AEAT/ENV/R/1826

Greater London Authority Waste Composition Scoping Study

A report produced for Greater London Authority

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1 Introduction

1.1 Background

The Mayor has developed a Municipal Waste Management Strategy which will enable London to meet both its recycling targets and the requirements set by the Landfill Directive on landfilling of biodegradable waste. One area where information is required in order to enable the Strategy to be implemented is the composition of municipal waste. The Mayor's Municipal Waste Management Strategy identifies the need to obtain further information on the composition of waste in London in order to determine the amount of material that could be targeted for either recycling or composting in different areas of London. Policy 5 in the Strategy states that 'The Mayor will work with relevant organisations to ensure that statistically reliable, comparable data for the composition and recyclability of London's municipal waste stream is undertaken, to inform strategic decision making'. This information could then be used to assess further options for management of the residual waste. This is outlined in further detail in Chapter 2 and Section 4A of the Strategy.

Waste composition analyses have traditionally concentrated on household collected (dustbin) waste. The different methodologies used, make it more difficult to directly compare the findings. Although household collected waste represents a significant proportion of the municipal solid waste (MSW), there is also a need for information on the composition of other municipal solid waste streams, such as street sweepings and litter, and information on how factors such as ethnicity and the method of waste collection can affect the quantity and composition of municipal solid waste.

1.2 Objectives

The key objectives of this report are:

- To undertake a review of municipal waste analyses undertaken by London's 37 waste authorities since 1997
- Develop a statistically reliable and representative sample matrix and methodology for a London wide study of municipal waste
- Identify potential sources of funding for undertaking a London wide composition study of municipal waste, with identification of authorities already proposing to undertake waste analyses
- Develop a standard methodology and sampling matrix for waste authorities undertaking 'individual' waste analysis studies

1.3 Methodology

In Spring 2004 the Greater London Authority requested copies of waste composition analysis studies undertaken by waste authorities in London since 1997. These studies were reviewed as part of this project, in particular to assess the broad findings of the analyses undertaken (in terms of the make up of the waste stream), methodologies and sampling matrices used and their potential use within the context of a Londonwide study. Analyses conducted by London waste authorities were also assessed in order to identify gaps in information available to the Greater London Authority (in particular composition of waste streams, socio-economic groupings, methods of waste containment).

This assessment was supplemented by some telephone interviews with a selection of waste authorities in London, in order to identify the main areas where further waste analysis data was required.

1.4 Report Format

This report presents the findings from a study conducted by AEA Technology for the Greater London Authority. It assesses the adequacy of available data on waste composition analyses in London and identifies areas where further data is required. The report then discusses a methodology for obtaining further analyses of municipal solid waste in London and identifies possible funding options for obtaining the data.

2 Review of recent waste composition studies in London

Table 1 shows that the arisings of municipal waste in London in 2002/03 were 4.4 million tonnes. The total arisings of household waste were 3.4 million tonnes, and about 11 per cent of household waste was recycled in 2002/03.

Table 1: Arisings of Municipal Solid Waste in London (2002/03)

	Weight (tonnes)	Wt %
Household collected (dustbin)	2,216,459	50
Other household collected waste	297,654	7
Civic Amenity Waste	497,372	11
Household waste recycling	349,195	8
Non household waste	1,067,172	24
Total	**4,446,476**	**100**

Source: GLA/DEFRA Municipal Waste Management Survey 2002/03

There are 37 waste authorities in London. Of the 33 London boroughs, 12 are responsible for the collection and disposal of municipal waste. The other 21 London boroughs are responsible for waste collection and are arranged into four statutory joint waste disposal authorities. The number of authorities in each grouping is listed below:

- Four London Boroughs in the East London Waste Authority (ELWA)
- Seven London Boroughs in the North London Waste Authority (NLWA)
- Six London Boroughs in the West London Waste Authority (WLWA)
- Four London Boroughs in the Western Riverside Waste Authority (WRWA)
- 12 Unitary authorities.

The Greater London Authority requested information/reports from each of the 33 London Boroughs on any waste analyses that they had conducted since 1997. This report summarises the responses that were received, but may not contain all of the analyses, which have been conducted since 1997.

Table 2 shows that waste analyses have been conducted in 20 of the 33 London Boroughs since the Ecologika study[1], which summarised 17 household dustbin waste analyses conducted in eight London Boroughs in 1997. A full list of the reports used to compile this information is shown in Appendix 1. The majority of analyses received by the Greater London Authority have been conducted in three of the joint statutory waste disposal authority groupings (NLWA, WLWA and WRWA). The other joint statutory waste disposal authority, ELWA, requires analysis of its municipal waste stream to be conducted every five years through its long-term waste management contract with Shanks. Analyses have also been conducted in four unitary authorities, Bexley, Corporation of London, Southwark and the City of Westminster. Bromley and Croydon are considering conducting waste analyses.

Table 2: Waste analyses conducted since 1997

Authority	WDA area	Household collected	Civic amenity	Litter	Street sweepings	Trade waste
Barnet	NLWA	X				
Bexley	Unitary	X	X	X		
Brent	WLWA	X				
Camden	NLWA	X				
Corporation of London	Unitary	X[1]				
Ealing	WLWA	X				
Enfield	NLWA	X				
Hackney	NLWA	X				
Hammersmith & Fulham	WRWA	X				
Haringey	NLWA	X				
Hounslow	WLWA	X				
Islington	NLWA	X				
Kensington & Chelsea	WRWA	X				
Lambeth	WRWA	X				
Newham	ELWA	X				
Richmond	WLWA	X				
Southwark	Unitary	X				
Waltham Forest	NLWA	X				
Wandsworth	WRWA	X				
Westminster	Unitary	X		X	X	X

Source: reports provided by London waste authorities

Notes
1. Corporation of London - samples contain commercial waste

Although analyses of household collected waste (which represents 50 per cent of overall municipal waste) have been conducted in 20 authorities, analyses of litter have only been conducted in two authorities (Bexley and Westminster) since 1997. Analyses of civic amenity waste have only been conducted in Bexley, and analyses of both street sweepings and trade waste (which represents a significant proportion of non-household municipal solid waste) have only been conducted in Westminster. The results of each waste composition analysis are contained in Appendix 2.

[1] Managing information for effective recycling and composting programmes. Report from the Ecologika study, 1997

2.1 Household collected (dustbin) waste

Table 3 shows that most of the analyses of household collected (dustbin) waste in London have been conducted since the beginning of 2002 onwards.

Table 3: Analyses of household collected waste conducted in London since 1997

	WDA area	1998	1999	2000	2001	2002	2003	2004
Newham[a]	ELWA			X				X
Barnet[b]	NLWA							X
Camden[b]	NLWA							X
Enfield[a,b]	NLWA				X			X
Hackney[b]	NLWA							X
Haringey[a,b]	NLWA							X
Islington[b]	NLWA							X
Waltham Forest[b]	NLWA							X
Brent[c]	WLWA					X	X	
Ealing[c]	WLWA					X	X	
Hounslow[c]	WLWA					X	X	
Richmond[c]	WLWA					X	X	
Hammersmith and Fulham[d]	WRWA					X	X	
Kensington and Chelsea[d]	WRWA		X			X	X	
Lambeth[d]	WRWA					X	X	
Wandsworth[d]	WRWA					X	X	
Bexley	Unitary					X		X
Corporation of London	Unitary				X		X	
Southwark	Unitary				X			
Westminster	Unitary				X			

Notes

a. As part of landfill tax study to assess variations in composition due to type of property and ethnicity of households in 2004
b. As part of joint NLWA programme in 2003 & 2004
c. As part of Organics in West London (OWL) project in 2002 & 2003
d. As part of joint WRWA programme in 2002 & 2003

There have been three major analysis programmes:

- The 'Organics in West London' (OWL) project[2] – analyses were conducted in four of the six constituent authorities in WLWA. The first set of analyses was conducted in October 2002, and the second set of analyses was conducted in October 2003 after the introduction of an organic waste collection scheme.

[2] Organics in West London Project – Household waste composition study, October 2002 and October 2003. Network Recycling, 2003

- Analyses in each of the four constituent authorities in WRWA. The first set of analyses was conducted in April 2002, and the second set was conducted in October 2003.
- Analyses in all seven constituent authorities in NLWA – this programme started in October 2003, and samples will be analysed in October 2003, January 2004, April 2004 and July 2004.

Analyses have also been conducted in Enfield, Haringey and Newham for a landfill tax funded study (which the Greater London Authority is supporting) to assess variations in composition in dustbin waste due to both type of property and ethnic nature of households. Two sets of analyses were conducted; the first in October 2003 and the second in June 2004. The final report will be available in November 2004.

Bexley is currently conducting seasonal analyses (January, May and October 2004). Analyses are also being conducted in the four authorities in Western Riverside. This is due to be completed by August 2004.

All of the analyses since 1997 have been conducted by one of the four main waste analysis contractors in England[3]. These have followed well established protocols; sample selection procedures have generally been based on the use of ACORN[4] socio-economic profiles, and a sample size of 50 households. However, in assessing the results, it should be noted that:

- most analyses, including those conducted in WLWA and WRWA in 2002 and 2003, only cover one season. However, seasonal data is available from Westminster, NLWA, the landfill tax funded study outlined above and the 2004 analyses in Bexley.

- most analyses are for samples of residual waste. However;

    - some reports did not comment on whether the analysis was just residual waste or if it also included kerbside collected recyclables.
    - some samples included kerbside collected recyclables in the analysis of residual waste (i.e. it was not possible to separately determine the composition of the residual waste) if they were put out for collection on the same day as the residual waste.
    - where kerbside recyclables were collected and analysed separately (samples collected in Western Riverside in October 2003), the report provides information on the composition of the residual waste.

- no analyses were conducted of material collected by drop-off (bring) schemes in the areas in which the residual waste samples were collected for analysis

The waste composition analyses from London waste authorities studied in this report use a number of different systems for classifying the types of material in the waste stream. Whilst it has been possible to compare the composition in terms of the main material categories (such as paper and card) it was not possible to compare sub-categories. For example, one classification system breaks paper and card, into a further 11 sub-categories of paper and card materials[5].

[3] M.E.L Research, Network Recycling, SWAP and Waste Research

[4] ACORN – A Classification of Residential Neighbourhoods. This uses UK census data to classify postcode areas into one of a number of socio-economic profiles.

[5] Paper and card can be sub-divided into newspaper, magazines, directories and catalogues, wall paper, paper packaging, other recyclable paper, non-recyclable paper, liquid cartons, card product packaging, corrugated card and other card.

2.1.1 Composition

Table 4 shows the average composition of residual household collected waste based on the results obtained from reports shown in Table 3, excluding the Corporation of London, as the samples included commercial waste. The results in both Table 4 and Appendix 2 exclude kerbside collected recyclables were they have been separately analysed.

Table 4: Average and range composition of residual household collected waste from analyses undertaken in London

Category	Average Wt %	Range	
		Minimum Wt %	Maximum Wt %
Paper and card	27.8	21.3	34.1
Plastic film	5.0	2.4	8.5
Dense plastic	5.5	3.1	8.4
Textiles	2.4	1.6	4.1
Other combustibles	10.3	6.2	16.0
Glass	7.5	0.5	6.0
Other non-combustibles	1.6	4.0	11.9
Organics	34.3	26.5	43.6
Ferrous metal	2.9	1.7	4.0
Non ferrous metal	0.9	0.6	1.3
Waste electrical and electronic equipment (WEEE)	0.3	0.0	1.6
Household hazardous waste (HHW)	0.2	0.0	1.5
Fines (< 10 mm)	1.3	0.2	3.6
Total	**100.0**	**-**	**-**

Notes:
Categories that are considered recyclable or compostable are in italics. However not all types of material in each category will be recyclable or compostable. For example some sub-categories of paper and card may not be recyclable.

The two main categories by weight are paper and card, and organics. The average weight percentage of paper and card was 28 per cent with a range of 21 per cent to 34 per cent (higher values for analyses which included kerbside collected material). The average percentage weight of organics was 34 per cent with a range of 27 per cent to 44 per cent.

Table 4 suggests that 52 per cent of residual household collected waste is potentially recyclable, and that a further 34 per cent is potentially compostable. However, this does not take into account the suitability of the material for recycling, for example, not all paper and card can be targeted for recycling (Waste Strategy 2000[6] suggests that ~65per cent of paper grades are recyclable). A more detailed analysis shows that the overall composition of dry recyclable materials which can be targeted for collection (such as newspapers, metal cans and glass and plastic bottles) represents about 35 per cent of residual household collected waste. Consequently, approximately 70 per cent of the arisings of residual household collected waste could be targeted for either recycling or composting. However, the maximum amount of recyclable and compostable material that could be collected for recycling will be lower because of a number of factors:

[6] Waste Strategy 2000 – England and Wales Part 1 – Department of the Environment Transport and the Regions.

- Some materials are not targeted for collection
- Some households do not have access to kerbside recycling facilities
- Only about 70 per cent of households typically participate in a kerbside collection scheme (although this figure will probably be higher for schemes which collect refuse and recyclables on alternate weeks).

Thus in order to achieve high levels of recycling and composting the local authorities will need to provide suitable facilities for collecting these quantities of materials, educate householders on the need to recycle, and develop markets for both the dry recyclables and compost products.

The overall biodegradable content of residual household collected waste in the London studies analysed was 69 per cent. This is comparable to the value of 68 per cent used in calculating landfill allowance targets in England[7].

The overall average weight arising for household collected waste in the reports analysed was 13.4 kg per household per week; this ranged from 10.2 to 16.8 kg per household per week. Table 5 shows the average weekly weight arisings of each category of waste; these have been determined using an arising of 13.4 kg per household per week and the average weight per cent composition shown in Table 4. The weight arisings in terms of kg/household per week provides a much better method than information on percentage composition for comparing these arisings with those from other studies.

Table 5: Average weight arisings of household collected waste from analyses conducted in London

Category	Average weight (Kg/h'hld/week)
Paper and card	3.73
Plastic film	0.67
Dense plastic	0.73
Textiles	0.32
Other combustibles	1.38
Glass	1.00
Other non-combustibles	0.22
Organics	4.60
Ferrous metal	0.39
Non ferrous metal	0.12
Waste electrical and electronic equipment (WEEE)	0.04
Household hazardous waste (HHW)	0.03
Fines (< 10 mm)	0.17

[7] Based on Parfitt, J, Analysis of household waste composition and factors driving waste increases, 2002

Total	**13.40**

An average weight arising of 13.4 kg per household per week determined from the analyses is comparable to an overall arising of 13.8 kilograms per household per week based on actual data for London for 2002/03 shown in Table 1.

2.1.2 Comparison of London data with other UK studies

Table 6 compares the results obtained in London with those used in the development of Waste Strategy 2000 (based on analyses conducted in the early 1990s), those presented in the recent Strategy Unit report[8] and other recent analyses conducted outside London. There has been a significant change in the composition of household collected waste since the early 1990s in terms of an increase in the weight per cent of organics and a decrease in the weight per cent of paper and card. The recent results for London show the same trend; that the paper and card content is now less than the organics content.

The main reason for this trend is that whilst there has been little change in the weekly weight arisings of dry recyclables since the early 1990s, there has been a significant increase in the weekly weight arisings of organics. Although changing lifestyles might mean that the arisings of food and kitchen waste would reduce because households generally have less time for cooking, and thus would tend to eat more convenience foods (i.e. there is less preparation of vegetables), the arisings of food and kitchen waste is increasing. Research by the pre-packaged food industry has shown that although the amount of food waste is low if meals are planned before food is bought, offers such as "buy one, get one free" increase the amount of food taken into a household. Food may be wasted either because it passes its sell-by date, only some of it is eaten, other meals are produced and then food is no longer wanted, or food bought to make sandwiches is not used because there is not enough time to make sandwiches. In addition, the amount of food which is bought may well also be increasing because less households now shop every day.

Table 6: Comparison of the composition of household collected waste in London with other UK studies

	Waste Strategy 2000 early 1990's (Wt %)	Strategy Unit Report Nov 2002 (Wt %)	London 1999-2003 (Wt %)	Other recent studies 2001-2003 (Wt %)
Paper and card	32	19	28	25
Plastic	11	7	11	10
Textiles	2	3	2	2
Other combustibles	8	8	10	8
Metal	8	7	4	4
Organics	21	42	34	38
Glass	9	7	8	7
Other non-combustibles	2	4	2	5
Fines	7	3	1	1
Total	**100**	**100**	**100**	**100**

[8] Waste not, Want not. A strategy for tackling the waste problem in England. Strategy Unit, December 2002

Table 7 compares the weekly weight arisings of five recyclable/compostable categories determined for London with those from other recent studies. This shows that although the arisings of dry recyclables determined in London are comparable to those determined in other studies, the arisings of organic material are lower.

Table 7: Arisings (kg per household per week) of a number of categories of collected household residual waste

	London 1999-2003	Other recent studies 2001-2003
Paper and card	3.7	3.8
Dense plastic	0.7	0.9
Glass	1.0	1.l
Ferrous metal	0.4	0.5
Organics and fines	4.8	6.2

A recently completed study in Wales[9] identified that the only category for which there was a statistically significant seasonal variation in arisings was garden waste. One possible reason for the lower arisings of organics in London may be because the majority of analyses were conducted in either autumn or winter, and garden waste arisings peak in spring and early summer. In addition, 33 per cent of London's housing stock is purpose built flats and the percentage of properties with a garden is smaller in London this will also reduce the arisings of garden waste.

The overall weekly weight arisings of 13.4 kg per household per week, determined in the analyses are lower than typical values of 15-18 kg per household per week determined in other recent studies outside of London. One factor that affects the amount of waste generated by a household is the number of people in the household, and two studies (the study in Wales and a study[10] conducted by the Environment Agency in 1996) have shown that there is a statistically significant relationship between the number of people in the household and the amount of waste produced by the household. The average household size in London is 2.34, which is lower than the national average, and London also has the highest level[11] of single households in the UK. Consequently, the reason for the lower waste arisings in London is probably due to a combination of two factors; a smaller number of people per household and a higher proportion of properties with little or no garden.

There are a number of other factors that may influence the arisings and composition of household collected waste such as:

- Socio-economic profile
- Method of collection (sack or wheeled bin)

However, the recently completed study in Wales showed that there were no statistically significant variations in waste arisings due to method of collection. This study also showed that there was no identifiable relationship between socio-economic profile and either the amount of

[9] The Composition of Municipal Solid Waste in Wales. Report produced by AEA Technology, December 2003.
[10] A study of the Composition of Collected Household Waste in the United Kingdom, with particular reference to packaging waste. Environment Agency Technical Report P347, 1996
[11] 2001 Census

waste, or the amount of paper produced. Another recent study[12] has also shown that there are no significant differences in the amount of waste produced by households in different socio-economic groups.

Two other factors which may affect waste arisings and composition are differences between inner and outer London, and the ethnic nature of the population. These are both being investigated in current studies (the NLWA study and the landfill tax funded study on property and ethnicity), and final reports from both of these studies should be available by November 2004.

2.2 Civic Amenity (Reuse And Recycling Centre) Waste

There are 38 civic amenity sites (reuse and recycling centres) in London, with most located in the outer London authorities. Although civic amenity waste represents about 15 per cent of household waste, only one analysis of civic amenity waste in London has been conducted since 1997. This analysis was conducted in Bexley in February 2002[13]. Table 8 compares the results of this analysis with two other studies (both covering all four seasons); one conducted in Wales and one from the National Assessment of Civic Amenity Sites (NACAS) 2004[14]. The information from the Bexley analysis cannot be viewed as the composition of waste at all of London reuse and recycling centres. .

Table 8: Comparison of composition (Wt %) of civic amenity waste studies

	Bexley (2002)	Wales (2003)	NACAS (2004)
Paper and cardboard	2	7	5
Plastic	1	1	2
Glass	1	2	2
Textiles	1	2	2
Wood	11	13	9
Metal	2	7	6
Garden	8	18	25
Other organic	-	1	-
C&D waste	42	17	17
WEEE	1	7	3
HHW	-	1	1
Mixed household	17	9	6
Other combustibles	14	13	20
Other non combustibles	-	1	2
Fines	-	1	-
Total	**100**	**100**	**100**

[12] SWAT: A tool to enhance the precision and compatibility of solid waste analysis data. Newcastle 2004. Warmer Bulletin 94, March 2004.
[13] Household waste composition study – London Borough of Bexley. Network Recycling, February 2002
[14] National Assessment of Civic Amenity Sites. Future West and Network Recycling, 2004.

The results in Table 8 from the Welsh Assembly study and the NACAS report show that the main components of civic amenity waste are garden waste, construction and demolition waste, and wood. The analysis conducted in Bexley showed a lower proportion of garden waste, but had a significant percentage of both wood and construction and demolition waste. The lower proportion of garden waste in Bexley may well be because the analysis in Bexley was conducted in February, and the study conducted in Wales showed that garden waste arisings are significantly higher between April and July.

The percentage of garden waste in civic amenity waste has generally reduced over time since the first studies[15] were conducted in the 1980's. This reduction may be due to a combination of three factors, newer homes have smaller gardens, an increase in DIY activities (which increase the arisings of both wood and construction and demolition waste), and an increase in the amount of garden waste which is home composted. It should also be noted that the introduction of kerbside collection of green/garden waste will reduce the amount of garden waste which is taken to civic amenity sites.

The weight percent of construction and demolition waste was much higher in the Bexley sample. The study in Wales identified that arisings of construction and demolition waste were highest in spring, and this may be because larger outdoor DIY projects start in the spring. However it is unlikely that this is the reason for the high content in the Bexley sample.

A factor which may affect the composition of civic amenity waste is the different enforcement measures or acceptance criteria for materials at different civic amenity sites. Although a large number of analyses of waste brought to civic amenity sites have been conducted, only one analysis of waste brought to civic amenity sites in London has been conducted since 1997. Thus it is therefore not possible to assess whether any of these measures affected the composition determined in Bexley in February 2002.

As civic amenity waste represents about 15 per cent of household waste, it is a stream which local authorities will need to target in order to meet their recycling targets. Consequently, whilst the analysis conducted in Bexley shows that the main components in this stream are likely to be similar to those determined in other studies, there is a need to conduct further analyses of this waste stream in order to obtain more data on the amounts of recyclable and compostable material which could be separated for recycling.

2.3 Other Waste Streams

Other waste streams in household waste include:

- litter
- bulky household waste
- street sweepings.

These represent about nine per cent of overall household waste in London. Non-household waste represents about 24 per cent of total municipal solid waste arisings Two of the components of this are fly-tipped waste and collected commercial waste.

[15] The Effect of Wheeled Bins on Domestic and Civic Amenity Waste. Poll A J. Warren Spring Laboratory Report LR710, March 1989

Although samples of litter, street sweepings and commercial waste have been analysed, no analyses of either fly-tipped waste or bulky household waste have been conducted in London. Published data on the composition of fly-tipped waste is available nationally (e.g. Maidstone[16]). Analyses of bulky household waste in Wales showed that the main categories are furniture (about 35 per cent), white goods (about 25 per cent), and carpets (up to 10 per cent). It may be possible to refurbish some of the white goods, and the remainder could be recycled. It may also be possible to re-use some of the furniture which is collected.

Very few waste analyses have been conducted in London of the waste streams outlined above. As a consequence it is not possible to make direct comparisons between studies conducted in the other regions of the UK and London as a whole. Where comparisons are made, they are made between the individual London authorities that have undertake analysis and those conducted in other regions.

2.3.1 Litter

Table 9 shows the composition of litter collected from litter bins determined in Bexley[17] and Westminster[18], and compares this with analyses conducted in Wales of litter bins. The Bexley sample only covers one season (February) but both the Westminster and Wales analyses cover all four seasons.

Table 9: Composition (Wt %) of litter bin waste in Bexley, Westminster and Wales

	Bexley 2002	Westminster 2002	Wales 2003
Paper and card	19	38	31
Plastic film	5	4	8
Dense plastic	5	7	13
Textiles	-	-	2
Misc combustibles	10	7	4
Misc non-combustibles	2	-	1
Glass	6	13	8
Organics[1]	48	24	24
Ferrous metal	3	1	4
Non ferrous metal	2	1	4
WEEE	-	-	-
HHW	-	-	-
Fines	-	4	2
Total	**100**	**100**	**100**

Note
1. The organic content is mostly food

Although there is a wide variation in the composition of individual samples, the results obtained in Westminster are comparable to those obtained in Wales. These results suggest that the overall composition of litter can be summarised as follows:

[16] Fly tipping surveys, 1998-2001. Maidstone Borough Council, November 2001
[17] Household waste composition study – London Borough of Bexley. Network Recycling, February 2002
[18] Westminster waste analysis project – final report. SWAP, April 2002

Table 10: Summary of litter analyses

Category	Weight %
Newspapers and magazines	10-15
Packaging (including plastic film)	30-40
Organics	20-25
Other materials	30-40
Total	**100**

Note - Cardboard packaging is included in packaging, other card included in "other materials"

The results from Wales identified that there was a higher percentage of dense plastic bottles in spring and summer. Although this is likely to be due to more drinks being consumed during warmer weather, there was no evidence for seasonal variations for metal drink containers.

2.3.2 Street sweepings

Table 11 compares the analyses of street sweepings conducted in Westminster with those conducted in Wales. Both sets of analyses represent an average of all four seasons. There are significant differences in composition between the two studies. This is possibly due to the different methodologies used; in Wales samples from mechanical sweepers were visually assessed whilst in Westminster samples were bagged and then hand sorted. Consequently the much higher weight percentage of categories such as paper and plastic in the results for Westminster are probably due to the fact that the samples were more comparable to normal litter.

Table 11: Composition (Wt %) of street sweepings in Westminster and Wales

Category	Westminster 2002	Wales 2003
Paper and card	24	5
Plastic film	2	1
Dense plastic	4	1
Textiles	-	-
Other combustibles	7	1
Glass	-	-
Other non-combustibles	8	1
Organics	32	40
Ferrous metal	1	1
Non-ferrous metal	1	-
WEEE	-	-
HHW	-	-
Fines	20	50
Total	**100**	**100**

Both of the studies showed a significant proportion of street sweepings were organics. Westminster is conducting trials (funded by London Recycling Fund) into composting leaves. Westminster, in partnership with Onyx, collected 86 tonnes of street leaves for composting in October and November 2003, and chemical analysis indicates that street leaves collected in Westminster meet the BSI Specification for Composted Materials (BSI PAS 100).

2.3.3 Commercial Waste

Table 12 shows the composition of commercial waste collected from retail, hospitality and office premises in Westminster.

Table 12: Composition (Wt %) of collected commercial waste by sector in Westminster, 2002

Category	Retail	Office	Hospitality
Paper and card	67.7	73.0	22.9
Plastic film	9	4.1	3.1
Dense plastic	3.9	3.6	3.5
Textiles	2	0.6	0.6
Other combustibles	2.2	0.6	0.7
Glass	3.1	4.5	42.4
Other non-combustibles	0.4	1.1	0.3
Organics	9.2	9.7	20.2
Ferrous metal	0.6	0.8	2.1
Non ferrous metal	0.6	0.7	0.5
WEEE	-	-	-
HHW	-	-	-
Fines	1.3	1.3	3.7
Total	**100.0**	**100.0**	**100.0**

Table 12 shows that there are differences between the types of waste produced by different types of establishment. For example, the proportion of food/kitchen waste is highest in waste from hospitality establishments. Table 13 shows that a similar result was found in Wales. Results also showed that the proportion of cardboard boxes was highest in waste from retail premises (SIC code 32[19]), the proportion of kitchen waste was highest in waste from hotels and restaurants (SIC code 55) and the proportion of recyclable paper was highest in waste from other business activities (SIC code 74 – samples taken from small offices).

Table 13: Variations in composition for collected commercial waste in Wales

Category	Retail premises	Hotels and restaurants	Other business activities
Food and kitchen waste	12.3	42.8	7.8
Cardboard boxes and containers	21.9	11.0	7.9
Recyclable paper	4.0	3.1	22.9

[19] Industrial sectors are classified according to the UK Standard Industry Classification (SIC) codes defined by the Office of National Statistics (ONS)

3 Summary of Analyses Review

The first aim of the study was to review available data on waste analyses in London. This showed that analyses of household collected dustbin waste have been conducted in 20 authorities since 1997 (and most of these have been conducted since the beginning of 2002). However, there have been far fewer waste analysis of other municipal waste streams in London since 1997. Analyses of litter have only been conducted in Bexley and Westminster. Analyses of civic amenity waste has only been conducted in Bexley, and analyses of both street sweepings and collected commercial waste have only been conducted in Westminster. No analyses have been conducted of either bulky household waste or fly-tipped waste As the authorities in London may have little need for further data on these waste streams, discussions were held with the waste authorities to identify the main areas where further waste analysis data was being undertaken or was required.

The following authorities were contacted in preparing this report:

- The four statutory joint waste disposal authorities
- Four Unitary authorities – Bexley, Bromley, Croydon and Westminster
- One waste collection authority – Richmond.

The main findings from discussions with the waste disposal authorities were as follows:

- They collate data provided by the boroughs on recycling and residual waste.
- The NLWA and the WLWA do not operate any civic amenity sites
- The NLWA has set a 50 per cent recycling target for their civic amenity sites in their draft Waste Strategy.
- Waste analyses are undertaken by boroughs. However NLWA are currently funding analyses as part of the revision of the commercial waste charging levy, and the contract between ELWA and Shanks will require analyses to be conducted every five years.
- Litter analysis may become an issue for NLWA, and they are considering an analysis of bulky household waste.

The main findings from the discussions with unitary authorities were as follows:

- Bexley has been conducting analyses of household collected waste since 1991. They will be conducting further analyses of this stream during 2004, and would like to conduct annual analyses if funding is available. They analysed civic amenity waste in 2002, and may conduct a further analysis in 2005. They are also considering conducting an analysis of street cleansing wastes in 2005.
- Bromley's contract with its service provider requires analyses to be conducted. They are about to redevelop their civic amenity site, so an analysis of civic amenity waste would be of interest.
- Croydon would like to conduct analyses of both household collected waste (recyclables and residual waste) and civic amenity waste if funding is available. However, analysis of litter is not a high priority.
- Westminster conducted analyses before starting a new contract. They are unlikely to conduct further analyses of household collected waste and litter for the next five years, but may consider analysing market waste and bulky household waste.

The main findings from discussions with the one waste collection authority were as follows:

- Richmond has seven years of data on household collected waste. They are planning to conduct their next analysis of this waste stream in 2005, but are currently not considering analysis of civic amenity waste.

The findings show that although a considerable amount of data on the composition of household collected waste in London is available (since 1997), some authorities are still planning to conduct further analyses of their waste stream. It is understandable that authorities are concentrating on analysis of the household collected waste stream in order to obtain data which would be used in developing additional recycling facilities to attain their statutory recycling performance targets. There is currently little interest in conducting analyses of other waste streams, although some are considering conducting analyses of civic amenity waste, and some authorities are considering conducting analyses of other municipal solid waste streams during the next two years.

The second aim of the study was to develop a methodology for future waste analyses. Although some analyses have been coordinated between a number of authorities (the OWL project and analyses in both WRWA and NLWA), there would clearly be benefits for London in coordinating all future analysis programmes. In addition, whilst recent analyses have been conducted using well known procedures, there would also be a benefit to London if, for example, all future analyses used the same category classification system. The remaining sections outline how future activities could be coordinated, suggests analysis protocols which could be adopted for each waste stream and identifies possible sources of funding for future waste analyses.

3.1 Coordination role for the Greater London Authority

About two thirds of London authorities have conducted analyses of household collected waste. However, many authorities may be unaware of the amount of compositional data on this waste stream available in both London and other areas of the UK. A role for the Greater London Authority could be to disseminate available data on this (and other) waste streams to each waste authority in London.

The operation of civic amenity sites is generally the responsibility of the local authority in which the site is located (apart from those in the ELWA and some in WRWA). Only one analysis has been conducted of this waste stream, but a number of authorities are considering conducting analyses in the next two years. Although this waste stream only represents about 11 per cent of overall municipal solid waste arisings in London, over 50 per cent of it is potentially recyclable. Maximising the level of recycling of this stream will be a factor in increasing the overall level of recycling of municipal solid waste in London. This is an area where the Greater London Authority could take the lead in assessing the current level of recycling at each civic amenity site (using weight data), developing and conducting a suitable analysis programme to identify the potential amount of material in civic amenity waste that could be recycled or composted, and then working with the authorities to maximise the amount of material which is recycled at each civic amenity site.

The other waste streams in household waste include litter, bulky household waste and street sweepings. These represent about nine per cent of total household waste in London. Although samples of litter and street sweepings have been analysed, no analyses of bulky household waste have been conducted in London. There is currently little interest from authorities in analysing these streams. The Greater London Authority could consider conducting a survey of each local authority to determine their interest in obtaining data on these streams, but it is probable that available data would provide sufficient information for local authorities in London.

Non-household waste represents about 24 per cent of overall municipal solid waste arisings in London. Two components of this stream are fly-tipped waste and collected commercial waste. No analyses of fly-tipped waste have been conducted in London, but published data (e.g. Maidstone) are available, and this may be suitable for providing analysis data if this is required.

Analyses of commercial waste has been conducted in Westminster, and other published data (Wales and reports by the Environment Agency[20]) are available. The Environment Agency is currently conducting a further survey of both commercial and industrial waste arisings, and the report is expected to be published at the end of 2004.

The level of charging for co-collected commercial waste is likely to continue to be an issue for waste disposal authorities. Some data is available; for example, ELWA has done some work on weighing of commercial waste containers. Bromley use a dedicated vehicle to collect most of their trade waste, and information on typical weight per sack of different types of commercial waste was obtained during the analyses in Westminster. The Greater London Authority could consider working with both collection and disposal authorities to develop a standardised levy/charge procedure for use in London.

3.2 Analysis Protocols

Procedures for analysing household waste have been developed over many years, and a protocol[21] for analysing most of the waste streams in municipal solid waste was published in 2002. DEFRA has also produced guidance[22] for local authorities on waste composition analysis which concentrates on household collected waste. Whilst it sets out the fundamental principles for ensuring that good quality data will be collected, it does not cover operational procedures. However, it does recommend a category classification system. The protocols described in this report, have been developed using these two documents and are particularly relevant to household collected waste.

3.2.1 Household collected waste

The London analyses which have been conducted on this waste stream have shown that it is similar, in terms of dry recyclable arisings, to other areas of the UK. However, overall arisings by weight are lower in comparison to other areas of the UK because of lower amount of organics in the waste stream. Consequently, although additional analyses would improve confidence in the existing data, the main priority for local authorities is likely to be the need for data to assess the performance of both existing and new kerbside collection schemes.

[20] Strategic Waste Management Assessment reports. Environment Agency, October 2000
[21] Protocol for conducting analysis of municipal solid waste in Wales. Welsh Assembly Government, 2002
[22] Waste Composition Analysis – Guidance for Local Authorities. DEFRA 2004

The performance of a kerbside scheme can be assessed using the weight of material collected per household per week. (This should be compared to similar schemes in other authorities). However, analysis of both collected recyclables and organics, and residual waste will provide information on the composition of the overall arisings of household collected waste. It also enables the level of contamination in the recyclables stream by non-targeted materials to be determined. Consequently, any further analyses of household collected waste should be based on the DEFRA guidance, and cover collection and analysis of both kerbside collected materials (including the organic fraction if this is also collected) and the residual waste stream. Reports which are produced should include:

- information on set-out/participation rate in the area in which the waste was obtained,
- the level of contamination of the recyclables stream(s), and tables showing the arisings (in kg per household per week)
- composition of both residual waste and overall collected waste.

As the only category which shows a statistically significant seasonal variation is garden waste, the report needs to comment on the arisings (and variations) of garden waste, particularly if an assessment of a green/garden waste kerbside collection scheme is being conducted.

3.2.2 Civic amenity (Reuse and recycling centre) waste

Two approaches can be used to determine the composition of waste brought to civic amenity sites:

- Analyse a sample (usually one container) of waste, which will be sent to landfill, and use this data, together with data on the amounts of material recycled, to calculate the composition of waste brought to the site.
- Obtain waste from a representative sample of about 50 visitors who use the site during a day, analyse each visitors waste, and use this data to calculate the composition of waste brought to the site

The main advantage of analysing residual waste is that it enables information to be obtained on the amount of potentially recyclable or compostable material which is not being diverted for recycling. The main advantage in analysing waste brought to the site by individual visitors is that it provides information on the range of weights, and types of material, brought by each visitor.

Although either approach can be used, it is suggested that future analyses of waste brought to a civic amenity site are conducted by analysing the waste that visitors bring to the site. This is because the survey can be supplemented by conducting questionnaire interviews with the visitors which are sampled, and additional information can be obtained by observation of the types and approximate quantities of waste brought by visitors whose waste is not hand sorted.

Procedures for selecting 50 visitors during the day and analysing their waste are described in the protocol for municipal solid waste developed for the Welsh Assembly Government and should be based on the "sampling next available visitor" approach, as this is the most operationally convenient procedure. Sampling could be conducted on either weekdays or at weekends; this is because the survey conducted in Wales showed that there was no consistent overall difference between weekdays and weekends in the mean weight per visitor.

Other analysis data has shown that the only categories of civic amenity waste which show statistically significant seasonal variations are garden waste, construction and demolition waste, and wood. As only one analysis of civic amenity waste has been conducted in London, and this only covered one season, any analyses of civic amenity waste which are conducted in London should include seasonal analyses.

When conducting civic amenity analyses surveys can be used to assess why visitors do, or do not, recycle. Information obtained can be used to assess options for improvement such as access issues, signage and information provision to reinforce the reuse and recycling message.

3.2.3 Other waste streams

Litter
The procedures which have been used to analyse litter in both Bexley and Westminster are comparable to those outlined in the municipal solid waste protocol for Wales and could be used for further analyses if required.

Street Cleansing
Although the protocol developed for analysis of street sweepings in Wales was based on visual assessment, the samples analysed in Westminster were hand sorted. This may be because the street sweepings collected in Westminster contained a higher level of potentially recyclable categories such as paper. If further analyses of street sweepings were to be conducted, the analysis method will depend on the nature of the waste arising, and thus the waste should be hand sorted if a visual inspection shows that it contains a significant proportion of potentially recyclable materials.

Bulky Waste
No analyses of bulky household waste have been conducted in London. Although individual collections could be analysed, the wide variation in individual collections would mean that it would be unlikely that these results would be representative of overall arisings. Consequently, the protocol developed for municipal solid waste in Wales is based on the use of a sample of individual collection logs, together with typical weights for each type of item (such as a washing machine). Thus provided that suitable collection logs, listing the number of each type of item collected in each collection, are available, this procedure could be used to determine the composition of bulky household waste if this information was required. The procedure used for bulky household waste can be also be used to assess the composition of fly-tipped waste if suitable collection log sheets are available.

Commercial Waste
Due to the diverse nature of commercial waste, the best option may be to use published data rather than conducting further analyses in London.

Parks and Gardens Waste
No samples of park and garden waste have been analysed in London. Any analysis procedure, which is developed, needs to consider the reason for the analysis. For example, if information

on the level of non-compostable contaminants (such as plastic) is required, this could be determined by visual inspection.

3.3 Potential sources of funding

A number of possible sources of funding for conducting waste analyses are available.

- The Greater London Authority has allocated funds to support the Environment Agency's National Household Waste Analysis Programme (NHWAP). Although this programme has been discussed for a number of years, it is not yet clear if it will proceed. If it does not proceed, then the allocated funds could be used to fund analyses of selected waste streams in London.

- The waste management contracts for Bromley and ELWA require the contractor to conduct waste analyses. The Greater London Authority could also assess whether a requirement to include waste analyses has been included in any other recent waste disposal contracts, and encourage the London boroughs, and the other waste disposal authorities to include this requirement in future contracts.

- A number of local authorities are considering conducting analyses of civic amenity waste. The GLA should encourage them to contribute to a London-wide study of civic amenity waste.

Cory Environmental has funded two sets of analyses in the four authorities in Western Riverside (one completed in 2003[23] and one, which will be completed by the end of 2004. Cory is looking to undertake further analyses over a five-year period.

4 Conclusions

4.1 Review of London waste composition data

Analyses of household collected waste have been conducted in 20 of the 33 London Borough's since 1997, and most of these have been conducted since the beginning of 2002. The majority of analyses have been conducted in three of the waste disposal authority areas (NLWA, WLWA and WRWA). Five of the 12 unitary authorities have also conducted analyses. Current analysis programmes are; seasonal analyses in each of the seven authorities in North London, seasonal analyses in Bexley, and a landfill tax funded study analysing waste in Enfield, Haringey and Newham.

Existing analyses show that whilst the arisings of dry recyclable materials are comparable with those in other areas of the UK, the arisings of organic materials are lower. Consequently, the overall arisings, at 13.8 kg per household per week, are lower than typical values of 15-18 kg

[23] Characterisation of Kerbside Household Waste Arising in the Western Riverside Waste Authority. Waste Research, November 2003

determined in other areas of the UK. The lower arisings are probably due to a combination of two factors; a smaller number of people per household and a higher proportion of properties with little or no garden.

Although a significant number of analyses of household collected waste have been conducted since 1997, there have been very few analyses of other waste streams. Only one analysis (Bexley in 2002) has been conducted of waste taken to civic amenity sites, two analyses have been conducted of litter (Bexley and Westminster), and Westminster has also analysed samples of both street sweepings and waste generated by commercial premises. The analysis results are generally comparable with those determined in other areas of the UK.

A survey of a number of authorities showed that although a considerable amount of data on the composition of household collected waste in London is available and authorities plan to conduct further analyses of this waste stream. Some are considering conducting analyses of civic amenity waste during the next two years. There was little interest in conducting analyses of other waste streams.

4.2 Recommendations

The Greater London Authority should consider the following:

- Disseminating available waste composition data to all London boroughs and the waste disposal authorities
- Developing a London-wide analysis strategy to show the amount of civic amenity waste available for reuse, recycling or composting
- Assessing options for increasing the current level of recycling of other household waste streams.

4.2.1 Household Collected Waste

The extent of recent data on the composition of household collected waste means that the GLA would be better placed to put resources into other waste streams The Greater London Authority should encourage individual authorities to regularly monitor performance of their kerbside schemes through the use of weight data. Authorities can fund and conduct their own analyses, but must ensure that the analysis procedures conform with DEFRA guidance and other protocols as appropriate, and should forward results to the Greater London Authority for dissemination.

4.2.2 Civic Amenity (Reuse and Recycling Centre) Waste

Civic amenity waste represents about 15 per cent of household waste and increasing the current level of recycling of this stream could increase London's household waste recycling rate significantly. The Greater London Authority should consider taking the lead in assessing the current level of recycling at each civic amenity site (using weight data), developing and conducting a suitable analysis programme with London waste authorities to identify the potential amount of material in civic amenity waste that could be recycled or composted, and then working with the authorities to maximise the amount of material which is recycled at each civic amenity site. In addition, options for improving current recycling rates at all civic amenity sites in London should be assessed.

4.2.3 Other Waste Streams

For the other municipal solid waste streams, published data, together with the analyses, which have been conducted in London, should provide sufficient information to local authorities that require this information. However, if further information on the composition of bulky household waste was required, it could be obtained using one years collection records from between five and ten London boroughs. A sample of about 500 records[24] could then be produced for each borough. The composition of the waste could then be determined from information on typical weights for each type of item, which is collected. The current level of recycling could be determined through discussions with each borough, and options for increasing this could then be assessed.

The Greater London Authority should also consider ways of enabling further trials on composting street sweepings, particularly if markets for the compost product can be identified.

The main potential source of funding for further analyses is the funds allocated to support the National Household Waste Analysis Programme (NHWAP). It is still not clear whether this will proceed, but if it does it is likely it would include analyses in London, and thus would provide additional data on most municipal solid waste streams, including both household collected waste and civic amenity waste.

The other main source of funding is through contracts between boroughs/authorities and waste management companies, which will require the waste management company to conduct analyses. In addition, Cory Environmental are considering funding a five-year programme of analyses in the four authorities in Western Riverside. A number of boroughs are also considering conducting further analyses. The Greater London Authority will need to discuss the possible use of this funding to support a London wide programme with the relevant boroughs and authorities.

The level of charging for co-collected trade waste is likely to continue to be an issue for waste disposal authorities. The Greater London Authority could consider working with both collection authorities and the waste disposal authorities to develop a standardised levy/charge procedure for use in London.

[24] For example, if a Borough made 5,000 collections during the year, sampling every 10th collection record would give a total of 500 records

Appendices

CONTENTS

Appendix 1
Analysis Reports

Appendix 1 - Analysis reports

Managing information for effective recycling and composting programmes. Report from the Ecologika study, 1997

Hounslow household waste study. MEL Research (not dated)

Waste Composition study – Waltham Forest. Network Recycling (not dated)

Household waste analysis on behalf of the London Borough of Richmond Upon Thames. MEL Research, July 1997

Letter report on analysis of waste in Kensington and Chelsea. MEL Research, March 1999

Domestic refuse composition study – Bexley Council. Network Recycling, December 1999

London Borough of Newham - Waste Composition Survey Results. Network Recycling, December 2000

Sampling and analysis of waste arising from the city of London. Waste Research , May 2001

Waste analysis in London borough of Enfield. SWAP, September 2001

Southwark Council – Waste analysis. Network Recycling, November 2001

Household waste composition study – London Borough of Bexley. Network Recycling, February 2002

Household waste composition study of four London boroughs. Network Recycling, April 2002

Westminster waste analysis project - final report. SWAP, April 2002

Analysis of waste arisings for the Corporation of London. Waste Research, March 2003

Organics in West London Project – Household waste composition study, October 2002 and October 2003. Network Recycling, 2003

Characterisation of Kerbside Household Waste Arising in the Western Riverside Waste Authority. Waste Research, November 2003

The arisings and composition of household collected waste in North London – First Interim report. AEA Technology, November 2003

Household collected waste – variations in composition. Interim report on a landfill tax funded study to assess variations in waste arisings due to both type of property and ethnic nature of the household. AEA Technology, January 2004.

The arisings and composition of household collected waste in North London – Second Interim report. AEA Technology, February 2004

The arisings and composition of household collected waste in North London – Third Interim report. AEA Technology, May 2004

Appendix 2
Composition of Household Collected Waste

Appendix 2 – Composition of household collected waste

All tables are Wt %

	London 1997	Hounslow No date	Waltham Forest No date	Kensington & Chelsea 1999	Bexley 1999	Newham 2000
Paper and card	26.9	24.9	21.3	32.2	30.6	26.4
Plastic film	4.0	6.9	5.2	3.8	2.4	6.3
Dense plastic	4.4	8.4	5.2	4.7	3.1	4.9
Textiles	2.0	2.9	1.9	3.0	4.1	3.8
Misc combustibles	10.0	8.5	9.5	6.2	16.0	15.0
Misc non-combustibles	0.9	1.3	0.9	1.5	2.8	0.9
Glass	8.0	4.4	7.3	9.3	5.6	6.4
Organics	39.2	34.7	43.6	33.8	30.5	30.9
Ferrous metal	3.0	2.7	3.5	1.7	3.8	3.6
Non ferrous metal	0.6	1.0	1.0	0.9	0.6	1.0
WEEE	0.0	0.3	0.0	0.0	0.0	0.0
HHW	0.0	0.7	0.0	0.0	0.0	0.0
Fines	1.0	3.3	0.6	2.9	0.5	0.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Wt/household	**-**	**10.2**	**-**	**11.6**	**11.9**	**13.9**

	Enfield 2001	Westminster 2001	Southwark 2001	Western Riverside 2002	Organics in West London (OWL) 2002	Bexley 2002
Paper and card	28.8	34.1	28.0	32.3	27.6	28.6
Plastic film	5.0	5.2	7.0	4.7	4.4	4.9
Dense plastic	6.1	6.0	4.0	5.3	5.3	5.2
Textiles	2.0	2.8	2.0	1.8	2.6	3.0
Misc combustibles	10.1	9.0	10.0	9.0	10.5	10.9
Misc non-combustibles	0.5	1.0	6.0	1.7	0.6	1.5
Glass	6.1	7.7	4.0	10.9	6.2	7.5
Organics	35.2	26.5	32.0	29.4	38.8	33.6
Ferrous metal	3.5	2.4	4.0	1.7	2.8	3.3
Non ferrous metal	0.6	1.0	1.0	0.7	0.8	1.3
WEEE	0.0	0.7	0.0	0.5	0.0	0.0
HHW	0.0	0.0	0.0	1.5	0.0	0.0
Fines	2.1	3.6	2.0	0.5	0.4	0.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Wt/household	**11.6**	**10.6**	**-**	**13.9**	**11.7**	**14.1**

	Western Riverside 2003	OWL 2003	NLWA 2003	EB Nationwide study 2003	NLWA 2004	NLWA 2004
Paper and card	32.9	25.4	23.7	25.8	26.2	21.9
Plastic film	3.3	7.0	3.6	4.4	4.4	4.1
Dense plastic	5.7	7.0	5.7	5.7	6.0	5.9
Textiles	2.4	2.4	1.7	2.4	1.7	1.7
Misc combustibles	10.5	8.5	9.3	10.4	10.5	11.2
Misc non-combustibles	0.8	0.6	5.7	1.5	0.9	1.4
Glass	11.9	7.1	6.5	6.8	9.2	7.7
Organics	27.7	38.4	38.6	37.7	34.5	39.9
Ferrous metal	2.1	2.6	2.6	2.7	3.2	2.5
Non ferrous metal	0.8	0.8	0.9	1.0	0.8	0.9
WEEE	0.9	0.0	0.5	0.9	1.6	1.3
HHW	0.5	0.0	0.3	0.2	0.4	0.4
Fines	0.5	0.2	0.9	0.6	0.6	1.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Wt/household	**16.0**	**-**	**16.2**	**14.0**	**15.4**	**16.8**