' Whilst currently not a significant issue, any future land development will need to take into consideration the principles of best practice urban stormwater quality management.	1
Building Sites	In keeping with the current trend in land development, building activity is limited. There are future plans to further develop Lake Terang (dry), including pathways and recreation facilities. Once these development activities take place consideration will need to be given to management of sediment, erosion and litter.	2
Unstable Waterways	Pejark Drain has ongoing maintenance issues associated with pumping the drain.	2
Flow Modification	Lake Terang is currently being pumped. Pejark Drain is an open drain which receives stormwater from the northern area of the town which drains to Mount Emu Creek.	3

Markets & events	Terang hosts a number of activities and events, including the Annual Gala Evening, the New Year's Day Family Picnic Races; Terang Community Arts Show and the Terang Weekend. Some of these events may present a potential source of contaminants, particularly litter. The town also hosts a number of regular sporting events.	2
Upstream Inflows	Given the topography of the surrounding land of Terang, it is highly likely that upstream inflows associated with agricultural land use (for example, the dairy industry) may be entering the stormwater system.	3
Open Space	The MSS notes that Lake Terang provides an interesting open space area to the main commercial and retail centre. There are several informal and formal open space areas which are concentrated within the dry Lake Terang Basin. Community facilities clustered around the lake include the primary school, caravan park, swimming pool and a number of halls. Key sporting facilities include the recreation reserve, golf club, croquet facilities, playground & viewing platform, cricket & football oval, equestrian/pony club facilities, swimming pool and caravan park. There is also a walking track around the perimeter of the lake area. Community groups are undertaking a significant revegetation program within and surrounding the recreation area of Lake Terang. There is significant community interest in investigating the feasibility of returning flows to the lake and the creation of a wetland system. Council takes grass clippings to the Terang trotting track. Terang's school may present a potential source of litter. Pejark Drain does not provide a significant open space resource.	2
Landfills etc	There are no landfills within this town.	0
Septic & Sewer	The urban area of Terang is serviced by a reticulated sewerage system. The Terang sewerage treatment plant is located behind the industrial estate.	2
Docks & Wharves	Not relevant to this town.	0
Pests	Weeds, both agricultural and environmental, are a problem throughout the Shire, particularly along waterways where dispersal is helped by the flow.	2
Rural Residential	Surrounding the perimeter of the town are some rural residential properties which typically have a house, gravel driveway, animals (horse, sheep, cow etc) and would be on septic systems. These properties present a potential source of contaminants, particularly in terms of their septic systems, animal litter, property maintenance (eg. mowing, fertilisers etc).	2
Rural	The area surrounding the town is rural. Issues typically associated with rural areas (such as nutrients, fertilisers, etc) may present a potential source of contaminants.	3

Timboon	THREATS	RATING
Residential	Timboon has a small population of approximately 690 people or 4.1% of the Shire (Timboon Strategic Development Plan, April 2001). Whilst the residential areas appear to be in generally good state, they are still a potential source of pollutants from lawn clippings, vehicle deposits (sealed roads), dog faeces, washing cars and garden fertilizer application. Council indicated that there is some dumping of rubbish in and around Timboon, for example in bushland along Cowleys Creek Road. There are also several unmade roads in residential areas and there is a lack of properly formed stormwater system.	2
Industrial	Dairying and its various support industries (artificial breeders, milking machine providers and repairers and milk transporters) are the major industry in the district. The area is experiencing growth in the manufacturing industries, with the production and distribution of treated pine and other rural products. Examples of industries within and surrounding the town include, Pivot, Timboon Motorcycles, Flood Wash - Dairy Cleaning System etc. There is land zoned Industrial 1 in Bailey Street. Given the types of industries present in the town, it is considered a possibility that these areas may present a potential threat to urban stormwater quality. Timboon is also serviced by a sewerage treatment plant. There are also a number of industries setting up in residential areas (e.g. builders, plumbers, storage etc) which are strictly licensed.	3
Commercial	The town's commercial area is concentrated around Timboon-Curdie Vale Road. A large portion of the commercial area backs onto Powers Creek. Businesses within the commercial precinct are typical of many of the Shire's towns, including an IGA supermarket, bakery, takeaway shop, pharmacy, surf shop, Martin's Timber & Hardware etc. There is also construction taking place within the commercial area of three new retail stores (pharmacy, cafe/restauraunt & one vacant). It would appear that stormwater or grey water drains directly into Powers Creek which is located to the rear of the commercial properties. Given the concentration of commercial activity, within close proximity to Powers Creek and topographic nature of the town, the commercial areas present a potential threat to the quality of urban stormwater.	3
Major Roads	There are a number of roads that traverse the urban area of Timboon. These roads include the Timboon-Nullaware Road; the Timboon-Curdievale Road; and the Timboon-Port Campbell Road. These roads carry a range of traffic including truck traffic. (The Timboon Strategic Development Plan, (April 2001), notes the 'poor state of local roads is a major infrastructure issue for the community'.	2
Land Development	There is limited land development activity taking place within Timboon. Timboon has a residential land supply in excess of 210 years with an average of 6 houses being constructed per year. The number of private dwellings increased from 278 in 1981 to 325 in 1996. Approximately, 13.2% of these dwellings are vacant (Timboon Strategic Development Plan, April 2001).	3
Building Sites	There are three shops being constructed along the commercial strip. These activites are occuring within close proximity to Powers Creek. During the field inspections, it appeared that the site was being appropriately managed so as to minimise impact to the creek.	2
Unstable Waterways	Powers Creek appears to be relatively stable.	1
Flow Modification	Powers Creek has not been modified to manage in coming urban stormwater.	1
Markets & events	The Timboon Lions Club holds a Trash'n'Treasure market on the third weekend in November which attracts a wide range of people from across the district. There is also the Take a Bite of Corangamite food festival. These activities do not present a significant threat to urban stormwater quality given their infrequency and size. Football games are an event that may impact on waterways due to litter and traffic.	2
Upstream Inflows	Given the close proximity of Timboon to surrounding rural land uses, in particular dairy, it is highly likely that contamination is occuring of upstream inflows (eg. Nutrients, fertiliser, sediment etc).	3

Open Space	There are a number of formal and informal open space areas within the town, including a linear reserve that was formerly the Camperdown to Timboon railway line. There is also a recreation complex, swimming pool, tennis courts, golf course, children's playgrounds etc. Some of these open space areas are located within close proximity to the creek (for example, the swimming pool, the Timboon and District Memorial park). The MSS notes the Council intend to 'develop Powers Creek area in the centre of town as a pleasant parkland with park seats and creek improvements and provide a link from the flora and fauna reserve to the swimming pool, shops and railway.' There are also a number of schools with open space areas within the town. Given the proximity of open space areas (including car parking areas, the memorial park, swimming pool) to Powers Creek, there is an increased potential for contamination of the waterways.	3
Landfills etc	There is an old landfill site near the golf course 1.5km from town, across the road from the new transfer station. It is not currently monitored.	1
Septic & Sewer	New sewerage infrastructure has recently been installed by South West Water to reduce reliance on septic tanks.	1
Docks & Wharves	Not relevant within this town.	0
Pests	Weeds, both agricultural and environmental, are a problem throughout the Shire, particularly along waterways where dispersal is helped by the flow. The waterways are a hotspot for weeds such as willows and Cape Ivy.	3
Rural Residential	Timboon is surrounded by rural residential land uses which are a potential source of contaminants.	2
Rural	The area surrounding the town is rural. Issues typically associated with rural areas (such as nutrients, fertilisers, etc) may present a potential source of contaminants.	3

Appendix E

RISK ASSESSMENT

		Environment		Amenity		Cultural		Stormwater		Economic	
Camperdown	***Threat Rating***	**In-stream Habitat**	**Riparian Habitat**	**Recreation**	**Landscape**	**Indigenous Heritage**	**European Heritage**	**Conveyance**	**Water Treatment**	**Property & tourism**	**Extraction/Use**
Value Rating		*4*	*4*	*3*	*3*	*3*	*2*	*1*	*1*	*3*	*3*
Sensitivity		*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
Residential	*4*	48	32	36	24	12	8	12	12	24	24
Industrial	*4*	*4*	*2*	*3*	*3*	*1*	*1*	*3*	*4*	*3*	*4*
		64	32	36	36	12	8	12	16	36	48
Commercial	*4*	*2*	*2*	*2*	*3*	*1*	*1*	*3*	*2*	*2*	*2*
		32	32	24	36	12	8	12	8	24	24
Major Roads	*4*	*4*	*3*	*3*	*3*	*1*	*1*	*3*	*3*	*2*	*2*
		64	48	36	36	12	8	12	12	24	24
Land Development	*1*	*3*	*2*	*3*	*2*	*1*	*1*	*4*	*3*	*2*	*2*
		12	8	9	6	3	2	4	3	6	6
Building Sites	*2*	*3*	*2*	*3*	*3*	*1*	*1*	*3*	*3*	*2*	*2*
		24	16	18	18	6	4	6	6	12	12
Unstable Waterways	*3*	*3*	*2*	*3*	*4*	*2*	*2*	*3*	*4*	*2*	*2*
		36	24	27	36	18	12	9	12	18	18
Flow Modification	*3*	*3*	*2*	*2*	*3*	*2*	*2*	*4*	*4*	*2*	*1*
		36	24	18	27	18	12	12	12	18	9
Markets & events	*2*	*2*	*2*	*3*	*3*	*1*	*2*	*3*	*3*	*1*	*2*
		16	16	18	18	6	8	6	6	6	12
Upstream Inflows	*2*	*3*	*2*	*3*	*2*	*2*	*2*	*3*	*3*	*2*	*2*
		24	16	18	12	12	8	6	6	12	12
Open Space	*2*	*3*	*3*	*2*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
		24	24	12	12	6	4	6	6	12	12
Landfills etc	*1*	*3*	*2*	*3*	*2*	*1*	*1*	*3*	*4*	*3*	*4*
		12	8	9	6	3	2	3	4	9	12
Septic & sewer	*1*	*4*	*2*	*3*	*2*	*1*	*1*	*2*	*3*	*3*	*3*
		16	8	9	6	3	2	2	3	9	9
Docks & wharves	*0*	*4*	*1*	*2*	*2*	*1*	*1*	*2*	*3*	*1*	*1*
		0	0	0	0	0	0	0	0	0	0
Pests	*1*	*4*	*3*	*3*	*4*	*2*	*2*	*3*	*4*	*2*	*3*
		16	12	9	12	6	4	3	4	6	9
Rural Residential	*2*	*3*	*3*	*3*	*2*	*1*	*1*	*2*	*3*	*1*	*2*
		24	24	18	12	6	4	4	6	6	12
Rural	*1*	*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*1*	*2*
		12	8	9	6	3	2	3	3	3	6

	Environment			Amenity		Cultural		Stormwater		Economic	
Cobden	***Threat Rating***	**In-stream Habitat**	**Riparian Habitat**	**Recreation**	**Landscape**	**Indigenous Heritage**	**European Heritage**	**Conveyance**	**Water Treatment**	**Property & tourism**	**Extraction/Use**
Value Rating		***3***	***4***	***3***	***3***	***2***	***2***	***3***	***2***	***3***	***3***
Sensitivity		*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
Residential	***3***	27	24	27	18	6	6	27	18	18	18
Industrial	***3***	*4* 36	*2* 24	*3* 27	*3* 27	*1* 6	*1* 6	*3* 27	*4* 24	*3* 27	*4* 36
Commercial	***1***	*2* 6	*2* 8	*2* 6	*3* 9	*1* 2	*1* 2	*3* 9	*2* 4	*2* 6	*2* 6
Major Roads	***2***	*4* 24	*3* 24	*3* 18	*3* 18	*1* 4	*1* 4	*3* 18	*3* 12	*2* 12	*2* 12
Land Development	***2***	*3* 18	*2* 16	*3* 18	*2* 12	*1* 4	*1* 4	*4* 24	*3* 12	*2* 12	*2* 12
Building Sites	***2***	*3* 18	*2* 16	*3* 18	*3* 18	*1* 4	*1* 4	*3* 18	*3* 12	*2* 12	*2* 12
Unstable Waterways	***3***	*3* 27	*2* 24	*3* 27	*4* 36	*2* 12	*2* 12	*3* 27	*4* 24	*2* 18	*2* 18
Flow Modification	***2***	*3* 18	*2* 16	*2* 12	*3* 18	*2* 8	*2* 8	*4* 24	*4* 16	*2* 12	*1* 6
Markets & events	***2***	*2* 12	*2* 16	*3* 18	*3* 18	*1* 4	*2* 8	*3* 18	*3* 12	*1* 6	*2* 12
Upstream Inflows	***2***	*3* 18	*2* 16	*3* 18	*2* 12	*2* 8	*2* 8	*3* 18	*3* 12	*2* 12	*2* 12
Open Space	***2***	*3* 18	*3* 24	*2* 12	*2* 12	*1* 4	*1* 4	*3* 18	*3* 12	*2* 12	*2* 12
Landfills etc	***1***	*3* 9	*2* 8	*3* 9	*2* 6	*1* 2	*1* 2	*3* 9	*4* 8	*3* 9	*4* 12
Septic & sewer	***1***	*4* 12	*2* 8	*3* 9	*2* 6	*1* 2	*1* 2	*2* 6	*3* 6	*3* 9	*3* 9
Docks & wharves	***0***	*4* 0	*1* 0	*2* 0	*2* 0	*1* 0	*1* 0	*2* 0	*3* 0	*1* 0	*1* 0
Pests	***2***	*4* 24	*3* 24	*3* 18	*4* 24	*2* 8	*2* 8	*3* 18	*4* 16	*2* 12	*3* 18
Rural Residential	***2***	*3* 18	*3* 24	*3* 18	*2* 12	*1* 4	*1* 4	*2* 12	*3* 12	*1* 6	*2* 12
Rural	***3***	*3* 27	*2* 24	*3* 27	*2* 18	*1* 6	*1* 6	*3* 27	*3* 18	*1* 9	*2* 18

	Environment			Amenity		Cultural		Stormwater		Economic	
Darlington	*Threat Rating*	In-stream Habitat	Riparian Habitat	Recreation	Landscape	Indigenous Heritage	European Heritage	Conveyance	Water Treatment	Property & tourism	Extraction/Use
Value Rating		***4***	***3***	***1***	***2***	***2***	***2***	***3***	***1***	***2***	***0***
Sensitivity		*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
Residential	***1***	12	6	3	4	2	2	9	3	4	0
Industrial	***1***	*4* 16	*2* 6	*3* 3	*3* 6	*1* 2	*1* 2	*3* 9	*4* 4	*3* 6	*4* 0
Commercial	***1***	*2* 8	*2* 6	*2* 2	*3* 6	*1* 2	*1* 2	*3* 9	*2* 2	*2* 4	*2* 0
Major Roads	***2***	*4* 32	*3* 18	*3* 6	*3* 12	*1* 4	*1* 4	*3* 18	*3* 6	*2* 8	*2* 0
Land Development	***1***	*3* 12	*2* 6	*3* 3	*2* 4	*1* 2	*1* 2	*4* 12	*3* 3	*2* 4	*2* 0
Building Sites	***2***	*3* 24	*2* 12	*3* 6	*3* 12	*1* 4	*1* 4	*3* 18	*3* 6	*2* 8	*2* 0
Unstable Waterways	***2***	*3* 24	*2* 12	*3* 6	*4* 16	*2* 8	*2* 8	*3* 18	*4* 8	*2* 8	*2* 0
Flow Modification	***1***	*3* 12	*2* 6	*2* 2	*3* 6	*2* 4	*2* 4	*4* 12	*4* 4	*2* 4	*1* 0
Markets & events	***2***	*2* 16	*2* 12	*3* 6	*3* 12	*1* 4	*2* 8	*3* 18	*3* 6	*1* 4	*2* 0
Upstream Inflows	***1***	*3* 12	*2* 6	*3* 3	*2* 4	*2* 4	*2* 4	*3* 9	*3* 3	*2* 4	*2* 0
Open Space	***1***	*3* 12	*3* 9	*2* 2	*2* 4	*1* 2	*1* 2	*3* 9	*3* 3	*2* 4	*2* 0
Landfills etc	***0***	*3* 0	*2* 0	*3* 0	*2* 0	*1* 0	*1* 0	*3* 0	*4* 0	*3* 0	*4* 0
Septic & sewer	***3***	*4* 48	*2* 18	*3* 9	*2* 12	*1* 6	*1* 6	*2* 18	*3* 9	*3* 18	*3* 0
Docks & wharves	***0***	*4* 0	*1* 0	*2* 0	*2* 0	*1* 0	*1* 0	*2* 0	*3* 0	*1* 0	*1* 0
Pests	***2***	*4* 32	*3* 18	*3* 6	*4* 16	*2* 8	*2* 8	*3* 18	*4* 8	*2* 8	*3* 0
Rural Residential	***2***	*3* 24	*3* 18	*3* 6	*2* 8	*1* 4	*1* 4	*2* 12	*3* 6	*1* 4	*2* 0
Rural	***1***	*3* 12	*2* 6	*3* 3	*2* 4	*1* 2	*1* 2	*3* 9	*3* 3	*1* 2	*2* 0

		Environment		Amenity		Cultural		Stormwater		Economic	
Derrinallum	***Threat Rating***	**In-stream Habitat**	**Riparian Habitat**	**Recreation**	**Landscape**	**Indigenous Heritage**	**European Heritage**	**Conveyance**	**Water Treatment**	**Property & tourism**	**Extraction/Use**
Value Rating		***3***	***3***	***3***	***2***	***3***	***1***	***3***	***1***	***2***	***2***
Sensitivity		*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
Residential	***1***	9	6	9	4	3	1	9	3	4	4
Industrial	***2***	*4* 24	*2* 12	*3* 18	*3* 12	*1* 6	*1* 2	*3* 18	*4* 8	*3* 12	*4* 16
Commercial	***2***	*2* 12	*2* 12	*2* 12	*3* 12	*1* 6	*1* 2	*3* 18	*2* 4	*2* 8	*2* 8
Major Roads	***1***	*4* 12	*3* 9	*3* 9	*3* 6	*1* 3	*1* 1	*3* 9	*3* 3	*2* 4	*2* 4
Land Development	***1***	*3* 9	*2* 6	*3* 9	*2* 4	*1* 3	*1* 1	*4* 12	*3* 3	*2* 4	*2* 4
Building Sites	***2***	*3* 18	*2* 12	*3* 18	*3* 12	*1* 6	*1* 2	*3* 18	*3* 6	*2* 8	*2* 8
Unstable Waterways	***2***	*3* 18	*2* 12	*3* 18	*4* 16	*2* 12	*2* 4	*3* 18	*4* 8	*2* 8	*2* 8
Flow Modification	***1***	*3* 9	*2* 6	*2* 6	*3* 6	*2* 6	*2* 2	*4* 12	*4* 4	*2* 4	*1* 2
Markets & events	***2***	*2* 12	*2* 12	*3* 18	*3* 12	*1* 6	*2* 4	*3* 18	*3* 6	*1* 4	*2* 8
Upstream Inflows	***1***	*3* 9	*2* 6	*3* 9	*2* 4	*2* 6	*2* 2	*3* 9	*3* 3	*2* 4	*2* 4
Open Space	***2***	*3* 18	*3* 18	*2* 12	*2* 8	*1* 6	*1* 2	*3* 18	*3* 6	*2* 8	*2* 8
Landfills etc	***2***	*3* 18	*2* 12	*3* 18	*2* 8	*1* 6	*1* 2	*3* 18	*4* 8	*3* 12	*4* 16
Septic & sewer	***3***	*4* 36	*2* 18	*3* 27	*2* 12	*1* 9	*1* 3	*2* 18	*3* 9	*3* 18	*3* 18
Docks & wharves	***0***	*4* 0	*1* 0	*2* 0	*2* 0	*1* 0	*1* 0	*2* 0	*3* 0	*1* 0	*1* 0
Pests	***2***	*4* 24	*3* 18	*3* 18	*4* 16	*2* 12	*2* 4	*3* 18	*4* 8	*2* 8	*3* 12
Rural Residential	***1***	*3* 9	*3* 9	*3* 9	*2* 4	*1* 3	*1* 1	*2* 6	*3* 3	*1* 2	*2* 4
Rural	***2***	*3* 18	*2* 12	*3* 18	*2* 8	*1* 6	*1* 2	*3* 18	*3* 6	*1* 4	*2* 8

	Environment			Amenity		Cultural		Stormwater		Economic	
Lismore	*Threat Rating*	In-stream Habitat	Riparian Habitat	Recreation	Landscape	Indigenous Heritage	European Heritage	Conveyance	Water Treatment	Property & tourism	Extraction/Use
Value Rating		*4*	*4*	*1*	*1*	*3*	*2*	*3*	*1*	*2*	*2*
Sensitivity		*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
Residential	*1*	12	8	3	2	3	2	9	3	4	4
Industrial	*2*	*4*	*2*	*3*	*3*	*1*	*1*	*3*	*4*	*3*	*4*
		32	16	6	6	6	4	18	8	12	16
Commercial	*1*	*2*	*2*	*2*	*3*	*1*	*1*	*3*	*2*	*2*	*2*
		8	8	2	3	3	2	9	2	4	4
Major Roads	*3*	*4*	*3*	*3*	*3*	*1*	*1*	*3*	*3*	*2*	*2*
		48	36	9	9	9	6	27	9	12	12
Land Development	*1*	*3*	*2*	*3*	*2*	*1*	*1*	*4*	*3*	*2*	*2*
		12	8	3	2	3	2	12	3	4	4
Building Sites	*2*	*3*	*2*	*3*	*3*	*1*	*1*	*3*	*3*	*2*	*2*
		24	16	6	6	6	4	18	6	8	8
Unstable Waterways	*2*	*3*	*2*	*3*	*4*	*2*	*2*	*3*	*4*	*2*	*2*
		24	16	6	8	12	8	18	8	8	8
Flow Modification	*3*	*3*	*2*	*2*	*3*	*2*	*2*	*4*	*4*	*2*	*1*
		36	24	6	9	18	12	36	12	12	6
Markets & events	*2*	*2*	*2*	*3*	*3*	*1*	*2*	*3*	*3*	*1*	*2*
		16	16	6	6	6	8	18	6	4	8
Upstream Inflows	*2*	*3*	*2*	*3*	*2*	*2*	*2*	*3*	*3*	*2*	*2*
		24	16	6	4	12	8	18	6	8	8
Open Space	*2*	*3*	*3*	*2*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
		24	24	4	4	6	4	18	6	8	8
Landfills etc	*0*	*3*	*2*	*3*	*2*	*1*	*1*	*3*	*4*	*3*	*4*
		0	0	0	0	0	0	0	0	0	0
Septic & sewer	*3*	*4*	*2*	*3*	*2*	*1*	*1*	*2*	*3*	*3*	*3*
		48	24	9	6	9	6	18	9	18	18
Docks & wharves	*0*	*4*	*1*	*2*	*2*	*1*	*1*	*2*	*3*	*1*	*1*
		0	0	0	0	0	0	0	0	0	0
Pests	*2*	*4*	*3*	*3*	*4*	*2*	*2*	*3*	*4*	*2*	*3*
		32	24	6	8	12	8	18	8	8	12
Rural Residential	*2*	*3*	*3*	*3*	*2*	*1*	*1*	*2*	*3*	*1*	*2*
		24	24	6	4	6	4	12	6	4	8
Rural	*1*	*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*1*	*2*
		12	8	3	2	3	2	9	3	2	4

	Environment			Amenity		Cultural		Stormwater		Economic	
Noorat	*Threat Rating*	In-stream Habitat	Riparian Habitat	Recreation	Landscape	Indigenous Heritage	European Heritage	Conveyance	Water Treatment	Property & tourism	Extraction/Use
Value Rating		*0*	*0*	*0*	*0*	*2*	*0*	*3*	*2*	*0*	*2*
Sensitivity		*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
Residential	*1*	0	0	0	0	2	0	9	6	0	4
Industrial	*2*	*4*	*2*	*3*	*3*	*1*	*1*	*3*	*4*	*3*	*4*
		0	0	0	0	4	0	18	16	0	16
Commercial	*2*	*2*	*2*	*2*	*3*	*1*	*1*	*3*	*2*	*2*	*2*
		0	0	0	0	4	0	18	8	0	8
Major Roads	*2*	*4*	*3*	*3*	*3*	*1*	*1*	*3*	*3*	*2*	*2*
		0	0	0	0	4	0	18	12	0	8
Land Development	*1*	*3*	*2*	*3*	*2*	*1*	*1*	*4*	*3*	*2*	*2*
		0	0	0	0	2	0	12	6	0	4
Building Sites	*2*	*3*	*2*	*3*	*3*	*1*	*1*	*3*	*3*	*2*	*2*
		0	0	0	0	4	0	18	12	0	8
Unstable Waterways	*0*	*3*	*2*	*3*	*4*	*2*	*2*	*3*	*4*	*2*	*2*
		0	0	0	0	0	0	0	0	0	0
Flow Modification	*1*	*3*	*2*	*2*	*3*	*2*	*2*	*4*	*4*	*2*	*1*
		0	0	0	0	4	0	12	8	0	2
Markets & events	*2*	*2*	*2*	*3*	*3*	*1*	*2*	*3*	*3*	*1*	*2*
		0	0	0	0	4	0	18	12	0	8
Upstream Inflows	*1*	*3*	*2*	*3*	*2*	*2*	*2*	*3*	*3*	*2*	*2*
		0	0	0	0	4	0	9	6	0	4
Open Space	*1*	*3*	*3*	*2*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
		0	0	0	0	2	0	9	6	0	4
Landfills etc	*1*	*3*	*2*	*3*	*2*	*1*	*1*	*3*	*4*	*3*	*4*
		0	0	0	0	2	0	9	8	0	8
Septic & sewer	*4*	*4*	*2*	*3*	*2*	*1*	*1*	*2*	*3*	*3*	*3*
		0	0	0	0	8	0	24	24	0	24
Docks & wharves	*0*	*4*	*1*	*2*	*2*	*1*	*1*	*2*	*3*	*1*	*1*
		0	0	0	0	0	0	0	0	0	0
Pests	*1*	*4*	*3*	*3*	*4*	*2*	*2*	*3*	*4*	*2*	*3*
		0	0	0	0	4	0	9	8	0	6
Rural Residential	*2*	*3*	*3*	*3*	*2*	*1*	*1*	*2*	*3*	*1*	*2*
		0	0	0	0	4	0	12	12	0	8
Rural	*1*	*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*1*	*2*
		0	0	0	0	2	0	9	6	0	4

	Environment			Amenity		Cultural		Stormwater		Economic	
Port Campbell	*Threat Rating*	In-stream Habitat	Riparian Habitat	Recreation	Landscape	Indigenous Heritage	European Heritage	Conveyance	Water Treatment	Property & tourism	Extraction/Use
Value Rating		***3***	***4***	***4***	***4***	***4***	***3***	***2***	***1***	***4***	***2***
Sensitivity		*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
Residential	***2***	18	16	24	16	8	6	12	6	16	8
Industrial	***1***	*4* 12	*2* 8	*3* 12	*3* 12	*1* 4	*1* 3	*3* 6	*4* 4	*3* 12	*4* 8
Commercial	***3***	*2* 18	*2* 24	*2* 24	*3* 36	*1* 12	*1* 9	*3* 18	*2* 6	*2* 24	*2* 12
Major Roads	***3***	*4* 36	*3* 36	*3* 36	*3* 36	*1* 12	*1* 9	*3* 18	*3* 9	*2* 24	*2* 12
Land Development	***4***	*3* 36	*2* 32	*3* 48	*2* 32	*1* 16	*1* 12	*4* 32	*3* 12	*2* 32	*2* 16
Building Sites	***3***	*3* 27	*2* 24	*3* 36	*3* 36	*1* 12	*1* 9	*3* 18	*3* 9	*2* 24	*2* 12
Unstable Waterways	***3***	*3* 27	*2* 24	*3* 36	*4* 48	*2* 24	*2* 18	*3* 18	*4* 12	*2* 24	*2* 12
Flow Modification	***2***	*3* 18	*2* 16	*2* 16	*3* 24	*2* 16	*2* 12	*4* 16	*4* 8	*2* 16	*1* 4
Markets & events	***2***	*2* 12	*2* 16	*3* 24	*3* 24	*1* 8	*2* 12	*3* 12	*3* 6	*1* 8	*2* 8
Upstream Inflows	***3***	*3* 27	*2* 24	*3* 36	*2* 24	*2* 24	*2* 18	*3* 18	*3* 9	*2* 24	*2* 12
Open Space	***2***	*3* 18	*3* 24	*2* 16	*2* 16	*1* 8	*1* 6	*3* 12	*3* 6	*2* 16	*2* 8
Landfills etc	***1***	*3* 9	*2* 8	*3* 12	*2* 8	*1* 4	*1* 3	*3* 6	*4* 4	*3* 12	*4* 8
Septic & sewer	***2***	*4* 24	*2* 16	*3* 24	*2* 16	*1* 8	*1* 6	*2* 8	*3* 6	*3* 24	*3* 12
Docks & wharves	***3***	*4* 36	*1* 12	*2* 24	*2* 24	*1* 12	*1* 9	*2* 12	*3* 9	*1* 12	*1* 6
Pests	***2***	*4* 24	*3* 24	*3* 24	*4* 32	*2* 16	*2* 12	*3* 12	*4* 8	*2* 16	*3* 12
Rural Residential	***1***	*3* 9	*3* 12	*3* 12	*2* 8	*1* 4	*1* 3	*2* 4	*3* 3	*1* 4	*2* 4
Rural	***3***	*3* 27	*2* 24	*3* 36	*2* 24	*1* 12	*1* 9	*3* 18	*3* 9	*1* 12	*2* 12

	Environment			Amenity		Cultural		Stormwater		Economic	
Princetown	***Threat Rating***	**In-stream Habitat**	**Riparian Habitat**	**Recreation**	**Landscape**	**Indigenous Heritage**	**European Heritage**	**Conveyance**	**Water Treatment**	**Property & tourism**	**Extraction/Use**
Value Rating		***4***	***3***	***3***	***3***	***3***	***2***	***2***	***1***	***3***	***3***
Sensitivity		*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
Residential	***1***	12	6	9	6	3	2	6	3	6	6
Industrial		*4*	*2*	*3*	*3*	*1*	*1*	*3*	*4*	*3*	*4*
	0	0	0	0	0	0	0	0	0	0	0
Commercial		*2*	*2*	*2*	*3*	*1*	*1*	*3*	*2*	*2*	*2*
	2	16	12	12	18	6	4	12	4	12	12
Major Roads		*4*	*3*	*3*	*3*	*1*	*1*	*3*	*3*	*2*	*2*
	1	16	9	9	9	3	2	6	3	6	6
Land Development		*3*	*2*	*3*	*2*	*1*	*1*	*4*	*3*	*2*	*2*
	2	24	12	18	12	6	4	16	6	12	12
Building Sites		*3*	*2*	*3*	*3*	*1*	*1*	*3*	*3*	*2*	*2*
	2	24	12	18	18	6	4	12	6	12	12
Unstable Waterways		*3*	*2*	*3*	*4*	*2*	*2*	*3*	*4*	*2*	*2*
	1	12	6	9	12	6	4	6	4	6	6
Flow Modification		*3*	*2*	*2*	*3*	*2*	*2*	*4*	*4*	*2*	*1*
	1	12	6	6	9	6	4	8	4	6	3
Markets & events		*2*	*2*	*3*	*3*	*1*	*2*	*3*	*3*	*1*	*2*
	2	16	12	18	18	6	8	12	6	6	12
Upstream Inflows		*3*	*2*	*3*	*2*	*2*	*2*	*3*	*3*	*2*	*2*
	3	36	18	27	18	18	12	18	9	18	18
Open Space		*3*	*3*	*2*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
	1	12	9	6	6	3	2	6	3	6	6
Landfills etc		*3*	*2*	*3*	*2*	*1*	*1*	*3*	*4*	*3*	*4*
	0	0	0	0	0	0	0	0	0	0	0
Septic & sewer		*4*	*2*	*3*	*2*	*1*	*1*	*2*	*3*	*3*	*3*
	2	32	12	18	12	6	4	8	6	18	18
Docks & wharves		*4*	*1*	*2*	*2*	*1*	*1*	*2*	*3*	*1*	*1*
	0	0	0	0	0	0	0	0	0	0	0
Pests		*4*	*3*	*3*	*4*	*2*	*2*	*3*	*4*	*2*	*3*
	2	32	18	18	24	12	8	12	8	12	18
Rural Residential		*3*	*3*	*3*	*2*	*1*	*1*	*2*	*3*	*1*	*2*
	1	12	9	9	6	3	2	4	3	3	6
Rural		*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*1*	*2*
	3	36	18	27	18	9	6	18	9	9	18

	Environment			Amenity		Cultural		Stormwater		Economic	
Simpson	*Threat Rating*	In-stream Habitat	Riparian Habitat	Recreation	Landscape	Indigenous Heritage	European Heritage	Conveyance	Water Treatment	Property & tourism	Extraction/Use
Value Rating		***2***	***2***	***1***	***3***	***1***	***1***	***3***	***3***	***2***	***1***
Sensitivity		*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
Residential	***2***	12	8	6	12	2	2	18	18	8	4
Industrial	***2***	*4* 16	*2* 8	*3* 6	*3* 18	*1* 2	*1* 2	*3* 18	*4* 24	*3* 12	*4* 8
Commercial	***2***	*2* 8	*2* 8	*2* 4	*3* 18	*1* 2	*1* 2	*3* 18	*2* 12	*2* 8	*2* 4
Major Roads	***2***	*4* 16	*3* 12	*3* 6	*3* 18	*1* 2	*1* 2	*3* 18	*3* 18	*2* 8	*2* 4
Land Development	***1***	*3* 6	*2* 4	*3* 3	*2* 6	*1* 1	*1* 1	*4* 12	*3* 9	*2* 4	*2* 2
Building Sites	***2***	*3* 12	*2* 8	*3* 6	*3* 18	*1* 2	*1* 2	*3* 18	*3* 18	*2* 8	*2* 4
Unstable Waterways	***2***	*3* 12	*2* 8	*3* 6	*4* 24	*2* 4	*2* 4	*3* 18	*4* 24	*2* 8	*2* 4
Flow Modification	***2***	*3* 12	*2* 8	*2* 4	*3* 18	*2* 4	*2* 4	*4* 24	*4* 24	*2* 8	*1* 2
Markets & events	***2***	*2* 8	*2* 8	*3* 6	*3* 18	*1* 2	*2* 4	*3* 18	*3* 18	*1* 4	*2* 4
Upstream Inflows	***3***	*3* 18	*2* 12	*3* 9	*2* 18	*2* 6	*2* 6	*3* 27	*3* 27	*2* 12	*2* 6
Open Space	***1***	*3* 6	*3* 6	*2* 2	*2* 6	*1* 1	*1* 1	*3* 9	*3* 9	*2* 4	*2* 2
Landfills etc	***1***	*3* 6	*2* 4	*3* 3	*2* 6	*1* 1	*1* 1	*3* 9	*4* 12	*3* 6	*4* 4
Septic & sewer	***1***	*4* 8	*2* 4	*3* 3	*2* 6	*1* 1	*1* 1	*2* 6	*3* 9	*3* 6	*3* 3
Docks & wharves	***0***	*4* 0	*1* 0	*2* 0	*2* 0	*1* 0	*1* 0	*2* 0	*3* 0	*1* 0	*1* 0
Pests	***2***	*4* 16	*3* 12	*3* 6	*4* 24	*2* 4	*2* 4	*3* 18	*4* 24	*2* 8	*3* 6
Rural Residential	***1***	*3* 6	*3* 6	*3* 3	*2* 6	*1* 1	*1* 1	*2* 6	*3* 9	*1* 2	*2* 2
Rural	***3***	*3* 18	*2* 12	*3* 9	*2* 18	*1* 3	*1* 3	*3* 27	*3* 27	*1* 6	*2* 6

	Environment			Amenity		Cultural		Stormwater		Economic	
Skipton	*Threat Rating*	In-stream Habitat	Riparian Habitat	Recreation	Landscape	Indigenous Heritage	European Heritage	Conveyance	Water Treatment	Property & tourism	Extraction/Use
Value Rating		*4*	*3*	*2*	*3*	*2*	*2*	*3*	*1*	*2*	*3*
Sensitivity		*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
Residential	*1*	12	6	6	6	2	2	9	3	4	6
Industrial	*3*	*4*	*2*	*3*	*3*	*1*	*1*	*3*	*4*	*3*	*4*
		48	18	18	27	6	6	27	12	18	36
Commercial	*2*	*2*	*2*	*2*	*3*	*1*	*1*	*3*	*2*	*2*	*2*
		16	12	8	18	4	4	18	4	8	12
Major Roads	*2*	*4*	*3*	*3*	*3*	*1*	*1*	*3*	*3*	*2*	*2*
		32	18	12	18	4	4	18	6	8	12
Land Development	*3*	*3*	*2*	*3*	*2*	*1*	*1*	*4*	*3*	*2*	*2*
		36	18	18	18	6	6	36	9	12	18
Building Sites	*2*	*3*	*2*	*3*	*3*	*1*	*1*	*3*	*3*	*2*	*2*
		24	12	12	18	4	4	18	6	8	12
Unstable Waterways	*2*	*3*	*2*	*3*	*4*	*2*	*2*	*3*	*4*	*2*	*2*
		24	12	12	24	8	8	18	8	8	12
Flow Modification	*1*	*3*	*2*	*2*	*3*	*2*	*2*	*4*	*4*	*2*	*1*
		12	6	4	9	4	4	12	4	4	3
Markets & events	*2*	*2*	*2*	*3*	*3*	*1*	*2*	*3*	*3*	*1*	*2*
		16	12	12	18	4	8	18	6	4	12
Upstream Inflows	*2*	*3*	*2*	*3*	*2*	*2*	*2*	*3*	*3*	*2*	*2*
		24	12	12	12	8	8	18	6	8	12
Open Space	*2*	*3*	*3*	*2*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
		24	18	8	12	4	4	18	6	8	12
Landfills etc	*0*	*3*	*2*	*3*	*2*	*1*	*1*	*3*	*4*	*3*	*4*
		0	0	0	0	0	0	0	0	0	0
Septic & sewer	*3*	*4*	*2*	*3*	*2*	*1*	*1*	*2*	*3*	*3*	*3*
		48	18	18	18	6	6	18	9	18	27
Docks & wharves	*0*	*4*	*1*	*2*	*2*	*1*	*1*	*2*	*3*	*1*	*1*
		0	0	0	0	0	0	0	0	0	0
Pests	*2*	*4*	*3*	*3*	*4*	*2*	*2*	*3*	*4*	*2*	*3*
		32	18	12	24	8	8	18	8	8	18
Rural Residential	*2*	*3*	*3*	*3*	*2*	*1*	*1*	*2*	*3*	*1*	*2*
		24	18	12	12	4	4	12	6	4	12
Rural	*2*	*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*1*	*2*
		24	12	12	12	4	4	18	6	4	12

	Environment			Amenity		Cultural		Stormwater		Economic	
Terang	*Threat Rating*	In-stream Habitat	Riparian Habitat	Recreation	Landscape	Indigenous Heritage	European Heritage	Conveyance	Water Treatment	Property & tourism	Extraction/Use
Value Rating		***2***	***2***	***3***	***3***	***2***	***2***	***2***	***1***	***2***	***1***
Sensitivity		*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
Residential	***3***	18	12	27	18	6	6	18	9	12	6
Industrial	***3***	*4* 24	*2* 12	*3* 27	*3* 27	*1* 6	*1* 6	*3* 18	*4* 12	*3* 18	*4* 12
Commercial	***2***	*2* 8	*2* 8	*2* 12	*3* 18	*1* 4	*1* 4	*3* 12	*2* 4	*2* 8	*2* 4
Major Roads	***3***	*4* 24	*3* 18	*3* 27	*3* 27	*1* 6	*1* 6	*3* 18	*3* 9	*2* 12	*2* 6
Land Development	***1***	*3* 6	*2* 4	*3* 9	*2* 6	*1* 2	*1* 2	*4* 8	*3* 3	*2* 4	*2* 2
Building Sites	***2***	*3* 12	*2* 8	*3* 18	*3* 18	*1* 4	*1* 4	*3* 12	*3* 6	*2* 8	*2* 4
Unstable Waterways	***2***	*3* 12	*2* 8	*3* 18	*4* 24	*2* 8	*2* 8	*3* 12	*4* 8	*2* 8	*2* 4
Flow Modification	***3***	*3* 18	*2* 12	*2* 18	*3* 27	*2* 12	*2* 12	*4* 24	*4* 12	*2* 12	*1* 3
Markets & events	***2***	*2* 8	*2* 8	*3* 18	*3* 18	*1* 4	*2* 8	*3* 12	*3* 6	*1* 4	*2* 4
Upstream Inflows	***3***	*3* 18	*2* 12	*3* 27	*2* 18	*2* 12	*2* 12	*3* 18	*3* 9	*2* 12	*2* 6
Open Space	***2***	*3* 12	*3* 12	*2* 12	*2* 12	*1* 4	*1* 4	*3* 12	*3* 6	*2* 8	*2* 4
Landfills etc	***0***	*3* 0	*2* 0	*3* 0	*2* 0	*1* 0	*1* 0	*3* 0	*4* 0	*3* 0	*4* 0
Septic & sewer	***2***	*4* 16	*2* 8	*3* 18	*2* 12	*1* 4	*1* 4	*2* 8	*3* 6	*3* 12	*3* 6
Docks & wharves	***0***	*4* 0	*1* 0	*2* 0	*2* 0	*1* 0	*1* 0	*2* 0	*3* 0	*1* 0	*1* 0
Pests	***2***	*4* 16	*3* 12	*3* 18	*4* 24	*2* 8	*2* 8	*3* 12	*4* 8	*2* 8	*3* 6
Rural Residential	***2***	*3* 12	*3* 12	*3* 18	*2* 12	*1* 4	*1* 4	*2* 8	*3* 6	*1* 4	*2* 4
Rural	***3***	*3* 18	*2* 12	*3* 27	*2* 18	*1* 6	*1* 6	*3* 18	*3* 9	*1* 6	*2* 6

		Environment		Amenity		Cultural		Stormwater		Economic	
Timboon	*Threat Rating*	In-stream Habitat	Riparian Habitat	Recreation	Landscape	Indigenous Heritage	European Heritage	Conveyance	Water Treatment	Property & tourism	Extraction/Use
Value Rating		*3*	*4*	*3*	*2*	*2*	*2*	*3*	*1*	*3*	*1*
Sensitivity		*3*	*2*	*3*	*2*	*1*	*1*	*3*	*3*	*2*	*2*
Residential	*2*	18	16	18	8	4	4	18	6	12	4
Industrial	*3*	*4* 36	*2* 24	*3* 27	*3* 18	*1* 6	*1* 6	*3* 27	*4* 12	*3* 27	*4* 12
Commercial	*3*	*2* 18	*2* 24	*2* 18	*3* 18	*1* 6	*1* 6	*3* 27	*2* 6	*2* 18	*2* 6
Major Roads	*2*	*4* 24	*3* 24	*3* 18	*3* 12	*1* 4	*1* 4	*3* 18	*3* 6	*2* 12	*2* 4
Land Development	*3*	*3* 27	*2* 24	*3* 27	*2* 12	*1* 6	*1* 6	*4* 36	*3* 9	*2* 18	*2* 6
Building Sites	*2*	*3* 18	*2* 16	*3* 18	*3* 12	*1* 4	*1* 4	*3* 18	*3* 6	*2* 12	*2* 4
Unstable Waterways	*1*	*3* 9	*2* 8	*3* 9	*4* 8	*2* 4	*2* 4	*3* 9	*4* 4	*2* 6	*2* 2
Flow Modification	*1*	*3* 9	*2* 8	*2* 6	*3* 6	*2* 4	*2* 4	*4* 12	*4* 4	*2* 6	*1* 1
Markets & events	*2*	*2* 12	*2* 16	*3* 18	*3* 12	*1* 4	*2* 8	*3* 18	*3* 6	*1* 6	*2* 4
Upstream Inflows	*3*	*3* 27	*2* 24	*3* 27	*2* 12	*2* 12	*2* 12	*3* 27	*3* 9	*2* 18	*2* 6
Open Space	*3*	*3* 27	*3* 36	*2* 18	*2* 12	*1* 6	*1* 6	*3* 27	*3* 9	*2* 18	*2* 6
Landfills etc	*1*	*3* 9	*2* 8	*3* 9	*2* 4	*1* 2	*1* 2	*3* 9	*4* 4	*3* 9	*4* 4
Septic & sewer	*1*	*4* 12	*2* 8	*3* 9	*2* 4	*1* 2	*1* 2	*2* 6	*3* 3	*3* 9	*3* 3
Docks & wharves	*0*	*4* 0	*1* 0	*2* 0	*2* 0	*1* 0	*1* 0	*2* 0	*3* 0	*1* 0	*1* 0
Pests	*3*	*4* 36	*3* 36	*3* 27	*4* 24	*2* 12	*2* 12	*3* 27	*4* 12	*2* 18	*3* 9
Rural Residential	*2*	*3* 18	*3* 24	*3* 18	*2* 8	*1* 4	*1* 4	*2* 12	*3* 6	*1* 6	*2* 4
Rural	*3*	*3* 27	*2* 24	*3* 27	*2* 12	*1* 6	*1* 6	*3* 27	*3* 9	*1* 9	*2* 6

Appendix F

MANAGEMENT REVIEW

Appendix F
Management review

RESPONSIBILITIES

Agencies

Council

There are a number of units within Council responsible for stormwater management, albeit this is primarily focused on urban stormwater quantity management. There is no unit facilitating the management of stormwater quality.

Catchment Management Authorities

The *Catchment and Land Protection Act 1994* laid down a framework for implementing a coordinated strategic approach to catchment management across Victoria. The Corangamite Catchment and Land Protection (CALP) Board was established as part of this framework in December 1994. The major role of the Board is to advise on the management of land and water resources throughout Corangamite Shire and the broader region. In 1997 nine catchment management authorities were formed to create a whole of catchment approach to resource management. The Corangamite Catchment Management Authority (CCMA) is responsible for all waterways within the shire exception Mount Emu Creek, which is the responsibility of the Glenelg-Hopkins Catchment Management Authority (GHCMA).

- CCMA:

  The region covered by the CCMA comprises 13340 square kilometres of south-western Victoria, including 17,500 ha of Victoria's coastal fringe area. The CCMA are responsible for the development and implementation of Regional Catchment Strategies and for the preparation and implementation of Action Plans. The authority is also responsible for managing the catchment surrounds and inflowing streams and drainage.

  Relevant to the development of the stormwater plan, the CCMA has produced a number of key documents that will be taken into consideration. These include:

  – Corangamite Regional Catchment Strategy
  – Waterway Health Strategy (Draft)
  – Corangamite Nutrient Management Plan (2002).

- GHCMA:

  The GHCMA is a community-based organisation directed by a board of ten community representatives. The GHCMA is responsible for the development and implementation of Regional Catchment Strategies and for the preparation and implementation of Action Plans. The authority is also responsible for managing the catchment surrounds and inflowing streams and drainage.

  Relevant to the development of the stormwater management plan, the GHCMA has produced a number of key documents that will be taken into consideration. These include:

  – Glenelg-Hopkins Regional Catchment Strategy (2002–07)
  – Rural Drainage Strategy (Draft)
  – Glenelg-Hopkins Catchment Nutrient Management Plan.

South Western Regional Waste Management Group (SWRWMG)

The SWRWMG was constituted in December 1997, and its members are the Councils of Glenelg Shire Council, Southern Grampians Shire Council, Moyne Shire Council, Corangamite Shire Council and Warrnambool Shire Council. The group has employed a Regional Education Officer (REO) with funding from EcoRecycle Victoria to implement EcoRecycle Victoria's Waste Wise Program. The REO's responsibility is to coordinate and provide a uniform approach and a continual focus to the educational needs of the region and individual Councils (Regional Waste and Litter Education Plan, 1999).

Environment Protection Authority Victoria

The Environment Protection Authority Victoria (EPA) is responsible for the protection of the quality of Victoria's environment. The role of the EPA in stormwater management includes establishing environmental standards, encouraging the use of best practice in order to meet environmental standards and the application of regulatory and non-regulatory means to achieve these standards.

The EPA also has an involvement in the management of licenses granted to environmentally relevant activities within the municipality (e.g. license to discharge for industry). In this regard the EPA plays a role in education and awareness and the establishment and enforcement of license conditions. The EPA is also responsible for the coordination of VSAP, a role which includes hands on involvement in guiding the development of individual stormwater management plans (i.e. representation on steering committees and project working groups) and also administration and allocation of funding for priorities identified in the plans.

Department of Natural Resources and Environment (DNRE)

DNRE are responsible for environmental flows, management of sites of flora and fauna significance and implementation of Catchment and Land Protection (CALP) legislation. During the preparation of this Plan the DNRE underwent a restructure resulting in the formation of two new departments. The Department of Sustainability and Environment (DSE) took over the environmental functions of DNRE, while the Department of Primary Industry (DPI) is now responsible for agriculture and fisheries.

Parks Victoria

Under the Parks Victoria Act 1998, Parks Victoria's responsibilities are to provide services to the State and its agencies for the management of parks, reserves and other public land. With the approval of the Minister, it may also provide land management services to the owner of any other land used for public purposes. The Act requires that, in carrying out its functions, Parks Victoria must not act in a way that is not environmentally sound.

At the time of preparation of this Plan, overall arrangements regarding the relationships and responsibilities for the provision of services to the Department of Natural Resources and Environment (NRE) are set down in a Management Services Agreement (MSA) between Parks Victoria, the Minister for Environment and Conservation and the Secretary of the Department of Natural Resources and Environment. Parks Victoria's management services are delivered within state policy, contractual agreements and the specific responsibilities and powers of the Secretary (NRE) under the National Parks Act 1975.

Parks Victoria's responsibilities encompass the management of:

- all areas reserved under the National Parks Act 1975;
- metropolitan waterways and adjacent land under the Water Industry Act 1994;
- nominated Crown land reserved under the Crown Land (Reserves) Act 1978;
- conservation reserves reserved under the Crown Land (Reserves) Act 1978 and managed in accordance with approved land use recommendations under the Land Conservation Act 1970;
- areas reserved under the Heritage Rivers Act 1992;
- planning for all Ramsar sites and management of some sites;

- piers and jetties in Port Phillip Bay and Western Port and recreational boating on these Bays pursuant to powers conferred by the Marine Act, 1988 and the Port of Melbourne Authority Act 1958;
- other areas as specified under the Parks Victoria Act 1998.

VicRoads

VicRoads have responsibility for all main roads, the definition of which depends on traffic volume and road status (e.g. its importance as a transport route). Within the Shire of Corangamite the Princes Highway, Hamilton Highway, Princess Highway and the Great Ocean Road are examples of highways and roads that are part of VicRoads jurisdiction.

Community groups

Communities groups include a number of 'Friends of groups' and Landcare Groups. These groups have the potential to be involved in the dissemination of information regarding best practice urban stormwater management within the community upon completion of the SWMP.

Council departments

Strategic planning and policy making

Strategic planning and policy preparation activities are undertaken on an as needs basis. At the time of undertaking the review these activities were undertaken by Council's Building, Planning and Environment unit, in consultation with other units of Council.

Statutory planning and development approvals

This function is performed by the Building, Environment and Planning unit in consultation with a number of other Council departments, such as Environmental Health and Asset Planning units, through an internal referrals process, and other agencies such the EPA through an external referral process.

Local law enforcement

Local law enforcement is undertaken by the Public Safety and Amenities unit.

Environmental policy and management

Environmental policy and management is primarily the responsibility of the Environment Officer, in consultation with the Statutory Planning officers and other relevant officers/units within Council.

Drainage design

The responsibility for drainage design is within the Assets Planning unit of Council.

Drainage

The Council drainage system is maintained by Works department.

Street cleansing

Street cleansing is undertaken and managed by the Works department. Street cleansing is undertaken in all of the towns that form the study area, with the exception of Princetown and Darlington.

Waste collection

Corangamite Shire, through their Waste Management Operations Strategy, is committed to the overall direction of the South West Regional Waste Management Plan, 1999 (Corangamite Shire Waste and Litter Education Strategy 1999-2001). There are five transfer stations operating within the Shire, these are operating at Port Campbell, Timboon, Simpson, Derrinallum and Skipton. The transfer stations operate on an 8 hour week basis and are fully supervised during operation hours. The Shire has a new regional landfill in Naroghid. The landfill is a state of the art landfill with best practice in waste management being implemented. The Corangamite landfill serves as a regional landfill and is utilised by other Council areas. Landfills have been closed at Port Campbell, Timboon, Simpson, Derrinallum, Noorat and Skipton.

Recycling in all towns is available using Council's contracted service. A local service club via a council contractual agreement provides Skipton's recycling collection. Materials collected include glass, paper, aluminiumand plastics. In 1998 the Corangamite domestic garbage collection served 4,605 tenements and collected 7,592 t of waste and an estimated 1,078 t of recyclables. This accounts for 62% of the Shire's residents. Camperdown, Cobden, Noorat, Port Campbell, Simpson, Terang and Timboon have a weekly recyclables collection (glass, paper, cardboard, aluminium and plastics.

Litter control

Litter control is addressed through the *Litter Control Act 1987*. The Shire is part of the South Western Regional Waste Management Group who contribute to litter control programmes and have a number of strategies in place to address litter. Council has a *Waste and Litter Education Strategy 1999–2001,* which refers to the Litter Prevention Task Force. The local schools are also involved in litter management initiatives.

Parks and open space planning

Parks and open space planning is the responsibility of the Building, Environment and Planning unit.

Parks and open space management

This is primarily the responsibility of Works unit of Council. There are a range of open space areas within the municipality. Management includes litter collection, mowing, general garden maintenance, weed management and fertiliser application. Examples of open space areas managed by Council include the road median strips (i.e. centre median strip of Princes Highway, Camperdown), swimming pools, etc.

Contract administration

Council's contracts are managed by the Contracts unit of Council and also by specific project managers within specific units.

Community education and awareness

Community education and awareness programmes are undertaken on a department specific basis. There is no specific department overseeing community education within Council. It should be noted that Council works with a number of agencies on awareness programmes, such as EcoRecycle, the CCMA, GHCMA, EPA, and the South Western Regional Waste Management Group and a number of community based groups such as 'Friends of Groups' and Landcare. Council also works closely with the local schools, for example Camperdown College recently hosted a wetlands conference. Council has a number of tools available for information dissemination, including community newsletters, newspapers, television (WIN), calendar and through the library and post offices.

Grant applications

A number of grant applications have been prepared for a range of environmental projects. In particular the environment team has been responsible for sourcing funding for a number of projects.

CORPORATE POLICIES AND KNOWLEDGE

Environmental management

- The Corangamite Catchment Management Authority Draft Waterway Health Strategy is one of a number of regional plans developed under the Corangamite Regional Catchment Strategy. The strategy has the following vision, '*In ten years time, through the implementation of this strategy in partnership with the community, we will have maintained, protected and improved the environmental condition of the Corangamite region's waterways*'.

  The strategy identifies the current condition of key waterways within the Corangamite Catchment region, as well as the values of the waterways and current threats to the values. The strategy recommends a combination of strategic and on-ground actions that will improve waterway health.

  Although the strategy does not specifically consider urban stormwater quality and impacts, a number of the recommended actions have the potential to positively impact the quality of water discharging to waterways. For example, actions such as revegetation and bank stabilisation works and the use of artificial wetlands filtration and flow retardation systems on urban drainage lines will greatly improve water quality.

- The Western District Lakes Ramsar Site Strategic Management Plan is part of a program that aims to develop comprehensive management frameworks for Victoria's Ramsar sites. The aim of the plan is to facilitate the conservation and wise use of the Western District Lakes, so as to maintain and restore the ecological values for which the area is recognised. The plan provides those stakeholders involved with the management of the lake with a framework and information to guide decisions regarding land use and development. It aims to ensure that decisions are made with full regard for wetland values in environmental, social and economic terms. The plan includes a description of the wetlands and their values as well as threats to these values and a number of site management strategies.

- The Corangamite Shire Corporate Plan 2001–2004 notes one of its five strategic objectives as being to '*lead in our environment management practices*'. The plan sets out clear strategies and actions to achieve this objective. These are:

  – continue to enhance waste minimisation through successfully implementing the Waste Management Strategy and Waste Minimisation Program by continuing green waste collection, waste minimisation and community education;

  – preserve and enhance native vegetation and care for the environment by: developing a Roadside Management and Conservation Plan and a Street Tree Strategy; addressing salinity and water quality issues within available resources; developing an Environmental Management Plan with reference to Local Agenda 21 and working with Catchment Management Authorities, Landcare Groups and the community on conservation projects and education.

- The Corangamite Shire Waste and Litter Education Strategy 1999–2001 has been prepared by Council and a Regional Education Officer employed by the South Western Regional Waste Management Group through funding from EcoRecycle Victoria. The Strategy has been strategically designed to assist Corangamite Shire in taking waste and litter initiatives to the community, using the waste minimisation hierarchy model (reduce, reuse, recycle) for educational purposes. The strategy has targeted key groups within the Shire and developed specific programmes for each group to ensure maximum reduction and minimisation of waste. Key groups include Council, residents, schools, business/industry, events management, litter prevention taskforce, community groups and the agricultural sector. Implementation of programmes to reduce litter and encourage waste minimisation can have a positive impact on stormwater quality by reducing the amount of litter entering the stormwater system.

- The South West Sustainability Blueprint and Strategy provides a framework to improve the economic, environmental and social wellbeing of South West Victoria through the adoption of sustainability as an overarching theme. The blueprint has been developed through a partnership of organisations including the Corangamite, Glenelg, Moyne, Southern Grampians and Warrnambool Councils, regional water boards, post-secondary educational institutions, the Department of Natural Resources and Environment, the Glenelg-Hopkins Catchment Management Authority and the Western Coastal Board. The blueprint focuses on four interrelated themes:
  - building capacity for regional action;
  - conserving and enhancing the natural resource base;
  - creating prosperity through using sustainability as a competitive advantage;
  - requirements for effective implementation and monitoring.

  Within these themes, actions and initiatives that are directly relevant to stormwater quality management are:
  - implement stormwater plans at a municipal level to minimise stormwater runoff and maximise opportunities for stormwater to be used for productive purposes;
  - formal incorporation of sustainability principles in corporate and operation planning of authorities responsible for water management;
  - to communicate a common message to the regional community regarding water and water use and conservation;
  - adopt best practice for sustainable urban development on green fields sites;
  - adopt best practice for urban stormwater management;
  - identify and communicate how waste can best be minimised;
  - work with small business to minimise introduction of waste to region.

The blueprint also recommends incorporating the principles of sustainability into the planning schemes:

- The Corangamite Shire Council Draft Roadside Environment Management Plan has been prepared with the goal of protecting all indigenous vegetation and fauna on roadsides. The plan recognises the value of indigenous vegetation for its contribution to biodiversity, provision of wildlife habitat, erosion prevention capabilities and contribution to water quality. The plan provides a series of management guidelines to ensure that activities with the potential to affect roadside vegetation are carried out with as little impact as possible.

  Although the plan does not specifically target stormwater quality improvement as an objective, several of its objectives and guidelines will potentially have a positive impact on water quality:
  - 1.15, Wetlands: before conducting works or using herbicides near wetlands the Shire or NRE must be contacted.
  - 4.4, Herbicides: herbicides are to be used only when there are no alternative weed control options available and staff must be trained in their use.
  - 5.2, Dust suppression: dust suppression measures must be taken when performing roadside works.
  - 5.3, Erosion and sediment control: erosion and sediment control measures must be incorporated into the planning and design stage of any project, erosion must be minimised, there must be provision for stormwater run-off during the job and there must be adequate inspection and maintenance of all stormwater drainage systems.
  - 5.5, Stack sites: material storage sites must not be located on drainage lines.

Environmental data

Council collects water quality information primarily through the activities of the Corangamite Waterwatch program.

Opportunities to improve the dissemination of this information should be investigated further.

Council expertise

Traditionally Council has been responsible for planning for a reduction in stormwater quantity. The various departments within Council have a general appreciation of the range of threats impacting on urban stormwater quality.

Opportunities to build on existing expertise through additional training and education programmes should be investigated further.

PLANNING MATTERS

Strategic planning framework: Local Planning Policy Framework

Municipal Strategic Statement

The Corangamite Planning Scheme, through the Local Planning Policy Framework and the MSS, does make reference to the importance of environmental issues including the protection of remnant vegetation and fauna habitat, protection of significant landscapes, management of salinity and erosion and catchment management. Part of the Corangamite Shire's vision is to work for the sustainable development of the Shire based on *'sustainable management and protection of natural resources of soil, water, flora, fauna and ecosystems'*. Within the strategic framework plan it is recognised that the absence of reticulated sewerage systems in several of the townships within the shire is an issue for residential development. The Port Campbell strategic framework has listed the minimisation of stormwater impacts from urban development as a strategy.

There is an opportunity through the review of the MSS, to include more detailed reference to urban stormwater quality issues and include key outcomes from the plan in the 'Objectives and Strategies' section of each clause.

Local policies

There are three policies within the Local Planning Policy Framework which have direct relevance to the stormwater planning. These are:

- Clause 22.01-1, Urban Growth Boundaries: this policy notes that it is important to accommodate urban development within the main township areas that have or will have reticulated infrastructure such as water, sewerage and stormwater drainage. It lists ensuring that all urban areas are provided with reticulated water, sewerage, power, stormwater and all-weather roads as an objective.
- Clause 22.01-1, House Lot Excision: this policy notes that waste water discharges to the environment should be reduced to the maximum extent that is reasonable and practicable.
- Clause 22.01-3, Residential Infrastructure: the objective of this policy is to '*ensure that all existing and future forms of residential development, including low density residential development, is serviced with reticulated sewerage (when available), water, electricity and drainage*' and to '*ensure that environment and water quality downstream of urban development is not affected*'. The policy notes that infrastructure in towns should be developed to lessen pollution of watercourses, water catchments of the river systems and surrounding agricultural land.
- Clause 22.02-1, Catchment and Land Protection: this clause ensures that impacts on soil, water, flora, fauna, air and ecosystems are considered in the assessment of use and development proposals.
- Clause 22.02-4, Wetland Areas: the policy recognises that wetland areas provide important environmental functions, such as water filtration, and states that preference will be given to maintaining the environmental integrity of wetlands and protecting their foreshore, drainage, habitat, landscape, filtration and storage functions.

Particular provisions

Clause 56.09, Drainage Systems: the majority of objectives associated with this clause are aimed at minimising stormwater damage to property and minimising the nuisance potential of stormwater. Objectives that are directly related to stormwater quality management are:

- 56.09-1, Minor drainage layout objectives: to minimise increases in stormwater run-off and protect the environmental values and physical characteristics of receiving watercourses from degradation by urban run-off.
- 56.09-4, Drainage pits objective: to protect environmental values and physical characteristics of receiving watercourses from degradation by urban run-off.
- 56.09-5, Major drainage systems objectives: to protect the environmental values and physical characteristics of receiving water courses.

Upon completion of the stormwater management plan there may be scope to prepare a separate local policy within the LPPF to address urban stormwater quality management.

Strategic Planning Framework: State Planning Policy Framework

The State Planning Policy Framework sets out policies that apply to all land in Victoria. The purpose of the State policies is to inform planning authorities and responsible authorities of aspects that they must consider and give effect to in their local areas. The State Planning Policy Framework notes that planning should adopt a best practice environmental management and risk management approach, which aims to avoid or minimise environmental degradation and hazards. In particular, clause 15.01, Protection of Catchments, waterways and groundwater, notes that an objective is to protect and, where possible, restore catchments and waterways. To do this planning authorities must have regard to relevant aspects of catchment management strategies approved under the *Catchment and Land Protection Act 1994* and other relevant plans and strategies such as vegetation plans, drainage plans, nutrient management plans and management plans for roadsides.

Approvals process

Council has a system within their development approval assessment process that involves internal and external approvals. Planning approvals are dealt with through delegation to Council officers. It is therefore the responsibility of Council officers to determine whether there are stormwater management issues within an application and then refer the application on to the relevant department or agency for comment.

Planning scheme use and development applications are referred to a number of departments within Council and externally to agencies. Council departments are regularly required to contribute to the assessment of development applications. Within Council, key referral units include Asset Planning for impact assessment on stormwater assets, health surveyor for unsewered areas and septic tank applications, and the environment officer for vegetation removal and biodiversity conservation issues.

External referral agencies include the Corangamite Catchment Management Authority and the Glenelg Hopkins Catchment Management Authority for comments relating to flooding, EPA for license requirements, VicRoads for properties within the RDZ1 and RDZ2, DNRE for vegetation removal, soil conservation and general environmental impact issues.

There are standard planning permit conditions relating to stormwater management that Council can use. Determining whether conditions are required is a combination of the planning officers' discretion or if requested by another department or agency.

Subdivision and development standards

Council has a set of standard conditions relevant to subdivisions, dams, dwellings and sheds/garages.

REGULATORY MATTERS

Local Laws and enforcement

Local law enforcement is undertaken by the Public Safety and Amenities Unit. Council relies on the *Litter Act 1987* to address littering issues within the Shire. The majority of Corangamite's local laws address issues relating to stock, such as control of stock while driving. The objectives of Livestock Local Law No. 2 are to '*minimise any damage to road pavements, formations, drainage, vegetation and surrounding areas arising form livestock*'. There are no local laws that address sediment and waste control from construction and building sites or the deposition of dog faeces. Local laws currently play no role in planning enforcement. Dumping of rubbish is a rare occurrence within the Shire and Council's two Local Laws officers are predominantly engaged in addressing stock issues.

Due to resourcing issues, the local laws officers take a reactive rather than a proactive approach to local law enforcement; however the community and the local laws officers have expressed interest in a more proactive approach to enforcement.

Council has a set of guidelines relevant to assessing tank applications. The guidelines provide information for applicants, outline regulatory requirements and the application process and alternative treatment processes. The guidelines also provide information relating to effluent disposal trenches, on-site waste water treatment units and reed bed systems.

EDUCATION

Community education and awareness

Council is clearly committed to the broad objectives of community education and awareness.

Whilst there are no specific programmes or education campaigns targeted at urban stormwater quality management, there is scope to develop such programmes for the broad community, industries, traders, builders and developers.

Staff education

Council does actively encourage staff to increase their general awareness of best practice environmental management. Staff education does occur, however there has not been any programme specifically targeted at urban stormwater quality management. Therefore, a significant opportunity exists to promote the importance of stormwater management within Council's activities and decision-making processes.

Contractor education

There is no specific requirement for Council's contractors to be aware of stormwater quality issues, such as sediment control, chemical usage and dumping. Council has indicated that there is an opportunity to improve this approach when dealing with contractors, possibly through the provision of best practice stormwater management training.

Advocacy and association

Council has not previously sought funding for stormwater related projects. Council has a number of existing associations with adjoining Councils (for example, the environment officers from adjoining meet, as do the planning officers within the region). There may be opportunities to identify common stormwater management issues with neighbouring municipalities and to develop regional strategies and identify regional funding opportunities. In addition, there may be an opportunity to tap into other agencies programmes, particularly those of the EPA, CCMA, and GHCMA.

Council has demonstrated a clear commitment to sourcing funding to support environmental projects, examples include:

- the project at Cobden Lake funded by CCMA to replace deciduous trees with natives;
- Stewart Park in Skipton, which received funding from the GHCMA for construction of a platypus viewing platform near Mount Emu Creek;

- tree planting/habitat link for Mount Leura;
- purchasing recycling services through funding provided by EcoRecycle Victoria;
- funding through the Coast and Clean Seas funding for the installation of litter traps in Port Campbell.

OPERATIONAL ISSUES

Stormwater devices

Port Campbell has six litter traps which have been recently installed at strategic locations around the town. Through the development of the stormwater management plan, there will be an opportunity to identify potential locations for the installation of structural treatment measures.

Contracts management

There are currently no specific measures in place with regard to contract contents and management that relates specifically to urban stormwater quality. There is a requirement for tenders to prepare an Environmental Management Plan for proposed works.

Waste management

Council currently has an extensive waste management programme, which includes a kerbside service for household garbage, recycling and green waste. Council has also prepared a waste management strategy (draft).

Street cleansing

Street sweeping is undertaken periodically throughout the year. The purpose of the street sweeping is primarily to remove debris from accidents and stones and soil.

Open space

The Shire contains a number of open space areas, including cricket/football ovals, recreation reserves and swimming holes. which are formally managed (including mowing and use of fertilisers).

Appendix G

REACTIVE MANAGEMENT STRATEGIES

Reactive Management Strategies									
		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
Residential land use									
The purpose of this strategy is to identify opportunities and implement strategies to minimise the impacts of residential land use on Lake Colongulac. Residential land use in Camperdown poses a very high risk to in-stream habitat values and a high risk to recreation and riparian habitat values within Lake Colongulac. Residential land use poses a potential threat to the quality of urban stormwater through atmospheric deposits and build up from traffic; nutrients from washing cars, fertiliser application, lawn clippings and leaf litter (particularly from decidiuous trees); and poor waste management practices. Key pollutants and impacts associated with residential activities include, increased flows, sediment, nutrients, litter, oxygen depleting material, hydrocarbons , pathogens, trace metals, pesticides and surfactants. This strategy provides an integrated approach to address the risk of residential runoff, with key aspects including education and awareness campaigns and initiatives; structural treatment measures; source control measures; and planning and regulation controls. Whilst this strategy has been specifically designed to respond to issues pertaining to Camperdown, the strategies are applicable to a other urban areas within the municipality and can be applied at other locations with minimal additional costs.								
RE1	Education and awareness	Implement a community awareness campaign, including displays, workshops and education material on environmental best practice in property management (e.g. waterwise gardens, vehicle washing, appropriate disposal of garden waste, use of fertiliser on gardens, collection & disposal of dog faeces - particularly in open space areas etc). Utilise EPAV, CCMA, GHCMA material if appropriate and involve the students of schools within Camperdown. The education campaign can be linked with many of Council's current strategies (i.e. Waste and Litter Education Strategy 1999-2001).	15000	5000	Council, CCMA, GHCMA, EPAV	Very high	Education and awareness campaigns have many similar elements. Costs could be reduced by combining with other education strategies or with other Councils	31746.032	7
RE2	Education and awareness	Facilitate a demonstration project showing best practice in stormwater management and WSUD. Investigate ways of including aspects of the site in educational curriculum and involving Camperdown Secondary College. Utilise outcomes from/or become involved in the WSUD project being undertaken by Melbourne Water and the Urban Land Corporation which is investigating community attitudes to WSUD. Utilise and expand on DNRE's Regional Stormwater Education Kit as an educational resource for schools. Localise the information to refer to issues relevant to Corangamite.	10000	2000	Council	High	Costs could be reduced - implement with RE1 actions.	160000	9
RE3	Education and awareness	Undertake drain marking in residential areas. The stencilling can build on the current drain stenciling program and implement an awareness campaign during the stenciling program and investigate opportunities to include Waterwatch as a potential partner and involve primary and secondary school students. Key milestone to stencil 50 stormwater drains by December 2003.	9700	1000	Council stormwater project coordinator, Camperdown Secondary School students	***Very high***	Can be linked with RI1	***29115.646***	***4***

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
RE4	Education and awareness	Use the local press to publicise Council's initiatives regarding stormwater management, for example notify the community of the development of the stormwater management plan and any associated guidelines or activities such as the preparation of the Lake Colongulac feasibility and concept design project. Time releases to publicise workshops and other education events.	1000	1000	Council	***Very high***	0	***8163.2653***	***3***
RE5	Education and awareness	Incorporate stormwater quality protection in Council's general environmental awareness campaigns and provide stormwater protection information in Council's New Resident Information Packs (mention ways that residents can improve stormwater quality, including actions such as raking up of deciduous leaves and the reuse of grey water on gardens).	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
RE6	Education and awareness	Design and develop an environmental trail around significant lakes (e.g. Lake Colongulac) highlighting the importance of the Shire's waterways and how people can protect them. Key features of the trail may include information signs at the stormwater outlets to the Lake and natural features such as bird hides.	65000	5000	Council, CCMA, Tourism Victoria, Parks Victoria and DSE/DPI	Medium	0	36281.179	7
RE7	Education and awareness	Conduct an environmental awards program highlighting BPEM in residential areas. The awards could highlight positive actions taken by both existing residents and new developers. Possibly include as part of the existing environmental awards as part of the Corangamite Shire Business Acheivement Awards.	5000	5000	Council	Medium	Costs could be reduced - implement with other RE8 actions.	40816.327	8
RE8	Education and awareness	Promote and support the Urban Program within the Corangamite Regional Nutrient Management Plan and the Glenelg Hopkins Nutrient Management Plan.	0	0	Council CCMA	Medium	No additional cost - undertake as part of existing Council and CCMA obligations.	0	1
RS1	Structural treatment measure - primary	Undertake a design feasibility and options study to address litter, gross pollutants, commercial, industrial, residential land use runoff and runoff from heavy vehicle parking and major highways. The purpose of the study will be to determine best practice management options including designs and costs provided to Council for improving stormwater quality entering Lake Colongulac via the north western outlet site. Aim to have prepared a draft feasibility and design conceptsby December 2003 and a final design concept and costings by March 2004.	22400	0	Council	***Very high***	Not necessary if the outfalls are redirected towards a wetland.	***7111.1111***	***2***

		Actions	Estimated Costs (per					Cost	
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**	**Ranking score**	**Rank**
RS2	Structural treatment measure - primary	Incorporate open swale grass drains in the construction and reconstruction of streets and drains. Proposed kerb and channel works may need to be reassessed. Investigate different mowing regimes for improved water treatment, effectiveness and retrofitting to improve the efficiency of open swale drains for water quality treatment.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
RS3	Structural treatment measure - primary	Reform drain outlets to waterways to act as natural sediment and litter traps and to minimise erosion (e.g. the 3 stormwater outlets to Lake Colongulac) particularly along Medanarook Creek.	20000	5000	Council	High	Council	1095238.1	10
RS4	Structural treatment measure - tertiary	Subject to the results of a concept design and feasibility studyof Medanarook Creek to construct a wetland or other appropriate end of pipe treatment and implement appropriate source control measures.	15000	0	Council, CCMA		Costs will be dependant on the outcomes of the design and feasibility study.		
RC1	Source controls	Encourage the installation of rainwater storage and reuse tanks to reduce runoff during storm events and water wise gardening initiatives to conserve water.	0	0	Residents, South West Water	***Very high***	No additional cost - if implemented as part of RE1..	***0***	***6***
RC2	Source controls	Publicise the benefits of diverting roof water to grassed swales or gardens, or other pre-treat options in order to reduce total flows, scouring, sediment and nutrients entering the stormwater system and water costs to residents. Possibly through the establishment of a demonstration site.	0	0	Council, South West Water	Very high	No additional cost - if implemented as part of RC1.	0	1
RI1	Information	Develop a protocol and monitor the volumes of litter, silt and leaves in the drainage system during periodic drain maintenance (cleaning and inspections). Conduct litter surveys before and after drain stencilling by community groups	2700	1000	Council (stormwater project coordinator), Council's operations unit	Very high	0	12789.116	1
RSM1	Site Management	*No practical options identified.*							

		Actions	Estimated Costs (per					Cost	
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**	**Ranking score**	**Rank**
RI1	***Information***	***Develop a protocol and monitor the volumes of litter, silt and leaves in the drainage system during periodic drain maintenance (cleaning and inspections). Conduct litter surveys before and after drain stencilling by community groups***	***2700***	***1000***	***Council (stormwater project coordinator), Council's operations unit***	***Very high***		27630.805	***5***
RP1	Planning and regulation	Undertake periodic audits and random inspections of 'hot spot' areas, for illegal dumping of domestic waste. Focus on areas identified by the Waste and Litter Education Strategy. This could be undertaken as part of Council's and SWRWMG's Waste and Litter Education Strategy and the Waste Wise program. Data and information collected should be stored in a central data store with all other litter monitoring data)	0	0	Council, SWRWMG, Schools	Very high	No additional cost - undertake as part of existing Council obligations. Related to I2.	0	1
RO1	Operations	*No practical options identified.*							

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
Industrial land use									
The purpose of this strategy is to work with the Camperdown, Cobden, Lismore, Skipton and Timboon industrial community to identify opportunities and implement strategies to minimise the impacts of industrial land use on the receiving waterways for each of these towns. Industrial landuse poses a very high risk to in-stream habitat and extraction and use values in the receiving waters of Camperdown (Lake Colongulac) and Skipton (Mount Emu Creek). Industrial land use also poses a high risk to recreation and riparian habitat values in Cobden's receiving waterways (Cobden Lake); a high risk to extraction and use values in Mount Emu Creek in Skipton and in-stream habitat values in Timboon (Powers Creek), Lismore (Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek). Industrial land use poses a threat to these waterways through atmospheric deposition and build up from traffic, poor waste management, accidental spills and illegal discharges. Key pollutants and impacts associated with these sources include, increased flows, sediment, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals, pesticides and surfactants. This strategy incorporates a balanced approach to address industrial based threats with key aspects including a number of education and awareness campaigns and initiatives; structural treatment measures; source control measures								
IE1	Education and awareness	Implement an awareness campaign, including displays, workshops and education material relating to best practice at industrial sites for business owners/operators. (Utilise EPAV/CCMA material if appropriate). Where possible coordinate with visits undertaken by the Environmental Health Officer or with the water authorities' trade waste inspections. There may be a possibility to align such a program with the industrial program of the Waste and Litter Education Strategy and promote waste management and stormwater management at the same time. Build on the experiences of the pilot project being conducted in Ballarat - the Ballarat Stormwater Awareness Officer - Project Report - South West Education and Awareness for Industrial premises which is due for release at the end of 2002.	10000	5000	Council, EPAV, CCMA	Very high	Costs could be reduced - implement with other education strategies.	70546.737	3
IE2	Education and awareness	Conduct an environmental awards program highlighting businesses and industries that demonstrate a commitment to being environmentally aware, with particular focus on improving stormwater quality entering Lake Colongulac, Cobden Lake and Mount Emu Creek.	5000	5000	Council	High	Costs could be reduced - implement with other IE1 actions.	952380.95	7
IE3	Education and awareness	Undertake a business survey, advisory audit and education campaign (for example Old Joes Creek in the City of Knox) or neighbourhood improvement program to improve stormwater discharges to Lake Colongulac, Cobden Lake and Mount Emu Creek. Seek information on similar VSAP funded projects from the EPA and use educational information from EPA and CMA's as appropriate.	50000	5000	Council, CCMA, EPAV	High	Costs could be reduced - implement with other IE1 actions.	272108.84	5
IS1	Structural treatment measure - primary	RS1 - feasibility and options study is also applicable to industrial runoff.	0	0	0		Costs are outlined in RS1.		

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
IS2	Structural treatment measure - secondary	Review the capability of the Camperdown Saleyards stormwater retention system. Seek EPA advice as to best practice in retention systems.	15000	0	Council, EPAV	Very high		2222222.2	8
IS3	Structural treatment measure - tertiary	No practical options identified.							
IC1	Source controls	Audit loading, storage and waste storage areas to ensure contaminants (i.e. chemicals, litter, packages etc) are being handled appropriately and disposed of appropriately. This will be particularly important for industries that involve large quantities of chemicals (e.g. Pivot fertiliser). As part of this audit porcess review trade waste connections and illegal connections to the stormwater system.	5000	1000	Council	Medium		31746.032	2
IC2	Source controls	Review access and egress design for all major industrial sites with the aim to minimise potential spills/accidents.	0	0	Council	Medium	No additional cost - implement as part of IC1.	0	1
ISM1	Site management	Encourage the development of site based EMP's for key industrial sites (e.g. dairy and fertiliser sites) to address stormwater, waste management, spill management, chemical storage, bunding, signage etc. For example, use Cobden's new industrial estate as an opportunity to function as a role model for new developments taking place. Utilise information from EPA and other VSAP funded projects in developing the plans.	0	0	Council, EPAV	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
ISM2	Site management	Ensure eel farming premises have adequate SMPs and EMPs in place. Monitor discharge licences which impact on adjoining waterways. Utilise information available from EPA and CMA's.	0	0	Coucil, EPAV, CCMA	Very high	No additional cost - ake as part of existing Council and agency obligations.	0	1
ISM3	Site management	Review petrol station management, particularly the bunding, chemical storage and litter control procedures, with the aim to bringing all operators up to best practice standards. Utilise information from EPA regarding best practice for bunding, chemical storage etc.	5000	2000	Council, EPAV	Very high		740740.74	6
II1	Information and data collection	Undertake ongoing monitoring of the significant outlet drains (e.g. those discharging to Lake Colongulac, Cobden Lake and Mount Emu Creek) upstream and downstream of industrial premises. Seek EPA involvement in the monitoring and utilise EPA information regarding monitoring techniques and water quality.	15000	15000	Council, EPAV	High		740740.74	6
IPR1	Planning and regulation	Review discharge and waste management practices at all industrial premises through an advisory audit.	10000	5000	Council, EPAV	Very high		126984.13	4

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
IO1	Operations	*No practical options identified.*							

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
Commercial land use									
The purpose of this strategy is to work within Camperdown's commercial community to identify opportunities and implement measures to minimise the impacts of commercial land use on Lake Colongulac. Commercial land use runoff poses a high risk to in-stream habitat and riparian habitat values of Lake Colongulac through atmospheric deposition, build up from traffic and poor waste management and associated litter problems. Key pollutants and impacts associated with these sources include, increased flows, sediment, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals, pesticides and surfactants. This strategy offers an integrated approach to mitigate commercial threats with key aspects including a number of education and awareness campaigns and initiatives; structural treatment measures; source control measures and site management measures.									
CE1	Education and awareness	Implement an awareness campaign, including displays, workshops and education material for commercial business owners/operators regarding their responsibilities with regard to stormwater management. Target particular issues such as appropriate waste disposal (including disposal of cigarette butts and takeaway food containers), management of loading and unloading of materials and appropriate storage of goods (including chemicals). Use EPAV/CCMA material if appropriate.	10000	2000	Council	High	Costs could be reduced if implemented with other education strategies.	49382.716	5
CE2	Education and awareness	Undertake drain stencilling, with a priority on heavily used or tourist precincts. For example, build on drain stencilling already undertaken in Port Campbell, focusing on stencilling along Lord Street.	2000	1000	Council	Very high	Costs could be reduced if implemented with RE3.	8465.6085	2
CE3	Education and awareness	Install signage at locations of the seven litter traps identifying their location, role and possibly results of monitoring/audits of litter trap contents.	5000	0	Council	Very high		20576.132	3
CS1	Structural treatment - primary	Install litter traps and side entry baskets in areas of high litter e.g. the streets in Port Campbell (Lord Street).	5000	1000	Council, Regional WMG	High		97959.184	4
CS2	Structural treatment - primary	RS1 - feasibility and options study is also applicable to commercial land use runoff.	0	0	0		Costs are outlined in RS1.		
CS3	Structural treatment - tertiary	*No practical options identified.*							
CC1	Source controls	Encourage traders to install cigarette butt containers and provide advice on the available and appropriate disposal options and along Princes Highway (Camperdown) and along Lord Street (Port Campbell).	0	0	Traders, Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
CC2	Source controls	Encourage banks to review ATM operations to reduce street litter, particularly in hotspot areas such as the Princes Highway Camperdown.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
CSM1	Site managment	Liaise with local interest groups to discuss management options for specific commercial areas. Focusing on implementing best practice waste management and recycling programmes.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
CI1	Information	Monitor the outcomes of VSAP funded projects that address commercial runoff and remain up to date with best practice management information. This may be acheived by monitoring the research web pages or outputs from CRC for Catchment Hydrology and CRC for Freshwater Ecology and Melbourne Water, EPAV and MAV.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
CPR1	Planing and regulation	*No practical options identified.*							
CO1	Operations	*No practical options identified.*							
Septic and sewer seepage									
This strategy aims to address the impacts of septic and sewer seepage on the receiving waterways of Camperdown, Derrinallum, Darlington, Lismore, Skipton(although Central Highlands Water is introducing sewerage system to Skipton, this strategy will be relevant until such time as all of Skipton is connected) and Princetown. Septic and sewer seepage is associated with infiltration and overflow from sewerage systems and septic tanks. Key polluntants and impacts associated with this threat, include oxygen depleting material, pathogens and nutrients. Septic and sewer seepage poses a very high risk to in-stream habitats in recieving waterways associated with Darlington and Skipton (Mount Emu Creek) and Lismore (Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek) and a high risk to in-stream habitats in the recieving waterways below Derrinallum (Lake Tooliarook) and Princetown (Gellibrand River and LaTrobe Creek). This strategy presents an integrated suite of activities to address the septic and sewer threat, including education and awareness campaigns and initiatives; source control measures; site management measures; planning and regulation controls; and operations procedures.								
SE1	Education and awareness	Implement a community awareness campaign for residents' with septic treatment systems, utilising displays, workshops and education material. Focus on their maintenance responsibilities, ongoing monitoring requirements and responsible water and waste management practices.	5000	1000	Council	Very high	Costs could be reduced if implemented with other education strategies.	14814.815	2
SE2	Education and awareness	Encourage connection to sewer where and when available, possibly through an incentive program offering rebates or discounted connection fees.	2000	2000	Council, South West Water	Very high	Costs could be reduced - implement with other SE actions.	14814.815	2
SE3	Education and awareness	Promote and support the implementation of relevant actions from the Corangamite Regional Nutrient Management Plan Sewerage Program and the Glenelg Hopkins Nutrient Management Plan Wastewater treatment program.	0	0	Council CCMA, GHCMA	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
SS1	Structural treatment - primary	*No practical options identified.*							
SS2	Structural treatment - secondary	*No practical options identified.*							

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
SS3	Structural treatment - tertiary	*No practical options identified.*							
SS4	Source control	Advocate either extension of reticulated sewerage system to reach unserviced properties or provision of an alternative waste disposal technique.	0	0	Council, South West Water	High	No additional cost - undertake as part of existing Council obligations.	0	1
SSC1	Source control	Advocate for the use of package treatment plants or neighbourhood waste management systems in Princetown.	0	0	Council, South West Water	High	No additional cost - undertake as part of existing Council and agencyobligations.	0	1
SSM1	Site management	Encourage property owners to ugrade and/or maintain on-site treatment systems so that septic discharges and sullage are retained on site. EPA can provide information regarding the correct operation of septic systems and on approved septic systems (available on the internet). A strategic project to develop a wastewater management database for on-site wastewater systems has been proposed. There is potential for Corangamite Shire to become involved in this project.	0	0	Council, EPAV	High	No additional cost - undertake as part of existing Council and agency obligations.	0	1
SSM2	Site management	Encourage property owners to reuse grey water by diverting it to gardens and lawns.	0	0	Council, South West Water	Very high	No additional cost - undertake as part of existing Council and agency obligations.	0	1
SPR1	Planning and regulation	Review permit documentation (maintain register) and carry out inspections of existing on site waste management systems and enforce maintenance requirements in permits. Investigate opportunities for a regional approach in association with adjoining Councils.	10000	5000	Council and other adjoining Councils	Very high	0	1269841.3	4
SPR2	Planning and regulation	Promote connection to reticulated sewerage, where available. Require annual inspections of septic tanks and the reporting of results to Council.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
SI1	Information	*No practical options identified.*							
SO1	Operations	Under existing legislation, perform a review of known septic seepage hotspot areas.	0	0	Council, South West Water	High	No additional cost - undertake as part of existing Council obligations.	0	1

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
Land development and building sites									
The purpose of this strategy is to work with the communities of Port Campbell and Skipton to identify opportunities and implement strategies to minimise the impacts of land development and building site activity on the receiving waterways of these towns. Threats associated with land development and building site activity are related to poor sediment and erosion control, uncontrolled wash down of equipment, deposition of sediment, poor site waste management and spills or deliberate discharge from sites (eg. washing paint or concrete down drains). Key polluntants and impacts associated with these threat types include sediments, nutrients and litter. Land development activity poses a very high risk to recreation values and a high risk to in-stream and riparian habitats in the receiving waterways of Port Campbell (Port Campbell Creek and the Southern Ocean) and a high risk to in-stream habitat values of Mount Emu Creek at Skipton. Building site activities at Port Campbell pose a high threat to recreation values of Port Campbell Creek and the Southern Ocean. This strategy provides a balanced approach to mitigate the effects of land development and building site runoff with key aspects including education and awareness campaigns and initiatives; source control measures; site management measures; information; planning and regulation; and operations.								
LE1	Education and awareness	Implement an awareness campaign, including displays, workshops and education material for contractors and developers regarding management of stormwater. Brochures can be used as a guide for contractors when preparing Environmental Management Plans and when preparing documentation to meet quality assurance procedures. Use EPAV/CCMA/GHCMA material as appropriate. Visit sites where best practice has been put in place (e.g. Lynbrook Estate).	5000	1000	Council	Very high	Costs could be reduced if implemented with other education strategies.	6913.5802	2
LS1	Structural treatment - primary	*No practical options identified.*							
LS2	Structural treatment - secondary	*No practical options identified.*							
LS3	Structural treatment - tertiary	*No practical options identified.*							
LSC1	Source controls	Include requirements for source controls in permit requirements (e.g. litter containment on site, use of hay bales/sand bags to prevent sediment escape from site, covering and containment of stock piled materials etc.) and identification of the local waterway (ie. proforma which requires the developer to state how they are going to control ongoing litter and sediment).	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
LSM1	Site management	Encourage the housing and construction industry to develop a code of practice for environmental management and for control of wastes (including sediment, paints etc) from construction sites.	2000	0	Council	Very high		29629.63	4

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
LI1	Information	Monitor the outcomes of VSAP funded projects relevant to the land development and building industry and remain up to date with best practice management information (e.g. Control of building and construction site practices for the improvement of stormwater quality- a project involving the Cities of Melbourne, Moonee Valley, Moreland, Hume, Kingston and Casey. It will look at the development of model Local Laws and Codes of Practice).	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
LPR1	Planning and regulation	Ensure that all permits for subdivisions are granted with conditions relating to sediment control. Consider the application of water sensitive urban design requirements to subdivision and development permits on a case by case basis. Ensure that all subdivision and building sites are appropriately designed and sited with respect to waterways.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
LPR2	Planning and regulation	Require land developers to prepare an EMP (including sediment/erosion control initiatives) for land for subdivision activities, particularly target undeveloped areas. Ensure a pre-commencement meeting is held to explain the EMP requirements to contractors.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
LPR3	Planning and regulation	Enforce development controls (planning, local laws etc.) through regular site inspections.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
LO1	Operations	Investigate opportunities for Council to review its operations procedures relating to construction works and landscaping with a view to improving their responsiveness to stormwater quality issues. Utilise outcomes from the pilot programme being undertaken by LGPro which involves a number of Councils reviewing and developing best practice stormwater protection for construction works, road works and construction activities.	0	0	Council LGPro	Very high	No additional cost - undertake as part of existing Council obligations.	0	1

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
Major roads									
The purpose of this strategy is identify opportunities and implement strategies to minise the impacts of major road runoff on receiving waterways. Major roads pose a very high risk to in-stream habitat and riparian habitat and a high risk to recreation values in Lake Colongulac and Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek. Major road runoff also poses a high risk to in-stream habitat, riparian habitat and recreation values in Port Campbell Creek and the Southern Ocean, and a high risk to in-stream habitat values of Mount Emu Creek. Major road runoff poses a potential threat to the quality of urban stormwater in terms of atmospheric and vehicular deposition and accumulation which results in sediment, litter, trace metals and hydrcarbon contaminants entering the stormwater system. Accidents resulting in spills of oils, engine coolants or loads are another potential risk. This strategy aims to reduce the impact of major roads through actions including education and awareness campaigns; structural treatment measures; source control measures; site management, information; planning and regulation and operations.								
ME1	Education and awareness	Liaise with the local truck industry (e.g. trucks involved in agricultural/horticultural cartage, timber transport trucks, milk tankers etc) regarding management of loads to avoid spillages, truck maintenance to minimise contaminants accumulating on the road including engine oils, grease, air pollution deposits etc.	0	0	Council, industry reps	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
ME2	Education and awareness	Use the local press to publicise load spillages and the impact they are likely to have on local lakes (including Ramsar sites) and waterways (where possible use actual examples) and point out the measures that truck/vehicle owners and operators can take to minimise reoccurrence.	0	0	Council	Very high	Costs could be reduced - implement with other ME2 actions.	0	1
MS1	Structural treatment measures - primary	Investigate the installation of drainage entrance treatments/inline types (e.g. litter traps, trash racks, return flow litter baskets, circular screens etc) at known vehicle stopover locations, for example near the Caltex Petrol Station in Camperdown, close to waterways along Princes Highway, Hamilton Highway and the Great Ocean Road which carry a substantial amount of traffic.	5000	0	Council, VicRoads	Very high		113378.68	2
MS2	Structural treatment measures - secondary	Investigate opportunities for the installation of grass swales, infiltration trenches or wetlands to treat road runoff the Mount Emu Creek crossing to collect and treat major road runoff.	0	0	Council	Medium	No upfront cost however installation will have a cost that is dependant on the type of measure installed.	0	1
MS3	Structural treatment measures - secondary	Incorporate pre-entrance treatment measures such as filter strips, grass swales, infiltration systems, bio-retention systems (for example, the centre of Geelong triple interceptor pits, porous pavements and oil and grease baffles in main road design.	0	0	Council, VicRoads	Very high	No additional cost - undertake as part of existing Council and VicRoads obligations.	0	1

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
MS5	Structural treatment - tertiary	*No practical options identified.*							
MSC1	Source controls	Review road drainage in close vicinity to waterways and develop 'emergency' detention basins where feasible so that spillages can be trapped.	5000	5000	Council, VicRoads	Very high		264550.26	3
MSC2	Source controls	Review existing street sweeping regime, checking to ensure that the schedule includes all hot spot areas.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
MSM1	Site management	Require environmental management plans including site specific sediment and erosion control plans for road works and other construction activities in road reserves.	0	0	Council, VicRoads	Very high		0	1
MSM2	Site management	Ensure there are adequate litter bins along stopping points on major roads (e.g. at the Caltex petrol station in Camperdown). Encourage programs such as Clean Up Australia Day or Adopt a Highway to target litter along major roads	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
MI1	Information	Utilise information available through the EPAV (e.g. types and amounts of pollutants generated through road use) in education campaigns.	0	0	Council, EPAV	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
MPR1	Planning and regulation	Liaise with VicRoads to encourage WSUD and water treatment measures, such as the use of detention and treatment areas, in future projects. Utilise current best practice management information as it becomes available (e.g. Cooperative Research Centre for Catchment Hydrology report " Water Sensitive Road Design - Design options for improving stormwater quality road runoff").	0	0	Council, VicRoads	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
MPR2	Planning and regulation	Council, in association with VicRoads, EPAV and the Police, need to reinforce controls with regard to speed limits, securing of loads, vehicle maintenance etc. Promote EPAV initiatives such as reporting people littering from their cars (i.e. phone in their number plate, litterers can be fined).	0	0	Council, EPAV, Vic Roads, Police	Very high	No additional cost - undertake as part of existing Council and agency obligations.	0	1
MO1	Operations	Ensure Council roadworks activities (e.g. spraying, vegetation removal, road maintenance) adhere to best practice guidelines.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
MO2	Operations	Introduce controls with regard to best practice environmental management for Council staff, particularly targeting road crews near Lismore, Derrinallum and Skipton.	0	0	Council		No additional cost - undertake as part of existing Council obligations.	0	1

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
Upstream inflows									
The purpose of this strategy is to work within the communities of Princetown and Port Campbell to identify opportunities and implement strategies to minise the impacts of upstream inflows on Port Campbell Creek, the Southern Ocean, Gellibrand River and La Trobe Creek. Upstream inflows from tributaries higher up the catchment pose a risk to recreation values of Port Campbell Creek and the Southern Ocean and to in-stream habitat values in the Gellibrand River and LaTrobe Creek. Upstream inflows pose a potential threat to water quality primarily due to agricutlural land use activities resulting in contaminants such as sediment, nutrients, litter and pathogens. This strategy incorporates a balanced approach to mitigate the threat of upstream inflows including actions such as education and awareness campaigns, source control measures and site management measures.									
UE1	Education and awareness	Liaise with rural property owners to reduce sediment and pollutant loads washing into creeks that pass through the towns. Use DSE/DPI, CCMA, GHCMA and Landcare material as appropriate and utilise existing Landcare networks.	0	0	Council, DSE/DPI, CCMA, GHCMA	High	No additional cost - undertake as part of existing Council and agency obligations.	0	1
UE2	Education and awareness	Develop, with landcare/friends of groups, localised catchment management plans extending from the upper rural catchments through the urban areas. Seek partnerships with DSE/DPI, CCMA, GHCMA to utilise current strategies and facilitate plan development and implementation.	5000	2000	Council, DSE/DPI, CCMA, GHCMA	High		19047.619	2
UE3	Education and awareness	Promote relevant actions within current CMA strategies (e.g. Regional Catchment Strategies and Draft Waterway Health Strategy).	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
US1	Structural treatment measures - primary	*No practical options identified.*							
US2	Structural treatment measures - secondary	*No practical options identified.*							
US3	Structural treatment - tertiary	*No practical options identified.*							
USC1	Source controls	Encourage actions that limit pollutants entering waterways from upstream areas (e.g. riparian zone revegetation and stock exclusion to limit sediment; review of agricultural chemical use and storage to limit toxicant input).	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
USC2	Source controls	Maintain unsealed roads and review the effectiveness/state of repair of open table drains with the aim of decreasing the amount of sediment entering waterways from unsealed road runoff.	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
USM1	Site management	Encourage the production of rural property/farm management plans to improve overall farm management and limit the inputs of sediments, nutrients and chemicals entering the waterways from rural properties. DSE/DPI, in coordination with Council and Glenormiston Agricultural College (supported by Melbourne University), run farm management planning courses.	0	0	Council, DSE/DPI, CCMA, GHCMA	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
UI1	Information	*No practical options identified.*							
UPR1	Planning and regulation	*No practical options identified.*							
UO1	Operations	*No practical options identified.*							
Pests									
The purpose of this strategy is to minimise the impacts of pests on the receiving waterways of Timboon, Darlington, Lismore, Princetown and Skipton. Pests pose a high risk to in-stream and riparian habitat values in Powers Creek in Timboon and a high risk to in-stream habitat values of Mount Emu Creek, Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek, the Gellibrand River and LaTrobe Creek. Pests pose a threat in terms of bank instability and erosion (e.g rabbit burrowing) and the destruction of instream and riparian habitat (e.g. willows and carp). Pest activity in waterways can result in excess levels of sediment, nutrients and oxygen depleting material. This strategy addresses the impact of pests through education and awareness campaigns; source control measures; information; planning and regulation; and operations.								
PE1	Education and awareness	Liaise with the Shires of Moyne and Colac Otway to tackle pests along shared waterways e.g. Mount Emu Creek (Moyne Shire Council) and Gellibrand River (Colac Otway Shire Council). Communication with adjacent Shires can achieve a coordinated response to weeds whereby upper catchment areas are targeted before those areas downstream and greater results can be achieved.	0	0	Council, CCMA, GHCMA, DSE/DPI	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
PE2	Education and awareness	Implement an awareness campaign, including displays, workshops and education material targeted at property owners adjacent to creek lines. It should focus on litter control and discourage people from throwing green waste into waterways, as well as highlighting the potential for muddied/dirt encrusted vehicles to spread weeds between sites.	5000	1000	Council	Very high	Costs could be reduced - implement with other education strategies.	207407.41	4
PE3	Education and awareness	Promote and support the implementation of relevant programs within the CCMA Regional Catchment Strategy (e.g. the targeted pest management program), the GHCMA Regional Catchment Strategy (e.g. Management Action Targets for Pest Plants and Animals) and the GHCMA Weed and Rabbit Action Plans.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
PS1	Structural treatment measures - primary	*No practical options identified.*							
PS2	Structural treatment measures - secondary	*No practical options identified.*							
PS3	Structural treatment - tertiary	*No practical options identified.*							
PSC1	Source controls	Undertake a targeted program of weed and vermin eradication, commencing with hot spot areas. Utilise existing information available from DSE/DPI, CCMA, GHCMA and Landcare Groups.	10000	2000	Council, CCMA, GHCMA, DSE/DPI	Medium		888888.89	6
PSM1	Site management	Develop site management plans for heavily pest infested areas that are of importance to the community (e.g. Lakes Colongulac and Gnarpurt) describing actions and programs to address the pest problem. Review the plans annually.	5000	1000	Council, CCMA, GHCMA, DSE/DPI	Medium		444444.44	5
PI1	Information	Distribute information to nurseries and homeowners informing them of plants that are considered environmental weeds in the area.	1000	0	Council	Medium	Costs could be reduced if implemented with RE1 actions.	5878.8948	2
PI2	Information	Develop maps showing priority areas for weed control. Utilise and build on current CMA and DSE/DPI information. Review the maps biennially.	5000	500	Council, CCMA	Medium		16460.905	3
PPR1	Planning and regulation	Investigate the use of an incentive system to encourage landholders to address pest problems on their land.	0	0	Council, CCMA, GHCMA	Medium	No additional cost - undertake as part of existing Council and CMA obligations.	0	1
PPR2	Planning and regulation	Require all fill to be clean before use in order to limit the spread of pests. Encourage the use of all fill to be free from pests.	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
PO1	Operations	Review Council landscaping guidelines to ensure environmental weeds are not used in Council areas. Investigate options for using native grass species in Council areas and in the development of grassed swales as native species require less mowing on Council owned or managed land.	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
Unstable waterways									
The purpose of this strategy is to identify opportunities and implement measures to minimise impacts of unstable waterways on the receiving waterways of Camperdown, Port Campbell and Cobden. Unstable waterways pose a high risk to in-stream habitat values in Lake Colongulac and recreation values of Port Campbell Creek and the Southern Ocean and landscape values of Cobden Lake. Unstable waterways pose a potential threat to urban stormwater quality particularly in terms of poorly controlled stock and recreational access, weed infestation, damage from waterway works, development encroachment, vegetation loss, and eroded and unstable riparian zones. This results in pollutants such as sediment, nutrients and oxygen depleting material entering the waterway. This strategy includes an education and awareness campaign; structural treatment measures; source control measures; and site management.								
WE1	Education and awareness	Implement an awareness campaign, including displays, workshops and distribution of education material to land owners, particularly those with properties with waterway frontage, regarding BPEM of waterways environs. Highlight issues such as minimising stock access to waterways, revegetating and fencing the riparian environment either side of the waterways. Utilise existing information from the CMA's	5000	2000	Council, CCMA, GHCMA	High	Costs could be reduced if implemented as part of other education strategies.	2666666.7	2
WE2	Education and awareness	Promote and support relevant programs within the CCMA Regional Catchment Strategy (e.g. program 3.13 vegetation retention and protection) and the GHCMA Regional Catchment Strategy (e.g. 5.2.4 Management Action Targets for Biodiversity), particularly along watercourses.	0	0	Council, CCMA, GHCMA	Medium	No additional cost - undertake as part of existing Council and agency obligations.	0	1
WS1	Structural treatment measures - primary	Investigate weed eradication and structural works in areas of particularly unstable waterways. Could link in with various GHCMA or CMA programs already underway such as the Draft Waterway Health Stratey prioritisation of bank protection and stabilisation and willow removal.	0	0	Council, CCMA, GHCMA	High	No additional cost - undertake as part of existing Council and agency obligations.	0	1
WS2	Structural treatment measures - secondary	*No practical options identified.*							
WS3	Structural treatment - tertiary	*No practical options identified.*							
WSC1	Source controls	Encourage landholders to limit stock access and clearing of riparian vegetation adjacent to waterways. Utilise existing Landcare networks and the CCMA biodiversity team for information and biodiversity program activities. Planning permits are required to remove native vegetation as per legislative requirements.	0	0	Council, CCMA, GHCMA, Landcare groups	High	No additional cost - undertake as part of existing Council and agency obligations.	0	1

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
WSM1	Site management	Review stormwater outlets and modify where required to reduce the capacity of flows to destabilise waterways. Modifications may include structures to reduce flow intensity, protecting the bank with rock works, or introducing a detention basin at the outlet to allow water to enter the waterway in a more controlled rate.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
WI1	Information	Maintain up to date information regarding BPEM of pests. Liaise with other agencies, such as Landcare and CMAs, to share information.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
WPR1	Planning and regulation	*No practical options identified.*							
WO1	Operations	*No practical options identified.*							
Flow modification									
The purpose of this strategy is to work with the communities of Campderdown and Lismore to identify opportunities and implement strategies to to minimise the impacts of flow modification on Lake Colongulac and Lake Gnarpurt. Flow modification poses a high risk to instream habitat values of both lakes. Flow modification can occur through water extraction for agricultural purposes (i.e. reduced flows) or an increase in flow intensity, as occurs when stormwater is channeled to an outfall point or vegetation is removed from the water's flow path (i.e. change in flow type). This strategy includes education and awareness campaigns; source control measures; and planning and regulation controls.									
FE1	Education and awareness	Educate the community regarding the effects that increased urban runoff has on natural ecosystems.	0	0	Council, CCMA	Very high	No cost if implemented as part of RE strategies.	0	1
FE2	Education and awareness	Promote and support the implementation of relevant actions within the CCMA and GHCMA Regional Catchment Strategies (e.g. CCMA RCS Program 2.1.E changed flow regimes).	0	0	Council, CCMA	Medium	No additional cost - undertake as part of existing Council and agency obligations.	0	1
FS1	Structural treatment measures - primary	Reform drains to ensure high velocity and intensity urban runoff is discharged to streams in a more natural way. Investigate ways to improve the quality of water being discharged via these drains (e.g. a detention basin may reduce velocities and improve water quality through allowing sediments to settle).	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.	0	1
FS2	Structural treatment measures - secondary	*No practical options identified.*							
FS3	Structural treatment - tertiary	*No practical options identified.*							

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
FSC1	Source controls	Encourage the use of rain water tanks, reuse of stormwater and activities that will reduce the amount of runoff from urban areas.	0	0	Council, South West Water	Medium	No additional cost - undertake as part of existing Council and agency obligations.	0	1
FSM1	Site management	*No practical options identified.*							
FI1	Information	Invesigate the reuse of stormwater for Council irrigation purposes.	2000	0	Council, South West Water	High		493827.16	2
FRP1	Planning and regulation	Assess planning permit applications with regard to any effects that the development may have on the flow regime. Such consideration should be informed by hydrological flow and water quality modelling data representing different stormwater scenarios.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
FO1	Operations	*No practical options identified.*							
Docks and wharves									
The purpose of this strategy is to work with the Port Campbell community to identifgy opportunities and implement measures to minimise the impact of the wharf on the instream habitat values of the Southern Ocean. Docks and wharves pose a potential threat to urban stormwater quality due to runoff from wharf areas which can contain atmospheric deposition, spilt raw product, erosion from unsealed areas, accidential spills and litter. This results in sediment, raw product (oxygen depleting materials), oils and greases, trace metals and toxic substances. This strategyy includes education and awareness campaigns; source control measures, site management; and information dissemintation.									
DE1	Education and awareness	Ensure those using the crane to lift boats are adequately trained and aware of the impact the activity may have on water quality.	1000	500	Council, Parks Victoria	Very high		326530.61	5
DE2	Education and awareness	Install signs at the wharf advising users of their environmental responsibilities. Use the signs to raise awareness of general stormwater issues.	1000	0	Council, Parks Victoria	Very high		17777.778	2
DS1	Structural treatment measures - primary	*No practical options identified.*							
DS2	Structural treatment measures - secondary	*No practical options identified.*							
DS3	Structural treatment - tertiary	*No practical options identified.*							

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
DSC1	Source controls	Provide adequate numbers of litter bins along the wharf and review the frequency of their emptying (may require greater frequency during peak times).	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
DSM1	Site management	Develop a site management plan for the wharf that details how risks to water quality will be handled.	2000	0	Council, Parks	Medium		59259.259	3
DI1	Information	Compile information on wharf usage (e.g. frequency of boat launching, type of boat, pedestrian access etc). Use this information to develop the site management plan.	2000	0	Council, Parks	Medium		211640.21	4
DPR1	Planning and regulation	*No practical options identified.*							
DO1	Operations	*No practical options identified.*							
Rural land use									
The purpose of this strategy is to work with the rural communities in and around Princetown and Port Campbell to identify opportunities and implement measures to minimise the impacts of rural land use on the receiving waterways of these towns. Rural land use activities near Port Campbell and Princetown pose a high risk to recreation values in Port Campbell Creek and the Southern Ocean and in-stream habitat values in the Gellibrand River and LaTrobe Creek near Princetown. Rural land use activities pose a potential risk to urban stormwater quality due to runoff from unmade roads, septic tanks and intensive activities such as poultry sheds, landscape suppliers etc. This results in sediment, nutrients and oxygen depleting materials entering the waterways. This strategy aims to reduce the amount of pollutants in rural runoff through education and awareness campaigns; source control measures; site management; information dissemination; planning and regulation controls; and operations procudures.								
RUE1	Education and awareness	Support the education of landholders regarding the threat that rural activities can pose to water quality. Educational opportunities exist through the CCMA RCS program 4.1 community education, the CCMA and GHCMA RCS Agricultural landuse action programs and the DSE/DPI farm extension activities.	5000	2000	Council, Landcare, CMAs	Medium	Costs could be reduced if implemented with RE actions.	80000	2
RUE2	Education and awareness	Continue to support the drum muster program for farm chemical drums. Review the program to include new educational components focussing on stormwater issues for rural properties. Provide guidelines for property owners regarding appropriate chemical storage, particularly focussing on intensive agricultural industries (such as livestock feedlots, broiler farms etc).	0	0	Landcare, Council, EPAV	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
RUS1	Structural treatment measures - primary	*No practical options identified.*							
RUS2	Structural treatment measures - secondary	*No practical options identified.*							

		Actions	Estimated Costs (per					Cost	
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment	Ranking score	Rank
RUS3	Structural treatment - tertiary	*No practical options identified.*							
RUSC1	Source controls	Identify sources of rural contaminants and undertake monitoring to determine the extent of the impact and possible means of reducing the contaminants. It is important that rural areas upstream of the towns are considered to reduce their impacts on urban stormwater downstream.	15000	15000	Council	Medium		666666.67	3
RUSM1	Site management	Encourage the development of property and catchment plans (e.g. through Farm Management Planning courses run by DSE/DPI or as outlined in CCMA and GHCMA RCS such as CCMA RCS Program 1.1 Soil and Catchment Management).	0	0	Council, CMAs, DSE/DPI, Landcare groups	Medium	No additional cost - undertake as part of existing Council and agency obligations.	0	1
RUI1	Information	Utilise information obtained from research undertaken through the RCS, the Coorperative Research Centre for Catchment Hydrology - River Restoration Program and other relevant research, in education campaigns and media releases etc.	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
RUPR1	Planning and regulation	Develop/review, as appropriate, controls for the removal of vegetation on rural properties. Undertake a review of the planning scheme as outlined in the CCMA Regional Catchment Strategy.	0	0	Council, CMAs	Medium	No additional cost - undertake as part of existing Council and agency obligations.	0	1
RUO1	Operations	*No practical options identified.*							
Open space									
This strategy aims to identify opportunities and implement measures to minimise the impact of Timboon's open space areas on Powers Creek. Open space areas within the town pose a high risk to riparian habitat values of the Creek. Open space poses a potential threat to the quality of urban stormwater through wash off of nutrients (fertilisers) and litter from public gardens, parks, sporting facilities and golf courses, distribution of environmental weeds from gardens and discharge of poor quality water from ornamental lakes. This strategy incorporates education and awareness campaigns and activities; structural treatment measures; source control measures; site management; information dissemination; planning and regulation controls; and operations measures in order to reduce the impact of open space areas on the creek.									
OE1	Education and awareness	Establish work procedures that ensure grass clippings/prunings are not left close to waterways or water bodies. Ideally clippings would be collected and composted. Provide education to Council's parks and gardens staff and the community.	0	0	Council	Very high	No additional cost - undertake as part of existing Council obligations.	0	1
OE2	Education and awareness	Develop signage demonstrating the values of local waterside parks (e.g. Powers Creek Reserve), good environmental practice and stormwater issues.	5000	0	Council, Powers Creek Reserve Committee of Management	Very high		114,286	3

		Actions	Estimated Costs (per					Cost	
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**	**Ranking score**	**Rank**
OS1	Structural treatment measure- primary	Upgrade Cobden Lake through the addition of sediment ponds, litter nets, vegetated swales, weed removal and revegetation in order to improve stormwater quality and in-stream and riparian habitats of the Lake. Incorporate community awareness through drain stencilling and water monitoring. Utilise information and technical expertise from relevant agencies.	160000	1000	Council, EPAV, CCMA, GHCMA	***Very high***		***405,896***	***6***
OS2	Structural treatment measure- secondary	*No practical options identified.*							
OS3	Structural treatment measure- tertiary	*No practical options identified.*							
OC1	Source controls	Review fertiliser, herbicide and pesticide use in council parks with the objective of minimising toxicant input into waterways/water bodies.	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
OM1	Site management	Develop site specific waste management plans for key events through lease arrangements with Council (e.g. for sporting clubs, markets etc).	5000	2000	Council, Event organiser	Medium		571,429	4
OM2	Site management	Consider temporary signage indicating waste disposal practice required at event location (5 x $200).	1000	0	Council	Medium		10,582	2
OM3	Site management	Follow up events, such as markets, with coordinated clean up plan (street sweeping, rapid rubbish collection, recycling containers, cigarette butt containers etc).	0	0	Council, Event organiser	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
OM4	Site management	Encourage the development of an environmental management plan for the local golf courses (e.g. Timboon Golf Club and other golf courses and bowling greens).	15000	0	Council	High	Council, Golf Course managers	680,272	5
OP1	Planning and regulation	Require park users to develop environmental/waste management plans as part of lease conditions.	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1
OO1	Operations	Review maintenance operations to ensure they meet with best practice requirements in terms of chemical use, irrigation and maintenance procedures (e.g. lawn mowing, pruning).	0	0	Council	Medium	No additional cost - undertake as part of existing Council obligations.	0	1

Appendix H

MANAGEMENT FRAMEWORK STRATEGIES

Management Framework Strategies							
Actions			Estimated Costs				
No.	Table	Details	Capital Cost ($)	Ongoing Cost ($)	Respons-ibility	Priority	Comment
Commitment							
C1	Commitment	Adopt the Corangamite Stormwater Management Plan.	1000	0	Council	Very High	No additional cost - undertake as part of existing Council obligations.
C2	Policy	Incorporate BPEM for stormwater and the Corangamite Stormwater Management Plan (SWMP) in Council policies and strategies (including the Corporate Plan, Roadside Environment Management Plan, Waste and Litter Education Strategy and other environmental, planning, waste management, drainage and open space strategies).	5000	0	Council	High	No additional cost- if implemented as part of C5.
C3	Responsibilities	Clarify stormwater management responsibilities throughout the Shire and for all of its waterways, particularly for those waterways crossing municipal boundaries (e.g. Mount Emu Creek and the Gellibrand River). Clarify stormwater drainage issues within Terang.	2000	0	Council, CCMA, GHCMA	High	No additional cost - if implemented as part of C5.
C4	Responsibilities	Clarify stormwater responsibilities within Council and designate a Council department or position with prime responsibility for the promotion and implementation of the Corangamite Stormwater Management Plan and liaison with the stormwater officer. Also designate a position within each Council department to liaise with the stormwater officer and report relevant information to the department.	5000	5000	Council	Very High	No additional cost - if implemented as part of C5.
C5	Resourcing	Appoint a stormwater officer with prime responsibility for the implementation of the Corangamite Stormwater Management Plan and for provision of educational and other programs highlighted as priorities in the Plan.	30000	30000	0	Very High	
C6	Resourcing	Allocate sufficient funds to implement the Corangamite Stormwater Management Plan.	0	0	Council	Very High	
C7	Coordination	Establish a committee to coordinate stormwater management between Council EPAV, CCMA, GHCMA and other agencies and community groups.	0	0	Council	High	
C8	Review	Identify funding sources and apply for funds to implement the Corangamite Stormwater Management Plan (e.g. through VSAP, NHT and from industry sources).	0	0	Council, EPAV, VSAP	High	No additional cost - undertake as part of existing Council obligations.

Actions			Estimated Costs				
No.	**Table**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**
C9	Review	Monitor emerging trends in stormwater management, including the outcomes of strategic projects funded by VSAP, and incorporate the results into Council's stormwater management procedures. Refer to the Victorian Stormwater Action Programme website www.epa.vic.gov.au/vsap	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
C10	Review	Review the implementation of the Corangamite SWMP on an annual basis and if necessary amend the implementation program to respond to contemporary requirements.	2000	2000	Council	High	
Operations							
O1	Contracts	Amend council contracts and operational procedures to include the requirements for best practice standards on sediment and litter control (e.g. Consider the outcomes from the project being undertaken by LGPro to establish model contract provisions for Council construction activities etc.)	2000	0	Council	Very High	No additional cost - if implemented as part of C5.
O2	Waste Management	Seek to develop synergies between the outcomes of the Corangamite Stormwater Management Plan and the existing waste management practices.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
O3	Waste Management	Monitor recycling and hard waste collections, litter and green waste collections and material collected through street and drain cleansing processes and use the results to modify practices to increase their efficiency (e.g. street sweeping will be required more frequently in autumn in areas where deciduous trees are present).	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
O4	Waste Management	Review bin design, placement and emptying procedures to minimise the potential for spillages.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
O5	WSUD	Include water sensitive urban design (WSUD) in Council projects including carparks, open space, roads, drainage works and building sites.	0	0	Council	Very High	No direct cost - but the implementation may have a cost consequence on individual projects.

Actions			Estimated Costs				
No.	**Table**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**
O6	EMPs	Prepare environmental management plans for Council activities, particularly construction and maintenance activities.	0	0	Council	Very High	No additional cost - undertake as part of existing Council obligations.
O7	EMPs	Review fertiliser, herbicide, pesticide, landscaping treatments and species choice to avoid the contamination of local waterways with chemicals and pests from Council maintenance activities.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
O8	EMPs	Investigate water reuse options in Council projects, including the use of rain tanks for Council buildings (captured water could be used to irrigate gardens).	0	0	Council	High	No direct cost - but the implementation may have a cost consequence on individual projects.
Planning and regulation							
P1	Planning scheme	Review Local Planning Policy Framework and Municipal Strategic Statement sections of the Corangamite Planning Scheme to specifically refer to the need to protect and improve stormwater quality.	0	0	Council	Very High	No additional cost - undertake as part of existing Council obligations (e.g. when the next review is conducted).
P2	Planning scheme	Review the outcomes of the planning policy project being undertaken by the Association of Bayside Municipalities and consider including the outcomes in the Corangamite Planning Scheme.	5000	0	Council	High	
P3	Permit conditions	Amend Council's existing suite of standard permit conditions to include conditions relating to the protection of stormwater quality, particularly from construction, commercial and industrial premises. Utilise information and guidelines developed by the EPAV.	5000	0	Council	Very High	
P4	Planning guidelines	Develop and provide information on water sensitive urban design for developers, residents and other interested parties, utilising material developed by Barwon Water and EPAV.	2000	2000	Council	Very High	

Actions			Estimated Costs				
No.	**Table**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**
P5	Planning guidelines	Encourage developers and builders to incorporate water sensitive urban design into projects before they are submitted for planning approval (for example, water tanks).	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
P6	Planning referrals	Refer planning applications for urban infrastructure, subdivision and development to Council 'experts', CCMA, GHCMA, DSE and DPI (as a statutory referral authority), South West Water and or EPAV, for comment, to ensure that they meet BPEM criteria and WSUD principles.	0	0	Council, CCMA, South West Water, EPAV	High	No additional cost - undertake as part of existing Council obligations.
P7	Enforcement	Actively enforce planning permit conditions, local laws and other regulatory requirements designed to protect water quality, including a review of resourcing and requirements.	0	0	Council	Very High	No additional cost - undertake as part of existing Council obligations.
P8	Enforcement	Integrate enforcement procedures with education programs and place emphasis on preventing, rather than prosecuting, problems.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
Education and training							
E1	Council Officers	Promote opportunities for Councillors and Council staff to attend stormwater management seminars or related events, possibly combining trips with other municipalities and agencies to facilitate travel if necessary.	2000	2000	Council	Very High	
E2	Council Officers	Provide a program of internal training and forums for Council staff to develop a regular exchange of technical and operational information on stormwater. Make use on EPAV expertise in this field.	2000	1000	Council	Very High	
E3	Contractors	Require Council contractors to have an appreciation of stormwater issues and incorporate stormwater protection measures in their operating procedures.	0	0	Council	Very High	No additional cost - undertake as part of existing Council obligations.

Actions			Estimated Costs				
No.	**Table**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**
E4	Community education	Incorporate BPEM for stormwater in Council's general environmental education programs.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
E5	Community education	Support community group implementation of stormwater education programs (e.g. Cobden, Port Campbell and Camperdown schools).	5000	5000	Council	High	
E6	Community education	Implement targeted community education programs for residents, traders, industrialists, developers and contractors as set out in the reactive strategies.	0	0	Council	Very High	See reactive strategies for costs.
E7	Community education	Review the "Waste Minimisation Education Kit" prepared by SWRWMG, waste contractors and REO, and include information regarding the impacts of litter on water quality.	5000	5000	Council, SWRWMG	High	
Advocacy and association							
A1	Partnerships	Seek the cooperation and commitment of other stakeholders to achieve stormwater improvements throughout the municipality (e.g. CCMA, GHCMA, Landcare groups, Committees of Management and other interest groups such as schools).	2000	2000	Council, Waterwatch	Very High	No additional cost - if implemented as part of C5.
A2	Partnerships	Recognise and promote effective stormwater management as a shared responsibility between Council, State government, various agencies (e.g. CCMA and GHCMA) and interest groups (e.g. Landcare, Committees of Management and other interest groups such as schools) and the wider community.	0	0	Council, Waterwatch	High	No additional cost - undertake as part of existing Council obligations.
A3	Partnerships	Promote an integrated approach to stormwater management with landowners generally responsible for on-site issues, Council for local area and municipal wide programs and the CCMA and GHCMA for larger regional initiatives.	2000	2000	Council	High	No additional cost - if implemented as part of C5.
A4	Regional networks	Work with neighbouring Councils (e.g. the Shire of Corangamite and Moyne) to address regional stormwater issues (e.g. joint programs and the management of upstream inflows and shared waterways).	2000	2000	Council	Very High	No additional cost - if implemented as part of C5.
A5	Regional networks	Encourage and work with the MAV to lobby State Government, EPAV and/or other CMAs and DoI to respond to common management issues (e.g. community education, planning reform, regulatory reform, etc.) and therefore avoid duplication by Council (and other Councils).	2000	2000	Council, State Govt., EPAV, CMAs, DoI	Very High	No additional cost - if implemented as part of C5.

Actions			Estimated Costs				
No.	**Table**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**
A6	Agencies	Encourage relationships between EPAV and Council (e.g. the Shire of Corangamite and Moyne) to be developed, with the objective of building an understanding of roles and responsibilities for stormwater management, including a greater understanding of when EPAV needs to be contacted (ie. Spills or when VSAP reports are due, etc.) Similarly, develop a greater understanding of roles and responsibilities for South West. In addition to outlining how EPAV information can be accessed.	0	0	Council, EPAV	High	No additional cost - undertake as part of existing Council obligations.
A7	Agencies	Implement joint and/or coordinated investigations with EPAV to address issues which are relevant across the region, such as land development and building controls, septic and sewer seepage etc. Liaise with other adjoining municipalities (Colac-Otway Shire Council, Golden Plains, Moyne, etc.).	0	0	Council, EPAV	High	No additional cost - undertake as part of existing Council obligations.
A8	Agencies	Encourage and support implementation of strategies developed by other agencies that aim to improve water quality. This may include the support of relevant actions within the CCMA's and GHCMA's Regional Catchment Strategies, the CCMA's Draft Waterway Health Strategy and Corangamite Nutrient Management Plan and the Glenelg Hopkins Nutrient Management Plan.	0	0	Council	High	No additional cost - undertake as part of existing Council obligations.
A9	Agencies	Support other agencies in the development and implementation of strategies addressing rural issues. For example the Corangamite Regional Nutrient Management Plan has an action program to address nutrient laden runoff from agricultural land and the Waste and Litter Education Strategy has identified that agricultural waste is a significant issue for the Shire. In addition, the CRC for Catchment Hydrology and CRC for Freshwater Ecology are undertaking a research into best practice to protect waterways, particularly the urban program of the CRCCH.	0	0	Council, CCMA, GHCMA	High	No additional cost - undertake as part of existing Council obligations.
A10	Works	Encourage government agencies and service providers (e.g. water, sewerage, electricity, gas and telecommunication companies) to adopt BPEM procedures and require EMPs for their projects.	0	0	Council, neighbouring Councils, CCMA	Very High	No additional cost - if implemented as part of C5.
A11	Statewide	Encourage EPAV and/or Barwon Water to develop simple guidelines for best practice stormwater management for residential, commercial and industrial areas, including quality protection and on-site re-use options.	0	0	Council, MAV	Very High	No additional cost - if implemented as part of C5.
A12	Statewide	Encourage EPAV, Barwon Water, Building Control Commission and the building industry to develop environmental management guidelines (including sediment and litter control) for building and construction sites.	0	0	Council, MAV	Very High	No additional cost - if implemented as part of C5.

Actions			Estimated Costs				
No.	**Table**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons-ibility**	**Priority**	**Comment**
A13	Statewide	Participate in strategic projects funded by VSAP and incorporate the results into Council's stormwater management procedures.	0	0	Council	High	
A14	Community groups	Liaise regularly with community groups such as Landcare, Committees of Management and individual or groups who have an interest in environmental management issues, particularly stormwater management issues.	2000	0	Council	High	No additional cost - if implemented as part of C5.
Information							
I1	Data collection	Coordinate water quality, littering, pollution incidents and complaint data within Council.	2000	2000	Council	High	
I2	Data collection	Monitor stormwater quality and performance of all GPT's and treatment devices and report the results in Council's environmental reporting program. (i.e. Keep records of amount of litter removed (wet or dry weight, date of clean out, etc.)	5000	2000	Council	High	
I3	Data collection	Make the above monitoring data and references to alternative data sources (e.g. Streamwatch) readily available to interested stakeholders.	2000	2000	Council	High	
I4	Data collection	Collation of data and information relating to Terang's urban stormwater drainage system, to ascertain impacts of urban stormwater on the quality of the recieving waterways. Following assessment of this data, opportunities to include Terang in the reactive management strategies should be investigated.	5000	0	Council	High	
I5	Waterwatch	Continue to support community waterwatch programs.	5000	5000	Council. Barwon Water	High	

Appendix I

IMPLEMENTATION PLAN

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons- ibility	Comment	Capital Cost ($)	Ongoing Cost ($)	Year 1	Year 2	Year 3	Estimated total cost
Management Framework Strategies												
Commitment												
C1	Commitment	Adopt the Corangamite Stormwater Management Plan.	1,000	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
C2	Policy	Incorporate BPEM for stormwater and the Corangamite Stormwater Management Plan (SWMP) in Council policies and strategies (including the Corporate Plan, Roadside Environment Management Plan, Waste and Litter Education Strategy and other environmental, planning, waste management, drainage and open space strategies).	5,000	0	Council	No additional cost- if implemented as part of C5.	0	0	0	0	0	0
C3	Responsibilities	Clarify stormwater management responsibilities throughout the Shire and for all of its waterways, particularly for those waterways crossing municipal boundaries (e.g. Mount Emu Creek and the Gellibrand River). Clarify stormwater drainage issues within Terang.	2,000		Council, CCMA, GHCMA	No additional cost - if implemented as part of C5.	0	0	0	0	0	0
C4	Responsibilities	Clarify stormwater responsibilities within Council and designate a Council department or position with prime responsibility for the promotion and implementation of the Corangamite Stormwater Management Plan and liaison with the stormwater officer. Also designate a position within each Council department to liaise with the stormwater officer and report relevant information to the department.	5,000	5,000	Council	No additional cost - if implemented as part of C5.	0	0	0	0	0	0
C5	Resourcing	Appoint a stormwater officer with prime responsibility for the implementation of the Corangamite Stormwater Management Plan and for provision of educational and other programs highlighted as priorities in the Plan.	30,000	30,000			30,000	30,000	30,000	30,000	30,000	90,000
C6	Resourcing	Allocate sufficient funds to implement the Corangamite Stormwater Management Plan.	0	0	Council	No cost to allocate, however the provision of funds will include a cost.	0	0	0	0	0	0
C7	Coordination	Establish a committee to coordinate stormwater management between Council EPAV, CCMA, GHCMA and other agencies and community groups.	0	0	Council		0	0	0	0	0	0
C8	Review	Identify funding sources and apply for funds to implement the Corangamite Stormwater Management Plan (e.g. through VSAP, NHT and from industry sources).	0	0	Council, EPAV, VSAP	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
C9	Review	Monitor emerging trends in stormwater management, including the outcomes of strategic projects funded by VSAP, and incorporate the results into Council's stormwater management procedures. Refer to the Victorian Stormwater Action Programme website www.epa.vic.gov.au/vsap	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
C10	Review	Review the implementation of the Corangamite SWMP on an annual basis and if necessary amend the implementation program to respond to contemporary requirements.	2,000	2,000	Council		2,000	2,000	2,000	2,000	2,000	6,000

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
Operations												
O1	Contracts	Amend council contracts and operational procedures to include the requirements for best practice standards on sediment and litter control (e.g. Consider the outcomes from the project being undertaken by LGPro to establish model contract provisions for Council construction activities etc.)	2,000		Council	No additional cost - if implemented as part of C5.	0	0	0	0	0	0
O2	Waste Management	Seek to develop synergies between the outcomes of the Corangamite Stormwater Management Plan and the existing waste management practices.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
O3	Waste Management	Monitor recycling and hard waste collections, litter and green waste collections and material collected through street and drain cleansing processes and use the results to modify practices to increase their efficiency (e.g. street sweeping will be required more frequently in autumn in areas where deciduous trees are present).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
O4	Waste Management	Review bin design, placement and emptying procedures to minimise the potential for spillages.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
O5	WSUD	Include water sensitive urban design (WSUD) in Council projects including carparks, open space, roads, drainage works and building sites.	0	0	Council	No direct cost - but the implementation may have a cost consequence on individual projects.	0	0	0	0	0	0
O6	EMPs	Prepare environmental management plans for Council activities, particularly construction and maintenance activities.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
O7	EMPs	Review fertiliser, herbicide, pesticide, landscaping treatments and species choice to avoid the contamination of local waterways with chemicals and pests from Council maintenance activities.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
O8	EMPs	Investigate water reuse options in Council projects, including the use of rain tanks for Council buildings (captured water could be used to irrigate gardens).	0	0	Council	No direct cost - but the implementation may have a cost consequence on individual projects.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons- ibility	Comment	Capital Cost ($)	Ongoing Cost ($)	Year 1	Year 2	Year 3	Estimated total cost
Planning and regulation												
P1	Planning scheme	Review Local Planning Policy Framework and Municipal Strategic Statement sections of the Corangamite Planning Scheme to specifically refer to the need to protect and improve stormwater quality.	0	0	Council	No additional cost - undertake as part of existing Council obligations (e.g. when the next review is conducted).	0	0	0	0	0	0
P2	Planning scheme	Review the outcomes of the planning policy project being undertaken by the Association of Bayside Municipalities and consider including the outcomes in the Corangamite Planning Scheme.	5,000	0	Council		5,000	0	0	5,000	0	5,000
P3	Permit conditions	Amend Council's existing suite of standard permit conditions to include conditions relating to the protection of stormwater quality, particularly from construction, commercial and industrial premises. Utilise information and guidelines developed by the EPAV.	5,000	0	Council		5,000	0	5,000	0	0	5,000
P4	Planning guidelines	Develop and provide information on water sensitive urban design for developers, residents and other interested parties, utilising material developed by Barwon Water and EPAV.	2,000	2,000	Council		2,000	2,000	2,000	2,000	2,000	6,000
P5	Planning guidelines	Encourage developers and builders to incorporate water sensitive urban design into projects before they are submitted for planning approval (for example, water tanks).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
P6	Planning referrals	Refer planning applications for urban infrastructure, subdivision and development to Council 'experts', CCMA, GHCMA, DSE and DPI (as a statutory referral authority), South West Water and or EPAV, for comment, to ensure that they meet BPEM criteria and WSUD principles.	0	0	Council, CCMA, South West Water, EPAV	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
P7	Enforcement	Actively enforce planning permit conditions, local laws and other regulatory requirements designed to protect water quality, including a review of resourcing and requirements.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
P8	Enforcement	Integrate enforcement procedures with education programs and place emphasis on preventing, rather than prosecuting, problems.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons- ibility	Comment	Capital Cost ($)	Ongoing Cost ($)	Year 1	Year 2	Year 3	Estimated total cost
Education and training												
E1	Council Officers	Promote opportunities for Councillors and Council staff to attend stormwater management seminars or related events, possibly combining trips with other municipalities and agencies to facilitate travel if necessary.	2,000	2,000	Council		2,000	2,000	2,000	2,000	2,000	6,000
E2	Council Officers	Provide a program of internal training and forums for Council staff to develop a regular exchange of technical and operational information on stormwater. Make use on EPAV expertise in this field.	2,000	1,000	Council		2,000	1,000	2,000	1,000	1,000	4,000
E3	Contractors	Require Council contractors to have an appreciation of stormwater issues and incorporate stormwater protection measures in their operating procedures.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
E4	Community education	Incorporate BPEM for stormwater in Council's general environmental education programs.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
E5	Community education	Support community group implementation of stormwater education programs (e.g. Cobden, Port Campbell and Camperdown schools).	5,000	5,000	Council		5,000	5,000	0	5,000	5,000	10,000
E6	Community education	Implement targeted community education programs for residents, traders, industrialists, developers and contractors as set out in the reactive strategies.	0	0	Council	See reactive strategies for costs.	0	0	0	0	0	0
E7	Community education	Review the "Waste Minimisation Education Kit" prepared by SWRWMG, waste contractors and REO, and include information regarding the impacts of litter on water quality.	5,000	5,000	Council, SWRWMG		5,000	5,000	0	5,000	5,000	10,000
Advocacy and association												
A1	Partnerships	Seek the cooperation and commitment of other stakeholders to achieve stormwater improvements throughout the municipality (e.g. CCMA, GHCMA, Landcare groups, Committees of Management and other interest groups such as schools).	2,000	2,000	Council, Waterwatch	No additional cost - if implemented as part of C5.	2,000	2,000	0	2,000	2,000	4,000
A2	Partnerships	Recognise and promote effective stormwater management as a shared responsibility between Council, State government, various agencies (e.g. CCMA and GHCMA) and interest groups (e.g. Landcare, Committees of Management and other interest groups such as schools) and the wider community.	0	0	Council, Waterwatch	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
A3	Partnerships	Promote an integrated approach to stormwater management with landowners generally responsible for on-site issues, Council for local area and municipal wide programs and the CCMA and GHCMA for larger regional initiatives.	2,000	2,000	Council	No additional cost - if implemented as part of C5.	2,000	2,000	0	2,000	2,000	4,000
A4	Regional networks	Work with neighbouring Councils (e.g. the Shire of Corangamite and Moyne) to address regional stormwater issues (e.g. joint programs and the management of upstream inflows and shared waterways).	2,000	2,000	Council	No additional cost - if implemented as part of C5.	2,000	2,000	0	2,000	2,000	4,000
A5	Regional networks	Encourage and work with the MAV to lobby State Government, EPAV and/or other CMAs and DoI to respond to common management issues (e.g. community education, planning reform, regulatory reform, etc.) and therefore avoid duplication by Council (and other Councils).	2,000	2,000	Council, State Govt., EPAV, CMAs, DoI	No additional cost - if implemented as part of C5.	2,000	2,000	0	2,000	2,000	4,000

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons- ibility	Comment	Capital Cost ($)	Ongoing Cost ($)	Year 1	Year 2	Year 3	Estimated total cost
A6	Agencies	Encourage relationships between EPAV and Council (e.g. the Shire of Corangamite and Moyne) to be developed, with the objective of building an understanding of roles and responsibilities for stormwater management, including a greater understanding of when EPAV needs to be contacted (ie. Spills or when VSAP reports are due, etc.) Similarly, develop a greater understanding of roles and responsibilities for South West. In addition to outlining how EPAV information can be accessed.	0	0	Council, EPAV	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
A7	Agencies	Implement joint and/or coordinated investigations with EPAV to address issues which are relevant across the region, such as land development and building controls, septic and sewer seepage etc. Liaise with other adjoining municipalities (Colac-Otway Shire Council, Golden Plains, Moyne, etc.).	0	0	Council, EPAV	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
A8	Agencies	Encourage and support implementation of strategies developed by other agencies that aim to improve water quality. This may include the support of relevant actions within the CCMA's and GHCMA's Regional Catchment Strategies, the CCMA's Draft Waterway Health Strategy and Corangamite Nutrient Management Plan and the Glenelg Hopkins Nutrient Management Plan.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
A9	Agencies	Support other agencies in the development and implementation of strategies addressing rural issues. For example the Corangamite Regional Nutrient Management Plan has an action program to address nutrient laden runoff from agricultural land and the Waste and Litter Education Strategy has identified that agricultural waste is a significant issue for the Shire. In addition, the CRC for Catchment Hydrology and CRC for Freshwater Ecology are undertaking a research into best practice to protect waterways, particularly the urban program of the CRCCH.	0	0	Council, CCMA, GHCMA	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
A10	Works	Encourage government agencies and service providers (e.g. water, sewerage, electricity, gas and telecommunication companies) to adopt BPEM procedures and require EMPs for their projects.	0	0	Council, neighbouring Councils, CCMA	No additional cost - if implemented as part of C5.	0	0	0	0	0	0
A11	Statewide	Encourage EPAV and/or Barwon Water to develop simple guidelines for best practice stormwater management for residential, commercial and industrial areas, including quality protection and on-site re-use options.	0	0	Council, MAV	No additional cost - if implemented as part of C5.	0	0	0	0	0	0
A12	Statewide	Encourage EPAV, Barwon Water, Building Control Commission and the building industry to develop environmental management guidelines (including sediment and litter control) for building and construction sites.	0	0	Council, MAV	No additional cost - if implemented as part of C5.	0	0	0	0	0	0
A13	Statewide	Participate in strategic projects funded by VSAP and incorporate the results into Council's stormwater management procedures.	0	0	Council		0	0	0	0	0	0
A14	Community groups	Liaise regularly with community groups such as Landcare, Committees of Management and individual or groups who have an interest in environmental management issues, particularly stormwater management issues.	2,000	0	Council	No additional cost - if implemented as part of C5.	2,000	0	2,000	0	0	2,000

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
Information												
I1	Data collection	Coordinate water quality, littering, pollution incidents and complaint data within Council.	2,000	2,000	Council		2,000	2,000	0	2,000	2,000	4,000
I2	Data collection	Monitor stormwater quality and performance of all GPT's and treatment devices and report the results in Council's environmental reporting program. (i.e. Keep records of amount of litter removed (wet or dry weight, date of clean out, etc.)	5,000	2,000	Council		5,000	2,000	0	5,000	2,000	7,000
I3	Data collection	Make the above monitoring data and references to alternative data sources (e.g. Streamwatch) readily available to interested stakeholders.	2,000	2,000	Council		2,000	2,000	0	2,000	2,000	4,000
I4	Data collection	Collation of data and information relating to Terang's urban stormwater drainage system, to ascertain impacts of urban stormwater on the quality of the recieving waterways. Following assessment of this data, opportunities to include Terang in the reactive management strategies should be investigated.	5,000	0	Council		5,000	0	0	5,000	0	5,000
I5	Waterwatch	Continue to support community waterwatch programs.	5,000	5,000	Council. Barwon Water		5,000	5,000	0	5,000	5,000	10,000
I6	Data utilisation	Utilise the data already obtained by CMAs and DSE/DPI to feed into the Corangamite Stormwater Management Plan (e.g. information available regarding the status of bank stability and willow infestation across the Shire).	0	0	Council		0	0	0	0	0	0
Estimated Management Framework Strategy Cost									***45,000***	***79,000***	***66,000***	***190,000***
Reactive Management Strategies												
Residential land use												
The purpose of this strategy is to identify opportunities and implement strategies to minimise the impacts of residential land use on Lake Colongulac. Residential land use in Camperdown poses a very high risk to in-stream habitat values and a high risk to recreation and riparian habitat values within Lake Colongulac. Residential land use poses a potential threat to the quality of urban stormwater through atmospheric deposits and build up from traffic; nutrients from washing cars, fertiliser application, lawn clippings and leaf litter (particularly from decidiuous trees); and poor waste management practices. Key pollutants and impacts associated with residential activities include, increased flows, sediment, nutrients, litter, oxygen depleting material, hydrocarbons , pathogens, trace metals, pesticides and surfactants. This strategy provides an integrated approach to address the risk of residential runoff, with key aspects including education and awareness campaigns and initiatives; structural treatment measures; source control measures; and planning and regulation controls. Whilst this strategy has been specifically designed to respond to issues pertaining to Camperdown, the strategies are applicable to a other urban areas within the municipality and can be applied											
RE1	Education and awareness	Implement a community awareness campaign, including displays, workshops and education material on environmental best practice in property management (e.g. waterwise gardens, vehicle washing, appropriate disposal of garden waste, use of fertiliser on gardens, collection & disposal of dog faeces - particularly in open space areas etc). Utilise EPAV, CCMA, GHCMA material if appropriate and involve the students of schools within Camperdown. The education campaign can be linked with many of Council's current strategies (i.e. Waste and Litter Education Strategy 1999-2001).	15,000	5,000	Council, CCMA, GHCMA, EPAV	Education and awareness campaigns have many similar elements. Costs could be reduced by combining with other education strategies or with other Councils	15,000	5,000	15,000	5,000	5,000	25,000
RE2	Education and awareness	Facilitate a demonstration project showing best practice in stormwater management and WSUD. Investigate ways of including aspects of the site in educational curriculum and involving Camperdown Secondary College. Utilise outcomes from/or become involved in the WSUD project being undertaken by Melbourne Water and the Urban Land Corporation which is investigating community attitudes to WSUD. Utilise and expand on DNRE's Regional Stormwater Education Kit as an educational resource for schools. Localise the information to refer to issues relevant to Corangamite.	10,000	2,000	Council	Costs could be reduced - implement with RE1 actions.	10,000	2,000	0	10,000	2,000	12,000

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
RE3	***Education and awareness***	***Undertake drain marking in residential areas. The stencilling can build on the current drain stenciling program and implement an awareness campaign during the stenciling program and investigate opportunities to include Waterwatch as a potential partner and involve primary and secondary school students. Key milestone to stencil 50 stormwater drains by December 2003.***	***9,700***	***1,000***	***Council stormwater project coordinator, Camperdown Secondary School students***	***Can be linked with RI1***	***9,700***	***1,000***	***9,700***	***1,000***	***1,000***	***11,700***
RE4	***Education and awareness***	***Use the local press to publicise Council's initiatives regarding stormwater management, for example notify the community of the development of the stormwater management plan and any associated guidelines or activities such as the preparation of the Lake Colongulac feasibility and concept design project. Time releases to publicise workshops and other education events.***	***1,000***	***1,000***	***Council***		1,000	1,000	1,000	1,000	1,000	3,000
RE5	Education and awareness	Incorporate stormwater quality protection in Council's general environmental awareness campaigns and provide stormwater protection information in Council's New Resident Information Packs (mention ways that residents can improve stormwater quality, including actions such as raking up of deciduous leaves and the reuse of grey water on gardens).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
RE6	Education and awareness	Design and develop an environmental trail around significant lakes (e.g. Lake Colongulac) highlighting the importance of the Shire's waterways and how people can protect them. Key features of the trail may include information signs at the stormwater outlets to the Lake and natural features such as bird hides.	65,000	5,000	Council, CCMA, Tourism Victoria, Parks Victoria and DSE/DPI		65,000	5,000	0	0	65,000	65,000
RE7	Education and awareness	Conduct an environmental awards program highlighting BPEM in residential areas. The awards could highlight positive actions taken by both existing residents and new developers. Possibly include as part of the existing environmental awards as part of the Corangamite Shire Business Acheivement Awards.	5,000	5,000	Council	Costs could be reduced - implement with other RE8 actions.	5,000	5,000	0	0	5,000	5,000
RE8	Education and awareness	Promote and support the Urban Program within the *Corangamite Regional Nutrient Management Plan and the Glenelg Hopkins Nutrient Management Plan.*	0	0	Council CCMA	No additional cost - undertake as part of existing Council and CCMA obligations.	0	0	0	0	0	0
RS1	***Structural treatment measure - primary***	***Undertake a design feasibility and options study to address litter, gross pollutants, commercial, industrial, residential land use runoff and runoff from heavy vehicle parking and major highways. The purpose of the study will be to determine best practice management options including designs and costs provided to Council for improving stormwater quality entering Lake Colongulac via the north western outlet site. Aim to have prepared a draft feasibility and design conceptsby December 2003 and a final design concept and costings by March 2004.***	***22,400***	***0***	***Council***	***Not necessary if the outfalls are redirected towards a wetland.***	22,400	0	22,400	0	0	22,400
RS2	Structural treatment measure - primary	Incorporate open swale grass drains in the construction and reconstruction of streets and drains. Proposed kerb and channel works may need to be reassessed. Investigate different mowing regimes for improved water treatment, effectiveness and retrofitting to improve the efficiency of open swale drains for water quality treatment.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
RS3	Structural treatment measure - primary	Reform drain outlets to waterways to act as natural sediment and litter traps and to minimise erosion (e.g. the 3 stormwater outlets to Lake Colongulac) particularly along Medanarook Creek.	20,000	5,000	Council	Council	20,000	5,000	0	20,000	5,000	25,000

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
RS4	***Structural treatment measure - tertiary***	***Subject to the results of a concept design and feasibility studyof Medanarook Creek to construct a wetland or other appropriate end of pipe treatment and implement appropriate source control measures.***	***15,000***	***0***	***Council, CCMA***	***Costs will be dependant on the outcomes of the design and feasibility study.***	15,000	0	15,000	0	0	15,000
RC1	Source controls	Encourage the installation of rainwater storage and reuse tanks to reduce runoff during storm events and water wise gardening initiatives to conserve water.	0	0	Residents, South West Water	No additional cost - if implemented as part of RE1..	0	0	0	0	0	0
RC2	Source controls	Publicise the benefits of diverting roof water to grassed swales or gardens, or other pre-treat options in order to reduce total flows, scouring, sediment and nutrients entering the stormwater system and water costs to residents. Possibly through the establishment of a demonstration site.	0	0	Council, South West Water	No additional cost - if implemented as part of RC1.	0	0	0	0	0	0
RI1	***Information***	***Develop a protocol and monitor the volumes of litter, silt and leaves in the drainage system during periodic drain maintenance (cleaning and inspections). Conduct litter surveys before and after drain stencilling by community groups***	***2,700***	***1,000***	***Council (stormwater project coordinator), Council's operations unit***		2,700	1,000	2,700	1,000	1,000	4,700
RP1	Planning and regulation	Undertake periodic audits and random inspections of 'hot spot' areas, for illegal dumping of domestic waste. Focus on areas identified by the Waste and Litter Education Strategy. This could be undertaken as part of Council's and SWRWMG's Waste and Litter Education Strategy and the Waste Wise program. Data and information collected should be stored in a central data store with all other litter monitoring data)	0	0	Council, SWRWMG, Schools	No additional cost - undertake as part of existing Council obligations. Related to I2.	0	0	0	0	0	0
Estimated Residential land use strategy									***65,800***	***38,000***	***85,000***	***188,800***

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons- ibility	Comment	Capital Cost ($)	Ongoing Cost ($)	Year 1	Year 2	Year 3	Estimated total cost
Industrial land use												
The purpose of this strategy is to work with the Camperdown, Cobden, Lismore, Skipton and Timboon industrial community to identify opportunities and implement strategies to minimise the impacts of industrial land use on the receiving waterways for each of these towns. Industrial landuse poses a very high risk to in-stream habitat and extraction and use values in the receiving waters of Camperdown (Lake Colongulac) and Skipton (Mount Emu Creek). Industrial land use also poses a high risk to recreation and riparian habitat values in Cobden's receiving waterways (Cobden Lake); a high risk to extraction and use values in Mount Emu Creek in Skipton and in-stream habitat values in Timboon (Powers Creek), Lismore (Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek). Industrial land use poses a threat to these waterways through atmospheric deposition and build up from traffic, poor waste management, accidental spills and illegal discharges. Key pollutants and impacts associated with these sources include, increased flows, sediment, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals, pesticides and surfactants. This strategy incorporates a balanced approach to address industrial based threats with key aspects including a number of education and awareness campaigns and initiatives; structural treatment measures; source control measures; site management; information and data collection and planning and regulation control.											
IE1	Education and awareness	Implement an awareness campaign, including displays, workshops and education material relating to best practice at industrial sites for business owners/operators. (Utilise EPAV/CCMA material if appropriate). Where possible coordinate with visits undertaken by the Environmental Health Officer or with the water authorities' trade waste inspections. There may be a possibility to align such a program with the industrial program of the Waste and Litter Education Strategy and promote waste management and stormwater management at the same time. Build on the experiences of the pilot project being conducted in Ballarat - the Ballarat Stormwater Awareness Officer - Project Report - South West Education and Awareness for Industrial premises which is due for release at the end of 2002.	10,000	5,000	Council, EPAV, CCMA	Costs could be reduced - implement with other education strategies.	10,000	5,000	10,000	5,000	5,000	20,000
IE2	Education and awareness	Conduct an environmental awards program highlighting businesses and industries that demonstrate a commitment to being environmentally aware, with particular focus on improving stormwater quality entering Lake Colongulac, Cobden Lake and Mount Emu Creek.	5,000	5,000	Council	Costs could be reduced - implement with other IE1 actions.	5,000	5,000	0	5,000	5,000	10,000
IE3	Education and awareness	Undertake a business survey, advisory audit and education campaign (for example Old Joes Creek in the City of Knox) or neighbourhood improvement program to improve stormwater discharges to Lake Colongulac, Cobden Lake and Mount Emu Creek. Seek information on similar VSAP funded projects from the EPA and use educational information from EPA and CMA's as appropriate.	50,000	5,000	Council, CCMA, EPAV	Costs could be reduced - implement with other IE1 actions.	50,000	5,000	0	50,000	5,000	55,000
IS1	Structural treatment measure - primary	RS1 - feasibility and options study is also applicable to industrial runoff.	0	0		Costs are outlined in RS1.	0	0	0	0	0	0
IS2	Structural treatment measure - secondary	Review the capability of the Camperdown Saleyards stormwater retention system. Seek EPA advice as to best practice in retention systems.	15,000	0	Council, EPAV		15,000	0	15,000	0	0	15,000
IC1	Source controls	Audit loading, storage and waste storage areas to ensure contaminants (i.e. chemicals, litter, packages etc) are being handled appropriately and disposed of appropriately. This will be particularly important for industries that involve large quantities of chemicals (e.g. Pivot fertiliser). As part of this audit porcess review trade waste connections and illegal connections to the stormwater system.	5,000	1,000	Council		5,000	1,000	0	0	5,000	5,000
IC2	Source controls	Review access and egress design for all major industrial sites with the aim to minimise potential spills/accidents.	0	0	Council	No additional cost - implement as part of IC1.	0	0	0	0	0	0
ISM1	Site management	Encourage the development of site based EMP's for key industrial sites (e.g. dairy and fertiliser sites) to address stormwater, waste management, spill management, chemical storage, bunding, signage etc. For example, use Cobden's new industrial estate as an opportunity to function as a role model for new developments taking place. Utilise information from EPA and other VSAP funded projects in developing the plans.	0	0	Council, EPAV	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
ISM2	Site management	Ensure eel farming premises have adequate SMPs and EMPs in place. Monitor discharge licences which impact on adjoining waterways. Utilise information available from EPA and CMA's.	0	0	Coucil, EPAV, CCMA	No additional cost - ake as part of existing Council and agency obligations.	0	0	0	0	0	0
ISM3	Site management	Review petrol station management, particularly the bunding, chemical storage and litter control procedures, with the aim to bringing all operators up to best practice standards. Utilise information from EPA regarding best practice for bunding, chemical storage etc.	5,000	2,000	Council, EPAV		5,000	2,000	5,000	2,000	2,000	9,000
II1	Information and data collection	Undertake ongoing monitoring of the significant outlet drains (e.g. those discharging to Lake Colongulac, Cobden Lake and Mount Emu Creek) upstream and downstream of industrial premises. Seek EPA involvement in the monitoring and utilise EPA information regarding monitoring techniques and water quality.	15,000	15,000	Council, EPAV		15,000	15,000	0	15,000	15,000	30,000
IPR1	Planning and regulation	Review discharge and waste management practices at all industrial premises through an advisory audit.	10,000	5,000	Council, EPAV		10,000	5,000	10,000	5,000	5,000	20,000
Estimated Industrial land use strategy costs									***40,000***	***82,000***	***42,000***	***164,000***
Commercial land use												
The purpose of this strategy is to work within Camperdown's commercial community to identify opportunities and implement measures to minimise the impacts of commercial land use on Lake Colongulac and Port Campbell. Commercial land use runoff poses a high risk to in-stream habitat and riparian habitat values of Lake Colongulac through atmospheric deposition, build up from traffic and poor waste management and associated litter problems. Key pollutants and impacts associated with these sources include, increased flows, sediment, nutrients, litter, oxygen depleting material, hydrocarbons, pathogens, trace metals, pesticides and surfactants. This strategy offers an integrated approach to mitigate commercial threats with key aspects including a number of education and awareness campaigns and initiatives; structural treatment measures; source control measures and site management measures.											
CE1	Education and awareness	Implement an awareness campaign, including displays, workshops and education material for commercial business owners/operators regarding their responsibilities with regard to stormwater management. Target particular issues such as appropriate waste disposal (including disposal of cigarette butts and takeaway food containers), management of loading and unloading of materials and appropriate storage of goods (including chemicals). Use EPAV/CCMA material if appropriate.	10,000	2,000	Council	Costs could be reduced if implemented with other education strategies.	10,000	2,000	0	10,000	2,000	12,000
CE2	Education and awareness	Undertake drain stencilling, with a priority on heavily used or tourist precincts. For example, build on drain stencilling already undertaken in Port Campbell, focusing on stencilling along Lord Street.	2,000	1,000	Council	Costs could be reduced if implemented with RE3.	2,000	1,000	2,000	1,000	1,000	4,000
CE3	Education and awareness	Install signage at locations of the seven litter traps identifying their location, role and possibly results of monitoring/audits of litter trap contents.	5,000	0	Council		5,000	0	5,000	0	0	5,000
CS1	Structural treatment - primary	Install litter traps and side entry baskets in areas of high litter e.g. the streets in Port Campbell (Lord Street).	5,000	1,000	Council, Regional WMG		5,000	1,000	0	5,000	1,000	6,000
CS2	Structural treatment - primary	RS1 - feasibility and options study is also applicable to commercial land use runoff.	0	0		Costs are outlined in RS1.	0	0	0	0	0	0
CC1	Source controls	Encourage traders to install cigarette butt containers and provide advice on the available and appropriate disposal options and along Princes Highway (Camperdown) and along Lord Street (Port Campbell).	0	0	Traders, Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
CC2	Source controls	Encourage banks to review ATM operations to reduce street litter, particularly in hotspot areas such as the Princes Highway Camperdown.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
CSM1	Site managment	Liaise with local interest groups to discuss management options for specific commercial areas. Focusing on implementing best practice waste management and recycling programmes.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
CI1	Information	Monitor the outcomes of VSAP funded projects that address commercial runoff and remain up to date with best practice management information. This may be acheived by monitoring the research web pages or outputs from CRC for Catchment Hydrology and CRC for Freshwater Ecology and Melbourne Water, EPAV and MAV.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated commercial land use strategy									***7,000***	***16,000***	***4,000***	***27,000***
Septic and sewer seepage												
This strategy aims to address the impacts of septic and sewer seepage on the receiving waterways of Camperdown, Derrinallum, Darlington, Lismore, Skipton(although Central Highlands Water is introducing sewerage system to Skipton, this strategy will be relevant until such time as all of Skipton is connected) and Princetown. Septic and sewer seepage is associated with infiltration and overflow from sewerage systems and septic tanks. Key polluntants and impacts associated with this threat, include oxygen depleting material, pathogens and nutrients. Septic and sewer seepage poses a very high risk to in-stream habitats in recieving waterways associated with Darlington and Skipton (Mount Emu Creek) and Lismore (Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek) and a high risk to in-stream habitats in the recieving waterways below Derrinallum (Lake Tooliarook) and Princetown (Gellibrand River and LaTrobe Creek). This strategy presents an integrated suite of activities to address the septic and sewer threat, including education and awareness campaigns and initiatives; source control measures; site management measures; planning and regulation controls; and operations procedures.											
SE1	Education and awareness	Implement a community awareness campaign for residents' with septic treatment systems, utilising displays, workshops and education material. Focus on their maintenance responsibilities, ongoing monitoring requirements and responsible water and waste management practices.	5,000	1,000	Council	Costs could be reduced if implemented with other education strategies.	5,000	1,000	5,000	1,000	1,000	7,000
SE2	Education and awareness	Encourage connection to sewer where and when available, possibly through an incentive program offering rebates or discounted connection fees.	2,000	2,000	Council, South West Water	Costs could be reduced - implement with other SE actions.	2,000	2,000	2,000	2,000	2,000	6,000
SE3	Education and awareness	Promote and support the implementation of relevant actions from the Corangamite Regional Nutrient Management Plan Sewerage Program and the Glenelg Hopkins Nutrient Management Plan Wastewater treatment program.	0	0	Council CCMA, GHCMA	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
SS4	Source control	Advocate either extension of reticulated sewerage system to reach unserviced properties or provision of an alternative waste disposal technique.	0	0	Council, South West Water	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
SSC1	Source control	Advocate for the use of package treatment plants or neighbourhood waste management systems in Princetown.	0	0	Council, South West Water	No additional cost - undertake as part of existing Council and agencyobligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
SSM1	Site management	Encourage property owners to ugrade and/or maintain on-site treatment systems so that septic discharges and sullage are retained on site. EPA can provide information regarding the correct operation of septic systems and on approved septic systems (available on the internet). A strategic project to develop a wastewater management database for on-site wastewater systems has been proposed. There is potential for Corangamite Shire to become involved in this project.	0	0	Council, EPAV	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
SSM2	Site management	Encourage property owners to reuse grey water by diverting it to gardens and lawns.	0	0	Council, South West Water	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
SPR1	Planning and regulation	Review permit documentation (maintain register) and carry out inspections of existing on site waste management systems and enforce maintenance requirements in permits. Investigate opportunities for a regional approach in association with adjoining Councils.	10,000	5,000	Council and other adjoining Councils		10,000	5,000	10,000	5,000	5,000	20,000
SPR2	Planning and regulation	Promote connection to reticulated sewerage, where available. Require annual inspections of septic tanks and the reporting of results to Council.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
SO1	Operations	Under existing legislation, perform a review of known septic seepage hotspot areas.	0	0	Council, South West Water	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated septic and sewer strategy cost									***17,000***	***8,000***	***8,000***	***33,000***
Land development and building sites												
The purpose of this strategy is to work with the communities of Port Campbell and Skipton to identify opportunities and implement strategies to minimise the impacts of land development and building site activity on the receiving waterways of these towns. Threats associated with land development and building site activity are related to poor sediment and erosion control, uncontrolled wash down of equipment, deposition of sediment, poor site waste management and spills or deliberate discharge from sites (eg. washing paint or concrete down drains). Key polluntants and impacts associated with these threat types include sediments, nutrients and litter. Land development activity poses a very high risk to recreation values and a high risk to in-stream and riparian habitats in the receiving waterways of Port Campbell (Port Campbell Creek and the Southern Ocean) and a high risk to in-stream habitat values of Mount Emu Creek at Skipton. Building site activities at Port Campbell pose a high threat to recreation values of Port Campbell Creek and the Southern Ocean. This strategy provides a balanced approach to mitigate the effects of land development and building site runoff with key aspects including education and awareness campaigns and initiatives; source control measures; site management measures; information; planning and regulation; and operations.												
LE1	Education and awareness	Implement an awareness campaign, including displays, workshops and education material for contractors and developers regarding management of stormwater. Brochures can be used as a guide for contractors when preparing Environmental Management Plans and when preparing documentation to meet quality assurance procedures. Use EPAV/CCMA/GHCMA material as appropriate. Visit sites where best practice has been put in place (e.g. Lynbrook Estate).	5,000	1,000	Council	Costs could be reduced if implemented with other education strategies.	5,000	1,000	5,000	1,000	1,000	7,000
LSC1	Source controls	Include requirements for source controls in permit requirements (e.g. litter containment on site, use of hay bales/sand bags to prevent sediment escape from site, covering and containment of stock piled materials etc.) and identification of the local waterway (ie. proforma which requires the developer to state how they are going to control ongoing litter and sediment).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
LSM1	Site management	Encourage the housing and construction industry to develop a code of practice for environmental management and for control of wastes (including sediment, paints etc) from construction sites.	2,000	0	Council		2,000	0	2,000	0	0	2,000

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
LI1	Information	Monitor the outcomes of VSAP funded projects relevant to the land development and building industry and remain up to date with best practice management information (e.g. *Control of building and construction site practices for the improvement of stormwater quality-* a project involving the Cities of Melbourne, Moonee Valley, Moreland, Hume, Kingston and Casey. It will look at the development of model Local Laws and Codes of Practice).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
LPR1	Planning and regulation	Ensure that all permits for subdivisions are granted with conditions relating to sediment control. Consider the application of water sensitive urban design requirements to subdivision and development permits on a case by case basis. Ensure that all subdivision and building sites are appropriately designed and sited with respect to waterways.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
LPR2	Planning and regulation	Require land developers to prepare an EMP (including sediment/erosion control initiatives) for land for subdivision activities, particularly target undeveloped areas. Ensure a pre-commencement meeting is held to explain the EMP requirements to contractors.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
LPR3	Planning and regulation	Enforce development controls (planning, local laws etc.) through regular site inspections.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
LO1	Operations	Investigate opportunities for Council to review its operations procedures relating to construction works and landscaping with a view to improving their responsiveness to stormwater quality issues. Utilise outcomes from the pilot programme being undertaken by LGPro which involves a number of Councils reviewing and developing best practice stormwater protection for construction works, road works and construction activities.	0	0	Council LGPro	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated land development and building site strategy cost									***7,000***	***1,000***	***1,000***	***9,000***

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons- ibility	Comment	Capital Cost ($)	Ongoing Cost ($)	Year 1	Year 2	Year 3	Estimated total cost
Major roads												
The purpose of this strategy is identify opportunities and implement strategies to minise the impacts of major road runoff on receiving waterways. Major roads pose a very high risk to in-stream habitat and riparian habitat and a high risk to recreation values in Lake Colongulac and Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek. Major road runoff also poses a high risk to in-stream habitat, riparian habitat and recreation values in Port Campbell Creek and the Southern Ocean, and a high risk to in-stream habitat values of Mount Emu Creek. Major road runoff poses a potential threat to the quality of urban stormwater in terms of atmospheric and vehicular deposition and accumulation which results in sediment, litter, trace metals and hydrcarbon contaminants entering the stormwater system. Accidents resulting in spills of oils, engine coolants or loads are another potential risk. This strategy aims to reduce the impact of major roads through actions including education and awareness campaigns; structural treatment measures; source control measures; site management, information; planning and regulation and operations.											
ME1	Education and awareness	Liaise with the local truck industry (e.g. trucks involved in agricultural/horticultural cartage, timber transport trucks, milk tankers etc) regarding management of loads to avoid spillages, truck maintenance to minimise contaminants accumulating on the road including engine oils, grease, air pollution deposits etc.	0	0	Council, industry reps	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
ME2	Education and awareness	Use the local press to publicise load spillages and the impact they are likely to have on local lakes (including Ramsar sites) and waterways (where possible use actual examples) and point out the measures that truck/vehicle owners and operators can take to minimise reoccurrence.	0	0	Council	Costs could be reduced - implement with other ME2 actions.	0	0	0	0	0	0
MS1	Structural treatment measures - primary	Investigate the installation of drainage entrance treatments/inline types (e.g. litter traps, trash racks, return flow litter baskets, circular screens etc) at known vehicle stopover locations, for example near the Caltex Petrol Station in Camperdown, close to waterways along Princes Highway, Hamilton Highway and the Great Ocean Road which carry a substantial amount of traffic.	5,000	0	Council, VicRoads		5,000	0	5,000	0	0	5,000
MS2	Structural treatment measures - secondary	Investigate opportunities for the installation of grass swales, infiltration trenches or wetlands to treat road runoff the Mount Emu Creek crossing to collect and treat major road runoff.	0	0	Council	No upfront cost however installation will have a cost that is dependant on the type of measure installed.	0	0	0	0	0	0
MS3	Structural treatment measures - secondary	Incorporate pre-entrance treatment measures such as filter strips, grass swales, infiltration systems, bio-retention systems (for example, the centre of Geelong triple interceptor pits, porous pavements and oil and grease baffles in main road design.	0	0	Council, VicRoads	No additional cost - undertake as part of existing Council and VicRoads obligations.	0	0	0	0	0	0
MSC1	Source controls	Review road drainage in close vicinity to waterways and develop 'emergency' detention basins where feasible so that spillages can be trapped.	5,000	5,000	Council, VicRoads		5,000	5,000	5,000	5,000	5,000	15,000
MSC2	Source controls	Review existing street sweeping regime, checking to ensure that the schedule includes all hot spot areas.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
MSM1	Site management	Require environmental management plans including site specific sediment and erosion control plans for road works and other construction activities in road reserves.	0	0	Council, VicRoads		0	0	0	0	0	0
MSM2	Site management	Ensure there are adequate litter bins along stopping points on major roads (e.g. at the Caltex petrol station in Camperdown). Encourage programs such as Clean Up Australia Day or Adopt a Highway to target litter along major roads	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
MI1	Information	Utilise information available through the EPAV (e.g. types and amounts of pollutants generated through road use) in education campaigns.	0	0	Council, EPAV	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
MPR1	Planning and regulation	Liaise with VicRoads to encourage WSUD and water treatment measures, such as the use of detention and treatment areas, in future projects. Utilise current best practice management information as it becomes available (e.g. Cooperative Research Centre for Catchment Hydrology report " Water Sensitive Road Design - Design options for improving stormwater quality road runoff").	0	0	Council, VicRoads	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
MPR2	Planning and regulation	Council, in association with VicRoads, EPAV and the Police, need to reinforce controls with regard to speed limits, securing of loads, vehicle maintenance etc. Promote EPAV initiatives such as reporting people littering from their cars (i.e. phone in their number plate, litterers can be fined).	0	0	Council, EPAV, Vic Roads, Police	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
MO1	Operations	Ensure Council roadworks activities (e.g. spraying, vegetation removal, road maintenance) adhere to best practice guidelines.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
MO2	Operations	Introduce controls with regard to best practice environmental management for Council staff, particularly targeting road crews near Lismore, Derrinallum and Skipton.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated major road runoff strategy cost									***10,000***	***5,000***	***5,000***	***20,000***
Upstream inflows												
The purpose of this strategy is to work within the communities of Princetown and Port Campbell to identify opportunities and implement strategies to minise the impacts of upstream inflows on Port Campbell Creek, the Southern Ocean, Gellibrand River and La Trobe Creek. Upstream inflows from tributaries higher up the catchment pose a risk to recreation values of Port Campbell Creek and the Southern Ocean and to in-stream habitat values in the Gellibrand River and LaTrobe Creek. Upstream inflows pose a potential threat to water quality primarily due to agricutlural land use activities resulting in contaminants such as sediment, nutrients, litter and pathogens. This strategy incorporates a balanced approach to mitigate the threat of upstream inflows including actions such as education and awareness campaigns, source control measures and site management measures.											
UE1	Education and awareness	Liaise with rural property owners to reduce sediment and pollutant loads washing into creeks that pass through the towns. Use DSE/DPI, CCMA, GHCMA and Landcare material as appropriate and utilise existing Landcare networks.	0	0	Council, DSE/DPI, CCMA, GHCMA	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
UE2	Education and awareness	Develop, with landcare/friends of groups, localised catchment management plans extending from the upper rural catchments through the urban areas. Seek partnerships with DSE/DPI, CCMA, GHCMA to utilise current strategies and facilitate plan development and implementation.	5,000	2,000	Council, DSE/DPI, CCMA, GHCMA		5,000	2,000	0	5,000	2,000	7,000
UE3	Education and awareness	Promote relevant actions within current CMA strategies (e.g. Regional Catchment Strategies and Draft Waterway Health Strategy).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
USC1	Source controls	Encourage actions that limit pollutants entering waterways from upstream areas (e.g. riparian zone revegetation and stock exclusion to limit sediment; review of agricultural chemical use and storage to limit toxicant input).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
USC2	Source controls	Maintain unsealed roads and review the effectiveness/state of repair of open table drains with the aim of decreasing the amount of sediment entering waterways from unsealed road runoff.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
USM1	Site management	Encourage the production of rural property/farm management plans to improve overall farm management and limit the inputs of sediments, nutrients and chemicals entering the waterways from rural properties. DSE/DPI, in coordination with Council and Glenormiston Agricultural College (supported by Melbourne University), run farm management planning courses.	0	0	Council, DSE/DPI, CCMA, GHCMA	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated upstream inflow strategy cost									***0***	***5,000***	***2,000***	***7,000***
Pests												
The purpose of this strategy is to minimise the impacts of pests on the receiving waterways of Timboon, Darlington, Lismore, Princetown and Skipton. Pests pose a high risk to in-stream and riparian habitat values in Powers Creek in Timboon and a high risk to in-stream habitat values of Mount Emu Creek, Lake Gnarpurt, Browns Waterholes and Mundy Gully Creek, the Gellibrand River and LaTrobe Creek. Pests pose a threat in terms of bank instability and erosion (e.g rabbit burrowing) and the destruction of instream and riparian habitat (e.g. willows and carp). Pest activity in waterways can result in excess levels of sediment, nutrients and oxygen depleting material. This strategy addresses the impact of pests through education and awareness campaigns; source control measures; information; planning and regulation; and operations.											
PE1	Education and awareness	Liaise with the Shires of Moyne and Colac Otway to tackle pests along shared waterways e.g. Mount Emu Creek (Moyne Shire Council) and Gellibrand River (Colac Otway Shire Council). Communication with adjacent Shires can achieve a coordinated response to weeds whereby upper catchment areas are targeted before those areas downstream and greater results can be achieved.	0	0	Council, CCMA, GHCMA, DSE/DPI	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
PE2	Education and awareness	Implement an awareness campaign, including displays, workshops and education material targeted at property owners adjacent to creek lines. It should focus on litter control and discourage people from throwing green waste into waterways, as well as highlighting the potential for muddied/dirt encrusted vehicles to spread weeds between sites.	5,000	1,000	Council	Costs could be reduced - implement with other education strategies.	5,000	1,000	5,000	1,000	1,000	7,000
PE3	Education and awareness	Promote and support the implementation of relevant programs within the CCMA Regional Catchment Strategy (e.g. the targeted pest management program), the GHCMA Regional Catchment Strategy (e.g. Management Action Targets for Pest Plants and Animals) and the GHCMA Weed and Rabbit Action Plans.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
PSC1	Source controls	Undertake a targeted program of weed and vermin eradication, commencing with hot spot areas. Utilise existing information available from DSE/DPI, CCMA, GHCMA and Landcare Groups.	10,000	2,000	Council, CCMA, GHCMA, DSE/DPI		10,000	2,000	0	0	10,000	10,000
PSM1	Site management	Develop site management plans for heavily pest infested areas that are of importance to the community (e.g. Lakes Colongulac and Gnarpurt) describing actions and programs to address the pest problem. Review the plans annually.	5,000	1,000	Council, CCMA, GHCMA, DSE/DPI		5,000	1,000	0	0	5,000	5,000
PI1	Information	Distribute information to nurseries and homeowners informing them of plants that are considered environmental weeds in the area.	1,000	0	Council	Costs could be reduced if implemented with RE1 actions.	1,000	0	0	0	1,000	1,000

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
PI2	Information	Develop maps showing priority areas for weed control. Utilise and build on current CMA and DSE/DPI information. Review the maps biennially.	5,000	500	Council, CCMA		5,000	500	0	0	5,000	5,000
PPR1	Planning and regulation	Investigate the use of an incentive system to encourage landholders to address pest problems on their land.	0	0	Council, CCMA, GHCMA	No additional cost - undertake as part of existing Council and CMA obligations.	0	0	0	0	0	0
PPR2	Planning and regulation	Require all fill to be clean before use in order to limit the spread of pests. Encourage the use of all fill to be free from pests.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
PO1	Operations	Review Council landscaping guidelines to ensure environmental weeds are not used in Council areas. Investigate options for using native grass species in Council areas and in the development of grassed swales as native species require less mowing on Council owned or managed land.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated pest strategy cost									***5,000***	***1,000***	***22,000***	***28,000***
Unstable waterways												
The purpose of this strategy is to identify opportunities and implement measures to minimise impacts of unstable waterways on the receiving waterways of Camperdown, Port Campbell and Cobden. Unstable waterways pose a high risk to in-stream habitat values in Lake Colongulac and recreation values of Port Campbell Creek and the Southern Ocean and landscape values of Cobden Lake. Unstable waterways pose a potential threat to urban stormwater quality particularly in terms of poorly controlled stock and recreational access, weed infestation, damage from waterway works, development encroachment, vegetation loss, and eroded and unstable riparian zones. This results in pollutants such as sediment, nutrients and oxygen depleting material entering the waterway. This strategy includes an education and awareness campaign; structural treatment measures; source control measures; and site management.											
WE1	Education and awareness	Implement an awareness campaign, including displays, workshops and distribution of education material to land owners, particularly those with properties with waterway frontage, regarding BPEM of waterways environs. Highlight issues such as minimising stock access to waterways, revegetating and fencing the riparian environment either side of the waterways. Utilise existing information from the CMA's	5,000	2,000	Council, CCMA, GHCMA	Costs could be reduced if implemented as part of other education strategies.	5,000	2,000	0	5,000	2,000	7,000
WE2	Education and awareness	Promote and support relevant programs within the CCMA Regional Catchment Strategy (e.g. program 3.13 vegetation retention and protection) and the GHCMA Regional Catchment Strategy (e.g. 5.2.4 Management Action Targets for Biodiversity), particularly along watercourses.	0	0	Council, CCMA, GHCMA	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
WS1	Structural treatment measures - primary	Investigate weed eradication and structural works in areas of particularly unstable waterways. Could link in with various GHCMA or CMA programs already underway such as the Draft Waterway Health Stratey prioritisation of bank protection and stabilisation and willow removal.	0	0	Council, CCMA, GHCMA	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
WSC1	Source controls	Encourage landholders to limit stock access and clearing of riparian vegetation adjacent to waterways. Utilise existing Landcare networks and the CCMA biodiversity team for information and biodiversity program activities. Planning permits are required to remove native vegetation as per legislative requirements.	0	0	Council, CCMA, GHCMA, Landcare groups	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
WSM1	Site management	Review stormwater outlets and modify where required to reduce the capacity of flows to destabilise waterways. Modifications may include structures to reduce flow intensity, protecting the bank with rock works, or introducing a detention basin at the outlet to allow water to enter the waterway in a more controlled rate.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
WI1	Information	Maintain up to date information regarding BPEM of pests. Liaise with other agencies, such as Landcare and CMAs, to share information.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated unstable waterway strategy cost									***0***	***5,000***	***2,000***	***7,000***
Flow modification												
The purpose of this strategy is to work with the communities of Campderdown and Lismore to identify opportunities and implement strategies to to minimise the impacts of flow modification on Lake Colongulac and Lake Gnarpurt. Flow modification poses a high risk to instream habitat values of both lakes. Flow modification can occur through water extraction for agricultural purposes (i.e. reduced flows) or an increase in flow intensity, as occurs when stormwater is channeled to an outfall point or vegetation is removed from the water's flow path (i.e. change in flow type). This strategy includes education and awareness campaigns; source control measures; and planning and regulation controls.											
FE1	Education and awareness	Educate the community regarding the effects that increased urban runoff has on natural ecosystems.	0	0	Council, CCMA, GHCMA	No cost if implemented as part of RE strategies.	0	0	0	0	0	0
FE2	Education and awareness	Promote and support the implementation of relevant actions within the CCMA and GHCMA Regional Catchment Strategies (e.g. CCMA RCS Program 2.1.E changed flow regimes).	0	0	Council, CCMA, GHCMA	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
FS1	Structural treatment measures - primary	Reform drains to ensure high velocity and intensity urban runoff is discharged to streams in a more natural way. Investigate ways to improve the quality of water being discharged via these drains (e.g. a detention basin may reduce velocities and improve water quality through allowing sediments to settle).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
FSC1	Source controls	Encourage the use of rain water tanks, reuse of stormwater and activities that will reduce the amount of runoff from urban areas.	0	0	Council, South West Water	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
FI1	Information	Invesigate the reuse of stormwater for Council irrigation purposes.	2,000	0	Council, South West Water		2,000	0	0	2,000	0	2,000
FRP1	Planning and regulation	Assess planning permit applications with regard to any effects that the development may have on the flow regime. Such consideration should be informed by hydrological flow and water quality modelling data representing different stormwater scenarios.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated flow modification strategy cost									***0***	***2,000***	***0***	***2,000***

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
Docks and wharves												
The purpose of this strategy is to work with the Port Campbell community to identifgy opportunities and implement measures to minimise the impact of the wharf on the instream habitat values of the Southern Ocean. Docks and wharves pose a potential threat to urban stormwater quality due to runoff from wharf areas which can contain atmospheric deposition, spilt raw product, erosion from unsealed areas, accidential spills and litter. This results in sediment, raw product (oxygen depleting materials), oils and greases, trace metals and toxic substances. This strategyy includes education and awareness campaigns; source control measures, site management; and information dissemintation.												
DE1	Education and awareness	Ensure those using the crane to lift boats are adequately trained and aware of the impact the activity may have on water quality.	1,000	500	Council, Parks Victoria		1,000	500	1,000	500	500	2,000
DE2	Education and awareness	Install signs at the wharf advising users of their environmental responsibilities. Use the signs to raise awareness of general stormwater issues.	1,000	0	Council, Parks Victoria		1,000	0	1,000	0	0	1,000
DSC1	Source controls	Provide adequate numbers of litter bins along the wharf and review the frequency of their emptying (may require greater frequency during peak times).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
DSM1	Site management	Develop a site management plan for the wharf that details how risks to water quality will be handled.	2,000	0	Council, Parks Victoria		2,000	0	0	0	2,000	2,000
DI1	Information	Compile information on wharf usage (e.g. frequency of boat launching, type of boat, pedestrian access etc). Use this information to develop the site management plan.	2,000	0	Council, Parks Victoria		2,000	0	0	0	2,000	2,000
Estimated docks and wharves strategy cost									***2,000***	***500***	***4,500***	***7,000***

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
Rural land use												
The purpose of this strategy is to work with the rural communities in and around Princetown and Port Campbell to identify opportunities and implement measures to minimise the impacts of rural land use on the receiving waterways of these towns. Rural land use activities near Port Campbell and Princetown pose a high risk to recreation values in Port Campbell Creek and the Southern Ocean and in-stream habitat values in the Gellibrand River and LaTrobe Creek near Princetown. Rural land use activities pose a potential risk to urban stormwater quality due to runoff from unmade roads, septic tanks and intensive activities such as poultry sheds, landscape suppliers etc. This results in sediment, nutrients and oxygen depleting materials entering the waterways. This strategy aims to reduce the amount of pollutants in rural runoff through education and awareness campaigns; source control measures; site management; information dissemination; planning and regulation controls; and operations procudures.											
RUE1	Education and awareness	Support the education of landholders regarding the threat that rural activities can pose to water quality. Educational opportunities exist through the CCMA RCS program 4.1 community education, the CCMA and GHCMA RCS Agricultural landuse action programs and the DSE/DPI farm extension activities.	5,000	2,000	Council, Landcare, CMAs	Costs could be reduced if implemented with RE actions.	5,000	2,000	0	0	5,000	5,000
RUE2	Education and awareness	Continue to support the drum muster program for farm chemical drums. Review the program to include new educational components focussing on stormwater issues for rural properties. Provide guidelines for property owners regarding appropriate chemical storage, particularly focussing on intensive agricultural industries (such as livestock feedlots, broiler farms etc).	0	0	Landcare, Council, EPAV	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
RUSC1	Source controls	Identify sources of rural contaminants and undertake monitoring to determine the extent of the impact and possible means of reducing the contaminants. It is important that rural areas upstream of the towns are considered to reduce their impacts on urban stormwater downstream.	15,000	15,000	Council		15,000	15,000	0	0	15,000	15,000
RUSM1	Site management	Encourage the development of property and catchment plans (e.g. through Farm Management Planning courses run by DSE/DPI or as outlined in CCMA and GHCMA RCS such as CCMA RCS Program 1.1 Soil and Catchment Management).	0	0	Council, CMAs, DSE/DPI, Landcare groups	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
RUI1	Information	Utilise information obtained from research undertaken through the RCS, the Coorperative Research Centre for Catchment Hydrology - River Restoration Program and other relevant research, in education campaigns and media releases etc.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
RUPR1	Planning and regulation	Develop/review, as appropriate, controls for the removal of vegetation on rural properties. Undertake a review of the planning scheme as outlined in the CCMA Regional Catchment Strategy.	0	0	Council, CMAs	No additional cost - undertake as part of existing Council and agency obligations.	0	0	0	0	0	0
Estimated rural land use strategy cost									***0***	***0***	***20,000***	***20,000***

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	Type	Details	Capital Cost ($)	Ongoing Cost ($)	Respons- ibility	Comment	Capital Cost ($)	Ongoing Cost ($)	Year 1	Year 2	Year 3	Estimated total cost
Open space												
This strategy aims to identify opportunities and implement measures to minimise the impact of Timboon's open space areas on Powers Creek and Cobden+A265. Open space areas within the town pose a high risk to riparian habitat values of the Creek. Open space poses a potential threat to the quality of urban stormwater through wash off of nutrients (fertilisers) and litter from public gardens, parks, sporting facilities and golf courses, distribution of environmental weeds from gardens and discharge of poor quality water from ornamental lakes. This strategy incorporates education and awareness campaigns and activities; structural treatment measures; source control measures; site management; information dissemination; planning and regulation controls; and operations measures in order to reduce the impact of open space areas on the creek.											
OE1	Education and awareness	Establish work procedures that ensure grass clippings/prunings are not left close to waterways or water bodies. Ideally clippings would be collected and composted. Provide education to Council's parks and gardens staff and the community.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
OE2	Education and awareness	Develop signage demonstrating the values of local waterside parks (e.g. Powers Creek Reserve), good environmental practice and stormwater issues.	5000	0	Council, Powers Creek Reserve Committee of Management		5,000	0	5,000	0	0	5,000
OS1	***Structural treatment measure-primary***	***Upgrade Cobden Lake through the addition of sediment ponds, litter nets, vegetated swales, weed removal and revegetation in order to improve stormwater quality and in-stream and riparian habitats of the Lake. Incorporate community awareness through drain stencilling and water monitoring. Utilise information and technical expertise from relevant agencies.***	***160000***	***1000***	***Council, EPAV, CCMA, GHCMA***		***160,000***	***1,000***	160,000	1,000	1,000	162,000
OC1	Source controls	Review fertiliser, herbicide and pesticide use in council parks with the objective of minimising toxicant input into waterways/water bodies.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
OM1	Site management	Develop site specific waste management plans for key events through lease arrangements with Council (e.g. for sporting clubs, markets etc).	5000	2000	Council, Event organiser		5,000	2,000	0	0	5,000	5,000
OM2	Site management	Consider temporary signage indicating waste disposal practice required at event location (5 x $200).	1000	0	Council		1,000	0	0	0	1,000	1,000
OM3	Site management	Follow up events, such as markets, with coordinated clean up plan (street sweeping, rapid rubbish collection, recycling containers, cigarette butt containers etc).	0	0	Council, Event organiser	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
OM4	Site management	Encourage the development of an environmental management plan for the local golf courses (e.g. Timboon Golf Club and other golf courses and bowling greens).	15000	0	Council	Council, Golf Course managers	15,000	0	0	15,000	0	15,000
OP1	Planning and regulation	Require park users to develop environmental/waste management plans as part of lease conditions.	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
OO1	Operations	Review maintenance operations to ensure they meet with best practice requirements in terms of chemical use, irrigation and maintenance procedures (e.g. lawn mowing, pruning).	0	0	Council	No additional cost - undertake as part of existing Council obligations.	0	0	0	0	0	0
Estimated open space strategy cost									***165,000***	***16,000***	***7,000***	***188,000***
Total reactive management strategies cost									***318,800***	***179,500***	***202,500***	***700,800***

Actions			Estimated Costs				Estimated Combined		Indicative Implementation			
No.	**Type**	**Details**	**Capital Cost ($)**	**Ongoing Cost ($)**	**Respons- ibility**	**Comment**	**Capital Cost ($)**	**Ongoing Cost ($)**	Year 1	Year 2	Year 3	Estimated total cost
Total strategies cost									***363,800***	***258,500***	***268,500***	***890,800***