CIRCULAR RESOURCE PRACTICES IN BUSINESS PRECINCTS

POST-INTERVENTION FINAL REPORT

28.03.2024

Olivia Ashton & Cian Dreyer
Reground Pty Ltd
2 Wingrove St
Alphington VIC 3078

Executive Summary

The Circular Resource Practices in Business Precincts project, as supported by Sustainability Victoria on behalf of the Victorian State Government, involved 14 Councils and 125 businesses to implement cost effective, scalable solutions to commercial waste and recycling issues. This aimed at promoting the shared use of bins between businesses to provide a scalable, affordable means of accessing recycling and to divert recyclable material being sent to landfill. Additionally, the project set out to increase traders' awareness of where their waste goes and their understanding of circular economy waste practices.

The project consisted of three main phases:

- pre-intervention
- interventions
- post-intervention evaluation.

This report outlines the process of all three phases, presents a comparison of data collected during the pre and post-intervention phases, and discusses the key findings and learnings from the project overall as well as outlining recommendations for councils moving forward.

Key data findings:

- **Sharing models**: precinct wide sharing models were only feasible where precincts had a dedicated waste area, in the form of an enclosure, and a central managing body to manage the collection and payment of the shared bins in the enclosure.
- **Access to new streams**: businesses utilising shared streams gained access to significantly more recycling streams than businesses using individual streams.
- **Resource recovery rates**: an overall increase in resource recovery rate was observed for precincts that were sharing streams. Precincts that utilised individual bins for each business showed no significant change in resource recovery rates.
- **Contamination rates**: contamination rates dropped for precincts that shared streams, no significant change in contamination levels was observed for precincts using individual streams.

Key learnings and recommendations

- **Barriers to sharing model**: currently a number of barriers exist that prevent businesses from sharing both council or private bins, these include; lack of a system to facilitate payment for shared bins, lack of infrastructure to house shared bins and lack of waste contractor cooperation or transparency.
- **Barriers to hosting model**: barriers which prevented hosting models from being implemented included risk management from personnel accessing bins hosted on another businesses property, amenity and relying on existing healthy relations between businesses.
- **Enclosures:** enclosures provided the best environment to house shared bins as well as implement clear colour coordinated signage and floor markings. The largest increases in resource recovery rates were observed at precincts with enclosures present.
- **Education**: when education and signage were provided without accompanying infrastructural change to the businesses' waste and recycling system, no significant changes in recycling behaviour were observed.
- **Waste contractors**: waste contractors were notably non-cooperative with facilitating shared bins or providing transparency on the end destination of their collections. Traders were often locked into unfavourable, long-term contracts and were hesitant to try to make changes to their set up to prevent damaging their relationship with their waste contractor.

- **Typology**: business typology can indicate what streams they need the most as well as which service type (council or private) they can avail of.
- **Collection points**: council operated collection points for a dedicated material, such as cardboard, would significantly help businesses divert material that is currently being sent to landfill.

Table of Contents

Background

The Circular Resource Practices in Business Precincts Project (**Business Precincts Project**) emerged from a joint application submitted in March 2022, to Sustainability Victoria from Reground and 14 participating councils, with City of Whittlesea being the lead council. The Business Precincts Project aimed to deliver on the following Circular Economy Council's Fund objectives:

- to decrease the volume of waste going to landfill
- to increase the volume of material reused, repaired, repurposed, or recycled
- to increase Circular Economy activity, stimulating local employment and economic development
- to establish scalable circular solutions for business precincts that can be shared amongst councils.

The Business Precincts Project was supported by the Recycling Victoria Councils Fund delivered by Reground on behalf of the Victorian State Government. In collaboration with:

- City of Ballarat
- City of Boroondara
- Greater Dandenong Council
- Glen Eira City Council
- City of Greater Geelong
- Hobsons Bay City Council
- City of Kingston
- Maroondah City Council
- Merri-Bek City Council
- Mornington Peninsula Shire
- Nillumbik Shire Council
- City of Stonnington
- City of Whittlesea
- Yarra City Council.

This project involved the 14 Metropolitan and Regional councils and 125 businesses working collaboratively to implement effective waste and recycling models across a variety of business precincts. A core focus of the project was to enable businesses to achieve waste avoidance and minimisation, increasing resource recovery and decreasing waste to landfill. Furthermore, this project aimed to help businesses understand what happens to their waste and educate them on circular economy waste practices. Communication and engagement with stakeholders including traders' associations and businesses was a key component of implementation and uptake of the models.

Glossary

- **Best practice:** a set of evolving educational and infrastructure techniques and methods used at business precincts that build on best waste practices guidelines.
- **Contamination:** can be either a resource disposed of in the incorrect stream (such rigid plastic in a cardboard and paper stream) or a contaminated item in the correct stream (such as food-contaminated rigid plastic in the mixed recycling stream).
- **Missed recyclable:** recyclable material observed in the general waste stream.
- **Non-recyclables**: material audited that currently cannot be recycled.
- **Recoverable contaminant:** a recyclable material observed in the incorrect recycling stream, i.e. rigid plastic in a cardboard and paper bin.
- **Recycling streams:** all resource recovery streams, including mixed recycling, cardboard and paper, Food Organics and Garden Organics (FOGO), electronic waste (e-waste), glass, clothing and textiles and soft plastic.
- **Resource recovery rate:** the proportion of recyclable materials being recovered in the correct streams, as a percentage of all waste and recycling combined.
- **Stream**: a bin for a defined typology of material, e.g. cardboard stream for cardboard waste.
- **Stream utilisation:** The proportion of the stream that is being used, calculated by measuring bin fullness of each bin of that stream.

Project Objectives

- Long-term, scalable solutions for each council to facilitate better waste and recycling systems in business precincts.
- Cost-effective waste and recycling solutions for small to medium sized businesses.
- Introduce four or more streams and achieve 50 percent increase in resource recovery from businesses from pre-implementation levels.
- Manage community expectations in relation to traffic, noise and odour control, aesthetics and community safety.

Methodology

This project consisted of three phases (Figure 1):

- Phase 1: pre-intervention
- Phase 2: interventions
- Phase 3: post-intervention evaluation

Figure 1: Overview of each phase of the Business Precincts project.

Phase 1: Pre-intervention

Recruitment

On commencement of the Business Precincts Project, each Council proposed a business precinct to Reground. Each precinct consisted of 10-13 businesses with a mix of typologies. Recruitment involved gathering contact details for the main point of contact for each business, gaining a verbal agreement to participate in the program and included an initial site assessment and visual audit.

Site assessments

Site assessments were conducted at the elected business precinct chosen by each Council. During the initial site visit, individual businesses were recruited via direct engagement with Council's assistance. The condition and effectiveness of their waste and recycling areas were reviewed. This was done by assessing the following:

- external and internal waste area layout of businesses
- existing infrastructure i.e. enclosures and specialised equipment (compactors, balers etc.)
- placement and functionality of internal and external bin/s
- ease of use by staff and waste collection services
- signage
- capacity for further streams.

These site assessments also involved interviews with owners and management to understand issues they were facing with their current waste and recycling setups.

Visual audits

Visual audits were conducted at each business within each precinct, these audits:

- recorded the size and collection frequency of each bin
- recorded the percentage fullness of each bin
- sorted the top of 20% of each bin by hand (including opening bagged waste, where necessary)
- recorded the type and quantity of materials in each bin to 5% intervals, in accordance with the following material categories:
    - paper
    - cardboard
    - aluminium & steel packaging
    - rigid plastic
    - glass
    - container deposit scheme (CDS) items (eligible glass, aluminium, plastic & liquid paperboard)
    - liquid paperboard
    - soft plastic
    - coffee cups
    - e-waste & batteries
    - food waste
    - garden waste

- ground coffee
- food contaminated packaging
- bagged recycling
- polystyrene
- compostable packaging
- napkins
- hygiene & hazardous items (e.g. sanitary items, medical material, masks)
- hard waste
- clothing
- other textiles
- other recycling*
- other general waste*

*Other items were recorded as required.

The first visual audit was conducted during the initial site assessment at each precinct, between June and August 2023, the visual audit data was captured in volumes (L).

Recommendations

Following the site assessments and visual audits, Reground recommended one of the four models for installation at each precinct:

1. **Enclosure**
   Involved installation of physical infrastructure that would house shared bins for the 10 businesses.

2. **Shared**
   Involved facilitating shared bins amongst the businesses (without the presence of an enclosure). Bins could be housed on council or private property and costs would be broken down evenly between businesses or by the percentage of stream utilisation per business.

3. **Hosting**
   Involved one business hosting shared bins on their property. This model would involve an incentive for the 'host' and required the host to facilitate costs and upkeep.

4. **Hybrid**
   Developed on a case-by-case basis if a business precinct does not fit the criteria of models 1-3. This model will utilise elements of the other models to facilitate the desired outcome.

Phase 2: Installation and engagement

Reground followed the below process with each council to approve and install the recommended models:

Table 1: Approval process following initial visual audit between Reground and each Council and precinct stakeholder.

Step	Process
1	After completing the visual audits and initial waste area assessment, **the Reground team submitted individual briefs containing model recommendations to each council.** These briefs contained snapshot data of their precincts resource recovery rate, contamination rates and missed recyclables found in the general waste stream.
2	Individual meetings between Reground and each council were held to discuss the recommendations.
3	Council returned to Reground with what they were willing to **approve for installation**.
4	**The scoping phase commenced upon receiving the approval for the recommended model. This involved:** ● Contacting each business to discuss the intricacies of each model, i.e. introducing new streams, hosting of shared bins, payment arrangements for shared bins, etc. Where franchises were involved, contacting their head office to discuss these details. ● Contacting waste contractors to enquire about: ○ what streams they serviced ○ end destination for each stream ○ pricing for available streams ○ ability to facilitate shared streams. ● Facilitating the dialogue between waste contractors and businesses to finalise changes.
5	**Reground returned to each property to install new streams**, Sustainability Victoria signage, floor markings and bespoke signage (created by Reground, approved by Council) was introduced where necessary.
6	At each installation Reground also installed a sign with a link and QR code inviting participating business staff to **report any feedback and issues**.

Image 1: Installation of shared bins within an enclosure operated by a central managing body, streams include: cardboard, soft plastic, mixed recycling, FOGO and general waste. Pictured: Mornington Peninsula Shire

Image 2: Signage and floor markings installed within an enclosure operated by council that held business' individual bins. Pictured: Maroondah City Council.

Image 3: Signage and floor markings installed for a business with individual bins. Pictured: City of Kingston.

Phase 3: Post installation evaluation

Site assessment and visual waste audits

Phase 3 involved a follow-up visual audit at each precinct, using the same method used in the pre-intervention audit during Phase 1. The purpose of this phase was to measure the impact of changes and identify further areas for support and refinement to internal and external waste and recycling set-ups. Due to unforeseen delays in the Phase 2 timeline, there were variations in the timeframe between the initial audit and the installation for the business precincts. Factors that contributed to delays included a breakdown in cooperation with waste contractors, business ownership changing and businesses withdrawing from sharing models, further outlined in the key learnings section of this report. Phase 3 was carried out from December 2023 to February 2024, installation and visual audit timeframes can be viewed in the appendix.

Survey

A survey was either answered in person during the post installation visual audit, or circulated to each business via email to gather feedback on the new waste and recycling system and to assess businesses' change in understanding of circular economy waste practices.

Example question:
Do you feel like your awareness of the benefits of recycling and circular waste management has increased? *1 - strongly disagree, 5 - no change, 10 - strongly agree.*

1	2	3	4	5	6	7	8	9	10

Project Data

The data below reflects the findings from the pre and post-implementation visual audits, site assessments and survey responses across the three phases of the project.

Note: there are many variables that impact the data that cannot be accounted for within this scope of this project, such as: seasonality of waste output for different businesses, staff turnover and business' bins being accessible to the public and susceptible to incorrect use. For some businesses' second visual audit was conducted on a different day of the week to their pre-installation visual audit, this is outlined in the appendix.

Precinct snapshot

Of the 140 businesses across 14 councils that were approached to participate in this project, 125 agreed to participate and were engaged throughout each phase of the project. Business drop-out was due to businesses closing down, changing ownership, or lack of engagement with the project.

Table 2: Overview of each council's chosen precinct, businesses involved, recommended model and installed model.

Council	Precinct	No. of businesses	Proposed Model	Implemented Model	Interventions
Ballarat	Ballarat Umbrella Laneway	8	Hosting + Enclosure /Sharing	Individual/ Sharing	Shared + signage and education
Boroondara	Willsmere Village	10	Sharing	Individual	Signage + education
Dandenong	Springvale	10	Hosting + Sharing	Individual	Signage + education
Geelong	Baylie Place	8	Enclosure /Sharing	Individual	Signage + education
Glen Eira	Centre Rd, Bentleigh	10	Enclosure /Sharing	Enclosure/ Sharing	New streams + Signage and education
Hobsons Bay	Railway St, Altona	9	Hosting + Enclosure /Sharing	Individual	Signage + education
Kingston	Main St, Mordialloc	7	Hosting + Enclosure /Sharing	Individual	Signage + education
Maroondah	Thomas Brew Lane, Croydon	8	Enclosure /Sharing	Enclosure/ Individual	Enclosure + signage and education
Merri-bek	Foley's Mall, Sydney Road	12	Enclosure /Sharing	Enclosure/ Sharing	New streams + signage and education
Mornington	Ritchies	13	Enclosure	Enclosure/	New streams

Council	Precinct	No. of businesses	Proposed Model	Implemented Model	Interventions
Peninsula	Shopping Village, Mount Eliza		/Sharing	Sharing	+ signage and education
Nillumbik	Main Rd, Research	10	Sharing	Individual	Signage + education
Stonnington	Chapel St	8	Enclosure /Sharing	Enclosure/ Individual	New stream + signage and education
Whittlesea	Northern Hospital Epping	10	Enclosure /Sharing	Enclosure/ Sharing	New internal streams + signage and education
Yarra	Rathdowne St	9	Hosting + Enclosure /Sharing	Individual	Micro-sharing + signage and education

Barriers to model implementation

Extensive scoping was undertaken to implement enclosure models, however a number of barriers prevented Council from approving their installation. Five councils who were proposed enclosures as their original model that were not able to implement them during the project timeline. These Councils cited the following reasons as barriers to implementation:

- traffic management
- land zoning
- cost.

Precinct-wide sharing models were able to be implemented at a total of four precincts, all of which had an enclosure present. Two additional precincts had enclosures present; however sharing models were not able to be implemented here. This was due to these two enclosures lacking a third party (e.g. a body corporate, engaged traders association or council) to manage the logistics associated with implementing shared streams.

Hosting models, sharing models and micro-sharing were approved by Council and proposed to precincts without enclosures as cost effective models to facilitate the introduction of four or more recycling streams. Hosting models were proposed to a total five precincts but only one group of businesses were able to agree on a hosting arrangement. This agreement was not fulfilled after intervention from a waste contractor, further discussed in the key learnings section of this report.

Reasons that prevented the introduction of hosting and sharing models include:

- lack of waste contractor cooperation
- spatial restrictions
- billing for shared bins
- cost.

All the barriers to sharing models are examined in detail in the Findings & Observations section of this report.

Model Overviews

The data has been grouped by the following variables to assess changes in resource recovery rates, contamination levels access to new streams:

- Businesses using **shared bins within an enclosure** (total: 45)
- Businesses using **individual bins within an enclosure** (pre-intervention: 3, post intervention: 11)
- Businesses using **shared bins outside of an enclosure** (total: 2)
- Businesses using **individual bins outside of an enclosure** (pre-intervention: 76, post-intervention:67)

Below are the profile overviews of all businesses grouped to these variables, this overview highlights: resource recovery rate, missed recyclables, recoverable contaminants and non-recyclables.

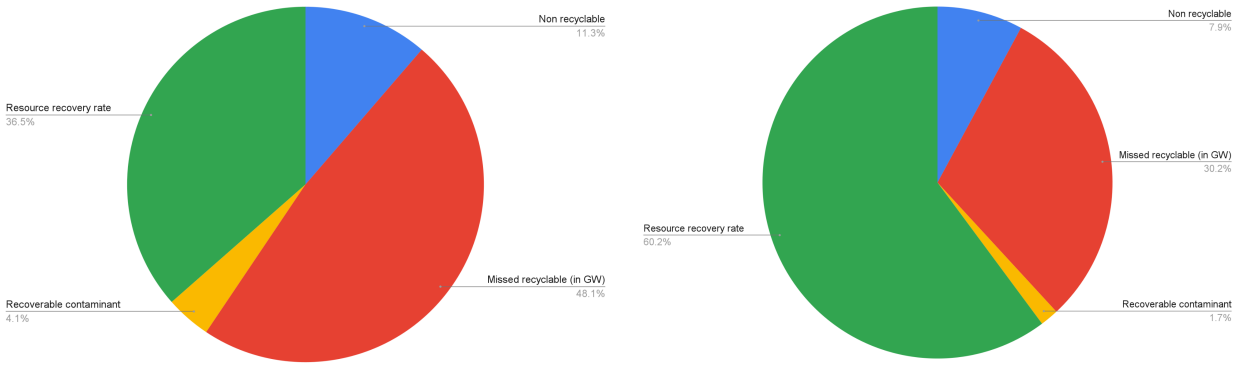


Figure 2: Profile overview of businesses <u>sharing within an enclosure</u> for *pre (left)* and *post-installation (right) audits*. *Total businesses: 45*

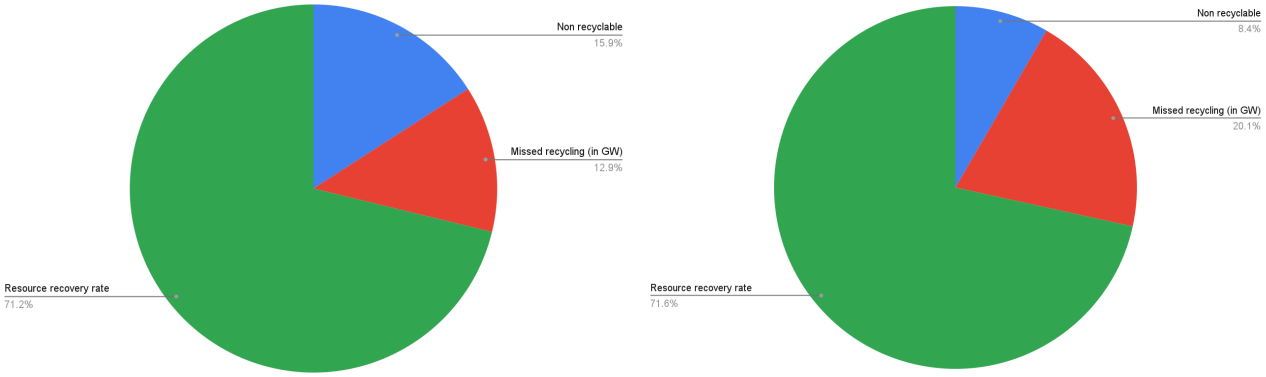


Figure 3: Profile overview of businesses with <u>shared bins outside of an enclosure</u> for *pre (left)* and *post-intervention (right)* audits. *Total businesses Audit 1: 2, audit 2: 2*

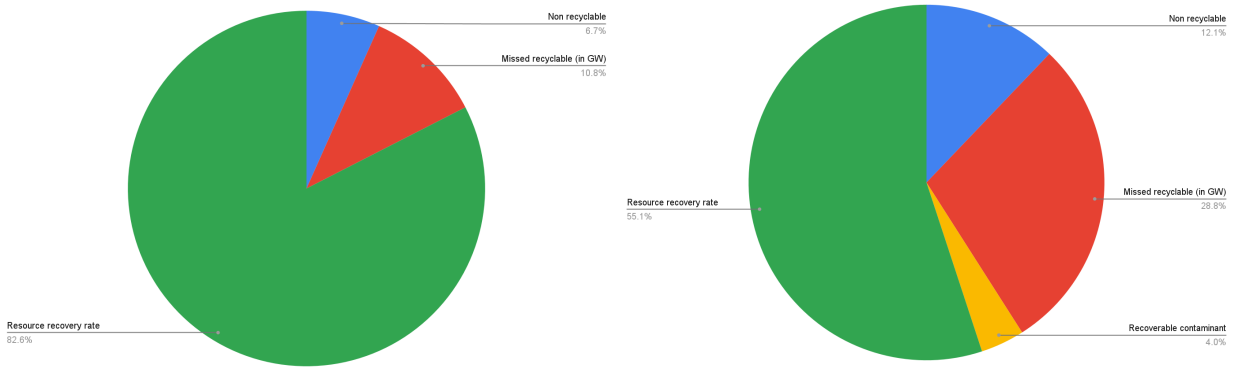


Figure 4: Profile overview of businesses with <u>individual bins within an enclosure</u> for *pre (left)* and *post-intervention (right) audits*. *Total businesses Audit 1: 3, Audit 2: 11*

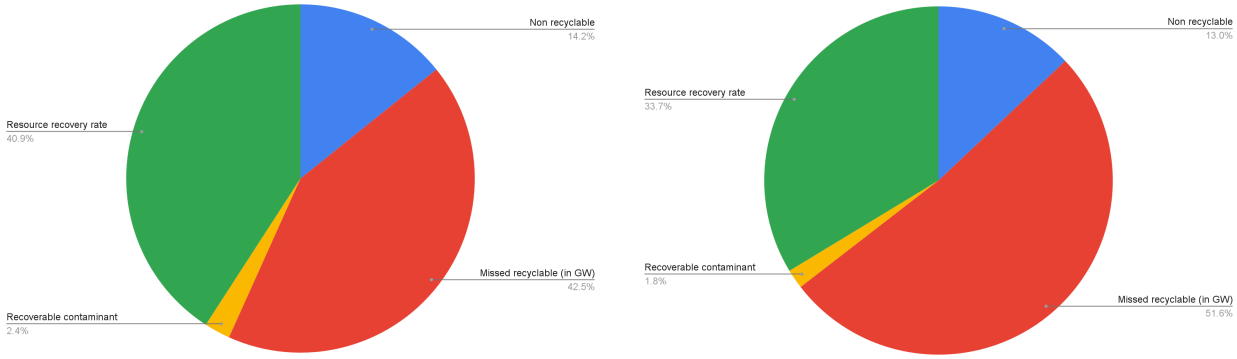


Figure 5: Profile overview of businesses with <u>individual bins with no enclosure</u> for *pre (left)* and *post-intervention (right) audits*. *Total businesses pre-intervention audit: 76, post-intervention audit: 67*

New stream implementation

Businesses within precincts that utilised a shared waste and recycling model gained access to more streams than businesses utilising individual bins. The most common shared streams to be introduced were cardboard and paper, mixed recycling and FOGO (Figure 6).

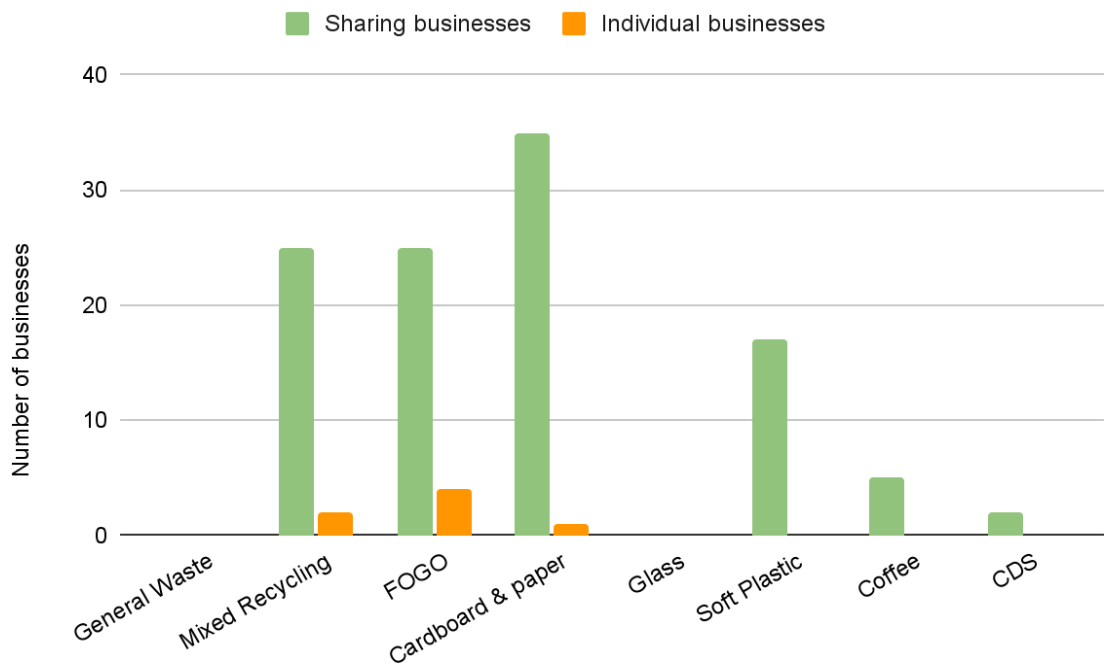


Figure 6: Total number of businesses that gained access to new streams from pre-installation to post-installation.

Resource recovery rates:

The resource recovery rate indicated the percentage of recyclable materials correctly recycled in a given precinct or sharing arrangement. This was calculated from the visual audits, where the top 20% of each stream was observed and divided into materials, and the data recorded for each bin within the precinct.

An increase in resource recovery rates was observed for businesses utilising shared bins between the pre and post-intervention audits (Table 3). An increase in resource recovery of 23.7% occurred for businesses utilising shared bins within an enclosure, while businesses utilising shared bins outside of an enclosure had an increase of 1.3% in resource recovery rate. Businesses utilising individual bins inside of an enclosure observed a decrease in resource recovery rate of 27.5%, reasons for this are explored within the findings and observations section of this report.

Table 3: Overall resource recovery rates for businesses with shared or individual streams, within and without an enclosure.

System	***Enclosure***	***Pre-intervention recovery rate*** *(number of businesses)*	***Post-intervention recovery rate*** *(number of businesses)*	***Change in resource recovery rate***
Sharing	Yes	**36.5%** *(45)*	**60.2%** *(45)*	**23.7%**
Sharing	No	**71.2%** *(2)*	**72.5%** *(2)*	**1.3%**
Individual	Yes	**82.6%** *(3)*	**55.1%** *(11)*	**-27.5%**
Individual	No	**40.9%** *(75)*	**33.7%** *(67)*	**- 7.2%**

Contamination rates

Contamination levels reduced between the pre and post-intervention audits for all businesses using shared bins (Figure 6). Contamination levels remained consistent for those with individual bins outside of enclosures (pre-intervention: 9.0%, post-intervention: 9.3%) (Figure 6).

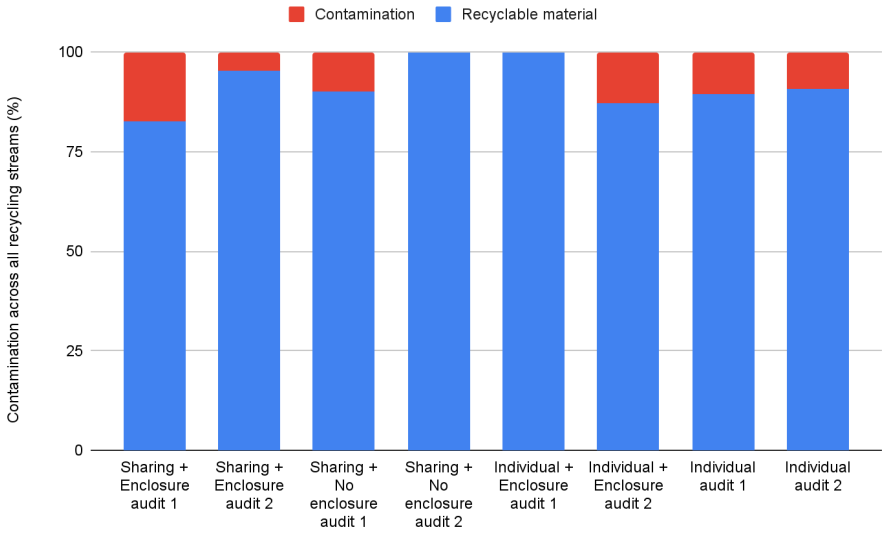


Figure 7: Overall contamination rates for businesses with shared or individual streams, within and without an enclosure

Business typologies

The 125 businesses that partook in the entirety of the project can be broken down into the overarching typologies of hospitality, retail*, grocery/supermarket, hair and beauty, medical & pharmaceutical and service*.

*Within this project: retail included: clothing outlets, op shops, sports equipment stores, florists and; *service included: real estate agents, phone repairs, gyms, physiotherapists, post offices.

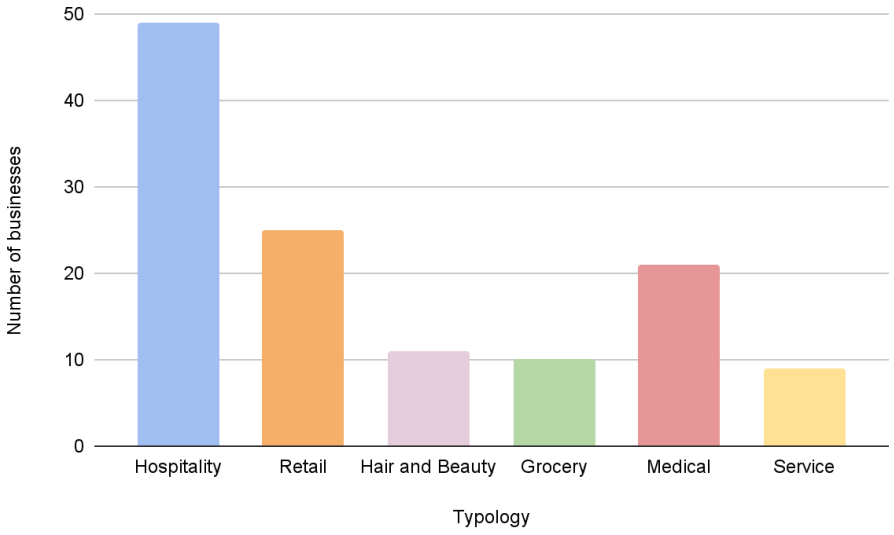


Figure 8: Typology breakdown of all participating businesses.

Service type

Business typology was a factor in businesses being council or privately serviced (Figure 9). Figure 9 shows the service type for the 78 businesses with individual bins. The remaining 47 businesses not featured in Figure 9 utilised shared bins and were all privately serviced.

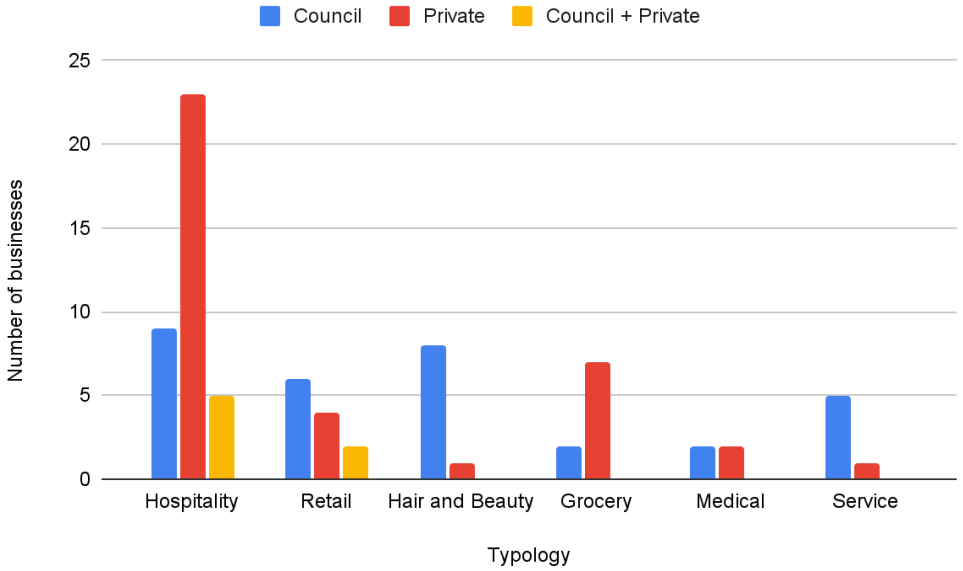


Figure 9: Overview of service type by business typology, for businesses with individual bins.

Stream breakdown

Which collection service a business used (council, private or both) impacted what streams were present at that business (Figure 10). Many council collection services offered at minimum general waste and mixed recycling. For applicable councils, some were able to offer up to four streams (general waste, mixed recycling, glass and FOGO) which is reflected in the diversity of streams observed for typologies that were predominantly council serviced (hair and beauty and retail). Where businesses subscribed to a private collection service, many only had a general waste bin (Table 4) as there is no standardisation for private waste collection services.

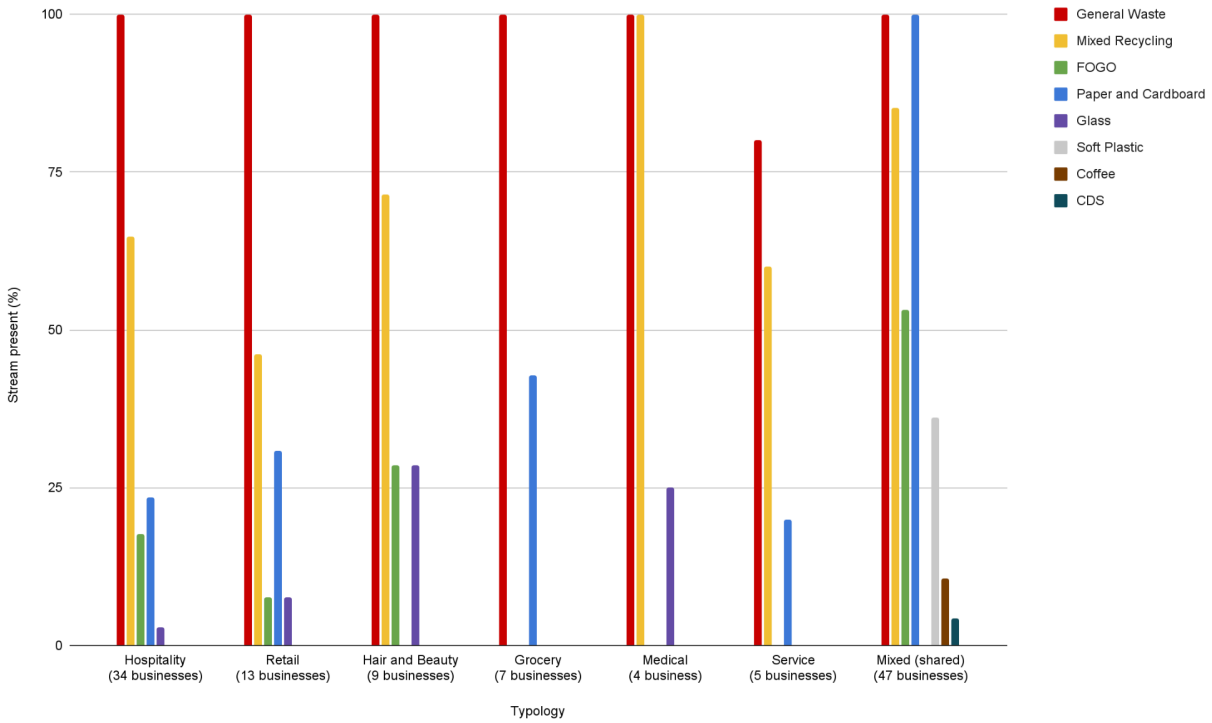


Figure 10: Post-installation stream breakdown by typology.

A reduction was observed in the number of businesses that had only a general waste service from pre to post intervention levels, due to additional streams being introduced during the project (Table 4). Businesses that were serviced by general waste only were using individual bins, all businesses that were sharing bins had access to at least two streams.

Table 4: Number of businesses that only had a general waste service, pre and post intervention levels.

Service type	***Pre-intervention***	***Post-intervention***
Council	27% (*8 businesses*)	24% (*7 businesses*)
Council + Private	0%	0%
Private	41% (*25 businesses*)	15% (*12 businesses*)

Resource recovery rates & contamination rates

Resource recovery rates varied between business typologies as seen in Figure 11, with the mean resource recovery rate being 44.9% for the pre-installation audit and 46.3% for the post-installation audit.

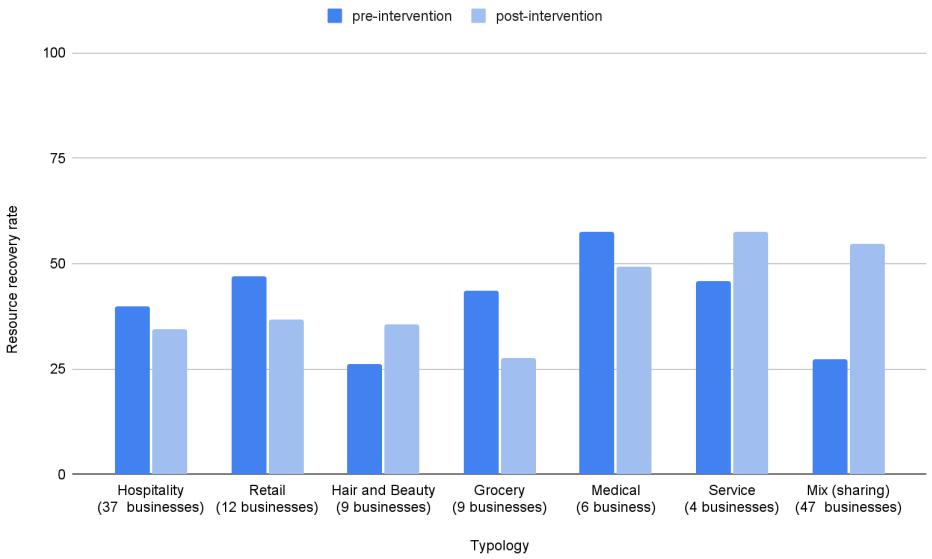


Figure 11: Resource recovery rate of each business typology for the pre and post-intervention audits.

Contamination rates varied across typologies, with services (which included: tattoo parlour, gym, post office, florist) experiencing the highest rates of contamination. This included a contamination rate of 25% during the post-intervention audit (Figure 12).

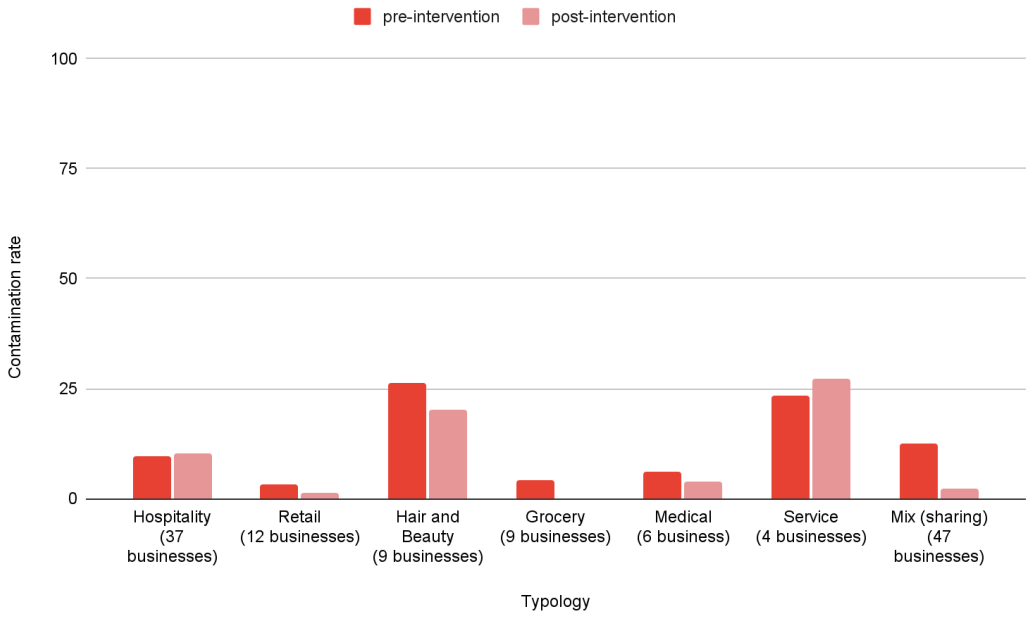


Figure 12: Contamination rate of each business typology, for the pre and post-intervention audits.

Missed recyclables

The following table highlights the top three missed recyclables for each business typology for both pre and post-intervention audits. These are recyclable materials that were observed in the general waste stream (e.g. soft plastic comprised 33.2% of all recyclable material observed in the general waste stream for all grocery stores, pre-intervention).
Soft plastic and cardboard were common missed recyclables for each business typology, excluding hair and beauty (Table 5).

Table 5: Top three missed recyclables per business typology.

Typology *(number of businesses in pre-intervention audit: number of businesses in post-intervention audit)*	**Top three missed recyclables *(proportion of missed recyclables)***			
	Pre-intervention audit		***Post-intervention audit***	
Grocery *(9:8)*	Soft plastic Food waste Cardboard	33.2% 21.2% 17.7%	Soft plastic Food waste Cardboard	33.5% 28.4% 17.8%
Hair and Beauty *(9:6)*	Rigid plastic Soft plastic Aluminium & steel packaging	25.2% 18.5% 12.7%	Organic waste Aluminium & steel packaging Paper	42.2% 14.2% 8.4%
Hospitality *(37:38)*	Food waste Soft plastic Cardboard	25.5% 25% 18.6%	Food waste Soft plastic Cardboard	26.6% 18.9% 19.1%
Medical *(15:15)*	Cardboard Paper Soft plastic	61.1% 18.8% 9%	Soft plastic Paper Rigid plastic	51.8% 22.3% 8.2%
Mix (sharing) *(22:35)*	Cardboard Soft plastic Rigid Plastic	57% 15% 7%	Food contaminated recyclables Soft plastic Food waste	19.5% 19.4% 15.3%
Retail *(11:13)*	Soft plastic Hard waste Clothing	41% 23% 9%	Hard waste Soft plastic Garden waste	36.9% 27.6% 12.5%
Service *(3:4)*	Rigid plastic Cardboard Food waste	28.9% 26.0% 22.6%	Soft plastic Paper Cardboard	40% 18% 8%

Survey responses

A total of 40 businesses responded to the survey or were able to answer the survey in person during the final visual audits. Responses are presented as follows:

A total of 60% respondents agreed that their awareness of the benefits of recycling and the circular economy increased (Figure 13).

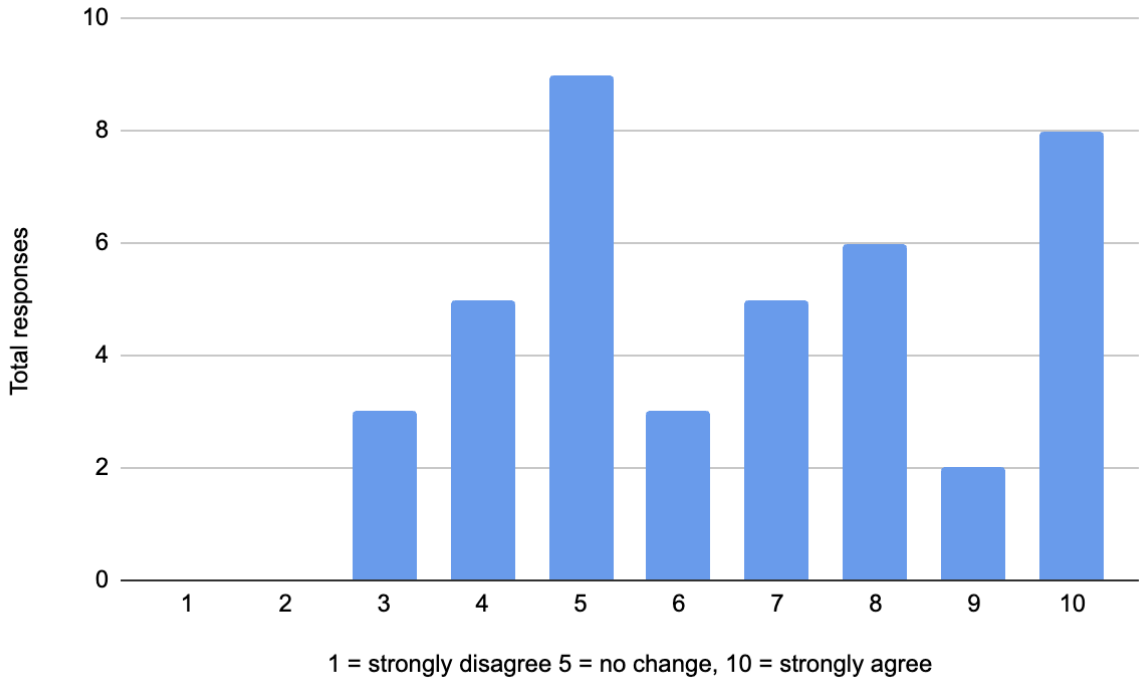


Figure 13: Survey responses to *Q: Do you feel like your awareness of the benefits of recycling and circular waste management has increased?*

A further 60% of respondents agreed that they were engaged throughout the program, with 13 respondents stating they had ‘no opinion’ (figure 14)

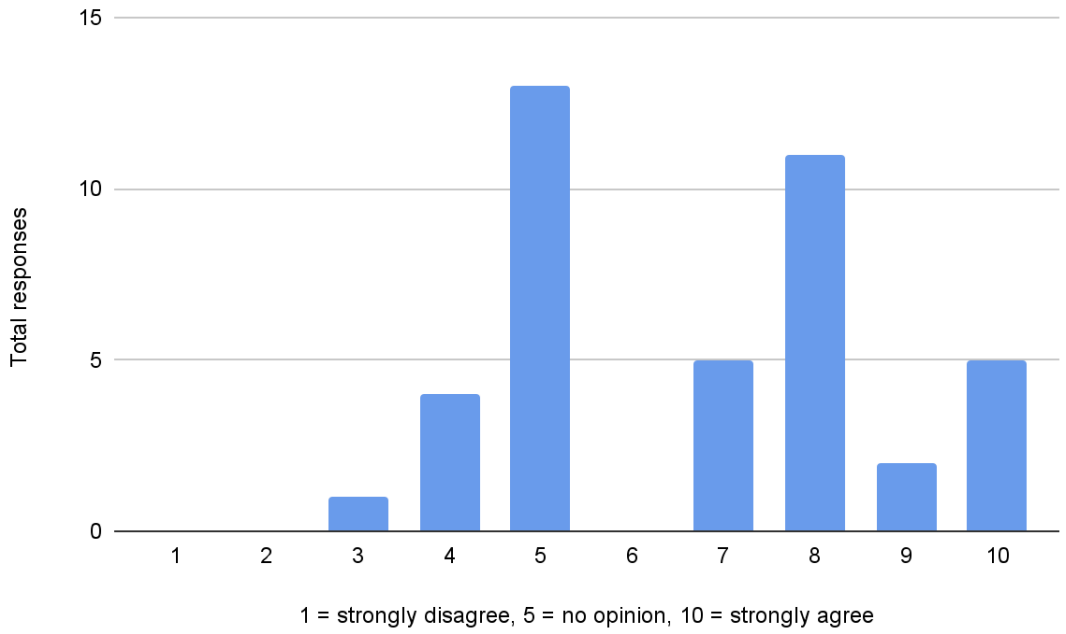


Figure 14: Survey responses to *Q: Do you feel like you were engaged throughout the program?*

63% of respondents agreed that their new waste and recycling model serviced them well, with 11 respondents citing there had been ‘no change’.

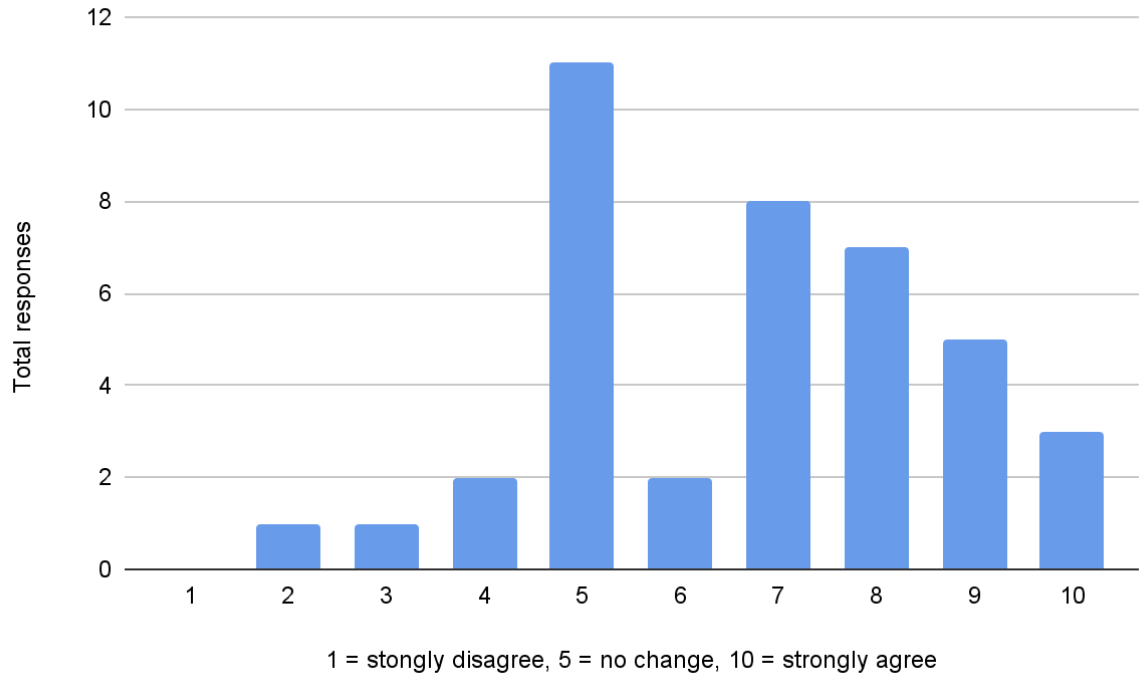


Figure 15: Survey responses to *Q: Does the new waste and recycling model service your business well?*

A total of 58% of respondents reported a positive change to their access to recycling, with 38% reporting no change.

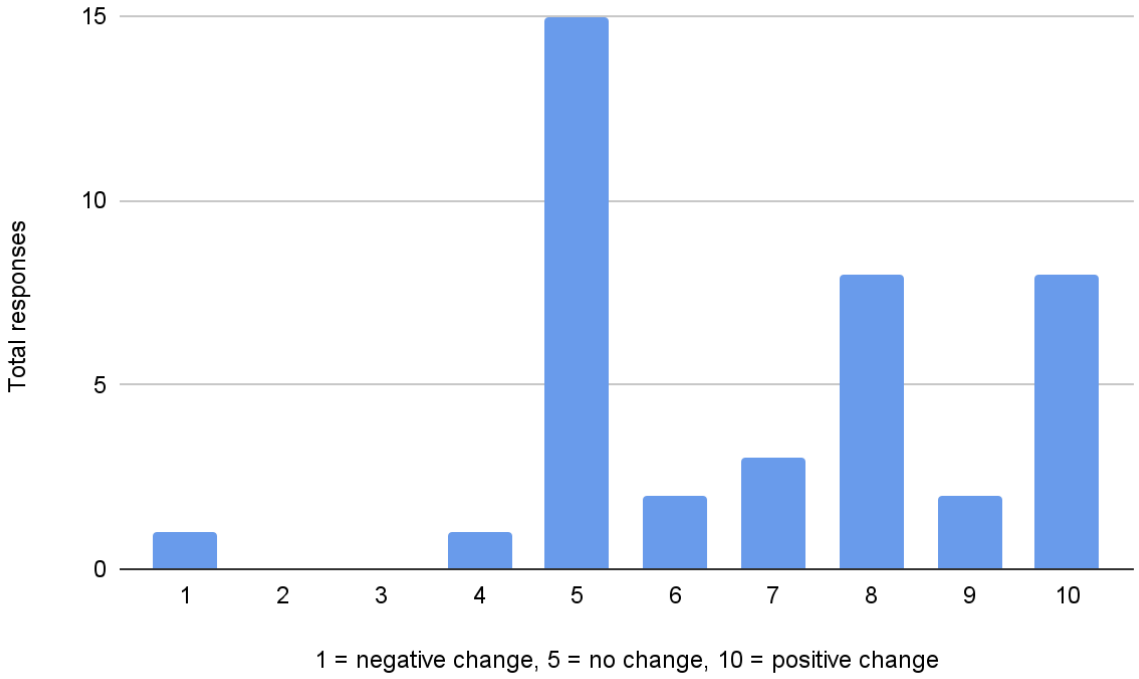


Figure 16: Survey responses to *Q: Please indicate how the following areas changed: Access to recycling*

63% of respondents reported a positive change to the aesthetics of their waste and recycling area, with 30% responding no change had occurred.

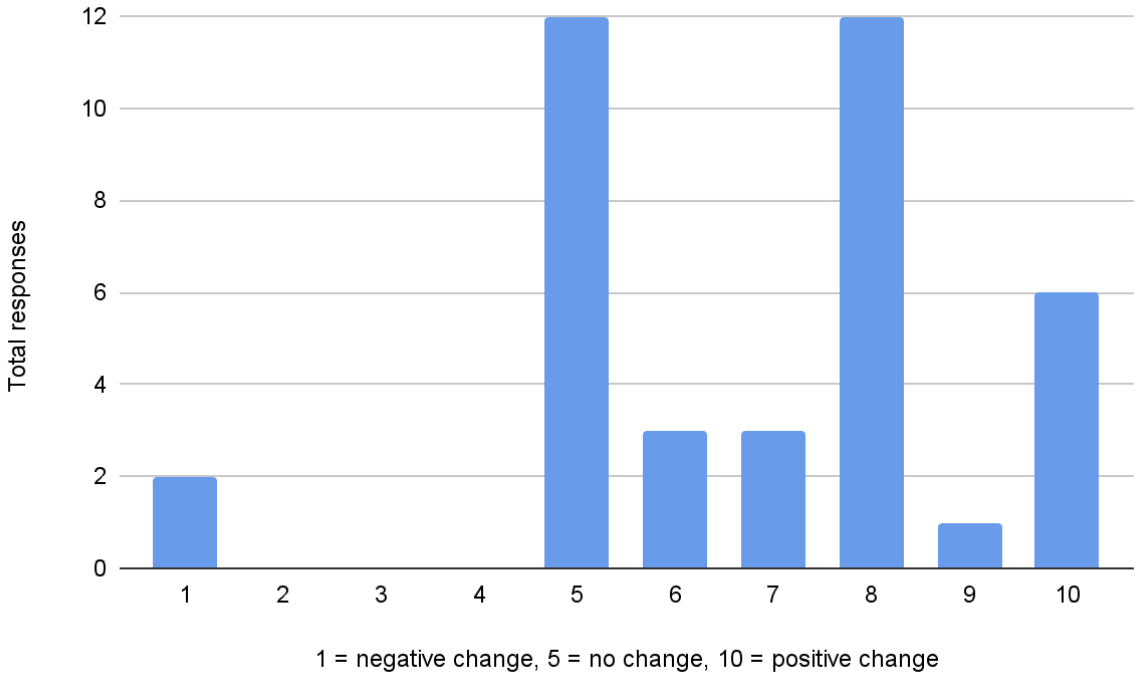


Figure 17: Survey responses to *Q: Please indicate how the following areas changed: Aesthetics*

68% of respondents agreed that the ease of use of their waste and recycling system had increased, with 25% responding that no change had occurred.

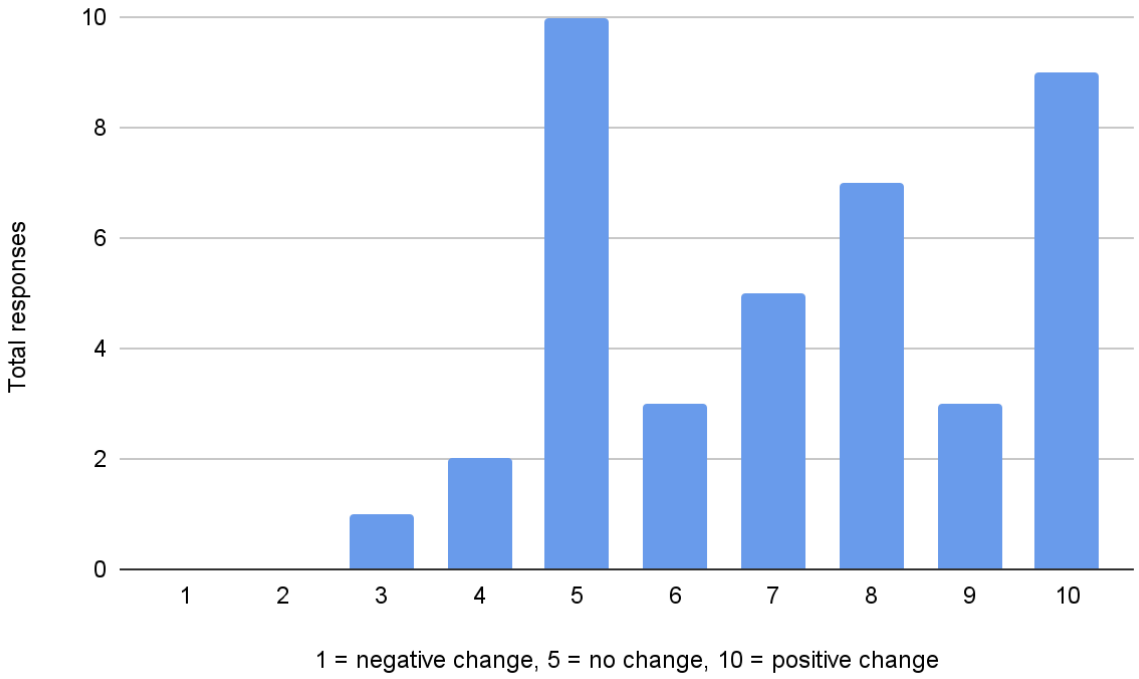


Figure 18: Survey responses to *Q: Please indicate how the following areas changed: Ease of use*

Only 13% responded that an increase in security had occurred, with the vast majority (83%) responding that no change had occurred to the security of their waste and recycling system.

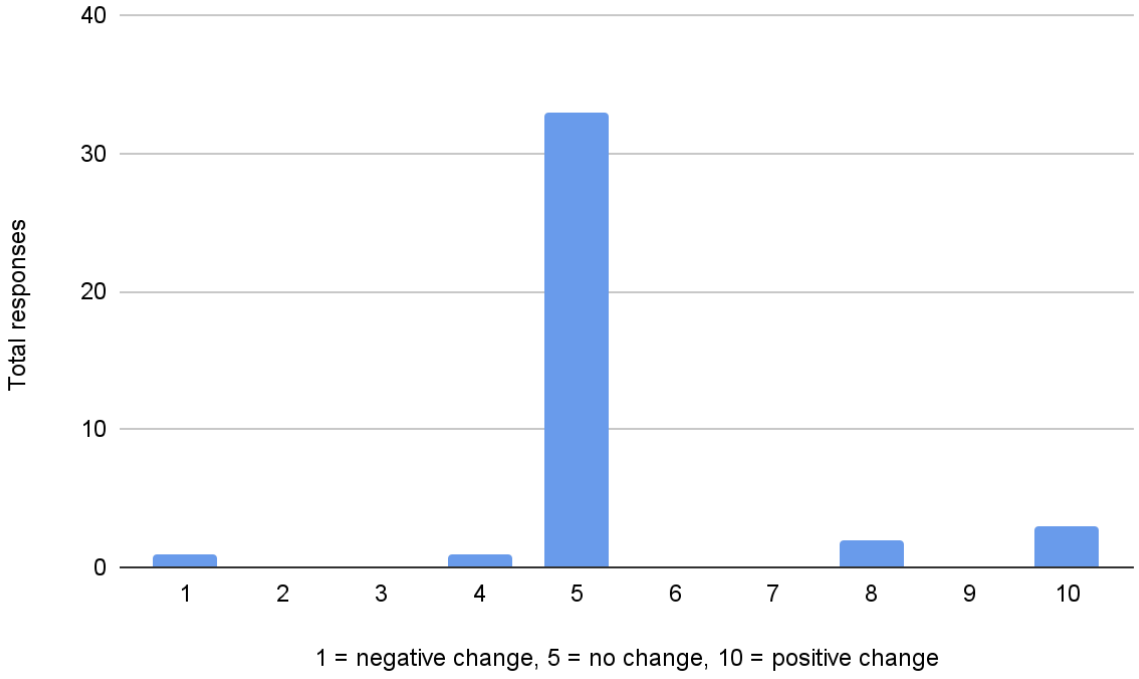


Figure 19: Survey responses to *Q: Please indicate how the following areas changed: Security*

Only 18% responded that they received an improvement to the cost of their waste and recycling service, with the remaining 82% responding with ‘no change’ having occurred to the cost of their service.

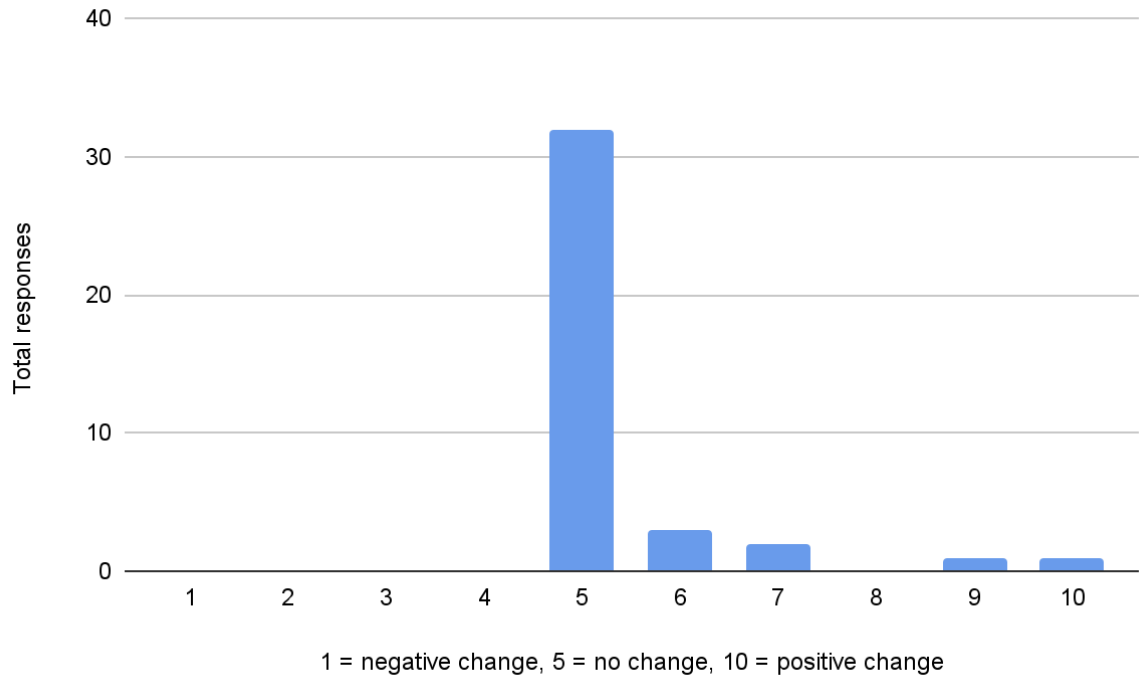


Figure 20: Survey responses to *Q: Please indicate how the following areas changed: Cost*

Table 5: Responses to *Q: Any additional observations or areas that could still be improved?*

Question	Response
Any additional observations or areas that could still be improved?	Communal collection point is needed
	If cost wasn’t an issue a soft plastics bin would have been good
	There was no way to reduce cost on the current set up, so no changes in that area, we did learn more about what bins to use. We still have to use council issued bins and pay for them. They continue to be stolen/and not used by us so it is a continued problem.
	Great, good example for the rest of Australia
	Bigger signage, specific signage for coffee cups and paper towels, to separate them where possible.
	If people could use the streams better. Has definitely cut down our general waste. Down to one bag.

Findings & Observations

Working with 125 businesses of varying typologies and management setups resulted in a range of key observations and learnings which have been outlined in detail below.

Sharing

Sharing arrangements were shown to provide businesses with increased access to recycling streams (Figure 6), increased resource recovery rates and decreased contamination levels (Table 3, Figure 6). Precinct wide sharing arrangements were able to be implemented at precincts that had an enclosure that was managed by a centralised management body (either a body corporate or Council). It is worth noting that councils current systems present barriers to facilitating payments for shared bins of commercial properties. Additionally, managing invoices and associated intricacies of a business precinct can present challenges if it is not embedded in the day-to-day service provided by council.

Resource recovery

Businesses with shared bins held in enclosures had the highest increase in resource recovery rates of 23.7% (Table 3). Enclosures provided the best platform to utilise sharing models as they provided the following benefits:

- Bins were stored away from public access, preventing contamination from public dumping.
- Infrastructure (e.g., mesh fencing or wooden panels) was available to install clear, colour-coordinated signage and floor markings for each stream to assist in ensuring bins were returned to the same setup.
- The central management body could initiate changes and updates to the collection service.

Enclosures overseen by a central managing body gained the following benefits:

- centralised billing point for shared bins
- executive decision making capability to introduce new recycling streams
- often serviced by one waste contractor allowing for streams to be adjusted easily
- cost savings are achieved through large scale diversified waste and recycling setups (e.g. use of 1100L and 660L bins).

Contamination

Contamination levels dropped within precincts with shared bins in an enclosure by 12.5% between the pre and post-intervention visual audits (Figure 6). Introduction of additional recycling streams can reduce contamination levels as with more specific streams it can be easier from a behavioural perspective to know what can and cannot go into each bin. In addition to new recycling streams the installation of clear, colour coordinated signage and floor markings as well as specific education for each stream present in the enclosure, is likely to have contributed to lowering the contamination rate for these precincts.

As a result of enclosures operated by central managing bodies, Reground were able to successfully introduce multiple new recycling streams and accompanying education in two Council's precincts; Merri-bek and Mornington Peninsula.

Example 1: Merri-bek

Foley's Mall in Merri-bek City Council was serviced by a single 3000L general waste skip emptied three times a week. Through a visual audit of the general waste skip, the internal bins of each business within the shopping centre and interview with each business owner, we calculated the required volume of waste and recyclable streams to be:

- *2x 1100L cardboard recycling (collected twice weekly),*
- *1x 1100L mixed recycling (collected weekly),*
- *3x 120L food organics (FOGO) (collected weekly),*
- *1x 240L soft plastic (collected fortnightly), and*
- *2x 1100L general waste (collected weekly).*

The new waste and recycling set up ***saved Foley's Mall between $500-$800 a month*** *in collection costs (pre installation: $1700-2000 /month for general waste, post installation: $1154 /month for all streams). This new service provides the capacity to divert up to 23,920L of recyclable material from landfill a month.*

Example 2: Mornington Peninsula

Ritchies Village Shopping Centre in Mount Eliza was serviced by a single general waste compactor which had 2.6-2.9 tonnes of general waste sent to landfill weekly. This combined cost of the collection and rental for this compactor was between $2140-2840 per month, and the contract was renewed monthly.

Through visual audits of the shopping centres internal bins, interviews with business owners and calculations based on the collection frequency of the compactor, the following streams were introduced to replace the compactor:

- *1x soft plastics baler (100kg bales collected fortnightly)*
- *1x cardboard baler (100kg bales collected fortnightly)*
- *2x1100L mixed recycling bins collected 1 time/week*
- *6x120L FOGO bins (collected 3 x week)*
- *4x 1100L general waste (collected 3 x week)*

This new service provides the capacity to divert up to 8640L of organic waste, 4400L of mixed recycling and up to 400 kg of cardboard and soft plastics from landfill monthly. This service currently costs $3348 per month, however this is due to the centre requesting an initial surplus of general waste volume, when this is brought down to the recommended volume of general waste their collection cost will drop to an estimated $2772 per month.

Individual

Resource recovery rate

A decrease in resource recovery rate was observed in businesses that utilised individual bins, both within an enclosure (reduction of 27.5%) and those not within an enclosure (reduction of 7.2%,Table 3). The decrease observed for businesses not utilising an enclosure could be a result of a number of variables such as: bins being publicly accessible making them susceptible to contamination, seasonal change in waste output, staff changeover, etc.

The decrease in resource recovery rate for businesses with individual bins within enclosures could be due to Maroondah constructing an enclosure for their precinct, which housed business' individual bins. This increased the sample size from two businesses at the time of the first visual audit, to eleven businesses by the second audit. Increasing the participating businesses likely contributed to the reduction in the overall resource recovery rate due to the addition of differing business typologies that have varying resource recovery rates, as seen in Figure 11.

Contamination

Contamination rates remained consistent between the two audits for businesses utilising individual bins, from 9.0% in the pre-intervention audit to 9.3% in the post-intervention audit (Figure 6). Although education was provided and signage offered to each business, uptake was not consistent. Some business owners refused signage as there was no change to the streams present at their business. In some cases we were unable to provide education to every staff member of a business, and so could not guarantee the information was properly disseminated to all staff.

The lack of improvement in contamination rates could be as a result of the minimal infrastructural changes implemented for businesses utilising individual bins. Despite being provided educational materials and signage, it is likely that the lack of change to their physical system (I.e., many businesses with individual bins did not gain access to new streams) resulted in the lack of any behavioural shift and therefore no improvement in contamination rates.

Typologies

Resource recovery and contamination

Resource recovery rates varied across business typologies as seen in Figure 11. Two main factors influenced the variation. The first is that business typology dictated the profile of waste produced by that business. As Table 5 highlights, the key missed recyclables of a hair and beauty salon are different to a hospitality venue. This difference dictates what type and percentage of material can be successfully recycled from a business, influencing their resource recovery rate.

Secondly, business typology dictated what type of service (council or private) is available to that business. For example, a grocery store can rarely utilise a council collection service due to their volume of waste and recycling. Hence, grocery stores were often limited to a private collection and were frequently serviced by a general waste and cardboard and paper stream only (Figure 9), leading to a higher percentage of missed recyclables and lower resource recovery rate.

Contamination levels were highest for typologies that were predominantly council serviced (hair and beauty and service businesses). This could be resulting from lack of awareness of specific waste items that are unique to a business's typology.

Missed recyclables

Cardboard and soft plastic were consistently the most common missed recyclables across all business typologies (Table 5). Council serviced businesses lack a dedicated cardboard stream, resulting in their mixed recycling quickly filling with cardboard boxes, with the overflow ending up in general waste. Some councils have implemented cardboard collection points for their precinct. In other precincts, members of the community offered an unofficial cardboard collection service to address the surplus of cardboard waste being produced. The high levels of utilisation of both of these services indicates the need for

infrastructure to be installed to collect commercial quantities of cardboard, to prevent it from being sent to landfill. Soft plastic is a recyclable material that many businesses produce in high volumes. However, businesses likely do not have access to a soft plastic recycling stream due to additional collection costs or lack of awareness, as it is currently not a common recycling stream for all contractors to offer.

Survey results

The responses from the 40 businesses who filled out the survey which was circulated after the final visual audit highlighted a positive program impact overall. There was an overall increase in respondents' awareness of the benefits of recycling and circular waste management practices (Figure 13). Positive feedback was received from precincts where changes were made to their waste and recycling service, and infrastructure (Figure 15). Overall, there was a positive response to having greater access to recycling (Figure 16) aesthetic improvement (Figure 17), and the ease of use of waste and recycling setups (Figure 18).

Many respondents did not have a strong response to the implemented changes at their precinct, answering either 'no change' or 'no opinion' for multiple questions. The responses reflected the necessity for a combination of infrastructure, education, signage and markings to create a positive perception to respondents waste and recycling set up.

Key Learnings

Waste contractors

Waste contractors were a focal point of change making during the implementation phase of this project. Their lack of transparency and/or cooperation and their resistance to change were large contributors in preventing sharing models from being implemented. Although they facilitated shared bin arrangements when they could send one invoice to one host, they are reluctant to split bills to facilitate shared bins between individual traders. Traders often reported issues contacting their waste contractor, negotiating changes with their current service, or with existing contracts they were not satisfied with.

Waste contractors seemed to have significant sway in decision making by traders, despite Reground's expertise and personalised recommendations. Traders were often hesitant to change their waste and recycling systems to prevent damaging their relationship with their waste contractor. In some cases when the traders did request a change, waste contractors proactively resisted these requests.

Example 2: Springvale

An agreement had been reached with three traders to implement a hosting model. Two additional shared recycling streams would be introduced that were hosted on one business' property. As many business owners did not have English as their first language, we provided each business with an example email of how to request the change from their waste contractor. Upon receiving this request, the waste contractor sent an in person representative to each business to offer a discounted rate on their general waste, and encouraged them their current setup was the best for their businesses needs. This resulted in general waste remaining as the only stream for all three businesses. The perceived risk, instilled by the waste contractor, of changing their recycling system, combined with the newly discounted rate on their current collection service, prevented a hosting model from being introduced.

Contractual obligations

Businesses were often locked into multi-year contracts with waste contractors with clauses preventing them from exiting their contract early without incurring a fee. This was a large barrier to sharing arrangements from being introduced as there were often multiple waste contractors operating within one precinct. To introduce a shared bin system it would be necessary for some businesses to change waste contractors. This was a main incentive for pursuing micro-sharing arrangements as it allowed all businesses to stay with their current waste contractor, whilst gaining access to an additional shared stream.

Service type

Whether a business is serviced by a council or private collection service ultimately dictated the bins that they are able to access, as well as whether a sharing system is viable. Currently there is a lack of a viable system for businesses to share council bins. The greatest benefit of sharing would be for businesses that produce low volumes of waste, as it would reduce the total number of bins on site, number of collections and could free up external space, which businesses often lack.

Costs

Introducing multiple recycle streams was found to rarely be a financially viable option for individual businesses. Cost effective recycling streams are available, such as cardboard and paper, which is usually the cheapest stream offered by private waste contractors for collection. If a business is privately serviced, introducing a cardboard and paper stream can have the price offset by reducing the collection frequency of the general waste stream, creating a low cost to potentially cost neutral solution.

Introducing multiple recycling streams, however, is yet to be cost effective for an individual business. The collection cost associated with many recycling streams prevents them from being cost effective, such as soft plastics or FOGO which can cost up to $30 per collection for a 120L bin.

Although incentives exist to divert from landfill, such as the annual increase in landfill levies, it was a challenge to offer cost neutral recycling setups for individual businesses. In some precincts existing relations with waste contractors that provided a ‘good deal’ for their general waste collection prevented businesses from diversifying their waste and recycling set up.

Inefficient waste collection costs were experienced less when businesses shared bins. It was found that diversifying a shared waste set up could often be cost effective, if not reduce overall collection costs. This stemmed from high fees associated with collecting large volumes of general waste, or renting a general waste compactor to service multiple businesses. In these situations, reducing the volume and collection frequency of general waste and introducing multiple recycling streams such as cardboard and paper, mixed recycling, FOGO and soft plastics, was found to be a cost effective solution (see Example 1: Merri-bek).

Payment methods

Although shared waste and recycling setups were often found to be cheaper or cost neutral, there was a lack of existing online infrastructure to facilitate payment methods between individual businesses. Waste contractors, traders associations and most councils were not interested in splitting collection bills and passing on consolidated invoices to traders. Some council’s cited their reason for not facilitating payments for shared bins being that their internal systems are tailored toward individual rate payers. For precincts that lacked a central managing body, arranging payments between individual

businesses came with multiple associated risks. The options were either for one business to arrange and pay for the contract for all of the shared bins, with the remaining businesses to set up a regular direct debit. Or, for each business to arrange and pay for an individual stream, which may result in differing costs overall. Both came with inherent risks for involved businesses, such as businesses not paying on time for their stream, leading to one business being out of pocket, or bins not being collected regularly enough.

Managing bodies in the form of a body corporate or council, provided a centralised billing point which solved this issue. This facilitated large scale changes to the waste and recycling setup of precincts that had a managing body, facilitating the payment for shared bins and leading to better recycling outcomes.

It is worth noting that the two businesses that shared bins outside of an enclosure were owned by the same individual, negating the barriers which prevented sharing arrangements from being implemented with individual businesses.

Spatial restrictions

Lack of space was a common barrier to introducing additional recycling streams, therefore preventing sharing models from being implemented in multiple precincts. Traders frequently reported a lack of space, both internal and external, as one of the main barriers to introducing recycling streams. External space for bins was often limited due to bins not being permitted on footpaths or in public areas, or restrictions where outdoor space was shared with residents. External bins were generally an amenity issue for traders and residents.

When additional space was introduced, in the form of an enclosure, additional recycling streams were able to be introduced (Figure 6). Lack of space was the driving factor for pivoting to micro-sharing arrangements, which had the goal of one business hosting one stream (e.g. general waste) and a neighbouring business hosting another (e.g., cardboard and paper) allowing the total number of bins, and spatial requirements on site to remain the same.

Trader attitude

Trader's enthusiasm or belief in the recycling system as a whole impacted the success of sharing models and whether additional recycling streams were introduced. A disenfranchised attitude towards private waste contractors was common, with multiple traders seeing first-hand recycling bins being collected by the general waste truck.

Common misconceptions about recycling were seen across all precincts and typologies. For example, very few businesses were aware that tetra pack cartons can only be recycled in dedicated recycling centres. When informed of this and provided with clear signage outlining that tetra paks cannot be recycled, businesses were enthusiastic to correct their behaviour.

Some traders were hesitant to adopt a shared recycling model due to the interpreted risk of sharing streams. A common concern was of shared bins being contaminated, leading to a fine/repercussion being issued from their waste contractor, unfairly costing a business more money. Another concern was that of waste output changing seasonally and managing this change of volume and therefore price into shared bins would be difficult.

Rental agreement and franchises

Many businesses do not own the property they operate from and require their landlord or estate agent to facilitate changes to their council collection service. This impacted proposed sharing arrangements where a business was required to remove their council collection service in order to transition to a shared private collection service that would have offered additional recycling streams. Unresponsive or disengaged landlords prevented business owners from being able to make changes to their collection service even when traders themselves were enthusiastic to do so.

Franchisees often lack the authority to change their waste management set up, they are reliant on a head office receiving their request and acting upon it. Extensive efforts were made to engage with the head office of franchises participating in this project. However, most were unresponsive, with no head office approving changes to the waste and recycling set up of any franchise.

Council impact

Many precincts were initially recommended to build an enclosure in order to house bins for traders. Several councils investigated this option, however, only one council built and implemented the model change from individual to enclosure. Council personnel noted planning regulations and traffic control as the biggest inhibitors of building enclosures for their precincts.

Recommendations

Waste contractor legislation

Throughout the project, when servicing commercial properties waste contractors were observed to price businesses differently for similar collections services in similar areas. In order to create consistency and transparency in the waste and recycling service industry, legislative pressure must be put on waste contractors by government at all levels. Additionally, users of their service have a right to know where their waste and recycling end destinations are for each stream. Legislation needs to be introduced targeting waste contractor transparency and pricing to prevent traders from being taken advantage of, especially where language barriers exist. Council's should exert legislative pressure to ensure waste contractors are providing a service that aligns with state government and federal recycling targets. The Circular Economy (Waste Reduction and Recycling) Act 2021 lays the framework for businesses to be separating recyclable and organic material from general waste by 2025.
Legislation should enable businesses to make this transition by addressing current barriers imposed by waste contractors such as their lack of transparency and inconsistent pricing.
This should be accompanied by targeted education on affordable methods of introducing a recycling stream and how to save costs by reducing the volume of general waste output.

Supporting and managing enclosures

Councils have the opportunity to utilise portions of public land, for example two car spaces, to create private enclosures for several traders to host their own, or provide shared waste and recycling setups. As the data shows in Figure 6, enclosures significantly increased the opportunities for recycling by traders. If councils can gain approval for land utilisation from planning and traffic departments, and build enclosures within 100m of several (5-15 businesses), the opportunities for increased recycling and implementing the recommendations below will become significantly easier to manage. Enclosures

would also allow councils to have an increased ability to manage changes for new state and federal waste and recycling targets in future.

Communal collection points

Businesses were consistently found to lack space, private or communal, to house multiple streams. This severely limited what streams could be introduced and prevented businesses from having adequate access to affordable recycling streams such as cardboard and paper. The introduction of a council supported collection point for streams such as cardboard, soft plastic or coffee grinds would greatly benefit businesses and significantly reduce the volume of recyclable material currently being sent to landfill.

Collection points require minimal infrastructure to be installed to be functional, for example a dedicated cage with a combination lock can function as a cardboard collection point. Clear, colour coordinated signage should be installed outlining correct usage of the collection point. Traders must be engaged in the process when collection points are installed, informed on the role they play in keeping it tidy, maintained and utilised correctly (e.g. flattening cardboard boxes).

Shared council service incentives

There is currently a lack of incentive and infrastructure for businesses to share bins, both private and council. For businesses that use their council kerbside service, a financial incentive should exist for sharing. This could be a discounted annual collection rate for businesses that reduce the total number of bins across their site through sharing agreements with their neighbours. This would benefit councils by increasing collection efficiency, as well as addressing amenity issues by reducing the number of bins on the kerb in their precinct.

Typology Support

Business typology can indicate what recycling streams a business should have, as well as which streams would have the highest impact if they were introduced. Tailored support should be offered to differing business typologies in the form of education of what their common contaminants are, and what their common missed recyclables might be. Recommendations should be made as to what streams can be reduced, to balance cost and volume in an effective manner. Refer to our 'Best Practice Guides' deliverable of this project on Typology, for a detailed breakdown of contaminants and missed recyclables for each business typology.

Educational videos

To ensure correct stream usage, council can create business typology focussed 30-90 second videos for each of their kerbside streams to communicate correct stream usage, key contaminants, and opportunities for recycling. These should address typology specific issues such as tetra pack cartons not being recyclable for hospitality venues. Promoting business to integrate this into staff inductions and to hold education sessions for existing staff, will help encourage correct stream usage for both council and privately serviced businesses.

Signage and internal bins

Wherever new recycling streams were introduced in this project, accompanying signage and internal bins were required for each business to support the new stream. Businesses required education on how

to use the new stream, why using it was important, with signage added internally and externally to ensure communication across staff, mitigating contamination. Colour coordination between internal and external bins is key to habit formation and the ongoing correct use of recycling streams.

Conclusion

The outcome of this project highlights current barriers and opportunities to implement best practice waste management in the commercial space. Key barriers include waste contractor transparency and cooperation, a lack of infrastructure to house shared bins, and a lack of an existing system for individual businesses to pay for shared bins without requiring a managing body and there being no current system for businesses to share council kerbside bins without a financial barrier.

Businesses are enthusiastic to recycle their waste but due to the above barriers they currently cannot have access to multiple recycling streams without bearing a financial cost. Recommendations to help address these include legislation targeting waste contract transparency and reporting, the introduction of enclosures or collection points for key missed recyclables such as cardboard and soft plastic and enabling businesses to share council kerbside bins.

Where enclosures were present or installed, sharing models were able to be implemented and there was a significant increase in businesses' access to recycling streams and in resource recovery rates. Enclosures provided a dedicated waste and recycling area to facilitate shared bins and the implementation of colour coordinated stream signage and floor markings.

The project worked directly with business owners, staff, waste contractors, residents, and head offices of franchise to engage them about their waste and recycling systems and to provide solutions to commercial waste management.

This project outlined the importance of in person engagement when implementing changes to existing waste and recycling systems and infrastructure. Utilisation of recycling streams increased when in person education was provided on correct stream usage and explanations were provided on the importance of correct recycling practices.

The Circular Resource Practices in Business Precincts project, was supported by Sustainability Victoria on behalf of the Victorian State Government. The project involved 14 Councils and 125 businesses to implement cost effective, scalable solutions to improve commercial waste and recycling issues.

Appendix

I. Material classification in each stream.

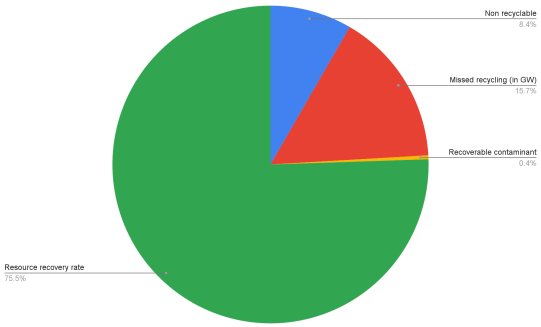
Material	Mixed recycling	FOGO	Paper & Cardboard	Glass	Soft Plastic	E-waste	Textiles
Paper	Recycling	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant
Cardboard	Recycling	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant
Aluminium & steel packaging	Recycling	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant
CDS aluminium	Recycling	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant
Rigid plastic	Recycling	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant
CDS plastic	Recycling	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant
Glass	Recycling	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant
CDS glass	Recycling	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant
Liquid paperboard	General waste	General waste	General waste	General waste	General waste	General waste	General waste
Soft plastic	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recycling	Recoverable contaminant	Recoverable contaminant
Coffee cups	General waste	General waste	General waste	General waste	General waste	General waste	General waste
E-waste & batteries	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recycling	Recoverable contaminant
Food waste	Recoverable contaminant	Recycling	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant
Garden waste	Recoverable contaminant	Recycling	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant
Contaminated recyclables	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant
Bagged recycling	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant
Polystyrene	General waste	General waste	General waste	General waste	General waste	General waste	General waste
Nappies & sanitary items	General waste	General waste	General waste	General waste	General waste	General waste	General waste
Hygiene & Hazardous	General waste	General waste	General waste	General waste	General waste	General waste	General waste
Hard waste	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant
Clothing	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recycling
Other textiles	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recoverable contaminant	Recycling

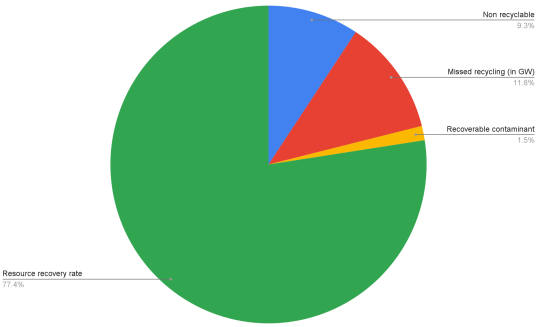
II. Each precinct profile overview

Graphs depict each precinct's current resource recovery rate across all streams (including general waste) versus what was successfully recycled, comparing the pre-intervention audit and post-intervention audit..

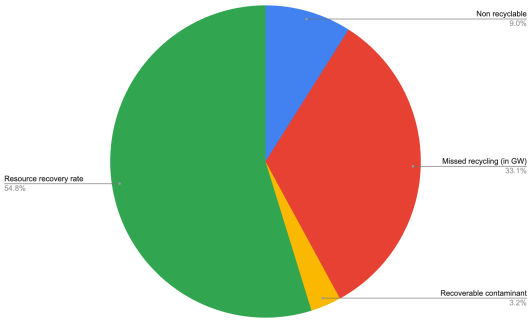
Graphs on the left show the pre-intervention audit, on the right depict the post-intervention audit..

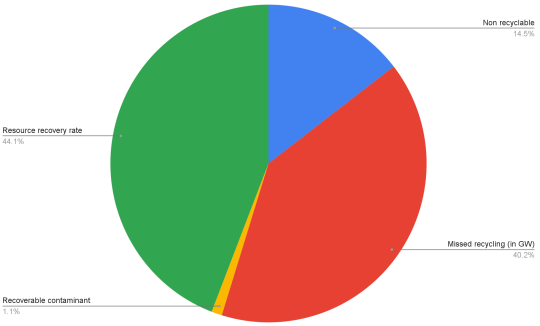
City of Ballarat



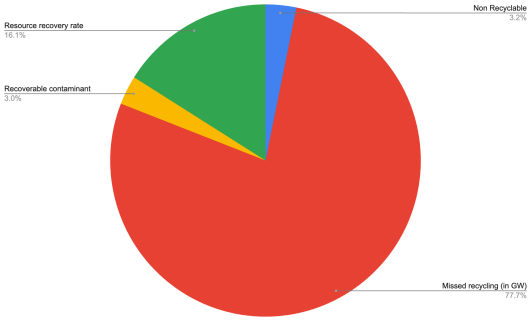


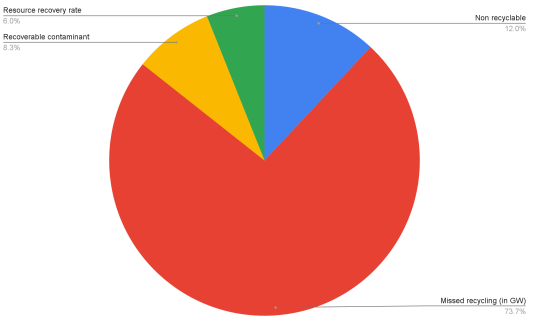
City of Boroondara



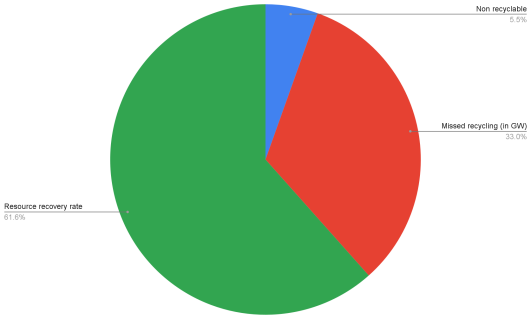


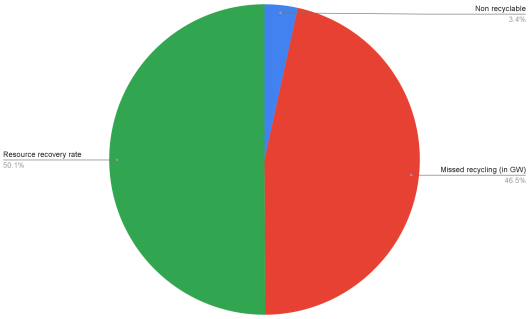
City of Greater Dandenong



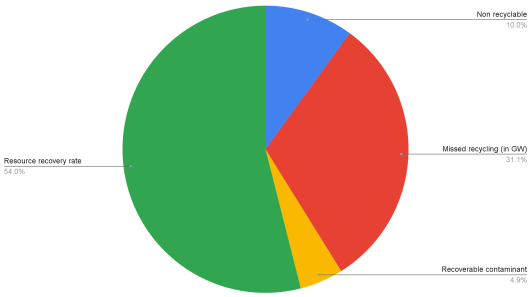


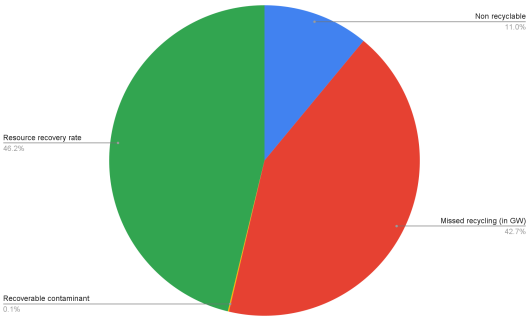
City of Greater Geelong





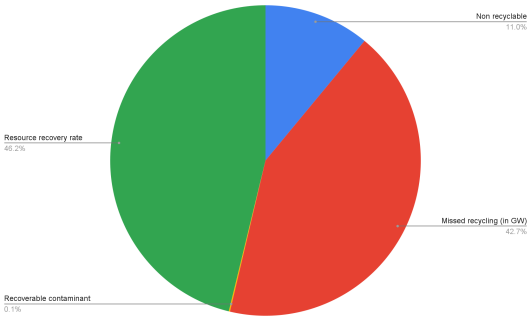
Glen Eira City Council

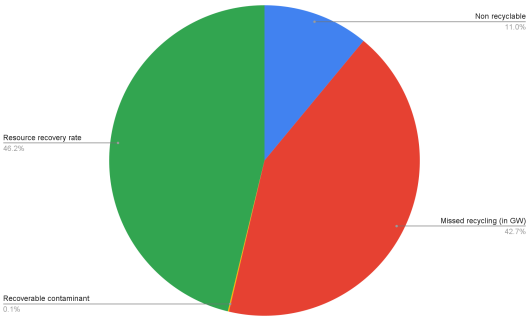




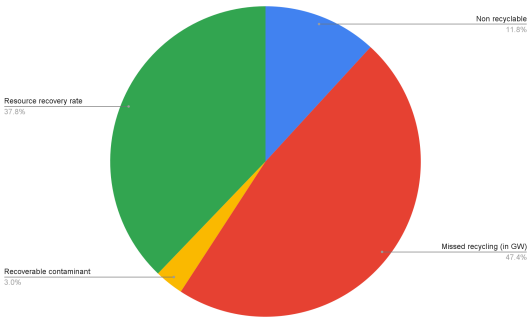
Pie chart and % of current resource recovery rate across all streams (including general waste) vs what was successfully recycled

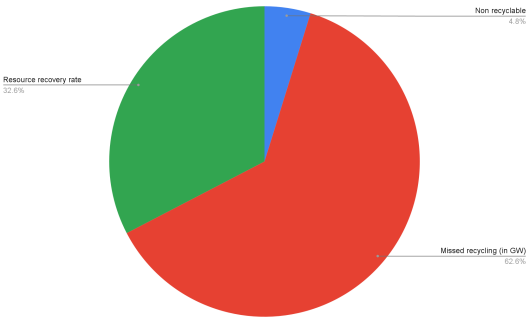
Hobsons Bay City Council



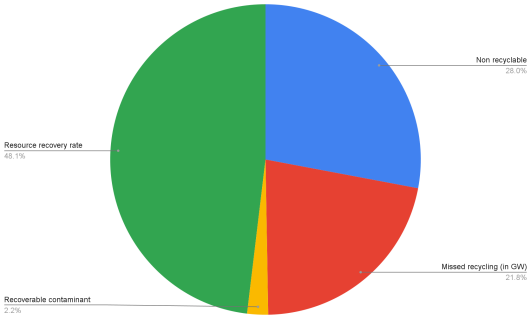


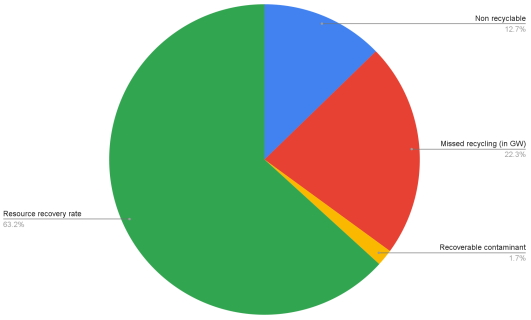
City of Kingston



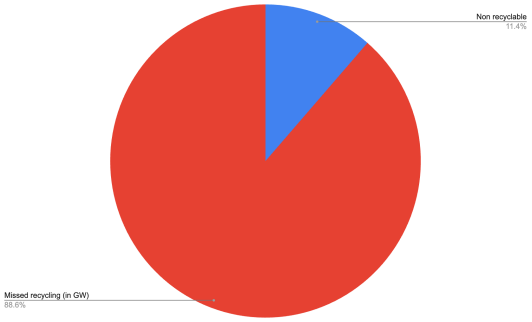


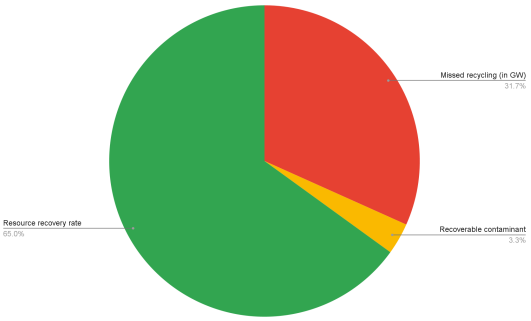
Maroondah City Council





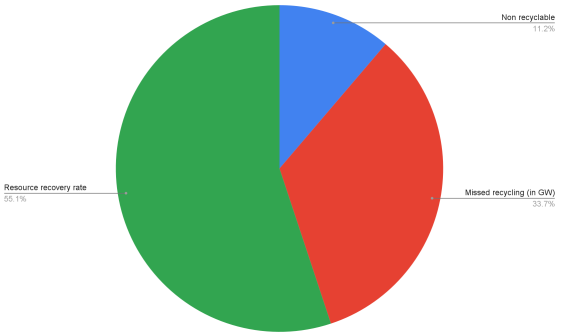
Merri-bek City Council





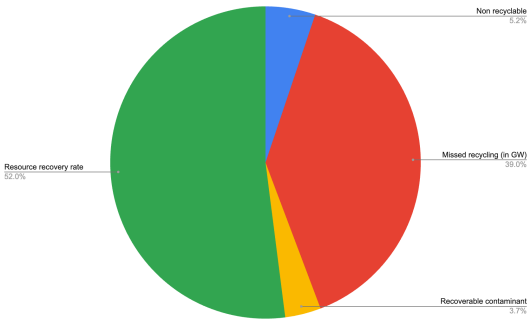
**This precinct started with a general waste compactor, therefore the Audit 1 data does not include any ‘successfully recovered materials’ or ‘recoverable contaminants’.

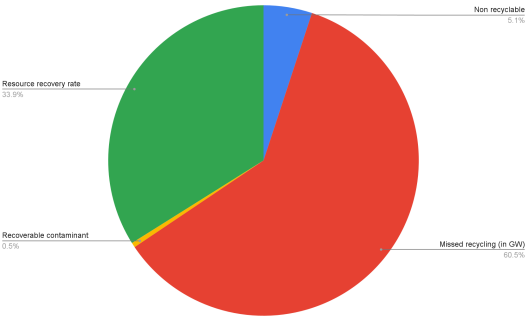
Mornington Peninsula Shire



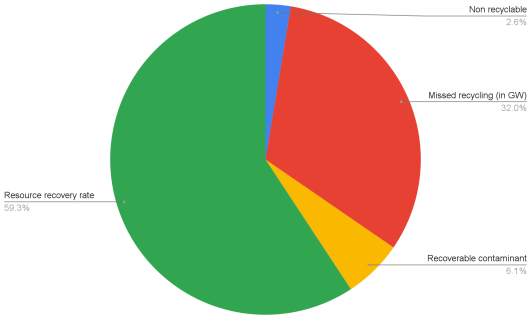
**There is no pre-intervention audit for Mornington Peninsula as this precinct began with a general waste compactor which prevented our team from conducting an initial visual audit.

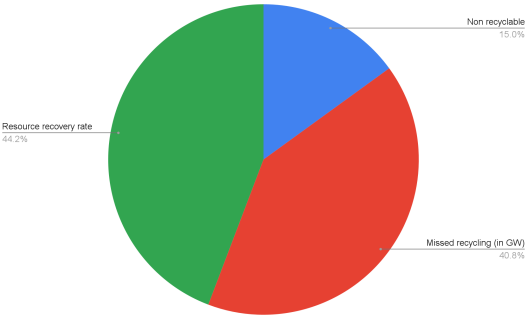
Nillumbik Shire



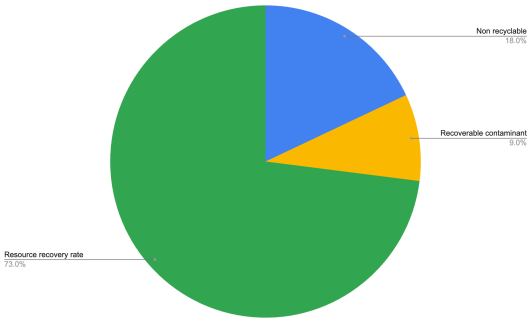


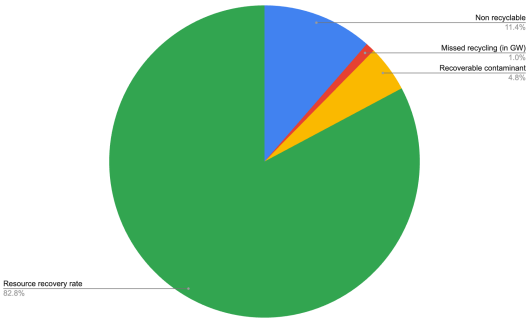
City of Stonnington





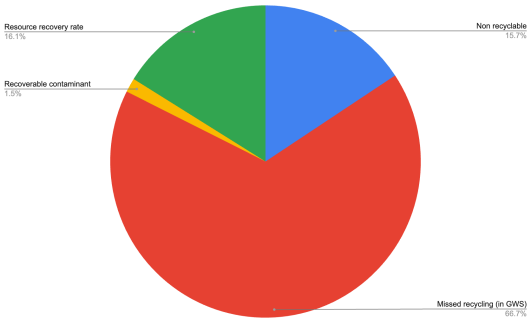
City of Whittlesea

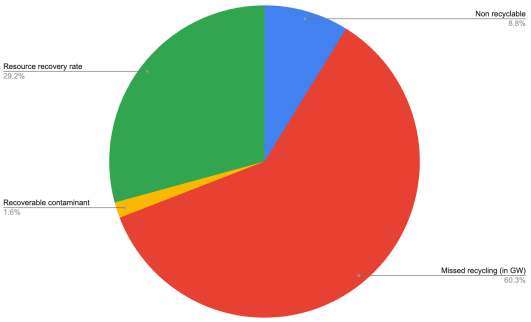




**This data represents the mixed recycling stream as this precinct had a general waste compactor, cardboard compactor, and FOGO dehydrator, preventing us from auditing these streams. During post-intervention, a small amount of general waste and cardboard/paper from internal bins were kept aside to audit; however the majority of this data portrays materials in the mixed recycling stream.

City of Yarra





Contamination pre and post intervention

Council	Pre-intervention contamination rates	Post-intervention contamination rates	Key contaminants
City of Ballarat	3.8%	8.1%	Napkins, vinyl gloves, soft plastics
City of Boroondara	5.6%	5.2%	Liquid paperboard, coffee cups, soft plastic
City of Greater Dandenong	42.5	60%	Soft plastic, food contaminated recyclables, hard waste
City of Greater Geelong	7.8%	3.5%	Soft plastic, liquid paperboard, coffee cups
Glen Eira City Council	11.7%	1.09%	Soft plastics, coffee cups, food waste
Hobsons Bay City Council	4.1%	3.9%	Food waste, coffee cups, soft plastic
City of Kingston	10%	2.3%	Soft plastic, coffee cups, liquid paperboard
Maroondah City Council	24.5%	14.3%	Liquid paperboard, soft plastic, napkins
Merri-bek City Council	N/A*	4.8%	Food waste, food contaminated recyclables, soft plastic
Mornington Peninsula Shire	N/A*	4.3%	BPA receipts, coffee cups
Nillumbik Shire	7.8%	28.1%	Liquid paperboard, soft plastic, coffee cups
City of Stonnington	9.7%	8.2%	Liquid paperboard, soft plastic, napkins
City of Whittlesea	27%	14.9%	Liquid paperboard, hard waste, hygiene and hazardous
City of Yarra	13.4%	5.7%	Soft plastic, napkins, hard waste

*Two precincts; Merri-bek and Mornington Peninsula, had only a general waste stream pre-intervention, preventing a contamination rate from being calculated.

Key dates for each precinct

Council	Initial visual audit	Installation	Final visual audit
City of Ballarat	18.10.2023	07.02.2024	27.02.2024
City of Boroondara	05.07.2023	27.11.2023	14.02.2024
City of Greater Dandenong	17.08.2023	25.01.2024	27.02.2024
City of Greater Geelong	22.06.2023	15.01.2024	20.02.2024
Glen Eira City Council	14.06.2023	26.09.2023	06.02.2024
Hobsons Bay City Council	01.08.2023	30.01.2024	20.02.2024
City of Kingston	28.06.2023	16.11.2023	06.02.2024
Maroondah City Council	11.07.2023	01.02.2024	21.02.2024
Merri-bek City Council	17.08.2023	15.11.2023	19.12.2023
Mornington Peninsula Shire	19.07.2023	25.01.2024	15.02.2024
Nillumbik Shire	13.07.2023	23.11.2023	20.12.2023
City of Stonnington	15.06.2023	29.11.2023	13.02.2024
City of Whittlesea	03.08.2023	07.02.2024	26.02.2024
City of Yarra	21.06.2023	19.12.2024	14.02.2024

Reground is a certified social enterprise with Social Traders helping organisations and individuals create a circular economy through waste collection and waste minimisation projects. We collect ground coffee and chaff from businesses and divert it back to the local community for use in a host of circular initiatives. We divert soft plastics from a lifetime in landfill and turn them back into a resource. We provide strategies and solutions in reducing waste for businesses, councils, and commercial sites – downsizing the excess and upsizing the benefits to the environment and the balance sheet.