Barwon South West Waste and Resource Recovery Implementation Plan

2017-2026

BARWON SOUTH WEST
WASTE AND RESOURCE RECOVERY GROUP VICTORIA

Front cover image: Public place recycling on the beach at Warrnambool

Barwon South West Waste and Resource Recovery Implementation Plan

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Conflicts of Interest

Potential conflicts of interest of the Barwon South West Waste and Resource Recovery Group have been considered and managed throughout the development and adoption of this publication.

Accessibility
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CHAIRPERSON'S FOREWORD

We are extremely pleased to present the first *Barwon South West Waste and Resource Recovery Implementation Plan* (Barwon South West Implementation Plan). This plan will shape the way waste and resource recovery is delivered and managed in our region over at least the next 10 years.

As an amalgam of two previous entities, Barwon Regional Waste Management Group and South West Waste Regional Waste Management Group, the Barwon South West Waste and Resource Recovery Group (Barwon South West WRRG) commenced operations on 1 August 2014 through amendments to the *Environment Protection Act 1970*. The Group has a clear statutory role to plan for all waste streams and to undertake regional waste and resource recovery planning that aligns with Victoria's broader *Statewide Waste and Resource Recovery Implementation Plan*.

The combining of the region provides greater collective opportunities for improved economies of scale and new ways of dealing with our waste collaboratively. It is estimated our region recovers more than 50% of its waste but there is much more that can be effectively diverted from landfill. We recognise that the disposal of waste to landfill has limited social acceptance and can result in problematic environmental consequences.

We are committed to strengthening our existing relationships while also creating new partnerships with the commercial and industrial and construction and demolition sectors. We also recognise that local government and the community continue to play a key role in future planning and delivery of waste and resource recovery initiatives.

The main objective of the Barwon South West Implementation Plan is to better manage waste and decrease tonnages going to landfill by exploring opportunities to improve our systems such as increasing the recovery of organic material. The plan also recognises opportunities to examine new and innovative methods of resource recovery whilst ensuring the protection of critical existing infrastructure.

I would like to acknowledge the efforts of the Barwon South West WRRG's staff in the preparation of the plan and look forward to its implementation.

Chris O'Connor

Former Chairperson
Barwon South West Waste and Resource Recovery Group

Crushed and baled cans at a materials recovery facility

EXECUTIVE SUMMARY

The Barwon South West Waste and Resource Recovery Implementation Plan provides a 10-year vision for the region's waste and recycling needs into the future.

The plan recognises the community and industry's desire to work collaboratively to reduce waste and increase resource recovery to deliver economic, environmental and social benefits for the region.

While existing waste and resource recovery infrastructure provides the capacity to manage current waste volumes for at least the next 10 years, advances in technology will provide the opportunity to invest in alternative infrastructure to improve our systems and processes to increase the recovery of priority materials.

The Group is committed to work with all key stakeholders to drive innovation in resource recovery, bringing new job opportunities in the waste sector and environmental benefits to the region. The plan considers the impacts of climate change, including the potential increase in extreme events such as droughts and floods that can affect waste infrastructure and service delivery.

Increasing recovery of organic materials is a significant opportunity for the region and a priority action. Engaging with industry and cross regional collaboration to aggregate volumes of organics opens the possibilities to creating significant resource recovery improvements.

Feedback provided during the consultation phase of the development of the Plan together with the strategic directions of the *Statewide Waste and Resource Recovery Infrastructure Plan* (State Infrastructure Plan), have shaped the Barwon South West Waste and Resource Recovery Implementation Plan.

During the 10 years of this plan we will work with our partners to deliver 12 priority actions that complement the direction set out in the State Infrastructure Plan.

Regional waste and resource recovery implementation plans will establish a strategic direction and framework which will inform and encourage waste and resource recovery infrastructure that meets the needs of the Victorian community now and into the future.


Portland - Fawthrop Lagoon

Priority action 1	Facilitate behavioural change to reduce waste generation, improve source separation and recovery rates.
Priority action 2	Support the development of innovative and viable opportunities to increase recovery of priority materials including organics, wood/timber, plastics, and textiles.
Priority action 3	Facilitate viable systems to increase recovery rates, including those from mixed loads of waste and bin collection arrangements.
Priority action 4	Facilitate viable solutions to increase the recovery of materials currently going to landfill including those sourced from municipal, agricultural industries and commercial businesses.
Priority action 5	Facilitate regional and cross sectoral linkages to improve markets for materials that could be diverted from landfill and used by another industry as a resource.
Priority action 6	Facilitate collaborative procurements to improve economies of scale and cost efficiencies.
Priority action 7	Facilitate the aggregation of material streams to improve economies of scale and cost efficiencies.
Priority action 8	Assess the future strategic role of landfill and resource recovery needs within the Barwon South West Region.
Priority action 9	Work with planning authorities to recognise and protect existing facilities and hubs from encroachment and ensure that waste and resource recovery infrastructure planning is appropriately integrated with land use and transport planning.
Priority action 10	Work with councils and other relevant authorities to reduce risk and to ensure contingency plans are in place for managing waste.
Priority action 11	Work collaboratively with all stakeholders to ensure statewide policy, planning and funding programs support the region's infrastructure needs.
Priority action 12	Work with all stakeholders to establish an integrated and effective data network.

Recycling bins on the beach in Glenelg Shire

1 ABOUT THE BARWON SOUTH WEST WASTE AND RESOURCE RECOVERY IMPLEMENTATION PLAN

1.1 Purpose

Victoria's waste and resource recovery system is an essential service that manages waste and materials to minimise impacts to the community, environment and public health, and supports a viable resource recovery system that reduces our reliance on landfill.

The *Barwon South West Waste and Resource Recovery Implementation Plan* (Barwon South West Implementation Plan) outlines the waste and resource recovery infrastructure needs of the region for the next 10 years.

The needs have been guided by the input and feedback of key stakeholders, including local government, industry and the community.

While the *Statewide Waste and Resource Recovery Infrastructure Plan 2015-44* (State Infrastructure Plan) provides the strategic direction for the next 30 years and the framework for investment in Victoria's waste and resource recovery system, the Barwon South West Implementation Plan identifies needs and initiatives for the region for at least the next 10 years. The Barwon South West Implementation Plan has been prepared to align strategically with the state infrastructure plan and the six other regional implementation plans, while focussing on the operational requirements for best practice waste management within the region.

Together these plans form the Victorian Waste and Resource Recovery Infrastructure Planning Framework (Framework).

1.2 The Barwon South West Resource Recovery Group

The Barwon South West Waste and Resource Recovery Group (Barwon South West WRRG) replaced the former Barwon and South West Regional Waste Management Groups and is now one of seven waste and resource recovery groups (WRRGs) established under the *Environment Protection Act 1970* (EP Act). The Barwon South West Waste and Resource Recovery Region (Barwon South West region) covers nine local government areas (LGAs) from Avalon Airport through to the South Australian border. Table 1 lists the nine LGAs and the abbreviations used throughout the Barwon South West Implementation Plan.

The Barwon South West WRRG is responsible for planning and facilitating the development of waste and resource recovery facilities and services across the region. The functions of the group are outlined in S49(H) of the EP Act and include:

- planning for future infrastructure needs
- facilitating infrastructure, services and joint procurement
- working with and advising Sustainability Victoria (SV), councils, businesses and communities
- supporting collaborative forums and undertaking projects funded by government.

Appendix 1 provides the requirements of the EP Act and the regulatory and policy context.

Table 1 Councils in the Barwon South West region and abbreviations used in the plan

Local government area	Abbreviation used in text	Abbreviation used in tables
Borough of Queenscliffe	Queenscliffe	Queenscliffe (B)
Greater Geelong City Council	Greater Geelong	Greater Geelong (C)
Colac Otway Shire Council	Colac Otway	Colac Otway (S)
Corangamite Shire Council	Corangamite	Corangamite (S)
Glenelg Shire Council	Glenelg	Glenelg (S)
Moyne Shire Council	Moyne	Moyne (S)
Southern Grampians Shire Council	Southern Grampians	Southern Grampians (S)
Surf Coast Shire Council	Surf Coast	Surf Coast (S)
Warrnambool City Council	Warrnambool	Warrnambool (C)

1.2.1 Governance

A governance structure was developed as one of the first steps in the development of the Barwon South West Implementation Plan. It included processes to manage actual or perceived conflict of interest and to make and implement decisions to develop the implementation plan. Details of the structure as well as the roles and responsibilities of each group are included in Appendix 2 Collaboration to achieve coordinated planning.

1.3 How this implementation plan has been developed

The Barwon South West Implementation Plan has been developed in consultation with other WRRGs, SV, the Environment Protection Authority Victoria (EPA) and the Department of Environment, Land, Water and Planning (DELWP), and through consultation with key stakeholders including industry, local government and the community.

The EP Act[1] outlines the requirements of the Barwon South West Implementation Plan. It must include:

- The description and analysis of waste and resource recovery infrastructure within its waste and resource recovery region (Section 4).
- The description of how the long term directions in the state infrastructure plan will be implemented to give effect to local and regional infrastructure needs within the waste and resource recovery region (Section 2).
- The schedule of existing and proposed waste and resource recovery infrastructure within the waste and resource recovery region (Section 6).
- Any matters required by the *Ministerial Guideline: Making, amending and integrating the Statewide Waste and Resource Recovery Infrastructure Plan and Regional Implementation Plans* (Ministerial Guideline).

WRRGs and SV worked together to integrate the priorities and directions of the regional implementation plans and the state infrastructure plan to resolve any differences in the plans. WRRGs worked collaboratively, to the extent practicable, to ensure plans were consistent and align with one another.

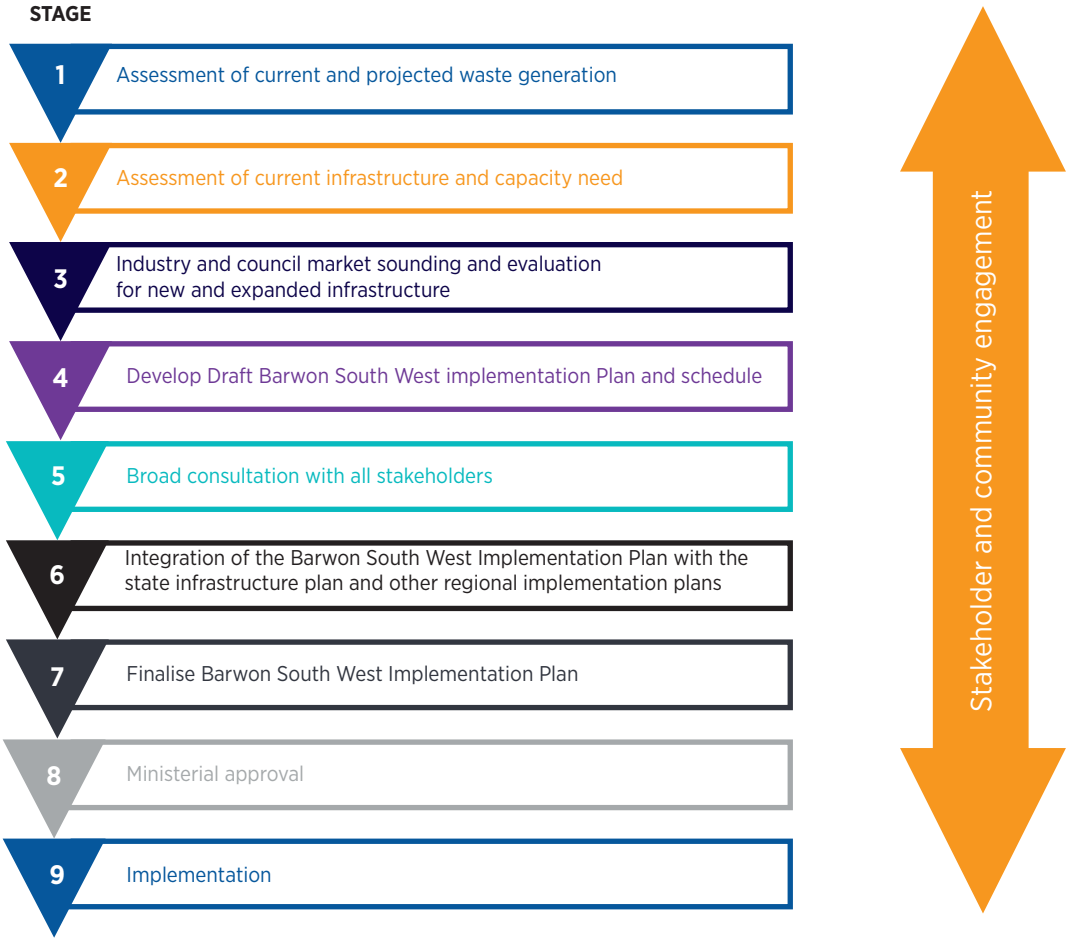
For more detail on the collaboration process and outcomes see Appendix 2.

Figure 1 shows the overall process for preparing the plan.

Underpinning this approach is evidence-based analysis and assessment, principles of transparency and fairness, and engagement with stakeholders and community.

[1] *Environmental Protection Act 1970,* Section 50BB, page 42

Figure 1 Process for preparing the Barwon South West Waste and Resource Recovery Implementation Plan



1.4 Inclusions and exclusions

During the development of the Barwon South West Implementation Plan, consideration has been given to municipal solid waste (MSW), commercial and industrial (C&I) and construction and demolition (C&D) waste. MSW, C&I and C&D define where the waste is generated. MSW is solid waste generated from municipal and residential activities, while C&I is solid inert waste generated from trade, commercial and industrial activities. C&D is solid inert waste generated from residential and commercial construction and demolition activities. Further information can be referred to in the Terms and definititions.

The following items are part of the government's broader strategy for managing waste, but they are legislatively outside the statutory requirements of the Barwon South West Implementation Plan:

- charity recyclers
- asbestos
- Prescribed Industrial Waste[2]
- liquid waste streams.

Asbestos is a PIW and is not within the scope of this plan but is acknowledged due to its extensive prevalence in buildings and its potential impact on the community.

Any licensed landfills can apply during an emergency to apply to accept asbestos. Three landfills are licensed to accept asbestos – Drysdale, Fyansford and Portland (see Table 28 in Section 7.2.1).

1.5 Consultation and community engagement

The Barwon South West WRRG has been open and transparent about how the plan has been developed, how information will be used and in providing stakeholders with opportunities to participate.

Stakeholder consultation and community engagement have occurred throughout the development of the Barwon South West Implementation Plan based on the International Association for Public Participation principles and Public Participation Spectrum[3] to ensure the broadest participation

[2] *Environmental Protection (Industrial Waste Resource) Regulations,* 2009

[3] https://www.iap2.org.au/resources/public-participation-spectrum

possible. A consultation and engagment plan was developed. It defined four distinct phases, moving from 'informing', at the lower end of public participation on the spectrum, to 'collaboration and seeking approval' at the higher levels of the spectrum.

The principles of environmental justice that are based on the concepts of equity and participation were incorporated into the consultation process. The principles require that environmental benefits and impacts should be distributed proportionately and affected communities should be able to participate in decision making. For the plan, this meant the community must be involved in determining the waste and resource recovery priorities and have opportunities to participate in the decisions and long term planning to establish a safe, integrated waste and resource recovery system.

Further consultation and collaboration details are included in Appendix 2.

1.5.1 Draft implementation plan consultation activities

Community and industry consultation was conducted from 4 July to 12 August 2016. During this time the Barwon South West WRRG received significant contributions to the development of the plan.

Key statistics for the community consultation period included:

- 635 visits to the Implementation Plan tab on the Barwon South West WRRG website.
- 146 downloads of the *Consultation Draft Barwon South West Implementation Plan*.
- 33 people attended four information sessions.
- 24 feedback submissions:
  - 8 individuals completed the online survey
  - 16 responses by email or letter.

A report summarising feedback and how each issue or comment has been addressed has been included as Appendix 3 to this plan.

1.6 How the plan was integrated with the other plans

The EP Act and the Ministerial Guidelines establish processes to ensure that each regional implementation plan is aligned to the priorities and directions of the state infrastructure plan and the regional implementation plans. See Appendix 2 for further details.

The first step following the consultation process was for the draft implementation plans to be submitted to SV to ensure strategies, directions, actions and data were aligned to the state infrastructure plan, EPA reviewed it to identify any objection to any particular proposed scheduled landfill and DELWP to ensure they were consistent with other government policies. As part of the integration process, all the WRRGs met to ensure that all of the plans were integrated with the state infrastructure plan and the other six plans.

1.7 How the plan was approved

The Minister for Energy, Environment and Climate Change reviewed and approved the plan following the integration phase.

1.8 Who will use the plan

Councils, industry, individuals and community involved in waste and resource recovery will use the plan to inform their decision making.

It will be of value to all levels of government in their own planning and land use decisions. This particularly includes councils in their capacity as responsible authorities under the *Planning and Environment Act 1987*, the State Government environment portfolio, including DELWP, EPA, SV and the WRRGs, and the Department of Economic Development, Jobs, Transport and Resources, Parks Victoria and regional catchment management authorities and water authorities. EPA will use the plan and infrastructure schedules (and other regional implementation plans and schedules) in considering applications for works approvals for landfills and resource recovery facilities.

The EP Act specifically requires that:

- Councils must perform waste management functions which are consistent with the regional implementation plans.
- Any person involved in the generation, management or transport of waste within a waste and resource recovery region must not do anything in relation to the waste that is inconsistent with the relevant regional implementation plan.


Mulched organics

2 STRATEGIC DIRECTIONS AND PRIORITY ACTIONS

2.1 Vision, goals and strategic directions

The Barwon South West WRRG shares the vision, goals and strategic directions of the state infrastructure plan shown in Table 2.

Table 2 Statewide infrastructure plan vision, goals and strategic directions

VISION	
Victoria has an integrated statewide waste and resource recovery system that provides an essential community service to: • protect the community, environment, and public health • recover valuable resources from our waste • minimise long term costs to households, industry, and governments.	
LONG TERM STRATEGIC DIRECTIONS (SD)	
SD1	**To maximise the diversion of recoverable materials from landfills** Resource recovery will be undertaken by local government and industry where it is economically viable and where it will result in better community environment and public health outcomes.
SD2	**To support increased resource recovery** Planning of new landfill airspace, including the scheduling of new landfill sites, will be based on: • the volumes of residual waste streams remaining after all materials that can be recovered viably have been extracted • a demonstrated need for additional airspace.
SD3	**To achieve quantities for reprocessing** Consolidation and aggregation of material streams, around a hubs and spokes network, will be undertaken if: • there is a market for the feedstock • there is a viable business case • potential community, environment, and public health impacts are minimised.
SD4	**To manage waste and material streams** Suitably located and zoned land will be made available for the mix of infrastructure required.
SD5	**To maximise economic outcomes, provide cost effective service delivery and reduce community, environment, and public health impacts** Decisions to determine resource recovery and waste management options will be based on evidence.
SD6	**To facilitate a cost effective statewide network of waste and resource recovery infrastructure** Integrated statewide planning and decision making will be capable of addressing local, regional and state needs.

2.2 Barwon South West regional strategic objectives

Five regional strategic objectives (RSOs), aligned with the statewide strategic directions, have been established to provide direction for the waste and resource recovery system for the 10-years of the Barwon South West Implementation Plan.

The objectives focus on addressing the current resource recovery and waste management challenges, needs and opportunities in the Barwon South West region and also aim to shape the region's future directions.

Table 3 lists the RSOs against the key area addressed.

Ongoing evaluation and collaboration with stakeholders is essential to ensure the regional strategic objectives continue to be relevant. This will be undertaken throughout the 10 years of the Barwon South West Implementation Plan and includes a mid-term review within five years.

Barwon South West WRRG will be working with SV and other WRRGs to develop a monitoring and evaluation framework to assess the delivery of the state and regional actions.

Table 3 Regional strategic objectives

Key area	RSO
Behaviour change	1. Achieve behaviour change that reduces waste generation and increases resource recovery.
Resource recovery and innovation	2. Encourage innovative and cost effective ways to increase resource recovery.
Market development	3. Identify and establish industry relationships to build market opportunities to maximise resource recovery.
Collaborative procurement	4. Facilitate the aggregation of services through joint procurement to maximise resource recovery and cost effectiveness.
Strategic planning	5. Plan for future waste and resource recovery infrastructure and service needs for the region.

Portland Transfer Station

2.3 Priority actions to deliver strategic objectives

Barwon South West WRRG has developed **12 priority actions** which are consistent with the state strategic directions and regional strategic objectives and are underpinned by:

- research and analysis of waste projections (Section 3)
- infrastructure capacity (Section 4)
- a market sounding process (Section 4.12)
- contribution by local government, industry and community.

2.3.1 Behaviour change: Achieve behaviour change that reduces waste generation and increases resource recovery.

Why is this proposed?

Alignment with the *Victorian Waste Education Strategy* will ensure consistent messaging for engaging with community.

- There are opportunities to reduce waste and increase source separation through participation in household, business and industry resource recovery initiatives throughout the Barwon South West region.
- There is an opportunity to evaluate the extension and participation in food and garden organics collection services (including from commercial premises).

		Activities and initiatives	Regional strategic objectives	State strategic directions	Lead and partners	When
PRIORITY ACTION 1 Facilitate behaviour change to reduce waste generation, improve source separation and recovery rates.	1.1	Employ an education, research, and innovations officer to increase regional capacity to deliver waste and resource recovery initiatives in the region.	1, 2	1, 3, 5, 6	**BSW WRRG**	2017
	1.2	Prepare and deliver a waste and resource recovery education strategy that aligns with the *Victorian Waste Education Strategy*.	1	1	**BSW WRRG** Council Industry SV	2018
	1.3	Support and engage with regional education working groups.	1	1	**BSW WRRG** Councils Industry	2017 Ongoing
	1.4	Support education programs that encourage and lead to improved waste and resource recovery.	1, 2	1, 3, 4	**BSW WRRG** Councils Industry SV	Ongoing

2.3.2 Resource recovery and innovation: Encourage innovative and cost effective ways to increase resource recovery

Why is this proposed?

- Potential resource recovery. According to data collected for the development of the plan, it is estimated that of the 258,000 tonnes of waste sent to landfill in the region annually, approximately 91,000 tonnes is organics (based on extrapolation of landfill audit data, 55,000 tonnes of food waste, 19,000 tonnes of wood/timber, 16,000 tonnes of garden waste). It is estimated through the same methodology that approximately 30,000 tonnes of paper/cardboard, 26,000 tonnes of plastics and 10,000 tonnes of textiles are sent to landfill.
- Organics sent to landfill is a resource recovery opportunity. The region is home to a range of agricultural, forestry and fishing industries that generate significant volumes of organic material. In addition, the restaurant, hospitality, accommodation, and food services industries, all contribute to organic waste. There is a need to further investigate these industries to understand the type and volume of waste materials generated, and resource recovery opportunities.
- The LG Forum have identified innovation and research as a priority, providing future partnership opportunities.
- Technology and management advancements are ongoing, including:
  - larger more efficient truck bodies (walking floor compactors)
  - improvements in processing infrastructure
  - composting technologies and techniques
  - infrastructure collaboration opportunities with industry
  - advances in the energy from waste.
- Pre-sort of mixed loads of waste received at landfill or resource recovery centre sites prior to disposal is limited, resulting in potentially recoverable resources being landfilled. Landfill audits[4] have shown up to 20-30% of material going to landfill is recyclable. Pre-sort can improve the recovery of priority waste streams such as cardboard, timber, metals, hard plastics, some building materials, and other key wastes such as batteries, gas bottles, tyres, e-waste, and soft plastics such as silage wrap and agricultural plastics.

		Activities and initiatives	Regional strategic objectives	State strategic directions	Lead and partners	When
PRIORITY ACTION 2 Support the development of innovative and viable opportunities to increase recovery of priority materials including organics, wood/ timber, plastics and textiles.	2.1	Support targeted research, including waste audits to identify quantities of recoverable material.	1, 2, 4, 5	1, 2, 3, 5	**BSW WRRG** Councils Industry	2017 Ongoing
	2.2	Support the investigation of innovative opportunities in the region in line with relevant strategies such as the: • *Victorian Organics Resource Recovery Strategy* • *Victorian Market Development Strategy for Recovered Resources.*	2, 3, 4,	1, 3, 5, 6	**BSW WRRG** Councils Industry SV	2016 Ongoing
	2.3	Support the investigation and assessment of energy from waste opportunities relevant to meeting the needs of the region.	1, 5	3, 5	**BSW WRRG** Councils Industry SV	2018

[4] *Sustainability Victoria's disposal-based waste survey,* 2009

PRIORITY ACTION 3 Facilitate viable systems to increase recovery rates, including those from mixed loads of waste and bin/collection arrangements.	3.1	Facilitate the implementation of best practice kerbside collection models with a focus on resource recovery.	1, 2	1, 5	**BSW WRRG** Councils Industry SV	2017 Ongoing
	3.2	Identify and facilitate the introduction of systems to increase the recovery of C&D and C&I material.	1, 2, 3, 4	1, 3, 5	**BSW WRRG** Councils Industry SV	2017 Ongoing
PRIORITY ACTION 4 Facilitate viable solutions to increase the recovery of materials currently going to landfill including those sourced from municipal, agricultural industries and commercial businesses.	4.1	Investigate opportunities to increase the recovery of priority materials such as organics from municipal, wood/timber and agricultural wastes, plastics, textiles, tyres and e-waste.	2, 3	1, 3	**BSW WRRG** Industry, SV Councils WRRGS	Ongoing
	4.2	Support the investigation and installation of viable 'pre-sort' infrastructure that can extract recyclables from the front end of a landfill, improving management of operations.	2	1, 3, 5, 6	**BSW WRRG** Councils Industry	Ongoing

2.3.3 Market development: Identify and establish industry relationships to build market opportunities to maximise resource recovery

Why is this proposed?

- Material streams that are currently going to landfill can potentially be diverted and used as a resource material by another industry.
- Sharing information across the region and between regions will assist in identifying resource recovery opportunities.
- Innovation and regional economic benefits can result from providing collaborative opportunities between potential feedstock suppliers, processors, and end users.

		Activities and initiatives	Regional strategic objectives	State strategic directions	Lead and partners	When
PRIORITY ACTION 5 Facilitate regional and cross sectoral linkages to improve markets for materials that could be diverted from landfill and used by another industry as a resource	5.1	Establish mechanisms (network or data base) that facilitate the exchange of information between waste generators, manufacturers, potential users and service providers.	2, 3	1, 3	**BSW WRRG** Industry, Councils WRRGs	2018
	5.2	Investigate and promote options for market development in line with the Victorian Market Development Strategy for Recovered Resources.	3	3	**BSW WRRG** Industry Councils WRRGs SV	Ongoing

2.3.4 Collaborative procurement: Facilitate the aggregation of services through joint procurement to maximise resource recovery and cost effectiveness.

Why is this proposed?

- Economies of scale provide opportunities for resource recovery to become more viable in regional areas.
- Consolidated contracts may achieve cost savings, providing benefits to local government and the community.
- Providing identical/similar services enables the delivery of consistent messages and programs across the region.

		Activities and initiatives	Regional strategic objectives	State strategic directions	Lead and partners	When
PRIORITY ACTION 6 Facilitate collaborative procurements to improve economies of scale and cost efficiencies	6.1	Work with councils to identify and introduce collaborative resourcing opportunities.	1, 4	3, 5	**BSW WRRG** **Councils**	2017
PRIORITY ACTION 7 Facilitate the aggregation of material streams to improve economies of scale and cost efficiencies	7.1	Work across regions to achieve aggregation that supports viable resource recovery.	4	5	**BSW WRRG** Councils WRRGs Industry	Ongoing
	7.2	Establish forums with commercial, manufacturing and industry stakeholders to identify opportunities to increase consolidation and aggregation of materials.	2, 4	1, 5	**BSW WRRG** Councils WRRGs Industry	2018 Ongoing

2.3.5 Strategic Planning: Plan for future waste and resource recovery infrastructure and service needs for the region

Why is this proposed?

LANDFILLS AND INFRASTRUCTURE

- Landfills play a role in safely and effectively managing residual waste streams. While increasing resource recovery is a priority in the region, it is recognised landfills will continue to play a necessary role in the infrastructure network for at least the next 10 years.
- Landfill air space capacity should be monitored for future planning, minimising environmental and social impacts and to ensure delivery of an effective waste and resource recovery system. Through its needs analysis, the Barwon South West region has access (inside and outside the region) to sufficient landfill airspace to accommodate projected waste generation beyond 10 years.
- Future strategic planning of the region's waste and resource recovery system requires ongoing assessment of economic, environmental, social, land use planning and transport consideration.

LAND USE PLANNING

- It is critical to manage the interface between waste and resource recovery facilities and surrounding land uses. It is of strategic importance for both the ongoing operation of waste and resource recovery facilities in the region and the protection of public amenity and health.
- The Victorian Planning Provisions (clause 19.03-5) state that planning must consider any relevant regional waste management plans. This consideration must be promoted to councils for any new waste and resource recovery infrastructure applications.
- All Victorian planning schemes require planning decision makers to consider any relevant regional waste management plans. Regional perspectives are integral to developing new regulations.
- Recognition that changes in regulation can have an impact on the financial viability of waste and resource recovery infrastructure.

Why is this proposed (continued)?

TRANSPORT

- Large vehicle access to waste and resource recovery facilities is important to provide affordable transport options.
- Proximity to major road networks is important for ease of access and to reduce impacts on local communities, travel times and greenhouse gas emissions.

CONTINGENCY PLANNING

- Seasonal fluctuations, emergency events such as fires and floods, and other unplanned events have the potential to contribute to spikes in the volumes of waste to be managed by infrastructure within the region and in bordering regions.

DATA

- It is recognised that data accuracy plays an important role in planning, monitoring and evaluation. Data collection can improve by investing in consistent collection methods and sharing of information. Accurate data is the foundation on which councils and the private sector undertake cost benefi t and business case assessment for the establishment of new infrastructure or systems.
- Improving relationships with the private sector could lead to improved data information for the region. During the development of the Barwon South West Implementation Plan, 23 reprocessors were identifi ed in the region and 13 of these provided data to assist informing the regional profi le. Regional data collection can continue to improve by building relationships in the waste industry sector.
- Technological advances in data collection may assist in improving data consistency and efficiency of collection of information. It is recognised that the waste and resource recovery portfolio is currently investigating ways to share information. The region can contribute localised experience to this investigation to ensure that data collection meets the needs of the region.
- Accurate information for future regional infrastructure needs provides strong evidence for funding consideration.

		Activities and initiatives	Regional strategic objectives	State strategic directions	Lead and partners	When
PRIORITY ACTION 8 Assess the future strategic role of landfill and resource recovery needs within the Barwon South West Region.	8.1	Review data and airspace requirements prior to 2019 for the next 10 years and determine if there is a need for additional airspace within the Barwon South West region.	5	2, 5	**BSW WRRG** Councils Industry	2018
	8.2	Provide support to owners and operators of RRC/TSs to meet best practice operations and maximise resource recovery.	1	1, 3, 5	**BSW WRRG** **Councils** EPA	2017 Ongoing
	8.3	Liaise with councils and EPA regarding the development of strategies for closed landfills.	5	6	**EPA** **Duty holders** BSW WRRG	Ongoing
PRIORITY ACTION 9 Work with planning authorities to recognise and protect existing facilities and hubs from encroachment and ensure that waste and resource recovery infrastructure planning is appropriately integrated with land use and transport planning.	9.1	Work with councils and industry to review the need for additional land use planning controls to protect buffers for existing and future landfills and resource recovery infrastructure.	5	4, 6	**BSW WRRG** **Councils** Minister for Planning SV DELWP	2017 Ongoing

PRIORITY ACTION 10 Work with councils and other relevant authorities to reduce risk and to ensure contingency plans are in place for managing waste.	10.1	Work with councils and state authorities to develop mechanisms/ contingency plans to appropriately manage waste and material during and after emergency or unplanned event.	5	5	**BSW WRRG** **Councils** Country Fire Authority Emergency Management Victoria DELWP SV WRRG	Ongoing
	10.2	Work with councils to develop mechanisms/contingency plans to appropriately manage waste and materials during seasonal fluctuations.	5	5	**BSW WRRG** **Councils**	Ongoing
PRIORITY ACTION 11 Work collaboratively with all stakeholders to ensure statewide policy, planning and funding programs support the region's infrastructure needs.	11.1	Provide input into statewide policy, strategy, program development and implementation related to waste and resource recovery.	1, 5	6	**BSW WRRG** Councils DELWP SV	Ongoing
	11.2	Support the establishment of a regional template for the development of municipal waste and resource recovery strategies that will align with the regional implementation plan.	5	5, 6	**Councils** BSW WRRG	2017
	11.3	Work with the LG Forum to develop a decision making framework to support councils to identify viable opportunities to recover organics and residual material.	2, 5	3, 5	**Councils** BSW WRRG	2016
	11.4	Work with the LG Forum to investigate optimal efficiencies in infrastructure to manage residual waste across the region.	2, 5	5	**Councils** BSW WRRG	2016
	11.5	Develop tools to assist operators to understand viability, operating and whole-of-life costs of existing and new resource recovery infrastructure (e.g. transition of landfills to materials processing).	5	1, 3, 5	**Councils** BSW WRRG	2017
PRIORITY ACTION 12 Work with all stakeholders to establish an integrated and effective data network.	12.1	Contribute to the ongoing development and application of Statewide Waste and Resource Recovery Data Framework and regional data sets.	5	5, 6	**BSW WRRG** Councils Industry SV WRRG	Ongoing

Some actions in this plan are similar to those in the implementation plans for other waste and resource recovery regions. Where appropriate the Barwon South West WRRG will work with the other WRRGs to determine if a joint approach may provide opportunities to achieve better outcomes that align with those of this plan.

The Twelve Apostles, Port Campbell National Park

3 THE STATE OF WASTE IN THE BARWON SOUTH WEST REGION

3.1 Overview of the region

The Barwon South West region comprises nine LGAs shown in Figure 2. The region incorporates 800 kilometres of coastline, covering an area of over 27,000 square kilometres.

The region includes iconic tourism destinations such as the Great Ocean Road, Bells Beach, Bellarine Peninsula, Port Campbell National Park (featuring the Twelve Apostles and Loch Ard Gorge) and the Grampians National Park. The region is also home to a vibrant recreational boating and fishing tourism industry.

Figure 2 Map of the Barwon South West region

3.1.1 Population

The permanent population for the region is 378,000[5]. The regional population is forecast to increase to 462,000 over the next 14 years[6]. The most significant population growth is expected in the Greater Geelong and Surf Coast areas.

Table 4 provides an overview of the permanent population, population growth forecast and seasonal population fluctuations for all nine LGAs, that are all factors that influence planning future waste and resource recovery initiatives.

Seasonal population increases are generally observed in coastal towns during summer and during the winter tuna fishing season in Apollo Bay, Portland and Port Fairy.

3.1.2 Economy, employment and geography

Economic development, employment and industry sector type influence the type and volumes of wastes generated. Barwon South West region's economic diversity can be categorised into three main areas:

- inland and rural, largely based on livestock and timber industries
- coastal, driven by tourism and amenity lifestyles
- Geelong City with a diverse economic and social base around an urban core.

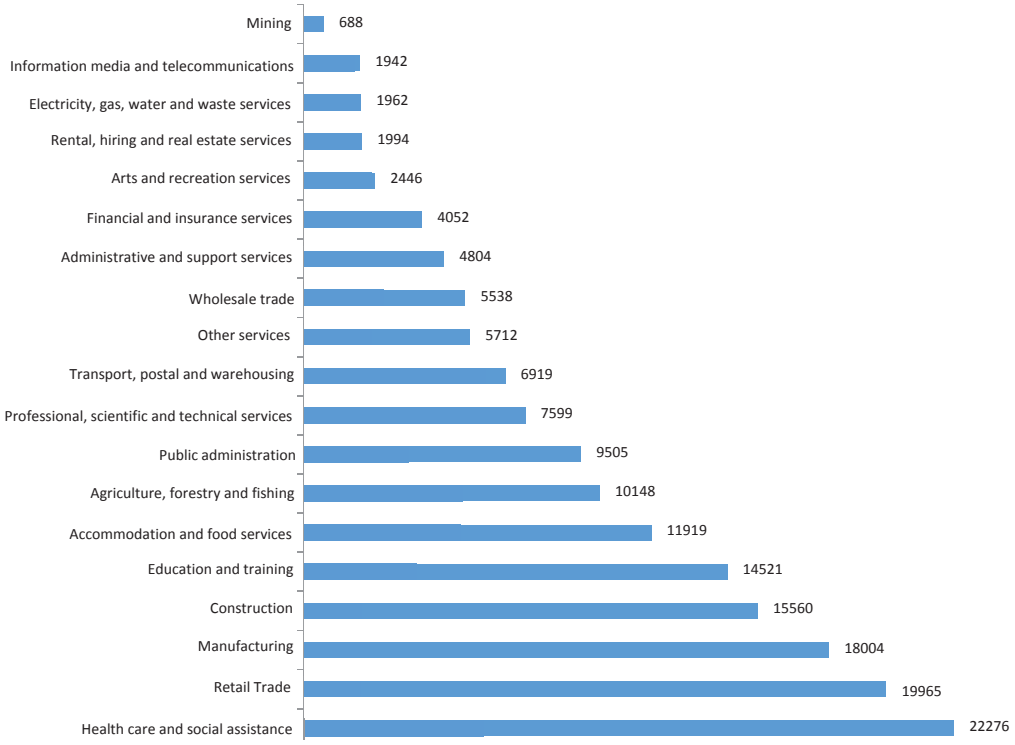
The key industries that provide employment opportunities in the region include healthcare, retail trade, agribusiness (including beef or dairy farming, forestry, timber and viticulture and broad acre cropping), tourism (accommodation and food services), manufacturing, and education and training. Figure 3 shows the number of full time employees for each industry.

Table 4 Councils in the Barwon South West region

Local government areas	Permanent population[1]	Population growth 2030[2]	Seasonal population increases[3]
Queenscliffe (B)	3,027	3,149	17,000
Greater Geelong (C)	224,926	289,024	100,000
Colac Otway (S)	20,501	22,035	14,000
Corangamite (S)	15,996	15,241	2,000
Glenelg (S)	19,357	19,529	9,000
Moyne (S)	16,344	18,126	7,500
Southern Grampians (S)	15,919	15,348	2,000
Surf Coast (S)	28,481	39,281	57,000
Warrnambool (C)	33,501	40,170	15,000
TOTAL	**378,052**	**461,903**	**227,000**

[1] Australian Bureau of Statistics (2014) Census data by local government area
[2] Department of Environment, Land, Water and Planning (2014) Victoria in the Future – Population and Household Projections
[3] Seasonal population data provided by officers from each council

Figure 3 Industries and full time employees[7]



[5] Australian Bureau of Statistics (2014) Census data by local government area
[6] Department of Environment, Land, Water and Planning (2014) Victoria in the Future – Population and Household Projections
[7] Australian Bureau of Statistics (2014) Census data by local government area

It is estimated that there are over 8,000 people employed in the waste sector in Victoria[8]. Whilst the Barwon South West WRRG does not have accurate figures it is estimated that at least 300 people are employed in the waste sector in the region.

The population structure and growth rates, unique geographical characteristics and industry types across the Barwon South West region provide both challenges and opportunities in planning for waste minimisation and resource recovery.

The Barwon South West Implementation Plan recognises the diversity across the region and has taken these factors into consideration.

3.2 Data sources, limitations and handling

Refer to Appendix 4 Major data sources, assumptions and definitions and Appendix 5 Infrastructure for more detailed information to support this section.

Unless otherwise stated the data in the Implementation Plan is from 2013-14.

The main sources of data to inform the development of the Barwon South West Implementation Plan are:

- councils
- SV's Regional Waste and Resource Recovery Database (RWRRD)
- *Survey and analysis of regional reprocessors and material recovery facility operators: Barwon South West Waste and Resource Recovery Group Regional Report* conducted by Sustainable Resource Use for Sustainability Victoria, 2015
- *Barwon South West Infrastructure and capacity and needs assessment*, Blue Environment, unpublished, 2015.

Limitations in the availability and quality of the data

- With the exception of the State Environment Protection Policy requirement for councils to provide specific kerbside recycling information, data reporting in Victoria is not mandatory. Councils voluntarily report landfill, kerbside and litter data through SV's *Victorian Local Government Annual Survey*.
- Time lags in data collection, analysis and release.
- The RWRRD collects data on the waste and materials managed through facilities in the Barwon South West region. It does not include material generated in the region but transported to other regions for management or disposal, but does account for materials outside of the region transported into the region for management.

It is estimated 80% of reprocessors in the region participated in the regional reprocessor survey giving a reasonably robust view of facilities in the region. Some reprocessors were reluctant to provide information due to its commercial sensitivity. Where information was provided in confidence it has been used in the development of the plan but will only be reported in the plan so that it cannot be identified.

PRIORITY ACTION 12

Work with all stakeholders to establish an integrated and effective data network.

It is expected that the quantity and quality of data will be greatly improved through the Waste Data Governance Framework to be delivered by SV as part of the Framework. These improvements will be evident in the mid-term review.

3.2.1 Data rounding

Due to modelling, aggregated data and the need to maintain commercial-in-confidence, data is modelled and rounded to the nearest thousand:

- under 10,000 to the closest 1,000
- under 1,000 to the closest 100
- under 100 to 100.

3.2.2 Data availability

The 2013-14 data set was the most comprehensive set of data across both local government and industrial sectors available at the time to inform the development of the Barwon South West Implementation Plan.

3.2.3 Data collection and handling

SV's RWRRD provides a consistent data collection methodology for all of the WRRGs to achieve consistent plans across the state. A range of processes were established to ensure data protection that included:

- Confidentiality of commercially sensitive information was achieved through signed agreements between Barwon South West WRRG and councils or SV and reprocessors.
- Protection of personal information was achieved through compiling data based on material categories and not business categories and consolidating data to protect exposing confidential data. This and other commercial-in-confidence data was stored in the RWRRD in an internal secure folder that could only be accessed by authorised individuals.
- Obtaining consent for disclosure of information in surveys and consultation with councils and reprocessors between Barwon South West WRRG or Sustainable Resource Use, who conducted the reprocessor survey on behalf of SV, as appropriate.

[8] Sustainability Victoria *Impacts of Economic, Environmental Factors on the performance of Waste and Resource Recovery Infrastructure in Victoria* , Hyder Consulting, unpublished, 2015

3.3 Materials and waste generated in the region

It is difficult to accurately measure how much waste and materials are generated in the region each year due to the large number of generation points and complex ways waste and materials move in and out of the system. Estimates are calculated based on available data and modelled data where there are gaps. Barwon South West WRRG is committed to working with SV, the other WRRGs and the community and industry to continuously improve data collection.

In 2013-14 it was estimated that around 759,000 tonnes of materials and waste were generated in the Barwon South West region. As shown in Table 5, of the 759,000 tonnes generated around 501,000 tonnes was recovered and 258,000 tonnes was landfilled.

Table 6 provides an overview of the estimated breakdown of material categories recovered, landfilled and generated, highlighting recovery opportunities for organics, textiles and plastics.

It should be noted that approximately 100,000 tonnes of the materials generated in the region are recovered, reprocessed or disposed of outside the region. This is discussed in Section 3.3.2 Cross regional flows.

PRIORITY ACTION 2

Support the development of innovative and viable opportunities to increase recovery of priority materials including organics, wood/timber, plastics and textiles.

Table 5 Generated materials landfilled and recovered by source sector, tonnes

Source Sector	Generated[1]	Landfilled[2]	Recovered
MSW	189,000	111,000	78,0000
C&I	284,000	93,000	191,000
C&D	286,000	54,000	232,000
Total	759,000	258,000	501,000

[1] Generated figures based on modelling.
[2] Tonnes landfilled are derived from landfill levy data supplied by EPA and do not include prescribed industrial waste. There has been no allowance for daily cover which must be considered when comparing figures with those in earlier drafts of the state infrastructure plan. Previous landfill figures were adjusted to remove a daily cover allowance.

Table 6 Waste and material streams generated in 2013-14, tonnes

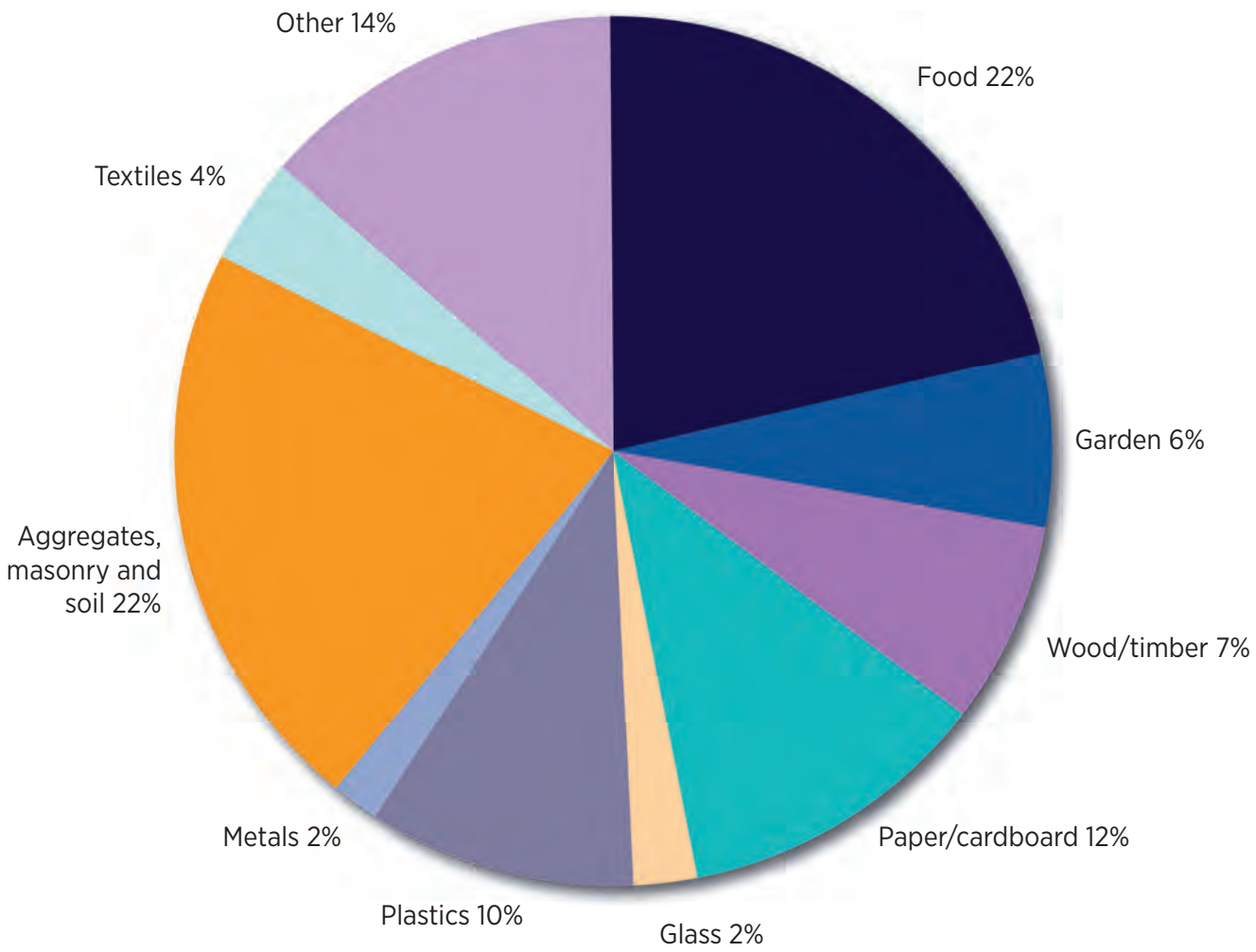
Material category		Generated	Landfilled	Recovered
Organics	Food	60,500	55,500	5,000
	Garden	39,000	16,000	23,000
	Wood/timber	26,500	19,000	7,500
	Organics other	21,500	500	21,000
Paper/cardboard		120,000	30,000	90,000
Glass		16,000	5,000	11,000
Plastics		36,000	26,000	10,000
Rubber (including tyres)		2,000	unknown	2,000
Metals		105,000	5,000	100,000
Aggregates, masonry and soil		287,000	56,000	231,000
Textiles		10,000	9,500	500
E-waste		unknown	unknown	unknown
Other		35,500	35,500	
Total		759,000	258,000	501,000

Source: Victorian Regional Waste and Resource Recovery Database v3; waste and resource recovery data provided by Sustainability Victoria

3.3.1 Waste disposed to landfill

Figure 4 shows the indicative material composition of the estimated 258,000 tonnes of material in the region that was landfilled. Aggregates, masonry and soil, and food were the two largest material categories landfilled. Food, garden and wood/timber materials comprise approximately 35% of the total composition of material entering landfill offering a significant recovery opportunity.

Figure 4 Indicative composition of MSW, C&I and C&D material entering Barwon South West landfills



Source: Victorian Regional Waste and Resource Recovery Database v3; waste and resource recovery data provided by Sustainability Victoria

3.3.2 Cross regional flows

Waste and material streams move around the region, to other regions and interstate to where they can be most cost effectively managed. These flows need to be considered in regional planning.

The movement of waste and materials, both within our region and to and from the region is complex. Understanding these flows is important to enable effective planning that will achieve the long term objective to only rely on landfills for materials that cannot be viably recovered.

The sustainable recovery of individual material streams relies on establishing the right volumes and market conditions to support viable reprocessing and recovery. The economies of scale vary by material streams and are influenced by factors such as market pressures, seasonal variability and commodity value.

Current data[9] indicates that approximately 100,000 tonnes of materials leave the region and 38,000 tonnes enter the region for management. These are detailed in Table 7.

Materials flowing into the region include mixed recyclables from South Australia, organic material from the Melbourne, Grampians Central West and Loddon Mallee regions and plastics and mattresses from Grampians Central West region.

The flows out of the region are more complex and include:

- MSW to landfills in Werribee in the Metropolitan region and Stawell in the Grampians Central West region.
- Preliminary figures indicate that metals, tyres and e-waste is collected in the region and transported to Melbourne for processing. The exact quantity and volumes are unknown and is not an accurate reflection of the flow out of the region.
- Paper and cardboard is collected in the region and transported to Melbourne.
- Mixed recyclables especially from the south west of the region are transported to Melbourne.
- Hazardous waste, such as oil, car batteries, paint and gas bottles, are collected and sent to Melbourne for processing.
- Silage wrap and some mattresses are collected in the region and sent to Melbourne for processing.

Table 7 Cross regional flows of material in and out of the Barwon South West Region 2013-14

Material type			Description of movement of material
Recovery	MRF		**Outflows:** • 20,000-30,000 tonnes of mixed recyclables (includes paper/cardboard, glass, plastics and metals) from council kerbside collections, transported to one or more MRFs in the Metropolitan region.
			Inflows: • 20,000-30,000 tonnes of mixed recyclables (includes paper/cardboard, glass, plastics and metals) transported into the region, with the majority coming from Interstate. • Small quantities from councils in the Grampians Central West region.
Reprocessing	Organics	Garden organics	**Outflows:** • 100-500 tonnes of garden organics from local industry transported to Metropolitan region for reprocessing.
			Inflows: • 1,000-2,000 tonnes of garden organics from the Metropolitan region was sent to local industry for reprocessing. • 2,000 tonnes are received from Loddon Mallee region for reprocessing (note that this was identified in 2015-16).
		Combined food and garden organics	**Inflows**: • 5,000-10,000 tonnes of combined garden and food organics transported to local industry for reprocessing with majority coming from Grampians Central West region. • Small quantities received from Metropolitan region. (Some timber is included in the materials collected)

[9] *Survey and analysis of regional reprocessors and material recovery facility operators: Barwon South West Waste and Resource Recovery Group Regional Report* conducted by Sustainable Resource Use for Sustainability Victoria, unpublished, 2015.

Material type		Description of movement of material
Reprocessing continued	Paper/cardboard	**Outflows:** • 20,000-30,000 tonnes of paper/cardboard from council kerbside collections and transfer stations transported to Metropolitan region for reprocessing.
	Glass	**Outflows:** • 1,000-2,000 tonnes of glass from local industry transported to the Metropolitan region for reprocessing.
	Plastic	**Outflows:** • 2,000-5,000 tonnes of plastics (including silage wrap) from council RRC/TSs transported to the Metropolitan region for reprocessing.
		Inflows: • 2,000-5,000 tonnes of plastics with the majority from the Metropolitan region and small quantities from councils and industry in the Grampians Central West region.
	Rubber (including tyres)	**Outflows:** • <50 tonnes of tyres from councils and local industry transported to the Metropolitan region for reprocessing. • It is likely that additional tonnes are sent out of the region but data is currently unavailable.
	Metals	**Outflows:** • 10,000-15,000 tonnes of metals from council kerbside collections and transfer stations as well as local industry sent to the Metropolitan region for reprocessing.
	Textiles	**Inflows:** • <50 tonnes of mattresses from the Grampians Central West region reprocessed by local industry.
	Hazardous (excluding e-waste)	**Outflows:** • <50 tonnes of oil from local industry and council RRC/TSs sent to the Metropolitan region for reprocessing. • <50 tonnes of car batteries from council RRC/TSs and local industry sent to the Metropolitan and Grampians Central West regions for reprocessing. Unknown quantity sent interstate for reprocessing. • 100-500 tonnes of paint from council RRC/TSs and local industry sent to Metropolitan region from the Detox your home program. • <50 tonnes of gas bottles from local industry sent to Metropolitan region for reprocessing.
	E-waste	**Outflows:** • Small quantities of e-waste from council RRC/TSs and local industry sent to the Metropolitan and Grampians Central West regions for reprocessing.
Waste to landfill		**Outflows:** • 40,000-50,000 tonnes of residual waste sent to the Metropolitan region for disposal. • Small quantities are transported to Grampians Central West region for disposal

Source: Victorian Regional Waste and Resource Recovery Database v3; waste and resource recovery data provided by Sustainability Victoria

The Barwon South West WRRG has considered available data on these flows in the development of the Barwon South West Implementation Plan including the market sounding process with the neighbouring Grampians Central West WRRG (see Section 6).

It must be noted that available data relies on voluntary sharing of information. The exact amount of material entering and leaving the region is difficult to quantify as businesses and reprocessors are reluctant to share commercially sensitive data. Barwon South West WRRG will continue to establish and build on relationships with reprocessors and promote the shared mutual benefits of data sharing to underpin future strategic planning for the region.

3.4 Waste generation projections and future opportunities

By 2045, it is projected that waste generation in the Barwon South West region will grow to approximately 1.1 million tonnes annually, with an estimated 700,000 tonnes to be recovered and 400,000 tonnes landfilled, shown in Figure 5.

Under a business as usual scenario, overall waste generation increases across the 30 years with recovery increasing at a higher rate than landfilling. This trend is consistent with statewide trends identified by Sustainability Victoria.

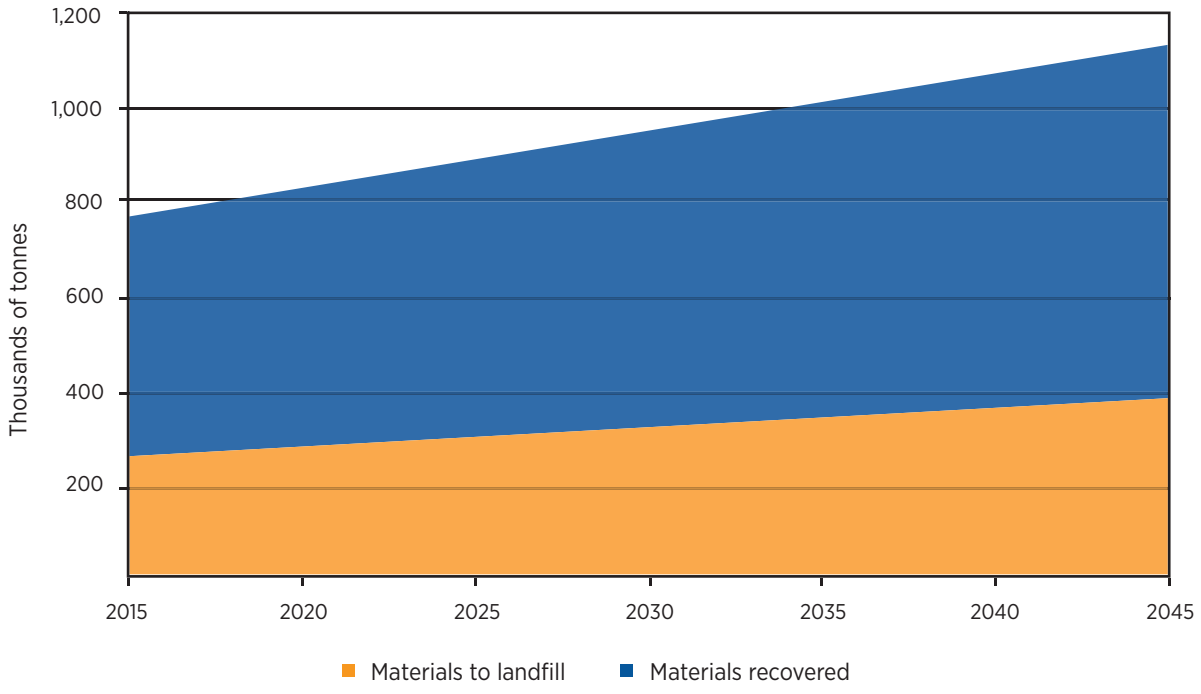
PRIORITY ACTION 4

Facilitate viable solutions to increase the recovery of materials currently going to landfill including those sourced from municipal, agricultural industries and commercial businesses.

This trend is not uniform across all nine councils in the region. Higher rates of population growth in some council areas, particularly Greater Geelong, are expected to result in different contributions to the regional total.

Analysis undertaken in preparing the Barwon South West Implementation Plan recognises potential opportunities to increase resource recovery through existing infrastructure and potential new infrastructure such as pre-sort facilities. Based on these findings and an assessment of future landfill airspace needs, it has been determined that the region will not require additional landfill capacity within the next 10 years. This will be reviewed in three to five years time to monitor the impact of recovery initiatives and future landfill needs. Further information on the landfill needs assessment can be found in Section 4.6.2.

Figure 5 Projected waste generated in the region based on generation rates



Source: Victorian Regional Waste and Resource Recovery Database v3; waste and resource recovery data provided by Sustainability Victoria

Public place recycling infrastructure in Torquay

4 THE WASTE AND RESOURCE RECOVERY SYSTEM IN THE BARWON SOUTH WEST REGION

This section outlines existing infrastructure in the region for materials landfilled or reprocessed recognising the waste flows into and out of the region discussed in Section 3.3.2. It identifies future needs for the region that form the basis of the actions for the Barwon South West Implementation Plan. Appendix 2 provides an overview of the types of infrastructure that support a waste and resource recovery system.

The data used for this section is from 2013-14 unless otherwise stated and is drawn from several sources including:

- SV's Victorian Regional Waste and Resource Recovery Database v3
- *Barwon South West Infrastructure and Capacity needs assessment*, Blue Environment, unpublished, 2015
- *Survey and analysis of data provided by regional reprocessors and material recovery facility operators: Barwon South West Waste and Resource Recovery Group Regional Report,* by Sustainable Resource Use for Sustainability Victoria, unpublished, 2015
- Market Sounding for Waste and Resource Recovery Infrastructure conducted jointly by Barwon South West WRRG and Grampians Central West WRRG, 2016.

Please note Section 3.2 discusses data limitations and handling that apply to this section.

Due to the commercially sensitive information the exact source of information or quantities of materials for specific types of infrastructure may not be included in each section.

4.1 Summary of regional infrastructure

There are 83 infrastructure facilities in the Barwon South West region. This includes 45 resource recovery centres/transfer stations (RRC/TSs), seven drop off (DO) facilities, two materials recovery facility (MRFs), 19 reprocessing facilities managing a diverse range of materials including organics, textiles and aggregates, masonry and soils, seven licensed landfills and three landfills exempt from licensing. Table 8 provides details of the infrastructure types in the region.

Table 8 Summary of infrastructure types in the region, 2013-14

Infrastructure type		Number
Resource recovery	Drop off facility	7
	RRC/TS stand alone[1]	39
	RRC/TS co-located	6
	MRF	2
Reprocessors	Organics, wood/timber, textiles, glass, plastics, tyres, aggregates, masonry and soil	19
Disposal landfill	Licensed	7
	Exempt from licensing[2]	3
Total		83

[1] RRC/TSs in Port Fairy and Bessiebelle closed and the Portland Resource Recovery Centre opened during the development of the Barwon South West Implementation Plan.

[2] Dartmoor landfill closed during the development of the Barwon South West Implementation Plan.

4.2 Collection systems

A waste collection system involves services to pick up waste where it is generated and transport it to waste and resource recovery facilities for processing or disposal. These services are provided through councils to households. Private commercial operators also provide collection services. Collection services play an important role in aggregating waste for appropriate management and protecting public health and the environment.

4.2.1 Municipal kerbside collection

Municipal kerbside collections provide an essential community service through the regular removal of waste materials from households and some businesses. These services include the collection of commingled recyclables, garden and food organics and general waste. Some councils provide kerbside collection services to small to medium enterprise.

Where council provides no kerbside service, property owners engage commercial operators or transport materials to RRC/TS or drop off facilities to manage their household waste.

Kerbside collections provide a secure feedstock for reprocessors. Efficiency, transport and environmental performance has improved through technological advances such as global positioning guidance and tracking systems, cameras, improved emission standards, low entry and high visibility collection vehicles. Table 9 shows the kerbside collection systems provided by council.s

Table 9 Council kerbside collection arrangements

Council/shire	Kerbside collections					
	Garbage		Recyclables		Food/garden	
	Litres	Description	Litres	Description	Litres	Description
Colac Otway (S)	120	Weekly	240	Fortnightly	240	Fortnightly FOGO
Corangamite (S)	120	Weekly	240	Fortnightly	240	Fortnightly FOGO[1]
Glenelg (S)	120	Weekly	240	Fortnightly	No council service	
Greater Geelong (C)	120	Weekly	240	Fortnightly	240	Fortnightly GO
Moyne (S)	120	Weekly	240	Fortnightly	240	Fortnightly FOGO
Queenscliffe (B)	120	Weekly	120	Weekly	240	Fortnightly GO
Southern Grampians (S)	120	Weekly	120	Weekly	240	Optional collection
			240	Fortnightly		
Surf Coast (S)	120	Weekly	240	Fortnightly	240	Fortnightly GO
Warrnambool (C)	80	Weekly	240	Fortnightly	No council service – collection by private waste operators	

FOGO (food organics garden organics) GO (garden organics)

[1] weekly service from October to December

4.2.1.1 Analysis of future need

Increased resource recovery and improved quality of material could be achieved through:

- Analysing opportunities when councils renew kerbside contracts such as:
  - offering households a larger commingled recycling bin (360 litres)
  - investigating smaller waste bins.
- Assessing optimal collection frequencies for organics and garbage.
- Joint procurement opportunities with councils.
- Expanding food and garden organics collection services where feasible.
- Adoption of the Australian Standard for Mobile Waste Containers (AS4123) at the time of kerbside contract renewal to achieve uniform bin lid and body colours to support standard education and messaging for appropriate use of bins.
- Implementing region-wide education campaigns supported by ongoing localised household engagement programs.

4.2.2 Hard waste collections

Hard waste collections have historically been provided by a number of councils across the region for households to dispose of items not suitable or permitted in the household kerbside collections. Hard waste collection services have been discontinued by most councils in the region due to the cost, amenity and occupational health and safety issues, with residents encouraged to use the RRC/TS network.

Queenscliffe offers kerbside hard waste collections to their residents. Surf Coast Shire provides residents with a voucher system to subsidise the cost of disposal at the RRC/TS.

4.2.3 Residential multi-unit and mixed-use development collections

In the Barwon South West region, the predominant forms of residential multi-unit and mixed-use developments are holiday apartments and retirement establishments where greater resource recovery could be achieved.

Challenges include lower resource recovery rates and higher contamination rates for these properties.

Poorly designed collection arrangements are costly to address through retrofitting so intervention early in the planning and design phases is critical.

4.2.4 Public place recycling and litter collection

Litter and illegal dumping poses a significant problem for communities in terms of environmental and amenity impacts, clean up and collection costs. Litter also has a negative impact on local community feelings of safety and wellbeing.

PRIORITY ACTION 1

Facilitate behavioural change to reduce waste generation, improve source separation and recovery rates.

Public place recycling (PPR) and litter bin collections refers to systems installed in high use public areas to collect recyclable materials and litter. Litter and PPR collection systems are most effective when bin infrastructure is underpinned by, and integrated with, research and communication techniques.

Litter and illegal dumping is managed through a wide range of infrastructure, education and enforcement actions across state government and councils. The *Victorian Waste Education Strategy* identifies regional litter plans as a key mechanism to identify and prioritise regional litter issues and develop targeted, measurable and evidence based litter prevention activities.

Barwon South West WRRG will play a role in supporting the waste education strategy and councils to facilitate the development and implementation of litter prevention and PPR programs.

4.2.5 Commercial collections

Collection services for industry including C&I and C&D waste generators are privately arranged typically using ‘skip’ bins provided by a private contractor to collect and remove bulk waste from premises. Source separation in this sector is growing, with cardboard, shrink wrap and plaster-only skips offered, in addition to residual mixed waste.

The types of collections include:

- mini-skips to householders for weekend clean ups or building and renovation
- mixed waste for farms (due to the isolation from council services and facilities)
- larger sized bulk bins for larger manufacturers and food processors
- larger sized bulk bins for transporting aggregated waste from council RRC/TSs
- larger sized bulk bins or tipper trucks for C&D waste generators.

In Greater Geelong and some regional areas there are building markets that sell second hand building materials which is an important element in diverting waste from landfill.

PRIORITY ACTION 3

Facilitate viable systems to increase recovery rates, including those from mixed loads of waste and bin/collection arrangements.

4.2.5.1 Analysis of future need

Landfill composition information (Figure 4) recognises that more can be done to maximise resource recovery from industry sectors and private collectors.

Key challenges include:

- Limited reprocessing infrastructure to receive mixed industrial waste, particularly construction waste and source separating materials for collection.
- Only limited sorting of selected loads of mixed waste currently takes place.
- Commercial-in-confidence issues can prohibit partnerships and information sharing with private industry. Effective engagement with the industrial sector is resource intensive.

Maximising resource recovery from commercial collections can be achieved through:

- Supporting reduced waste generation and reusing materials where possible such as through onsite composting in the agriculture sector and maximising recycling.
- Engaging business and the community through implementing a regional waste education strategy.
- Supporting the introduction of pre-sort systems to extract resources prior to landfilling.
- Working to ensure that appropriate data and reporting systems provide the evidence to support future opportunities.
- Supporting targeted waste audits and assessments to improve the understanding of the C&I and C&D waste profile across the region.
- Establishing networks to facilitate the exchange of information and create innovative resource recovery opportunities through common need.

4.3 Resource recovery centres/ transfer stations

RRC/TSs represent an important link in the infrastructure system and are an important service particularly for those rural communities that do not have access to kerbside collections.

RRC/TSs provide a consolidation point for the community, where materials are separated into streams and aggregated to facilitate transport for further management. They are critical to the waste and resource recovery network to support viable reprocessing of materials in and outside of the region.

There is a well developed geographical network of council and private owned RRC/TSs accepting a range of materials for disposal and recycling across the region. Map 1 provides an overview of RRC/TSs across the region.

There are currently 39 stand alone RRC/TSs in the region, 33 managed by councils and six privately managed. Six RRC/TSs are co-located at landfills.

Depending on the nature of the site and the availability of options, some sites are limited to household waste and others accept larger quantities of commercial waste. They focus on recovering, sorting and/or consolidating recyclable materials for transport to reprocessing/recycling facilities or MRFs, or on consolidating residual waste for transport to landfills.

The network is supplemented by private sector metal merchants and recyclers that offer drop off points for households and businesses. The RRC/TSs are further supported by product stewardship arrangements for e-waste and mattress collections for transport to mattress reprocessors.

Table 10 lists facility details by council. These facilities are included in the Resource Recovery Infrastructure Schedule (Section 7, Table 23).

PRIORITY ACTION 4

Facilitate viable solutions to increase the recovery of materials currently going to landfill including those sourced from municipal, agricultural industries and commercial businesses.

Table 10 Resource recovery centres/transfer stations, 2013–14

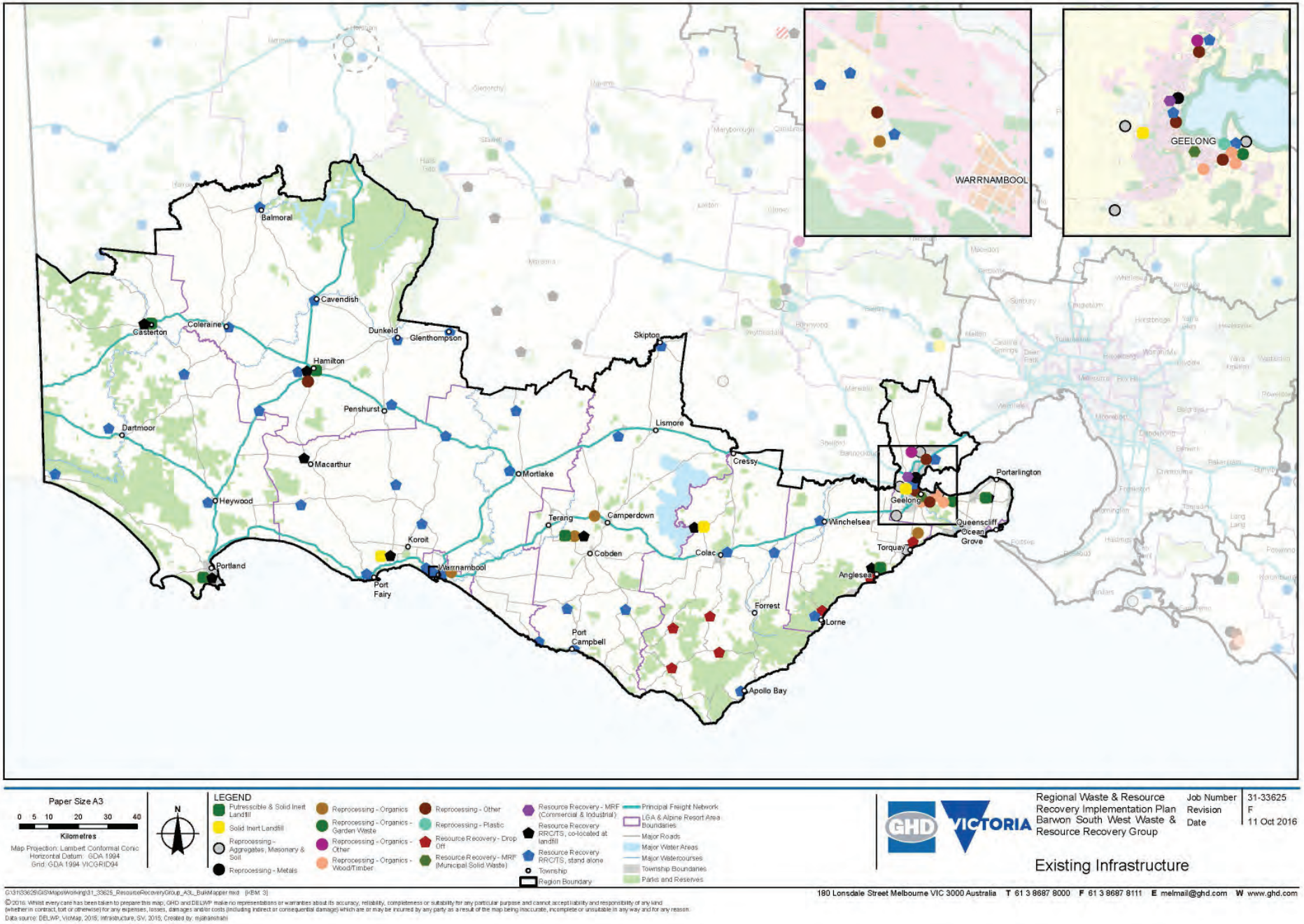
Council	Facility type	Tonnes currently managed (annually)
Colac Otway (S)	Alvie RRC/TS (co-located at landfill)	5,000-10,000
	Apollo Bay - RRC/TS	1,000-5,000
	Beech Forrest - DO	<100
	Birregurra - RRC/TS	100-200
	Carlisle - DO	<100
	Gelligrand - DO	<100
	Lavers Hill - DO	<100
Corangamite (S)	Naroghid RRC/TS (co-located at landfill)	1,000-5,000
	Derrinallum – RRC/TS	100–200
	Port Campbell – RRC/TS	100–200
	Simpson – RRC/TS	100–200
	Skipton – RRC/TS	<100
Glenelg (S)	Timboon - RRC/TS	200-300
	Casterton RRC/TS	<100
	Dartmoor - RRC/TS	<100
	Heywood - RRC/TS	<100
	Jarrads Road - RRC/TS	<100
	Nelson RRC/TS	<100
	Portland - RRC/TS (co-located at landfill)	5,000-10,000
Greater Geelong (C)	Drysdale - RRC/TS (co-located at landfill)	1,000-5,000
	Point Henry RRC/TS	10,000-15,000
	North Geelong RRC/TS	5,000-10,000
Moyne (S)	Bessiebelle - RRC/TS (closed during the development of plan)	100-200
	Caramut – RRC/TS	100–200
	Hawkesdale – RRC/TS	100–200
	Killarney RRC/TS (co-located at landfill)	1,500–2,500
	Macarthur – RRC/TS	100–200
	Mortlake – RRC/TS	400–500
	Peterborough – RRC/TS	400–500
	Port Fairy – RRC/TS (closed during the development of plan)	100–200
	Woolsthorpe – RRC/TS	200–300
	Woorndoo – RRC/TS	200–300
Queenscliffe (B)	No facilities	n/a
Southern Grampians (S)	Balmoral – RRC/TS	<100
	Branxholme – RRC/TS	100–200
	Cavendish – RRC/TS	<100
	Coleraine – RRC/TS	200–300
	Dunkeld – RRC/TS	100–200
	Glenthompson – RRC/TS	<50
	Penshurst – RRC/TS	100–200

Council	Facility type	Tonnes currently managed (annually)
Surf Coast (S)	Anglesea – RRC/TS (located at landfill)	5,000–10,000
	Anglesea – DO	<100
	Lorne – RRC/TS	500–1,000
	Lorne – DO	<100
	Torquay – DO	<100
	Winchelsea – RRC/TS	100 – 200
Private operators	Colac Cardboard and Paper Recovery	unknown
	Sims Metal	unknown
	Westvic - RRC	1,000-5,000
	Barton's Waste Collection – RRC/TS	10,000–20,000
	Statewide Waste RRC/TS	unknown
	Suez – RRC	unknown
	Western Waste Management – RRC	40,000-50,000

Drop off (DO)
For details concerning waste and resource recovery options accepted at facilities refer to individual council or business websites for further information.

Baled plastics at a materials recovery facility

Map 1 Existing waste and resource recovery infrastructure in the Barwon South West region



Data source: DELWP, VicMap, 2016; Infrastructure, SV, 2015, Created by: mjahanshahi

4.3.1 Analysis of future needs

Analysis found that RRC/TSs in the region are likely to have sufficient existing capacity over the 10 year planning period, although there may be some need for upgrades to meet best practice, increased frequency of collection of waste skips and some additional storage equipment for recovered materials. Changing populations and cost considerations may also drive some infrastructure changes in the region[10].

Increased resource recovery from RRC/TSs can be achieved through:

- Identifying and prioritising upgrades to meet best practice and economically viable resource recovery.
- Joint contracting for collection, transport and processing of recovered material streams.
- Improving the regional data collection system to inform future planning and opportunities.

Key challenges include:

- Rationalising and consolidating facilities to create viable economies of scales to service the community.
- Assessing future infrastructure needs given population changes, planned landfill closures, usage trends, operating and capital costs, facility limitations and market changes for material streams.

4.4 Materials recovery facilities

There are two operational MRFs in the Barwon South West region. A MRF is a centre for the receipt, sorting and transfer of materials recovered from the waste stream prior to transport to another facility for recovery and managment. MRFs receive and sort household and business commingled recyclables. Recyclables are compacted/baled or consolidated for transporting.

The MRFs operating in the region are listed in Table 11 and located on Map1. The facilities managed 70,000 tonnes in 2013–14 but have an approximate capacity to process 90,000 tonnes per year.

Table 11 Materials recovery facilities

Business name	Location	Materials managed
Visy	North Geelong	paper/cardboard
SKM[1]	South Geelong	paper/cardboard/glass/metals/plastics

[1] SKM have indicated that a change in the operations of their South Geelong plant in the future may impact on quantities of material sorted at this site.

4.4.1 Analysis of future needs

The viability of existing and future MRFs within the region to sort and process recyclables depends on:

- The timing of council tenders for waste service contracts. Four councils in the region joined with neighbouring Golden Plains Shire Council and undertook a joint procurement that resulted in the five councils delivering kerbside recyclables to one facility in Geelong.
- How well such facilities compete with large-scale Melbourne facilities on transport and market economics.

PRIORITY ACTION 8

Assess the future strategic role of landfill and resource recovery needs within Barwon South West region.

Increased resource recovery opportunities include:

- Recovery of industrial waste would improve recovery outcomes in the region. Improved sorting, segregation and reprocessing of materials that are currently disposed of at landfill as part of the mixed waste stream may increase job opportunities and grow the economy through available resources.
- Pre-sorting at landfills would recover addition recyclable materials from all sectors.

4.5 Reprocessing infrastructure

Reprocessing and recycling facilities manage a range of materials from the C&I, C&D and MSW sectors including cardboard/paper, organic waste, wood/timber, textiles, tyres, aggregates, masonry and soil, e-waste and asbestos.

Nineteen reprocessors were identified in the region during the development of the Barwon South West Implementation Plan. Identifying reprocessors was critical to establish regional data to inform the implementation plan.

Reprocessors were identified through the 2015 SV reprocessor survey[11], the market sounding process (discussed in Section 6) and regional knowledge. Ten reprocessors participated in the 2015 SV reprocessor survey and reprocessing data for two of the non-respondents was estimated on pre existing survey data for the facility.

The research found there are a number of material streams that are not reprocessed in the region or, if they are, the existing capacity is limited. For some materials not reprocessed, local management solutions may not be feasible, given limited economies of scale in regional areas, lack of local markets or the need for specialised treatment technologies. However, there is potential to establish or expand reprocessing for some materials in the region.

[10] *Barwon South West infrastructure capacity and needs assessment,* Blue Environment, unpublished, 2015
[11] *Survey and analysis of regional reprocessors and material recovery facility operators: Barwon South West Waste and Resource Recovery Group Regional Report* conducted by Sustainable Resource Use for Sustainability Victoria, unpublished, 2015

Data sources for reprocessing infrastructure

Unless otherwise referenced, the data sources for this section are the:

- *Survey and analysis of regional reprocessors and material recovery facility operators: Barwon South West Waste and Resource Recovery Group regional report* conducted by Sustainable Resource Use for Sustainability Victoria, unpublished, 2015.
- *Barwon South West infrastructure capacity and needs assessment*, Blue Environment, unpublished, 2015.

4.5.1 Current reprocessing capacity

Table 12 lists the reprocessors identified in the region, including those that participated in SV's 2015 reprocessor survey.

The current installed and under-utilised capacity of existing reprocessing facilities provides important data to determine future needs and opportunities.

Table 12 Reprocessing or recycling facilities

Council	Number	Facility	Reprocessor facility type
Corangamite (S)	2	Camperdown Compost	organics
		Corangamite Regional Landfill Composting	organics
Greater Geelong (C)	13	Australian New Energy	organics, wood/timber
		Bellarine Tree Services	organics, garden
		Central recyclers	aggregates, organics
		GDP Industries	aggregates, e-waste, glass, metals, paper/cardboard, organics, plastics, textiles
		GT Recycling	plastics, textiles
		Local Mix Concrete	aggregates, masonry and soils
		Regional Recycle	aggregates, masonry and soils
		Geelong Restorers Barn	organics, wood/timber
		C&D Recycling Lara	organics, aggregate, masonry and soils
		The Mattress Recycler	other
		Timberzoo P/L	organics, wood/timber
		Boral Cement	aggregates, masonry and soils
		Bernie Leen & Sons	aggregates, masonry and soils
Surf Coast (S)	1	AD & HM Robertson Pty Ltd	organics
Warrnambool (C)	3	The Midfield Group (Pomala Pty Ltd)	organics, paper/cardboard, plastics
		Statewide Waste (Austral Group)	organics
		Western District Employment Agency (WDEA)	e-waste, metals, paper/cardboard, organics, plastics, textiles

Note: Not all facilities are open to the general public. Contact the reprocessing or recycling facility directly for details of individual operations.

Table 13 provides an overview of installed and under-utilised reprocessor capacity by material type. It highlights that existing capacity for textiles and e-waste reprocessing is fully utilised and requires increased capacity in the future.

Processing capacity for organics is currently under-utilised but this does not mean there will not be a need for additional capacity within the next 10 years. Priority action 4.1 is to investigate opportunities to increase the recovery of priority materials such as household organics and wood/timber from C&I and C&D sectors. Section 4.5.2 discusses organics in more detail.

Table 13 Reprocessor capacity by material type

Material type	2013-14 throughput (tonnes)	Estimated capacity used, %
Organics food	64,900	75%
Organics garden	77,400	82%
Organics wood/ timber	17,400	68%
Organics combined	100	57%
Organics other	29,100	75%
Aggregates, masonry & soil	180,500	65%
Textiles	200	100%
E waste	1,200	99%

Note: The processing capacity of other mixed recyclables is unknown and excluded
Source: *Barwon South West infrastructure capacity and needs assessment,* Blue Environment, unpublished, 2015

4.5.2 Organics reprocessing infrastructure

Organic wastes are presented in a variety of forms:

- Food organics, including food waste from domestic and industrial sources such as food manufacturers.
- Garden organics, including grass clippings, prunings, plants and leaves.
- Wood and timber, excluding treated timber.
- Other organics, such as biosolids, grease trap waste and organic sludges.

Organics have a potentially high contribution to greenhouse gas emissions from landfills. Significant steps have been taken in the region to divert organics from household garbage bins and therefore landfill. The Barwon South West Implementation Plan aims to increase recovery of food and garden organics in coming years.

The Barwon South West region has established organics processing facilities, suitable land to establish additional facilities and a large quantity of organics in the region not currently recovered. These factors provide the opportunity to establish a state hub for organics processing that is likely to lead to increased jobs and economic benefits for the region.

PRIORITY ACTION 7

Facilitate the aggregation of material streams to improve economies of scale and cost efficiencies.

Different types of organic wastes require different technologies and treatment systems and some require very specialised treatment. This explains the range of organics reprocessor facilities listed in Table 13 and the number of organics material types listed. Some facilities can accept all types of organic waste, and some specialise in one or more types. For example, an estimated 20,000 tonnes of wood/timber was managed in the region in 2013-14, with a component being used in energy production. This figure excludes wood/timber from the forestry industry. It is known that there is cross sectoral use of timber/ wood waste as a by-products of sawdust, woodchips, heat-beads and for energy production.

4.5.2.1 Analysis of future needs

There are at least nine organics reprocessing facilities in the region and it is estimated that over 188,000 tonnes of organics were managed in 2013-14. It should be noted that some reprocessor did not participate in SV's reprocessor survey due to concerns about confidentiality.

Increased reprocessing of organics can be achieved through:

- Providing support for current reprocessors to improve current operations to increase the recovery of organic wastes.
- Introducing appropriate technologies to process specific organic waste types.
- Improving the regional data collection system to inform future planning and opportunities.
- Establishing food and garden organics kerbside collection services across the whole region where viable.
- Diverting organic waste streams from industry sectors including agricultural, hospitality, manufacturing, C&I and C&D.

Key challenges include:

- Assessing the viability of providing food and garden organics services to the whole region.
- Improving the understanding of the region's waste profile, waste types and volumes to inform future planning and facilitate appropriate opportunities.
- Aggregating materials for processing, taking into consideration transportation and other costs.
- Markets for end products.
- Land use planning, suitable buffer zones and operating guidelines.
- Quality assurance.

4.5.3 Cardboard and paper reprocessing

There is no cardboard and paper reprocessing infrastructure in the region. It is however, estimated that 47,000 tonnes, sourced mainly from MSW and C&I sectors, of paper and cardboard was managed in the Barwon South West region in 2013-14. It is understood that paper and cardboard is compacted and transported to recyclers outside of the region for further processing.

4.5.3.1 Analysis of future needs

While there may be opportunities to develop reprocessing within the region, they have not been identified as a priority in the plan. There is an opportunity to further improve aggregation of materials for resource recovery.

4.5.4 Textiles reprocessing

While Victoria generated 129,000 tonnes of textile waste in 2013-14, just 3,000 tonnes of this waste was recovered, representing a recovery rate of 2%[12]. There are at least two reprocessing facilities in the region and it is understood that the processed textiles are sent to markets outside of the region. Barwon South West region's textile waste includes discarded clothing, end-of-life furniture, mattresses and manufacturing offcuts. While reported tonnages are modest, data limitations suggest there are significant under-reported quantities of textile waste in the regional waste stream.

4.5.4.1 Analysis of future needs

Increased textile reprocessing can be achieved through:

- Supporting greater use and coordination of charity bins.
- Supporting the exchange of waste stream information across the region to inform textile collection opportunities.
- Supporting reprocessors to investigate technological advances to aid increased recovery.

4.5.5 Glass reprocessing

Around 16,000 tonnes of glass were accepted at MRFs in the region in 2013-14. Like paper and cardboard, glass is received at the MRF and transported to Melbourne for reprocessing.

4.5.5.1 Analysis of future need

There is an opportunity to increase reprocessing capacity of glass through increased tonnages collected from kerbside collections and through the C&D and C&I sectors.

Increased glass reprocessing may be achieved through:

- Investigating the viability of mobile crushing infrastructure and to reuse the product regionally, for example as a material alternative for road base.

PRIORITY ACTION 5

Facilitate regional and cross sectoral linkages to improve markets for materials that could be diverted from landfill and used by another industry as a resource.

4.5.6 Plastics reprocessing

The data analysis suggests the existing capacity for reprocessing of plastics will not be fully utilised within the 10-year planning period, however there are opportunities to grow both the reprocessing capacity and the types of plastics recycled. This could address the range of plastics that have been historically problematic to recover such as silage wrap, bailing twine, hard plastics and film.

4.5.6.1 Analysis of future needs

There are opportunities to grow the sector by:

- Targeting the plastics that have been historically problematic to recover such as silage wrap.
- Supporting the exchange of waste stream information across the region to inform new resource recovery opportunities.

4.5.7 Metals reprocessing

Metals are collected and aggregated across the region for transport to reprocessing facilities outside of the region. Based on current landfill composition data (Section 3.3.1 Figure 4) it is estimated that approximately 2% of metals are landfilled.

4.5.7.1 Analysis of future needs

There is adequate capacity and no need to recover more metals.

4.5.8 Tyres reprocessing

In Victoria, the landfilling of whole tyres is banned, requiring alternative management of this considerable resource. Over 90,000 tonnes of end-of-life tyres and rubber waste was generated in Victoria in 2013-14 and 12% of end-of-life tyres were recycled, 77% exported and 11% stockpiled or disposed without record[13].

While tonnages reported in the region are modest, the data limitations suggest significant under-reported quantities of tyres exist in the regional waste stream. The Victorian Government is taking action to reduce the fire risk from tyre stockpiles by imposing stricter rules, enforceable by EPA, on how tyres are stored. Tyre Stewardship Australia has been established by the

[12] Source: *Investment factsheet: Textile waste,* Sustainability Victoria, November 2015
[13] Source: *Investment factsheet: End-of-life tyres,* Sustainability Victoria, November 2015

tyre industry to administer a national tyre product stewardship scheme that was launched in January 2014.

4.5.8.1 Analysis of future needs

Barwon South West WRRG will work to support SV and complement the EPA regulatory framework by:

- promoting greater local recovery of tyres
- promoting demand for tyre derived products
- reporting illegitimate stockpiling activity
- helping to address priority legacy stockpiles
- assessing options for the local use of processed derived fuels from tyres to replace fossil fuels and non-fuel, tyre derived products
- support councils in assessing end-of-life tyre processing proposals.

4.5.9 Aggregates, masonry and soil reprocessing infrastructure

Over 180,000 tonnes of aggregates, masonry and soil were managed in the region in 2013-14. There is opportunity to grow the reprocessing capacity within the region, but it is recognised that recovery rates are driven by market demand.

4.5.9.1 Analysis of future needs

There are opportunities to grow the reprocessing capacity in the region through:

- Improving separation of waste streams such as concrete, bricks and asphalt.
- Establishing mobile crushing infrastructure to deliver services on site.
- Supporting an industrial MRF and operational advancements to sort C&D waste.

4.5.10 E-waste reprocessing infrastructure

There are two small e-waste reprocessors providing supported employment opportunities for disadvantaged people or people with a disability in the region. Currently most e-waste that is collected in the region is dismantled into component parts and transported to Melbourne for reprocessing. Approximately 1,200 tonnes of e-waste were collected in 2013-14.

The Victorian Government has made a commitment to ban e-waste from landfill.

4.5.10.1 Analysis of future needs

The introduction of the Victorian Government's landfill ban on e-waste will increase recovery rates of electrical equipment for recycling with the region's RRC/TSs likely to play a significant role.

Additional infrastructure, storage and solutions to divert banned materials from landfill will need to be considered as well as working with the rest of state government in the design of the ban.

PRIORITY ACTION 6

Facilitate collaborative procurements to improve economies of scale and cost efficiences.

Consideration will need to be given to:

- Retaining and expanding local reprocessing capacities.
- Systems to ensure that current national scheme difficulties are not replicated for regional and rural Victoria.
- Infrastructure capacity, established systems for collection, processing and secure markets are in place to prevent stockpiles.

4.5.11 Energy from waste facilities

Some advanced waste treatment technologies providing an alternative to landfilling operate in Victoria but are not common. The technologies can contribute to regional innovation and economic development, job opportunities, provide improved environmental outcomes, produce value-added products improve resource efficiency and to meet Victoria's Renewable Energy Target. They can potentially be high-risk, capital-intensive ventures that may not deliver on expected outcomes. There are several small scale private energy from waste (EfW) plants operating in the region.

Technologies include gasification, pyrolysis and anaerobic digestion to recover resources, generate energy from waste, produce processed derived fuel alternatives and reduce greenhouse gas emissions from landfills.

During the market sounding process two proponents indicated they were considering establishing EfW facilities to service the region but the proposals were not sufficiently advanced to be included in the infrastructure schedule. Barwon South West WRRG will monitor progress of the proposals.

4.5.11.1 Analysis of needs

Technology advances are seeing changes in the type and scalability of EfW facilities and therefore opportunities for the region:

- Continue to improve data collection to provide regional profile for future investors.
- Support the investigation of technology opportunities that meet the needs of the region.

4.6 Landfill infrastructure

Landfills are engineered waste disposal facilities that receive and contain waste in or on top of the ground.

Landfills play a central role in safely and effectively managing waste. While the government aims to maximise resource recovery, landfills will continue to play a necessary role in the regional infrastructure network for at least the short to medium term. Looking to the long term, there will still be a need for some landfill capacity to safely dispose of treated, residual material.

To prevent negative impacts on the environment and the community, existing and new landfill design, construction, operation and rehabilitation must comply with the *Best Practice Environmental Management (Siting, Design, Operation and Rehabilitation of Landfills)* (Landfill BPEM). Schedule A of the Landfill BPEM, deals with areas where landfill sites must not be established or extended into.

For landfills receiving putrescible material that decomposes, best practice rehabilitation and aftercare can extend to 30 years or more after a landfill stops receiving waste.

There are seven licensed landfills and three landfills exempt from licensing in the region and, except for one, all landfills are owned by councils. Landfills exempt from licensing service populations of less than 5,000 and are restricted to only receiving putrescible and solid inert waste. Table 14 provides details of the landfills in the region. Refer to table 26 Existing landfills in the Infrastructure Schedule for all landfill information.

4.6.1 Analysis of future need

Landfills are part of Victoria's waste and resource recovery infrastructure system. The *Waste Management Policy (Siting, Design and Management of Landfills)* requires that the development and use of landfills be minimised, but it is a role of this plan to ensure there is sufficient landfill airspace to meet the requirements of the Barwon South West region for the disposal of residual waste.

Many factors impact on how much landfill airspace will be required to meet the region's needs. A key factor is the Barwon South West Implementation Plan's objective to increase recovery so that only materials that cannot be viably recovered are disposed of to landfill. With changes in technologies and improved markets for goods made from recovered materials, many of the materials currently going to landfills may be recovered in future.

To achieve this the Barwon South West WRRG undertook a process in accordance with the Ministerial Guideline to assess and determine the region's landfill airspace needs. As part of this process the Barwon South West WRRG has committed to undertake regular future reviews of the Implementation Plan in accordance with the Act and relevant guidelines.

Table 14 Operating landfills, 2013–14

Duty holder	Landfill licence status	Landfill name
Greater Geelong (C)	Licensed	Drysdale
Colac Otway (S)	Licensed	Alvie
Corangamite (S)	Licensed	Corangamite Regional Landfill (Naroghid)
Geelong Landfill Pty Ltd	Licensed	Fyansford
Glenelg (S)	Exempt from licensing	Casterton
Glenelg (S)	Exempt from licensing	Dartmoor (closed 2016)
Glenelg (S)	Licensed	Portland (planned closure 2016)
Moyne (S)	Exempt from licensing	Killarney
Southern Grampians (S)	Licensed	Hamilton
Surf Coast (S)	Licensed	Anglesea

4.6.2 Landfill needs assessment

To determine landfill airspace needs the Barwon South West WRRG considered:

1) Projected tonnages of residual waste likely to need landfilling in the next 30 years taking into consideration:
   a) Regional population and catchment growth.
   b) Business as usual recovery rates as worst case scenario.
   c) Potential impact of recovery initiatives that could divert material from landfills (which are most likely to go ahead or have commenced since the baseline data year).
   d) Knowledge of the region.
   e) Information from the waste and resource recovery industry.
   f) Future of other existing landfills (including consideration of capacity need to compensate for landfills planned for closure).

2) Information from the owners and operators of individual existing landfill sites including:
   a) Compaction rates.
   b) The amount of daily cover.
   c) Site survey results, where available.
   d) Future plans.
   e) Airspace availability (e.g. quarry void space).
   f) Land use planning and EPA works approval status of the available airspace.

3) Tonnes currently going to individual landfills including:
   a) Landfill levy and council sourced data.
   b) Specific factors that may have influenced the data collection year (e.g. a major event such as a flood that caused more waste to be landfilled than in a typical year).
   c) Tonnages expected to be landfilled under contracts and duration of these contracts.
   d) Flows to or from other regions or interstate (including feedback from the generating region's WRRG in relation to long term prospects of these flows continuing).

4) Contingency requirements including:
   a) Natural disasters.
   b) Unexpected closure of facilities including those that may be located in another region and provide a service (landfill or recovery) to the region.

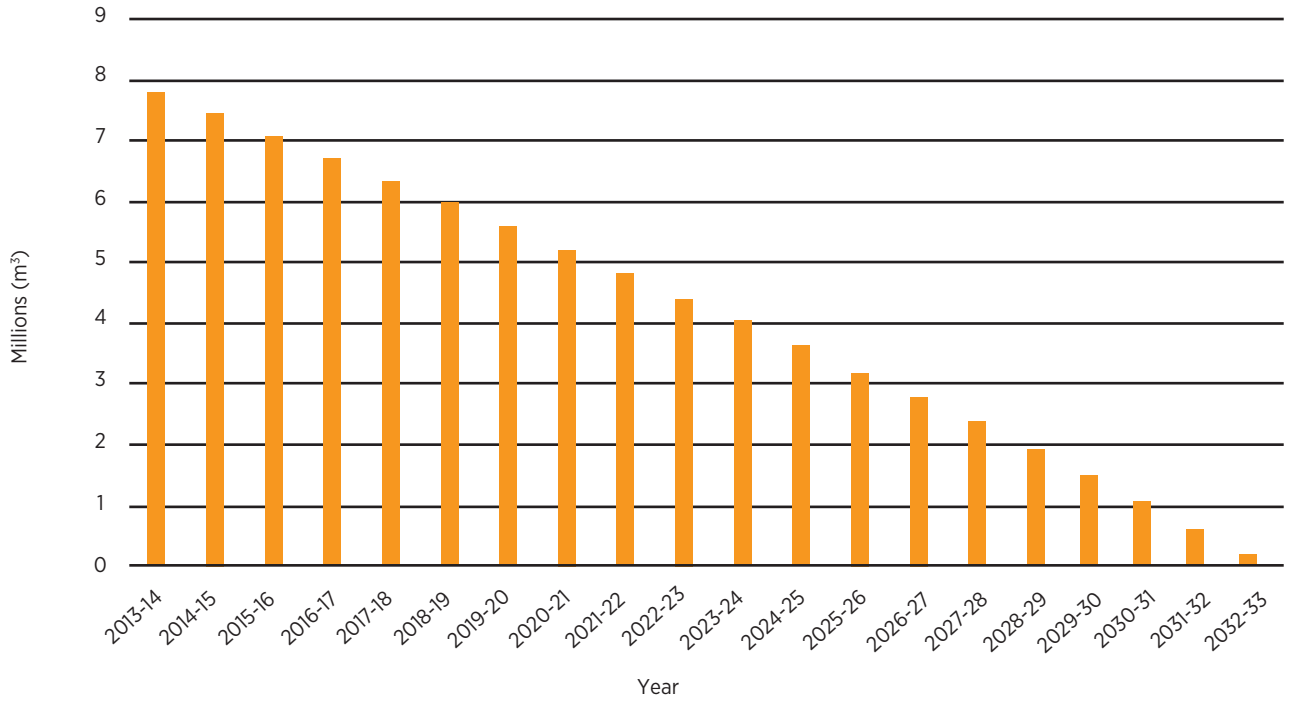
5) The management, accuracy and verification of Information provided by third parties and impact of data gaps on the assessment. If data was unavailable, a conservative approach was taken.

4.6.2.1 Findings of the landfill needs assessment

The detailed analysis in developing the plan indicates that no additional landfills will be required for the region for the next 10 years. A number of landfills have recently closed or will be closed in the life of this plan, however there is sufficient capacity at other landfills within the region to accommodate these closures. Figure 6 shows the modelling to 2033. Further landfill needs analysis is required beyond this period.

This assessment informs the Infrastructure Schedule (Part B) – Proposed Sequence of the filling of available landfill sites (Table 27). Section 50BB(c)(iv) of the EP Act sets out a required minimum timeframe for a landfill scheduling table of 10 years. While this plan is for a 10-year period, the schedule provides an indication of the extent to which the existing landfills may contribute to meeting the needs of the region for a 30-year period. This is to provide clarity to operators, decision-makers and the community. The schedule is subject to review.

Figure 6 Barwon South West landfill airspace capacity projection



With consideration of identified cross regional flows, the Barwon South West WRRG held discussions with Grampians Central West WRRG throughout the development stage of the consultation draft implementation plans. Discussion included consideration of likely landfill closures, movements of waste throughout the regions and the impact of these on current and future infrastructure. Discussions were also held with the Metropolitan WRRG concerning waste movements and management impacts.

The Barwon South West Implementation Plan is focused on reducing waste to landfill through increasing resource recovery, particularly organics and C&I and C&D waste currently being deposited at landfill. Reductions will be achieved through expansion of kerbside collection services and investment in pre-sort facilities. Any reductions in waste to landfill would increase the modelled airspace available.

4.6.2.2 Review process

The Barwon South West WRRG has committed to repeat the landfill needs assessment within five years. This will ensure that any gap in the availability of landfill airspace to meet the needs of the region will be identified and addressed with adequate time to determine the most appropriate solution(s), schedule new infrastructure in accordance with the statewide process (if required) and allow sufficient time for planning and construction.

Other factors which could trigger an earlier review or change to the schedule include:

- A direction from the Minister for Energy, Environment and Climate Change.
- Unexpected closure or filling of a landfill resulting in an immediate need.
- A request from another region to transport and manage residual waste in one of the Barwon South West region's landfills.
- A scheduled landfill not receiving approvals for scheduled expansions.
- Location and airspace capacity of individual landfills servicing areas must be considered.

In addition, there will be a high level contingency review undertaken by SV, DELWP and WRRGs across the state every 12 months. This will include consideration of the impact of emergency events.

4.6.2.3 Data sources for landfill infrastructure

Unless otherwise referenced, the data sources for this section are the:

- Victorian Regional Waste and Resource Recovery Database v3. Waste and resource recovery 2013-14 data
- Australian Bureau of Statistics
- *Barwon South West infrastructure capacity and needs assessment*, Blue Environment, unpublished, 2015
- landfill duty holders.

4.6.3 Private (own waste landfills)

'Private (own waste) landfills' is the term used to describe landfills that deposit waste exclusively arising from their own onsite activities. These landfills are licensed by EPA except for mining operations that solely deposit mining wastes in accordance with the relevant legislation (*Extractive Industries Development Act 1995* and *Mineral Resources (Sustainable Development) Act 1990*). Table 15 outlines the private (own waste) landfills in the region.

Private (own waste) landfills will not be able to accept waste from other sources unless they are first included in the sequence of filling table of the infrastructure schedule within this plan (Table 27). They will subsequently need to meet any EPA requirements associated with the proposed licence amendment and if required complete a works approval to the satisfaction of EPA.

These sites are subject to change by way of the nature of corporate operations. If corporations close their respective landfilling activity on their private site or desire to deposit additional waste materials, there may be a need to source an alternative location for material disposal or upgrade approvals, licences and permits. The corporation concerned would be required to undertake all necessary investigations and will subsequently need to meet any EPA requirements associated with the proposed licence amendment and if required complete a works approval to the satisfaction of EPA.

Table 15 Private (own waste) landfills in the region

Licence Number	Site name	LGA	Locality	Owner
11429	Alcoa of Australia	Surf Coast Shire	Anglesea	Alcoa of Australia Limited
11108	Boral Cement	Greater Geelong	Mount Duneed	Boral Cement Limited

4.6.4 Asbestos disposed in landfills

As discussed in Section 1.4, asbestos is a PIW and is outside the scope of the Barwon South West Implementation Plan. However, a high level outline of current asbestos management has been included in this plan, given it is an issue of interest for the community.

Asbestos is a silicate mineral made up of tiny fibres that form a dust when disturbed. Asbestos fibres breathed into the lungs can cause a range of health problems including lung cancer and mesothelioma.

Asbestos was previously used extensively in building products in Australia. All use, import or manufacture of asbestos was banned completely in Australia by 2003. Managing asbestos safely is a major regional and statewide priority. Table 16 shows the types of asbestos accepted by landfills in the region.

4.6.4.1 Analysis of future need

The relative scarcity of disposal locations for domestic asbestos is further compounded with the closure of the Portland Landfill in the western part of the region. In many instances the distance from population centres within the region to a disposal site is more than 100 kilometres. There are several businesses that provide an asbestos collection service in the region.

Hazardous wastes are wastes that pose significant environmental and/or human health risks if not managed or disposed of safely. Under Victoria's current hazardous waste management framework, many hazardous wastes are 'prescribed' through Victoria's Environment Protection (Industrial Waste Resource) Regulations.

The Victorian Government is committed to the protection of human health and the environment from the possible harms of hazardous wastes. A review of Victoria's hazardous waste management framework has commenced. This review will consider the infrastructure needs to appropriately manage these waste streams, including the potential to integrate this information into the state infrastructure plan and regional implementation plans.

4.6.5 Closed landfills

Closed landfills are those landfills that have received waste in the past. The potential of adverse impacts depends on a range of factors including the size of the landfill and types of waste accepted, the geology and natural features of the site and how the landfill was constructed and rehabilitated on closure.

Sixty-five landfills[14] that have been closed within the past 50 years have been identified in the Barwon South West region. Section 7.2.3 provides details of the closed landfills.

The responsibility for the management and rehabilitation of closed landfill sites lies with the duty holder for the site, as determined in accordance with the EP Act and any licence, works approval or notice issued under the EP Act in respect of the site. In most situations this is the current landholder. The EPA manages and regulates this process. Further information on landfill requirements, from planning through to rehabilitation, can be found on the EPA's website.

Specific related documents include the EPA's Landfill BPEM, the *Rehabilitation of Landfills Exempt from Licensing Guideline* (1999) and *Landfills Exempt from Licensing Guideline* (2014).

The requirements for rehabilitation depend on the risk of adverse impacts. Smaller landfills pose significantly lower risks to the environment and surrounding community and therefore rehabilitation, monitoring and maintenance are less stringent than for larger landfills that pose a greater risk. With the trend towards larger landfills the rehabilitation requirements have changed in recent years, with current operational landfills required to adhere to far more stringent guidelines when being rehabilitated.

It is estimated that at least 14 of the closed landfill sites in the region are yet to commence rehabilitation. The high cost of rehabilitation and ongoing post closure management to the standards required by the EPA are mostly unfunded liabilities, particularly for closed unlicensed sites. Delays are expected while councils allocate and obtain funding for this remedial work.

Table 16 Current landfills accepting asbestos waste

Landfill	Type of asbestos accepted	Criteria
Drysdale	Domestic	The landfill receives small quantities of asbestos from householders transported in their own vehicle (trailer). Domestic loads received by permitted vehicle with transport certificates.
Fyansford	Domestic, commercial	The landfill receives small quantities of asbestos from householders transported in their own vehicle (trailer). Commercial loads received by permitted vehicle with transport certificates.
Licensed landfills	Domestic, commercial	Landfill operators may gain s30 approval from EPA to accept asbestos contaminated waste in emergency circumstances.

[14] Identified through consultation with councils in the Barwon South West region and EPA

Many of the sites were small landfills servicing only the local area and closed some time ago. The group will liaise with councils and the EPA to develop risk-based assessments for closed landfills in the region that take into account the local context. This may effectively reduce environmental and human health risks of these landfills more efficiently than current approaches that are aimed at landfills more broadly.

4.7 Waste and resource recovery hubs

4.7.1 What is a hub?

The concept of hubs and spokes is a simple one – hubs are locations where materials are managed, with supporting spokes that enable materials to be transported to the hub. Together they form a system that supports the aggregation of materials within a network for efficient resource recovery and management of waste and material streams. The initial identification of a hub is the starting point to inform a discussion of its future.

Through identifying hubs we are seeking to:

- Inform land use planning around waste and resource recovery facilities and sites.
- Consolidate material streams to achieve tonnages that attract industry investment.
- Achieve an integrated system that maximises resource recovery.
- Achieve optimal economic, community, environment and public health outcomes.

During the implementation phase the future of hubs in the region will be explored, including alignment with local planning schemes as appropriate.

The state infrastructure plan outlines the cascading criteria for hubs of state, regional and local importance (Table 17). The criteria help determine at what level(s) to carry out the appropriate planning and indicate where the impact would be if activities occurring at existing hubs were to change. These criteria are not definitive and should be applied as a 'best fit'. An individual hub does not need to meet all criteria or functions. This approach highlights the importance of local and regional planning to achieve an integrated statewide waste and resource recovery system.

4.7.2 Roles the region plays in the overall statewide waste and resource recovery infrastructure system.

The region's existing waste and resource recovery network includes seven landfills, 42 RRC/TSs, 22 reprocessors and 3 MRFs.

The state infrastructure plan identified one existing hub of state importance to the state waste and resource recovery system, the Corangamite Regional Landfill. Maps 2 and 3 show the locations of the hubs of state and regional importance.

Hubs are strategically important locations where materials are managed. Together, they form a system that supports the aggregation of materials within a network for efficient resource recovery and management of waste materials.

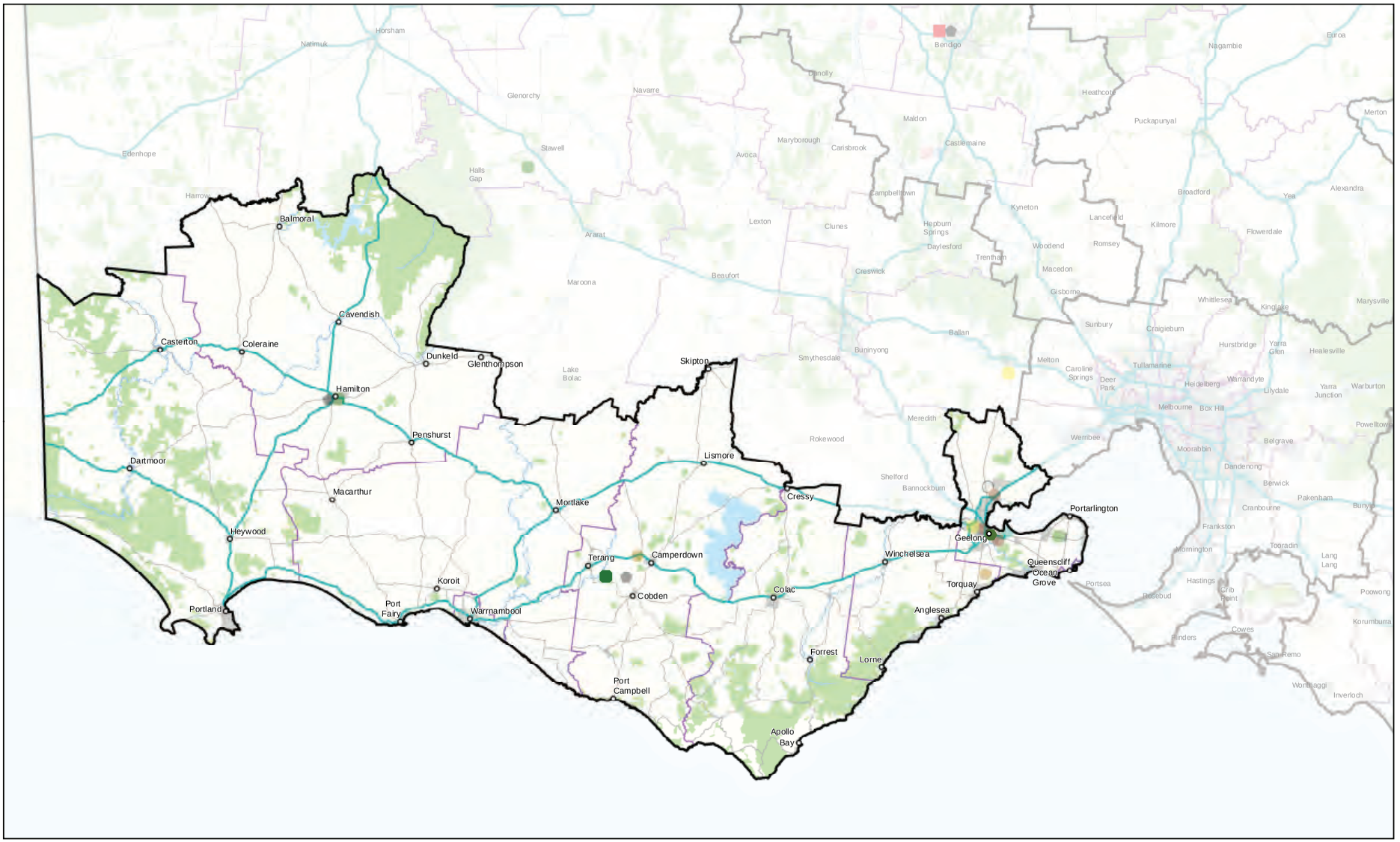
As defined in the state infrastructure plan: ***An ideal hub has appropriate buffers between the waste and resource recovery facilities and incompatible uses to support the activities undertaken at that location. It has well established feeder-spokes and good access to transport networks. It is co-located or in close proximity to complementary activities that provide feedstocks or markets for the products and services, or share and utilise the same buffers. It is [economically] viable, minimises community, environment and public health impacts and contributes to the local and state economy.***

Table 17 Cascading criteria for waste and resource recovery hubs

Level	Criteria
State importance	The hub manages or processes a significant proportion of one or more material streams for the state. The type of materials managed or reprocessed at the hub are of economic value to the state's economy or pose a significant risk to economic, community, environment and public health outcomes if not recovered. It is an existing hub with established spokes for one or more materials. It is an integral component of the supply and/or processing chain across multiple regions or the state. If the functionality of the hub was compromised, it would put pressure on the viability of upstream or downstream industries. The hub has access to generators, markets, ports or transport infrastructure. The hub is in a location compatible with waste management and resource recovery activities and has capacity for future waste management and resource recovery activities.
Regional importance	The hub manages or processes a significant proportion of one or more material streams for the waste and resource recovery region or adjacent regions. The type of materials managed or reprocessed at the site are of economic value to the region or adjacent regions or pose a significant risk to economic, community, environment and public health outcomes if not recovered. It is an existing hub with established spokes for one or more materials. If the functionality of the site was compromised it would put pressure on the viability of upstream and downstream industries within the region. The hub is in a location compatible with waste management and resource recovery activities and has capacity for future waste management and resource recovery activities. The hub enables aggregation or consolidation of material streams from within the region or adjacent regions prior to transport to a regional hub for reprocessing or disposal. The hub may facilitate some reprocessing within the region or in the close proximity.
Local importance	The hub manages or processes a significant proportion of one or more material streams for the local community. The hub is an integral component of the local infrastructure. If the functionality was compromised it would reduce the ability of the local community to manage its waste streams and recover resources. The hub enables aggregation or consolidation of material streams at the local level prior to transport to a regional or state hub for reprocessing or disposal. The type of materials managed or reprocessed at the site might be of economic value to the local community or pose a significant risk to economic, community, environment and public health outcomes if not recovered.

Source: *Statewide Waste and Resource Recovery Infrastructure Plan 2015-44,* Sustainability Victoria, 2015

Map 2 Barwon South West hub of state importance



Paper Size A3

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Kilometres

Map Projection: Lambert Conformal Conic
Horizontal Datum: GDA 1994
Grid: GDA 1994 VICGRID94

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LEGEND

State Significance
- Putrescible & Solid Inert Landfill
- Resource Recovery - MRF (Municipal Solid Waste)

Regional Significance
- Putrescible & Solid Inert Landfill
- Solid Inert Landfill
- Reprocessing - Aggregates, Masonary & Soil
- Reprocessing - Organics
- Reprocessing - Other
- Reprocessing - Plastic
- Resource Recovery - MRF (Municipal Solid Waste)
- Resource Recovery RRC/TS, co-located at landfill
- Township
- Region Boundary
- Principal Freight Network
- LGA & Alpine Resort Area Boundaries
- Major Roads
- Major Water Areas
- Major Watercourses
- Township Boundaries
- Parks and Reserves

GHD VICTORIA

Regional Waste & Resource Recovery Implementation Plan
Barwon South West Waste & Resource Recovery Group

Job Number 31-33625
Revision D
Date 11 Mar 2016

Hubs of State Importance

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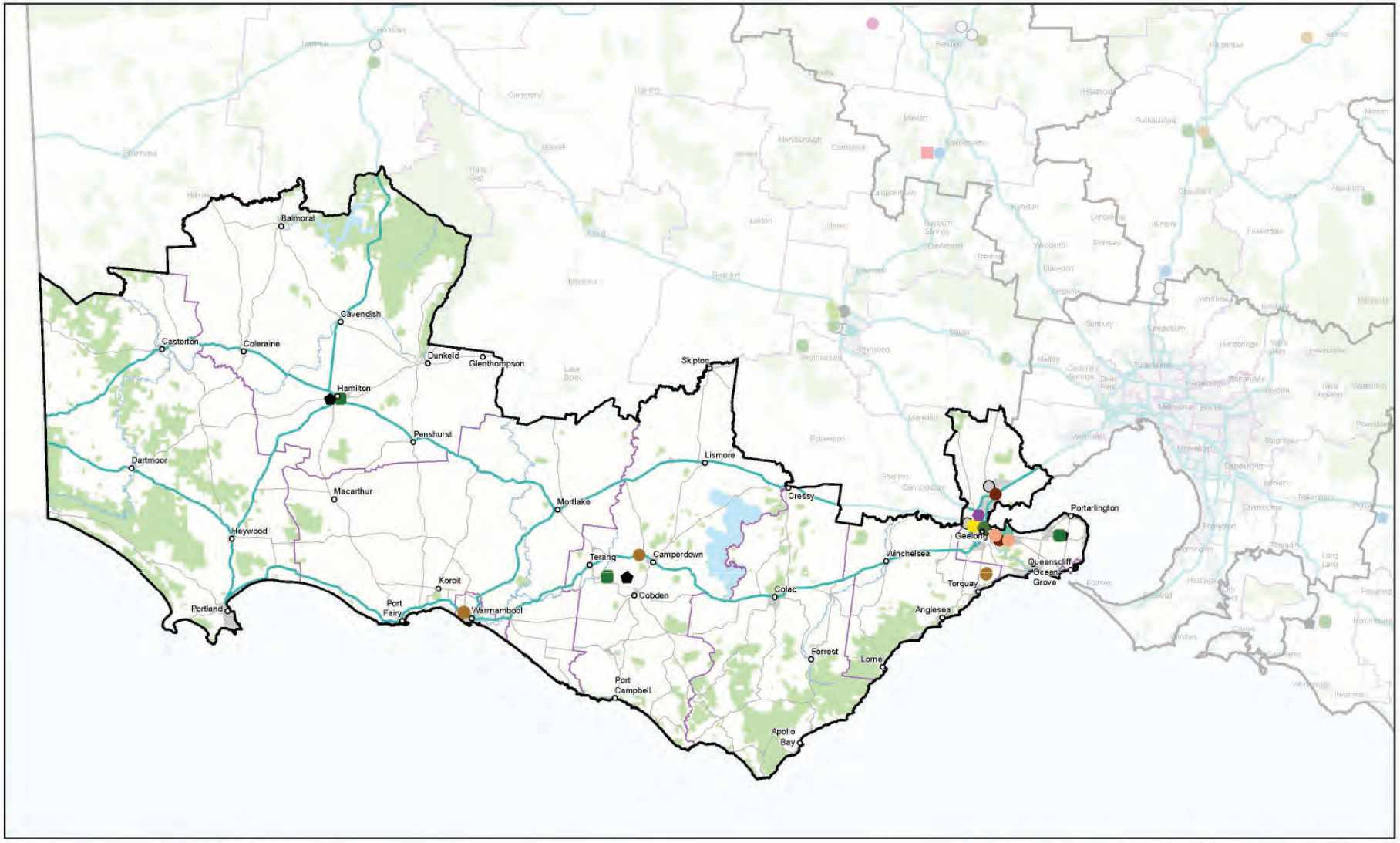
Data source: DELWP, VicMap, 2015; Infrastructure, SV, 2015; Created by: mjahanshahi

180 Lonsdale Street Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com W www.ghd.com

Map 3 Barwon South West hubs of regional importance



4.7.3 Strategic review of the Barwon South West region's hubs

Table 18 presents the results of the strategic review of the region's hubs. It lists the name of the hub and whether it is of state, regional or local importance as well as the individual challenges and opportunities for the hub. It also identifies any actions included in the Action plan to address the challenges and opportunities.

It is recognised that the network of RRC/TSs across the region are of local importance.

Table 18 Strategic analysis of hubs

Hub of importance	Challenges and opportunities	PRIORITY ACTION (if applicable)
STATE		
Corangamite Regional Landfill	Manages more than 15% of the region's waste going to landfill. Licensed to accept solid inert and putrescible waste. Currently has capacity until 2041-42 but this would be shortened if it receives waste diverted from other landfills as they close. Co-located with a RRC/TS and composting facility. Need to protect buffer zones around the landfill to prevent encroachment of sensitive land uses. The market sounding process identified an opportunity to upgrade composting operations onsite and establish pre-sort infrastructure.	2, 3, 4, 5, 8, 9, 10, 11, 12
REGIONAL		
SKM MRF	Recycling of cardboard/paper, plastics, glass and metals from within and outside the region including interstate. Currently under-utilised and has additional capacity.	1, 6, 7, 8, 9, 11, 12
AD & HM Robertson	Licensed composting facility located within a rural area and processes organics from both within and outside the region. Limited by licence capacity limits. Buffers need to be protected.	5, 8, 9, 11, 12
Australian New Energy	Processes timber and wood, has recently expanded operations and has capacity to process more material. Co-located with other RRC/TS facilities.	2, 5, 8, 11, 12
Bellarine Trees	Garden organics processor. Co-located with other RRC/TS facilities.	2, 5, 8, 11, 12
Camperdown Compost	Processes organics, including material from outside the region. Has a licensed facility near Camperdown and also conducts small scale on farm composting throughout the region. Opportunity to expand on farm composting at locations close to source materials. Buffers at licensed facility need to be protected.	2, 5, 8, 9, 11, 12
C&D Recycling Lara	Land use planning issues need to be resolved for the existing site. Opportunity for the development of end use markets for C&D materials recovered.	2, 3, 4, 5, 8, 9, 11, 12
Drysdale Landfill	Manages a large component of the region's (east end) waste going to landfill. Licensed to accept solid inert and putrescible waste. Co-located with a RRC/TS. There is a potential opportunity to expand into the neighbouring quarry (with appropriate statutory approvals) if such a need is identified in a future plan.	8, 11, 12

Fyansford Landfill	Manages a component (over 10%) of the region's (east end) waste going to landfill, licensed to receive solid inert waste.	8, 11, 12
Hamilton Landfill	Serves the Southern Grampians catchment. Established RRC/TS co-located onsite.	8, 11, 12
GDP Industries	Reprocesses e-waste, timber, polystyrene and textiles. Currently operating at capacity.	2, 4, 5, 8, 11, 12
Geelong Composting	Currently processes organic waste via small scale on farm composting. Opportunity to expand on farm composting at locations close to source materials.	2, 5, 8, 11, 12
GT Recycling	Processes rigid plastics from within and outside the region.	2, 4, 5, 8, 11, 12
Regional Recycle	Processes aggregates, masonry and soil. Opportunity to improve resource recovery rates by developing markets for recycled concrete and masonry products, for example road base.	2, 5, 11, 12
Statewide Waste	Organics processor and RRC/TS facility. Processor of kerbside organics from the region. Note: Statewide Waste RRC/TS has been included on Regional Hubs of Importance Infrastructure (Map 3) as part of their reprocessing system.	2, 5, 8, 9, 11, 12
The Mattress Recycler	Recycling mattresses and couches from within the region and Grampians Central West WRRG. Provided a submission to the market sounding process with options to expand reprocessing.	2, 4, 5, 8, 11, 12
Visy MRF	Recycling of paper grades from commercial sources.	1, 6, 7, 8, 9, 11, 12
LOCAL		
RRC/TSs	Provide a service to the community and the opportunity to participate in resource recovery beyond household collection systems. Opportunity to upgrade/improve infrastructure to increase resource recovery and to meet best practice. Buffers and land use planning considerations.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

4.8 Environmental and financial performance of infrastructure

There are many factors that influence the performance of waste and resource recovery infrastructure, which play out in different ways across the state and change over time and infrastructure type, size and location. SV undertook an analysis for Victoria in 2015, which used published reports and communications with industry to identify key factors and consider how these have, and may, influence the environmental and financial performance of infrastructure over the coming years (refer to Appendix 6 for a detailed outline of these factors). This report and other relevant information have been used to inform a regional assessment to assist planning and decision making (Table 19). Action plan actions have been listed where relevant. This analysis did not take into consideration any financial issues or constraints of individual facilitites due to data limitations.

Table 19 Environmental and financial performance of infrastructure in the region

Infrastructure category	Environmental and financial performance in the region	Opportunities	Priority Action
RRC/TSs	Environmental and social value needs consideration to better inform cost benefit analysis. Markets for recyclables are cyclical and financial returns can fluctuate significantly. End markets for recyclables are not as strong in regional centres compared to larger centres such as Melbourne. The cost of handling and transport can be greater than the market value when recyclables need to be transported large distances for their end use. When the cost of processing recyclable materials is greater than the cost of landfilling it is unlikely recycling collection systems will be established.	Investigation of infrastructure efficiencies where economies of scale are low, operations are challenging and the cost per tonne of waste managed is rising or high.	11
MRFs	MRFs generally have relatively stable demand and pricing for commodities and mature markets.	Opportunity to increase resource recovery.	1, 6
Organics	On farm composting at smaller scale occurs mostly without regulation and with varying management techniques. Windrow composting is more likely to suffer from odour and run off problems. Limitations on amounts of food and other wet organics impact the business model, but windrow processing remains popular given the lower cost of establishment and technology. Larger scale operators experience difficulty in obtaining approval to expand due to lack of certainty and direction in regulations. Varying quality of end product means that market opportunities can be limited.	Assist EPA and SV to establish greater clarity of direction for organics processing as per the Victoria Organics Strategy. Encourage operators to pursue better practice standards and obtain relevant approvals. Increase the quality and quantity of organics collected through council kerbside collection services. Ensure regional capacity can meet the growing regional need. Increase organics recovery from industry including the C&I and agriculture sectors.	1, 2, 4, 7, 8
Wood/timber processing	Low margin material markets, competing with cheap virgin materials or product imports (sometimes leading to stockpiling).	Increase recovery from C&I and C&D sectors. Increase recovery through pre-sort infrastructure at landfills. Ensure regional capacity is available when needed to meet growing region need. Potential for alternate end uses such as refuse derived fuels or animal bedding.	2, 3, 4, 5
Paper/ cardboard	While relatively stable in comparison to other commodities, market price fluctuations can result in material stockpiling and/or export. Well developed collection systems for commercial and kerbside sources. Leakage of paper and cardboard to landfill is a lost opportunity.	Increase recovery through kerbside and C&I collections.	1, 2, 4

Plastics	Cost of processing infrastructure and transport for often low value materials.	Increase recovery through kerbside and C&I collections. Work with reprocessors and councils to identify services and facilities that will enable greater recovery of plastics.	1, 2, 4
Metals	Market price fluctuations resulting in material stockpiling and/or export.		
Aggregates, masonry and soils	Low margin material markets, competing with cheap virgin materials or product imports (sometimes leading to stockpiling).	Recycled materials in pavement construction are endorsed by agencies including VicRoads, however it is not widely used in many councils. Investigate opportunities to increase reprocessing.	2, 5, 7
Energy from waste (including pyrolysis, gasification and anaerobic digestion)	Sourcing the large capital necessary for investment in infrastructure and equipment. The ability to attract sufficient material volumes to reach viable economies of scale.	Increase recovery of organics from all sectors. Assess potential development of scalable technologies relevant to the region's needs.	2
Existing landfills	In 2013 the EPA undertook an assessment of the financial and environmental sustainability of rural licensed landfills in Victoria[15] which prioritised site risks and opportunities. Increased compliance costs due to higher landfill design.	Work with councils to protect landfill buffers. Barwon South West WRRG can support efforts for accurate and consistent whole-of-life costing of landfilling including provision for landfill assurance. Investigate opportunities to pre-sort materials prior to landfilling. Revisit and assess strategic role of landfill needs prior to the development of the next 10-year implementation plan.	4, 8, 9
Closed landfills	These sites can pose risks that are a legacy of being sited and built to the standards that were accepted as good practice at that time, but with new information and technology available, the required standards are now higher. Duty holders bear the responsibility for complying with EPAs standards for rehabilitation. There may be an opportunity to better manage localised risks to the environment and surrounding community amenity, particularly at older sites. The Victorian Auditor-General commented on improvements needed to address these risks, which the EPA and councils are currently undertaking[2]. Increased compliance costs due to the higher post closure standards.	There is an opportunity to liaise with councils and EPA regarding the development of strategies for closed landfills, including the develoment of risk-based assessments for closed landfills in the region that take into account the local context.	8

[15] *Rural Landfill Risk Assessment Project Report,* URS Australia Pty Ltd, in association with Fox-Lane Consulting, June 2013

Municipal kerbside food and garden organics bin

4.8.1 Climate change

The Victorian Government is committed to positioning Victoria as a national and international leader in climate change action and is implementing a range of policy initiatives to deliver on this commitment, including:

- The new **Climate Change Act 2017** - legislates a long-term target of net zero greenhouse gas emissions by 2050 and gives effect to the majority of the commitments set out in the Victorian Government Response to the 2015 Independent Review of the Climate Change Act 2010.
- **Victoria's Climate Change Framework** - sets out our vision for Victoria in 2050 and the steps required across government and key sectors of the economy to commence the transition.
- **Victoria's Climate Change Adaptation Plan 2017-2020** - sets out the priorities for the next four years for the Victorian Government to better understand and manage current impacts, and to prepare for the long-term risks of climate change.
- **TAKE2** – Victoria's climate change pledge program for State Government, local governments, businesses, community groups, educational institutions and individuals to make public commitments to reduce emissions and build capacity between now and 2020.
- Committing to **Victorian renewable energy targets (VRET)** of 25% by 2020 and 40% by 2025, supported by a competitive reverse auction scheme.

Asserting climate change action as a core component of public sector business is essential to delivering these climate change policy objectives.

This requires all Victorian Government agencies and portfolio entities to understand the impacts of climate change on their assets and service delivery and contribute to reducing emissions.

The impacts of climate change on Victoria's waste sector are varied and may include issues such as changes in the timing, form and amount of precipitation as well as potential increases in extreme weather events such as bushfires, flood and drought.

These impacts can affect waste infrastructure, remediation and containment strategies as well as local water quality.

Waste management authorities have a number of opportunities to contribute towards action on climate change, including:

- Incorporating climate-resilience into the design and management of waste infrastructure.
- Contributing to TAKE2 by taking measures to reduce emissions from operations and facilities, landfills and reprocessing of materials such as organics.
- Assist the development of markets for reprocessed materials, i.e. organics to compost or energy.
- Review potential risks and current assumptions about remediation and containment methods in light of climate change impacts.
- Putting in place contingency plans to handle surges in treatment and disposal of waste generated from climate-related events (such as bushfires and floods).
- Contributing to improvements in soil quality through the provision of compost.
- Contributing to renewable energy targets through the use of EfW technologies.
- Engaging with the community to increase their understanding of the challenges and opportunities presented by climate change for the waste sector, and how they can help.

4.8.2 Greenhouse gas emissions and waste and resource recovery operations

Greenhouse gas emissions associated with the management of waste and resource recovery occur in different parts of the waste and resource recovery system. A major source is from the breakdown of organic materials causing the generation of methane gas. A number of landfills capture the gas off the landfill to produce energy of flaring. The transport of residual waste and materials for recovery and the energy used to process materials also generate emissions. This Barwon South West Implementation Plan aims to reduce the amount of organics to landfill reducing the generation of gas emissions.

As discussed, the Victorian Government is currently consulting on its Climate Change Framework, and this will consider waste and resource recovery and emissions, transport emissions and government responsibilities in planning and delivering services.

4.9 Risks and contingency planning

WRRGs are required to factor contingency requirements into the assessment of landfill and resource recovery needs.

Planning for, and allocating, contingency allowances ensures that sufficient landfill or reprocessing capacity is available if an adverse or emergency event occurs.

In the last decade, a wide range of natural disasters and other events of differing scales have occurred in the region highlighting the critical need for this work. This planning also needs to consider the non-delivery of new waste and resource recovery infrastructure and if existing waste and resource recovery infrastructure is not available.

Events requiring contingency consideration can include:

- Inadequate planning by landfill operators to develop existing sites and landfill cells to ensure an ongoing cycle of planning, construction and approval of airspace to meet contractual and industry demands.
- Delays in the development of a proposed waste and resource recovery facility against expected timeframes or abandonment of such developments entirely for example insufficient funds.
- Failure of existing reprocessors to obtain required planning and works approvals for expansion.
- An adverse environmental event, within or near to the Barwon South West region that may:
  - disrupt collection systems or access to RRC/TSs, such as a flood
  - produce large quantities of waste requiring immediate disposal or recovery at short notice.
- An adverse event that closes a landfill in the short term requiring alternative disposal options for this period. Examples include police operations, onsite fires, onsite accidents or prolonged rain events or periods of extreme fire weather.
- The closure of significant waste and resource recovery infrastructure (e.g. through emergency event, market or business failure).
- Failure of industry to operate as intended and/or contracted, which can inadvertently result in potential stockpiling of source materials or end products that may ultimately mean the products will need to be managed. This would be exacerbated by any market failures for one or more end products.
- A biosecurity event (animal disease), that would require specific transport, treatment and disposal protocols, has the potential to increase the amount of materials landfilled and use available landfill airspace at a faster rate than expected.
- A biosecurity event (plant, pest, disease and weed) that would require limitations on the movement of raw organics into and within the region or onsite treatment processes. Such an event could also result in significant economic and reputational damage to high value industries if not managed appropriately and in an integrated way.

4.9.1 Resource recovery and reprocessing infrastructure

The Barwon South West Implementation Plan relies on the development of new resource recovery infrastructure to progressively reduce the reliance on landfills.

Strategic risks could arise from:

- Failure of new infrastructure to be delivered, failure of processes or technologies to be approved and/or constructed to the timelines of the Infrastructure Schedule.
- Lost opportunities if markets cannot be stimulated and supported by demonstrations in technology advances.
- Lost opportunities through inability of planning and regulatory authorities to provide approval pathways and operating conditions for new technologies.
- Financial or technical failure of new resource recovery technology.

The midterm review of the infrastructure schedule will mitigate this risk. The review will include an assessment of council commitment, progress of alternative waste treatment and EfW technology to gauge the likelihood of delivery of new infrastructure as planned.

It is recognised that while the waste and resource recovery

PRIORITY ACTION 11

Work collaboratively with all stakeholders to ensure statewide policy, planning and funding programs support the region's infrastructure needs.

PRIORITY ACTION 10

Work with councils and other relevant authorities to reduce risk and to ensure contingency plans are in place for managing waste.

framework seeks to limit reliance on landfills, contingency airspace capacity, and management of residuals from more advanced processing technologies will still be a necessity.

4.9.2 Landfill infrastructure

The Barwon South West Implementation Plan is required to sequence the filling of available airspace. The likely closure dates of existing landfills (Section 7.2.2 Table 27) are based on void space available for landfill disposal.

Early closure of landfills within and near to the region within the planning period along with advances in transport efficiencies may result in changed material flows.

By offsetting the alleviation of environmental risks posed by numerous smaller landfills, there is an increased risk posed by a reliance on fewer, larger landfills. The deactivation of a large landfill site due to an emergency event, remediation works or inability to gain timely approval for cell development are all events that would result in significant disruption to the residual disposal system.

4.9.3 Emergency events

Emergency events can create an immediate need to safely landfill large quantities of waste.

Occupational health and safety of community, staff and contractors are paramount; natural disasters create many hazards, some of which are unforeseen. The working environment in the aftermath of an emergency event is a dynamic situation with waste management and resource recovery only one aspect of natural disaster management and recovery.

Depending on the scale of an emergency event, there are multiple landfill sites within the region that can accept most material at EPA's discretion. In most instances this will ensure disposal requirements can be managed at short notice and avoid the environmental and public health impacts that would otherwise be likely to eventuate.

There are operational challenges to providing contingency airspace in case of an emergency event. Sites with readily available airspace scheduled to accept the type of waste produced by an event may not be readily able to receive the waste at short notice. Practicalities of procurement processes and site issues such as traffic management can generally be accommodated to enable a timely solution.

An issue however, in the aftermath of fires and severe windstorms, is the management of asbestos waste. Current disposal options are few and those that are available have various restrictions which limit availability to the higher population centres within the region.

The requirement to observe hygiene requirements for handling asbestos bearing wastes and haul over greater distances could slow the management of a clean up effort and could cause significant delays in the demolition and removal of debris.

In Victoria, councils develop municipal emergency recovery plans (MERP) and have designated municipal recovery managers (MRM).

Efficient waste and resource recovery management is one vital aspect of a successful recovery from a natural disaster. Efficient delivery is underpinned by being part of the overall response plan. It is vital that waste and resource recovery management forms part of each MERP. It is the responsibility of the waste management officer, with the MRM, to ensure this occurs.

Priority Action 10 addresses the need to develop greater coordination and integration of waste and resource recovery contingency planning through establishing a group comprising EPA and regional municipal emergency recovery officer networks.

A key task is to further investigate the pre-event preparation for waste and resource recovery in emergencies and the process of decision making during such events.

Barwon South West WRRG will continue to work with SV and the other WRRGs, through an annual statewide contingency planning workshop, to address contingency planning.

4.9.4 Barwon South West risks and contingencies

As part of developing the Barwon South West Implementation Plan major risks and mitigation strategies have been identified through:

- A statewide risk and contingency workshop.
- Consultation with councils around risks associated with council owned/operated infrastructure.

Mitigation strategies have only been developed for the 10-year planning period. Risk rankings are based on risks at the time of writing the plan. Risks are likely to change as mitigation strategies are implemented over time and circumstances change. The risk register is shown in Table 20.

Table 20 Barwon South West Implementation Plan risk register

Risk	Cause(s)	Potential impact	Mitigation strategy	Mitigation addressed in plan	Risk ranking
Failure of markets	Immature markets, variable feedstock, low viability and demand	Cost, recovery rate, compliance action, environment, reputation	Work with industry and state government to develop local markets, monitor use of new technologies	Y	High
Infrastructure closes unexpectedly or is no longer available	Regulatory issue, business failure, market failure, biohazard	Cost, recovery rate, compliance action, environment, reputation	Investigate/establish if alternative options exist either within the region or in neighbouring regions so that the region is not dependent on one company/facility. As a last resort some material types could possibly be stockpiled or sent to landfill	Y	High
Financial viability of regional landfills	Increasing development, operational and rehabilitation costs are making small-medium landfills unviable	Increased cost of sending waste elsewhere	Divert waste to alternative landfills	Y	High
Natural disaster/ emergency event resulting in significant volumes of waste to be disposed of	Bush fire, floods	Increase in waste sent to landfill reducing cell life capacity, alternative transport to other facilities required, potential health impacts	Work with state government departments (EPA, DELWP, EMV) to further investigate the waste requirements caused by emergency events, Guidelines for Developing a Disaster Waste Management Plan, determine options for disposal during an emergency	Y	High
Waste resource recovery sites not well located and/ or not supported in local planning schemes	Community opposition, complaints, planning encroachment	Increased cost, stock piling, environmental risk	Work with council planning schemes, growth areas, effective community engagement	Y	Medium
Policies or regulations not producing desired outcomes	Regulatory failure	Failure to meet strategic direction	Work with state government to ensure policies are clear and realistic	Y	Medium
Landfill/s unable to accept waste	Non-compliant with regulations, business failure, biohazard	Increased cost of sending waste elsewhere, compliance action, environment	Engage with owner/operator and regulator, divert waste to other landfill	Y	Medium
State or federal schemes do not adequately consider regional implications	Regulatory failure	Failure to meet strategic direction	Work with government bodies to ensure schemes consider all impacts	Y	Medium
Significant increases in transport costs	Increased fuel prices based upon global oil prices, taxes or freight fees	Cost, recovery rate, market failure, reputation, stockpiling	Identify alternative options where possible. Improve waste aggregation and transport efficiencies	Y	Medium
Climate change	Extreme weather events, such as heat waves	May restrict opening hours of facilities, reduce the functionality of facilities or impact on collection systems	Work with state government departments and councils to further investigate the waste requirements caused by climate change	Y	Medium
Inadequate social licence to operate	Changing community attitudes	May restrict operation or opportunities to exand operations	Encourage operators to undertake effective community engagement at key facilities during establishment and during periods of change. Work with council planning schemes, growth areas, effective community engagement	Y	Medium
Infrastructure delivery issues	Region's waste management system may rely on significant new or expanded infrastructure becoming availbale at key points in time	Delays in planning and/or approvals, construction or non-compliance to regulations may result in infrastructure not available when required	Encourage operators to commence planning, procuring and construction with adequate time allowances. Encourage operators to monitor progress of infrastructure planning and delivery, to address potential timing risks	Y	Medium

Farmland in the Barwon South West region

5 LAND USE PLANNING AND THE TRANSPORT NETWORK

5.1 Land use planning

It is an objective of the Victorian Waste and Resource Recovery Infrastructure Planning Framework to effectively integrate waste and resource recovery infrastructure planning with land use and transport planning (EP Act s 50A).

A key function of the *Planning and Environment Act 1987* (Vic) is to minimise the risk of any potential adverse environmental, health and safety impacts. The Act establishes a framework (the *State Planning Policy Framework*) for planning the use, development and protection of land in Victoria to meet the present and long term interests of all Victorians.

All planning schemes in the State of Victoria include reference to waste and resource recovery infrastructure at clause 19.03-5 of the *State Planning Policy Framework*. This requires planning decision makers to consider (amongst other things) any relevant regional waste management plan. Planning decision makers are required to have regard to clause 19.03-5 as appropriate when preparing planning scheme amendments and determining planning permit applications.

Clause 19.03-5 provides a link between the Barwon South West Implementation Plan and local planning schemes from a policy perspective. Aligning this plan with relevant local planning schemes is critical to achieve the objectives of the planning framework. The process is outlined in Section 7 Infrastructure schedule.

5.1.1 Link between land use planning and waste recovery infrastructure

Planning for waste and resource recovery infrastructure is inherently linked with land use planning. As the population grows we need to secure more housing, essential community infrastructure and services including waste and resource recovery facilities and transport.

A key challenge for land use planning is to balance these competing needs and interests so that we achieve an overall community benefit by developing land in a fair, orderly, economic and sustainable way.

The state infrastructure plan summarises the land use planning challenge as, "*making suitably zoned land available for waste and resource recovery activities for the lifetime of industry investment. This requires planning to ensure there is well located land available with appropriate buffers and other mechanisms in place to protect sites from encroachment by incompatible land uses and the amenity of the surrounding community*".

Aligning siting requirements with both environmental and land use planning requirements is necessary to ensure the right sites are selected for essential waste and recovery infrastructure.

In order to attract initial investment and to maximise any economic gains arising from this investment, it is critical that a site can remain commercially viable and socially accepted by adjoining communities for its operating life.

Land use planning and environmental approvals, where appropriate, now require ongoing community engagement as part of the conditions of planning permits and licence approvals.

As with other essential services and infrastructure, it is important that sufficient land is available in suitable locations with appropriate approvals for the waste and resource recovery facilities that the Barwon South West region is going to need now and in the future. As with other essential services, waste and resource recovery facility owners and operators need to implement best practices to minimise their offsite impacts.

5.1.2 Siting

The Metropolitan WRRG developed high level siting criteria, for organics, non-organics and landfill infrastructure, to assist WRRGs, councils and industry with less experience in assessing the suitability of sites for resource recovery and disposal infrastructure. Barwon South West WRRG would promote this tool to councils and industry in the region when appropriate.

To support the long term future of waste facilities and landfills it is essential that there is a match between the type of facility, risk and the surrounding land uses.

Facilities likely to generate adverse offsite impacts need to be located on appropriately zoned land. In addition, appropriate buffers, or separation distances, around waste and resource recovery facilities can complement these strategic land use decisions to protect communities and the environment from potential adverse impacts such as dust, noise, odours, landfill gas migration and leachate. Preventing certain kinds of development, and land uses (such as housing and schools) from being too close to waste and resource recovery operations protects the community and waste facilities from the impacts of incompatible land uses.

The siting of waste and resource recovery infrastructure in close proximity to end markets provides employment opportunities and can offer opportunities for the co-location of alternative resource recovery facilities with other sectors, such as water and waste infrastructure. Minimising transport distances and costs, which are often a high proportion of overall costs, can increase the viability of a facility and result in financial, greenhouse and other benefits.

Barwon South West WRRG has considered the requirements of the Landfill BPEM in preparing the Barwon South West Implementation Plan. As discussed, the detailed analysis undertaken to develop the plan indicates that no additional landfills will be required for the region for the next 10 years. Therefore, addressing Schedule A of the policy, 'Areas where landfill sites must not be established or extended into' was not necessary. Current and future capacity needs will be reviewed as part of the implementation plan's mid term review.

Barwon South West WRRG will continue to work with councils to ensure that waste and resource recovery needs are adequately recognised in municipal strategic statements and other strategic planning documents.

It is recognised in the planning for organics processing infrastructure that consideration needs to be given to the EPA's *Designing, constructing and operating composting facilities guideline*.

Collected E-waste ready for transportation to a recycling facility

5.2 Transport

As noted in the state infrastructure plan, many areas of regional Victoria are reliant on reprocessing facilities in Melbourne under a 'hubs-and-spokes' waste network. This involves transporting materials regularly, sometimes over long distances, with subsequent impacts on energy resources (mostly using non-renewable fossil fuels), road networks and health, safety and environment risks including biosecurity risks.

Where feasible, local solutions can reduce the environmental footprint of waste management and recycling, and add value to the economy and job opportunities in the region.

There are opportunities to reduce transport costs through compaction and consolidation of materials, as well as new technologies such as walking floor compaction at RRC/TSs and the shredding and/or baling of specific material streams such as cardboard, plastics and tyres.

There is also an opportunity to rationalise smaller local landfills and RRC/TSs and establish larger regional resource recovery, disposal and transport hubs. This would need to be accompanied by regional partnerships and collaborative procurement to establish adequate tonnages of materials to minimise transport costs. Opportunities for back loading should also be considered.

Transport features of the region:

- The region is well serviced by a network of highways and major designated roads that includes the Princes, Hamilton, Henty, Glenelg and Hopkins Highways.
- State and regional hubs exhibit good road access but access to many local hubs is variable.
- Local transport strategies include VicRoads upgrades to the Forrest-Apollo Bay road and Princes Highway in the Colac area. The Great Ocean Road is recognised as an issue during peak tourist periods which hinder the movement of waste service vehicles.
- The Great Ocean Road and Camp Road, Anglesea are currently being reviewed with upgrades planned within the next twelve months.
- Construction of the Drysdale bypass will commence in 2017-18 that will ease waste vehicle traffic to the landfill.

5.2.1 The *Transport Integration Act 2010* and transport planning

The *Transport Integration Act 2010* (TI Act) is another key piece of relevant legislation for waste and resource recovery infrastructure. Recognising that land use and transport planning are interdependent, the TI Act requires certain agencies, like councils, to have regard to its objectives and principles when making certain decisions.

The TI Act objectives and decision making principles recognise the need for:

- environmental sustainability
- integration of transport and land use (s. 11)
- integrated decision making (s. 15)
- triple bottom line assessment.

The principle of integrated decision making means seeking to achieve government policy objectives through coordination between all levels of government and government agencies and with the private sector (s. 15).

5.2.2 Biosecurity

DELWP administer the *Plant Biosecurity Act 2010* which aims to prevent the entry of plant pests and diseases as well as manage and control the spread of plant pests and diseases within Victoria. The Act also aims to enhance market access for plant and plant products in local, national and international markets.

Transport of organic material through peak agricultural areas also raises the biosecurity risks of spreading pests and diseases.

Wannon Falls

Mixed recycling

6 MARKET SOUNDING FOR WASTE AND RESOURCE RECOVERY INFRASTRUCTURE

Barwon South West WRRG and Grampians Central West WRRG undertook a regional Market Sounding (Request for Information), together with a resource recovery scheduling application and evaluation process, to engage the waste resource recovery sector to inform the development of this plan (including the Infrastructure Schedule).

The process was looking for submissions on collection, consolidation, aggregation, sorting, separation, treatment and reprocessing of waste and material streams and information on perceived challenges and constraints to expansion.

In total, 21 proponents made submissions, proposing infrastructure to include in the schedule.

Following a detailed evaluation process, seven proposals were recommended for inclusion in the infrastructure schedule as shown in Table 21.

It is acknowledged that additional unidentified waste sector operators/providers may exist or have an interest in operating in the region but did not respond to the market sounding process.

Market sounding assisted in determining the appropriate infrastructure to manage the region's waste and resource recovery over the next 10 years.

Table 21 Infrastructure scheduling recommended proposals

Proponent	Location	Type of proposal	Description	Products
Corangamite (S)	Corangamite Regional Landfill, Naroghid	Existing facility with changed or expanded waste and/or resource recovery	Improve the quality of current material being processed onsite. Increase the site's capacity	Compost material to Australian Standards
Corangamite (S)	Corangamite Regional Landfill, Naroghid	Existing facility with changed or expanded waste and/or resource recovery	Increase resource recovery through pre-sort infrastructure at landfill	Increase resource recovery of organics and plastics
Greater Geelong (C)	Anakie	New infrastructure	Open windrow composting of kerbside organics	Soil improver
Surf Coast (S)	Anglesea	Existing facility with changed or expanded waste and/or resource recovery	Expand RRC/TSs, consolidation point to bulk haul waste post landfill closure	
Surf Coast (S)	Torquay	New infrastructure	Development of a RRC/TSs	
ReNu Waste Pty Ltd (Sustainable Clean Energy)	Little River	New infrastructure	Pyrolysis technology	Energy
The Mattress Recycler	Moolap	Existing facility with changed or expanded waste and/or resource recovery	Increased recovery of mattresses and furniture	Textiles, timber and metal for processing

6.1 Relationship between the market sounding process and the infrastructure schedule

The market sounding process directly informed the development of the resource recovery infrastructure component of the schedule.

Any organisation seeking to have its new and/or expanded infrastructure included in the schedules of the Barwon South West or Grampians Central West Regional Implementation Plans were required to make a submission.

While it is not a prerequisite for resource recovery infrastructure to be on the infrastructure schedule to be considered for approvals, the EPA may refuse to consider an application for a works approval or an application for the issue or amendment of a licence in relation to a waste management facility if the operations of the facility could be inconsistent with the state infrastructure plan or a relevant regional implementation plan (EP Act s. 50C(1)).

The EP Act also prescribes that a council must perform its waste management functions consistently with the regional implementation plans applying to the council's municipal district (s. 50BH).

Submissions that passed the assessment process are listed, subject to agreement by the respondent, in the existing Infrastructure Schedule or the future resource recovery infrastructure requirements and options (Section 7.1 Table 23).

Public place recycling infrastructure in Hamilton

The Grampians National Park

7 INFRASTRUCTURE SCHEDULE

The EP Act requires the Barwon South West Implementation Plan to include a schedule of the existing and required waste and resource recovery infrastructure within the region to enable strategic planning to identify the gaps in the existing infrastructure required to meet the strategic objectives for the region and plan for future needs.

In developing the schedule, the Barwon South West WRRG worked with other WRRGs to ensure consistency and alignment with the infrastructure schedules across the state.

To the knowledge of Barwon South West WRRG, all relevant existing facilities have been included on this schedule. Please note that inclusion of an existing facility in this schedule should not in any way be construed as a warranty or representation as to the quality, compliance, effectiveness or suitability of the facilities included. While Barwon South West WRRG has made every effort to compile this information accurately and completely, the list of facilities included, information and comments in the 'other considerations' sections of tables are not exhaustive, and are provided to generally facilitate the achievement of the objectives of the EP Act. Further information about individual facilities should be sought from the EPA or (where appropriate) owners or operators of facilities.

In the case that future resource recovery infrastructure listed on the schedule no longer presents a preferred option for the region, the schedule will be amended.

The schedules will be reviewed within five years to determine if they best suit the regions needs.

Infrastructure scheduling process

The schedule consists of two parts:

Part A: Resource recovery and consolidation infrastructure

The purpose of Part A of the Infrastructure Schedule is to identify where existing resource recovery infrastructure in the region is currently located and the potential future requirements for resource recovery infrastructure.

The Resource Recovery Infrastructure Schedule includes:

- existing resource recovery infrastructure (Table 23)
- indication of potential need for new infrastructure capacity (Table 24)
- future resource recovery infrastructure requirements and options (Table 25).

Abbreviations used in these tables:

- MSW – municipal solid waste
- C&D - construction and demolition
- C&I - commercial and industrial

The information contained in Part A will inform the planning for expansion of current resource recovery activities and the need to establish new facilities. It is essential that appropriate land use planning is undertaken to minimise the impact of these activities on the environment, public health and amenity of the surrounding community.

Part B: Landfill infrastructure

The purpose of Part B of the schedule is to ensure that there is adequate landfill capacity planned for residual wastes for at least the next 10 years.

The Landfill Infrastruture Schedule includes:

- Table 26 Existing landfills
- Table 27 Proposed sequence of the filling of available landfill sites
- Table 28 Rehabilitation status of closed landfills.

The schedule is restricted to landfill capacity in the Barwon South West region but its development considered waste flows that may enter the region from other areas of the state.

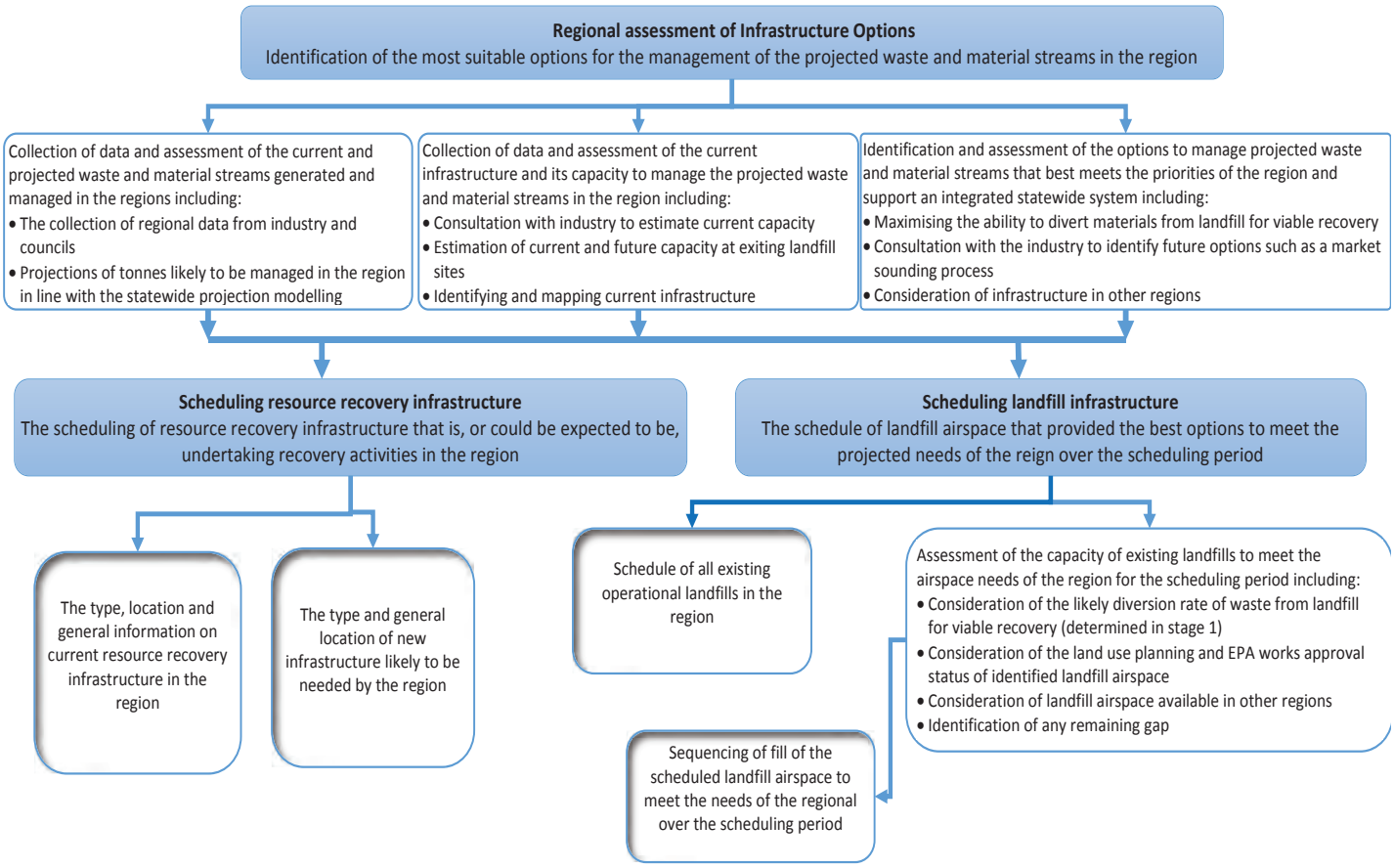
The landfill component of the Infrastructure Schedule is designed to enable appropriate buffers to be defined, allowing for sound planning decisions to be made for land development in the vicinity of existing landfills

It should be noted that listing a site or general location in this schedule does not imply or guarantee that the location or site will be further developed. Relevant planning and regulatory approvals need to be granted before the infrastructure can be developed.

Future reviews of this plan may identify that the need and or location of future resource recovery and landfill infrastructure listed in the schedule no longer presents the preferred option for the region. If this is the case, then the schedule will be amended.

Figure 7 provides a visual presentation of the scheduling process.

Figure 7 Infrastructure scheduling process



[1] *Guideline: Making, amending and integrating the Statewide Waste and Resource Recovery Infrastructure Plan and Regional Waste and Resource Recovery Implementation Plans*

[2] Supporting Guideline: Statewide infrastructure scheduling process (SV 2015)

Aligning the schedule with planning

Aligning the Barwon South West Implementation Plan with the relevant local planning schemes is critical to achieve the objectives of the Framework. To facilitate the alignment Barwon South West WRRG must:

1. Inform councils
Advise councils in Barwon South West region that this Plan (and its Infrastructure Schedule) is the Plan referred to in clause 19.03-5 of the planning scheme and that councils should give it due consideration when exercising its planning functions.

2. Provide comment to councils and proponents seeking planning approvals
Participate in planning approvals process, where relevant to implement new or expanded infrastructure.

3. Facilitate effective buffers
Work with councils to resolve encroachment of sensitive uses into buffers for existing infrastructure.

Table 22 shows how the land use planning framework and the waste planning framework interact.

Table 22 Land use planning and waste planning framework infrastructure categorisation

State infrastructure plan and regional implementation plan infrastructure type	Victorian Planning Provision (VPP)	
	Definitions (Clause 74)	Clause 52.10
Reprocessing infrastructure – other reprocessors	Industry – materials recycling Land used to collect, dismantle, treat, process, store, recycle, or sell, used or surplus materials	Advanced resource recovery technology facility
		Commercial and Industrial materials recycling
		Construction and demolition materials recycling
		Used metals treatment or processing
		Used paper and cardboard treatment or processing
		Used plastics treatment or processing
		Other resource recovery or recycling operations
Reprocessing infrastructure – organics reprocessing facility		Composting and other organics materials recycling
Reprocessing infrastructure – waste to energy facility	Renewable energy facility Land used to generate energy using resources that can be rapidly replaced by an ongoing natural process. Renewable energy resources include the sun, wind, the ocean, water flows, organic matter and the earth's heat. It includes any building or other structure or thing used in or in connection with the generation of energy by a renewable resource. It does not include a renewable energy facility principally used to supply energy for an existing use of the land	Combustion, treatment or bio-reaction of waste to produce energy
Resource recovery infrastructure – RRC/ TS	Industry – transfer station Land use to collect, consolidate, temporarily store, sort or recover refuse or use materials before transfer for disposal or use elsewhere	Refuse and used material storage, sorting and recovery in a transfer station: • Accepting organic wastes • other
Resource recovery infrastructure – MRF		
Disposal infrastructure – landfill	Industry – refuse disposal Land used to dispose of refuse, by landfill, incineration or other means	Sanitary and garbage disposal in landfill
Disposal infrastructure – incinerator[1]		

[1] Disposal Infrastructure – Incinerator – this infrastructure type was not considered in the development of this regional plan or this schedule.

Notes:
- Clause 74 of the VPP lists terms used in relation to the use of land. All waste and resource recovery activities are nested under the headline use of 'Industry'.
- Clause 52.10 lists uses with amenity impacts, some of which are relevant to the waste and resource recovery activities.

Landfill cover

7.1 PART A Resource recovery and consolidation infrastructure

All existing resource recovery infrastructure in the region that is currently operational or has all the appropriate planning and regulatory approvals has been included in the schedule. All infrastructure types in this region are:

- RRCs
- MRFs
- reprocessors.

The Resource Recovery Infrastructure Schedule includes:

- Table 23 Existing resource recovery infrastructure
- Table 24 Indication of potential need for new infrastructure capacity
- Table 25 Future resource recovery infrastructure requirements and options.

Abbreviations used in these tables:

- MSW – municipal solid waste
- C&D - construction and demolition
- C&I - commercial and industrial

Council abbreviations in the Barwon South West region used in the tables

Local government area	Abbreviations used in tables
Borough of Queenscliffe	Queenscliffe (B)
Greater Geelong City Council	Greater Geelong (C)
Colac Otway Shire Council	Colac Otway (S)
Corangamite Shire Council	Corangamite (S)
Glenelg Shire Council	Glenelg (S)
Moyne Shire Council	Moyne (S)
Southern Grampians Shire Council	Southern Grampians (S)
Surf Coast Shire Council	Surf Coast (S)
Warrnambool City Council	Warrnambool (C)

Table 23 Existing resource recovery and reprocessing infrastructure

Site name	Owner/ operator	Town/suburb	Local government area	GIS location	Materials accepted*
Drop off facility					
Beech Forest	Colac Otway (S)	Beech Forest	Colac Otway (S)	-38.6369 143.57268	• MSW recyclables and residual waste
Carlisle River	Colac Otway (S)	Carlisle River	Colac Otway (S)	-38.56057 143.39407	• MSW recyclables and residual waste
Gellibrand	Colac Otway (S)	Gellibrand	Colac Otway (S)	-38.52651 143.53893	• MSW recyclables and residual waste
Lavers Hill	Colac Otway (S)	Lavers Hill	Colac Otway (S)	-38.68275 143.38675	• MSW recyclables and residual waste
Anglesea	Surf Coast (S)	Anglesea	Surf Coast (S)	-38.40235 144.18601	• MSW recyclables and residual waste
Lorne	Surf Coast (S)	Lorne	Surf Coast (S)	-38.53974 143.97168	• MSW recyclables and residual waste
Torquay	Surf Coast (S)	Torquay	Surf Coast (S)	-38.30701 144.31112	• MSW recyclables and residual waste
RRC/TS					
Drysdale RRC	Greater Geelong (C)	Drysdale	Greater Geelong (C)	-38.1708 144.6276	• MSW recyclables and residual waste • C&D aggregates, masonry & soils • C&I paper/cardboard • MSW and C&I waste timber • MSW chemical collection point • *drumMUSTER* collection point
North Geelong RRC	Greater Geelong (C)	North Geelong	Greater Geelong (C)	-38.1218 144.3475	• MSW recyclables and residual waste • C&D aggregates, masonry & soils • C&I paper/cardboard • MSW and C&I waste timber • MSW chemical collection point • *drumMUSTER* collection point
Point Henry TS	Greater Geelong (C)	Moolap	Greater Geelong (C)	-38.1641 144.427	• MSW recyclables and residual waste
Suez TS	Suez	Corio	Greater Geelong (C)	-38.0517 144.38607	• MSW recyclables • C&I recyclables and residual waste
Alvie RRC/TS	Colac Otway (S)	Alvie	Colac Otway (S)	-38.25136 143.52228	• MSW recyclables and residual waste • MSW kerbside recyclables and organics • MSW and C&I garden and food organics • MSW chemical collection point • *drumMUSTER* collection point
Apollo Bay RRC	Colac Otway (S)	Apollo Bay	Colac Otway (S)	-38.75673 143.6546	• MSW recyclables and residual waste • MSW chemical collection
Birregurra RRC	Colac Otway (S)	Birregurra	Colac Otway (S)	-38.33322 143.79275	• MSW recyclables and residual waste
Western Waste Management RRC	Colac Otway (S)	Colac	Colac Otway (S)	-38.33007 143.61032	• MSW recyclables and residual waste • C&I recyclables and residual waste • C&D aggregates, masonry and soils
Derrinallum RRC	Corangamite (S)	Derrinallum	Corangamite (S)	-37.96977 143.1934	• MSW recyclables and residual waste • MSW kerbside recyclables • MSW garden organics • MSW chemical collection point • *drumMUSTER* collection point

Site name	Owner/ operator	Town/suburb	Local government area	GIS location	Materials accepted*
Naroghid RRC	Corangamite (S)	Naroghid	Corangamite (S)	-38.271 143.0506	• MSW recyclables and residual waste • MSW kerbside recyclables • MSW and C&I garden organics • MSW chemical collection point • *drumMUSTER* collection point
Port Campbell RRC	Corangamite (S)	Port Campbell	Corangamite (S)	-38.61951 143.00524	• MSW recyclables and residual waste • MSW kerbside garden organics
Simpson RRC	Corangamite (S)	Simpson	Corangamite (S)	-38.50095 143.20871	• MSW recyclables and residual waste • MSW kerbside organics • *drumMUSTER* collection point
Skipton RRC	Corangamite (S)	Skipton	Corangamite (S)	-38.68279 143.35841	• MSW recyclables and residual waste • MSW kerbside organics • *drumMUSTER* collection point
Timboon RRC	Corangamite (S)	Timboon	Corangamite (S)	-38.49506 142.98113	• MSW recyclables and residual waste • MSW kerbside organics • *drumMUSTER* collection point
Casterton RRC	Glenelg (S)	Casterton	Glenelg (S)	-37.06968 144.19474	• MSW recyclables and residual waste • *drumMUSTER* collection point
Dartmoor RRC	Glenelg (S)	Dartmoor	Glenelg (S)	-37.90267 141.2292	• MSW recyclables and residual waste
Heywood RRC	Glenelg (S)	Heywood	Glenelg (S)	-38.13804 141.59706	• MSW recyclables and residual waste • MSW and C&I paper/cardboard • *drumMUSTER* collection point
Jarrads Road RRC	Glenelg (S)	Merino	Glenelg (S)	-37.74242 141.52272	• MSW recyclables and residual waste
Nelson RRC	Glenelg (S)	Nelson	Glenelg (S)	-38.03253 141.00985	• MSW recyclables and residual waste
Portland RRC	Glenelg (S)	Portland	Glenelg (S)	-38.36984 141.60237	• MSW recyclables and residual waste • MSW and C&I organics • C&D aggregates, masonry and soils • MSW chemical collection point • *drumMUSTER* collection point
Caramut RRC	Moyne (S)	Caramut	Moyne (S)	-37.95727 142.52566	• MSW recyclables and residual waste
Hawkesdale RRC	Moyne (S)	Hawkesdale	Moyne (S)	-38.0211 142.32817	• MSW recyclables and residual waste • *drumMUSTER* collection point
Killarney RRC	Moyne (S)	Killarney	Moyne (S)	-38.31886 142.29692	• MSW recyclables and residual waste • MSW or C&I organics • C&D aggregates, masonry and soils • MSW chemical collection point • *drumMUSTER* collection point
Macarthur RRC	Moyne (S)	Macarthur	Moyne (S)	-38.01261 141.97525	• MSW recyclables and residual waste • MSW or C&I organics • MSW chemical collection point • *drumMUSTER* collection point
Mortlake RRC	Moyne (S)	Mortlake	Moyne (S)	-38.06898 142.76917	• MSW recyclables and residual waste • MSW or C&I organics • *drumMUSTER* collection point
Peterborough RRC	Moyne (S)	Peterborough	Moyne (S)	-38.59386 142.86812	• MSW recyclables and residual waste • MSW or C&I organics
Woolsthorpe RRC	Moyne (S)	Woolsthorpe	Moyne (S)	-38.22443 142.42437	• MSW recyclables and residual waste • MSW or C&I organics
Woorndoo RRC	Moyne (S)	Woorndoo	Moyne (S)	-38.88489 142.79958	• MSW recyclables and residual waste

Site Name	Owner/ Operator	Town/Suburb	Local government area	GIS location	Materials Accepted*
Balmoral RRC	Southern Grampians (S)	Balmoral	Southern Grampians (S)	-37.23889 141.83601	• MSW recyclables and residual waste • *drumMUSTER* collection point
Branxholme RRC	Southern Grampians (S)	Branxholme	Southern Grampians (S)	-37.86238 141.80776	• MSW recyclables and residual waste • *drumMUSTER* collection point
Cavendish RRC	Southern Grampians (S)	Cavendish	Southern Grampians (S)	-37.52941 142.03405	• MSW recyclables and residual waste
Coleraine RRC	Southern Grampians (S)	Coleraine	Southern Grampians (S)	-37.60366 141.70162	• MSW recyclables and residual waste • *drumMUSTER* collection point
Dunkeld RRC	Southern Grampians (S)	Dunkeld	Southern Grampians (S)	-37.6584 142.34886	• MSW recyclables and residual waste *drumMUSTER* collection point
Glenthompson RRC	Southern Grampians (S)	Glenthompson	Southern Grampians (S)	-37.62252 142.55226	• MSW recyclables and residual waste *drumMUSTER* collection point
Hamilton RRC	Southern Grampians (S)	Hamilton	Southern Grampians (S)	-37.7465389 141.99663	• MSW recyclables and residual waste • MSW kerbside recyclables • C&D aggregates, masonry and soils • MSW chemical collection • *drumMUSTER* collection point
Penshurst RRC	Southern Grampians (S)	Penshurst	Southern Grampians (S)	-38.85652 142.31903	• MSW recyclables and residual waste • *drumMUSTER* collection point
Anglesea RRC	Surf Coast (S)	Anglesea	Surf Coast (S)	-38.3843 144.205	• MSW recyclables and residual waste • MSW kerbside organics • C&D aggregates, masonry & soils • C&I paper/cardboard • MSW and C&I organics and waste timber • MSW chemical collection • *drumMUSTER* collection point
Lorne RRC	Surf Coast (S)	Lorne	Surf Coast (S)	-38.5293 143.947	• MSW recyclables and residual waste • MSW kerbside organics • MSW and C&I garden organics
Winchelsea RRC	Surf Coast (S)	Winchelsea	Surf Coast (S)	-38.49506 142.98113	• MSW recyclables and residual waste • MSW kerbside organic • MSW and C&I garden organics • *drumMUSTER* collection point
Barton's Waste TS	Barton's Waste	Warrnambool	Warrnambool (C)	-38.36772 142.45041	• MSW recyclables and residual waste • C&I recyclables and residual waste
Statewide Recycling RRC	Statewide Waste	Warrnambool	Warrnambool (C)	-38.374863 142.4633	• MSW recyclables and residual waste • C&I recyclables and residual waste
Westvic RRC	Westvic Waste	Warrnambool	Warrnambool (C)	-38.36617 142.45578	• MSW recyclables and residual waste • C&I recyclables and residual waste
MRF					
SKM MRF	SKM	Geelong	Greater Geelong (C)	-38.16875 144.36729	• commingled recyclables
Visy MRF	Visy	Geelong	Greater Geelong (C)	-38.17077 144.3661	• paper/cardboard
Reprocessor					
AD & HM Robertson Pty Ltd	AD & HM Robertson Pty Ltd	Mt Duneed	Surf Coast (S) Greater Geelong (C)	-38.2444 144.2444	• organics – food, garden, other
Australian New Energy	Australian New Energy	Moolap	Greater Geelong (C)	-38.16462 144.42541	• organics – wood/timber
Bellarine Tree Services	Bellarine Tree Services	Moolap	Greater Geelong (C)	-38.16564 144.4246	• organics – garden, wood/timber

Site Name	Owner/ Operator	Town/Suburb	Local government area	GIS location	Materials Accepted*
Boral Cement	Boral Cement	Mt Duneed	Greater Geelong (C)	-38.22573 144.26579	• aggregates, masonry & soils
C&D Recycling	Central Recyclers Lara	Lara	Greater Geelong (C)	-38.04592 144.38048	• aggregates, masonry & soils
Central Recyclers	Central Recyclers	Lara	Greater Geelong (C)	-38.04592 144.38048	• organics – garden, wood/timber
GDP Industries	GDP Industries	North Geelong	Greater Geelong (C)	-38.12462 144.34998	• paper/cardboard • plastics • metals • glass • aggregates, masonry & soil • textiles • e-waste
Geelong Composting (subsidiary of Camperdown composting)	Camperdown Composting	Various – on farm composting	Greater Geelong (C) Surf Coast (S)	N/A	• organics – garden
GT Recycling	GT Recycling	Moolap	Greater Geelong (C)	-38.15976 144.43026	• plastics paper/cardboard
Local mix concrete	Local mix concrete	Moolap	Greater Geelong (C)	-38.15705 144.43312	• aggregates, masonry & soils
Regional Recycle	Regional Recycle	Breakwater	Greater Geelong (C)	-38.14275 144.36969	• aggregates, masonry & soils
Suez	Suez	Corio	Greater Geelong (C)	-38.0517 144.38607	• organics – garden, wood/timber
The Mattress Recycler	The Mattress Recycler	Moolap	Greater Geelong (C)	-38.16814 144.41943	• mattresses & furniture
Geelong Restorers Barn	Geelong Restorers Barn	Breakwater	Greater Geelong (C)	-38.18367 144.36416	• organics
Timberzoo P/L	Timberzoo P/L	Moolap	Greater Geelong (C)	-38.16942 144.42668	• organics – wood/timber
Sims Metal Management	Sims Metal Management	North Geelong	Greater Geelong (C)	-38.10888 144.34433	• metals
Bernie Leen & Sons	Bernie Leen & Sons Pty Ltd	Newtown	Greater Geelong (C)	-38.16125 144.34106	• aggregates, masonry & soils
Camperdown Compost	Camperdown Compost	Bookar	Corangamite (S)	-38.17415 143.07959	• organics - food, garden, other
Corangamite Regional Landfill	Corangamite Landfill	Naroghid	Corangamite (S)	-38.271 144.0506	• organics - food, garden, wood/ timber, other
The Midfield Group (Pomala Pty Ltd)	Pomala Pty Ltd	Warrnambool	Warrnambool (C)	-38.37409 142.45988	• organics – food/animal waste • paper/cardboard • plastic
Statewide waste	Statewide waste	Warrnambool	Warrnambool (C)	-38.37486 142.4633	• organics – garden, other
WDEA	Western District Employment Agency	Warrnambool	Warrnambool (C)	-38.37387 142.45802	• paper/cardboard • glass • plastics • metals • e-waste

Notes:

- Further information on the wastes and material streams accepted at the facility can be found at the appropriate council or company website.
- To the knowledge of the Barwon South West WRRG, all relevant existing facilities have been included on the schedule. It should be noted that inclusion of an existing facility in this schedule should not in any way be construed as a warranty or representation as to the quality of compliance, effectiveness or suitability of the facilities included. While Barwon South West WRRG has made every effort to compile this information accurately and completely, the list of facilities included, information and comments in the 'other considerations' section are not exhaustive, and are provided to generally facilitate the achievement of the Act. Further information about individual facilities should be sought from the EPA or (where appropriate) owners or operators of facilities.

Table 24 Indication of potential need for new infrastructure capacity

Infrastructure type	Category	Material to be managed	Increased capacity required by:	Reason
RRC/TS	Consolidate and upgrade infrastructure	MSW, recyclables, green organics, e-waste, mattresses, mixed metals, waste oil, gas bottles, building/demolition, timber, paint, batteries, fluorescent lights and garden organics	Ongoing	Upgrade infrastructure to increase resource recovery and consolidation of materials for transportation for improved efficiencies Upgrade of infrastructure to meet best practice operations
Organics processing	New or upgraded infrastructure	Kerbside garden and food organics Organics from C&I sector including agriculture and timber/forestry sectors	Within 10-year planning frame	Current processing at near capacity Opportunity to increase recovery from kerbside and C&I including agricultural sectors
Glass processing	New or upgraded infrastructure	Glass	Within 10-year planning frame	Opportunity to increase collection and resource recovery
Plastics processing	New or upgraded infrastructure	Plastics from C&I sector including agriculture sector	Within 10-year planning frame	Opportunity to increase recovery from industrial and agricultural sectors
Textiles processing	New or upgraded infrastructure	Textiles	Within 10-year planning frame	Opportunity to increase collection and resource recovery.
Pre-sorting facility	New or upgraded infrastructure	Mixed uncompacted waste	Within 10-year planning frame	Opportunity to recover additional resources from waste prior to landfill disposal Extend landfill capacity timeframe
Waste aggregation	New or upgraded infrastructure	Residual waste	Within 10-year planning frame	Opportunity to improve transport, economic and environmental impacts Extend landfill capacity timeframe
E-waste	New or upgraded infrastructure	E-waste	Within 10-year planning frame	Opportunity to increase collection and resource recovery.

Source: *Barwon South West infrastructure capacity and needs assessment,* Blue Environment 2015

Seven facilities to be developed/expanded or operational in the next seven years have been included in the resource recovery schedule as a result of the market sounding process. Three are new facilities and four are proposing expanding an existing facility. Details of these facilities are listed in Table 25. All seven facilities are designed to divert materials from landfill.

A number of the region's needs were not responded to in the market sounding process. The Barwon South West WRRG will need to continue to engage with the waste and resource recovery sector to pursue opportunities to recover, reprocess and manage the identified needs that have not been addressed. Progress towards this will be assessed in the mid term review.

Table 25 Future resource recovery infrastructure requirements and options1

Proponent	Location	Timeframe	Type of proposal	Description
Corangamite (S)	Corangamite Regional Landfill	2021	Existing facility with changed or expanded waste and/or resource recovery. In vessel composting processing.	Improve the quality of current material being processed on site. Increase the site capacity to produce compost that meets Australian standards.
Corangamite (S)	Corangamite Regional Landfill	2023	Existing facility with changed or expanded waste and/or resource recovery. Pre-sort infrastructure.	Increase resource recovery, reduced residual waste to landfill. Extend capacity timeframe of site.
Greater Geelong (C)	Anakie	2016	New infrastructure.	Open windrow composting of kerbside garden organics to produce soil improver.
Surf Coast (S)	Anglesea	2024	Existing facility with changed or expanded waste and/or resource recovery.	Expand transfer station to a consolidation point to bulk haul residual waste once Anglesea Landfill closes.
Surf Coast (S)	Torquay	2018	New infrastructure.	Development of a RRC/TS.
ReNu Waste Pty Ltd (Sustainable Clean Energy)	Little River	2016	New infrastructure.	Facility to treat tyres, mattresses, plastics, treated timber, grease trap waste via pyrolysis to produce energy.
The Mattress Recycler	Moolap	2017	Existing facility with changed or expanded waste and/or resource recovery.	Increase resource recovery, mattresses and lounge suites from landfill.

[1]Note: It is expected that all infrastructure technologies considered in this schedule will not be inconsistent with those detailed in the state infrastructure plan.

Inspecting a landfill cell

7.2 PART B Landfill infrastructure

Part B of the Schedule is restricted to landfill infrastructure and includes:

- operating licensed landfills
- landfills exempt from licensing
- landfills that have closed in the last 30 years.

The purpose of this schedule is to identify options for future landfill capacity in the region.

The EP Act requires the waste and resource recovery portfolio to minimise the development and use of landfills, while providing sufficient landfill airspace need for the disposal of residual waste. The purpose of scheduling landfill infrastructure is to:

- Ensure that each region has an adequate amount of landfill capacity, to ensure the safe and sanitary disposal of wastes that are not recovered, for at least the next 10 years.
- Minimise the development and use of landfills for the management of waste in Victoria as per section 9(3) of the *Waste Management Policy (Siting, Design and Management of Landfills)*.
- Propose the sequence for the filling of available landfill sites for at least the next 10 years.
- Provide estimations of the intended or likely closure date for the landfills that are listed in the schedule.
- Report on the rehabilitation status for closed landfills within the Barwon South West region that have been recently closed (in the past 30 years) to drive effective rehabilitation and to ensure that the public are informed of landfills that require more active management.
- Ensure that future landfill capacity needs are planned for to enable appropriate buffers to be known and defined, allowing for sound planning decisions to be made for land development in the vicinity of any new landfills that are listed in the schedule.

Unlike resource recovery infrastructure, if a proposed landfill operator is to obtain approval from the EPA to commence works, its site **must** be listed on the relevant regional implementation plan infrastructure schedule otherwise approval cannot be granted from the EPA. However, there is no identified need for new landfill infrastructure in the Barwon South West region for at least the next ten years.

If a landfill site, prior to being issued a works approval, planning permit and licence, is found, through the infrastructure scheduling process (Part B) to no longer be the most suitable option to service the needs identified by Barwon South West WRRG, then it can be removed from the schedule and suitable alternatives scheduled if new infrastructure is still required. This review will be undertaken as part of the mid term review of this plan.

The Landfill Infrastructure Schedule includes:

- Table 26 Existing landfills
- Table 27 Proposed sequence of the filling of available landfill sites
- Table 28 Closed landfills.

Maps 4-13 show individual existing landfills listed in Table 26.

7.2.1 Existing landfills

Table 26 lists details of existing landfills.

Table 26 Existing landfills

Landfill name	EPA licence number	Address and LGA	GIS coordinates	Owner (and operator if different)	Waste types able to be accepted under current licence	Likely closure date	Additional considerations
Alvie Landfill	12281	977 Corangamite Lake Road, Alvie Colac Otway (S)	-38.25215 143.51742	Colac Otway (S)	• solid inert waste • tyres (shredded <250mm)		No longer accepting waste
Portland Landfill	22492	Derril Road, Portland Glenelg (S)	-38.36919 141.57777	Glenelg (S)	• putrescible • solid inert waste • tyres (shredded <250mm) • asbestos waste (all forms)	2016	Co-located RRC/ TS opened during development of Barwon South West Implementation Plan
Anglesea Landfill	21470	50 Coalmine Road, Anglesea Surf Coast (S)	-38.38506 144.19862	Surf Coast (S)	• putrescible • solid inert waste	2023	Previous licence HS539 Co-located with Anglesea RRC
Drysdale Landfill	74222	82-180 Becks Road, Drysdale Greater Geelong (C)	-38.16925 144.62752	Greater Geelong (C)	• putrescible • solid inert waste • tyres (shredded <250mm) • asbestos waste (domestic) • Category C animal effluent & residues • Category C filter cake	2027	Co-located with Drysdale RRC
Fyansford Landfill	11848	5-103 Hamilton Highway, Fyansford Greater Geelong (C)	-38.14431 144.30219	Geelong Landfill Pty Ltd	• solid inert waste • tyres (shredded <250mm) • asbestos waste (all forms)	2034	
Corangamite Regional Landfill (Naroghid)	12192	County Boundary West Road, Cobrico Corangamite (S)	-38.27278 143.04848	Corangamite (S)	• putrescible • solid inert waste • tyres (shredded <250mm) • municipal green waste • solid animal wastes • solid domestic food wastes	>2046	Co-located with Corangamite Regional RRC Organics composting occurs on site

Landfill name	EPA Licence Number	Address & LGA	GIS coordinates	Owner (and operator if different)	Waste types able to be accepted under current licence	Likely closure date	Additional considerations
Hamilton Landfill	20720	68 Elijah Street, Hamilton Southern Grampians (S)	-37.74784 141.99278	Southern Grampians (S)	• putrescible • solid inert waste • tyres (shredded <250mm)	>2046	Co-located RRC/ TS
LANDFILLS EXEMPT FROM LICENSING							
Landfill name		**Address & LGA**	**GIS coordinates**	**Owner (and operator if different)**	**Waste types able to be accepted**	**Likely closure date**	**Additional considerations**
Casterton Landfill		291 Bahgallah Road, Casterton Glenelg (S)	-37.61080 141.38945	Glenelg (S)	• putrescible • solid inert waste	2016	Co-located RRC/ TS
Dartmoor Landfill		270 Bowds Lane, Dartmoor Glenelg (S)	-37.89853 141.22418	Glenelg (S)	• putrescible • solid inert waste	2015	Co-located RRC/ TS
Killarney Landfill		12 Badhams Road, Crossley Moyne (S)	-38.31809 142.29754	Moyne (S)	• solid inert waste	2029	Co-located RRC/ TS

Notes:
*Likely closure dates reflect the year in which the site is likely to cease receiving waste. They are estimated based on modelled tonnage projections and airspace available and may include potential void space at quarry based landfill sites as identified by owners and operators. These timeframes will depend commercial decisions of site operators and the site achieving the appropriate approvals. A listing in this table does not indicate that all available space will be sequenced or approved.
#Landfills exempt from licencing are landfills operated by a Council, serve less than 5,000 people but more than 500 people, which are the exemption categories specified in the Environment Protection (Scheduled Premises and Exemptions) Regulations 2007 (Vic). They can accept a range of wastes including putrescible and solid inert as per Waste Management Policy (Siting, Design and Management of Landfills) 2004 and the EP Act.
·Landfills included in the above table are existing operational facilities in the region at the time of publication.
·Licenced sites can only accept wastes listed as per current EPA licence.
For the avoidance of doubt, private landfills which are privately owned and will only receive wastes that consist of substances owned by the owner of the site (before the substances became wastes) referred to in section 50C(3) of the EP Act are not included in the above table. Any need for a works approval for these sites will be assessed by the EPA without reference to this implementation plan, in accordance with section 50C(3) of the EP Act.

7.2.2 Proposed sequencing of available landfill sites

Table 27 shows the proposed sequence for the filling of available landfill sites for the next 30 years. The region's landfill needs will be met with the existing landfills. Please note that subject to limited exceptions, under section 50C(2) of the EP Act, EPA must refuse to consider an application for a works approval in relation to a new landfill if the landfill is not provided for in this table.

This table should be read in conjunction with the description of the landfill needs assessment outlined in section 4.6.2.

Table 27 Proposed sequence of the filling of available landfill sites[1]

Landfill	Year																															Likely closure date
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	
Alvie, 12281																																
Casterton, exempt from licensing																																2016
Portland, 22492																																2016
Anglesea, 21470																																2023
Drysdale, 74222																																2027
Killarney, exempt from licensing																																2029
Fyansford, 11848																																2034
Hamilton, 20720																																>2046
Corangamite Regional Landfill, 12192																																>2046

[1] As referred to in section 50C (2) of the EP Act

Key

- Has all appropriate approvals including EPA works approval land use planning approval where relevant
- Land use planning approved (still requires EPA works approval)
- Airspace available subject to receiving appropriate approvals

Notes relating to Table 27:

- The landfill airspace detailed in the above table has been classified according to its land use planning and works approval status at the time of preparation of this implementation plan. Only sites with landfill airspace having the appropriate approvals are permitted (and where applicable, licensed) to receive waste. Inclusion of airspace still requiring either land use planning or EPA approvals is based on an assessment of the need and suitability in line with the statewide process. Where further approvals are required, the appropriate processes to achieve such approvals, must be undertaken and inclusion in the above table does not guarantee the granting of these approvals.
- Licenced landfills are sequenced to indicate their potential to accept the wastes allowed under their current EPA licence over the ten year sequencing period.
- Landfills exempt from licensing are sequenced to indicate their potential to accept wastes as per Waste Management Policy (Siting, Design and Management of Landfills) 2004 and the EP Act over the 10-year sequencing period.
- Sites exempt from licensing are those which are occupied by a municipal council, serve less than 5,000 people and accept a range of wastes including putrescible and solid inert as per Waste Management Policy (Siting, Design and Management of Landfills) 2004, the **Environment Protection (Scheduled Premises and Exemptions) Regulations 2007 (Vic)** and the EP Act.
- Sites which are exempt from a requirement to obtain a works approval under the **Environment Protection (Scheduled Premises and Exemptions) Regulations 2007 (Vic)** and the **EP Act** are those which are occupied by a municipal council and which serve less than 500 people. **Those sites are not included in the above table.**
- For the avoidance of doubt, private (own waste) landfills which are privately owned and will only receive wastes that consist of substances owned by the owner of the site (before the substances became wastes) referred to in section 50C(3) of the EP Act are not included in the above table. These sites are not approved to accept waste from external sources. Any need for a works approval for these sites will be assessed by the EPA without reference to this implementation plan, in accordance with section 50C(3) of the EP Act.
- Likely closure dates reflect the year in which the site is likely to cease receiving waste. They are estimated based on modelled tonnage projections and airspace available and may include potential void space at quarry based landfill sites as identified by owners and operators
- Additional airspace may be sequenced in the future, if an assessment of airspace requirements in the region identifies a need in line with the statewide scheduling process. A listing on the above table does not guarantee the airspace will be scheduled in the future.
- When Landfills close they must go through a decommissioning phase which includes working with the EPA to establish a long term rehabilitation plan. During this time they will cease to accept waste, but may continue to receive clean fill and soils to undertake appropriate capping and contouring. The actual time required for this process may vary from site to site.
- Sequencing in this table has been done pursuant to the requirements of section 50BB (c)(iv) of the EP Act.

7.2.3 Closed landfills

Barwon South West WRRG is required to develop a program for the rehabilitation of landfill sites. An important function of this part of the schedule is to identify landfills that have yet to undertake the appropriate rehabilitation and aftercare activities. The responsibility of rehabilitation is generally the responsibility of the owner, in many cases councils.

Closed landfills must meet the requirements of the EPA *Closed Landfill Guidelines* (December 2012). Barwon South West WRRG and the councils have considered the guidelines as part of developing the Barwon South West Implementation Plan and the landfill infrastructure schedule.

Please note: The schedule of closed landfills is a list based on the best of Barwon South West WRRG's knowledge and all of the information provided in developing the plan and consultation with duty holders.

Table 28 lists details of the 69 landfills in the region that have been closed over the last 30 years. Most are owned by councils. Included in this table is the rehabilitation status for each site where it is known (see key below table).

Barwon South West WRRG will liaise with councils and the EPA regarding the development of strategies for closed landfills.

Public place recycling Warrnambool

Table 28 Closed landfills

Licence number	GIS location	Municipality	Material received	Location	Closure date	Rehabilitation status
74222	-38.058196 144.407221	Greater Geelong (C)	putrescible	Corio	2011	Ongoing monitoring and maintenance
HS328	-38.141078 144.292567	Greater Geelong (C)	putrescible	Fyansford	1996	Rehabilitation complete
HS1161	-38.093534 144.292567	Greater Geelong (C)	putrescible	North Shore	1994	Rehabilitation complete
ES338	-38.1 144.4	Greater Geelong (C)	putrescible	Point Henry	1996	Rehabilitation complete
HS1148	-38.1 144.4	Greater Geelong (C)	putrescible	Point Henry	1997	Rehabilitation complete
*	-38.158891 144.367251	Greater Geelong (C)	putrescible	South Geelong	1987	Ongoing monitoring and maintenance
*	-38.158891 -144.33375	Greater Geelong (C)	putrescible	Newtown	pre 1996	Rehabilitation Complete
*	-38.157244 -144.33013	Greater Geelong (C)	putrescible	Newtown	unknown	Rehabilitation complete
*	-38.145043 -144.3818	Greater Geelong (C)	putrescible	East Geelong	unknown	Rehabilitation complete
*	-38.15733 144.705559	Greater Geelong (C)	putrescible	St Leonards	unknown	Rehabilitation complete
*	-38.262331 144.50977	Greater Geelong (C)	putrescible	Ocean Grove	unknown	Rehabilitation complete
*	-38.103534 144.353093	Greater Geelong (C)	putrescible	North Geelong	unknown	Rehabilitation complete
*	-38.180069 144.357869	Greater Geelong (C)	putrescible	Belmont	unknown	Rehabilitation complete
*	-38.261283 144.478814	Greater Geelong (C)	putrescible	Barwon Heads	unknown	Rehabilitation complete
*	-38.126967 144.325277	Greater Geelong (C)	putrescible	Newtown	unknown	Rehabilitation complete
*	-38.126967 144.355186	Greater Geelong (C)	putrescible	Rippleside	unknown	Rehabilitation complete
*	-38.158605 144.332243	Greater Geelong (C)	putrescible	Newtown	unknown	Rehabilitation complete
*	-38.1679464 144.36597	Greater Geelong (C)	putrescible	South Geelong	unknown	Rehabilitation complete
*	-38.1639119 144.364818	Greater Geelong (C)	putrescible	South Geelong	unknown	Rehabilitation complete
*	-38.160681 144.3384716	Greater Geelong (C)	putrescible	Newtown	unknown	Rehabilitation complete
*	-38.0867679 144.3803626	Greater Geelong (C)	putrescible	North Shore	1978	Rehabilitation complete
Exempt from licensing	-38.480182 143.75809	Colac Otway (S)	putrescible	Barwon Downs	1994	Yet to commence rehabilitation
Exempt from licensing	-38.196734 143.635772	Colac Otway (S)	putrescible	Beeac	1990	Ongoing monitoring and maintenance

* Not known

Licence number	GIS location	Municipality	Material received	Location	Closure date	Rehabilitation status
Exempt from licensing	-38.333379 143.79276	Colac Otway (S)	putrescible	Birregurra	pre-1995	Yet to commence rehabilitation
Exempt from licensing	-38.331302 143.598887	Colac Otway (S)	putrescible	Colac	1997	Ongoing monitoring and maintenance
Exempt from licensing	-38.024365 143.630374	Colac Otway (S)	putrescible	Cressy	1988	Ongoing monitoring and maintenance
Exempt from licensing	-38.528506 143.71017	Colac Otway (S)	putrescible	Forrest	1998	Yet to commence rehabilitation
ES393	-38.528854 143.517236	Colac Otway (S)	putrescible	Gellibrand	1998	Yet to commence rehabilitation
Exempt from licensing	-38.777187 143.653702	Colac Otway (S)	putrescible	Marengo	1998	Ongoing monitoring and maintenance
Exempt from licensing	-38.24262 143.158239	Corangamite	putrescible	Camperdown	1997	Ongoing monitoring and maintenance
ES281	-38.303674 143.039091	Corangamite	putrescible	Cobrico	1997	Ongoing monitoring and maintenance
HS923	-37.969773 143.193404	Corangamite	putrescible	Derrinallum	1998	Ongoing monitoring and maintenance
ES173	-38.181985 142.924726	Corangamite	putrescible	Noorat	1999	Ongoing monitoring and maintenance
Exempt from licensing	-37.960623 143.190338	Corangamite	putrescible	Port Campbell	1996	Ongoing monitoring and maintenance
Exempt from licensing	-38.506757 143.198106	Corangamite	putrescible	Simpson	1998	Ongoing monitoring and maintenance
Exempt from licensing	-37.675249 143.360659	Corangamite	putrescible	Skipton	1998	Ongoing monitoring and maintenance
Exempt from licensing	-37.898774 141.228879	Glenelg	putrescible	Dartmoor	2015	Rehabilitation commenced
Exempt from licensing	-37.842141 141.523454	Glenelg	putrescible	Digby	2006	Yet to commence rehabilitation
Exempt from licensing	-38.138992 141.606172	Glenelg	putrescible	Heywood	2007	Yet to commence rehabilitation
Exempt from licensing	-37.722021 141.494071	Glenelg	putrescible	Merino	2006	Yet to commence rehabilitation
Exempt from licensing	-37.915052 141.189122	Glenelg	putrescible	Mumbannar	2002	Yet to commence rehabilitation
Exempt from licensing	-37.996653 141.693313	Glenelg	putrescible	Myamyn	2002	Yet to commence rehabilitation
Exempt from licensing	-38.243522 141.699256	Glenelg	putrescible	Narrawong	unknown	Rehabilitation completed
Exempt from licensing	-38.035847 141.008553	Glenelg	putrescible	Nelson	2015	Rehabilitation commenced
Exempt from licensing	-37.630887 141.456463	Glenelg	putrescible	Sandford	2002	Ongoing monitoring and maintenance
Unlicensed	-38.125584 141.949478	Moyne	putrescible	Bessiebelle	1998	Rehabilitation complete
Exempt from licensing	-37.958771 142.52597	Moyne	putrescible	Caramut	1998	Rehabilitation complete

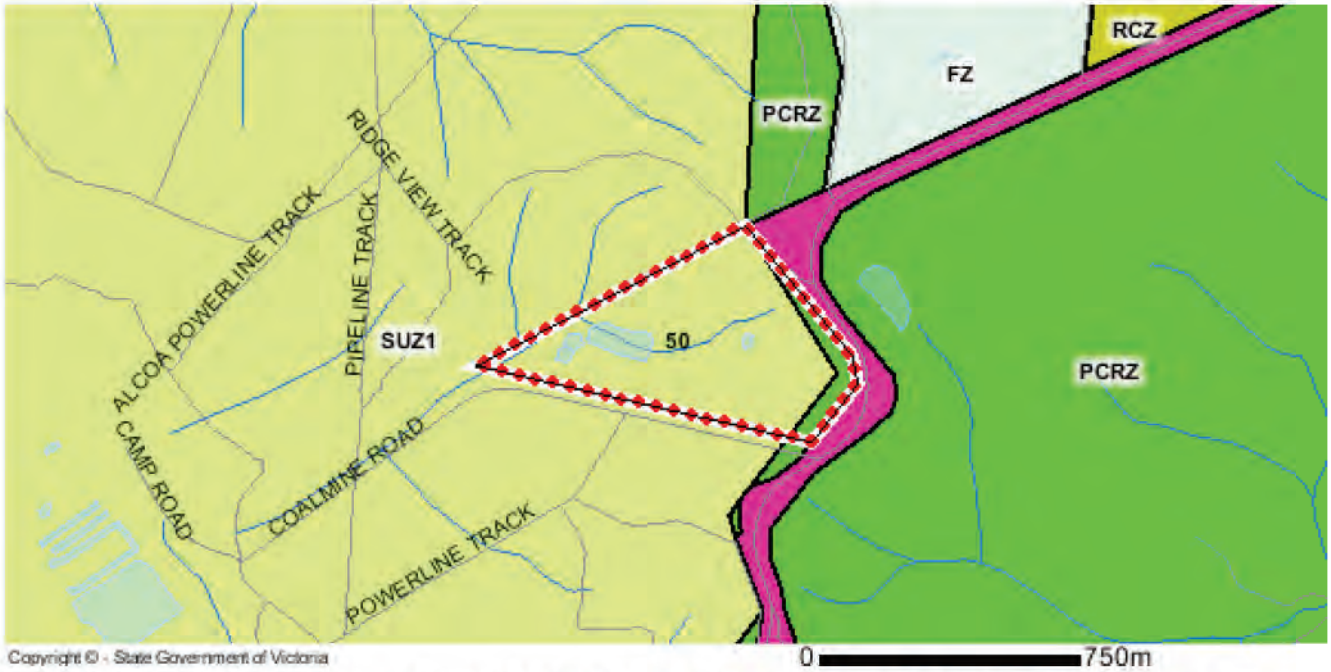
Licence number	GIS location	Municipality	Material received	Location	Closure date	Rehabilitation status
Exempt from licensing	-38.10154 142.328201	Moyne	putrescible	Hawkesdale	2005	Ongoing monitoring and maintenance
Exempt from licensing	-37.959103 142.747025	Moyne	putrescible	Hexam east	1998	Rehabilitation complete
Exempt from licensing	-38.255345 142.370068	Moyne	putrescible	Koroit	1985	Rehabilitation complete
Exempt from licensing	-38.009799 141.969284	Moyne	putrescible	Macarthur	2011	Rehabilitation complete
HS343	-38.07164 142.768234	Moyne	putrescible	Mortlake	2007	Rehabilitation complete
Exempt from licensing	-38.30413 142.705245	Moyne	putrescible	Panmure	1998	Rehabilitation complete
Exempt from licensing	-38.59499 142.866302	Moyne	putrescible	Peterborough	2004	Ongoing monitoring and maintenance
Exempt from licensing	-38.363117 142.265503	Moyne	putrescible	Port Fairy	1998	Ongoing monitoring and maintenance
Exempt from licensing	-38.373283 142.204636	Moyne	putrescible	Port Fairy	2001	Ongoing monitoring and maintenance
Exempt from licensing	-38.337772 142.60347	Moyne	putrescible	Wangoom	2011	Rehabilitation commenced
Exempt from licensing	-38.211193 142.419937	Moyne	putrescible	Woolsthorpe	1998	Rehabilitation complete
Exempt from licensing	-38.184688 142.43399	Moyne	putrescible	Woolsthorpe	1978	Rehabilitation complete
Exempt from licensing	-37.884884 142.800354	Moyne	putrescible	Woorndoo	2000	Rehabilitation complete
Exempt from licensing	-38.340714 142.059387	Moyne	putrescible	Yambuk	1998	Rehabilitation complete
Exempt from licensing	-37.625906 141.6402	Southern Grampians	putrescible	Coleraine	unknown	Yet to commence rehabilitation
Exempt from licensing	-37.247206 142.172739	Southern Grampians	putrescible	Glenisla	2014	Yet to commence rehabilitation
HS20720	-37.748617 141.995345	Southern Grampians	putrescible	Hamilton	unknown	Rehabilitation complete
Exempt from licensing	-37.745635 141.996783	Surf Coast	putrescible	Deans Marsh	2003	Rehabilitation complete
ES159	-38.52883 143.947388	Surf Coast	putrescible	Lorne	2004	Rehabilitation complete
HS913	-38.31107 144.36047	Surf Coast	putrescible	Torquay	1995	Rehabilitation complete
HS834	-38.240307 143.973837	Surf Coast	putrescible	Winchelsea	1994	Rehabilitation complete
ES91/6	-38.369915 142.452445	Warrnambool (C)	putrescible	Warrnambool	1999	Ongoing monitoring and maintenance

Key to closed landfill abbreviations

Explanation of rehabilitation status	
Status criteria	**Explanation**
Yet to commence rehabilitation	Yet to begin process of rehabilitation
Rehabilitation commenced	Working to design a rehabilitation plan and undertake rehabilitation activities appropriate to each site
Rehabilitation completed	Rehabilitation appropriate to the site and regulation relevant at the time of closure has been completed. No further rehabilitation activities planned or required
Ongoing monitoring and maintenance	Landfills that are undergoing a range of activities including: • monitoring of groundwater, surface water, landfill gas, leachate and cap settlement • landfill cap maintenance to prevent erosion, restore depressions, seal cracks, restore vegetation • leachate control systems (if applicable) • landfill gas-extraction system (if applicable)

Licensed and landfills exempt from licensing maps

Map 4 Anglesea Landfill

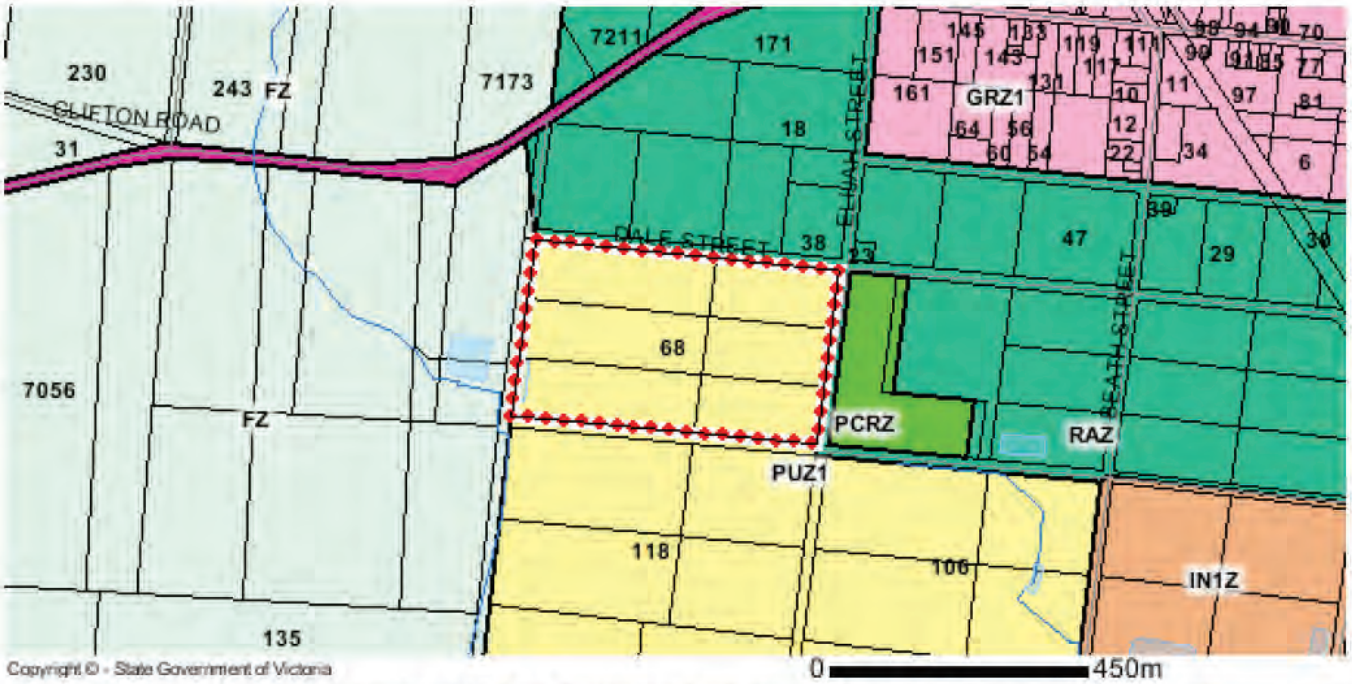


Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

Zones Legend

- ACZ - Activity Centre
- B1Z - Commercial 1
- B2Z - Commercial 1
- B3Z - Commercial 2
- B4Z - Commercial 2
- B5Z - Commercial 1
- C1Z - Commercial 1
- C2Z - Commercial 2
- CA - Commonwealth Land
- CCZ - Capital City
- CDZ - Comprehensive Development
- DZ - Dockland
- ERZ - Environmental Rural
- FZ - Farming
- GRZ - General Residential
- GWAZ - Green Wedge A
- GWZ - Green Wedge
- IN1Z - Industrial 1
- IN2Z - Industrial 2
- IN3Z - Industrial 3
- LDRZ - Low Density Residential
- MUZ - Mixed Use
- NRZ - Neighbourhood Residential
- PCRZ - Public Conservation & Resource
- PDZ - Priority Development
- PPRZ - Public Park & Recreation
- PUZ1 - Public Use - Service & Utility
- PUZ2 - Public Use - Education
- PUZ3 - Public Use - Health Community
- PUZ4 - Public Use - Transport
- PUZ5 - Public Use - Cemetery/Crematorium
- PUZ6 - Public Use - Local Government
- PUZ7 - Public Use - Other Public Use
- PZ - Port
- R1Z - General Residential
- R2Z - General Residential
- R3Z - General Residential
- RAZ - Rural Activity
- RCZ - Rural Conservation
- RDZ1 - Road - Category 1
- RDZ2 - Road - Category 2
- RGZ - Residential Growth
- RLZ - Rural Living
- RUZ - Rural
- SUZ - Special Use
- TZ - Township
- UFZ - Urban Floodway
- UGZ - Urban Growth
- Urban Growth Boundary

Map 5 Hamilton Landfill



Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

Zones Legend

- ACZ - Activity Centre
- B1Z - Commercial 1
- B2Z - Commercial 1
- B3Z - Commercial 2
- B4Z - Commercial 2
- B5Z - Commercial 1
- C1Z - Commercial 1
- C2Z - Commercial 2
- CA - Commonwealth Land
- CCZ - Capital City
- CDZ - Comprehensive Development
- DZ - Dockland
- ERZ - Environmental Rural
- FZ - Farming
- GRZ - General Residential
- GWAZ - Green Wedge A
- GWZ - Green Wedge
- IN1Z - Industrial 1
- IN2Z - Industrial 2
- IN3Z - Industrial 3
- LDRZ - Low Density Residential
- MUZ - Mixed Use
- NRZ - Neighbourhood Residential
- PCRZ - Public Conservation & Resource
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- RGZ - Residential Growth
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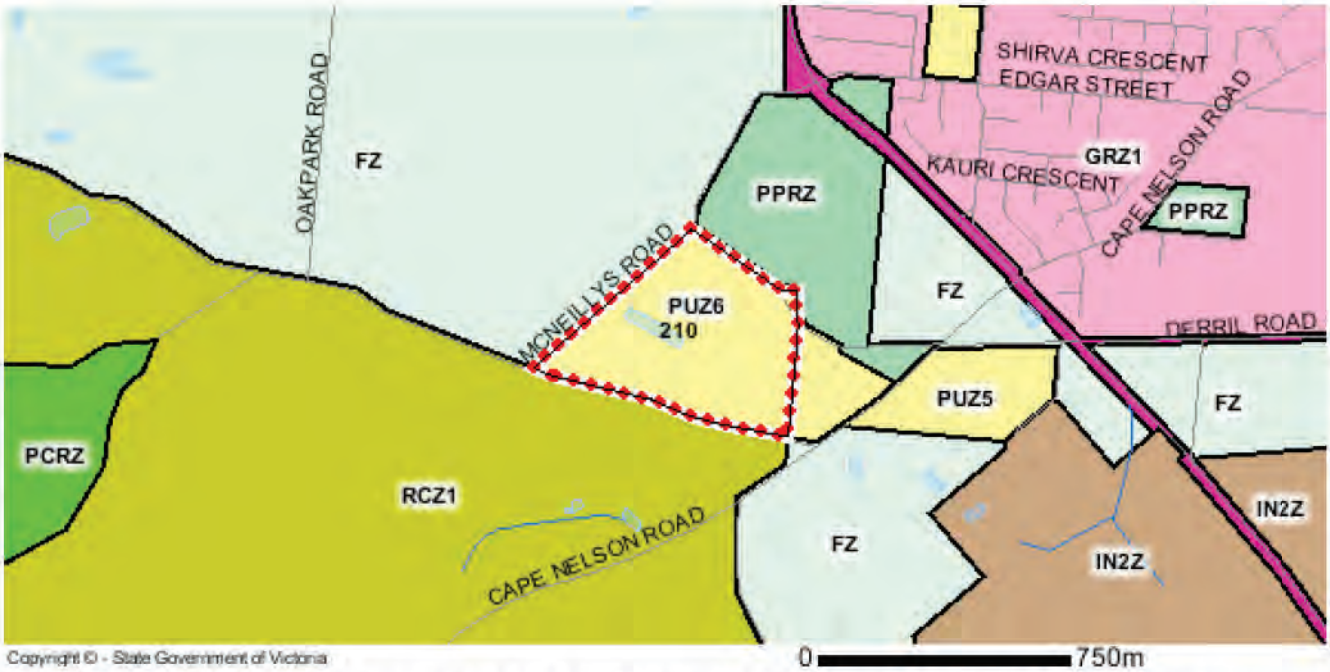
- RUZ - Rural
- SUZ - Special Use
- TZ - Township
- UFZ - Urban Floodway
- UGZ - Urban Growth

-- Urban Growth Boundary

Map 6 Portland Landfill



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Zones Legend

- ACZ - Activity Centre
- B1Z - Commercial 1
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- B4Z - Commercial 2
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- PUZ6 - Public Use - Local Government
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- R3Z - General Residential
- RAZ - Rural Activity
- RCZ - Rural Conservation
- RDZ1 - Road - Category 1
- RDZ2 - Road - Category 2
- RGZ - Residential Growth
- RLZ - Rural Living
- RUZ - Rural
- SUZ - Special Use
- TZ - Township
- UFZ - Urban Floodway
- UGZ - Urban Growth
- Urban Growth Boundary

Map 7 Corangamite Regional Landfill

Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

Zones Legend

- ACZ - Activity Centre
- B1Z - Commercial 1
- B2Z - Commercial 1
- B3Z - Commercial 2
- B4Z - Commercial 2
- B5Z - Commercial 1
- C1Z - Commercial 1
- C2Z - Commercial 2
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- RGZ - Residential Growth
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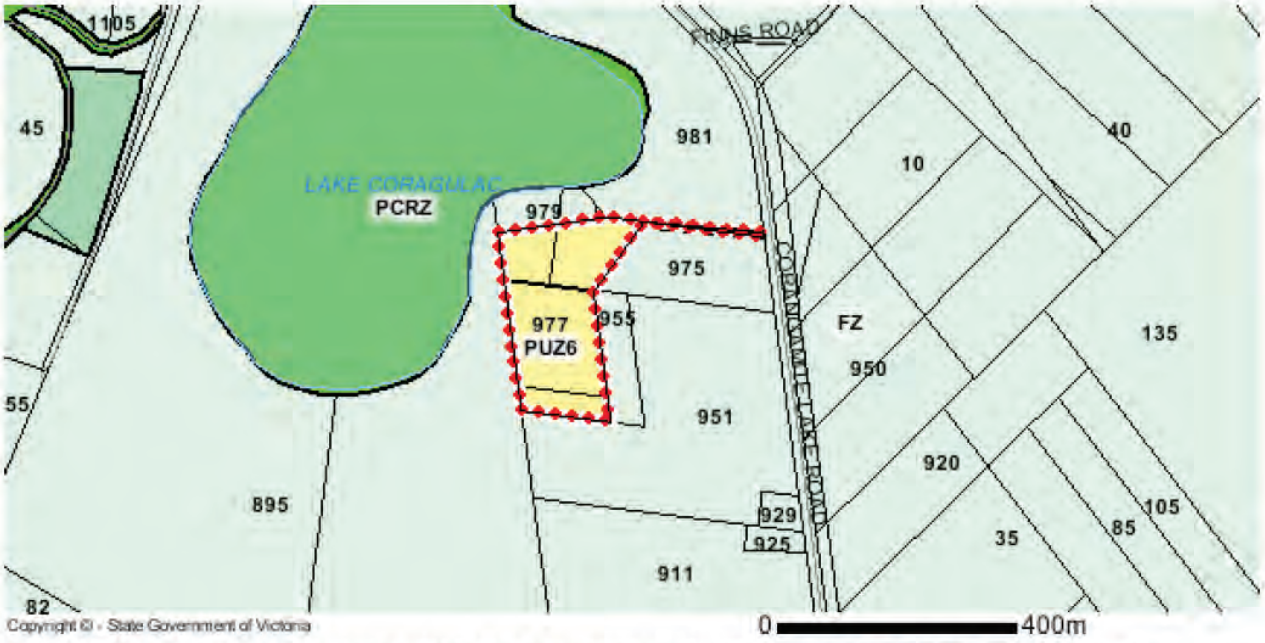
- RUZ - Rural
- SUZ - Special Use
- TZ - Township
- UFZ - Urban Floodway
- UGZ - Urban Growth
- Urban Growth Boundary

Map 8 Alvie Landfill



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Zones Legend

- ACZ - Activity Centre
- B1Z - Commercial 1
- B2Z - Commercial 1
- B3Z - Commercial 2
- B4Z - Commercial 2
- B5Z - Commercial 1
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- C2Z - Commercial 2
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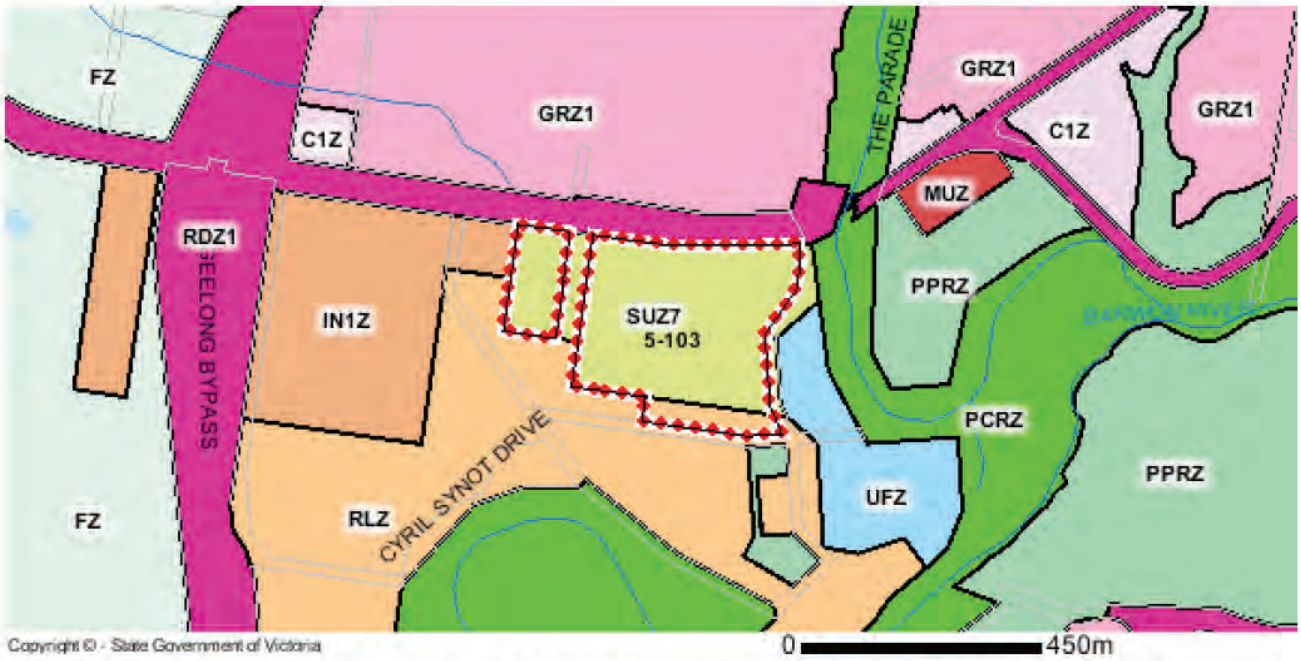
- RLZ - Rural Living
- RUZ - Rural
- SUZ - Special Use
- TZ - Township
- UFZ - Urban Floodway
- UGZ - Urban Growth

-- Urban Growth Boundary

Map 9 Fyansford Landfill



Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

Zones Legend

- ACZ - Activity Centre
- B1Z - Commercial 1
- B2Z - Commercial 1
- B3Z - Commercial 2
- B4Z - Commercial 2
- B5Z - Commercial 1
- C1Z - Commercial 1
- C2Z - Commercial 2
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- DZ - Dockland
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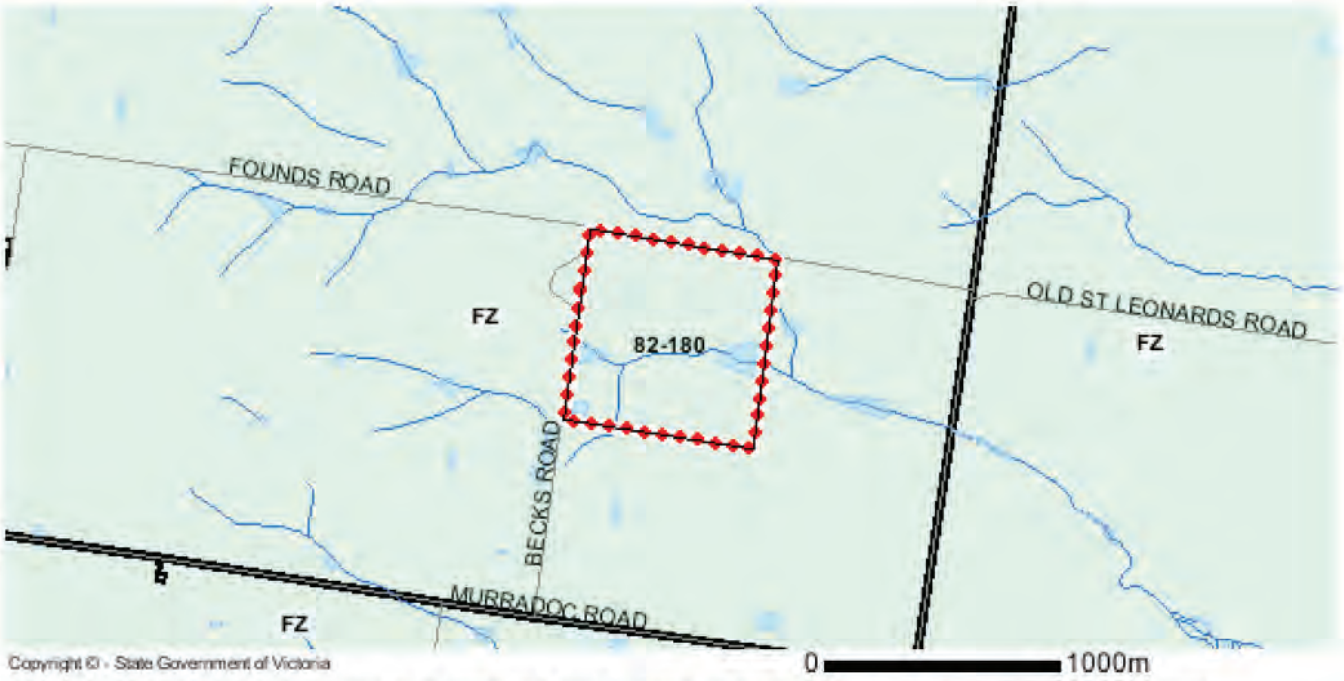
- UFZ - Urban Floodway
- UGZ - Urban Growth
- Urban Growth Boundary

Map 10 Drysdale Landfill



Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

Zones Legend

- ACZ - Activity Centre
- B1Z - Commercial 1
- B2Z - Commercial 1
- B3Z - Commercial 2
- B4Z - Commercial 2
- B5Z - Commercial 1
- C1Z - Commercial 1
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- RDZ1 - Road - Category 1
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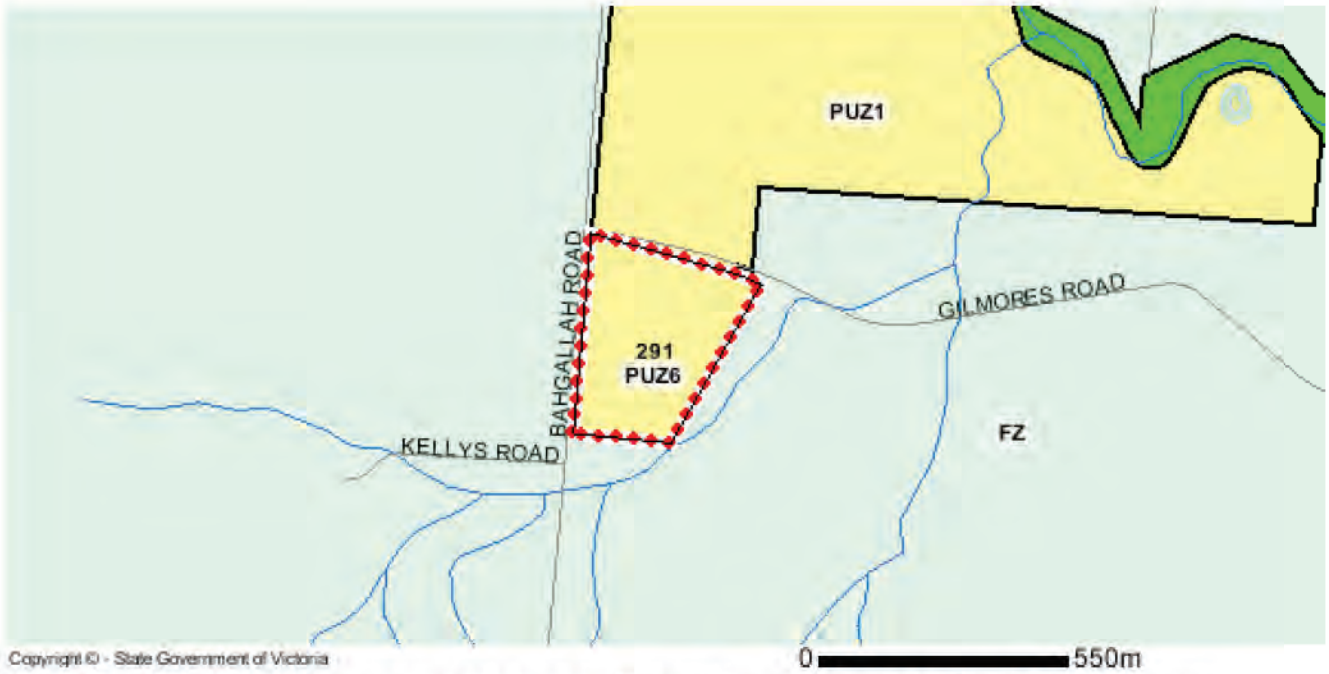
- RLZ - Rural Living
- RUZ - Rural
- SUZ - Special Use
- TZ - Township
- UFZ - Urban Floodway
- UGZ - Urban Growth

-- Urban Growth Boundary

Map 11 Casterton Landfill



Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

Zones Legend

- ACZ - Activity Centre
- B1Z - Commercial 1
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- B4Z - Commercial 2
- B5Z - Commercial 1
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- C2Z - Commercial 2
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- RLZ - Rural Living
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- TZ - Township
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- UGZ - Urban Growth
- Urban Growth Boundary

Map 12 Dartmoor Landfill

Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

Zones Legend

- ACZ - Activity Centre
- B1Z - Commercial 1
- B2Z - Commercial 1
- B3Z - Commercial 2
- B4Z - Commercial 2
- B5Z - Commercial 1
- C1Z - Commercial 1
- C2Z - Commercial 2
- CA - Commonwealth Land
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- CDZ - Comprehensive Development
- DZ - Dockland
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- PUZ3 - Public Use - Health Community
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- PUZ6 - Public Use - Local Government
- PUZ7 - Public Use - Other Public Use
- PZ - Port
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- R3Z - General Residential
- RAZ - Rural Activity
- RCZ - Rural Conservation
- RDZ1 - Road - Category 1
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- RGZ - Residential Growth
- RLZ - Rural Living
- RUZ - Rural
- SUZ - Special Use
- TZ - Township
- UFZ - Urban Floodway
- UGZ - Urban Growth
- Urban Growth Boundary

Map 13 Killarney Landfill

Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

Zones Legend

- ACZ - Activity Centre
- B1Z - Commercial 1
- B2Z - Commercial 1
- B3Z - Commercial 2
- B4Z - Commercial 2
- B5Z - Commercial 1
- C1Z - Commercial 1
- C2Z - Commercial 2
- CA - Commonwealth Land
- CCZ - Capital City
- CDZ - Comprehensive Development
- DZ - Dockland
- ERZ - Environmental Rural
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- GRZ - General Residential
- GWAZ - Green Wedge A
- GWZ - Green Wedge
- IN1Z - Industrial 1
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ABBREVIATIONS

Councils in the Barwon South West region and abbreviations used in the plan

Local government area	Abbreviation used in text	Abbreviation used in tables
Borough of Queenscliffe Council	Queenscliffe	Queenscliffe (B)
Greater Geelong City Council	Greater Geelong	Greater Geelong (C)
Colac Otway Shire Council	Colac Otway	Colac Otway (S)
Corangamite Shire Council	Corangamite	Corangamite (S)
Glenelg Shire Council	Glenelg	Glenelg (S)
Moyne Shire Council	Moyne	Moyne (S)
Southern Grampians Shire Council	Southern Grampians	Southern Grampians (S)
Surf Coast Shire Council	Surf Coast	Surf Coast (S)
Warrnambool City Council.	Warrnambool	Warrnambool (C)

Abbreviation	Full
Barwon South West Implementation Plan	*Barwon South West Waste and Resource Recovery Implementation Plan*
Barwon South West region	Barwon South West Waste and Resource Recovery Region
Barwon South West WRRG	Barwon South West Waste and Resource Recovery Group
C&D	construction and demolition
C&I	commercial and industrial
DELWP	Department of Environment, Land, Water and Planning
DO	Drop off facility
EPA	Environment Protection Authority Victoria
EP Act	*Environment Protection Act 1970*
Framework	Victorian Waste and Resource Recovery Infrastructure Planning Framework
landfill BPEM	*Best Practice Environmental Management (Siting, Design, Operation and Rehabilitation of Landfills)*
LGA	local government area
LG Forum	Barwon South West Local Government Waste Forum
MERP	municipal emergency recovery plan
Ministerial Guideline	*Ministerial Guideline: Making, amending and integrating the Statewide Waste and Resource Recovery Infrastructure Plan and Regional Implementation Plans*
MRF	materials recovery facility
MRM	municipal recovery managers
MSW	municipal solid waste
PIW	Prescribed Industrial Waste
PPR	public place recycling
RSO	regional strategic objective
RRC/TSs	resource recovery centres/transfer stations
RWRRD	Sustainability Victoria's Regional Waste and Resource Recovery Database
SD	strategic direction
SIW	solid industrial waste
state infrastructure plan	*Statewide Waste and Resource Recovery Infrastructure Plan 2015-44*
state organics strategy	*Victorian Organics Resource Recovery Strategy*
SV	Sustainability Victoria
TI Act	*Transport Integration Act 2010*
waste education strategy	*Victorian Waste Education Strategy*
WRRGs	waste and resource recovery groups

TERMS AND DEFINITIONS

Term	Explanation
Aerobic composting	The controlled biological decomposition of organic materials under aerobic (in the presence of oxygen) conditions, accomplished in open r enclosed windrows or piles.
Airspace	The remaining capacity of a landfill.
Anaerobic composting	The controlled biological decomposition of organic materials under anaerobic (in the absence of oxygen) conditions, accomplished in enclosed vessels producing combustible methane gas and compost.
Anaerobic digestion (AD)	Biological breakdown by microorganisms of organic matter, in the absence of oxygen, into biogas (a mixture of carbon dioxide and methane) and digestate (a nutrient-rich residue).
Asbestos	A term for a group of six naturally occurring mineral fibres belonging to two groups: • Serpentine Group – comprised of only chrysotile (white asbestos) • Amphibole Group – comprised of anthophyllite, amosite (brown asbestos or grey asbestos), crocidolite (blue asbestos), tremolite, and actinolite. Asbestos containing materials (ACMs) can be categorised as friable and non-friable. Non-friable asbestos, where it is mixed with other materials like cement, is the type most commonly found in our built environment. Friable asbestos is more likely to become airborne. Both friable and non-friable asbestos pose a significant health risk to all workers and others if the materials are not properly maintained or removed carefully. The risk of exposure from the built environment is broad, with the potential to impact the entire Australian community.
Avoidance	The first step in the waste hierarchy. Indicates practices whereby waste generation is circumvented.
Beneficiation	An optical sorting process used to separate different colours of container glass to produce cullet for reprocessing and mixed fines.
Biogas or syngas	A gas generated by breaking down organic matter in the absence of oxygen, such as occurs in landfills. Biogas is typically comprised of 60% methane and 40% carbon dioxide, and can be used as an energy source.
Biomass	Biological material that is not fossilised, including forest and mill residues, agricultural crops and waste, wood and wood waste, animal waste, livestock operation residues, aquatic plants, fast growing trees and plants.
Biosolids	Biosolids are considered to be organic solids derived from sewage treatment processes that are in a state that they can be managed to sustainably utilise their nutrient, soil conditioning, energy, or other value (achieve minimum EPA standards for classification as T3 and C2 biosolids). The solids that do not meet these criteria are defined as sewage sludge.
BPEM (Landfill)	*Best Practice Environmental Management – siting, design, operation and rehabilitation of landfills.*
Buffer zone	Buffer zones, or separation distances, aim to minimise the offsite impacts of sensitive land uses arising from unintended, industry generated odour and dust emissions. A buffer zone is an area of land outside the operating area of a facility that is set aside to maintain an adequate distance between the facility and sensitive land uses (such as residential development) so those uses are not adversely affected by noise, odour or dust. The land may or may not be owned by the facility owner.
Category C contaminated soil	Refer to prescribed waste and prescribed industrial waste (PIW).
Clean fill	Material that has no harmful effects on the environment. This material is a natural soil material and does not contain any chemicals or other materials such as concrete rubble. Also called fill material.
Closed landfill	Landfills which have ceased to receive waste. During the decommissioning phase they may continue to receive clean fill and soils to undertake the appropriate capping and contouring. If it was a licensed landfill, it should have received a post closure pollution abatement notice (PAN) from the EPA. If exempt from licensing, there should be reassurance that the closure process has commenced or is in place.
Collection system	System for collecting materials from the kerbside, including bin type and collection frequency.
Commercial and industrial (C&I) waste	Solid inert waste generated from trade, commercial and industrial activities including the government sector. It includes waste from offices, manufacturing, factories, schools, universities, state and government operations and small to medium enterprises e.g. food waste.
Commingled recyclables	Materials combined generally for the purposes of collection, mainly through municipal collection services. Includes plastic bottles, other plastics, paper, glass and metal containers. Commingled recyclable materials require sorting after collection before they can be reprocessed. Can also be called commingled materials.
Composting	The process whereby organic materials are microbiologically transformed under controlled aerobic conditions to create a pasteurised and stabilised organic product for application to land.
Construction and demolition (C&D) waste	Solid inert waste generated from residential and commercial construction and demolition activities e.g. bricks and concrete.
Cullet	Sorted glass feedstock resulting from the beneficiation process of mixed container glass. Generally consists of sorted streams of amber, flint and green glass of particle size greater that 5-10 mm depending on the capacity of the beneficiation plant.
Current capacity of infrastructure	Estimation of the installed capacity of an existing facility or infrastructure type
Daily cover	The layer of compressed soil or earth which is laid on top of a day's deposition of waste on an operational landfill site. The cover helps prevent interaction between waste and air, reducing odours and creating a firm base for vehicles to work on.

Term	Explanation
Delamination	The process of splitting a composite material into its component parts e.g. laminated glass.
Department of Environment, Land, Water and Planning (DELWP)	A Victorian government department providing policy planning, preparation of legislative amendments, leadership coordination and oversight of the environment portfolio.
Digestate	A nutrient-rich residue remaining after the anaerobic digestion of a biodegradable feedstock.
Drop off centre/ site	A facility where households can drop off selected materials and household items for recycling and reuse. Also called drop off facilities.
Duty holder	Any person who has a duty or obligation under the Environment Protection Act 1970. For the purposes of this plan, the above definition, used by the EPA, is relevant. Note – under section 67B of the EP Act, EPA may require duty holders to provide financial assurance as a condition of a licence or works approval.
E-waste	E-waste comprises of electronic equipment with a plug or battery that requires a current to operate and that has reached end of life. It includes televisions, computers, monitors and whitegoods such as fridges and washing machines.
Energy from waste (EfW)	The terms 'energy recovery from waste', 'waste to energy' or 'energy from waste' can be used interchangeably to describe a number of treatment processes and technologies used to generate a usable form of energy from waste materials. Examples of usable forms of energy include electricity, heat and transport fuels.
EP Act	*Environment Protection Act 1970.*
Environment Protection Authority Victoria (EPA)	Established under the auspices of the Environment Protection Act 1970, EPA's role is to be an effective environmental regulator and an influential authority on environmental impacts.
Environmental justice	The principles of environmental justice are based on the concepts of equity and participation. The principles require that environmental benefits and impacts should be distributed proportionately and affected communities should be able to participate in decision making.
Existing operating landfill	Landfills currently accepting waste for disposal or have recently ceased to accept waste but are yet to receive a post closure PAN from the EPA.
Feedstock	Raw material used to manufacture products. Material varies depending on what is being produced.
Fill material	See clean fill.
Fines (glass)	Unsorted sub 5-10 mm glass material left over from the glass beneficiation process. It can contain contamination including plastics and small pieces of metals. These fines can be further processed to produce a glass sand product which has a number of uses.
Food organics	Food waste from households or industry, including food processing waste, out-of-date or off-specification food, meat, fruit and vegetable scraps. Excludes liquid wastes.
Garden organics	Organics derived from garden sources e.g. grass clippings, tree prunings. Also known as green organics.
Gasification	Thermal technology that converts material into combustible gases by partial oxidation under the application of heat, leaving an inert residue.
Generated material/waste	Refers to materials or waste originating from the region.
Green organics/ waste	Referred to as garden organics.
Greenhouse gases	Gases, including carbon dioxide and methane, that trap heat in the earth's atmosphere, affecting weather and climate patterns.
Hard waste	The term applied to household garbage that is not usually accepted in kerbside garbage bins by local councils e.g. old fridges and mattresses.
Hazardous waste	See prescribed waste and prescribed industrial waste (PIW).
Hubs	A facility or group of facilities that manage or recover waste or material streams. For larger hubs the concentration of facilities enable sufficient waste derived feedstock to support viable reprocessing and best practice management options. The location of hubs will vary for individual material streams.
Illegal dumping	Illegal dumping is the deliberate and unauthorised dumping, tipping or burying of waste on land that is not licensed or fit to accept that waste.
Incinerator	For the purpose of this document, a site that facilitates the disposal of waste streams through incineration without producing another useful end product or capturing value from the waste material.
Inert waste	Inert waste is neither chemically nor biologically reactive and will not decompose. Includes glass, sand and concrete.
In-vessel composting	Composting technology involving the use of a fully enclosed chamber or vessel in which the composting process is controlled by regulating the rate of mechanical aeration. Aeration assists in heat removal, temperature control and oxygenation of the mass. Aeration is provided to the chamber by a blower fan which can work in a positive (blowing) and/or negative (sucking) mode. Rate of aeration can be controlled with temperature, oxygen or carbon dioxide feedback signals.
Kerbside waste/ collection	Waste collected by local councils from residential properties, including garbage, commingled recyclables and garden organics, but excluding hard waste.

Term	Explanation
Landfill	Discharge or deposit of solid wastes onto land that cannot be practically removed from the waste stream.
Landfill available airspace	Refer to airspace.
Landfill capping	An impermeable geo-membrane and/or clay materials with, possibly a further layer of soil, placed over the capping. Capping allows greenhouse gases to be captured and creates a 'dry tomb' protecting groundwater. (Once a landfill cell is filled, the waste matter must be covered with landfill capping.)
Landfill levy	A levy applied at differential rates to municipal, industrial and prescribed wastes disposed of at licensed landfills in Victoria. Landfill levies are used solely for the purposes of environment protection and fostering environmentally sustainable use of resources and best practice in waste management. They fund the activities of WRRGs, SV and EPA, helping to establish waste management infrastructure, industry waste reduction programs, education programs, regulatory controls and enforcement regimes. Levies also provide an incentive to minimise the generation of waste, sending a signal to industry that the government supports efforts to develop alternatives to disposal to landfill.
Landfill likely closure dates	An estimate of the likely year of closure of the landfill based on consideration of modelling tonnage projections and land available under current EPA works approval, planning and permit requirements and potential void space that may eventuate at a quarry-based landfill site as identified by owners and operators.
Landfill tonnages	Tonnes landfilled derived from landfill levy data supplied by EPA. Does not include prescribed industrial waste (PIW). There has been no allowance for daily cover which must be considered when comparing figures with those earlier drafts of the *Statewide Waste and Resource Recovery Infrastructure Plan* (state infrastructure plan). Previously landfill figures were adjusted to remove a 15% allowance for daily cover.
Leachate	Contaminated water that has percolated through or drained from a landfill.
Litter	Any small, medium or large item placed inappropriately.
LG ARG	Local Government Advisory Reference Group: A sub group of the local government waste forum established to advise, assist and inform the forum.
LG Waste Forum	Local Government Waste Forum established as per section 49B of the EP Act which requires each WRRG to establish a forum consisting of representatives of the councils in the region.
Local Litter Measurement Toolkit (LLMT)	The Local Litter Measurement Toolkit has been designed for local government and land managers to: • Increase access to best practice techniques, data and analysis to inform management of litter and illegal dumping. • More efficiently evaluate litter and illegal dumping programs and interventions at a local scale. • Conduct cost-benefit analyses to improve local litter prevention projects. • Prepare business cases to bid for funding for initiatives to reduce litter and illegal dumping, maximise recycling, improve or introduce infrastructure and enforcement.
Managed materials/waste	Materials or waste managed in the region refers to materials or wastes that have passed through or been managed at a waste and resource recovery facility in the region including, RRC/TS, MRFs, reprocessors or landfills. They may have been generated in another region and or they ultimately be reprocessed or disposed of outside the region.
Materials or wastes generated in the region	See Generated material/waste.
Materials or wastes managed in the region	Refer to Managed materials/waste.
Materials recovery facility (MRF)	A centre for the receipt, sorting and transfer of materials recovered from the waste stream prior to transport to another facility for recovery and management. At a MRF materials may undergo mechanical treatment for sorting by characteristics such as weight, size, magnetism and optical density and may include cleaning and compression. Materials may be received as mixed streams such as commingled recyclables from households and businesses or single streams such as metals.
Materials processed	Materials processed in the region or facility refers to the materials that have been sorted, consolidated or processed at resource recovery centres, transfer stations, drop off centres and/or MRFs in the region.
Materials recovered	Materials recovered from the region refers to materials diverted from landfill for use or reprocessing irrespective of where the recovery or reprocessing takes place.
Materials reprocessed	Materials reprocessed in the region refers to the materials that have passed through reprocessing facilities in the region. Materials reprocessed in a particular facility refers to the materials that are directly reprocessed in the individual facility.
Mechanical biological treatment (MBT) plant	MBT plants combine mechanical sorting (such as in a MRF) with biological treatment of organic waste to process residual organic waste. This could include technology such as anaerobic digestion to stabilise the material and generate heat and power. Material remaining after further treatment (often referred to as 'digestate') can be added to compost or used as fuel in a thermal waste-to-energy facility.
Municipal solid waste (MSW)	Solid waste generated from municipal and residential activities, and including waste collected by, or on behalf of, a municipal council. In this document, MSW does not refer to waste delivered to municipal disposal sites by commercial operators or waste from municipal demolition projects.
Open windrow composting operation	A type of outdoor composting process where organic materials are piled into windrows and are turned for aeration.

Term	Explanation
Optical sorting	Technologies used to sort glass by colour type, and plastics by polymer type.
Organic material	Plant or animal matter, e.g. grass clippings, tree prunings and food waste, originating from domestic or industrial sources.
Pollution abatement notice (PAN)	Pollution abatement notices are issued under section 31A of the *Environment Protection Act 1970*. They aim to prevent further occurrence of pollution or the potential environmental risk through installation of risk controls and changes to onsite processes and practices.
Prescribed waste and prescribed industrial waste (PIW)	These wastes are defined in the *Environment Protection (Industrial Waste Resource) Regulations 2009*. EPA closely regulates these wastes because of their potential adverse impacts on human health and the environment. Prescribed wastes carry special handling, storage, transport and often licensing requirements, and attract substantially higher disposal levies than non-prescribed solid wastes. Also known as hazardous waste.
Private (own waste) landfills	Landfills privately owned by an entity that generate and deposit waste exclusively from a single source (arising from their own onsite activities).
Process derived fuels	Also called process engineered fuel (PEF) or refuse derived fuel (RDF), is a fuel produced after basic processing in a MRF or MBT to increase the calorific value and remove recyclable materials and contaminants of municipal solid waste, commercial and industrial waste and construction and demolition waste.
Processing facilities	Facilities which either receive materials directly from collection systems or from recovery facilities for further sorting and/or processing to provide material for use in the generation of new products.
Product stewardship	A concept of shared responsibility by all sectors involved in the manufacture, distribution, use and disposal of products, which seeks to ensure value is recovered from products at the end of life.
Public place recycling	Recycling facilities found in public areas, such as parks, reserves, transport hubs, shopping centres and sport and entertainment venues, that allow the community to recycle when away from home.
Putrescible waste	Waste that readily decomposes, including food waste and organic waste from gardens.
Pyrolysis	Thermal breakdown of waste in the absence of air, to produce char, pyrolysis oil and syngas e.g. the conversion of wood into charcoal.
Recover / recovery / resource recovery	The process of recovering resources from waste for reuse or reprocessing. This includes collection, sorting and aggregation of materials.
Recyclable materials	Waste and materials which can be recycled. Collection of recyclable materials can be done separately to provide feedstocks for viable recovery.
Recyclables	While this term strictly applies to all materials that can be recycled, in this document the term is generally used to refer to the recyclable containers and paper/cardboard component of kerbside waste e.g. it excludes food and garden organics.
Recyclate	Raw materials that can be recycled that are sent to and processed in a recovery facility.
Recycle / recycling	To convert waste into a reusable material. In common practice the term is used to cover a wide range of activities, including collection, sorting, reprocessing and reuse.
Refuse derived fuels	Refer to Process derived fuels.
Reprocess / reprocessing	To put a material that has been used through an industrial process to change it so that it can be used again.
Reprocessor / reprocessing facility / reprocessing infrastructure	Facility that uses an industrial process to change the physical structure and properties of a waste material so it can be used again. This can include facilities that dismantle products, such as tyres, e-waste and mattresses, and energy from waste facilities that use materials to generate energy.
Resale centre / shop	A centre/shop that enables the sale and subsequent reuse of good quality, saleable products and materials that were disposed of by their previous owner.
Residual waste	Residual material that remains after any source separation or reprocessing activities of recyclable materials or garden organics. Waste that is left over after suitable materials have been recovered for reuse and recycling. This generally means the environmental or economic costs of further separating and cleaning the waste are greater than any potential benefit of doing so.
Resource recovery centre (RRC)	A facility established to receive and/or recover reusable and recyclable materials that would otherwise be destined for disposal. Can be combined with a transfer station and may include resale centres.
Resource recovery infrastructure	Facility that receives and manages materials to enable them to be reused or reprocessed. This includes drop off points, resale centres, resource recovery centres, transfer stations and materials recovery facilities.
Reuse	Recovering value from a discarded resource without processing or remanufacture e.g. garments sold though opportunity shops are, strictly speaking, a form of reuse, rather than recycling.
Scrap metal	Metals recovered from all sectors (households, building and business) and can be further categorised into ferrous and non-ferrous metals.
Sectors / industry sectors	Groupings of industries used to generalise patterns in waste generation and disposal e.g. construction and demolition, food services including food retail and food manufacturing, small to medium enterprises.

Term	Explanation
Separation distance	Refer to buffer zone.
Shredder floc	Residue directly arising from large scale shredding operations to recover metals. Shredded material includes, but is not limited to, end-of-life vehicles, white goods, machineries, drums and corrugated material.
Social licence to operate	The concept of a 'social licence to operate' has evolved from broader concepts of 'corporate social responsibility' and is based on the idea that a business not only needs appropriate government or regulatory approval but also a 'social licence'. The social licence is the acceptance that is continually granted to industry and facility operators by the local community or other stakeholders to operate.
Solid industrial waste (SIW)	Solid waste generated from commercial, industrial or trade activities, including waste from factories, offices, schools, universities, state and federal government operations and commercial construction and demolition work. Excludes MSW, wastes that are prescribed under the *Environment Protection Act 1970* and quarantine wastes.
Solid waste	Non-hazardous, non-prescribed, solid waste materials, ranging from municipal garbage to industrial waste.
Source separation	The practice of segregating materials into discrete material streams prior to collection by, or delivery to, processing facilities.
Spokes	The sequence of activities that move materials from waste generators to (and from) hubs e.g. collection, transport and sorting. The length of the spoke, and hence the location of the hub, for a particular material stream is influenced by the impact of transport on the margin of return for that particular material stream.
Stockpiling	Storage of materials.
Sustainability Victoria (SV)	Statutory authority established in October 2005 under the *Sustainability Victoria Act 2005* with the key objective of 'facilitating and promoting environmental sustainability in the use of resources'. SV works across the areas of energy, waste and water with communities, industries and government applying the best ideas and encouraging action to enable change in environmental practices.
Transfer station	A facility allowing the drop off and consolidation of garbage and a wide range of recyclable materials. Can be combined with a resource recovery centre and may include resale centres. Does not undertake processing activities.
Treatment	A specific activity, process or handling of an item/material (often involved with reprocessing to remove contamination and the like).
Vermiculture	Worm farming, to reprocess food and garden organics into liquid fertiliser.
Waste	Any discarded, rejected, unwanted, surplus or abandoned matter, including where intended for recycling, reprocessing, recovery, purification or sale. Anything that is no longer valued by its owner for use or sale and which is, or will be, discarded. In this document, the term 'solid waste' refers to non-hazardous, non-prescribed, solid waste materials ranging from municipal garbage to industrial waste.
Waste and resource recovery group (WRRG)	Statutory authorities established under the *Environment Protection Act 1970* responsible for preparing the regional waste and resource recovery implementation plan for their region.
Waste and Resource Recovery Planning Framework	The planning framework as defined in the 2014 amendments to the *Environment Protection Act 1970* and including: • The *Statewide Waste and Resource Recovery Infrastructure Plan* (state infrastructure plan). • The seven regional waste and resource recovery implementation plans (regional implementation plans). • Relevant Ministerial Guidelines made under section 50CA of the EP Act. • The process for integration of the state infrastructure plan and regional implementation plans.
Waste hierarchy	A concept promoting waste avoidance ahead of recycling and disposal. Recognised as promoting management of waste in the order of preference: avoidance, reduce, reuse, recycle and disposal.
Waste management industry	Applies to those involved in managing waste e.g. collectors, sorters, processors and landfill operators.
Waste minimisation	The concept of, and strategies for, waste generation to be kept to a minimum level in order to reduce the requirement for waste collection, handling and disposal to landfill. Also referred to as waste avoidance.
Waste to energy	Refer to Energy from waste.

APPENDICES

Appendix 1 Requirements of the *Environment Protection Act 1970* and regulatory and policy context

Division 2AD – Regional waste and resource recovery implementation plans

50B Preparation of draft Regional Waste and Resource Recovery Implementation Plans

(1) Each Waste and Resource Recovery Group must prepare a Regional Waste and Resource Recovery Implementation plan for its waste and resource recovery region.

(2) Subject to subsection (3), each Waste and Resource Recovery Group must submit a draft Regional Waste and Resource Recovery Implementation Plan to Sustainability Victoria and to the Authority within 12 months after the State-Wide Waste and Resource Recovery Infrastructure Plan takes effect.

(3) A draft Regional Waste and Resource Recovery Implementation Plan must be submitted by the Metropolitan Waste and Resource Recovery Group within 3 months after the date on which the first State-Wide Waste and Resource Recovery Infrastructure Plan takes effect.

(4) The Authority must make any comments within 60 days after receiving a draft Regional Waste and Resource Recovery Implementation Plan.

50BA Objective of Regional Waste and Resource Recovery Implementation Plans

The objective of a Regional Waste and Resource Recovery Implementation Plan is to set out how the waste and resource recovery infrastructure needs of a waste and resource recovery region will be met over at least a 10 year period.

50BB Content of Regional Waste and Resource Recovery Implementation Plans

(1) A Regional Waste and Resource Recovery Implementation Plan must include—

(a) a description and analysis of waste and resource recovery infrastructure within its waste and resource recovery region, including a consideration of—

(i) environmental and financial performance; and

(ii) current infrastructure and anticipated opportunities for providing infrastructure across the waste and resource recovery region; and

(iii) the waste and resource recovery infrastructure needs, priorities and preferred locations for the waste and resource recovery region; and

(iv) regional transport and land use planning; and

(b) a description of how the long-term directions in the State-Wide Waste and Resource Recovery Infrastructure Plan will be implemented to give effect to local and regional infrastructure needs within the waste and resource recovery region; and

(c) a schedule of existing and required waste and resource recovery infrastructure within the waste and resource recovery region including—

(i) the type, general location and other requirements of new waste and resource recovery infrastructure, other than landfills; and

(ii) the timeframe for when new waste and resource recovery infrastructure is needed; and

(iii) an identification of steps required to align the schedule with local planning schemes; and

(iv) the proposed sequence for the filling of available landfill sites for at least the next 10 years; and

(v) a program for replacing and rehabilitating landfill sites; and

(vi) the intended or likely date of closure of each landfill site; and

(vii) options for future landfill capacity and resource recovery infrastructure; and

(d) any matters required by guidelines made under section 50CA.

(2) Subject to subsection (3), a Regional Waste and Resource Recovery Implementation Plan must be consistent with any policy and any government policies.

(3) If a Regional Waste and Resource Recovery Implementation Plan is inconsistent with a policy, the policy prevails to the extent of the inconsistency.

50BC Consultation during preparation of Regional Waste and Resource Recovery Implementation Plans

Before submitting a draft Regional Waste and Resource Recovery Implementation Plan to Sustainability Victoria and to the Authority under section 50B, a Waste and Resource Recovery Group must consult with—

(a) the Secretary of the Department of Environment and Primary Industries; and

(b) the Chairman; and

(c) the Chairperson of Sustainability Victoria; and

(d) the Chairperson of each Waste and Resource Recovery Group; and

(e) the chairperson of the Urban Renewal Authority Victoria; and

(f) the chief executive of each council within its waste and resource recovery region.

50BD Further preparation of Regional Waste and Resource Recovery Implementation Plans

(1) On the submission of a draft Regional Waste and Resource Recovery Implementation Plan under section 50B, each Waste and Resource Recovery Group and Sustainability Victoria must work together to integrate the priorities and directions of the Regional Waste and Resource Recovery Implementation Plan and the State-Wide Waste and Resource Recovery Infrastructure Plan and to resolve any differences in the Plans.

(2) Each Waste and Resource Recovery Group and Sustainability Victoria are jointly responsible for integrating the Plans for a period of up to 6 months.

(3) Sustainability Victoria and each Waste and Resource Recovery Group must—

(a) take into account any comments made by the Authority under section 50B(4); and

(b) amend the schedule of existing and required waste and resource recovery infrastructure within the draft Regional Waste and Resource Recovery Implementation Plan if the Authority objects to the inclusion of a proposed landfill on the ground that it is unlikely to meet the requirements of a relevant policy.

(4) The integration process in subsections (1) to (3) must comply with any guidelines issued under section 50CA.

(5) A Waste and Resource Recovery Group must submit a draft Regional Waste and Resource Recovery Implementation Plan to the Minister for approval—

(a) no later than 6 months after submitting a draft to Sustainability Victoria and the Authority under section 50B; and

(b) not before either the Authority has provided its comments under section 50B(4) or the 60 days in which the Authority may comment on the Plan have expired.

(6) On receiving a draft Regional Waste and Resource Recovery Implementation Plan under subsection (5) the Minister must—

(a) approve the Plan; or

(b) approve the Plan with amendments; or

(c) return the Plan to the relevant Waste and Resource Recovery Group for amendment.

(7) If the Minister returns the Regional Waste and Resource Recovery Implementation Plan to a Waste and Resource Recovery Group under subsection (6)(c), the Minister must give directions as to the amendments required to be made to the draft Plan.

(8) A Waste and Resource Recovery Group must comply with a direction of the Minister under subsection (7) within 30 days or a longer period specified by the Minister.

50BE Publication of approval of Regional Waste and Resource Recovery Implementation Plans

(1) The Minister must cause to be published in the Government Gazette a notice of approval of a Regional Waste and Resource Recovery Implementation Plan.

(2) The notice of approval must be published—

(a) in the next general edition of the Government Gazette; or

(b) in a special edition of the Government Gazette within 10 working days after the approval of the Plan.

(3) A Regional Waste and Resource Recovery Implementation Plan takes effect on—

(a) the date on which the notice of approval is published in the Government Gazette; or

(b) a later date specified in the notice.

(4) A Regional Waste and Resource Recovery Implementation Plan remains in force until it is replaced by another Regional Waste and Resource Recovery Implementation Plan.

50BF Publication of Regional Waste and Resource Recovery Implementation Plans

(1) A Waste and Resource Recovery Group must publish a copy of its Regional Waste and Resource Recovery Implementation Plan on its Internet site within 7 days of a notice of approval of the Plan being published in the Government Gazette.

(2) Sustainability Victoria must publish a copy of a Regional Waste and Resource Recovery Implementation Plan on its Internet site within 7 days of a notice of approval of the Plan being published in the Government Gazette.

(3) A Waste and Resource Recovery Group and Sustainability Victoria must each publish on its Internet site a revised copy of a Regional Waste and Resource Recovery Implementation Plan within 7 days of a notice of approval of an amendment or variation to the Plan being published in the Government Gazette.

50BG Amendment of Regional Waste and Resource Recovery Implementation Plans

(1) A Waste and Resource Recovery Group may prepare draft amendments to its Regional Waste and Resource Recovery Implementation Plan at any time, including any schedule of existing and required waste and resource recovery infrastructure within the Plan.

(2) The Minister may at any time direct a Waste and Resource Recovery Group to prepare draft amendments to its Regional Waste and Resource Recovery Implementation Plan within a specified period of time.

(3) The Minister may at any time make a variation to a Regional Waste and Resource Recovery Implementation Plan that is declaratory, machinery or administrative in nature.

(4) Sections 50BC, 50BD and 50BE apply to an amendment of a Regional Waste and Resource Recovery Implementation Plan under subsections (1) and (2) as if the amendment were a draft Regional Waste and Resource Recovery Implementation Plan.

(5) Sections 50BD(6) to (8) and 50BE apply to a variation of a Regional Waste and Resource Recovery Implementation Plan under subsection (3) as if the variation were a draft Regional Waste and Resource Recovery Implementation Plan.

50BH Consistency with Regional Waste and Resource Recovery Implementation Plans

(1) A council must perform its waste management functions consistently with the Regional Waste and Resource Recovery Implementation Plan applying to the council's municipal district.

(2) If a council disposes of waste in a waste and resource recovery region other than the waste and resource recovery region in which the council's municipal district is located, the disposal of the waste must be consistent with the Regional Waste and Resource Recovery Implementation Plan applying to the other waste and resource recovery region.

(3) Any person involved in the generation, management or transport of waste within a waste and resource recovery region must not do anything in relation to the waste that is inconsistent with the relevant Regional Waste and Resource Recovery Implementation Plan while the waste is in that region.

Regulatory and policy context

Document	Summary
The Minister for the Environment, *Environment Protection Act 1970* (EP Act)	The overarching Act for waste management and the environment in Victoria. In August 2014, it was amended to establish the Victorian Waste and Resource Recovery Infrastructure Planning Framework. The framework facilitates strategic planning for waste and resource recovery at both the state and local level for regional communities. The framework, as articulated in section 50CA of the EP Act, is constituted by the following: • Statewide Waste and Resource Recovery Infrastructure Plan • Regional Waste and Resource Recovery Implementation Plans • Any guidelines made under section 50CA in relation to the State-wide Waste and Resource Recovery Infrastructure Plan and Regional Implementation Plans • The formal integration process of the state and regional plans as outlined in section 50BD of the Environment Protection Act. • Pollution abatement notices (which are issued by the EPA Victoria to direct a person to prevent further pollution or environmental risk by controlling on-site processes and practices) (EPA Victoria 2013c). • The preparation and content of Regional Waste and Resource Recovery Implementation Plans are outlined in Division 2AD Section 50B.
EPA Victoria, Environment Protection (Scheduled Premises and Exemptions) Regulations 2007	Stipulates the premises that are subject to and/or exempt from works approval and/or licensing by EPA. Under the EP Act and the EP Premises Regulations, EPA Victoria administers: • Works approvals (which are necessary for industrial and waste management activities that could potentially have a significant environmental impact) and appeals against such approvals. • Licences (which regulate waste acceptance and treatment, air and water discharges, and noise and odour, and which are required for scheduled premises). • Research development and demonstration approvals (similar to works approvals, however applicable to projects of a smaller size, timeframe and environmental impact. These approvals could be useful in the development of emerging markets as they may provide an opportunity for trial research projects with approvals that are simpler and at a lower cost than works approvals, are decided in 30 days, provide legal certainty and thereby encourage development of new technologies).
EPA Victoria, Environment Protection (Industrial Waste Resource) Regulations 2009	Replaced the Environmental Protection (Prescribed Waste) Regulations 1998 (the 1998 Regulations). The 1998 Regulations set out administrative and reporting requirements for businesses in relation to waste (for example exemption applications, permits/certificates for transport of prescribed industrial wastes (PIWs), and annual reporting requirements). The 2009 Regulations increased the responsibility of waste producers, transporters and receivers for waste management. The objectives are to: • Assist industry to implement the principle of the wastes hierarchy. • Prescribe requirements for assessing, categorising and classifying industrial waste and PIW. • Encourage industry to use industrial waste as a resource by exempting material from categorisation as PIW if a secondary beneficial reuse is established. • Establish the requirements for the transport and management of prescribed industrial waste including requirements for the tracking of PIW (Victorian Government 2009).

EPA Victoria, Best Practice Environmental Management Publication – Siting, Design, Operation and Rehabilitation of Landfills 2015	In 2010, the EPA changed the requirements for environmental management of landfills as part of its license reform program and this resulted in clearer identification of the responsibility of license holders and stricter, less flexible requirements as part of the license. The Landfill Best Practice Environmental Management (BPEM) is the guiding document for the management of licensed landfills in Victoria. The document outlines the requirements of landfill operators in the design, construction, operation and long term rehabilitation of landfill facilities. Two supporting guidelines - the Closed Landfill Guidelines 2012 and the Landfills exempt from licensing Guideline 2014 – work with the Landfill BPEM to provide the framework for operators on how to meet best practice requirements. The EPA monitor compliance through inspections, annual license performance statements, investigations and audits. The BPEM on its own is not enforceable. It is given legal force through the licence conditions. Compliance with the Landfill BPEM and its amendments in recent years has required the industry to invest in considerable improvements to the development of new landfill cells, and in the management of closed landfills which pose a risk to the community
Sustainability Victoria, Statewide Waste and Resource Recovery Infrastructure Plan 2015-2044, approved by the Minister for Environment pursuant to section 50AD of the EP Act	This document provides Victoria with the longterm vision and roadmap to guide future planning for waste and resource recovery infrastructure. It describes the current waste and resource recovery system at the state level and models projections for future trends in waste generation, recovery and landfilling over the next 30 years. The goals are: • Landfills will only be for receiving and treating waste streams from which all materials that can be viably recovered have been extracted • Materials are made available to the resource recovery market through aggregation and consolidation of volumes to create viability in recovering valuable resources from waste • Waste and resource recovery facilities including landfills are established and managed over their lifetime to provide the best economic, community, environment and public health outcomes for local communities and the state and ensure their impacts are not disproportionately felt across communities. • Targeted information provides the evidence base to inform integrated statewide waste and resource recovery infrastructure planning and investment at the state, regional and local levels by industry, local government, WRRGs, government agencies and the broader community.
EPA Victoria, Energy from Waste Guidelines	Provides guidance for industry, government and the community on the EPA's expectations for energy from waste projects. In particular, the document focuses on the siting, design, construction and operation of such facilities. The guidelines, however, are high level. The document outlines how the Environment Protection Act 1970 and associated statutory policies and regulations are applied to the assessment of energy from waste proposals. The guidelines closely mirror the standards set for emissions in the EU opening the door for existing technologies to be considered.
EPA Victoria, Designing, Constructing and Operating Composting Facilities (Composting Guidelines)	Provides information on composting operators' obligations under laws administered by the EPA and provides suggestions on how to comply. Specifically, it: • Provides composting operators with advice on how to design, construct and manage composting facilities in a manner that protects human health and the environment in Victoria. • Will be used to inform EPA decision making for facilities that require research, design and demonstration approvals, works approvals and licences. • Will be used by EPA as a guide for how premises could resolve issues of non-compliance. • Whilst not explicitly restricting the use of open windrow technology in metropolitan areas, the Composting Guideline does set conditions that suggest only in-vessel processing facilities are acceptable.

EPA Victoria, State Environmental Protection Policy (Control of Noise from Commerce, Industry and Trade)	State environment protection policies (SEPPs) are subordinate legislation made under the provisions of the Act to provide more detailed requirements and guidance for the application of the Act to Victoria. SEPPs aim to safeguard the environmental values and human activities (beneficial uses) that need protection in Victoria from the effect of pollution and waste. The Noise SEPP aims to protect people from the effects of industrial and commercial noise in neighbouring residential zones. This is particularly relevant in Melbourne and regional urban centres where residential development occurs close to or within the buffer zones of industrial facilities such as waste MRFs and reprocessors.
EPA Victoria, State Environment Protection Policy (Ambient Air Quality & Air Quality Management)	The Air SEPP aims to protect air quality in Victoria and sets goals, monitoring and reporting protocols for six common pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), photochemical oxidants (as ozone), sulphur dioxide (SO_2), lead and particles as PM10. The SEPP also includes a separate objective for visibility reducing particles, which is not included in the National Environment Protection Measure (NEPM).
Barwon South West council waste management plans and strategies	Currently each council has a council plan that outlines its future direction and commitments. Each plan details a number of objectives, goals and strategies that relate to waste management either directly or indirectly. The local government advisory reference group has identified that a number of councils have a need to update their plans and flagged this as a joint project to ensure consistency in the near future.

Appendix 2 Collaboration, alignment and integration process and outcomes

The EP Act and the Ministerial Guidelines establish processes for consultation and collaboration during the plan's development to achieve a coordinated approach to planning for Victoria's waste and resource recovery system. This appendix outlines the collaboration process over the two years including:

- developing the plan
- alignment with the state infrastructure plan
- integration with the other six regional plans.

This appendix documents these processes undertaken by Barwon South West WRRG including collaboration with other WRRGs to achieve a coordinated approach to planning for Victoria's waste and resource recovery system.

Developing the plan

Extensive background work was undertaken to inform the plan, including:

- A literature review of recent regional, state and national research.
- Data collection (see Major data sources at Appendix 4) and analysis including:
  - detailed surveys of and data collection from local government
  - detailed surveys and data collection from the regional reprocessing industry as part of a statewide study
  - detailed surveys of and data collection from the commercial and industrial (C&I) and construction and demolition (C&D) sectors in the region.
- Consideration of requirements for the integration into the state infrastructure plan.
- Market sounding and review—together with a resource recovery scheduling application and evaluation process—to understand the waste sector's capacity and infrastructure investment intentions, challenges, capacity gaps, needs and opportunities and to inform the development of an infrastructure schedule.
- Surveys to gauge community aspirations and priorities around waste and resource recovery.
- Development of an industry, local government and community data base to ensure that all stakeholders are kept informed of developments.
- Meetings with local government representatives, including waste, environment and planning departments.
- Face to face meetings and consultation with industry representatives.

Broad consultation

See Appendix 3 for details and outcomes of the consultation.

Government agency alignment and integration to achieve coordinated planning

Barwon South West WRRG collaborated with the waste and resource recovery portfolio agencies, comprising the other six WRGGs, DELWP, EPA and SV. Collaboration over the two years occurred both as a collective and through collaboration with individual groups.

Barwon South West WRRG collaborated with the portfolio through:

- A statewide regional implementation plan working group, which met monthly throughout the development process. It facilitated a consistent approach to interpret and apply the legislation and guidelines, inform the development of documented guidance material, consistent definitions and approach to data analysis and enabled groups to collectively solve problems and devise practical solutions.
- A shared approach to establish a data system to capture and analyse data from a range of sources, a study to identify consistent financial and environmental performance factors and a survey to capture reprocessor information.
- A risk workshop identified common and shared risks which informed the high level approach to contingency plans.
- An integration conference addressed final alignment issues, including cross regional flows and contingency measures.
- An industry forum was held to collectively engage industry on the six regional plans.
- Information and draft material was shared throughout the planning process.

Barwon South West WRRG also collaborated with individual groups. This included:

- Cross checking information with specific regional groups (adjacent or otherwise) in relation to cross regional flows.
- Shared market assessment activity.
- Sharing of information and draft material throughout the planning process.
- Formal correspondence with other groups – and outcomes such as landfill scheduling with needs met in other regions, feedback on the draft plan that resulted in changes and so on.
- Joint procurement for development of infrastructure maps for plans.

As a result of the collaborative approach, the following outcomes were achieved:

- Efficiencies in engagement with the waste and resource recovery sector.
- Comprehensive data set using the same methodology, represented consistently in the regional implementation plans and which will also be reflected in the state infrastructure plan.
- Consistent terminology used throughout the plans.
- Infrastructure schedules which are consistent across the state.
- Consistent response to statewide policy.
- Cross regional flows and opportunities were considered.
- Commitment to annual contingency planning across the state.
- Commonality of priority actions, including statewide priorities.

Appendix 3 Summary of response to comments

Introduction

The Barwon South West Implementation Plan details the strategy to manage the region's waste over the next 10 years. Councils, industry, business and the community all create waste and participate in the waste and resource recovery system in different ways. Our consultation process included a range of opportunities for people and organisations from all sectors to all participate and provide feedback.

Barwon South West WRRG engaged community, industry, local government and state government in developing the implementation plan through four main phases of engagement:

- market assessment process
- pre-draft engagement
- public consultation
- portfolio consultation and integration.

The four key phases of the consultation were based on the Victorian Auditor General's Office *Public participation in decision-making: better practice guide (2015)* for consultation and community engagement. The guide used the International Association for *Public Participation's Public Participation Spectrum* that includes levels of increasing public engagement.

Responses

This document presents a summary of the responses received during the public consultation and how they were addressed. The support for the plan was welcomed as evidence that overall the plan addressed the waste and resource recovery infrastructure needs for the next 10 years. The constructive feedback on the draft plan was an invaluable contribution to the final plan.

A total of 24 responses were received, 16 written submissions and eight anonymous online surveys.

The figure below shows the breakdown of the stakeholder type of each of the written submissions received. Note that responses to the online survey were anonymous so a breakdown of the stakeholder groups is not available.

Table 29 Barwon South West Waste and Resource Recovery Implementation Plan consultation process

Phase	1	2	3	4
IAP2 spectrum	• Inform / consult	• Consult	• Involve	• Collaborate / approve
Activities	• state infrastructure plan launch • registration of interest in initial consultation for the Barwon South West Implementation Plan	• industry and council consultation to assess current waste generated, infrastructure and capacity need • market sounding process • community engagement survey • meetings with waste infrastructure owners/ operators	• public consultation on draft plan • targeted to all stakeholders • range of opportunities including workshops, online submission access • review submissions and amend plan	• alignment with state infrastructure plan • integration with other regional implementation plans • finalise draft plan • Ministerial approval

Responses not included in this document

There were several factual corrections, such as landfill licence numbers, closed landfill rehabilitation status and photograph captions, which have been amended but not included in this document.

Other types of comments that have not been included in this document include:

- statements of support
- comments that did not require a response
- responses to questions asking if there were any gaps or concerns, or an area required further work where the answer was 'No'.

Key themes

Comments from the submissions have been organised into 10 key themes and are listed in the order of highest to lowest number of comments for each theme.

Barwon South West Implementation Plan written submissions by stakeholder type

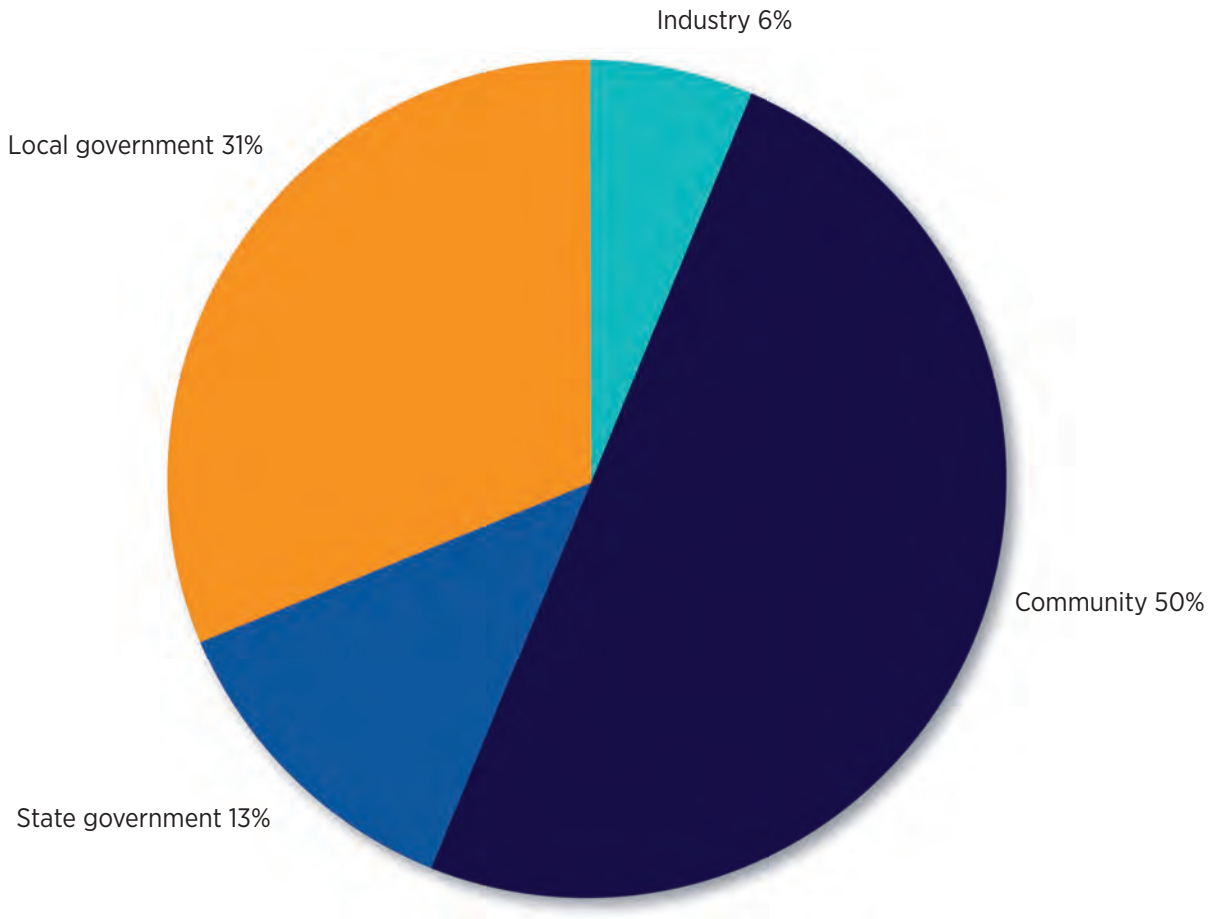

Table 30 Key themes from the responses

Theme	Feedback	Response	Issues for:		
			Community	Council	Industry
Objectives and actions	Demonstrated link to state strategic directions and strengthen underpinning message that sustainable resource recovery requires a positive business case, a market for the recovered goods and materials and improved outcomes for the community, environment and public health. The plan should also demonstrate the integration of planning for waste and resource recovery at the state, regional and local levels and will involve engagement and education of the community, industry and all relevant stakeholders.	Relevant state strategic directions linked to priority actions and activities/initiatives, illustrating alignment with state infrastructure plan.	✓	✓	✓
	No evidence of targets or key performance indicators to evaluate progress.	The Barwon South West Implementation Plan is a strategic document – measurable targets and detailed activities to achieve the actions in the implementation plan will be included in the Barwon South West WRRG business plan. We will be working with the portfolio to develop a monitoring and evaluation plan in 2017.	✓	✓	✓
	Councils have developed a program of waste and resource recovery projects that have not been clearly identified in the plan and also demonstrated the relationship between councils and the Barwon South West WRRG	Actions relating to assessment of existing infrastructure, improving operations and planning for future needs to improve resource recovery and waste management have been included in the relevant priority actions.	✓	✓	✓
Behaviour change and engagement	The plan provides little insight into the organisational structure and its relationship with stakeholders in delivering the actions.	The Barwon South West WRRG Business Plan provides detail of the organisational structure and persons responsible for delivering activities and initiatives.	✓	✓	✓
	Behaviour change is necessary to driving increased resource recovery and waste minimisation.	The Barwon South West WRRG recognise the importance of behaviour change and engagement within its functions. There is a commitment from the Barwon South West WRRG to employ an education officer to develop a regional education strategy and to support the development and implementation of programs across sectors in the region.	✓	✓	✓
	Limited consultation during the development of plan.	During the development of the plan stakeholders engaged in the development of the plan through the collection of data and relevant information concerning infrastructure and future needs. The waste industry was also provided the opportunity to participate in the market sounding process. Community and key stakeholders were provided the opportunity to provide feedback on the draft plan through a series of workshops and through online and written response avenues.	✓	✓	✓

Theme	Feedback	Response	Issues for:		
			Community	Council	Industry
Infrastructure and hubs	There is limited information relating to how land use planning considerations and environmental and financial factors impact on infrastructure operations.	Land use considerations and factors impacting the operation of infrastructure have been addressed in Section 4.8 and Section 5 of the plan.	✓	✓	✓
	The plan needs to provide a clear overview of the infrastructure in the region, recognising the needs and future opportunities and current cross regional flows.	Considerable effort has been placed in working with the waste sector (including councils) to ensure that the information provided for inclusion in the plan is accurate. Section 4 highlights not only the future needs within the region to increase resource recovery, it also recognises opportunities and consideration of cross regional material flows.	✓	✓	✓
	Consideration needs to be given for waste streams such as asbestos given the planned closure of licensed sites.	While PIW is excluded in the Implementation Plan, the closure of licensed landfills accepting PIW such as asbestos is recognised and being addressed through policy review. The plan provides landfill disposal options currently available in the region.	✓	✓	✓
	Residential encroachment continues to be a critical planning issue for the establishment and operation of waste and materials recycling facilities in regional and urban settings.	Aligning siting requirements with both environmental and land use planning requirements is necessary to ensure the right sites are selected for essential waste and recovery infrastructure. Priority Action 9: Work with planning authorities to recognise and protect existing facilities and hubs from encroachment and ensure that waste and resource recovery infrastructure planning is appropriately integrated with land use and transport planning recognises this need.	✓	✓	✓
	New infrastructure identified as part of the market sounding process may require works approvals.	The market sounding process identified several new opportunities as well as upgrades to existing infrastructure to include on the infrastructure schedule. It is recognised that the owner of the infrastructure will be required to apply for the appropriate approvals to operate.	✓	✓	✓
	The draft implementation plan does not adequately consider the challenges of operating resource recovery centres and providing services in rural areas, including operational and transport costs to move waste streams.	The plan recognises the spread of infrastructure across the region and the need to further investigate efficiencies in sustaining a viable waste infrastructure network. Activity11.4 refers to: Work with LG Forum to investigate optimal efficiencies in infrastructure to manage residual waste across the region. The market sounding exercise did not attract a regional processing facility proposal.	✓	✓	✓
	Many of the RRCs in the region have relatively basic infrastructure and support is needed to upgrade RRC infrastructure to meet best practice standards and increase resource recovery.	A legislated function of the group is to advise, with SV, councils and businesses within its waste and resource recovery region on best practices for waste and resource recovery systems, facilities and services. Activity 8.2 Provide support to owners and operators of RRC/TSs to meet best practice operations and maximise resource recovery, recognises the function.	✓	✓	✓
	Identified infrastructure gap – public place recycling (PPR) infrastructure and event management.	PPR infrastructure section has been included and it is recognised that there has been significant investment of PPR infrastructure across the region. Event waste management is not noted in the plan, but planning for seasonal fluctuations which may coincide with key events is considered.	✓	✓	✓

Theme	Feedback	Response	Issues for		
			Community	Council	Industry
Infrastructure and hubs	The draft plan misses an opportunity to embed the region as leaders in waste and resource recovery innovation. There is the opportunity for the region to become a hub in organics processing particularly given the region has a number of established facilities, suitable land to establish additional facilities and a large quantity of organics in the region that are not currently being recovered.	The plan includes activity around improving data and understanding of recovery opportunities. Work in this area in conjunction with other activities/initiatives around innovation, market development and future planning, places the region in a position to put forward a business case to develop and be recognised as a state hub of importance.	✓	✓	✓
	Market sounding submission excluded in draft plan.	Market sounding submission was assessed and scored, resulting in submission added to the infrastructure schedule.	✓	✓	✓
	The plan should provide support to the continued operation of existing facilities where they are well sited, and particularly where they are identified as regional or state hubs of importance.	The plan recognises that sustainable resource recovery requires a positive business case, a market for the recovered goods and materials and improved outcomes for the community, environment and public health and that landfills will continue to play an important role in the waste infrastructure network. The airspace capacity and need for landfills will be revisited during the mid term review process.	✓	✓	✓
	The diversion of waste from landfill is a key objective, the Plan needs adequate scope to address those waste streams that have traditionally been more difficult to address such as nappies and polystyrene and soft plastics such as film.	The plan recognises the need for improved data collection and includes Activity: 2.1 Support targeted research, including waste audits to identify quantities of recoverable material. Investigations of the regional waste profile will assist in directing future activities with a focus on resource recovery and link to Activity 4.1 Investigate opportunities to increase the recovery of priority materials such as organics from municipal, wood/ timber and agricultural wastes, plastics, textiles, tyres and e-waste.	✓	✓	✓
	There is a need for more landfill.	The region is required to plan waste and resource recovery needs for a 10-year planning period. *The Infrastructure and capacity needs assessment* in the Barwon South West indicated that the region has adequate landfill airspace for the planning period. Infrastructure and capacity needs assessment will be revisited at the mid term review (5 years) to ensure that future airspace needs are met. It is recognised in the plan that landfill airspace capacity beyond 10 years requires further investigation.	✓	✓	✓
	What is the Barwon South West WRRG's role in planning?	It is critical to manage the interface between waste and resource recovery facilities and surrounding land uses. It is of strategic importance for both the ongoing operation of waste and resource recovery facilities in the region and the protection of public amenity and health. The Victorian Planning Provisions (clause 19.03-5) state that planning must consider any relevant regional waste management plans. This consideration must be promoted to councils for any new waste and resource recovery infrastructure applications. All Victorian planning schemes require planning decision-makers to consider any relevant regional waste management plans. Regional perspectives are integral to developing new regulations. Activity 9.1 outlines that Barwon South West WRRG will work with councils and industry to review the need for additional land use planning controls to protect buffers for existing and future landfills and resource recovery infrastructure.	✓	✓	✓

Theme	Feedback	Response	Issues for		
			Community	Council	Industry
Infrastructure and hubs	The plan does not illustrate how it is contributing to the state's five year outcome to utilise closed landfills or closing landfills for alternate resource recovery.	The market sounding process recognised a RRC will be established when the Anglesea Landfill closes, scheduled for 2024. It is recognised that the Portland Landfill has been closed and replaced with a RRC on the site.	✓	✓	✓
Material streams	A range of material streams have been included in response submissions identified as difficult streams to manage, including plastic film (including silage wrap) nappies, polystyrene, organics and waste from the C&D sector.	The Plan recognises that targeted research, including waste audits to identify quantities of recoverable material (activity 2.1) is required to inform future activities and initiatives to ultimately achieve sustainable resource recovery and improved outcomes for the community, environment and public health.	✓	✓	✓
Waste flows	Evidence of opportunities to use cross regional flows to consolidate material streams and opportunities across the extensive region where the economies of scale may be hard to achieve.	Cross regional flows of waste streams have been recognised in the plan and have been taken into consideration in assessing infrastructure needs and identifying opportunities. Priority action 7 Facilitate the aggregation of material streams to improve economies of scale and cost efficiencies, highlights the cross regional partnerships in delivering activities.	✓	✓	✓
Procurement and end markets	Resource recovery should be expanded to include recycling services for batteries, light globes and paint to satellite RRCs. There is also the need for support to undertake collaborative procurement for e-waste recycling services, particularly given that the state government is planning to ban e-waste from landfill.	Barwon South West WRRG recognises that there are numerous resource recovery opportunities and effort placed in providing the best outcome for the region. The region is committed to implementing activities around improving waste data and understanding the waste profile to inform future actions and assisting local government to introduce collaborative resourcing. Activity 2.1 Support targeted research, including waste audits to identify quantities of recoverable material and 6.1 Work with local government to identify and introduce collaborative resourcing opportunities.		✓	✓
	The plan is unclear about creating partnership opportunities in line with the organics strategy.	Priority action 5 Facilitate regional and cross sectoral linkages to improve markets for materials that could be diverted from landfill and used by another industry as a resource and Activity 5.2 Investigate and promote options for market development in line with the Victorian Market Development Strategy for Recovered Resources opens the opportunity to build relationships with organisations such as water authorities to investigate potential future infrastructure options. It is recognised that significant work in understanding the region's biomass and developing cross regional stakeholder relationships is required as part of the process.		✓	✓
	How are industry growth projections considered in the planning process?	The Plan recognises the need to continuously improve data for the region and strengthen its relationships with the waste industry. Opportunities may arise through Activity 5.1 Establish mechanisms (network or data base) that facilitate the exchange of information between waste generators, manufacturers, potential users and service providers.		✓	✓
	There needs to be improvement in the opportunities to recycle some agricultural waste streams and to identify what potential there is in recovering organics.	The Plan recognises developing stakeholder relations and market development opportunities in Activity 7.2 Establish forums with commercial, manufacturing and industry stakeholders to identify opportunities to increase consolidation and aggregation of materials. Barwon South West WRRG identified the need for activity around investigating opportunities to increase the recovery of priority materials such as organics from municipal, wood/timber and agricultural wastes, plastics, textiles, tyres and e-waste.		✓	✓

Theme	Feedback	Response	Issues for		
			Community	Council	Industry
Procurement and end markets	Demonstration that the plan includes mechanisms to support increased resource recovery through encouraging the consolidation and aggregation of materials to achieve the economies of scale in line with the organics and market development strategies.	Priority action 5 provides direction to market development in line with the state organics and market development strategies and recognises priority materials as identified in needs assessment. Priority action 6 provides direction to collaborative procurement and identifying aggregation of materials as discussed in infrastructure needs (section 4).		✓	✓
	How will industry/councils/WRRGs link to improve markets?	The Barwon South West WRRG has appointed a marketing officer to facilitate and support the implementation activities/ initiatives outlined in the key area: market development.		✓	✓
Technology and innovation	The plan states that the region should carry out a study to investigate the conditions that would be necessary for the private sector to show interest and invest in a commercial WfE facility in the region, yet this is not included as an action in the draft plan.	Addressed: Priority action 2 Support the development of innovation and viable opportunities to increase recovery of priority materials including organics, wood/timber, plastics and textiles. Activity 2.3 Support the investigation and assessment of energy from waste opportunities relevant to meeting the needs of the region. Activities around improved waste audits/assessments and improved data will also assist in driving this action and future market sounding processes.		✓	✓
	The resource recovery sector has seen significant change over the past decade and as technology continues to develop, opportunities are emerging that could see major transformational change. While the plan recognises this there is concern that there is not an overarching principle of innovation as a key business driver within the plan.	Priority action 2 Support the development of innovation and viable opportunities to increase recovery of priority materials including organics, wood/timber, plastics and textiles. Provides direction in driving activities around resource recovery technology improvements. The market sounding process also provides the opportunity for relevant technologies to be presented to the region.		✓	✓
Landfill closure	The plan acknowledges that the Barwon South West WRRG could assist in the progressive rehabilitation of closed landfills by facilitating work between managers and the EPA to develop risk-based assessments for closed landfills in the region that consider the local context. This has not however been included as an action in the plan.	Addition: Activity 8.3 Facilitate work between councils and EPA to assist with the development of strategies for closed landfills.	✓	✓	
Cost and funding	The plan is silent on funding and costs associated with implementing the plan.	The Barwon South West Implementation Plan is a strategic document – the 10-year Plan's actions will be prioritised for implementation with the available budget. The Barwon South West WRRG will work with key partners to seek funding opportunities to implement activities and initiatives when they become available.	✓	✓	✓

Theme	Feedback	Response	Issues for		
			Community	Council	Industry
Data and anlysis	Landfill assessment consistent with the state approach?	Section 4 provides an overview of the landfill assessment approach taken. The landfill needs assessment has followed a consistent statewide approach that: • considered options to reduce the need for landfill through viable resource recovery, • identified space available in existing landfills in the region and neighbouring regions • prioritised sites with long term mechanisms to preserve against encroachment.		✓	
	Is the plan supported by the most appropriate and best available data?	It is recognised that there is a need for continual improvement in building the waste and resource recovery data bank for the Barwon South West region. The region has worked close with key stakeholders to establish data for the region and is committed to further building on relationships to improve the quality of data as reflected in activity 12.1.		✓	
	Demonstration that the process to develop the infrastructure schedule has followed the consistent statewide process.	The development of the Infrastructure schedule followed the state process and included regional assessment of infrastructure options with consideration of cross regional flows and infrastructure available in other regions and market input, the development of a schedule for resource recovery infrastructure, and the development of a schedule for landfill infrastructure. Figure 7 provides an overview of the scheduling process.			
	The plan highlights that 'this has been the first opportunity to reflect on the expanded region' however there is a lack of significant analysis of how these factors will shape outcomes and drive change.	The market sounding exercise provided the waste industry the opportunity to bring relevant waste and resource recovery proposals for future planning consideration. This is the first time that this type of opportunity has been provided and it is expected that a future market sounding process may encourage more opportunities to meet the future needs of the region.			

Consultation process

The Barwon South West Implementation Plan has been developed in consultation with other WRRGs, SV, EPA and DELWP and through consultation with key stakeholders including industry and the community.

Community and industry consultation was conducted from **4 July to 12 August 2016**. During this time the Barwon South West WRRG received significant contributions to the development of the Plan. A range of engagement opportunities were offered for councils, industry, business and the community to participate and provide feedback. This included:

- Four targeted community and industry consultation and information sessions in communities that host significant waste and resource recovery facilities (Geelong City, Camperdown, Hamilton and Port Fairy).
- Online portal hosting information and multiple ways to provide feedback – a quick survey, short comment or formal submission.

Key statistics for the community consultation period included:

- 635 visits to the Waste and Resource Recovery Implementation Plan tab on the Barwon South West WRRG website
- 146 downloads of the Consultation Draft Barwon South West Implementation Plan
- 33 people attended information sessions (ranged from 0–18 for individual sessions)
- 24 feedback submissions:
  - 8 individuals completed the online survey
  - 16 responses through email or letter.
- Statutory feedback from SV and EPA.

Appendix 4 Major data sources, assumptions and definitions

Major data sources

Data source	Description
Victorian Local Government Annual Survey (VLGAS)	Annual data on materials collected through local government kerbside collection systems and published by Sustainability Victoria. All local governments in Victoria participate. The survey provides trending data on recyclables, organics, residual waste, hard waste and litter. The Plan uses survey data from the financial year 2012-13, which is available on the Sustainability Victoria website at www.sustainability.vic.gov.au
Victorian Recycling Industry Annual Survey (VRIAS)	Annual data collection measuring tonnages of materials diverted from landfill by major reprocessors in Victoria. This is used to measure progress against Victorian waste reduction targets, and trends in the recovery of waste materials. The survey is voluntary and although the return rate is relatively constant, contributors can vary from year to year. VRIAS is available on the Sustainability Victoria website at www.sustainability.vic.gov.au
EPA landfill levy returns	Unpublished information provided by EPA on a confidential basis.
Australian Bureau of Statistics (ABS) population data	ABS Catalogue Number 3101.0 – Australian Demographic Statistics, Sep 2014
Victorian landfill audits	Sustainability Victoria's disposal-based waste survey, 2009. A visual waste audit of eight metropolitan landfills, one regional landfill and one transfer station, covering 2003 separate inbound loads.
Regional Waste and Resource Recovery Database v3	Sustainability Victoria's purpose-built database for data storage, analysis and projection to assist development of Regional Implementation Plans and alignment with the state infrastructure plan.
Infrastructure and capacity needs assessment in Barwon South West, Blue Environment, unpublished, 2015	Investigation in to the current and future capacity, needs and priorities of waste and resource recovery infrastructure in the Barwon South West region.
Survey and analysis of regional reprocessors and material recovery facility operators, SRU for Sustainability Victoria, 2015	Data on the activity of reprocessors and material recovery facilities (MRFs) in regional Victoria

Major data assumptions and definitions

Landfill tonnages	Tonnes landfilled are derived from landfill levy data supplied by EPA and do not include prescribed industrial waste (PIW). There has been no allowance for daily cover which must be considered when comparing figures with those in earlier drafts of the Statewide Resource Recovery Infrastructure Plan (State Infrastructure Plan). Previously landfill figures were adjusted to remove a 15% allowance for daily cover.
Existing operating landfill	Landfills that are accepting waste for disposal or have recently ceased to accept waste but are yet to receive their post closure pollution abatement notice (PC PAN) from the EPA
Landfill available airspace	Calculating landfill airspace is based on information from WRR region landfill owners, local governments and EPA. It reflects the estimated amount of airspace void and the amount of works approved airspace.
Closed landfill	Landfill that is no longer accepting waste. If in the case of licenced landfills it should have received its PC PAN from the EPA. If it is exempt from licensing then there should be reassurance that closure process have commenced or are in place

Landfill likely closure dates	An estimate of the likely year of closure of the landfill based on consideration of modelled tonnage projections and land available under current EPA works approval, planning and permit requirements and potential void space that may eventuate at quarry based landfill sites as identified by owners and operators. A closure date of beyond 30 years should be represented as >30 years
Rounding of data	As a general rule, all of the data is rounded to the nearest thousand. This may result in minor discrepancies between totals and line items. Graphs, charts and modelling were generated using non-rounded data. Any exceptions are referenced.
Generation tonnages	This is the sum of the state landfill tonnes and state tonnes reprocessed using VRIAS data. Because this modelling uses landfill data, generation tonnages will differ from those in pervious drafts of the State Infrastructure Plan due to no allowance being made for daily cover
Recovered tonnages	Unless stated, these are tonnes of materials entering reprocessing facilities. This is not a direct correlation to how much was reprocessed as there is no data on tonnes stockpiled by reprocessors or tonnes landfilled by reprocessors. For this reason, quantities are referred to as recovered, rather than reprocessed
Current capacity of infrastructure	An estimate of the installed capacity of an existing facility or infrastructure type

Infrastructure categories for data collection

Infrastructure type	
Resource Recovery	drop off
	RRC/TS, stand alone
	co-located and landfill
	MRF
Reprocessor organics	food
	garden
	wood/timber
	organics
	other
Reprocessor paper/cardboard	
Reprocessor glass	
Reprocessor plastics	
Reprocessor rubber including tyres	
Reprocessor metals	
Reprocessor aggregate, masonry and soils	
Reprocessor textiles	
Reprocessor other	
Disposal landfill	Licensed
	Exempt from licensing

Appendix 5 Types of infrastructure that support the waste and resource recovery system

Type	Characteristics
Collection infrastructure: Infrastructure to collect and transfer waste materials at the point of generation	
Kerbside bins and collection	• Collections from households of residual waste, garden organics and commingled recyclables; hard waste collections; and kerbside collection from businesses and other commercial premises. • Includes services provided by local governments and their service and commercial providers.
Skip bin	• Large bin provided by a private contractor to collect and remove bulk waste from households, businesses, schools, commercial premises and hospitals.
Tip truck	• Truck used to remove large amounts of mainly commercial and industrial waste.
Resource recovery infrastructure: Infrastructure to facilitate recovery of materials and resources	
Drop-off centres and charity bins	• Recovers selected materials and goods mainly dropped off by householders for recycling and reuse. • May include aggregation for transport to a resource recovery centre or transfer station.
Resource recovery centres/ transfer stations (RRC/TS)	• Receives, sorts and/or consolidates a range of material streams (depending on the facility) including hard, organic and residual waste and commingled recyclables for transport for materials recovery, processing or disposal to landfill. • Accepts materials from all sectors and can be publicly or privately owned and operated. • May include a resale centre.
Materials recovery facility (MRF)	• Sorting, consolidation and transfer. • Receives and sorts household and business commingled recyclables. • Compacts and bales, or consolidates materials and sends to reprocessing facilities. • May include a resale centre.
Reprocessing infrastructure: Infrastructure to recover materials and resources	
Organic reprocessing facility	• A facility that biologically reprocesses organic matter, yielding a variety of products including stabilised organic residues for use as a soil additive, heat and renewable energy. • Includes both windrow and in-vessel technologies.
Energy from waste facility	A facility that uses waste or refuse derived fuels as a feedstock to produce a useful end product with market value such as heat and electricity. Technologies can include anaerobic digestion and heat processing such as pyrolysis and gasification.
Other reprocessors	A facility that changes the physical structure and properties of a waste material that would otherwise be sent to landfill adding financial value to the processed material. Without reprocessing, the beneficial use of the material would be lost.
Disposal infrastructure: Infrastructure established as the final repository of waste materials	
Landfill	• A site for the disposal of waste into the ground. • May include a RRC/TS or resale shop.
Incinerator	• Disposal by burning. • A site that disposes of waste by burning it, without producing a useful end product.

Appendix 6 Statewide summary: Environmental and financial factors influencing the performance of waste and resource recovery infrastructure in Victoria

Background

In May 2015 the Victorian Government commissioned a high level analysis of the economic and environmental factors that impact the performance of waste and resource recovery (WRR) infrastructure in Victoria. This was a broad assessment that aimed to identify key factors and highlight their potential impact on specific types of waste and resource recovery infrastructure. The analysis was drawn from existing reports and stakeholder consultation.

Summary

There are many factors influencing the performance of waste and resource recovery infrastructure, both positively and negatively; which play out in different ways across the state and change over time and infrastructure type, size and **location**. At a broad level, they are:

Financial and economic factors

- Market economics

The functioning of the WRR market has considerable impact on the performance of infrastructure. Traditional high volume, low value commodity streams typify the industry and have led to business models that are exposed to changes in market conditions. A key factor currently impacting infrastructure performance is the condition of end markets, both locally and internationally. For example, a considerable fall in base metal prices is impacting scrap metal reprocessors in Victoria; and limited local markets for compost impacts organics reprocessing infrastructure. A number of types of infrastructure are heavily reliant on export markets, which can be affected by both commodity prices and international policy decisions. For example, export markets for tyre derived products and mixed low grade plastic and paper have contracted in recent years impacting the performance of related infrastructure types. Increases in transport and operational costs have impacted many types of infrastructure and this is most prevalent in regional and rural Victoria.

- Policy settings

Current and potential future policy and regulatory settings impact performance of infrastructure. In Victoria, the policy and regulatory framework has many elements and covers the activities of local government and private industry. The landfill levy remains the key instrument aimed at driving resource recovery. The current levy supports reprocessing infrastructure for heavy materials (such as concrete, brick and masonry) mainly around urban areas but is not yet considered high enough to drive processing of residual waste.

Land use planning controls remains a key factor particularly impacting landfills and organics reprocessing infrastructure. Residential development has reduced the separation distances to some facilities and led to community complaints; and overall the availability of land for waste and resource recovery management activities near urban areas has declined. Potential changes to policy settings such as landfill bans and product stewardship schemes may have significant impacts on the economic performance of some WRR infrastructure.

- Industry trends

Performance of infrastructure such as material recovery facilities (MRFs) for commingled waste benefits from strong community support for recycling at the household level. In addition, global trends in technology ranging from truck bodies that improve compaction rates to complex infrastructure for sorting material streams improves efficiency, benefits recovery rates and sale-ability of end products. In Victoria, performance of infrastructure is being impacted by a general decline in manufacturing.

Environmental factors

- Management of emissions and amenity issues

A key environmental factor is the management of emissions and the associated amenity impacts on the local community. Odour remains the most prevalent issue, being particularly relevant to landfills and organics reprocessing facilities. Noise and dust remain common factors impacting the performance of reprocessing infrastructure, in particular those facilities reprocessing concrete, brick and masonry. The generation of leachate at many landfill sites contributes to odour issues and the treatment and discharge of leachate is an ongoing challenge.

- Compliance and monitoring

In light of the ongoing issues with emissions and amenity impacts, a key factor improving the performance of infrastructure is the rigorous compliance and monitoring framework. High risk infrastructure such as landfills and organics reprocessing facilities must be managed in accordance with EPA guidelines such as the guideline for Best practice environmental management – Siting, design, operation and rehabilitation of landfills (Landfill BEPM) and recently released guidelines for Designing, constructing and operating composting facilities. These guidelines require operators to implement a management controls which are monitored through licenses and regular site inspections.

- Legacy issues / post closure rehabilitation of landfill sites

A key factor that is impacting the current and future financial and environmental performance of landfill facilities relates to legacy issues from closed or capped landfill cells and the overall rehabilitation of landfill sites. Recent changes to the Landfill BPEM are likely to drive improved environmental performance at current landfills. However, Victoria has a large number of landfills that have been operating for decades and the management of legacy sites, particularly in regional and rural Victoria remains an issue. The provisions for post closure aftercare and rehabilitation are varied and may also impact performance in the long term.

Statewide and regional perspectives

A continual theme across the majority of these factors is the considerable differences in the performance of infrastructure in metropolitan Melbourne compared to facilities in regional and rural Victoria. In general terms, performance and indeed operating conditions are more favourable in metropolitan Melbourne where economies of scale drive greater access to material. Large landfill sites in Melbourne perform on average better than their smaller regional and rural counterparts as they are more easily able to absorb compliance and development costs due to the significant volumes of waste managed. Similarly, the dominance of the major reprocessors in Melbourne has led to the closure of a number of regional operators (for example some smaller MRF operators) as the larger players are able to compete on price. This is however not always the case, with a number of regional organisations, including those offering employment to disadvantaged and long term unemployed, operating successfully.

Summary of the key economic and environmental factors of infrastructure types across the state (May 2015)

Infrastructure category	Key economic factors impacting performance	Key environmental factors impacting performance	Opportunities	Future outlook – five years
Resource recovery centre (RRC) / waste transfer station (TS)	Transport / freight costs • High costs are particularly an issue for rural and regional RRC/TSs. Economies of scale • Regional and rural RRC/TSs in particular find it difficult to aggregate sufficient volumes of low value commodities to encourage the market to collect and reprocess the material. End markets • Insufficient end markets for materials including timber, polystyrene, mattresses and tyres impacts performance of this infrastructure. • Movement of concrete and masonry is an issue at some regional and rural facilities.	Emissions to air, land and water / amenity issues • Noise and odour associated with putrescible waste and onsite reprocessing of organic waste can be an issue for facilities close to residential development. • Stockpiles of some materials, such as timber or compost, could be a fire risk if not managed appropriately. Extreme weather / climate change impacts • Many facilities cannot handle significant influxes of material from extreme weather events. Regional and rural facilities are particularly prone to bushfire and flood risk. Sustainability and other benefits of recycling / recovery • Recovery of materials has an environmental benefit.	• Improved transport efficiencies (e.g. compaction and larger trucks). • Regional reprocessing at central points using mobile reprocessing infrastructure may improve outcomes for these facilities. • Consolidation of sites and closure of regional landfills may improve throughput and increase cost effectiveness.	• Current financial factors likely to continue to impact performance. • Consolidation of infrastructure may see larger, regional facilities which improve efficiencies and generate economies of scale for some materials. • Emergence of product stewardship schemes for materials such as tyres and mattresses may improve conditions for these commodities.
Materials recovery facility (MRF)	Conditions of end markets • Significant falls in commodities prices are impacting profitability (e.g. plastics, metals and glass). Export markets • Many commodities being separated at MRFs are dependent on export markets that have contracted in the last few years due to stricter controls on waste imports. Landfill levy • The increasing levy rates have been one of a number of factors that have driven additional material into MRFs. The levy rate stabilises in 2015-16. Tendering of municipal solid waste (MSW) contracts • This factor has significantly impacted regional MRF operators with contracts being won by metropolitan MRFs who are actively seeking volume to complement existing contracts.	Emissions to air, land and water / amenity issues Some MRFs have had issues with odour and noise complaints from surrounding residents. Sustainability and other benefits of recycling / recovery Separation and recovery of materials has an environmental benefit.	Improve sorting efficiency and quality of end products (tied to the ability of the operator to secure MSW contracts and access capital). Potential for the development of a methodology which may allow MRF operators to access the Emissions Reduction Fund (ERF). Increase volumes of commingled recyclables by improving services to the commercial and industrial (C&I) sector (through local government contracts and the commercial collection market).	End market conditions related to commodities prices are likely to persist. However, as commingled recycling is a recognised core service for most councils the market will continue to support MRF operators. Business models for MRF operators are likely to fluctuate as they take on commodity price risk. The number of councils being paid for commingled recyclables may reduce if commodity prices remain low.

Infrastructure category	Key economic factors impacting performance	Key environmental factors impacting performance	Opportunities	Future outlook – five years
In-vessel reprocessing of organics	Condition of end markets • Compost markets are constrained. However, there has been some improvement in recent years with bulk movement of material occurring from Melbourne to Gippsland and into north east Victoria. • End market conditions are intrinsically linked to contamination and quality of end products and products designed for specific uses. • Gross contamination from household waste remains an issue. Land use planning controls • Encroachment can impact the performance of some existing facilities. • There is limited suitable land for development of new facilities particularly in built up areas. Transport / freight costs • There is considerable freight costs associated with moving recycled organics into agricultural markets. Back-loading is commonly employed to offset this impact. Tendering of MSW contracts • Significant volumes of garden, and increasingly food organics, are now reprocessed through council collection contracts. Management of contamination through these contracts remains a significant challenge. • Contamination is a cost both at the point of removal (or disposal for gross contamination) and in terms of its impact on the sale-ability of end products.	Emissions to air, land and water / amenity issues • In-vessel organics reprocessing infrastructure odour management has improved considerably. However, sites in built up areas and those that are reprocessing food waste can still experience odour management issues. Compliance and monitoring regime • The *Designing, Constructing and Operating Composting Facilities Guidelines* detail EPA's expectations for the management of organic waste in order to meet the State Environment Protection Policies (SEPPs) and Regulations. The number of notices issued by EPA has increased in recent years and the guidelines may be a catalyst for more regular audits and inspections.	• Opportunities relate primarily to the value and sale-ability of end products. Improvement of conditions for end markets offers opportunity for upside, and this may be achieved through introduction of new infrastructure and improved household education. • The potential for compost producers to generate credits under the ERF may present new opportunities to industry. CSIRO is investigating the ability of recycled organics to add carbon to soil. • This industry is almost entirely driven by the tendering of MSW contracts. Introducing new green and/or food waste services may present an opportunity. • The use of food waste and even prescribed waste streams to augment reprocessing of garden organics can increase revenue for organics reprocessors, however due to odour issues this is likely only to be feasible at in-vessel facilities.	• The outlook for in-vessel reprocessors remains good with new tenders likely to be released. • Environmental management at these sites is significantly better than open windrow alternatives as vessels are usually enclosed and under negative pressure. Increasing landfill costs will also support diversion of organics, particularly food organics which offers an opportunity and a challenge. • More advanced technologies for in-vessel reprocessing and odour treatment may provide better odour control. This may create more potential sites, since reduced impacts could reduce required buffer distances.
Open windrow reprocessing of organics[1]		Emissions to air, land and water / amenity issues • The performance of open windrow composting facilities is considerably impacted by the generation of odour and potential leachate contamination of ground and surface water. Managing these issues remains a considerable challenge for operators. • Odour is a particular issue for sites near built up urban areas or other sensitive land uses. • Complaints from the community have eroded the social licence to operate at some facilities. • The presence of physical contamination (particularly from MSW garden organics) in feedstock is a challenge and its removal requires appropriate onsite equipment and management systems. • Potential movement of weeds / seeds and other pathogens are an ongoing risk requiring appropriate onsite management. This is of particular risk where material is being composted on or near productive land. • Stockpiles of material could be a potential fire risk if not managed appropriately.		• The outlook for open windrow reprocessing is mixed. It is likely that in coming years there will be few if any reprocessors using this technology in built up areas. • The economics of scale and capex required for in-vessel alternatives is prohibitive for many regional and rural areas, and as such it is likely that new open windrow reprocessing facilities or covered / enclosed composting will emerge to service these areas. • Regional and rural facilities may also be set up to attract volumes from Melbourne.

Infrastructure category	Key economic factors impacting performance	Key environmental factors impacting performance	Opportunities	Future outlook – five years
Open windrow reprocessing of organics[1]		• Material that has not decomposed thoroughly (also known as oversized) and has no end use may have associated environmental and economic risks if not managed with appropriate equipment and systems. • Compliance and monitoring regime • The Composting Guidelines outline requirements for composting facilities that suggest it will be difficult to manage open windrow facilities in developed areas in the long term.		
Wood/ timber reprocessing	Conditions of end markets • There are significant issues in moving low quality, mixed timber in the market, from RRC/ TSs, construction and demolition (C&D) processors and C&I sorting facilities. • Some organisations working higher up the value chain (such as pallet repair and resale) are experiencing good conditions. However reduced road development (a major avenue for chipped, low value mixed timber) is impacting performance with some facilities holding significant stockpiles. Business model • The timber processing market is very volume dependent with traditionally very low margins on gate fee and end product sales. The lack of end markets and reluctance in the market to pay to move timber (instead opting to stockpile and wait for cheaper options) is a considerable factor. Trends in resource recovery technologies • Globally, there are no viable recycling / processing options for treated timber and manufactured timber. While some energy from waste (EfW) facilities are becoming operational it is yet to be seen whether air cleaning equipment to allow the thermal treatment of these products is feasible in Australia.	Emissions to air, land and water / amenity issues • Timber processing is generally a low impact activity. However, there may be some noise impacts associated with chipping in large shredders and visual amenity impacts associated with stockpiling.	• The key opportunity in this area is the emergence of EfW technologies able to utilise woody biomass to generate power. Some small scale facilities are now operating in Melbourne and regional Victoria with others in the planning phase. • However, the technology ideally needs to be able to eventually cope with manufactured and treated timbers also as these products make up a considerable portion of the timber waste stream and currently have no viable markets other than landfill. • New road projects predicted offer an opportunity for bulk movement of recovered timber for landscaping.	The outlook for the timber market is linked to two factors: 1. The degree to which energy from waste technology can utilise both clean and treated/ manufactured timber streams 2. The emergence of road construction projects (and other major development projects involving landscaping). Without these things, the performance outlook looks challenging.

[1]EPA licensing is required when a facility has the capacity to reprocess over 100 tonnes per month or 1,200 tonnes per year. Many organics reprocessing activities occurring at rural landfills, transfer stations and on-farms may not require an EPA licence. EPAs *Designing, Constructing and Operating Composting Facilities Guidelines* (March 2015) are the appropriate guidelines to inform operators of all composting facilities regardless of whether or not a licence is required.

Infrastructure category	Key economic factors impacting performance	Key environmental factors impacting performance	Opportunities	Future outlook – five years
Paper/ cardboard	Industry trends / economies of scale • Access to high quantities of clean material is a key factor. Around two thirds of paper/ cardboard is generated in the C&I sector and there is strong competition to get access to this material to generate economies of scale. Contamination is more easily managed in source separated C&I waste and this material is favoured. • Many companies do not use dedicated cardboard bins which means a significant volume of material is lost to landfill. Tendering of MSW contracts provides access to the remaining third of feedstock. This also dictates whether material is reprocessed in Victoria, other Australian jurisdictions (mainly NSW) or internationally. Conditions of end markets • Paper/cardboard products are separated by their value in terms of end market purchasing. Separated office paper has strong markets, however mixed, low grade paper (e.g. newsprint) does not move as freely on the international market.	Emissions to air, land and water / amenity issues • There are some potential issues with odour and trade waste related to paper/cardboard reprocessing.	• The opportunity lies in recovering the tonnes of material that currently go to landfill. The majority is landfilled from the C&I sector and as such greater diversion and consolidation remains possible where the business case exists. Education and changes in trends within businesses may assist. • The construction of a new mill in Victoria will increase the local reprocessing capacity for recycled paper. • EfW is also an option for paper/cardboard that is highly contaminated.	Stricter enforcement on poorly sorted materials entering the Asian economies has had an impact on mixed low grade paper/cardboard. It is likely that this will continue into the future. Markets for well separated office paper remain strong nationally and internationally.
Glass	Market intensity • There is only one manufacturer of glass in Victoria who purchases the majority of beneficiated (sorted by colour) glass from MRF operators. • Cullet prices have been reduced in recent years to compete with international glass imports. • Reliance on one operator is a potential risk. Business models / condition of end markets • Alternative business models that do not rely on the sale of cullet but instead use lower capex investment to crush glass into a sand replacement product have found some difficulty in finding markets.	Emissions to air, land and water / amenity issues • The key issue associated with glass processing has been the management of the undersize fraction, known as “glass fines”. A number of large stockpiles of material exist in Melbourne’s west which impacts on visual amenity and has in the past led to notices being issued due to an organic sludge generated from stockpiled post-consumer glass reaching nearby surface water.	• The value of glass cullet is dependent on the degree to which it can be separated. The introduction of improved technology to sort glass by colour down to smaller fractions (less than 5mm) offers a considerable opportunity. This can generate greater returns however this must be weighed up against the significant infrastructure costs. • Recent work with Victorian water authorities to use glass sand as pipe bedding has improved the markets for this product.	• The glass cullet market is likely to remain stable in coming years and may grow if investment in glass beneficiation infrastructure increases volumes of colour and size sorted material. • The outlook for glass crushing infrastructure looks relatively positive in light of the increased uptake of some sand replacement products, however this is location dependent and more work is required to build a statewide market. • Off specification glass fines will remain an ongoing challenge for the industry.

Infrastructure category	Key economic factors impacting performance	Key environmental factors impacting performance	Opportunities	Future outlook – five years
Plastics	Industry trends / condition of end markets • Victoria has traditionally been a hub for plastics reprocessing, however the downturn in manufacturing conditions and closure of many manufacturing operations has significantly impacted plastics reprocessors. • There are limited local end markets leading to reprocessors sending material offshore. Capex / opex costs • Increasing energy costs are impacting plastics reprocessing. Export market strength • Movement of mixed plastics and low grade plastics has been constrained by increased border scrutiny of waste entering Asian ports. Consumer trends • The trend toward flexible, multilayered plastics, especially in food packaging. This material increases the shelf life of fresh products but is not currently recyclable in Australia.	Emissions to air, land and water / amenity issues There are some potential emissions impacts (mainly air) associated with recycling plastics however most are managed well. Sustainability and other benefits of recycling / recovery • There are considerable benefits from recycling plastics (mainly relating to offsets in energy and oil consumption), however studies suggest there is a net cost associated with water usage.	• Plastics value is dependent on the degree to which it can be separated by type. Clean, well separated plastics can generate strong prices. Improved technology to sort plastics by type offers a considerable market opportunity. This can generate greater returns, however must be weighed up against the significant infrastructure costs.	• The plastics market outlook is varied. The local reprocessing industry appears to be contracting and may continue to do so based on local manufacturing decline. • Export of material will continue to increase as an option for recovered plastics and if MRF operators commence collecting flexible plastics there may be more pressure put on export of low value materials.
Rubber (including tyres)	Conditions of end markets • Local recycling of end-of-life tyres has contracted by around half in the past five years. This is due in part to limited local options for tyre-derived products and cheaper offshore options for tyre-derived fuel (TDF). Export market strength / transport / freight costs • Around 75% of reprocessed end-of-life tyres are sent offshore as TDF. This market has contracted significantly in 2015 after the closure of thermal plants in Malaysia and a tightening of import requirements in some Asian countries. This has led to many smaller reprocessors and collectors of tyres going out of business. Policy and regulatory framework • The lack of strong regulation to limit tyre stockpiling has had a considerable impact on tyre reprocessing infrastructure. This has driven poor practices and allowed the market to undercut more legitimate recycling operations. The introduction of regulations for the management of end-of-life tyres is likely to improve the economic performance of infrastructure.	Emissions to air, land and water / amenity issues • Stockpiling of material for reprocessing or illegal storage constitutes significant risk for tyre reprocessing infrastructure in terms of potential fire and the associated impacts on air and water. Recent changes in legislation have been made to prevent this occurring. • A significant proportion of tyres are exported for use as fuel in thermal reprocessing facilities around the world. Adequate environmental management standards of destination countries are an important consideration.	• The price differential between local markets for high quality tyre crumb and international markets for shredded TDF is considerable. While the reprocessing costs to produce crumb rubber are considerably greater, the margins can be large enough to warrant this investment. This is dependent on demand for high quality crumb rubber, which is currently limited in in Australia. • Improving local markets is a focus of Tyre Stewardship Australia (TSA), formed in 2014. The combination of tighter regulation and the TSA accreditation scheme offers the industry an opportunity to build local markets and increase the sale of high quality products, in turn reducing the focus on low value exports.	• The long term outlook for reprocessors of end-of-life tyres is good. However, the short to medium term conditions within the market indicates that the current pressures on local and international markets will persist.

Infrastructure category	Key economic factors impacting performance	Key environmental factors impacting performance	Opportunities	Future outlook – five years
Metals	Conditions of end markets • The slowdown in global construction has seen the price of scrap metal (base metals such as scrap steel) fall more than 30% in the past four years which has significantly impacted performance. However, it should be noted that some non-ferrous metals are fetching record prices and as such this market is considerably stronger at present. Economies of scale • The low price of scrap metals is leading to operators "hedging" through stockpiling as they wait for higher prices. This is also because many metals collectors are requiring greater volumes of material to justify transport expenses. Capex / opex costs • The recycling of scrap steel into steel billet (a semi-finished steel product) is an energy intensive process and increasing energy costs have impacted margins. • Disposal costs associated with the by-products of shredding cars and whitegoods to reclaim scrap steel (shredder floc) are increasingly impacting the business. • Local reprocessing of non-ferrous metals such as aluminium has also been impacted by energy prices which may see some facilities close in coming years.	Emissions to air, land and water / amenity issues • Noise issues associated with both scrap metal yards and centralised reprocessing facilities (shredders mainly) have been noted within the industry. • The disposal of shredder floc is limited to one licensed landfill in Victoria and the presence of oils and polychlorinated biphenyls in the material offers some potential environmental risk. • The vast majority of metals are brought to Melbourne for reprocessing from across the state thus greenhouse gas emissions from transport is a factor for consideration.	• There are opportunities for greater consolidation of material in regional Victoria to improve economics of scale. • Potential opportunities for operators to reduce operational costs through reduced power consumption (or onsite alternative fuel generation) and also through increased recovery of shredder floc. • There are options for processing shredder floc using pyrolysis or gasification, however at this stage it is likely not to be cost effective to invest in such infrastructure. Ongoing increases in power and waste disposal charges may improve the business case for investment of this infrastructure.	• Most analysts are predicting ongoing softness in commodity prices into the future. It may well be the case that current prices for base metals are the "new normal" as opposed to a temporary low price. The major metals reprocessors are likely to continue to operate under these conditions as they can set the price (effectively the recovery of metals remains cost effective as long as it's cheaper than landfilling) and manage operational costs more easily than small and mid-tier players. • The outlook for non-ferrous metals reprocessors looks more positive with prices for copper and aluminium likely to remain high.

Infrastructure category	Key economic factors impacting performance	Key environmental factors impacting performance	Opportunities	Future outlook – five years
Aggregate, masonry and soils	Government levies • An ongoing driver supporting the diversion of masonry products is the landfill levy. When combined with increasing operational costs it makes the business case for recycling heavy materials strong. Transport / freight • The cost of transport for C&D materials makes it cost prohibitive to recover them beyond around a 50 km radius to a reprocessing facility. Policy and regulatory framework • The approval of solid inert landfills may impact the performance of C&D reprocessing in that area.	Emissions to air, land and water / amenity issues • Amenity issues associated with noise and dust impact the performance of C&D reprocessing infrastructure. • Community concerns have impacted the social licence to operate for a number of facilities.	• There are opportunities for further reprocessing of C&D materials in regional and rural Victoria where costs and end markets allow. • Mobile reprocessing infrastructure to service local construction projects, as well as consolidation at regional hubs could be considered here.	• The C&D industry is intrinsically linked to the construction market, which is predicted to increase over the next five years indicating positive signs for C&D reprocessing infrastructure. • The uptake of end products for construction and road development projects is favourable with competitive pricing and work being undertaken by Victoria and NSW to increase the profile of recycled aggregates.
Textiles (including mattresses)	Condition of end markets • There are limited opportunities for recovery and reprocessing of textiles primarily because costs are high and the value of end products generally low. Performance of reprocessing infrastructure is heavily impacted by end markets which have declined in line with general manufacturing. Capex / opex costs • Reprocessing of mattresses in particular is expensive as it is either heavily automated and requires high capex costs, or is via manual deconstruction which requires high capex / labour costs. Consumer trends • The textiles market is almost entirely gate fee driven due to the limited resale value of end products. Consumers are often unwilling to pay the true cost of disposal for these instead opting to use kerbside bulk waste collections or seek lower rates at transfer stations. Business models • The industry is strongly driven by throughput and low margins with many processors using lower cost labour alternatives, for example social enterprises, to maintain cost effectiveness. However, small changes in market conditions and high capex costs make the operation marginal and prone to issues.	• Limited environmental issues with textiles recycling.	• Given that just 3% of textiles are recovered for reprocessing, there are opportunities for greater recovery and investment in improved infrastructure. However, the business case remains marginal in most instances.	• Work underway within the industry to develop a product stewardship approach may influence recovery of mattresses. • The outlook for textiles recovery is less clear; it is unlikely the business case will improve under current conditions. Energy from waste infrastructure may become a viable alternative.

Infrastructure category	Key economic factors impacting performance	Key environmental factors impacting performance	Opportunities	Future outlook – five years
E-waste	Business models • The business case for investment in reprocessing infrastructure is dependent on continuous supply of feedstock from the existing National Television and Computer Recycling Scheme (NTCRS) or material collected outside of the scheme. • Low volumes of material and high reprocessing costs contribute to export being financially more viable. Condition of end markets • Commodity markets for reprocessed e-waste is a global, fluctuating market conditional on supply and demand. Capex / opex costs • E-waste reprocessing is labour intensive increasing the costs and lowering reprocessing efficiencies. However, where automated reprocessing does exist to increase efficiency rates, it carries a higher power cost due to high electricity rates compared to shipping off shore. • Investment in downstream reprocessing of components containing high value metals is very low. Transport / economies of scale • High transport costs impact cost efficiencies.	Emissions to air, land and water/ amenity issues • E-waste can contain hazardous components, such as lead, mercury and arsenic, which, as whole items or as residual waste from e-waste reprocessing, can create long term soil and groundwater contamination issues and human health issues. • These hazardous components can also pose a health and safety risk to workers in the landfill and recycling industry. Sustainability and other benefits of recycling / recovery • A range of valuable non-renewable materials, such as copper, silver and gold, may be recovered and made more available for further reprocessing and reuse. • Less greenhouse gases are emitted through recovery of e-waste than that required to mine, process and transport raw materials to create new electronic products.	• Opportunities may exist in investment in technology that increases the processing efficiency rates per kilogram per hour. Using more efficient technology can increase processing rates, lower contamination, improve material separation and yield a higher return on commodity markets. • Community interest in recycling televisions and computers is high. Targeted awareness raising and education coupled with sufficient infrastructure to meet demand will help increase the amount of material available for reprocessing. • Increasing community access to disposal points for e-waste could be achieved through collaborative procurements. • A stable and larger supply of feedstock for reprocessors may lead to investment in improved reprocessing technology.	• Greater amounts of material will flow through the system as a result of > The Victorian Government's implementation of an e-waste landfill ban and appropriate supporting measures. > The increase in the annual NTCRS recycling target for the recovery of televisions and computers. • Victorians will be better informed and have greater access to e-waste collection points. • Reprocessors that recover material as part of the NTCRS will have adopted AS5377 standard for collection, storage and processing of e-waste improving the standard and safety within which the reprocessors operate.
Alternative waste technologies (AWTs) (such as mechanical biological treatment [MBT])	There are no operational facilities in Victoria, however a number have been recently considered and it is likely that reprocessing of residual waste using this technology will occur in the future. Key economic factors likely to impact this technology includes: Landfill levy • Investment in AWT infrastructure will be driven almost entirely by the cost of disposal. Where the disposal cost exceeds AWT gate fees then investment may be encouraged. Currently, the levy has been stabilised at a rate that is potentially too low for significant sized investments to compete. (NB an inadequate supply of landfill airspace may also be a factor that would likely increase the competitiveness of AWT).	Social licence to operate • Appropriate and early engagement with the community is necessary to ensure that facilities are supported locally. This will be essential as these facilities will be largely unknown to the public. Emissions to air, land and water/ amenity issues • It is likely that similar issues as those associated with in-vessel composting will be experienced for facilities such as MBTs however this is dependent on the volume and material. For example, odour is likely to be a key consideration for an MBT reprocessing residual waste while dust and noise management is more likely a concern for a C&I dirty MRF (mixed waste reprocessing facility).	• There are considerable opportunities for reprocessing of C&I waste in a dirty MRF. There have been some projects considered by industry that have not progressed due to capex issues and concerns with ability to sell RDF offtakes. • Climate change and renewable energy programs may see credits become available for certain facilities. • Smaller scale, onsite facilities may be viable in regional/rural settings.	• The AWT category takes in a broad array of facilities and if landfill cost increases and airspace availability decreases then the business case for facilities may become more viable. • For organics, Victoria has seen AWT facilities (in-vessel composting facilities) to reprocess organic waste successfully implemented. Collective tendering of residual waste may encourage the market to take similar steps.

Infrastructure category	Key economic factors impacting performance	Key environmental factors impacting performance	Opportunities	Future outlook – five years
Alternative waste technologies (AWTs) (such as mechanical biological treatment [MBT])	Tendering of MSW contracts • Large scale infrastructure requires significant volumes of material that can usually only be achieved through council contracts. While most facilities will augment MSW volumes with C&I waste, securing a base-load via council contracts is the basis for investment. Collective tendering of contracts to give the market access to large volumes of material has supported investment in AWT infrastructure in other parts of the world. Condition of end markets • The business case for large scale infrastructure is dependent on both an attractive gate fee and end markets for separated materials. While the Victorian conditions for typical commodities are likely to be suitable for this business case, most AWT facilities have some sort of lower value materials that requires end markets (for example a refuse derived fuel for the residual dry fraction and a compost-like output from anaerobic digestion). Markets for these products are unknown and untested, and export markets may be difficult to access cost effectively.			• The outlook remains positive, however, given the planning time needed to engage with the community and the required approvals large scale facilities are unlikely to be operational in the next five years.
Energy from waste (EfW) (including pyrolysis, gasification and anaerobic digestion)	Landfill levy – as above Tendering of MSW contracts – as above Regulatory / approvals framework • As yet, the Energy from Waste (EfW) Guidelines (2013) have not been fully tested by the market. It is likely that the approvals framework both within EPA Victoria and the concurrent planning approval will require considerable thought when such a proposal emerges. Capex / opex costs • The high investment required (even small scale) is a significant factor impacting potential projects. End markets • The outputs of EfW infrastructure differ depending on the technology and feedstock. End markets across all types are a key factor in success. For example, the offtake of pyrolysis of tyres is likely to include a low grade diesel and the sale-ability of such a fuel is unclear particularly in the light of lower oil prices. • .	Social licence to operate • As above. International experience shows that even in places where incineration is common, poor community engagement has led to projects being rejected. Emissions to air, land and water/ amenity issues • The degree to which this is a factor depends on the proposed technology and scale. Air scrubbing technology is advanced and the EfW Guidelines use the strict European Union Standards as a baseline for air emissions. However, the management, treatment and disposal of filter cake and associated hazardous material may be an issue and require further treatment at an approved facility prior to disposal. • The management of bottom ash (produced in combustion plants) also need to be considered carefully.	• Potential for renewable energy certificates and ERF credits. There are significant opportunities in two key areas: 1. Reprocessing residual waste to reclaim energy from material destined to landfill (i.e. waste streams that have been processed to remove as much recyclate as is feasible 2. Reprocessing difficult material streams where existing reprocessing options may be limited (such as tyres and treated timber). The former is likely to be years away. The latter can be developed on a much smaller scale and deployed for onsite utilisation of energy which makes them significantly more viable than large scale facilities that require connection to the grid.	• Demonstration plants that utilise pyrolysis and gasification technology to reprocess end-of-life tyres are currently in operation in NSW and are showing potential to be dramatically scaled up or even deployed at small scale to reprocess material in regional areas. • Collaborative procurement for MSW contracts may drive the market to examine the feasibility of larger scale facilities, however it is unlikely that the business case currently exists to compete with landfill gate fees at the moment.

Infrastructure category	Key economic factors impacting performance	Key environmental factors impacting performance	Opportunities	Future outlook – five years
	• Direct energy is also a key market and the structure of the energy market in Victoria means that wholesale energy prices remain relatively low yet distribution costs are high. The attractiveness of energy offtakes from EfW infrastructure is marginal unless energy, particularly heat, can be utilised onsite or at nearby installations		• EfW facilities can also be designed to promote an integrated system, using MSW base load to drive the business case then bringing in a range of commercial waste steams to improve the return on investment.	
Landfills	Capex / opex costs • A significant factor, particularly in regional areas, is the increase in opex attached to compliance and monitoring requirements, and increased capex costs associated with cell construction and auditing. While this is a factor for larger facilities also, they have a greater ability to absorb these costs in their 'per tonne' pricing due to the significant volume of material moving through them. • Regional landfills have expressed concerns about ongoing financial viability, however there is a reluctance to close and consolidate facilities as some councils feel obliged to provide a local landfill for the community. Government levies • The impact of the landfill levy through its ability to drive diversion has had an impact on the performance of landfill infrastructure over the past decade. Consumer trends • Victoria has an established system for kerbside recycling. Attitudes in the community towards the landfilling of valuable materials continue to shift and sending material to 'the tip' is no longer appropriate in many communities. Conditions of end markets / export markets • The inability of some markets to develop feasible business cases for resource recovery continues to drive material being sent to landfill (e.g. timber, polystyrene and plastics). Land use planning controls • Encroachment of sensitive uses (such as residential areas or schools) on facilities is a significant issue. Residential development has been approved close to or into buffers for landfill facilities impacting the long term viability of a number of sites.	Emissions to air, land and water/ amenity issues • Amenity issues relating to odour and windborne litter as well as the management of leachate. Odour complaints can peak from time to time, generally resulting from increased rainfall and poor management practices. Compliance and monitoring regime • This factor adds complexity and cost to landfill management but is generally improving environmental outcomes. • The need for suitable financial assurance to cover the cost of rehabilitation. Suitable provisions (such as financial assurance) should be made by landfill operators. Post closure rehabilitation / legacy issues • While the Landfill BPEM is improving the management of new landfill cells, there are ongoing issues with some legacy sites which predate the current standards. • Progressive rehabilitation of closed cells remains a deficiency in the market, again with a particular focus on regional and rural landfills.	The primary opportunities relating to the performance of landfill infrastructure are: • Improving environmental management (particularly odour and litter) and community engagement. • Improving leachate management. Opportunities to improve economic performance of landfill infrastructure may include: • Provisioning for aftercare and rehabilitation costs. • Consolidation of smaller regional and rural landfills. • Improved long term planning for cell development to reduce construction and design costs. • New provisions to transfer landfill gas projects from the former Carbon Farming Initiative program into the ERF. • The installation of 'pre-sort' infrastructure to extract recyclables from the front end of a landfill can improve margins and preserve airspace, however issues related to markets for RDF offtakes will need to be overcome. • Co-location of resource recovery facilities in general at landfills should also be considered.	• The performance outlook is varied. At least in the short term there are a number of regional and rural landfills facing significant costs to manage compliance and rehabilitation of existing and past cells. These costs may drive councils to consider closure and consolidation of some facilities. • EPA's ongoing focus on compliance and enforcement will continue to drive improvements in environmental management and possibly contribute to increased operational costs. • Economic performance at larger landfills should remain strong as high barriers to entry and limited options for reprocessing residual waste continues to preserve margins.

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