

## Swansea 'In the Loop' – Compositional analysis overview

Keep Wales Tidy

February 2020

Six counts took place each month between September 2019 and February 2020 which analysed a total of 153 bags from priority bins, 69 of which were recycling and 66 were residual. The overall weight of waste sorted (recycling and general) was 233.72kg (113.72kg of which was from recycling) which equaled 6408 items (2859 from recycling).

In addition, and not included in the overall figures above, 3 coffee cup bins were analysed. These were introduced in sort #3 and the bins were relocated to become part of some of the quad bins in sort #6. These have been analysed separately.

The primary analysis has been on the composition of the recycling bins, however additional analysis has been done on the general bins with interesting results. Further analysis has considered the contamination ratio per bin and changes over the period.

Some anomalies should be taken into consideration, primarily the occurrence of Fresher's week in Sort #2 where large and unusual items such as boots and handbags were discounted from the audit. All effort was made to remove significant amounts of liquids from bottles, but certain levels of liquids will have inevitably affected the overall weight count. Dates of when the sorts took place can be seen in the overview table below.

Categories which were weighed and counted – were as follows:

Category	Total counted in Recycling bags (Kg) *	Total counted in recycling bags (No.) *
<b>Glass</b>	31.18	100
<b>Plastic bottles</b>	25.18	716
<b>Cans</b>	8.89	380
<b>Paper (wet and dry)</b>	5.19	173
<b>Paper cups</b>	6.61	317
<b>Cup lids</b>	2.55	421
<i>*Not including Coffee Cup bins</i>		

Cup lids and residual waste was also counted separately. Only glass, plastic bottles and cans were considered to be 'target collection' content, everything else including residual waste, has been considered as contamination. The exception to this is where separate analysis has been done on the coffee cup bins where only cups and lids have been considered as 'target content, however, these are not included in the overall figures.

Although it has been outside of the scope of this analysis, the number and weight increase over the course of the period may indicate a greater participation in responsible disposal overall – if the figures were available, the council may wish to consider any street cleansing / litter data for the period since the campaign was introduced in order to verify this.

## Key Figures

	Date of count	Number of Bins sorted	Total Number of bags	Number of Recycling bags	Number of General bags
Sort #1 (BASELINE)	5 <sup>th</sup> Sept 2019	8	18	10	8
Sort #2	3 <sup>rd</sup> Oct 2019	8	22	11	11
Sort #3	21 <sup>st</sup> Nov 2019	8	18	10	8
Sort #4	9 <sup>th</sup> Dec 2019	10	25	12	13
Sort #5	9 <sup>th</sup> Jan 2020	9	24	12	12
Sort #6	18 <sup>th</sup> Feb 2020	10	28	14	14
<b>Totals:</b>		53	135	69	66

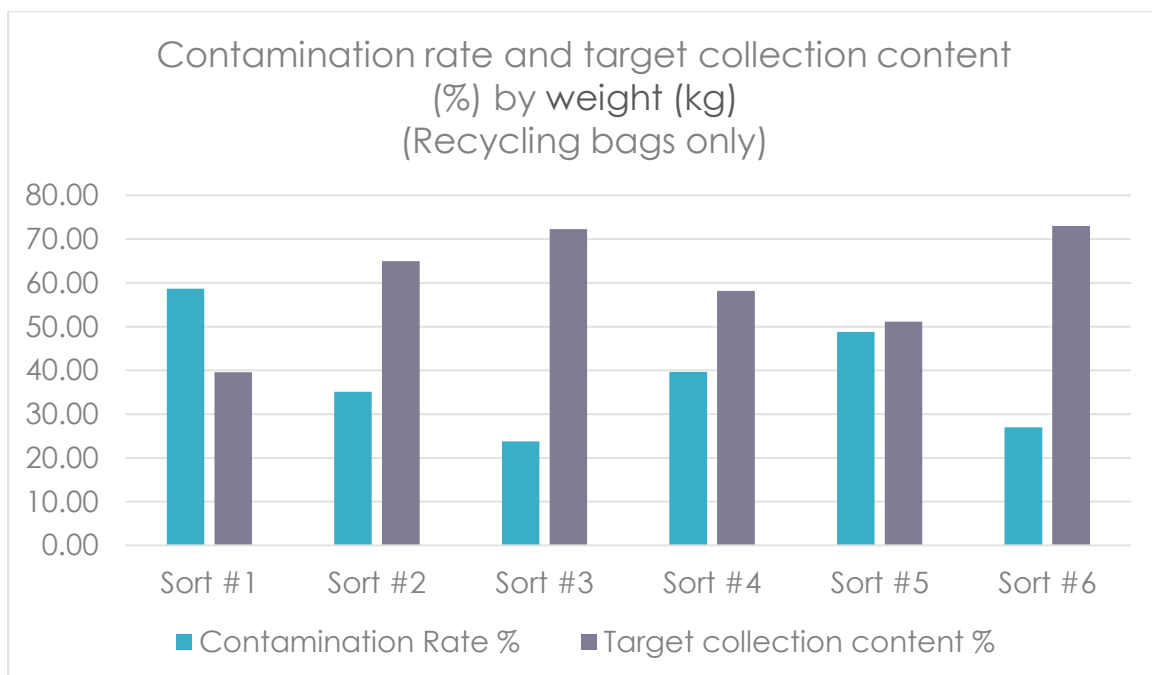
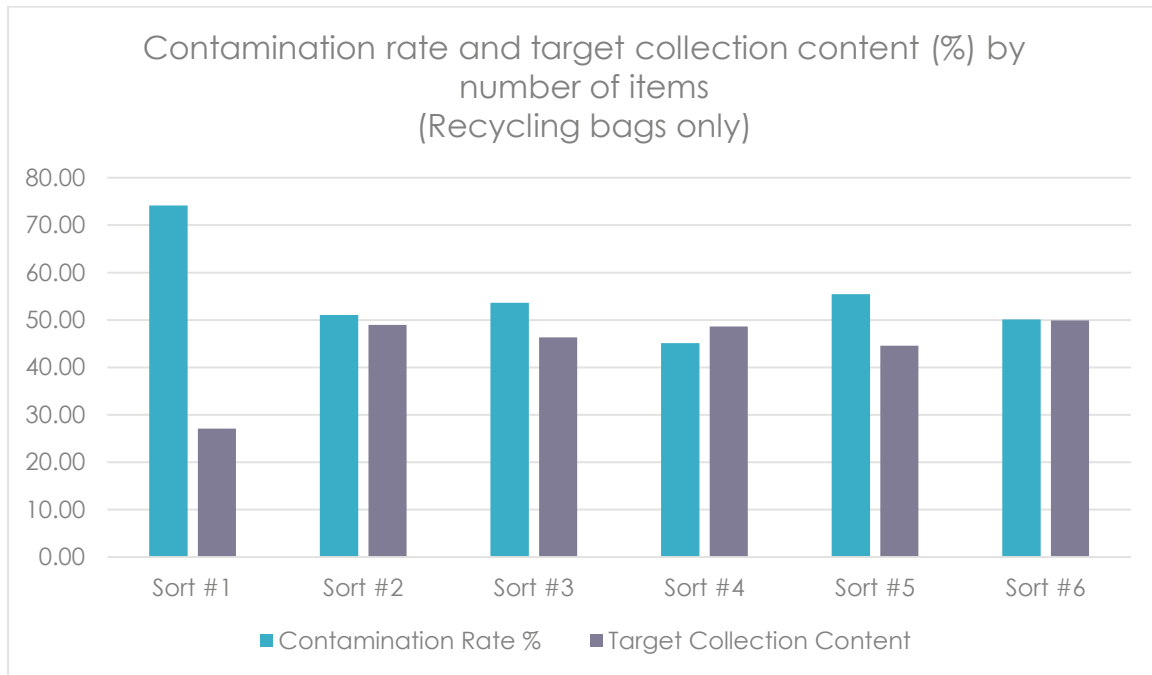
	Total Weight Sorted	Total Weight of Recycling bags	Total weight of General Bags	Total Number of Items sorted	Total Number in Recycling bags	Total Number of general Bags
Sort #1 (BASELINE)	46.6	29.08	17.52	1259	708	551
Sort #2	39.29	15.68	22.08	1093	379	715
Sort #3	37.22	20.99	16.23	941	479	462
Sort #4	30.01	11.52	18.49	868	337	531
Sort #5	34.29	19.10	14.65	854	471	383
Sort #6	65.07	17.35	31.03	1780	485	907
<b>Totals:</b>	252.48	113.72	120	6795	2859	3549

	Target Content in Rec bags	Residual in Rec bags	Target content in Gen. bags	Residual in Gen bags
Sort #1 (BASELINE)	11.79	17.29	3.77	20.43
Sort #2	9.65	6.03	2.05	20.43
Sort #3	15.72	5.27	3.37	12.87
Sort #4	6.74	4.78	0.84	17.63
Sort #5	10.05	9.05	1.31	13.34
Sort #6	11.30	6.05	1.16	29.17
<b>Totals:</b>	65.25	48.47	12.5	113.87

## Recycling composition

The graphs below show that, although variable, there has been a relatively steady decrease of contamination rates and increase in target collection content. The figures below show only the compositional analysis of the recycling bags which was the main priority, however, further analysis has been undertaken on some of the findings from general waste bags.

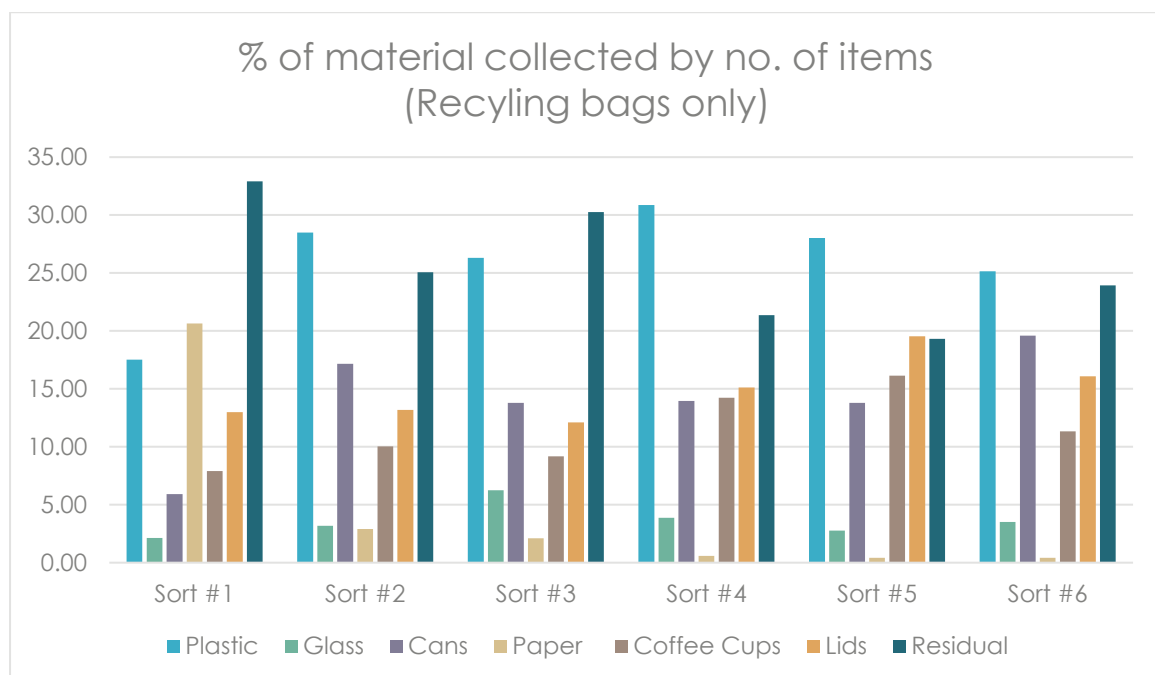
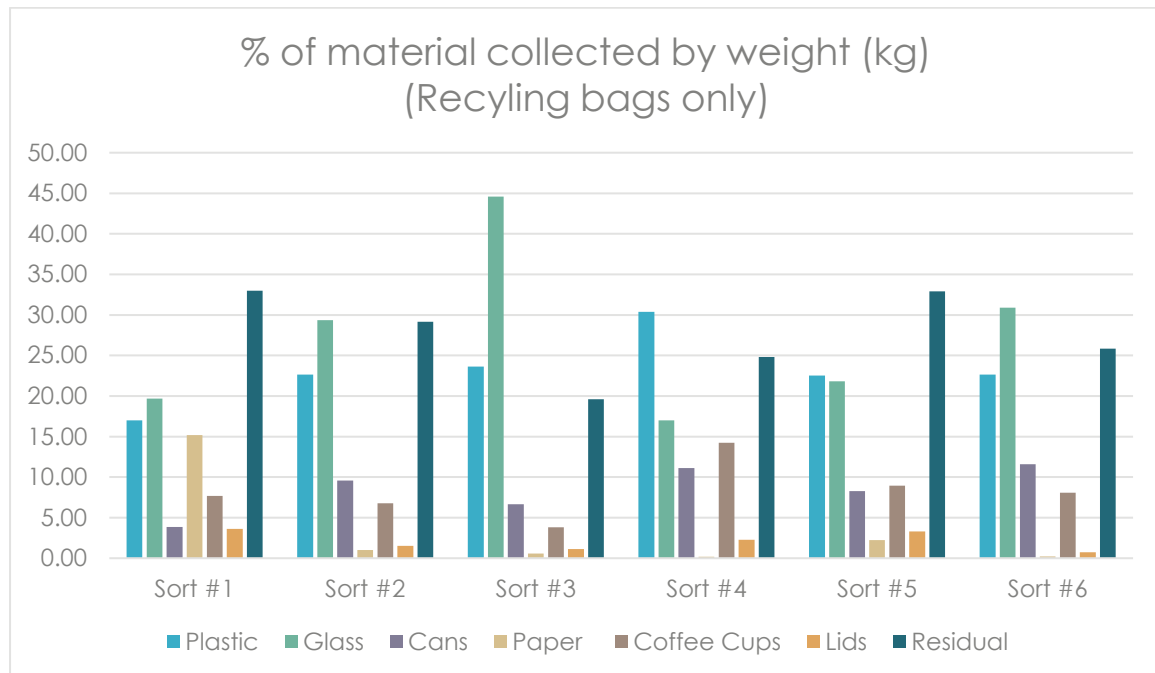
The data shown by the weight versus the number of items is relatively comparable, although the number of items demonstrate a steadier and more consistent picture. It may be more helpful to consider specific categories by number, rather than weight such as particularly heavy items (eg: glass) and particularly light items (eg: paper cups or cans).

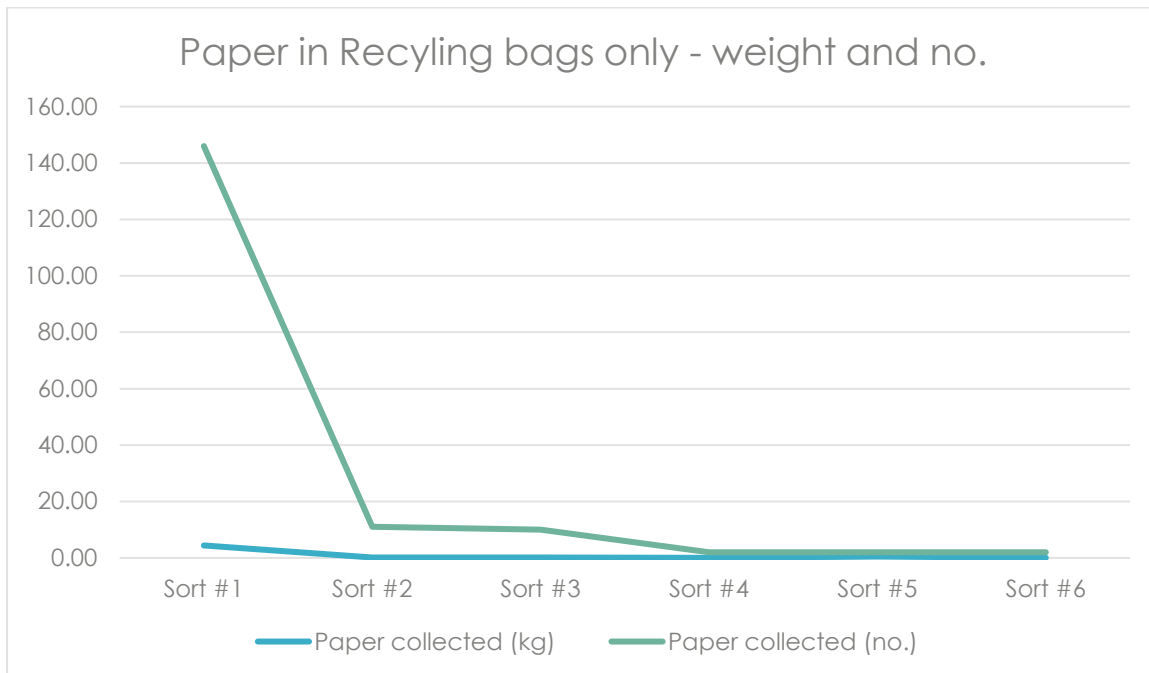


Some items show a relatively consistent level of correct disposal. Plastic bottles for example. This may reflect the differing types of materials and understanding of recyclability in the general public.

Glass is the most variable material and although the peak above correlates with Fresher’s week, the second peak in Sort #6 does not appear to have any obvious external influence.

What should be noted however, is that paper, which was not included in the campaign as target material, has seen a significant drop in the recycling bag composition.





## Bin Analysis – General vs Recycling

An important pattern in the data is worth highlighting in regard to the content of general bags and that is the significant and persistent change in the amount of target collection content in general bags. Particularly in regard to the number of items. The graph below shows the target collection items shown in recycling and general bags over the period.

When looking at the analysis per bag, many general bags showed 100% residual waste or very close. The baseline shows that this has decreased from around a third of general bags being made up of target content. These high ratios were constant throughout the period with the exception of 1 bin which showed a negative ratio twice (DQ8 at White Walls).

Conversely, the recycling only bags did not reach these levels at all during the period. This may suggest that there is still some confusion over what is and is not recyclable or that people have a tendency to err on the side of caution when trying to do the right thing, opting for recycling instead of being wrong. Either way, this is a significant change. A sample of the per bin analysis from bins which were analysed each month is shown below:

Sample showing ratio of Target / Non-target items in General bags by Weight							
Bin code & Bag type		Baseline	Sort #2	Sort #3	Sort #4	Sort #5	Sort #6
VD25	General	23/77	2/98	9/91	4/96	7/93	7/93
VD29	General	18/72	2/98	14/86	4/96	0/100	26/74
VD3	General	53/47	26/74	8/92	6/94	11/98	0/100

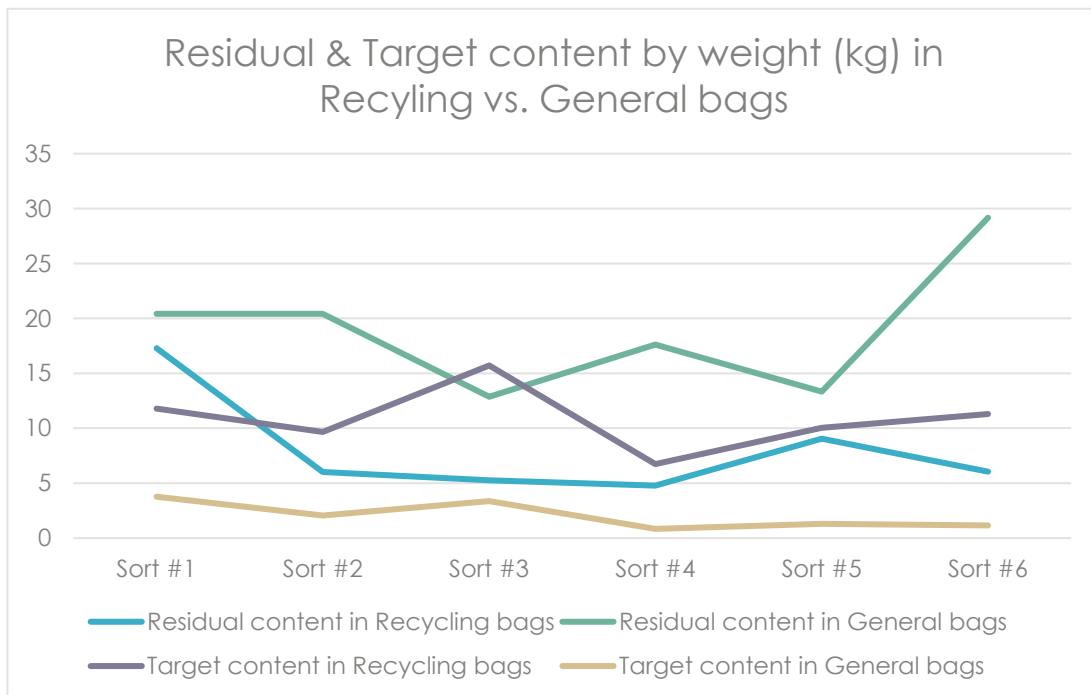
Sample showing ratio of Target / Non-target items in General bags by Number of items							
Bin code & Bag type		Baseline	Sort #2	Sort #3	Sort #4	Sort #5	Sort #6
VD25	General	13/87	4/96	4/96	5/95	10/90	5/95
VD29	General	9/91	3/97	62/38	7/93	0/100	11/89
VD3	General	17/83	5/95	4/96	11/89	9/91	0/100

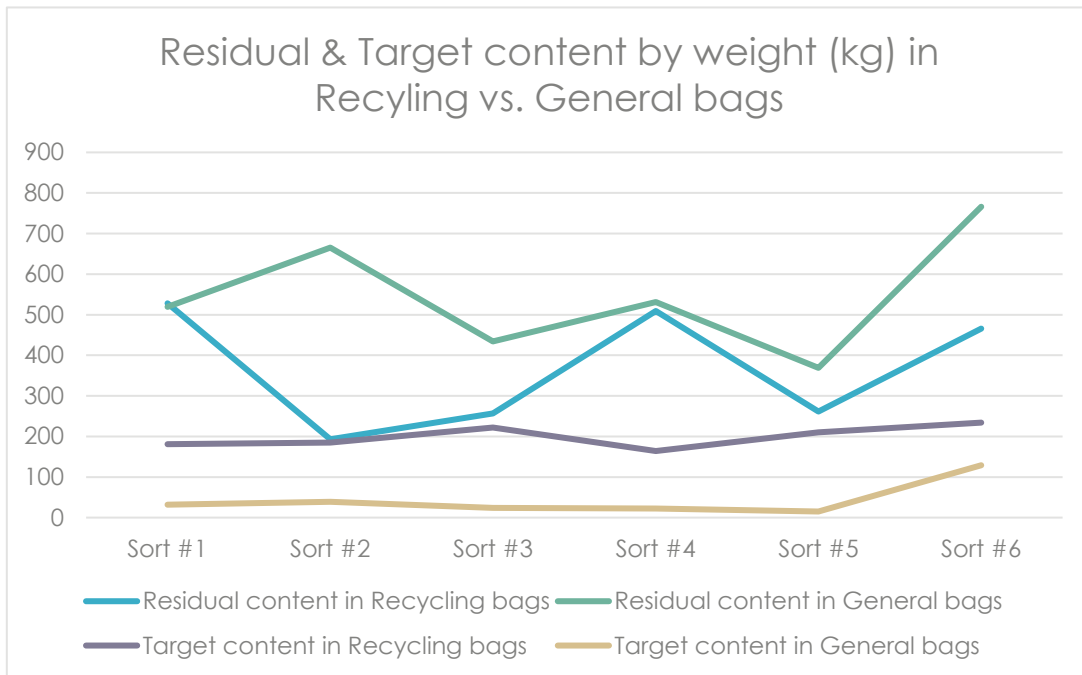
Sample showing ratio of Target / Non-target items in Recycling bags by Number of items							
Bin code & Bag type		Baseline	Sort #2	Sort #3	Sort #4	Sort #5	Sort #6
<b>VD25</b>	Recycling	40/60	71/29	75/25	62/38	84/16	66/34
<b>VD29</b>	Recycling	18/72	64/36	69/31	45/55	57/43	84/16
<b>VD3</b>	Recycling	0/100	94/6	91/9	0/100	29/71	73/27

Sample showing ratio of Target / Non-target items in Recycling bags by Number of items							
Bin code & Bag type		Baseline	Sort #2	Sort #3	Sort #4	Sort #5	Sort #6
VD25	Recycling	37/63	51/49	52/48	46/54	73/27	58/42
VD29	Recycling	36/64	33/66	38/62	35/65	43/57	73/27
VD3	Recycling	0/100	73/27	80/20	0/100	50/50	75/25

In terms of bin type, there appears to be little correlation in relation to content with many showing variability. Interestingly however, Bin VNR2 which was the only solely general waste bin included in the study also showed very low rates of target content in Sort #4.

However, there were some bins which consistently under-performed for recycling, notably VD14 and DQ3, both on Oxford Street. DQ5 should also be considered.

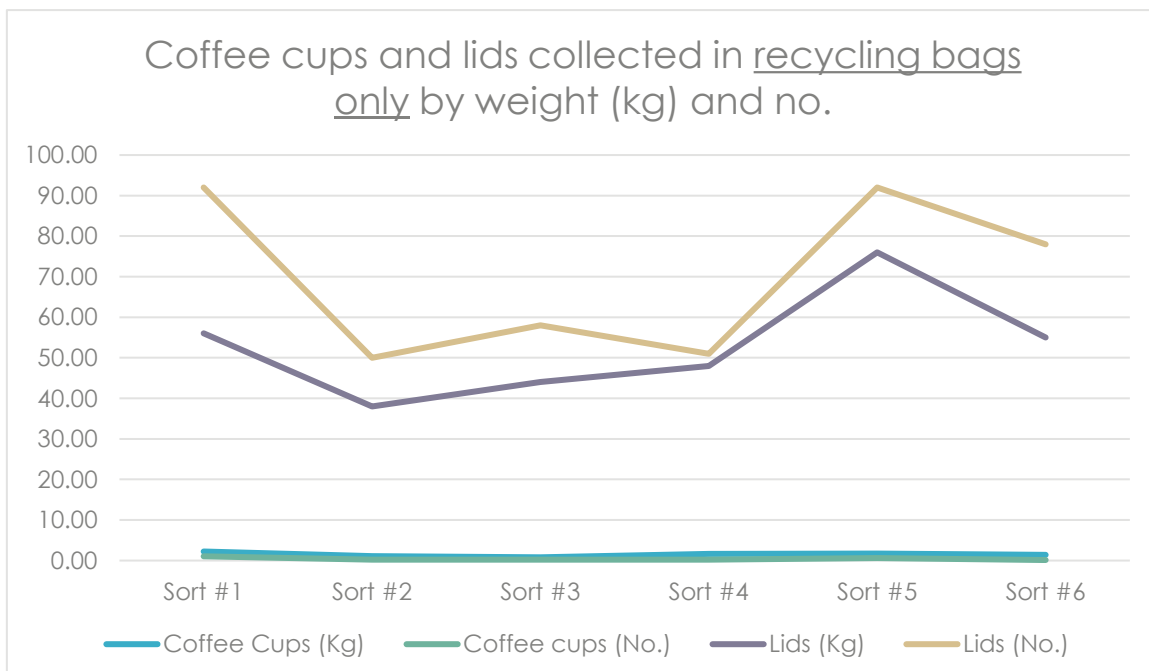




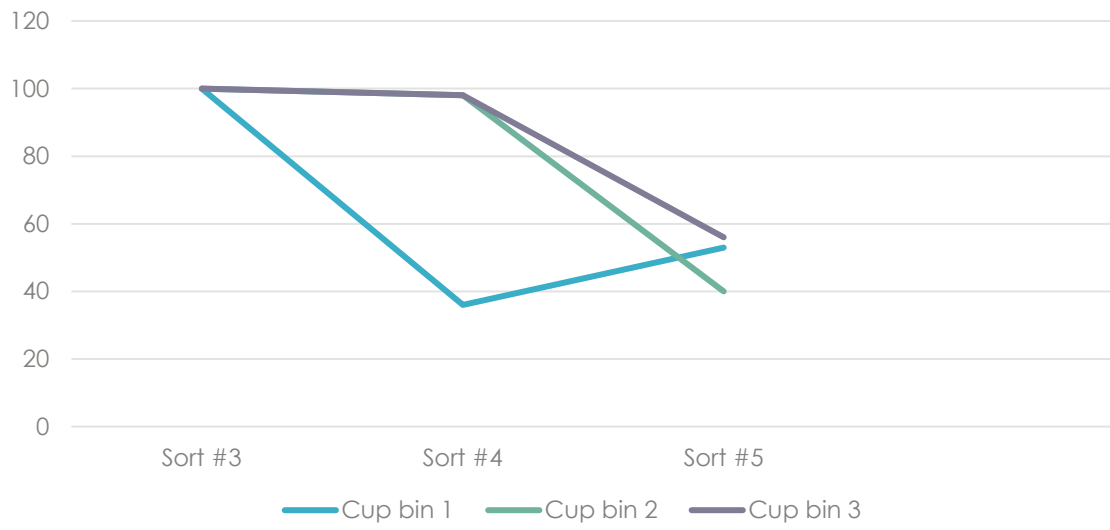
### Coffee Cup bins

Separate Coffee Cup bins were introduced in Sort #3 and were made to be a part of the Quad bins in Sort #6. For these bins, only Coffee Cups and lids have been considered as 'target content' – all other items, even if they were recyclable has been classed as 'contamination'. It should be noted that the sample for Sort #3 was very low.

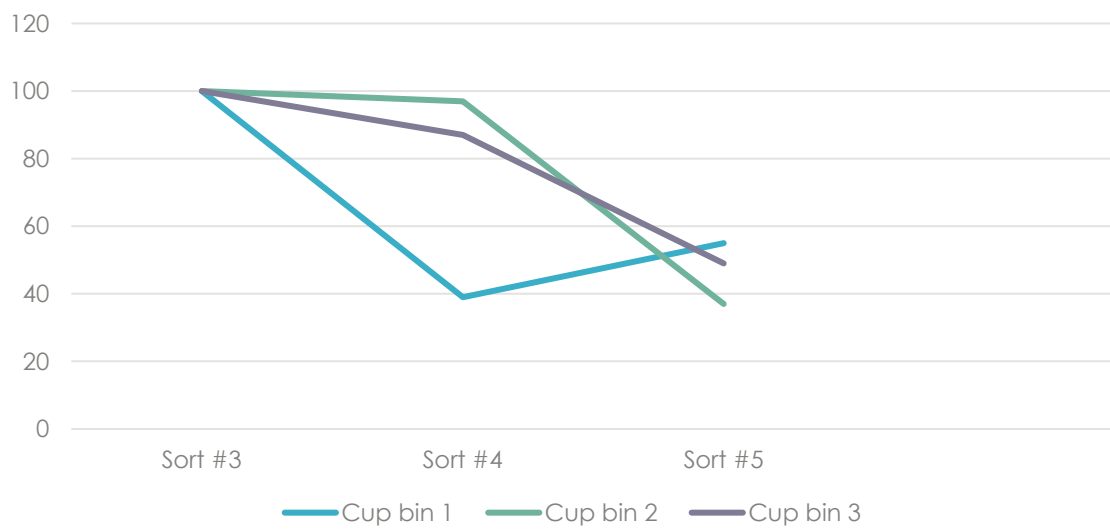
The data shows that coffee cup separation has decreased over the period and many residual recyclable and non-recyclable items were found in these specific bins. However, there is some indication that since the coffee cup bins were introduced, that it has had an impact on the amount of coffee cups ending up in recycling bins elsewhere. As seen in the graph below, a steady increase can be seen since their introduction in terms of the number collected. This may indicate a shift in the public perception of their recyclability and perhaps a lack of understanding in the need for separation from other recyclables. The weight of paper cups are affected greatly by the liquid content and saturation of material and the number of items provide a more accurate picture of composition.



Coffee cups as a % of collected material from separate Cup Bins (weight)



Coffee cups as a % of collected material from separate Cup Bins (no.)





Sort #6 Coffee cups as a % of collected material from Integrated Cup Bins (no. & kg)

