



Compositional analysis of Local Authority collected and non-Local Authority collected non-household municipal waste (England)

Date: January 2020

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Executive summary

The residual component of non-household waste was estimated at 8,673,869 tonnes in 2017 in England. This comprised 1,129,218 tonnes of Local Authority (LA) collected non-household waste and 7,544,678 tonnes of non-LA collected waste. Very little is known about the composition of the non-household element that is collected by local authorities.

WRAP, on behalf of DEFRA, commissioned Resource Futures to conduct research into the composition of residual waste from two waste streams: Non-household waste collected by local authorities and non-household waste collected by private companies. This research will contribute to understanding the impact of national policies and targets around waste, packaging and recycling (including the EU Circular Economy Package). In turn, this can provide a focus for future targets.

The objective of the research was to produce accurate and robust composition of the following residual waste streams:

- LA collected non-household waste; and
- Waste management company (WMC) collected non-household waste.

The fieldwork included “deep dives” to assess the composition and item count of selected specific components of the waste stream, focusing on items of policy interest (i.e. single use plastic items, coffee cups, wet wipes etc.).

LA collected non-household waste

Across England, nine LAs took part in the study and 22 samples with a total weight of 10,270 kg were sorted. The average composition largest categories were putrescible (36% or ~406,500 tonnes/yr), paper and card (27% or ~305,000 tonnes/yr), plastic film (7% or ~79,000 tonnes/yr) and dense plastic (6% or ~68,000 tonnes/yr)¹.

Extrapolating the composition profile on to reported 2017 Waste Data Flow (WDF) collected tonnage (1,129,218 tonnes), estimates that ~270,000 tonnes (24%) of the material consisted of dry recyclable material that is widely recycled, ~370,000 tonnes (33%) was food waste and ~295,000 tonnes (26%) was packaging.

Analysis carried out to weigh the average profile of LA collected non-household waste based on the sample profile (Appendix 6) did not result in any significant change to the calculated composition.

The deep dive analysis of the LA collected non-household residual waste estimated that over 1.5 billion items were discarded in 2017 across ‘high profile’ items (coffee cups, drink cans, plastic drink bottles, cotton buds, wet wipes, stirrers, straws) with a combined weight of over 25,000 tonnes.

WMC collected non-household residual waste

In total, 6 WMC sites were included in the research and 59 samples with a total weight of 19,629kg were sorted. The average composition by site showed significant differences in the proportion of paper and card, putrescible and other combustible materials.

¹ Rounded to the nearest 1,000 tonnes.

WRAP estimated for England that 7,544,678 tonnes of WMC collected non-household waste was disposed in 2017.

The results from the study indicate that the largest category was paper and card at 31% or ~2,340,000 tonnes, putrescible was second largest with 26% or 1,960,000 tonnes, plastic film at 11% or 830,000 tonnes, other non-combustible and dense plastic both at 9% or 680,000 tonnes. Further analysis shows that 25% (7,545,000 tonnes) was dry recycling material that is widely recycled, 24% (1,810,000 tonnes) was food waste and 29% (2,190,000 tonnes) was packaging.

The deep dive analysis indicated that over 13.5 billion high profile items (water bottles, cotton buds, coffee cups etc.) with a combined weight of 225,000 tonnes were discarded in 2017.

Comparing LA non-household and WMC collected non-household waste

When comparing the composition of the two sources of non-household residual waste the main difference is in the proportion of putrescible waste, which is lower in the WMC collected profile. The WMC results indicate a higher proportion of plastics and combustible material compared to the LA non-household collected material.

Headline category	LA collected non-household municipal	WMC collected commercial
	Average composition (%)	Average composition (%)
Putrescible	36.2	25.6
Paper and Card	27.5	30.7
Plastic Film	6.9	11.3
Dense Plastic	6.4	8.7
Other Combustible	5.9	9.4
Glass	4.2	2.1
Other Non-Combustible	2.8	1.7
Fine Material	2.6	3.0
Ferrous Metal	2.5	3.0
Textiles	2.4	2.2
WEEE	1.4	0.9
Non Ferrous Metal	1	1.1
Potentially Household Hazardous Waste Items	0.3	0.4

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1.0 Introduction

WRAP, on behalf of Defra, commissioned Resource Futures to conduct research into the composition of LA collected non-household municipal commercial residual waste collected by waste management companies (WMC) in England.

Over the past decade, a huge amount of effort and resource has been allocated to understanding the composition of the household waste stream. In contrast, there has been comparatively little research conducted into both the non-household component of municipal waste and commercial residual waste. The residual component of non-household municipal and commercial waste constitutes a significant tonnage of material in England (estimated at 8,673,869 tonnes in 2017) – yet little is known about its composition. This research will contribute to understanding the impact of national policies and targets around waste, packaging and recycling (including the EU Circular Economy Package). In turn, this can provide a focus for future targets.

1.1 Aims and objectives

The objective of the research was to produce accurate and robust composition of the following residual waste streams:

- LA collected non-household municipal waste; and
- Waste management company (WMC) collected commercial waste.

The fieldwork included “deep dives” to assess the composition and item count of selected specific components of the waste stream focusing on items of policy interest (i.e. single use plastic items, coffee cups, wet wipes etc.). The deep dives categorised the waste by material and recorded the number of items present – see Appendix 1 for further details on the category lists for the main and “deep dive” sorts.

It was agreed with WRAP and Defra that the focus of the research was obtaining composition data. The task of researching and estimating arisings tonnage data for the two waste streams and for specific business sectors was outside the remit of this project.

2.0 Methodology

2.1 Desktop review of arisings data sources

A review of available data sources, conducted in cooperation with WRAP and DEFRA, identified that for LA collected non-household municipal waste, WasteDataFlow (WDF) was the best source for arisings. The review did not identify any sector specific data on collected tonnage within or linked to WDF.

The review confirmed that there were no definitive current robust tonnage estimates for WMC collected commercial residual waste. Estimates of the arisings of commercial waste in UK and England are predominantly based on the data collected as part of the Defra work on Euro Stat reporting and the now dated commercial and industrial waste surveys (England 2009² and Wales 2012³). It was especially difficult to establish accurate figures of the waste that would be destined for disposal. With regard to sector specific estimates, the commercial

² *Commercial and Industrial Waste Survey 2009 Final Report*,
<https://webarchive.nationalarchives.gov.uk/20130125163914/http://www.defra.gov.uk/statistics/files/ci-project-report.pdf>

³ <https://naturalresources.wales/evidence-and-data/research-and-reports/waste-reports/industrial-commercial-waste-survey/?lang=en>

and industrial waste surveys (England 2009 and Wales 2012) are the current best sources of information on tonnage arisings.

WRAP has commissioned a separate study (forthcoming) to estimate the arisings of non-household municipal waste and WMC collected commercial residual waste. The combined composition profiles from this research will be combined with the estimated arisings, and with household waste data, to produce overall composition estimates.

2.2 Research methodology design decision around sector specific sampling

A secondary aim of the research was to obtain sector specific composition data. Business sectors of interest included: retail (grocery); retail (non-grocery); wholesale (grocery); wholesale (non-grocery); transport (airports); transport (ports); & GPs' surgeries.

Following initial conversations with the LAs and Suez (the project WMC partner) it became apparent that whilst sites were accepting material from a wide variety of businesses (including hospitality, retail, education, offices and transport hubs), it would not be possible to source the samples from each sector without significant disruption to normal collection operations.

The issues included:

- Practicalities of identifying individual customers matching the target business sector;
- Needing to carry out separate collections for each sector specific sample;
- Multiple businesses of different sector types sharing containers, such as a retail park or serviced building environment;
- Lack of ability to positively identify waste from specific businesses where presented together on the street
- Blurred boundaries between business sectors, for example education establishments including catering, retail as well as halls of residence with the material deposited as one stream.

These operational barriers combined with the lack of any sector-specific arisings data (see section 2.1) to apply composition profiles to, meaning that any sector-specific samples would need to be excluded from both the calculation of the average composition and from any calculation of tonnage values.

Considering these issues, and the priority of establishing an overall composition, it was decided that the study would not sample sector-specific material but would randomly sample loads as they arrived at the point of disposal (i.e. transfer station or depot where the material was taken straight after collection from customers). Where known, details of the business sectors making up the sampled loads would be recorded.

Resource Futures site managers were briefed to discuss with the site operation managers on obtaining details of the tipped loads to ascertain the business sectors that were included in the round.

2.3 LA collected non-household municipal commercial residual waste

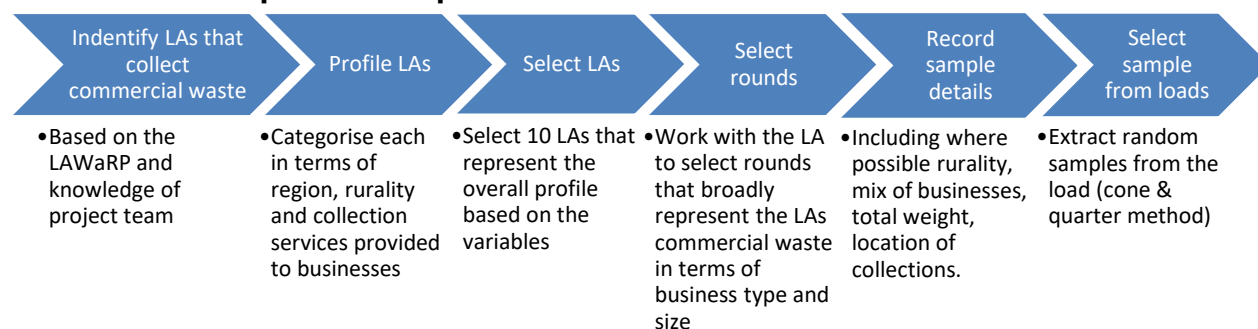
The target for each LA was to collect and test two non-household municipal samples.

In addition to the LA collected non-household municipal sampling **a single kerbside household residual waste sample** was also included for each LA. This enabled the research to conduct "deep dive" analysis on specific items of current Government policy interest (e.g. wet wipes, plastic bottles). As this report focuses on non-household residual waste please refer to Appendix 3 for further information and results.

2.3.1 Sampling

The sampling strategy for the LA non-household municipal commercial residual waste stream was based on a bulk sampling of material collected by the LAs from their commercial rounds including outsourced contracts. Data held by WRAP in the Local Authority Waste and Recycling Portal (LAWaRP)⁴ was used to identify the authorities that collect commercial waste separately. The authorities that collect this material were then profiled in terms of region and urban:rural split, following which a shortlist was selected for initial contact. The following flow chart shows the sample selection process.

Figure 1: Flow chart showing the non-household LA collected municipal commercial residual waste sample selection process



2.3.2 LA engagement and fieldwork preparation

Following the profiling exercise, 34 LAs were shortlisted based on commercial collection, tonnages, region and rurality:urban mix. They were contacted to establish initial interest and availability for taking part in the study. The initial conversations aimed to confirm the information found via LAWaRP and WDF⁵ about the nature of commercial collections, that the material was collected separately from the household or other waste streams and to check the availability of sort sites.

Originally, the aim was to include 10 LAs. It proved difficult to recruit in the Eastern region, so the plan was adjusted to include more samples from the West Midlands (Birmingham) and London (Camden).

Once the initial contact had been conducted and the key conditions of participation were clear, a short list of nine LAs was selected and arrangements on sampling were discussed with the officers. Samples were selected to be representative of the local authority, whilst not interfering with the normal operation of the collection services – see Table 1 below for details.

The aim in all cases was to collect the sample directly from the loads at transfer stations. The samples were extracted using plant machinery at the transfer station or disposal point and observed by the Resource Futures site manager where possible. In two of the LAs (Camden, where the material is collected in bags, and Birmingham, where the team was accompanied by the commercial collection manager) it was agreed that the samples would be collected directly by the Resource Futures teams.

⁴ <http://laportal.wrap.org.uk/>

⁵ <http://www.wastedataflow.org/>

Table 1: Details of the nine selected LAs

Region	LA	Authority type	Rural / urban classification	% rural	Commercial recycling	LA collected non-household municipal commercial residual waste (tonnes)
West Midlands	Birmingham City Council	Unitary	Urban with Major Conurbation	0.1	Yes	60,064
North West	Blackburn with Darwen BC	Unitary	Urban with City and Town	4.7	Yes	4,110
Yorkshire And The Humber	Bradford MDC	Unitary	Urban with Major Conurbation	9.7	Yes	19,657
London	London Borough of Camden	Collection	Urban with Major Conurbation	0	Yes	28,581
London	London Borough of Enfield	Collection	Urban with Major Conurbation	0.5	Yes	8,999
East Midlands	High Peak Borough Council	Collection	Largely Rural (rural including hub towns 50-79%)	55	Yes	2,911
South East	Horsham District Council	Collection	Largely Rural (rural including hub towns 50-79%)	60.6	Yes	3,869
London	London Borough of Newham	Collection	Urban with Major Conurbation	0	Yes	5,128
South West	Plymouth City Council	Unitary	Urban with City and Town	0	Yes	9,075
Total	n/a	n/a	n/a	n/a	n/a	142,394

2.4 Waste management company (WMC) collected commercial waste

The aim of the research was to conduct work across England sampling commercial residual waste. The research partner for this aspect of the project was Suez. Suez were selected based on their national coverage of commercial waste collections, they had previously collaborated successfully with Resource Futures on other complex fieldwork studies, and they saw the need for this work and expressed an interest in being involved when contacted.

2.4.1 Selection of sites

The sites were initially identified by Suez based on the requirement that regions in England were adequately represented. Following discussions, 6 sites were selected by Suez as

suitable in terms of location, availability of the target commercially collected material and ability to accommodate the fieldwork.

The sites selected were:

- South West – Bristol Avonmouth;
- South West – Exeter;
- London - Croydon, Mitcham;
- South East – Southampton;
- East Midlands – Northampton; and
- North East – Newcastle.

2.4.2 Suez site engagement

Following an initial introduction over email from Suez to each individual site, explaining the research project, Resource Futures made contact with the site operations manager. The sites were contacted to confirm commercial waste streams collected, timescales, the facilities on site and the operational set-up for taking the samples and sorting the material.

2.4.3 Sample selection

The samples were selected across a working week to include morning and afternoon tips of the material collected from private contract commercial collections. The loads were identified by Suez site staff based on their in-depth knowledge of the commercial material arriving across the week.

The material for testing was selected from the targeted loads using standard bulk sampling techniques. The preferred method was to 'cone and quarter' the load using a shovel loader to extract a random sample. When coning and quartering was not possible, due to site space or operational constraints, samples were extracted from a cross section of the tipped material.

2.5 Material analysis

2.5.1 Categorisation

The categorisation list that the samples would be hand sorted into was agreed with WRAP and Defra. The aim was to capture the key headline materials, such as food, paper, plastics, metals, glass, with a particular focus on packaging items and single use plastics. The category list is reproduced in Appendix 1: Categorisation list.

All samples were hand sorted by a team of experienced waste composition technicians. The samples were sorted off a table fitted with screens and magnets to aid the sorting. All materials were sorted into containers and weighed by the site manager checking quality at the point of weigh-off.

2.5.2 Deep dive sort

The 'deep dives' aimed to provide count and average weight data on key items of policy significance. The items were weighed separately and an item count was made and recorded.

Items included in the 'deep dive' analysis included:

- Single use plastics (cotton buds, plastics stirrers, wet wipes)
- Plastic packaging (different types of plastic bottles and pots, tubs and trays)
- Mixed material items (pouches)
- Paper and card packaging (tubs, coffee cups and sandwich boxes).

The full deep dive category list is reproduced in Appendix 1: Categorisation list.

2.5.3 Photography

Throughout the fieldwork analysis, photographs of the sorted material were taken. This aided in showing the miscellaneous items that could not be categorised (for example toothbrushes, pens, plastic crockery and plant pots, which were made of dense plastic)⁶.

2.6 Data quality checking and analysis

2.6.1 Data quality checking

Data was recorded during the on-site analysis using data recording sheets, with separate sections for the main categorisation and the “deep dives”. The site manager was responsible for checking the quality of the sort and recording the weigh-off results. Once offsite, data sheets were entered into spreadsheets and quality checked for accuracy. The project manager then validated the data for any outliers and unusual items that would have been flagged up by the site managers on the paperwork.

2.6.2 Data analysis

The combined composition of the LA collected non-household municipal commercial residual was taken as an average across the nine LAs included in the study.

The combined composition of the WMC collected commercial residual waste was calculated by taking the average composition from all samples taken across the six sites included in the study.

The analysis included an assessment of the proportion of the material that was widely recyclable, food waste and packaging.

- The widely recyclable classification included the following categories: recyclable paper packaging; recyclable paper non packaging; thin card packaging; thin card non packaging; corrugated card packaging; corrugated card non packaging; drink cartons (Tetra packs); non-ferrous cans; non-ferrous aerosols; aluminium foil; plastic bottles; pots tubs and trays; glass bottles and jars; ferrous cans and tins; and ferrous aerosols.
- The food classification included the following categories: edible food waste; and inedible food waste.
- The packaging classification included the following categories: recyclable paper packaging; thin card packaging; corrugated card packaging; drink cartons (Tetra packs); waxed/laminated/wet strength paper & card; non-ferrous cans; non-ferrous aerosols; aluminium foil; other plastic film packaging; plastic bottles; pots tubs and trays; black plastic pots tubs and trays; wood and cork packaging; glass bottles and jars; ferrous cans and tins; and ferrous aerosols.

⁶ A separate document with a catalogue of the photos has been produced along with this report.

3.0 Results

3.1 Non-household LA collected municipal commercial residual waste

Table 2 below details the number of samples and sorted weight of material for each LA. In total, 22 samples were sorted, with a total of 10,270kg of material.

Table 2: LA collected non-household municipal commercial residual waste sample details

	No. of samples	Sorted (kg)	Average sample (kg)
Plymouth	2	818	409
Bradford	2	624	312
High Peak	2	822	411
Horsham	2	1,077	538
Newham	2	1,062	531
Camden	4	2,035	509
Enfield	2	1,123	561
Birmingham	4	2,201	550
Blackburn	2	509	255
Total	22	10,270	467

The sample weights vary as a result of operational factors at each location. These included limited access for sampling and restricted sort time resulting from late delivery of material. The site manager worked with LA site operation managers and the project manager also liaised with LA contacts to continuously monitor and manage the situation⁷.

3.1.1 Combined average composition

The average composition was calculated by taking the average percentage composition from all 22 samples. Table 3 show the results for the headline categories. It shows that the largest category was putrescible (36%) followed by, paper and card (28%), plastic film (7%) and plastic (6%) – these four categories accounted for 77% of the waste.

Analysis of the data shows that 24% of the material consisted of dry recyclable material that is widely recycled, 33% of the waste was food waste and 26% was packaging^{8 9}.

⁷ See Appendix 2: LA collected municipal commercial residual waste sample profile tables for a profile of the sample LAs.

⁸ See section 2.6.2 for details of the categories included in each classification.

⁹ See Appendix 4 for LA collected municipal commercial residual waste for the detailed sub-category list results table. See Appendix 6 for an analysis comparing the average composition with weighted composition profiles.

Table 3: Combined average composition for LA collected non-household municipal commercial residual waste

Headline category	Average composition (%)
Putrescible	36.2
Paper and Card	27.5
Plastic Film	6.9
Dense Plastic	6.4
Other Combustible	5.9
Glass	4.2
Other Non-Combustible	2.8
Fine Material	2.6
Ferrous Metal	2.5
Textiles	2.4
WEEE	1.4
Non Ferrous Metal	1.0
Potentially Household Hazardous Waste Items	0.3

3.1.2 National estimated arisings composition

Analysis of WDF showed that 1,129,218 tonnes of LA collected non-household municipal commercial waste was reported for 2017. Applying the average composition to this tonnage gives the following arisings of material.

Table 4: Estimated annual tonnage of LA collected non-household municipal commercial residual waste, 2017

Headline category	Average composition (%)	Annual tonnage estimate (2017)
Putrescible	36.2	408,378
Paper and Card	27.5	310,053
Plastic Film	6.9	78,232
Dense Plastic	6.4	72,464
Other Combustible	5.9	66,463
Glass	4.2	47,295
Other Non-Combustible	2.8	31,293
Fine Material	2.6	29,659
Ferrous Metal	2.5	28,124
Textiles	2.4	26,829
WEEE	1.4	15,843
Non Ferrous Metal	1.0	11,457
Potentially Household Hazardous Waste Items	0.3	3,127
Total		1,129,218

Table 4 above estimates that over 400,000 tonnes of putrescible waste was discarded in 2017. Analysis of the data shows that ~270,000 tonnes (24%) of the material consisted of

dry recyclable material that is widely recycled, ~370,000 tonnes (33%) was food waste and ~295,000 tonnes (26%) was packaging¹⁰.

3.2 WMC collected commercial residual waste

Table 5 details the number of samples and sorted weight of material for each Suez site. In total 59 samples were sorted with a combined weight of 19,629 kg.

Table 5: Waste management company commercial residual waste sample details

	No. of samples	Sorted kg	Average sample (kg)
Southampton	9	2,241	249
Exeter	10	2,592	259
Avonmouth	10	3,922	392
Northampton	10	3,388	339
Mitcham	10	4,508	451
Newcastle	10	2,979	298
Total	59	19,629	333

The sample weights vary as a result of operational factors at each location. For example, these included sampling techniques and restricted sort time. The site manager worked with the Suez site operations manager to continuously monitor and manage the situation.

3.2.1 Combined average composition

As detailed in section 2.4, all sampling was carried out on randomly selected loads arriving on site to allow extrapolation of the data. All of the samples were described as mixed loads, and it was not possible to conduct any sector-specific analysis. The average composition was calculated by taking the average percentage of the 59 samples and the results are shown in Table 6.

The data shows that the largest category was paper and card 30.7%, putrescible with 25.6%, plastic film 11.3%, other non-combustible 9.4% and dense plastic 8.7%.

Further analysis shows that 25% of the material was dry recycling that is widely recycled, 24% was food waste and 29% was packaging¹¹.

¹⁰ Rounded to the nearest 5,000 tonnes.

¹¹ See section 2.6.2 for categories included in each classification group.

Table 6: WMC collected commercial residual waste composition, %

Headline category	Average composition (%)
Paper and Card	30.7
Putrescible	25.6
Plastic Film	11.3
Other Combustible	9.4
Dense Plastic	8.7
Ferrous Metal	3.0
Fine Material	3.0
Textiles	2.2
Glass	2.1
Other Non-Combustible	1.7
Non Ferrous Metal	1.1
WEEE	0.9
Potentially Household Hazardous Waste Items	0.4

3.2.2 National estimated arisings composition

WRAP estimated for England that 7,544,678 tonnes of WMC collected commercial residual waste was disposed in 2017. Applying the average composition to this tonnage gives the following arisings of material. The estimated tonnage indicates over 2.3 million tonnes of paper and card, nearly 2 million tonnes of putrescible waste and 850,000 tonnes of plastic film.

Table 7: Estimated annual tonnage of WMC collected commercial residual waste 2017

Headline category	Average composition (%)	Annual tonnage estimate (2017)
Paper and Card	30.7	2,314,656
Putrescible	25.6	1,928,838
Plastic Film	11.3	849,480
Other Combustible	9.4	706,801
Dense Plastic	8.7	659,255
Ferrous Metal	3.0	225,663
Fine Material	3.0	223,866
Textiles	2.2	167,172
Glass	2.1	157,038
Other Non-Combustible	1.7	130,931
Non Ferrous Metal	1.1	85,292
WEEE	0.9	64,840
Potentially Household Hazardous Waste Items	0.4	30,845
Total	n/a	7,544,678

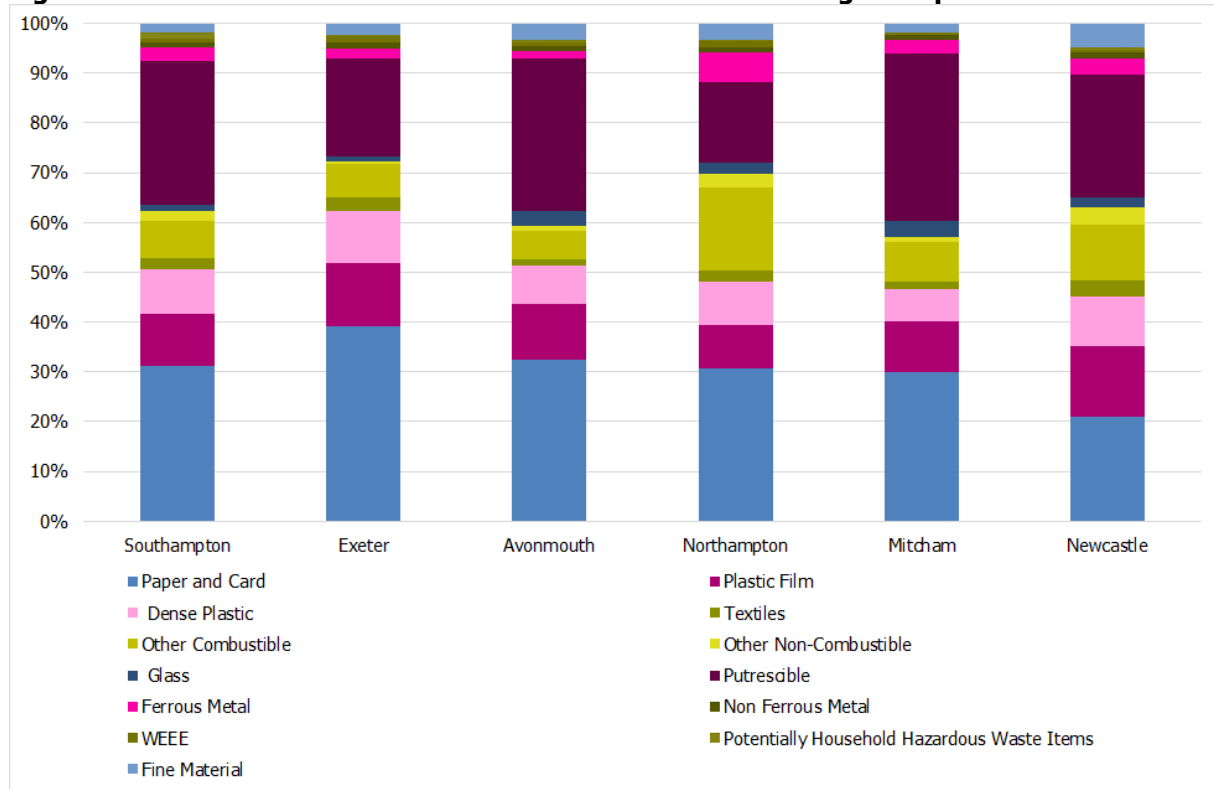
3.2.3 Fieldwork site specific average composition profiles for WMC collected samples

The average composition was calculated for each site. The results are presented in Table 7 and Figure 2. The data shows that the composition across the WMC sites are broadly similar. The variance in the composition appears to be in the paper and card category, other combustible and putrescible. Table 8 indicates that across the sites between 20-30% of material was categorised as widely recyclable, 15-32% was food waste and 25-34% was packaging.

Table 8: WMC collected commercial residual waste site average compositions (%)

Headline category	Southampton	Exeter	Avonmouth	Northampton	Mitcham	Newcastle
Paper and Card	31.2	39.0	32.3	30.7	30.0	21.0
Putrescible	28.9	19.5	30.8	16.2	33.8	24.7
Plastic Film	10.3	12.8	11.4	8.8	10.1	14.1
Dense Plastic	9.1	10.6	7.7	8.7	6.5	9.9
Other Combustible	7.5	6.6	5.7	16.7	8.1	11.3
Ferrous Metal	2.6	2.1	1.4	6.0	2.7	3.2
Textiles	2.3	2.8	1.3	2.2	1.5	3.2
Fine Material	1.9	2.4	3.3	3.4	1.8	4.9
Other Non-Combustible	1.9	0.4	1.0	2.7	1.0	3.4
Glass	1.2	1.1	2.9	2.1	3.1	2.0
Non Ferrous Metal	1.2	1.4	1.0	1.0	0.9	1.3
Potentially Household Hazardous Waste Items	1.1	0.2	0.5	0.1	0.2	0.4
WEEE	0.8	1.2	0.9	1.3	0.4	0.6
Widely recyclable %	26.3	25.2	20.9	29.7	26.1	24.0
Food %	26.3	18.8	26.8	15.3	32.3	22.3
Packaging %	25.1	33.6	26.4	31.8	25.5	29.5

Figure 2: WMC collected commercial residual waste site average compositions



3.3 Combined LA collected and WMC collected commercial residual waste composition

The estimated arisings for LA and WMC collected commercial residual waste were combined to calculate the total amount of commercial residual waste in 2017. Table 9 presents the results at the headline category level. WRAP estimated that 8,673,896 tonnes of commercial residual waste were disposed in 2017.

The largest category was paper and card accounting for an estimated 2.6M tonnes (30%) of material. Putrescible waste was the second largest with an estimated 2.3M tonnes (27%). It is noted that an estimated ¼ million tonnes of fine material was discarded in 2017, the nature of this material is unknown as it was sorted by size, however, the organic content of this material by weight is often high.

Table 9: Estimated annual arisings and headline category composition for combined commercial residual waste across LA collected and WMC collected sources (2017)

Headline category	Total commercial residual waste (%)	Total commercial residual waste annual tonnage 2017
Paper and Card	30.3	2,624,709
Putrescible	26.9	2,337,216
Plastic Film	10.7	927,712
Other Combustible	8.9	773,264
Dense Plastic	8.4	731,719
Ferrous Metal	2.9	253,787
Fine Material	2.9	253,525
Glass	2.4	204,334
Textiles	2.2	194,001
Other Non-Combustible	1.9	162,224
Non Ferrous Metal	1.1	96,749
WEEE	0.9	80,684
Potentially Household Hazardous Waste Items	0.4	33,972
Total		8,673,896

Analysis of the data shows that an estimated 25% or 2,170,000 tonnes of material was categorised as material that is widely recycled, the same amount, 25%, was categorised as food waste and 28% or 2,430,000 tonnes was categorised as packaging¹².

3.4 Deep dives

The fieldwork included a “deep dive” analysis with the aim to quantify the average item weight of specific items. Of particular interest were ‘high profile’ single use items that have been the focus of much public, political and business discussion over the past 18 months including items such as cotton buds, plastic drinks bottles, coffee cups etc.

3.4.1 LA collected non-household municipal commercial residual waste

Table 10 details the ‘high profile’ items from the LA collected non-household municipal commercial residual waste deep dive sorts. Taking coffee cups as an example the table shows that 22 samples were sorted that had coffee cups present in. Overall coffee cups accounted for 0.5% of the combined average composition. The average weight of a cup was 21g. It is estimated that 4.9kg of coffee cups would be present in every tonne of residual waste and this would be made up of approximately 230 coffee cups. Combined the items listed below account for 2.2% of the overall composition.

¹² Tonnes rounded to the nearest 5,000.

Table 10: Deep dive results for 'high profile' items in LA collected non-household municipal commercial residual waste

Deep dive category	No. of samples item present in	Proportion of average composition (%)	Average item weight (kg)	% composition Stdev.S	Item weight Stdev.s	Est. weight in 1 tonne (kg)	Est. item count in 1 tonne
Coffee cups	22	0.492%	0.021	0.006	0.006	4.921	230
Coffee cup lids	22	0.085%	0.005	0.001	0.004	0.847	156
Water bottles	21	0.340%	0.027	0.002	0.006	3.396	125
Other drinks bottles	21	0.499%	0.036	0.003	0.010	4.992	139
Ferrous drink cans	17	0.170%	0.037	0.003	0.017	1.704	46
Non-ferrous drinks can	20	0.486%	0.018	0.003	0.004	4.863	273
Stirrers	4	0.0002%	0.002	0.00001	0.002	0.002	1
Cotton buds	10	0.002%	0.001	0.00004	0.001	0.019	20
Wet wipes	21	0.144%	0.006	0.001	0.004	1.443	234
Straws	22	0.024%	0.002	0.0003	0.003	0.245	145

An analysis was carried out to combine the average item weights with the estimated annual tonnage for this material **stream**. It was estimated that 1,129,218 tonnes of LA collected non-household municipal commercial residual waste was reported in WDF in 2017. Applying the proportion of the average composition to this figure and dividing it by the average item weight enables an estimate to be made of the number of items discarded per year.

Table 11 shows that an estimated 5,557 tonnes of coffee cups are discarded per year which equates to over a quarter of a billion coffee cups (259,511,947). The estimated results contained in Table 11 indicate that over 1.5 billion items are discarded across the 'high profile' items listed¹³. For a detailed list of all items included in the deep dive see Appendix 7: Non-household LA collected municipal commercial residual waste deep dive results.

¹³ For a detailed list of all items included in the deep dive see Appendix 7.

Table 11: Estimated number of 'high profile' items discarded per year

Deep dive category	Estimated annual tonnage (2017)	Estimated No. of items / year
Coffee cups	5,557	259,511,947
Coffee cup lids	957	175,946,338
Water bottles	3,835	140,627,197
Other drinks bottles	5,637	157,049,297
Ferrous drink cans	1,924	51,706,677
Non-ferrous drinks can	5,492	307,720,892
Stirrers	3	1,683,137
Cotton buds	21	22,865,041
Wet wipes	1,629	264,638,191
Straws	276	163,723,357
Total	25,330	1,545,472,074

3.4.2 WMC collected commercial residual waste

In Table 12 are the details of the 'high profile' items from the WMC collected commercial residual waste deep dive sorts. Taking water bottles as an example the table shows that 52 samples were sorted that contained them and they accounted for 0.3% of the combined average composition. The average item weight was 28g. It was estimated that in 1 tonne of waste there would be 3.2 kg of water bottles consisting of 115 items. Combined the items listed in account for 3.0% of the overall composition.

Table 12: Deep dive results for 'high profile' items in WMC collected commercial residual waste

Deep dive category	No. of samples item present in	Proportion of average composition (%)	Average item weight (kg)	% composition Stdev.S	Item weight Stdev.s	Est. weight in 1 tonne (kg)	Est. item count in 1 tonne
Coffee cups	51	0.940%	0.023	0.014	0.007	9.405	414
Coffee cup lids	51	0.154%	0.005	0.003	0.003	1.540	284
Water bottles	52	0.322%	0.028	0.004	0.009	3.221	115
Other drinks bottles	51	0.813%	0.035	0.010	0.009	8.126	229
Ferrous drink cans	13	0.073%	0.054	0.001	0.044	0.735	14
Non-ferrous drinks can	52	0.468%	0.019	0.005	0.004	4.682	248
Stirrers	7	0.000%	0.001	0.00001	0.001	0.004	5
Cotton buds	13	0.001%	0.002	0.00003	0.002	0.011	7
Wet wipes	48	0.194%	0.006	0.002	0.005	1.938	320
Straws	46	0.023%	0.001	0.0004	0.002	0.230	158

An analysis was carried out to combine the average item weights with the estimated annual tonnage for this material stream. It was estimated that 7,544,678 tonnes of WMC collected commercial residual waste was disposed in 2017. Applying the proportion of the average composition to this figure and dividing it by the average item weight enables an estimate to be made of the number of items discarded per year.

The data in Table 13 shows that an estimated 24,299 tonnes of water bottles were discarded in 2017 which equates to 865 million items. The estimated results indicate that over 13.5 billion items are discarded across the 'high profile' items listed¹⁴.

Table 13: Estimated number of 'high profile' items discarded per year WMC collected commercial residual waste

Deep dive category	Estimated annual tonnage	Estimated No. of items / year
Coffee cups	70,955	3,122,455,718
Coffee cup lids	11,617	2,146,142,997
Water bottles	24,299	865,349,325
Other drinks bottles	61,307	1,729,858,271
Ferrous drink cans	5,543	102,562,488
Non-ferrous drinks can	35,325	1,869,893,808
Stirrers	29	34,942,948
Cotton buds	84	53,261,791
Wet wipes	14,623	2,416,343,209
Straws	1,738	1,189,188,234
Total	225,521	13,529,998,787

4.0 Summary

The results presented in this report represent a significant study to understand the composition of LA collected non-household municipal residual waste and WMC collected commercial waste in England.

9 LAs took part in the study and 22 samples with a total weight of 10,270 kg was sorted. The average composition shows the largest categories were putrescible (36%), paper and card (27%), plastic film (7%) and dense plastic (6%).

Extrapolating the composition profile on to reported WDF 2017 collected tonnage (1,129,218 tonnes) estimates that ~270,000 tonnes (24%) of the material consisted of dry recyclable material that is widely recycled, ~370,000 tonnes (33%) was food waste and ~295,000 tonnes (26%) was packaging.

Analysis carried out to weight the average profile by various factors based on the sample profile (Appendix 6) did not result in any significant difference to the composition.

The deep dive analysis of the LA collected non-household municipal commercial residual waste estimated that over 1.5 billion items are discarded across the 'high profile' items listed

¹⁴ For a detailed list of all items included in the deep dive see Appendix 7.

(coffee cups, drink cans, plastic drink bottles, cotton buds, wet wipes, stirrers, straws) with a combined weight of over 25,000 tonnes.

6 WMC sites were included in the research and 59 samples with a total weight of 19,629kg was sorted. The site-specific average compositions have significant differences in a few material categories namely paper and card, putrescible and other combustible.

WRAP estimated for England that 7,544,678 tonnes of WMC collected commercial residual waste was disposed in 2017.

The results from the study indicate that the largest category was paper and card at 31% or ~2,340,000 tonnes, putrescible was second largest with 26% or 1,960,000 tonnes, plastic film at 11% or 830,000 tonnes, other non-combustible and dense plastic both at 9% or 680,000 tonnes. Further analysis shows that 25% (7,545,000 tonnes) was dry recycling material that is widely recycled, 24% (1,810,000 tonnes) was food waste and 29% (2,190,000 tonnes) was packaging.

The deep dive analysis indicated that over 13.5 billion high profile (water bottles, cotton buds, coffee cups etc.) items with a combined weight of 225,000 tonnes were discarded in 2017.

When comparing the composition of the two sources of commercial residual waste the main difference is in the proportion of putrescible waste being less in the WMC profile. The WMC results indicate a higher proportion of plastics and combustible material compared to the LA non-household municipal collected material.

Table 14: Comparison of non-household LA collected and WMC collected commercial waste composition

Headline category	LA collected non-household municipal	WMC collected commercial
	Average composition (%)	Average composition (%)
Putrescible	36.2	25.6
Paper and Card	27.5	30.7
Plastic Film	6.9	11.3
Dense Plastic	6.4	8.7
Other Combustible	5.9	9.4
Glass	4.2	2.1
Other Non-Combustible	2.8	1.7
Fine Material	2.6	3.0
Ferrous Metal	2.5	3.0
Textiles	2.4	2.2
WEEE	1.4	0.9
Non Ferrous Metal	1	1.1
Potentially Household Hazardous Waste Items	0.3	0.4

Appendix 1: Categorisation list

Main Categories	Sub-categories	Deep dives categorisation	Comments	
1. Paper and Card	Recyclable paper packaging		clean paper bags and packaging paper, envelopes, low grade and brown paper	
	Recyclable paper non packaging		news and mags, junk mail, household/office paper, books, catalogues, directories	
	Thin card packaging		cereal boxes, tea boxes,	
	Thin card non packaging		greeting cards, manila folders, stationary	
	Corrugated card packaging		large boxes and carboard sheets	
	Corrugated card non packaging		box folders, displays, magazine holders	
	Drink cartons (Tetra packs)		juice boxes, UHT milk boxes	
	Kitchen roll and tissues		kitchen towel, tissues and wipes but not the polyester variety	
	Food contaminated P&C		otherwise recyclable but with heavily soiled with residues of food and grease	
	Waxed/laminated/wet strength P&C	Coffee cups		coffee cups, drinks cups, separate lid and straw
		Sandwich boxes		
		Paper plates		single use paper plates and bowls
		Takeaway containers		takeaway tray lids, burger box, ice cream and yogurt pots
		Laminated and waxed paper		Deli/counter & rotisserie chicken bags and paper, coated bags for popcorn, powder soup, pasta-n-sauce, greaseproof & baking paper
Laminated and waxed tubes and containers			Crisp tubes, baby formula boxes, gravy boxes, separate lids and bottoms if possible	
Other non recyclable paper and card	Wallpaper			
	Other non recyclable P&C		LIST	
2. Plastic Film	Carrier bags			
	Black bags and sacks			
	Other plastic film packaging		Bubble wrap, bread bags, cling film	
	Other plastic film non packaging		plastic wallets, agricultural film	
3. Dense Plastic	Plastic bottles	Milk bottles	HDPE	
		Other HDPE bottles	HDPE	
		Water bottles	PET	
		Other drinks bottles	PET	

Main Categories	Sub-categories	Deep dives categorisation	Comments	
		Other PET bottles	ketchup, sauce, some shower gel	
		Other bottles	PP, other	
		Black bottles		
	PTTs		All types not black plastic trays	
	Black plastic PTT		Black PTTS	
	Other dense plastic	Coffee cup lids		
		EPS trays		Food and takeaway trays
		EPS non food packaging		for electronic goods and toys
		Straws		
		Cutlery		
		Stirrers		
		Plates and cups		single use plastic plates, bowls and cups
		Cotton buds		
		Razors		disposable razors and razor heads
		Other dense plastic single use		balloon sticks
Other items		toys, pipes, hangers, PVC, plastic furniture; LIST		
Bio plastics		plant-based PLA, coffee cup lids, plastic cutlery, packing beans LIST		
4. Textiles	Clothing			
	Shoes, bags, belts			
	Non clothing textiles		rags, sheets, blankets, towels, pillows, sleeping bags, duvets	
5. Other Combustible	Carpet and underlay			
	Furniture		Wooden and soft furniture, NOT plastic or metal	
	Mattresses			
	Absorbent hygiene products (AHPs)		nappies, pads, feminine absorption products, puppy pads	
	Wood and cork packaging			
	Wood and cork non packaging			
	Other combustible	Wet wipes		plastic fibre face and cleaning wipes
		Cleaning products		sponges, j clothes, mop heads, latex gloves
Pouches			multilayer cat and baby food pouches, Capri sun drink pouches	
Netting			Netting packaging for fruit and veg	

Main Categories	Sub-categories	Deep dives categorisation	Comments
		Pill packets	pill blister packets
		stuffed toys and balls	stuffed toys, tennis, football, dog balls
		DIY combustibles	lagging, decorators foam, rubber, vinyl
		Other	hoover bags, soap, candles, hair, string; LIST
6. Other Non-Combustible	Other non-combustible		clay cat litter, crockery and ornaments, bricks, concrete, plaster, rocks, ash, traditional lightbulbs
	Non combustible, non food liquid		Liquid cosmetics, soaps, non food, Only if the weight is more than packaging
7. Glass	Glass bottles and jars		
	Glass non-packaging		drinking glasses, pane glass
8. Putrescible	Garden waste		including straw pet bedding from herbivorous pets (Guinee pigs, hamsters, rabbits)
	Soil		
	Edible food waste		cooked and prepared meals; whole fruit and veg; fruit & veg flesh; whole coffee products (pods, bags); unused teabags; cakes: bread - slices, whole loaves, rolls, unused oils, marge/butter, confectionary, condiments, meat & fish cooked and raw; sprouting potato
	Inedible food waste		Bones; gristle; cheese wax; nut shells; fruit stones; pineapple, banana, avocado, melon skin; fruit cores; fruit stalks; tops and stalks of veg except: broccoli, cauliflower, mushrooms; garlic/ginger/onion peel; teabags; coffee grounds; egg shells
	Other organic		pet litter including wooden cat litter, unidentifiable
9. Ferrous Metal	Ferrous cans and tins	Drinks cans	
		Food tins	
	Other ferrous items		pans, tools, cutlery, pipes, metal furniture
10. Non Ferrous Metal	Non Ferrous cans	Drinks cans	
		Food tins	
	Non Ferrous aerosols		
	Alu foil		including foil trays
	Other non ferrous		pans, tools, cutlery, pipes, non ferrous furniture

Main Categories	Sub-categories	Deep dives categorisation	Comments
11. Waste Electrical and Electronic Equipment	WEEE		
12. Potentially Household Hazardous Waste Items	HHW		Paint, household chemicals, pesticides, energy saving bulbs and fluorescent tubes
	Batteries		all Batteries
13. Fine Material	<10 mm Fines		

Appendix 2: LA collected non-household municipal commercial residual waste sample profile tables

The following table shows the summary information of the LA collected municipal commercial residual waste tonnage by region recorded on WDF.

App Table 1: Regional tonnage data of LA collected non-household municipal commercial residual waste, WDF 2017

Region	Commercial residual tonnage (2017 WDF)	Count	Tonnage %	Region represented in sample
West Midlands	154,170	22	13.7%	Yes
North West	83,137	29	7.4%	Yes
Yorkshire And The Humber	124,154	16	11.0%	Yes
London	390,258	30	34.6%	Yes
East Midlands	81,203	32	7.2%	Yes
South East	83,978	29	7.4%	Yes
South West	70,272	25	6.2%	Yes
Eastern	87,833	31	7.8%	No
North East	54,213	11	4.8%	No
Total	1,129,218	225		

The table below shows the rural/urban classifications that are represented by the LAs included in the sample. The tonnages shown are for the whole classification group and not the LAs included in the study.

App Table 2: Rural / urban classification profile of LA collected municipal commercial residual waste WDF tonnage

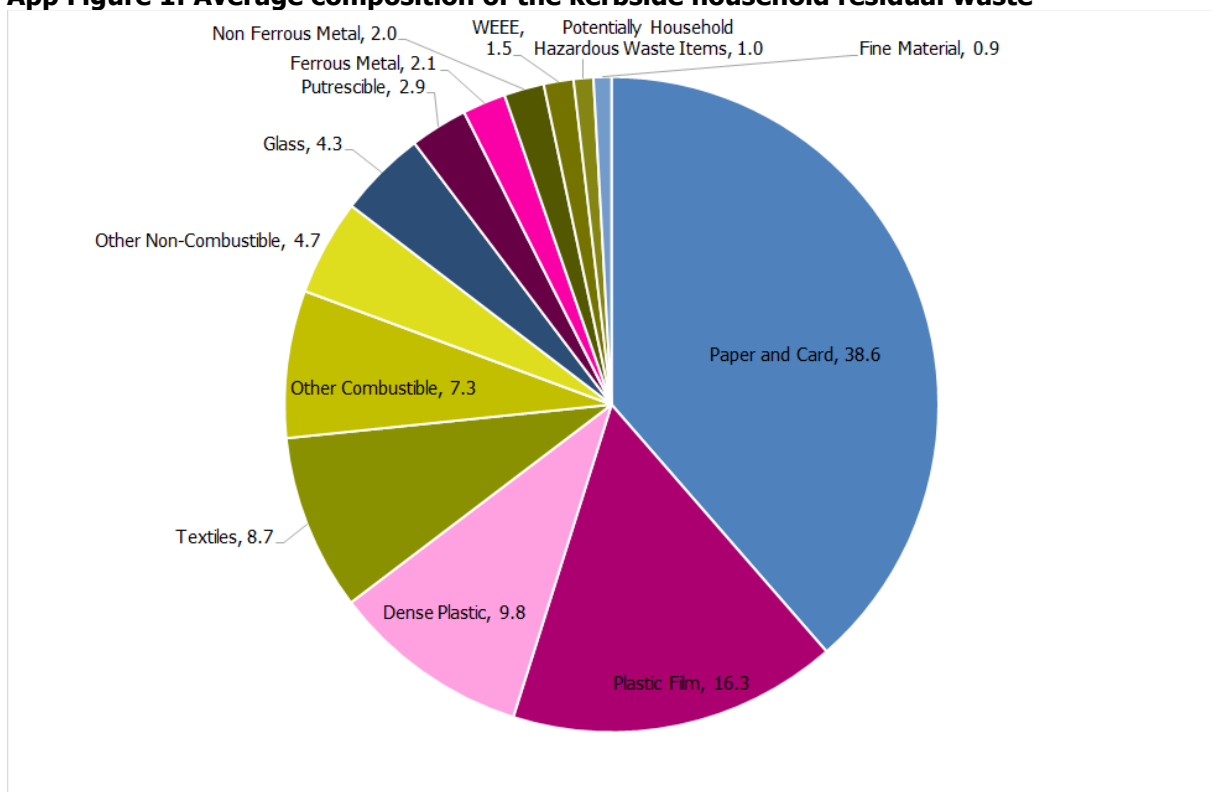
Rural / urban classification	Commercial residual tonnage (2017 WDF)	Count	Represented by a LA in sample	Tonnage % for combined total	Tonnage % weighted for analysis
Largely Rural (rural including hub towns 50-79%)	99,182	30	Yes	8.8%	10.5%
Urban with City and Town	229,237	63	Yes	20.3%	24.3%
Urban with Major Conurbation	614,357	59	Yes	54.4%	65.2%
<i>Sub total represented in sample</i>	<u>942,776</u>	<u>152</u>	<u>n/a</u>	<u>83.5%</u>	100.0%
Mainly Rural (rural including hub towns >=80%)	50,498	28	No	4.5%	n/a
Urban with Minor Conurbation	51,864	8	No	4.6%	n/a
Urban with Significant Rural (rural including hub towns 26-49%)	63,066	32	No	5.6%	n/a
No classification	21,013	5	No	1.9%	n/a
<i>Sub total not represented in sample</i>	<u>186,442</u>	<u>73</u>	<u>n/a</u>	<u>16.5%</u>	n/a
Total combined	1,129,218	225	-	-	-

Appendix 3: LA Collected household municipal residual results

The samples of household waste were included in the study to supply an indicative assessment of the composition along with the deep dive data for the household waste stream. A single sample was included from each of the 9 LAs where fieldwork was conducted. The results were combined to provide an average composition.

App Figure 1 shows the average composition for the household municipal residual waste samples. The five largest proportions of the waste were putrescible (38.6%), paper and card (16.3%), other combustible (9.8%), plastic film (8.7%) and dense plastic (7.3%). An estimated 20% of material consisted of widely recycled dry recycling materials (paper, card, plastic, metal and glass), 33% was food waste and 23% was packaging.

App Figure 1: Average composition of the kerbside household residual waste



The data in App Table 3 shows the average composition of the LA collected household municipal samples compared against the LA collected non-household municipal and the WMC collected commercial waste. The table shows some differences between the three sources of waste but they are broadly comparable at the headline category level. The main difference is the level of paper and card in the household source being much lower than the other two sources.

App Table 3: LA collected household waste average composition

Headline sort category	Kerbside household	LA collected non-household	WMC collected
	Average %	Average %	Average %
Putrescible	38.6	36.2	25.6
Paper and Card	16.3	27.5	30.7
Other Combustible	9.8	5.9	9.4
Plastic Film	8.7	6.9	11.3
Dense Plastic	7.3	6.4	8.7
Glass	4.7	4.2	2.1
Textiles	4.3	2.4	2.2
Other Non-Combustible	2.9	2.8	1.7
Fine Material	2.1	2.6	3.0
Ferrous Metal	2.0	2.5	3.0
Non Ferrous Metal	1.5	1.0	1.1
WEEE	1.0	1.4	0.9
Potentially Household Hazardous Waste Items	0.9	0.3	0.4

LA collected household municipal residual waste deep dive results

The data in App Table 4 presents the headline results for the deep dive analysis for high profile single use items. Taking ferrous drink cans as an example the table shows that 6 of the samples contained ferrous drink cans and they accounted for 0.1% of the average composition with an average item weight of 30g. Based on the average composition it was calculated that in a tonne of material there would be 1kg of ferrous drink cans made up of 33 items.

In total the high profile single use items accounted for 2.5% of the LA collected household residual waste.

App Table 4: LA collected household waste “deep dive” results for high profile single use items

Deep dive category	How many samples item present in	Proportion of average composition (%)	Average item weight (kg)	% composition Stdev.S	Item weight Stdev.s	Est. weight in 1 tonne (kg)	Est. item count in 1 tonne
Coffee cups	9	0.104%	0.017	0.002	0.006	1.037	60
Coffee cup lids	8	0.025%	0.005	0.000	0.002	0.245	53
Water bottles	8	0.418%	0.027	0.005	0.007	4.176	152
Other drinks bottles	9	0.673%	0.037	0.006	0.005	6.735	183
Ferrous drink cans	6	0.097%	0.030	0.002	0.007	0.971	33
Non-ferrous drinks can	9	0.690%	0.019	0.007	0.003	6.900	362
Stirrers	1	0.002%	0.004	0.00005	n/a	0.017	5
Cotton buds	9	0.004%	0.001	0.00004	0.001	0.040	42
Wet wipes	9	0.499%	0.005	0.002	0.002	4.989	946
Straws	8	0.009%	0.00	0.0001	0.00	0.094	91

App Table 5 below reproduces the deep dive results for LA collected non household municipal commercial waste for comparison with the household results in App Table 4. In comparing the estimated item count in 1 tonne of material column between the two tables it is interesting to note the differences: four times as many coffee cups in the non-household commercial sample; approximately the same number of water bottles; more other drinks bottles and ferrous and non-ferrous cans in the household material; a low number of cotton buds in both but twice as many in the household material; four times as many wet wipes in the household material; and 1.5 as many straws in the non-household material. These differences would seem to follow the expected logic based on use and disposal practices for these items.

App Table 5: LA collected non-household municipal commercial waste “deep dive” results for high profile single use items

Deep dive category	No. of samples item present in	Proportion of average composition (%)	Average item weight (kg)	% composition Stdev.S	Item weight Stdev.s	Est. weight in 1 tonne (kg)	Est. item count in 1 tonne
Coffee cups	22	0.492%	0.021	0.006	0.006	4.921	230
Coffee cup lids	22	0.085%	0.005	0.001	0.004	0.847	156
Water bottles	21	0.340%	0.027	0.002	0.006	3.396	125
Other drinks bottles	21	0.499%	0.036	0.003	0.010	4.992	139
Ferrous drink cans	17	0.170%	0.037	0.003	0.017	1.704	46
Non-ferrous drinks can	20	0.486%	0.018	0.003	0.004	4.863	273
Stirrers	4	0.0002%	0.002	0.00001	0.002	0.002	1
Cotton buds	10	0.002%	0.001	0.00004	0.001	0.019	20
Wet wipes	21	0.144%	0.006	0.001	0.004	1.443	234
Straws	22	0.024%	0.002	0.0003	0.003	0.245	145

The data in App Table 6 shows the results for all items tested.

App Table 6: LA collected household waste “deep dive” results for all items¹⁵

Sort sub-category	Deep dive category	No. of samples item present in	Average item weight (kg)	Item weight Stdev.s	Proportion of average composition (%)
Waxed/laminated/wet strength P&C	Coffee cups	9	0.017	0.006	0.104%
Waxed/laminated/wet strength P&C	Sandwich boxes	9	0.017	0.004	0.037%
Waxed/laminated/wet strength P&C	Paper plates	6	0.012	0.004	0.035%
Waxed/laminated/wet strength P&C	Takeaway containers	9	0.022	0.008	0.241%
Waxed/laminated/wet strength P&C	Laminated and waxed paper	8	0.018	0.014	0.320%
Waxed/laminated/wet strength P&C	Laminated/waxed tubes & containers	9	0.042	0.012	0.121%
Other non recyclable paper and card	Other non recyclable P&C	1	0.101	0	0.437%
Plastic bottles	Milk bottles	9	0.054	0.011	0.433%
Plastic bottles	Other HDPE bottles	9	0.044	0.019	0.353%
Plastic bottles	Water bottles	8	0.027	0.007	0.418%
Plastic bottles	Other drinks bottles	9	0.037	0.005	0.673%
Plastic bottles	Other PET bottles	9	0.047	0.009	0.405%
Plastic bottles	Other bottles	6	0.036	0.012	0.054%
Plastic bottles	Black bottles	6	0.052	0.037	0.012%
PTTs	PP	7	0.025	0.005	0.512%
PTTs	PET	8	0.022	0.005	0.276%
PTTs	PVC	0	0	0	0.000%
PTTs	Other and not known	8	0.026	0.008	0.997%
Other dense plastic	Coffee cup lids	8	0.005	0.002	0.025%
Other dense plastic	EPS trays	9	0.013	0.003	0.164%
Other dense plastic	EPS non food packaging	6	0.024	0.038	0.126%
Other dense plastic	Straws	8	0.001	0.000	0.009%
Other dense plastic	Cutlery	9	0.003	0.001	0.021%
Other dense plastic	Stirrers	1	0.004	0	0.002%
Other dense plastic	Plates and cups	7	0.010	0.003	0.040%
Other dense plastic	Cotton buds	9	0.001	0.001	0.004%
Other dense plastic	Razors	8	0.008	0.002	0.059%
Other dense plastic	Dense plastic lids	9	0.006	0.003	0.108%

¹⁵ The average item weight data has been cleansed to remove outliers. The quality checking procedure identified incomplete count data records.

Sort sub-category	Deep dive category	No. of samples item present in	Average item weight (kg)	Item weight Stdev.s	Proportion of average composition (%)
Other dense plastic	Non food plastic packaging	6	0.024	0.009	0.418%
Other dense plastic	Other dense plastic single use	9	0.005	0.005	0.058%
Other dense plastic	Other items LIST	7	0.060	0.041	1.511%
Other combustible	Wet wipes	9	0.005	0.002	0.499%
Other combustible	Cleaning products	9	0.015	0.005	0.420%
Other combustible	Pouches	9	0.008	0.001	0.196%
Other combustible	Netting	9	0.014	0.011	0.096%
Other combustible	Pill packets	9	0.003	0.001	0.059%
Other combustible	stuffed toys and balls	8	0.143	0.138	0.062%
Other combustible	Balloons	5	0.010	0.005	0.005%
Other combustible	DIY combustibles	1	0.238	0	0.070%
Other combustible	Other LIST	8	0.083	0.057	0.870%
Ferrous cans and tins	Drinks cans	6	0.030	0.007	0.097%
Ferrous cans and tins	Food tins	9	0.066	0.013	1.030%
Non Ferrous cans	Drinks cans	9	0.019	0.003	0.690%
Non Ferrous cans	Food tins	7	0.016	0.008	0.035%
Plastic	Netting large	0	0	0	0.000%
Plastic	Packaging non-food	0	0	0	0.000%
Plastic	Coffee pods	3	0.013	0.003	0.035%
Card	Thick card tubing	0	0	0	0.000%
Wood	Wooden stirrer + lollipop sticks	1	0.002	0	0.001%

Appendix 4: Sub-category average composition for LA collected non-household municipal and MWC collected commercial residual waste

Main Categories	Sub-categories	LA Collected average composition (%)	WMC collected average composition (%)
Paper and Card	Recyclable paper packaging	0.95	0.71
Paper and Card	Recyclable paper non packaging	5.23	7.39
Paper and Card	Thin card packaging	1.65	2.05
Paper and Card	Thin card non packaging	0.42	0.28
Paper and Card	Corrugated card packaging	6.46	5.80
Paper and Card	Corrugated card non packaging	0.00	0.06
Paper and Card	Drink cartons (Tetra packs)	0.22	0.39
Paper and Card	Kitchen roll and tissues	8.29	9.21
Paper and Card	Food contaminated P&C	1.56	1.15
Paper and Card	Waxed/laminated/wet strength P&C	1.92	2.99
Paper and Card	Other non recyclable paper and card	0.76	0.63
Plastic Film	Carrier bags	0.64	0.53
Plastic Film	Black bags and sacks	1.84	3.00
Plastic Film	Other plastic film packaging	4.30	7.46
Plastic Film	Other plastic film non packaging	0.15	0.27
Dense Plastic	Plastic bottles	1.81	2.38
Dense Plastic	PTTs	1.70	2.49
Dense Plastic	Black plastic PTT	0.18	0.36
Dense Plastic	Other dense plastic	2.73	3.44
Dense Plastic	Bio plastics	0.00	0.07
Textiles	Clothing	1.24	0.91
Textiles	Shoes, bags, belts	0.37	0.50
Textiles	Non clothing textiles	0.77	0.81
Other Combustible	Carpet and underlay	0.12	1.04
Other Combustible	Furniture	0.13	0.42
Other Combustible	Mattresses	0.00	0.11
Other Combustible	Absorbent hygiene products (AHPs)	1.30	1.05
Other Combustible	Wood and cork packaging	0.56	0.30
Other Combustible	Wood and cork non packaging	1.50	3.07
Other Combustible	Other combustible	2.28	3.38
Other Non-Combustible	Other non-combustible	2.53	1.66

Main Categories	Sub-categories	LA Collected average composition (%)	WMC collected average composition (%)
Other Non-Combustible	Non combustible, non food liquid	0.24	0.07
Glass	Glass bottles and jars	3.80	1.77
Glass	Glass non-packaging	0.39	0.31
Putrescible	Garden waste	1.07	0.98
Putrescible	Soil	0.54	0.42
Putrescible	Edible food waste	20.94	14.88
Putrescible	Inedible food waste	12.46	8.71
Putrescible	Other organic	1.15	0.58
Ferrous Metal	Ferrous cans and tins	1.29	1.02
Ferrous Metal	Ferrous aerosols	0.08	0.08
Ferrous Metal	Other ferrous items	1.12	1.90
Non Ferrous Metal	Non Ferrous cans	0.51	0.47
Non Ferrous Metal	Non Ferrous aerosols	0.03	0.05
Non Ferrous Metal	Alu foil	0.33	0.38
Non Ferrous Metal	Other non ferrous	0.14	0.23
WEEE	WEEE	1.40	0.86
Potentially Household Hazardous Waste Items	Empty Paint Tins	0.03	0.03
Potentially Household Hazardous Waste Items	Full Paint Tins	0.06	0.04
Potentially Household Hazardous Waste Items	HHW	0.17	0.30
Potentially Household Hazardous Waste Items	Batteries	0.02	0.04
Fine Material	<10 mm Fines	2.63	2.97

Appendix 6: LA collected non-household municipal commercial residual composition weighted results

As part of the data analysis weighted average composition profiles were calculated based on the following parameters:

1. the WDF reported collected tonnage of the LAs included in the research;
2. Regional WDF reported collected tonnage; and
3. Rural:urban classification WDF reported tonnage.

Sample LA reported tonnages

The average composition was weighted using the Waste Data Flow returns for each LA. The average composition for each of the local authorities was applied to the tonnages of commercial waste collected in that authority and combined to produce the overall composition.

App Table 6: Weighting factors for LA collected tonnages

LA	LA collected non-household commercial residual tonnage (2017 WDF)	Analysis weighting factor
Birmingham City Council	60,064	42.2%
Blackburn with Darwen BC	4,110	2.9%
Bradford MDC	19,657	13.8%
Camden LB	28,581	20.1%
Enfield London Borough Council	8,999	6.3%
High Peak Borough Council	2,911	2.0%
Horsham District Council	3,869	2.7%
Newham London Borough Council	5,128	3.6%
Plymouth City Council	9,075	6.4%

Regional WDF reported tonnages

The total tonnage reported in WDF for each region was calculated. The results were weighted for the regions covered in the study. The regions represented in the sample account for 87% of the reported tonnage (987K tonnes). Where more than one LA was categorised to the same group (i.e. London) the average composition for that group was calculated and weighting factor was applied to the group average.

App Table 7: Regional WDF weighting factor

Region	Represented in sample	Commercial residual tonnage 2017 (WDF)	WDF Count	Tonnage %	Analysis weighting factor
West Midlands	Yes	154,170	22	13.7%	15.6%
North West	Yes	83,137	29	7.4%	8.4%
Yorkshire And The Humber	Yes	124,154	16	11.0%	12.6%
London	Yes	390,258	30	34.6%	39.5%
East Midlands	Yes	81,203	32	7.2%	8.2%
South East	Yes	83,978	29	7.4%	8.5%
South West	Yes	70,272	25	6.2%	7.1%
Eastern	No	87,833	31	7.8%	n/a
North East	No	54,213	11	4.8%	n/a
Grand Total		1,129,218	225		

Rural:urban categorisation weighting

The total tonnage based on rural / urban categorisation was calculated from WDF tonnage. As presented in sections above 1,129,218 tonnes were reported in WDF for 2017, the categories represented account for 84% of the total tonnage. Where more than one LA was categorised to the same classification, the average composition for that classification group was calculated and the weighting factor was applied.

The table below shows the rural/urban classifications that are represented by the LAs included in the sample. The tonnages shown are for the whole classification group and not the LAs included in the study.

App Table 8: Rural:urban weighting factor

Rural / urban classification	Represented in Sample	Commercial residual tonnage 2017 (WDF)	Count	Analysis weighting factor
Largely Rural (rural including hub towns 50-79%)	Yes	99,182	30	10.5%
Urban with City and Town	Yes	229,237	63	24.3%
Urban with Major Conurbation	Yes	614,357	59	65.2%
<i>Sub total of classifications in sample</i>		<i>942,776</i>	<i>152</i>	-
Mainly Rural (rural including hub towns >=80%)		50,498	28	n/a
n/a				n/a
Urban with Minor Conurbation		51,864	8	n/a
Urban with Significant Rural (rural including hub towns 26-49%)		63,066	32	n/a
#N/A		21,013	5	n/a
<i>Sub total of classifications not in sample</i>		<i>186,442</i>	<i>73</i>	n/a
Total combined		1,129,218	225	

App Table 9 and 10 show the fact that average composition and the various weighted compositions are similar.

App Table 9: Comparison of the average composition with the weighted averages

Headline category	Average composition (%)	LA weighted average (%)	WDF regional weighted (%)	Rural / urban weighted (%)
Putrescible	36.2	37.3	36.3	35.7
Paper and Card	27.5	30.0	27.2	27.5
Plastic Film	6.9	6.7	6.8	7.0
Dense Plastic	6.4	6.6	6.3	6.4
Other Combustible	5.9	4.9	6.0	6.0
Glass	4.2	3.9	4.3	4.1
Other Non-Combustible	2.8	2.0	2.9	2.9
Fine Material	2.6	2.6	2.6	2.6
Ferrous Metal	2.5	2.5	2.5	2.5
Textiles	2.4	1.4	2.4	2.5
WEEE	1.4	0.8	1.2	1.4
Non Ferrous Metal	1.0	1.0	1.0	1.1
Potentially Household Hazardous Waste Items	0.3	0.2	0.3	0.3

APP Table 10: Comparison of the average composition tonnages with the weighted averages

Headline category	Average composition tonnage	LA weighted average tonnage	WDF regional weighted tonnage	Rural / urban weighted tonnage
Putrescible	408,378	421,346	410,330	403,491
Paper and Card	310,053	338,872	307,486	310,856
Plastic Film	78,232	75,723	77,091	79,609
Dense Plastic	72,464	74,203	71,601	71,980
Other Combustible	66,463	55,345	67,523	67,878
Glass	47,295	43,578	49,024	46,123
Other Non-Combustible	31,293	23,147	32,652	32,266
Fine Material	29,659	29,795	29,531	29,893
Ferrous Metal	28,124	28,342	28,065	28,195
Textiles	26,829	16,264	27,154	27,721
WEEE	15,843	9,375	13,974	16,287
Non Ferrous Metal	11,457	10,795	11,598	11,917
Potentially Household Hazardous Waste Items	3,127	2,433	3,189	3,001
Total	1,129,218	1,129,218	1,129,218	1,129,218

App Table 10: Detailed composition profile for the average LA collected municipal commercial residual waste and the weighted average profiles

Main Categories	Sub-categories	Average composition (%)	LA weighted average (%)	WDF regional weighted (%)	Rural / urban weighted (%)
Paper and Card	Recyclable paper packaging	0.9	0.9	0.9	0.9
Paper and Card	Recyclable paper non packaging	5.2	6.3	5.1	5.2
Paper and Card	Thin card packaging	1.6	1.6	1.7	1.7
Paper and Card	Thin card non packaging	0.4	0.4	0.4	0.4
Paper and Card	Corrugated card packaging	6.5	7.3	6.5	6.6
Paper and Card	Corrugated card non packaging	0.0	0.0	0.0	0.0
Paper and Card	Drink cartons (Tetra packs)	0.2	0.2	0.2	0.2
Paper and Card	Kitchen roll and tissues	8.3	9.0	8.3	8.4
Paper and Card	Food contaminated P&C	1.6	2.2	1.5	1.5
Paper and Card	Waxed/laminated/wet strength P&C	1.9	1.5	1.9	1.8
Paper and Card	Other non recyclable paper and card	0.8	0.6	0.7	0.7
Plastic Film	Carrier bags	0.6	0.6	0.7	0.6
Plastic Film	Black bags and sacks	1.8	1.5	1.8	1.9
Plastic Film	Other plastic film packaging	4.3	4.4	4.2	4.3
Plastic Film	Other plastic film non packaging	0.1	0.2	0.2	0.1
Dense Plastic	Plastic bottles	1.8	1.9	1.8	1.9
Dense Plastic	PTTs	1.7	2.0	1.7	1.8
Dense Plastic	Black plastic PTT	0.2	0.2	0.2	0.2
Dense Plastic	Other dense plastic	2.7	2.5	2.7	2.5
Dense Plastic	Bio plastics	0.0	0.0	0.0	0.0
Textiles	Clothing	1.2	0.7	1.3	1.4
Textiles	Shoes, bags, belts	0.4	0.3	0.4	0.4
Textiles	Non clothing textiles	0.8	0.5	0.8	0.7
Other Combustible	Carpet and underlay	0.1	0.1	0.1	0.1
Other Combustible	Furniture	0.1	0.1	0.1	0.1
Other Combustible	Mattresses	0.0	0.0	0.0	0.0

Main Categories	Sub-categories	Average composition (%)	LA weighted average (%)	WDF regional weighted (%)	Rural / urban weighted (%)
Other Combustible	Absorbent hygiene products (AHPs)	1.3	1.2	1.4	1.4
Other Combustible	Wood and cork packaging	0.6	0.4	0.6	0.6
Other Combustible	Wood and cork non packaging	1.5	1.2	1.6	1.5
Other Combustible	Other combustible	2.3	1.9	2.2	2.3
Other Non-Combustible	Other non-combustible	2.5	1.7	2.6	2.6
Other Non-Combustible	Non combustible, non food liquid	0.2	0.4	0.2	0.2
Glass	Glass bottles and jars	3.8	3.6	4.0	3.8
Glass	Glass non-packaging	0.4	0.3	0.4	0.3
Putrescible	Garden waste	1.1	0.7	1.1	1.1
Putrescible	Soil	0.5	0.3	0.6	0.5
Putrescible	Edible food waste	20.9	22.0	20.8	21.0
Putrescible	Inedible food waste	12.5	14.0	12.8	12.5
Putrescible	Other organic	1.2	0.3	1.1	0.7
Ferrous Metal	Ferrous cans and tins	1.3	1.5	1.3	1.3
Ferrous Metal	Ferrous aerosols	0.1	0.1	0.1	0.1
Ferrous Metal	Other ferrous items	1.1	0.9	1.1	1.1
Non Ferrous Metal	Non Ferrous cans	0.5	0.6	0.5	0.5
Non Ferrous Metal	Non Ferrous aerosols	0.0	0.0	0.0	0.0
Non Ferrous Metal	Alu foil	0.3	0.3	0.3	0.4
Non Ferrous Metal	Other non ferrous	0.1	0.1	0.1	0.1
WEEE	WEEE	1.4	0.8	1.2	1.4
Potentially Household Hazardous Waste Items	Empty Paint Tins	0.0	0.0	0.0	0.0
Potentially Household Hazardous Waste Items	Full Paint Tins	0.1	0.0	0.1	0.1
Potentially Household Hazardous Waste Items	HHW	0.2	0.1	0.2	0.2
Potentially Household	Batteries	0.0	0.0	0.0	0.0

Main Categories	Sub-categories	Average composition (%)	LA weighted average (%)	WDF regional weighted (%)	Rural / urban weighted (%)
Hazardous Waste Items					
Fine Material	<10 mm Fines	2.6	2.6	2.6	2.6

App Table 11: Detailed composition profile for the average LA collected municipal commercial residual waste and the weighted average profiles, tonnage 2017

Main Categories	Sub-categories	Average composition tonnage	LA weighted average tonnage	WDF regional weighted tonnage	Rural / urban weighted tonnage
Paper and Card	Recyclable paper packaging	10,725	10,062	10,469	10,149
Paper and Card	Recyclable paper non packaging	59,056	71,182	57,761	59,054
Paper and Card	Thin card packaging	18,600	18,530	18,699	18,848
Paper and Card	Thin card non packaging	4,718	4,267	4,608	4,903
Paper and Card	Corrugated card packaging	72,993	81,885	72,989	74,908
Paper and Card	Corrugated card non packaging	0	0	0	0
Paper and Card	Drink cartons (Tetra packs)	2,428	2,484	2,423	2,505
Paper and Card	Kitchen roll and tissues	93,604	101,777	93,863	95,232
Paper and Card	Food contaminated P&C	17,623	24,960	16,940	17,319
Paper and Card	Waxed/laminated/wet strength P&C	21,686	17,020	21,335	20,410
Paper and Card	Other non recyclable paper and card	8,622	6,707	8,399	7,529
Plastic Film	Carrier bags	7,251	6,579	7,663	7,316
Plastic Film	Black bags and sacks	20,729	16,820	20,114	21,851
Plastic Film	Other plastic film packaging	48,610	50,215	47,514	48,782
Plastic Film	Other plastic film non packaging	1,642	2,109	1,801	1,660
Dense Plastic	Plastic bottles	20,488	21,304	20,337	21,188
Dense Plastic	PTTs	19,161	22,766	18,842	19,937
Dense Plastic	Black plastic PTT	2,011	1,905	2,020	2,132
Dense Plastic	Other dense plastic	30,782	28,214	30,382	28,700
Dense Plastic	Bio plastics	23	14	20	24
Textiles	Clothing	14,001	8,003	14,269	15,282
Textiles	Shoes, bags, belts	4,164	3,033	4,340	4,335
Textiles	Non clothing textiles	8,665	5,228	8,545	8,103
Other Combustible	Carpet and underlay	1,336	777	1,237	1,024
Other Combustible	Furniture	1,413	1,638	1,260	1,240

Main Categories	Sub-categories	Average composition tonnage	LA weighted average tonnage	WDF regional weighted tonnage	Rural / urban weighted tonnage
Other Combustible	Mattresses	0	0	0	0
Other Combustible	Absorbent hygiene products (AHPs)	14,675	13,261	15,412	16,295
Other Combustible	Wood and cork packaging	6,337	4,411	6,626	6,268
Other Combustible	Wood and cork non packaging	16,911	13,702	17,690	17,018
Other Combustible	Other combustible	25,790	21,556	25,298	26,034
Other Non-Combustible	Other non-combustible	28,596	19,155	29,896	29,616
Other Non-Combustible	Non combustible, non food liquid	2,698	3,992	2,755	2,650
Glass	Glass bottles and jars	42,885	40,261	44,660	42,636
Glass	Glass non-packaging	4,411	3,317	4,364	3,487
Putrescible	Garden waste	12,127	7,899	12,613	12,031
Putrescible	Soil	6,091	3,796	6,428	5,713
Putrescible	Edible food waste	236,427	248,321	234,905	236,979
Putrescible	Inedible food waste	140,736	157,626	144,355	140,824
Putrescible	Other organic	12,997	3,704	12,030	7,943
Ferrous Metal	Ferrous cans and tins	14,537	16,562	14,286	15,064
Ferrous Metal	Ferrous aerosols	934	1,175	981	931
Ferrous Metal	Other ferrous items	12,652	10,605	12,798	12,201
Non Ferrous Metal	Non Ferrous cans	5,750	6,305	5,871	5,995
Non Ferrous Metal	Non Ferrous aerosols	346	235	353	355
Non Ferrous Metal	Alu foil	3,769	3,370	3,805	3,998
Non Ferrous Metal	Other non ferrous	1,593	885	1,569	1,569
WEEE	WEEE	15,843	9,375	13,974	16,287
Potentially Household Hazardous Waste Items	Empty Paint Tins	300	287	328	296
Potentially Household Hazardous Waste Items	Full Paint Tins	699	275	676	606

Main Categories	Sub-categories	Average composition tonnage	LA weighted average tonnage	WDF regional weighted tonnage	Rural / urban weighted tonnage
Potentially Household Hazardous Waste Items	HHW	1,907	1,672	1,947	1,871
Potentially Household Hazardous Waste Items	Batteries	222	199	239	229
Fine Material	<10 mm Fines	29,659	29,795	29,531	29,893
Total		1,129,218	1,129,218	1,129,218	1,129,218

Appendix 7: LA collected non-household municipal commercial residual waste deep dive results

Deep dive category	No. of samples item present in	Average item weight (kg)	Item weight Stdev.s	Proportion of average composition (%)	Est. weight in 1 tonne (kg)	Est. item count in 1 tonne
Coffee cups	22	0.021	0.006	0.492%	4.92	230
Sandwich boxes	21	0.019	0.005	0.069%	0.69	37
Paper plates	14	0.020	0.012	0.059%	0.59	29
Takeaway containers	20	0.024	0.009	0.663%	6.63	273
Laminated and waxed paper	18	0.010	0.005	0.507%	5.07	488
Laminated/waxed tubes & containers	20	0.047	0.027	0.131%	1.31	28
Other non recyclable P&C	2	0.038	0.001	0.666%	6.66	176
Milk bottles	22	0.046	0.008	0.330%	3.30	71
Other HDPE bottles	22	0.086	0.034	0.396%	3.96	46
Water bottles	21	0.027	0.006	0.340%	3.40	125
Other drinks bottles	21	0.036	0.010	0.499%	4.99	139
Other PET bottles	20	0.056	0.022	0.217%	2.17	39
Other bottles	13	0.045	0.024	0.025%	0.25	6
Black bottles	6	0.061	0.038	0.007%	0.07	1
PP	19	0.037	0.013	0.775%	7.75	211
PET	19	0.027	0.012	0.204%	2.04	76
PVC	1	0.120	0	0.002%	0.02	0
Other and not known	19	0.029	0.019	0.541%	5.41	187
Coffee cup lids	22	0.005	0.004	0.085%	0.85	156
EPS trays	21	0.012	0.005	0.349%	3.49	285
EPS non food packaging	16	0.032	0.047	0.085%	0.85	26
Straws	22	0.002	0.003	0.024%	0.24	145
Cutlery	21	0.005	0.005	0.080%	0.80	176
Stirrers	4	0.002	0.002	0.000%	0.00	1
Plates and cups	20	0.009	0.005	0.195%	1.95	212
Cotton buds	10	0.001	0.001	0.002%	0.02	20
Razors	13	0.009	0.007	0.004%	0.04	4
Dense plastic lids	22	0.006	0.004	0.133%	1.33	216

Deep dive category	No. of samples item present in	Average item weight (kg)	Item weight Stdev.s	Proportion of average composition (%)	Est. weight in 1 tonne (kg)	Est. item count in 1 tonne
Non food plastic packaging	17	0.030	0.021	0.213%	2.13	71
Other dense plastic single use	20	0.014	0.031	0.059%	0.59	42
Other items LIST	21	0.060	0.069	1.501%	15.01	251
Wet wipes	21	0.006	0.004	0.144%	1.44	234
Cleaning products	19	0.017	0.009	0.719%	7.19	413
Pouches	21	0.012	0.005	0.098%	0.98	83
Netting	22	0.036	0.038	0.065%	0.65	18
Pill packets	22	0.004	0.004	0.030%	0.30	71
stuffed toys and balls	9	0.049	0.057	0.027%	0.27	6
Balloons	9	0.004	0.003	0.002%	0.02	4
DIY combustibles	1	0.793	0	0.170%	1.70	2
Other LIST	20	0.238	0.515	1.034%	10.34	43
Drinks cans	17	0.037	0.017	0.170%	1.70	46
Food tins	21	0.150	0.078	1.045%	10.45	70
Drinks cans	20	0.018	0.004	0.486%	4.86	273
Food tins	12	0.025	0.010	0.007%	0.07	3
Netting large	0	0	0	0.000%	0.00	0
Packaging non-food	0	0	0	0.000%	0.00	0
Coffee pods	6	0.014	0.004	0.043%	0.43	31
Thick card tubing	0	0	0	0.000%	0.00	0
Wooden stirrer + lollipop sticks	1	0.002	0	0.002%	0.02	11

Appendix 8: WMC collected commercial residual waste deep dive results

Deep dive category	No. of samples item present in	Average item weight (kg)	Item weight Stdev.s	Proportion of average composition (%)	Est. weight in 1 tonne (kg)	Est. item count in 1 tonne
Coffee cups	51	0.023	0.007	0.940%	9.40	414
Sandwich boxes	50	0.022	0.006	0.225%	2.25	102
Paper plates	35	0.021	0.010	0.081%	0.81	38
Takeaway containers	48	0.027	0.010	0.823%	8.23	308
Laminated and waxed paper	17	0.017	0.017	0.537%	5.37	322
Laminated/waxed tubes & containers	40	0.047	0.023	0.113%	1.13	24
Other non recyclable P&C	0	0	0	0.434%	4.34	0
Milk bottles	51	0.043	0.014	0.367%	3.67	85
Other HDPE bottles	48	0.077	0.037	0.458%	4.58	60
Water bottles	52	0.028	0.009	0.322%	3.22	115
Other drinks bottles	51	0.035	0.009	0.813%	8.13	229
Other PET bottles	43	0.050	0.021	0.203%	2.03	41
Other bottles	26	0.037	0.025	0.042%	0.42	11
Black bottles	9	0.062	0.026	0.007%	0.07	1
PP	48	0.030	0.015	1.109%	11.09	370
PET	48	0.027	0.015	0.259%	2.59	97
PVC	1	0.017	0	0.001%	0.01	1
Other and not known	52	0.022	0.010	0.852%	8.52	379
Coffee cup lids	51	0.005	0.003	0.154%	1.54	284
EPS trays	45	0.016	0.009	0.154%	1.54	98
EPS non food packaging	8	0.034	0.035	0.106%	1.06	31
Straws	46	0.001	0.002	0.023%	0.23	158
Cutlery	51	0.004	0.005	0.083%	0.83	197
Stirrers	7	0.001	0.001	0.000%	0.00	5
Plates and cups	51	0.012	0.012	0.240%	2.40	207
Cotton buds	13	0.002	0.002	0.001%	0.01	7
Razors	14	0.010	0.005	0.004%	0.04	4

Deep dive category	No. of samples item present in	Average item weight (kg)	Item weight Stdev.s	Proportion of average composition (%)	Est. weight in 1 tonne (kg)	Est. item count in 1 tonne
Dense plastic lids	52	0.006	0.003	0.094%	0.94	169
Non food plastic packaging	46	0.038	0.034	0.306%	3.06	81
Other dense plastic single use	36	0.009	0.013	0.051%	0.51	59
Other items LIST	45	0.061	0.060	1.951%	19.51	322
Wet wipes	48	0.006	0.005	0.194%	1.94	320
Cleaning products	52	0.029	0.040	1.121%	11.21	393
Pouches	51	0.017	0.022	0.092%	0.92	54
Netting	43	0.019	0.018	0.056%	0.56	30
Pill packets	50	0.003	0.002	0.026%	0.26	78
stuffed toys and balls	14	0.114	0.095	0.034%	0.34	3
Balloons	29	0.009	0.011	0.007%	0.07	8
DIY combustibles	0	0	0	0.273%	2.73	0
Other LIST	45	0.169	0.187	1.124%	11.24	66
Drinks cans	13	0.054	0.044	0.073%	0.73	14
Food tins	51	0.136	0.089	1.015%	10.15	74
Drinks cans	52	0.019	0.004	0.468%	4.68	248
Food tins	16	0.027	0.016	0.008%	0.08	3
Netting large	0	0	0	0.000%	0.00	0
Packaging non-food	0	0	0	0.000%	0.00	0
Coffee pods	30	0.016	0.006	0.044%	0.44	27
Thick card tubing	0	0	0	0.000%	0.00	0
Wooden stirrer + lollipop sticks	0	0	0	0.000%	0.00	0

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