

Waste Composition Analysis

Project Integra

PI results

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Commercial confidentiality

We regard the ideas we are submitting to be commercially confidential and we ask you to respect this and not to share this document with any individuals or agencies who would have an interest in tendering for any of these work packages or to use the information and ideas in the drawing up of tender specifications.

Executive Summary

Resource Futures carried out a comprehensive analysis of kerbside collected household waste and HWRC residual waste streams for the Project Integra partnership. Project Integra (PI) is a partnership between the 11 Waste Collection Authorities (WCAs) in Hampshire, Hampshire County Council, the Unitary Authorities of Portsmouth and Southampton, and Veolia UK as the integrated waste management contractor for the partnership. The aim of the project was to provide up to date information on the composition of the waste streams and the performance of the recycling services. The data will inform future service improvements and communication campaigns.

The kerbside waste analysis of residual waste and dry mixed recycling (DMR) was based on a representative sample of approximately 150 households in each of the WCAs (including the two Unitary Authorities) making the total sample for PI 1,956 households. Output Area Classification data from the Office for National Statistics was used to stratify the sample ensuring that a variety of household types were represented in the sample.

The HWRC residual waste analysis was based on samples from 10 sites selected to represent the PI partnership area. Site throughput, performance and layout were taken into account during the selection.

The sample collection and analysis took place in September and October 2018.

The kerbside results show that an average household within the PI area set out 8.94kg of residual waste and 2.63kg of dry mixed recycling (DMR) per week.

Kerbside residual waste consisted predominantly of putrescible waste (42.0%). This was mostly made up of food waste (34.7% of the total composition) and most of it was avoidable (26.3%). This suggests that residents in the PI area are throwing out considerable amounts of food that could have been eaten.

Other combustible waste was the second most prominent category (12.4%) and this was mostly made up of nappies (5.7%) and other absorbent hygiene products (1.2%) as well as miscellaneous combustible items (3.6% e.g. wet wipes and cleaning products). Paper and card made up 11.7% of the total composition and included 4.9% that was potentially recyclable. Plastic film contributed 7.9% to the composition while 7.2% was dense plastics. Overall 7.8% of the residual waste could have potentially been recycled via the dry mixed recycling (DMR) services provided to all residents. Figure E 1 (reading from 12 o'clock clockwise) shows the composition of kerbside residual waste for the PI area.

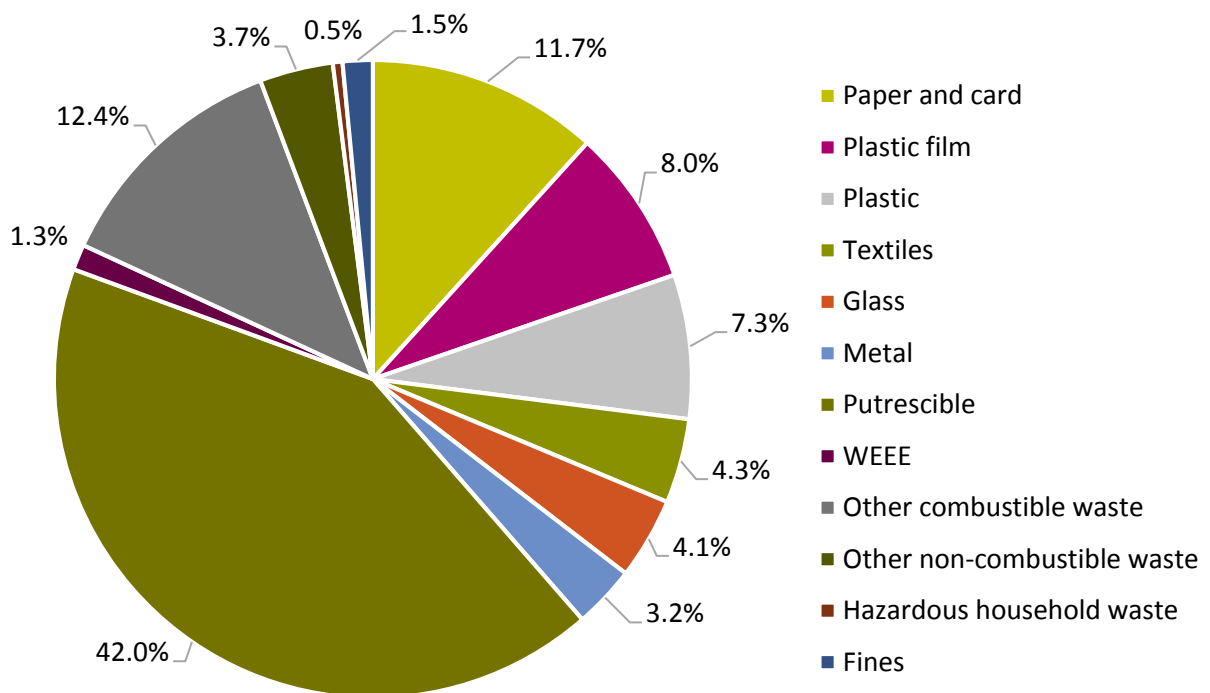


Figure E 1 Composition of kerbside collected residual waste in PI (%)

DMR samples were collected from the same sets of households included in the residual waste analysis. The analysis of the material showed that paper and card made up the great majority of the DMR collected by PI at 69.9%. This was followed by plastic at 13.9% (with 3.7% being non-target plastics including pots tubs and trays) with bottles accounting for 10.2% of the composition. Metals contributed a further 7.0%. Putrescible waste was the most prominent non-target material contributing 3.1% to the composition followed by plastic film (1.6%), other combustibles (1.4%) and glass (1.3%). The average contamination rate of the DMR in PI was 17.4%. Figure E 2 shows the DMR composition graphically.

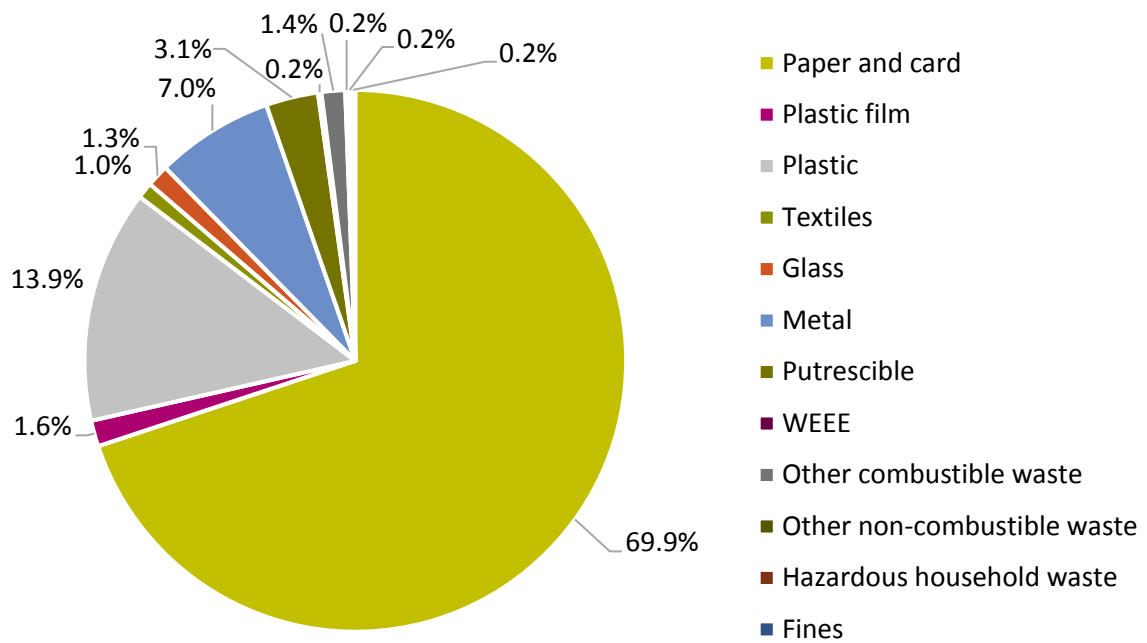


Figure E 2 Composition of kerbside collected DMR in PI (%)

The overall capture rate for the DMR service was 76% with card, paper and plastic bottles captured more than the other materials.

The HWRC residual waste in PI consisted of other combustible waste (29.0%) which includes carpet and underlay (7.8%) and miscellaneous combustible items (8.8%) such as mixed material household items, cleaning items (sponges, wet wipes) and combustible DIY waste), putrescible waste (16.8%, mostly food waste and pet bedding), and plastic (12.3%, mostly household plastic items such as bowls and toys). Paper and card accounted for a further 13.9% followed by textiles (7.3%).and plastic film (6.8%). Figure E 3 shows the composition graphically.

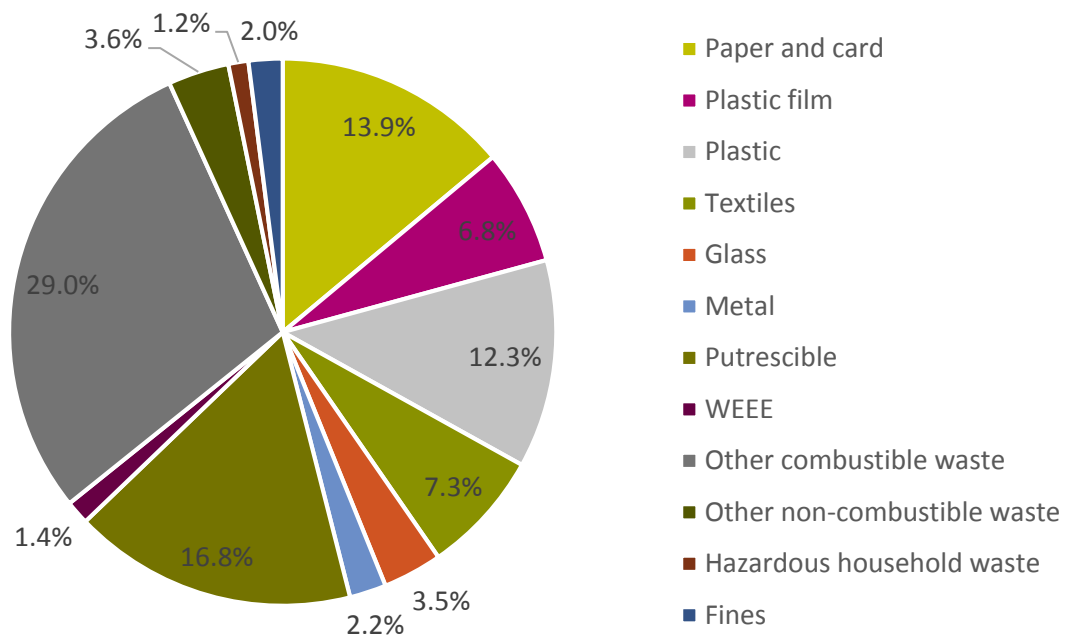


Figure E 3 Composition of HWRC residual waste for PI (%)

Overall 12% of the HWRC residual composition could have potentially been recycled using the kerbside DMR services provided by the PI WCA and 26% could have potentially been recycled at the HWRCs and local recycling banks.

The overall waste composition, including all waste collected via the kerbside residual waste collection, DMR collection, HWRCs, brink banks, bulky waste as well as garden, food waste and glass collection across PI included 33.8% of putrescible waste, 16.7% of paper and card, 16.3% of other combustibles, 7.2% of glass, 7.0% of plastics, 4.8% of metals, 4.6% of plastic film and 3.8% of textiles. The analysis showed that the kerbside collected residual waste is the biggest waste stream collected across PI at 44% of the overall waste.

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Glossary

Amenity waste – residual waste collected at HWRCs.

Amenity-Combustible – residual waste collected at the HWRC separately for energy recovery

Arising – quantities of waste generated and collected. This could be expressed in tonnes or be normalised and expressed in kilograms per household per week

Capture rates –how much targeted recyclable material is found in the DMR as opposed to the residual (%). For example, if we measured 10kg of newspaper in the residual waste and 90kg in the DMR, this would result in a 90% capture rate.

Confidence interval – a statistical measure, calculated from observed data, that quantifies how the observed mean relates to the “true” result. Usually expressed as +/- around the mean and a level of confidence for this interval (usually 95%). For example, if the calculated 95% confidence interval is 10% and the mean value is 10kg/hh/wk then we can be 95% confident that the “true” result would be 10kg +/-1kg or between 9kg and 11kg per household per week.

Contamination rate in DMR – – the amount of non-target material found in the DMR collection service (% or kg/hh/wk)

Dry mixed recycling (DMR) – mixed material collected for recycling. In PI this includes: paper and card, plastic bottles, metal tins and cans

HWRC – Household Waste Recycling Centre

Loss rate of targeted DMR – the amount of material currently accepted via the DMR collection services that was found in the residual waste (% or kg/hh/wk)

Loss rate of food – the amount of food waste that was found in the residual waste (% or kg/hh/wk)

Loss rate of garden waste – – the amount of garden waste found in residual waste (% or kg/hh/wk)

Loss rate of glass — the amount of glass found in residual waste (% or kg/hh/wk)

Loss rate of textiles – – the amount of textiles found in residual waste (% or kg/hh/wk)

Output Area Classification (OAC) - socio-demographic indicator based on UK census and developed by Office of National Statistics. OAC is a free and open geo-demographic segmentation. It is based on the UK Census and classifies 41 census variables into a 3-tier classification of 8, 21 and 52 groups.

Project Integra (PI) - partnership between the 11 Waste Collection Authorities in Hampshire, Hampshire County Council, the Unitary Authorities of Portsmouth and Southampton, and Veolia UK as the integrated waste management contractor for the partnership.

Residual waste – material collected and disposed without any recycling or composting

Waste collection authority (WCA) – A local authority responsible for collection of municipal waste

1 Introduction

Project Integra is a partnership between the 11 District/Borough authorities in Hampshire (Waste Collection Authorities (WCAs)), Hampshire County Council (Waste Disposal Authority (WDA)), the Unitary Authorities of Portsmouth and Southampton, and Veolia UK as the integrated waste management contractor for the partnership. A waste disposal contract between Hampshire County Council in partnership with the Unitary Authorities and Veolia UK as the service provider is in place until 2030. Additionally, Veolia UK is also contracted to manage all 26 Household Waste Recycling Centres (HWRCs) on behalf of the County Council until 2030.

For the purposes of this report, Project Integra (PI) is used instead of Hampshire to represent all the authorities involved in this waste composition analysis. Waste Collection Authority (WCA) is used to refer to both the Waste Collection Authority and the Unitary Authorities.

The WCAs across PI provide a collection of dry mixed recycling (DMR) including paper and card, plastic bottles, tins and cans and aerosols. All authorities provide a collection of garden waste, although 11 out of the 13 charge for the collection. Glass is collected from the kerbside by seven WCAs and food is collected by one.

The network of HWRCs across the PI area provides a comprehensive collection of a range of recyclables including scrap metal, wood, garden waste, WEEE and textiles. Additionally, soil, rubble, plasterboard and asbestos can be deposited at the sites for a small charge.

There has been an overall steady increase of household-waste generation over the last 5 years. The recycling and composting rate for PI in 2016/17 was 38.3%.

In Hampshire, the last household waste composition data set was generated in 1999. This data is now significantly out-of-date as a result of numerous changes to waste services locally as well as external influences on materials and where they are placed in the waste stream.

Resource Futures was commissioned to carry out a comprehensive analysis of the kerbside collected residual and DMR as well as HWRC residual (amenity and amenity combustible) waste produced by PI.

The results of this analysis will inform waste forecasts for future years and provide supporting data for discussions about future waste infrastructure, and collection services, as well as informing the refresh of the Joint Municipal Waste Management Strategy. The data will also help identify fractions for targeting as part of Hampshire County Council's waste prevention programme, assist with targeted communications and behaviour change activity for increasing capture and reducing contamination, and to help identify trends (e.g. in packaging) and behaviours.

2 Methodology

2.1 Sampling

The nature of waste does not make it feasible to determine the exact composition of all waste produced within a local authority area. It is therefore necessary to use sampling techniques and ensure that the results are based on a sample which represents the overall population studied. This means considering the variables that influence waste behaviours. Research shows that waste service provision, housing type,

household make up, socio-economics and season or weather (mostly applicable for garden waste) influence waste arising and composition.

A good sampling strategy should account for these factors and ensure that a representative mix is included in the sample. Stratification is therefore often used to ensure that these characteristics are present in the overall sample. This means that the population is divided into groups and the subsamples are selected from these specific groups.

Throughout the initial stages Resource Futures worked with the Project Integra officers and the WCA officers to design a suitable sampling strategy and identify appropriate samples.

The sample collection and analysis took place in September and October 2018.

The following sections detail the sampling approaches and strategies for the kerbside and HWRC waste.

2.1.1 Kerbside residual waste and dry mixed recycling

For the kerbside element of the waste compositional analysis of residual waste and DMR, Output Area Classification (OAC) data from the UK Office for National Statistics' (ONS) was chosen as a socio-demographic indicator for stratification. OAC is a free and open geo-demographic segmentation. It is based on the UK Census and classifies 41 census variables into a 3-tier classification of 8, 21 and 52 groups. Appendix A includes pen portraits of each of the 8 top-tier groups.

Figure 1 below shows a map of Hampshire and the surrounding areas with the OAC groups shown in different colours.

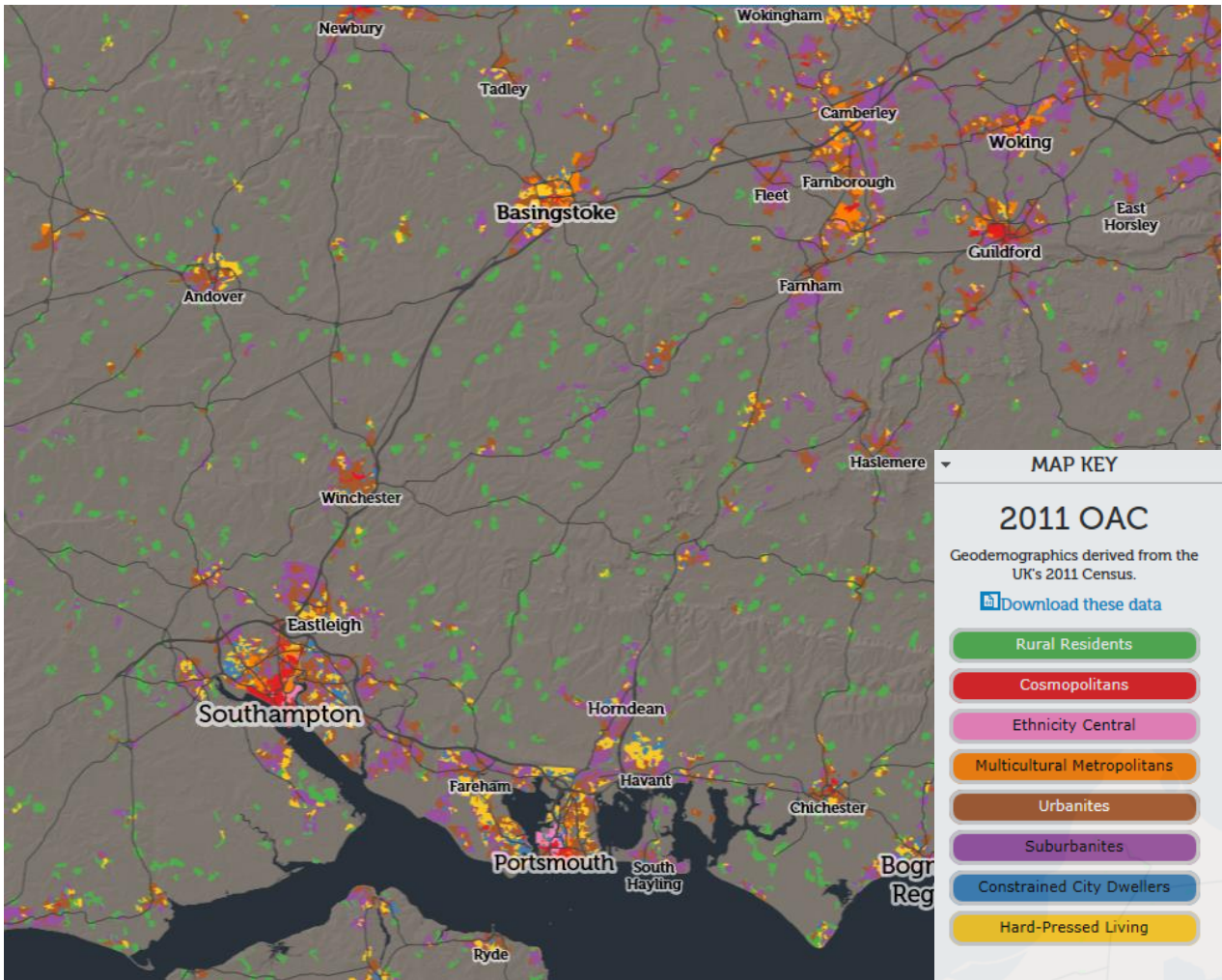


Figure 1 Map showing the spread of OAC groups across Hampshire

The stratification also takes the local authority area, waste and recycling collection type and frequency into account by including samples from every WCA.

The sample size of 150 households per WCA was chosen to deliver reasonably robust results for each WCA while at the same time keeping to the strict budgetary constraints of the project. For further details about the accuracy of the achieved results see section 4.

Table 1 shows the OAC profile for each of the WCAs alongside the collection frequency. Table 2 shows the planned household sample numbers for each WCA and OAC group.

The tables below present the stratification with the OAC group name and number descriptors. Tables in the subsequent sections include the group number descriptors only for conciseness.

Table 1 Demographic and collection profile of PI¹

WCA	Residual Frequency	Dry mixed recycling frequency	OAC Group								Total
			1	2	3	4	5	6	7	8	
			Rural Residents	Cosmopolitans	Ethnicity Central	Multicultural Metropolitans	Urbanites	Suburbanites	Constricted City Dwellers	Hard-Pressed Living	
Basingstoke	W	F	4%	1%	0%	9%	23%	21%	20%	21%	100%
East Hants	F	F	6%	0%	0%	0%	33%	30%	15%	15%	100%
Eastleigh	F	F	0%	0%	0%	2%	44%	31%	5%	18%	100%
Fareham	F	F	1%	0%	0%	0%	23%	45%	7%	24%	100%
Gosport	F	F	0%	1%	0%	1%	21%	15%	30%	32%	100%
Hart	F	F	2%	0%	0%	0%	43%	45%	3%	6%	100%
Havant	F	F	0%	0%	0%	0%	35%	28%	13%	24%	100%
New Forest	W	W	7%	1%	0%	0%	33%	33%	4%	22%	100%
Portsmouth	W	F	0%	12%	0%	7%	29%	5%	20%	27%	100%
Rushmoor	W	F	0%	1%	10%	17%	41%	15%	6%	10%	100%
Southampton	F	F	0%	12%	2%	17%	25%	8%	21%	15%	100%
Test Valley	F	F	7%	0%	0%	0%	39%	31%	4%	18%	100%
Winchester	F	F	7%	2%	0%	0%	38%	18%	17%	17%	100%
PI			3%	3%	1%	5%	32%	25%	13%	19%	100%

F – fortnightly collection frequency, W – weekly collection frequency

¹ Appendix A includes pen portraits detailing the characteristics of each OAC group

Table 2 Sample strategy for PI waste compositional analysis

WCA	OAC Group								Total	% population represented
	1	2	3	4	5	6	7	8		
	Rural Residents	Cosmopolitans	Ethnicity Central	Multicultural Metropolitans	Urbanites	Suburbanites	Constricted City Dwellers	Hard-Pressed Living		
Basingstoke	0	0	0	0	40	40	30	40	150	85%
East Hampshire	25	0	0	0	38	37	25	25	150	99%
Eastleigh	0	0	0	0	69	46	0	35	150	93%
Fareham	0	0	0	0	30	65	25	30	150	99%
Gosport	0	0	0	0	30	25	45	50	150	98%
Hart	0	0	0	0	60	65	0	25	150	94%
Havant	0	0	0	0	50	40	25	35	150	100%
New Forest	25	0	0	0	45	45	0	35	150	95%
Portsmouth	0	30	0	30	30	0	30	30	150	95%
Rushmoor	0	0	25	25	50	25	0	25	150	93%
Southampton	0	18	0	29	37	12	31	23	150	98%
Test Valley	25	0	0	0	60	40	0	25	150	95%
Winchester	25	0	0	0	38	37	25	25	150	98%
PI	100	48	25	84	577	477	236	403	1,950	100%

The overall sampling strategy and the representativeness of the samples across the WCA ensured that the results of the research represent the population very well and therefore contribute to achieving robust results.

The waste composition analysis excluded sampling from flats with communal collections. Although some of the WCA have a considerable number of such properties, overall this type of collection only contributes small amount to PI waste stream overall and tends to have a very similar composition to kerbside collected waste. Other streams such as glass, food and HWRC recycling were also excluded from the waste compositional analysis but are included in the overall analysis of total waste arisings generated by PI (see Section 3.1).

Following the development of the sampling strategy, the individual WCA officers were contacted to help identify suitable roads and areas that match the planned sample groups. The streets and the corresponding normal collection days were then checked and confirmed by the WCA.

The authorities were then asked to deliver the material collected from the sample areas in batches by demographic group and material stream. Instructions on the key considerations to take into account when collecting samples for waste composition analysis (detailed below) were issued to the WCA officers.

All material was collected on the usual collection days and weeks, as in the case of alternate weekly collections, and the same households were included for both residual waste and DMR analysis. Residual waste was collected first to ensure only households that participated in services during the collection cycle are included in the analysis i.e. empty households or those on holiday are excluded as much as possible. This also ensures that capture rates can be calculated.

The WCA were asked to deliver the material in suitable vehicles and it was agreed that compaction, if applicable would be disabled to ensure that material was not broken up and the absorption of moisture from food by paper and card or textiles was minimised.

2.1.2 HWRC residual waste

The sample of 10 HWRC sites was selected from the total of 26 sites across PI. The sites were selected based on geography, performance and size as well as layout, and whether the site separates the combustible and bulky (amenity) waste. This selection of sites for analysis was based on a qualitative assessment of the characteristics of the sites to include a variety of sites. For example, some high, mid and low performing sites were included in order to match the profile of the HWRC sites across Hampshire as much as possible.

The following Table 3 shows the sites selected for the analysis and their main characteristics considered during the site selection.

Table 3 HWRC sites selected for analysis

HWRC name	NI 192 Recycling, reuse and composting performance 16/17	Recycling, recovery and reuse performance 16/17	Total tonnage 16/17 (t)	Size	Split/single	Combustible split?
Andover	59.29%	84.86%	11,350	L	Split	Yes
Bishops Waltham	67.83%	92.88%	3,734	S	Single	No
Farnborough	59.94%	86.79%	11,617	M	Split	No
Gosport	52.57%	94.74%	14,554	L	Split	Yes
Hartley Wintney	63.91%	87.07%	5,067	S	Single	No
Marchwood	65.34%	95.12%	10,258	L	Single	Yes
Netley	54.35%	95.58%	9,458	M	Split	Yes
Portsmouth	51.03%	94.27%	13,106	L	Split	Yes
Segensworth	58.92%	94.74%	15,666	L	Split	Yes
Waterlooville	54.59%	93.78%	12,606	L	Split	Yes

The Excel data appendix includes the breakdown of the performance and layout for the HWRC sites and the sites selected for the analysis.

2.2 Sorting protocol and material categorisation

The sorting of all samples took place at the Down End Transfer Station in Fareham. Samples were collected and delivered for sorting by an experienced and trained team of Resource Futures technicians. Samples delivered were labelled to ensure that individual samples could be accurately identified if the team was sorting another sample.

The sample material was weighted before sorting to ensure that a total weight of material was known and for quality control purposes. If any material had to be weighed off due to operational issues, sampling techniques (such as points of compass sampling) were employed to extract a representative sample and it was ensured that suitable quantities were sorted to allow for accurate composition to be determined.

The material for sorting was placed on the table and the sorting was carried out by hand by positive identification of individual items. All bags were opened, and contents sorted. Food was emptied from containers where possible and any items consisting of multiple materials were classified according to predominant category by weight.

Each category of material had a designated container at the sorting table. Once the container was full or the batch sort was finished each category was weighted separately. The weighing process was overseen by the site manager who would make sure that the material was sorted accurately, and any containers used on the scales were appropriately tarred (i.e. the weight of the box or container was not taken into account when weighing the material). The site manager was responsible for accurately recording the results on

specially prepared forms. The teams used calibrated digital weighing scales with precision of 0.01kg and capacity of 60kg or above.

The category list used for the sorting process differentiated between the material types and recyclability at the kerbside or HWRCs and bring banks. The category list is included in Appendix B.

The HWRC samples were also sorted in three stages where applicable: bulky waste, bagged waste and loose waste to ensure that any size differentiation was captured.

2.3 Data analysis

Composition and arising per household per week was calculated for each of the batches sorted.

Where required the data was weighted to match the profile of the WCA.

Weighting is a process whereby the size of the individual groups is accounted for in the average. For example, if Group A accounts for 75% of the population and Group B accounts for 25% of the population the weighted average would be calculated using the following formula:

$$\text{Group A result} \times 75\% + \text{Group B result} \times 25\% = \text{Weighted average AB}$$

This method was applied to kerbside waste taking household numbers in different OAC groups into account and HWRC waste taking total tonnage per site into account.

The following measures were calculated for each of the authorities, PI overall and demographic groups:

- Loss rate of targeted DMR – the amount of material currently accepted via the DMR collection services that was found in the residual waste (% or kg/hh/wk)
- Loss rate of food – the amount of food waste that was found in the residual waste (% or kg/hh/wk)
- Loss rate of garden waste – – the amount of garden waste found in residual waste (% or kg/hh/wk)
- Loss rate of glass — the amount of glass found in residual waste (% or kg/hh/wk)
- Loss rate of textiles – – the amount of textiles found in residual waste (% or kg/hh/wk)
- Contamination rate in DMR – – the amount of non-target material found in the DMR collection service (% or kg/hh/wk)
- Capture rates –how much targeted recyclable material is found in the DMR as opposed to the residual (%). For example, if we measured 10kg of newspaper in the residual waste and 90kg in the DMR, this would result in a 90% capture rate.

2.3.1 Calculating overall PI results

The PI kerbside composition and arisings results (see section 3.2) are based on the weighted average composition from all of the WCA samples. The composition of the residual and dry recycling was then applied to the tonnage of the material collected in PI in 2016/17.

The weighted HWRC composition for the residual waste was calculated using the 2016/17 annual tonnages of residual waste for the sites sampled and this was then applied to the Hampshire HWRC tonnage from all 26 sites.

The overall municipal waste stream (MSW) composition was calculated by combing the composition and tonnage from the PI kerbside analysis, HWRC analysis and tonnages of other waste streams collected across PI.

3 PI results

3.1 Overall waste composition and arisings

The data obtained throughout the waste composition analysis in PI area was applied to the 2016/17 tonnages reported and combined with the additional tonnage data for the waste streams not included in the analysis. These included kerbside recycling of glass, putrescible waste and other materials, bring bank recycling, HWRC recycling and other materials² and bulky waste.

The composition of these waste streams was estimated based on the Waste Data Flow returns and any additional information available about the material. Bulky waste composition was estimated based on the national bulky waste composition³.

The following Figure 2 and Table 4 below show the composition and arisings of the various waste streams collected in the PI area and the total composition.

² Includes amenity RDF (refuse derived fuel) and bric-a-brac

³ www.wrap.org.uk/content/study-re-use-potential-household-bulky-waste

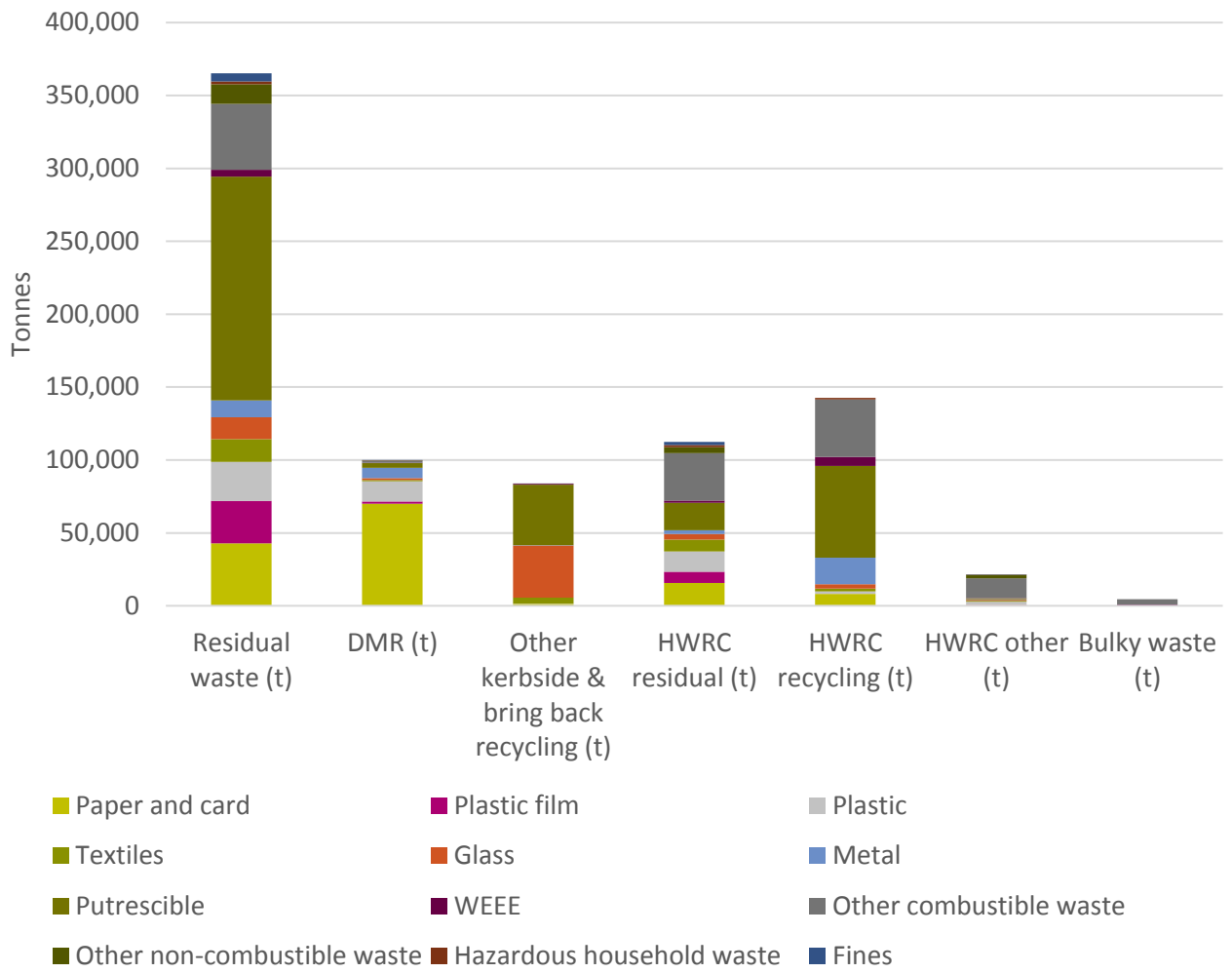


Figure 2 Composition and arisings of the PI waste streams (tonnes)

Table 4 Composition and arisings of the PI waste streams and overall

Primary Category	Residual waste (t)	DMR (t)	Other kerbside & bring back recycling (t)	HWRC residual (t)	HWRC recycling (t)	HWRC other (t) ⁴	Bulky waste (t)	Total (t)	Total composition (%)
Paper and card	42,843	69,919	1,377	15,681	8,111	389	0	138,320	16.7%
Plastic film	29,121	1,551	0	7,654	0	261	0	38,587	4.6%
Plastic	26,679	13,904	126	13,843	1,717	2,193	0	58,462	7.0%
Textiles	15,639	962	3,980	8,206	1,906	598	0	31,291	3.8%
Glass	15,095	1,322	35,935	3,941	3,163	686	0	60,142	7.2%
Metal	11,545	7,044	58	2,437	18,182	328	113	39,708	4.8%
Putrescible	153,367	3,123	41,706	18,882	62,766	645	0	280,489	33.8%
WEEE	4,739	200	620	1,582	6,333	374	767	14,615	1.8%
Other combustible waste	45,169	1,410	219	32,568	39,314	13,331	3,658	135,669	16.3%
Other non-combustible waste	13,607	166	0	4,057	0	2,371	0	20,201	2.4%
Hazardous household waste	1,783	191	0	1,328	1,089	213	0	4,605	0.6%
Fines	5,560	235	0	2,258	0	236	0	8,289	1.0%
Total	365,147	100,028	84,021	112,436	142,581	21,625	4,539	830,378	100%
% of arisings	44%	12%	10%	14%	17%	3%	1%		

⁴ Includes amenity RDF (refuse derived fuel) and bric-a-brac

Kerbside residual waste accounted for the largest category of waste collected at 44% of the overall PI waste stream.

The overall composition of waste from PI included 33.8% of putrescible waste, 16.7% of paper and card, 16.3% of other combustibles, 7.2% of glass, 7.0% of plastics, 4.8% of metals, 4.6% of plastic film and 3.8% of textiles. The following Figure 3, which should be read from 12 o'clock clockwise, shows this composition graphically.

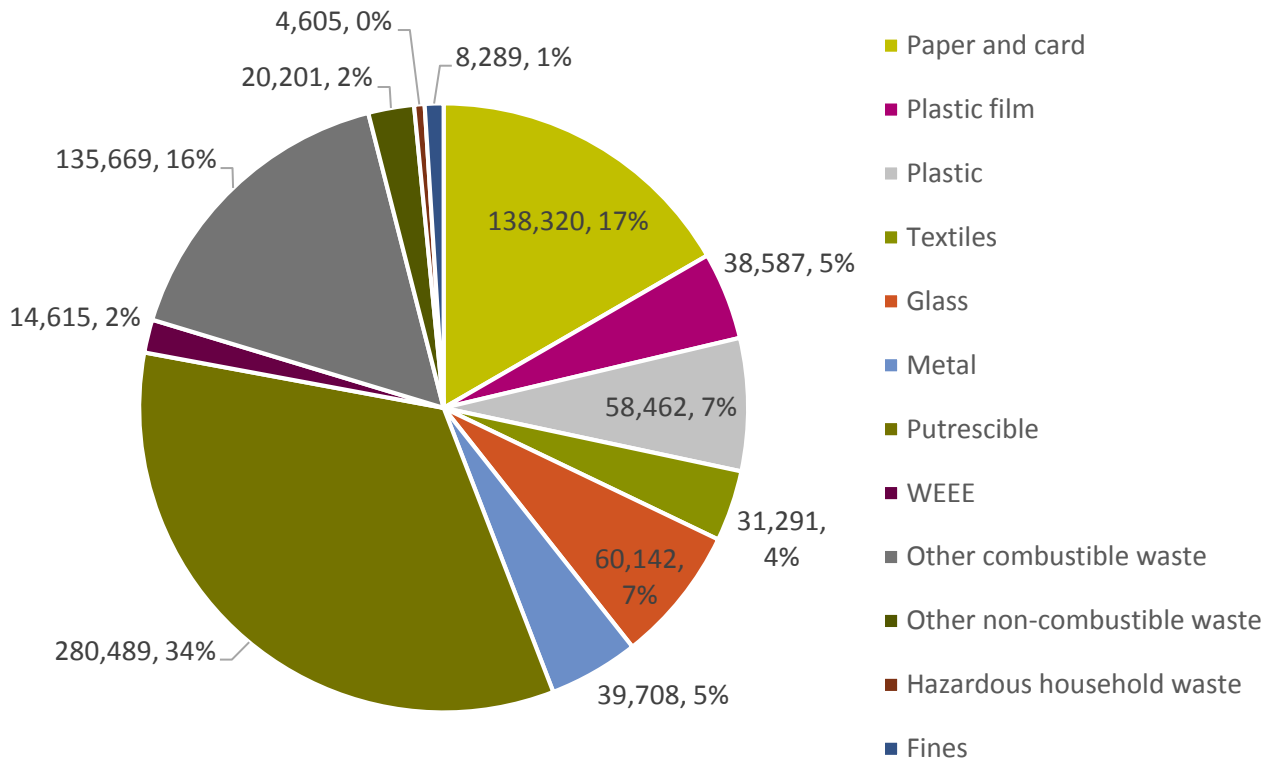


Figure 3 Total composition of waste streams collected in PI (tonnage and %)

3.2 Kerbside PI results

3.2.1 Samples achieved

Over the course of the project approximately 150 household’s worth of residual waste and dry mixed recycling (DMR) from each of the 13 WCAs in PI (including the Unitary Authorities of Southampton and Portsmouth) was analysed. In total 1,956 households across PI were included in the study.

Small variations within the numbers of samples collected from the different WCA occurred due to operational reasons. However, this does not affect the overall quality of the results.

The number of households collected for each OAC group in PI across all WCAs is shown in Table 5 below. The information for each WCA is shown in the relevant section for each WCA below.

Table 5: PI kerbside samples collected for analysis

OAC demographic group	Name of demographic group	Total households included (residual waste)	Total households setting out DMR
1	Rural Residents	96	83
2	Cosmopolitans	60	54
3	Ethnicity Central	23 ⁵	21
4	Multicultural Metropolitans	93	90
5	Urbanites	575	514
6	Suburbanites	468	444
7	Constricted City Dwellers	238	229
8	Hard-Pressed Living	403	371
Total		1,956	1,806

3.2.2 Composition and arising of combined waste collected at the kerbside

The overall composition and arising of combined kerbside waste (residual and DMR) in PI is shown in Table 6 and Figure 4. Please note that the pie chart should be read from 12 o'clock clockwise.

The overall figures presented in this section have been calculated by combining the arising and composition of kerbside residual waste and DMR from PI and applied to the annual tonnages of each waste stream collected in 2016/17.

⁵ OAC Group 3 Ethnicity Central was sampled from only one WCA where the group accounted for 10% of the households compared to 1% for the whole of the PI. The results for this group should be therefore treated with caution throughout this report.

Table 6: Overall composition and arising of combined kerbside waste in PI

Primary category	Proportion of combined waste (%)	Estimated annual tonnage (t)
Paper and card	25.0%	112,761
Plastic film	6.5%	30,672
Plastic	8.8%	40,584
Textiles	3.5%	16,602
Glass	3.5%	16,417
Metal	4.0%	18,589
Putrescible	33.2%	156,490
WEEE	1.0%	4,939
Other combustible waste	9.9%	46,579
Other non-combustible waste	2.9%	13,773
Hazardous household waste	0.4%	1,974
Fines	1.2%	5,795
Total	100.0%	465,175

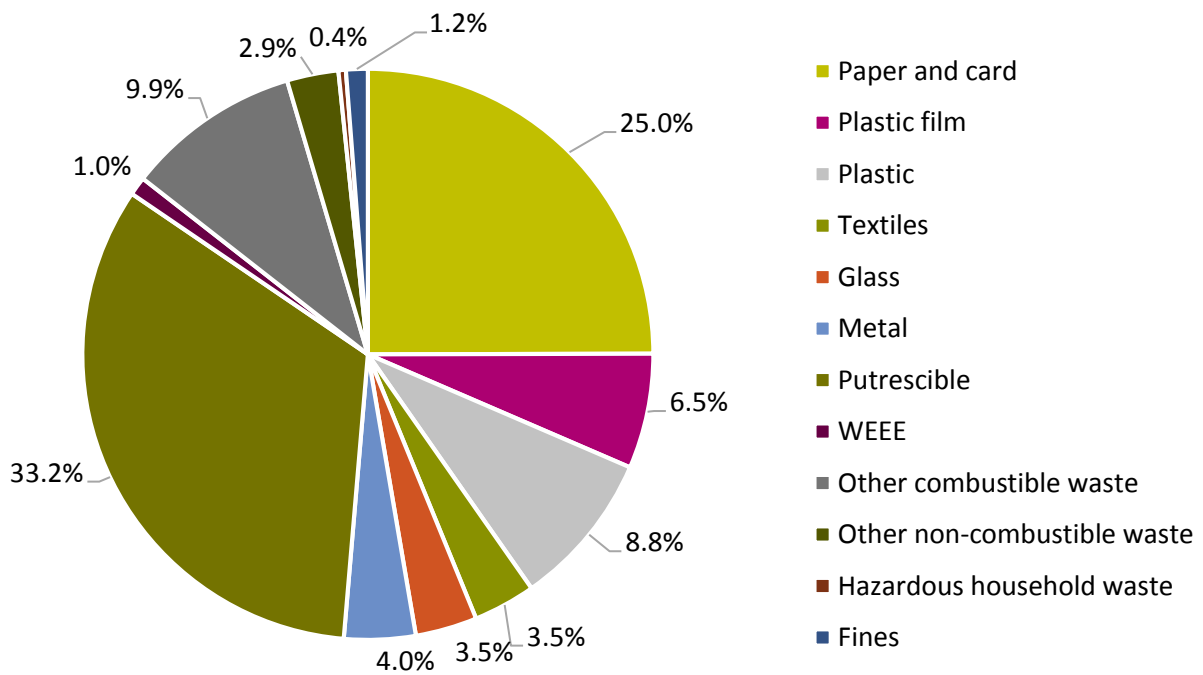


Figure 4: Overall composition of combined kerbside waste in PI (%)

The most common material found within the combined kerbside waste in PI was putrescible waste, which accounted for 33.2% of all waste produced, or an estimated 156,490 tonnes annually. The majority of the putrescible waste was food waste (27.4%) of which avoidable food waste accounted for 20.9% of total combined waste. Paper and card accounted for 25.0% of combined waste, or an estimated 112,761 tonnes annually. The majority of this material was recyclable: newspapers, brochures and magazines (8.2%), thin card (4.4%), corrugated card (2.9%) and other recyclable paper (2.5%). Other combustibles made up 9.9% of the overall composition and included mostly nappies (4.5%). Plastic was the next biggest category at 8.8% of the composition and included 3.4% of plastic bottles, and 2% pots tubs and trays (PTTs). Additionally, plastic film accounted for 6.5% of the combined kerbside composition.

3.2.3 Composition and arising of kerbside residual waste

The overall composition and arising of kerbside residual waste in PI is shown in Table 7 and Figure 5 below.

Table 7: Overall composition and arising of kerbside residual waste in PI

Primary category	Proportion of residual waste (%)	Estimated annual tonnage (t)
Paper and card	11.7%	42,843
Plastic film	8.0%	29,121
Plastic	7.3%	26,679
Textiles	4.3%	15,639
Glass	4.1%	15,095
Metal	3.2%	11,545
Putrescible	42.0%	153,367
WEEE	1.3%	4,739
Other combustible waste	12.4%	45,169
Other non-combustible waste	3.7%	13,607
Hazardous household waste	0.5%	1,783
Fines	1.5%	5,560
Total	100.0%	365,147

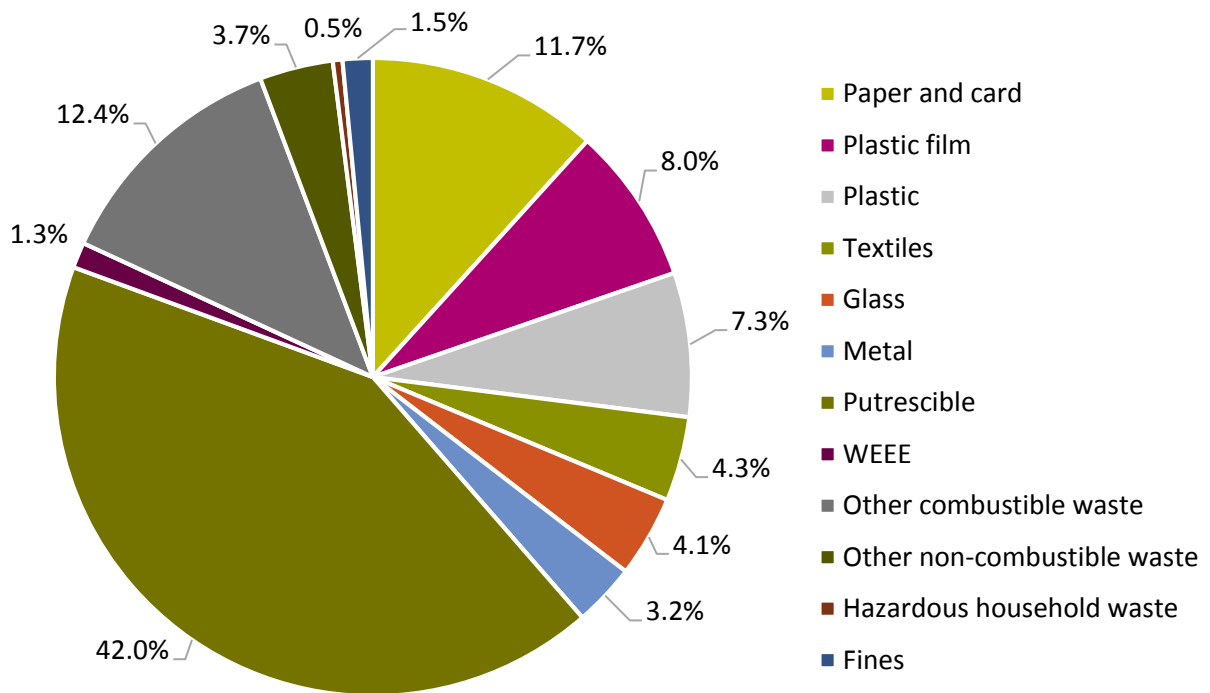


Figure 5: Overall composition of kerbside residual waste in PI (%)

Putrescible waste (42.0%) made up the largest category of the kerbside residual waste collected in PI. This was mostly made up of food waste (34.7%) and most of it was avoidable (26.3%).

Other combustible waste was the second most prominent category (12.4%) and this was mostly made up of nappies (5.7%) and other absorbent hygiene products (1.2%) as well as miscellaneous combustible items (3.6%). Paper and card made up 11.7% of the total composition and 4.9% was recyclable. Plastic film contributed 7.9% to the composition while 7.2% was dense plastics.

The composition and arising of residual waste in Project Integra per socio-demographic group is shown in the Table 8 and Table 9 below.

Table 8: Composition of residual waste in PI per demographic group (%)

Primary category	OAC group							
	1	2	3	4	5	6	7	8
Paper and card	12.3%	15.3%	15.4%	10.3%	13.1%	11.6%	9.7%	10.7%
Plastic film	8.1%	6.7%	8.2%	6.8%	8.1%	8.7%	7.4%	7.8%
Plastic	7.7%	6.8%	4.3%	5.3%	7.2%	8.2%	6.3%	7.3%
Textiles	5.4%	3.2%	4.2%	6.6%	4.5%	3.5%	4.3%	3.6%
Glass	3.3%	6.3%	0.8%	5.5%	3.9%	3.3%	5.3%	4.8%
Metal	4.3%	3.3%	1.4%	2.3%	3.3%	2.8%	3.0%	3.4%
Putrescible	41.9%	40.4%	60.2%	44.5%	40.0%	43.7%	44.6%	44.4%
WEEE	1.0%	0.5%	0.0%	1.0%	1.2%	1.2%	1.1%	1.0%
Other combustible waste	9.9%	14.2%	4.1%	11.6%	12.6%	10.3%	13.9%	11.6%
Other non-combustible waste	3.1%	1.9%	0.0%	4.4%	4.0%	4.6%	2.5%	3.4%
Hazardous household waste	0.7%	0.7%	0.2%	0.2%	0.5%	0.4%	0.6%	0.6%
Fines	2.3%	0.7%	1.2%	1.5%	1.4%	1.6%	1.3%	1.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

1 Rural Residents, 2 Cosmopolitans, 3 Ethnicity Central, 4 Multicultural Metropolitans, 5 Urbanites, 6 Suburbanites, 7 Constricted City Dwellers, 8 Hard-Pressed Living

Table 9: Arising of residual waste in PI per demographic group (kg/household/week)

Primary category	OAC group							
	1	2	3	4	5	6	7	8
Paper and card	1.02	1.37	1.58	1.16	1.02	0.91	1.14	1.08
Plastic film	0.68	0.61	0.84	0.77	0.62	0.68	0.87	0.78
Plastic	0.64	0.61	0.44	0.60	0.56	0.65	0.75	0.73
Textiles	0.45	0.29	0.43	0.75	0.35	0.28	0.50	0.37
Glass	0.27	0.56	0.09	0.62	0.30	0.26	0.62	0.48
Metal	0.36	0.29	0.14	0.25	0.26	0.22	0.35	0.34
Putrescible	3.48	3.62	6.16	5.02	3.10	3.44	5.24	4.45
WEEE	0.08	0.05	0.00	0.11	0.10	0.09	0.13	0.10
Other combustible waste	0.82	1.27	0.41	1.30	0.98	0.81	1.63	1.16
Other non-combustible waste	0.26	0.17	0.00	0.50	0.31	0.36	0.29	0.34
Hazardous household waste	0.06	0.06	0.02	0.02	0.04	0.03	0.07	0.06
Fines	0.19	0.06	0.13	0.17	0.11	0.13	0.15	0.14
Total	8.29	8.97	10.23	11.29	7.74	7.85	11.75	10.03

1 Rural Residents, 2 Cosmopolitans, 3 Ethnicity Central, 4 Multicultural Metropolitans, 5 Urbanites, 6 Suburbanites, 7 Constricted City Dwellers, 8 Hard-Pressed Living

The composition and arising differed between the OAC categories with the highest arising observed for OAC 7 Constricted City Dwellers (11.75kg/hh/wk) and lowest for OAC 5 Urbanites (7.74kg/hh/wk). Putrescible waste was the most prominent category for all OAC categories and OAC 3 Ethnicity Central samples included, on average 60.2% of this material. However, the arising of this material differed considerably between the demographic groups with OAC 3 Ethnicity Central households producing 6.16kg while OAC 5 Urbanites households almost half of that (3.10kg) per week.

3.2.4 Composition and arising of kerbside DMR

The composition and arising of kerbside DMR in PI is shown in Table 10 and Figure 6 below.

Table 10: Overall composition and arising of DMR in PI

Primary category	Proportion of DMR (%)	Estimated annual tonnage (t)
Paper and card	69.9%	69,919
Plastic film	1.6%	1,551
Plastic	13.9%	13,904
Textiles	1.0%	962
Glass	1.3%	1,322
Metal	7.0%	7,044
Putrescible	3.1%	3,123
WEEE	0.2%	200
Other combustible waste	1.4%	1,410
Other non-combustible waste	0.2%	166
Hazardous household waste	0.2%	191
Fines	0.2%	235
Total	100.0%	100,028

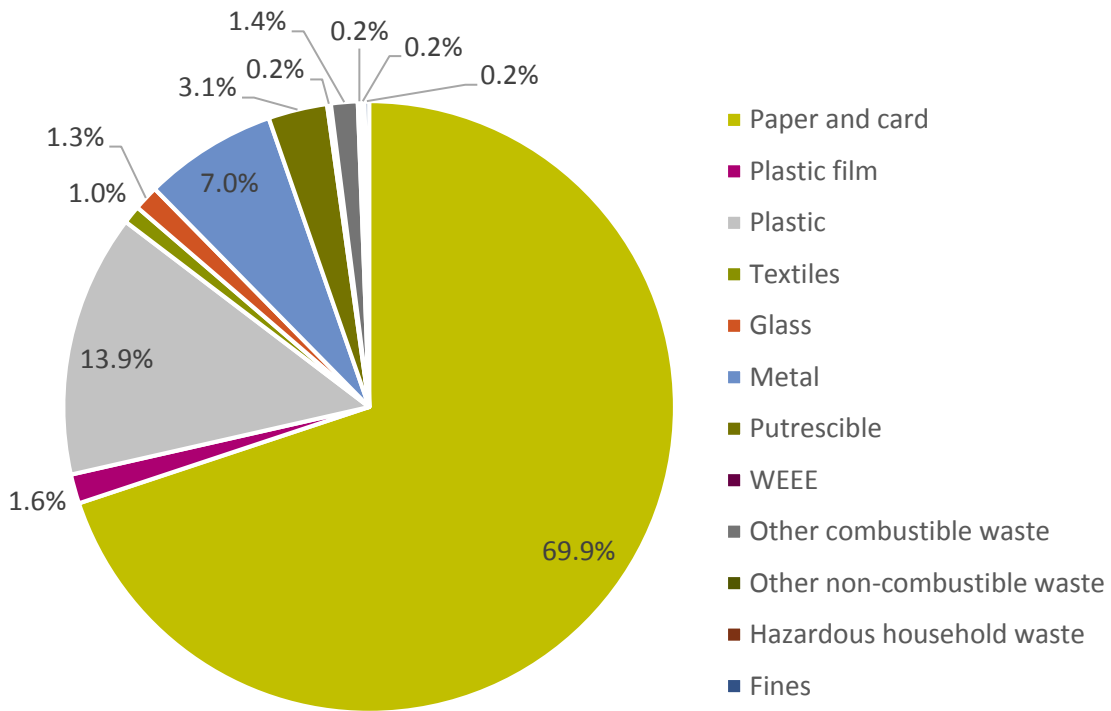


Figure 6: Overall composition and arising of DMR in PI (%)

Paper and card made up the great majority of the DMR collected by PI at 69.9%. This was followed by plastic at 13.9%) with bottles accounting for 10.2% of the composition (6.1% PET, 3.9%HDPE and 0.2% other polymers), non-target plastics pots tubs and trays accounting for 2.4% (mostly PET and PP but some were also unlabelled) and other dense plastic items such as expanded polystyrene, toys and pies accounted for 1.3% of DMR composition. Metals contributed further 7.0% (4.1% ferrous packaging, 2.6% non-ferrous and 0.4% scrap metal).

Putrescible waste was the most prominent non-target material contributing 3.1% to the composition followed by plastic film (1.6%), other combustibles (1.4%) and glass (1.3%).

The composition and arising of DMR in PI per demographic group is shown in the Table 11 and Table 12 below.

Table 11: Composition of DMR in PI per demographic group (%)

Primary category	OAC							
	1	2	3	4	5	6	7	8
Paper and card	73.4%	66.5%	64.2%	61.3%	71.4%	77.3%	65.0%	65.6%
Plastic film	1.5%	1.4%	4.4%	2.1%	1.2%	1.0%	1.9%	2.1%
Plastic	11.9%	11.2%	18.7%	15.0%	13.5%	12.1%	16.4%	14.7%
Textiles	0.2%	4.2%	0.6%	0.0%	0.6%	0.3%	1.5%	1.1%
Glass	1.6%	8.1%	1.1%	1.0%	1.3%	0.8%	1.3%	1.4%
Metal	8.5%	3.5%	6.9%	9.1%	6.6%	5.8%	8.4%	7.7%
Putrescible	1.1%	2.4%	2.5%	6.3%	3.6%	1.3%	2.9%	4.2%
WEEE	0.6%	0.1%	0.1%	0.5%	0.2%	0.1%	0.2%	0.2%
Other combustible waste	0.5%	2.0%	0.8%	2.5%	1.1%	0.9%	1.6%	2.3%
Other non-combustible waste	0.3%	0.0%	0.5%	1.4%	0.1%	0.1%	0.3%	0.2%
Hazardous household waste	0.2%	0.2%	0.0%	0.0%	0.2%	0.2%	0.2%	0.1%
Fines	0.2%	0.2%	0.1%	0.7%	0.3%	0.2%	0.3%	0.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

1 Rural Residents, 2 Cosmopolitans, 3 Ethnicity Central, 4 Multicultural Metropolitan, 5 Urbanites, 6 Suburbanites, 7 Constricted City Dwellers, 8 Hard-Pressed Living

Table 12: Arising of DMR in PI per demographic group (kg/hh/wk)

Primary category	OAC							
	1	2	3	4	5	6	7	8
Paper and card	2.22	1.32	1.26	1.55	1.73	2.18	1.75	1.87
Plastic film	0.05	0.03	0.09	0.05	0.03	0.03	0.05	0.06
Plastic	0.36	0.22	0.37	0.38	0.33	0.34	0.44	0.42
Textiles	0.00	0.08	0.01	0.00	0.01	0.01	0.04	0.03
Glass	0.05	0.16	0.02	0.03	0.03	0.02	0.03	0.04
Metal	0.26	0.07	0.14	0.23	0.16	0.17	0.23	0.22
Putrescible	0.03	0.05	0.05	0.16	0.09	0.04	0.08	0.12
WEEE	0.02	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Other combustible waste	0.02	0.04	0.02	0.06	0.03	0.02	0.04	0.06
Other non-combustible waste	0.01	0.00	0.01	0.03	0.00	0.00	0.01	0.01
Hazardous household waste	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Fines	0.01	0.00	0.00	0.02	0.01	0.00	0.01	0.01
Total	3.02	1.99	1.96	2.52	2.42	2.82	2.69	2.85

1 Rural Residents, 2 Cosmopolitans, 3 Ethnicity Central, 4 Multicultural Metropolitan, 5 Urbanites, 6 Suburbanites, 7 Constricted City Dwellers, 8 Hard-Pressed Living

The arising of DMR between the groups ranged from 1.96kg/hh/wk for OAC 3 Ethnicity Central to 3.02kg/hh/wk for OAC 1 Rural Residents. The proportion of paper and card varied between the demographic groups from 61.3% for OAC 4 Multicultural Metropolis to 77.3% for OAC 6 Suburbanites.

3.2.5 Capture, loss and contamination rates

Table 13 shows the capture rate for each material targeted by the DMR service. Capture rates show how much (in %) targeted recyclable material is found in the DMR as opposed to the residual.

Tonnages of the material available within the combined kerbside waste stream (residual and DMR) are presented for context.

Table 13: Capture rates in PI

Materials	Capture rate (%)	Estimated annual tonnage in kerbside combined waste stream (t)
Newspapers, magazines & brochures	88%	36,171
Other recyclable paper	54%	11,269
Plain Corrugated Cardboard	88%	12,705
Laminated cardboard	89%	4,052
Recyclable Thin card	71%	19,683
Plastic bottles - PET	67%	9,320
Plastic bottles - HDPE	70%	5,685
Other plastic bottles	37%	539
Ferrous food cans	58%	6,636
Ferrous drink cans	83%	128
Ferrous aerosols	33%	713
Non-ferrous food cans	54%	150
Non-ferrous drink cans	67%	3,371
Non-ferrous aerosols	35%	606
Total	76%	111,029

The overall capture rate of the DMR materials was 76%. The majority of the paper and card categories were captured more than the average for the PI DMR stream. On the other hand, other recyclable paper (such as office paper, packaging paper and envelopes) was one of the least well captured material (54%).

Ferrous drinks cans were then the next best captured material category (83%) however this material accounts for a very small quantity of material available.

Capture rate for plastic bottles was 70% for HDPE and 67% PET bottles. Ferrous food cans and non-ferrous drinks cans which constitute the majority of metals available were captured in 58% and 67% of cases. Aerosols were not well captured; however, this material contributes only around 1% to total available recyclable material.

Table 14: Loss rates in PI

Material	Loss rate
Loss rate of targeted DMR	7.8%
Loss rate of food	34.7%
Loss rate of garden waste	3.6%
Loss rate of glass	3.7%
Loss rate of textiles	3.3%

The residual waste stream included material that could have potentially⁶ been recycled at the kerbside or via bring sites/HWRCs provided by PI⁷. Across PI 7.8% of the residual waste could have potentially been recycled via the DMR collection services. This mostly consisted of paper and card (4.3%).

Food waste accounted for 34.7% with the majority being avoidable (26.3%). Additionally, the residual waste included 3.6% of garden waste, 3.7% glass and 3.3% of textiles.

Contamination

The overall contamination rate of the DMR was 17.4%. This is above the levels specified within the disposal contract (5%) but similar to what was found thorough other composition analysis carried out for the Material Facility's code of practice.

The contamination consisted mostly of non-target plastics including pots, tubs and trays (3.7%), non-recyclable paper (2.3%) and putrescible waste (3.1%). A full breakdown of contamination is presented in Table 15 below.

Table 15 Detailed breakdown of contamination with DMR

Primary category	Secondary category	% composition
Paper & Card	Non-recyclable paper	2.3%
Paper & Card	Liquid cartons/Tetrapaks	0.6%
Paper & Card	Non-recyclable thin card or cardboard	1.0%
Plastic film	Plastic bags	0.5%
Plastic film	Other film	1.1%
Plastic	Pots, tubs and trays - PP	0.7%
Plastic	Pots, tubs and trays - PET	0.6%
Plastic	Pots, tubs and trays - HDPE	0.1%
Plastic	Pots, tubs and trays - Other polymers	0.1%
Plastic	Black Plastic (bottles, pots, tubs trays)	0.3%
Plastic	Expanded polystyrene	0.1%

⁶ The term "potentially recyclable" is used throughout the report to account for the condition of some of the materials in the residual waste (wet or food contaminated) as it is not possible to know what the items looked like before they were disposed

⁷ This excludes food waste as it is only collected by Eastleigh

Primary category	Secondary category	% composition
Plastic	Other dense plastic	1.2%
Plastic	Fibreglass	0.0%
Plastic	Unlabelled pots, tubs and trays	0.7%
Textiles	Clothes	0.6%
Textiles	Shoes, belts, bags	0.2%
Textiles	Non-clothing textiles	0.1%
Glass	Glass bottles	0.9%
Glass	Glass jars	0.3%
Glass	Other glass	0.0%
Metal	Foil and foil packaging	0.1%
Metal	Other scrap metal	0.4%
Putrescible	Green garden waste	0.3%
Putrescible	Woody and bulky garden waste	0.0%
Putrescible	Soil	0.1%
Putrescible	Food waste -avoidable	2.4%
Putrescible	Food waste -non-avoidable	0.2%
Putrescible	Dead animals, hair & other organic	0.0%
Putrescible	Pet waste and bedding	0.1%
Putrescible	Cooking oils and fats	0.0%
WEEE	WEEE	0.2%
WEEE	Household Batteries	0.0%
WEEE	Lightbulbs and tubes	0.0%
Other Combustible	Wood (not visibly treated)	0.1%
Other Combustible	Wood (visibly treated)	0.2%
Other Combustible	Soft furnishings including sofas & armchairs	0.0%
Other Combustible	Tyres	0.0%
Other Combustible	Mattresses and mattress toppers	0.0%
Other Combustible	Carpet and underlay including flooring offcuts	0.0%
Other Combustible	Vinyl flooring and tiles	0.0%
Other Combustible	Disposable children's nappies	0.4%
Other Combustible	Other absorbent hygiene & sanitary products	0.1%
Other Combustible	Non-hazardous paint	0.0%
Other Combustible	Laminate packaging	0.1%
Other Combustible	Other combustible	0.6%
Other Non-Combustible	Rubble	0.0%

Primary category	Secondary category	% composition
Other Non-Combustible	Plasterboard	0.0%
Other Non-Combustible	Crockery, vases & ornaments	0.1%
Other Non-Combustible	Other non-combustible	0.1%
Hazardous household waste	HHW	0.2%
Fines	Particles <10 mm	0.2%
Total		17.4%

3.3 HWRC PI results

The following Table 16 and Figure 7 show the estimated tonnages and composition of the HWRC residual waste for all sites in the PI area.

Table 16 Composition and arising of HWRC waste for all sites in the PI area

Primary category	HWRC residual composition (%)	HWRC residual tonnage (t, not reused, recovered or recycled)
Paper and card	13.9%	15,681
Plastic film	6.8%	7,654
Plastic	12.3%	13,843
Textiles	7.3%	8,206
Glass	3.5%	3,941
Metal	2.2%	2,437
Putrescible	16.8%	18,882
WEEE	1.4%	1,582
Other combustible waste	29.0%	32,568
Other non-combustible waste	3.6%	4,057
Hazardous household waste	1.2%	1,328
Fines	2.0%	2,258
Total	100.0%	112,436

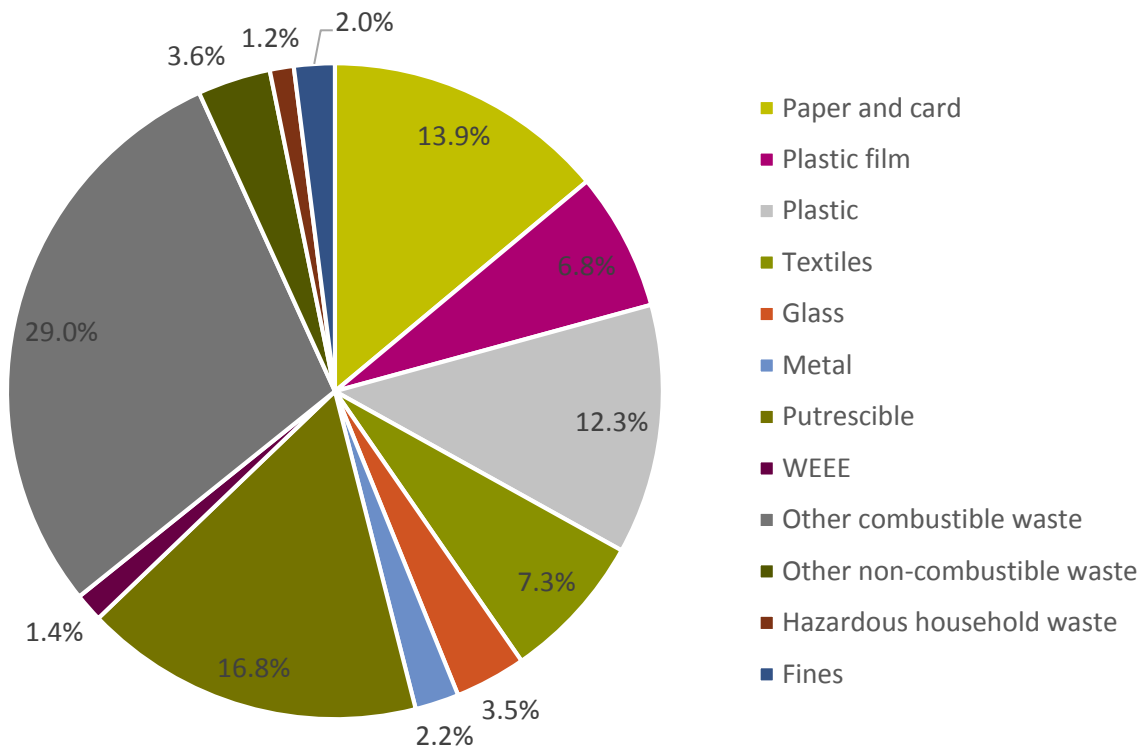


Figure 7 Composition of HWRC residual waste for all sites in the PI area (%)

The HWRC residual waste consisted of other combustable waste (29.0%) which includes carpet and underlay (7.8%) and miscellaneous combustable items (8.8%) such as mixed material household items, (cleaning items (sponges, wet wipes etc.) and combustable DIY waste), putrescible waste (16.8%, mostly food waste and pet bedding), and plastic (12.3%, mostly household plastic items such as bowls and toys). Paper and card accounted for a further 13.9% followed by textiles (7.3%) and plastic film (6.8%). Overall 12% of the composition could have potentially been recycled via the kerbside DMR and 26% could have potentially been recycled at the HWRCs and local recycling banks.

4 Accuracy

The project results presented in the sections above are based on the analysis of the data collected throughout the project. The samples achieved through kerbside residual waste and DMR analysis represented at least 85% of each WCA in terms of demographics, and therefore each collection system and frequency. This in turn, resulted in the overall PI results representing the waste stream across all demographic groups and WCA (and therefore collection systems and collection frequencies).

The sample collection and analysis were delivered without any significant deviations from plan. Where small variations of household sample numbers delivered occurred due to operational reasons, this did not affect the overall result.

The scales used throughout the fieldwork research were calibrated digital scales with precision level of 0.01kg and capacity of 60kg or more.

Data collection was overseen by trained and experienced site managers and carried out by trained technicians. Data was recorded by the site managers on specifically designed forms to ensure consistency and accuracy. Quality control procedures were employed throughout the sort with regular checks of sorting accuracy throughout the day and a final check during weighing of each sorted category.

The data was entered into MS Excel database and the entry checked by a consultant to 100% accuracy. A sense check to identify any irregularities or outliers was carried out at the same time.

The data analysis sheets included formulas and links to ensure that any changes to the data were automatically updating the analysis. Automatic checks and sums were incorporated where possible. The analysis was quality checked by the Project Director.

Although statistical analysis of the results is not possible due to the batch sorting methodology, we can assess the level of accuracy based on previous individual household sort analysis and modelled confidence intervals for similar collection systems. The confidence intervals included in this section are indicative estimates only and should not be directly applied to the results presented throughout this report.

With the achieved sample size of 1,956 households we can estimate that the confidence interval at 95% confidence level would be +/-3.3%. This means that if the average arisings were found to be 10kg/hh/wk we can be 95% confident that the “true” result would be 10kg +/-0.33kg or between 9.67kg and 10.33kg per household per week.

For the individual WCAs samples achieved varied between 141 and 160 households. It is estimated the 95% confidence interval is therefore around +/-12%.

Output Area Classification results within each individual WCA should be treated as indicative only as the samples sizes are small (between 20 and 70 households).

5 Conclusions

The comprehensive waste compositional analysis of the kerbside residual and DMR streams in the PI representative sample shows that an average household in the area produces 8.94kg of residual waste and 2.63kg of DMR per week.

The residual waste still included recyclable materials with 7.8% of the weight of the residual waste comprised of materials PI collects via the standard DMR collection service. The majority of this material was recyclable paper and card (4.9%). The analysis showed that the residual waste also included 3.6% of garden waste, 3.7% of glass, and 3.3% textiles, all materials that could potentially be recycled using a variety of kerbside services, bring banks and HWRCs.

A large proportion of the material was food waste (34.7% of the overall composition or 3.11kg/hh/wk). This was mostly made up of avoidable food waste (26.3% of the total composition). This suggests that a large quantity of food that could have been eaten is thrown away by the residents in the PI area. Given the likely future direction of Waste and Resource Management policy, addressing food waste could be an area of focus for the PI Partnership going forward.

The overall capture rate of the DMR collection services was 76%. Cardboard and newspapers were captured more than the average for the stream at 88%. Thin card (71%), plastic bottles (70% for HDPE and 67% for PET) and other recyclable paper (54%) were not as well captured. Cans and tins, both ferrous and non-ferrous were captured better than aerosols however it is worth noting that only small quantities of these containers are present in the waste stream.

Overall contamination in the DMR stream was 17.4% and there was a variety of materials that contributed to the overall figure. The most commonly found incorrect materials were non-target dense plastics including pots, tubs and trays (3.7%), putrescible waste (3.1%) and non-recyclable paper (2.3%). This level of contamination is higher than specified within the disposal contract (<5%) but similar to the rate measured through other analysis throughout PI. It's interesting to note that non-recyclable paper and non-target plastics may appear similar in nature to the recyclable paper and plastic respectively, and this may be contributing to resident confusion about recycling these materials.

Putrescible waste (mostly food waste) would generally be regarded as significant contamination by MRF operators and is likely to affect the quality of other items due to moisture, greasiness or decomposition of this material. This type of material usually occurs because of food packaging containers were not emptied however instances of whole bags of residual waste deposited in the waste stream will also contribute to this issue.

The HWRC residual waste in PI consisted of other combustible waste (29.0%) which includes carpet and underlay (7.8%) and miscellaneous combustible items (8.8%) such as mixed material household items, cleaning items (sponges, etc, wet wipes and combustible DIY waste), soft furnishings (4.0%) and mattresses (2.8%). It's important to note that some of the materials can be difficult to recycle, particularly the miscellaneous combustible fractions. The current changing global materials market as well as the Waste and Resources Strategy will influence the availability of outlets for these materials.

Putrescible waste accounted for 16.8% (mostly food waste and pet bedding) while dense plastics contributed further 12.3% (mostly household plastic items such as bowls and toys).

Paper and card accounted for a further 13.9% followed by textiles (7.3%).and plastic film (6.8%).

Overall 12% of the composition could have potentially been recycled using the DMR services provided by the PI WCA and 26% could have potentially been recycled at the HWRCs and local recycling banks.

The overall PI Partnership waste stream tonnage and composition analysis showed that around a third (33.8%) of the overall waste was putrescible waste, 16.7% accounted for paper and card, 16.3% for other combustibles, 7.2% for glass, 7.0% for plastics, 4.8% for metals, 4.6% for plastic film and 3.8% for textiles. Kerbside residual waste contributed 44% or 365,147 tonnes to the overall material collected in PI in 2016/17.

Appendix A Pen Portraits OAC Demographic Groups

1 - Rural Residents

The population of this supergroup live in rural areas that are far less densely populated compared with elsewhere in the country. They will tend to live in large detached properties which they own and work in the agriculture, forestry and fishing industries. The level of unemployment in these areas is below the national average. Each household is likely to have multiple motor vehicles, and these will be the preferred method of transport to their places of work. The population tends to be older, married and well educated. An above average proportion of the population in these areas provide unpaid care and an above average number of people live in communal establishments (most likely to be retirement homes). There is less ethnic integration in these areas and households tend to speak English or Welsh as their main language.

2 - Cosmopolitans

The majority of the population in this supergroup live in densely populated urban areas. They are more likely to live in flats and communal establishments, and private renting is more prevalent than nationally. The group has a high ethnic integration, with an above average number of residents from EU accession countries coinciding with a below average proportion of persons stating their country of birth as the UK or Ireland. A result of this is that households are less likely to speak English or Welsh as their main language. The population of the group is characterised by young adults, with a higher proportion of single adults and households without children than nationally. There are also higher proportions of full-time students. Workers are more likely to be employed in the accommodation, information and communication, and financial related industries, and using public transport, or walking or cycling to get to work.

3 – Ethnicity Central

The population of this group is predominately located in the denser central areas of London, with other inner urban areas across the UK having smaller concentrations. All non-white ethnic groups have a higher representation than the UK average especially people of mixed ethnicity or who are Black, with an above average number of residents born in other EU countries. Residents are more likely to be young adults with slightly higher rates of divorce or separation than the national average, with a lower proportion of households having no children or non-dependent children. Residents are more likely to live in flats and more likely to rent. A higher proportion of people use public transport to get to work, with lower car ownership, and higher unemployment. Those in employment are more likely to work in the accommodation, information and communication, financial, and administrative related industries.

4 - Multicultural Metropolitans

The population of this supergroup is concentrated in larger urban conurbations in the transitional areas between urban centres and suburbia. They are likely to live in terraced housing that is rented – both private and social. The group has a high ethnic mix, but a below average number of UK and Irish born residents. A result of this is that households are less likely to speak English or Welsh as their main language. Residents are likely to be below retirement age. There is likely to be an above average number of families with children who attend school or college, or who are currently too young to do so. The rates of marriage and divorce are broadly comparable with the national average. The level of qualifications is just under the national average with the rates of unemployment being above the national average. Residents who are employed are more likely to work in the transport and administrative related industries. Public transport is the most likely method for individuals to get to and from work, since households are less likely to have multiple motor vehicles available to them.

5 - Urbanites

The population of this group are most likely to be located in urban areas in southern England and in less dense concentrations in large urban areas elsewhere in the UK. They are more likely to live in either flats or terraces, and to privately rent their home. The supergroup has an average ethnic mix, with an above average number of residents from other EU countries. A result of this is households are less likely to speak English or Welsh as their main language. Those in employment are more likely to be working in the information and communication, financial, public administration and education related sectors. Compared with the UK, unemployment is lower.

6 - Suburbanites

The population of this supergroup is most likely to be located on the outskirts of urban areas. They are more likely to own their own home and to live in semi-detached or detached properties. The population tends to be a mixture of those above retirement age and middle-aged parents with school age children. The number of residents who are married or in civil-partnerships is above the national average. Individuals are likely to have higher-level qualifications than the national average, with the levels of unemployment in these areas being below the national average. All non-White ethnic groups have a lower representation when compared with the UK and the proportion of people born in the UK or Ireland is slightly higher. People are more likely to work in the information and communication, financial, public administration, and education sectors, and use private transport to get to work.

7 – Constrained City Dwellers

This supergroup has a lower proportion of people aged 5 to 14 and a higher level aged 65 and over than nationally. It is more densely populated than the UK average. People are more likely to be single or divorced. There is a lower representation of all the non-White ethnic groups and of people who were born in other EU countries. There is a lower proportion of households with no children. Households are more likely to live in flats and to live in social rented accommodation, and there is a higher prevalence of overcrowding. There is a higher proportion of people whose day-to-day activities are limited, and lower qualification levels than nationally. There is a higher level of unemployment in the supergroup. There are no particular industries in which workers are most likely to be employed, but some industries such as information and communication, and the education sector are underrepresented.

8 – Hard-pressed Living

The population of this group is most likely to be found in urban surroundings, predominately in northern England and southern Wales. There is less non-White ethnic group representation than elsewhere in the UK, and a higher than average proportion of residents born in the UK and Ireland. Rates of divorce and separation are above the national average. Households are more likely to have non-dependent children and are more likely to live in semi-detached or terraced properties, and to socially rent. There is a smaller proportion of people with higher level qualifications, with rates of unemployment above the national average. Those in employment are more likely to be employed in the mining, manufacturing, energy, wholesale and retail, and transport related industries.

Appendix B Category List

Primary category	Secondary category
Paper and Card	Newspapers, magazines and brochures
	Other recyclable paper
	Non-recyclable paper
	Liquid cartons/Tetrapaks
	Plain Corrugated Cardboard
	Laminated cardboard
	Recyclable Thin card
	Non-recyclable thin card or cardboard
Plastic film	Plastic bags
	Other film
Plastic	Plastic bottles - PET
	Plastic bottles - HDPE
	Other plastic bottles
	Pots, tubs and trays - PP
	Pots, tubs and trays - PET
	Pots, tubs and trays - HDPE
	Pots, tubs and trays - Other
	Pots, tubs and trays - Unlabelled
	Black Plastic (bottles, pots, tubs and trays)
	Expanded polystyrene
	Other dense plastic
	Fibreglass
Textiles	Clothes
	Shoes, belts, bags
	Non-clothing textiles
Glass	Glass bottles
	Glass jars
	Other glass
Metal	Ferrous food cans

Primary category	Secondary category
	Ferrous drink cans
	Ferrous aerosols
	Non-ferrous food cans
	Non-ferrous drink cans
	Non-ferrous aerosols
	Foil and foil packaging
	Other scrap metal
Putrescible	Green garden waste
	Woody and bulky garden waste
	Soil
	Food waste - avoidable
	Food waste - non-avoidable
	Dead animals, hair & other organic
	Pet waste and bedding
	Cooking oils and fats
WEEE	WEEE
	Household Batteries
	Lightbulbs and tubes
Other Combustible	Wood (not visibly treated)
	Wood (visibly treated)
	Soft furnishings including sofas and armchairs
	Tyres
	Mattresses and mattress toppers
	Carpet and underlay including flooring offcuts
	Vinyl flooring and tiles
	Disposable children's nappies
	Other absorbent hygiene and sanitary products
	Non-hazardous paint
	Laminate packaging
	Other combustible
Other Non-Combustible	Rubble

Primary category	Secondary category
	Plasterboard
	Crockery, vases and ornaments
	Other non-combustible
Hazardous household waste	List
Fines	Particles <10 mm

Appendix C Kerbside Services

WCA	Residual frequency	DMR frequency	Glass collection	Food collection	Glass frequency	Garden waste charging
Basingstoke and Dean Borough Council	Weekly	Fortnightly	Yes	No	Fortnightly	Charged
East Hampshire District Council	Fortnightly	Fortnightly	Yes	No	Monthly	Charged
Eastleigh Borough Council	Fortnightly	Fortnightly	Yes	Yes	Monthly	Charged
Fareham Borough Council	Fortnightly	Fortnightly	No	No	N/A	Free
Gosport Borough Council	Fortnightly	Fortnightly	No	No	N/A	Charged
Hart District Council	Fortnightly	Fortnightly	Yes	No	Fortnightly	Charged
Havant Borough Council	Fortnightly	Fortnightly	No	No	N/A	Charged
New Forest District Council	Weekly	Weekly	Yes	No	Monthly	Charged
Portsmouth City Council	Weekly	Fortnightly	No	No	N/A	Charged
Rushmoor Borough Council	Weekly	Fortnightly	Yes	No	Fortnightly	Charged
Southampton City Council	Fortnightly	Fortnightly	Yes	No	Fortnightly	Charged
Test Valley Borough Council	Fortnightly	Fortnightly	No	No	N/A	Charged
Winchester City Council	Fortnightly	Fortnightly	No	No	N/A	Free

Appendix D 2016/17 Kerbside Tonnages

	DMR tonnage (t)	Residual waste tonnage (t)
Basingstoke and Deane	8,966	39,145
East Hampshire	7,721	21,254
Eastleigh	7,686	21,662
Fareham	7,033	18,341
Gosport	4,338	16,708
Hart	6,188	24,898
Havant	7,948	16,604
New Forest	10,013	34,705
Portsmouth	8,654	48,223
Rushmoor	4,659	20,662
Southampton	11,131	56,836
Test Valley	7,864	24,321
Winchester	7,828	21,789
Total	100,028	365,147

Appendix E Comparison of key characteristics across PI

WCA	Total arising for residual (kg/hh/wk)	Total arising for DMR (kg/hh/wk)	Contamination rate (%)	Overall capture rates (%)
Basingstoke	11.81	2.38	15%	69%
East Hants	8.66	3.38	16%	83%
Eastleigh	5.98	2.62	15%	82%
Fareham	8.71	2.66	20%	77%
Gosport	9.04	2.90	16%	79%
Hart	6.12	2.30	15%	83%
Havant	8.81	2.84	22%	80%
New Forest	8.52	2.81	17%	75%
Portsmouth	10.91	2.48	17%	73%
Rushmoor	9.88	2.50	18%	74%
Southampton	9.22	2.52	21%	69%
Test Valley	7.60	3.00	14%	79%
Winchester	9.50	2.50	12%	75%
Project Integra	8.94	2.63	17%	76%

If you have any questions relating to this report, please contact integra@hants.gov.uk