



**SWAN HILL RURAL CITY COUNCIL
WASTE MANAGEMENT STRATEGY
2007-2012**





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1 ABBREVIATIONS

CMRVMG	Central Murray Regional Waste Management Group
SV	Sustainability Victoria
EPA	Environment Protection Authority
DSE	Department of Sustainability
SEPP	State Environment Protection Policy (Management of Landfills and Receiving Municipal Wastes)
ZWS	Zero Waste Strategy
MGB	Mobile Garbage bin
MRF	Material Recovery Facility

2 GLOSSARY

Best practice	Applied to any area of waste management to reflect the current "state of the art" in achieving particular goals.
Commercial & Industrial waste	Waste generated by industry with the exemption of construction and Demolition Waste.
Construction & Demolition Waste	Waste sourced from the demolition, building and construction, earth moving and road construction
Domestic Waste	Includes all households refuse except night soil
Ecological footprint	Concept that defines a theoretical area of land (hectares per person) needed to provide products for human consumption as well as that required for waste disposal.
Garden /Green organics	Vegetative material, not classed as food organics
Non-renewable	Resources with finite stocks that can be used up or depleted to such a degree that recovery is too expensive.
Resource recovery	The process of obtaining matter or energy from waste
Recycling	Includes glass, pet, Aluminum etc
Renewable Resource	Natural resources that come from essentially inexhaustible source i.e. solar energy
Sustainability	The simultaneous pursuit of economic prosperity, social equity and environmental quality
Waste Wise	Effective Waste reduction program

3 INTRODUCTION

Effective Waste Management is a priority for Swan Hill Rural City Council. In 2006 Council identified the need to review the previous Waste Strategy (1997) and conduct an extensive internal review of Waste Management in the Municipality. The review has highlighted Council's commitment to achieving a minimum of 100% cost recovery and reducing green house emissions. The Current waste management achievements include significant reductions in the use of plastic bags, and encouraging residents to buy reusable and recyclable packaging.

The 2007 Waste Strategy evaluates current waste management practices and sets targets in conjunction with the regions waste management vision of reducing Council's footprint working towards sustainable development.

3.1 Vision

Swan Hill Rural City Council will continue to meet the needs of our diverse community by delivering cost effective innovative and environmentally responsible waste management services.

3.2 Background

The objectives of the SHRCC Waste Management Strategy is to evaluate the existing practices and services and to develop a framework for the planning of waste management services and facilities. The aim is to meet community needs and expectations for the next 10 years whilst reducing Council's ecological footprint. Meinhardt, was engaged by the Swan Hill Rural City Council to prepare a Waste Management Strategy in 1997. The Meinhardt report has since been used as the basis for the current Waste Management Strategy.

The Swan Hill municipality spans some 6,120 sq km south of the Murray River in the North Western Region of Victoria. The municipality's population is estimated to be 22,000 residents, 8,275 households, and 11,144 rateable premises.

The municipality comprises numerous residential settlements, broad acre farming, intensive viticultural and horticultural pursuits, light industry, tourist attractions and a variety of shopping and commercial business.

4 WASTE COLLECTION SERVICES

4.1 Overview of Current Waste Management Systems in Swan Hill

The large variations in population distribution through the municipality give rise to variations in the waste collection services required and provided. Weekly collection services are provided by the Swan Hill Rural City Council to the townships of Swan Hill and Robinvale, other small townships within the Municipality, and also to the townships of Euston, Koraleigh, Tooleybuc and Murray Downs in NSW. Recycling bins are collected fortnightly in all of the townships, except for Euston in NSW.

4.2 Domestic Garbage

Council provides a weekly garbage collection service to most townships in the municipality. Residents may choose a 120L mobile bin or a 240L mobile bin for garbage. Currently there are 8,245 units collected in the weekly garbage service. This figure also includes NSW collections. The 2006/2007 annual charges are \$210 for the 120L, or \$275 for the 240L bin. Charges are itemised on rate notices.

4.3 Recycling

All residents provided with a garbage collection are also supplied with a 240L Mobile Bin for recycling, collected fortnightly.

Materials recovered through the kerbside collection include:

- Steel cans
- Aluminium cans
- Glass
- Paper and cardboard
- Plastic codes 1,2,3
- Liquid paperboard (milk cartons)

Resource recovery at landfills for the municipality include:

- Metal
- Silage Wrap & baling twine
- Concrete
- DrumMUSTER drums
- Green Waste
- Waste Oil

Used oil collection facilities at Swan Hill, Manangatang and Robinvale landfills are part of a statewide network of sites made possible by a small levy placed on the sale of oil by the Commonwealth Government.

4.4 Hard Waste Collection Services

Swan Hill Rural City Council currently provides free hard waste collections at various times. This collection requires manual collection using loaders for heavier objects by Council's Landfill Contractors.



Figure 1: Hard waste collection October 2006 at Viniñera

4.5 Green Waste

Green Waste is a major problem in landfills as it is combustible material, causing OH&S issues for those working at the landfill. Ellwaste in Swan Hill offers a green waste weekly pick up service and recycles this into garden mulch at the Swan Hill landfill. Contaminants found in green waste such as plastic wrappings, metal and other non-green waste reduce the quality of the composted garden mulch products, making the product unusable and discourages potential users from buying the product.

The cost for green waste pick up service provided (fortnightly) by Ellwaste Swan Hill is \$177,82 per year in 2006/2007.

Garden Mulch can be obtained from the landfill at no cost if the individual loads his or her own trailer. Commercial quantities of mulch may be available at \$18.00 per cubic meter.

4.6 Commercial Waste

Contractors provide Swan Hill's commercial businesses a range of services, which include providing 240L bins (orange lid) serviced by request weekly or fortnightly.

Larger bins 10 cubic meters –15 cubic meters are also supplied to commercial sites by arrangement.

Commercial businesses can access the Recycling Depot for cardboard/paper drop off during office hours.

4.7 Hazardous Waste

Hazardous waste collection in 2006/2007 at Swan Hill's Licensed Landfill incorporates, but not restricted to the following:

- Asbestos is accepted at Swan Hill landfill, \$128/tonne. The material must be double wrapped in black plastic and buried on the same day.
- Tyres are recycled at all landfills. Cost ranges from \$5.00 per car tyre, to \$58.00 per tractor tyre
- Low level contaminated soil is accepted at Swan Hill at a cost of \$64.40 per tonne.

- Grease trap waste cooking oil is transported and recycled in Bendigo.
- Septic waste is collected by contractors and discharged at the Lower Murray Water sewage farm in Swan Hill.

Currently, there are only 14 municipalities out of a possible 79 in Victoria that accept asbestos (known as Prescribed Industrial Waste P.I.W). See Appendix D.

4.8 Litter

Council's contractor is responsible for the collection of litter from the streets, parks and gardens. Litter is collected from strategically located 120l & 240l Bins, within a 3 meter collection radius of the bin. Parks and Garden staff collect litter before mowing, and are responsible for the maintenance of Shopping Strips including Cambell Street Swan Hill.

5 ECONOMIC ANALYSIS

5.1 Domestic Garbage and Collection Services

Council's domestic garbage collection levy of \$210 is charged to each household within the municipal garbage collection areas. Payment of this charge entitles the property to a weekly collection of a 120l garbage bin and a fortnightly collection of a 240l recyclable bin. For an additional \$65 p.a. the garbage bin size can be varied to a 240l service.

The average cost per bin collection per household in the 2004/05 financial year was \$1.02.

5.2 Litter Collection Costs

Council's garbage contractors carry out collection services in both shopping precincts, parks and gardens. The following cost summary is provided for these services:

Litter Collection Costs 2006/2007

Service	No. of Bins	Collection Cost per bin per month	Sub Total per month	Monthly Maintenance Charge	Total Cost per annum
Parks and Gardens	219	\$0.27	\$59.13	\$656.73	\$8,590.32
Shopping Strips	132	\$0.22	\$29.04	\$1,180.56	\$14,515.20

5.3 Landfills

Litter collection costs detailed in the Table below shows the net cost of operating the municipality's landfills based on a per capita cost for the catchment of that landfill. A five year projection has also been provided, based on the current cost multiplied by an annual CPI increase of three percent per annum.

Per Capita Operating Costs for Landfills.

Landfill Site/Group	Full Cost per Capita					
	04/05	05/06	06/07	07/08	08/09	09/10
Swan Hill Landfill	\$26.00	\$26.78	\$27.58	\$27.58	\$28.41	\$29.26
Robinvale Landfill	\$21.81	\$22.46	\$23.14	\$23.83	\$24.54	\$25.28
Rural Landfills	\$18.84	\$19.40	\$19.99	\$20.59	\$21.21	\$21.84



Figure 2: Waste Oil Collection Facility located at the Swan Hill Landfill

3.4 Waste Wise Program

The Waste Wise program aims to deliver a financial return to organisations through effective waste reduction and recycling systems for solid and non hazardous wastes. Certification is the recognition of the commitment of an organisation to make significant achievements in waste reduction.

Waste Wise accreditation was achieved in 2005 for the Swan Hill Rural City Council offices in Splatt Street. Further waste audits carried out by Waste Task Force Committee includes the Regional Resource Centre, Swan Hill Rural City Council Municipal Library and the Pioneer Settlement. This successful Waste Wise program fosters staff and community participation and encourages changes in behaviour towards waste generation in the workplace.

6 SWAN HILL MUNICIPALITY WASTE MANAGEMENT FACILITIES



Figure 3. Location Map of landfills in the Swan Hill Municipality

6.1 Waste Management Facilities Overview

The Swan Hill Rural City Council is served by a network of seven waste management facilities comprising six landfill sites and one recycling center, the locations are shown in Figure 3.

All landfill sites, except Swan Hill, service under 5,000 people and consequently do not require an EPA license to operate.

Rural landfills service smaller townships (less than 5000); however, a number of these landfills are reaching their airspace capacity and alternatives to waste disposal at these sites require further exploration.

Green waste in all landfill sites except Robinvale, is collected and transferred to Swan Hill Landfill, where it is mulched and composted. Green waste is currently burnt as required at the Robinvale landfill when meteorological conditions are favorable. The SEPP siting and management of landfills receiving Municipal Waste stipulates procedures, types of material and conditions concerning the burning of waste in Municipal landfills for landfill sites servicing less than 5,000 people. Burning at landfill sites that service populations greater than 5,000 people is not permitted.

The Recycling Center at Swan Hill processes a range of recyclables. Its collection area extends beyond the municipality and is the major Recycling Center in North Western Victoria and South Western New South Wales. Recycling drop-off points are available in all landfills and at the entrance of the Recycling Center.

Projected Landfill Catchment Populations

Landfill	Population			
	1991	2001	2011	2021
Boundary Bend	241	213	188	166
Manangatang	728	527	381	276
Piangil	2364	2200	2047	1905
Robinvale	3894	3917	3940	3963
Swan Hill	12819	13418	14045	14701
Ultima	514	436	370	314
Total	20560	20711	20971	21325

6.2 Swan Hill Recycling Centre Material Recovery Facility (MRF)

The Swan Hill Rural City Council currently contracts the Recovery Facility at Gray Street Swan Hill to Visy Paper Pty Ltd trading as Visy Recycling, until 2012. The centre provides access for community education including a platform for safe viewing of recycling operations, at which designated staff members explain the processes of the MRF operations and the benefits of recycling.

The centre sorts commingled plastics, paper, cardboard, glass, aluminium and tin. Materials are packed and redirected to Visy Recycling Centres in Melbourne for further value adding.

6.3 Licensed Landfills

Swan Hill Landfill

The Swan Hill Landfill is located 4 km West of Swan Hill and 5 km West of the Murray River on Council owned land. It is located on the Sea Lake – Swan Hill Road, which is the main access to Swan Hill from the West. There is little screening of the site from the road.

"This landfill site services more than 10,000 people in Swan Hill and surrounding areas, hence an EPA license had been issued to the site in order to meet the general provision of the Environment Protection Act (1970), State environment protection policies, and industrial waste management policies".



Figure 4: Swan Hill Landfill Site Office and Weighbridge as you enter the site from the Sea Lake – Swan Hill Road.

The Swan Hill Landfill is the Municipality's largest landfill occupying 44.47 Ha. The fenced landfill area currently occupies approximately 18 Ha of the site with the remaining 26.47 ha reserved for future landfill use.

The landfill operation is such that the site is currently being filled below natural surface level and will be filled above ground level to the design finish surface profile. It was estimated in 1995 that there was 900,000m³ of airspace available on site. In January 2006, it was estimated that the landfill had approximately 690,000m³ of airspace remaining.

The landfill site is well sign posted informing all users of designated disposal areas for individual waste streams.

The operating hours of the site are from 9 am to 4 pm Sunday to Friday, and from 9 am to 2 pm on Saturday.

The site accepts approximately 16,000 tonnes (21,000m³) of waste per annum, including putrescible waste, solid inert waste and asbestos. The following resource recovery facilities and practices are available at this site:

- Waste Oil Tank 3,000 Litres
- Drum/MUSTER compound
- Drop-off area for all recyclable materials including glass, plastic bottles, car batteries, gas bottles, paint, cardboard and cans. These recyclables are collected and transferred to the Swan Hill Recycling Centre.
- Greens are composted into stockpiled mulch (including timber).
- Used tyres are stockpiled and sent to Melbourne for recycling.
- Scrap metals and car bodies are collected and recycled.
- Concrete is stockpiled on the site for future reuse as a road base.

6.4 Unlicensed Landfills

6.4.1 Ultima Landfill

The Ultima landfill is located on the Swan Hill – Sea Lake Road approximately one kilometer east of the Ultima Township. The topography of the region is very flat and the site is surrounded by Mallee scrub and farmland.

Green waste is stockpiled at the site and is transferred on a fortnightly basis to the Swan Hill landfill where it is mulched. Recyclable materials are collected using two 3 x 1 m³ skip bins that allow this resource to be transferred to the Swan Hill Recycling Centre.

This site also provides a DrumMUSTER collection point.

6.4.2 Piangil Landfill

The Piangil Landfill is located 3 km south of the Piangil Township on Hayward Road adjacent to the railway line.

The former landfill cell areas are raised above ground level and provide a clear indication that the landfill has operated in a ‘push and mix’ fashion. The former cell edges are at a steep grade showing signs of erosion with debris protruding through the embankment.

Green waste is stockpiled at the site and is transferred on a fortnightly basis to the Swan Hill Landfill where it is mulched. Recyclable materials are collected using two 3 x 1 m³ skip bins that allow this resource to be transferred to the Swan Hill Recycling Centre.

6.4.3 Boundary Bend Landfill

The Boundary Bend Landfill (is a leased site) and is located on the Koolorong Road, five kilometers south of the township, on freehold land.

The site is situated adjacent to farming land and the topography is gently undulating sand hills. Green waste is collected fortnightly, transferred and mulched at Swan Hill landfill. Recyclable materials are collected via a 6m³ Skip Bin system and transferred to the Swan Hill Recycling Centre.

6.4.4 Robinvale Landfill

The Robinvale landfill is located ten kilometers south of Robinvale on the Sea Lake Road. Total area of this landfill site is 30 hectares with a lifetime expectancy of 30 years. The landfill is the second largest in the Municipality and services the 4,491 residents of Robinvale and the surrounding rural districts.

The following waste facilities are also available at the site:

- Waste Oil Tank 2,000 Litres
- DrumMUSTER compound.
- Well established recycling bays & sorting area.

6.4.5 Manangatang Landfill

The Manangatang Landfill is located two kilometers north east of the township on Moondah Road.

The landfill services the townships of Manangatang and Chinkapook and surrounding rural residents.

Green waste is stockpiled at the site and is transferred on a fortnightly basis to the Swan Hill landfill where it is mulched. Recyclable materials are collected using two 3m³ skip bins that allow this resource to be transferred to the Swan Hill Recycling Centre.

Within the town limits there is a collection depot containing 10 bins accepting commingled recycled products.



Figure 5: Manangatang Year 8 students – Encouraging Responsible Recycling

The following waste facilities are also available at the site:

- Waste Oil Tank 2,000 litres
- DrumMUSTER collection facility
- Tyres.

The former landfill cell areas are raised above ground level and provide a clear indication that the landfill has operated in a 'push and mix' fashion. The former cell edges are at a steep grade showing signs of erosion with debris protruding through the embankment.



Figure 6: Manangatang Landfill Operating Cell Area

6.5 Recently Closed Landfills

6.5.1 Chinkapook Landfill

The Chinkapook Landfill is located on the Nyah West Road less than two kilometres east of the township. The site was closed on 31 October 2005 by resolution of Council.

The site as at January 2006 was not capped and does not have a rehabilitation plan.

6.5.2 Nyah West Landfill

The Nyah West Landfill is located on Yarraby Road, two kilometers north of the main township. Capping the site was completed in 2003 with a total area of 24,000 m² capped. Revegetation and pest plant control is integral in the ten-year aftercare management plan, which commenced in 2004.

6.5.3 Lake Boga Landfill

The Lake Boga Landfill is located on Lalbert Road. The landfill is on a slight rise and there are two salt lakes in a depression at the bottom of this rise. The site is visible from the Ultima Road and is in a view of the Golf Course – little screening of the site is provided. Capping the site was completed in 2005 with a total area of 24,000m² capped. Revegetation and pest plant control is integral in the ten-year aftercare management plan, which commenced in 2005.



Figure 7: Rehabilitated Lake Boga Landfill

6.5.4 Wemen Landfill

The Wemen Landfill is located about five kilometers east of the Wemen township. Access to the site is via a four-kilometer “dry weather only” road. The site was capped and completely rehabilitated in December 1998.

6.6 Summary Of Swan Hill Disposal Operations

	Facility	Estimated Airspace remaining (m ³)	Expected Closure Date	Compaction Equipment	EPA Licence	Site Owner
1	Swan Hill Landfill	690,000 ^{#1}	2031	Sheep foot compactor Volvo / 16 ton	SH 622	Municipality
2	Ultima Landfill	1,250 ^{#2}	2016	As above	N/A	Crown Reserve
3	Piangil Landfill	3,900 ^{#2}	2013	As above	N/A	Municipality
4	Boundary Bend Landfill	1,400 ^{#2}	2013	As above	N/A	Lease on freehold Land. Council is to pursue entering into lease agreement with the new owner.
5	Manangalang Landfill	400 ^{#2}	2010	As above	N/A	Crown Reserve (Rs3122)
6	Robinvale Landfill	80,000	2036	John Deere 646C Compactor	N/A	Crown Reserve

#1 Potential airspace created by increasing landfill area.

#2 Potential airspace created by further excavation.

#3 Council is considering closing the landfill due to low rate of waste disposal and/or shortage of covering material.

6.7 Summary Of Former Landfill Sites

	Facility	Closure Date	Site Owner	C.Licence	Status	Period of Aftercare / Rehabilitation	Comment
1	Women Landfill	28/03/1997	Crown Reserve	0100935	Capped	Cancelled	Capped and completely rehabilitated.
2	Nyah West Landfill	May 2000	Crown Reserve	2014088	Capped	2004 - 2014	Capped/under rehabilitation plan
3	Lake Boga Landfill	19/02/1999	Crown Reserve	2014089	Capped	2004 - 2014	As above.
4	Chinkapook	31/10/2005	Crown Reserve	Committee of Management	Closed	No Licence	Capping work and rehabilitation plan are required.

6.8 Summary of landfill operation costs (for financial year 2004 – 2005)

	Landfill Site	Population Served	Operation Cost \$	Licence No	Minor works \$	Licences cost \$	Total Operational Expenditure \$
1	Swan Hill	11,287	359,978.00	SH1622 (I-PA)	3,537	1,778	365,293.00
2	Ultima	132	6,600.00	0100933 (General)		302	6,902.00
3	Piangil	181	7,425.00	0100946 (General)		125	7,550.00
4	Boundary Bend	213	7,425.00	Management Committee ¹		lease's expired	7,425.00
5	Manangalang	329	8,250.00	Management Committee ²	1,475		9,725.00
6	Chinkapook	N/A at Manangalang	3,300.00	Management Committee ¹			3,300.00
7	Nyah West	541 at Swan Hill	Closed	2014088 (After Care)		3,364 – 263	3,627.00
8	Lake Hoga	679 at Swan Hill	Closed	2014089 (After Care)		1,714 + 263	1,977.00
9	Wemen	574 at Robinvale	Closed	0100935 (Miscellaneous)		0.00	0.00
10	Robinvale	4,491	78,867.00	0105482 (General)	1,475	114	80,456.00
	Total	16,638	471,845.00		6,487.00	7,809.00	486,141.00

Council has been appointed as a Committee of Management above the site. No Licences required

7 POLICY & LEGISLATIVE REQUIREMENTS

7.1 Commonwealth Legislation

Swan Hill Rural City Council operates within a framework of Federal and State Government Waste Management Policy and Legislation. Most of the responsibility for management of waste is at a Local, Regional or State level. However, there are some areas where the Commonwealth has taken a leading role. This is mainly in the area of product stewardship (also known as extended producer responsibility), with programs addressing specific sectors such as consumer packaging (National Packaging Covenant 2006), waste oil, and electric and electronic appliances. Funding is available through these programs for Local Government initiatives including kerbside recycling and waste oil facilities at landfills and transfer stations.

7.2 Victorian Legislation

In Victoria the responsibilities for waste management planning, regulation and service delivery fit within a framework including State Government, Regional Waste Management Groups and Local Governments. The roles of these agencies are shown below.

Roles of Solid Waste Management Agencies in Victoria

<p>Environment Protection Authority Victoria</p> <ul style="list-style-type: none"> • Provides statutory policy framework • Develops statutory agreements with industry • Works with other jurisdictions on national waste issues • Approves Sustainability Victoria and Regional Waste Management Group Waste Management Plans 	<p>Sustainability Victoria</p> <ul style="list-style-type: none"> • State wide strategies for municipal and industrial waste to implement overarching policy • State wide planning for industrial waste • Facilitates best practice waste management through grants and programs
<p>Regional Waste Management Groups</p> <ul style="list-style-type: none"> • 12 Groups across Victoria • Regional planning for municipal waste, giving effect to state wide strategies and programs • Work in partnership with member Councils • Accountable to the Minister for Environment 	<p>Local Government</p> <ul style="list-style-type: none"> • 79 municipalities across Victoria • Plans for and delivers waste management services within each municipality (directly or through contractors)

EPA Victoria is the Statutory Body responsible for enforcing Environmental Regulation and Legislation in Victoria.

Sustainability Victoria is a State Government Body that was created on 1 October 2005 by the merging of EcoRecycle Victoria and the Sustainable Energy Authority Victoria.

Sustainability Victoria has five objectives:

1. Drive a water, energy and materials saving culture in business, communities and Government
2. Support the demonstration and application of innovative technologies, systems, services and products
3. Reduce climate impact of energy supply, and increase the supply and use of renewable and distributed energy
4. Increase efficiency and productivity of materials, energy and water use
5. Enable the recovery, re-use and recycling of materials.

Sustainability Victoria takes over the previous roles of EcoRecycle Victoria in formulating and implementing waste management strategic direction at the State Level, and overseeing various educational programs for Local Government, business and the community.

7.3 Regional Waste Management Groups

Regional waste management Groups are responsible for implementing a State Waste Management Policy at a Regional level. Previously there were 16 Regional Waste Management Groups including 4 Metropolitan groups and 12 non-Metropolitan groups. However, a recent change to this structure has seen the 4 Melbourne groups combine to form the Metropolitan Waste Management Group. The boundaries of the non-Metropolitan groups have not changed.

Swan Hill Rural City Council along with Gannawarra Shire Council, Buloke Shire Council, Loddon Shire Council and Wakool Shire Council are member Councils of the Central Murray Regional Waste Management Group.

7.4 Strategic Directions

Our Environment, Our Future: Victoria's Environmental Sustainability Framework was released in April 2005 as a key strategy in Victoria's move towards sustainability. The Department of Sustainability and Environment (DSE) are leading the implementation of the strategy and working with other State Government Departments, Local Government, business and the community to build environmental sustainability into all of our actions.

Waste management is a key component of environmental sustainability. Victoria's Waste Management Strategy, *Towards Zero Waste Strategy* (TZW Strategy 2006), was released in September 2005 and falls within the Environmental Sustainability Framework. The Towards Zero Waste Strategy dictates Waste Management Policy at the Local Government level and sets both State wide and Regional targets for waste minimisation and recovery of waste.

7.5 State wide objectives and targets to achieve Towards Zero Waste Strategy:

Objective	Target
1. Generating less waste from our activities	<ul style="list-style-type: none"> A 1.5 million tonne reduction in the projected quantity of solid waste generated, by 2014
2. Increase the sustainable recovery of materials for recycling and reprocessing	<ul style="list-style-type: none"> 75% by weight of solid waste recovered for reuse, recycling and / or energy generation by 2014 45% by weight of <u>municipal</u> solid waste recovered by 2008/09 and 65% recovered by 2014, 65% of <u>commercial</u> solid waste recovered by 2008/09 and 65% recovered by 2014
3. A reduction in damage to the environment caused by waste disposal	<ul style="list-style-type: none"> A 25% improvement, from 2003 levels, in littering behaviours by 2014

The Towards Zero Waste Strategy assigns priority to a range of waste types offering significant capacity for improved resource recovery and/or reduced environmental harm when disposed. The priority materials and products for the municipal sector are:

Materials	Products
<ul style="list-style-type: none"> Garden Organics Food organics Paper / cardboard Timber 	<ul style="list-style-type: none"> Electrical and electronic appliances (including televisions and mobile phones) Computers and other IT equipment Tyres Consumer packaging Paint Mercury-containing lamps, including fluorescent lamps Treated timber Batteries Plastic shopping bags Motor vehicles

The Towards Zero Waste Strategy also sets out infrastructure priorities for metropolitan, provincial city and rural areas of Victoria. The municipal infrastructure priorities for rural areas are:

- Waste reduction and recovery initiatives that will significantly reduce the need for new landfills.
- Expanded capacity for the recovery of priority materials and products, e.g. timber.
- Improved siting, design, operation and rehabilitation of landfills.
- New transfer station and resource recovery facilities to replace smaller landfills that do not meet modern environmental standards.
- Infrastructure at landfills serving more than 5,000 people to enable the drop off of metals, timber, construction and demolition waste, cardboard and paper, commingled containers, oil and chemical containers, silage wrap, plastic mulches etc.
- Infrastructure for dropping off recyclables (i.e. containers and paper / cardboard) at landfills and resource recovery facilities serving populations between 500 and 5000 people.
- Infrastructure at resource recovery facilities to enable compacting and baling of materials to achieve greater transport efficiencies.

A number of funding schemes were established through EcoRecycle Victoria. It is assumed these funding schemes will continue in some form and now be administered by Sustainability Victoria. Funding opportunities include:

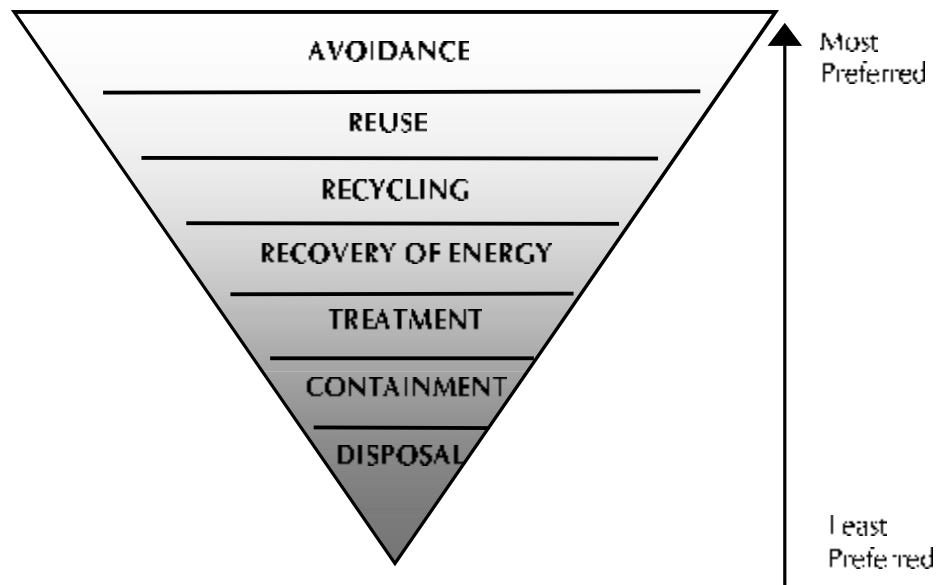
- Towards Zero Waste Infrastructure Support Program
- Litter Prevention Grants
- Public Place Recycling Grants

7.6 Requirements of the Environment Protection Act

The Environment Protection Act 1970 (The Act) is the overarching environmental legislation in Victoria and establishes the powers, duties and functions of EPA Victoria. EPA Victoria's statutory functions under The Act include administration of works approvals, licences, pollution abatement notices and waste transport permits and certificates. A licence is required for any landfill serving a population of greater than 5,000 people.

The Act establishes the waste hierarchy, which states that wastes should be managed according to the order of preference shown in Figure 8 below.

Figure 8: The Waste Hierarchy



The Act defines the principles of intergenerational equity, shared responsibility and product stewardship. It requires the effective integration of economic, social and environmental considerations in decision-making processes with the need to improve community well being and the benefit of future generations.

A number of subordinate regulations, policies and guidelines have been developed under the Act including State Environment Protection Policies (SEPPs), Waste Management Policies (WMPs), Best Practice Environmental Management (BPEM) guidelines and the Landfill levy. A full copy of the Act and subordinate documentation is available from www.epa.vic.gov.au.

1. SEPPs (State Environment Protection Policy) outline detailed requirements (such as discharge limits) in order to protect specific environmental values, such as waterways, groundwater, air quality, noise and contamination of land. SEPPs indirectly affect the management of wastes within the Swan Hill municipality.
2. WMPs (Waste Management Policy) provide a framework to improve the management of wastes in Victoria. The *WMP (Siting, Design and Management of Landfills)* is linked to the *BPEM (Siting, Design, Operation and Rehabilitation of Landfills)*. These two key documents are described briefly below.
3. **WMP (Siting, Design and Management of Landfills)**

The WMP (Siting, Design and Management of Landfills) was released by EPA Victoria in December 2004 and replaces the State Environment Protection Policy (Siting and Management of Landfills Receiving Municipal Waste).

While the WMP (Landfills) acknowledges that landfills will need to be used for the foreseeable future, it also sets an intention to minimise the need for landfills and to replace current unlicensed landfills with a network of waste transfer stations.

Any application for a works approval or licence for a landfill site must comply with the WMP (Landfills) and meet each required outcome of the BPEM (Siting, Design, Operation and Rehabilitation of Landfills).

Holders of a landfill licence are required to develop and submit an Environmental Improvement Plan (EIP) for their site. The EIP must be consistent with any relevant neighbourhood EIP, Regional Waste Management Plan, and any Solid Industrial Waste Management Plan (SIWMP) approved by the EPA.

4. BPEM (Siting, Design, Operation and Rehabilitation of Landfills)

EPA Victoria released the BPEM (Landfills) in October 2001, which outlines current best practice for all areas of landfill management. This includes everything from preliminary planning considerations to landfill design for minimal environmental harm, to operational aspects and effective rehabilitation. The BPEM is linked to the WMP (Landfills) and applicants for a works approval or licence for a landfill site must comply with the WMP and meet each required outcome of the BPEM. While the BPEM is mandatory for licensed landfills only, it provides a useful guide for improving environmental management at any landfill site. Any new landfill must obtain a licence and will therefore be subject to the requirements of both the WMP (Landfills) and the BPEM (Landfills).

7.7 Guidelines for Services and Facilities

EcoRecycle Victoria published a number of documents to promote best practice waste management and assist planning by Local Governments and other sectors. Two documents directly relevant to this Waste Management Plan are the *Guide to Preferred Service Standards for Kerbside Recycling in Victoria*, and the *Guide to Best Practice at Resource Recovery and Waste Transfer Stations*, both outlined below. Copies of all documents previously available through EcoRecycle Victoria can be found at www.sustainability.vic.gov.au.

7.8 Guidelines to Preferred Service Standards for Kerbside Recycling in Victoria

These guidelines were originally released by EcoRecycle Victoria in 2000 and updated in August 2004. They are designed to provide a benchmark from which Government and industry can move forward in an efficient and sustainable manner with regard to collection of recyclables. In line with other strategies, the guidelines aim to improve materials efficiency and also ensure that occupational health and safety is maintained at the highest level.

The guidelines outline best practice standards including a list of primary materials to be collected, safety standards (including a 'no-lift' policy), service systems (i.e. bin size, bin colour and frequency of collection) and other standards such as extent of service. It is outlined that the extent of kerbside recycling services for rural and remote residences be based on contract costs of up to \$50 / household / year and pick up of at least 400 MBs per 8 hr day.

For non-residential properties including SME's and non-rateable properties such as Schools and Churches, it is recommended that Local Governments provide a kerbside collection service for recyclables equivalent to that provided for residential properties. For non-rateable properties some Councils apply a direct charge while others do not charge.

7.9 Guidelines for Best Practice at Resource Recovery and Waste Transfer Stations

These guidelines were released by Sustainability Victoria in July 2004 and cover a range of issues for resource recovery and waste transfer stations, including siting, design, construction, operation and rehabilitation.

Design considerations include layout for optimal material recovery (e.g. recyclables drop off located before residual waste disposal), optimal infrastructure depending on anticipated throughput of materials, optimal traffic access and signage. Operational considerations include everyday site management procedures, emergency response plans, inspections, monitoring and reporting, and requirements for hazardous or prescribed waste (including unacceptable materials being presented at the facility).

The guidelines also include references to relevant Australian Standards and OH&S legislation.

7.10 Regional Waste Management

Swan Hill Rural City Council is located within the Central Murray Regional Waste Management Group (CMRWMG). The Central Murray Regional Waste Management Plan (2004) is a statutory document with which all Local Governments in the Central Murray Region should comply. Regional Waste Management Plans must include a Schedule which shows a proposed sequence of filling if available.

EPA Victoria will not approve any new landfill in Victoria that is not listed in the Regional Waste Management Plan.

CMRWMG has set the following goals for the next 5 years:

- Minimum 75% cost recovery for municipal waste / resource management programs
- Approaching zero net greenhouse gas emissions
- 60% resource recovery
- Align contract end dates to enable future regional contracts for resource collection
- Markets for recycled green waste established within the region in order to establish a green waste processing facility
- Establish minimum of one value-added industry for recyclables
- Sustainable consumption including 75% reduction in plastic shopping bags.
- Reduction of Region's Ecological Footprint by 20%.
- Ongoing closure of non-licensed landfills.

The Central Murray Regional Waste Management Plan is available from www.cmrwmg.com.au.

7.11 Local Waste Management

Swan Hill Rural City Council Plan

The Council Plan 2004 – 2008 sets the key directions and strategies that will be pursued. These key directions are:

1. Sustainable Communities
2. Economic Growth
3. Environmental Management
4. Governance and Leadership

Swan Hill Rural City Council is committed to effective, environmentally responsible waste management through the Council Plan. One of Council's key performance indicators under Environmental Management is the amount of household waste material diverted from landfill.

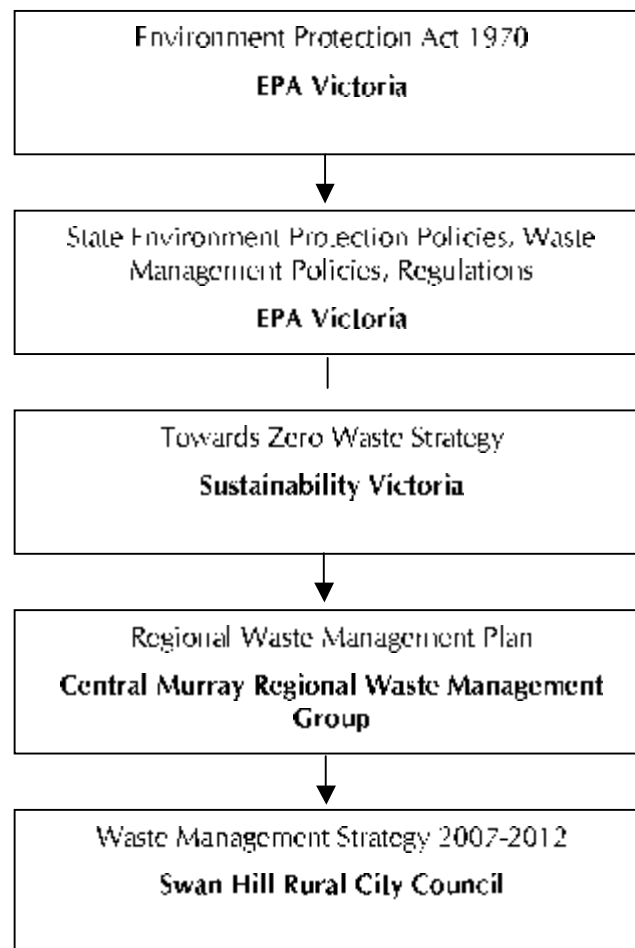
7.12 Waste Management Strategy (1997)

Swan Hill Rural City Council adopted a Waste Management Strategy in 1997. This strategy addressed kerbside collections, landfills and transfer stations within the municipality. An action plan was prepared as part of the Waste Management Strategy.

Changes in Government Policy and improvements in 'Best Practice' for Waste Management have led to the review of the Waste Management Strategy and preparation of this document, the Swan Hill Rural City Council Waste Management Strategy 2007 - 2012.

Figure 9 shows the relationship of the Waste Management Strategy within the framework of Victorian Environmental Policy and State Waste Management Planning.

Figure 9: Framework of Victorian Environmental Policy and Waste Management Planning



8 WASTE STREAM ANALYSIS

8.1 Current Waste Generation

The nature of the population and the industry distribution throughout a Municipality greatly affects the waste generation rates in the urban and rural districts. Due to the greater industrial and commercial concentration in the Swan Hill City district, the generation rates per capita are higher for this region. The population of the Swan Hill area fluctuates during the year due to an influx of visitors to the area between the holiday seasons of December to January and again at Easter (March to April). Rural districts such as Lake Boga and Robinvale also experience population fluctuation due to the presence of seasonal fruit picking workers.

There are also other factors that contribute to the increase in the amount of waste generated seasonally. The growth rate of vegetation and change of living habits are only two examples of the contributing factors to the three to five truck loads per week (approximately 23 m³ per truckload) increased during the summer months.

The determination of current waste generation rates for the SHRCC is imperative when developing a reliable waste generation forecast and Waste Management Strategy. Through the determination of current and future waste generation rates, strategy waste management implementation timelines may be established resulting in an efficient and economic Waste Management Service.

Waste generation rates may be established via a variety of methods. Surveys may be made at residential properties or at local receiving landfills. In conjunction with these surveys, comparisons may be drawn from previous studies of the specific area or surrounding areas.

8.2 Domestic Recycling and Waste Generation

During the preparation of this strategy the garbage collection compactor trucks and recycling trucks were weighed as a means to determine the quantity of waste collected through kerbside collection. All trucks collecting waste on behalf of the Council were weighed where practical before disposing of their load to appropriate waste management facilities. The garbage collection for the district was weighed for one week between 2 January 2006 and 9 January 2006 as this service is provided on a weekly basis. The recycling collection was weighed for two weeks as kerbside collection is provided on a fortnightly basis between the 9 January 2006 and 23 January 2006.

Tables 1 and 3 present the results of the collection truck weighing.

Table 1 - Garbage Truck Weighbridge Results

Waste Source	Net Waste Weight (Tonnes)							
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total
Domestic Waste	30.28	12.29	15.00	9.15	22.18			88.9
Average Truck Weight	5.05	4.01	5	4.57	5.45			4.8
Commercial (Front Lift)	12.87	10.28	13.90	8.67	6.36			52.02
Average Truck Weight	6.43	5.15	6.95	4.3	6.36			5.8

Twigg Group provided estimates of total truckloads that have been collected for the year 2004-2005 at the Swan Hill Landfill site, which takes into account seasonal variations.

Table 2 – Annual Tonnage Of Domestic And Commercial Waste

Landfill Site	Trips to Landfill/ year			Weight to Landfill Tonne/year
	Domestic	Commercial	Roadside	
Robinvale	1100	1835	185	3120
Swan Hill	3808.32 *	2752.12	N/A	6560
Total				9680

* Includes roadside trips

Table 2 provides an estimate of the total tonnage of domestic and commercial waste disposed at Swan Hill and Robinvale Landfills in the year 2004-2005.

Table 3 – SHRCC’s Kerbside Collection Services and Weighbridge Data

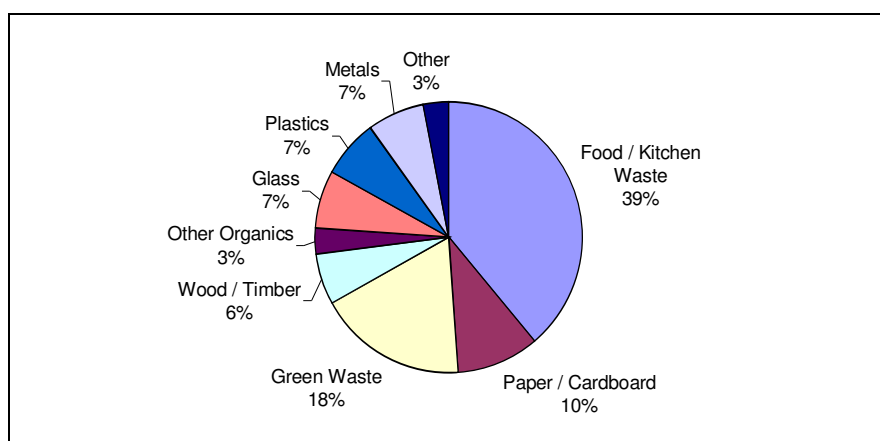
	Month						Average
	Aug 06	Sep 06	Oct-06	Nov-06	Dec-06	Jan-07	
Tonnage	140.62	138.21	159.06	154.52	130.98	170.17	148.927
Services provided	7749	7755	7761	7767	7778	7787	7766
Kg/tenement / month	18.1	17.8	20.5	19.9	16.8	21.9	19.2
Kg/tenement / fortnight	9.1	8.9	10.2	9.9	8.4	10.9	9.6

Source: Weighbridge Data & Fillwaste monthly invoices

Table 3 shows that the amount of recyclables generated by an average of 7766 tenement is nearly 19.2 kg/tenement/month or 9.6 kg/tenement/fortnight. This survey was carried out over a 6 month period.

8.3 State Wide Waste Generation Rates

Composition of Municipal Waste by tonnage



Source: Goldtr Associates (1999), Waste Profile Study of Victorian Landfills

Waste Products	Component (%)
Food / Kitchen Waste	39
Paper / Cardboard	10
Green Waste	18
Wood / Timber	6
Other Organics	3
Glass	7
Plastics	7
Metals	7
Other	3

The Central Murray Regional Waste Management Plan sets targets for the closure of landfill sites. The CMRWMC Regional Waste Management Strategy 2005 states that:

“The last five years has seen a major rationalisation of landfills with the closure of 20 landfills across the Central Murray Region. There are currently 26 landfills, 6 transfer stations, and one resource recovery site supporting the region.

The draft Solid Industrial Waste Management Plan has assessed the landfill capacity of the region and concluded that there is enough landfill capacity for the next 20 years.

Based on the anticipated reduction in waste, limited landfill life, the environmental risks associated with unlicensed landfills, and economic costs of landfill operations, this plan proposes further rationalisation of landfills with some being replaced with transfer stations.”

Swan Hill Rural City Council Existing Landfill Lifetime Projections

Site	Type of Facility	Remaining Life	Closure Date	Comment
Boundary Bend	Unlicensed Landfill	7 years	2013	Limited Cover material
Manangatang	Unlicensed Landfill	2 - 3 Years	2010	Limited Cover material
Piangil	Unlicensed Landfill	7 Years	2013	Active site
Robinvale	Unlicensed Landfill	30 Years	2036	Active site
Swan Hill	Licensed Landfill	25 Years	2031	Active site
Ultima	Unlicensed Landfill	10 Years	2016	Shortage in cover material

By simply closing rural landfills may only achieve some aspects of the desired outcome. When landfills are closed, rubbish dumping in surrounding areas and on farms could result. For this reason, emphasis should be placed on conversions to transfer stations in conjunction with the closures. Council then faces the financial burden of transferring the waste to a licensed landfill such as Swan Hill, and paying landfill levies where these costs were not incurred previously.

Therefore, the tyranny of distance becomes an issue and cost to our community. The question must be asked “What advantages is there to Rural Municipalities to close landfills?”

The economical feasibility for the implementation of transfer stations does not appear to be warranted due to the current landfill levy.

9 COUNCILS JOURNEY TOWARDS SUSTAINABLE DEVELOPMENT

Towards Zero Waste establishes direction and goals for Victoria’s solid waste management and resource recovery framework. By encouraging all members of the community to take responsibility for reducing their impact on the environment, economy and society.

“We need to recognise that we do not have the solutions for environmental and social problems. We all need to learn along the path to sustainable development and particularly how to manage in a new way in a participatory process”.

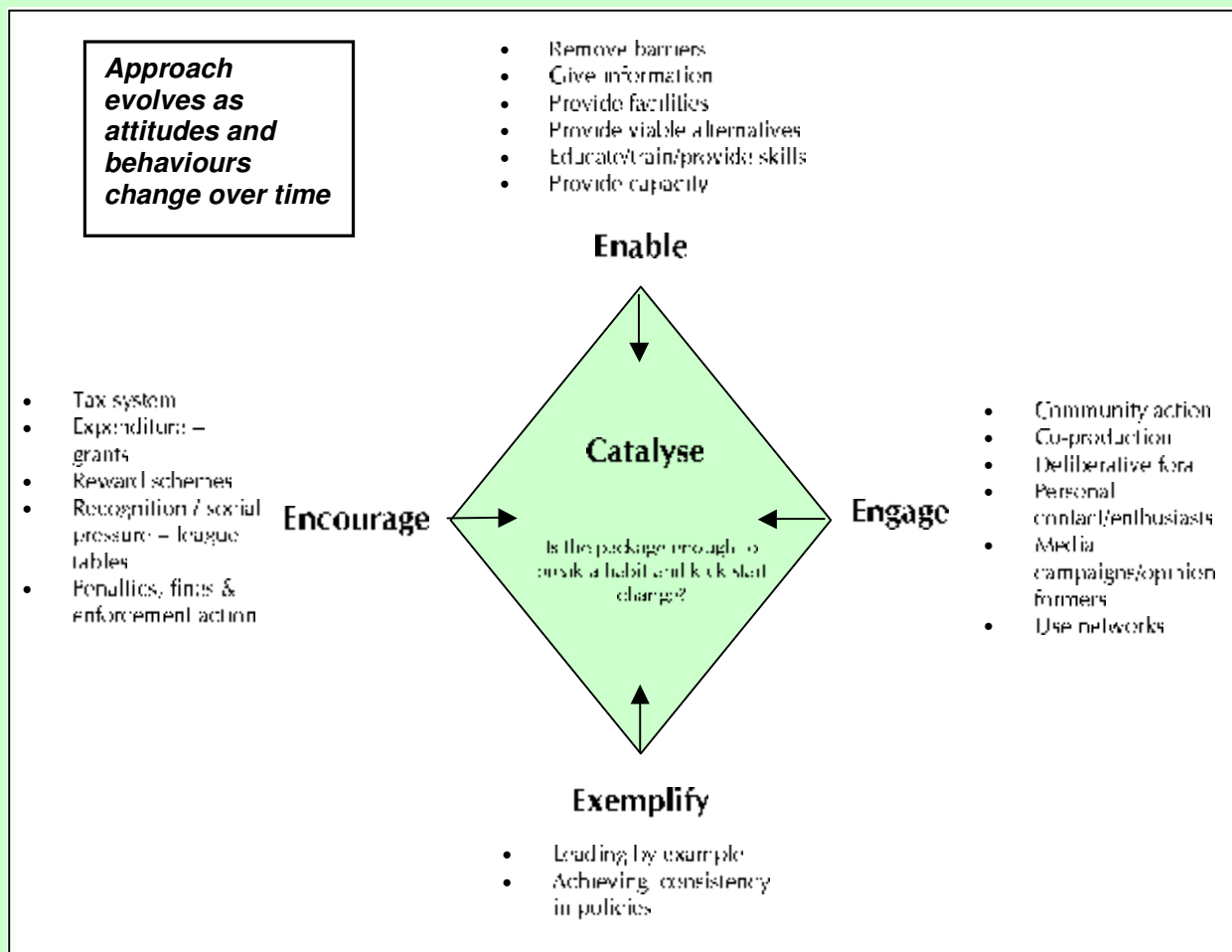
Denise Hamel, Chair, IUCN Commission on Education and Communication.

9.1 Community Engagement

Engagement and education are essential for achieving behavioural changes that translate into positive and enduring sustainable practices. Council is building on existing innovative programs to reduce, reuse and recycle messages to the community, and will continue to do so as an important element of the Towards Zero Waste Strategy.

A model of behaviour change for sustainability

The following diagram illustrates some of the main measures that can contribute to learning and behaviour change for sustainability and some of the ways these may reinforce each other when brought together within an integrated strategy. This model from the UK Sustainable Development Strategy emphasises that the measures initially identified may not prove to be sufficient and that an adaptive approach of review and continuous improvement is needed.

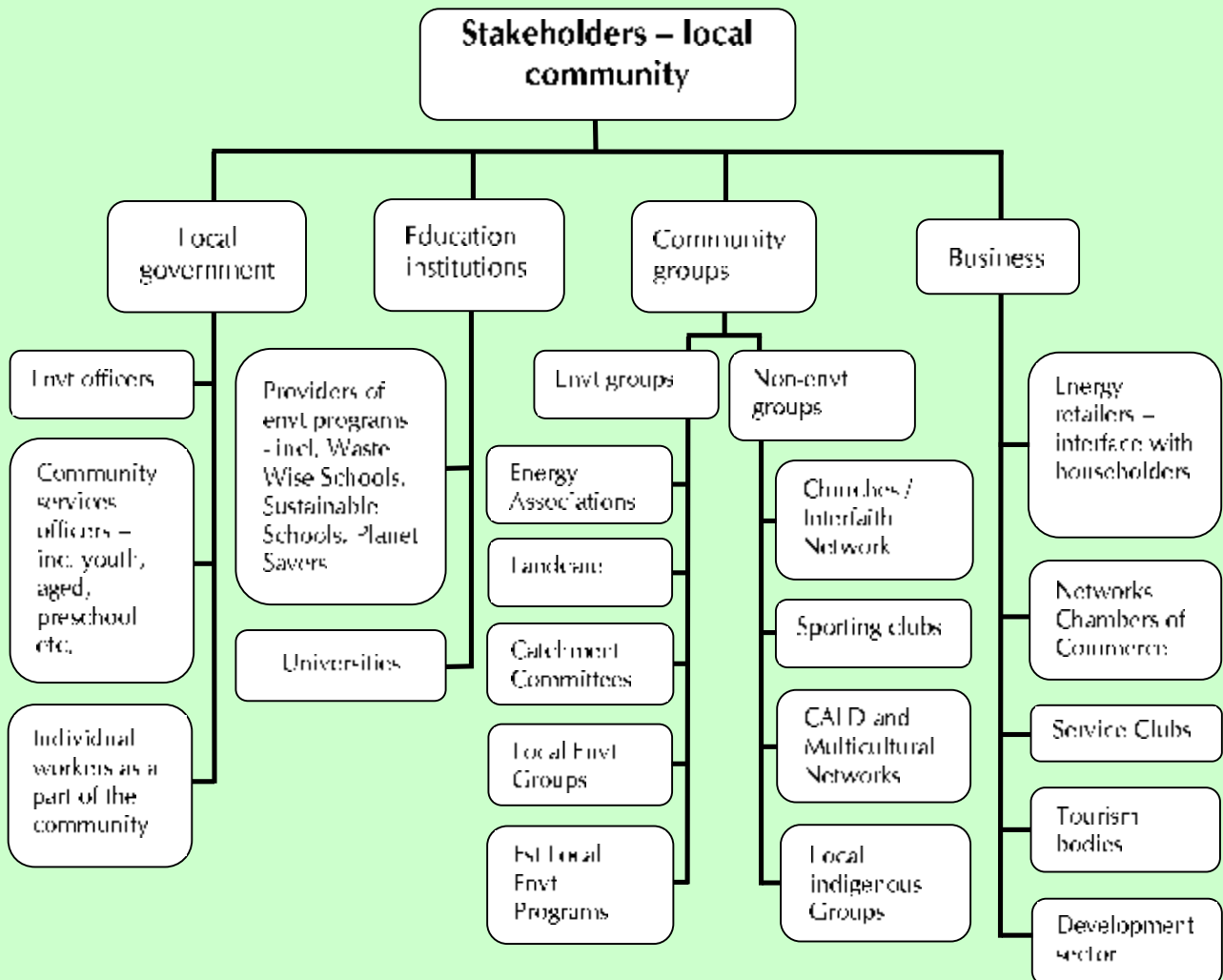


From Helping people make better choices. Chapter on behaviour change in *Securing the Future*, UK Government Sustainability Development Strategy, HM Government (2005).

9.2 Integrated approach to Waste Management

Successful waste management and effective resource recovery requires a co-ordinated approach at Local, Regional and State levels. The Central Murray Regional Waste Management Group (CMRWMG) provides regional planning for the management of solid waste. SHRCC embraces the group's objectives and strategies as an integral part of this Waste Strategy.

An example of local groups with a part to play in learning-based change for environmental sustainability



Adapted from *Western Port Greenhouse Alliance Community Education Scoping Study*. Environment Victoria, RMIT and WPGA (2005)

The Objectives of the CMRWMG provide Council with achievable targets that will contribute to reducing green house emissions and enhance Council's ability to achieve sustainable living standards by the year 2020.

Central Murray Regional Waste Management Group Regional Waste Management Targets

Activity	Vision 2010	Vision 2015	Vision 2020
Cost Recovery for municipal waste/ resource management programs	Minimum 75%	Total cost recovery	Total cost recovery
Greenhouse emissions	Approaching zero net (50% of current levels)	Approaching zero net (25 % of current levels)	Zero Net
Landfills	Less than 24 within the region. Resource Recovery Facilities to replace local Transfer Stations and closed rehabilitated landfills	Less than 12 within the region. Resource Recovery Facilities to replace local Transfer Stations and closed rehabilitated landfills	7 Landfills across region. Resource Recovery Facilities to replace local Transfer Stations/landfills
Resource recovery	60%	70%	90%
Regional contracts	Align contract end dates to enable future regional contracts for resource collection	Regional contracts for resource collection.	Regional contracts for resource collection.
Green Waste	Markets for recycled green waste established within the region in order to establish a green waste processing facility.	Green waste processing facility.	Green waste processing facility
Value added industry for recyclables	Establish a minimum of one value added industry for recyclables	Value-added industries for recyclables.	Value added industries for recyclables.
Sustainable consumption	Sustainable Consumption including a 75% reduction in Plastic Shopping Bags Encourage a 75% reduction in packaging, reusable packaging and recycled/recyclable packaging. Buy Recycled.	Sustainable Consumption including no Plastic Shopping Bags. Encourage a reduction in packaging, reusable packaging and recycled/recyclable packaging. Buy Recycled.	Sustainable Consumption including no Plastic Shopping Bags Encourage a reduction in packaging, reusable packaging and recycled/recyclable packaging. Buy Recycled.
Ecological Footprint	Reduce 20%	Reduce 35%	Reduce 50%

All resource recovery targets depicted in this table are set by weight

9.3 Working towards improving volume recycling and increasing waste wise events.

Recycling at home is a daily event for most Victorians, and now the community has an expectation that recycle facilities will be provided at public events. Sustainability Victoria has a comprehensive community education program to minimise waste and increase recycling. The Regional Education Officer from the CMRWMG provides support when planning waste wise events.

Council promotes recycling and broader sustainability messages through community engagement and education programs in conjunction with Sustainability Victoria, National Packaging Covenant and the CMRWMG. This will make recycling visible at major sporting and commercial venues, gathering and tourist spots.

Council will encourage householders to further increase their recycling rates and extend this practice into the "away from home" living environment. This will be achieved by increasing community awareness about alternative recyclable products including reduction of packaging, introduction of waste wise events and the introduction of recycling bins in public places including parks and shopping strips. Contamination of recycling bins is a major issue and will require extensive community education highlighting the impact and long term affects unsustainable consumption is having on the environment.

9.4 Regional Waste Management Plan Objectives

Towards Zero Waste Strategy and Solid Industrial Waste Management Plan Priorities	Adopted Regional Plan
Waste reduction and resource recovery initiatives that will extend the life of existing landfills.	Resource recovery target of 60% by 2010 through community Education Programs targeting households, business/industry/agriculture, Schools, community/Special Interest groups and Local Government, implementing a sustainable consumption program, and by targeting priority waste streams.
Infrastructure and markets for garden organics and residual waste processing (where viable and appropriate)	Markets for recycled green waste established within the region in order to establish a green waste processing facility by 2010.
Infrastructure at landfills and transfer stations servicing populations of greater than 5000 to enable provision for drop-off of a range of materials including solid industrial waste (SIW), metals, timber, C&D waste, cardboard and paper, commingled containers, oil and chemical containers, silage wrap and plastic mulches, etc.	Most of the landfills and transfer stations have infrastructure in place to enable drop-off of a range of materials particularly recyclables, timber, concrete, chemical containers and, where applicable, silage wrap. Areas for improvement have been identified at some sites and are included in the Infrastructure Improvement section of the Plan.
Infrastructure at landfills and transfer stations servicing populations of greater than 500 for drop off of municipal solid waste and solid industrial waste recyclables.	Most of the landfills and transfer stations have infrastructure in place to enable drop-off of a range of materials particularly recyclables, timber, concrete, chemical containers and where applicable silage wrap. Areas for improvement have been identified at some sites and are included in the Infrastructure Improvement section of the Plan.
Infrastructure at landfills and transfer stations to enable compaction and baling of materials to achieve greater transport efficiencies	Some sites in the region already have balers to facilitate efficient transport. Where applicable, additional infrastructure needs will be investigated and included in the infrastructure improvement list.

Towards Zero Waste Strategy and Solid Industrial Waste Management Plan Priorities	Adopted Regional Plan
Improved siting, design, operation and rehabilitation of landfills	<p>SIIRCC will take into account regulatory requirements and guidelines monitor the siting, design and operation of landfills.</p> <p>Rehabilitation plans for the closed landfills within the region are being formulated for progressive rehabilitation.</p> <p>Progressive capping is being undertaken across the region for the operational landfills.</p>
Regional contracts for municipal recycling and waste organics and residual waste processing (where viable and appropriate)	<p>The opportunity to align municipal recycling and waste contracts will arise in 2008 where the viability and appropriateness of entering into a regional contract will be considered.</p> <p>At present Swan Hill Rural City Council is the only member Council that offers an optional garden organics service.</p>
Where viable, soil banks for stockpiling fill materials for appropriate reuse.	<p>Areas for stockpiling concrete and fill have been, or are being, set up at landfills and transfer stations across the region.</p>
Expanded recycling services to C&I sector, including small and medium enterprises (where viable and appropriate).	<p>The expansion of recycling services to C&I sector will be investigated by the region.</p>

9.5 SHRCC Municipal Waste Disposal and Diversion Targets in Kilograms for 2020.

Viable options for the Swan Hill Region will be reliant on the community's ability to embrace the waste hierarchy of avoidance, reuse, recycling and disposal. In conjunction with the CMRWMC and Council's community Education Programs and promotion of sustainable consumption will play a major role in meeting these objectives.

Household materials generated per household	2002/2003 (kgs/household week)	Target 2010	Target 2015	Target 2020
Waste to landfill	11.11	6.25	4.38	1.25
Commingled packaging and paper/cardboard recycling	5.47	7.83	8.60	9.91
Garden/organics recycling	0.11	1.5	2.0	3.00
Total household materials	16.69	15.58	14.98	14.16
Kerbside Recycling %	33.43	60	70	91

Sustainability Victoria's Towards Zero Waste Strategy sets the targets of 45% recovery rate in household (municipal) solid waste by July 2008 and a 65% recovery rate in household (municipal) solid waste by July 2013.

Closely linked to the Solid Industrial Waste Management Plan is the need for ongoing support for services and facilities to enhance the variability of Waste Management services, including the recovery of materials in Rural Victoria.

9.6 Waste Objectives linking to the Zero Waste Strategy





In addition to the CMRWMC Regional priorities, the Towards Zero Waste Strategy and Solid Waste Industrial Management Plan identify the following infrastructure priorities for rural regions that the Swan Hill region considers applicable and achievable in the medium to long-term timeframe:

- Establishment or upgrade of materials recovery facilities at all transfer stations and landfills so that these can cost-effectively recover the majority of received materials. In addition to recovery of large volume items such as commercial and domestic waste, timber, garden organics, and cardboard/paper, these facilities may need to provide resource recovery opportunities for items such as tyres, and mixed component post-consumer goods.
- Development of resource recovery initiatives that will largely replace the need for new landfills.
- Further development of collection and drop-off systems is required in all regions to 'feed' processing facilities and markets.

From a regional perspective the following waste streams have been identified and prioritised as having the opportunity to be addressed within the Swan Hill region. The majority of these priorities align with either the Towards Zero Waste Strategy or draft Solid Industrial Waste Plan.

The priority waste streams have been chosen through local knowledge, availability of existing systems for resource recovery, and environmental impact or risks in relation to landfills.

Priority Waste Streams

HIGH PRIORITIES	
 <p>Garden organics</p>	<p>Organic/Green Waste</p> <p>Green organics is typically 30-40% of the waste stream to landfill.</p> <p>Green waste at the landfill currently chipped at Swan Hill Landfill Reused in Landscape projects in the Municipality</p>
	<p>Plastics Code 3-7</p> <p>Currently plastic codes 3-7 are not part of the core recycling</p>
 <p>Tyres</p>	<p>Tyres</p> <p>Tyres are collected at cost and transported to for recycling. Long-term solutions are needed to address the need for a cost effective recovery of tyres.</p>
MEDIUM PRIORITIES	
	<p>Agricultural Plastics</p> <p>Agricultural Plastics including silage wrap, baling twine, vine plastic, bunker wrap</p> <p>Markets in North West Victoria have been identified and will take clean silage wrap at no charge.</p>
LOW PRIORITIES WASTE STREAMS	
	<ul style="list-style-type: none"> • Oil • Concrete • Putrescible waste • Household Chemicals • Batteries • Paint • Expanded Polystyrene

10 ADVANTAGES OF REDUCING CONTAMINATED PRODUCTS GOING TO LANDFILL

In the past Regional Victoria landfills have been poorly monitored and managed. Changes in management have reduced the incidence of pollution of ground water, and impacts to local residents including odour, dust, litter, noise, fire and vermin. The Towards Zero Waste Strategy Objective is to have fewer well located and managed landfills rather than many smaller landfills that would not be able to meet the new landfill standards.

The strategy assumes increases in waste production, however increasing landfill costs and growth in recycling will result in a net reduction in the amount of waste going to the landfill.

"This will help to prolong the life of the landfill-fewer materials deposited so landfills will take longer to fill", Sustainability in Action 2005.

10.1 Waste Minimisation

Garbage is a modern problem. Since the 1970s, the amount of waste going to landfills has dramatically increased, largely due to consumer trends. The popularity of supermarkets and convenience foods means more packaging is thrown away. Similarly the trend to replace rather than repair has also led to more hard waste going to landfill.

Recycling helps the environment in three ways by:

1. Reducing waste to landfills
2. Saving energy
3. Preserving natural resources.

Victoria produces approximately 1.7 million tonnes of organic waste (green organics plus food organics) each year equates to 350 kg per person. This makes up to 40% of the total waste stream.

Over the next decade the Victorian Government aims to cut this by 50% to 175kg per person through their Green Organics Action Plan (Zero Waste Strategy 2005). The aim is to lower landfill greenhouse gas emissions and extend the life of existing landfills by increased tonnages of waste diversion. In turn, returning valuable organics to the environment.

Techniques to reduce organics going to landfill include home composting and mulching. These practices eliminates transport costs in collecting material, improves health of gardens and soils, and involves the household in a positive environmental activity and reduces household waste.

The practice of green waste separation helps the community to sort their waste and divert recoverable items from the landfill. The three-bin recycling and waste collection system would provide every resident with the opportunity to reduce and recycle.



Figure 10 The Three Bin Waste Management System

Council encourages the use of recyclable products and ensure, as much of the waste we produce will be available for recycling processes.

- The **recycling bin** for glass jars and bottles, plastic soft drink and cordial bottles, milk and juice cartons, steel and aluminium cans, along with paper and cardboard.
- Lawn clippings, prunings, leaves and small branches (up to 10 cm diameter and 30cm in length) in your **green waste bin** (if you don't compost or mulch already).
- **Garbage bin** only for household rubbish that cannot be recycled or reused. By reducing the amount of waste you create, you are doing your bit to ensure a sustainable future for the Swan Hill Region.

An educated and aware community will make use of these alternative services. The amount of resources we consume has direct implications for the amount of waste produced. New technologies and approaches to waste management encourages recycling the majority of the waste we produce or utilise in alternative ways.

10.2 Alternative Technologies

Alternative technologies utilising waste is becoming accepted as the standard alternative practice to disposing of waste in landfills.

The optimal applications of alternative technologies is restricted to the level of processing required proximity to potential markets, market awareness and acceptance of products derived from garden wastes and more importantly the availability of capital to develop appropriate infrastructure and technology.

As a result the dominant driver for implementing alternative waste technologies is the increasing costs associated with landfills.

10.3 Drivers For Implementing Alternative Waste Technologies Including:

Drivers for Alternative Waste Technology	Barriers to Alternative Waste Technology
<ul style="list-style-type: none"> • Increasing landfill prices • Higher environmental standards and landfill regulation • Increasing environmental awareness • Proponents and Councils are keen to be seen as leading edge • Appeal of the one size fits all solution • Potential for reduced collection costs from fewer kerbside collections • Rising recycled commodity prices • More public/private waste management partnerships • Increasing rationalisation of the management of waste. 	<ul style="list-style-type: none"> • Cost • Unknown nature of new technologies • Long-term contracts required to make them viable • Community concerns and uncertainty • Financing • Competitive methods of managing waste streams • Vulnerable markets for end products • Concern over end product quality • The need for large volumes of material

10.4 Existing and Potential Markets

Past land use practices has contributed to a loss of organic matter through soil erosion, salinisation, nutrient depletion. Such land degradation is one of the most serious environmental threats facing Australia.

Recycled garden/organic wastes have a range of potential applications. Processing can occur in a variety of ways to improve soil organic matter content used in conjunction with capping material when covering landfills. These wastes can be composted with contaminated soils and materials to neutralise soils or organic wastes can be recovered for their caloric value.

10.5 Compost

Compost based products will address a range of soil degradation issues. Applications include reversing the rapid rate of soil decline (carbon) other uses of compost improves water use efficiency, and ultimately reducing the risk of soil salinisation through excessive leaching.

There is a high demand from fruit and vegetable markets for compost based products that include viticulture and horticulture, landscape (amenity), rehabilitation and bioremediation. However, extensive agricultural use is restricted due to high transport and application costs compared to the low value of the crops.

10.6 Renewable Energy

Converting organic waste to renewable energy contributes to achieving the Australian Government commitment to meeting the targets to reducing green house emissions as part of the Greenhouse Kyoto Protocol.

Power generators meeting mandated targets and the introduction of tradeable Renewable Energy Certificates has resulted in the development of alternative technologies. High levels of commitment and financial support from the Federal Government has encouraged uptake including thermal technologies pyrolysis and gasification and other energy generation processes such as anaerobic digestion.

11 FINANCIAL PLAN

11.1 Financial Assurance

Council is required to provide financial assurance to the EPA annually in accordance with Section 67B (1) of the EPA Act. Swan Hill Rural City Council provides security to the EPA by way of Bank Guarantee, which is reviewed every five (5) years for CPI.

Council's Financial Assurance is summarised as follows.

COMPONENT	Amount	Funding Source
Remedial Action	5478,400.00	Bank Guarantee
Site Rehabilitation	\$965,840.00 *	Accumulated Reserve
Site Aftercare (30 years)	512,200.00 pa	Operating Budget

* This figure will reduce at the next EPA review.

11.2 Four Year Major Works

Swan Hill Rural City Council has adopted a Four Year Major Works Plan, which incorporates Capital Works for Waste Management. The Works programmed is for the period 2007/08 to 2010/11.

11.3 Four Year Major Works Adopted By Swan Hill Rural City Council

Project	2007/08	2008/09	2009/10	2010/11	5 – 10 Years
Boundary Bend Transfer Station			\$ 60,000.00		\$ 60,000.00
Manangatang Transfer Station	\$ 10,000.00	\$ 50,000.00			\$ 60,000.00
Manangatang/Boundary Bend Tip Closure & Capping	\$ 50,000.00	\$ 30,000.00	\$ 10,000.00	\$50,000.00	\$ 110,000.00
Nyah West Transfer Station					\$ 60,000.00
Piangil Tip Closure/Capping/ Vegetation					\$ 48,000.00
Robinvale Landfill (upgrade to licensed)					\$ 830,000.00
Swan Hill Landfill Improvements	\$ 52,800.00				
Swan Hill Landfill Improvements for leachate and capping			\$ 30,000.00	\$50,000.00	\$ 140,000.00
Ultima Tip Clean Up Works		\$ 10,000.00			\$ 90,000.00
Ultima Tip Closure/Capping/ Vegetation					\$ 175,000.00
Total	\$112,800.00	\$ 90,000.00	\$100,000.00	\$100,000.00	\$1,474,000.00

* Prioritising the implementation of transfer stations will be carried out following the review of costs implications as a result of landfill levies.

Operating Budget (2005/06)

Council's current operating budget for the financial year shows a net cost to Council of \$3,455.00.

The 2006/07 budget is summarised as follows.

DETAILS	INCOME/EXPENDITURE
Contributors (Shire of Wakool/Barranald)	(\$ 32,800.00)
Garbage Charges	
-5028 x 120l @ \$210.00}	(\$1,784,355.00)
-2649 x 240l @ \$275.00}	
Drum Muster/New bin surcharge	(\$ 23,000.00)
Total Operating Income	(\$1,840,155.00)
Recurrent Operating Expenditure	\$ 1,713,610.00
Non Capitalised Major Projects	\$ 80,000.00
Transfer to landfill reserve	\$ 50,000.00
Council's Net Cost	\$ 3,455.00

11.4 Towards Total Cost Recovery

The Regional Waste Management objectives for cost recovery in the Municipal Waste/Resource Management program is set at total cost recovery by 2015. In essence, the total works establishment in Council's Four Year Major Works should show to be cost neutral for Waste.



11.5 Swan Hill Rural City Council Waste Management Income/Expenditure 10 Year Financial Plan Management for Council's rates income.

	2006:2007	2007:08	2008:09	2009:10	2010:11	2011:12	2012:13	2013:14	2014:15	2015:16	Note
	budget \$	budget \$	budget \$	budget \$	budget \$	budget \$	budget \$	budget \$	budget \$	budget \$	
Revenue											
Waste Management rates and charges	1,794,355	1,838,000	1,893,000	1,950,000	2,009,000	2,039,000	2,137,000	2,199,000	2,261,000	2,329,000	1
Drum musler and new bin surcharge	23,000	24,000	25,000	25,000	27,000	28,000	29,000	30,000	31,000	32,000	2
Contributions - Wakool / Baranald	32,800	100,000	103,000	106,000	109,200	112,500	115,900	119,500	123,000	127,000	3
Total Revenue	1,849,155	1,962,000	2,021,000	2,082,000	2,145,200	2,209,500	2,271,900	2,344,500	2,415,000	2,488,000	
Expenditure											
Korrbick waste collection contrac.	748,000	770,440	794,000	834,300	859,000	885,000	912,000	939,000	957,000	996,000	4
Swan Hill Landfill contract	375,000	387,000	399,000	411,300	423,000	444,150	457,300	471,000	485,000	500,000	5
Robinvale Landfill contract.	82,000	84,000	87,000	90,000	94,500	97,300	100,200	103,200	106,300	109,500	6
Recycling contract	177,000	182,000	187,000	196,350	202,000	208,000	214,000	220,000	227,000	234,000	7
Recruitment operating expenditure other	390,610	340,500	350,700	361,200	372,000	383,200	394,700	406,500	418,700	431,300	8
Transfer to reserves - EPA requirements	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	9
Transfer to Reserves - future capital works	0	45,000	53,000	40,000	45,000	40,000	680,000	55,000	60,000	86,000	3.1
Capital/non capital major projects	80,000	100,000	100,000	100,000	100,000	100,000	930,000	100,000	100,000	100,000	10
Total Expenditure	1,843,610	1,959,940	2,020,700	2,082,550	2,145,500	2,207,850	2,277,900	2,344,700	2,414,000	2,488,800	
Total Surplus/(Deficit)	(3,455)	3,060	300	(460)	(500)	1,850	(2,000)	(200)	1,000	1,200	\$995

Note: Total Surplus/(Deficit) for the 10 year period

- 1 Calculated assuming cost increase of 3%
- 2 With ongoing reduction in the need for drum muster, this figure has been left as status quo
- 3 Needs to be increased from the current \$52,800
- 4 Calculated assuming cost increase of 3% - contract expires 1/1/08. A 5% increase has been assumed at this time to cover the increase in legislative requirements
- 5 Contract expires 30 June 2010 - A 5% increase has been assumed at this time to cover the increase in legislative requirements
- 6 Contract expires 30 June 2010 - A 5% increase has been assumed at this time to cover the increase in legislative requirements
- 7 Contract expires on 1/03/09. A 5% increase has been assumed for this time to allow for increase volume of recyclables to be processed
- 8 Cost increase of 3%
- 9 Transfer to reserves allows for EPA Financial Assurance in form of bank guarantee, and other EPA requirements
- 9.1 Allows for the future capital works program as adopted by Council and in line with licensing the Roolvale landfill site.
- 10 Reflects Council's current four year major works program which may vary annually. Council's contribution only shown, not total project cost. The current plan shows an average annual capital (rates revenue) expenditure of: \$171,000

11.6 Construction and Road Waste Material

The Swan Hill and Robinvale landfill sites accept concrete and both sites have allocated areas where this material is stockpiled.

It is intended that when a sufficient volume of this material is stockpiled onsite it will be crushed and used for municipal purposes as road base, beaching and for reinstatement works.

12 ACTIONS/RECOMMENDATIONS

	Action	Action Officer	Due Date for Completion
1	Investigate Green Waste Collection	Environment Officer	Dec 2007
2	Investigate Commercial Recycling Collection	Environment Officer	June 2008
3	Investigate cost comparison and suitability of increasing recycling services as compared to that of 120ltr waste bins to 240ltr waste bins	Manager Engineering Services	June 2008
4	Lobby State Government to reduce landfill levies in rural areas so as to reduce littering and facilitate closure of rural landfills	Director Engineering Services and Asset Management	Dec 2007
5	Investigate Green Waste recycling services for Robinvale Landfill	Special Projects Engineer	Dec 2007
6	Clean up waste deposited in mallee scrub in vicinity of L. timia Landfill	Special Projects Engineer	June 2008
7	Establish a rehabilitation plan for Chinkapook Landfill site	Special Projects Engineer	March 2008
8	Investigate requirements for the need of a 10 year maintenance aftercare plan for the Weman Landfill site	Special Projects Engineer	Dec 2007
9	Establish through CMRWMG Councils status in achieving the desired outcome as detailed in clause 7.10 of this document	Environment Officer	Dec 2007
10	Support and encourage the CMRWMG to lobby the State Government to reduce landfill levies in rural areas so as to reduce littering and facilitate the closure of rural landfills	Director Engineering Services and Asset Management	Dec 2007
11	Extend recycling of plastics from categories 1-3 to 1-7	Environment Officer	Dec 2007
12	Investigate the introduction of Sustainability Victoria Waste Wise construction and demolition kits	Special Projects Engineer	Dec 2007
13	Investigate the legal enforceability of signage for uncovered loads and subsequent fines	Special Projects Engineer	Dec 2007

14	Investigate the viability and practicalability of introducing subsidised compost/worm units	Environment Officer	Dec 2007
15	Encourage Wakool and Baranald Council's to progress towards achieving the CMRWMC goals	Environment Officer	Ongoing
16	Continue to encourage community participation in waste minimisation and recycling activities.	Environment Officer	Ongoing
17	Continue to provide waste collection services which encourage the separation of recyclables and reusable waste, and provide incentive for minimising the amount of waste produced.	Director Engineering Services & Asset Management	Ongoing
18	Explore the viability of a three bin Waste Management System, Recycling Green Waste and Rubbish.	Environment Officer	June 2008
19	Explore the viability biannual bundled green waste collections	Environment Officer	Dec: 2007
20	Promote home composting via display flyers information sessions and workshops.	Environment Officer	March 2008
21	Continue to monitor and assess Council's waste production and recycling programs.	Special Projects Engineer	Ongoing
22	Explore recycling of tyres cost etc.	Manager Engineering Services	March 2008
23	Investigate concept of onsite mulching in ratepayers yards	Special Projects Engineer	March 2008
24	Investigate the concept of public place recycling	Special Projects Engineer	March 2008
25	Explore practicabilities of waste wise initiation for Councils events	Environment Officer	March 2008
26	Implement media campaign in conjunction with 1-7 recycling implementation	Environment Officer	Dec: 2007



APPENDIX A

1991						2001					
	Collector District Landfill Number	Collector District Population	% of CD Within Landfill Catchment	Landfill Catchment Population		Collector District Landfill Number	Collector District Population	% of CD Within Landfill Catchment	Landfill Catchment Population		
Boundary Bend	2010801	241	100%	241		2010801	213	100%	213		
Total				241					213		
Manangatang	2010707	136	100%	136		2010707	165	100%	165		Bigger than old
	2010804	118	50%	59		2010804	93	50%	47		
	2010806	157	100%	157					0		Now part of 707
	2010807	300	100%	300		2010807	251	100%	251		
	2010809	110	40%	44		2010809	89	40%	36		
	2010810	162	20%	32		2010810	139	20%	28		
Total				728					527		



1991					
	Collector District Landfill Number	Collector District Population	% of CD Within Landfill Catchment	Landfill Catchment Population	
Piangil	2010802	203	100%	203	
	2010803	164	100%	164	
	2010804	118	50%	59	
	2010805	524	100%	524	
	2010808	340	100%	340	
	2010810	162	80%	130	
	2010811	335	100%	335	
	2010901	609	100%	609	
Total				2364	

2001					
	Collector District Landfill Number	Collector District Population	% of CD Within Landfill Catchment	Landfill Catchment Population	
	2010802	180	100%	180	
	2010803	181	100%	181	
	2010804	93	50%	47	
	2010805	541	100%	541	
	2010808	315	100%	315	
	2010810	139	80%	111	
	2010806	302	100%	302	CD number change
	2010901	523	100%	523	
				2200	

Robinvale	2010701	378	100	378	
	2010702	721	100	721	
	2010703	281	100	281	
	2010704	568	100	568	
	2010705	634	100	634	
	2010706	488	100	488	
	2010708	184	67	123	
	2010709	701	100	701	
Total				3894	

	2010701	321	100	321	
	2010702	732	100	732	
	2010703	220	100	220	Smaller than old district
	2010704	553	100	553	
	2010705	696	100	696	Bigger than old
	2010706	574	100	574	Bigger than old
				0	Include r 706
	2010708	821	100	821	CD number change
				3917	



1991				
Collector District Landfill Number	Collector District Population	% of CD Within Landfill Catchment	Landfill Catchment Population	
2010902	345	100	345	
2010903	942	100	942	
2010904	350	100	350	
2010905	288	100	288	
2010906	139	67	93	
2010908	531	100	531	
2010909	260	33	86	
2010910	600	90	540	
2010911	482	100	482	
2011001	429	100	429	
2011002	682	100	682	
2011003	701	100	701	
2011004	617	100	617	
211005	322	100	322	
2011006	501	100	501	
2011007	448	100	448	
2011008	664	100	664	
2011009	505	100	505	
2011010	752	100	752	

2001				
Collector District Landfill Number	Collector District Population	% of CD Within Landfill Catchment	Landfill Catchment Population	
2010902	324	100	324	
2010903	992	100	992	
2010904	323	100	323	
2010905	258	100	258	
2010906	128	67	86	
2010908	385	100	385	Smaller area
2010909	225	33	74	
2010910	584	90	526	
2010911	503	100	503	
2010912	176	100	176	Formerly par. of 908
2011001	426	100	426	
2011002	562	100	562	
2011003	677	100	677	
2012204	635	100	635	CD number change
2012205	362	100	362	CD number change
2012206	543	100	543	CD number change
2012207	461	100	461	CD number change
2012208	768	100	768	CD number change
2012203	644	100	644	CD number change
2011008	701	100	701	CD number change



1991				
	Collector District Landfill Number	Collector District Population	% of CD Within Landfill Catchment	Landfill Catchment Population
Swan Hill cont.	2011011	515	100	515
	2011012	465	100	465
	2011013	1058	100	1058
	2011014	544	100	544
	2011015	451	100	451
	2011016	708	67	474
	2020102	336	10	34
Total				12819

2001					
	Collector District Landfill Number	Collector District Population	% of CD Within Landfill Catchment	Landfill Catchment Population	
	2011007	494	100	494	CD number change
	2011006	476	100	476	CD number change
	2011005	1029	100	1029	CD number change
	2011004	554	100	534	CD number change
	212202	512	100	512	CD number change
	2012201	927	100	927	CD number change
					New part of 9'0
Total				13418	

Ultima	2010809	110	60	66
	2010906	139	33	46
	2010907	168	100	168
	2010909	260	67	174
	2010910	600	10	60
Total				514

	2010809	89	60	53
	2010906	128	33	42
	2010907	132	100	132
	2010909	225	67	151
	2010910	584	10	58
				436

Grand Total				20560
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				20711
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APPENDIX B

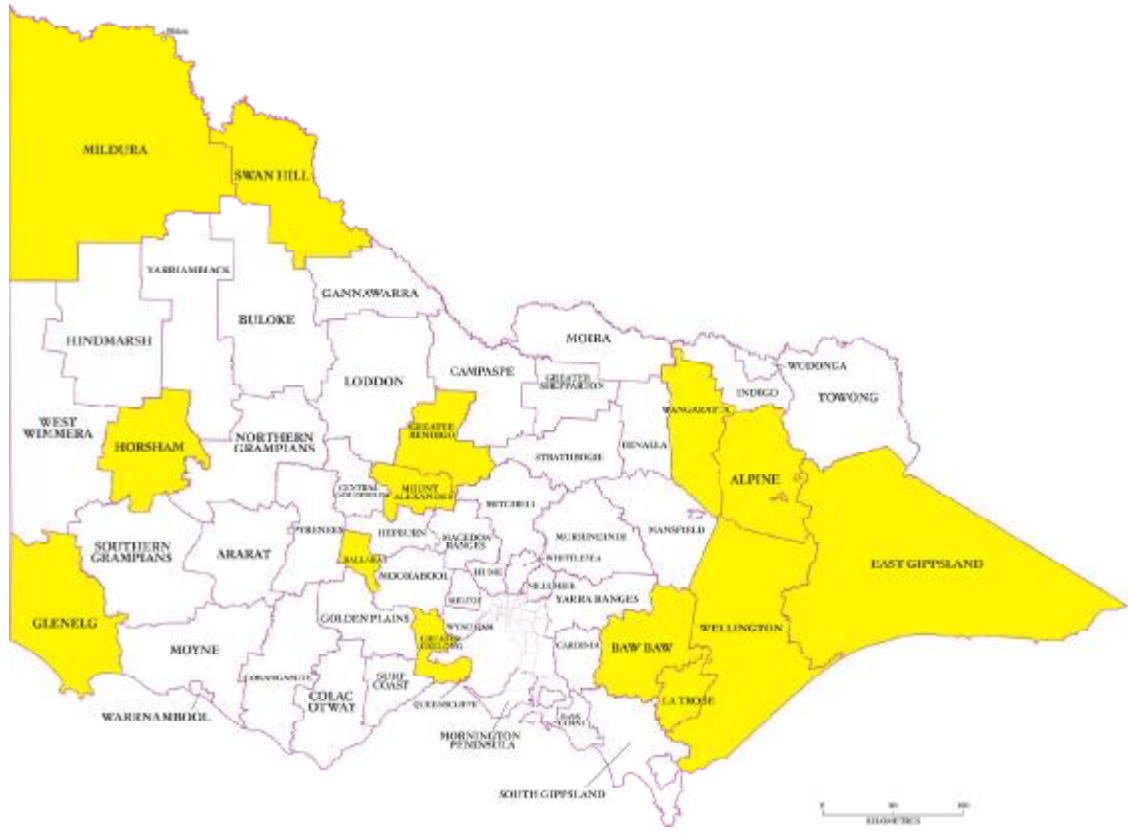
Municipality	Tipping Fee (Asbestos) \$/Tonne Includes GST	Population	Pre-requisite	Landfill Management
1. Wangaratta	120.00	26,641	Prior Notice	Council
2. Mount Alexander	76.80	17,242	24 hours notice	Contract
3. Horsham	57.20	18,901	Local use only	Council
4. Bendigo	85.00	94,614	Prior Notice Local Use Only	Council
5. Wellington	72.00 Domestic	41,450	48 hours notice	Contract
6. East Gippsland	110.00	40,826	24 hours notice Local Use Only	
7. Mildura	74.15	51,263	24 hours notice	Council
8. Latrobe City	184.00 commercial	70,315	24 hours notice	Council
9. Alpine Shire	30.00 minimum 44.00	13,168	48 hours notice	Contract
10. Glenelg	117.45	20,220	Local Use Only	Council
11. Ballarat	100.00	87,148	24 hours notice	Contract
12. Baw Baw	85.00	37,935	Prior notice	Contract
13. Swan Hill Rural City Council	128.00	21,461	60 mins	Contract
14. Greater Geelong City Council	44.00 Trailer load	202,615	60 mins (Pre double wrapped) No domestic Waste	Contract

APPENDIX C

Technology	Method	Efficiency
Methane capture from Landfills	Capture of methane using sinking pipes wells (projected life span 15-20 years) Dependant on anaerobic conditions	Low
Waste separation & sorting	Leads to higher value and end use applications Mechanical sorting using barrel and screens	Medium
	Automated and manual sorting to separate mixed recyclable materials or reprocessing	High
Biological treatments Anaerobic composting	Open windrow composting Simple uses decomposition of organic materials by aerobic conditions Process released the nutrients and energy contained in waste material	Medium
Enclosed composting	Controlled atmosphere and moisture conditions (uses drums tunnels silos). Improves rates organic decomposition and controls odour	Medium
Vermicomposting	Uses worms to consume organic waste including bio-solids food wastes animals and organics to produce high quality	High
Anaerobic & digestion	Digestion is the bacterial degradation of organic materials in the absence of oxygen Carried out in temperature pH controlled tanks with some mechanical processing main types are mechanical biological treatment and fermentation	High
Mechanical Biological treatment	MBT splits residual waste streams in 3 fractions, recyclable (glass metals) biological stream (composting anaerobic digestion) fuel stream for energy recovery	Low
Thermal technologies Incineration	Recovers the calorific energy contained in residual waste streams "Mass burn" incineration utilising up to 200 - 400 tonnes per day	High

Technology	Method	Efficiency
Cogeneration	Cogeneration harnesses waste heat from electricity production for useful purposes i.e. heat/steam from turbine	High
New thermal processes Pyrolysis	Pyrolysis Involves indirect heating of carbon rich material with the aim of achieving thermal degradation of the material temperatures of 500C in the absence of oxygen and under pressure generating up to 200-400 kw per hour per tonne.	High
Gasification (Carbon Sequestration)	Heats carbon rich material in an atmosphere with slightly reduced oxygen Carbon is converted to a gaseous form. Efficient technique to reducing the volume of solid waste for recovering energy.	Medium

APPENDIX D



APPENDIX E

SWAN HILL LANDFILL

**Financial Assurance Determination
(EPA Licence No. H5622)
June 2005**

A. Site Details

The Swan Hill Landfill is located on Council owned land on the Swan Hill – Sea Lake Road approximately 4.5 kms west of the town boundary.

The total site comprises an area of 43.79 ha of which approximately 20.7 ha has been identified as potential for use as landfill.

While access roads, parking, administration and storage areas occupy part of the licenced area it is estimated that approximately 6 hectares require rehabilitation within the near future (including the current cell).

The site is in a low rainfall (0.35m), high evaporation rate area, with minimal to nil leachate generation having been experienced to date.

Immediate cover is won on site from cell excavation, with supplementary sources available from adjoining land or Council operations if required.

The nearest residential property is greater than 500m from the site.

The site has been operated as a landfill by Council since approximately the mid 1960's.

B. Gas Generation

Significant vegetation has been established in buffer plantations. Some vegetation regrowth has occurred over previously filled areas.

No evidence exists of any adverse effect on vegetation or generation of odours from the site.

Given the relatively low volume operation, the low rainfall, high evaporation, the absence of any significant industrial waste, life of the site and its isolation, it is considered that a gas collection system is not warranted.

11.1.A – Envirosciences Pty Ltd in the Swan Hill Landfill Rehabilitation and Closure Plan states in relation to gas generation – clause 5.4.5 Page 9

“In summary, the landfill is considered to represent a relatively low risk to the potential receptors identified, mainly due to the age and expected low gas generation rates from the waste”.

As the site has a potential long life (20 years) and the target of reducing waste volumes it is proposed to progressively cap and rehabilitate the site.

It is acknowledged that a review needs to be undertaken every 3- 5 years to take into account, capping and rehabilitation completed, and any extension of the filled area.

Site after care forms part of the ongoing day-to-day management of the site and is included in contract requirements and annual operational budgets.

C. Calculations

1. Remedial Action

$$\begin{aligned} & \$200,000 + (16 \times \text{typical waste tonnage received}) \\ & - 200,000 - (16 \times 17,400) \\ & = \$478,400 \end{aligned}$$

(Bank Guarantee – reviewed every 5 years for CPI)

2. Site Rehabilitation

(See Swan Hill Closure and Rehabilitation Plan)

HIA – Enviroscience Pty Ltd.

The calculations are based on existing active landfill area (excluding storage areas, roads, etc.)

It is assumed that the amount will be reviewed on a regular basis to take into account any extension of the landfill area and any staged rehabilitation that has been completed.

Total landfill area = 6 ha

Landfill immediate cover (300mm) – progressively carried out.

Landfill low permeability cap – (600mm) low permeability clay
 $0.6\text{m} \times 60,000 \text{ m}^2 = 36,000 \text{ m}^3$

Landfill cap – local topsoil with mulch sourced on site (600mm)
 $0.6\text{m} \times 60,000 \text{ m}^2 = 36,000 \text{ m}^3$.

As the Council owns a large parcel of land for future recreational development – cover material, topsoil etc can be won within close proximity to the landfill cells.

Cost of clay (supplied and placed) \$15/m³
Cost of clay top $36,000 \text{ m}^3 \times 15\$/\text{m}^3 = \$540,000$

Cost of cap topsoil and mulch (supplied and placed) - \$10/m³
Cost of topsoil cap $36,000 \text{ m}^3 \times 10 \$/\text{m}^3 = \$360,000$

Grass/Vegetation

Direct seeding native vegetation (Saltbush – wattle etc)

\$200/kg – 1kg/ha - \$80/h x 7.6h/ha	
(S200/kg x 1kg/ha x 6/ha) – (\$80/h x 7.6h/ha x 6ha)	= \$ 4,848
Remove facilities – Item (net cost)	= \$ 15,000
And decommission services	
(Office buildings are transportable and have a high residual value	\$919,848
The weighbridge has a high residual Value well in excess of annual cost)	
Design, supervision and quality control - 5%	\$ 45,992
Total cost of site rehabilitation	\$965,840

Accumulating Fund (Council Reserve over 20 years i.e. \$50,000 p/a)

3. Site Aftercare

As the site is expected to be operational for a further 20 years, early stage aftercare will be included in annual operating costs and all are currently included in operational contracts.

Aftercare period (years)	30	
Number of ground waste bores	4	
Bore maintenance/bore/ year	\$250 x 4 = \$1,000	
30 yrs x \$1,000/yr		\$ 30,000
Bore sample frequency/year – 1		
Analytical cost/sample	\$ 8,000 (i.e. 2000/bore)	
30 yrs x 8,000 \$/yr		\$240,000
No gas collection		
Costs per cap inspection and vegetation maintenance		
2/yr x 30 yrs x \$100		\$ 6,000
Restoration of partial settlement of cap		
10% of area		
6000 m ³ x 10 \$/m ³ ,		\$ 60,000
Leachate treatment and disposal per year		
Currently no leachate is being generated		
From the cells – minimal		\$ 30,000
\$1,000/year (contingency)		
Total site aftercare		\$366,000
Average cost		\$ 12,200 pa.

(Annual operating budget Contractor/Council during life of site - indexed by CPI annually)