

ESTIMATION OF HOUSEHOLD WASTE FOR SCOTTISH LOCAL AUTHORITIES

Best Practice Note

1. Introduction

The reporting of Local Authority Collected Waste (LACW) broken down by source in WasteDataFlow (WDF) is important as domestic and European recycling targets now apply to waste from households rather than the wider 'municipal waste'.

The *Zero Waste Plan - Guidance for Scottish Local Authorities*¹, sets out a revised definition of 'household waste' which is now only waste collected from households and not longer the definition as per Controlled Waste Regulations 1992 (including some waste from commercial premises such as campsites and charity shops).

In Scotland it is not uncommon for local authorities to collect household waste together with waste from commercial and industrial sources in the same vehicle, particularly in rural areas. Consequently, Scottish Local Authorities (SLAs) that co-collect in this way need to estimate the tonnages that come from each source when reporting tonnages in WDF.

In order to ensure that the split between household and commercial waste is as accurate as possible, SLAs have been asked to:

- revise their estimation methods to take into account the new definition of household waste in conjunction with the reporting of financial year 2011-2012 data in WDF;
- provide information to SEPA on their estimation methods in order to establish the accuracy of Quarter 1 (Q1) Apr-Jun 2011 data reporting.

2. Aim

The aim of this Best Practice Note is to provide guidance for SLAs on how to best estimate co-collected household waste on the basis of methods currently used by SLAs.

This report is an important step in delivering the outcomes of the Waste Data Strategy (published June 2011) to improve the quality of reporting data and ensuring that the reporting of household waste arising and management is in line with the Waste Framework Directive and the Zero Waste Plan.

3. Method

In August 2011 SLAs completed an on-line survey (via "surveymonkey") about their waste collections and method used to estimate the proportion of household waste in mixed collections.

¹ http://www.sepa.org.uk/waste/waste_data/idoc.ashx?docid=a63382c3-580c-4060-a2e6-9d2e853531ac&version=-1

Following the collection of survey data, the current methods were compared and assessed in order to identify which one would produce the most accurate household waste data estimation.

The selected SLAs were then contacted to gather more detailed information on their kerbside collection and recycling centre estimation methodologies.

A decision was made to concentrate on kerbside collection and recycling centres as the majority of waste arises from these collections. Furthermore, estimating the quantity of commercial waste from recycling points is very difficult and has little potential for improvement.

Information about the method for assessing the quality of Q1 data and a summary of the results are available in Annex A and B respectively.

4. Results and Best Practice Recommendations

4.1 KERBSIDE COLLECTION

Segregated Kerbside Collection

For waste collected for recycling and composting, of the 32 SLAs surveyed, 20 SLAs provide segregated collection of household and commercial waste. Of the remaining 12 SLAs, 7 provide both segregated and mixed collections while only 5 provide solely mixed collections (four of which are classed as rural local authorities).

For residual waste, 11 SLAs provide segregated collection, 11 SLAs provide both segregated and mixed collections, and 10 SLAs provide solely mixed household and commercial collection services.

Mixed Kerbside Collection

Where mixed kerbside collections are undertaken, either solely or in addition to segregated collections, the following method is recognised as the most accurate:

Calculation of household waste where collected in mixed kerbside collection

For each waste stream:

1. Record tonnages per collection route (preferably weighed, but may be estimated by number of bins collected) (**RCT** = route collection tonnes)
2. For **each collection route** record:
 - a. the number of commercial bins that are supplied for the service;
 - b. the number of household bins that are supplied for the service;
 - c. assume full bins are collected.

The percentage household bins (**PHH**) is:

Number of household bins/(number of household bins + number of commercial bins)*100

The percentage commercial bins (**PComm**) is:
Number of commercial bins/(number of household bins + number of commercial bins)*100

3. The tonnage split per collection route is:

Household tonnes per collection route (**HHTCR**) = RCT * PHH
Commercial tonnes per collection route (**CommTCR**) = RCT * PComm

4. The total tonnage household split is: sum of all HHTCR
The total tonnage commercial split is: sum of all CommTCR.

5. If the tonnages in step 1. above is an estimate only, calculate the actual split from total weighed tonnages for the quarter as follows:

Household tonnages = (sum of HHTCR)/((sum of HHTCR) + (sum of CommTCR)) * actual weighed total tonnages for the quarter.

Commercial tonnages = sum of CommTCR)/((sum of HHTCR) + (sum of CommTCR))* actual weighed total tonnages for the quarter.

6. **Repeat for each waste stream** in which a kerbside collection is supplied.

4.2 RECYCLING CENTRES COLLECTION

For waste deposited at recycling centres for recycling, 19 SLAs reported that the materials are from household sources only and 5 mixed with commercial waste. The remaining 8 reported that some materials are from household only and some are mixed with commercial waste.

For residual waste deposited at recycling centres, 21 SLAs reported that the materials are from household sources only and 6 mixed with commercial waste. The remaining 5 reported that some waste is from households only and some is mixed with commercial waste.

The best practice for recycling centres is to be able to weigh the materials or the residual waste by material and by source before being deposited at the site.

Where there is not scope for SLAs to improve their systems as described above, the following methods are proposed. These have been developed on the basis of methods currently used by some SLAs in Scotland², with the addition of further steps in order to make them more robust.

² Falkirk for method A and Fife for method B

Calculation of household waste from mixed collections at recycling centres

METHOD A

1. Allow commercial customers to purchase permits for depositing commercial materials in advance from the Council offices. Ideally the permits should be different for:
 - a. Recycling – different materials
 - b. Recycling – generic
 - c. Disposal

A standard tonnage should be allocated to each permit on the basis of the capacity of the commercial vehicle and each material. For example a generic recycling permit or a disposal permit could be considered to weigh 1.5 tonnes. Other materials permits could be given a different weight.

2. Calculate the commercial waste deposited at the recycling centres with the following calculation on a monthly or quarterly basis:

Commercial waste = Number of permits (P) * standard weight (W)

Household waste = Total tonnage – commercial waste

3. Ensure that the recycling centres have officers checking the entry to the facilities and ensuring commercial customers have permits.
4. Where the customer has commercial waste but does not have a permit, the customer should be either sent to purchase a permit and come back at a different time, or allowed to purchase the permit directly at the centre.
5. Ideally the methodology above should be applied to each individual material stream. Where it is not possible to use a different permit for different materials, the generic should be used.

METHOD B

This method involves the installation of a vehicle recognition system at the recycling centres.

This method is similar to the one above but is less accurate:

1. an annual permit can be purchased by commercial waste customers;
2. a vehicle counter is available at the recycling centre.

The calculation assumes that customers with an annual permit will visit the site once a day.

Each month or each quarter the Council calculates the number of household waste tonnage with the following calculation:

Household waste visits (HHV) = (total number of visits – number of active permits)

Total household waste (HH) = total tonnage * HHV/total number of visits

5. Next steps

Following the circulation of this Best Practice Note to SLAs, SEPA will contact SLAs to monitor improvements in the estimation methods since the 2011 survey data submission.

ANNEX A

Methodology for assessment of accuracy of Q1 data on the basis of surveymonkey results.

Scottish SLAs were asked to complete an on-line surveymonkey questionnaire which was designed to establish the manner in which the collection of household waste for different types of collection is undertaken. Specifically, the questionnaire focussed on ascertaining whether collections were undertaken separately, mixed with commercial waste or both separate and mixed with household waste.

The different collections type considered were:

- A- Recycling kerbside collection
- B- Recycling centres
- C- Recycling Points
- D- Residual kerbside
- E- Special/bulky collection
- F- Residual at recycling centres

Where a mixed collection was identified, SLAs were asked to report the percentage split for household/commercial waste, and specify the estimation method used for the identification of the split. Where known, SLAs were asked to report the percentage split for individual recycling materials.

The collated information was then compared with what has been actually reported in WasteDataFlow in the immediate previous two quarters (Q1 (Apr - Jun 2011) and Q4 (Jan - Mar 2011)), in order to identify any inconsistency.

In addition, the total rubble recycled (split by source) was taken into consideration for the data analysis. In order to accomplish this, SEPA liaised directly with those SLAs with a high tonnage of rubble reported for household sources or high percentage of household rubble compared to the total recycling. This was in an effort to establish whether the source of rubble was genuinely from households as opposed to being from commercial sources.

Individual SLAs were then contacted by telephone or, where necessary, by email, in order to gather further information, either because (i) a local authority provided insufficient information, (ii) to seek clarification on certain responses, or (iii) to establish the accuracy of reporting for Q1 data on the basis of comparison with previous quarter data and of the source of rubble recycled.

Limitations

In some cases there was duplication in the surveymonkey questionnaire results because more than one officer provided a response for a local authority. Where the duplication caused an inconsistency, the duplication was removed, where necessary, following discussion with the relevant local authority officers.

In retrospect, it would have been useful to add another question to the questionnaire specifically tailored for SLAs that have both a separate and mixed collection, with such question asking them to report the proportion of tonnage collected with separate collection and with mixed collection. This approach would have allowed SEPA to more accurately establish the level of accuracy of the total household tonnage. For example, a local authority with both separate and mixed collection but with high tonnage of separate collection has more accurate data for household waste than a local authority with a tonnage of separate collection lower than the mixed collection.

ANNEX B

Results

B.1 Types of collection

Table 1 below summarises the results from the collection questions for the SLAs (alphabetical order), as split by the level of separation per type of collection. The code for reading the table is as follows:

- Green – High accuracy of household waste reported;
- Amber – Medium accuracy of household waste reported;
- Red – Low accuracy of household waste reported.

The allocation of colours is based on the response provided for each question:

- a) from household sources only /separate;
- b) mixed with materials from commercial sources /mixed;
- c) some are from household sources only and some are mixed with materials from commercial sources/ both separate and mixed.

Table 2 below lists the SLAs on the basis of Local Authority Collected Municipal Solid Waste (LACMSW) arisings for the financial year 2010-2011. It should be noted that if a local authority is near the top of the list (i.e. has a high tonnage of waste arisings) and has a high percentage of mixed collection, this may indicate less accuracy for household waste reported.

Legend:

Code	Description	Level of accuracy
a	Separate only	High
c	Both separate and mixed collection	Medium
b	Mixed only	Low

Table 1 – Level of accuracy of household waste reported on the basis of type of collection.

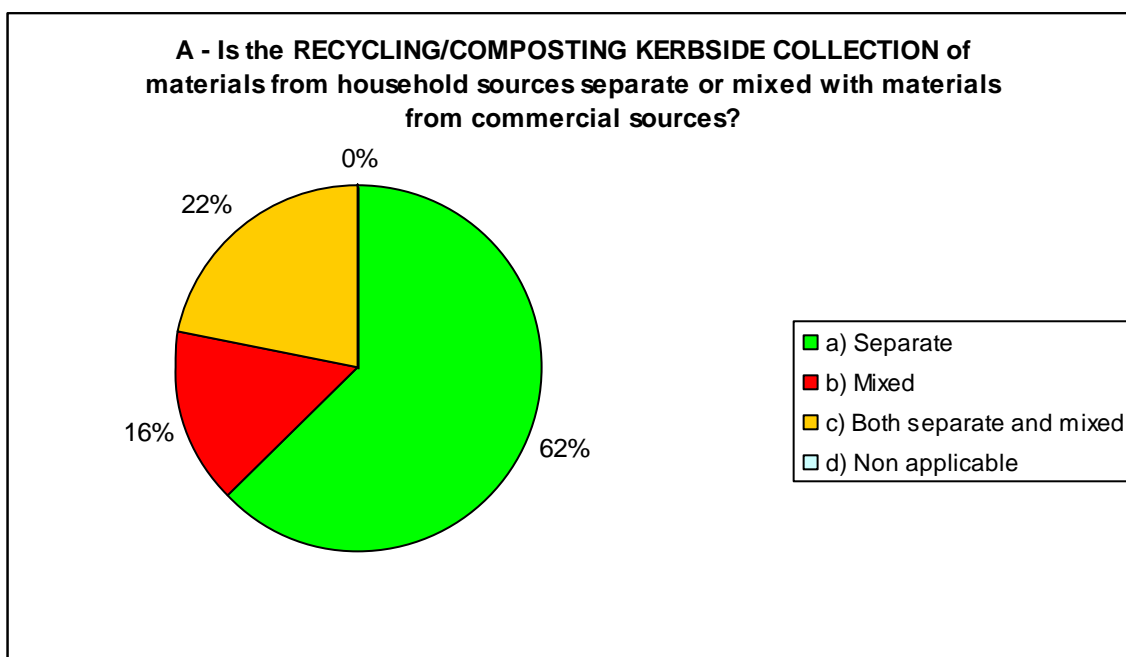
Local Authority	A - kerbside recycling	B - RC recycling	C - bring recycling	D - residual	E - bulky residual	F - RC residual
Aberdeen	a	a	a	b	b	a
Aberdeenshire	a	a	a	c	a	c
Angus	a	b	b	b	b	b
Argyll and Bute	b	c	a	c	a	a
Clackmannanshire	c	b	c	c	c	b
Dumfries and Galloway	b	a	a	b	d	a
Dundee	a	a	a	b	a	a
East Ayrshire	c	c	a	c	a	a
East Dunbartonshire	a	a	a	c	a	a
East Lothian	a	c	a	b	a	b
East Renfrewshire	b	a	a	a	a	a
Edinburgh	a	c	a	b	b	b
Falkirk	a	b	a	a	a	c
Fife	a	c	a	c	a	c
Glasgow	a	a	a	a	a	a
Highland	c	b	b	b	a	a
Inverclyde	a	a	a	a	a	a
Midlothian	a	a	a	a	a	a
Moray	a	c	a	a	d	b
North Ayrshire	a	a	a	a	a	a
North Lanarkshire	a	a	a	c	a	a
Orkney	b	a	a	b	a	a
Perth and Kinross	a	c	c	c	a	c
Renfrewshire	a	a	a	c	a	a
Scottish Borders	c	a	a	c	b	a
Shetland Islands	b	a	c	b	a	a
South Ayrshire	c	a	a	a	a	a
South Lanarkshire	a	a	a	a	a	a
Stirling	a	a	a	a	a	a
West Dunbartonshire	a	a	a	a	a	a
West Lothian	c	b	b	c	a	b
Western Isles	c	c	a	b	a	c

Table 2 - Ranking of SLAs on the basis of Local Authority Collected Municipal Solid Waste arisings 2010-2011.

Local Authority	LACMSW Arisings (tonnes) 10/11	A - kerbside recycling	B - RC recycling	C - bring recycling	D – residual	E - bulky residual	F - RC residual
Glasgow	334,906	a	a	a	a	a	a
Fife	253,990	a	c	a	c	a	c
Edinburgh	221,865	a	c	a	b	b	b
North Lanarkshire	207,166	a	a	a	c	a	a
South Lanarkshire	177,021	a	a	a	a	a	a
Highland	155,213	c	b	b	b	a	a
Aberdeenshire	154,167	a	a	a	c	a	c
Aberdeen	118,049	a	a	a	b	b	a
West Lothian	109,783	c	b	b	c	a	b
Dundee	94,946	a	a	a	b	a	a
Dumfries and Galloway	94,864	b	a	a	b	d	a
Perth and Kinross	92,808	a	c	c	c	a	c
Renfrewshire	92,123	a	a	a	c	a	a
Falkirk	90,122	a	b	a	a	a	c
North Ayrshire	84,483	a	a	a	a	a	a
South Ayrshire	77,501	c	a	a	a	a	a
Angus	72,965	a	b	b	b	b	b
East Ayrshire	69,069	c	c	a	c	a	a
Scottish Borders	67,749	c	a	a	c	b	a
Moray	66,659	a	c	a	a	d	b
East Dunbartonshire	66,004	a	a	a	c	a	a
East Lothian	61,986	a	c	a	b	a	b
Argyll and Bute	55,143	b	c	a	c	a	a
Stirling	52,051	a	a	a	a	a	a
West Dunbartonshire	47,927	a	a	a	a	a	a
East Renfrewshire	46,999	b	a	a	a	a	a
Midlothian	46,621	a	a	a	a	a	a
Inverclyde	46,424	a	a	a	a	a	a
Clackmannanshire	31,368	c	b	c	c	c	b
Western Isles	22,263	c	c	a	b	a	c
Orkney	15,604	b	a	a	b	a	a
Shetland Islands	13,365	b	a	c	b	a	a

B.2 Summary of responses per type of collection

A - Recycling kerbside collection



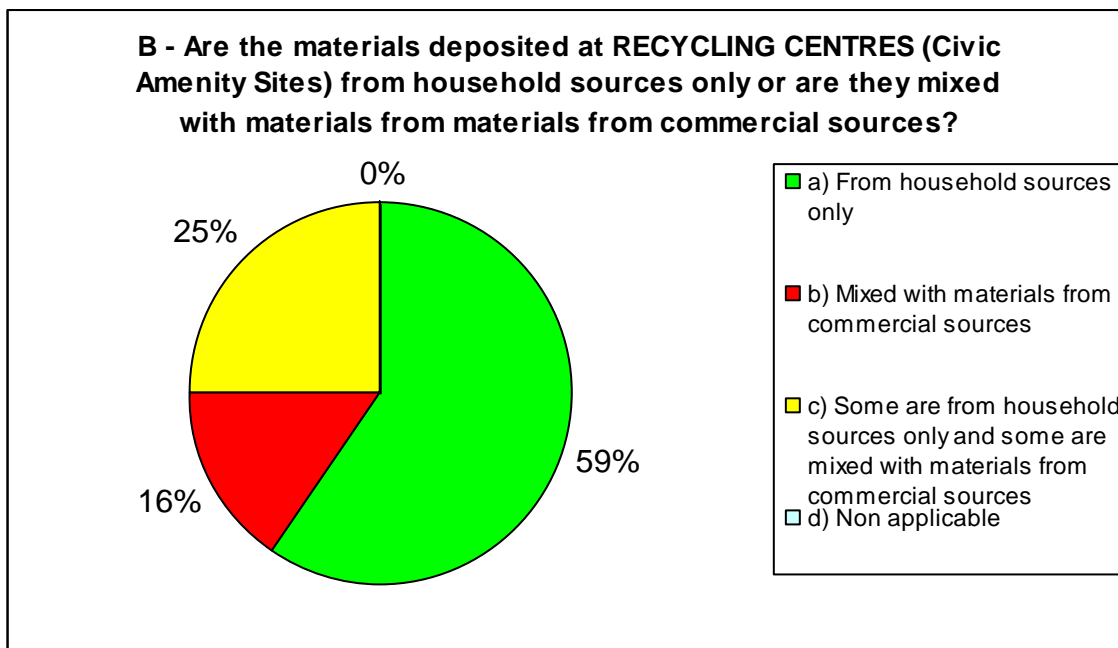
b	c
Dumfries & Galloway	Highland
Argyll & Bute	West Lothian
East Renfrewshire	South Ayrshire
Orkney	East Ayrshire
Shetland Islands	Scottish Borders
	Clackmannanshire
	Western Isles

Graph A shows that the majority of the SLAs have a separate collection for household kerbside recycling.

From the information collected and the telephone calls, it looks like most of the SLAs that have a mixed or both separate and mixed collection do have an estimation method for providing a split. However Clackmannanshire Council could not provide a split or an estimate and Orkney and Shetland only have a split based on historical information. As those SLAs are near the bottom of Table 2 (therefore contributing to the total arisings with a lower tonnage compared to the others) it is not thought that their level of inaccuracy will significant impact on the data accuracy for the household recycling rate for Scotland as a whole.

Information on general split and specific material split is available for a number of SLAs. This has not been reported in this document but may be used for further analysis and reporting.

B - Recycling centres



b	c
Highland	Fife
West Lothian	Edinburgh
Falkirk	Perth and Kinross
Angus	East Ayrshire
Clackmannanshire	Moray
	East Lothian
	Argyll and Bute
	Western Isles

Graph B shows that for the majority of SLAs the materials collected for recycling at recycling centres come from household sources. Some of these SLAs have however confirmed that it is possible that some limited amount of commercial waste is deposited at recycling centres, but they consider the quantity minimal and therefore have given a) as an answer.

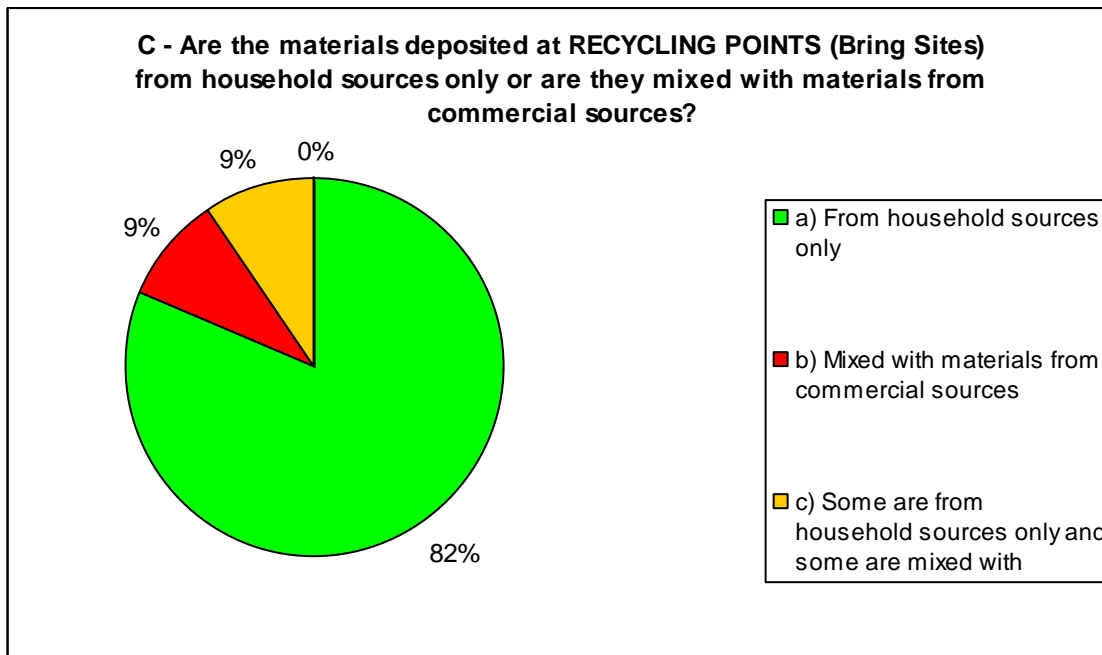
Some SLAs with material from both household and commercial sources collected at recycling centres provided a robust estimation method for the split based on tipping permits or counting of vehicles entering the site (i.e. Falkirk Council, Fife Council).

Clackmannanshire Council and East Lothian Council could not provide a split or estimate for materials collected at recycling centres due to the absence of an appropriate weighing system.

Some SLAs are still working on an estimation method or are in the process of changing existing arrangements for the management of recycling centres. For example, West Lothian Council is intending to restrict entrance to commercial waste vehicles for most recycling centres and Moray Council is currently working on an estimation method based on volume.

The SLAs that are unable to estimate the split for material collected at recycling centres are at a low level in the ranking based on tonnages of LACMSW arisings (towards the bottom of Table 2).

C - Recycling Points

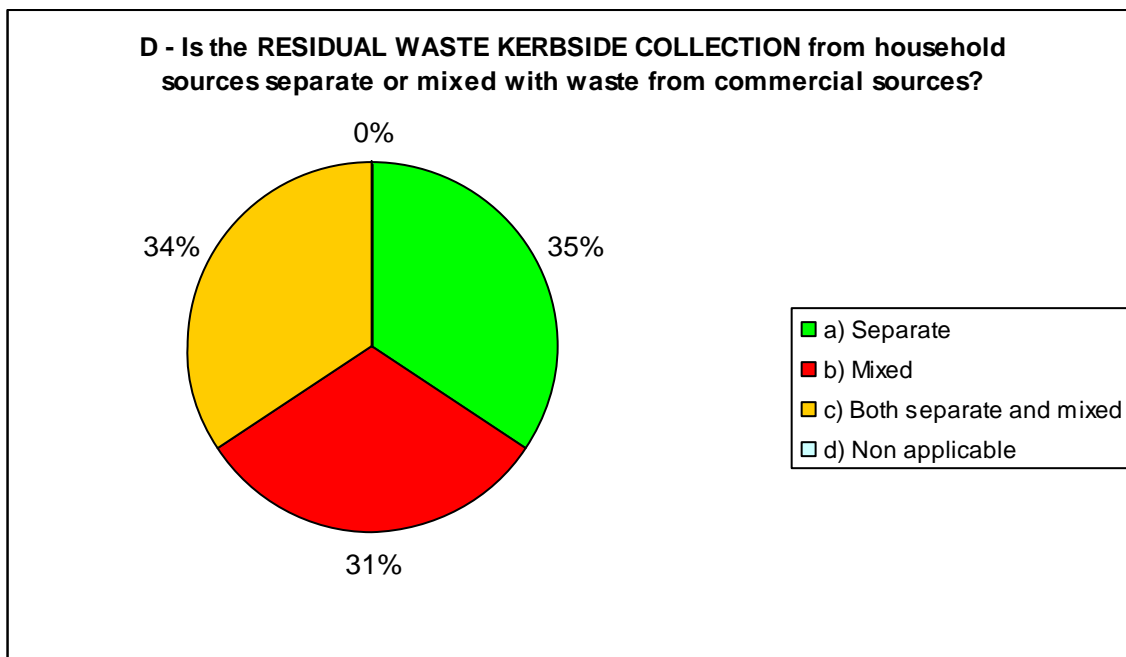


b	c
Highland	Perth and Kinross
West Lothian	Clackmannanshire
Angus	Shetland Islands

Graph C shows that the majority of SLAs have a collection for recycling at Recycling Points from household sources only.

Some of these SLAs highlighted the fact that whilst the materials are expected to be from household sources only, there could be some commercial waste as well deposited at Recycling Points. Detailed information is not however available to provide accurate estimations but, in any event, the quantities of commercial waste is not considered to be significant.

D - Residual waste kerbside collection



b	c
Edinburgh	Fife
Highland	North Lanarkshire
Aberdeen	Aberdeenshire
Dundee	West Lothian
Dumfries and Galloway	Perth and Kinross
Angus	Renfrewshire
East Lothian	East Ayrshire
Western Isles	Scottish Borders
Orkney	East Dunbartonshire
Shetland Islands	Argyll and Bute
	Clackmannanshire

Graph D shows that although for residual waste over a third of SLAs have a separate collection for household waste, there is a significantly higher percentage of b) and c) responses compared to the recycling questions, with 34% of both separate and mixed collection and 31% of only mixed.

As discussed under the paragraphs on limitations, it would have been helpful to ask a question in relation to the proportion of tonnage that is collected separately and mixed for the SLAs that answered c), as this would have helped establish for those SLAs whether most of the residual waste was collected through separate collection or through mixed collection.

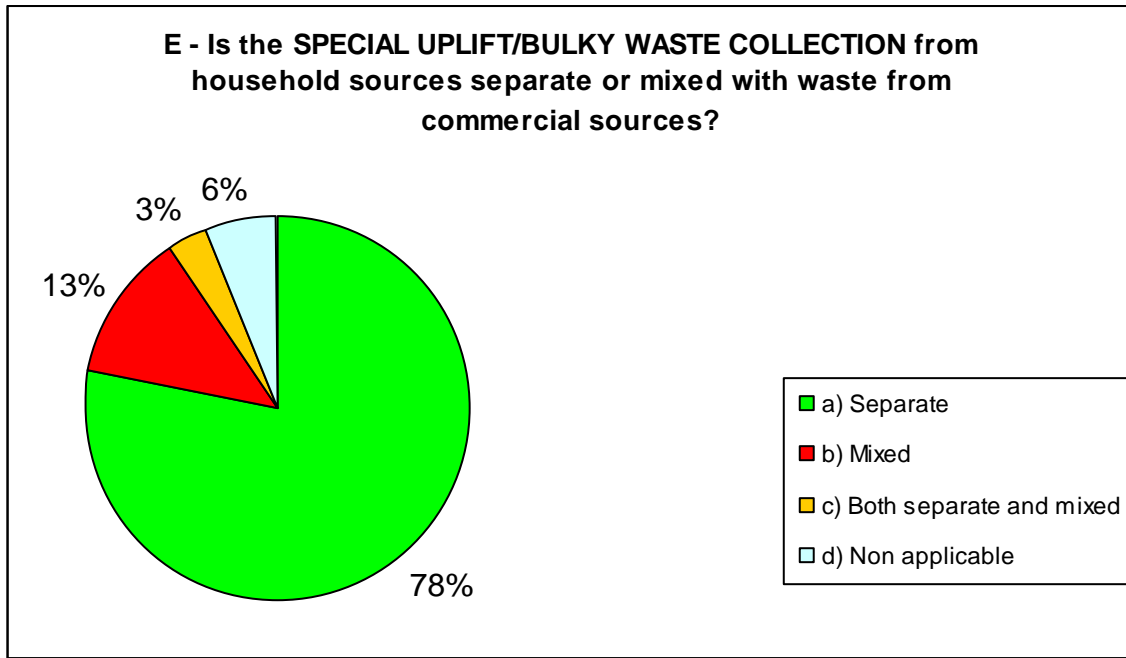
Most SLAs that have a mixed or both separate and mixed collection have reported an estimation method, mainly based on volume multiplied by a conversion factor or capacity, number of commercial bins and frequency of collections. Some SLAs are currently revising and improving the estimation method used (i.e. Western Isles, Orkney, Perth and Kinross and West Lothian), with the result that more accurate data is expected with future reporting in WDF.

The SLAs that could not provide a robust method for estimating household waste from mixed routes are Angus, Clackmannanshire and Shetland. Angus Council will provide more information in the future after further consultation with operators, Clackmannanshire Council

have requested further guidance from SEPA or the Scottish Government on a national estimation method, and Shetland Council claims that further funding is needed in order for them to provide a better estimating system.

Edinburgh Council has a mixed collection for residual waste and is towards the top of the ranking in Table 2. However, as the change to mixed collection from separate is quite recent, the Council is confident that the estimation method is robust for Q1 data. This may be less so in the future, so the Council is working on a new estimation method.

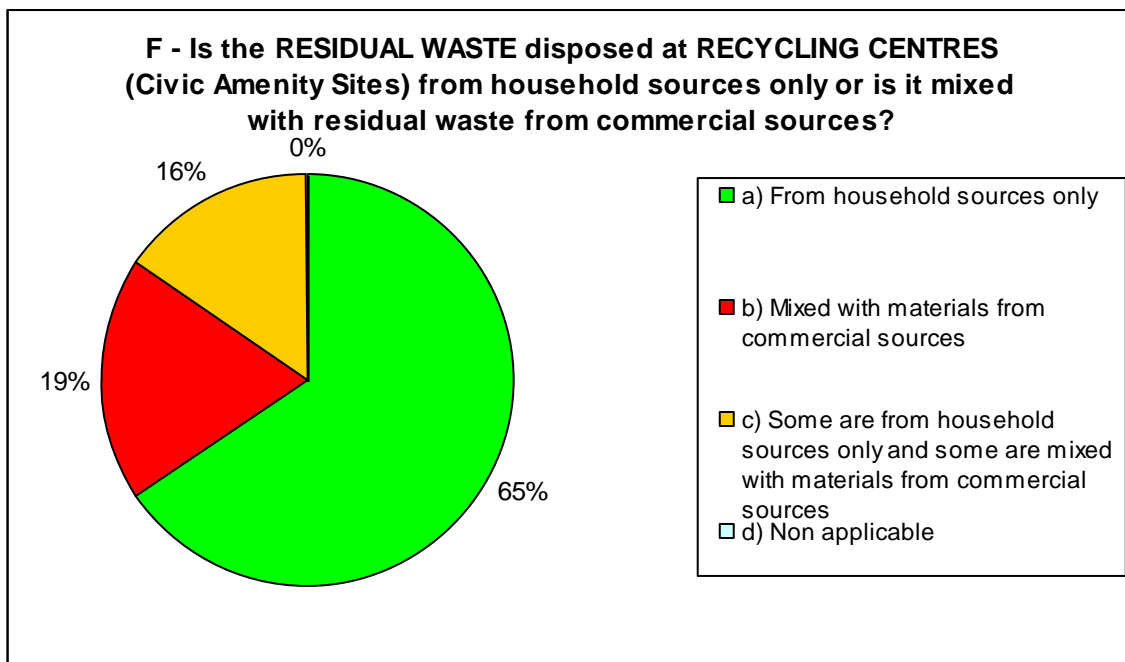
E - Special/bulky collection



b	c
Edinburgh	Clackmannanshire
Aberdeen	
Angus	
Scottish Borders	

The vast majority of special/bulky uplifts come from domestic premises. Those SLAs which had a mixed collection also reported that the quantity of commercial waste is minimal.

F - Residual waste at recycling centres



b	c
Edinburgh	Fife
West Lothian	Aberdeenshire
Angus	Perth and Kinross
Moray	Falkirk
East Lothian	Western Isles
Clackmannanshire	

Graph F shows that the majority of residual waste collected at recycling centres comes from households.

Some SLAs are working on a method to provide more accurate figures for household waste through changes in the system (i.e. West Lothian Council will restrict access to household waste only for most recycling centres) or through new estimations (i.e. Moray Council).

Angus has committed to providing more information in the future and Clackmannanshire has requested further guidance about a standard method to estimate household waste.

