



MERSEYSIDE RECYCLING & WASTE AUTHORITY



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Merseyside and Halton Waste Composition Study 2015/16

Final Project Report



June 2016

Amec Foster Wheeler Environment
& Infrastructure UK Limited



Report for

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Document revisions

No.	Details	Date
1	Draft Final Project Report 16173i1	May-2016
2	Final Report 16173i2	June-2016
3	Final Report 16173i3	June 2016



Executive summary

Purpose of this report

This report has been produced for the purpose of identifying the main waste materials arising from the Local Authority areas in the Merseyside and Halton Waste Partnership (MHWP)¹ in the following waste streams:

- ▶ Kerbside collected household waste (residual, dry recycling and organics); and,
- ▶ Household Waste Recycling Centre (HWRC) residual waste.

The composition data for these waste streams will then be used by MHWP with operational data to inform the Joint Recycling and Waste Management Strategy review.

The aims of the project are to:

- ▶ Identify the composition (% weight) of household waste collected or recycled or composted or delivered for disposal in the Liverpool City Region through physical waste sampling;
- ▶ Estimate general household waste composition through combining composition and arisings data;
- ▶ Identify the proportion of the sample waste which could have been repaired or reused but are currently being sent for recycling or disposal; and,
- ▶ Estimate the biodegradable content and net calorific value (CV) of the kerbside and HWRC residual waste streams.

Table E.1 presents the kerbside waste composition results for MHWP.

Key results include:

- ▶ The high proportion of food waste in the residual stream at 39.1% (approximately 140,000 tonnes) of which 63.9% (approx. 90,000 tonnes) was “avoidable”². WRAP (2014) *Household food and drink waste: A product focus* found that approximately 15% of all food and drink waste was thrown away in its packaging with around 4% thrown away in packaging which was not opened;
- ▶ Approximately 63% (approx. 225,000 tonnes) of the residual waste stream was potentially recyclable. The majority of the potentially recyclable material was food waste (approx. 140,000 tonnes) followed by recyclable paper (approx. 18,000 tonnes) and textiles (approx. 17,000 tonnes); and,
- ▶ 4.6% (approx. 25,000 tonnes) of the total kerbside waste was potentially reusable. The potentially reusable materials in the total kerbside waste were predominantly textiles at 3.4% (approx. 18,000 tonnes) followed by WEEE at 0.6% (approx. 3,000 tonnes).

Figure E.1 shows the study average kerbside residual waste composition result.

¹ Halton Borough Council, Knowsley Metropolitan Borough Council, Liverpool City Council, Merseyside Recycling and Waste Authority (MRWA), St Helens Metropolitan Borough Council, Sefton Metropolitan Borough Council and Wirral Metropolitan Borough Council..

² Food and drink waste that was, at some point prior to disposal, edible.

Table E.1 Kerbside waste composition results (% wt.) – MHWP

	Dry recycling	Food waste	Garden	Residual	Kerbside waste
Paper	28.1%	0.3%	0.2%	9.8%	12.2%
Card	18.5%	0.0%	0.1%	5.1%	7.1%
Plastic	13.0%	0.8%	0.2%	13.9%	11.9%
Glass	27.7%	0.0%	0.0%	3.4%	7.9%
Metals	6.0%	0.0%	0.1%	3.7%	3.7%
Textiles	0.9%	0.0%	0.6%	4.7%	3.4%
WEEE	0.3%	0.0%	0.2%	0.8%	0.6%
Food	2.1%	95.7%	0.8%	39.1%	27.2%
Garden	0.1%	0.7%	95.4%	2.5%	13.7%
Other organics	0.2%	2.5%	0.1%	2.1%	1.5%
Hazardous	0.2%	0.0%	0.0%	0.6%	0.4%
Sanitary	0.5%	0.0%	0.0%	3.5%	2.4%
Misc. combustibles	1.1%	0.0%	0.3%	3.7%	2.7%
Misc. non-combustible	0.6%	0.0%	2.1%	2.7%	2.2%
<20 mm fines	0.7%	0.0%	0.0%	4.4%	3.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Biodegradability				66.2%	64.7%
Potentially recyclable*				62.9%	70.3%
Potentially reusable	2.4%			6.1%	4.6%
Non-target	15.8%	4.3%	24.0%**		

*Based on materials currently collected at the kerbside. For the Partnership we have used the broadest definition of recyclable and included all textiles and food waste.

**The majority of the non-target material in the garden waste stream was composed of soil.

Figure E.1 Kerbside residual waste result – MHWP

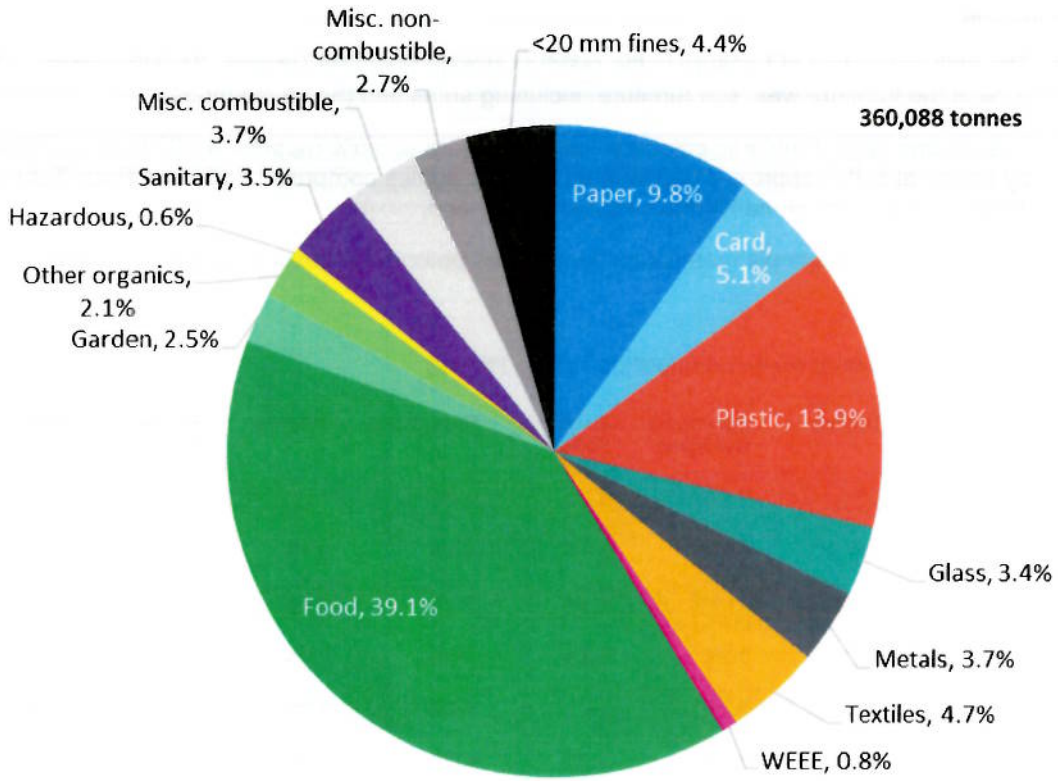


Table E.2 and Figure E.2 present the HWRC residual waste composition results.

Key results include:

- ▶ The high proportion of furniture in the residual stream at 45.3% (approx. 21,000 tonnes). Over 97% of the furniture was “soft furniture” including sofas and their furnishings;
- ▶ The second largest material category was food waste at 8.5% (approx. 4,000 tonnes) followed by plastic at 8.1% (approx. 4,000 tonnes). Plastic bottles comprised 1.0% and Pots, Tubs and Trays (PTTs) 0.7% of the HWRC residual waste; and,
- ▶ The proportion of sample material categorised as potentially reusable was 45.5% (approx. 21,000 tonnes).

Table E.2 HWRC residual waste composition results (% wt.)

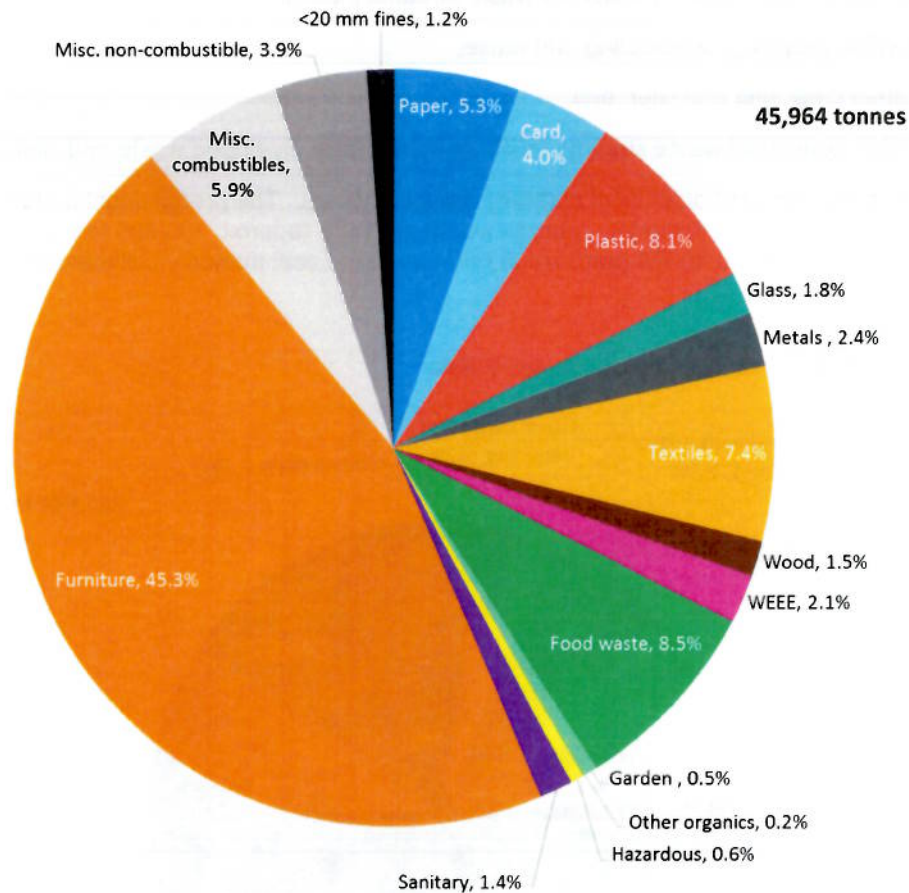
	Huyton	Otterspool/ Old Swan	South Sefton	Ravenhead	Bidston	Picow Farm	Average
Paper	3.7%	5.8%	6.0%	6.9%	3.4%	6.2%	5.3%
Card	4.0%	4.2%	2.7%	3.3%	6.5%	2.7%	4.0%
Plastic	7.1%	11.3%	7.9%	8.1%	6.4%	6.7%	8.1%
Glass	1.7%	1.1%	3.6%	2.0%	0.9%	1.1%	1.7%
Metals	2.5%	4.2%	1.7%	2.7%	1.6%	1.1%	2.4%
Textiles	6.5%	9.6%	5.1%	6.0%	8.1%	8.9%	7.5%
Wood	1.2%	2.7%	1.3%	1.9%	0.8%	0.9%	1.5%
WEEE	2.0%	1.6%	2.8%	1.3%	3.5%	0.7%	2.1%
Food waste	6.2%	7.2%	9.1%	9.5%	10.2%	8.6%	8.5%
Garden	1.0%	0.1%	0.1%	0.3%	1.0%	0.1%	0.5%
Organics	0.0%	0.6%	0.0%	0.1%	0.1%	0.1%	0.2%
Hazardous	1.2%	0.1%	0.6%	0.3%	0.1%	1.0%	0.6%
Sanitary	1.3%	0.7%	1.1%	1.9%	2.1%	1.4%	1.4%
Furniture	52.6%	39.7%	41.2%	41.0%	48.3%	51.6%	45.3%
Misc. combustibles	6.1%	5.6%	7.3%	9.6%	3.4%	4.7%	5.9%
Misc. non-combustible	2.0%	3.8%	8.3%	3.6%	2.6%	2.8%	3.9%
<20 mm fines	0.7%	1.6%	1.0%	1.4%	1.1%	1.3%	1.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Biodegradability	48.5%	49.1%	47.1%	51.6%	52.9%	52.2%	50.1%
Potentially recyclable or reusable*	79.1%	77.3%	73.8%	69.3%	79.3%	81.3%	76.7%
Potentially reusable**	46.4%	45.5%	46.7%	49.5%	49.6%	39.7%	45.5%

*Based on materials currently collected at HWRCs.

**Based on categorisation during physical sort.



Figure E.2 Average composition (% wt.) of HRWC residual waste



The differences between the HWRC residual waste composition estimates for 2015/16 study compared with previous studies is substantial. Furniture has increased from around 10% in 2010 to over 45% of the HWRC residual waste stream in 2015/16. Applying the HWRC residual waste tonnages used in each study to the associated composition result suggests that the quantity of furniture disposed of in HWRCs in Merseyside and Halton has increased from approximately 9,000 tonnes in 2010 to over 21,000 tonnes in 2015/16. After accounting for housing growth³ the quantity of furniture disposed of at HWRCs more than doubles from 14 kg/hh/yr in 2010 to 31 kg/hh/yr in 2015/16. This may reflect temporary impacts (e.g. the Ikea effect⁴) or be a function of the sampling approach and the bias that may have been introduced by requesting HWRC user permission.

It is clear that furniture, specifically soft furniture (e.g. sofas) is becoming a more important component of the HWRC residual waste stream, however it is possible that the furniture composition may have been over-estimated as a consequence of the methodology adopted. The HWRC residual waste composition result and the proportion of furniture estimated to be present is unusual and requires further investigation.

³ Household numbers from the ACORN database have been used. In the 2009 ACORN database the number of households in Merseyside and Halton was 641,843. In the 2015 ACORN database the number of households in Merseyside and Halton was 664,544.

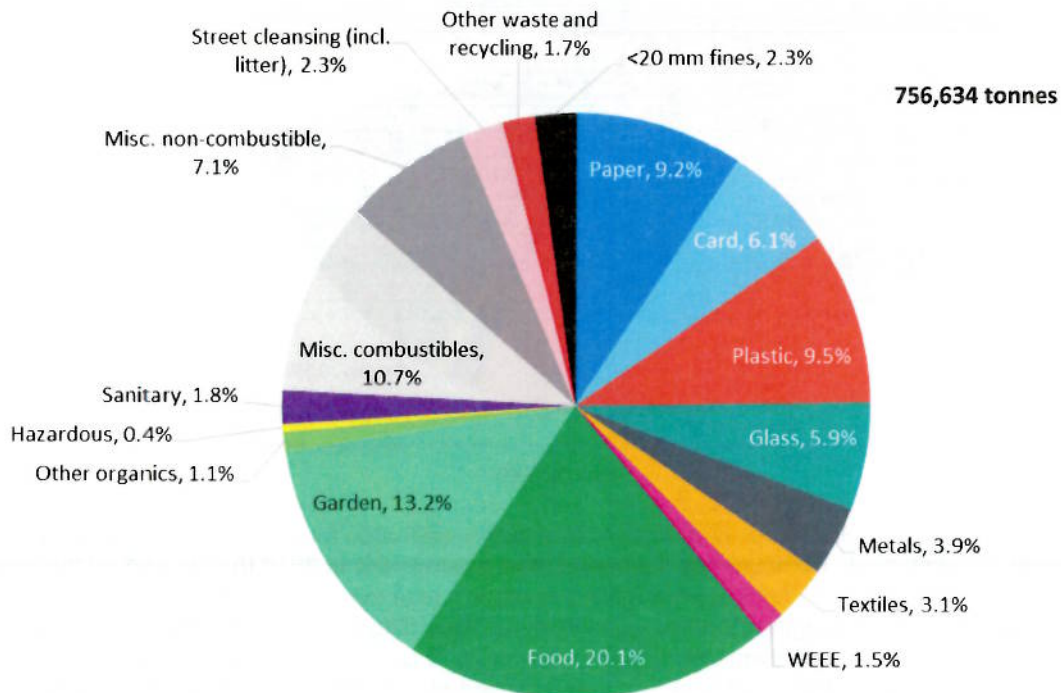
⁴ Resource Futures/Defra (2009) WR0121 – Understanding Waste Growth at Local Authority Level describes a case where the introduction of a series of new budget furniture stores within the area which led to a temporary influx of furniture / office equipment being thrown out by local residents.

The authorities in the Partnership collect and manage more than just kerbside household waste and HWRC residual waste. Other local authority collected waste streams include:

- ▶ HWRC recycling, composting and reuse;
- ▶ Street cleansing and litter; and,
- ▶ Other household waste streams (such as bring banks, fly-tipped waste and clinical waste).

Figure E.3 shows the composition of local authority collected waste. The predominant materials are food waste at 20.1% (approx. 150,000 tonnes), garden waste at 13.2% (approx. 100,000 tonnes) and miscellaneous combustibles at 10.7% (approx. 80,000 tonnes). Local authority collected waste is discussed in Section 3.4 of the report.

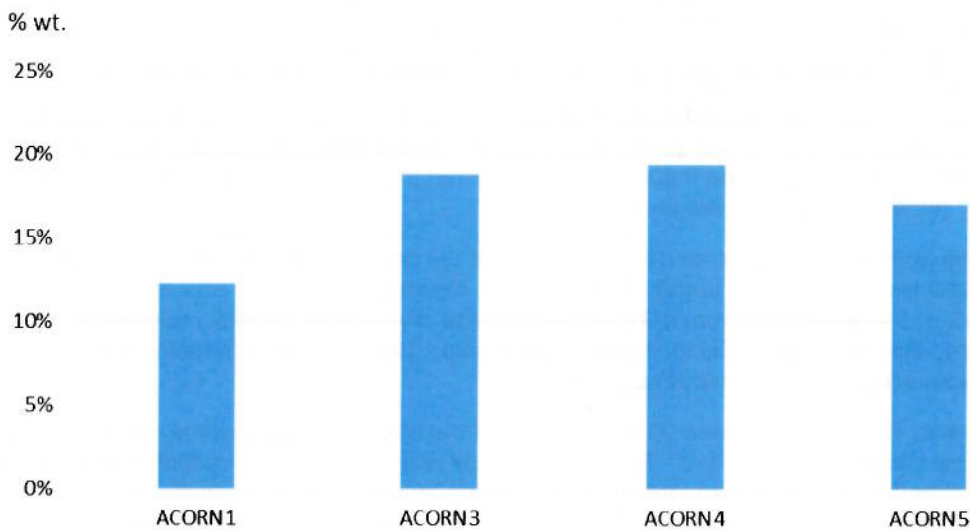
Figure E.3 MHWP Local Authority Collected Waste





An exploratory data analysis was undertaken to see what the sample data can reveal about the waste produced by households from different ACORN⁵ categories. The analysis showed that the levels of contamination in the dry recycling stream vary by ACORN category⁶ (Figure E.4). The analysis also identified potential differences in the residual waste and dry recyclables produced by households from different ACORN categories are primarily associated with materials used for packaging such as paper, card, plastic, glass and metals. The ACORN categories associated with more affluent households appeared to produce a higher proportion of paper and glass. In contrast, ACORN categories associated with less affluent households appeared to generate a higher proportion of plastic in their waste. Similar differences have also been found in other studies undertaken by Amec Foster Wheeler and others⁷.

Figure E.4 Average dry recycling contamination levels by ACORN category



⁵ 'A Classification of Residential Neighbourhoods (ACORN)' is a recognised socio-demographic tool used in the majority of household waste composition survey projects. The tool classifies each postcode area within the authority and assigns it to a Category, a Group and a Type. There are 6 categories, 18 groups and 62 types. The database is widely used across disciplines and is owned and managed by CACI Ltd. Further details about the ACORN classifications are included in Section 4.2.

⁶ ACORN 2 was not included in the study as less than 3% of the households in Merseyside and Halton are assigned to this category. The ACORN 6 category contains predominantly communal establishments, and those that do not contain residential populations.

⁷ Warren Spring and Aspinwall (1993) The National Household Waste Analysis Programme Phase Two - Results Report, Volume One - Category Analysis and Weight Data. However it should be noted ACORN classification have changed over time making direct comparisons difficult.

Based on the findings of this study our recommendations for the MHWP are:

1. Approximately 64% of the kerbside residual waste in the MHWP was potentially recyclable. The main component of the potentially recyclable material was food waste which was estimated to comprise 39.1% \pm 2.1% of the kerbside residual waste (between 130,000 and 150,000 tonnes). The introduction of separate food waste collections has the potential to significantly reduce the quantity of residual waste requiring treatment and disposal and improve recycling performance. The “whole system costs” (i.e. from collection through to treatment/disposal) would need to be considered to fully assess the economic viability of separate food waste collections;
2. Approximately 24% (approx. 86,000 tonnes) of the residual waste was comprised of materials which are currently collected at the kerbside for recycling by at least one of the Districts. Recyclable materials present in the kerbside residual waste include recyclable paper (approx. 18,000 tonnes), textiles (approx. 17,000 tonnes), recyclable card including books and telephone directories (approx. 16,000 tonnes), glass (approx. 11,000 tonnes), metal packaging (approx. 9,000 tonnes) and plastic bottles (approx. 8,000 tonnes). There was also an estimated 7,000 tonnes of garden waste present in the kerbside residual waste stream. The Partnership should target these materials to divert them from the residual waste stream into the dry recycling or garden waste streams;
3. Approximately 16% (approx. 18,000 tonnes) of the dry recycling stream was comprised of materials which are not targeted for recycling. Communication and education initiatives which reduce the level of contamination in the kerbside dry recycling would improve the quality of recyclable materials collected by the Partnership. This could have benefits in terms of the prices achieved for dry recyclables; and,
4. Almost 45% (approximately 21,000 tonnes) of the HWRC residual waste stream was estimated to be composed of furniture. This is an unusual result which requires further investigation to confirm the contribution of furniture to this waste stream and identify ways in which furniture can be managed more sustainably. Furniture was also one of the main components contributing to the estimate that 45.5% of the HWRC residual waste was potentially reusable indicating that there is an opportunity to divert large quantities of material from disposal to reuse. At a minimum, if it is assumed the quantity of furniture arising at HWRCs has not changed between 2010 and 2015/16 approximately 9,000 tonnes (20%) of the HWRC residual waste stream would be furniture which could be potentially reusable.