Hepburn
SHIRE COUNCIL

WASTE MANAGEMENT AND RESOURCE RECOVERY STRATEGY

JANUARY 2014






Executive Summary

Hepburn Shire is located in the Central Highlands region of Victoria, about 110 kilometres north-west of Melbourne. It is a predominately rural area, with many townships, villages and rural-residential areas. The population in 2011 was 14,981 and is predicted to increase to 17,520 by 2031. The number of households is also expected increase from 6,493 in 2011 to 8,020 by 2031.

Almost half the total waste (49%) managed by Hepburn Shire Council (HSC) is collected through the kerbside system which is provided as a weekly residual waste collection and a fortnightly recyclables collection in the main townships. The residual waste is disposed at the regional landfill operated by Ballarat City Council in Smythesdale and the recyclables are sent to Visy in Melbourne for sorting and processing. A large number of households are not provided with a kerbside service and are instead issued with vouchers to allow disposal of waste at the transfer stations.

The annual budget for management of the municipal solid waste by HSC is in the regional of $2.33 million per annum, with the major costs relating to:

- Kerbside waste and recyclables collection and management : $904,000
- Management of the three transfer stations at Creswick, Daylesford and Trentham: $876,000
- Management of public place litter and recycling bins: $242,000

The residual waste sent to landfill contains a number of resources which could be recovered for beneficial reuse, including organic material (food and garden waste) which could be converted to either compost or energy and recyclables which could be recovered through the existing recycling system.

A number of options for decreasing the amount of waste generation and/or increasing the amount of recycling through the kerbside system are considered as part of this strategy, including:

- Reducing the bin size for residual waste
- Encouraging the use of compost bins and worm farms for food and garden waste
- Getting more recyclables into the recycling bin
- Extending the kerbside collection system to the more households
- Implementing a kerbside collection for household garden and food waste

Several options for improving the performance and efficiency of the transfer station network have also been considered as part of the strategy, including:

- improving the management of green waste

- improving transfer station efficiency
- implementing full cost recovery
- utilising green waste for energy generation

A number of other actions propose improvements to existing service and systems or will achieve a high level of compliance with environmental requirements.

Overall the actions proposed in the strategy are expected to reduce greenhouse gas emissions from waste management, reduce costs, increase recycling and support the development of new businesses involved in resource recovery.

TABLE OF ACRONYMS AND TERMS USED

Aerobic	A process that is undertaken in the presence of oxygen, such as aerobic composting
Anaerobic	A process that is undertaken in the absence of oxygen, such as anaerobic digestion
Anaerobic digestion	A process or collection of processes, by which microorganisms break down biodegradable material, such as food waste, in the absence of oxygen.
CFL	Compact Fluorescent Light
Composting	The decomposition of organic matter (e.g. garden waste, food waste) by aerobic microorganisms
°C	Degrees Celsius
DEPI	Victorian Department of Environment and Primary Industries
EPA	Environment Protection Authority of Victoria
E-waste	A generic term for electronic waste including computers, TVs, mobile phones and related products
Gasification	A process of combustion undertaken at high temperatures (above 700°C) in a reduced oxygen environment to produce an synthesis gas consisting of carbon dioxide, carbon monoxide, hydrogen and methane
Gigajoule	1 Billion joules
GHG	Greenhouse Gas
Green waste/Garden waste	Waste from garden maintenance, gardening and related activities including grass and lawn clippings, prunings, weeds, branches and whole plants
HSC	Hepburn Shire Council
Incineration	A process of combustion undertaken at high temperature in the presence of excess oxygen to produce a flue gas consisting of predominately carbon dioxide and water vapour.

Kg/hh/yr	Kilograms per household per year
Km	kilometres
L	Litres
LFHW	Love Food Hate Waste
m^3	Cubic metres
MRF	Materials Recovery Facility
Megalitre	1 Million litres
Mulch	A product made from chipped or shredded garden waste which can be applied to the surface of an area of soil to conserve moisture, suppress weed growth, improve soil fertility and health or improve the visual amenity of the area.
NSW EPA	New South Wales Environment Protection Authority
Organic waste	The organic fraction of the waste stream which can readily decompose. It includes garden waste, food waste, timber, paper and cardboard.
p.a.	Per annum
Putrescible	The organic fraction of the waste stream which can readily decompose to produce unpleasant odour and a liquid (leachate).
PAN	Pollution Abatement Notice
Pyrolysis	A process of moderate to high temperature decomposition of organic material in the absence of oxygen or air to produce a synthesis gas, tars and a solid residue rich in carbon (char)
Resale shop	A shop operating at a Transfer Station, Resource Recovery Centre of landfill to recover usable or repairable items for sale prior to disposal.
Resource recovery rate	The ratio of recyclables to recyclables and landfill expressed as a percentage.
RWMG	Regional Waste Management Group

TPA	Tonnes per annum
TS	Transfer Station
Waste to Energy (WtE)	A process of generating energy in the form of electricity and/or heat from the thermal or biological conversion of waste. It includes incineration, gasification, pyrolysis and anaerobic digestion.
WMRRS	Waste Management and Resource Recovery Strategy
wt	Weight
yr	Year

01. BACKGROUND AND CONTEXT

The Council Plan 2013-2017 sets out a vision for Hepburn Shire Council (HSC) to be a "cutting edge Council making excellent decisions for future generations". The Plan also outlines the strategic objectives that are relevant to the development of a Waste Management and Resource Recovery Strategy (WMRRS). These are shown in Table 1.

TABLE 1 – RELEVANT STRATEGIC OBJECTIVES, PERFORMANCE MEASURES AND TARGETS

Strategic Objective	Strategic Activity	Performance Measure	Performance Target
Quality Community Infrastructure - through understanding waste services and our asset portfolio the infrastructure team plan for, create and manage waste and recycling services and the timely replacement of public assets to maximise environmental sustainability, community safety, convenience and well being	Waste	Re-establish baseline date for volumes of recyclables and waste to landfill	Evidence based data compiled and available to establish ratios of recyclables to waste
Sustainable Environment and a Vibrant Economy – through balanced and progressive programs and processes (Sustainable Development) will encourage development that promotes economic diversity and prosperity while enhancing and preserving the natural and built environment of all Hepburn Shire	Sustainability	To reduce the Council's carbon footprint	A 5% reduction in Council's carbon emissions

The specific actions under each of the strategic activities that are relevant to the development of the WMRRS are highlighted in Table 2.

TABLE 2 – STRATEGIC ACTIVITIES RELEVANT TO THE WMRRS

Strategic Activity	Action	Measure	Target
Waste – Develop and Implement the Waste Management Strategy with a focus on converting Waste into Opportunity through education, technology and innovation	Complete Waste Strategy	% complete	100% complete
	Implement Waste to Energy pilot project (subject to business case development)	Business Case complete	Adopted by council
Sustainability – develop opportunities for increased renewable energy and minimisation of energy consumption within Hepburn Shire Council in order to reduce our reliance on non renewable energy generation	Develop a Bio Energy Feasibility Study	Complete initial study	Study 100% complete

The Council Budget * provides further detail on the intended waste management objectives and outcomes, namely[1]:

- Deliver high quality kerbside waste and recycling collection services that are reliable and cost effective
- Operate the Material Recovery Facility and three Transfer Station facilities that are clean, cost effective and maximise recycling opportunities
- Constantly monitor waste services and industry best practice to improve performance by reducing waste volumes and exploring alternatives to landfill disposal

The HSC Environmental Sustainability Strategy (2011-15) further outlines some actions related to waste management including:

- Establish a recycling system for timber at the transfer stations
- Establish a recycling system for mulch at the transfer stations
- Education on recycling and waste reduction
- Establish a reuse centre at the transfer station(s)

[*] Hepburn Shire Council Budget 2013-14, page 22

- Store and sell firewood and mulch at the transfer stations
- Establish composting at the transfer stations
- Encourage a plastic bag and plastic bottle free policy in the Shire

Within this context the proposed objectives for the Waste Management and Resource Recovery Strategy are to:

1. Reduce greenhouse gas emissions associated with Council's waste management activities
2. Minimise costs to Council and the community through reductions in waste to landfill and efficiencies in waste management practices
3. Create new business opportunities by converting waste to resources or energy

The proposed performance indicators to measure progress against these objectives are shown in Table 3.

TABLE 3 – KEY PERFORMANCE INDICATORS

Objective	Performance Indicator	Baseline value	Target Value	Key Assumptions
Reduce GHG emissions	A reduction in organic material disposed to landfill	220 kg/hh/yr from kerbside	191 kg/hh/yr without a kerbside organics service 70 kg/hh/yr with a kerbside organics service	Based on 2008 bin audits which indicated 49% organic matter (garden, food and paper/cardboard) and using the 2010/11 figure of 449 kg/hh/yr for kerbside waste generation[2]. The baseline and target can be revised if data from new waste audits shows an organics composition significantly different to the 2008 audit.
		49% of the total waste to landfill from kerbside	46% without a kerbside organics service	Based on the 2008 bin audit and applying the same composition to the transfer station waste stream[3].

The 2008 data has been adjusted for a very high cardboard weight % which appears to be an anomaly.
Applying the kerbside waste composition to the Transfer Station waste stream will not be accurate but is the only data currently available

Objective	Performance Indicator	Baseline value	Target Value	Key Assumptions
		and transfer stations	32% with a kerbside organics service	The baseline and target can be revised if data from new waste audits shows an organics composition significantly different to the 2008 audit.
Minimise costs	A reduction in cost per tonne of waste	$255/Tonne		Based on total kerbside and transfer station waste, recycling and green waste streams and 2013/14 budget expenditure figures, being: • Kerbside waste: 2950 tonnes • Kerbside recycling: 1000 tonnes • Transfer station waste: 2802 tonnes • Transfer station recyclables: 712 tonnes • Transfer station garden waste: 626 tonnes
	A reduction in cost per rateable property	$202/rateable property		Based on 2013/14 budget expenditure and 10,212 rateable properties
	An increase in kerbside recycling rate	38%[4]	46% without a kerbside organics service 60% with a kerbside organics service	Based on the data provided for the Victorian Local Government Annual Survey 2010/11
	An increase in overall	35%[5]	To be	Based on 2010-11 kerbside date and 2012/13 Transfer Station

Based on the likely data for 2013/14 of 2950 tonnes of kerbside waste and 1000 tonnes of kerbside recycling this will fall to 25%. Historically it appears the kerbside recycling figure has included recyclables recovered through the transfer station network

This will reduce to 29% if the 2013/14 kerbside figures are used

Objective	Performance Indicator	Baseline value	Target Value	Key Assumptions
	recycling rate (including transfer stations)		determined	data
New Business opportunities	Number of new business opportunities established	nil		

In the development of this strategy a number of options were investigated and preliminary business cases developed for improvements to the current kerbside collection system, operation of the transfer station network, and utilisation of the green waste collected at the Transfer Stations as feedstock for a Waste to Energy project. A number of other actions have also been recommended for consideration that relate to compliance with legislation or improvements in service level. The links between the strategy objectives and the options are shown in Table 4. These options are discussed in more detail in subsequent sections of the document and the preliminary business cases are included in Appendix 2.

TABLE 4 – STRATEGY OBJECTIVES AND OPTIONS

Strategy Objective	Proposed Option
Reduce greenhouse gas emissions associated with Council's waste management activities	Option 2: Increasing the size of the recycling bin from 240 litres to 360 litres Option 3: Encouraging the use of compost bins and worm farms for food and garden waste Option 6: Implementing a kerbside collection for household garden and food waste
Minimise costs to Council and the community through reductions in waste to landfill and efficiencies in waste management practices	Option 1: Reducing the bin size for residual waste from 120 litres to 80 litres Option 4: Getting recyclables into the recycling bin Option 5: Extending the kerbside collection system to more households Option 7: Improving the management of green

Strategy Objective	Proposed Option
	waste Option 8: Improving transfer station efficiency Option 9: Implementing full cost recovery at transfer stations
Create new business opportunities by converting waste to resources or energy	Option 10: Utilising green waste for energy generation Option 11: Expanding the range of materials recovered at transfer stations

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02. PROPOSED STRATEGY ACTIONS

The proposed actions to be implemented under the strategy are listed in Table 5 along with an indication of the priority. A high, medium or low priority has been assigned to each strategy action based on the expected economic, environmental and social outcomes, the need to address compliance, or the sequential link between actions.

TABLE 5 – STRATEGY ACTIONS BY SERVICE AREA

Proposed Strategy Action	Action Summary	Green House Gas Emissions	Payback Period	Cost	Business Case No (Option No)	Ranking
	Kerbside Collection Service					
1	Determine community acceptance for extending the kerbside collection service to households in the small hamlets through the Shire and extend the service where there is community support	Overall a decrease in GHG emissions	5 years	Return of $78,000	5	High
2	Promote home composting and worm farming of food and garden waste for households that have a kerbside service through either a rebate or council bulk purchasing	Overall a small environmental benefit in GHG	4 years	$27,000	3	Medium
3	Implement an education program to get recyclables into the recycling bin (linked to	*Clear reduction in GHG*	*1.6 years*	*$55,000*	*4*	*High*

Proposed Strategy Action	Action Summary	Green House Gas Emissions	Payback Period	Cost	Business Case No (Option No)	Ranking
	Get it Right on Bin Night)					
4	Undertake further research into the benefits of implementing a smaller effective volume for the residual waste bins through introduction of 80 litre bins or moving the current 120 litre bin to fortnightly collection (especially in the colder months)	*Reduction in GHG*	*6.3 years*	*$154,000*	*1*	*Medium*
5	Undertake further quantification of the waste composition to define the potential benefits from a household organics collection service	*Not determined*	*Not determined-*	*Not determined*	*Future development if required*	*Medium*
	Transfer Station Operations					
6	Improving the management of greenwaste received at transfer stations through the investigation and implementation of actions for the receival, processing and reuse of greenwaste. The management of greenwaste will link to Action No 12 - Bio Energy feasibility study	*Small reduction in GHG*	*1 Year*	*Return of $99,200*	*7*	*High*

Proposed Strategy Action	Action Summary	Green House Gas Emissions	Payback Period	Cost	Business Case No (Option No)	Ranking
7	Restructure the contracts for the transfer stations so that there is a financial incentive to improve the transport efficiency for both residual waste and recyclables	*Reduction of GHG through reduction in transport*	*More detailed assessment required*	*More detailed assessment required*	*8*	*High*
8	Undertake capital upgrades at transfer stations to allow more efficient handling of recyclables	*Neutral*	*More detailed assessment required*	*More detailed assessment required*	*Future development if required*	*Medium*
9	Undertake a design and costing to integrate the Daylesford MRF with the Daylesford Transfer Station to eliminate double handling of materials	*Neutral*	*More detailed assessment required*	*More detailed assessment required*	*Future development if required*	*Medium*
10	Review the use and management of the current voucher system that is currently supplied to properties without a kerbside service and include all residential properties in a review of the voucher system.	*Nil*	*More detailed assessment required*	*More detailed assessment required*	*9*	*High*
11	Investigate the potential for recovery of clean concrete and soil at each	*Neutral*	*More detailed assessmen*	*More detailed assessment*	*Future development if*	*Low*

Proposed Strategy Action	Action Summary	Green House Gas Emissions	Payback Period	Cost	Business Case No (Option No)	Ranking
	of the transfer stations		*t required*	*required*	*required*	
	Waste to Energy					
12	Support the bio-energy feasibility study to progress to the next stage of business case development	*Reduction in GHG*	*10 years*	*$1,815,000*	*10*	*High*
	MRF Operations					
13	Monitor the effectiveness of litter reduction and cleanup associated with operations of the of the Materials Recovery Facility: • work with Wheelie Waste to ensure historical litter from the MRF operation present on adjoining landholder properties is removed. • implement a periodic litter inspection at the MRF to ensure no new litter is being generated. • meet with the concerned residents on quarterly basis for 12 months to ensure the new operation of the MRF no longer deposits wind generated litter on their properties	*Neutral*	*NA*	*NA*	*NA*	*High*

Proposed Strategy Action	Action Summary	Green House Gas Emissions	Payback Period	Cost	Business Case No (Option No)	Ranking
14	Promote the availability of existing and new options for recycling of unwanted/used of products	*More detailed assessment required*	*More detailed assessment required*	*More detailed assessment required*	*Future development if required*	*Low*
	Hard Waste Collection					
15	Continue to monitor the response to the Clunes hard waste collection and undertake a review of hard waste collections in conjunction with Action No 10	*Neutral*	*NA*	*Monitor*	*NA*	*Low*
	Public Place Bins and Events					
16	Investigate changing the collection frequency for public place litter bins by further pairing with recycle bins	*Neutral*	*NA*	*As per contracted rates*	*NA*	*Medium*
17	Investigation of litter and public place bin recycling bin technology solutions to improve the efficiency of the service	*Neutral*	*NA*	*Additional costs per bin collection*	-	*Medium*
18	Install standard signage on all public place recycling and litter bins	*Not determined*	*NA*	*minor*	-	*Medium*
19	Undertake a follow up audit of public place bins	*Not determine*	*NA*	*minor*	-	*Medium*

Proposed Strategy Action	Action Summary	Green House Gas Emissions	Payback Period	Cost	Business Case No (Option No)	Ranking
	in the warmer summer period	*d*				
20	Review the operation and performance of recycling bins at events	*Not determined*	*NA*	*minor*	-	*Low*
	Littering and illegal Dumping					
21	Develop a joint approach to enforcement with DEPI and other land managers including joint approaches to prosecution of those identified as being responsible for illegal dumping and promote these prosecution actions through local media to raise the community awareness about illegal dumping. As part of this action consideration could be given to waiving the gates fees for illegal dumping cleaned up by DEPI	*Not Determined*	*NA*	*$3,000*	-	*High*
22	Ensure rapid response and cleanup of illegally dumped waste to ensure a mindset of "its ok to dump here" (rubbish attracts rubbish) doesn't	*Not Determined*	*NA*	*$20,000 per year*	-	*High*

Proposed Strategy Action	Action Summary	Green House Gas Emissions	Payback Period	Cost	Business Case No (Option No)	Ranking
	develop					
23	Ensure high level of cleanliness of waste management assets such as bins, collection vehicles and transfer stations to reinforce a sense of pride and value in waste management services	*Not determined*	*NA*	*No additional cost*	-	*High*
	Waste Avoidance					
24	Further investigate the possibility of implementing a food waste avoidance program	*Not determined*	*More detailed assessment required*	*More detailed assessment required*	*Future development if required*	*Low*
25	Continue to support the Garage Sale Trail	*Not determined*	*NA*	*More detailed assessment required*	-	*Medium*
26	Upgrade the resale shops at the transfer stations to provide further value adding and refurbishment opportunities possibly through engagement with an appropriate social enterprise	*Not determined*	*NA*	*More detailed assessment required*	*Future development if required*	*Medium*
27	Complete rehabilitation requirements for the Creswick landfill in	*Not determine*	*Not determine*	*More detailed assessm*	-	*High*

Proposed Strategy Action	Action Summary	Green House Gas Emissions	Payback Period	Cost	Business Case No (Option No)	Ranking
	accordance with EPA requirements	*d*	*d*	*ent required*		
28	Confirm with EPA that closure and rehabilitation of the Daylesford and Trentham landfills have been completed to a satisfactory standard	*Not determined*	*Not determined*	*NA*	-	*Medium*
	Developing a Social Enterprise at the Transfer Stations					
29	Investigate and support the development of a social enterprise at the Transfer Stations to enhance the recovery of unwanted items, timber and other materials with the initial focus towards the transfer stations receiving the largest volume.	*Not determined*	*Not determined*	*More detailed assessment required*	*Future development if required*	*High*
	Improving Data Collection and Management					
30	*Regular auditing of kerbside bin composition to measure any changes in waste composition from strategy actions and provide a more comprehensive data set for decisions such as introduction of a*	*Not determined*	*Not determined*	*To be determined*	-	*High*

Proposed Strategy Action	Action Summary	Green House Gas Emissions	Payback Period	Cost	Business Case No (Option No)	Ranking
	collection service for household organics					
31	*Regular auditing of Transfer Station waste composition and origin to build up a better understanding of the percentage of different materials (e.g. garden waste, timber, soil, concrete, etc) in the material stream*	*Not determined*	*Not determined*	*To be determined*	-	*High*

Total cost for these programs is estimated at $2,300,000 of which $1,815,000 is the capital cost of a "Green Waste to Energy Generating" plant which has net annual saving from operations estimated at $173,500. The overall annual savings from the options above is at $410,000 per annum which includes the savings from the green waste to energy generating plant. There are a number of recommendations for further investigations of the actions in the above table which will affect the above expenditure figures.

Implementation of the Strategy will be through the annual budget process which will allocate funding to strategy actions based on the priorities identified in Table 5. A proposed implementation schedule is included in Section 1.

03. REGIONAL OVERVIEW

Hepburn Shire is located in the Central Highlands region of Victoria, about 110 kilometres north-west of Melbourne. It is a predominately rural area, with many townships, villages and rural-residential areas. The shire encompasses a total area of about 1,470 square kilometres. The main townships are Daylesford, Hepburn Springs, Creswick, Clunes and Trentham and account for an estimated 55% of the Shire's population. Rural activities include agriculture (grazing and cropping) and forestry, with some viticulture. Tourism is an important industry, with the shire containing 80% of Australia's mineral spring reserves.

The Shire's population increased marginally during the 1990s, growing from 13,300 in 1991 to 13,800 by 2001. The population in 2011 had increased to 14,981 according to the 2011 Census and is predicted to increase to 17,520 by 2031. The number of households is also expected increase from 6,493 in 2011 to 8,020 by 2031.

04. CURRENT WASTE MANAGEMENT

The annual budget for management of the municipal solid waste by HSC is in the regional of $2.33 million per annum. This revenue for waste management services is derived from:

- a charge for the kerbside collection of household waste of $130 per household
- a charge for the kerbside collection of household recyclables of $54 per household
- charges for commercial garbage and recycling collection
- a general waste management charge of $120 per rateable property
- revenue from cash receipts at the Transfer Stations

The budget expenditure on waste management services in 2013/14 matches the revenue of $2.33 million. It is noted that this is dependent to some extent on the total tonnages of waste disposed, with budget expenditure shown in Table 6.

Table 6: 2013/14 Waste Management Expenditure

Waste Management Item	Budget Expenditure
Kerbside Waste Collection and Disposal	$630,000
Kerbside Recycling Collection and Sorting	$274,000
Public Litter and Recycling Bins	$242,000
Management of Transfer Stations (including waste disposal)	$876,000
Hard Waste Collection	$15,000
Landfill monitoring	$40,000
Street cleaning	$112,000
Bin replacement	$16,000
Operating and management costs	$124,000
Total	**$2,329,000**

The proposed financial performance indicators against which to measure progress are shown in Table 7.

TABLE 7 – FINANCIAL PERFORMANCE INDICATORS

Proposed Indicator	Benchmark	Basis for indicator
Cost per tonne – kerbside waste	$213/tonne	Derived from 2013/14 budget figures for 2950 tonnes
Cost per tonne – kerbside recyclables	$267/tonne	Derived from 2013/14 budget figures for 1000 tonnes
Cost per service – kerbside waste	$130/service	From the 2013/14 rates
Cost per service – kerbside recyclables	$54/service	From the 2013/14 rates
Litter & PPR – cost per tonne	$576/tonne	Derived from 2013/14 budget figures for 420 tonnes
Hard Waste Collection Service	$545/tonne	Derived from 2012 Hard waste collection costs and tonnes
Transfer Stations – cost per tonne	$210/tonne	Based on 2012/13 data for estimated tonnes and 2013/14 budget figures

All waste contracts have gone out to competitive tender over the last 12 months which has resulted in considerable savings in the public litter and kerbside recycling collection[6]. This has been reflected in a reduction in the recycling service charge and general waste management charge.

The contract for kerbside collection of waste and recyclables was let as a 5 year contract with a possible 2 year extension. The contract has the flexibility to allow for the extension of kerbside collection to small townships and hamlets throughout the shire at any time during the contract period. This contract was awarded to Wheelie Waste.

The contracts for management of the Transfer Stations (Zoobins), Hook lift Bin transport (Sita) and the Materials Recovery Facility (Wheelie Waste) were all let as single year contracts (expiring March 2014) with a possible 12 month extension.

[6] From the 13/14 Budget

05. CURRENT KERBSIDE COLLECTION SERVICE

Almost half the total waste (49%) managed by HSC is collected through the kerbside system[7]. This comprises:

- a weekly kerbside residual waste collection using a 120 litre bin for the townships of Creswick, Clunes, Daylesford, Hepburn Springs and Trentham provided to 4503 residential properties
- a fortnightly kerbside recycling collection using a 240 litre bin for the townships of Creswick, Clunes, Daylesford, Glenlyon, Hepburn Springs and Trentham provided to 4602 residential properties
- 130 commercial residual waste services using a 240 litre bin and 400 commercial services using the standard 120 litre bin[8]
- 561 commercial recycling services

A total of 2950 tonnes of residual waste and 1000 tonnes of recyclables are expected to be collected through the kerbside system in 2013/14. The residual waste is transported to the regional landfill at Smythesdale for disposal and the recyclables have historically been sent to the Daylesford Materials Recovery Facility (MRF). The MRF sorted the mixed recyclables out into the various commodities (e.g. paper, cardboard, steel cans) and sold them into the market. However in early 2013 this arrangement was changed due to the increasing and substantial stockpiles of unprocessed recyclables at the MRF. A new operator was contracted and the collected recyclables are now transported to one of the Visy MRFs in Melbourne which operators at much higher levels of throughput and efficiency resulting in greater recovery of the mixed recyclables and more stable and viable end markets.

There is limited data on the composition of the kerbside residual waste, however the waste composition based on a bin audit undertaken in 2008[9] is shown in Figure 1[10].

[7] The remaining 51% is managed through the three Transfer Stations
[8] The charge for a 240 litre service is higher than for the standard 120 litre service
[9] Sample size = 100 bins, sample date 11/6/2008
[10] Highlands Regional Waste Management Group, 2008 Garbage Audits (September 2008, Wastemin)

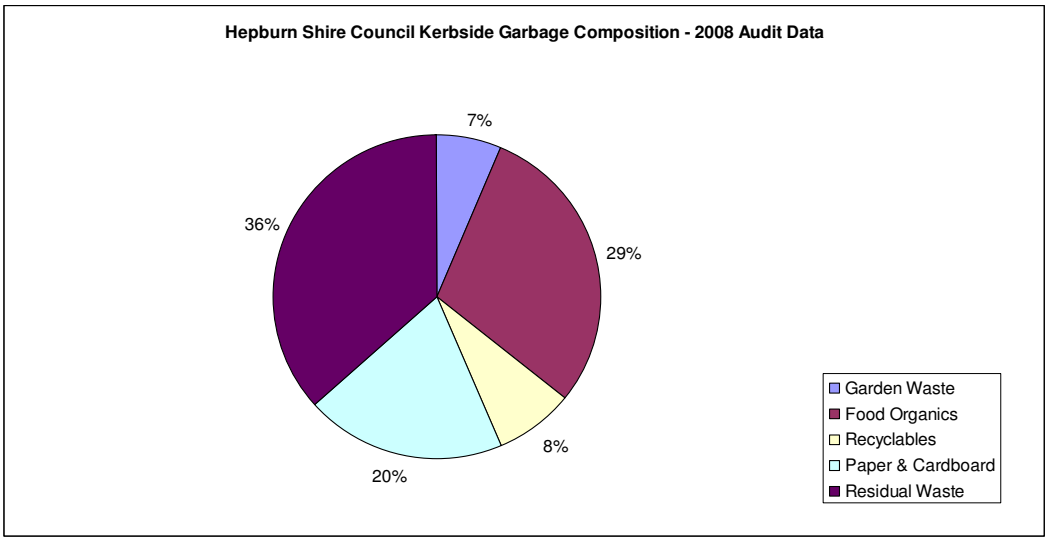

Figure 1: Kerbside Waste Composition (2008)

The 2008 audit also included the five other councils in the Highlands Regional Waste Management Group (RWMG). The bin composition for HSC is compared against the average for the Highlands RWMG member councils, the Goulburn Valley and North East RWMGs and a number of Melbourne Councils in Figure 2. This indicates that the amount of garden waste in the HSC kerbside residual waste stream is lower than most other results and the amount of paper & cardboard is considerably higher. The amount of food waste at 29% and recyclables at 8% are comparable with other councils.

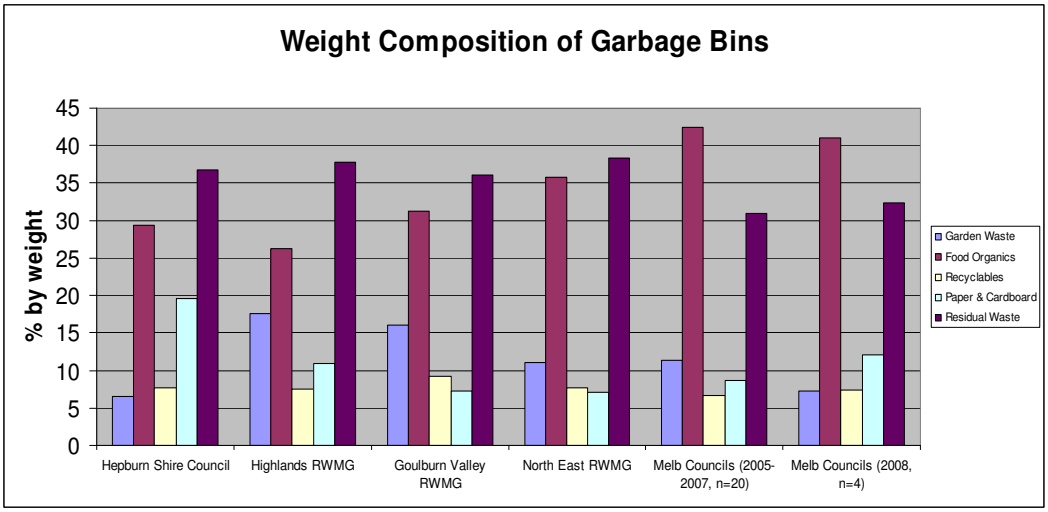

Figure 2: Hepburn Shire Council kerbside waste composition compared to other Councils and Regional Waste Management Groups

The amount of kerbside residual waste and recyclables, expressed as kilograms per household per year (kg/hh/yr), have been trending upwards in HSC. The increase in recyclables is comparable with the state average for similar councils[11]. The increase in residual waste is counter the trend for similar councils. In part this may be explained by the general move to 120 litre bins over the period 2002/3-2010/11 (10 small provincial councils in 2002/3, 16 in 2010/11) as smaller bin size is correlated with lower garbage generation rates[12]. However the average yield for a 120 litre bin has also decreased from 503 kg/hh/yr in 2002/3 to 474 kg/hh/yr in 2010/11 and the data for HSC are counter to this trend. The kerbside residual waste and recyclables generation for HSC is compared to the average for similar councils in Figure 3.

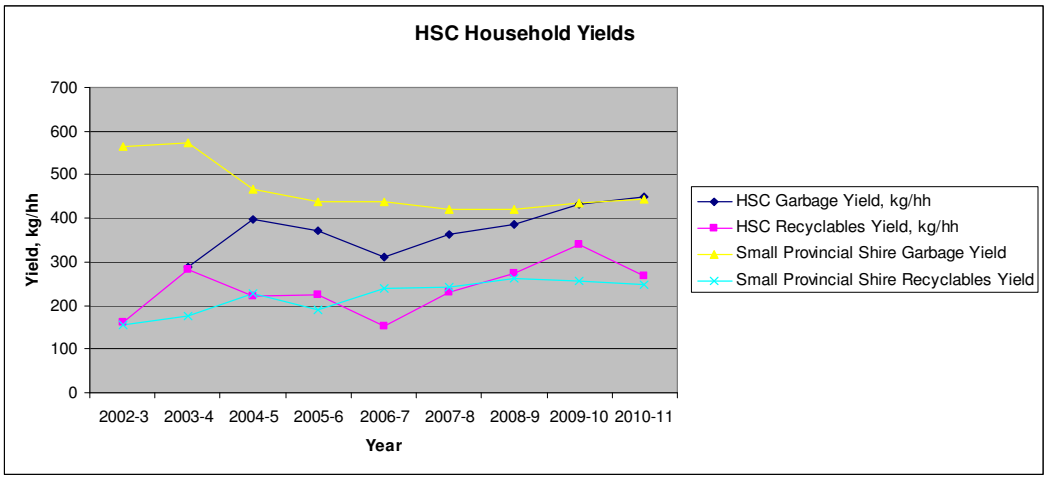

Figure 3: Hepburn Shire Council kerbside waste and recyclables generation

There are 2569 residential properties that are currently not provided with a kerbside residual waste collection service and these households are provided with 12 "free" vouchers to dispose of up to 6 cubic metres (m^3) of residual waste or green/garden waste at one of the three transfer stations managed by HSC. These vouchers are covered by the general rates charge paid by all households although households with access to a kerbside service, which is charged on a cost recovery basis, are not provided with vouchers and must pay to dispose of any residual waste or garden waste at any of the transfer stations.

A number of options for decreasing the amount of waste generation and/or increasing the amount of recycling through the kerbside system have been considered as part of this strategy. These have included:

- Reducing the bin size for residual waste from 120 litres to 80 litres
- Increasing the size of the recycling bin from 240 litres to 360 litres
- Encouraging the use of compost bins and worm farms for food and garden waste

[11] defined as small provincial, n = 25 or 32% of councils in the SV Annual Local Government Survey
[12] SV Local Government Annual Survey 2010-11

- Getting recyclables into the recycling bin
- Extending the kerbside collection system to the more households
- Implementing a kerbside collection for household garden and food waste

The business case for each of these options is discussed further below.

Option 1: Reducing the bin size for residual waste from 120 litres to 80 litres

There is a clear correlation between bin size and the amount of waste a household generates with the least amount of household waste being associated with an 80 litre residual waste bin. The amount of waste then increases with an increase in bin size to 120 litres and 140 litres with the highest household waste generation being associated with a 240 litre residual waste bin[13]. The average household waste generation across the nine councils with an 80 litre service is 426 kg/hh/yr compared to 474 kg/hh/yr as the average across the 50 councils who use a 120 litre bin. This represents a reduction of 10% in waste disposal to landfill. Based on current household yield of 449 kg/hh/yr for HSC this would reduce waste to landfill by approximately 200 tonnes per annum (tpa). Based on current landfill costs and the anticipated outlay for new 80 litre bins, the simple payback on this option is around 6 years.

Other options to achieve the same desired result of reducing bin size include:

- Moving to a fortnightly collection for residual waste (effective bin volume of 60 litres). This option would have a saving of approximately $34 per household per year from reduced collection charges and reduced landfill disposal. However the fortnightly collection of residual waste that includes food and other putrescible wastes may be undesirable in the absence of a kerbside collection for food and garden waste.
- Moving to a fortnightly collection of residual waste during the colder winter months, when odour from the putrescible and organic components in the waste is likely to be significantly less, and reverting to a weekly collection during the warmer months.

The benefit of both of these options is that they do not involve a capital outlay on new bins and therefore would provide an immediate reduction in waste charges to households.

[13] SV Local Government Annual Survey 2010-11

Business Case Summary

The cost of new 80 litre bins to the current 4503 households with a kerbside collection service: $154,000

Reduction in waste to landfill: $24,300 per annum

Simple payback: 6.3 years

Resource Recovery Outcome: increase in resource recovery rate from 38% to 40%

Refer to Appendix 2.1 for the full business case.

Option 2: Increasing the size of the recycling bin from 240 litres to 360 litres

The rationale behind this option is that recyclables end up in the residual waste bin because the recycling bin is full. Providing a larger 360 litre bin would overcome this by providing more space for recyclables. A number of councils have introduced 360 litre bins or undertaken trials to collect data on the extent to which recycling is increased and waste to landfill decreased. The available data available indicates that 360 litre bins do result in an increase in recyclables, however this does not necessarily translate to a reduction in residual waste (possibly the extra space in the residual waste bin is then used for other waste materials). Clearly 360 litre bins are unlikely to increase household recycling rates where the recycling bin is not filled each fortnight. Based on an assumption that 50% of households would use a larger 360 litre bin and a 6% reduction in waste to landfill is achieved a small reduction of 62 tpa in waste to landfill would be achieved. Based on expected costs for the new bins and the saving from reduced waste to landfill a simple payback on this option was calculated to be in excess of 15 years.

An alternative to the provision of 360 litre bins is to provide a weekly collection for recyclables. This would increase the cost for each household by an estimated $40/yr, with an overall cost of around $180,000 per annum (pa) for a reduction in landfill costs of $7,500 pa. It is therefore not considered a financially viable option.

Households that generate a large volume of recyclables currently have the option of an additional recycling bin.

A larger 360 litre bin could be provided to commercial customers where the current 240 litre bin is limiting recycling.

Business Case Summary

Key assumption: 50% of existing households with kerbside recycling service use a 360 litre bin

Cost of new 360 litre recycling bins: $115,050

Reduction in waste to landfill: $7,400 pa

Simple payback: 15.6 years

Resource Recovery Outcome: increase in resource recovery rate from 38% to 40%

Refer to Appendix 2.2 for the full business case.

Option 3: Encouraging the use of compost bins and worm farms for food and garden waste

Reducing the amount of food waste sent to landfill has dual benefits in reducing costs (based on the current bin audit data food and garden waste make up 36% of household waste sent to landfill) and reducing greenhouse gas emissions associated with the decomposition of this organic waste material in landfill[14]. Without a kerbside collection service for household food and garden waste one option is to encourage home composting and/or worm farming of these materials. Council can encourage this activity by providing rebates for compost bins and worm farms and exploring opportunities for bulk procurement.

Based on results in other councils that have implemented this type of program[15] a reduction of 25% in waste disposed to landfill can be achieved. Assuming an uptake by 500 households a reduction of approximately 50 tpa in organics waste to landfill could be achieved. Although the reduction in landfill is relatively modest the payback on a rebate in the order of $30-50 per bin is in the region of 2.5-4 years. In addition it has benefits around community engagement and reinforcing messages and actions to reduce household waste generation.

Training and education would be provided to participating households to maximise the likelihood of composting and worm farming being undertaking correctly and not becoming anaerobic.

[14] A footnote about the GHG intensity of methane
[15] E.g. Frankston City Council. Albury City

Business Case Summary
Key assumption: uptake by 500 households
Cost to implement a rebate to 500 households: $27,000
Reduction in Waste to landfill: $6,700 pa
Simple Payback: 4 years
Resource Recovery Outcome: increase in resource recovery rate from 38% to 38.6%
Refer to Appendix 2.3 for the full business case.

Option 4: Getting recyclables into the recycling bin

Based on data from the 2008 bin audit[16] there is approximately 20% by weight of recyclables in the residual waste bin. There are three main reasons why this might be occurring:

- The recycling bin is full so the extra recyclables are being put into the residual waste bin (see *360 litre recycling bin* option)
- There is uncertainty about what materials can be put into the recycling bin
- There is a lack of concern about the environmental benefits of recycling

There have been a number of life cycle studies undertaken which indicate conclusively that recycling has a considerable environmental benefit in addition to just reducing the amount of material that ends up in landfill. These benefits include the recovery of the embodied energy[17] in the material being recycled which means it requires less energy to recycle than it does to make it from virgin material. In most cases there is also a significant reduction in water. For example the 8.06 million tonnes of waste that was recovered and recycled in Victoria in 2010-11 is estimated to have:

- Saved more than 93 million Gigajoules of energy
- Avoided the emissions of almost 5 million tonnes of greenhouse gas emissions (equivalent to almost 819,000 cars)
- Saved 61,000 mega litres of water[18]

[16] Adjusted for 13% cardboard and paper by weight compared to the 20% indicated by the audit which is considered to be unrepresentatively high
[17] Provide definition for embodied energy
[18] Sustainability Victoria, Victorian Recycling Industries Annual Survey 2010-11

The recent change in operation of the Daylesford MRF which now sees recyclables transported to Melbourne for sorting by Visy also means a wider range of recyclables are now recoverable. A community education program to increase awareness and knowledge about the materials that can be recycled from throughout the entire home could significantly increase the amount of recycling by the community. Based on the assumption that such a program would halve the amount of recyclables in the residual waste bin (i.e. a reduction from 20% to 10%) the benefit would be a reduction in waste to landfill of almost 300 tpa at a cost saving of around $35,000 pa from reduced waste disposal costs (equivalent to approximately $7 per household). The Victorian Government's Get it Right on Bin Night * program is currently being rolled out in regional Victoria and provides a range of resources to assist with increasing community awareness about the range of items that can be recycled. An additional benefit of this option is that it should also reduce the level of contamination of the recyclables, such as placing recyclables inside plastic bags or including nappies in the recycling.
*(http://www.getitrightbinnight.vic.gov.au/about-get-it-right)

Business Case Summary
Key assumption: the quantity of recyclables in the waste bin is halved
Cost to implement an education program including pre and post bin audits: $55,000
Reduction in Waste to landfill: $35,000 pa
Simple Payback: 1.6 years
Resource Recovery Outcome: increase in resource recovery rate from 38% to 44%
Refer to Appendix 2.4 for the full business case.

Option 5 - Extending the kerbside collection system to more households

The current kerbside service is only provided to the main towns in the Shire and an estimated 35% of households in the smaller hamlets and rural parts of the Shire have to manage their own waste by carting waste to one of the three transfer stations operated by HSC. In lieu of a kerbside service these households are provided with 12 vouchers per year which allow disposal of up to 6 m^3 of waste at the transfer stations. Extending the kerbside waste and recycling service to more households would provide greater equity of service between residents and reduce the need to store waste and recyclables pending a trip to one of the transfer stations. In order to model this option it has been assumed that bulk of properties without a kerbside service manage organic waste on their property by either composting and/or worm farming and that on average a trip is taken to the transfer station once per month. This means that a kerbside residual waste service could be provided on a fortnightly

basis using a 140 litre bin (equivalent to a 70 litre bin collected weekly – refer to option 1 regarding the benefit of reducing the bin size on waste generation).

Assuming an extension of service to 1500 households[19], this option would collect an additional 670 tpa of residual waste and 400 tpa of recyclables which would no longer need to be managed through the transfer station network. This would incur a once off cost of around $107,000 for new bins and $174,000 pa on collection and disposal costs. This would be offset by a reduction in operating costs of the transfer stations of $207,000 pa through reduced throughput and a commensurate reduction in operating hours.

The cost of this option to each new household would be in the region of $130 pa, however this could be offset by a potential reduction to the general waste management charge of around $20 to all rateable properties.

Previous modelling of the green house gas benefits of this option indicates a small reduction in transport emissions due to replacing a number of individual trips to the transfer stations with a collection vehicle.

Sensitivity analysis on this option suggests it would still provide a positive return if it was only extended to 500 households, however at 250 households the opportunity for a reduction in operating hours of the transfer station is minimal and the option does not appear to provide a positive return.

A detailed implementation plan for this option would determine precisely how many new households would be provided with a kerbside service and would asses the suitability of some of the smaller rural roads in the Shire for waste collection trucks.

Business Case Summary
Key assumptions: kerbside services are provided to 1500 additional households with a fortnightly collection frequency for both residual waste and recyclables
Cost to implement an extension to 1500 households: $1,020,000 over 5 years
Reduction in Transfer Station operation costs: $1,097,000 over 5 years
Operational Return: $78,000 over 5 years
Resource Recovery Outcome: resource recovery rate remains at 38%
Refer to Appendix 2.5 for the full business case.

[19] An extension to 1500 households was chosen on the basis that not all households may be accessible to a waste collection truck

Option 6: Implementing a kerbside collection for household garden and food waste

Organic waste in the form of food and garden waste form a significant component of the kerbside waste stream and can be turned into useful products such as compost or energy if they are collected separately. The option of introducing a third bin for household organic waste for the major towns that currently have a kerbside residual waste service has been considered. Each of these households would be provided with a new 240 litre bin which would be collected fortnightly for organic waste. A kitchen caddy with compostable bags would also be provided to each household to assist with managing food waste from the kitchen area. Based on the current data 36% of the kerbside waste stream is organics. Assuming that 75% of this is diverted to the new organics bin a reduction in waste to landfill of around 540 tpa could be expected. Other key assumptions in assessing this option are that the residual waste collection is moved from weekly to fortnightly and that the cost of processing the collected organics material is less that current landfill costs[20]. Preliminary cost modelling of this option indicates a separate organics collection service could be introduced for around an additional cost of $25-30 per household per year.

The low percentage of garden waste that appears to be in the kerbside waste stream means that it would not be effective to introduce a third bin for garden waste only.

A key constraint to the implementation of this option is that there is no current processor identified that could take the combined food and garden waste material and process it into a useful product. The cities of Ballarat and Bendigo are currently investigating the possibility of jointly tending for processing kerbside organics, with the tender likely to be released in the first half of 2014. Given the quantity of organic material from these cities is substantially greater than HSC it would seem prudent to wait and see if this tender identifies a feasible option for organics processing that HSC could subsequently join. This also provides time for further analysis of the organics composition in the kerbside residual waste to confirm the potential benefits of this option.

As an alternative the establishment of a dedicated facility by council was considered, however this appears to be more expensive with preliminary costing estimates indicating this would cost around an additional $45-50 per household per year. It has therefore not been considered any further.

[20] A figure of $90/tonne has been used for the preliminary modelling

Business Case Summary

Key assumptions: that the residual waste collection is moved from weekly to fortnightly on the introduction of a kerbside organics collection and the processing gate fee is lower than the current landfill gate fee.

Cost to implement a kerbside organics service to the existing 4503 households: $1,550,000 over 5 years

Reduction disposal and collection costs for residual waste: $980,000 over 5 years

Operational Cost: $570,000 over 5 years

Cost per household: $26-30 per year

Resource Recovery Outcome: increase in resource recovery rate from 38% to 54%

Refer to Appendix 2.6 for the full business case.

Proposed strategy actions

The proposed strategy actions to increase recycling and reduce waste to landfill from the kerbside system are:

- extend the kerbside collection service to households in the small hamlets through HSC (e.g. Dean, Newlyn, Blampied, Eganstown, Kingston, Campbelltown, Smeaton, Allendale, Broomfield, Yandoit, Franklinford, Coomoora, Glenlyon, Drummond, Musk, Bullarto, Lyonville, Newbury, Porcupine Ridge, Rocklyn and Mollongghip)
- promote home composting and worm farming of food and garden waste for households that have a kerbside service through either a rebate or council bulk purchasing
- implement an education program to get recyclables into the recycling bin (linked to Get it Right on Bin Night),
- implement smaller effective volume for the residual waste bin through introduction of 80 litre bins or moving the current 120 litre bin to fortnightly collection (especially in the colder months),
- undertake further quantification of the waste composition to define the potential benefits from a household organics collection service

06. TRANSFER STATION OPERATIONS

There are currently three Transfer Stations in operation in HSC[21]. These are located at Creswick, Daylesford and Trentham. The Transfer Stations accept general waste for disposal, green waste for mulching and recyclables for recovery. A charge of $17 or 1 voucher per 0.5 m^3 is applied to general waste and green waste, while household recyclables are accepted free of charge. Small quantities of commercial waste and building waste up to about 2 m^3 are also accepted. However waste from large commercial collection vehicles is not accepted at the Transfer Stations.

In 2012/13, 2802 tonnes of residual waste, 712 tonnes recyclables and 626 tonnes of green waste were handled through the Transfer Stations. The recyclables are sent to the Daylesford MRF and combined with the kerbside recyclables for transport to Visy in Melbourne. General waste is transported to the Smythesdale landfill for disposal. Green waste is stockpiled and mulched annually, with mulch then being provided free of charge to residents. Excess mulch is currently stockpiled or used for landscaping at each of the Transfer Stations. Some of this mulch material is contaminated with high levels of plastics and other materials which limits its use considerably.

Scrap metal is accepted free of charge at each Transfer Station and collected by a scrap metal merchant when significant volumes have accrued. A range of other materials are also accepted including car batteries, mattresses, TVs and other related electronic waste, paint (Creswick & Daylesford), waste oil, and empty, triple rinsed chemical containers (Daylesford only).

Resale shops operate at Daylesford and Trentham. The resale shop at Creswick was closed in mid 2013 due to high levels of vandalism at the facility.

There is currently no reliable data on the composition of the waste received at the Transfer Stations.

The Daylesford Transfer Station is the busiest of the three facilities and handled an estimated 2509 tonnes of material (61% of the total) in 2012/13. The Creswick Transfer Station handled 997 tonnes of material and the Trentham Transfer Station 625 tonnes.

Patronage and material volumes handled through the transfer station network in 2012/13 are shown in Figure 4. The vehicle numbers shown in the figure relate only to general waste and green waste. Vehicles bringing in recyclables or scrap metal only are not recorded and hence actual patronage will be higher than shown in the figure. In 2012/13 green waste was received at the Transfer Stations free of charge for a six week period from the beginning of November

[21] Note that term Transfer Station and the term Resource Recovery Centre (RRC) are often used interchangeably

until mid December. This resulted in a significant spike in the amount of vehicles and green waste as shown. The percentage of green waste received during the free period in Nov/Dec 2012 is estimated at 52% overall and 41%, 69% and 61% for Daylesford, Creswick and Trentham Transfer Stations respectively. In contrast the volumes of general waste and recyclables is much more constant with a slight increase over the Christmas/new year holiday period.

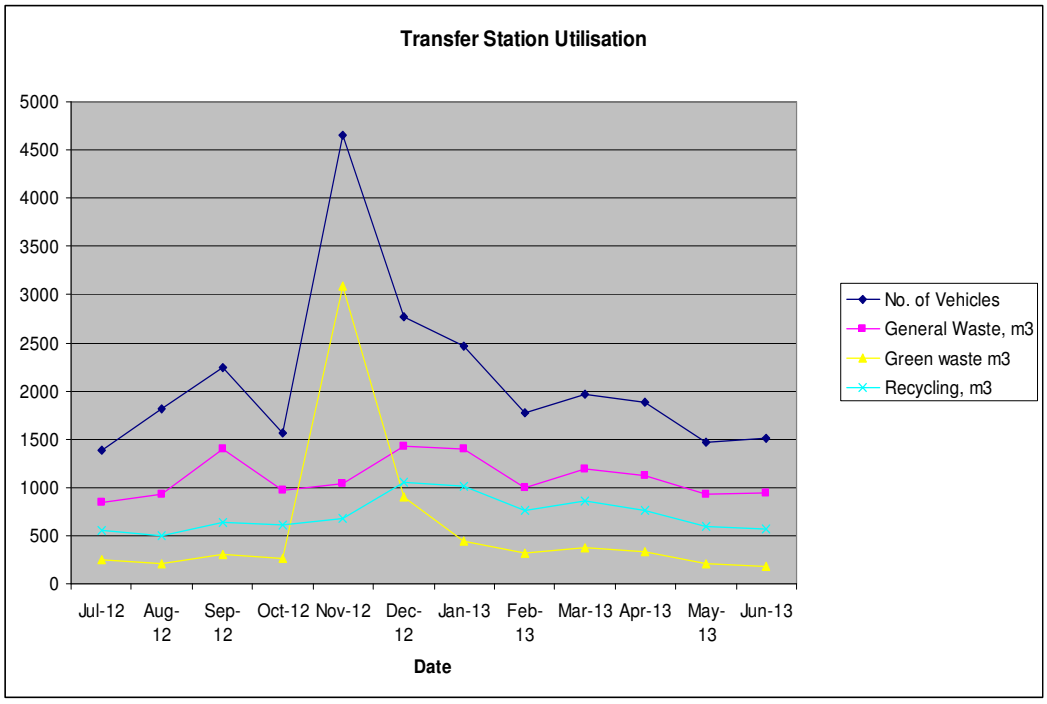

Figure 4: Transfer Station Patronage and volumes

The overall voucher redemption rate for 2012/13 is estimated at 69%. All three Transfer Stations reported incidences of forged and photocopied vouchers being redeemed. The voucher redemption rate being well under 100% suggests that the issue of fraudulent vouchers is probably not widespread.

Several options for improving the performance and efficiency of the transfer station network have been considered as part of this strategy. These include:

- improving the management of green waste
- improving transfer station efficiency
- implementing full cost recovery
- utilising green waste for energy generation

The business case for each of these options is discussed below.

Option 7: Improving the Management of Green Waste

The current management approach to green waste at the Transfer Stations is to stockpile the material during the course of the year and then use a contractor to shred the material once each year. The shredded material is then left in piles which undergo some form of composting. This composting is uncontrolled and is not monitored to ensure that the resultant product complies with Australian Standard AS4454 *Composts, soil conditioners and mulches*. Without procedures to ensure compliance with this standard there is no quality control on the "compost" produced from the process and it is likely to still contain weed seeds and pathogens. The compost is available for use at no cost to residents however current supply is generally in excess of demand resulting in stockpiles at each of the transfer stations. Historically there has been limited control over contamination of the green waste resulting in significant contamination of some of the stockpiles which limits its value as a product.

Photograph 1: Mulched Timber and Green Waste at the Trentham Transfer Station

Using a composting process such as the Groundswell City to Soil technology (a heaped and covered aerobic composting process using proprietary inoculants) is capable of producing a compost product that can be demonstrated to meet AS4454. This would involve undertaking composting at each of the three transfer stations, or transporting the green waste between transfer stations.

The key assumptions used in evaluating this option included a 50% conversion of green waste to finished compost, resulting in 313 tpa of compost, and selling of the finished compost at $40/tonne. Based on published establishment and operating costs for the Groundswell system and the assumed revenue, the composting of green waste would cost an additional $17,000 per annum or approximately $2 per rateable property. The option of using this technology to also compost food waste from a kerbside organics collection increases the expense considerably and appears to be more expensive than utilising a third party for organics processing (refer to option 6).

An alternative to composting by council is to investigate interest by third parties to manage the green waste (shred and cart) or purchase the mulched product. Preliminary investigation indicates there is an interest in the market for both these options. Very preliminary costings indicate this could be the cheapest option and provide a financial saving over the current management costs. This would need to be confirmed by using a quote or tender process to better define the costs and benefits.

Business Case Summary – preferred option of 3rd party processing
Preliminary Cost to implement: $21,000 per annum
Reduction in green waste processing costs and gate revenue from green waste: $120,200 per annum
Operational return: $99,200
Resource Recovery Outcome: no change
The preliminary costing used in this business case needs further validation prior to proceeding. Refer to Appendix 2.7 for the full business case.

Option 8: Improving Transfer Station Efficiency

The current method of operating the transfer stations means that waste is placed in large 30 m^3 bins and recyclables are placed into 12 m^3 skips. The waste is transported to the Smythesdale landfill for disposal and the recyclables are transported to the Daylesford MRF for load consolidation prior to transport to Melbourne. The recyclables from the Daylesford

Transfer Station are moved to the adjacent MRF in the 12m^3 skips while at Creswick and Trentham the recyclables are transferred into 30m^3 bins prior to transport. The cost associated with both waste and recyclables transport is significant and accounts for approximately 30% of the total operating costs of the transfer stations. A number of potential options exist for reducing transport costs, primarily through increasing the compaction of waste prior to transport, reducing or avoiding double handling of materials, providing larger bins at Creswick and Trentham for depositing recyclables and potentially integrating the Daylesford MRF and Transfer Station operations. The costs associated with undertaking these works need further development to confirm the business case for these options.

The current structuring of the contracts for the Transfer Stations whereby council holds separate contracts for the management of the Transfer Stations and for the transport of waste and recyclables provides no direct financial incentive for either party to reduce transport costs through improvements to waste handling.

Council intends to restructure the next tender for the Transfer Stations to provide a clear financial incentive to reduce transportation costs in conjunction with investigating some infrastructure and capital upgrades at the Transfer Stations and MRF.

Business Case Summary - further development of this option is needed to asses the cost and benefit implications.

There is potential to reduce costs and greenhouse gas emissions through improved efficiency at transfer station operations.

Simple payback: appears to offer reasonable cost savings but requires further development.

Resource Recovery Outcome: No change

Refer to Appendix 2.8 for the full business case.

Option 9: Implementing Full Cost Recovery at Transfer Stations

The current method of financial management of the transfer stations involves setting a charge for the receival of residual waste, green waste and various other items such as paint and TV's. As none of the transfer stations have weighbridges the current charging system is based on volume and is set at $17 per 0.5 m^3 for residual waste and green waste. Recyclables are accepted free of charge, although as noted under Option 8 a significant cost is incurred in transporting recyclables from the transfer stations to the Daylesford MRF.

A breakdown of the materials received at the Transfer Stations in 2012/13 indicates the following volumes were received:

- 13,170 m^3 of residual waste

- 6,876 m^3 of green waste
- 8,580 m^3 of recyclables

An estimated 51.5%, or 3,541m^3, of green waste is received during the six week "free" green waste period that ran from the beginning of November to mid December 2012. Revenue from cash receipts for disposal of residual waste and green waste was $135,000 (equivalent to 3,970m^3 of material). This remaining volume of 12,535 m^3 of residual waste and green waste were therefore disposed of using vouchers.

An estimated 2569 households are not provided with a kerbside waste collection service and are issued with 12 vouchers for use at the transfer station. The vouchers are essentially provided for free to these households and a general waste charge of $120 is levied on all rateable properties to raise the revenue to fund the transfer station operations as well as other waste management activities such as the public place litter and recycling bins and street sweeping. Households with a kerbside collection service pay for that service on a full cost recovery basis ($130 for a kerbside waste service, $54 for a kerbside recycling service) and also pay the $120 general waste charge but do not receive any "free" vouchers. As the face value of the free vouchers is $204[22], it is apparent that residents with a kerbside service are subsidising the disposal of waste at the transfer stations by residents without a kerbside service. This can be clearly seem by considering the 2569 households without a kerbside service paid a total of $308,280[23] to disposal of 12,535 m^3 of material that would have cost $426,190 based on the stated charge of $34/$m^3$. The 13,170 m^3 of green waste brought into the transfer stations during the free period represents $120,400 of forgone revenue.

The estimated cost of and revenue from managing the various material streams at the transfer stations are summarised in Table 8.

Table 8: Transfer Station Costs and Revenues

Material	Cost to Manage, pa[24]	Revenue, pa
Residual Waste	$577,000	$447,780[25]
Green waste	$106,000	$113,400[26]
Recyclables	$161,000	nil

[22] Calculated based on each voucher allowing disposal of 0.5m^3 of waste that would otherwise cost $17.00
[23] Based on the general waste charge of $120 per property
[24] The Cost to manage includes direct costs and a proportion of the overhead costs based on the % contribution of the stream to the total material volume handled by the Transfer Station network
[25] Based on 13,170m^3 at $34/$m^3$
[26] Based on the 48.5% of green waste not received during the "free" period

In summary the current financial management of the transfer stations:

- Has a gate fee that is too low for residual waste with the actual cost to manage being calculated at $44/m^3$
- A gate fee for green waste that is slightly high, with the actual cost to manage being $32/m^3$ based on 51.5% of the total green waste being accepted at no charge. The cost to manage green waste, based on total green waste received, is $15/m^3$, indicating that if the free green waste period was abolished then the gate fee could be reduced substantially (based on an assumption there would be no change in total amount of green waste received)
- The cost of managing recyclables is high, and in contrast to the kerbside recycling system, it does not operate on a cost recovery basis. However there is a significant public and environmental good that is present in council continuing to provide free drop off of recyclables at Transfer Stations.
- There is a cross subsidisation from residents provided with kerbside collection service to those without in the form of "free" vouchers with a face value significantly higher than the $120 general waste charge.

Options to achieve operation of the transfer station network that is closer to full cost recovery and is equitable to all residents include:

- Continue to issue free vouchers but reduce the amount of waste that can be deposited with each voucher from 0.5 m^3 to 0.25 m^3
- Introduce a differential general waste management charge with properties without a kerbside collection service being charged a higher charge than those with a kerbside collection service to reduce the level of cross subsidisation
- Review and adjust the gate fees for residual waste and green waste
- Cease issuing free vouchers and move to a pre-pay voucher system

The option of ceasing to issue free vouchers and moving to a pre pay voucher system with a minimum quantity of 0.25 m^3 of waste is the preferred option.

Business Case Summary - Implementation in conjunction with extension to the kerbside service. Moving to a more equitable system and user pays cost recovery system for waste management. Resource Recovery Outcome: No Change

Refer to Appendix 2.9 for the full business case.

Option 10: Expanding the Range of Materials Recovered at Transfer Stations

The transfer stations currently recover general recyclables, green waste and a range of smaller items. A wider range of materials could be recovered with the establishment of separate drop off areas. Advice from the transfer station operators suggests there would be benefit in establishing areas to allow for the recovery of clean soil and concrete. This option requires further investigation to determine the potential reduction in waste to landfill from recovering concrete and soil and to ensure there was adequate demand for the recovered materials.

Business Case Summary -

Further investigation and development of this option is required to determine if benefits outweigh the costs and a market exists for recovered materials

Resource Recovery Outcome: Potential reduction in material going to landfill

A business case would be produced as part of further investigation and development of this option

Proposed strategy actions

The proposed strategy actions to increase the performance and efficiency of the transfer station operations are:

- prepare and release a tender for management of green waste at the three transfer stations to validate the preliminary interest showing third parties.
- restructure the contracts for the transfer stations so that there is a financial incentive to improve the transport efficiency for both residual waste and recyclables.
- undertake capital upgrades at transfer stations to allow more efficient handling of recyclables.
- undertake a design and costing to integrate the Daylesford MRF with the Daylesford Transfer Station to eliminate double handling of materials.
- change from issuing free vouchers and move to a pre-pay voucher system combined with an extension of the existing kerbside service to a greater number of households across HSC.
- investigate the potential for recovery of clean concrete and soil at each of the transfer stations.

07. WASTE TO ENERGY

The use of waste of various types to generate energy is not new, however there is increasing interest in the use of various waste streams to generate either heat or electricity or both (combined heat and power) using an increasing range of technologies. An additional benefit of a using such technology is that it can reduce the amount of waste that is sent to landfill and reduce the amount of greenhouse gas released from landfill. Some of these technologies are better suited to separated or homogeneous waste streams such as food waste or timber and others are better suited to mixed or heterogeneous waste streams such as mixed residual waste.

The main types of waste to energy technologies, general applicability and typical scale are discussed in Table 9.

Table 9: Waste to Energy Technologies and General Applicability

Waste to Energy Technology	Waste Material				Typical Scale and comments
	Food Waste	Garden waste	Timber	Residual Waste	
Anaerobic Digestion	✓			✓	Anaerobic digestion (AD) is commonly used in the treatment of sewage and agricultural wastes. It is increasingly being used for the treatment of food waste, particularly in the United Kingdom. Under the anaerobic conditions the organic waste material is converted to methane and a bio-sludge. The methane can then be combusted in an engine to generate electricity and heat. Typically AD plants used for treatment of food waste and related organics have a capacity of greater than 25,000 tpa. AD can also be used for the treatment of the organic fraction in a residual waste material as part of a mechanical biological treatment plant. AD technologies are not generally suited to the treatment of woody wastes such as garden waste. The bio-sludge may be suitable for incorporation with composts if it is clean and

Waste to Energy Technology	Waste Material				Typical Scale and comments
	Food Waste	Garden waste	Timber	Residual Waste	
					uncontaminated (e.g. from a separated food waste stream), however it may require further treatment if it is contaminated (e.g. from the organic fraction of a residual waste stream).
Pyrolysis		✓	✓		Pyrolysis is a thermal process that is undertaken in the absence of oxygen and breaks down the waste material to produce a synthesis gas (syngas) comprising carbon monoxide, hydrogen and methane and a range of tars and oils. The process can be undertaken over a range of temperatures from around 300°C up to 850°C. Lower temperatures favour the production of oils and tars while higher temperatures favour the production of syngas. The syngas can then be combusted in an engine to generate electricity and heat. Oils can be further refined to produce a range of products. Pyrolysis will also produce a charcoal product known as biochar which may have applications in carbon sequestration and soil amendments (particularly if combined with composts). Pretreatment of the waste is usually required to produce a fuel material that is consistent in size and shape. This technology is broadly applicable for treatment of timber and the woodier components of general garden waste. Pyrolysis plants typically operate in the range 30,000-60,000 tpa, however there are smaller plants in the earlier stages of commercialization in Australia.
Gasification		✓	✓		Gasification is a combustion process that is undertaken in the presence of reduced oxygen, thereby resulting in partial combustion of the material. The process typically operates at

Waste to Energy Technology	Waste Material				Typical Scale and comments
	Food Waste	Garden waste	Timber	Residual Waste	
					above 650°C and produces syngas. This syngas can then be combusted in an engine to generate electricity and heat. Pretreatment of the waste is usually required to produce a fuel material that is consistent in size and shape. This technology is broadly applicable for treatment of timber and the woodier components of general garden waste. Gasification plants typically operate in the range 30,000-60,000 tpa.
Large Scale Incineration				✓	Incineration involves the direct combustion of waste in the presence of oxygen to produce energy. Combustion temperatures are usually in excess of 850°C. These are typically very large scale facilities processing up to 600,000 tpa. The large capital cost for establishment typically dictates an investment in larger plants to achieved required economies of scale and return on investment. While a common technology in Europe and the UK there are no large scale incineration facilities in Australia.
Small Scale Incineration (e.g. industrial boilers)			✓		Source separated garden waste with high timber content and timber (e.g. construction and packaging timber) is a potential fuel for small scale industrial boilers for the generation of electricity and/or heat. Industrial boiler technology is a very mature technology and the key consideration is the requirements around fuel preparation (e.g. uniform size, moisture content) and the availability and cost of other conventional fuels (e.g. gas).

Waste to Energy Technology	Waste Material				Typical Scale and comments
	Food Waste	Garden waste	Timber	Residual Waste	
Landfill Gas Recovery				✓	The organic components of waste disposed to landfill breakdown to produce methane. In many landfills this methane, or landfill gas, is collected through a networks of pipes and used as a fuel for electricity generation. The efficiency of landfill gas collection systems varies from landfill to landfill and is dependent on a number of factors. No landfill gas collection system is 100% efficient meaning some of the methane will escape to the atmosphere. This means it is less efficient than other waste to energy technologies. However it is widely used technology and often has the lowest capital cost of any waste to energy technology.

The option of using the green waste received through the transfer stations has recently been explored through a bio-energy study commissioned by HSC. This study indicated that one of the most promising options is to utilise the green waste as a fuel for a boiler to generate heat for a district heating system. This system would see heat distributed to several of the higher energy users in Daylesford via a piping system. This option requires further investigation to confirm costings, fuel requirements and tonnages.

Business Case Summary
Capital cost of boiler and associated piping: $1,815,000
Annual operating costs; $55,000
Annual energy savings: $228,500
Simple payback: 10 years
Return of investment: 8%
Resource Recovery Outcome: no change
Refer to Appendix 2.10 for the full business case.

Proposed Strategy Actions

- support the bio-energy feasibility study to progress to the next stage of business case development.

08. MRF OPERATION

The Materials Recovery Facility (MRF) is located adjacent to the Daylesford Transfer Station and was historically used for the sorting of recyclables collected from both the kerbside collections and through the transfer station network. The previous operator of the MRF was unable to sort the collected material to the standard required by the council and increasing stockpiles of unsorted material, along with windblown litter, represented a significant liability. The contract to operate the facility was cancelled by HSC in May 2013 and a new contract awarded to Wheelie Waste. The facility has now been cleaned up with all material stockpiles being removed. The site no longer sorts the commingled recyclables but acts as a transfer point for the consolidation of recyclables and subsequent transport to one of the MRF's operated by Visy in Melbourne. Although this option requires the transport of the recyclables to Melbourne the greater sorting capacity and capability of the MRF in Melbourne has resulted in both a better environmental and financial outcome for HSC. Some further improvements will be made to the site by the current operator to reduce the possibility of litter generation from the stockpiling of relatively small quantities of recyclables prior to transport to Melbourne.

Based on current quantities of recyclables generated and handled it is anticipated there will be around 3-4 truck movements per month out of the MRF.

Photograph 2: Daylesford MRF in Early 2013 Showing Stockpiles of Unprocessed Materials

Proposed Strategy Actions

- Monitor the effectiveness of litter reduction and cleanup associated with operations of the of the Materials Recovery Facility:
  - work with Wheelie Waste to ensure historical litter from the MRF operation present on adjoining landholder properties is removed.
  - implement a periodic litter inspection at the MRF to ensure no new litter is being generated.
  - meet with the concerned residents on quarterly basis for 12 months to ensure the new operation of the MRF no longer deposits wind generated litter on their properties.

09. INCREASING RECOVERY OF UNWANTED PRODUCTS

The network of three transfer stations allows for the collection of a range of unwanted products including:

- Used motor oils
- Unwanted paint (Daylesford)
- Televisions and related e-waste
- Clean triple rinsed agricultural chemical containers (Drum Muster) – Daylesford only
- Used tyres
- Car batteries
- White goods

In addition a number of other options are available either within the Shire or in neighbouring councils. These are summarised in Table 10.

Location	Product								
	Computers	TVs	Printer Cartridges	Mobile Phones	Household Batteries	Plastic Shopping Bags	Paint	CFLs	Other Fluorescent tubes
Officeworks, Ballarat	✓								
Harvey Norman, Ballarat		✓							
IGA, Daylesford								✓	
Davies & Rose, Creswick								✓	
Australia Post, Daylesford			✓	✓					
Australia Post, Hepburn				✓					

Location	Product								
	Computers	TVs	Printer Cartridges	Mobile Phones	Household Batteries	Plastic Shopping Bags	Paint	CFLs	Other Fluorescent tubes
Springs									
Australia Post, Trentham				✓					
Daylesford Community Op Shop				✓					
Aldi Supermarkets (Ballarat, Alfredton & Sebastopol)					✓				
Coles Supermarket, Daylesford						✓			
Ballarat Transfer Station					✓		✓	✓	✓

Mobile phones can also be recycled via the Mobile Muster program by using a free recycling satchel available from Australia Post or by downloading a free reply paid label from Mobile Muster. A Drum Muster collection facility is also operated by the Smeaton CFA.

Further information on recycling a range of different products including locations can be found at the Recycling Near You website.

Proposed strategy actions

Promote the availability of existing and new options for recycling of unwanted/used of products

010. HARD WASTE COLLECTION

A hard waste collection service is provided once per year for the residents of Clunes. This service has been offered to the Clunes residents because there is no easily accessible Transfer Station that people can take hard rubbish to. The nearest Transfer Station is the Creswick Transfer Station at a distance of approximately 17 kilometres.

In 2012 the hard waste collection cost a total of $15,000 and collected 23 tonnes of waste and 92 mattresses. Under the contract the contractor providing the hard waste collection service has salvage rights for all scrap metal collected.

It is noted that the travel distance from Clunes to the Creswick Transfer Station is less than the travel distance from some other parts of the Shire to the nearest transfer station (e.g. the distance from Drummond to the Daylesford Transfer Station is approximately 24 km).

Proposed strategy actions

Continue to monitor the quantities collected through the hard waste collection and review the level of service if quantities reduce significantly.

011. PUBLIC PLACE BINS & EVENTS

There are 201 public place litter bins and 106 public place recycling bins in place across HSC. Fifty two of the litter bins are located in town precinct areas in Clunes, Creswick, Daylesford and Trentham and 39 of the recycling bins are located in town precinct areas in Creswick, Daylesford and Trentham. The remaining litter and recycling bins are located at sportsgrounds and reserves throughout the shire. The majority of litter and recycle bins in town precincts are 120 litre capacity bins while the majority of litter and recycle bins located at reserves are 240 litre capacity bins. An analysis of average bin weight per collection indicates that the public litter bins have, on average, a higher weight and density per lift than the kerbside bins. This suggests that the litter bins are not being over serviced. However as the majority of the bins are located in town precincts it may be possible to reduce the frequency of collection by further pairing the litter bins with recycle bins. This could reduce collection costs and allow expansion of public place recycling bins to other areas within the Shire.

An audit of public place bins was undertaken in June 2013, which involved a number of dual or paired litter and recycling bins. This audit indicated that 24% by weight of the material in the litter (or waste) bins was in fact recyclable and that only 46% (wt) of all recyclables was in the recycling bin, with the remainder being in the litter bin. The average yield per bin was relatively low which could reflect the time of year (winter) or a relatively short period of time since the bin was emptied.

In addition to collection from these public place bins Council also provides for waste collection and recycling services for the following events:

- Glenlyon Sports Day
- Chill Out
- Andersons Mill Food and Wine
- Swiss Italia Festa
- Forestry Festival
- Clunes, Daylesford and Kingston Agricultural Shows
- Daylesford Highland Gathering
- New Years Eve Gala
- Clunes Book Town Festival

Data on the number of recycling bins, yields and contamination levels from events is not available.

Proposed Strategy Actions

- The proposed strategy actions to improve public place recycling are:

- Investigate changing the collection frequency for public place litter bins by further pairing with recycle bins.
- Install public place recycling bins in Clunes
- Install standard signage on all public place recycling and litter bins
- Undertake a follow up audit of public place bins in the warmer summer period.
- Review the operation and performance of recycling bins at events.

012. LITTERING & ILLEGAL DUMPING

There are six gross pollutant traps installed in the Shire – three in Daylesford and three in Creswick. These are installed in the stormwater drainage system to catch litter prior to the stormwater discharging to the local creek system. These traps are cleaned out quarterly by a contractor and the contents disposed to landfill. An estimated 30 tonnes of litter is captured annually by these traps.

Street sweeping is also undertaken monthly in the main streets. This is done to remove litter, leaves and other items that might otherwise be flushed into the stormwater system during rainfall events. This is currently undertaken by a contract.

There are nine cigarette butt bins installed in the Shire.

HSC has identified a number of litter and related issues including:

- Illegal dumping on road reserves with a reported incidence rate of around three per week
- Dog poo on walking tracks
- Public litter bins being used for the disposal of commercial and household waste
- Waste management and litter from events
- There are a number of hot spots that have been identified including
- Ajax Rd, Daylesford in the vicinity of the Transfer Station
- Basin Rd (behind the football oval and reserve)
- Bald Hills Rd, Creswick

HSC incurs estimated costs of around $20,000 per year in the cleanup and management of illegally dumped waste. Other than this there is no firm or reliable data on the amount of waste that is illegally dumped in the Shire. Anecdotal information from a number of sources including waste contractors and the Department of Environment and Primary Industries (DEPI) indicates that the instances of illegal dumping is increasing. In addition to the costs to council, DEPI has advised that it incurs costs of $2,000-3,000 per annum associated with the cleanup of illegally dumped waste, including asbestos, in the Wombat State Forest and other crown land[27]. There is no data on the amount of waste illegally disposed on private land.

[27] Pers comms Nick Bower, DEPI Sebastopol

Proposed Strategy Actions

- Develop a joint approach to enforcement with DEPI and other land managers including joint approaches to prosecution of those identified as being responsible for illegal dumping and promote these prosecution actions through local media to raise the community awareness about illegal dumping. As part of this action consideration could be given to waiving the gates fees for illegal dumping cleaned up by DEPI.
- Ensure rapid response and cleanup of illegally dumped waste to ensure a mindset of "it's ok to dump here" (rubbish attracts rubbish) doesn't develop
- Ensure high level of cleanliness of waste management assets such as bins, collection vehicles and transfer stations to reinforce a sense of pride and value in waste management services.

013. WASTE AVOIDANCE

There are a number of options to avoid the generation of waste including reducing food waste and selling unwanted items through garage sales, donating to community opportunity and charity shops and recovering through the resale shops at the transfer stations.

Love Food Hate Waste is a UK based program aimed at reducing the generation of household food waste and is currently being implemented by the NSW EPA. A 2012 study by NSW EPA benchmarked community attitudes to find waste.[28] Analysis of outcomes does not appear available yet. Sustainability Victoria is currently developing a LFHW program for introduction in Victoria.

Unused food from the food services and retail sector can be recovered and donated to charitable organisations and a number of organisations provide this service throughout Victoria (e.g. Fare Share, Second Bite, Food Bank). Given the scale of the accommodation and hospitality sector in Hepburn Shire there may be an opportunity to support food recovery but more data is required.

Another opportunity for council to support waste avoidance by the community is through the recovery of unwanted but still usable goods. The options for recovery of goods include garage sales, donations to charity shops or through the resale shops at the transfer stations. HSC is promoting the Garage Sale Trail for 2013 (26th October) and is a partner for the program.

The recovery shops at the transfer stations provide another ideal opportunity to recover usable goods before they end up in landfill. While the goods recovered through these shops may only be a small percentage of the total waste sent to landfill they reinforce the importance of waste avoidance with the community. The operation of the shops could be enhanced by looking at new opportunities to recover additional materials and add value to them (e.g. structural timbers, firewood, and refurbishment of goods). The recovery of materials could be further enhanced by having a community art competition or artist in residence program.

[28] NSW EPA, Food Waste Avoidance Benchmark Study, 2012 (http://www.lovefoodhatewaste.nsw.gov.au/)

Proposed Strategy Actions

- Further investigate the possibility of implementing a food waste avoidance program
- Continue to support the Garage Sale Trail
- Upgrade the resale shops at the transfer stations to provide further value adding and refurbishment opportunities possibly through engagement with an appropriate social enterprise.

014. HISTORICAL LANDFILLS

While HSC has no currently operating landfills, there are three closed landfills within the Shire. These are located at the sites of the current transfer stations and land filling ceased at all of them around 2000. The landfills were all rehabilitated at the time of closure and replaced with the current Transfer Station infrastructure.

HSC has recently been issued with two draft Pollution Abatement Notices (PANs) by the EPA relating to the former Creswick landfill. These relate to:

- An assessment of the landfill cap construction to demonstrate that it complied with EPA requirements
- An assessment of whether the current landfill cap reduces infiltration of surface water into the old landfill to minimise risks to groundwater
- Development of an Aftercare Management Plan
- Undertaking a hydrogeological assessment of the former landfill, particularly relating to the current level and management of leachate in the former landfill

The cost of complying with the PANs is unknown at this stage, although a very preliminary estimate of $50,000-100,000 has been made. If any remediation work is required as a consequence of these assessments an additional financial liability is possible. No allowance has been made for this cost in the current budget.

It is not know whether similar issues exist with the Daylesford and Trentham landfills. Unlike the Creswick landfill, which was licensed by the EPA, the Daylesford and Trentham landfills were unlicensed as they serviced populations smaller than 5,000 people. The exact reasons for licensing of the Creswick landfill are unknown as it predates the formation of HSC.

Proposed Strategy Actions

- Complete rehabilitation requirements for the Creswick landfill in accordance with EPA requirements
- Confirm with EPA that closure and rehabilitation of the Daylesford and Trentham landfills have been completed to a satisfactory standard.

015. COMMERCIAL WASTE COLLECTION

The amount of commercial waste generated within Hepburn Shire has not been quantified as part of the development of this strategy. Some commercial waste is managed through the transfer station network, however larger commercial generators of waste are likely to use a commercial front lift service, typically using a 3 m^3 bin, provided by a number of commercial businesses. This waste is taken directly to landfill without any reference to Council. In a similar way these companies also provide a range of recycling options for larger volumes of commercial recyclables.

016. DEVELOPING A SOCIAL ENTERPRISE AT THE TRANSFER STATIONS

Resale shops operate in a limited capacity at the Daylesford and Trentham Transfer Stations. The opportunity exists to create or support the development of a social enterprise business to enhance the recovery of materials from the waste streams at the transfer stations. The Eaglehawk Recovery Centre in Bendigo and the Round Again Centre in Mildura are two successful operations on which such an operation could be modeled. Potential opportunities include:

- refurbishment of unwanted items
- recovery of timber including structural timbers and firewood
- resale of a greater range of materials
- providing an "at call" hard waste collection and recovery service

Proposed Strategy Actions

- Investigate and support the development of a social enterprise at the Daylesford Transfer Station to enhance the recovery of unwanted items, timber and other materials.

017. IMPROVING DATA COLLECTION AND MANAGEMENT

Resale shops operate in a limited capacity at the Daylesford and Trentham Transfer Stations. The opportunity exists to create or support the development of a social enterprise business to enhance the recovery of materials from the waste streams at the transfer stations. The Eaglehawk Recovery Centre in Bendigo and the Round Again Centre in Mildura are two successful operations on which such an operation could be modeled. Potential opportunities include:

- refurbishment of unwanted items
- recovery of timber including structural timbers and firewood
- resale of a greater range of materials
- providing an "at call" hard waste collection and recovery service

Proposed Strategy Actions

- Investigate and support the development of a social enterprise at the Daylesford Transfer Station to enhance the recovery of unwanted items, timber and other materials.

018. STRATEGY IMPLEMENTATION

The implementation of the strategy is anticipated to take several years as some of the proposed actions will take time to plan and implement. All actions will also need to be incorporated into the annual budget planning process to ensure adequate financial and employee resources are allocated to the implementation. The proposed timetable for implementation of the strategy is outlined in Table 11.

Strategy Area	Strategy Action		Year			
	Number	Description	2013/14	2014/15	2016/17	2017/1
Improving Kerbside Performance	1	Determine community acceptance for extending the kerbside collection service to households in the small hamlets through the Shire and extend the service where there is community support	Plan (P)	Implement (I)		
	2	Promote home composting and worm farming of food and garden waste		P		
	3	Implement an education program to get recyclables into the recycling bin	P	I		
	4	Undertake further research into the benefits of implementing a smaller effective volume for the residual waste bins through introduction of 80 litre bins or moving the current 120 litre bin to fortnightly collection (especially in the colder months)		P	I	
	5	Undertake further quantification of the waste composition to define the potential benefits from a household organics collection service				
Improving Transfer Station Performance	6	Improving the management of green waste received at transfer stations through the investigation and implementation of actions for the receival, processing and reuse of green waste. The management of green waste will link to Action No 12 - Bio Energy feasibility study	I			
	7	Restructure the contracts for the transfer stations so that there is a financial incentive to improve the transport efficiency for both residual waste and recyclables	I			
	8	Undertake capital upgrades at transfer stations to allow more efficient handling of recyclables	P	I	I	
	9	Undertake a design and costing to integrate the Daylesford MRF with the Daylesford Transfer Station to eliminate double handling of materials	P			

Strategy Area	Strategy Action		Year			
	Number	Description	2013/14	2014/15	2016/17	2017/1
	10	Review the use and management of the current voucher system that is currently supplied to properties without a kerbside service and include all residential properties in a review of the voucher system.		P	I	
	11	Investigate the potential for recovery of clean concrete and soil at each of the transfer stations			P	
Waste to Energy	12	Support the bio-energy feasibility study to progress to the next stage of business case development	I			
MRF Operation	13	Monitor the effectiveness of litter reduction and cleanup associated with operations of the of the Materials Recovery Facility	I			
Increasing recovery of Unwanted Products	14	Promote the availability of existing and new options available for recycling of unwanted/used of products	Ongoing			
Hard Waste Collection	15	Continue to monitor the response to the Clunes hard waste collection and undertake a review of hard waste collections in conjunction with Action No 10	Ongoing			
Public Place Bins & Events	16	Investigate changing the collection frequency for public place litter bins by further pairing with recycle bins		P		
	17	Investigation of litter and public place bin recycling bin technology solutions to improve the efficiency of the service			I	
	18	Install standard signage on all public place recycling and litter bins		I		
	19	Undertake a follow up audit of public place bins in the warmer summer period	I			
	20	Review the operation and performance of recycling bins at events		I		

Strategy Area	Strategy Action		Year			
	Number	Description	2013/14	2014/15	2016/17	2017/1
Littering & Illegal Dumping	21	Develop a joint approach to enforcement with DEPI and other land managers	P			
	22	Ensure rapid response and cleanup of illegally dumped waste	Ongoing			
	23	Ensure high level of cleanliness of waste management assets such as bins, collection vehicles and transfer stations to reinforce a sense of pride and value in waste manage services	Ongoing			
Waste Avoidance	24	Further investigate the possibility of implementing a food waste avoidance program			I	
	25	Continue to support the Garage Sale Trail	Ongoing			
	26	Upgrade the resale shops at the transfer stations				
Historical Landfills	27	Complete rehabilitation requirements for the Creswick landfill in accordance with EPA requirements	I	I		
	28	Confirm with EPA that closure and rehabilitation of the Daylesford and Trentham landfills have been completed to a satisfactory standard		I	I	
Developing a Social Enterprise	29	Investigate and support the development of a social enterprise at the Transfer Stations to enhance the recovery of unwanted items, timber and other materials	P	I	I	
Improving Data Collection & Management	30	Regular auditing of kerbside bin composition to measure any changes in waste composition	Ongoing			
	31	Regular auditing of Transfer Station waste composition and origin		Ongoing		

P – Planning
I – Implementation

APPENDIX 1: GOVERNMENT WASTE POLICY

In addition to the broader context around other Council plans and strategies this Waste Management Strategy is also influenced by the legislative and policy environment within which HSC operates.

LEGISLATION

National Legislation

Relevant national legislation includes the *Product Stewardship Act 2011* and the

Clean Energy Futures Act 2011.

The *Product Stewardship Act 2011* provides a framework for national product stewardship schemes. The recently introduced 'National Television and Computer Recycling Scheme' requires importers of televisions and computers to provide the funding for a national scheme to collect and recycle televisions, computers, printers and related computer products.

The *Clean Energy Futures Act 2011* provides a framework for reducing carbon pollution in Australia. The Act includes a 'cap and trade' scheme which requires emitters of greenhouse gases to acquire a permit for every tonne of carbon dioxide equivalent (CO2-e) they emit over specified thresholds. The consequence of this Act for HSC is that landfills above a certain threshold value are required to purchase permits for the methane and other GHG emissions resulting from the anaerobic degradation of organics wastes such as food, garden waste, cardboard and paper. The Smythesdale landfill, which is the current destination for all HSC municipal waste, is above this threshold and charges a "carbon tax' as part of its gate fee for accepting waste. The current federal government is planning to repeal the *Clean Energy Futures Act 2011*.

State Legislation

The two most relevant pieces of State legislation for HSC are the *Local Government Act 1989* and the *Environment Protection Act 1970*.

The *Local Government Act 1989 a*ssigns responsibility for providing for the collection, transport and management of household or municipal waste. This is the key reason kerbside collection of waste and recyclables is managed by local government.

The *Environment Protection Act 1970* stipulates responsibilities in relation to waste disposal, including the management, operation and rehabilitation of landfills. The Environment Protection Act also underpins the collection and distribution of a landfill levy. A landfill levy is charged on each tonne of waste disposed in landfill in Victoria. The levy rate for waste disposed at Smythesdale landfill is currently $53.20 per tonne (applied to both municipal and industrial waste). The levy is scheduled to increase by 10% to $58.50 for the 2014/15 financial year. The

levy currently represents 45% of the total gate fee per tonne for waste disposed at the Smythesdale landfill. Any increases in the levy beyond 2014/15 are unknown at this stage.

POLICY

Commonwealth Policy

The *National Waste Policy: Less waste more resources* was agreed to by all Australian environment ministers in November 2009. The aims of the policy are to:

- Avoid the generation of waste, reduce the amount of waste (including hazardous waste) for disposal,
- Manage waste as a resource
- Ensure that waste treatment, disposal, recovery and re-use is undertaken in a safe, scientific and environmentally sound manner, and
- Contribute to the reduction in greenhouse gas emissions, energy conservation and production, water efficiency, and the productivity of the land.

The Federal policy has set six key areas and identifies 16 priority strategies that would benefit from a national or co-ordinated approach. Details of the key areas and priority strategies can be found at waste policy website (.click to find website or http://www.environment.gov.au/topics/environment-protection/national-waste-policy/about-policy)

The *Australian Packaging Covenant (APC)* is a voluntary initiative by government and industry to reduce the effects of packaging on the environment. Further details on the APC can be found here (click to find website or http://www.packagingcovenant.org.au/)

State Policy

The new *Victorian Waste and Resource Recovery Policy - Getting Full Value,* was released in April 2013 and replaced the *Towards Zero Waste* policy adopted in 2005.

The 30 year vision for waste management in *Getting Full Value* is:

"Victoria has an integrated, state-wide waste management and resource recovery system that provides an essential community service by protecting the environment and public health, maximising the productive value of resources, and minimising long term costs to households, industry and government."

The state policy features six major goals:

- Help Victorians reduce the waste they generate and save Victorians' money through efficient use of resources.
- Facilitate strong markets for recovered resources.

- Have a Victorian waste and resource recovery system that maximises the economic value of waste.
- Reduce the environmental and public health risks of waste.
- Reduce illegal dumping and littering.
- Reform and strengthen the way institutions work and are governed to effectively implement waste policy.

Getting Full Value supports the development of an integrated system of waste infrastructure to cater for the range and variety of waste materials generated across the state, from both households and businesses. The system described in the policy involves waste facilities, such as large transfer stations, landfills and materials recovery facilities, acting as *hubs* connected by transport and collection routes (*spokes*).

To promote the development of a cost-effective network of waste and resource recovery infrastructure a state-wide infrastructure plan and corresponding metropolitan and regional waste and resource recovery plans will be developed.

Sustainability Victoria (SV), the agency responsible for leading and coordinating the implementation of Victoria's waste policy, has already commenced the development of the state-wide waste and resource recovery infrastructure plan that will include:

- An assessment of existing infrastructure across the state, including current and future capacity, and current environmental performance.
- Analysis of current and projected waste volumes, mixes, and origin to destination flows, and identification of likely 'regional waste catchments' based on these projections.
- Assessment of the potential for, and opportunities from, co-locating new waste and resource recovery infrastructure with similar activities such as waste water treatment and other industrial precincts.
- Identification of residential and industrial growth land use areas.
- Transport considerations such as strategic freight corridors and logistics hubs.
- State-wide guidance on issues, risks and infrastructure gaps.

Regional waste and resource recovery plans will be developed for each RWMG detailing the infrastructure needs of each regional waste catchment including identifying initiatives for getting the most value from existing local government infrastructure and services, and new infrastructure needs and timing for its development. The level of detail contained within the infrastructure plan will give clear direction on where government funds will be directed to support development of the integrated waste and resource system.

The *Victorian Litter Strategy 2012-14 – Love your Victoria* outlines the approach of the Victorian government to:

- Tackle the issue of illegal dumping at charitable recyclers.
- Improve data collection and conduct research into illegal dumping behaviours.
- Increase public place recycling infrastructure in regional Victoria.
- Improve resources and develop a training program for local governments, regional waste management groups and land managers to deliver local litter prevention and enforcement programs.
- Expand community partnering projects and programs to share knowledge across regions and local government boundaries.
- Increase roadside litter prevention via grants to prevent commonly littered items such as cigarettes butts and beverage containers.

019. REGIONAL WASTE MANAGEMENT PLANNING

Hepburn Shire Council is a member of the Highlands Regional Waste Management Group (HRWMG). The Highlands Regional Waste Management Group's member councils are:

- Ballarat
- Central Goldfields
- Golden Plains
- Hepburn
- Moorabool
- Pyrenees

Regional Waste Management groups were established in Victoria under the *Environment Protection (Amendment) Act 1996*. The functions of the Regional Waste Management groups are listed under Section 50H of the Act. The HRWMG is responsible for planning the management of municipal solid waste for local governments within its waste management regions, coordinate activities of its members to support State policies, strategies and programs relating to waste and facilitate and foster best practices in waste management.

The current Regional Waste Management Plan was approved in 1999 and is currently out of date. It is not considered relevant to the development of HSC's waste strategy.

In August 2013 the Victorian government accepted the majority of recommendations made by the Ministerial Advisory Committee on Waste and Resource Recovery Governance Reform to provide for effective implementation of its new Waste Management Policy Getting Full Value. The key changes are:

- the proposal to create expanded waste management groups including the formation of a new Grampians Central West Waste Group which will comprise the former Highlands, Grampians and Desert Fringe Regional Waste Management Groups
- providing a statutory role for the new group to plan for all waste streams, rather than just municipal solid waste, and to undertake regional waste planning aligned with statewide waste and resource recovery infrastructure plan
- to enable the waste groups to facilitate joint procurement by local governments

APPENDIX 2 - BUSINESS CASES

<table>
<tr><th colspan="3">Strategy Outcome: Optimising the Kerbside System</th></tr>
<tr><th colspan="3">Option 1: Reducing the bin size for residual waste from 120 litres to 80 litres</th></tr>
<tr><td>What will be the outcome from this project</td><td colspan="2">There will be a reduction in residual waste generation due to a smaller bin size. There is a clear correlation in data from the SV Local Government Annual Survey between bin size and household waste to landfill. The 2010-11 Survey reports average household waste generation for councils with an 80 L garbage bin is 426 kilograms per household per year (kg/hh/yr) compared to 474 kg/hh/yr for a 120 L bin. This represents a 10% reduction in waste generation. Nine councils utilised an 80L garbage bin in 2010-11 compared to 50 councils using a 120L bin. HSC generated 449 kg/hh/yr in the 2010-11 year.</td></tr>
<tr><td>What are the Key elements of this project</td><td colspan="2">• Replacement of 120L bins with 80L bins for residual waste collection across the entire kerbside collection system (4503 households)
• Excludes commercial waste services</td></tr>
<tr><td>What are the potential risks</td><td colspan="2">• A reduction in household waste generation of less than 10% is achieved
• Increased contamination of the recycling bin occurs because the 80L bin is full (Note: there is no correlation of recyclables contamination with bin size from the SV data)</td></tr>
<tr><td colspan="3">Financial Assessment</td></tr>
<tr><td></td><td>Costs

• Cost of new 80L bins = $34.10[29]
• Changeover cost = 4503x$34.10=$153,552
• Assume collection costs remain the same for 80L compared to a 120L bin
• Assume no impact on cost of recyclables collection and sorting
• The cost for distribution of the bins to residents has not been determined</td><td>Savings

• Household waste yield is 449 kg/hh/yr and 4503 households with a kerbside waste collection
• Potential reduction in household waste yield is 45.5 kg/hh/yr
• The reduction in total kerbside waste generation is 205 tonnes per annum
• Cost of disposal at Smythesdale $119/tonne
• Annual saving = $24,300</td></tr>
<tr><td>Simple Payback</td><td colspan="2">Simple Payback = 6.3 years</td></tr>
<tr><td colspan="3">GHG Reduction and other Environmental Impacts</td></tr>
<tr><td></td><td>Reductions

Based on an untested assumption that the composition of the waste doesn't change a reduction of GHG emission associated with the degradation of organics in landfill will occur – nominally the same 10%</td><td>Increases

There will be an environmental cost from the replacement of 120L bins before end of life. This could be negated if an alternate use is found for the retired bins</td></tr>
</table>

[29] Based on recent HSC quote for 120L bins. 80L bins may be slightly cheaper than the price quoted for 120L bins

Strategy Outcome: Optimising the Kerbside System		
Option 1: Reducing the bin size for residual waste from 120 litres to 80 litres		
	reduction in total waste generation. There may also be a small reduction in transport GHG emissions due to the increase in efficiency of collection (10% more bins collected before the collection vehicle needs to transport the waste to Smythesdale).	
Summary	An overall reduction in landfill GHG emissions is expected even though there would be a small increase in GHG emissions associated with production and distribution of new bins. The GHG increase from new bins is a once off "cost" while the reduction in landfill GHG accrues each year that the 80L bins are in use.	
Social Outcomes		
	Positive Assuming savings are passed on to ratepayers and based on a 10% reduction, there would be a reduction in cost to each household receiving a kerbside service of $24,300/4503 = $5.40	Negative There would be a once off cost of approx $34.10 to each household receiving a new 80L bin if full cost transfer was applied. Large families may be disadvantaged compared to small families because they generate more waste and have a genuine need for a larger bin. Exemptions from an 80L bin could be considered for these situations.
Summary	Overall the project is considered to be relatively neutral in its social impact	
Overall Project Assessment	The overall cost saving from this option is considered moderate and there is a once off cost to households	
Potential for Funding Support	Unlikely	
Recommendation to Proceed to more detailed assessment	Based on the simple payback of between 6.3 years this option may warrant further consideration, especially as part of a package of other measures.	

<table>
<tr><th colspan="3">Strategy Outcome: Optimising the Kerbside System</th></tr>
<tr><th colspan="3">Option 2: Increasing the size of the recycling bin from 240 litres to 360 litres</th></tr>
<tr><td>What will be the outcome from this project</td><td colspan="2">There will be an increase in the diversion rate through a greater transfer of recyclables from the residual waste bin to the recycling bin (based on the assumption that the 240L recycling bin is often full) and a commensurate reduction in waste to landfill leading to a reduction in waste disposal costs.</td></tr>
<tr><td>What are the Key elements of this project</td><td colspan="2">• Provision of 360 Litre recycling bins for large households in the Shire (nominally 4+ persons)
• Could be combined with a reduction in garbage bin size to 80L</td></tr>
<tr><td>What are the potential risks</td><td colspan="2">• There is no increase in recycling quantities
• There is no reduction in residual waste generation requiring disposal
Note: Actual data on the performance of 360L bin is hard to acquire. A trial conducted by two Victorian councils in early 2013 indicated that overall waste generation per household ranged from a decrease of 6% to an increase of 1.3% and overall recyclables generation increased by 3.1-12.3%.</td></tr>
<tr><td colspan="3">Financial Assessment</td></tr>
<tr><td></td><td>Costs

• Cost of new 360L bins = $50[30]
• No. households with kerbside recycling service = 4602[31]
• Assume 50% of current households change to 360L = 4602*0.5*$50=$115,050
• Assume collection costs remain same for 360L bin compared to a 240L bin
• Assume no change to costs for processing recyclables (i.e. cost independent of volume)</td><td>Savings

• Based on the most positive outcome of a 6% reduction in waste in 50% of kerbside services, the potential cost saving is: $7,361
• The variability is +$7,361 to -$1,595</td></tr>
<tr><td>Simple Payback</td><td colspan="2">Simple Payback = 15.6 years</td></tr>
<tr><td colspan="3">GHG Reduction and other Environmental Impacts</td></tr>
<tr><td></td><td>Reductions

There will be a benefit from the additional recovery of embodied energy in the extra recyclables collected. Based on a mid range of 6% increase in recyclable yields of average composition this could be</td><td>Increases

There will be an environmental cost from the replacement of 240L bins before end of life. This could be negated if an alternate use is found for the retired 240L bins (i.e. kept in storage pending the future introduction of a 3rd bin service for</td></tr>
</table>

[30] See City of Swan in WA Council Paper
[31] Commercial customers could also be provided with a 360L bin, but with an assumption they it would be on a full recovery basis they have not been included in the cost calculations

Strategy Outcome: Optimising the Kerbside System		
Option 2: Increasing the size of the recycling bin from 240 litres to 360 litres		
	modelled. There will be a variation in the number of garbage and recycle bins that are picked up before the collection vehicle is full and either needs to travel to the Smythesdale landfill or the Daylesford MRF. This has not been modelled and has been assumed to be a negligible impact.	household food and garden waste).
Summary	Although not modelled the change in travel emissions is expected to be close to neutral and the increase in embodied energy recovery would offset the emissions associated with the new bins	
Social Outcomes		
	Positive Reinforces an existing positive practice (kerbside recycling)	Negative There would be a once off cost of $50 to each household receiving a new 360L bin if full cost recovery was applied. This cost could be amortised over a number of years. Larger bins can be harder to manoeuvre and are not recommended for elderly residents or smaller households
Summary	Overall this option is probably socially neutral	
Overall Project Assessment	The overall benefit from this option is considered small	
Potential for Funding Support	Funding has been provided for 360L bins in the past (SV, Australian Packaging Group)	
Recommendation to Proceed to more detailed assessment	A trial might be required to validate the outcomes in HSC, however based on the potential costs and the simple payback of 15+ years it is not recommended.	

<table>
<tr><td colspan="3">Strategy Outcome: Reducing Organic Waste to Landfill</td></tr>
<tr><td colspan="3">Option 3: Encouraging the use of compost bins and worm farms for food and garden waste</td></tr>
<tr><td>What will be the outcome from this project</td><td colspan="2">A reduction in organics, particularly food waste, sent to landfill. Based on a household waste generation of 449 kg/hh/yr (2010-11 figures) and a 25% reduction in waste to landfill per participating household a reduction in waste to landfill of 112 kg/hh/yr could be achieved. An initial target of 500 households has been modelled.</td></tr>
<tr><td>What are the Key elements of this project</td><td colspan="2">• Provision of compost bin or worm farm to participating households – either outright or a rebate on purchase of approved models (or from approved retailers)
• Provision of kitchen tidy for food waste
• Provision of compostable kitchen tidy bags
• Provision of educational material
• Provision of training workshops
• Move to fortnightly residual waste collection for participating households (a form of recognition for participation)</td></tr>
<tr><td>What are the potential risks</td><td colspan="2">• Significantly lower participation than 500 households
• Low/no demand because of high existing prevalence of home composting/worm farming
• A reduction of significantly less than 112 kg/hh is achieved
• Composting/worm farming is not done properly
• There is large drop out rate of households who receive a rebate but then stop composting/wormfarming</td></tr>
<tr><td>Financial Assessment</td><td>Costs
• based on indicative cost of $150 for a compost bin, kitchen caddy and initial supply of bins: 500x$150 = $75,000
• based on a nominal $50 rebate = 500*50 = $25,000
• training – based on $10 per participant (ref: Albury Halve Waste project) = $5,000 (although this could be done on a cost recovery basis, i.e. participants make a financial contribution)
• a reduction in waste charge for participants based on fortnightly collection = $14,600 (this is a cost because it is assumed the current contract is based on number of bins regardless of presentation rate). This equates to $30/yr per participant</td><td>Savings
• based on data from City of Frankston a 25% reduction in landfill was achieved
• based on 500 households and 449 kg/hh/yr this equates to an annual reduction of 56 tonnes
• reduction in costs of landfill disposal: 56*$119 = $6,665 pa</td></tr>
</table>

<table>
<tr><td colspan="3">Strategy Outcome: Reducing Organic Waste to Landfill</td></tr>
<tr><td colspan="3">Option 3: Encouraging the use of compost bins and worm farms for food and garden waste</td></tr>
<tr><td></td><td>• development of education materials: allow $2,000

Three options modelled:
• Option 1: council covers full cost of bins, caddy and liners plus education materials. Cost = $77,000
• Option 2: council provides a once off rebate of $50 per household plus education. Cost = $27,000
• Option 3: Council provides a once off rebate of $30, a reduction in waste charges of $30 and education. Cost = $32,000</td><td></td></tr>
<tr><td>Simple Payback</td><td colspan="2">Option 1 = 11.6 years

Option 2 = 4.1 years

Option 3 = 4.8 years</td></tr>
<tr><td colspan="3">GHG Reduction and other Environmental Impacts</td></tr>
<tr><td></td><td>Reductions

Based on the 500 participating households and assumed diversion rates the overall reduction in waste to landfill would be 56 tonnes per annum (or 2% of the total kerbside waste stream).

There would be a decrease in GHG emissions associated with the reduced organic material being sent to landfill.</td><td>Increases

A small increase in resource usage and GHG emissions associated with purchase of compost bins and worm farms.</td></tr>
<tr><td>Summary</td><td colspan="2">The project has a small environmental benefit</td></tr>
<tr><td colspan="3">Social Outcomes</td></tr>
<tr><td></td><td>Positive

An increase resident's knowledge of opportunities to reduce organics waste to landfill and a related increase in pursuits associated with use of end</td><td>Negative

None identified</td></tr>
</table>

Strategy Outcome: Reducing Organic Waste to Landfill		
Option 3: Encouraging the use of compost bins and worm farms for food and garden waste		
	products from composting/worm farming (e.g. gardening).	
Summary	Project likely to have a small positive social outcome	
Overall Project Assessment	A partial rebate on compost bins/worm farms has the better financial outcome. At 500 participating households the impact on overall waste generation is minor. The cost per tonne of waste diverted is high.	
Potential for Funding Support	Other councils have received funding support for this type of project	
Recommendation to Proceed to more detailed assessment	Recommended in conjunction with other options to improve the kerbside efficiency (kerbside extension, smaller bins and education to get the recyclables into the recycling bin).	

Strategy Outcome: Optimising the Kerbside System	
Option 4: Getting recyclables into the recycling bin	
What will be the outcome from this project	An increase in recycling of municipal waste through transfer of recyclables from the residual waste bin to the recycling bin for the kerbside system. Based on the 2008 bin audit data 28% of the residual waste was recyclables. However the quantity of cardboard in the waste reported by this audit (20% wt) seems high and a figure of 13% wt is in line with other audit results. A figure of 20% for recyclables in the waste is therefore assumed. Diverting 50% of this recyclable material to the recycling bin is considered feasible.
What are the Key elements of this project	• Program design • Pre audits of recyclables content of the kerbside residual waste bin to determine baseline and confirm potential savings • Development of education materials • Implementation • Post audits to measure outcomes
What are the potential risks	• That the 2008 audit was not representative and the quantity of recyclables in the residual waste bin is considerably less than 28% by weight. The % recyclables in the waste stream has been adjusted to 20% to reflect a probable over estimate of cardboard in the 2008 audit. • That the community education program doesn't delivery a 50% diversion of those recyclables into the correct bin

<table>
<tr><td colspan="3">Strategy Outcome: Optimising the Kerbside System</td></tr>
<tr><td colspan="3">Option 4: Getting recyclables into the recycling bin</td></tr>
<tr><td colspan="3">Financial Assessment</td></tr>
<tr><td></td><td>Costs (preliminary estimates)

• Pre audit = $10,000
• Development of education materials = $10,000
• Implementation (e.g. print media, etc) = $20,000
• Post audits = $15,000 (assumed that more post auditing conducted than pre audits)

Total = $55,000

Assumed there are no changes to collection frequencies</td><td>Savings

• Reduction in waste to landfill based on 2950 tpa (2013-14 budget figure) = 295 tonnes
• At $119/t landfill cost = $35,000 pa</td></tr>
<tr><td>Simple Payback</td><td colspan="2">The simple payback on this option is 1.6 years</td></tr>
<tr><td colspan="3">GHG Reduction and other Environmental Impacts</td></tr>
<tr><td></td><td>Reductions

There is a reduction in GHG emissions associated with

• the recovery of cardboard which would generate methane in landfill and
• the recovery of embodied energy value in all addition materials recovered

These have not been modelled</td><td>Increases

Unlikely to be any increase. There may be a small change in the number of residual and recycling bin lifts before each collection vehicle is full and needs to travel to landfill of the Daylesford MRF. In the absence of modelling this is assumed to be neutral. Any small change in transport emissions would be more than offset by the reductions achieved.</td></tr>
<tr><td>Summary</td><td colspan="2">There is a clear GHG reduction from this option which can be modelled if required</td></tr>
<tr><td colspan="3">Social Outcomes</td></tr>
<tr><td></td><td>Positive

This option optimises the existing kerbside system that residents are already very familiar with.</td><td>Negative

None identified</td></tr>
<tr><td>Summary</td><td colspan="2">A positive social outcome through reinforcing positive behaviours already undertaken by</td></tr>
</table>

Strategy Outcome: Optimising the Kerbside System	
Option 4: Getting recyclables into the recycling bin	
	the majority of households
Overall Project Assessment	The project appears to have positive financial, environmental and social outcomes
Potential for Funding Support	May be able to receive support through the current Get it Right on Bin Night and Kerbside Pride programs
Recommendation to Proceed to more detailed assessment	Recommended

Strategy Outcome: Optimising the Kerbside System		
Option 5: Extending the kerbside collection system to more households		
What will be the outcome from this project	A standard kerbside service will be provided to more households in the Shire negating the need for self haul of waste and recyclables to one of the three Transfer Stations	
What are the Key elements of this project	• Provision of a kerbside service to an additional 1500 homes • 240L recycle bin picked up fortnightly • 80L bin picked up weekly (if combined with Option 1) otherwise 120L picked up weekly, or • 140L bin (or 240L bin) picked up fortnightly	
What are the potential risks	• The increase in rates (kerbside charges) to households that currently have no service might be met with some opposition • That increased truck movements on some minor roads (especially unpaved roads) may cause increased road degradation and hence increased road maintenance costs. A total of 1500 new services has been modelled rather than the full 2569 estimated properties without a kerbside service to reflect that road access limitations may restrict the service in some areas.	
Financial Assessment		
	Costs • Cost of new 120L bins = $34.10 • Cost of new 240L bin = $37.20[32] • For 1500 new services total cost	Savings • Average garbage yield for HSC 2010-11 was 449 kg/hh/yr • Average recyclables yield for HSC 2010-11 was

[32] Based on recent HSC quotation

<table>
<tr><td colspan="3">Strategy Outcome: Optimising the Kerbside System</td></tr>
<tr><td colspan="3">Option 5: Extending the kerbside collection system to more households</td></tr>
<tr><td></td><td>of 2 bins/hh = $107,000
• Cost of disposal for 606 tonnes additional waste = $72,000 pa
• Cost of weekly waste and fortnightly recyclables collection = $146,000
• Cost of alternate option (Option 5A) of fortnightly waste and recyclables collection = $102,400

The total cost over 5 years is $1.20 million ($979,000 for option 5A)</td><td>267 kg/hh/yr[33]
• Based on 1500 households
o reduction in waste at Transfer Stations = 606 tonnes
o reduction in recycling at Transfer Stations = 1500*0.267 = 400.5 tonnes
• Reduction in waste disposal & cartage costs = $106,000
• Reduction in recycling transport charges = $60,400
• Reduction of 25% in Transfer Station Operating hours = $41,500

Total revenue and saving over 5 years $1.04 million</td></tr>
<tr><td>Simple Payback</td><td colspan="2">Over 5 years this option incurs a cost over 5 years of $160,000 (or a return of $59,000 for Option 5A).</td></tr>
<tr><td colspan="3">GHG Reduction and other Environmental Impacts</td></tr>
<tr><td></td><td>Reductions

The work undertaken by Hyder assumed that an extension of the kerbside service would yield a higher tonnage of recyclables than achieved from drop off at the Transfer Stations – presumably due to the convenience of the kerbside system leading to better segregation. Hyder estimated an increase of 245 tonnes per annum (based on an extension to all households).

The Hyder work also indicated a reduction in GHG emissions from this option due to the reduction in trips to the Transfer station by Householders to drop off waste and recyclables. This modelling</td><td>Increases

There will be an increase in GHG emissions from the increase in collection vehicle travel distance associated with extension of the kerbside service. Hyder modelling indicated that this increase was completely offset by the reduction in GHG emissions from reduced self haul trips.

There would also be a small increase in GHG emissions and resource consumption associated with the purchase and distribution of the new bins. This is likely to be minor.</td></tr>
</table>

[33] SV Victorian Local Government Annual Survey 2010-11

Strategy Outcome: Optimising the Kerbside System		
Option 5: Extending the kerbside collection system to more households		
	assumed specific and separate trips were made for this purpose – this may not be a valid assumption as a percentage of trips may be made in conjunction with trips for other purposes such as shopping.	
Summary	Overall there should be a positive environmental outcome from this option due to an increase in recyclables yield and a decrease in overall GHG emissions	
Social Outcomes		
	Positive The service will be more equitable between existing townships and rural areas. The kerbside system is undoubtedly more convenient than transporting waste to a transfer station and the regular collection means smaller volumes of waste need to be stored by the householder. There may be other social benefits from reduced dumping or burning of waste (not quantified). A reduction Transfer Station costs of $208,000 pa equates to a $20 reduction in the general waste management charge (Based on 10,208 rateable properties)	Negative Households receiving a new kerbside service would be charged an estimated $158 (based on fortnightly waste collection) above what they are charged now and would no longer receive free vouchers. The fact that a commercial business operates a kerbside waste pickup at charge higher than the council charges indicates that there is a demand and willingness to pay by some residents for the convenience of a kerbside pickup ($14 per pickup).
Summary	Overall the issues of greater equity and convenience from the extension of kerbside services probably balances the increase in direct costs to householders via council rates	
Overall Project Assessment	The project appears to have a positive outcome for a relatively small increase in overall cost	
Potential for Funding Support	Unlikely to be eligible for any funding support	
Recommendation to Proceed to more	Recommended with Option 5A preferred over Option 5.	

Strategy Outcome: Optimising the Kerbside System	
Option 5: Extending the kerbside collection system to more households	
detailed assessment	

Strategy Outcome: Reducing Organic Waste to Landfill		
Option 6: Implementing a kerbside collection for household garden and food waste		
What will be the outcome from this project	Greater diversion of organic material from landfill. Based on the 2008 bin audit food waste and garden waste made up 29% and 7% by weight respectively of the kerbside waste stream. Based on a diversion of 75% of the organics waste and a household waste yield of 449 kg/hh/yr (2010/11 data) the expected diversion would be between 544 tonnes per annum.	
What are the Key elements of this project	• Introduction of a fortnightly food and garden waste collection for township areas only (i.e. those that have currently have a kerbside collection) using a 240 L MGB (# households = 4503) • Concurrent education program • Move residual waste collection from a weekly service to a fortnightly service post introduction of the organics bin	
What are the potential risks	• That diversion of organics to the third bin is less than 75% and significant quantities or organics remain in the waste to landfill • That no processor for combined garden and food waste exists in reasonable proximity to HSC and at a reasonable gate price • That the current proposed joint tender between Ballarat and Bendigo for organic waste processing doesn't identify a tenderer that can or will process HSC organic waste. An option of processing the material using the Hot Rot technology has been included to provide indicative costs in the event that this risk is realised.	
Financial Assessment		
	Costs • New 240L bins for green waste: 4503*$37.20 = $167,500 • Kitchen Caddy = 4503*$3.00[34] = $13,500 • Kitchen caddy compostable bags = 4503*$10[35] = $45,000 pa • Based on the current recycling service costs the annual collection cost will be: $175,600	Savings • Savings accrue from a reduction in waste to landfill • Based on current gate fees at Smythesdale of $119/tonne, annual savings are in the range $64,650 • Savings from moving residual waste to a fortnightly collection based on a current cost for waste collection = $131,800

[34] Source: Groundswell project report
[35] Ibid

Strategy Outcome: Reducing Organic Waste to Landfill		
Option 6: Implementing a kerbside collection for household garden and food waste		
	pa • Based on a gate fee of $90/tonne for an organics processing option, the cost for processing cost will 544 tonnes per annum will be $49,000 pa • Cost of the education program: allow $5,000 per annum • Total 5 yr cost = $1.55 million • There will also be once off costs associated with managing a tender process for collection and processing As an alternative the option of processing at the Daylesford Transfer Station using the Hot Rot Technology (Model 1811 – capacity up to 900 tpa) is costed: • Capital cost: $500,000 • Annual energy cost $3,500 (figures based on site visit by Barwon RWMG, October 2012) • Assume same collection costs (new bins and lift costs) • Shredding is still required for transfer station green waste • 1 FTE is required to operate the system • Total 5 yr cost = $2.36 million	• Total 5 yr savings: $980,000 Savings for alternative Hot Rot option, based on 544 tpa of kerbside food waste and 456 tpa of Transfer Station Green waste and based on conversion of 1000 tpa feed to 500 tpa of compost product with a market value of $40/tonne, the additional savings and revenue are: • Green waste gate fees = $50,300 pa (assumes 41% of green waste at Daylesford is during the free period) • Compost sales: $20,000 pa Total 5 yr saving = $1.33 million
Simple Payback	Simple payback is not applicable. There is an ongoing annual cost associated with this option which is due to the significant cost of introducing a new service. Based on a 75% diversion of organics to the new bin the cost over 5 years is $571,500 and the annual cost to residents (based on 4503 households that currently have a kerbside waste service) is $25.40 p.a. The option is not highly sensitive to a higher gate fee for organics processing. The alternative option of processing combined food and green waste using a technology similar to Hot Rot is calculated to be more expensive with a cost over 5 years of $1.02 million or an annual cost of $45.40 per household (based on 4503 households).	

<table>
<tr><td colspan="3">Strategy Outcome: Reducing Organic Waste to Landfill</td></tr>
<tr><td colspan="3">Option 6: Implementing a kerbside collection for household garden and food waste</td></tr>
<tr><td colspan="3">GHG Reduction and other Environmental Impacts</td></tr>
<tr><td></td><td>Reductions

There are clear benefits from the avoided landfill methane generation. The actual amount of GHG avoidance is dependent on the efficiency of the landfill gas capture system at the Smythesdale landfill. Based on an assumed gas capture efficiency of 50% and a further 10% oxidation of methane in the landfill environment prior to emission it is assumed that 40% of the generated methane escapes to the atmosphere

The modelling work undertaken by Hyder (Scenario Analysis Report) indicated a similar option would achieve a 10% reduction (200 tpa) in GHG emissions over the existing kerbside system by 2022.

There will also be unspecified benefits from the application of compost to land (assuming a composting option) although this may accrue outside HSC boundaries.</td><td>Increases

There is no significant increase in GHG emissions. The change to fortnightly residual waste collection offsets the emissions from introducing a new service.

There is a once off impact from the manufacture of the new bins.</td></tr>
<tr><td>Summary</td><td colspan="2">There is a clear positive outcome from this option</td></tr>
<tr><td colspan="3">Social Outcomes</td></tr>
<tr><td></td><td>Positive

Allows households to participate actively in reducing GHG emissions through source separation of organics wastes – a practice they are used to through participating in kerbside recycling.</td><td>Negative

Would only be available to households in township areas that currently receive a kerbside service (note: even if kerbside services are extended, the introduction of 3rd bin should be limited to townships as it is assumed than areas currently without a kerbside service find alternative means of managing food and garden organics rather than hauling to the transfer</td></tr>
</table>

Strategy Outcome: Reducing Organic Waste to Landfill		
Option 6: Implementing a kerbside collection for household garden and food waste		
		station – this is an untested assumption).
Summary	This is considered to be relatively neutral in its social outcome	
Overall Project Assessment	The overall assessment of this option is highly dependent on some of the assumptions (e.g. processing gate fee, amount of organics diverted from the residual waste bin to the new organics bin) as well as the availability of a viable processing option for both food and garden waste. Based on the currently available data indicating a low % of garden waste in the residual waste this option is not considered viable on garden waste only. Discussions with the City of Ballarat indicate that the proposed joint Ballarat/Bendigo tender will be framed to allow a regional solution for other councils. The possible timing of this is tender release in early 2014 with service commencement from 2015/16 financial year. The option of council operated processing using Hot Rot is less financially viable than using a 3rd party processor.	
Potential for Funding Support	There is potential for funding support for a project of this type (e.g. SV, waste management group)	
Recommendation to Proceed to more detailed assessment	Recommended for further consideration, pending the outcome of Ballarat/Bendigo tender process.	

Strategy Outcome: Improving Transfer Station Performance	
Option 7: Improving the management of green waste	
What will be the outcome from this project	Improved management of green waste at the transfer station network leading to better quality product meeting Australian Standards which is then suitable for sale and a reduction in contamination leading to limited/no stockpiles of contaminated/unwanted mulched material at the transfer stations.
What are the Key elements of this project	• Improved inspection procedures for green waste • Improvements to transfer stations to facilitate better management (e.g. drainage, internal access roads, hardstand) • Separation of fine and coarse green waste • Regular mulching of coarse green waste (e.g. monthly-quarterly rather than annually)

<table>
<tr><th colspan="3">Strategy Outcome: Improving Transfer Station Performance</th></tr>
<tr><th colspan="3">Option 7: Improving the management of green waste</th></tr>
<tr><td></td><td colspan="2">• Use of Groundswell City to Soil technology (heaped and covered aerobic composting) – batch size approx 10 t (option to include food waste with garden waste)
• Development and implementation of monitoring protocols
• Screening of composted material
• Sales of compost and mulch products</td></tr>
<tr><td>What are the potential risks</td><td colspan="2">• Odours from composting
• Contamination detracts from quality
• No or limited markets for finished product
• Competition from existing garden supply businesses
• Unfair competitive advantage over existing garden supply businesses selling compost as the rate payer is effectively subsidising the production of the compost product</td></tr>
<tr><td>Financial Assessment</td><td>Costs

Option 1: Processing Transfer Station Green waste only – estimated total tonnes = 626 tonnes

Establishment costs[36]:

Tarps: $37.5/tonne

• Inoculants $25/t
• Testing $5/t
• Total cost = $67.5*626 = $42,255

Ongoing annual costs:

• Tarps: $5/t
• Inoculants: $25/t
• Testing: $12.5/t
• Screening: $7.5/t
• Plant & equipment: $27.5/t
• Salaries: $103.75/t
• Total operating cost: $181.25*626 = $113,400

Total 5 yr cost = $42,255 + (5*$107,202) = $609,200</td><td>Savings

Option 1: Processing Transfer Station Green waste only – estimated total tonnes = 626 tonnes

• Assume 50% of received green waste no longer needs chipping/shredding; saving = $31,750
• Assume sales of compost at $40/t and 50% conversion by weight from feedstock to finished compost = 626*0.5*$40 = $12,500
• Gate fee revenue for receipt of green waste (48.5% is paid for using vouchers or cash) = 6876m3*0.485*$17/m3 = $56,690
• Total annual savings: $101,000

Total 5 yr savings = $504,800</td></tr>
</table>

[36] Based on per household costs presented in the Groundswell report and converted to a per tonne cost assuming an 80 kg/hh diversion to the 3rd bin

Strategy Outcome: Improving Transfer Station Performance		
Option 7: Improving the management of green waste		
	Option 2: Processing Transfer Station Green waste plus introduction of a kerbside organics service – estimated total tonnes = 626 tonnes green waste + 544 tpa kerbside organics Establishment costs: • Bins: $167,500 • Caddies: $13,500 • Groundswell costs: $67.5*1170t = $79,000 • Total = $260,000 Operating costs, per annum • Bin collection $175,600 • Caddy compostable bags: $45,000 • Education: $5,000 • Groundswell costs: $181.25*1170t = $212,100 • Total = $437,7006 Total 5 yr cost: = $2.45 million	Option 2: Processing Transfer Station Green waste plus introduction of a kerbside organics service – estimated total tonnes = 626 tonnes green waste + 600 tpa kerbside organics Annual savings • Reduced shredding: $31,750 • Compost sales: 1170t*0.5*$40 = $23,400 • Green waste gate fee revenue (as above) = $56,690 • Avoided landfill: 544t*$119 = $64,700 • Residual waste to fortnightly collection = $131,800 • Total savings: $308,300 Total 5 yr saving: $1.54 million
	Option 3: Contract out management of green waste Costs: $10/m3 based on 2086 m3 of output (mulched material) and cartage for offsite composting/processing[37] = $20,900 p.a.	Option 3: Contract out management of green waste Savings & Revenue: • Avoided council costs for mulching: $63,500 • Revenue from green waste: $56,690 Total Saving & Revenue: $120,200 p.a.
Simple Payback	Option 1 has an annual cost over 5 years of $20,900 and based on 10,208 rateable properties equates to a $2 pa increase in the general waste management charge Option 2 has an annual cost over 5 years of $183,300 and based on 4503 properties with a kerbside service equates to the introduction of a kerbside waste service for an additional $40 per property. This is a higher cost option than using a 3rd party processor. Option 3: would appear to provide an immediate saving to HSC.	

[37] Based on verbal and preliminary discussion with one potential contractor

<table>
<tr><td colspan="3">Strategy Outcome: Improving Transfer Station Performance</td></tr>
<tr><td colspan="3">Option 7: Improving the management of green waste</td></tr>
<tr><td colspan="3">GHG Reduction and other Environmental Impacts</td></tr>
<tr><td></td><td>Reductions

Option 1 will probably have a small reduction in GHG emissions associated with better management of the composting process for Transfer Station green waste (not quantified) and a reduction in emissions associated with shredding the green waste (not quantified)

Option 2: in addition to option 1 will have the additional benefit of avoided methane generation in landfill.

Option 3: is considered to be similar to Option 1.</td><td>Increases

There will be an increase in water usage associated with the composting process at the approximate rate of 20 litres per tonne of feedstock.

For option 1 this equates to 12,250 litres. For option 2 this equates to 24,540 litres. This is considered to be minor,

There will also be minor emissions associated with use of a front end loader to turn the compost piles and for screening of the final product prior to sale.</td></tr>
<tr><td>Summary</td><td colspan="2">There is a minor environmental benefit from options 1 and 3, and a more significant benefit from option 2 due to the avoided methane emissions.</td></tr>
<tr><td colspan="3">Social Outcomes</td></tr>
<tr><td></td><td>Positive

As this option relates to internal operations at the current transfer stations it is not considered to have any positive or negative social outcomes</td><td>Negative</td></tr>
<tr><td>Summary</td><td colspan="2">Not applicable</td></tr>
<tr><td>Overall Project Assessment</td><td colspan="2">Overall Option 1 would provide for improved management of the green waste received at the Transfer Stations at a reasonable small increase in the general waste management charge levied on all properties ($120 p.a. to $122 p.a. or 1.7%).

Option 2 is less financially attractive than the option of a kerbside service with processing by a 3rd party (based on the assumptions used) and should only be considered in the absence of any viable option coming from the Ballarat/Bendigo organics tender process.

Option 3 comes out as the best option based on preliminary costings.</td></tr>
<tr><td>Potential for Funding</td><td colspan="2">Yes, organics diversion is a priority for SV</td></tr>
</table>

Strategy Outcome: Improving Transfer Station Performance	
Option 7: Improving the management of green waste	
Support	
Recommendation to Proceed to more detailed assessment	Proceed with Option 3 by going to market with a 5 year (3+2) contract.

Strategy Outcome: Improving Transfer Station Performance		
Option 8: Improving Transfer Station Efficiency		
What will be the outcome from this project	To improve the efficiency of Transfer Station operations and reduce transportation costs associated with waste and recyclable movements from the Transfer Station	
What are the Key elements of this project	• Provide larger bins for recycling at Trentham & Creswick (provide additional bay(s) at each TS to allow 30m^3 bins to be used for recyclables to reduce trips to Daylesford MRF and reduce on site litter generation) • Compact waste and recycling into bins prior to transport offsite to reduce transport costs • Rationalise Transfer station operational hours (to be done in conjunction with extension of kerbside collection service) • Integrate recyclables drop off at Daylesford TS with MRF operation to eliminate double handling • Bulk haul of residual waste from Daylesford	
What are the potential risks	• Capital improvement costs higher than estimated • Compaction of waste less than expected • Community opposition to any reduction in Transfer Station opening hours	
Financial Assessment	Costs	Savings
Option 1: Provide larger recycle bins at Creswick, Trentham and Daylesford	• Construction cost for new bays (2 at Trentham, 1 at Creswick) = *to be determined* • Assume no new bay is required at Daylesford and bay previously allocated for metals is used for recyclables	• Based on assumed 30 %reduction in transport trips (based on fact that at two Transfer Stations recyclables from 1-2 12m^3 skips are tipped into an empty 30m^3 bin for transport to Daylesford MRF) = $108,000*0.3 = $32,400 pa • Note: total number of recycle bin movements reduced from 715 to 500
Option 2: Compact waste and recycling in 30	• 1 x backhoe for compaction at each transfer station (note backhoe	• Based on an increase in average waste bin weight from 5.66 tonnes to 8.0 tonnes the

Strategy Outcome: Improving Transfer Station Performance		
Option 8: Improving Transfer Station Efficiency		
m^3 bins using a backhoe	already present at Daylesford) – assume $50,000 for reasonable 2nd hand models = $100,000 • Cheaper backhoes may be available Simple payback = $100,000/$67,400 = 1.5 years (note this ignores any operational and maintenance costs for the backhoes)	reduction in transport costs = $45,530 • Based on the same % reduction for recycling the potential saving = $21,900[38] • Total saving: $67,400 p.a.
Option 3: Rationalise Transfer Station Hours	• Negligible	• Based on 25% reduction in hours if kerbside collection is extended, saving = $41,500 • This saving has been included in the business case for Extending the Kerbside Service
Option 4: Integrate recyclables drop off at Daylesford TS with MRF to avoid double handling	• Scope of works to enable public to safely drop off recyclables at the MRF would need to be developed	• This would totally eliminate recyclables transport cost for Daylesford • Saving = $40,000 p.a.
Option 5: Bulk haul of residual waste from Daylesford	• This would require infrastructure to enable transfer of waste to 75m^3 containers for B-Double transport to landfill (as per recyclables from MRF) and could be applied to kerbside waste and Daylesford TS waste. This would need further investigation before a preliminary cost could be determined.	• Based on an increase in tonnage per load from 5.66 t to 40 t this would have a saving of $73,500 p.a.
Simple Payback		
GHG Reduction and other Environmental Impacts		
	Reductions The majority of these options result in a reduction of transport related GHG emissions	Increases None identified
Summary	Reductions in GHG transport emissions	

[38] This saving assumes Option 1 has already been implemented

Strategy Outcome: Improving Transfer Station Performance		
Option 8: Improving Transfer Station Efficiency		
Social Outcomes		
	Positive Not applicable	Negative Not applicable
Summary	As these options mostly related to transport and internal operations at the Transfer Stations they do not appear to have any identifiable social impacts	
Overall Project Assessment	The range of options to optimise transfer station operations appear to offer reasonable cost savings, however the costs to implement a number of options are unknown at this stage.	
Potential for Funding Support	Based on advice from the Highlands RWMG, SV is developing a funding assistance program for transfer station upgrades for possible release in 2014. This may relate to increases in resource recovery rather than improvements in transport efficiencies.	
Recommendation to Proceed to more detailed assessment	Recommended for further development.	

Strategy Outcome: Improving Transfer Station Performance		
Option 9: Implementing full cost recovery at transfer stations		
What will be the outcome from this project	Reduced cost to council and residents through the implementation of a user pays cost recovery system for operation of the transfer stations	
What are the Key elements of this project	• Replace the free voucher system currently in place for residents that don't receive a kerbside service with a pre-pay voucher system • Alternatively replace the voucher with a cash payment at the Transfer Stations	
What are the potential risks	• There will be an increase in illegal dumping of waste (to reduce this risk this option should be implemented in conjunction with the extension of the kerbside service) • Risk associated with increased cash takings at the Transfer Stations if the pre-purchase system is not implemented • Increased level of fraudulent vouchers used (can be overcome by implementing increased security on the prepaid voucher)	
Financial Assessment		
	Costs	Savings and Revenue

Strategy Outcome: Improving Transfer Station Performance		
Option 9: Implementing full cost recovery at transfer stations		
	• Cost of implementing a prepay system, including arranging outlets and potentially increased security have not been costed	Currently the 3 transfer stations cost in the order of $871,250 per year to operate (includes contract management fees, waste disposal and cartage, recyclables cartage, green waste shredding, and management of special wastes). These costs are generally covered by the $120 waste management charge levied per rateable property. In addition the households that don't have access to the kerbside service are issued with 12 vouchers per year (equivalent to 6 m^3 of waste). These vouchers are essentially issued free of charge although they have a face value of $204 (based on $17/$m^3$ gate fee). Although there is an inconvenience factor involved in having to transport waste to a transfer station the 4503 households with a kerbside service are effectively subsidising the 2569 properties that don't. The current revenue (non voucher transactions) at Transfer Stations = $135,000 pa Assuming the tonnages remain the same, revenue would be earned on all waste received and 48.5% for all green waste. At current volumes of waste received this would equate to: • Waste: 13,170 m3 @$34/m3 = $447,780 pa • Green waste: 6876 m3@48.5%@$34/m3 = $113,400 pa • total revenue = $561,180 pa
Simple Payback	The additional revenue from this option is $426,180 The implementation of a full cost recovery model offers scope to reduce the gate fee for green waste (especially in conjunction with Project 7 – contract management of green waste), e.g., a reduction to $10/$m^3$. It is noted that the revenue from general waste = $447,780 but the current costs for waste cartage and disposal = $495,350, which indicates the gate fee of $17/m3 is too low for general waste (it should also make a significant contribution to the annual management costs of the Transfer Stations)	

<table>
<tr><td colspan="3">Strategy Outcome: Improving Transfer Station Performance</td></tr>
<tr><td colspan="3">Option 9: Implementing full cost recovery at transfer stations</td></tr>
<tr><td></td><td colspan="2"></td></tr>
<tr><td colspan="3">GHG Reduction and other Environmental Impacts</td></tr>
<tr><td></td><td>Reductions

None identified</td><td>Increases

None identified</td></tr>
<tr><td>Summary</td><td colspan="2">Not applicable</td></tr>
<tr><td colspan="3">Social Outcomes</td></tr>
<tr><td></td><td>Positive

Combined with an extension to the kerbside service this option would provide a much more equitable outcome for all rate payers across the shire. Moving the transfer stations to a user pays full cost recovery model would mean the general waste charge in the rates would only need to cover the hard waste collection, public place bin collection, transport of recyclables and disposal and mulching of green waste received during the free green waste period (currently around 51.5%).

There are anecdotal stories of the vouchers being used as an alternative to currency, which if substantial, would amount to ratepayers essentially supporting an unintended black market. The elimination of this market would be another positive social outcome.</td><td>Negative

With an extension of the kerbside service to an assumed additional 1500 properties only about 1000 properties would need to pay for waste disposal at the transfer stations.</td></tr>
<tr><td>Summary</td><td colspan="2">Overall this appears to be a more equitable system and moves all rate payers to a user pays cost recovery system for waste management. Under the current system the residents without a kerbside system enjoy a significant subsidy from those with a kerbside system (which is essentially a full cost recovery model) and enjoy significantly greater value than what is paid in the general waste charge.</td></tr>
<tr><td>Overall Project</td><td colspan="2">The project has some potential negative aspects but is considered important to address</td></tr>
</table>

Strategy Outcome: Improving Transfer Station Performance	
Option 9: Implementing full cost recovery at transfer stations	
Assessment	some significant cross subsidy issues
Potential for Funding Support	none
Recommendation to Proceed to more detailed assessment	Recommended in conjunction with an extension to the kerbside service. Alternative options are: • Stick with the current system but increase the general rate charge for non kerbside properties to reflect the true value of the vouchers (this would also allow a reduction in general waste charge for properties they have a kerbside service) • Provide vouchers to all residents. However this would result in a loss of revenue of $135,000 (assume that there would be a drastic reduction in gate takings) and based on an assumption of a 25% increase in green waste (additional $16,000 pa for mulching) and a 10% increase in waste to landfill (additional $50,000 for transport and disposal) the overall additional cost of this option would be $201,000 (or an increase in general rates charge by $20 property per year)

Strategy Outcome: Exploring Waste to Energy Opportunities	
Option 10: Utilising the Green Waste at Transfer Stations for Energy Generation	
What will be the outcome from this project	Utilisation of the woody components of green waste received at Transfer Stations for energy generation using thermal technologies (pyrolysis or combustion)
What are the Key elements of this project	• Consultants Pitt & Sherry have evaluated options for processing of biomass from with the HSC region, including material received at the Transfer Station network (including historical stockpiles). • The preferred option is a central boiler with heat distribution to end users through a piping system
What are the potential risks	• That available biomass from the Transfer Stations has been over estimated – the preferred option identified by Pitt & Sherry has a feed input of 1573 tpa. This appears to be considerably higher than the annual green waste feedstock available from the transfer stations (626 tpa estimated, however this is highly dependent on the density of the incoming green waste and the estimated range is 626-1375 tonnes) • That all green waste received at Transfer Stations is suitable for use as a feedstock (in reality much of the finer material may not be suitable due to high moisture content/low energy value) – a moisture content of 50% has been assumed in the P&S report • For pyrolysis, that a ready market exists for biochar that is willing to pay $100/tonne

<table>
<tr><th colspan="4">Strategy Outcome: Exploring Waste to Energy Opportunities</th></tr>
<tr><th colspan="4">Option 10: Utilising the Green Waste at Transfer Stations for Energy Generation</th></tr>
<tr><td></td><td colspan="3">(pyrolysis is not Pitt & Sherry's preferred technology for this application)
• That feedstock preparation and handling costs are higher than have been assumed</td></tr>
<tr><td>Financial Assessment</td><td colspan="3"></td></tr>
<tr><td></td><td>Costs

The Pitt & Sherry report contains a cost benefit analysis for three different options, with the most favourable being a centralised district heating model.

• Capital cost for boiler and associated piping = $1,815,000
• Annual operating costs include
o Labour $20,000 pa
o Electricity consumption: $20,000 pa
o Feed preparation: $15,000 pa</td><td colspan="2">Savings

Annual heat savings: $228,500</td></tr>
<tr><td>Simple Payback</td><td colspan="3">Pitt & Sherry calculate the simple payback at around 10 years,

The preliminary cash flow analysis indicates an Internal rate of Return of 8% and a positive cash flow result by Year 11, but this is based on a feedstock of 1573 tpa (cf. Estimated annual tonnage at TS is 626 tonnes). It is not clear if these have been standardised to the desired moisture content.</td></tr>
<tr><td>GHG Reduction and other Environmental Impacts</td><td colspan="3"></td></tr>
<tr><td></td><td>Reductions

There would be reductions in GHG emissions from offsetting the emissions associated with the current heating of end users.</td><td colspan="2">Increases

Resource use and emissions associated with construction and installation of the system (assumed to be completely offset by the emissions reduction).</td></tr>
<tr><td>Summary</td><td colspan="3">A reduction in GHG would be achieved</td></tr>
<tr><td>Social Outcomes</td><td colspan="3"></td></tr>
<tr><td></td><td>Positive

To be determined</td><td colspan="2">Negative

To be determined</td></tr>
<tr><td>Summary</td><td colspan="3">To be determined</td></tr>
<tr><td>Overall Project</td><td colspan="3">Overall the project is probably at the outer limit of financial viability without a grant to</td></tr>
</table>

Strategy Outcome: Exploring Waste to Energy Opportunities	
Option 10: Utilising the Green Waste at Transfer Stations for Energy Generation	
Assessment	assist with capital cost
Potential for Funding Support	Possible
Recommendation to Proceed to more detailed assessment	Parameters such as clarification of feedstock availability, moisture content and feedstock preparation requirements need further investigation to ascertain impact on cost and viability