Leeds City Council

Defra / LASU Waste Composition Study

The Composition of Kerbside Collected Household Waste Arising In Leeds City Council

June 2007

Entec UK Limited

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Report for

Leeds City Council
City Services Department
Knowsthorpe Gate
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Leeds
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This Report

Is produced on behalf of the Department for Environment Food and Rural Affairs Direct Consultancy Support Local Authority Support Unit in partnership with Entec UK Ltd

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Executive Summary

In September 2004, Entec was appointed to the Local Authority Support Unit (LASU) call-off contract by the Department of the Environment, Food and Rural Affairs (Defra) as part of the wider Waste Implementation Programme (WIP). In August 2006, Defra commissioned Entec to provide Leeds City Council (LCC or the Council) with consultancy support for the delivery of a comprehensive household waste composition analysis project.

The aim of the analysis was to determine the indicative composition of kerbside collected dry recyclable and residual household waste arising in LCC. The study provides snapshot of waste arisings and composition during February 2007.

LCC provided the sampling plan for this Study. The plan was based on ACORN data. The sampling regime was designed to collect household waste from population groups which reflect the range of waste composition and waste generation in the Leeds City Council area (Leeds). The study included only those households receiving a wheeled bin dry recyclables and residual waste collection service.

The study was carried out over a two week period between 19th February and 1st March 2007. Residual and dry recyclable waste samples were collected from the same households, on the same day.

Waste sorting took place at LCC's transfer station located in Seacroft, Leeds. A total of 3,308 kg of dry recyclable and 3,883 kg of residual household waste were collected. All of this waste was manually sorted into 39 material categories. The weight of material reporting to each material category was recorded. This data was used to identify the waste composition and provided a base for further analysis.

The Study average set-out of Dry Recyclables for Leeds during this study was 74 %.

The Dry Recyclables collections operating in Leeds yielded an average 2.44 kg/hh/wk of material. This was predominantly Paper and Card which formed 81.59 % of the collected material. Newspapers and Magazines represented 53.37 %, while Paper and Card represented 18.59 % of the total arising of Dry Recyclables. Other materials collected in Dry Recyclables included Cardboard Boxes and Containers (0.45 kg/hh/wk, 18.59 %), Dense Plastic (0.18 kg/hh/wk, 7.41 %), Metals (ferrous at 0.08 kg/hh/wk, 3.33 % and non-ferrous at 0.03 kg/hh/wk, 2.08 %), Plastic Film (0.05 kg/hh/wk, 2.08 %) and Miscellaneous Combustibles (0.03 kg/hh/wk, 1.03 %).

The Residual Waste collections yielded an average 15.53 kg/hh/wk of material. Putrescibles was the most dominant material category with arisings of 5.44 kg/hh/wk or 35.01 % of the total Residual Waste arisings. Most of this was kitchen waste. A significant quantity of Paper and Card (2.95 kg/hh/wk or 19.01 %) was also found in the Residual Waste.

The total combined weekly waste arising (Dry Recyclables and Residual Waste) was 17.97 kg/hh/wk. Putrescibles and Paper and Card were the two most prominent fractions.

A total of 5.31 kg/hh/wk of target recyclable material were identified in the combined Dry Recyclables and Residual Waste. From this, 2.09 kg/hh/wk or 39.38 % was actually captured in the recycling scheme. Paper and Card at 3.87 kg/hh/wk represented most of the target material

potentially available. Capture rates for the headline recyclable materials were as follows: Paper and Card 47.89 %; Dense Plastic 22.71 %; Non-Ferrous Metal 20.26 %; Ferrous Metal 17.17 %; and Plastic Film 6.39 %.

The study average figure for non-target material arising in the Dry Recyclables was 0.35 kg/hh/wk (14.27 %). Some of this material such as Other Paper and Card will is unlikely to have a significant affect on the Dry Recyclables stream. Material such as Putrescibles and Glass however, are contaminants, and should be removed from the collections.

The overall BMW content of the combined waste (Dry Recyclables and Residual Waste together), was calculated as 65.99 %. Most of the BMW was Putrescibles at 31.88 % and Paper and Card at 27.50 %. Capturing more Paper and Card as Dry Recyclables would reduce the amount passing into the Residual Waste, and would help to divert BMW from landfill.

Between January 2005 and February 2007 there was an increase in the amount of Paper and Card arising as Dry Recyclables, from 2.01 kg/hh/wk (54 %), to 2.70 kg/hh/wk (81 %). Over the same period there was a decrease in the amount of Putrescibles present in the Dry Recyclables, from 0.88 kg/hh/wk (23.9 %), to 0.03 kg/hh/wk (0.9 %) in 2007.

Contents

1. Introduction

1.1 Background

1.1.1 WIP and LASU

The Strategy Unit Report "Waste Not Want Not" details recommendations for the effective delivery of sustainable waste management in England and Wales. To implement a number of these recommendations the Department for Environment, Food and Rural Affairs (DEFRA) initiated the Waste Implementation Programme (WIP) in May 2003. WIP aims to provide local authorities in England and Wales with the advice and support they need to meet statutory recycling and composting targets[1]. To accomplish this WIP created eight work streams, one of which is the Local Authority Support Unit (LASU).

LASU was established to address the WIP local authority support work stream by providing funding, tools and guidance to help local authorities overcome barriers to sustainable waste management and meet or exceed their local authority specific statutory targets.

In August 2006 Entec was successfully appointed to provide support to Leeds City Council (LCC or the Council) under the Local Authority Support Unit (LASU) Direct Consultancy Support Programme. The support was to provide a waste composition study for LCC. The data generated in this study will inform the waste collection, treatment and disposal activities of LCC.

1.1.2 Project Overview

LCC recently completed a detailed waste flow modelling exercise and options appraisal of waste technologies. The preferred option identified was Energy from Waste within the Integrated Waste Strategy for LCC. The proposed overall solution for waste also includes the development of a Materials Recycling Facility and composting facilities, and the introduction of a range of major developments to kerbside collection services to deliver increased recycling.

At the time of this study LCC was in the process of submitting an Expression of Interest for PFI credits to Defra. As part of this, the Council needed to update the waste flow model developed in 2005 in order to feed into an Outline Business Case. Amongst a range of other assumptions to be reviewed, it is essential that the most up-to-date waste composition data be used to inform projections on throughput and composition for waste facilities, performance of kerbside recycling initiatives, and how the implementation of recycling services and education should be targeted in order to deliver the greatest benefits.

[1] Waste Implementation Programme: 1 Year On. DEFRA, 2004.

1.1.3 Previous Studies

This Report is based on a household waste sampling study performed by Entec UK Ltd. (Entec) in February 2007. This work compliments two previous studies (a winter sort in February 2006 and a summer sort in June 2005) carried out for LCC by Jacobs Babtie UK Ltd. (Jacobs Babtie). The sampling strategy for this Report was designed using ACORN data. The earlier studies were designed in a similar manner.

1.2 Aims and Objectives

The work specification was designed to deliver the support need identified within LCC's original DEFRA submission.

The aim of the analysis was to determine the indicative composition of kerbside collected recyclables (Dry Recyclables) and kerbside collected residual household waste (Residual Waste) arising in the Leeds City Council area (Leeds). To meet this aim the specific objectives were to:

- To determine the composition of kerbside collected residual household waste arising in Leeds during winter;
- To determine the composition of kerbside collected recyclable household waste arising in Leeds during winter;
- To determine the amount and type of contamination present in the kerbside collected recyclable household waste arising in Leeds during winter;
- To compare the composition results with the two previous waste composition studies carried out for LCC.

1.3 Report Structure

This Report presents the results from the household waste composition study carried out in February 2007. The sampling and analysis methodologies adopted are detailed in Section 2. Summary results for the samples collected are presented in Section 3. Modelled waste compositions for Leeds are also presented in Section 3. The results were interrogated to give information on material capture rates and the level of Biological Municipal Waste (BMW). This information is provided in Section 4 along with a comparison with earlier studies. Conclusions and Recommendations are presented in Section 5 and Section 6 respectively.

2. Methodology

2.1 Introduction

In order to achieve the objectives of the Project the following tasks were undertaken:

- Development of a household profile for LCC;
- Development of a sampling strategy for LCC;
- Collection of samples;
- A waste sorting exercise;
- Waste data analysis; and
- Reporting.

2.2 Profiling Households in Leeds

2.2.1 Factors Affecting Household Waste

The arisings and composition of household waste tend to vary in response to a number of socio-demographic parameters, these include; affluence, lifestyle and household type. As a consequence, the household waste derived from one area of Leeds would be expected to differ from other areas which exhibit different socio-demographic characteristics. Likewise it is assumed that waste derived from different areas with the same socio-demographic profile will be similar. In order to provide information on waste composition which is relevant to individual areas, a number of socio-demographic factors need to be taken into consideration.

2.2.2 Socio Demographic Factors

Based on Census data the ACORN profile (A Classification of Residential Neighbourhoods) classifies UK households according to a range of sociological, demographic and economic indicators (For example, age, sex, number of residents; income brackets, employment type, household amenities, property type and property location) and assigns an ACORN classification code to postcode areas. This profile was developed by CACI Limited as a targeting tool for marketing campaigns and has become the industry standard for waste composition studies. The primary ACORN categories are sub-divided, into 'groups' and 'types' which give a detailed description of households. ACORN classifications are given in Table 2.1.

The data provided by CACI assigns a percentage of the population in the area falling within each of these categories, to a standard postcode database for the area. The use of ACORN profiling therefore allows waste composition studies to target groups of specific households considered to represent the range of household characteristics (and therefore waste generation characteristics) in the survey area.

Table 2.1 ACORN Household Classifications

CATEGORY:		GROUP:		TYPE:	
1	Wealthy Achievers	A	Wealthy Executives	1	Wealthy mature professionals, large houses
				2	Wealthy working families with mortgages
				3	Villages with wealthy commuters
				4	Well-off managers, larger houses
		B	Affluent Greys	5	Older affluent professionals
				6	Farming communities
				7	Old people, detached homes
				8	Mature couples, smaller detached homes
		C	Flourishing Families	9	Older families, prosperous suburbs
				10	Well-off working families with mortgages
				11	Well-off managers, detached houses
				12	Large families and houses in rural areas
2	Urban Prosperity	D	Prosperous Professionals	13	Well-off professionals, larger houses and converted flats
				14	Older professionals in suburban houses and apartments
		E	Educated Urbanites	15	Affluent urban professionals, flats
				16	Prosperous young professionals, flats
				17	Young educated workers, flats
				18	Multi-ethnic young, converted flats
				19	Suburban privately renting professionals
		F	Aspiring Singles	20	Student flats and cosmopolitan sharers
				21	Singles and sharers, multi-ethnic areas
				22	Low income singles, small rented flats
				23	Student terraces
3	Comfortably Off	G	Starting Out	24	Young couples, flats and terraces
				25	White-collar singles/sharers, terraces
		H	Secure Families	26	Younger white-collar couples with mortgages
				27	Middle income, home owning areas
				28	Working families with mortgages
				29	Mature families in suburban semis
				30	Established home owning workers
				31	Home owning Asian family areas
		I	Settled Suburbia	32	Retired home owners
				33	Middle income, older couples
				34	Lower incomes, older people, semis
		J	Prudent Pensioners	35	Elderly singles, purpose built flats
				36	Older people, flats
4	Moderate Means	K	Asian Communities	37	Crowded Asian terraces
				38	Low income Asian families
		L	Post-Industrial Families	39	Skilled older families, terraces
				40	Young working families
		M	Blue-Collar Roots	41	Skilled workers, semis and terraces
				42	Home owning families, terraces
				43	Older people, rented terraces
5	Hard Pressed	N	Struggling Families	44	Low income larger families, semis
				45	Low income, older people, smaller semis
				46	Low income, routine jobs, terraces and flats
				47	Low income families, terraced estates
				48	Families and single parents, semis and terraces
				49	Large families and single parents, many children
		O	Burdened Singles	50	Single elderly people, council flats
				51	Single parents and pensioners, council terraces
				52	Families and single parents, council flats
		P	High-Rise Hardship	53	Old people, many high-rise flats
				54	Singles and single parents, high-rise estates
		Q	Inner City Adversity	55	Multi-ethnic purpose built estates
				56	Multi-ethnic crowded flats
U	Unclassified		Unclassified		Industrial premises, schools, hospitals prisons etc.

2.2.3 ACORN Profile for Leeds

The ACORN socio-demographic profile for Leeds is summarised as percentage of total households in Table 2.4. This profile shows that four categories of household are prominent in the Authority, categories 3, 5, 1, and 4.

Table 2.2 ACORN Profile for Leeds

ACORN Category	Description	%
1	Wealthy Achievers	17.2
2	Urban Prosperity	9.2
3	Comfortably Off	32.8
4	Moderate Means	15.2
5	Hard Pressed	25.6
U	Unclassified	0
Total		100

Source: Leeds City Council

2.3 Waste Collection Services in Leeds

LCC provides a kerbside collection service for recyclable and non-recyclable (residual) household waste. Residual waste is collected weekly. Across Leeds a range of receptacles are used for presenting residual waste, for example: wheeled black bins; black bin bags (for households where wheeled bins would be unsuitable); and 1,100 l Euro bins (for high rise flats). Dry recyclable waste material from households is presented in green bins. These are collected by the Council every four weeks. The range of recyclable materials which the Council will accept for collection is shown in Table 2.3.

Table 2.3 Materials Collected For Recycling At Kerbside by Leeds City Council

Material Category	Items Accepted	Items Not Accepted
Paper	Junk mail, office paper, newspapers, magazines	
Cardboard	Brown card, glossy card, egg boxes, toilet inner tubes	Tetrapaks (juice cartons)
Metal cans	Drink cans, food cans, pet food cans	
Plastics	Types 1, 2 and 4 such as bags, bottles and milk containers.	Cosmetics containers, garden hose, straws, microwave dishes, ice cream tubs or polystyrene, margarine tubs, yoghurt pots

Source: Leeds City Council Website

2.4 Sample Strategy

This Study concentrates on households served with a monthly green bin collection and a weekly black bin collection (for dry recyclables and residual waste respectively). Households served with bag collections, high rise properties and properties with no green bin collection or no black bin collection were excluded from the study. The total number of households in Leeds is 321,546 (ONS mid-year estimate 2005). The number of households with monthly green bin and weekly black bin collections is 272,475, approximately 85% of the households in Leeds.

Series of streets (sample areas) were selected to represent each ACORN group. The number of households collected from in each area was proportional to the ACORN profile for Leeds (see Table 2.4). Samples of waste were collected from a total of 250 households. The composition of this 250 household sample would therefore reflect the composition of household waste arising in Leeds.

Table 2.4 Sample Profile by ACORN Category and Number of Households

ACORN Category	Number Of Households	%
1	43	17.2
2	23	9.2
3	82	32.8
4	38	15.2
5	64	25.6
U	0	0
Total	250	100

Source: Leeds City Council

2.5 Sample Collection

Waste samples were collected over a two week period between 19th February and 1st March 2007. The sample collection schedule devised by LCC is given in Table 2.5. Sampling involved one visit to each sample area on a day when both recyclables and residual waste were scheduled for collection. The sampling team consisted of two LA provided vehicles (7.5t lorries with tail lifts), with drivers, loaders, and a member of Entec Staff. The sampling team arrived at the selected sites approximately 40 minutes prior to the arrival of the regular collection crews. The sample area (several adjacent streets) was surveyed and the set-out of recycling containers recorded. i.e., the address of households setting out recyclables was noted and the address of households not setting out recyclables was also noted. The specified number of households presenting recyclables and residual waste for collection (see Table 2.5) were then selected at random from across the sample area. All of the material set out for collection by the selected properties was placed into bulk carrying sacks and placed into the collection vehicle. Recyclables were collected into one vehicle and residual waste collected into the other. Material from individual properties was not marked or linked to specific households. The collected material was then transported to the sort site.

Table 2.5 Sample Collection Schedule (Dry Recyclables and Residual Waste): Number of Households Sampled By ACORN Category and Day (19 Feb – 01 Mar 2007)

	Week 1					Week 2					Total	
ACORN	Mon	Tue	Wed	Thu	Fri	Mon	Tue	Wed	Thu	Fri	Households	%
1A						16						
1B						6						
1C					21						43	17.2
2D							9					
2E				4								
2F	10										23	9.2
3G							10					
3H		8		13		8	12		9			
3I				17								
3J	5										82	32.8
4K								5				
4L		7										
4M	26										38	15.2
5N		25										
5N			22									
5O			10					4				
5P									2			
5Q								1			64	25.6
Total	41	40	32	34	21	30	31	10	11	0	250	100

Source: Leeds City Council

2.6 Sample Sorting

The waste sorting exercise was carried out at LCC's transfer station located in Seacroft, Leeds. Waste from individual households was bulked together to give single samples of either recyclables or residual waste for each (ACORN) sample area. Samples were stored and sorted separately. As far as practicable, samples were sorted within one day of collection.

Sample material was sorted on a 10mm screen table, allowing 'fines', less than 10mm in diameter, to fall to the floor for collection. All of the material collected was manually sorted according to material category. Fifteen primary categories and thirty nine sub-categories were used. See Table 2.6 for the waste sort categories with examples. The weight of material reporting to each sub-category was recorded. Once analysed all waste materials were disposed in the normal way. Both residual and dry recyclable waste samples were sorted in the same way.

Table 2.6 Waste Sort Categories

Primary Category	Secondary Category	Examples
Paper & Card	Cardboard Boxes and Containers*	All card drinks cartons, fabric conditioner cartons.
		Corrugated Card – Thick / Heavy card packaging
		Thin Card Packaging (Grey card) – cereal boxes, egg boxes
	Newspapers & Magazines*	Local & National Newspapers (Broadsheets & Tabloids), non-glossy magazines
		Glossy magazines & glossy paper (gummed & stapled spines)
	Recyclable Paper*	Letters, junk mail, phone books, books, office paper, Yellow Pages
	Other Paper & Card	Tissue paper, wall paper, sanitary tissue paper, fish & chip wrappers, photographs
		Greetings cards, train tickets, beer mats
Plastic Film	Refuse Sacks & Carrier Bags*	
	Packaging Film	Crisp packets, sweet wrappers, bread bags, potato bags, food wrapping film, gift wrap
	Other	Document wallets
Dense Plastic	Bottles*	All Plastic Bottles
	Other Packaging	Expanded polystyrene packaging, food trays, pizza bases, yoghurt pots, ready meal packets
	Other	All non-packaging dense plastic, video tapes, CD cases, CDs, toys, disposable razors
Textiles	Textiles	Clothing, rags, sheets, curtains, towels, fabric off cuts, balls of wool, wash cloths
	Shoes	All footwear
Miscellaneous	Disposable Nappies	Disposable nappies
Combustibles	Wood	Any painted or treated wood, DIY off cuts, boxes, fencing, shelves
	Carpet and Underlay	Carpet, rugs, carpet samples, bath mats, underlay
	Furniture	Complete (reusable) items of furniture made of plastic, wood, fabric & foam
	Other	Fluff, vacuum bags, sponges, soap, fake leather clothes, hand-bags, foam, tyres
Glass	Packaging	All glass bottles and jars
	Non-Packaging	All other glass – window glass, light bulbs, decorative ornaments
Putrescibles	Home Comp. Kitchen Waste	Fruit & vegetable peelings, tea bags
	Non-Home Comp Kitchen Waste	Meat, processed food, bread, egg shells, chocolate, biscuits, cheese
	Garden Waste	Twigs, leaves, grass cuttings, hedges trimmings, cut flowers, soil
	Other Organic	Dead animals, excrement, bone, cat litter
Ferrous Metal	Food and Beverage Cans*	Magnetic food cans
		Magnetic drinks cans
	Other Ferrous	Coat hangers, nails, screws, cutlery, door furniture, car parts, aerosols
Non-Ferrous metal	Food and Beverage Cans*	Non-magnetic food cans
		Non-magnetic drinks cans
	Other Non-Ferrous	Aluminium foil, copper pipe, decorative furnishings, jewellery
WEEE	White Goods	Fridges, cookers, dishwashers, microwave ovens, heaters
	Large Electronic Goods	Vacuum cleaners, computers, hi-fi's, printers, radios
	TV's and Monitors	Glass cathode ray tubes
	Other WEEE	Keyboards, wires, irons, lamps, kettles, personal stereos, electronic toys
Potentially	Lead-Acid Batteries	Car batteries
Hazardous	Oil	Engine Oil
	Identifiable Clinical Waste	Drugs, tablets & packaging, wound dressings, syringes, medical items, blood soiled waste
	Other Potentially Hazardous	White spirit, thinners, paint, insecticides, bleach, chemicals, asbestos
		Household batteries
Miscellaneous	Construction and Demolition	Floor tiles, plasterboard, plaster, rubble, sawdust, gravel, sand, cement
Non- Combustibles	Other Misc. Non-Combustibles	Stones, crockery, porcelain ornaments, flower pots, cinder
Fines	Fines	Fine material less than 10 mm
Liquids	Liquids in Plastic Bottles	Drinks, water etc., non-hazardous

Note (*): Materials targeted by LCC for recycling

2.7 Data Reporting

2.7.1 Waste Arisings

The sample collection information and waste sort data were processed to determine average weekly arisings. Arisings are reported as kilograms per household per week (kg/hh/wk) for Leeds.

2.7.2 Dry Recyclables Arisings

Arisings for Dry Recyclables were calculated as:

$$\frac{\text{(Total weight of material reporting to material category, kg)}}{\text{(Number of households sampled)} \times \text{(Number of weeks in the collection period)}} \times \text{(Average Set-Out \%)} = \text{Dry Recyclables Arisings (kg/hh/wk)}$$

2.7.3 Residual Waste Arisings

The set-out of Residual Waste bins is assumed to be 100%. Arisings for Residual Waste were calculated as:

$$\frac{\text{(Total weight of material reporting to material category, kg)}}{\text{(Number of households sampled)} \times \text{(Number of weeks in the collection period)}} = \text{Residual Waste Arisings (kg/hh/wk)}$$

2.7.4 Waste Composition

These data are also presented as a weight percent (wt. %), giving an assay or waste composition. Data are presented in Section 3.2.

2.8 Research Limitations

Limitations of this research project and issues encountered during collection are as follows:

- Socio-demographic profiling for Leeds was carried out by LCC using ACORN data. The total number of households in Leeds is 321,546 (ONS mid-year estimate 2005). However, the study population does not include all of these households. The waste study concentrates on those households with a green wheeled bin (dry recyclable waste) and a black wheeled bin (residual waste). It excludes households on green or black bag collections, high rise properties and properties with no green bin collection or no black bin collection. Therefore, conclusions cannot be drawn about differences between households that have a collection for recyclables and those that do not. The number of properties in the study population is 272,475, approximately 85% of the households in Leeds;
- Every effort was made throughout this Study to ensure that the waste composition analysis would generate representative data. However, this Study can only provide a 'snapshot' composition of LCC's kerbside collected recyclables and residual waste;
- A participation study did not form part of this project. Such a study would provide an indication of overall household behaviour within Leeds, and inform the level

and frequency of participation. For example, some households may set-out their recyclables every other month. Dependent on whether this study collected recyclables from these households, or not, may influence the results.

3. Results

3.1 Set-out of Recyclables

The observed set-out of recycling containers is shown for each ACORN category in Table 3.1. The overall set-out for Leeds was calculated to be 74 %.

Set-out rate provides a fairly arbitrary measurement of public involvement in the recycling schemes. More robust information would be provided by a full participation survey, which DEFRA guidance recommends should be carried out over a period of 4 to 8 weeks (depending on the collection frequency). A full participation survey would allow some account to be taken of householders which participate in the schemes, but do not have sufficient waste to set-out recycling containers for collection on every occasion. Nevertheless, the information provides a useful indication of the variation in participation between ACORN categories.

Table 3.1 Recycling Container Set-Out (February 2007)

ACORN Category	ACORN profile for sample, %	Households surveyed, No.	Households presenting containers, No.	Set-out in survey area, %	Set-out weighted for sample profile, %
1	17%	67	57	85%	15%
2	9%	47	40	85%	8%
3	33%	146	98	67%	22%
4	15%	57	48	84%	13%
5	26%	142	91	64%	16%
Weighted average % set-out for Leeds					74%

3.2 Leeds - Waste Composition Data

The composition and arisings of Recyclables (green bin) and Residual Waste (black bin), identified during the study of LCC's kerbside scheme in February 2007, are illustrated in Figure 3.1. Supporting data are provided in

Table 3.2 and Table 3.3.

The weekly arisings of Dry Recyclables were found to be 2.44 kg/hh/wk. The most prominent material category was Paper and Card with arisings of 1.99 kg/hh/wk (81.59 % of Dry Recyclables). Newspapers and Magazines were the most prominent sub-category within Paper and Card, having arisings of 1.31 kg/hh/wk (53.37 % of Dry Recyclables). Cardboard Boxes and Containers were the second most prominent sub-category with arisings of 0.45 kg/hh/wk (18.59 % of Dry Recyclables).

The remaining 18.41 % of Dry Recyclables was made up largely of Dense Plastic (0.18 kg/hh/wk, 7.41 %), Metals (ferrous at 0.08 kg/hh/wk, 3.33 % and non-ferrous at 0.03 kg/hh/wk, 2.08 %), Plastic Film (0.05 kg/hh/wk, 2.08 %) and Miscellaneous Combustibles (0.03 kg/hh/wk, 1.03 %). Due to their low bulk density the plastics represented a large volume of material.

Weekly arisings of Residual Waste were 15.53 kg/hh/wk. Putrescibles were the most prominent material category with arisings of 5.44 kg/hh/wk (35.01 % of the Residual Waste). Most of this was Kitchen Waste at 4.25 kg/hh/wk; the remainder was Garden Waste at 1.19 kg/hh/wk. Compostible Kitchen waste arisings were 2.20 kg/hh/wk (14.16 % of Residual Waste). Non-Compostible Kitchen waste arisings were 2.06 kg/hh/wk (13.17 % of Residual Waste). The second most prominent fraction was Paper and Card with arisings of 2.95 kg/hh/wk (19.01 % of Residual Waste). The most significant sub-categories in Paper and Card were Newspapers and Magazines (1.04 kg/hh/wk 6.73 %), Other Paper and Card (0.94 kg/hh/wk, 6.03 %) and Cardboard Boxes and Containers (0.80 kg/hh/wk, 5.15 %).

Combined total weekly arisings (Dry Recyclables and Residual Waste) were 17.97 kg/hh/wk. Putrescibles and Paper and Card were the two most prominent fractions. The total arising of Putrescibles was 5.46 kg/hh/wk (30.38 % of the combined total) (Kitchen Waste at 4.26 kg/hh/wk and Garden Waste at 1.20 kg/hh/wk). The arising of Paper and Card was 4.94 kg/hh/wk (27.50 % of combined total).

Figure 3.1 Arisings and Composition of Collected Waste (Summary), Leeds February 2007

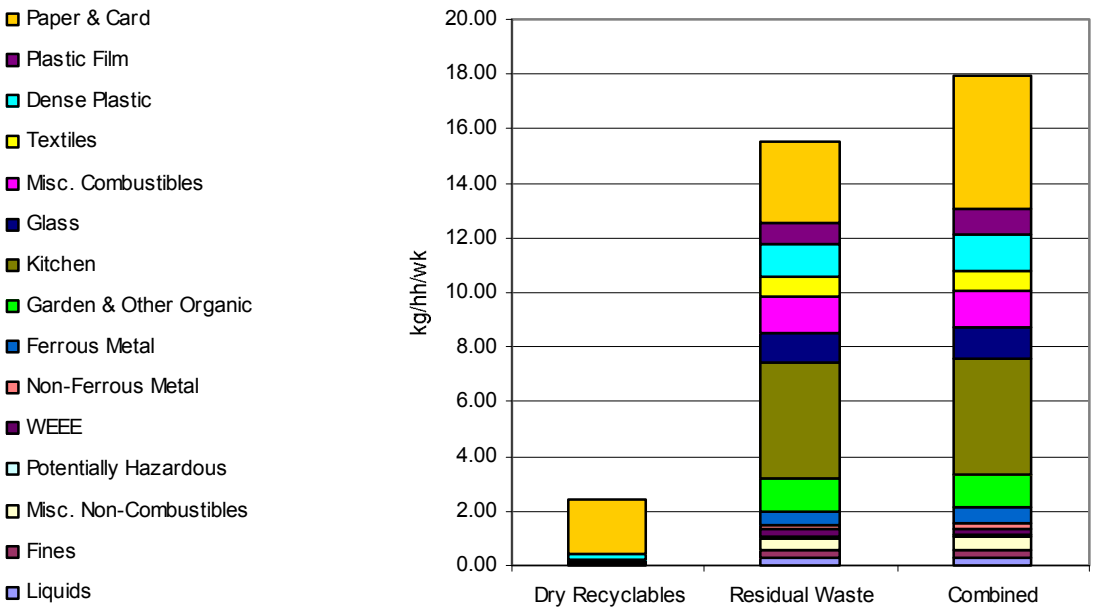

Table 3.2 Arisings and Composition of Collected Waste (Summary), Leeds February 2007

Primary Material Category	Dry Recyclables		Residual Waste		Total Arisings	
	kg/hh/wk	wt%	kg/hh/wk	wt%	kg/hh/wk	wt%
Paper & Card	1.99	81.59	2.95	19.01	4.94	27.50
Plastic Film	0.05	2.08	0.81	5.25	0.87	4.82
Dense Plastic	0.18	7.41	1.17	7.56	1.35	7.54
Textiles	0.01	0.34	0.71	4.55	0.72	3.98
Misc. Combustibles	0.03	1.03	1.35	8.70	1.38	7.66
Glass	0.02	0.74	1.11	7.18	1.13	6.30
Kitchen Waste	0.01	0.52	4.25	27.33	4.26	23.69
Garden & Other Organic	0.01	0.34	1.19	7.68	1.20	6.69
Ferrous Metal	0.08	3.33	0.50	3.24	0.58	3.25
Non-Ferrous Metal	0.03	1.11	0.16	1.00	0.18	1.02
WEEE	0.01	0.28	0.24	1.52	0.24	1.35
Pot. Hazardous	0.00	0.12	0.07	0.43	0.07	0.39
Misc. Non-Comb.	0.01	0.44	0.48	3.10	0.49	2.74
Fines (Less than 10 mm)	0.01	0.51	0.27	1.73	0.28	1.57
Liquids in Plastic Bottles	0.00	0.15	0.27	1.72	0.27	1.50
Totals	2.44	100.00	15.53	100.00	17.97	100.00

Table 3.3 Arising and Composition of Collected Waste, Leeds February 2007

Secondary Material Category	Dry Recyclables		Residual Waste		Total Arisings	
	kg/hh/wk	wt%	kg/hh/wk	wt%	kg/hh/wk	wt%
Cardboard Boxes & Containers *	0.45	18.59	0.80	5.15	1.25	6.97
Newspapers & Magazines *	1.31	53.57	1.04	6.73	2.35	13.08
Recyclable Paper *	0.09	3.85	0.17	1.10	0.26	1.47
Other Paper & Card	0.14	5.59	0.94	6.03	1.07	5.97
Refuse Sacks & Carrier Bags *	0.03	1.04	0.37	2.39	0.40	2.20
Packaging Film	0.02	0.97	0.38	2.44	0.40	2.24
Other plastic Film	0.00	0.07	0.07	0.42	0.07	0.38
Bottles *	0.12	4.87	0.40	2.60	0.52	2.91
Other Packaging	0.04	1.68	0.51	3.25	0.55	3.04
Other Dense Plastic	0.02	0.86	0.26	1.70	0.29	1.59
Textiles	0.00	0.20	0.54	3.50	0.55	3.05
Shoes	0.00	0.14	0.16	1.05	0.17	0.93
Disposible Nappies	0.00	0.07	0.69	4.43	0.69	3.84
Wood	0.01	0.24	0.23	1.51	0.24	1.34
Carpet & Underlay	0.00	0.02	0.17	1.12	0.17	0.97
Furniture	0.00	0.00	0.00	0.00	0.00	0.00
Other Misc. Combustibles	0.02	0.71	0.26	1.64	0.27	1.52
Packaging Glass	0.02	0.73	1.03	6.62	1.05	5.82
Non-Packaging Glass	0.00	0.01	0.09	0.56	0.09	0.48
Home Comp. Kitchen Waste	0.00	0.10	2.20	14.16	2.20	12.25
Non-Home Comp. Kitchen	0.01	0.42	2.05	13.17	2.06	11.44
Garden Waste	0.00	0.16	0.75	4.86	0.76	4.22
Other Organic	0.00	0.18	0.44	2.82	0.44	2.46
Food & Beverage Cans *	0.07	2.80	0.33	2.12	0.40	2.21
Other Ferrous Metal	0.01	0.53	0.17	1.12	0.19	1.04
Food & Beverage Cans *	0.02	1.01	0.10	0.63	0.12	0.68
Other non-Ferrous Metal	0.00	0.10	0.06	0.38	0.06	0.34
White Goods	0.00	0.00	0.00	0.00	0.00	0.00
Large Electronic Goods	0.01	0.23	0.21	1.38	0.22	1.22
TVs and Monitors	0.00	0.00	0.00	0.00	0.00	0.00
Other WEEE	0.00	0.05	0.02	0.14	0.02	0.13
Lead-Acid Batteries	0.00	0.00	0.00	0.01	0.00	0.01
Oil	0.00	0.05	0.00	0.00	0.00	0.01
Identifiable Clinical Waste	0.00	0.00	0.01	0.09	0.01	0.08
Other Pot. Haz.	0.00	0.07	0.05	0.33	0.05	0.29
C&D Waste	0.00	0.00	0.11	0.70	0.11	0.61
Other Misc Non-Comb.	0.01	0.44	0.37	2.40	0.38	2.14
Fines (Less than 10 mm)	0.01	0.51	0.27	1.73	0.28	1.57
Liquids in Plastic Bottles	0.00	0.15	0.27	1.72	0.27	1.50
Totals	2.44	100.00	15.53	100.00	17.97	100.00

Note (*): Materials targeted by LCC for recycling

4. Data Analysis

4.1 Data Analysis Table

The waste arisings data presented in Section 3 were further analysed to gain an insight into the nature of the materials arising in the Dry Recyclables and Residual Waste streams. This analysis is presented in Table 4.1 below. The following bullets explain the table's content and layout.

Column 1 - Lists the 39 material sub-categories into which samples of waste were sorted. Sub-totals are given for the 14 headline categories.

Column 2 - Gives the average arisings of Dry Recyclables in kilograms per household per week (kg/hh/wk).

Column 3 - Gives the average arisings of Residual Waste in kilograms per household per week (kg/hh/wk).

Column 4 - Gives the combined total arisings of kerbside collected Dry Recyclables and Residual Waste (the sum of columns 2 and 3).

Column 5 - Gives the assay or waste composition (Column 4 expressed as weight percent).

Column 6 - Shows the amount of targeted dry recyclable materials present in the combined waste streams (kg/hh/wk).

Column 7 - Shows the amount of targeted dry recyclable material available in the combined waste streams, as a percentage of the total arisings.

Column 8 - Gives the amount of target dry recyclable material collected in the kerbside recycling scheme (kg/hh/wk).

Column 9 - Shows capture rates for individual target Dry Recyclables (collected in the kerbside recycling scheme) (Column 8 as a percentage of column 6). The sub-totals in this column give the capture rates for the target materials in each headline category.

Column 10 - Gives the amount of non-target material collected in the kerbside recycling scheme (kg/hh/wk).

Column 11 - Shows the level of non-target material captured as Recyclables. This is expressed as a percentage of collected Dry Recyclables (Column 10 as a percentage of total arisings in column 2).

Table 4.1 Data analysis, Leeds February 2007

1	2	3	4	5	6	7	8	9	10	11
Material	Arisings			Assay	Target Dry Recyclables		Captured Target Materials		Captured Non-Target	
	Dry Recyclables	Residual Waste	Total Arisings			wt% of total arisings		material fraction wt%		wt% of recyclables
	kg/hh/wk	kg/hh/wk	kg/hh/wk	wt%	kg/hh/wk		kg/hh/wk		kg/hh/wk	
Cardboard Boxes & Containers *	0.45	0.80	1.25	6.97	1.25	6.97	0.45	36.16	-	-
Newspapers & Magazines *	1.31	1.04	2.35	13.08	2.35	13.08	1.31	55.56	-	-
Recyclable Paper *	0.09	0.17	0.26	1.47	0.26	1.47	0.09	35.39	-	-
Other Paper & Card	0.14	0.94	1.07	5.97	-	-	-	-	0.14	5.59
Subtotal: Paper & Card	1.99	2.95	4.94	27.50	3.87	21.53	1.85	47.89	0.14	5.59
Refuse Sacks & Carrier Bags *	0.03	0.37	0.40	2.20	0.40	2.20	0.03	6.39	-	-
Packaging Film	0.02	0.38	0.40	2.24	-	-	-	-	0.02	0.97
Other plastic Film	0.00	0.07	0.07	0.38	-	-	-	-	0.00	0.07
Subtotal: Plastic Film	0.05	0.81	0.87	4.82	0.40	2.20	0.03	6.39	0.03	1.04
Bottles *	0.12	0.40	0.52	2.91	0.52	2.91	0.12	22.71	-	-
Other Packaging	0.04	0.51	0.55	3.04	-	-	-	-	0.04	1.68
Other Dense Plastic	0.02	0.26	0.29	1.59	-	-	-	-	0.02	0.86
Subtotal: Dense Plastic	0.18	1.17	1.35	7.54	0.52	2.91	0.12	22.71	0.06	2.54
Textiles	0.00	0.54	0.55	3.05	-	-	-	-	0.00	0.20
Shoes	0.00	0.16	0.17	0.93	-	-	-	-	0.00	0.14
Subtotal: Textiles	0.01	0.71	0.72	3.98	0.00	0.00	0.00	-	0.01	0.34
Disposible Nappies	0.00	0.69	0.69	3.84	-	-	-	-	0.00	0.07
Wood	0.01	0.23	0.24	1.34	-	-	-	-	0.01	0.24
Carpet & Underlay	0.00	0.17	0.17	0.97	-	-	-	-	0.00	0.02
Fumiture	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00
Other Misc. Combustibles	0.02	0.26	0.27	1.52	-	-	-	-	0.02	0.71
Subtotal: Misc. Combustibles	0.03	1.35	1.38	7.66	0.00	0.00	0.00	-	0.03	1.03
Packaging Glass	0.02	1.03	1.05	5.82	-	-	-	-	0.02	0.73
Non-Packaging Glass	0.00	0.09	0.09	0.48	-	-	-	-	0.00	0.01
Subtotal: Glass	0.02	1.11	1.13	6.30	0.00	0.00	0.00	-	0.02	0.74
Home Comp. Kitchen Waste	0.00	2.20	2.20	12.25	-	-	-	-	0.00	0.10
Non-Home Comp. Kitchen	0.01	2.05	2.06	11.44	-	-	-	-	0.01	0.42
Garden Waste	0.00	0.75	0.76	4.22	-	-	-	-	0.00	0.16
Other Organic	0.00	0.44	0.44	2.46	-	-	-	-	0.00	0.18
Subtotal: Putrescibles	0.02	5.44	5.46	30.38	0.00	0.00	0.00	-	0.02	0.87
Food & Beverage Cans *	0.07	0.33	0.40	2.21	0.40	2.21	0.07	17.17	-	-
Other Ferrous Metal	0.01	0.17	0.19	1.04	-	-	-	-	0.01	0.53
Subtotal: Ferrous Metal	0.08	0.50	0.58	3.25	0.40	2.21	0.07	17.17	0.01	0.53
Food & Beverage Cans *	0.02	0.10	0.12	0.68	0.12	0.68	0.02	20.26	-	-
Other non-Ferrous Metal	0.00	0.06	0.06	0.34	-	-	-	-	0.00	0.10
Subtotal: Non-Ferrous Metal	0.03	0.16	0.18	1.02	0.12	0.68	0.02	20.26	0.00	0.10
White Goods	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00
Large Electronic Goods	0.01	0.21	0.22	1.22	-	-	-	-	0.01	0.23
TVs and Monitors	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00
Other WEEE	0.00	0.02	0.02	0.13	-	-	-	-	0.00	0.05
Subtotal: WEEE	0.01	0.24	0.24	1.35	0.00	0.00	0.00	-	0.01	0.28
Lead-Acid Batteries	0.00	0.00	0.00	0.01	-	-	-	-	0.00	0.00
Oil	0.00	0.00	0.00	0.01	-	-	-	-	0.00	0.05
Identifiable Clinical Waste	0.00	0.01	0.01	0.08	-	-	-	-	0.00	0.00
Other	0.00	0.05	0.05	0.29	-	-	-	-	0.00	0.07
Subtotal: Pot. Hazardous	0.00	0.07	0.07	0.39	0.00	0.00	0.00	-	0.00	0.12
C&D Waste	0.00	0.11	0.11	0.61	-	-	-	-	0.00	0.00
Other Misc Non-Comb.	0.01	0.37	0.38	2.14	-	-	-	-	0.01	0.44
Subtotal: Misc. Non-Comb.	0.01	0.48	0.49	2.74	0.00	0.00	0.00	-	0.01	0.44
Fines (Less than 10 mm)	0.01	0.27	0.28	1.57	-	-	-	-	0.01	0.51
Liquids in Plastic Bottles	0.00	0.27	0.27	1.50	-	-	-	-	0.00	0.15
Totals	2.44	15.53	17.97	100.00	5.31	29.53	2.09	39.38	0.35	14.27

Note (*): Materials targeted by LCC's recycling scheme

4.2 Capture Rates for Recyclables

4.2.1 Target Materials Collected As Recyclables

LCC targets specific materials for collection in their kerbside collection scheme (as detailed in Table 2.3). The scheme targets primarily paper and card. Plastic bags and bottles as well as ferrous and non-ferrous food and beverage cans are also accepted. The data in Table 4.1 show that some of the target materials are captured more effectively than others.

Out of a total of 17.97 kg/hh/wk combined Dry Recyclables and Residual Waste arisings, a total of 5.31 kg/hh/wk of target recyclable material was found to be potentially available. From this target material, 2.09 kg/hh/wk or 39.38 % was actually captured. The capture rate for individual targeted materials was found to be low. Paper and Card at 3.87 kg/hh/wk represented most of the target material potentially available. Of this amount 1.85 kg/hh/wk or 47.89 % was actually captured. Similar schemes elsewhere in the UK have demonstrated capture of over 80% for targeted paper. The capture rates for Dense Plastic, Non-Ferrous Metal, Ferrous Metal and Plastic Film were 22.71 %. 20.26 %, 17.17 % and 6.39 % respectively.

4.2.2 Non-Target Material Collected As Recyclables

The amount of target and non-target material arising in Dry Recyclables is detailed in Table 4.1 (Columns 8 to 11). The study average figure for non-target material arising in the Dry Recyclables was 0.35 kg/hh/wk (14.27 %). Similar schemes recently studied average in the range of 5 % to 15 % for non-target materials.

The average composition of non-target material arising in the Dry Recyclables collections in Leeds is given in Table 4.2. Depending on their nature, non-target materials arising in the Dry Recyclables may be regarded as recyclables or contaminants.

Other Paper and Card (39.13 %), although a non-target material, will be accepted at certain levels in a mixed paper product. This mixed paper product may attract a lower price in the market place. However, the captured Other Paper and Card will count towards LCC's recycling figures.

Putrescibles (6.06 %) on the other hand can only be regarded as contaminants when present in the collected Dry Recyclable stream. Putrescibles cross-contaminate other recyclable materials, and reduce the amount of material that can be recovered from the Dry Recyclables. This type of contamination hinders the operation at a MRF (where both the contaminants and cross contaminated material are removed). Glass (5.2 %) will also cross-contaminate and is known to damage equipment at the MRF. Furthermore, Glass poses a health and safety risk to MRF operatives. Putrescibles and Glass combined represent 11.27 % (0.04 kg/hh/wk) of total non-target material arising in the Dry Recyclables stream.

Table 4.2 Average Composition of Non-Target Materials Arising In Dry Recyclables Collections

Primary Material Category	Assay (wt. %)
Paper & Card	39.13
Plastic Film	7.29
Dense Plastic	17.78
Textiles	2.41
Misc. Combustibles	7.24
Glass	5.20
Putrescibles	6.06
Ferrous Metal	3.68
Non-Ferrous Metal	0.69
WEEE	1.97
Pot. Hazardous	0.83
Misc. Non-Comb.	3.05
Fines	3.59
Liquids	1.07
Total	100.00

4.3 Biodegradable Municipal Solid Waste

The level of biodegradable municipal solid waste (BMW) present in the two waste streams was determined using Defra's assigned Biodegradability factors (given in Table 4.3).

The overall BMW content for combined Dry Recyclables and Residual Waste streams was calculated to be 65.99 % (See Table 4.4). The most prominent materials contributing to BMW were Putrescibles at 31.88 % (24.45 % Kitchen and 7.44 % Garden) and Paper and Card at 27.50 %.

Dry Recyclables made up 11.33 % of Total / Combined BMW. Captured recyclable material represents BMW diverted from landfill. Paper and Card captured in Dry Recyclables contributed to 11.07 % BMW diversion.

Residual Waste represents 54.65 % of Total / Combined BMW. Putrescibles and Paper and Card, at 31.88 % and 27.50 % respectively, make up the majority of the BMW content in the Residual Waste stream. Putrescibles comprised mostly of Kitchen Waste at 24.37 %, with Garden comprising the remainder at 7.38 %. As detailed in Section 4.2, the capture rate for Paper and Card was 47.89 %. Capturing more Paper and Card in the Dry Recyclables and reducing the amount going to the Residual Waste stream would help divert BMW from landfill.

Table 4.3 Biodegradable Content of Household Waste Materials (Waste Strategy 2000 for England and Wales)

Primary Material Category	Biodegradable Content
Paper & Card	100.0%
Dense plastics	0.0%
Plastic film	0.0%
Glass	0.0%
Textiles	50.0%
Ferrous metals	0.0%
Non-ferrous metals	0.0%
Putrescibles (Kitchen, Garden and Other Organics)	100.0%
WEEE	0.0%
Household hazardous waste	0.0%
Miscellaneous combustible	50.0%
Miscellaneous non-combustible	0.0%
Fines <10mm	50.0%

Table 4.4 BMW content of waste streams, Leeds (February 2007)

	Recyclables	Residual	Total / Combined
	wt. %	wt. %	wt. %
Paper & Card	11.07	16.43	27.50
Plastic Film	0.00	0.00	0.00
Dense Plastic	0.00	0.00	0.00
Textiles	0.02	1.97	1.99
Misc. Combustibles	0.07	3.76	3.83
Glass	0.00	0.00	0.00
Kitchen*	0.08	24.37	24.45
Garden and Other Organics*	0.06	7.38	7.44
Ferrous Metal	0.00	0.00	0.00
Non-Ferrous Metal	0.00	0.00	0.00
WEEE	0.00	0.00	0.00
Potentially Hazardous	0.00	0.00	0.00
Misc. Non-Combustibles	0.00	0.00	0.00
Fines	0.03	0.75	0.78
Total	11.33	54.65	65.99

Note (*): Kitchen and Garden Other Organics include Liquids and are collectively referred to as Putrescibles

4.4 Comparison with Previous Studies

4.4.1 Introduction

Two previous waste composition studies were undertaken for LCC in June 2005 and February 2006. In this section the results these two studies are compared with the results determined in this study for February 2007.

In the existing work no account was taken of the set out of Dry Recyclables. The reported results therefore illustrate waste arisings (and composition) which effectively had a set out of 100% for Dry Recyclables. To facilitate a like for like comparison, the February 2007 results were re-calculated (see equation 2.7.2) for a set out rate of 100%.

4.4.2 Waste Arisings

Household waste arisings determined during the three studies (June 2005, February 2006 and February 2007) are summarised in Figure 4.1, Figure 4.2 and Figure 4.3 for the Dry Recyclable, Residual and Combined Waste streams respectively. The supporting data are also provided in Table 4.5, Table 4.6 and Table 4.7.

In the Dry Recyclables stream, Paper and Card showed a year on year increase from 2.06 to 2.70 kg/hh/wk. Putrescible material arising in Dry Recyclables showed a year on year decrease

from 0.90 to 0.31 and 0.02 kg/hh/wk. Both of these patterns are likely to be genuine trends associated with a maturing collection scheme.

In the Residual Waste the most notable year on year decrease in arisings was in Putrescible material, from 7.83 to 6.51 and 5.44 kg/hh/wk. Several materials showed a small, but notable year on year increase in arisings, these materials were Plastic Film, Dense Plastics, Textiles and Miscellaneous Combustible material.

These data do not show a pattern in overall waste arisings. However, these apparent trends should be treated with caution, and it should be noted that each of these studies are individual snap shots of waste arisings in Leeds.

4.4.3 Waste Composition

Summary household waste composition data for the Dry Recyclables, Residual Waste and Combined Waste are provided in Table 4.5, Table 4.6 and Table 4.7 respectively.

For the Dry Recyclables these data indicate a year on year increase in the proportion of Paper and Card present, increasing from 54.60 %, and 70.40 % to 81.59 % of Dry Recyclables. This mirrors the increase in weight of collected Paper and Card. Over the same period there was a decrease in the amount of Putrescibles present in the Dry Recyclables, from 0.90 kg/hh/wk (23.92 %), to 0.02 kg/hh/wk (0.87 %) in 2007.

In the Residual Waste the most notable year on year proportional decrease is seen for Putrescibles. This material decreased from 49.73, through 47.64 to 35.01 % of Residual Waste. Again this mirrors the decrease in weight of material collected. Materials which showed a proportional increase were Glass and Miscellaneous Combustible material.

Figure 4.1 Dry Recyclables Composition, June 2005, February 2006 and February 2007

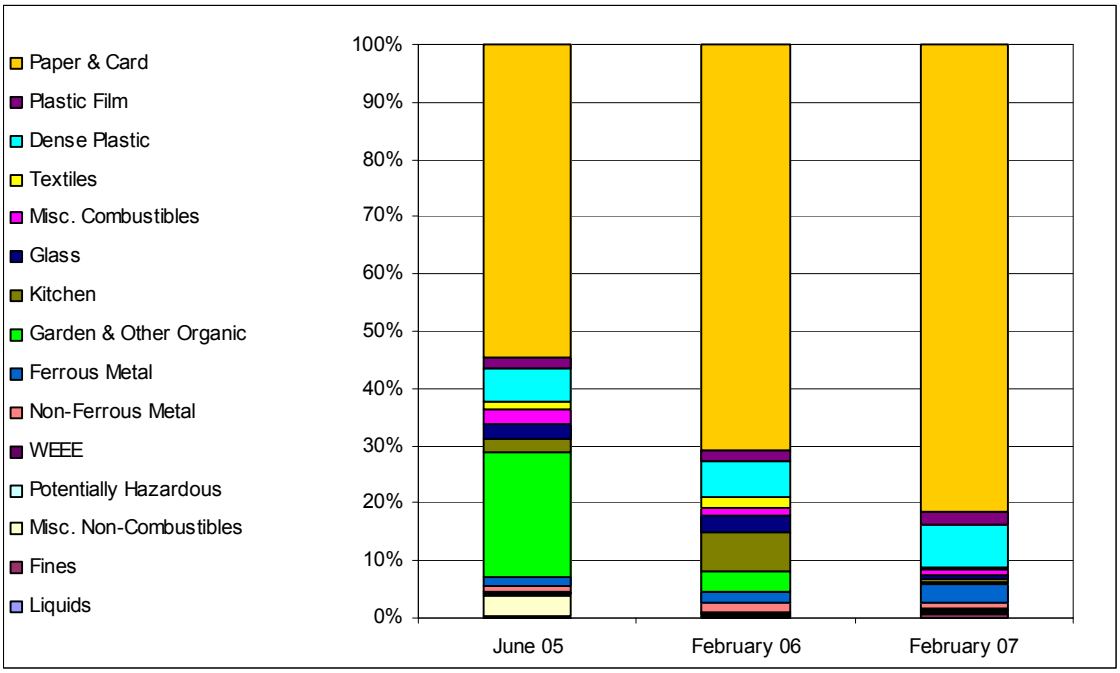

Table 4.5 Dry Recyclables Composition, June 2005, February 2006 and February 2007

Material Category	Arisings (kg/hh/wk)			Composition (wt. %)		
	Jun-05	Feb-06	Feb-07	Jun-05	Feb-06	Feb-07
Paper & Card	2.06	2.12	2.70	54.60	70.40	81.59
Plastic Film	0.07	0.06	0.07	1.80	1.90	2.08
Dense Plastic	0.22	0.19	0.25	5.90	6.30	7.41
Textiles	0.05	0.06	0.01	1.30	1.90	0.34
Misc. Combustibles	0.10	0.03	0.03	2.60	1.10	1.03
Glass	0.09	0.09	0.02	2.50	3.00	0.74
Kitchen	0.09	0.20	0.01	2.34	6.70	0.52
Garden & Other Organic	0.81	0.11	0.01	21.58	3.55	0.34
Ferrous Metal	0.07	0.06	0.11	1.80	1.90	3.33
Non-Ferrous Metal	0.04	0.05	0.04	1.00	1.70	1.11
WEEE	0.01	0.01	0.01	0.30	0.50	0.28
Potentially Hazardous	0.01	0.00	0.00	0.10	0.10	0.12
Misc. Non-Combustibles	0.14	0.01	0.01	3.70	0.40	0.44
Fines	0.01	0.00	0.02	0.30	0.00	0.51
Liquids	0.00	0.00	0.01	0.00	0.00	0.15
Total	3.77	2.99	3.31	100.00	100.00	100.00

Figure 4.2 Residual Waste Composition, June 2005, February 2006 and February 2007

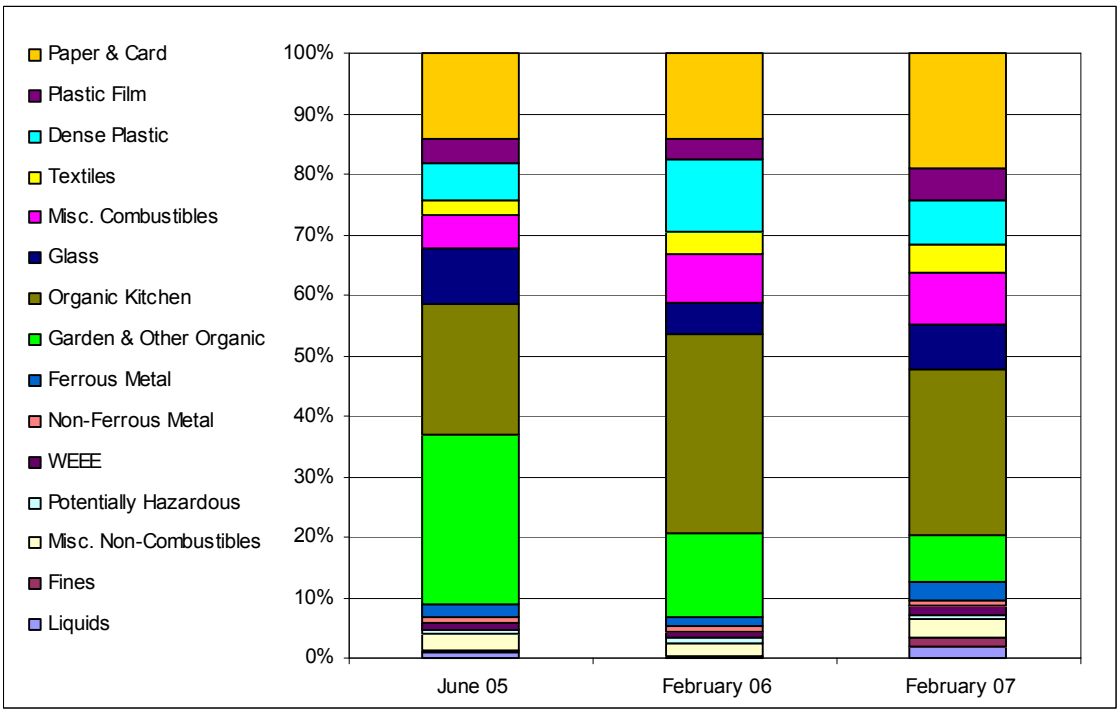

Table 4.6 Residual Waste Composition, June 2005, February 2006 and February 2007

Material Category	Arisings (kg/hh/wk)			Composition (wt. %)		
	Jun-05	Feb-06	Feb-07	Jun-05	Feb-06	Feb-07
Paper & Card	2.25	2.09	2.95	14.30	14.60	19.01
Plastic Film	0.01	0.49	0.81	4.00	3.40	5.25
Dense Plastic	0.92	1.07	1.17	5.90	12.30	7.56
Textiles	0.43	0.51	0.71	2.70	3.50	4.55
Misc. Combustibles	0.86	1.20	1.35	5.40	8.30	8.70
Glass	1.43	0.78	1.11	9.10	5.50	7.18
Kitchen	3.43	4.56	4.25	21.77	33.37	27.33
Garden & Other Organic	4.40	1.95	1.19	27.96	14.27	7.68
Ferrous Metal	0.32	0.21	0.50	2.00	1.50	3.24
Non-Ferrous Metal	0.18	0.15	0.16	1.20	1.00	1.00
WEEE	0.19	0.12	0.24	1.20	0.80	1.52
Potentially Hazardous	0.09	0.16	0.07	0.60	1.10	0.43
Misc. Non-Combustibles	0.41	0.30	0.48	2.60	2.10	3.10
Fines	0.07	0.02	0.27	0.40	0.10	1.73
Liquids	0.13	0.05	0.27	0.90	0.30	1.72
Total	15.12	13.66	15.53	100.00	100.00	100.00

Figure 4.3 Combined Waste Composition, June 2005, February 2006 and February 2007

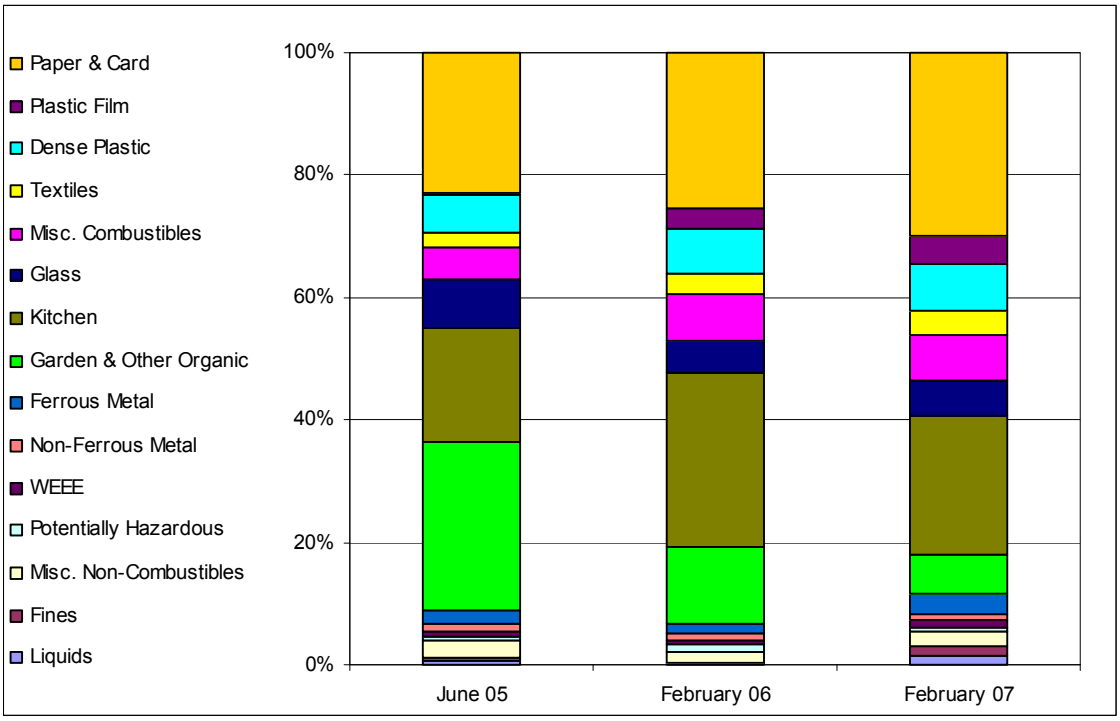

Table 4.7 Combined Waste Composition, June 2005, February 2006 and February 2007

Material Category	Arisings (kg/hh/wk)			Composition (wt. %)		
	Jun-05	Feb-06	Feb-07	Jun-05	Feb-06	Feb-07
Paper & Card	4.31	4.21	5.65	22.80	25.29	30.00
Plastic Film	0.08	0.55	0.88	0.42	3.31	4.69
Dense Plastic	1.15	1.26	1.42	6.08	7.60	7.53
Textiles	0.48	0.56	0.72	2.52	3.39	3.81
Misc. Combustibles	0.96	1.23	1.39	5.06	7.40	7.36
Glass	1.53	0.87	1.14	8.08	5.24	6.05
Kitchen	3.51	4.76	4.26	18.60	28.60	22.60
Garden & Other Organic	5.21	2.06	1.20	27.60	12.35	6.38
Ferrous Metal	0.39	0.27	0.61	2.07	1.59	3.26
Non-Ferrous Metal	0.22	0.20	0.19	1.16	1.17	1.02
WEEE	0.20	0.13	0.25	1.06	0.79	1.30
Potentially Hazardous	0.09	0.16	0.07	0.49	0.97	0.37
Misc. Non-Combustibles	0.55	0.31	0.50	2.92	1.88	2.64
Fines	0.08	0.02	0.29	0.42	0.11	1.52
Liquids	0.14	0.05	0.27	0.72	0.30	1.44
Total	18.89	16.65	18.84	100.00	100.00	100.00

5. Conclusions

The following text outlines the key findings from the waste sort exercise carried out by Entec for LCC in February 2007.

A total of 7.19 tonnes of material (3.31 tonnes Dry Recyclables, and 3.88 tonnes Residual Waste) were collected for the study. This material was manually sorted into 39 material sub-categories.

The study average set-out of Dry Recyclables for Leeds was 74 %.

The Dry Recyclables collections operating in Leeds yielded an average 2.44 kg/hh/wk of material. This was predominantly Paper and Card which formed 81.59 % of the collected material. Newspapers and Magazines represented 53.37 %, while Paper and Card represented 18.59 % of the total arising of Dry Recyclables.

The Residual Waste collections yielded an average 15.53 kg/hh/wk of material. Putrescibles was the most dominant material category with arisings of 5.44 kg/hh/wk or 35.01 % of the total Residual Waste arisings. Most of this was kitchen waste at 4.25 kg/hh/wk. A significant quantity of Paper and Card (2.95 kg/hh/wk or 19.01 %) was also found in the Residual Waste.

The total combined weekly arising of Dry Recyclables and Residual Waste was 17.97 kg/hh/wk. Putrescibles and Paper and Card were the two most prominent fractions.

A total of 5.31 kg/hh/wk of target recyclable material were potentially available in the combined waste streams. From this, 2.09 kg/hh/wk or 39.38 % was actually captured in the recycling scheme. Paper and Card at 3.87 kg/hh/wk represented most of the target material potentially available. Capture rates for the headline recyclable materials were as follows: Paper and Card 47.89 %; Dense Plastic 22.71 %; Non-Ferrous Metal 20.26 %; Ferrous Metal 17.17 %; and Plastic Film 6.39 %. These capture rates are low in comparison with similar schemes elsewhere in the UK.

The study average figure for non-target material arising in the Dry Recyclables was 0.35 kg/hh/wk (14.27 %). Some of this material such as Other Paper and Card will is unlikely to have a significant affect on the Dry Recyclables stream. Materials such as Putrescibles and Glass however, are contaminants and should be removed from the collections.

The overall BMW content of the combined waste was 65.99 %. Most of the BMW was Putrescibles (31.88 %) and Paper and Card (27.50%). Putrescibles comprised mostly of Kitchen Waste at 24.37 %. Capturing more Paper and Card as Dry Recyclables would reduce the amount passing into the Residual Waste, and would help to divert BMW from landfill.

Between January 2005 and February 2007 there was an increase in the amount of Paper and Card arising as Dry Recyclables, from 2.01 kg/hh/wk (54.30 %), to 2.70 kg/hh/wk (81.59 %). The proportion of Putrescible material present in the Dry Recyclables showed a year on year decrease, which mirrors the decrease in weight of this material.

6. Recommendations

This study indicates that there is scope for improving capture rates for all of the materials targeted for collection in the Dry Recyclables stream.

Paper and Card at 30 % of arisings has a capture rate of 47 %. A push to increase the collection of this material may deliver the double benefit of: an increased recycling rate, and an increased diversion of BMW. This may be achieved through a relatively simple message to householders.

Putrescibles account for 48 % of the BMW content of Residual Waste. A significant proportion of is compostable kitchen waste. Should garden waste collections be rolled out, this material could be collected in the same bin. More work could also be done to encourage home composting.

During this study glass arose in the collected Dry Recyclables, contaminating other recyclable material and posing a health and safety risk. Separate collections for glass or more careful policing might help to avoid this.