

13.13**Waste Reforms - July 2022 Update****Directorate**

Infrastructure and City Services

Director

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Attachment(s)

1. Consultation Report [**13.13.1** - 55 pages]
2. Kerbside Waste Audit Report [**13.13.2** - 39 pages]
3. Financial Analysis Report [**13.13.3** - 33 pages]

Purpose

For decision

For noting

For Council to receive a report on the Waste Reforms, in particular the outcome of community consultation on the draft 4-Bin preferred residential kerbside waste and recycling collection model, results of a Waste Audit of Council's existing residential kerbside waste and recycling collection services, outcomes of the financial analysis on the 4-Bin residential kerbside waste and recycling collection model and analysis of the current issues in the consideration of the implementation of a 4-Bin residential kerbside waste and recycling collection service.

Legislation/Council Plan/Policy Context

This report supports the Council Plan 2021-2025 strategic direction and objective of:

2. Places and Spaces - Liveable and connected neighbourhoods that support healthy and sustainable futures - A green place for all

- Sustainable and Green - Protect natural environments for current and future generations

3. Opportunity and Prosperity - A future focused, transforming city where all have opportunities to learn and earn - A prosperous place for all

- Growing and Transforming - Optimise community opportunities through infrastructure innovation and investment

4. Leadership and Governance - A high performing organisation that enacts the vision and decisions of Council through the delivery of quality and innovative services - A fairer place for all

- Engaged and Responsive - Community insights are valued to enhance connection and engagement with Council
- High Performing and Accountable - Our workforce strive to enhance services and liveability for the Brimbank community.

This report complies with Council's Waste, Recycling and Litter Strategy 2018-2028, Federal Government's National Waste Policy, State Government's Recycling Victoria – A New Economy (Circular Economy Policy), Brimbank Climate Emergency Plan 2020-2025 and the *Local Government Act 2020 (the Act)*.

Council officers contributing to the preparation and approval of this report, have no conflicts of interests to declare.

Issue For Consideration

For Council to consider:

1. Noting the following:

- Outcomes of community consultation on the 4-Bin preferred residential kerbside waste and recycling collection service model, at **Attachment 1** to this report;
 - Findings of a Waste Audit on the residential kerbside, waste and recycling collection service, at **Attachment 2** to this report;
 - Outcomes of the Financial Analysis Report on the 4-Bin preferred residential kerbside waste and recycling collection service model; at **Attachment 3** to this report;
 - Current identified risks with the implementation of the State Government waste reforms, Circular Economy Policy entitled, 'Recycling Victoria – A new economy'; and
 - The introduction of food organics and garden organics (FOGO) into the existing optional, user pays, residential kerbside green waste collection service commenced on 1 July 2022.
2. Implementing a staged 4-Bin waste and recycling collection service model, consisting of the following:
- Continue weekly garbage collection at this stage;
 - Continue fortnightly recycling collection;
 - Continue fortnightly FOGO collection at this stage;
 - Delay introduction of new separate glass collection service until the impacts of the State Government's Container Deposit Scheme are better known; and
 - Consider options for Alternative Waste Processing as an alternative to landfill.
3. Receives a further report in relation to the option to introduce a 'Universal' food organics and garden organics (FOGO) residential kerbside collection service, no earlier than 1 July 2023 taking into consideration financial impact, environmental benefits, impacts on the garbage collection service and identify the optimum collection frequency, for consideration.

Background

Council, at its Meeting on 14 December 2021, received an update report in relation to the State Government's Waste Reforms proposed from its Circular Economy Policy, entitled 'Recycling Victoria – A new economy', and resolved as follows:

That Council:

- a. *Endorses the draft 4-Bin preferred residential kerbside waste and recycling collection service model, for implementation not earlier than 1 July 2023, for community consultation, in early 2022, for a four-week period and invites written submissions.*
- b. *Receives a further report outlining any submissions on the Draft 4-Bin preferred residential kerbside waste and recycling collection service model for implementation not earlier than 1 July 2023 and presenting a Final Draft 4-Bin preferred residential kerbside waste and recycling collection service model for consideration for adoption.*
- c. *Approves the introduction of food organics and garden organics (FOGO) into the existing optional, user pays, residential kerbside green waste collection service from 1 July 2022.*

- d. *Authorises the Chief Executive Officer to sign, Department of Environment, Land, Water and Planning, Kerbside Reform Support Fund - Funding Agreement as detailed at Confidential Attachment 2, and subsequent agreements as they become available as part of the 4-Bin waste and recycling collection service model.*
- e. *Notes that the global, Federal and State response to the COVID-19 pandemic may change the conditions encountered and information reviewed at the date of the preparation of this report.*
- f. *Authorises officers to redirect resources in order to give effect to the recommendations in this report if any such redirection is reasonably required as a result of a change caused by the COVID-19 pandemic, and in accordance with any delegations made by Council in effect at the time.*

Consultation

Extensive community consultation was undertaken in the development of Council's Waste, Recycling and Litter Strategy 2018-2028.

The State Government undertook extensive community and industry consultation in the development of its Circular Economy Policy.

Community consultation was undertaken on the 4-Bin preferred residential kerbside waste and recycling collection model, over a four (4) week period from 7 March to 4 April 2022, in accordance with Council's 'Community Engagement Policy 2021'.

Analysis

Community Consultation ('Sorting It Out')

Community consultation was undertaken over a four (4) week period from 7 March to 4 April 2022.

Key engagement activities included:

- Static Displays
 - Static displays were placed at 15No. locations to promote the consultation and direct residents to the Your Say webpage Survey on Council's website via the QR Code.
- Brimbank e-newsletter & social media
 - Further promotion of the consultation was provided via e-newsletter and Council's social media channels.
- Community Survey (Your Say platform)
 - 823 surveys were completed.
- Shopping Centre Engagement
 - 4No. Pop-Ups received approximately 165 conversation, 30 surveys and numerous postcards were distributed.
- Focus groups and Community Information Session
 - 17 total participants.
- Brimbank Have Your Say Days (Let's Talk Brimbank).
 - Provided residents the opportunity to meet Councillors face to face.

Community Survey

Results from the community survey are detailed as follows:

Of the 823 Responses:

- 53% see community benefit;
- 41% believe it is not good for the community;
- 62% believe it will not suit their household needs;
 - Of this 54% Garbage bin size or collection frequency was the dominant factor.
- 17% are unsure it will suit their household needs; and
 - Of this 55% Garbage bin size or collection frequency was the dominant factor.
- 21% believe it will suit their household needs.

Focus Groups

Key themes that emerged from the Focus group discussions are summarised as follows:

- Customisation should be based on various needs (Residents & ratepayers);
- Logistics and space identified as a concern (Residents & ratepayers);
- Waste-stream contamination identified as a concern (Residents & ratepayers);
- General support for the changes (People with disability);
- Education was critical for implementation success (People with disability);
- Strong environmental focus supported (Young People);
- Focus on changes and Council waste services more broadly (Young People);
- Behavioural change (Young People);
- Communication various communities (Vietnamese);
- Education and implementation opportunities for greater success (Vietnamese); and
- Waste-stream contamination identified as a concern (Vietnamese).

Shopping Centre Engagement

Key themes that emerged from the 'Pop-ups' discussions are summarised as follows:

- Bin size and the number of bins was identified as a concern (Sunshine Market Place);
- Cost of the service was identified as a concern (Sunshine Market Place);
- Garbage frequency for households with high volume nappies was identified as a concern (Sunshine Market Place);
- Price and concessions were suggested for consideration (Keilor Central);
- Customisability was suggested for consideration (Keilor Central);
- Bin size and frequency was identified as a concern (Keilor Central);
- FOGO concerns (Alfrieda Street, St Albans); and
- General support was provided for the Reforms (Alfrieda Street, St Albans).

Engagement Summary

The community engagement program for the 'Sorting It Out' project was extensive and far reaching, provided the following:

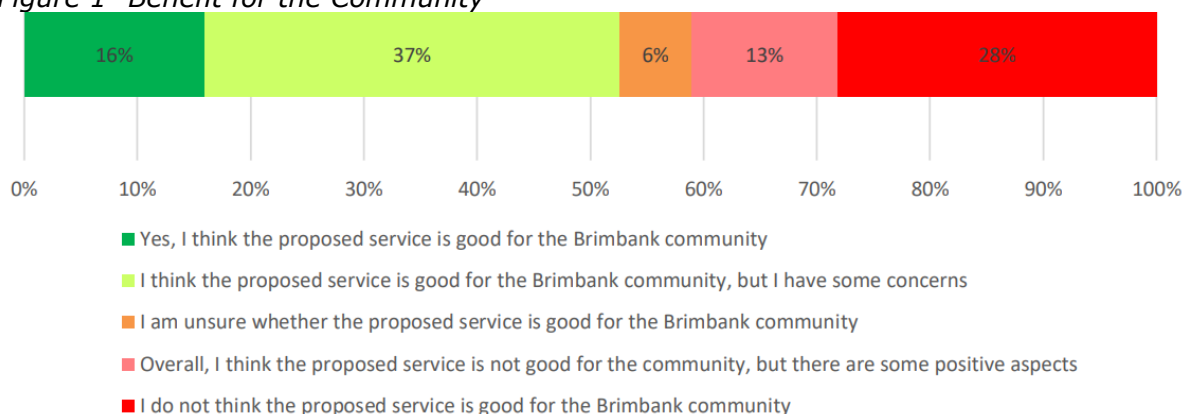
- Draft 4-bin model was promoted across a suite of online and offline methods;

- Draft 4-bin model was communicated to key community members and started conversations;
- Over 1000 items of feedback were received;
- The broad reach of engagement has successfully captured diverse voices;
- Community members were given multiple opportunities for engagement;
- Community Survey and Your Say page served as a vital channel of information; and
- Draft 4-bin model has been successfully explained to and tested with the community.

Engagement Outcomes

The community engagement program for the 'Sorting It Out' project, determined the following outcomes:

Figure 1- Benefit for the Community



- Majority of residents see the community benefit of the preferred 4-Bin residential kerbside waste and recycling collection service model;
- The main concerns for residents with the preferred 4-Bin residential kerbside waste and recycling collection service model included:
 - Garbage bin size or collection frequency;
 - Cost of service;
 - Contamination concerns; and
 - Odour issues (nappies).
- Residents supported the environmental outcomes of the preferred 4-Bin residential kerbside waste and recycling collection service model offered;
- Residents identified customization (bin sizes) for a better service offering; and
- Residents identified strong support for education/awareness campaigns for a successful implementation.

The community consultation report on the 4-Bin preferred residential kerbside waste and recycling collection service model is provided at **Attachment 1**.

Kerbside Waste Audit

An audit of the residential kerbside waste and recycling collection service was carried out during the period from Tuesday 15 March to Monday 28 March 2022. The audit was completed to better understand current performance and inform potential future Waste Reforms.

Results from the audit determined the following:

- 55% of the garbage bin contents are comprised of organics;
- 13% of the garbage bin contents are comprised of paper and cardboard;
- 2% of the garbage bin contents are comprised of glass;
- 2% of the garbage bin contents are comprised of metals;
- 9% of the garbage bin contents are comprised of plastic; and
- 3% of the recycling bin contents are comprised of organics.

In an ideal situation, potentially over 80% of the garbage bin contents could be recovered and diverted away from landfill. On average, the garbage bins audited were 77% full while the green waste and recycling bins sampled were 81% full.

A total of 1,008 Container Deposit Scheme (CDS) eligible containers were counted in the garbage bins audited, 5,203 units were found in the recycling bin samples and only 2 eligible containers were identified in the green waste bins. The total number of CDS eligible containers produced by the waste stream is 1,135,103/ weekly.

Results from this audit represent baseline data of the current three bin system performance and waste stream composition within the City of Brimbank. Data from this audit will inform future implementation of the four-bin system with the introduction of glass and FOGO segregation and roll-out of the CDS.

Based on household diversion rates and recycling rates, there is still significant margin for improvement to reduce waste to landfill.

The audit recommended on-going monitoring and education programs be specifically tailored to:

- Achieve a higher understanding of non-compliant materials categories that will lower contamination rates; and
- Reduce lost resources that currently have a low recovery rate in garbage bins.

It was also recommended that another waste audit be undertaken following the implementation of any waste reforms and CDS. This will provide greater understanding of system performance and inform future actions for service improvement.

The Kerbside Waste Audit Report is provided at **Attachment 2**.

Financial Analysis

A financial analysis was undertaken to report on the impacts and benefits of the 4-bin residential kerbside waste and recycling collection service model.

The project assessed three bin and four bin kerbside waste and recycling collection service models as follows:

- Business as usual (BAU) – Garbage (weekly), Green Organics (GO) (fortnightly), and Recycling (fortnightly);
- Option 1 - Garbage (fortnightly), FOGO (weekly), Recycling (fortnightly), and Glass (4 weekly);
- Option 2 - Garbage (weekly), FOGO (fortnightly), Recycling (fortnightly), and Glass (4 weekly); and
- Option 3 - Garbage (weekly), FOGO (weekly), Recycling (fortnightly), and Glass (4 weekly).

This report produced the following outputs:

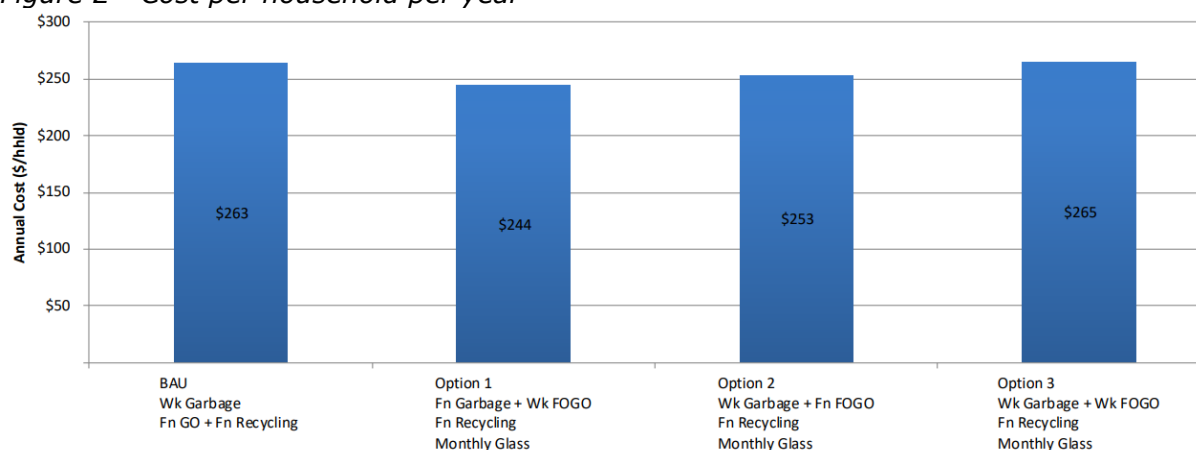
- Total system costs;
 - Cost per household (\$/household/annum)
 - Net Present Value (NPV) (\$m) across a 10-year planning horizon
 - Cost per tonne (\$/t)
- Recovery rate (%);
- Greenhouse gas emissions (t CO₂-e); and
- Vehicle kilometres travelled (km).

Modelling of the BAU and three options found that by introducing the Glass bin and changing the frequency of Garbage collection to fortnightly (Option 1) or changing the frequency of FOGO to fortnightly while maintaining weekly collection of Garbage (Option 2), the cost per household, compared to the current regime, decreases.

Increasing Garbage and FOGO frequency to weekly collection does increase the cost per household slightly.

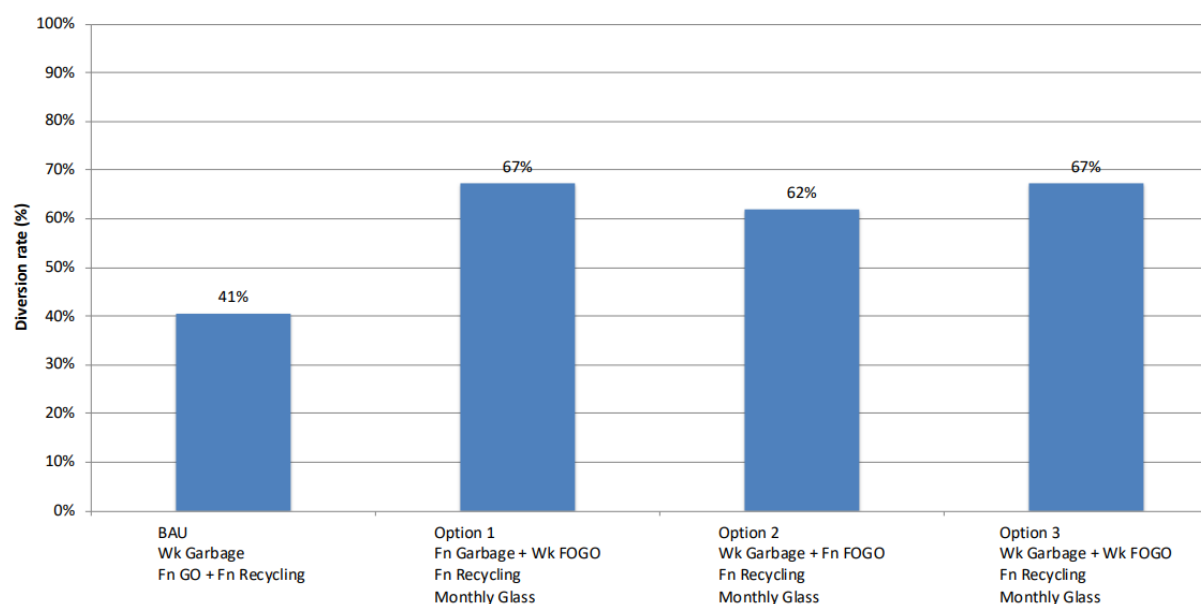
The following figure shows the cost per household per year for each Option.

Figure 2 - Cost per household per year



The implementation of a four-bin system reduces Garbage quantities and improves diversion rates from 41% to over 60% for all new options.

Figure 3 - System Material Diversion Rate



A Multi-Criteria Analysis was used to provide an integrated approach to rank the options based on agreed criteria. The criteria were weighted and includes different factors, both qualitative and quantitative (refer below).

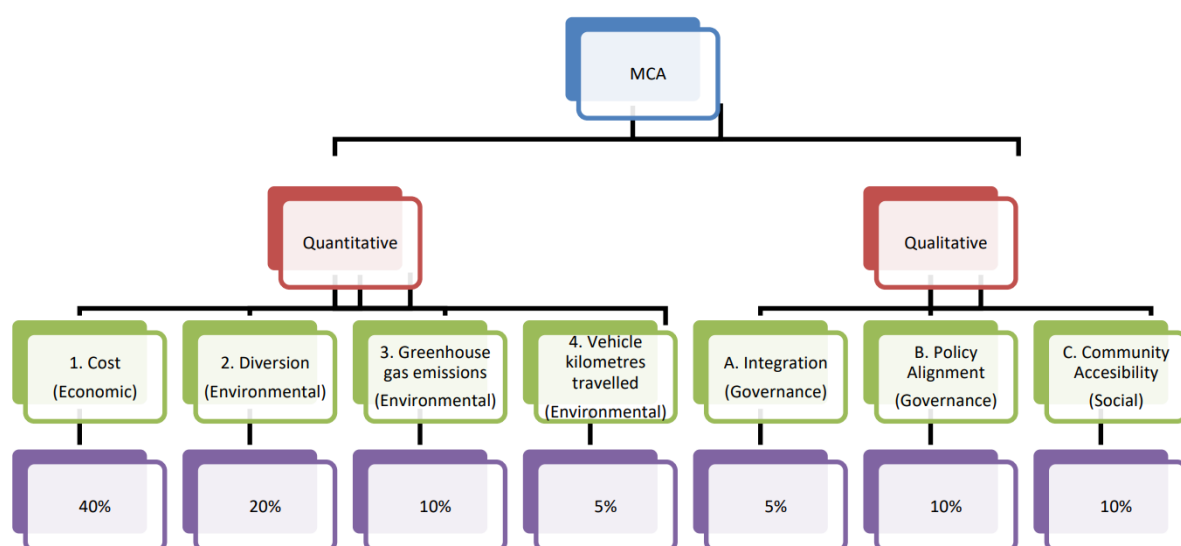


Figure 4 - Results of Multi-Criteria Analysis – Total Score and Rank

Option	Total Score (%)	MCA Rank
BAU Wk Garbage Fn GO + Fn Recycling	79.90%	4
Option 1 Fn Garbage + Wk FOGO Fn Recycling Monthly Glass	86.70%	1
Option 2 Wk Garbage + Fn FOGO Fn Recycling Monthly Glass	84.30%	3
Option 3 Wk Garbage + Wk FOGO Fn Recycling Monthly Glass	85.70%	2

The financial analysis determined the following:

- The implementation of a four-bin system reduces Garbage quantities and improves material recovery rates to over 50% for all new options, noting three-bin system currently achieves a 31% material recovery rate;
- Landfills are the biggest contributor to greenhouse gas emissions compared to collection, transport and organics processing, which generate significantly lower emissions;
- Residuals to landfill from Materials Recovery Facility (MRF) and Food Organics and Garden Organics (FOGO) processing create landfill gas and are responsible for the landfill emissions depicted for Options 1, 2 and 3.
- All options produce a reduction of CO2 emissions due to increased landfill diversion.
- Introducing a Glass bin and changing the frequency of Garbage collection to fortnightly (Option 1) or changing the frequency of FOGO to fortnightly while maintaining weekly collection of Garbage (Option 2), the cost per household, compared to the current model, decreases.
- Increasing Garbage and FOGO frequency to weekly collection does increase the cost per household ;
- That material recovery rates can be improved through the addition of a glass bin;
- Diversion of material from landfill, reduces the overall cost after Year 1 deployment costs;
- On average, the 10-year Net Present Value (NPV) costs are lower than BAU;
- Implementation of the proposed options will reduce the cost per household per year by \$5-10, if the initial setup costs (bins, caddies, education) are depreciated over the 10-year modelling term; and
- Option 1 is ranked overall as the best option based on the established criteria.

The Financial Analysis Report on the 4-Bin residential kerbside waste and recycling collection service model is provided at **Attachment 3**. Due to commercial sensitivity the relevant processing/disposal facilities gate fees have been redacted from the Financial Analysis Report.

Other Victorian councils

The following councils have adopted a 4-Bin residential kerbside waste and recycling collection service model:

- Hobsons Bay;
- Surf Coast;
- Moyne;
- Whittlesea;
- Macedon Ranges;
- Yarra;
- Bayside (committed from 1 July 2022); and
- Moreland (committed from late 2022).

All councils that have adopted or considering a 4-Bin collection service model have opted for monthly glass collection, except for Yarra which is weekly.

The following councils have adopted a fortnightly garbage collection service / weekly FOGO collection service model;

- Surf Coast;
- Boroondara;
- Glen Eira;
- Nillumbik;
- Macedon Ranges;
- Bass Coast;
- Bayside (committed from 1 July 2022); and
- Moreland (committed from late 2022).

The following councils have adopted a weekly garbage collection service / fortnightly FOGO* collection service model;

- Hobson's Bay**;
- Moonee Valley*;
- Melton* (No glass collection service);
- Whittlesea;
- Monash* (No glass collection service);
- Hume* (No glass collection service);
- Maribyrnong* (No glass collection service); and
- Wyndham* (No glass collection service).

Note:

* At this stage these councils are yet to make a decision on changing their fortnightly FOGO collection service model to the weekly collection model.

** Hobsons Bay initially rolled out garbage collected fortnightly, however reverted back to weekly due to community concerns.

The following councils have adopted a weekly garbage collection service / weekly FOGO collection service model;

- Moyne.

Other councils have opted to undertake a more cautious approach and have indicated they will consider further changes, such as a separate glass collection service once the 'Container Deposit Scheme' is implemented (by 2023).

Experience has also determined that any change to a collection service should be rolled out in winter, where there would be less odour issues than in summer. Therefore, a July – September transitional date is considered ideal.

Most councils that have introduced a FOGO service have adopted a universal approach, where every resident is provided the service and cost of the service is paid through rate charges (or separate waste charge).

The greatest effectiveness of a FOGO service is achieved where a compulsory/ universal service is adopted or voluntary participation rates of 60-70% or more are achieved. Voluntary participation indicates a full commitment to the service offering and the service will be used appropriately resulting in minimal contamination. A compulsory universal approach tends to lead to higher contamination rates whereas those that have not made a conscious effort to select the service may not use it effectively.

Brimbank introduced food organics and garden organics (FOGO) into the existing optional, user pays, residential kerbside green waste collection service from 1 July 2022. The take up rate for the optional, user pays service is approx. 65%.

Based on Brimbank's significant take up of the voluntary, user pays service, an option could be to further promote the services for increased take up. This would attract committed residents and not provide a service that residents do not necessarily desire.

Identified Risks

The following key components identified in the State Government's Circular Economy Policy entitled 'Recycling Victoria – A new economy', are yet to be established. These components have a significant bearing on the effectiveness of the implementation timelines of the proposed waste reforms.

Recycling Victoria

Recycling Victoria commenced on 1 July 2022 and will provide strategic leadership for the waste and recycling sector. Recycling Victoria has been provided with distinct functions and powers, including to regulate waste and recycling services, oversee the CDS, gather data and report on the state of the market, and support the development of Victoria's circular economy.

It is envisaged that Recycling Victoria will take time to establish itself before it is able to provide effective leadership and direction.

Circular Economy (Waste Reduction and Recycling) Act 2021

The Government is still developing regulations and standards to support the operation of the *Circular Economy Act 2021*. These will be developed in consultation with councils, alpine resorts, the waste and resource recovery industry, peak bodies and the wider community.

The regulations and standards will directly impact the way residential kerbside waste and recycling collection services are delivered; these impacts are yet to be determined.

Container Deposit Scheme (CDS)

The Victorian Government has indicated that a CDS will be implemented in 2023. Once implemented the scheme will have a direct impact on the contents of Council's recycling bin and potential glass bin, the extent of the impacts is yet to be determined.

Glass Processing Capacity in Victoria

Limited existing processing options currently exist and new processing facilities proposed in 2022 have not yet materialised.

The Metropolitan Waste and Resource Recovery Group has ceased facilitation of a collaborative procurement process that was to enable Council to access the services of a glass processing facility.

The maturity of the glass processing sector is still developing and is awaiting the implementation of the CDS. Many councils are also awaiting the commencement of the CDS before committing to a separate residential kerbside glass collection service.

Glass Collection Noise Issue

Councils that have already implemented a separate kerbside glass collection service have advised increased complaints due to noise issues associated with a glass only collection service. Previously glass breakage was somewhat absorbed by other recyclable material.

Noise attenuation measures such as noise absorbent matting have been trialled with limited success.

Implementation Timelines

'Recycling Victoria – A new economy' Policy requires a separate glass collection service to be implemented by 2027. Given the identified risks it might be prudent to hold off introducing the service until a number of the identified risks are better understood.

Community Consultation

Although the majority of residents see the community benefit with the preferred 4-Bin residential kerbside waste and recycling collection service model they had raised the following main concerns:

Garbage Bin Size or Collection Frequency

It was perceived that the size of the bin and/or the fortnightly collection frequency would not be suitable. Bin audit results indicate that over 80% of the garbage bin contents could potentially be recovered, reducing the need for a larger bin and weekly collection. To alleviate resident's concerns an arrangement where the collection frequency was transitioned over a 3-year period could be considered.

Cost of Service

The financial analysis determined that a 4-Bin collection model with a fortnightly FOGO and weekly garbage collection ranked overall as the best option based on the established criteria.

Given the considerable costs associated with the waste reforms, a cautious approach should be considered and where there are considerable unknowns further investigation is warranted prior to implementing any significant change.

Contamination Concerns

Research has shown that on-going well-coordinated and delivered awareness and educational programs are effective in achieving the desired behavioural practices to reduce contamination.

Odour Issues (nappies)

Research has indicated that the odour levels from nappies increase before remaining constant over a three-day period. Therefore, a weekly or fortnightly collection service will have the same odour levels over a three-day period.

Advanced Waste Processing (AWP) Availability

There have been advancements in the availability of AWP options.

The AWP processing option has the potential to significantly reduce Council's greenhouse gas emissions and provide an alternative to landfill.

Options for Consideration

Whilst the feedback from the community raised a number of concerns with the 4-Bin preferred residential kerbside waste and recycling collection service model the Financial Analysis Report ranked it the best option overall.

A number of identified risks can be managed to ensure the best outcomes are achieved, however a more cautious approach, which other councils have applied, will impact the delivery timelines of the preferred service model.

Options for consideration include:

A. Preferred 4-Bin Service Model

Proceed with the preferred 4-Bin Service Model as intended and address the concerns raised as part of the consultation process, as follows:

- Transition of garbage weekly collection to fortnightly over 3 years;
- Provide greater awareness of financial and environmental benefits; and
- Increase education/awareness programs regarding contamination/odour issues.

B. Stage the Implementation of Preferred 4-Bin Service Model once further details are known.

The implementation of the preferred 4-Bin Service Model can be staged so that the identified risks are better understood including following possible actions to allow a transitional process to occur, as follows:

Increase Promotion of FOGO Service

Council now provides a FOGO service (from 1 July 2022). Further promotion for greater uptake of the voluntary, user pays service will ensure only those committed will take up the service avoiding potential contamination issues and complaints from those not embracing the service offering if made compulsory.

Staged Introduction of Glass Collection Service

There are considerable costs associated with introduction of a separate glass collection service. Although the benefits are known, the identified risks associated with the limited advancement of glass market processing sector, unknown CDS impacts and noise concerns, make an earlier commencement less favourable. A more cautious approach would enable consideration of CDS impacts, successful noise attenuation trials and further advancements in available processors would be considered more advantageous.

Advanced Waste Processing

Further investigation and procurement of AWP service which are becoming more available as an alternative to landfill.

The following table provides a comparison of the pros and cons of both Options:

Comparison of Options

Options	Pros	Cons
Option A: 4-Bin Service Model	✓ Reduces garbage quantities & CO2 emissions. ✓ Improves material recovery rates. ✓ Cost per household decreases. ✓ Ranked overall as the best option based on the established criteria.	- X Details on Governance arrangements (Recycling Victoria) currently unknown. - X Details on legislative requirements not currently known. - X Impact of the implementation of Container Deposit Scheme on glass bin. - X Glass Processing Capacity in Victoria limited at this stage; - X Glass collection noise issues currently exist. - X Increasing Garbage and FOGO frequency to weekly collection does increase the cost per household slightly. - X Community Consultation determined concerns with: - o Garbage Bin Size or Collection Frequency - o Cost of Service. - o Contamination Concerns. - o Contamination. - o Odour Issues (nappies).
Option B: Staged 4-Bin Service Model	✓ Reduces garbage quantities. ✓ Improves material recovery rates. ✓ Further reduction of CO2 emissions with Alternative Waste Processing service availability. ✓ Allows details on Governance arrangements (Recycling Victoria) to be better understood. ✓ Allows details on legislative requirements to be better understood. ✓ Allows impact of the implementation of Container Deposit Scheme on glass bin to be better understood. ✓ Allows greater timeframe for Glass Processing Capacity in Victoria to increase. ✓ Allows greater timeframes to reduce glass collection noise issues. ✓ Allows greater timeframe to address community concerns pertaining to : - o Garbage Bin Size or Collection Frequency - o Cost of Service. - o Contamination Concerns. - o Contamination. - o Odour Issues (nappies).	X Delays early implementation of 4-Bin Service Model.

Based on the, community feedback, waste audit findings, financial analysis and current identified risks, it is considered most appropriate to implement a staged 4-Bin Waste and Recycling Collection Service Model, consisting of the following:

- Continue weekly garbage collection, at this stage;
- Continue fortnightly recycling collection;
- Continue fortnightly FOGO collection, at this stage; and
- Delay introduction of new glass collection service until the impacts of the proposed State Government Container Deposit Scheme are better known; and
- Consider options for Alternative Waste Processing.

In addition, further analysis is required in relation to the option to introduce a 'Universal' food organics and garden organics (FOGO) residential kerbside collection service, no earlier than 1 July 2023. The analysis will need to take into consideration financial impacts, environmental benefits, identification of optimum collection frequency and impacts on the garbage collection service.

Resource And Risk Implications

The resources required for this matter will be referred to the annual budget process for consideration.

Community: potential impact on community, including public trust and customer service impact

- Yes - The waste reform will introduce changes to the existing residential kerbside waste and recycling collection systems over time and any changes will be communicated well in advance to the community.

Environmental: impacts on environmental sustainability, including water/waste management, climate change, and contaminated land

- Yes - The waste reform seeks to reduce the environmental impacts of production and consumption, by creating less waste and pollution, better recycling, more jobs and a stronger economy.

Financial: significant financial impacts

- Yes - The waste reform is anticipated to require the procurement of additional waste collection services such as bin infrastructure, modification to existing (green waste to include food) and provision of new contracts (glass processing).

Regulatory: legal, legislative or regulatory implications including the rights/obligations of stakeholders

- Yes - The introduction of a new Waste Authority, Recycling Victoria has foreshadowed waste service becoming an essential service with the waste reform becoming mandatory.

There are no Safety risks identified.

Officer Recommendation

That Council:

a. Notes the following:

- Outcomes of community consultation on the draft 4-Bin preferred residential kerbside waste and recycling collection service model, at Attachment 1 to this report;**
- Findings of a Waste Audit on the residential kerbside waste and recycling collection service, at Attachment 2 to this report;**
- Outcomes of the Financial Analysis Report on the 4-Bin preferred residential kerbside waste and recycling collection service model; at Attachment 3 to this report;**
- Current identified risks with the implementation of the State Government waste reforms, Circular Economy Policy entitled, 'Recycling Victoria – A new economy'; and**
- The introduction of food organics and garden organics (FOGO) into the existing optional, user pays, residential kerbside green waste collection service commenced on 1 July 2022.**

b. Implements a staged 4-Bin waste and recycling collection service model, consisting of the following:

- Continue weekly garbage collection, at this stage;**

- ii. **Continue fortnightly recycling collection;**
 - iii. **Continue fortnightly FOGO collection, at this stage;**
 - iv. **Delay introduction of new separate glass collection service until the impacts of the proposed State Government's Container Deposit Scheme are better known; and**
 - v. **Consider options for Alternative Waste Processing as an alternative to landfill.**
- c. **Receives a further report in relation to the introduction of a 'Universal' food organics and garden organics (FOGO) residential kerbside collection service, no earlier than 1 July 2023, taking into consideration financial and environmental benefits, identifying the optimum collection frequency and impacts on the garbage collection service, for consideration for adoption.**

REPORT



Sorting It Out

A proposed 4-bin service for Brimbank

*Community Awareness and Engagement Report
for Brimbank City Council,
Final Report, April 2022*

COMMUNITY

The term community refers to a group of people that has something in common such as identity, behaviours, interests or values. A community often share a sense of place in a given geographical area (e.g. a country, city, town, or neighbourhood) or in virtual space through communication platforms.

STAKEHOLDER

The word stakeholder refers to individuals, groups or organisations with a stake or interest in the outcome of a decision. Stakeholders may also have the ability to influence the decision given their role or position.

ENGAGEMENT

Engagement is defined as a planned process with the purpose of working with communities and stakeholders to inform decisions, share knowledge and strengthen relationships.

BRIMBANK CITY COUNCIL

This report details the engagement findings of a community engagement commissioned by Brimbank City Council. This report was prepared by Capire Consulting Group on behalf of Brimbank City Council.

Brimbank

This report uses Brimbank to denote the geographic location and corresponding community that resides, visits, and is interested in the Local Government Authority area governed by Brimbank City Council.

Council

This report uses Council to denote the organisation of Brimbank City Council, includes its actors and operations within the organisation, including Council staff and elected officials.

(COMMUNITY) ENGAGEMENT PROGRAM

This report uses the term Community Engagement Program to denote all aspects of planned community engagement as supported by Capire Consulting Group.

ENGAGEMENT PERIOD

This report uses the term engagement period to denote the period community members were able to contribute to the project. The engagement period for this project was between Monday, 7 March and Monday, 4 April.

A PROPOSED 4-BIN SERVICE FOR BRIMBANK CITY COUNCIL

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1 Introduction

1.1 Project background

1.1.1 Drivers

To respond to a changing waste management landscape, communities and governments are faced with the challenge of how to minimise the detrimental impacts of waste on the environment whilst meeting community needs.

In 2020, the Victorian Government announced the *Recycling Victoria: A New Economy* policy, which mandates a 4-bin kerbside service separated by stream, amongst other changes. These changes are to be rolled out across every Victorian municipality. To reduce the amount of waste going into landfill, the new system will introduce separate bins for:

- Garbage (landfill)
- Recycling (comingled)
- Glass recycling
- Food organics and garden organics (FOGO).

Brimbank City Council have responded to this directive in December 2021, and in response have developed a draft 4-bin model for presentation to the community. This proposed model was planned in consultation with experts and industry and informed by case studies. Council is determined to seek community feedback before moving forward with the preferred mode, which was presented to the Brimbank community for consideration and feedback. The following preferred Draft 4-Bin Residential Kerbside Waste and Recycling Collection Service Model (draft 4-bin model) is proposed to achieve maximum environmental and economic benefits:

Table 1 Preferred draft Brimbank collection service model (draft 4-bin model)

Stream	Proposed Changed
Recycling Collection	Bin size: 240 litre mobile bin remains the same Collection frequency: fortnightly collection remains the same.
Garbage Collection	Bin size: 140/80 litre mobile bin remains the same Collection frequency: weekly collection changes to fortnightly

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Stream	Proposed Changed
	Bin lid colour changes to red.
Food Organics and Garden Organics (FOGO)	Replaces Green Waste Collection Bin size: 240/140 litre mobile bin remains the same Collection frequency: fortnightly collection changes to weekly The full conversion to FOGO includes provision of a kitchen caddy Service to change from “opt-in” service to part of standard service provision.
Glass Collection (new)	Bin size: 140 litre mobile bin Collection frequency: monthly.

1.1.2 Project negotiables and non-negotiables

While this project responds to State Government directives, the engagement process seeks to address negotiables and non-negotiables specific to Brimbank’s unique context. A list of negotiables is detailed below in Table 2.

Table 2 Project negotiables and information sought

Negotiable	Information sought
Model implementation	The process of implementation of the 4-bin model is considered as a negotiable. The engagement process seeks positive and negative feedback on the preferred, including bin collections frequency Other methods of implementation are also being considered, including trial periods, staging of implementations, and services to assist community members including kitchen caddies, fridge magnets, or other reminders.
Bin size	The draft 4-bin model proposes changes to bin sizes. These bin sizes are being presented for consultation and feedback and will be considered as negotiable as part of the approval process.
Communication	Brimbank encompasses a diverse community of residents. Preferences for communication methods, including how the community want to be

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	informed and educated about the changes to the service, is being considered as negotiable.
--	--

Other elements to the draft model, including FOGO Caddies, are also being considered through the engagement process. All feedback will be considered, including preference for delivery or pick-up from customer service centres

Non-negotiables

The following 'non-negotiable' elements cannot be influenced due to statutory, regulatory, or operational reasons. If something is non-negotiable, it cannot be influenced by the engagement process because it is an imminent occurrence, or out of scope. The non-negotiables for the project are outlined below:

- There will be changes to the current waste service, either in service provision or cost
- Only properties paying the waste charge can access Council's service
- The service must support the State government's *Circular Economy Policy*, and *Council's Waste, Recycling and Litter Strategy 2018-2028*, as well as any other acts, strategies, and policies
- Changes will be implemented in stages and as soon as practicable, factoring in a 14-month lead time
- Changes won't commence until Q3 2023 at the earliest.

2 Engagement approach

2.1 Purpose of engagement

The purpose of engagement was carefully considered during the early phases of the engagement process. In response, a list of core engagement objectives was written to guide the engagement and specify scope. Six engagement objectives were considered, which fall under two categories.

The primary category is to test the idea of the draft model and respond with relevant engagement. The secondary category is to educate and inform the community on Council's waste services:

Primary:

- To test the proposed draft 4-bin model with community, based on industry best-practice
- To understand positive and negative community sentiment to the proposed draft 4-bin model
- To ensure diverse voices contribute to the discussion
- To maximise participation by high visibility of the engagement program.

Secondary:

- To educate the community about waste and Council services
- To communicate with the community clearly and transparently about waste collection changes and their implications.

2.2 Engagement methodology and participation

A suite of engagement activities was implemented during the engagement period. An explanation of the activities is provided below, including their purpose, the objectives that they correspond to, and a brief description of participation.

2.2.1 Promotion campaign

Prior to, and throughout the extent of the engagement period, Council coordinated an extensive and broad-reaching promotional campaign. The campaign objectives were to 1) raise awareness of the presentation of the proposed changes to the community, and 2) to raise awareness of the opening of the community engagement program, including opportunities to provide feedback and input.

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The community engagement program for the draft 4-bin model was given the project name *Sorting It Out*. This project name appeared consistently through all collateral, including prior to the opening of the engagement period, as in Issue #4, Autumn 2022 of the *Brimbank News*.

The promotional campaign spanned both physical and digital mediums. The following table outlines the promotional channels utilised by Council

Table 3 Promotional methods used during the engagement process and their description

Promotion Method	Description
Project webpage	The project webpage, using Council's established <i>Your Say</i> platform, (https://yoursay.brimbank.vic.gov.au/sortingitout) presented information about the project, including information on the proposed changes, a project timeline, and FAQs. The webpage served as a central hub where participants could complete the Community Survey (Section 2.2.2) and register for the Community Information Session (Section 2.2.4) During the engagement period a total of 1,908 unique visitors visited the webpage, resulting in 2,216 visits.
Social media	The <i>Sorting It Out</i> project was promoted via the Facebook page of Brimbank City Council. 11 posts were made during 4 weeks of the engagement period. These posts were displayed 31,691 times and were engaged with by 529 people resulting in 578 clicks.
E-mail	An e-mail address for a direct Council contact was provided and advertised on the <i>Your Say</i> page. 8 e-mails were received during the engagement period
Advertisements	The <i>Sorting It Out</i> campaign was promoted via advertising in the <i>Brimbank Star Weekly</i>, including four ¼ page advertisements published during the campaign.
Customer service	The Council customer service hotline, and an internal Council contact, was advertised across all promotional material. During the engagement period, customer service officers received up to five phone calls per day, in addition to face-to-face enquiries at the Keilor Customer Service Centre. The high volume of phone number enquires necessitated members of the project team to formally brief Customer Service Officers on the project. A script was used to promote the project consultation while residents were on-hold with customer service.

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Promotion Method	Description
Postcards	Graphically designed postcards were printed and distributed at pop-up events (Section 2.2.3) and customer service centres. The postcards detail the core messages of the proposed 4-bin model and encouraged community members to participate in the community engagement process. This was done by providing website links, Council contact details, and a QR code which links to the Community Survey.
Banners and cubes	15 Graphically designed banners and information cubes, including QR codes linked to the <i>Your Say</i> page, invited residents to participate in the survey and informed them of the proposed changes. They were located at the following community venues. • Cairnlea Community Hub • Deer Park Library • Delahey Community Centre • Hunt Club Community and Arts Centre • Keilor Basketball Netball Stadium • Keilor Community Hub foyer • St Albans Community Centre • St Albans Library • Sunshine Customer Service • Sunshine Leisure Centre • Sunshine Library • Sydenham Community Hub • Sydenham Library • Visy Cares Hub • Westvale Community Centre
Media	The <i>Sorting It Out</i> project was promoted via the Brimbank Star Weekly and Brimbank News Issue #4 Autumn 2022.

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Image 1 A Sorting It Out banner on display in one of 15 community venues

2.2.2 Community survey

Purpose: To provide an opportunity to provide feedback on the proposed draft 4-bin model in a wide-reaching way.

Objectives: To test the proposed draft 4-bin model with community; to understand positive and negative community sentiment to the proposed draft 4-bin model.

The Community Survey served as the dominant method of obtaining community feedback. The survey was open to the public from Monday, 7 March 12am, until Monday, 4 April at 11.59pm. 823 survey responses were received. The Community Survey asked a range of demographic questions, as well as two primary questions:

Do you think the proposed 4-bin model will be good for the Brimbank community? and;

Do you think the proposed 4-bin model will suit your household's needs?

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Other engagement methods, including engagement collateral, pop-ups, and focus groups, directed participants to complete the Community Survey, while also responding to their own respective objectives.

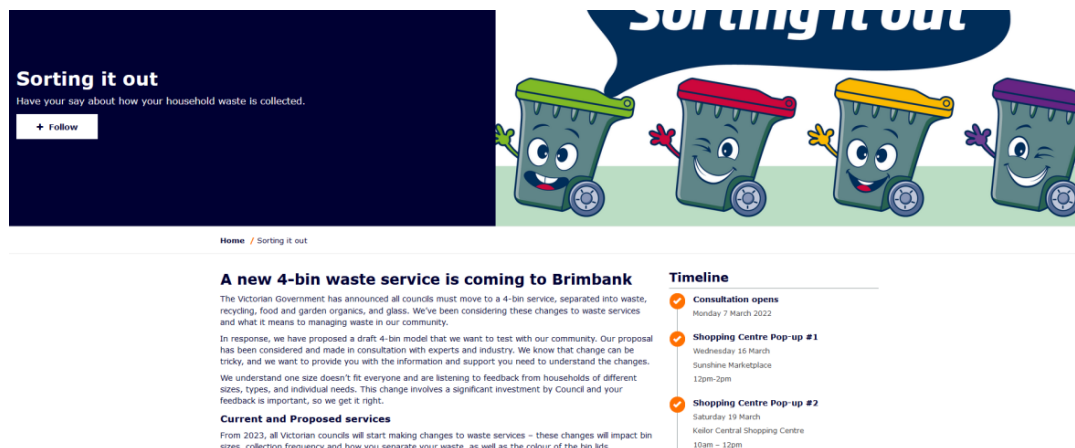


Image 2 A screenshot of the Your Say page, which directed participants to the Community Survey and event registration

2.2.3 Pop-ups

Purpose: To provide an opportunity for passive and incidental community engagement and conversations; to engage with people who prefer offline engagement methods, or with lower digital literacy rates; to visually communicate the proposed waste change while maintaining a physical presence.

Objectives: To test the proposed draft 4-bin model with community; to understand positive and negative community sentiment to the proposed draft 4-bin model; to ensure diverse voices contribute to the discussion; to educate the community about waste and Council services; to communicate with the community clearly and transparently about waste collection changes and their implications

Four pop-ups took place as part of the community engagement program. The pop-up events involved Council staff members being present at public locations, to answer questions about the draft 4-bin model and raise awareness of the community engagement program.

Each pop-up had an obvious physical presence marked by props and signage. The four pop-ups took place corresponding with each of Brimbank's Council wards. A summary of engagement is detailed below, with engagement findings detailed in Section 4.1 of this report.

Table 4 Summary of pop-up participation

Sunshine Marketplace:

Wednesday 16 March, 12-2pm

Over 40 individual conversations (plus postcards handed out).

Feedback captured via a mix of survey responses (13) and notes taken from conversations.

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Keilor Central

Saturday 19 March, 10am-12pm

Approximately 60 residents and 15 surveys were completed on iPads.

Brimbank Central

Friday 25th March, 10am-12pm

Over 35 individual conversations and 2 online surveys were completed, and over 50 postcards handed out.

Alfreda Street, St Albans

Wednesday 23 March, 12-2pm

Approximately 30 individual conversations (plus postcards handed out), however no surveys completed.



Image 3 Sunshine Central pop-up, with Council staff supported by Capire

Capire provided guidance and support for the first pop-up session. This included staff support and materials. The objective of this support, including a runsheet and list of required materials, was to provide the project team with the information and tools necessary to run the remaining three pop-ups independently.

Feedback received from the pop-ups has been included in *Section 4. Findings* of this report.

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Image 4 Council staff talk to community members at the Alfrieda Street pop-up event

2.2.4 Focus groups and Community Information Session

Purpose: To allow for targeted community groups, and the general community, to learn about the changes in the bin models; to create a safe space for community members to express how they will be impacted by the proposed changes; to provide a direct online engagement channel between Council and community members.

Objectives: To test the proposed draft 4-bin model with community; to understand positive and negative community sentiment to the proposed draft 4-bin model; to ensure diverse voices contribute to the discussion; to educate the community about waste and Council services; to communicate with the community clearly and transparently about waste collection changes and their implications

FOCUS GROUPS

A program of four focus groups was implemented on various dates during the engagement period. The four focus groups were tailored to key community cohorts which were identified during the drafting of the Engagement Strategy. These groups were identified as having a particular stake or interest in the changes or are groups of people who may experience Council waste services differently than the mainstream population. Council networks were drawn upon for recruitment. A targeted question was asked the participants during each of the focus group session. A summary of the focus groups, including date, time, recruitment channel, number of participants, as well as targeted question asked, can be found in Table 5.

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Table 5 Summary of focus groups

Residents and Ratepayers [Online] Thursday 17 March 2022, 6-7.30pm Participants were recruited from the Community Working Panel established for the <i>Brimbank Long-Term Asset Plan</i> project Targeted question: How will the proposed changes impact you? 4 participants
People with disability [Online] Tuesday 22 March 2022, 6-7.30pm Participants were recruited with the help of Council's Community Strengthening and Social Planning department Targeted question: What do you want Council to know about how you use the waste service? 2 participants
Young people [Online] Tuesday 29 March 2022, 6-7pm Participants were recruited with the help of Council's Youth Services department Targeted question: What does the future of waste look like to you? 6 participants
Vietnamese Community [Online] Participants were recruited with the help of Brimbank's Vietnamese Community Leadership Program Targeted question: How can Council work with the community to make sure this is the best waste service possible? 3 participants

Focus groups sessions were also planned for people with young children, and older people. Focus group sessions were not able to be coordinated for these groups due to low rates of registration. Community members who are a part of those groups were contacted directly, and were directed to complete the Community Survey, and register for the Community Information Session. They were also provided a channel of direct contact with the project team to answer any of their personalised enquiries.

COMMUNITY INFORMATION SESSION

A Community Information Session was organised to provide general members of the Brimbank community an opportunity to participate in a structured engagement session online. The

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Community Information Session took place via Zoom on Saturday, 2 April, and registration was open to the public. The session was advertised across multiple engagement channels, including the *Your Say* page. Two community attendees were registered for this session, and one attended. The session took an informal format and was tailored to the community member's interests and questions

2.2.5 *Let's Talk Brimbank*

Council hosted four pop-up events in local parks and shopping strips as part of the *Let's Talk Brimbank* initiative. Councillors from all four of Brimbank's wards were present. The *Sorting It Out* project was promoted as a conversation topic in the lead-up to the event, and project team members were present during the events to answer questions. *Let's Talk Brimbank* took place on Saturday 2 April and Sunday 3 April.

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2.2.6 Summary of approach

Table 6 Summary of approach

Approach (audience or location)	Time and participation
Promotion Campaign	
2,216 webpage visits on <i>YourSay</i> 578 social media clicks Graphically designed postcards handed out at pop-up events 15 large banners and information cubes at community venues Published advertisements in the <i>Star Weekly</i> and Brimbank News Issue #4	
Focus Groups & Community Information Session	
Residents and ratepayers	Thursday 17 March 2022, 6-7.30pm 3 participants
People with disability	Tuesday 22 March 2022, 6-7.30pm 2 participants
Young people	Tuesday 29 March, 6-7pm 6 participants
Brimbank's Vietnamese community	Thursday 31 March, 6-7.30pm 3 participants
People with young children	The session was cancelled due to low registration rates. A conversation format was offered to the one interested member in lieu of the session.

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Approach (audience or location)	Time and participation
Older people	The session was cancelled due to low registration rates. Registered members were contacted directly with details of the project, including how to provide feedback. They were also directed to registration for the Community Information Session.
Community Information Session	Saturday 2 April, 2-3pm 2 people registered, 1 participant
Pop-ups	
Sunshine Marketplace	Wednesday 16 March, 12-2pm Over 40 individual conversations, and 13 survey responses. Numerous postcards handed out
Keilor Central	Saturday 19 March, 10am-12pm Over 60 residents and 15 surveys responses
Brimbank Central	Friday 25th March, 10am-12pm Over 35 individual conversations, and 2 survey responses. Over 50 postcards handed out
Alfrieda Street, St Albans	Wednesday 23 March, 12-2pm Approximately 30 individual conversations, and numerous postcards handed out
Community Survey	
Survey open from Monday, 7 March 12am, until Monday, 4 April at 11.59pm 823 responses received	
<i>Let's Talk Brimbank</i>	

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Approach (audience or location)	Time and participation
Saturday 2 April and Sunday 3 April	Councillors and Council officers present to answer questions

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2.3 Engagement limitations

There are several limitations regarding the engagement methodology that should be acknowledged. These are outlined below.

- The *Sorting It Out* community engagement program was a targeted engagement program aimed at ascertaining positive and negative community sentiment towards the draft 4-bin model. Considering this, rescheduling focus groups, and long-spanning recruitment programs, were not within scope of this project. Where rescheduling was not available, community members were guided to further project information, direct contact with project staff, and to complete the Community Survey.
- People who participated in the online engagement self-selected to participate. Participants at the pop-up events were also self-selected. While overall participation was from a broad range of community members it is not a statistically representative sample of the community.
- In some instances, participants used the opportunity to provide feedback that was not related to the project. This feedback has not been included in this report, however all data collected has been provided to Council for consideration. Every effort has been made to summarise feedback accurately and comprehensively. Where responses are open-ended, interpretation has been used, and assumptions are made in the analysis.
- Our detailed analysis is based on the overall findings of the data. A comprehensive data set will be provided to Council at the submission of this report to provide the opportunity for further analysis and cross-checking.

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3 Summary of participants

The following section details a summary of the Community Survey participants. Demographic details of participants who participated in focus groups, pop-ups, or the Community Information Session, were not systematically noted and are thus not included in this section.

3.1 Demographics of survey respondents

The online survey included a series of demographics questions to help Council understand who participated and whether there are issues that need to be considered for certain groups within the Brimbank community. Collecting some demographic information about participants also helps to understand the breadth and representativeness of the survey results.

The following section provides an overview of participants that completed the survey. Overall, it demonstrates that the survey captured feedback from a broad cross section of the Brimbank community both in terms of age, household and dwelling types, and location.

3.1.1 Age

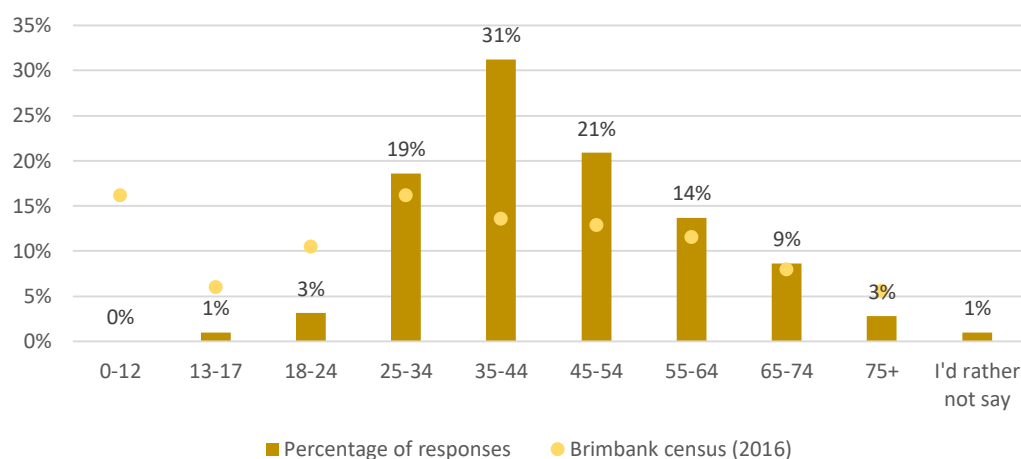


Figure 1 Age of survey respondents (n=823)

Figure 1 displays survey respondents' age groups compared to the Brimbank Local Government Area residential population during the 2016 Census.

As shown in Figure 1, Brimbank residents across all age groups over 12-years of age responded to the survey. The highest representation was from people aged between 35 and 44 years of age who represented 31 per-cent of the survey respondents (257 responses). This was an overrepresentation of that age group compared to the 2016 census data. There was an

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underrepresentation from people younger than 24 years of age, and people aged 75 years and older.

3.1.2 Gender

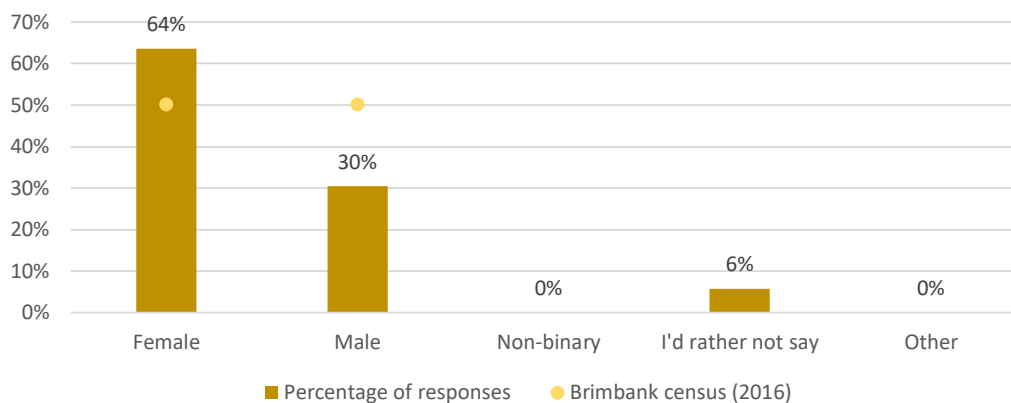


Figure 2 Gender of survey respondents (n=823)

Figure 2 displays survey respondents' gender compared to the Brimbank Local Government Area residential population during the 2016 Census.

64 per-cent of survey respondents (524 responses) identified as female.

3.1.3 Suburb

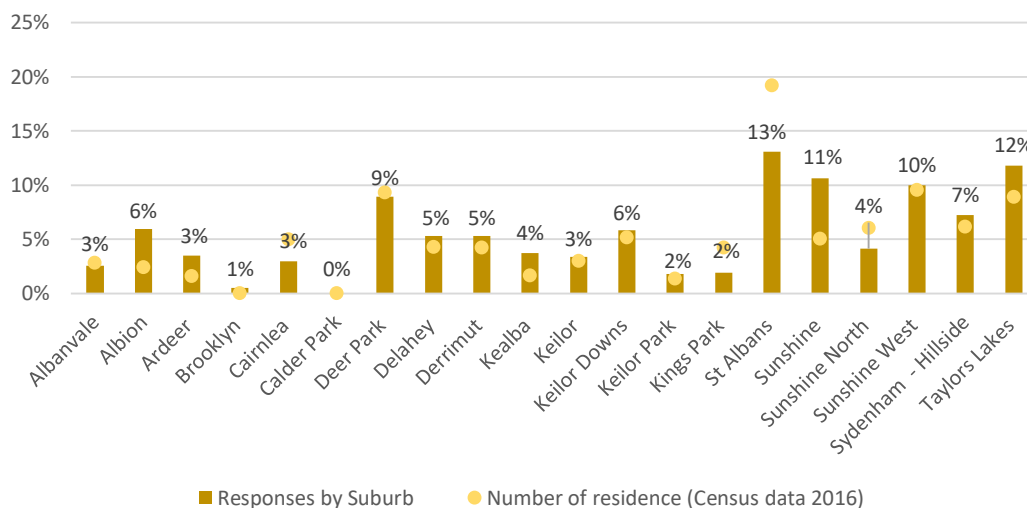


Figure 3 Suburb of survey respondents (n=820)

Figure 3 displays the suburb survey respondents live in or own a property in compared to the Brimbank's residential population during the 2016 Census. Suburbs with lower population rates, such as Albion, Kealba, and Kings Park, where slightly overrepresented in the survey, whereas the more populous suburb of St Albans was slightly underrepresented.

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3.1.4 Residential tenure

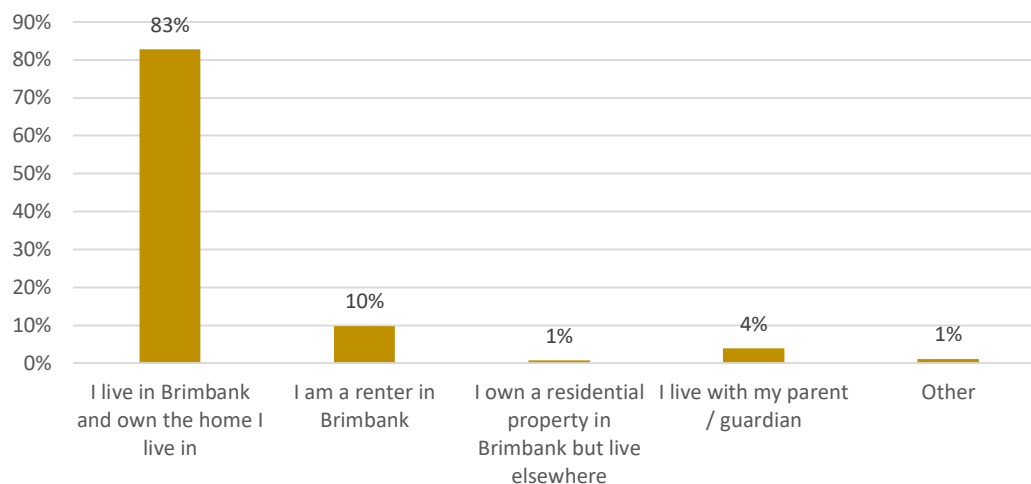


Figure 4 Residential tenure of survey respondents (n=823)

Figure 4 displays the housing tenure types of survey respondents. Survey respondents were able to select more than one answer.

83 per-cent of survey respondents (691 responses) live in Brimbank and own the home they live in. They are overrepresented in this survey compared to the overall population of Brimbank. Renters were underrepresented in this survey, with 82 responses received.

Respondents who indicated 'other' included respondents who work in the municipality, care about waste issues in Brimbank, have purchased homes in Brimbank, are living in properties owned by their extended families or are completing the survey on behalf of family who live in Brimbank.

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3.1.5 Household type

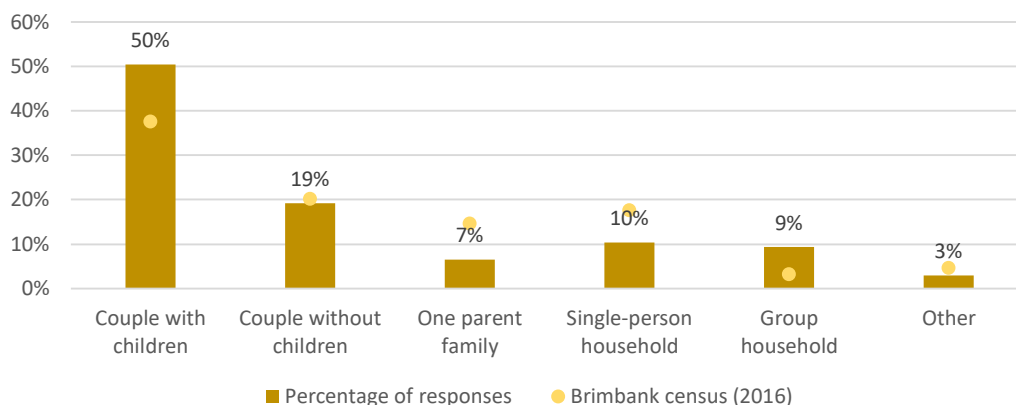


Figure 5 Household type of survey respondents (n=823)

Figure 5 displays the household type of survey respondents. 50 per-cent of responses (415 responses) were received from couples with children. Couples with children and group households were overrepresented, while one parent families and single-person households were underrepresented.

Respondents who indicated 'other' included couples with adult children, children living with parents, multi-family and multi-generational households, widows, children or extended family acting as carers in a household.

3.1.6 Dwelling type

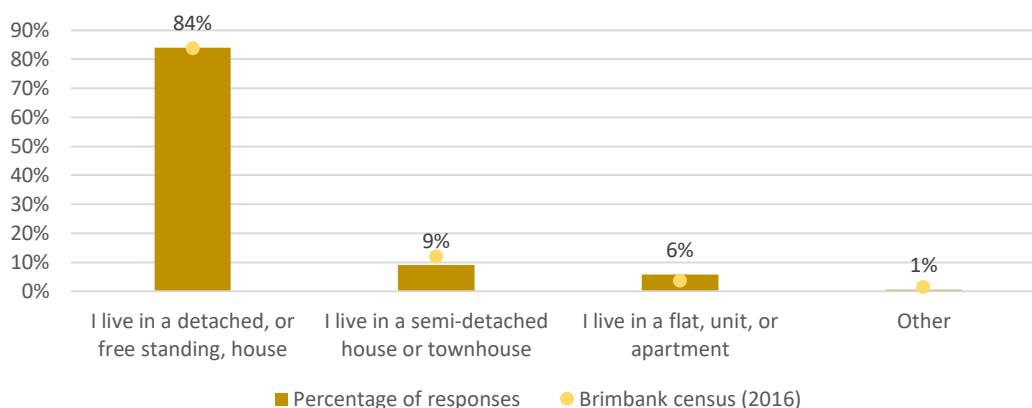


Figure 6 Dwelling type of survey respondents (n=823)

Figure 6 displays the dwelling types of survey respondents. 84 per-cent of survey responses (690 responses) were received from persons living in a detached or free-standing house. Semi-detached houses and townhouses were slightly underrepresented whilst flats, units and apartments were slightly overrepresented when compared to the 2016 census data.

Five respondents stated they live in an 'other' dwelling type. This included respondents who live in a terrace or villa.

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3.1.7 Household composition

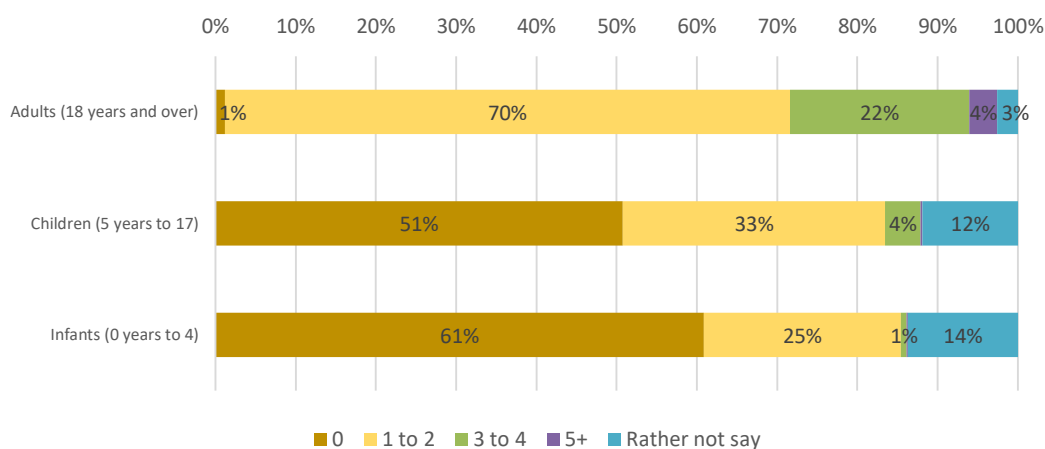


Figure 7 Household composition of survey respondents (n=823)

Figure 7 displays survey respondents' household composition. This is described by the number of children or adults living within the household. One third of all participants live in households with one or two children, and one quarter of all participants live in households with one or two infants. A 'rather not say' option has been included in this graph to account for the participants who did not specify the number of children or adults living within the household.

3.1.8 Language

68 survey respondents stated they speak a language other than English at home.

The top languages are Vietnamese (14 respondents), Maltese (6), Spanish (6), Greek (5) and Italian (5).

Additional languages spoken include:

Khmer	Cantonese	Swedish
Hindi	Polish	Telugu
Macedonian	Arabic	Hokkien
Thai	Punjabi	Serbian
Mandarin	Mandinko	Filipino (Tagalog)
Bahasa Melayu	Bosnian	Croatian
Hebrew	Turkish	

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4 Findings

4.1 Overall sentiment

In the Community Survey, participants were asked to consider two primary questions.

The first question, “Do you think the proposed changes will be good for the Brimbank community”, asked participants to consider possible community benefits of the changes. The responses to this question are outlined in Section 4.2

The second question, “Do you think the proposed changes will suit your households needs?”, asked participants to consider how their household would be impacted by the changes. The responses to this question are outlined in Section 4.3.

53 per-cent of participants believe the proposed service is good for the community, including those that have concerns. 41 per-cent believe the proposed service is not good for the Brimbank community, including those that recognise its positive aspects.

These findings contrast to the responses received to the second question, where 21 per-cent of participants believe proposed service will suit their household’s needs, and 62 per-cent believe it will not suit their household’s needs.

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4.2 Benefit for Community

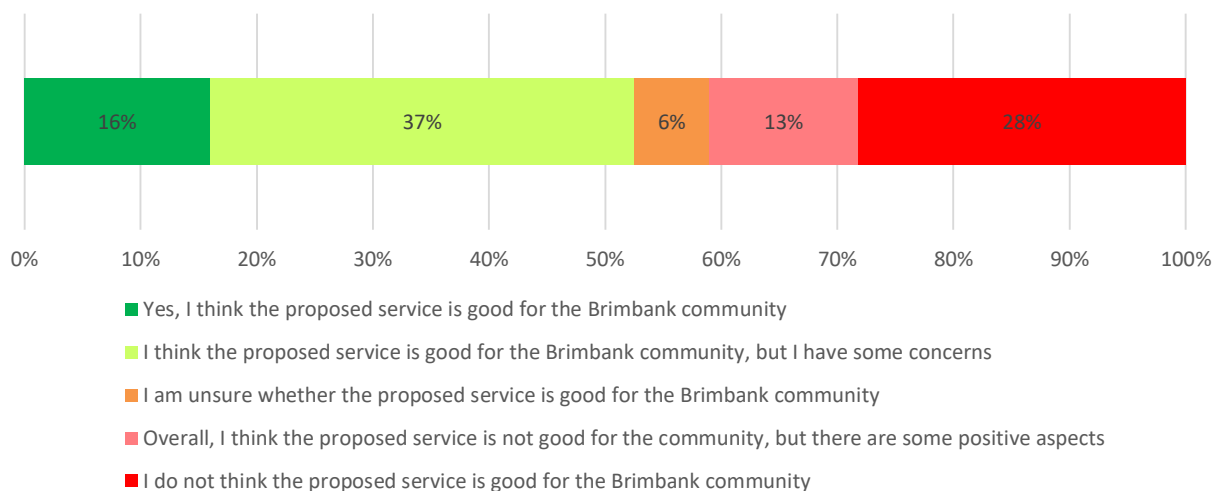


Figure 8 Survey respondents' response whether the proposed service will benefit community (n=823)

Figure 8 displays the survey respondents' responses to whether the proposed 4-bin service will benefit the Brimbank community. The greatest number of participants believed that the proposed service is good for the Brimbank Community but have concerns (37 per-cent). Over one-quarter of participants do not believe that the proposed service is good for the Brimbank community (41 per-cent).

This finding highlights an opportunity for Council to lead communication and education to target the concerns held by the large number of community members who can see the community benefits of the proposed changes. It also provides an opportunity to generally spread awareness of the community benefits to the Brimbank community broadly.

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4.3 Household needs

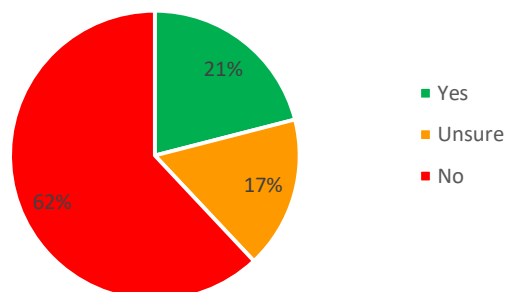


Figure 9 Survey respondents' response whether the proposed model will suit their household's needs (n=824)

Survey respondents were asked if they think the proposed model will suit their household's needs. As shown in Figure 9, 21 per-cent of respondents stated the proposed model will suit their household's needs whilst 62 per-cent said it will not. 17 per-cent of respondents were unsure.

The reasons why participants think the proposed model will or will not serve their household needs are detailed in the following sections.

4.3.1 Suits household's needs

175 participants responded that the proposed service would suit their household's needs. In the Community Survey, participants were given the option to describe the reasons why it would suit their household's needs. A summary of these responses is detailed below:

General:

- There were many households with high awareness of landfill's environmental impacts and the recycling system, or already desire to reduce and separate waste such as recyclable materials and composting.
- Some households foresee the change will encourage them to be more conscious of their waste, sorting and be more environmentally friendly. This includes separating glass, not including food waste in the garbage bin, and reducing overall landfill.
- Survey respondents found the proposed model easy to understand and follow.
- A few respondents shared they are confident or look forward to the model as they have seen it work in other Councils or have experienced FOGO bins and the reduction of garbage it creates in Europe or regional Victoria.

Garbage and FOGO:

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- Many households' waste mainly consists of compostable items or waste that can be placed in FOGO bins. These households appreciate the addition of FOGO bin, the environmental benefit this will have and the minimal garbage they will create.
- Some households who do not have a compost bin such as renters with minimal space appreciate the introduction of FOGO bins. Many respondents appreciated the disposal of organic waste which is difficult or unable to be composted at home but can be placed in FOGO bins including meat, seafood, citrus and dairy.
- Fortnightly garbage will not be an issue for many households who have minimal garbage waste, thus do not fill their garbage bins, or get it collected fortnightly or monthly. Additionally, fortnightly garbage collection may help some households understand the quantity of waste they dispose.
- A few households shared they believe their waste will not reduce or reduce minimally due to owning a worm farm, compost, or chickens.
- Some households understand or desire weekly FOGO collection.

Recycling and glass:

- There was mixed need for recycling bins as some households currently put it out monthly whilst fortnightly suits other households.
- Additionally, there was mixed need and use of glass. A few households acknowledged a glass bin will help them reduce their volume of recycling as it often currently overflows, whilst others stated they do not use much glass so monthly glass collection is suitable or too frequent.
- Some survey respondents appreciated the improvements that separating glass from recycling makes to the recycling process and system, thus happy to separate.

Despite 21 per-cent of survey respondents believing the proposed model will suit their household needs, the following issues and concerns were raised.

- Minimal space for four bins.
- The need for an extra collection of all bins during the Christmas break.
- Many respondents were concerned for fortnightly garbage collection. This is due to odour, insects, and rodents from rubbish including nappies and animal litter and faeces which cannot be placed in the FOGO bin. Despite this, other respondents thought fortnightly collection will work despite the disposal of nappies and that it may encourage many families to move to cloth nappies.
- There was concern other households will further contaminate the recycling bin with fortnightly rubbish and many Brimbank residents will line bins with plastic to not to have dirty bins. There was desire for further inclusive council-wide education around contamination and what waste can be placed in each bin.
- A few respondents were worried about the cost and rate increase. There was suggestion for a rate reduction for use of smaller bins.
- There was concern for elderly or memory impaired people who already struggle with two bins.

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- There was concern recycling is confusing with inconsistent standards across municipalities including what can and can't be recycled.
- There was desire for FOGO bins to allow council-provided compostable bin tidy bags.
- There was concern for the number of bins and space needed for apartment blocks and apartment dwellers who currently contaminate apartment recycling bins.
- There was concern for managing contamination and waste separation within the home, thus raising the option of household sorting systems such as used in Scandinavian households.

4.3.2 Doesn't suit household's needs

512 participants responded that the proposed service would not suit their household's needs. In the Community Survey, participants were given the option to select which streams of the draft 4-bin model would not suit their needs, as well as the reasons why.

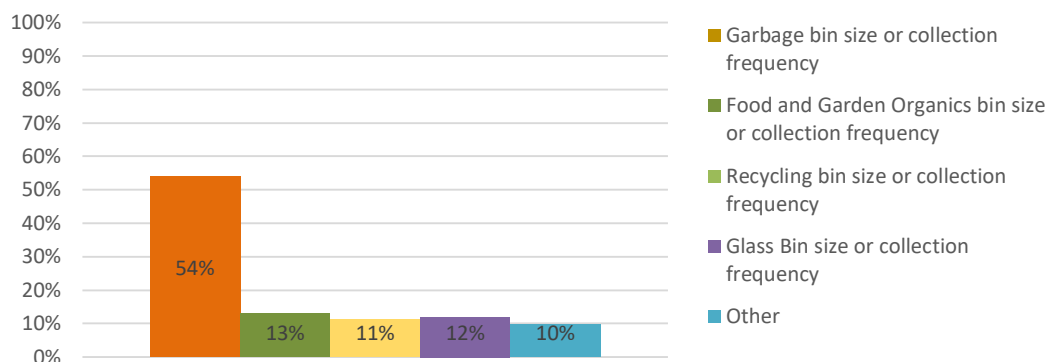


Figure 10 Answers to the question "Why do you not agree with this proposed service?" from participants who answer "No" in Figure 9 (n=758)

Figure 10 displays which waste streams participants believe will not suit their household needs. Participants were able to select multiple reasons when answering this question, accounting for a sample of 758. Garbage bin size or collection frequency (54 per-cent) was a dominant factor for survey participants who do not believe the proposed changes will meet their household needs. There was minor variation between the other streams.

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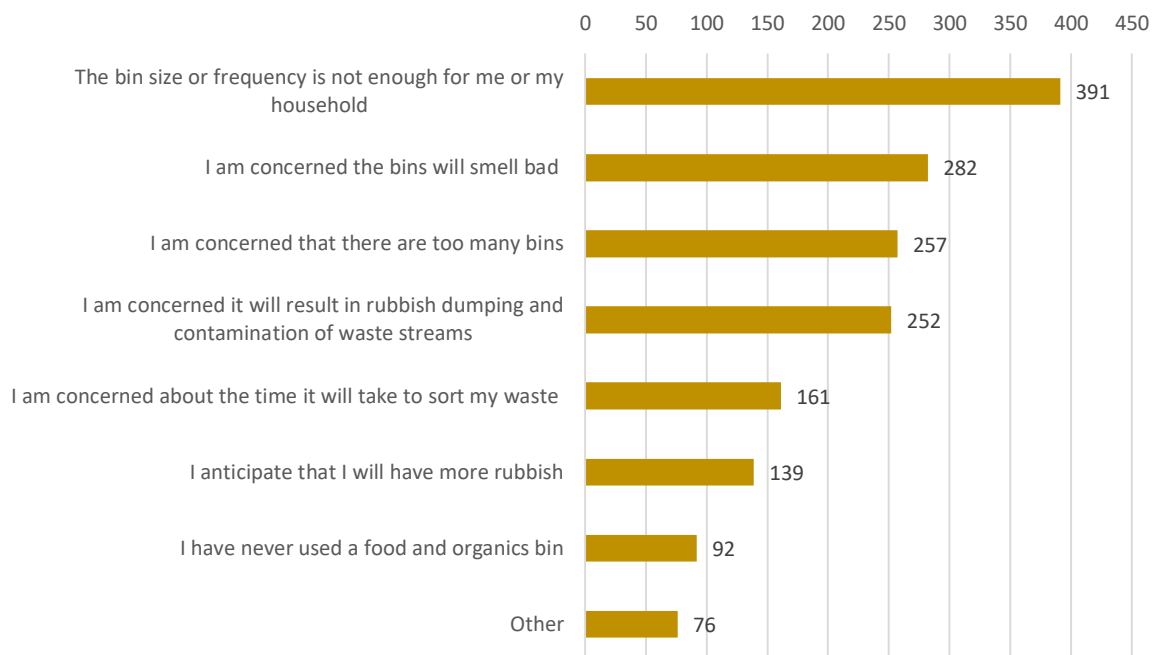


Figure 11 Reasons why participants answered “No” to the question “Do you think the proposed service will suit your household's needs?” (n=1650)

Figure 11 displays the reason why participants believe the model will not suit their household needs. Participants were able to select multiple reasons when answering this question, account for a sample of 1650. 24 per-cent of responses included *The bin size or frequency is not enough for me and my household* as a reason. *I am concerned the bins will smell bad*, *I am concerned that there are too many bins*, and *I am concerned it will result in rubbish dumping and contamination of waste streams*, still featured prominently.

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4.3.3 Unsure if it will suit household's needs

137 participants responded that they were unsure whether the proposed service would suit their household's needs. In the Community Survey, participants were given the option to select which streams of the draft 4-bin model they are unsure about, as well as the reasons why.

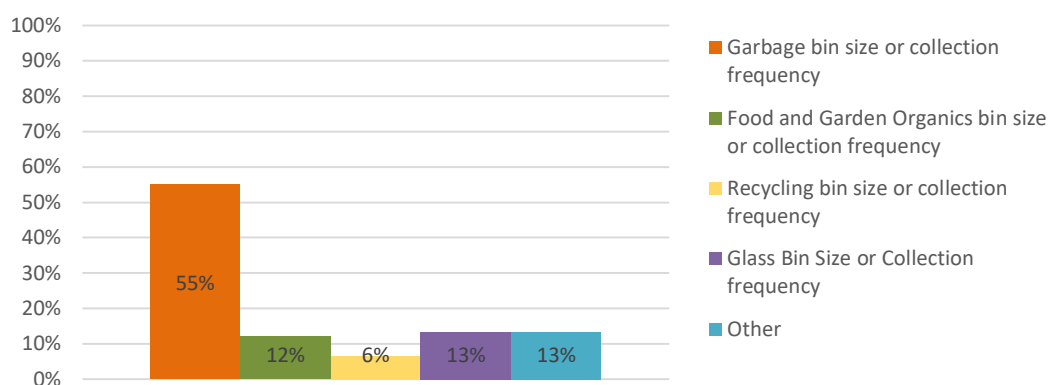


Figure 12 Answers to the question “Why do you not agree with this proposed service?” from participants who answer “Unsure” in Figure 9 (n=158 responses)

Figure 12 displays which waste streams participants are unsure will suit their household needs. Participants were able to select multiple options when responding to this question, accounting for a sample of 159. Garbage bin size or collection frequency (55 per-cent) was a dominant factor for survey participants who do not believe the proposed changes will meet their household needs. Recycling bin size of collection frequency was less of a concern than for those who replied “No” in Figure 9. There was minor variation between the other streams which a slightly higher level of concern for “Other” reasons.

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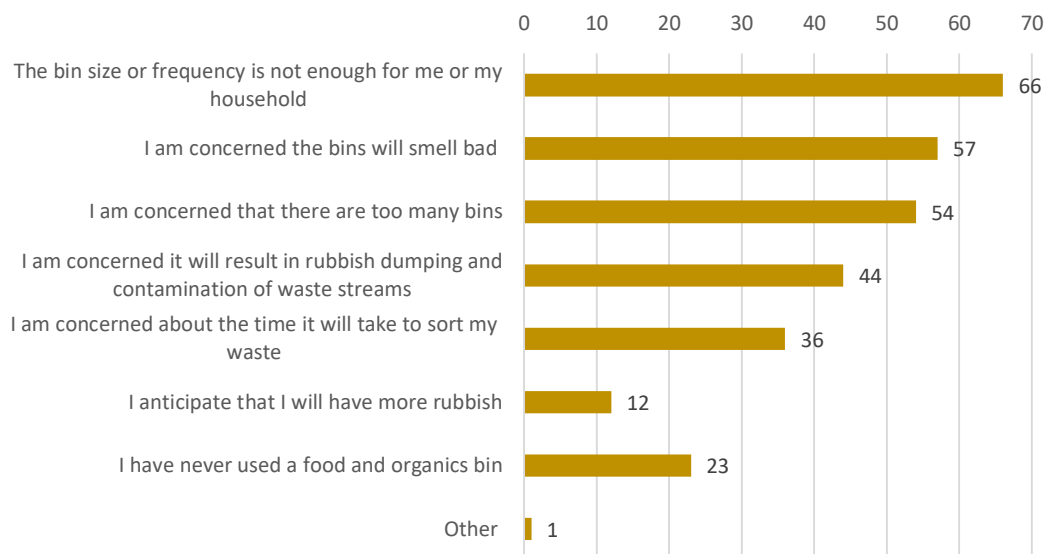


Figure 13 Reasons why participants answered “Unsure” to the question “Do you think the proposed service will suit your household's needs?” (n=158 responses)

Figure 13 displays the reason why participants are unsure the model will not suit their household needs. 23 per-cent of responses included *The bin size or frequency is not enough for me and my household* as a reason. *I am concerned the bins will smell bad*, *I am concerned that there are too many bins*, and *I am concerned it will result in rubbish dumping and contamination of waste streams*, featured prominently. These results mirror the findings from participants who believe the proposed changes will not suit their needs.

4.3.4 Responses to “Other”

Participants were able to select “Other” as a reason as to why they do not think the proposed model will not meet their needs. Representative answers captured under the open-ended option for “Other” are detailed below.

“Also, should be able to “bank” hard rubbish up to 3 amounts in a 5-year period if not used. Suggest an annual date for hard rubbish plus one additional per household”

“We would need a multilingual education process. I hope there will be community education in community languages and presented as best as possible to our wide cultural community”

“It might be best to roll out some ‘War on Waste’ style education at the same time - it was this show that got us down to minimal landfill”

“Council should keep promoting the benefits of home composting and worm farming as it is great for providing many people/gardeners with free garden food, reduce their gas emissions and provide many health benefits”

“Stickers on outside of bins to define what can be put inside”

“It would also be great to have a bin for electronic waste and batteries, etc”

“I'd also like to separate paper and cans from plastic, maybe if there were community points to recycle cans and paper”

“Soft plastics are a huge issue and would further reduce landfill if we had an option for easy recycling from home”

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“A discount for cloth nappy family should be something to consider to encourage [putting] less into waste”.

4.3.5 Findings by demographics

Analysis of the Community Survey responses was done across demographics, for whether the proposed changes would suit the respondents' household needs.

Age:

- People between 35 – 44 years' old, and 45 – 52 years' old, were most likely to respond that the proposed model will not suit their household needs. Findings for people between 13 – 17 years' old (75 per-cent) was limited due to a low response rate (4 responses).
- People between 55 – 64 years' old were most likely to respond that the proposed model will suit their household needs (25 per-cent). They were also most likely to be unsure if the changes will suit their needs (30 per-cent).

Gender:

- 65 per-cent of males, and 59 per-cent of females, do not believe the proposed model will suit their household needs. Findings for non-binary people are limited with one response.

Suburb:

- People living in Kealba (86 per-cent), Hillside (86 per-cent), Cairnlea (78 per-cent), Kings Park (73 per-cent), and Deer Park (71 per-cent), were most likely to respond that the proposed model will not suit their household needs. The representativeness for Hillside and Kings Park is limited due to low response rates (5 and 15 responses respectively).
- Sunshine (34 per-cent), Albion (37 per-cent), Brooklyn (50 per-cent), Ardeer (33 per-cent), were mostly likely to respond that the proposed model will suit their household needs. The representativeness for Brooklyn is limited due to low response rates (4 responses).
- People living in Sunshine North were most likely to be unsure if the proposed changes will suit their household needs (25 per-cent).

Household type:

- Group households were most likely to respond that the proposed model will not suit their household needs (77 per-cent), followed by one parent families (70 per-cent)
- Couples without children were mostly likely to respond that the proposed model will suit their household needs (31 per-cent), followed by single-person households (27 per-cent).

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Dwelling type:

- People living in semi-detached houses or townhouses were more likely to believe the proposed model will suit their household needs (27 per-cent), compared to detached or free standing houses (13 per-cent) and people in flats, units, or apartments (15 per-cent).
- People in flats, units, or apartments, were most likely to respond that they proposed model will not suit their household needs (71 per-cent).

4.4 Focus group and pop-up findings

Additional findings were identified from the Focus Groups and pop-ups. These findings are summarised below under key themes and observations by the project team.

FOCUS GROUPS**Residents and ratepayers***Key Themes*

- Customisation based on various needs
- Logistics and space
- Waste-stream contamination (with children / educating the broader community)
- Household compost and FOGO.

Observations

Participants acknowledged the “big picture” benefits and rational of the service. This included environmental as well as statutory reasons. Participants’ questions were all able to be addressed by the project team during the session. Participants approached the session with genuine curiosity and a willingness to learn. There was no discernible discontent or outrage.

People with disability*Key Themes*

- General support for the changes
- Education and implementation
- Sensitivity to household diversity

Observations

Participants believed the changes would have good outcomes for the environment. There was a concern that contamination in the bins would be an issue and therefore a strong need for education alongside the rollout. Another key concern was the potential rising cost of the bin

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service and how this would be tough on pensioners and requested that Council could offer a discount for people struggling financially.

Young people*Key themes*

- Strong environmental focus
- Focus on changes and Council waste services more broadly
- Behavioural change

Observations

Every participant was highly engaged, and the session was host to a high volume of questions. Participants were widely supportive of the changes, in particular its environmental orientation. Some participants believed the proposed model will cause people to reflect on sustainability more broadly. A wide range of questions were taken in response to the changes and waste services more broadly. Further engagement with young people may be warranted to address these questions.

Brimbank's Vietnamese community*Key themes*

- The need to communicate changes to Brimbank's various communities
- Education and implementation opportunities
- Waste-stream contamination

Observations

All participants were active community members, and participants to several community groups. Participants were supportive of the change but anticipate the difficulty in communicating changes to prevent waste stream contamination. Participants had practical ideas of how to communicate changes to the public, including with children. These include participating in multicultural community events and providing ongoing support and clear signage

POP-UPS**Sunshine Marketplace***Key themes*

- Bin size and amount (for low waste producing households)
- Cost of the service (and prospect of concession).
- Garbage frequency for households with high volume nappies (including people with incontinence, young children)

Observations

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It was noted that participants believed bin size and increase in number was excessive of the households needs, as many residents already active composters and do not generate much waste.

Keilor Central*Key themes*

- Glass bin (both excessive and insufficient)
- Small related to FOGO
- Bin size and frequency
- Contamination

Observations

There were mixed attitudes towards the proposed draft service. A necessity for Council action was noted surrounding bin contamination, but responses varied greatly by household needs. Common themes included additional cost concerns (especially amongst concession card holders) and fortnightly garbage collections; and residents living alone commented that the bins were too big for them and not necessary.

Brimbank Central*Key themes*

- Price and concessions
- Customisability
- Bin size and frequency

Observations

It was observed that the verbal feedback from the pop up was mainly positive. Strongest concerns were bins sizes and number of bins, as many community members did not believe they generated that much waste. Cost and concessions rates were also a concern. A majority of community members were already knowledgeable about the changes. The community welcomed the chance to speak to council staff about the proposed service.

Alfrieda Street, St Albans*Key themes*

- FOGO concerns, including smell, rodents, and bin liners
- General support

Observations

There was general support and gratitude for the proposed service. A small minority of participants felt personally impacted by the changes and responded in an anti-social way. A language barrier was noted at this pop-up.

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4.5 Questions raised

The following questions were raised by participants throughout all engagement methods. These questions may help form future engagement or education.

Cost

- How much will the change and proposed service cost rate payers?
- How will rates change for people who currently do and do not have green waste bins?

Garbage and FOGO

- What can be placed in the FOGO bin? Will include meat, dog poo and compostable shipping bags, nappies and cat litter?
- Can we use (biodegradable, paper or plastic) bags/liners in the FOGO bin?
- What happens when someone throws a plastic bag into the FOGO bin?
- What will happen to FOGO waste?
- Will residents receive a kitchen caddy for the FOGO bin?
- Who will clean the mess from the inevitable knocked over organic bins?
- Currently, our fortnightly green waste collection is often missed by the truck. Will this change?

Recycling and glass

- What can you put in the glass bin? Will it include lids?
- Do you need to wash glass or recyclable items?
- What is acceptable in the recycling bin? Will it include polystyrene?
- What is the current process of the recycling system?
- Will broken glass be recyclable in the glass bin?
- Why was glass chosen for the fourth bin and not paper, plastic or metal?

Other

- I don't have space on my property/apartment complex or on the curb for four bins, where do we put them all? Is there an option for a larger communal bin or area for townhouses or apartments?
- How will Council educate residents?
- How is Council going to address contamination?
- Could there be a trial of the proposed service in a neighbourhood to test the outcomes?
- What happens to the current bins? Who takes them away?

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- Will it be compulsory for everyone to change to four bins? Will everyone's rates be changed?
- Can residents request larger or smaller bins?
- Has a study into illegal dumping been completed? How is Council addressing current illegal dumping on nature strips?
- Will there be Council run soft plastic recycling in the future?

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4.6 Engagement summary table

Table 7 Engagement summary table

Approach	Number of respondents	Findings summary
Community Survey	823 responses	Comprehensive and wide-reaching participation 53% see community benefit, 41% believe it is not good for the community 62% believe it will not suit their household needs, 17% are unsure, and 21% believe it will suit their household needs Discrepancies when asked whether change is good for the community, and whether it will suit household needs Most answers captured by reasons provided (85%) highlight that barriers to adoption are well known and documented.
Focus groups & Community Information Session	17 total participants, including: • 3 participants in the Residents and ratepayers session • 2 participants in the People with disabilities session • 6 participants in the Young people session	Each focus group expressed the need for a robust education and implementation program Participants engaged with the recruitment channels were supportive of the changes Focus Group conversations captured desire for consideration of household diversity.

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	• 3 participants in the session for Brimbank's Vietnamese community • 1 participant in the Community Information Session	
Pop-ups	Approximately 165 conversations undertaken, and 30 surveys Numerous postcards distributed at events	Findings from the pop-up discussions did not reflect survey data Pop-up participants were more likely to consider the number or volume of bins to be excessive for their needs Passive engagement facilitated high levels of participation, and participants appreciated the opportunity to have conversations with Council staff.
Other engagement methods	8 e-mails received A high level of increased volume of enquires to customer service centers <i>Let's Talk Brimbank</i> generation discussion from Councilors	High levels of feedback received from Council channels outside of the engagement program highlight the value for broad education to further disseminate project messaging.
TOTAL	Approximately 1013 items of feedback were received in the duration of the engagement period	

5 Conclusions

5.1 Engagement summary

The community engagement program for the *Sorting It Out* project was extensive and far-reaching. The Community Survey and *Your Say* page served as a vital channel of information.

The Engagement Findings found great variation between responses when participants were asked to consider community benefit separate to their household needs. This highlights an opportunity for Council to gain leverage from the community benefits of the proposed changes, while also addressing community concerns that the revised bin frequency collection schedule will address household needs.

A summary of the engagement and its relationship to the Engagement Objectives is detailed below:

To test the proposed draft 4-bin model with community, based on industry best practice

The proposed draft 4-bin model was promoted across a suite of online and offline methods. It was communicated to key community members and started conversations. It has been successfully explained to and tested with the community.

To understand positive and negative community sentiment to the proposed draft 4-bin model

Over 1000 items of feedback were received, expressing their sentiment to model. This has resulted in a robust data base which has informed the findings of this report.

To ensure diverse voices contribute to the discussion

The broad reach of engagement has successfully captured diverse voices. Future engagement may draw on the benefit of longer timeframes to deeply engage with Brimbank's diverse community.

To educate the community about waste and Council services; and

To communicate with the community clearly and transparently about waste collection changes and their implications

Online engagement has had a far-reaching impact. All collateral provided baseline information and directed community members to access the online portal which further communicated the proposed 4-bin model.

To maximise participation by high visibility of the engagement program

Community members were given multiple opportunities for engagement, and the proposed project was advertised extensively using advertisements, Council information channels, and online.

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The intention of this engagement program was to test and understand sentiment towards the draft 4-bin model. The findings of this report can be used to assess the suitability of the draft 4-bin model for the Brimbank Community. When assessing suitability, this report may be considered with other bodies of evidence, including environmental impact assessments and case studies.

5.2 Consultant observations

The *Sorting It Out* project was undertaken by a team of dedicated and experienced project team members. Opportunities to talk to Council staff were received well by community members. Of note was the conversational aspect and high participation rates of the pop-ups, which captured the interest of passers-by.

Participant numbers for the Focus Groups did not reach the levels anticipated. This did not impact the quality of the engagement, and meaningful and productive discussions took place within those sessions accommodated by smaller numbers. The participants were highly engaged, active members of the community, who expressed the intention to spread information about the project to their respective communities. The Focus Group sessions thus achieved their purpose and objectives by disseminating project information to targeted groups, raising awareness of the community engagement program, and providing space to learn about the project in a safe environment.

This report has detailed some key questions raised. These questions can be used to guide future education and communication during the implementation of the 4-bin model.

5.3 Next steps

This report will be submitted to Council. It will form one part of a greater body of evidence in the submission of the proposed 4-bin model to Council for consideration.

Subject to Council adoption of a new 4-bin model, Council will implement a 12-month long education program as a preliminary part of the model implementation.

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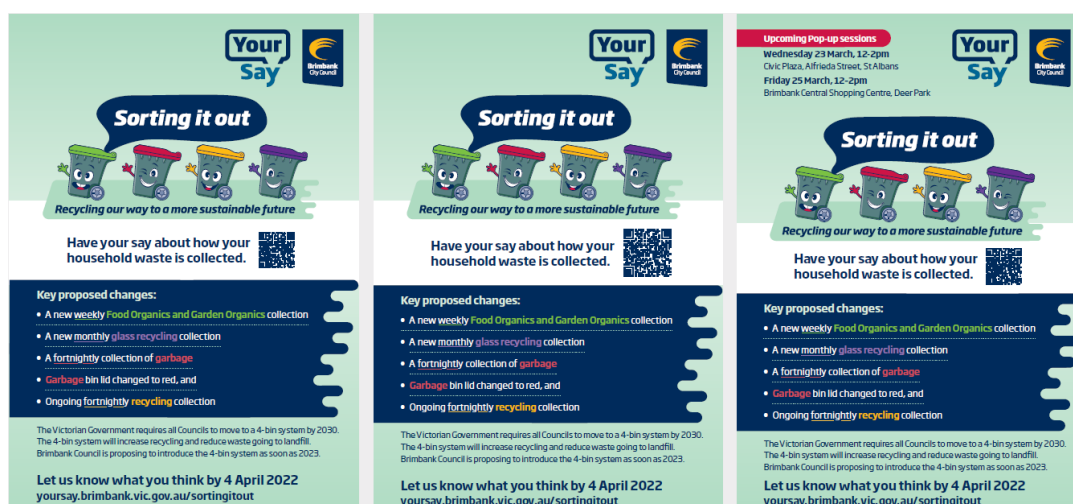
Appendices

Appendix A: Snapshot of collateral

1. Stacking Cubes Design



2. Adverts



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3. A-Frame Signs (A1)



Your Say Brimbank City Council

Sorting it out

Recycling our way to a more sustainable future

Have your say about how your household waste is collected.



Key proposed changes:

- A new weekly **Food Organics and Garden Organics** collection
- A new monthly **glass recycling** collection
- A fortnightly collection of **garbage**
- **Garbage** bin lid changed to red, and
- Ongoing fortnightly **recycling** collection

The Victorian Government requires all Councils to move to a 4-bin system by 2030. The 4-bin system will increase recycling and reduce waste going to landfill. Brimbank Council is proposing to introduce the 4-bin system as soon as 2023.

Let us know what you think by 4 April 2022
yoursay.brimbank.vic.gov.au/sortingitout

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4. A-Frame Signs (A1) with Infogram



yoursay.brimbank.vic.gov.au/sortingitout

050-0122

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5. Digital Screen



Sorting it out

Recycling our way to a more sustainable future

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6. Banner



The banner features a light green background. At the top left is the 'Your Say' logo in a speech bubble, and at the top right is the Brimbank City Council logo. In the center, a dark blue speech bubble contains the text 'Sorting it out'. Below this, four cartoon bins with faces and arms are shown: a green bin, a red bin, a yellow bin, and a purple bin. Below the bins, the text reads 'Recycling our way to a more sustainable future'. To the right of the bins is a QR code. Below the QR code, the text says 'Have your say about how your household waste is collected.'.

Key proposed changes:

- A new weekly **Food Organics and Garden Organics** collection
- A new monthly **glass recycling** collection
- A fortnightly collection of **garbage**
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Let us know what you think by 4 April 2022

yoursay.brimbank.vic.gov.au/sortingitout

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Appendix B: Community Survey

1. About you

Please tell us a little bit about yourself. This helps us to understand who we are hearing from.

2. Please select all that apply to you

- I live in Brimbank and own the home I live in
- I am a renter in Brimbank
- I own a residential property in Brimbank but live elsewhere
- I live with my parent / guardian
- Other (please specify)

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3. Which suburb/s of Brimbank do you live or own a property in?

- Albanvale
- Albion
- Ardeer
- Brooklyn
- Cairnlea
- Calder Park
- Deer Park
- Delahey
- Derrimut
- Hillside
- Kealba
- Keilor
- Keilor Downs
- Keilor East
- Keilor Lodge
- Keilor North
- Keilor Park
- Kings Park
- St Albans
- Sunshine
- Sunshine North
- Sunshine West
- Sydenham
- Taylors Lakes
- Tullamarine
- Other (please specify) _____

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4. What is your gender?

- Female
- Male
- Non-binary
- I'd rather not say
- Other: please specify_____ -

5. What is your age (in years)?**7. What language do you speak at home?**

- English
- Language other than English: please describe: _____

8. What best describes your household?

Couple with children

Couple without children

One parent family

Single-person household

Group household

Other

9. What best describes your residence?

I live in a detached, or free standing, house

I live in a semi-detached house or townhouse

I live in a flat, unit, or apartment

Other

10. How many adults (aged 18 years or older) live in your home?**11. How many children (aged 5 to 17 years) live in your home?**

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12. How many infant children (aged 0 to 4 years) live in your home?

Questions

About the proposed collection service and options to meet your household's needs

Our proposed waste service

The proposed 4 bin model includes:

Weekly Food and Garden Organics collection (240 litre bin)

Fortnightly Garbage collection (140 litre bin)

Fortnightly Recycling collection (240 litre bin)

New monthly Glass collection (140 litre bin)

1 free at-call hard waste collection per year

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Key questions**Do you think the proposed 4-bin service will benefit for the Brimbank community?**

Yes, I think the proposed service is good for the Brimbank community

I think the proposed service is good for the Brimbank community, but I have some concerns

I am unsure whether the proposed service is good for the Brimbank community

Overall, I think the proposed service is not good for the community, but there are some positive aspects

I do not think the proposed service is good for the Brimbank community

Do you think this proposed model will suit your household's needs? (yes/unsure/no)

YES / UNSURE / NO

If yes...

Please tell us why you think the proposed 4-bin model will suit your household needs.

If no/unsure...

Why do you not agree with this proposed service?

Garbage bin size or collection frequency

Recycling bin size or collection frequency

Food and Garden Organics bin size or collection frequency

Glass bin size or collection frequency

Overall

Other

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The bin size or frequency is not enough for me or my household

I am concerned about the time it will take to sort my waste I am concerned the bins will smell bad

I am concerned that there are too many bins

I am concerned it will result in rubbish dumping and contamination of waste streams

I anticipate that I will have more rubbish

I have never used a food and organics bin

Other

Other questions

Before you completed this survey, how much did you know about Council's waste collection services?

1 2 3 4 5

How would you like Council to communicate waste collection service changes with you? to

Email updates

Letters to your house

Public advertising

Information (flyers and fact sheets) at community centres and Council facilities

Notices in Council newsletters and publications

Household items like magnets or calendars

Other

How did you find out about this survey?

Council updates

Your Say page

From a friend or neighbour

Information posters or post-cards

Social media

From a community member or community group I am a part of

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Other [Please describe]

Please tick this box if you would you like to receive email updates about this project and changes to Council's waste services.

Kerbside Waste Audit

A Submission to Brimbank City Council

13 May 2022





Kerbside Waste Audit

A Submission to Brimbank City Council (ABN 35 915 117 478)]
Job No. 222-1012718

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Glossary

Terminology	Definition
CDS	Container deposit scheme
Council	Brimbank City Council
GO	Garden organics
kg	kilograms
LGA	Local Government Area
MRA	MRA Consulting Group
REC	Recycling
SV	Sustainability Victoria



Calculations

Contamination Rate is the amount of non-compliant material in a waste stream, expressed as a percentage, of the total weight of the waste stream.

$$\text{Contamination Rate (\%)} = \frac{\text{Total weight of non – compliant material}}{\text{Total weight of waste stream}} \times 100$$

Resource Recovery Rate is the amount of material recycled or composted expressed as a percentage of the overall amount of recyclable or compostable material generated.

$$\text{Resource Recovery Rate (\%)} = \frac{\text{Total weight of compliant material in REC (or GO) bins}}{\text{Total weight of recyclable (or GO compliant) material in all bins}} \times 100$$

Leakage (resource loss) is the amount of recyclable or compostable material disposed in the wrong bin expressed as a percentage of the overall amount of recyclable (or compostable material) in all bins.

$$\text{Leakage (resource loss) (\%)} = \frac{\text{Total weight of recyclable (or compostable material) in wrong bin}}{\text{Total weight of recyclable (or compostable material) in all bins}} \times 100$$

Household Diversion Rate is a measure of the proportion, expressed as a percentage, of the total waste diverted from landfill by households.

$$\text{Household Diversion Rate (\%)} = \frac{\text{Weight of material in REC and FOGO bins}}{\text{Total weight of all bin contents}} \times 100$$



Executive Summary

MRA Consulting Group (MRA) was engaged by Brimbank City Council to undertake a composition audit of the kerbside waste streams, including garbage, recycling (REC) and garden organics (GO).

The audit will provide critical input for the evaluation of current Council's waste performance and inform future 4-bin roll out to residents.

The target sample size for the audit, according to Council's requirements, was garbage and REC bins from 250 premises, and GO bins from 125 households.

The objectives of the waste audits were to determine:

- Bin fullness state for each bin type (% volume/volume);
- Average garbage, recyclables and green organics generated (kg/week/household);
- Resource loss of recyclables and garden organics in garbage waste stream (% weight/weight);
- Resource recovery rate of recyclables and garden organics (% weight/weight);
- Contamination rates of REC and GO waste streams (% weight/weight);
- Average household generation of eligible container deposit scheme (CDS) containers; and
- Average household generation of food waste in non-certified compostable bags.

The results from the audit indicate that:

1. A total of 3,359 kg was collected from weekly garbage bins, 2,225 kg from fortnightly REC bins and 3,316 kg from fortnightly GO bins.
2. On average, households generated a total of 13.17 kg of garbage per week, 4.36 kg of REC waste per week and 13.26 kg of GO waste per week.
3. Organics comprise the largest proportion of the overall garbage waste (55%) followed by other (18%) and paper and cardboard (13%).
4. Paper and cardboard comprise the largest proportion of overall recycling waste (35%) followed by glass (24%) and plastic (16%).
5. Organics comprise the largest proportion, at 99% of the total weight of the GO stream.
6. The resource recovery rate of recyclable materials is 68%.
7. The resource recovery rate of green organics is 95%.
8. The household diversion rate is 57%.
9. The recycling stream was found to contain 30% of contamination material.
10. The GO stream was found to contain 3% of contamination material.
11. On average, the garbage bin audited were 77% full while the GO and REC bins sampled were 81% full.
12. From extrapolation of generation rates calculated from the audit, an estimate of 1,135,103 CDS eligible containers are produced on average in the whole Council's LGA per week.

Based on household diversion rates and recycling rates, there is still significant margin for improvement to reduce waste to landfill.

A substantial number of bins throughout all three waste streams was found to be full or overfull. As a result, leakage between the waste streams may occur, causing higher contamination rates and resource loss.

CDS containers are mostly found in the REC stream with little loss in other streams.



Based on the results of the audit, MRA recommends that Council consider further actions in the following areas:

- Monitoring and education programs:

It is recommended that recycling education programs are specifically tailored to:

- achieve a higher understanding of non-compliant materials categories that will lower contamination rates. Specifically targeting problematic materials such as non-recyclable plastics, textiles, liquids, nappies, ceramics, mixed recyclables in plastic bags, napkins and paper towels.
 - reduce lost resources that currently have a low recovery rate in garbage bins
 - consider differences in waste generation due to COVID 19 (e.g. stress the importance of flatten cardboard boxes before disposing of them in the REC bins)
- Reassessment of REC service provision to household considering offering a larger (360L MGB) to large households on request.
- Conduct further studies:
 - Future waste audit targeting differences in waste generation between suburbs or areas with different demographics would allow Council to tailor actions for service improvement to specific areas.
- Conduct waste audits on an ongoing basis:

It is recommended that Council conduct another waste audit after the implementation of a 4-bin system and CDS scheme has been completed to understand system performance and inform future actions for service improvement.



1 Introduction

MRA was engaged by Brimbank City Council (Council) to conduct a composition audit of their three kerbside waste streams, GW, REC and GO, across the Brimbank Local Government Area (LGA). The audits were undertaken in accordance with Guidelines for Auditing Kerbside Waste in Victoria, Sustainability Victoria, 2009 (The Guidelines).

The audit fieldwork was conducted by MRA during the period from Tuesday 15 March to Monday 28 March 2022 for sample collection.

Sorting and measurement of the waste samples were carried out at Brimbank Resource Recovery Centre in Keilor Park. The results of the audit are presented in this report.

1.1 Background

Brimbank City Council includes western and north western suburbs of Melbourne, between 11 and 23 kilometres from Melbourne CBD. At the time of the audit, Council operated a three-bin domestic kerbside waste collection system comprising:

- Weekly collection of garbage bins;
- Fortnightly collection of REC bins; and
- Fortnightly collection of optional GO bins.

The audit will provide critical input for the evaluation of current Council's waste performance and inform future 4-bin roll out to residents.

1.2 Objectives

The objectives of the waste audits were to determine:

- Bin fullness state for each bin type (% volume/volume);
- Average garbage, recyclables and green organics generated (kg/week/household);
- Resource loss of recyclables and garden organics in garbage waste stream (% weight/weight);
- Resource recovery rate of recyclables and garden organics (% weight/weight);
- Contamination rates of REC and GO waste streams (% weight/weight);
- Average household generation of eligible container deposit scheme (CDS) containers; and
- Average household generation of food waste in non-certified compostable bags.

2 Methodology Summary

MRA undertook the waste audit in accordance with SV Audit Guidelines. A summary of activities undertaken in the audit is outlined below.

2.1 Sample collection and sorting, and data analysis

Council's waste service provider, Cleanaway, collected an aggregated sample of each of the garbage, REC and GO waste bins, from a specified list of streets across the municipality. MRA staff escorted the collection vehicle and recorded properties sampled. The target sample size for the audit, according to Council's requirements, was garbage and REC bins from 250 premises, and GO bins from 125 households. A detail of the samples collected is shown in Table 1.



Table 1: total number of samples collected by waste stream and collection days

Collection day	GO	REC	Garbage
Tuesday, 15 March 2022	12	30	30
Wednesday, 16 March 2022	12	25	25
Thursday, 17 March 2022	12	25	25
Friday, 18 March 2022	12	25	25
Monday, 21 March 2022	13	25	25
Tuesday, 22 March 2022	13	25	25
Wednesday, 23 March 2022	13	25	25
Thursday, 24 March 2022	13	25	25
Friday, 25 March 2022	13	25	25
Monday, 28 March 2022	12	25	25
Total	125	255	255

Samples were collected by kerbside collection truck, without compaction, and delivered to the Brimbank Resource Recovery Centre each day. Sorting and measurement were undertaken under the supervision of the MRA Audit Lead. The following data were recorded for each stream:

- Bucket number;
- Date;
- Suburb;
- Sorting category;
- Material type;
- Gross weight (kg);
- Empty Bucket Weight (kg);
- Net weight (kg); and
- Unit count (for applicable sorting categories).

Each material category was placed into a separate sorting bin and weights recorded. Once measured, the contents of each sorting bin were placed into a skip bin for disposal. This sorting process was repeated until the entire aggregate sample had been audited.

Photographic evidence of the audit is shown in Appendix D.

2.2 Study limitations

It should be noted that this audit is a 'single snapshot' and the results show the composition of the Council's garbage, REC and GO waste streams at a single moment in time. This audit is not sufficient to



enable measurement of certain variables that influence the household waste generation and recycling such as:

- Seasonal variations (i.e., the impact of seasonality on household waste generation e.g., garden waste);
- Occurrence of specific events e.g., public holidays or cultural events;
- Changes in population and demographics;
- Changes in weather conditions; and
- Changes in the behaviour of individuals, e.g., due to the COVID-19 pandemic.

Care needs to be taken when interpreting audit results and concluding that definite changes have occurred in the waste stream between different periods. The audit guidelines highlight uncertainties regarding the sample size needed to conclude confidence in these changes. Caution needs to be taken when deducing meaning from results pertaining to items with significant rarity in the waste stream (e.g., hazardous waste).

3 Overall audit results

3.1 Overall domestic kerbside waste stream

A total of 8,900 kilograms (kg) of kerbside waste material was collected during the audit. This calculation is the sum of waste collected from all households, including substitute households.

A total of 3,359 kg was collected from weekly garbage bins, 2,225 kg from fortnightly REC bin and 3,316 kg from fortnightly GO bins.

3.2 Household generation

The audit results indicate that on average households generated a total of 13.17 kg of garbage per week, 4.36 kg of REC waste per week and 13.26 kg of GO waste per week, as shown in Figure 1.

Table 2 summarises the household waste generation of garbage, REC and GO streams.

Figure 1: average household generation rate by waste stream

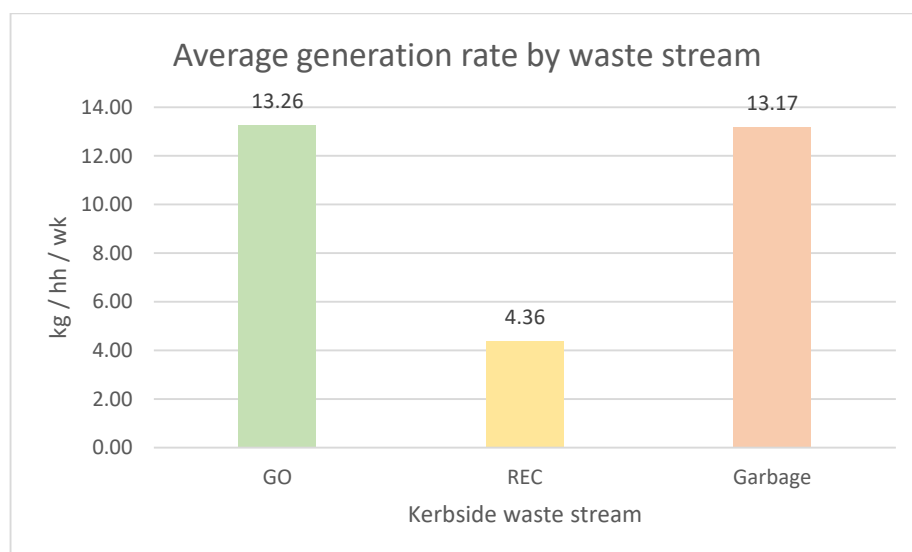


Table 2: household waste generation

	GO	REC	Garbage	Total (all streams)
Number of households audited	125	255	255	380
Total weight of all samples (kg)	3,316	2,225	3,359	8,900
Average sample weight per household collected (kg/hh)	26.53	8.72	13.17	n.a.
Average household generation rate (kg/hh/wk)	13.26	4.36	13.17	30.80

3.3 Waste composition

3.3.1 Garbage stream composition

Figure 2 provides the composition of the total garbage waste stream as a percentage by weight according to individual material types. Organics comprise the largest proportion of the overall garbage waste (55%) followed by other (18%). The 'Other' category mainly includes textiles, rubber, household chemicals, building material, nappies, liquids and residual waste. Paper and cardboard represent the third largest category by weight, at 13% of the total weight of the garbage stream. Detailed composition of the garbage stream is shown in Appendix A.

The majority of organic material present in the garbage stream is food waste. Specifically, 47% of the total organic material in the garbage stream is food/kitchen waste in non-compostable bags and 24% comprises loose food/kitchen waste. A detailed composition of the organic fraction of the garbage stream is shown in Figure 3.

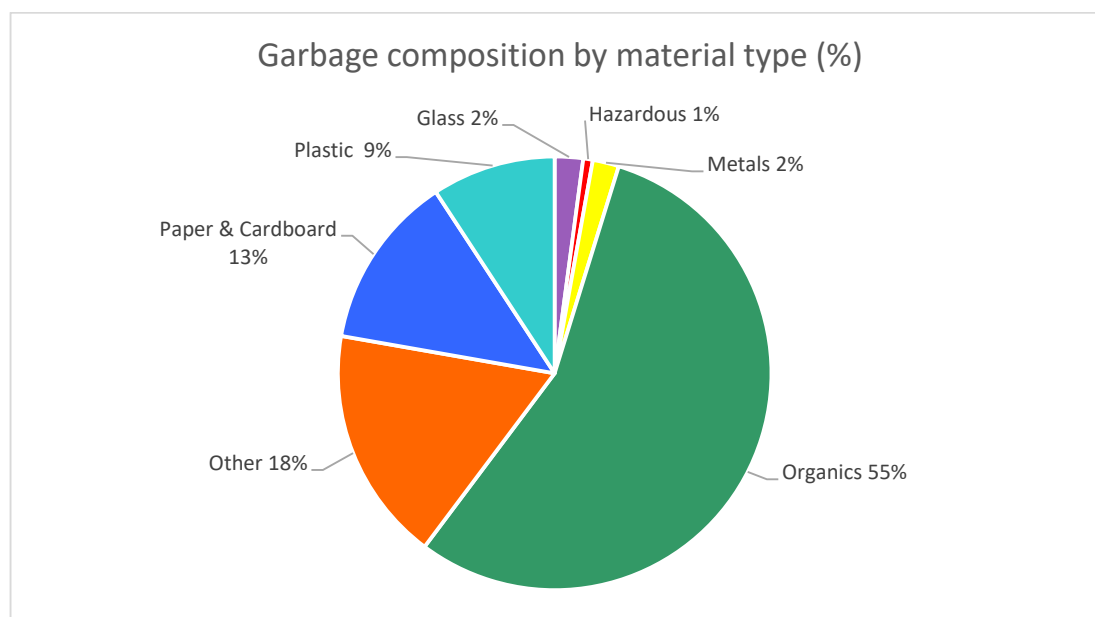
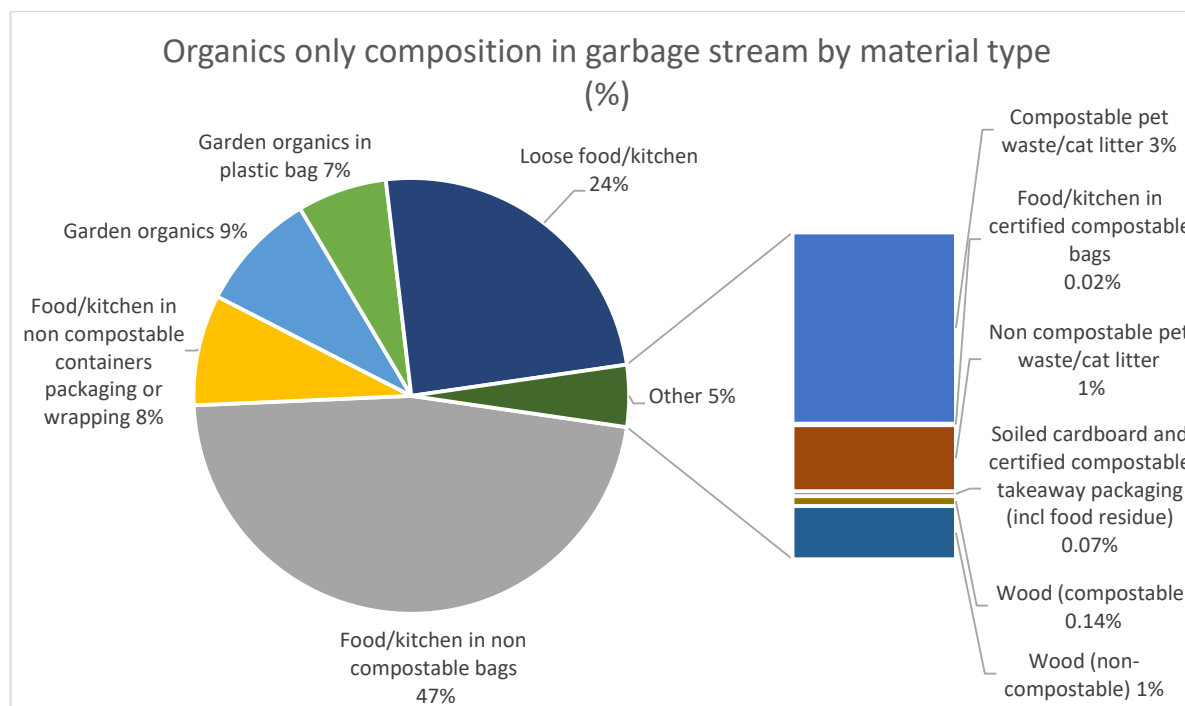
Figure 2: garbage composition by material type

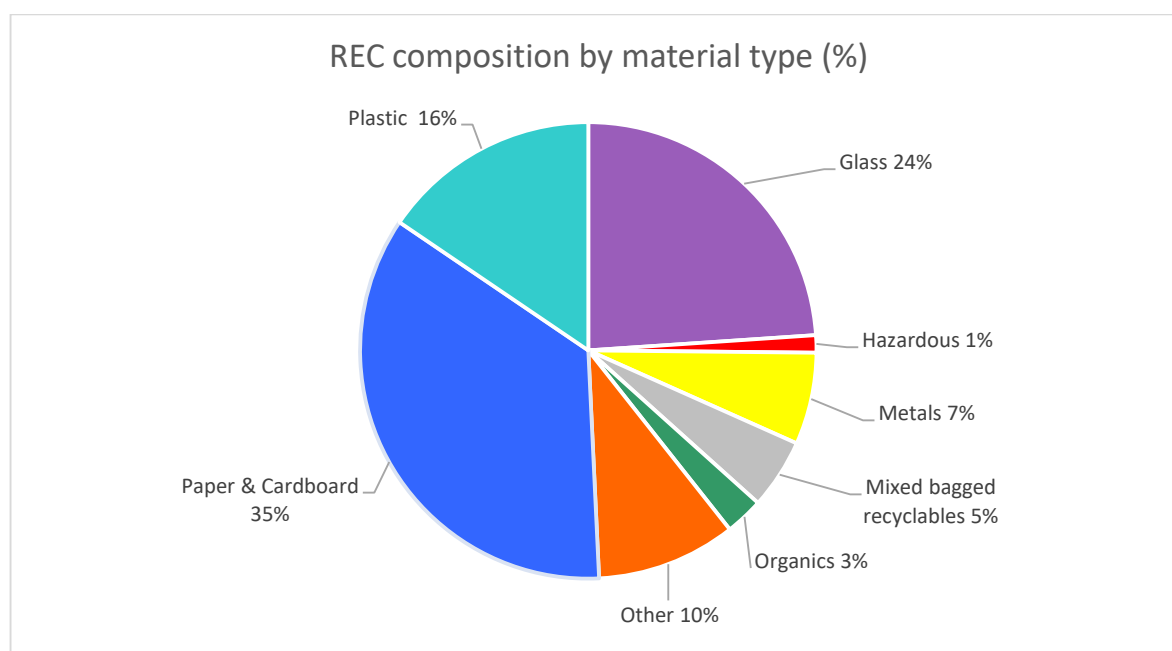
Figure 3: composition of the organic fraction of the garbage stream



3.3.2 Recycling stream composition

Figure 4 provides the composition of the total recycling stream as a percentage by weight according to individual material types. Paper and cardboard comprise the largest proportion of overall recycling waste (35%) followed by glass (24%) and plastic (16%). Detailed composition of the REC stream is shown in Appendix A.

Figure 4: recycling composition by material type



3.3.3 Garden organics stream composition

Figure 5 provides the composition of the total GO waste stream as a percentage by weight according to individual material types. Organics comprise the largest proportion, at 99% of the total weight of the GO stream. Of this 99%, the majority consists of garden organics (93% of the total organic material content of the GO stream). The remaining 7% is mainly made up of compostable wood (at 5%). The composition of the organic fraction of the GO stream is depicted in Figure 6.

Detailed composition of the GO stream is shown in Appendix A.

Figure 5: garden organics composition by material type

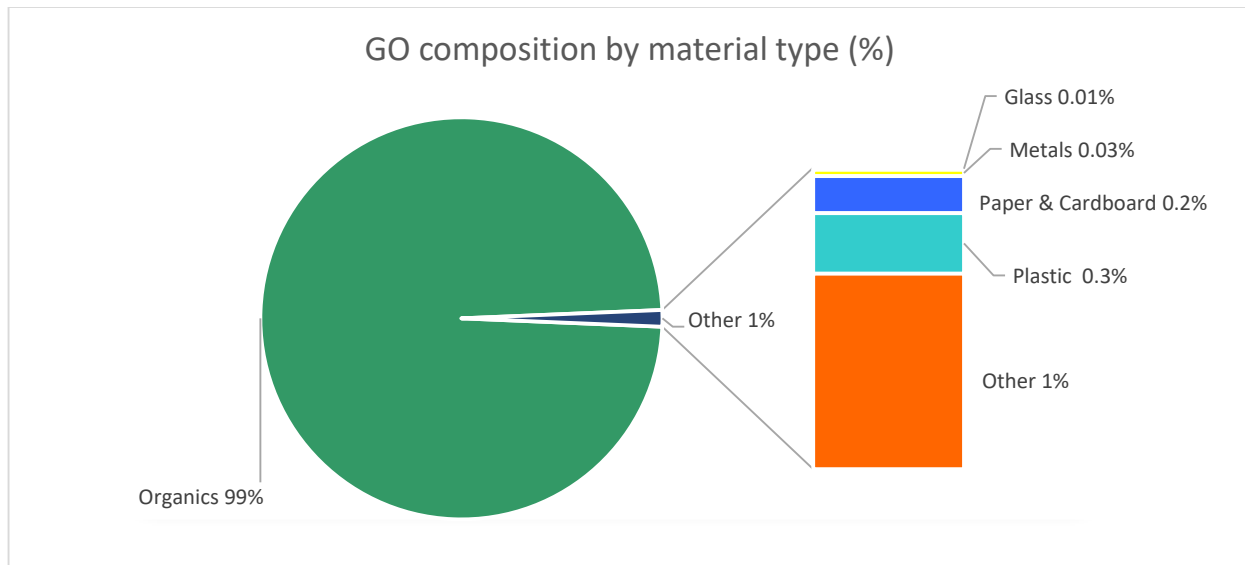
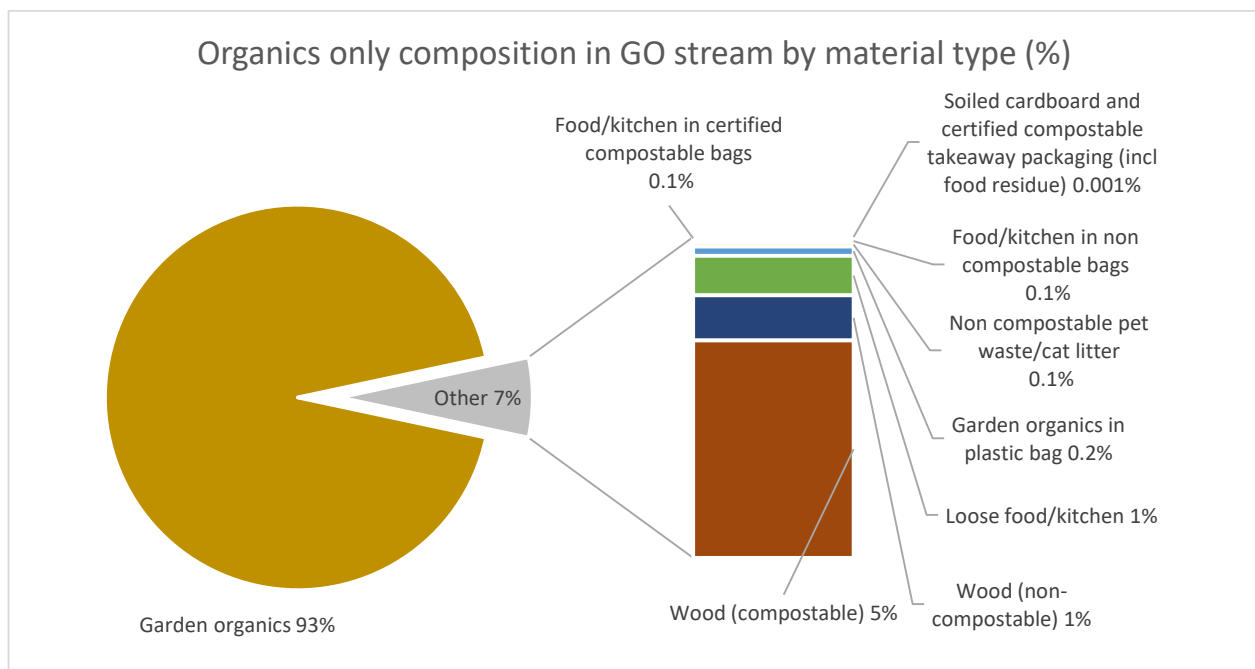


Figure 6: composition of the organic fraction of GO stream



3.4 Resource loss, resource recovery rate and household diversion rate

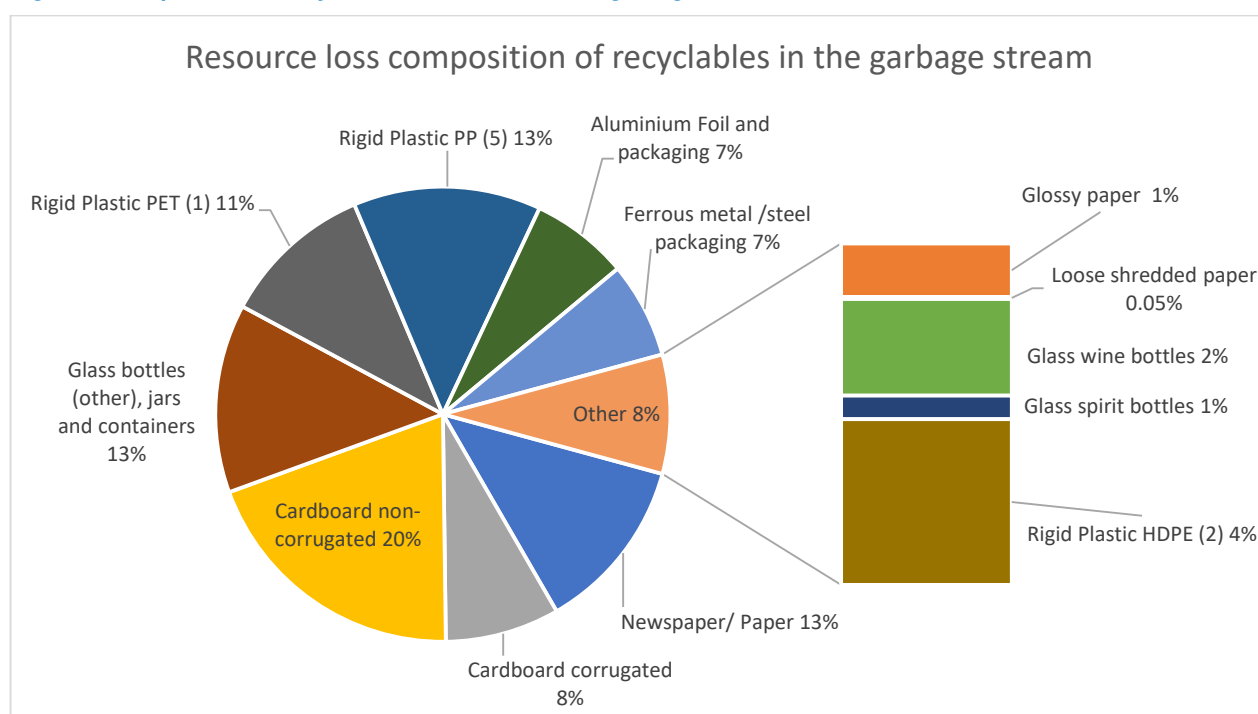
3.4.1 Recyclables resource loss and recovery rate

The resource recovery rate of recyclable materials is 68%. Therefore, 32% of the total material that could be recycled is currently disposed in the incorrect bin and it ends up in landfill. Of the total amount of potentially recyclable material, 31% is found in the garbage waste stream and just 1% in the GO stream.

The material composition of lost recyclables in the garbage stream is shown in Figure 7. The largest proportion of lost recyclables comprises non-corrugated cardboard (at 20% of the total recyclables lost in the garbage stream), followed by newspaper/paper, glass bottles/containers, and plastic (5), all at 13%.

Overall, paper and cardboard categories represent the largest proportion of lost recyclables in garbage bins (40%). Although, it must be noted that most of the paper and cardboard material present in the garbage stream is soiled and contaminated with food waste present in the bin, therefore weighing more than clean material.

Figure 7: composition of recyclable material lost in the garbage stream



3.4.2 Green waste resource loss and recovery rate

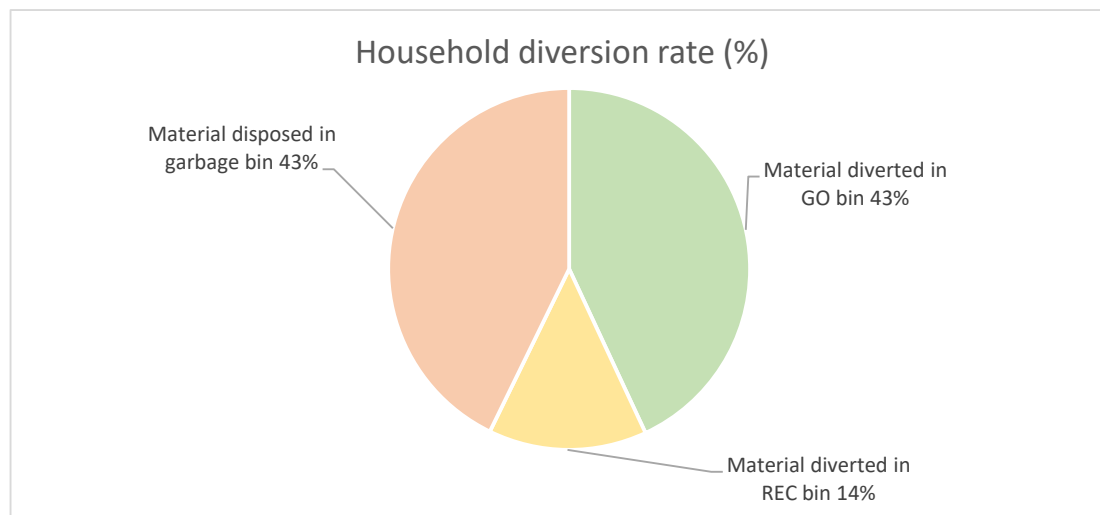
The resource recovery rate of green organics is 95%. Of all green waste produced by households, only 5.2% is lost in the incorrect waste stream and ends up in landfill. The majority of it (4.9%) is disposed in the garbage stream and only 0.3% can be found in the GO stream.

3.4.3 Household diversion rate

Household diversion rate is a measure of the proportion of the total waste diverted from landfill by households. It quantifies the amount of waste diverted from the garbage stream, that is considered “recyclable” or “compostable” by residents. This may include material categories that are not currently recycled/composted by the recycling/composting facility, such as liquid paper board containers or soft plastics.

The household diversion rate is 57%. 43% of all waste is diverted in the GO bin while 14% is disposed in the REC bin. Figure 8 illustrates the household diversion rate breakdown.

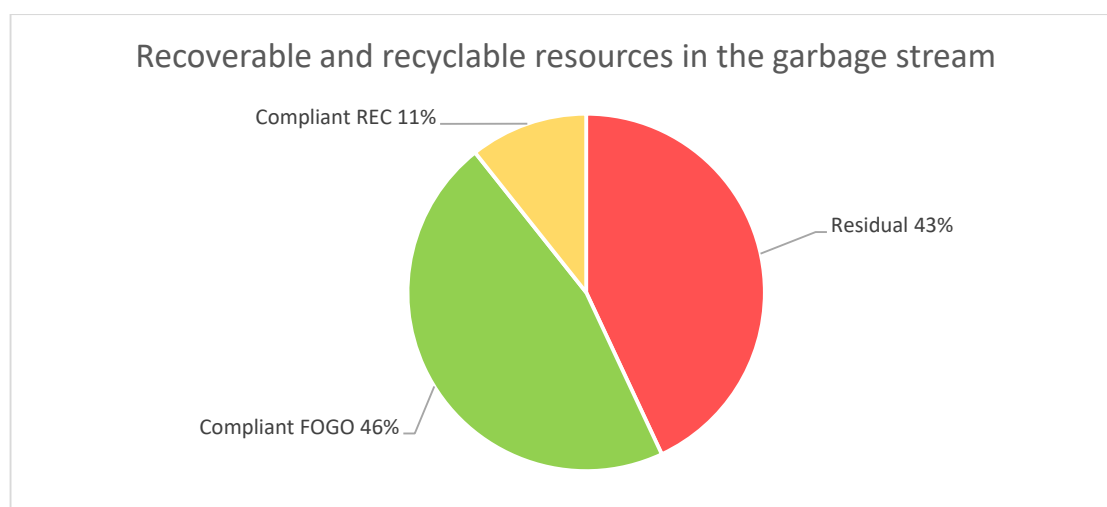
Figure 8: household diversion rate



3.4.4 Recoverable or recyclable resources in the garbage stream

A total of 57% of the total waste disposed in the garbage stream could be either recovered or recycled. In fact, 11% of the total garbage content could be potentially disposed in the REC bin while 46% of it could be redirected to the FOGO bin if bin roll-out is completed. Figure 9 shows the breakdown of recoverable and recyclable resources in the garbage stream.

Figure 9: recoverable and recyclable materials in the garbage stream



3.5 Contamination

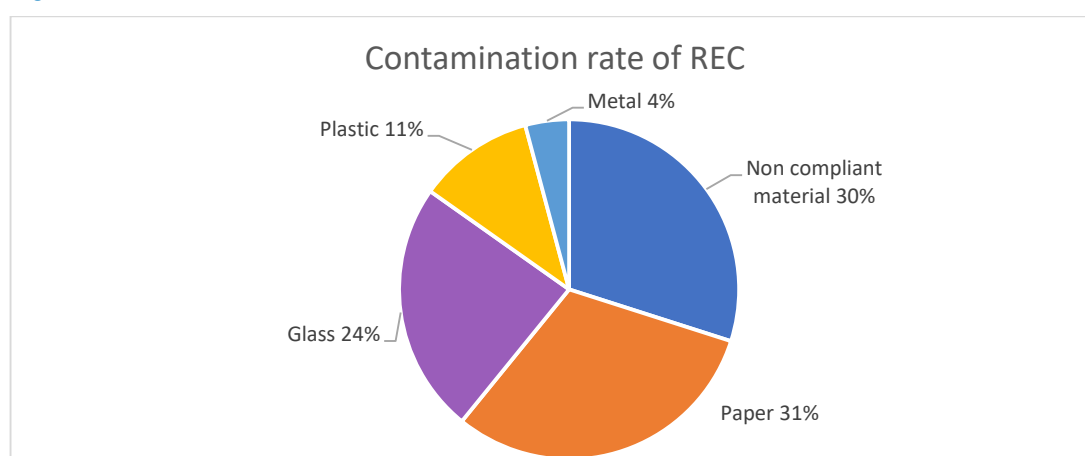
The contamination rate is a measure of the proportion of the amount of non-compliant material in a waste stream. It has been calculated considering the material categories that are currently accepted as recyclable or compostable by the Council's waste processing contractors.

A list of the sorting categories classified by their current recyclable/compostable status (i.e. recyclable material, compostable material and neither recyclable nor compostable) is presented in Appendix B.

3.5.1 Contamination rate of REC stream

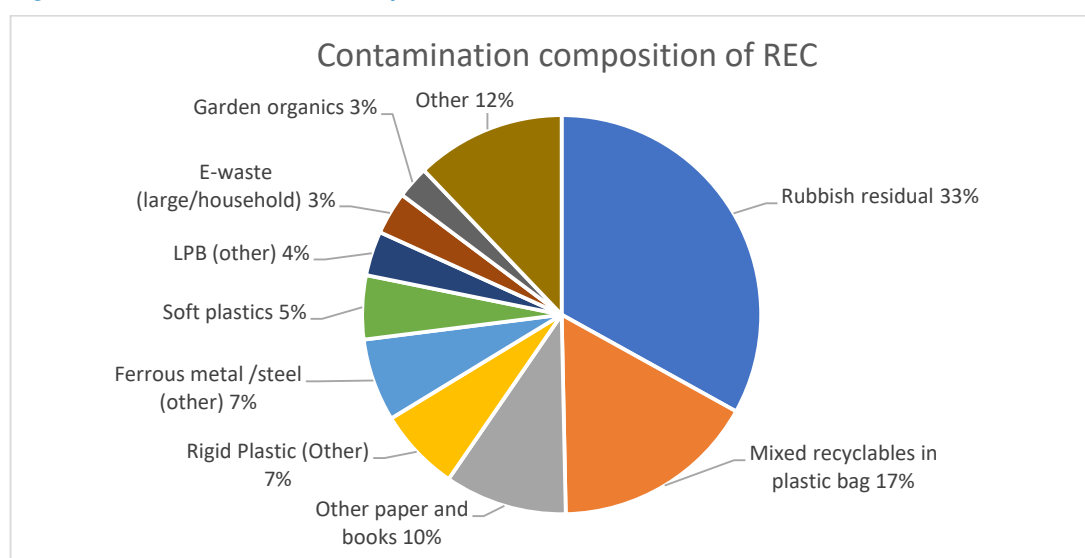
The recycling stream was found to contain 30% of contamination material, as shown in Figure 10. Contamination of REC includes non-compliant materials such as non-recyclable plastics, hazardous waste, composite material or bagged recyclables.

Figure 10: contamination rate of the REC stream



The largest contributor to contamination was rubbish residual (33% of total contamination content) that includes textiles, napkins, building material and ceramics, followed by bagged recyclables (17%). Figure 11 shows the detailed contamination composition. The category 'other', comprising 12% of total contamination composition, includes all categories that represent 2% or lower contamination.

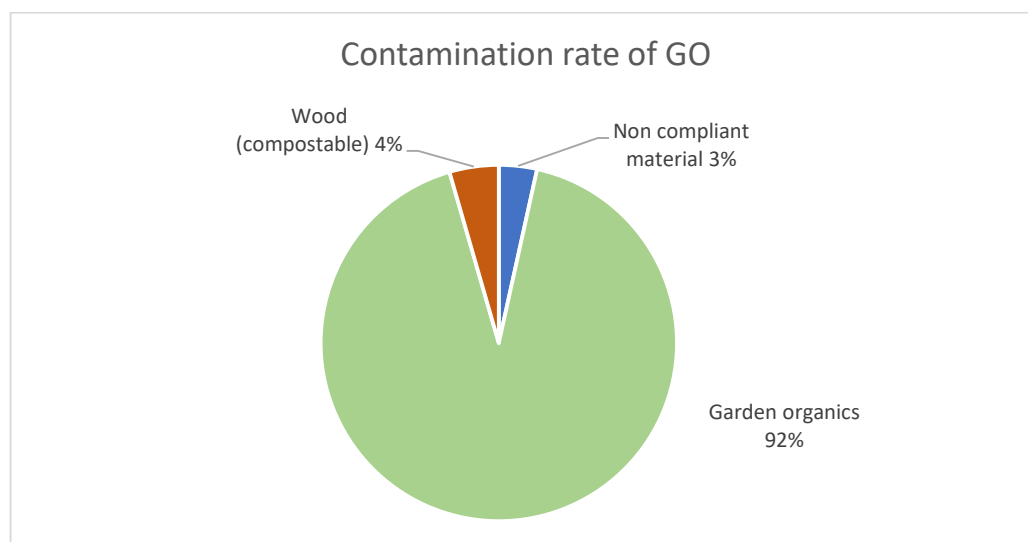
Figure 11: REC contamination composition



3.5.2 Contamination rate of GO stream

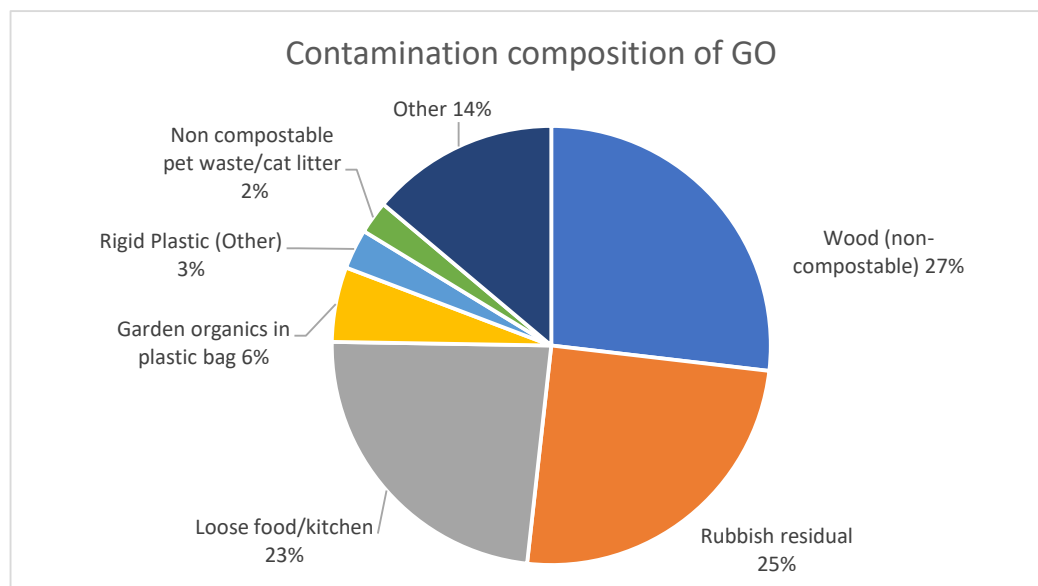
The GO stream was found to contain 3% of contamination material, as shown in Figure 12. Contamination of GO includes non-compliant material such as non-compostable wood, food waste and plastics.

Figure 12: contamination rate of the GO stream



The largest contributor to contamination was non compostable wood (27% of total contamination content), followed by residual rubbish (25%), that includes textiles, earth-based material and residuals, and loose food (23%). Figure 13 shows the detailed contamination composition. The category 'other', comprising 14% of total contamination composition, includes all categories that represent 2% or lower contamination.

Figure 13: GO contamination composition



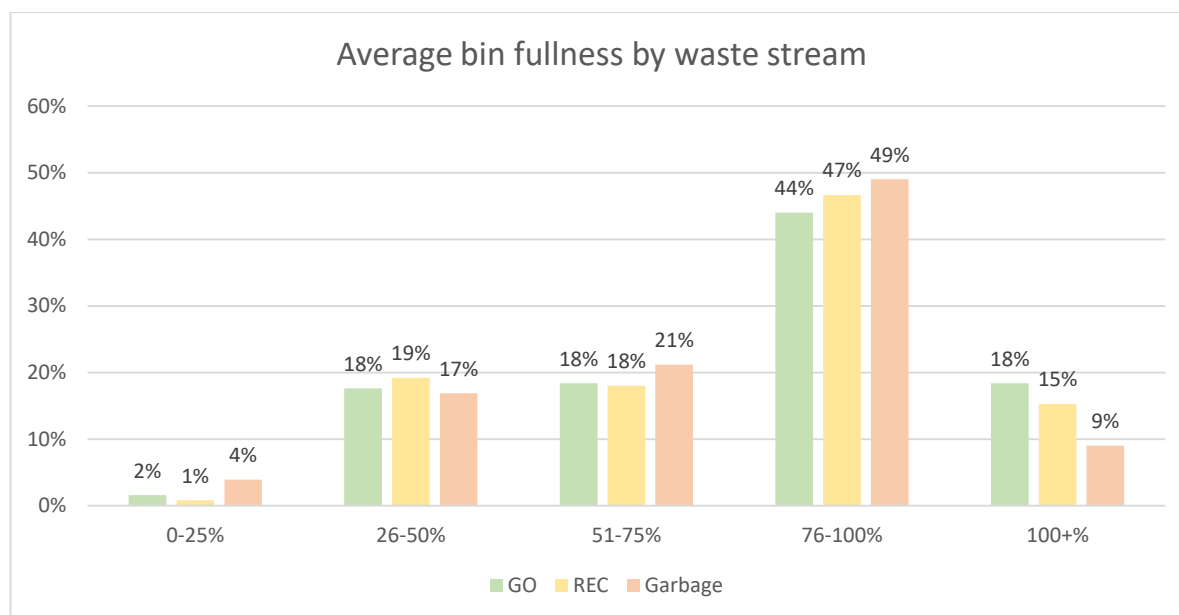
3.6 Bin fullness

Results show a uniform bin utilisation throughout the three waste streams. On average, the garbage bins audited were 77% full while the GO and REC bins sampled were 81% full.

Figure 14 shows the percentage of bins within a certain bin fullness range by waste stream. As shown in the bar chart, the majority of bins throughout the three waste streams were from 76% to 100% full.

The percentage of full (100%) or overfull (100+%) bins for general waste, REC and GO stream is 35%, 43% and 41% respectively.

Figure 14: average bin fullness by waste stream



3.7 CDS material

A total of 1,008 CDS eligible containers were counted in the garbage bins audited, 5,203 units were found in the REC samples and only 2 eligible containers were identified in the GO bins. Table 3 shows detail of the total number of CDS eligible containers present in the three waste streams by material type.

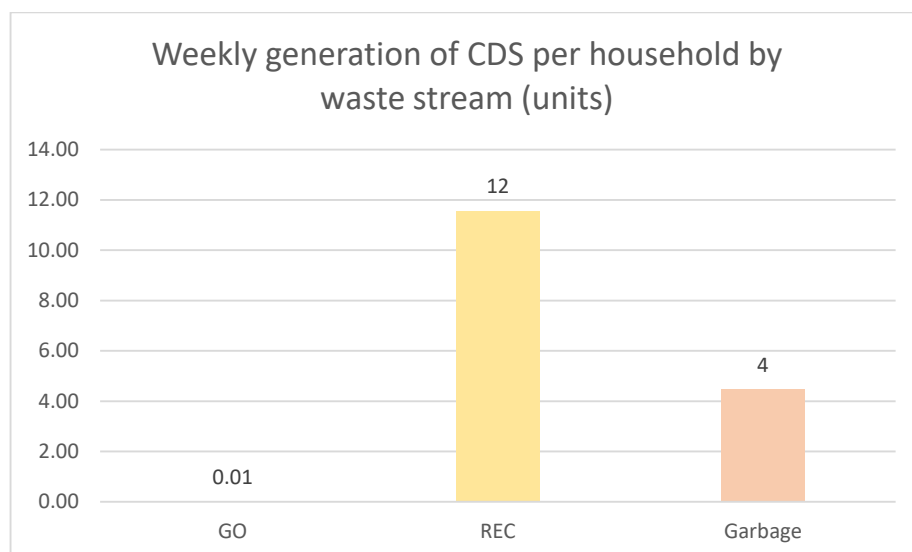
Table 3: CDS Count

Material type	GO Count	REC Count	Garbage Count
Aluminium CDS containers	2	1,434	342
Glass CDS bottles	0	1,150	71
LPB CDS containers	0	209	164
Plastic CDS bottles/containers	0	2,410	431
Grand Total	2	5,203	1,008



Households disposed of an average of 12 CDS eligible containers in the REC stream and 4 in the garbage stream, as shown in Figure 15.

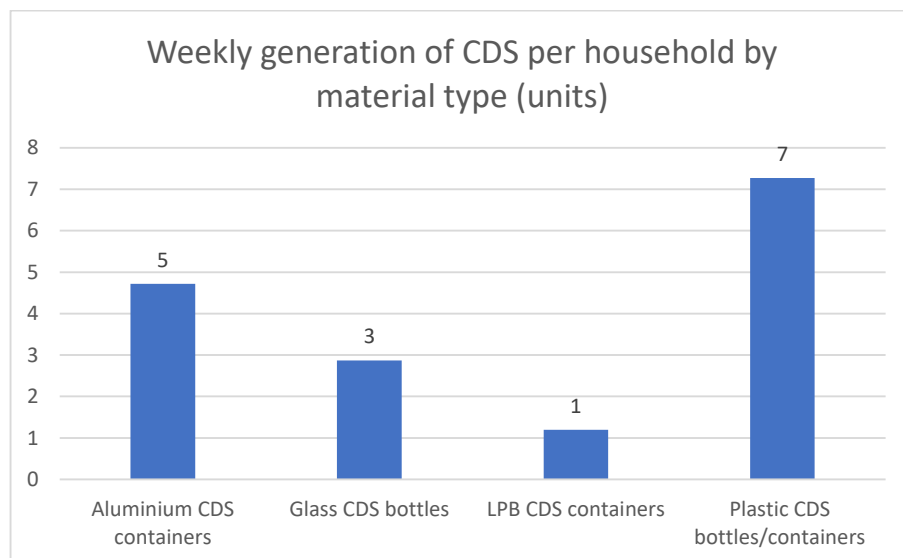
Figure 15: weekly household generation of CDS by waste stream



On average, households produce a total of 7 plastic CDS eligible bottles and containers per week, 5 eligible aluminium containers, 3 eligible glass bottles and 1 eligible LPB container.

A graphical representation of the weekly household generation of CDS eligible containers by material type is shown in Figure 16.

Figure 16: weekly household generation of CDS by material type



A total of 1,135,103 CDS eligible containers are produced on average in the whole Council's LGA per week. The calculation has used the rate calculated in the audit and considered the following numbers of households currently serviced by Council:

- 70,733 household for garbage and REC bins;
- 43,904 household for GO bins.



Detail of total number of CDS eligible containers produce in Brimbank by waste stream and material type is shown in Table 4.

Table 4: total number of CDS units recoverable by Council through the CDS scheme per week by material type (units/wk)

Material type	GO	REC	Garbage	Total (all streams)
Aluminium CDS containers	389	225,402	107,514	333,305
Glass CDS bottles	0	180,762	22,320	203,082
LPB CDS containers	0	32,852	51,556	84,408
Plastic CDS bottles/containers	0	378,815	135,493	514,308
Grand Total	389	817,831	316,884	1,135,103

3.8 Food waste in non-compostable bags

Table 5 and Table 6 show the key results for the analysis of food waste in non-compostable bags production.

Table 5: food waste in non-compostable bags: count and total weight

	GO	REC	Garbage
Total weight of samples (kg)	0	106	766
Total number of units	0	159	1120

Table 6: weekly household generation of non-compostable bags of food waste

	GO	REC	Garbage	Total (all streams)
kg/hh/wk	0	0.24	3.41	3.64
units/hh/wk	0	0.35	4.98	5.33



Conclusion/recommendations

Results from this audit represent baseline data of the current three bin's system performance and waste stream composition within Brimbank City Council.

Data from this audit will inform future implementation of the four-bins system with the introduction of glass and FOGO segregation and roll-out of the container deposit scheme.

Based on household diversion rates and recycling rates, there is still significant margin for improvement to reduce waste to landfill. In particular, there is the potential to recover 57% of the general waste content by:

- Implementing FOGO collection and therefore diverting 46% of compliant FOGO material into FOGO bins
- Diverting 11% of recyclables into REC bins by introducing targeted education programs and reassessing REC service provision to household.

A substantial number of bins throughout all three waste streams was found to be full or overfull. As a result, leakage between the waste streams may occur, causing higher contamination rates and resource loss.

In particular, 43% of bins in the REC sample audited were full. REC bins at full capacity may cause residents to discard their recyclables in general waste bins resulting in recyclables leakage. This indicates the potential for Council to reconsider REC bin size.

Differences in recyclables generation post COVID-19 must also be considered. In fact, residents are currently disposing of more recyclables, especially in the form of cardboard boxes, that are often not compacted or flattened, subsequently taking up space in bins.

Moreover, full general waste bins may be one of the causing factors for a relatively high contamination rate in the REC stream (30% of the total REC sample) as residents may dispose of their rubbish in the REC bins if general waste bin is at capacity. However, future implementation of FOGO collection service has the potential to divert 46% of FOGO compliant material from the general waste stream, with a subsequent decrease of general waste bin content.

Current high percentages of GO bins found at capacity (41%) and future diversion of food organics from general waste into FOGO bins need to be considered when planning for implementation of FOGO bin service.

Low GO contamination rates show good level of system efficiency. However, the optional nature of the GO service has to be taken into account when interpreting these results.

CDS containers are mostly found in the REC stream with little loss in other streams.

Based on the results of the audit, MRA recommends that Council consider further actions in the following areas:

- Monitoring and education programs:

It is recommended that recycling education programs are specifically tailored to:

- achieve a higher understanding of non-compliant materials categories that will lower contamination rates. Specifically targeting problematic materials such as non-recyclable plastics, textiles, liquids, nappies, ceramics, mixed recyclables in plastic bags, napkins and paper towels.
- reduce lost resources that currently have a low recovery rate in garbage bins
- consider differences in waste generation due to COVID 19 (e.g. stress the importance of flatten cardboard boxes before disposing of them in the REC bins)



- Reassessment of REC service provision to household considering offering a larger (360L MGB) to large households on request.
- Conduct further studies:
 - Future waste audit targeting differences in waste generation between suburbs or areas with different demographics would allow Council to tailor actions for service improvement to specific areas.

- Conduct waste audits on an ongoing basis:

It is recommended that Council conduct another waste audit after the implementation of a 4-bin system and CDS scheme has been completed to understand system performance and inform future actions for service improvement.



Appendix A Detailed Waste Stream Composition

Table 7, Table 8 and Table 9 show the detailed composition of the overall garbage, REC and GO stream respectively.

Table 7: detailed composition of garbage waste stream

Row Labels	Sum of Net Weight (kg)
Glass	71.06
Glass bottles (other), jars and containers	46.26
Glass broken >50mm	2.02
Glass broken 10-50mm	12.14
Glass non-recyclable	0.38
Glass spirit bottles	2.01
Glass wine bottles	8.25
Hazardous	23.94
E-waste (large/household)	1.64
E-waste (small/personal)	20.81
Household batteries	1.02
Light globes	0.47
Metals	65.76
Aluminium Foil and packaging	24.01
Ferrous metal /steel (other)	16.5
Ferrous metal /steel packaging	23.51
Non-ferrous metal (other)	1.74
Organics	1863
Compostable pet waste/cat litter	50.02
Food/kitchen in certified compostable bags	0.4
Food/kitchen in non compostable bags	875.9



Row Labels	Sum of Net Weight (kg)
Food/kitchen in non compostable containers packaging or wrapping	153.19
Garden organics	166.51
Garden organics in plastic bag	124.02
Loose food/kitchen	457.92
Non compostable pet waste/cat litter	17.3
Soiled cardboard and certified compostable takeaway packaging (incl food residue)	1.26
Wood (compostable)	2.59
Wood (non-compostable)	13.89
Other	588.47
other (please comment)	588.47
Paper & Cardboard	436.94
Cardboard corrugated	28.01
Cardboard non-corrugated	67.7
Glossy paper	4.56
Loose shredded paper	0.18
LPB (other)	10.02
Newspaper/ Paper	42.88
Other paper and books	269.15
Plastic lined paper / cardboard packaging (non-compostable)	14.44
Plastic	310.21
Expanded polystyrene	3.6
Large non - recyclable plastic items	0.54
Rigid Plastic (Other)	49.74
Rigid Plastic HDPE (2)	14.15



Row Labels	Sum of Net Weight (kg)
Rigid Plastic PET (1)	37.21
Rigid Plastic PP (5)	46.01
Rigid Plastic PS (6)	8.64
Rigid Plastic PVC (3)	2.21
Soft plastics	148.11
Grand Total	3359.38

Table 8: detailed composition of recycling waste stream

Row Labels	Sum of Net Weight (kg)
Glass	532.45
Glass bottles (other), jars and containers	361.83
Glass broken >50mm	34.54
Glass broken 10-50mm	41.41
Glass non-recyclable	0.15
Glass spirit bottles	29.38
Glass wine bottles	65.14
Hazardous	27.35
E-waste (large/household)	23.04
E-waste (small/personal)	3.9
Household batteries	0.29
Light globes	0.12



Row Labels	Sum of Net Weight (kg)
Metals	145.03
Aluminium Foil and packaging	30.08
Ferrous metal /steel (other)	44.63
Ferrous metal /steel packaging	62.41
Non-ferrous metal (other)	7.91
Mixed bagged recyclables	110.62
Mixed recyclables in plastic bag	110.62
Organics	60.14
Compostable pet waste/cat litter	1.73
Food/kitchen in certified compostable bags	0.17
Food/kitchen in non compostable bags	11.73
Food/kitchen in non compostable containers packaging or wrapping	15.32
Garden organics	17.52
Loose food/kitchen	1.93
Non compostable pet waste/cat litter	0.92
Soiled cardboard and certified compostable takeaway packaging (incl food residue)	2.21
Wood (compostable)	0.73
Wood (non-compostable)	7.88
Other	220.08
other (please comment)	220.08



Row Labels	Sum of Net Weight (kg)
Paper & Cardboard	784.1
Cardboard corrugated	302.79
Cardboard non-corrugated	164.59
Glossy paper	15.17
Loose shredded paper	7.31
LPB (other)	23.97
Newspaper/ Paper	198.56
Other paper and books	66.04
Plastic lined paper / cardboard packaging (non-compostable)	5.67
Plastic	345.08
Expanded polystyrene	3.3
Large non - recyclable plastic items	5.02
Rigid Plastic (Other)	44.67
Rigid Plastic HDPE (2)	77.32
Rigid Plastic PET (1)	128.78
Rigid Plastic PP (5)	39.74
Rigid Plastic PS (6)	10.26
Rigid Plastic PVC (3)	1.51
Soft plastics	34.48
Grand Total	2224.85



Table 9: detailed composition of garden organics waste stream

Row Labels	Sum of Net Weight (kg)
Glass	0.33
Glass bottles (other), jars and containers	0.28
Glass broken 10-50mm	0.05
Metals	0.9200
Aluminium Foil and packaging	0.21
Ferrous metal /steel (other)	0.21
Ferrous metal /steel packaging	0.3
Non-ferrous metal (other)	0.2
Organics	3271.68
Food/kitchen in certified compostable bags	1.82
Food/kitchen in non compostable bags	1.91
Garden organics	3052.82
Garden organics in plastic bag	6.32
Loose food/kitchen	26.93
Non compostable pet waste/cat litter	2.76
Soiled cardboard and certified compostable takeaway packaging (incl food residue)	0.04
Wood (compostable)	148.31
Wood (non-compostable)	30.77
Other	28.55
other (please comment)	28.55



Row Labels	Sum of Net Weight (kg)
Paper & Cardboard	5.41
Cardboard corrugated	1.04
Cardboard non-corrugated	0.67
Glossy paper	0.65
LPB (other)	0.12
Newspaper/ Paper	1.99
Other paper and books	0.93
Plastic lined paper / cardboard packaging (non-compostable)	0.01
Plastic	8.84
Expanded polystyrene	0.69
Rigid Plastic (Other)	3.37
Rigid Plastic HDPE (2)	0.1
Rigid Plastic PET (1)	1.73
Rigid Plastic PP (5)	1.36
Rigid Plastic PS (6)	0.72
Rigid Plastic PVC (3)	0.02
Soft plastics	0.85
Grand Total	3315.73

Appendix B Contamination Categories

Sorting category	Classification
Newspaper/ Paper	R
Glossy paper	R
Other paper and books	N
Cardboard corrugated	R
Cardboard non-corrugated	R
Plastic lined paper / cardboard packaging (non-compostable)	N
LPB (other)	N
Loose shredded paper	R
Food/kitchen in certified compostable bags	N
Loose food/kitchen	N
Soiled cardboard and certified compostable takeaway packaging (incl food residue)	N
Garden organics	C
Wood (compostable)	C
Compostable pet waste/cat litter	N
Food/kitchen in non-compostable bags	N
Food/kitchen in non-compostable containers packaging or wrapping	N
Garden organics in plastic bag	N
Non compostable pet waste/cat litter	N
Wood (non-compostable)	N
Mixed recyclables in plastic bag	N



Sorting category	Classification
Glass wine bottles	R
Glass spirit bottles	R
Glass bottles (other), jars and containers	R
Glass broken >50mm	R
Glass broken 10-50mm	R
Glass non-recyclable	N
Rigid Plastic PET (1)	R
Rigid Plastic HDPE (2)	R
Rigid Plastic PVC (3)	N
Rigid Plastic PP (5)	R
Rigid Plastic PS (6)	N
Rigid Plastic (Other)	N
Large non - recyclable plastic items	N
Soft plastics	N
Expanded polystyrene	N
Aluminium Foil and packaging	R
Non-ferrous metal (other)	N
Ferrous metal /steel packaging	R
Ferrous metal /steel (other)	N
E-waste (small/personal)	N
E-waste (large/household)	N



Sorting category	Classification
Household batteries	N
Light globes	N
other (please comment)	N

Legend:

- C Compostable material
- R Recyclable material
- N Neither recyclable nor compostable



Appendix C Sorting Categories

Sorting Category	Material Type	Count
Newspaper/ Paper	Paper & Cardboard	
Glossy paper	Paper & Cardboard	
Other paper and books	Paper & Cardboard	
Cardboard corrugated	Paper & Cardboard	
Cardboard non-corrugated	Paper & Cardboard	
Plastic lined paper / cardboard packaging (non-compostable)	Paper & Cardboard	
LPB CDS containers	Paper & Cardboard	Yes
LPB (other)	Paper & Cardboard	
Loose shredded paper	Paper & Cardboard	
Food/kitchen in certified compostable bags	Organics	Yes
Loose food/kitchen	Organics	
Soiled cardboard and certified compostable takeaway packaging (incl food residue)	Organics	
Garden organics	Organics	
Wood (compostable)	Organics	
Compostable pet waste/cat litter	Organics	
Food/kitchen in non compostable bags	Organics	Yes
Food/kitchen in non compostable containers packaging or wrapping	Organics	
Garden organics in plastic bag	Organics	
Non compostable pet waste/cat litter	Organics	



Sorting Category	Material Type	Count
Wood (non-compostable)	Organics	
Mixed recyclables in plastic bag	Mixed bagged recyclables	
Glass CDS bottles	Glass	Yes
Glass wine bottles	Glass	
Glass spirit bottles	Glass	
Glass bottles (other), jars and containers	Glass	
Glass broken >50mm	Glass	
Glass broken 10-50mm	Glass	
Glass non-recyclable	Glass	
Plastic CDS bottles/containers	Plastic	Yes
Rigid Plastic PET (1)	Plastic	
Rigid Plastic HDPE (2)	Plastic	
Rigid Plastic PVC (3)	Plastic	
Rigid Plastic PP (5)	Plastic	
Rigid Plastic PS (6)	Plastic	
Rigid Plastic (Other)	Plastic	
Large non - recyclable plastic items	Plastic	
Soft plastics	Plastic	
Expanded polystyrene	Plastic	
Aluminium CDS containers	Metals	Yes



Sorting Category	Material Type	Count
Aluminium Foil and packaging	Metals	
Non-ferrous metal (other)	Metals	
Ferrous metal /steel packaging	Metals	
Ferrous metal /steel (other)	Metals	
E-waste (small/personal)	Hazardous	
E-waste (large/household)	Hazardous	
Household batteries	Hazardous	
Light globes	Hazardous	
other (please comment)	Other	

Appendix D Photographic evidence of the audit



Corrugated cardboard in REC sample



Garden organics in GO sample



REC sample pile

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An Analysis of Kerbside Collection Options for Brimbank City Council

10 May 2022





Impacts and benefits of kerbside collection systems Brimbank City Council

A report to Brimbank City Council
Job No. 1012718

Prepared by

MRA Consulting Group (MRA)
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ABN 13 143 273 812

Disclaimer

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Glossary

Terminology	Definition
AWT	Alternative Waste Treatment
BAU	Business as Usual
C&D	Construction and Demolition (waste)
C&I	Commercial and Industrial (waste)
CCM	Consolidated Cost Model
CO ₂ -e	Carbon dioxide equivalent
FO	Food Organics
FOGO	Food Organics and Garden Organics
GHG	Greenhouse Gas
GO	Garden Organics
HH	Household
LGA	Local Government Area
MGB	Mobile Garbage Bin
MRA	MRA Consulting Group
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
MUD	Multi Unit Dwelling
NPV	Net Present Value
pa	per annum
REC	Recycling



Terminology	Definition
Residual waste	Waste that remains after the application of a better practice source separation process and Recycling system, consistent with the waste hierarchywaste under this waste strategy.
SUD	Single Unit Dwelling
tpa	Tonnes Per Annum
WtE	Waste to Energy
WtL	Waste to Landfill



Executive Summary

Brimbank City Council's *Waste, Recycling, and Litter Strategy 2018-2028*¹ contains objectives to avoid waste, recover more value and resources from waste, and protect the environment. It also includes a target to increase material recovery. Brimbank is adopting a fourth bin to collect glass, evolving from the current three-bin system.

Brimbank City Council engaged MRA Consulting Group (MRA) to report on the impacts and benefits of kerbside systems. The project assessed three bin and four bin kerbside systems as follows:

- Business as usual – Garbage (weekly), voluntary GO (fortnightly), and Recycling (fortnightly)
- Option 1 - Garbage (fortnightly), universal FOGO (weekly), Recycling (fortnightly), and Glass (4 weekly)
- Option 2 - Garbage (weekly), universal FOGO (fortnightly), Recycling (fortnightly), and Glass (4 weekly)
- Option 3 - Garbage (weekly), universal FOGO (weekly), Recycling (fortnightly), and Glass (4 weekly)

This report produces the following outputs:

- Total system costs
 - Cost per household (\$/household/annum)
 - NPV (\$m) across a 7-year planning horizon
 - Cost per tonne (\$/t)
- Recovery rate (%)
- Greenhouse gas emissions (t CO₂-e); and
- Vehicle kilometres travelled (km)

Average cost per household

MRA modelled the four options and found that by introducing the Glass bin and changing the frequency of Garbage collection to fortnightly (Option 1) or changing the frequency of FOGO to fortnightly while maintaining weekly collection of Garbage (Option 2), the cost per household, compared to the current regime, decreases.

Increasing Garbage and FOGO frequency to weekly collection does increase the cost per household slightly.

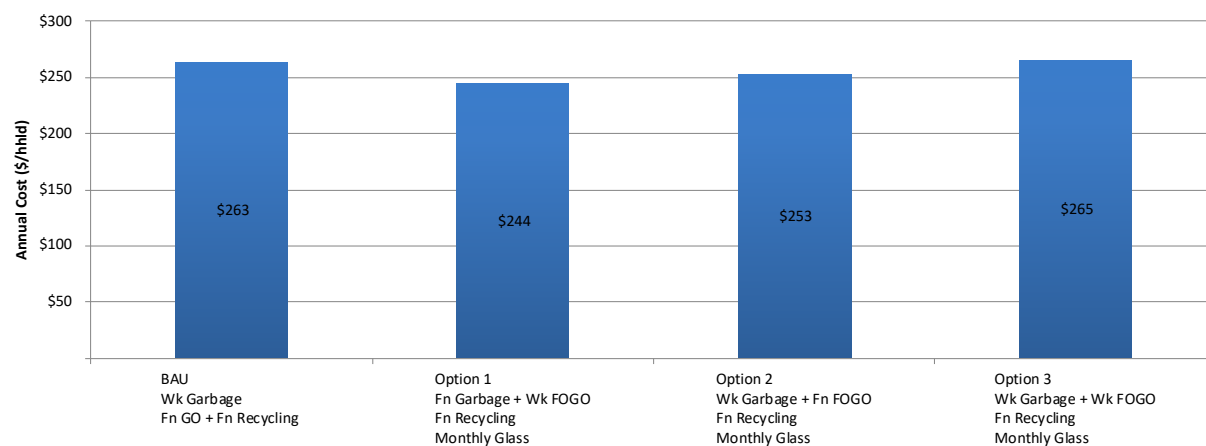
¹<https://www.brimbank.vic.gov.au/plans-policies-and-strategies/strategies/waste-recycling-and-litter-strategy-2018-2028>



Figure 1 shows the cost per household per year for each Option.

<https://www.brimbank.vic.gov.au/plans-policies-and-strategies/strategies/waste-recycling-and-litter-strategy-2018-2028>

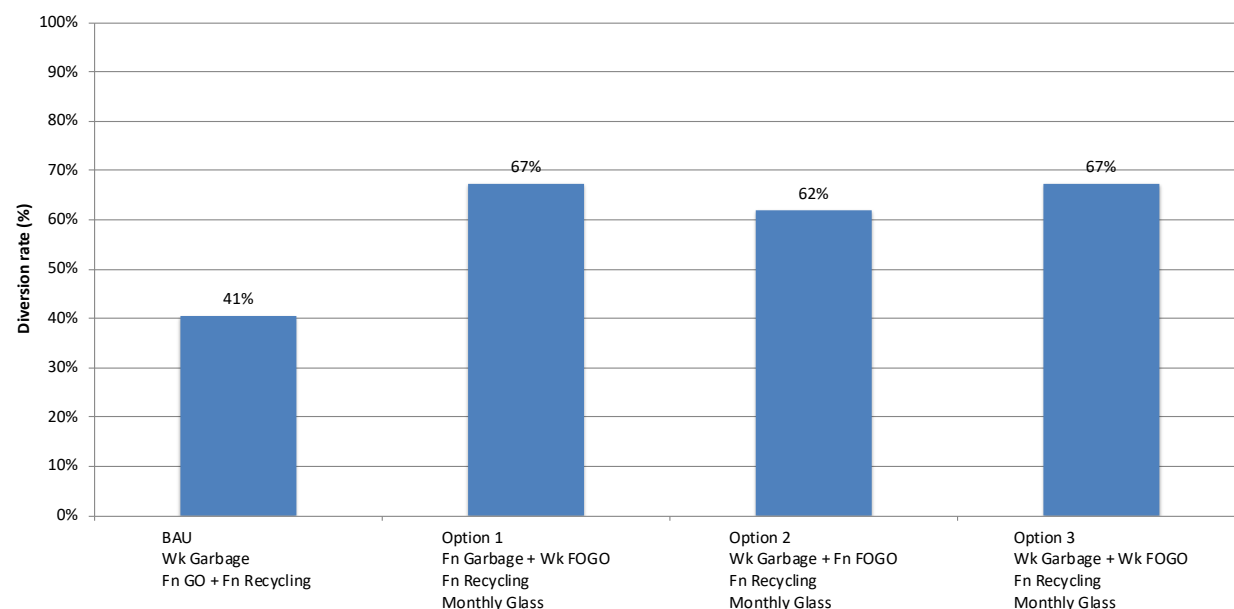
Figure 1 Cost per household per year



Diversion Rate

The implementation of a four-bin system reduces Garbage quantities and improves diversion rates from 41% to over 60% for all new options.

Figure 2 System Diversion Rate

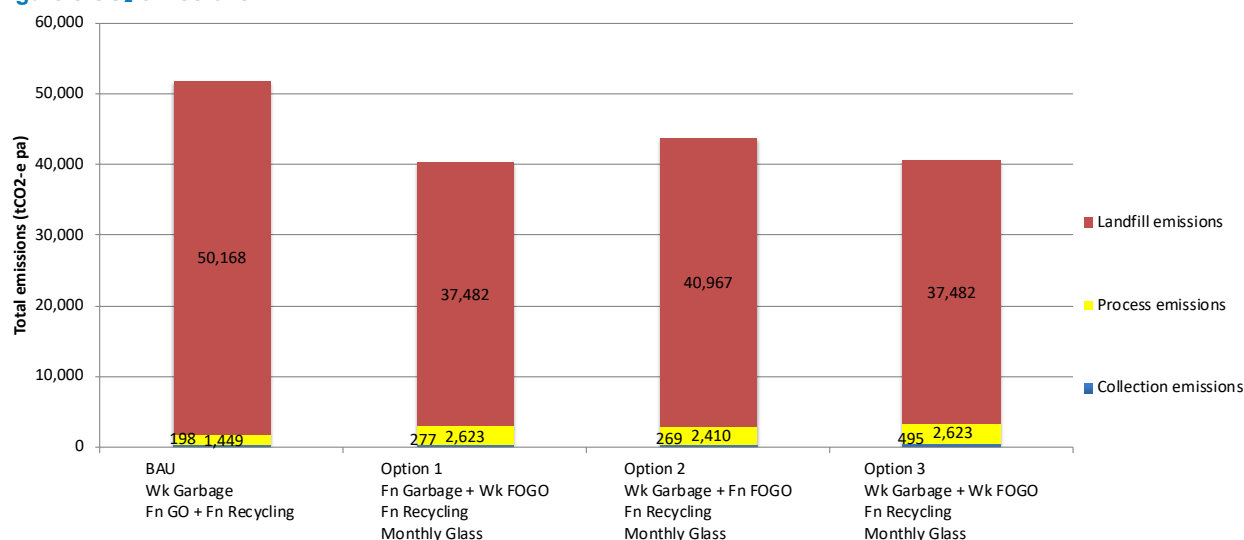




Greenhouse gas emissions

Landfills are the biggest contributor to greenhouse gas emissions compared to collection, transport and organics processing, which generate significantly lower emissions. Residuals to landfill from MRF and FOGO processing create landfill gas and are responsible for the landfill emissions depicted for Options 1, 2 and 3. All options produce a reduction of CO₂ emissions due to increased landfill diversion.

Figure 3 CO₂ emissions



Conclusion

Modelling confirms that Diversion Rate can be improved significantly through the introduction of an additional FOGO bin. A multi-criteria analysis was completed to evaluate the three options compared to BAU, using a weighted system discussed and agreed with Council Officers. The analysis showed that Option 1 was ranked first.

Overall, all options offer increased diversion with lower (options 1 and 2) or slightly higher (less than 2% increase) costs to household, when averaged over a 10 year period. This additional diversion generated better environmental outcomes by reducing CO₂ emissions.



1. Introduction

Brimbank City Council (BCC) engaged MRA Consulting Group (MRA) to report on the impacts and benefits of kerbside systems. The project assessed the current three-bin system and three options for a four-bin system, with different frequencies.

1.1 Project Background

BCC's *Waste, Recycling, and Litter Strategy 2018-2028*² contains objectives to avoid waste, recover more value and resources from waste, and protect the environment. It also includes a target to increase material recovery, increase diversion rates from landfill, and reduce contamination in recyclable streams.

Council is introducing a fourth bin for glass recycling and considering the effects of frequency of collection.

This study models the Options to explore their feasibility and capability to reach the strategy targets. The model also considers costs and benefits, as well as providing estimates of emissions and total distance travelled.

1.2 Study design

For the purposes of the study MRA has used data provided by BCC. This data included:

- Number of households (HH);
- Population increase rate;
- Disposal and recycling facilities
- Distance to facilities;
- Current lift rates;
- Waste and material quantities; and
- Disposal and processing cost.

The data was used to model and analyse the different options, presented in the table below:

²<https://www.brimbank.vic.gov.au/plans-policies-and-strategies/strategies/waste-recycling-and-litter-strategy-2018-2028>



Table 1 – Summary of options analysed in model

Option	Garbage	Recycling	GO/FOGO	Glass	Garbage management
BAU	Weekly collection, 140L MGB	Fortnightly collection, 240L MGB	Fortnightly collection voluntary GO, 140L MGB MUD's, 240L MGB SUD's		Landfill
1	Fortnightly collection, 140L MGB	Fortnightly collection, 240L MGB	Weekly FOGO collection, 240L MGB	4 Weekly collection, 140L MGB	Landfill
2	Weekly Collection, 140L MGB	Fortnightly collection, 240L MGB	Fortnightly FOGO collection, 240L	4 Weekly collection, 140L MGB	Landfill
3	Weekly Collection, 140L MGB	Fortnightly collection, 240L MGB	Weekly FOGO collection, 240L	4 Weekly collection, 140L MGB	Landfill

1.2.1 Population and generation data

For the purpose of creating the model, type of dwelling, generation and composition data were used.

Table 2 Data used for model (BCC RFI 2022)

Data type	Data
Number of MUDs	12,382
Number of SUDs	56,169
Total number of households	70,900
Annual growth (%)	1.58



Data type	Data
General Waste (tpa)	46,186 t
Comingled Recycling (tpa)	16,046 t
Organic Waste (tpa)	15,526 t

1.2.2 Diversion data

For the purpose of creating the model, diversion assumptions were used. The assumed values are presented in Table 3.

Table 3 Assumed capture and diversion rates used for model (BCC RFI 2022)

Option	FO in Garbage to FOGO	GO in Garbage to GO	Rec in Garbage to Rec	Glass in Rec to Glass
BAU	0%	0%	0%	0%
Option 1	57%	80%	40%	80%
Option 2	40%	80%	20%	80%
Option 3	57%	80%	40%	80%

1.2.3 Current waste management systems

For the purpose of modelling, the three-bin current system was defined as Business As Usual (BAU), with the current frequency. The three options studied included the adoption of a new Glass bin and changes in frequency.

Collection frequency for Garbage is currently weekly, using a 140L Garbage bin, fortnightly for GO, using 140L and 240L bins, and fortnightly for Recycling, with 240L bins.

Bin lift rates, truck sizes and assumed distance between dwellings were obtained from BCC.

The Materials are taken to several disposal and processing facilities in the region. Material transfer via transfer stations was not considered in the modelling. The data and facilities considered are summarised in Table 4 and Table 5.



Table 4 Data used for model (Brimbank RFI 2022)

Data type	Data
Lift rate for General Waste	\$0.86/lift
Lift rate for Organic Waste	\$0.67/lift
Lift rate for Recycling Waste	\$0.91/lift
Distance between lifts	20 m
Size collection truck for General Waste	29 m ³
Size collection truck for Organic Waste	24 m ³
Size collection truck for Recycling Waste	29 m ³

Table 5 Disposal and processing facility assumptions

Kerbside service	Relevant processing/disposal facilities	Address	Gate fee
Garbage to landfill	Melbourne Regional Landfill - Cleanaway	Christies Road, Ravenhall	
Recycling	MRF – Cleanaway Laverton	Gillbertson Rd, Laverton	
	Glass Processing Facility	Assumed 12.5 km away	
GO	GO Processing Facility – Veolia Bulla	Sunbury Rd, Bulla	
FOGO	FOGO Processing Facility – Veolia Bulla	Sunbury Rd, Bulla	



2. Options analysis

2.1 Methodology

2.1.1 Data and document review

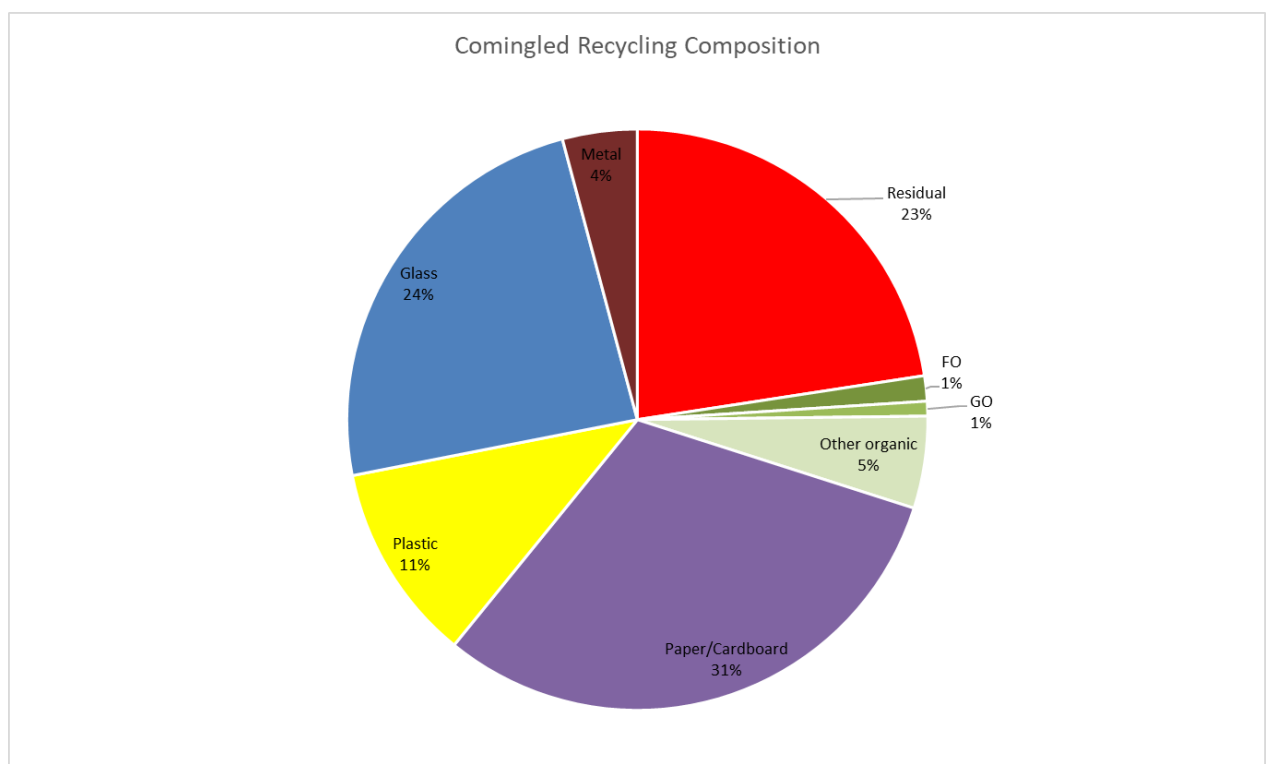
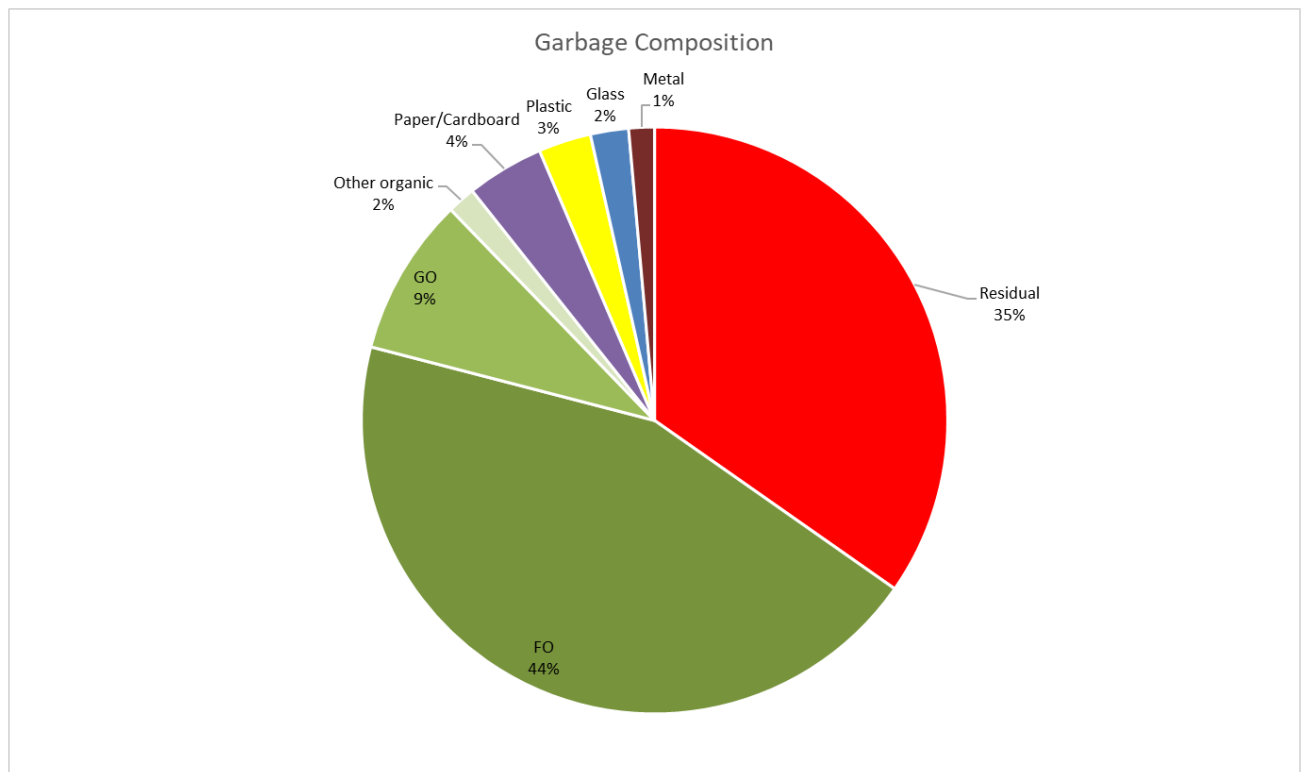
The BCC supplied data was reviewed in order to understand the current waste services. A summary of the reviewed data is provided in Table 6.

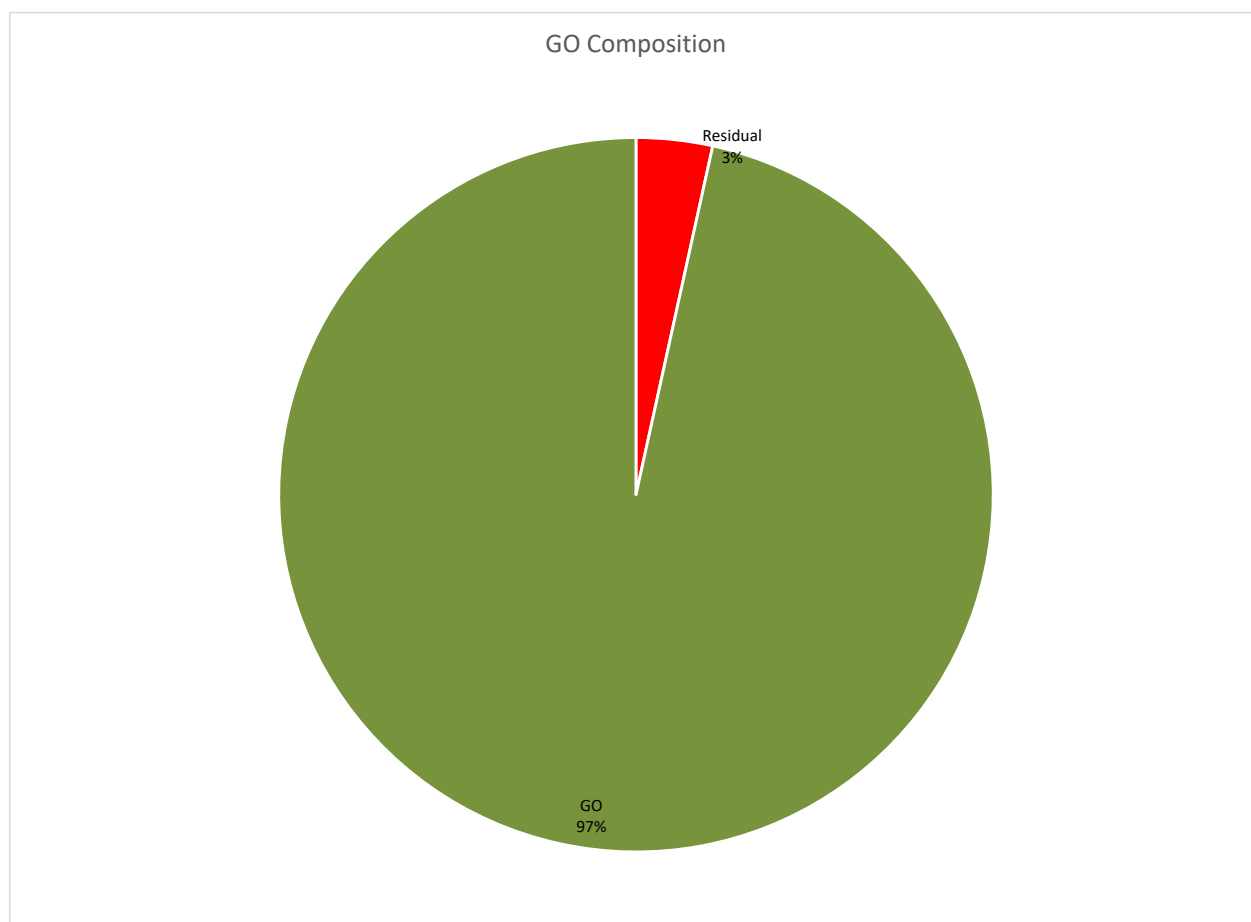
Table 6 Data review summary

Information type		Data supplied by
Waste facilities	- Landfill locations - MRF locations - FOGO facility locations	- BCC - Google Maps
Waste composition	- Assumed values by MRA - Audit MRA 2022	MRA
Population data	- Number of SUDs and MUDs - Population growth	- Australian Bureau of Statistics - BCC
Waste and Recycling tonnages	Volume of waste 2021	BCC

2.1.2 Composition

Composition of the Garbage fraction, Recycling fraction, and GO fraction was based on the composition of the audit completed in March 2022. The CCM was run with the values presented below:

Figure 4 Waste composition from audit completed in March 2022



7.2 Waste Service Options

Each of the kerbside collection Options considered is summarised in the following sections. To illustrate each Option, the diagrams below include coloured blocks that represent the coloured bin lids associated with each waste stream aligned with the Australian Standard bin lid colours (AS 4123.7-2006 (R 2017) Mobile Waste Containers – Colours, markings and designation requirements).

Currently the standard mobile garbage bins (MGB's) issued to residents are 140L bins for Garbage (red lidded bin) and 240L for GO and co-mingled Recycling, however it is noted that there are 140L deployed for GO/FOGO for MUD's. For the purpose of modelling all additional bins for GO/FOGO are considered to be 240L.

Any processing residual created from any of the processing facilities will go direct to landfill.

The options are presented in the table below:

Table 7 – Summary of options analysed in model

Option	Garbage	Recycling	GO/FOGO	Glass	Garbage management
BAU	Weekly collection, 140L MGB	Fortnightly collection, 240L MGB	Fortnightly voluntary GO collection, 140L MGB MUD's, 240L MGB SUD's		Landfill
1	Fortnightly collection, 140L MGB	Fortnightly collection, 240L MGB	Weekly FOGO collection, 240L MGB	4 Weekly collection, 140L MGB	Landfill
2	Weekly Collection, 140L MGB	Fortnightly collection, 240L MGB	Fortnightly FOGO collection, 240L	4 Weekly collection, 140L MGB	Landfill
3	Weekly Collection, 140L MGB	Fortnightly collection, 240L MGB	Weekly FOGO collection, 240L	4 Weekly collection, 140L MGB	Landfill

7.2.4 BAU: Three bin system – Garbage (landfill)

Option 1 reflects the three-bin collection system that has Garbage, GO and Recycling streams. It is assumed that the Garbage stream in FY2022/23 and onwards will be landfilled.

As per the current system it is assumed that 240L bins will be standard for Garbage, GO/FOGO, and Recycling, except for the fraction of 140L for GO/FOGO.

Figure 5 BAU - Three Bin system (WtL)





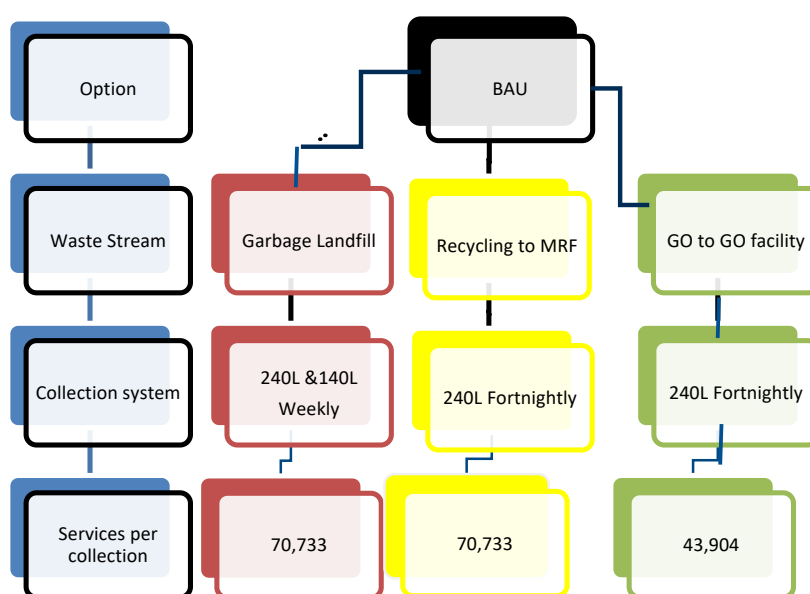
All Garbage is to be collected weekly and transported to a landfill with an average travel distance of 12km.

The distances to facilities have been based on the average distance of the local governments' centroid to their closest facility.

Recycling is to be collected fortnightly and transported to Cleanaway's MRF in Laverton. The average travel distance was 12.5km. GO is to be collected fortnightly and transported to Veolia's facility in Bulla. The average travel distance was 26km.

Travel distance assumptions are depicted in Figure 6.

Figure 6 BAU



7.2.5 Option 1: Four bin system – Changes in frequency

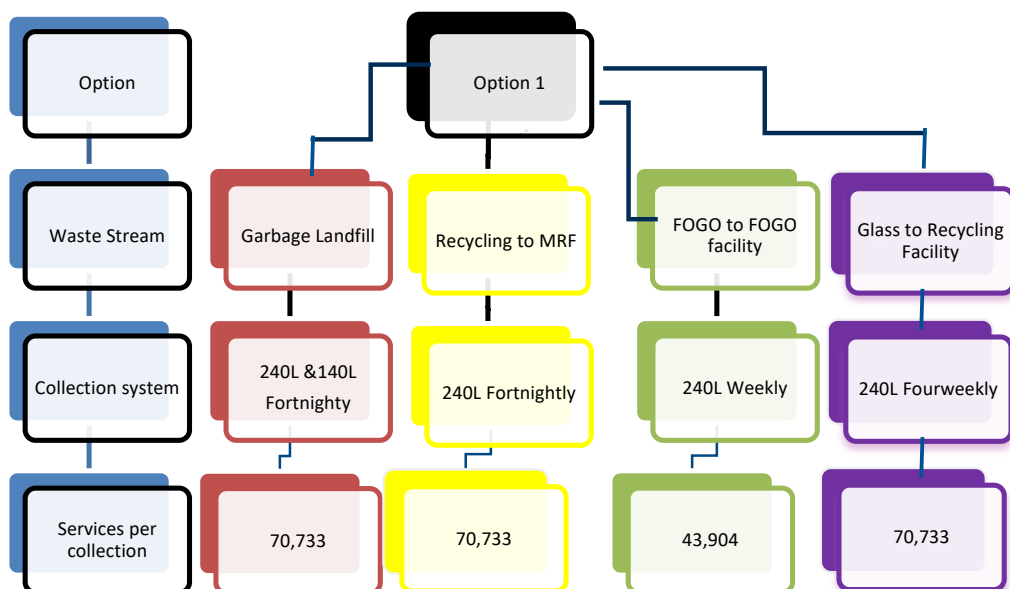
Option 1 includes the addition of the fourth bin for Glass Recycling and a change in the collection frequency to fortnightly collection for Garbage and FOGO.

Waste materials will continue to flow to the same facilities as BAU, except for the added fourth bin, which is assumed will go to a recycling facility at a distance of 12.5km. The new added bin will be 140L and will be collected once a month. This is shown in Figure 7.

Figure 7 Option 1 – Four bins, change in frequency



Figure 8 Option 1 – Four bins, change in frequency



1.1.1 Option 2: Four Bin System – Change in Frequency

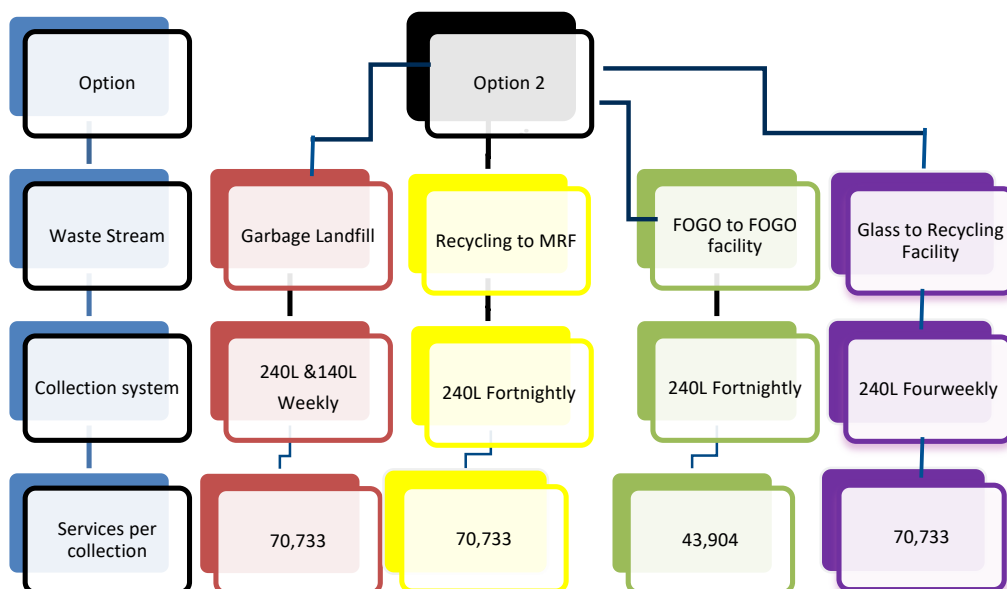
Option 2 is similar to Option 1 but changes collection frequencies to weekly for Garbage and fortnightly for FOGO, respectively.

Waste materials will continue to flow to the same facilities as Option 1. This is shown below.

Figure 9 Option 2 – Four bins, change in frequency



Figure 10 Option 2 – Four bins, change in frequency



1.1.2 Option 3: Four Bin System – Change in Frequency

Option 3 is similar to Option 1 but changes collection frequencies to weekly for both Garbage and for FOGO.

Waste materials will continue to flow to the same facilities as Option 1. This is shown below.

Figure 11 Option 3 – Four bins, change in frequency



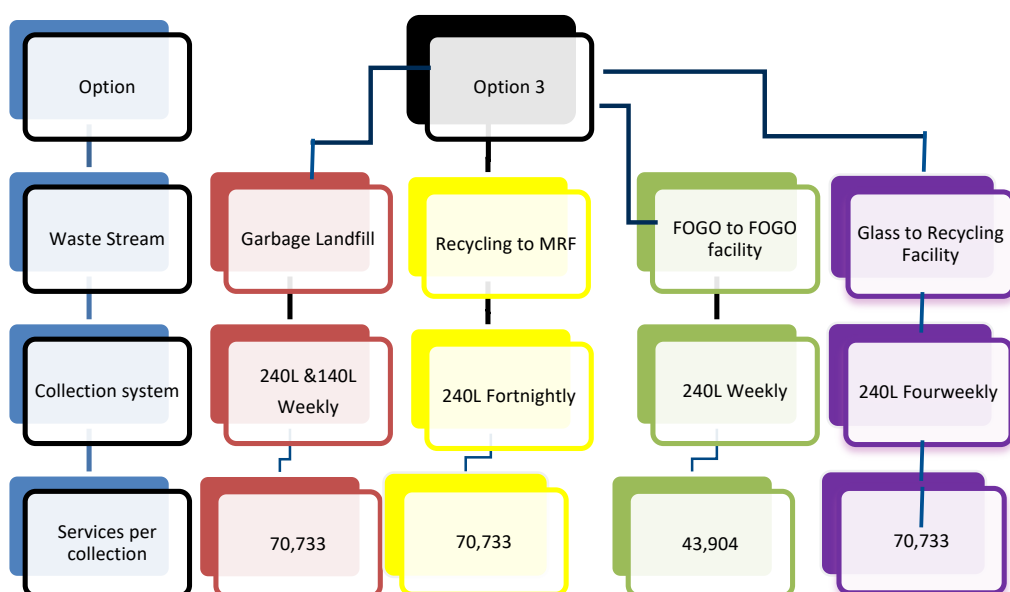


Figure 12 Option 3 – Four bins, change in frequency

2. Quantitative analysis results

All Options were modelled using MRA's Consolidated Cost Model (CCM). For each Option, the quantitative CCM results cover:

1. Total system costs;
 - a. Cost per household (\$/hhld);
 - b. Total system cost in year one(\$);
 - c. NPV (\$m) across a 10 year planning horizon; and
 - d. Cost per tonne recovered.
2. Diversion rate %;
3. Recovery rate (%);
4. Greenhouse gas emissions (t CO₂-e); and
5. Vehicle kilometres travelled (km).

2.1 Options

The Options description has been shortened for the y-axis labels in the following figures, to only mention system changes and increase legibility. Table 8 shows the use of shortened Option labelling in the following figures.



Table 8 Options labelling

Option	Full description	Label description
BAU	Three bin system • Garbage to landfill, 140L bin, weekly collection • Comingled Recycling, 240L bin, fortnightly collection • GO, 140L bin for MUDs, 240L bin for SUDs, fortnightly collection	BAU Wk Garbage Fn GO Fn Recycling
1	Four bin system • Garbage to landfill, 140L bin, fortnightly collection • Comingled Recycling, 240L bin, fortnightly collection • FOGO, 140L bin for MUDs, 240L bin for SUDs, weekly collection • Glass, 140L bin, fourweekly collection	Fn Garbage Wk FOGO Fn Recycling Monthly Glass
2	Four bin system • Garbage to landfill, 140L bin, weekly collection • Comingled Recycling, 240L bin, fortnightly collection • FOGO, 140L bin for MUDs, 240L bin for SUDs, fortnightly collection • Glass, 140L bin, fourweekly collection	Wk Garbage Fn FOGO Fn Recycling Monthly Glass
3	Four bin system • Garbage to landfill, 140L bin, weekly collection • Comingled Recycling, 240L bin, fortnightly collection • FOGO, 140L bin for MUDs, 240L bin for SUDs, weekly collection Glass, 140L bin, fourweekly collection	Wk Garbage Wk FOGO Fn Recycling Monthtly Glass



2.2 Total system costs

System costs are a function of a number of interrelated variables however, for all Options collection services their cost remains the same. The only key differentiating variable within scenarios is the frequency of service.

2.2.1 Cost per household

Cost per household is calculated by dividing the system's 10-year Net Present Value³ (NPV) by the number of households and the number of years modelled. Thus, factors such as cost of new bins, collection and transport cost, and facility gate fees are factored in and the displayed numbers are an average. Figure 13 shows the total annual cost per household and Figure 14 details the annual cost per household for each service.

With the addition of a fourth bin:

- the cost per household in year 1 increases, as the new service is rolled out by \$52 per household.
- The cost for the additional service is partially compensated during the analysis period by a reduction in Garbage cost. The cost of processing material through landfill is higher on a per tonne basis than the cost of processing the glass, so as volume is diverted away, there is a net saving.
- Increase in frequency, as expected, increases costs, with Option 3 having the highest costs as two of the bins are collected weekly.
- Option 1 is the lowest cost Option as it has the lower frequency of collection.

Figure 13 and Figure 14 show the cost per household in each Option. This provides the Brimbank with an indicative measurement of its costs.

³ Net Present Value (NPV) is the value of all future cash flows (positive and negative) over the entire life of an investment discounted to the present. NPV analysis is a form of intrinsic valuation and is used extensively across finance and accounting for determining the value of a business, capital project, or anything that involves cash flow.



Figure 13 Annual cost per HH per year averaged over 10 years at net present value.

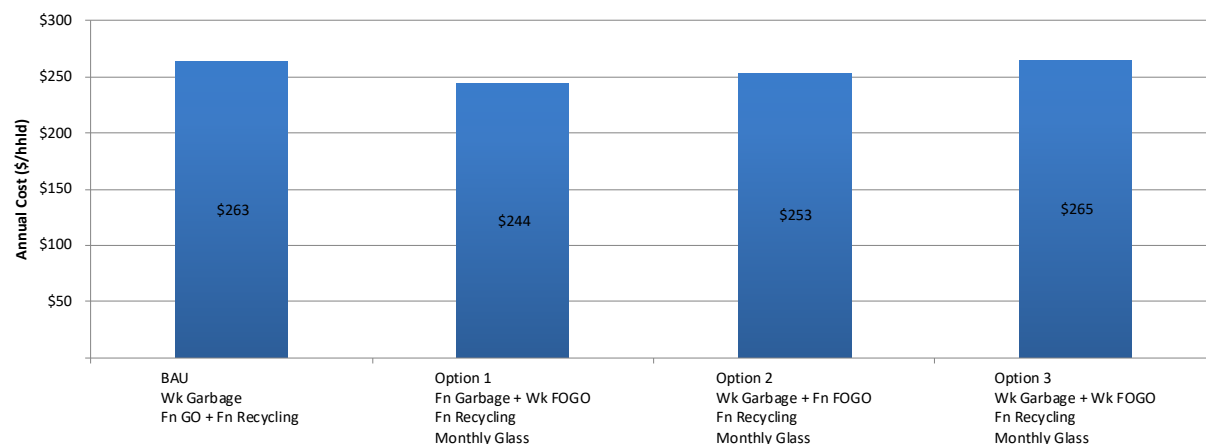
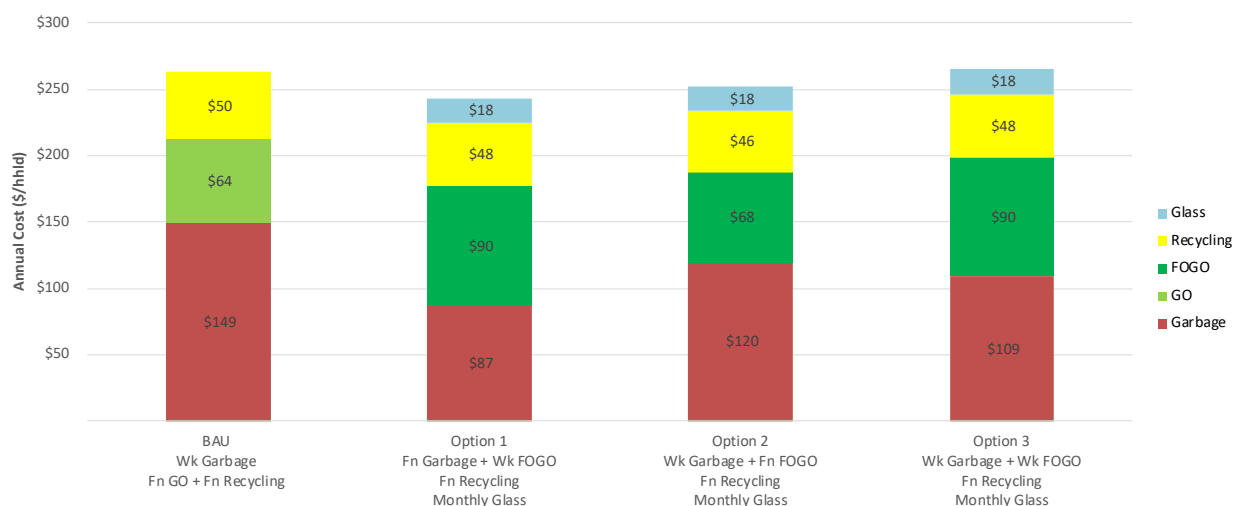


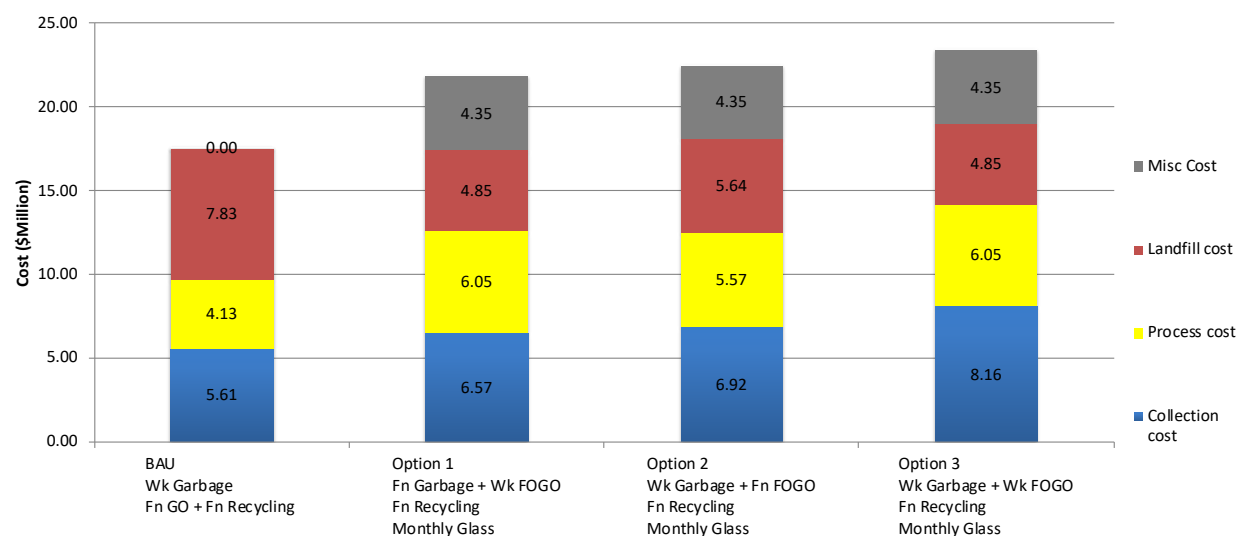
Figure 14 Annual cost per HH per year by service averaged over 10 years at net present value



2.2.2 Breakdown of total cost in Year 1

The costs shown are total costs in \$million. The most expensive Option is Option 3. Note:

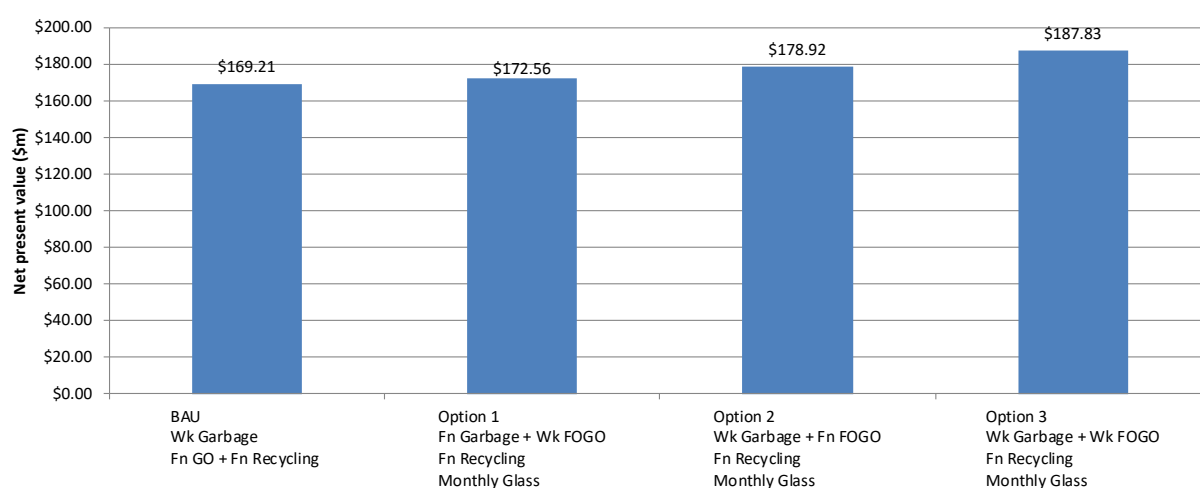
- Figure 15 shows the total system cost for year 1 and includes new infrastructure and education expenses in miscellaneous cost;
- Process costs include processing of Glass, Recyclables, FOGO and Garbage;
- Collection cost are slightly higher in Options 3 and 4 due to additional collections.

Figure 15 Total cost breakdown Year 1

2.2.3 Net present value, 10 year period

In order to amortise the one-off costs incurred in year one (including new bin infrastructure, caddies and education), the sum of the present values of the incoming and outgoing cash flows of each Option has been presented as a 10 year NPV in Figure 16. Note:

- Option 3 has the highest cost due to the increased frequency to weekly collections for Garbage and FOGO;
- All options are lower than BAU due to the diversion of waste from landfill to lower cost options;
- The NPV is calculated using 10 one-year periods; and
- The discount rate is 5%.

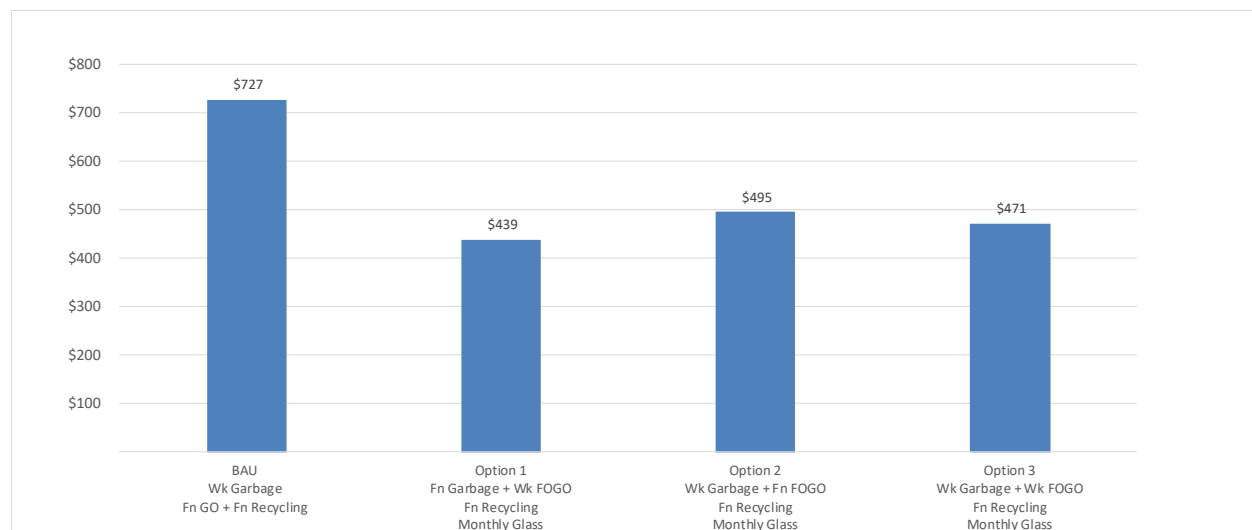
Figure 16 NPV, 10 years



7.2.6 Cost per tonne recovered

Figure 17 shows the total recovered tonnes divided by the total system cost. The addition of a fourth bin reduces the cost per tonne recovered significantly in comparison to three bin Option.

Figure 17 Cost per tonne recovered



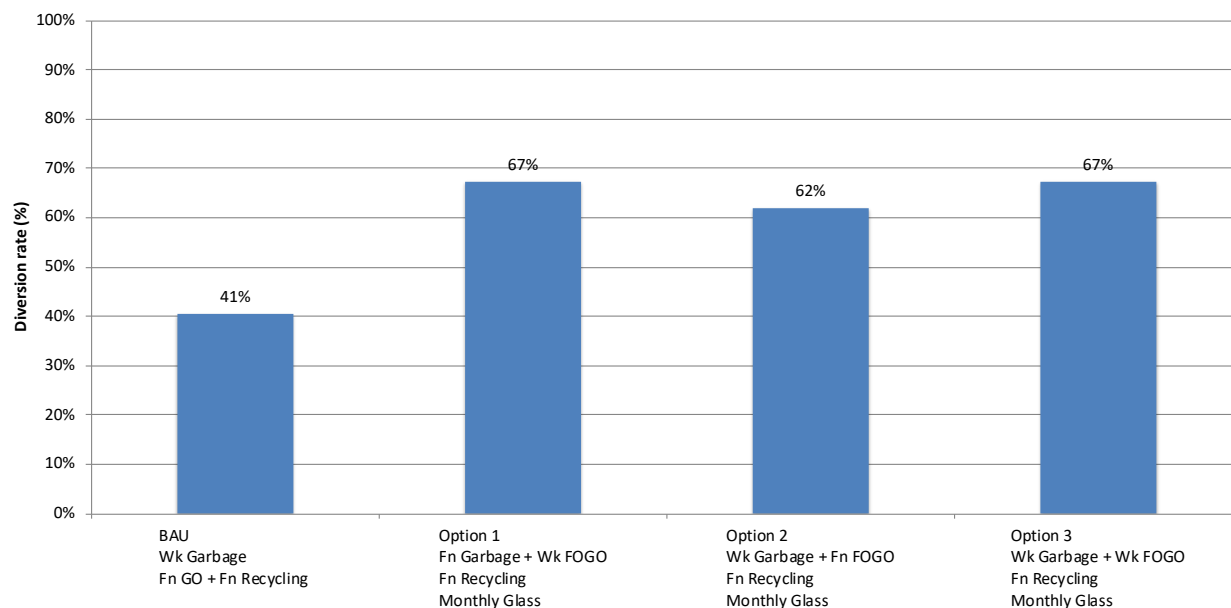
2.3 System diversion performance

The diversion rate of materials from the waste streams is shown in Figure 18.

Note:

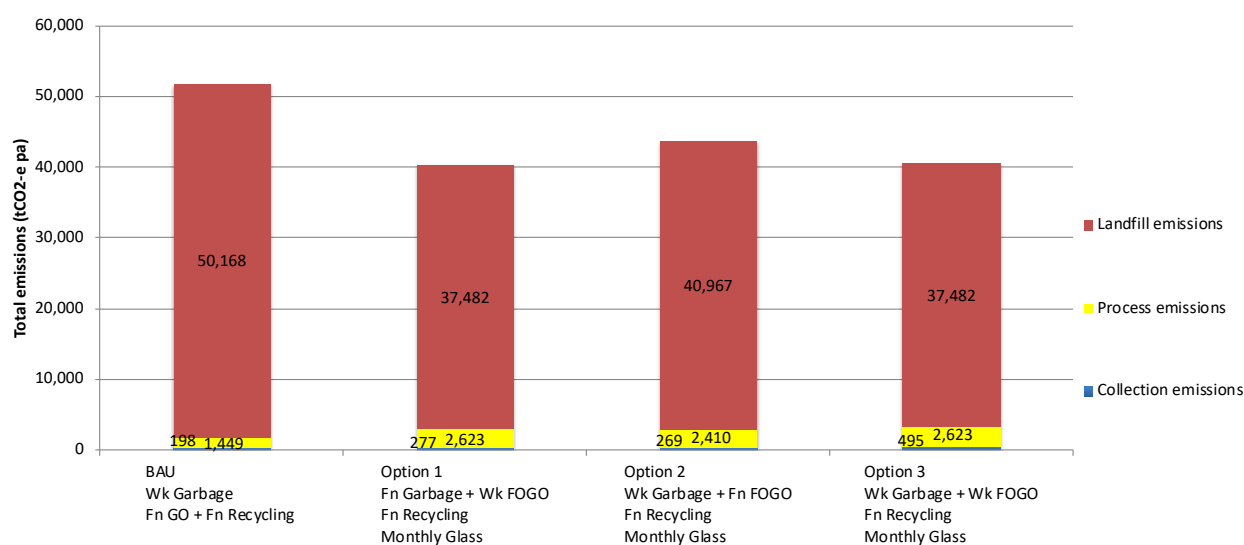
Diversion rates achieved by each Option, consider all materials diverted from the landfill bin.

The implementation of a four-bin system reduces Garbage quantities and improves diversion rates from 41% for BAU, to 67% for Option 1 and 3 and 62% for Option 2 (Figure 18).

Figure 18 Diversion rate

2.4 System greenhouse gas emissions

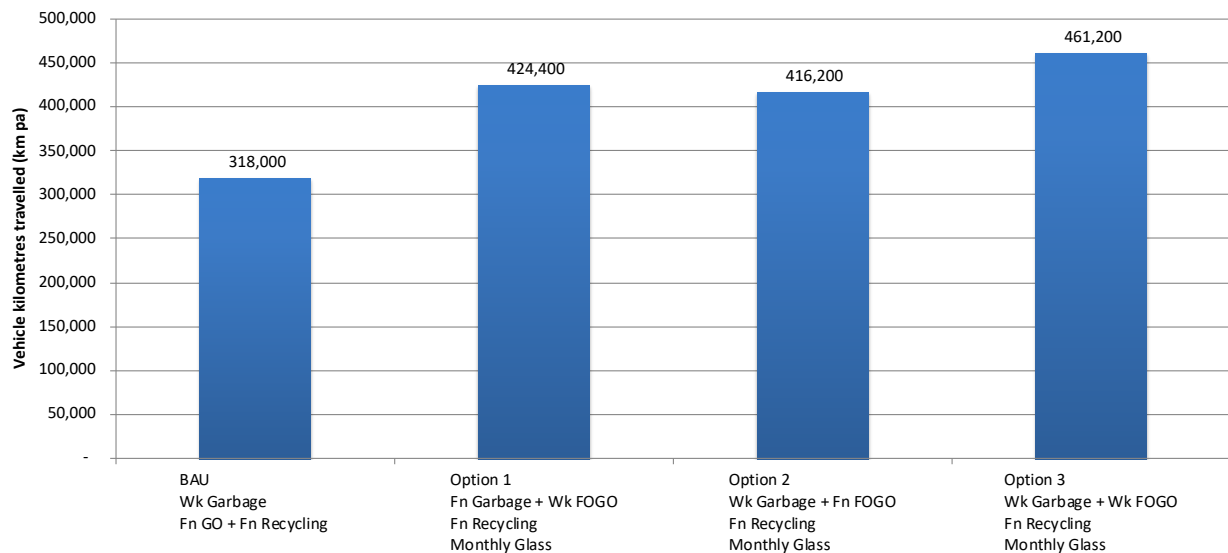
The greenhouse gas (GHG) emissions of each Option were calculated, considering collection, processing, and landfill emissions. A gas capture capacity at the landfill site of 50% was assumed for the modelling of greenhouse gas emissions. Landfills are the biggest contributor to greenhouse gas emissions compared to collection, transport and organics processing or waste to energy facilities, which generate significantly lower emissions. Residuals to landfill from MRF and FOGO processing create landfill gas and are responsible for the landfill emissions depicted. BAU is the worst performing option as it has the largest volume going to landfill.

Figure 19 System greenhouse gas emissions

2.5 System vehicle kilometres travelled

The annual vehicle kilometres travelled are higher for all options when compared to BAU due to the additional collection of glass and its transportation to the processing facility. An increase in frequency obviously increases the kilometres travelled, for the same volume. Figure 20 presents the vehicle kilometres for each Option.

Figure 20 Vehicle kilometres travelled





3. Policy integration and Multi-criteria Analysis

3.1 Policy alignment

Policy alignment examines how each Option aligns with the strategic requirements set out by BCC and State Government.

Table 9 Policy alignment

Option		Policy alignment
BAU	Three bin system - General Waste to landfill, 140L bin, weekly collection - Comingled Recycling, 240L bin, fortnightly collection - GO, 140L bin for MUDs, 240L bin for SUDs, fortnightly collection	Poor: Base case.
1	Four bin system - General Waste to landfill, 140L bin, fortnightly collection - Comingled Recycling, 240L bin, fortnightly collection - FOGO, 140L bin for MUDs, 240L bin for SUDs, weekly collection - Glass, 140L bin, fourweekly collection	Good: increased recovery through Glass service, diversion of waste from landfill. Question: will lower frequency affect efficiency rates?
2	Four bin system - General Waste to landfill, 140L bin, weekly collection - Comingled Recycling, 240L bin, fortnightly collection - FOGO, 140L bin for MUDs, 240L bin for SUDs, fortnightly collection - Glass, 140L bin, fourweekly collection	Good: increased recovery through Glass service, diversion of waste from landfill. Question: will lower frequency affect efficiency rates?

Option		Policy alignment
3	Four bin system - General Waste to landfill, 140L bin, weekly collection - Comingled Recycling, 240L bin, fortnightly collection - FOGO, 140L bin for MUDs, 240L bin for SUDs, weekly collection - Glass, 140L bin, fourweekly collection	Good: increased recovery through Glass service, diversion of waste from landfill. High frequency of service promotes optimal practices by residents

3.2 Multi-criteria Analysis

The Multi-criteria Analysis provides an integrated approach to rank the options based on criteria agreed with Brimbank. The criteria is weighted and includes different factors, both qualitative and quantitative. These are presented in the table below.

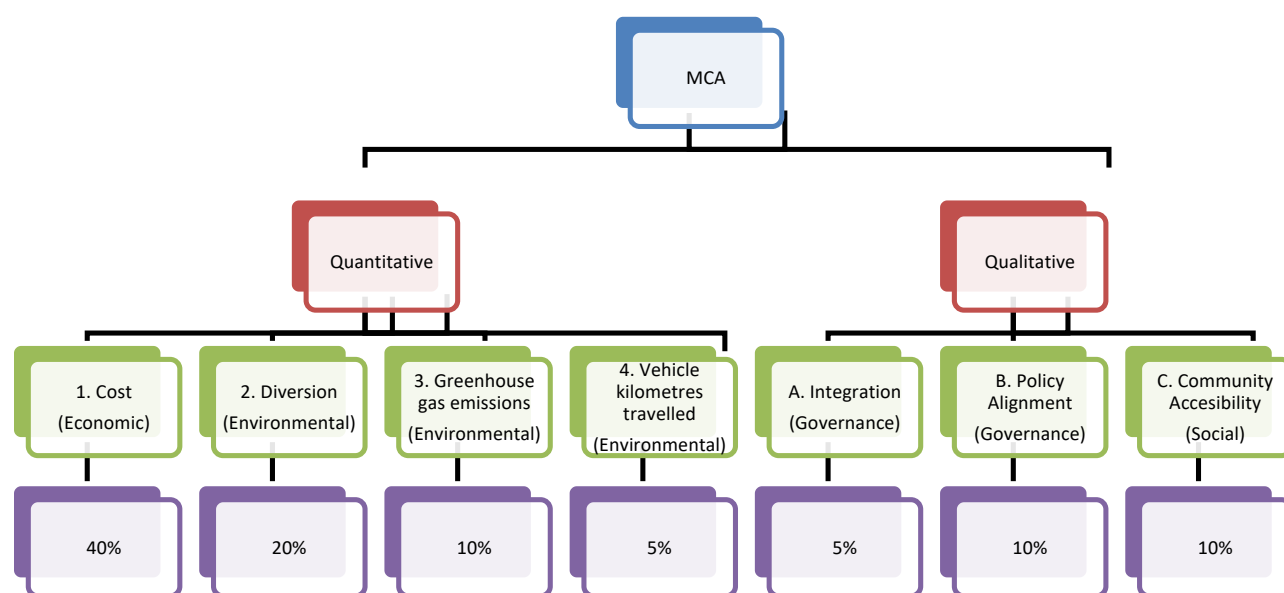
Table 10 Multi-criteria Analysis

Criteria	Factor	Weight
Economic	Cost	40%
Environmental	Landfill diversion	20%
	Annual vehicle distance travelled	5%
	Annual emissions (t-CO ₂)	10%
Governance	Policy alignment	10%
Governance	Integration	5%
Social	Community accessibility	10%

Criteria	Factor	Weight
Total		100%

The analysis is shown below:

Figure 21 Multi-criteria analysis



Using the data obtained from the model, the analysis generates the following results (Figure 22 Multi-criteria analysis):



Figure 22 Multi-criteria analysis

	Quantitative Analysis						Qualitative Analysis						Total Score (%)	
	Economic		Environmental				Governance		Integration		Social			
Option	Total Net Present Value (\$m)	Weight ed Score (%)	Diversion (%)	Annual Vehicle kilometres travelled	Annual Emissions (tCO ₂)	Weight ed Score (%)	Policy Alignment		Integration		Community accessibility (behaviour)			
Criterion weighting	40%		20%	5%	10%	75%	10%		5%		10%		100%	MCA Rank
BAU Wk Garbage Fn GO + Fn Recycling	\$169.21	40%	41%	318,000	51,810	25%	1	3%	4	5%	3	8%	79.9%	4
Option 1 Fn Garbage + Wk FOGO Fn Recycling Monthly Glass	\$172.56	39%	67%	424,400	40,380	34%	4	10%	1	1%	1	3%	86.7%	1
Option 2 Wk Garbage + Fn FOGO Fn Recycling Monthly Glass	\$178.92	38%	62%	416,200	43,650	31%	3	8%	2	3%	2	5%	84.3%	3
Option 3 Wk Garbage + Wk FOGO Fn Recycling Monthly Glass	\$187.83	36%	67%	461,200	40,600	33%	3	8%	1	1%	3	8%	85.7%	2



8 Conclusion

- Modelling confirms that Diversion Rates can be significantly improved through the addition of a universal FOGO bin.
- Diversion of material from landfill, reduces the overall cost for the Council after Year 1 deployment costs. On average, the 10 year NPV costs are lower than BAU.
- Implementation of the proposed options will reduce the cost per household per year by \$5-\$10, if the initial setup costs (bins, caddies, education) are depreciated over the 10 year modelling term.
- Diversion rate can be improved by over 50% (over 21 percent points) by introducing FOGO and glass collection systems
- Option 2 is ranked overall as the best option in the Multi Criteria Analysis, based on the council criteria.

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