



Torbay Kerbside Residual Waste Composition Analysis

Devon County Council

Summary Report November 2017



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Project details and acknowledgements

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Accuracy Statement

Results from the standard M·E·L sampling protocol for compositional analysis can be taken as accurate for each material category to within error bands of +/-10% at the 95% confidence level (2 standard deviations), assuming a normal statistical distribution. At the data entry stage, 1 in 10 parts of data that is inputted are checked with the data sheets and if errors are found all the data is then rechecked.

Introduction

Background

The Devon Districts and DCC last had a waste composition analysis of domestic kerbside Residual Waste carried out in 2012. Given the changes in collection regimes and waste prevention work that has taken place over the last 5 years DCC commissioned M.E.L Research Ltd to perform a comprehensive analysis.

Devon has eight city/district/borough councils, which are the Waste Collection Authorities (WCA). They are responsible for collecting household waste for recycling and disposal. Devon currently has a combined recycling and composting rate of 55.1% (2015/16). M·E·L Research were commissioned to undertake an analysis of the residual waste from selected kerbside properties. Results from the eight authorities that form the Devon County Council area are presented in a separate report.

This report presents the findings for the waste analysis performed in the Torbay Council area, which is the local authority of Torbay in Devon, and is a unitary authority. It has a combined recycling and composting rate of 42.6% (2015/16).

As well as giving indications as to the current amount of waste being generated, this report also provides observations on the levels of materials that are currently recyclable at the kerbside and those which could potentially be recyclable via future schemes. The sampling regime involved the direct collection and compositional analysis of waste from a target of 200 properties representing four of the five main socio-demographic categories (Acorns) for Torbay. Results could therefore be weighted to give a better picture of the waste being collected within the authority as a whole. Waste was surveyed during October 2017.

Objectives

Specific aims of the work were to:

- Understand, using socio-demographic profiling which sectors of the community are producing what type of waste,
- provide a breakdown of the material currently in the residual waste
- identify levels, and types of waste being produced by different households using ACORN classification.
- identify materials within the residual waste which could be consigned to the recyclable waste stream
- identify any additional materials that could be included in future recycling schemes
- and, to inform on specific waste materials where more concentrated efforts may need to be made to remove a greater amount of them from the residual waste.

Executive Summary

Key findings – Torbay averages

Kerbside residual waste

- On average, 69% of households sampled throughout Torbay presented residual waste for collection.
- In terms of waste generation, households were setting out an average of 4.84kg/hh/wk (6.97kg/hh/wk for those presenting waste).
- Food waste was seen to be the major component of residual waste forming 22.1% of the total, equating to 1.07kg/hh/wk. Of this food waste 9.9% was deemed to be packaged with 30.3% home compostable.
- 79.5% of all food in the residual waste was deemed to be avoidable.
- 12.4% or 0.60kg/hh/wk of the residual waste came from garden vegetation
- Paper items made up 9.3% of the residual waste; 30.8% of this (0.14g/hh/wk) was alternatively recyclable at the kerbside.
- Card and cardboard made up around 3.1% of collected residual waste; 67.5% of this (0.10kg/hh/wk) was alternatively recyclable at the kerbside.
- Plastics formed 15.2% of the residual waste; 26.9% of all plastic waste (0.20kg/hh/wk) was due to recyclable plastic bottles and containers.
- 3.8% of residual waste was metallic; 57.1% of this (0.10kg/hh/wk) was recyclable in the mixed recycling.
- Around 2.5% of residual waste was seen to be glass; 77.8% of this (0.10kg/hh/wk) was due to glass bottles and jars.
- 6.2% of residual waste was due to textiles; 79.0% of these items (0.24kg/hh/wk) were seen to consist of reusable clothing and linen that could have been recycled.
- 0.5% of residual waste was deemed to be either Hazardous or WEEE. An additional 7.7% consisted of disposable nappies and AHP waste.
- In total, 2.56kg/hh/wk or 52.9% of the residual waste surveyed across Torbay was of a type that could have been recycled by current schemes.

Residual Waste

Set out rates and waste generation levels

Each of the four Acorn samples taken was formed from 50 target households of the dominant Acorn type. Therefore, around 200 households were selected for Torbay with the set out relating to the proportion of these households actively placing out their waste.

The amount of waste in kilograms per household per week is collected from each sample of 50 households, not just those that are participating. The number of households setting out each waste container across all 50 households is recorded with the aim of collecting all presented waste and recycling. In some instances it is not possible to collect all presented waste (resident refuses, bins have H&S issues or total collected waste exceeds vehicle capacity). The collected waste is bulked for sorting as a single sample. The amount of collected waste can then be adjusted by the set out rate for any sample where not all presented waste was collected.

Torbay households have a fortnightly collection of residual waste using wheeled bins. On average (individual figures for Acorn samples are contained in a data appendix), 69% of households surveyed throughout Torbay set out their residual bins for collection.

From observed results, the level of residual waste being disposed of at the kerbside was 4.84kg/hh/wk. Solely considering presenting households, the average amount of waste generated is 7.00kg/hh/wk.

Compositional analysis of residual waste

This section looks at the average amount and composition of the residual waste presented by the various socio-demographic households sampled throughout Torbay. Hand sorting of the residual waste gave concentration by weight figures for the main categories of waste as well as the more detailed sub-categories. Looking at the concentration percentages gives an indication as to the proportions of each waste category. This can be translated into a figure relating to the average waste generation expected for each waste category; this is given in kilograms per household per week (kg/hh/wk). By knowing the composition of waste from the various samples, it is possible to gain an insight into the make-up of the residual waste that can be expected as a whole. Detailed composition tables can be found in a separate data appendix. Figure 1 shows residual waste data in terms of percentage composition with Figure 2 showing generation rates for major materials in terms of kg/hh/wk.

All residual waste will contain a proportion that is classified as potentially recyclable. That is to say that it should have been placed into one of the recycling receptacles available for residents:-

Residents currently two black boxes for the collection of mixed recyclables which are collected on a weekly basis. Box 1 is for the collection of the following materials -

- **Paper** - including Yellow Pages, junk mail, all types of envelopes and shredded paper
- **Plastic** - All empty plastic bottles, margarine tubs, yoghurt pots, ice cream tubs, clear plastic fruit containers
- **Metals** - Food tins, drink cans, aerosols, large tins
- **Textiles** - clean dry clothes, clean dry sheets, clean dry towels and pairs of shoes.
- **Batteries** - all household batteries, button batteries, hearing aid batteries, car batteries, laptop batteries, phone batteries.
- **Printer Cartridges** - all printer Ink Cartridges

Box 2 is for the collection of the following materials -

- **Glass** - mixed glass bottles and jars.
- **Metals** - foil packaging, aluminium food trays, tin foil.
- **Cardboard** - any cardboard, cereal boxes, cardboard tubes.
- **Cartons** - food and drink cartons, fruit juice cartons.
- **Oil** - cooking oil and engine oil
- **Mobile phones** - all types of mobile phone.

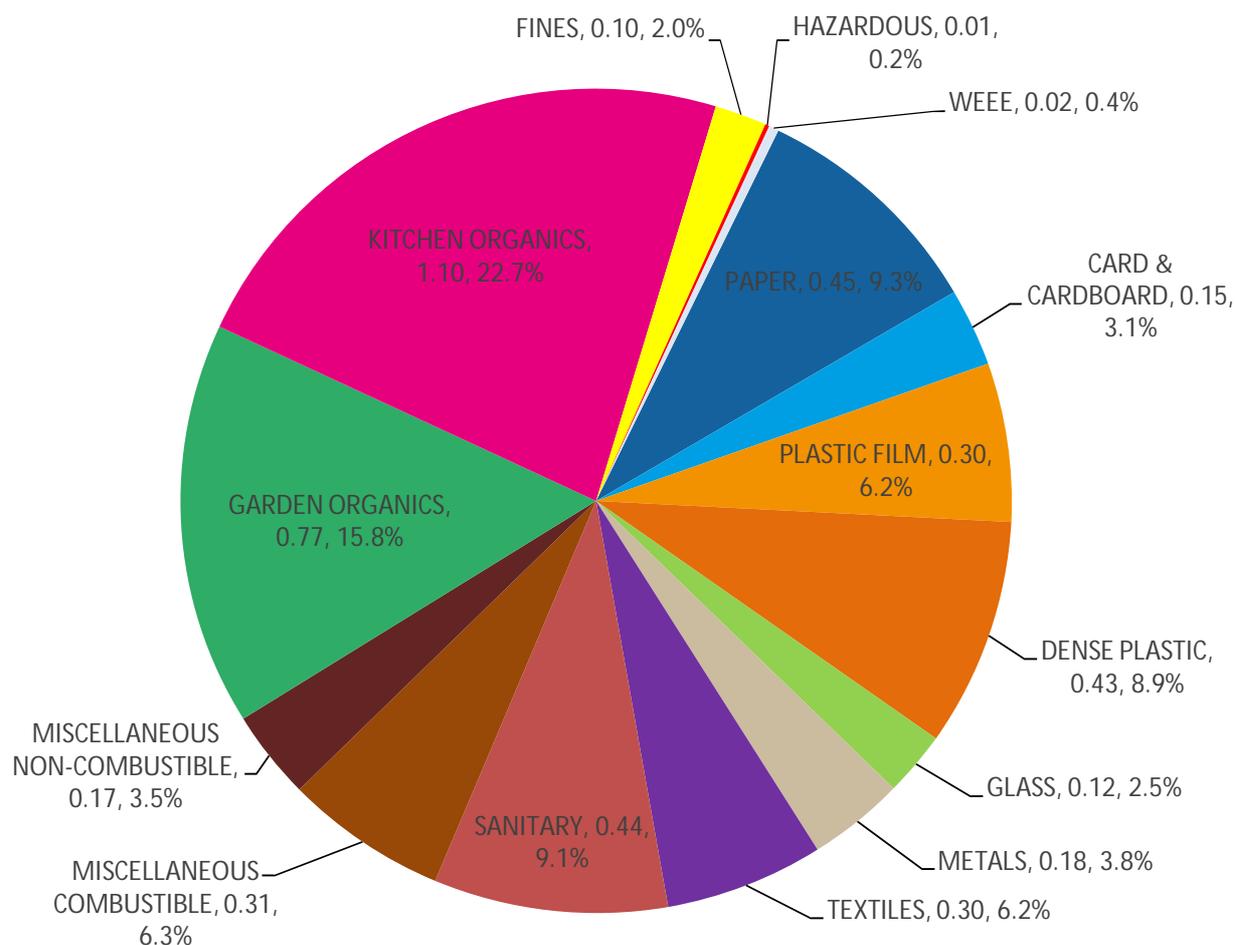
Residents also have smaller kitchen, and larger kerbside bin for the collection of food waste. This includes all cooked and uncooked food waste including, fruit and vegetables, meat and fish, cheese and dairy products, plate scrapings, bread and pasta. Plastic bags can be used to line bins.

Garden waste is collected by a "*cash on collection*" basis priced at £6 for up to eight bags of clippings.

Table 1: Average residual waste composition

WASTE MATERIAL	KG/HH/WK	% COMPOSITION
PAPER	0.45	9.3%
CARD & CARDBOARD	0.15	3.1%
PLASTIC FILM	0.30	6.2%
DENSE PLASTIC	0.43	8.9%
GLASS	0.12	2.5%
METALS	0.18	3.8%
TEXTILES	0.30	6.2%
SANITARY	0.44	9.1%
MISC. COMBUSTIBLE	0.31	6.3%
MISC. NON-COMBUSTIBLE	0.17	3.5%
GARDEN ORGANICS	0.77	15.8%
KITCHEN ORGANICS	1.10	22.7%
FINES	0.10	2.0%
HAZARDOUS	0.01	0.2%
WEEE	0.02	0.4%
TOTAL	4.84	100.0%

Figure 1: Average residual waste composition (kg/hh/wk, %)



Organic Waste

Organic waste, which includes garden and food waste (putrescibles), formed the greatest weight concentration of the primary waste categories. On average, 38.5% or 1.86kg/hh/wk of the residual waste consisted of organic matter. Food waste was seen to be the major constituent of the organic material in residual bins. Torbay households are able to recycle food at the kerbside; across the samples and average of 22.1% or 1.07kg/hh/wk of residual waste was seen to be due to discarded food.

Food waste was further categorised as to whether it was avoidable / unavoidable and home compostable / non-home compostable.

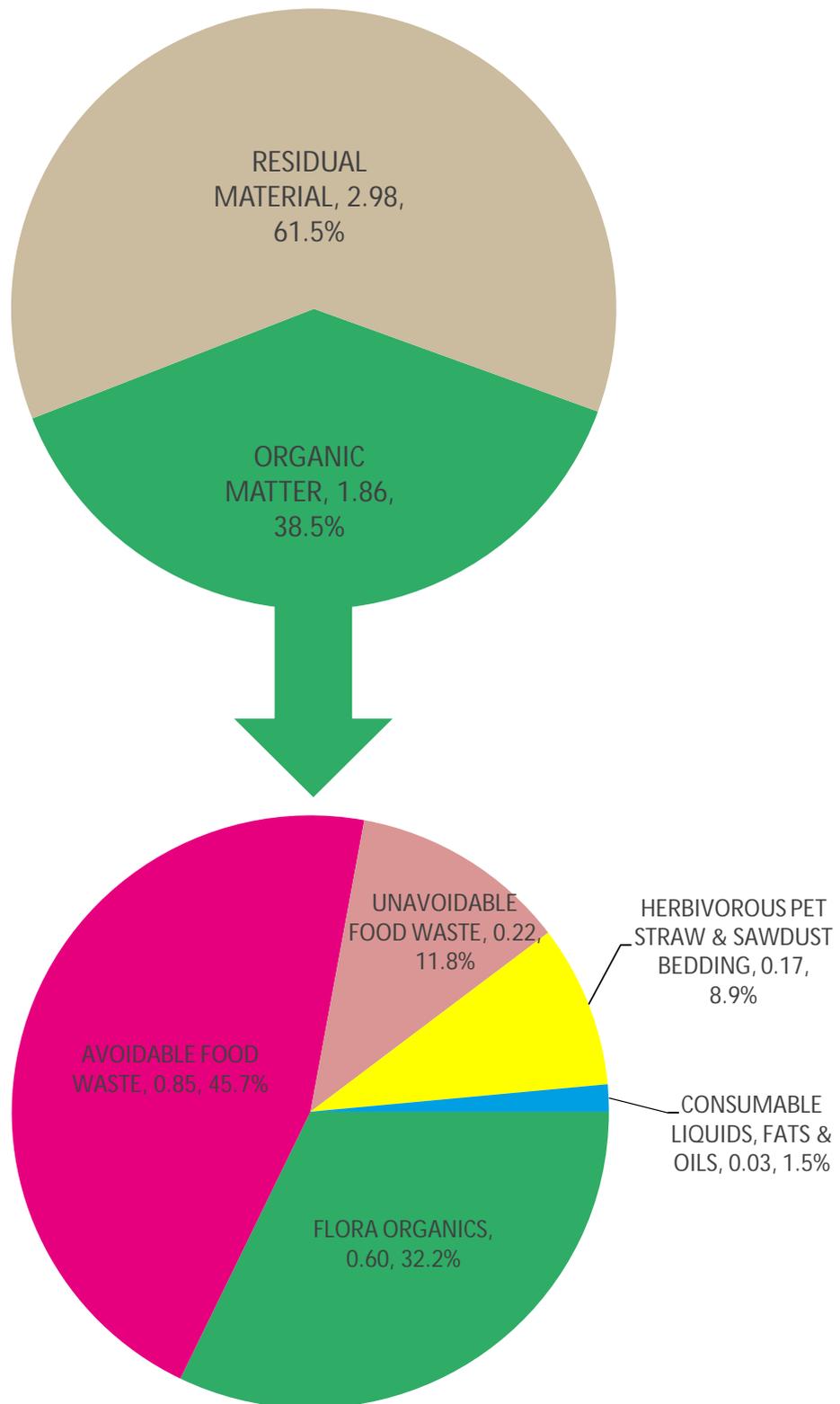
- Overall, around 79.5% of all food in the residual waste from kerbside households was classified as avoidable; this equates to 0.85kg/hh/wk.
- Additionally, 30.3% of kerbside food waste (0.32kg/hh/wk) is potentially compostable in general garden compost bins.
- 9.9% of kerbside food waste (0.11kg/hh/wk) was disposed of fully packaged.

Torbay residents can have garden waste collected from the kerbside via chargeable collections. On average, around 0.60kg/hh/wk or 12.4% of residual waste consisted of recyclable vegetation.

Table 2: Levels of organic material within the residual waste

RESIDUAL ORGANICS	(KG/HH/WK)
FLORA ORGANICS	0.60
SOIL & TURF	0.00
AVOIDABLE FOOD WASTE	0.85
UNAVOIDABLE FOOD WASTE	0.22
HERBIVOROUS PET STRAW & SAWDUST BEDDING	0.17
CONSUMABLE LIQUIDS, FATS & OILS	0.03
KG/HH/WK ORGANICS	1.86
% ORGANICS	38.5%
KG/HH/WK FOOD WASTE	1.07
% FOOD WASTE	22.1%

Figure 2: Levels of organics within residual waste (kg/hh/wk, %)



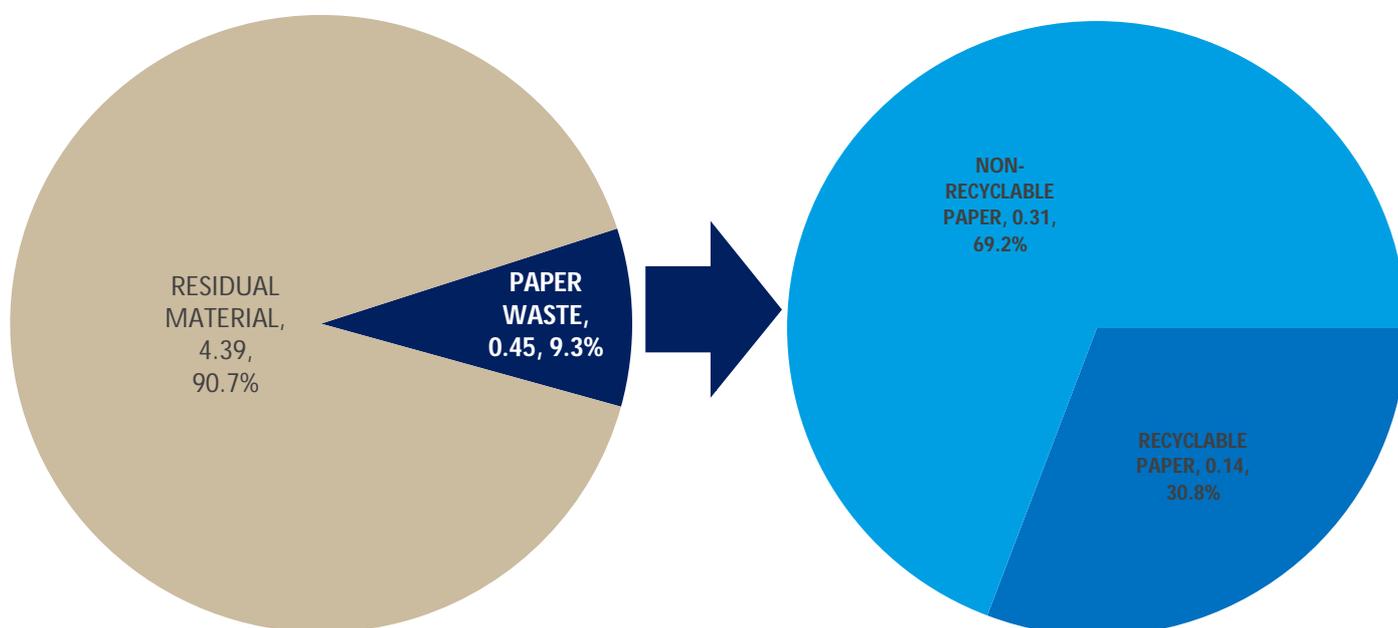
Paper

On average, 9.3% or 0.45kg/hh/wk of residual waste from Torbay was due to paper-based materials. A proportion of this paper is available for recycling at the kerbside. Torbay residents can recycle paper such as newspapers, junk mail, envelopes and directories. It was found that 30.8% of paper could have been placed into kerbside recycling containers as opposed to the residual waste. Therefore 2.9% or 0.14kg/hh/wk of residual waste was due to recyclable paper.

Table 3: Levels of paper within residual waste (kg/hh/wk)

RESIDUAL PAPER	KG/HH/WK
RECYCLABLE PAPER	0.14
NON-RECYCLABLE PAPER	0.31
KG/HH/WK TOTAL PAPER	0.45
% OF PAPER RECYCLABLE	30.8%

Figure 3: Levels of paper within the residual waste (kg/hh/wk, %)



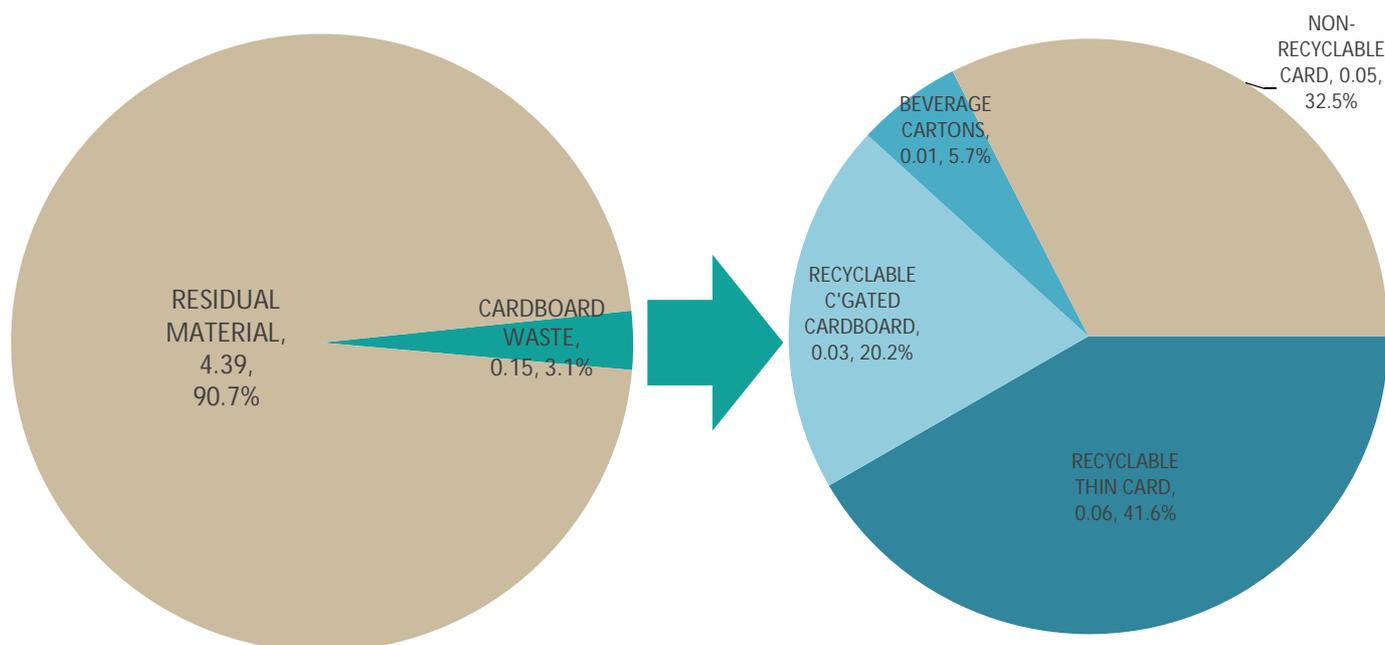
Card & Cardboard

On average, 3.1% or 0.15kg/hh/wk of residual waste from Torbay was due to card and cardboard-based materials. A proportion of this card and cardboard is available for recycling at the kerbside. Torbay residents can recycle thin card, corrugated cardboard and liquid cartons at the kerbside. It was found that 67.5% of all card and cardboard could have been placed into kerbside recycling containers as opposed to the residual waste. Therefore 2.1% or 0.10kg/hh/wk of residual waste was due to recyclable card and cardboard. Two thirds of the recyclable cardboard was due to thin card.

Table 4: Levels of card & cardboard within residual waste (kg/hh/wk)

RESIDUAL CARD & CARDBOARD	KG/HH/WK
RECYCLABLE THIN CARD	0.06
RECYCLABLE CORRUGATED CARDBOARD	0.03
BEVERAGE CARTONS	0.01
BOOKS	0.00
NON-RECYCLABLE CARD	0.05
KG/HH/WK TOTAL CARD & CARDBOARD	0.15
KG/HH/WK RECYCLABLE CARD & CARDBOARD	0.10
% OF CARD KERBSIDE RECYCLABLE	67.5%

Figure 4: Levels of card & cardboard within the residual waste (kg/hh/wk, %)



Plastics

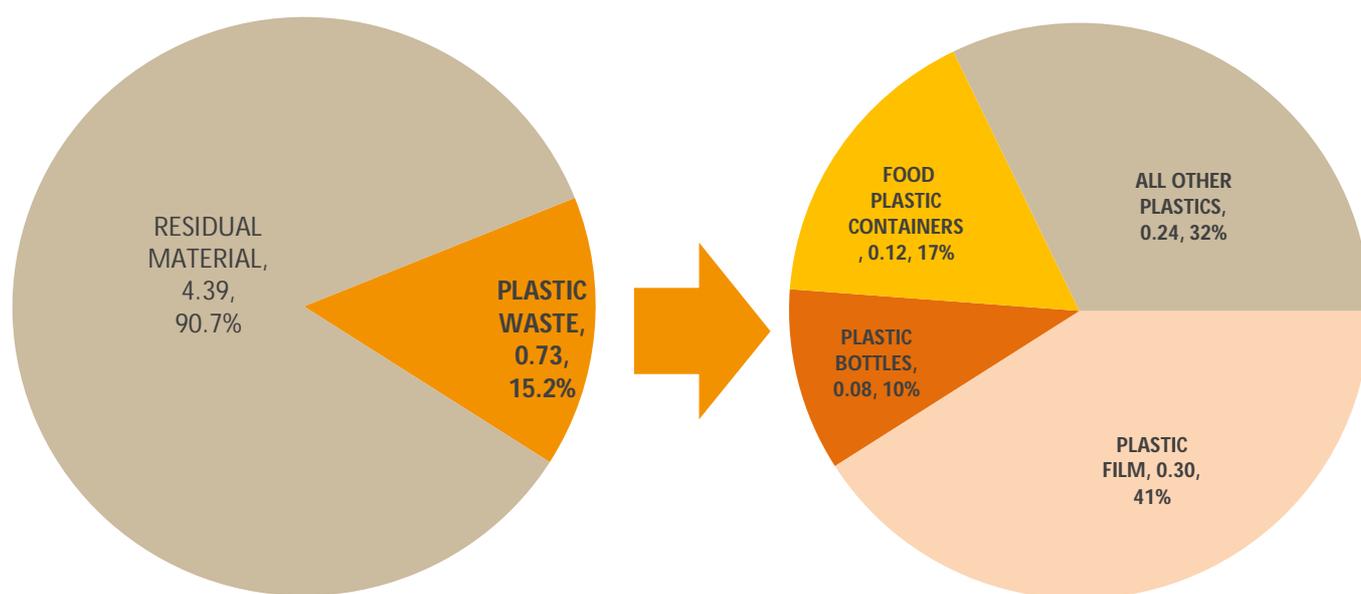
As a UK average approximately 12% of the waste disposed of by households is plastic. In this sampling campaign, the average for Torbay was 15.2% or 0.73kg/hh/wk. Residents can recycle plastic bottles with and food-packaging containers. Figure 5 clearly shows the levels of recyclable plastics within the residual waste. On average, around 26.9% of the plastic waste present in the residual was recyclable, equating to 0.20kg/hh/wk or 4.1% of the residual waste.

Plastic containers made up 62% of the recyclable plastics from kerbside properties with the remainder being plastic bottles.

Table 5: Levels of plastic within the residual waste (kg/hh/wk)

RESIDUAL PLASTICS	KG/HH/WK
PLASTIC FILM	0.30
PLASTIC BOTTLES	0.08
FOOD PLASTIC CONTAINERS	0.12
ALL OTHER PLASTICS	0.24
KG/HH/WK TOTAL PLASTIC	0.73
KG/HH/WK RECYCLABLE PLASTIC	0.20
% PLASTIC RECYCLABLE	26.88%

Figure 5: Levels of plastic within the residual waste (kg/hh/wk, %)



Metals

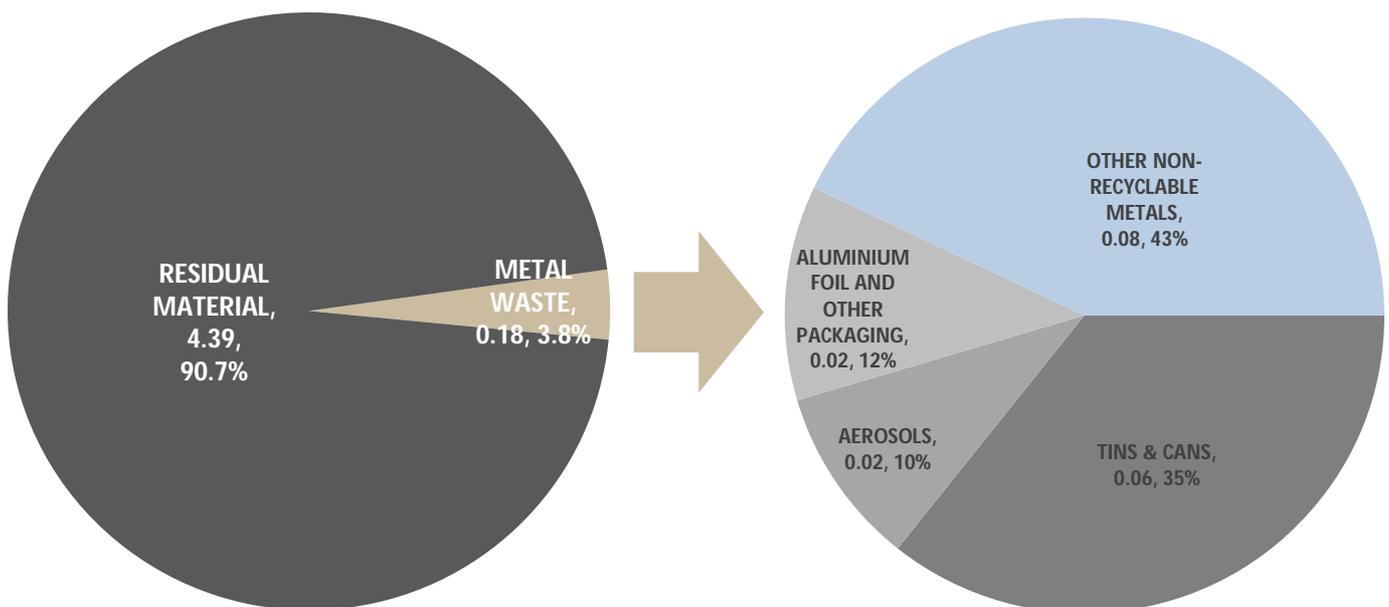
In this sampling campaign, the average metal content of the residual waste for Torbay was 3.8% or 0.18kg/hh/wk. Residents can recycle tins, cans foils and empty aerosols as part of their kerbside collections. Figure 6 clearly shows the levels of recyclable metals within the residual waste. On average, around 57.1% of the plastic waste present in the residual was recyclable, equating to 0.10kg/hh/wk or 2.1% of the residual waste.

Tins and cans made up 62% of the recyclable metals from kerbside properties with the remainder split equally between foil and aerosols.

Table 6: Levels of metal within the residual waste (kg/hh/wk)

RESIDUAL METALS	KG/HH/WK
TINS & CANS	0.06
AEROSOLS	0.02
ALUMINIUM FOIL AND OTHER PACKAGING	0.02
OTHER NON-RECYCLABLE METALS	0.08
RECYCLABLE METALS	0.10
TOTAL METALS	0.18
% OF METAL RECYCLABLE	57.09%

Figure 6: Levels of metal within the residual waste (kg/hh/wk, %)



Glass

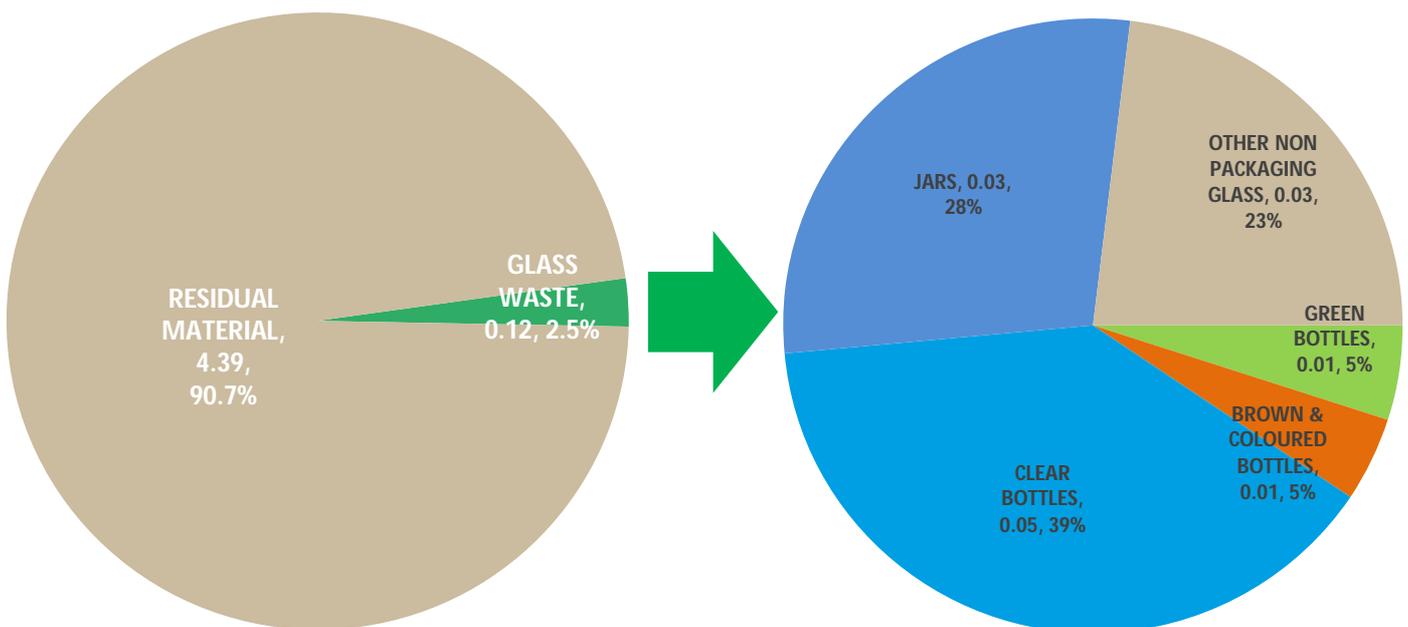
In this sampling campaign, the average concentration of residual glass across Torbay was seen to be 2.5% total glass by weight, equating to 0.12kg/hh/wk. Torbay residents are able to recycle glass bottles and jars at the kerbside. A proportion of this glass consists of bottles and jars. It was found that 77.8% or 0.10kg/hh/wk of glass consisted of bottles and jars, this equates to 2.0% of all collected residual waste.

An average of 87% of recyclable glass was clear; over 40% of the clear glass from kerbside properties was due to jars as opposed to bottles. Jars often need more cleaning than bottles and are generally less effectively recycled. Table 7 and Figure 7 show the amounts of the different forms of residual glass waste.

Table 7: Levels of glass within the residual waste (kg/hh/wk)

RESIDUAL GLASS	KG/HH/WK
GREEN BOTTLES	0.01
BROWN & COLOURED BOTTLES	0.01
CLEAR BOTTLES	0.05
JARS	0.03
OTHER NON PACKAGING GLASS	0.03
KG/HH/WK TOTAL GLASS	0.12
KG/HH/WK RECYCLABLE GLASS	0.10
% RECYCLABLE	77.8%

Figure 7: Levels of glass within the residual waste (kg/hh/wk, %)



Textiles

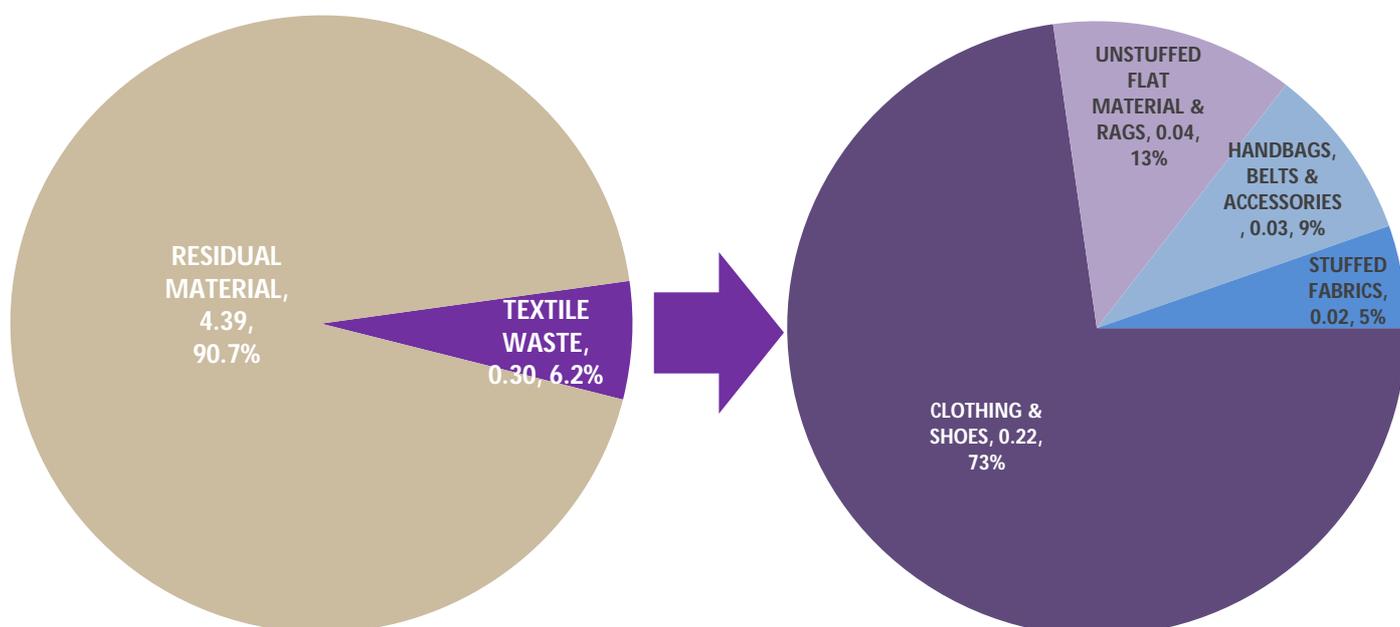
The concentration of residual textile waste was seen to be 6.2% or 0.30kg/hh/wk. A proportion of this textile waste is available for recycling as clean clothing or linen at the kerbside. It was found that 79.0% or 0.24kg/hh/wk of textile waste was of this potentially recyclable type. Therefore recyclable textiles made up 4.9% of the residual waste from Torbay.

Table 12 and Figure 11 show the amounts of the different forms of textile waste found within the samples from each authority.

Table 8: Levels of textiles within residual waste (kg/hh/wk)

RESIDUAL TEXTILES	KG/HH/WK
CLOTHING & SHOES	0.22
UNSTUFFED FLAT MATERIAL & RAGS	0.04
HANDBAGS, BELTS & ACCESSORIES	0.03
STUFFED FABRICS	0.02
KG/HH/WK TOTAL TEXTILES	0.30
KG/HH/WK REUSABLE TEXTILES	0.24
% REUSABLE TEXTILES	79.01%

Figure 8: Levels of textiles within the residual waste (kg/hh/wk, %)



Hazardous Items (HHW) & WEEE

In this sampling campaign the average overall concentration of hazardous and WEEE waste was seen to be just 0.5% which equates to around 0.03kg/hh/wk. Very small amounts of batteries and WEEE were present within the residual waste, these can be recycled directly at the kerbside within Torbay.

WEEE

Cables & Leads, Watches, Toys, Router, Circuit Boards, Hair Dryer, Curling Tongs, Shaver, Alarm Clock, Headphones, Vapes

HHW

Batteries, Halogen Bulbs, Paint,

Disposable Nappies & AHP waste

The profile of this type of waste has increased in recent years and nappy levels within the residual waste of households with babies can be extremely high. In this survey, the concentrations of disposable nappies and Absorbent Hygiene Products were 6.9%, which equates to 0.33kg/hh/wk.

Current recyclability of the residual waste

The overall recyclability of the residual waste relates to all the items present that could have been accepted into the kerbside recycling schemes currently running in Torbay. Results from the survey showed that 18.4% or 0.89kg/hh/wk of residual waste was compatible with the mixed recycling collections currently running in Torbay. Paper and card made up around 5% of the residual waste and 9.3% of the recyclable material present. Textiles accounted for 9.2% of the recyclables with plastics contributing 7.7%.

Overall, an additional 22.1% of residual waste was due to discarded food with 12.4% made up of garden vegetation. Therefore 34.5% (1.67kg/hh/wk) of residual waste was due to recyclable organic material. Food and garden waste combined formed 65% of the recyclable material present in residual bins.

By combining the mixed and organic recyclables from the residual waste it is seen that an average of 52.9% or 2.56kg/hh/wk of residual waste collected across Torbay could have been more effectively recycled by using the collection schemes currently in place.

Table 9: Amount of residual waste currently recyclable

KG/HH/WK MATERIALS WITHIN RESIDUAL WASTE	KG/HH/WK	% OF WASTE	% RECYCLABLES
RECYCLABLE PAPER	0.14	2.9%	5.4%
RECYCLABLE CARD & CARDBOARD	0.10	2.1%	3.9%
RECYCLABLE PLASTIC BOTTLES	0.08	1.6%	2.9%
RECYCLABLE PLASTIC CONTAINERS	0.12	2.5%	4.8%
RECYCLABLE GLASS	0.10	2.0%	3.7%
RECYCLABLE METALS	0.10	2.1%	4.1%
RECYCLABLE TEXTILES	0.24	4.9%	9.2%
RECYCLABLE HHW & WEEE	0.02	0.4%	0.8%
RECYCLABLE GARDEN WASTE	0.60	12.4%	23.4%
RECYCLABLE FOOD WASTE	1.07	22.1%	41.8%
TOTAL AMOUNT CURRENTLY RECYCLABLE	2.56	52.9%	100.0%

Figure 14: Proportional breakdown of currently recyclable materials

