

Auckland Council Plastic Flows

Plastics diversion in Tāmaki Makaurau

August 2023



Contents

1.0 Background	3
2.0 Stakeholders	4
3.0 Plastic Flows	6
3.1 Plastic flow data	6
3.2 Data Sources Detail	14
3.2.1 Caveats.....	16

DRAFT

1.0 Background

This report compiles and analyses data on waste plastic material flows (particularly end of life destinations) in Auckland. The information is intended to inform Auckland Council in the development of their waste assessment and subsequent Waste Management and Minimisation Plan.

This project covered the following waste streams;

- **Flexible/soft plastics.** This includes soft plastic packaging, shrink wrap, building films,
- **Plastic packaging.** This includes all consumer plastic packaging – predominantly food packaging, including bottles and food containers,
- **Durable/non-packaging plastics.** This includes electrical and electronic equipment, cars, durable consumer items (furniture, utensils etc.), and building and construction materials,
- **Pre consumer plastic scrap.** This includes production offcuts and scrap from manufacturing processes.

Note: Textiles are not covered in this analysis – it is understood that this is covered through separate research.

This project reviewed and compiled data from the following sources:

- Statistics NZ Import/Export data
- Rethinking Plastics in Aotearoa NZ, Office of the Prime Ministers Chief Science Advisor, 2019
- Auckland Council/Visy data
- Re:Plastics – Reshaping Plastics in Aotearoa New Zealand, Plastics NZ 2021
- Research to Support the Co-design of a Plastic Packaging Product Stewardship Scheme for New Zealand, Valpak, July 2023
- Soft Plastic Recycling Scheme's 2022 annual report
- Agrecovery Annual Report 2019-20
- Waste Infrastructure Stocktake data compiled by Eunomia in 2020/21
- Green-farms Product Stewardship Scheme, Price Waterhouse Coopers report on quantities of farm plastics sold in 2017, 2018 & 2019
- Plastic Atlas Facts and figures about the world of synthetic polymers¹

A value chain mapping exercise was undertaken to identify key parties and what material streams they are likely to be involved with. The value chain mapping exercise helped inform the waste plastic material flow data.

This brief report provides a brief commentary on the context of this data that has been gathered and analysed, including a brief methodology.

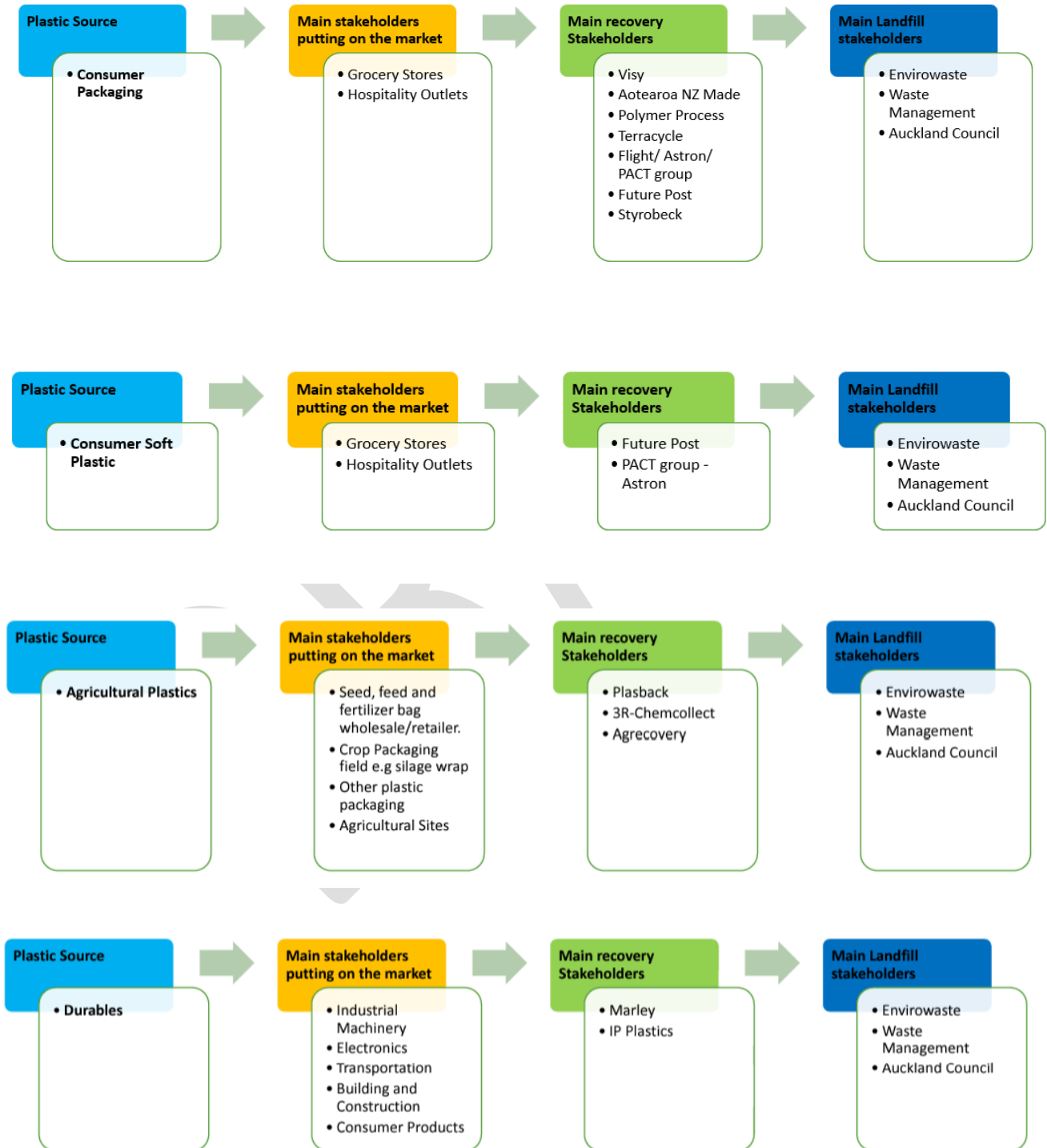
¹ The PLASTIC ATLAS 2019, Heinrich Böll Foundation, Berlin, Germany, and Break Free From Plastic

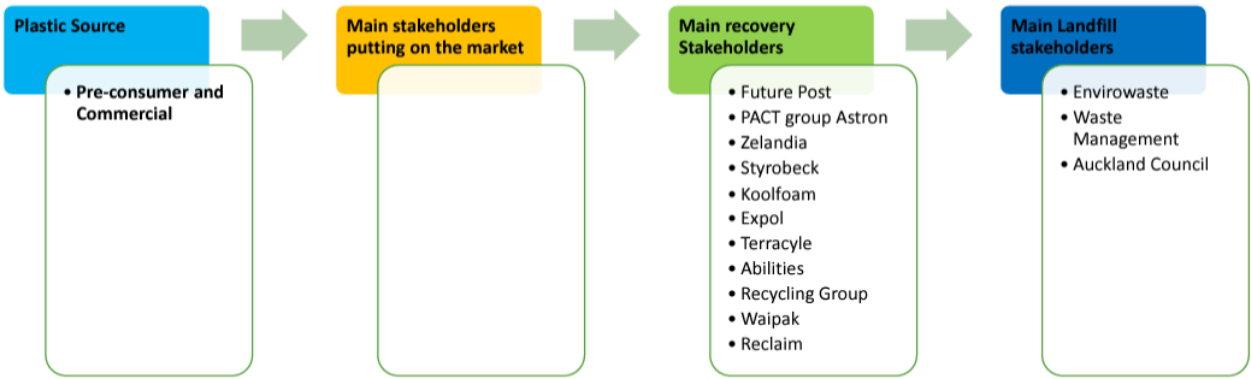


2.0 Stakeholders

The following flow charts display the key players for recovering plastics domestically for Auckland region's plastic waste. The focus in this exercise was identifying key parties in the resource recovery part of the value chain.

Figure 1 - Key Plastic Waste Stakeholder for Auckland's Plastic Waste





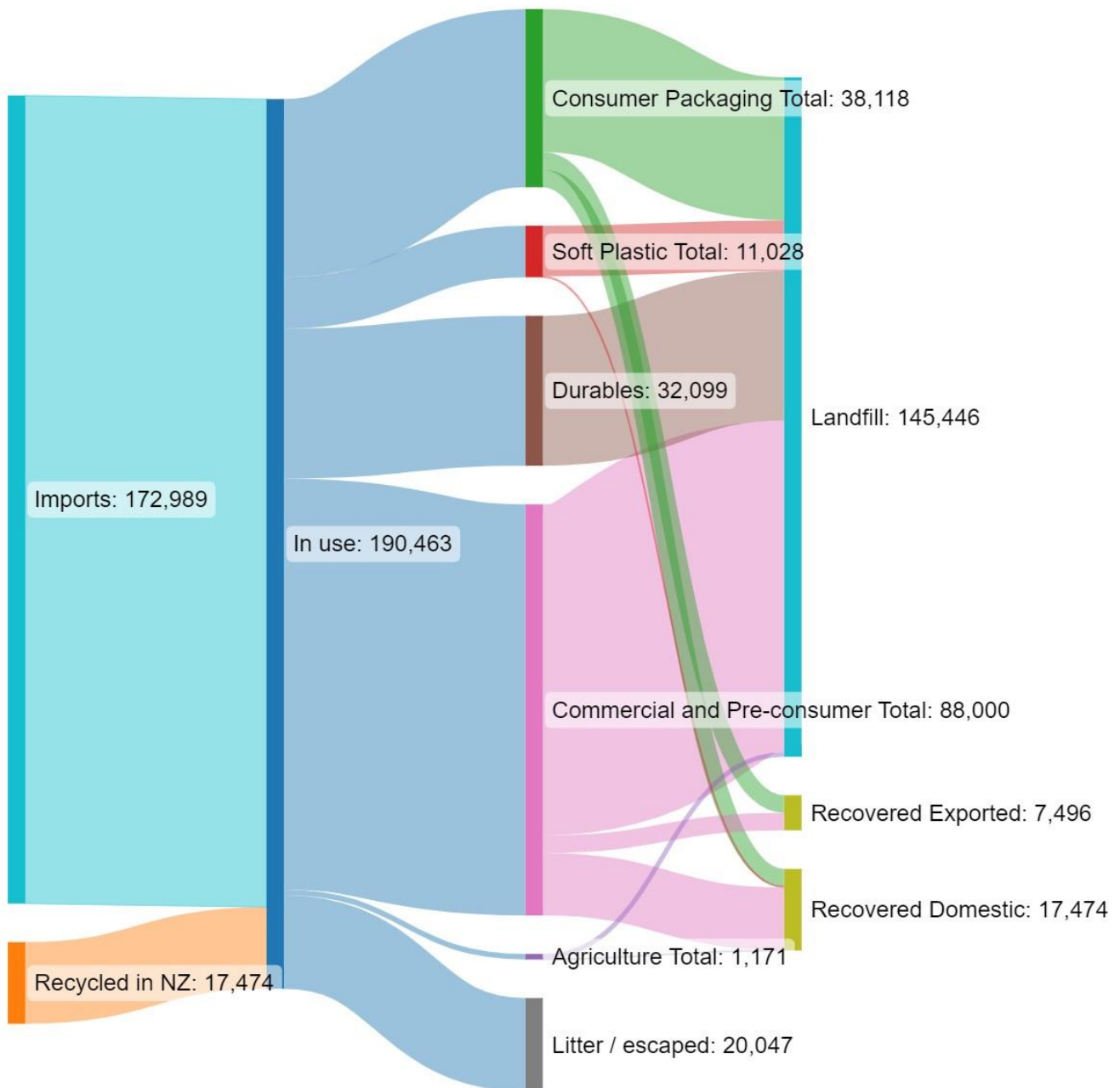
DRAFT

3.0 Plastic Flows

3.1 Plastic flow data

Figure 1 below demonstrates the plastic waste streams in Tāmaki Makaurau Auckland.

Figure 2 - Plastic Waste Streams in Auckland



There are approximately 190,000 tonnes of plastic estimated to be consumed in Auckland annually. Of this, consumer packaging makes up approximately 38,000 tonnes (20%), durables account for 32,000 tonnes 17%, while commercial and pre-consumer material makes up the largest share at 88,000 tonnes (47%). Finally soft plastics account for some 11,000 tonnes (6%) and agricultural plastics 1,200 tonnes (1%)

The majority (77%) of material is landfilled while only 13% is estimated to be recovered. 70% of recycled plastics are being processed onshore, while 30% of plastics recovered for recycling are shipped to export markets. Key export markets from Auckland include Malaysia and Taiwan. Based on the available data, an estimated 10% of the material in the system is unaccounted for and is either littered (44 tonnes), stockpiled, in flux, or otherwise lost to the system.

Commercial and Pre-consumer plastics account for a large portion of Auckland's Plastic waste, accounting for nearly 88,000 tonnes of annual plastic waste and only 19% of this finds its way to being recovered.

Durable plastic waste is also a large portion of total plastic waste being produced within the Auckland region and little to none of this has a suitable recovering stream. While there are some small-scale independent recycling schemes at play, such as that being run by IP Plastics and local CRC's, this accounts for less than 1 tonne of plastic waste being repurposed.

Within Auckland, agricultural plastics contribute a small percentage of plastic waste entering the system. Consumer packaging both flexible and non-flexible packaging accounts for 25% of plastic put on the market. There is a recovery rate of 20-25% of this consumer packaging that is recycled.

The following table and Sankey diagram provide a breakdown of plastic material flows by polymer type.

DRAFT

Table 1 - Plastic Waste Flows in Auckland

Plastic Category	Plastic Placed on Market (t)	Recovered (t)	Recovered Domestic	Recovered Exported	Landfill
Imported	172,989				
Consumer Packaging, PET 1*	12,303	4155	1891	2264	8,148
Consumer Packaging, HDPE 2*	11,017	2339	1134	1205	8,678
Consumer Packaging, PVC 3*	218			0	218
Consumer Packaging, LDPE 4*	1,042	208	208	0	834
Consumer Packaging, PP 5*	4,566	812	558	254	3,754
Consumer Packaging, PS 6*	2,079	10	10	0	2,069
Consumer Packaging, Other 7*	6,892	2		2	6,889
Consumer Packaging Total*	38,118	7527	3802	3725	30,591

Plastic Category	Plastic Placed on Market (t)	Recovered (t)	Recovered Domestic	Recovered Exported	Landfill
Soft Plastic HDPE	1,567	26	26		1,541
Soft Plastic LDPE	4,184	68	68		4,116
Soft Plastic, PP	753	12	12		741
Soft Plastic, Multi-layered plastics	4,524	74	74		4,450
Soft Total*	11,028	180	80		10,848
Agricultural, PP*	114				114
Agricultural, LDPE*	235	81			154
Agricultural, LLDPE*	234	33			201
Agricultural, BOPP*	73				73
Agricultural, HDPE*	50	25			25

Plastic Category	Plastic Placed on Market (t)	Recovered (t)	Recovered Domestic	Recovered Exported	Landfill
Agricultural, PE*	90				90
Agricultural Unknown*	374				374
Agricultural Total*	1,171	139	139		1,032
Industrial Machinery	577				577
Electronics	3,652				3,652
Transport	5,574				5,574
Building and Construction	13,647				13,647
Consumer Products	8,649				8,649
Durables Total	32,099	0**	0	0	32,099
Commercial and Pre-consumer 1		385	300	85	

Plastic Category	Plastic Placed on Market (t)	Recovered (t)	Recovered Domestic	Recovered Exported	Landfill
Commercial and Pre-consumer 2		3200	2495	705	
Commercial and Pre-consumer 4		10097	7874	2223	
Commercial and Pre-consumer 5		1023	798	225	
Commercial and Pre-consumer other		597	470	127	
Commercial and Pre-consumer soft plastics		5	0	5	
Pre-consumer and commercial total	88,000	17,124	13,354	3771	70,876
TOTAL	190,363	24,970	17,474	7,496	145,446

Plastic Category	Plastic Placed on Market (t)	Recovered (t)	Recovered Domestic	Recovered Exported	Landfill
	(Including 17,374 of domestic recovered plastic)				
Litter/ escaped/flux/stockpiled					20,047

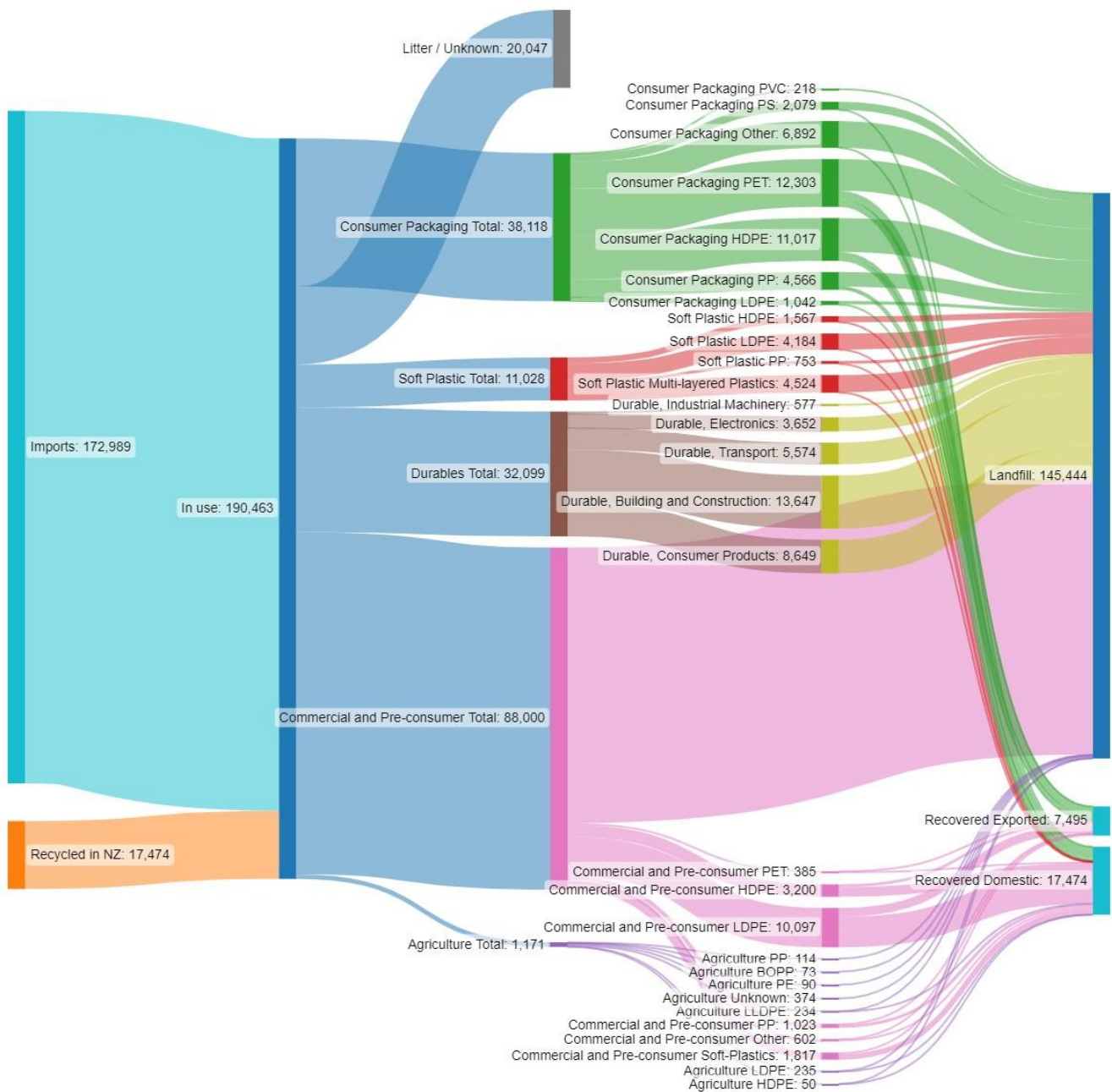
* National data pro-rated to Auckland

** There is a small amount (approximately 1 tonne) of durables recovered by IP Plastics and local CRC's

DRAFT

Figure 3 below displays the above data in Sankey form.

Figure 3: Plastic Waste Streams in Auckland by Polymer Type



The above data and chart show that the largest use of plastic is in the commercial and pre-consumer sector. Consumer packaging and durables also contribute substantial amounts, while soft plastics and agriculture are relatively small in the Auckland context. The most commonly recovered polymers are commercial and pre-consumer LDPE, PET, HDPE and HDPE consumer packaging. Commercial and pre-consumer materials accounts for the 68% of all material recovered. Soft plastics, and agricultural plastics only make up a small proportion of the total plastic recovered.

3.2 Data Sources Detail

The table below outlines how the information in the above tables and charts was calculated.

Category	Data Breakdown
Auckland Population	<p>Where national data was sourced, but there was no Auckland specific data available, the national data was pro-rated to arrive at an Auckland figure. To pro-rate national data to Auckland for consumer sources, Auckland's population was calculated to a percentage of National Population.</p> <p>National Population: 5,223,100²</p> <p>Auckland Population: 1,673,220³</p> <p>The pro-rated figure for Auckland therefore is 31.2%. This figure was used as the denominator to adjust national data respectively for Auckland.</p>
New Zealand population vs global	<p>For durable plastic, data was sourced for global durable plastics from Plastic Atlas 2019. This was pro-rated to New Zealand then Auckland. Based upon New Zealand making up for 0.06% of global population⁴.</p>
Imported plastics	<p>Imported plastics (540,000 tonnes) data sourced from the PMCSA report⁵ was pro-rated to Auckland.</p>
Consumer Packaging	<p>'Consumer packaging totals' data was sourced from the Valpak plastics report and pro-rated to Auckland,⁶. The split by polymer type and domestic vs export processing was derived from a combination of Visy MRF data and stocktake data. It should be noted that the</p>

² <https://www.worldometers.info/world-population/new-zealand-population/>

³ <https://populationstat.com/new-zealand/auckland>

⁴ <https://www.worldometers.info/world-population/new-zealand-population/>

⁵ Rethinking Plastics in Aotearoa NZ, Office of the Prime Ministers Chief Science Advisor, 2019

⁶ Research to Support the Co-design of a Plastic Packaging Product Stewardship Scheme for New Zealand, Valpak, July 2023

Category	Data Breakdown
	<p>totals for the different sources did not match precisely with the figure pro-rated from the Valpak report, so figures were adjusted to align the numbers while preserving the proportions in the datasets.</p>
Soft Plastics	<p>Soft Plastics data was compiled and pro-rated to Auckland based on the Soft Plastic Recycling Scheme Accreditation Report 2022⁷ and the Waste Infrastructure Stocktake data.</p>
Agricultural	<p>Agricultural plastics put on the market data was collected from PWC report on quantities of farm plastics sold in 2017, 2018 & 2019.</p> <p>Recovery data was taken from both the Agrecovery Annual Report and the Waste Infrastructure Stocktake data.</p> <p>Pro-rating to Auckland for Agriculture plastic was taken from the proportion of Auckland farms to national, as there are fewer farms in Auckland than other parts of the country, so population pro-rating was not used for this category of plastic flows. It was calculated that Auckland has 6.4% of New Zealand's farms. This figure was used to calculate an Auckland figure for agricultural plastics from national data.</p>
Durables	<p>Durable plastic data was not available at a regional or national level, so global data was used and pro-rated to national then Auckland figures as described above. The source for the durables breakdown was the plastic atlas 2019 report⁸.</p>
Commercial and Pre-Consumer	<p>Commercial and Pre-consumer data was taken from the Soft Plastic Recycling Scheme Accreditation Report 2022 for soft plastics and from the Waste Infrastructure Stocktake data. Some minor adjustments were made to align the data from the different datasets.</p>

⁷ <https://www.recycling.kiwi.nz/blog/soft-plastic-recycling-schemes-2022-annual-report>

⁸ <https://za.boell.org/en/2019/11/06/plastic-atlas-facts-and-figures-about-world-synthetic-polymers>

Category	Data Breakdown
Litter/Unknown	The litter figure was calculated from the Keep New Zealand Beautiful Litter Survey 2022. Weight taken from the litter found per km squared and multiplied by the total area of the Auckland Region (5600) ⁹ . The unknown figure was pro-rated from the PMCSA report ¹⁰
Total Landfill	Total Landfill data was calculated by subtracting recovered material from input material. This provided a figure of 145,000 tonnes. Waste composition data for all landfill waste supplied by council indicated that plastics is 12% of 1,480,000 tonnes, or approximately 177,000 tonnes. This is broadly in line with the figure calculated by the mass flow figures. .

3.2.1 Caveats

While the data gathered for this report has provided a reasonable amount of detail there remain a number of significant uncertainties around a some of the datasets. In particular:

- The amount of material imported. Statistics NZ has reliable data for where polymers are imported or exported as polymers or products made primarily of those polymers. However, a significant proportion of plastics enters NZ as incidental material – for example packaging to protect product in transit, packing that is necessary to contain a product, or as a minor component in a product type (e.g. cars). The quantities of these materials are therefore estimated.
- The quantity of durables. As noted, there is limited information on this in the NZ context and so this has been estimated based on international figures.
- The quantity in flux/littered or released into the environment. These are essentially losses in the system and so are, by their nature, unknown. The amount shown could represent actual material lost to the system or it could simply be a result of discrepancies in other estimates.
- Data from different sources does not align. It was necessary in compiling the data to make adjustments to data to be able to compile it and have it balance. In these instances what was deemed to be the most reliable dataset was chosen as the primary dataset and other figures adjusted to match that.
- Finally, even where quite specific figures based on industry supplied data are provided these come with some uncertainties. For example, information may be related to different time periods, be estimates by the operators themselves (rather than actual recorded figures), some information may be withheld due to commercial sensitivity issues, and not all operators may have supplied data.

⁹ <https://teara.govt.nz/en/auckland-region/page-16>

¹⁰ Rethinking Plastics in Aotearoa NZ, Office of the Prime Ministers Chief Science Advisor, 2019