



Regenerative Business Development



Choosing a Safe and Sustainable Reusable Serveware Fleet

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Executive Summary

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This report has been commissioned by Takeaway Throwaways to support groups in Aotearoa New Zealand who are establishing reusable serviceware systems to procure the most **sustainable** and **safe** reusable serviceware fleets possible. Events were the context studied for this report, but most of the findings are generally applicable across a range of hospitality contexts.

Serviceware is any vessel, receptacle and container used to hold prepared, ready-to-eat food and drink, either to be consumed on-site or to take away, e.g. cups, plates, bowls, cutlery and lunchboxes.

Reusable serviceware systems offer businesses and consumers an alternative to disposables. When functioning well, with high uptake and high rates of return, reuse systems avoid the creation and disposal of multiple single-use items. This can reduce costs while bringing significant environmental benefits. Public health benefits can also flow from avoiding single-use serviceware, which often contains harmful or potentially harmful chemical additives that can transfer into food and drink.

When designing a new reuse system, the decision of what type of reusable serviceware to buy plays a role in maximising the benefits of reuse and minimising unintended consequences. This report provides an evidence-based review of the key considerations - environmental impact, public health safety, cost and functionality - for investing in low-impact, high-quality reusable serviceware fleets.

A **high-level decision-making matrix** (below) applies these considerations in a New Zealand context, to commonly used serviceware materials (glass, polypropylene (PP), tritan, stainless steel, melamine, ceramics and enamelled metals). The matrix, its selected criteria and ratings are based on the report's research findings, and can be used by anyone in New Zealand looking to invest in a reusable serviceware fleet.





Less Desirable	Caution	Average	Good Practice	Best Practice	Unknown
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Decision-Making Matrix ratings

	Tempered Glass (drink-ware)	Vitrified Glass (dinner-ware)	PP (both)	Tritan (drink-ware)	Stainless Steel (both)	Melamine (both)	Vitrified Porcelain (both)	Enamelled steel (both)
Hazardous Substance Migration	Best Practice	Best Practice	Less Desirable	Caution	Best Practice	Caution	Good Practice	Average
Microplastic Release	Best Practice	Best Practice	Less Desirable	Unknown	Best Practice	Unknown	Best Practice	Best Practice
Hazardous Substance Accumulation	Best Practice	Best Practice	Less Desirable	Unknown	Best Practice	Unknown	Best Practice	Best Practice
Expected Lifespan	Good Practice	Good Practice	Less Desirable	Average	Best Practice	Good Practice	Average	Good Practice
Impact Durability	Average	Average	Best Practice	Good Practice	Best Practice	Best Practice	Caution	Best Practice
Recyclability	Average	Average	Good Practice	Less Desirable	Good Practice	Less Desirable	Caution	Good Practice
Hygiene	Good Practice	Good Practice	Less Desirable	Unknown	Best Practice	Unknown	Average	Average
Lifecycle Assessment	Caution	Caution	Caution	Unknown	Best Practice	Unknown	Unknown	Unknown
Weight	Less Desirable	Caution	Best Practice	Good Practice	Good Practice	Good Practice	Less Desirable	Good Practice

Decision-Making Matrix

In preparing the matrix, extra research was undertaken on material safety (toxicity, migration, shedding and microbial adhesion) because these topics often receive relatively less attention in the grey literature on packaging choices. The findings from this extra research is summarised in **Appendix A** of this report. For the purpose of making decisions about reusable serviceware, it may be useful to note that the research on material safety indicates that:

- Material choice is relevant not only for reusable serviceware, but also for dishwasher accessories, such as racks.
- Decisions about serviceware branding, such as on-product prints, should also be considered carefully as printing inks often contain large numbers of hazardous substances.
- To accredit against certain standards, including the PR3 Reusable Packaging System Standards, reusable packaging systems may need to avoid the use of plastic.

The report also provides a **serviceware cost comparison matrix** (below) that compares the cost of different serviceware options across materials and at different return rates. The matrix shows that the impact of reusable serviceware materials is connected to overall system design, and choices about reusable packaging procurement should take into account the need for high return rates (ideally, 90% or higher).

Serviceware Cost Comparison Matrix

	Tempered Glass	Vitrified Glass	PP	Tritan	Stainless Steel	Melamine	Vitrified Porcelain	Enamelled Steel
Cost Cold-drinkware*	Avg. Cost		Higher Cost	Highest Cost	Lowest Cost	Lower Cost		
Cost Cold-drinkware**	Avg. Cost		Lowest Cost	Highest Cost	Avg. Cost	Lower Cost		
Cost Foodware*		Lower Cost	Higher Cost		Avg. Cost	Lowest Cost	Highest Cost	Highest Cost
Cost Foodware**		Lower Cost	Lowest Cost		Avg. Cost	Lowest Cost	Highest Cost	Higher Cost

* assuming 100% return rate

** assuming 85-95% return rate with 2.5% glass and 5% porcelain breakage

Key findings and decision-making tree

Stainless steel and vitrified or tempered glass options fared the best across most criteria, with the caveat that return rates must be as high as possible (and breakage rates low for glass) or these options can become expensive or fail to meet environmental breakeven points.

Using carefully sourced second-hand serviceware options for any situation can reduce costs and provide the opportunity for return rates to improve before higher monetary investments are made to procure larger fleets.

PP is the lowest cost option for high volumes and low return rates, but would ideally only be considered an interim option while return rates are improved due to its potential health and environmental impacts.

For branding, a fleet without printing is a lower risk option in terms of material safety. Stainless steel can be branded by alternative means (e.g. embossing or engraving), if budget allows. Unbranded fleets can also be considered if other ways of raising the brand profile are explored, such as branding at returned serviceware collection/drop off points, and wash stations. Unbranded fleets can bring other benefits. For example, if stock is updated or the reuse system retires, unbranded serviceware can more easily be utilised in other reuse systems.

The following decision tree provides a guideline for what direction works best in different situations based on the criteria outlined:

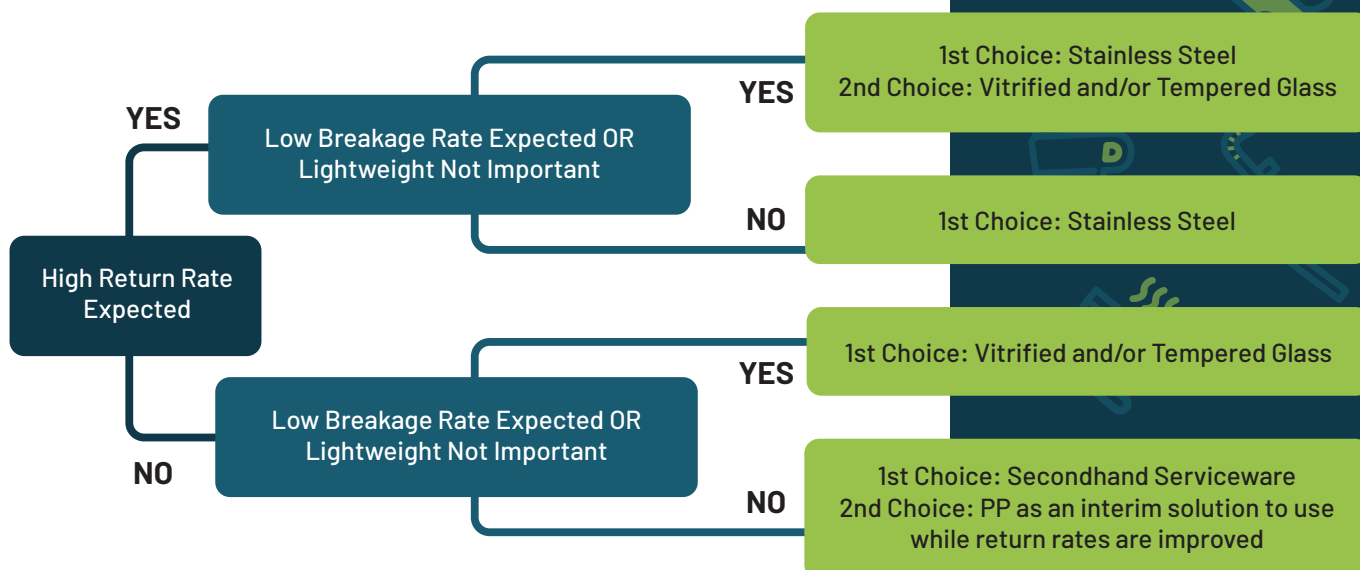


Figure 1: Decision Tree for Serviceware Material Choice