Dissertation

Title PUBLIC PERCEPTION OF CURRENT AND FUTURE HOUSEHOLD WASTE RECYCLING METHODS: A CASE STUDY OF THE VILLAGE OF SAUGHALL, CHESTER.

Author Pope, Jamie Ben

PUBLIC PERCEPTION OF CURRENT AND FUTURE HOUSEHOLD WASTE RECYCLING METHODS: A CASE STUDY OF THE VILLAGE OF SAUGHALL, CHESTER.

Jamie Pope
Environmental Management BSc
April 2013

Signed Declaration

‘I declare that the main body of this dissertation is all my own work’

Signed:

Date:

Abstract

Household waste recycling methods differ between UK local authorities in several ways. This includes; containers used for collection, frequency of collection, what materials are collected and the processing of materials after collection, amongst other aspects. Increased pressure is put upon local authorities to increase waste prevention and rates of reuse and recycling in order to meet UK and EU legislation. Local authorities are meeting this through several methods, including introduction of new items to the household waste service (for example collection of food waste), or introduction of an entirely new system with different containers and collection frequencies. This occurred during 2012 in Cheshire West and Chester Council (CWCC).

Meeting legislation is a legal obligation, making it of high priority. However, whatever system is in place, the local authority will rely on the household participation. Therefore the public perception of household waste recycling methods is also of high priority.

Perception of a system may differ depending on the system in place. In addition to this, perceptions may differ for several reasons including; the age of residents, number living within an individual household and household type (for example terraced compared to detached). With the system change being rolled out towards the end of 2012, this study used 2 postal surveys in the village of Saughall, within CWCC.

These surveys assessed the perceptions of residents on the household waste method in place before the new system was rolled out, and after. Analysis showed a major negative perception towards the new system. It is taken into account whether CWCC accounted for the perception of residents before a new system was decided upon.

Acknowledgements

I give thanks and appreciation to my supervisor Dr Chris Lowe for all of his support and encouragement throughout this dissertation. I would also like to thank all of those who responded to the surveys, making this dissertation possible.

Contents

Table of Figures

Table of Tables

List of Acronyms

CWCC – Cheshire West and Chester Council

DEFRA – Department of Environment, Food and Rural Affairs

DETR – Department of Environment, Transport and Regions

EC – European Commission

EfW – Energy from Waste

EU – European Union

FOE – Friends of the Earth

HWRC – Household Waste Recycling Centre

LA – Local Authority

LCA – Life Cycle Assessment

LCA-IWM – Life Cycle Assessment of Integrated Waste Management

MBT – Mechanical Biological Treatment

MRF – Materials Recovery Facility

MSWMS – Municipal Solid Waste Management System

REL – Rear End Loaders

ROHS – Restriction of Hazardous Substances

RORO – Roll-On-Roll-Off Bins

UK – United Kingdom

WEEE – Waste Electrical and Electronic Equipment

WRAP – Waste and Resources Action Programme

Chapter 1 – Introduction

Each Local Authority (LA) within the UK has its own household waste management system in place. These can vary in terms of what items are collected, the frequency of collection, the container used for disposal and methods of disposal after collections that are available. Research shown in Chapter 2, revealed that a greater majority of UK LAs systems changed from separate boxes to wheeled bins. DEFRA (2012) suggested that co-mingled collection has become more widespread in recent years. Changes are needed within the UK and across all EU member states in order to comply with EU waste framework directive (see 2.2). From this directive, the UK is required to recycle compost or reuse 50% of household waste by 2020. The study will focus on the public perception of household waste recycling methods, looking in particular at the change that occurred within the study area of Saughall, in Chester. Cheshire West and Chester Council (CWCC) changed the system from co-mingled (the collection of recyclable materials within the same container.) wheeled bin collection, to boxes for material separation before collection. Results will represent the change of perception (if any), how well consulted the public were, the future of the new service, and whether it can help the UK reach the 50% EU directive target by 2020.

Influences on the collection of household waste can depend on how the waste is processed by each LA, after collection. One method of collection is within HWRCs (see Chapter 2). Table 1 shows the composition of household waste within England, Scotland and Northern Ireland in terms of tonnage processed at HWRCs.

	Recycling tonnage		
Material	**2008/09**	**2009/10**	**2010/11**
Garden waste	1,175,635	1,110,490	1,051,187
Wood	535,386	682,635	708,617
WEEE	286,867	310,401	304,313
Scrap metal	307,960	295,572	275,542
Paper and cardboard	248,521	269,834	231,763
Glass	71,867	66,007	60,884
Textiles and footwear	39,687	44,133	44,938
Plastics	18,509	18,525	24,123
Furniture	21,435	10,920	12,398
Batteries	12,582	12,666	9,777
Metal cans	14,754	7,748	9,102
Mineral oil	6,843	7,136	7,139
Other recycling	188,034	105,799	144,997
Subtotal excluding rubble and soil	2,928,079	2,941,866	2,884,779
Rubble and soil recycling	840,954	807,415	788,228
Total including rubble and soil	3,769,033	3,749,281	3,673,007

Table 1: HWRCs in England, Scotland and Northern Ireland 2008/9 – 2010/11. Obtained from WRAP (2012 p9)

Looking at the totals, it can be seen that the tonnage of waste dealt with at HWRCs has decreased. WRAP (2012) suggested three reasons for this decline:

1) The economic recession causing fewer home improvement projects to be carried out.
2) Diversion of some materials to new kerbside recycling services.
3) Improved control of commercial waste at HWRCs, with less being collected disguised as household waste.

Figure 1 below shows the composition of waste materials collected from households during 2006/07.

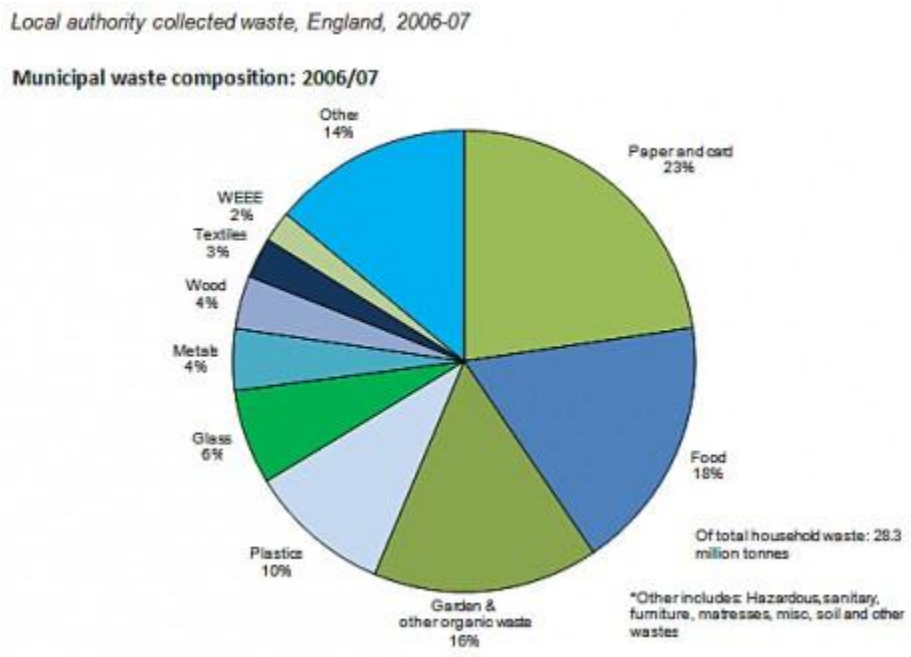


Figure 1: LA Collected Waste, England 2006-07. Obtained from DEFRA (2008)

For each LA to improve waste collection and management rates, as many of the waste streams presented within figure 1 as possible should be collected. However, these figures are dated, and composition of certain materials has now changed due to different collection methods being introduced. Since 2007 many LAs have now introduced kitchen food waste. For example WRAP (2009) shows how it provided funding and technical support to 21 LAs to carry out trials of separate food waste collections between 2007 and 2009.

This introduction required a separate food waste bin to prevent contamination. Along with this, different schemes use different containers such as wheeled bins or boxes. Wheeled bins are either 140 litres or 180 litres. Boxes are 55 Litres, and are used when recyclates are separated into 2 or more boxes per household. Read and Reed (2003 cited in Lyas *et al* 2005) discovered that one of the top performing authorities in England (Daventry District Council) used multiple

bins/boxes to collect organic material, dry recyclables and general waste. This helped the council to achieve a recycling rate of 44.3% in 2002-2003. The use of different containers represents a factor in the change of household waste composition. Different amounts of waste may be collected with different systems and containers in place. Also different types of waste may be collected or separated depending if authorities use the kerbside sorting scheme, sort at a HWRC, or do not sort at all.

1.1 – The Study Area: CWCC

Cheshire is a county in the North West of England, along the northern border of Wales. The highlighted area shown in figure 2 is the borough controlled by the Cheshire West and Chester Council (CWCC)

Figure 2: The area controlled by CWCC. (Obtained from Ordnance Survey 2013: Scale 1:600 000.)

According to CWCC (2013) the borough has a population of 329 000 and covers 350 square miles. It includes the city of Chester and the industrial and market towns of Ellesmere Port, Frodsham, Helsby, Malpas, Neston, Northwich and Winsford. Around one third of the entire population live within rural areas. The borough has an ageing population, with the number of residents aged over 65 expected to increase by over 50% by 2029.

1.2 – The Study Area: Village of Saughall

The village of Saughall is North West of the centre of the City of Chester, near to the border of Wales. The village is highlighted in red on figure 3.

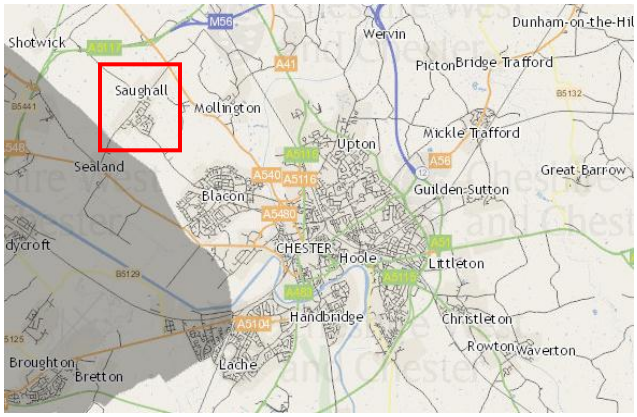


Figure 3: The local areas surrounding the City of Chester (obtained from Ordnance Survey 2013: Scale 1:100 000)

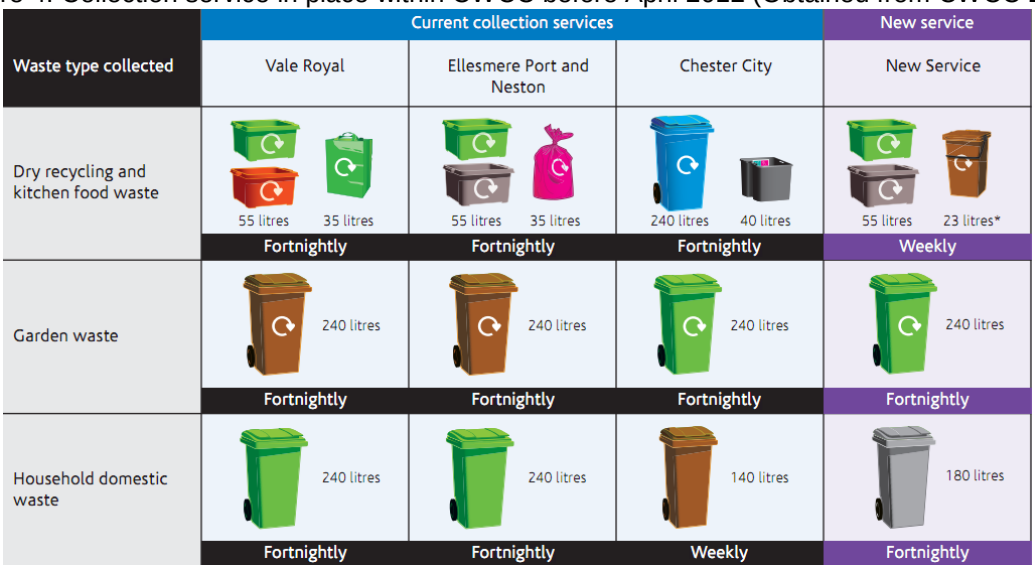
CWCC (2011) stated that in 2009 there were 4,460 people living in the ward, which covers 3,379 hectares. The population density is 1.32 people per hectare which is small when compared to 3.47 people per hectare within the entire CWCC borough.

This change of recycling system occurred between April and October 2012. Initial research found the council had had undertaken a waste collection survey in the borough during the summer of 2010. According to CWCC (2010) it was conducted as part of a multi-faceted consultation about a future waste collection service. Upon consultation with several residents within the village, it was found that many had not seen or heard of this survey. Along with this, few residents knew that the new service was being rolled out. However, CWCC had several informative road shows, newsletters, updates online and within the city newspaper about the new service.

1.3 – Brief History of Waste Collection in CWCC

In 2008, Chester and West Cheshire amalgamated becoming one local authority. This is stated in the Cheshire Structural Changes Order (2008): '*A new district council, to be known as CWCC shall be established as the sole principal authority for the non-metropolitan district of Cheshire West and Chester.*' Before the amalgamation, Cheshire West included the Vale Royal, Ellesmere Port and Neston. These areas, and Chester, had separate recycling schemes in place. This is shown in figure 4:

Figure 4: Collection service in place within CWCC before April 2012 (Obtained from CWCC 2012)



This represents a range of containers including wheeled bins, boxes and sacks of various sizes. The collection frequency for all containers was the same, except for household domestic waste which was collected more frequently in a wheeled bin 100 litres smaller in Chester. The major difference between these areas is the collection of dry recyclables and kitchen food waste. In Chester City, all was co-mingled and collected in a 240 litre wheeled bin, with the only separate collection being glass in a 40 litre caddy. While in Vale Royal, Ellesmere Port and Neston, recyclables were separated further into two 55 litre boxes and a 35 litre sack. These three separate collection services are due to combine in April 2012, with changes to the containers and frequency of collection shown on the right hand side of figure 4. The only system that remained the same was the fortnightly collection of garden waste in a 240 litre wheeled bin. The household domestic waste is now collected fortnightly in a 180 litre wheeled bin. The major difference is more relevant in Chester City. The 55 litre boxes being collected weekly rather than fortnightly, and the introduction of two new kitchen food waste caddys (one 7 litre caddy to be lined inside the kitchen and one 23 litre caddy for collection).

The purpose of this 2010 survey was to establish the views of residents and compare results from residents living in the different areas, and housing types (CWCC; 2010). Questions were based on the system in place during 2010 and possible future changes that could be made. From the results gained from this survey, a new scheme from May Gurney was introduced from spring, through to autumn 2012: '*The new 14 year contract will start in April 2012 and will transform the three existing collection arrangements into a single new service, with the aim to provide savings of more than £50 million.*' (CWCC; 2012). May Gurney (2011) states it is a well-

established company with a great deal of experience of working with the public sector, holding 8% of the outsourced waste collection market in England and Wales. This provides reasoning for CWCC selecting this company. Along with this, May Gurney (2011) claim the introduction of the kitchen food waste caddy is to prevent more waste from going to landfill, as it makes up approximately a third of the waste in general waste bins.

The company has shown success within other councils, such as Somerset Waste Partnership, Bridgend County Borough Council and West Oxfordshire District Council (see 2.5). CWCC (2010) suggests that changing from bins to boxes is advantageous due to sorting of recyclable materials at kerbside being possible, allowing a wider range of materials to be recycled. Using boxes, rather than wheeled bins, enables the collection crews to further sort the recyclable materials into separate compartments on the purpose built recycling vehicles.

1.4 Aims and Objectives

Aims:

This study aims to assess public perception of the current household waste management system (wheeled bins) and the future system (boxes) coming in to replace it within CWCC.

Objectives:

1. Develop and undertake a survey to assess the attitudes of the public in Saughall to the current recycling system, and the future changes that are occurring. Saughall is on the outskirts of Chester and is considered a microcosm of the wider study area.
2. Develop and undertake a second survey to assess the attitudes of the public in Saughall to the new recycling system, after it has been put into effect, asking the same residents asked in part 1.
3. Analyse the results from 1 and 2 and note the possible changes, if any, in the attitudes to the newly introduced system.

1.5 – Overview of Dissertation Layout

The fundamentals for this research have been set, the forthcoming chapters will provide a literature review on the subject of household waste management, looking in particular at recycling; a description of the methodology of this study, a discussion and analysis of the results gained from both surveys, noting comparisons between them, and finally a conclusion of the

results gained, with discussion of limitations to the study, and relevance to possible further research.

Chapter 2 – Literature Review

This chapter will identify the background of what waste is, what policies and legislation relate to the collection and sorting of household waste, and the different systems that are in place to deal with household waste. In relation to the aims of this study, it will be discussed how these factors can influence the public perception on what waste is, how policies and legislation affect household waste management and how satisfied residents are with different recycling systems that are in place. It will be noted how waste management differs on a national scale, between EU member states, and on a local scale, between different LAs within the UK.

2.1 What is Waste?

The EU Waste Framework Directive (1975) describes waste as "*any substance or object in which the holder intends to or is required to discard*." Coopland (2006) explains that once a final recovery operation has been completed (for example being made into a new product) then waste is no longer defined as waste. According to den Boer *et al* (2005) the definition of household waste differs between countries.

The EU Waste Framework Directive (2008) provides a waste management hierarchy where waste legislation and policy of EU member states has a priority order. This can be seen in the figure 5.

Figure 5: EU Waste Management Hierarchy. Obtained from EC (2012)

Prevention includes reduction in the amount of material used in the design and manufacturing processes of a product. Re-use is using the entire or part of an item for the same or new product. Recycling/composting is separating waste materials and using them to produce a new item or product. Recovery is the use of materials to provide valuable services. This includes anaerobic digestion, incineration with energy recovery, gasification and pyrolysis. These produce energy and materials from waste, known as Energy from Waste (EfW). Finally disposal

is the ‘throwing away’ of waste typically via incineration without energy recovery and landfill. In figure 5, these methods are put into an order of priority from top to bottom. According to DEFRA (2012a) prevention offers the best outcome for the environment, making it the top priority. The hierarchy then descends in order of environmental preference, with disposal being the least preferred option.

Waste is seen as a beneficial resource through EfW. An example is incineration, as described by Li (2011) ‘*Incineration is a waste treatment process that involves the combustion of organic substances contained in waste.*’ These bring resource benefits of producing electricity from the heat, and the ash produced can be used to increase crop yields on agricultural land. Other waste burning methods, such as gasification and pyrolysis, can also produce resources. FOE (2009) describes pyrolysis and gasification as thermal processes using high temperatures to break down waste, but unlike incineration, it is the burning of waste in a reduced oxygen environment. FOE (2009) goes on to explain how the gases (syngas), oils and solid char (ash) produced from these processes can be used as fuel resource, or as feedstock for petro-chemicals when purified.

The importance of the waste hierarchy is highlighted throughout the EU Waste Framework Directive (2008). According to the directive, all waste policy should aim to favour the practical application of the hierarchy. The main aim is to reduce the impact managing waste has upon the environment through promotion of reuse, recycling and reduction and moving away from landfill. A particular example of this is the disposal of bio-waste, which includes biodegradable garden and kitchen food waste. The 2008 directive states: it is important, in accordance with the waste hierarchy, to facilitate the separate collection and proper treatment of bio-waste for the purpose of reduction of greenhouse gases from landfill.

Waste is a mixture of different materials, some of which may have an increased value when separated. McDougall *et al* (2008) states that separating the materials in waste will generally increase their value if uses are available for recovered materials. All of the materials are processed in different ways depending on different situations. This includes; where the waste is produced and whether it is waste of a business or a household. Either way, regulations are in place locally, nationally and globally for the regulation of waste.

Products produced from waste not only relate to the hierarchy framework, but also the framework of the Life Cycle Assessment (LCA). Rebitzer *et al* (2004) defines LCA as a

'*methodological framework for estimating and assessing the environmental impacts attributable to the life cycle of a product*.' Figure 6 represents the LCA.

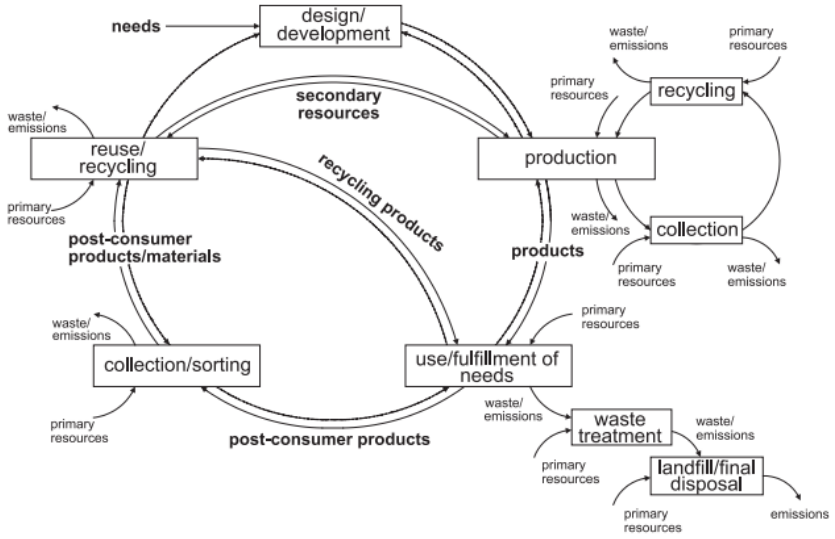


Figure 6: Schematic representation of a generic life cycle of a product (the full arrows represent material and energy flows, while the dashed arrows represent information flows). Obtained from Rebitzer *et al* (2000 cited in Rebitzer *et al* 2004)

Focussing on household waste, den Boer *et al* (2005) discusses a project known as LCA-IWM. This project ran from September 2002 to August 2005, with the financial support of the EC, looking at the development of integrated waste management strategies for cities and regions with rapidly growing economies at the time. The results of this project found faults within some household waste management systems across Europe, and it provided suggestion for areas of improvement, for example in recycling participation. Despite encouragement from the project towards better household systems, in particular relation to this study, legislation has caused further system changes.

2.2 Waste Legislation

The implementation of waste legislation and regulations is provided by the EU to all member states. At EU Level, one of current legislations in place that best relates to this study is the EU Waste Framework Directive. Particular targets within this directive for re-use and recycling are stated by Europa (2009): '*by 2020 preparing for re-use and recycling and other material recovery shall be increased to a minimum of 70% by weight.*' A larger amount of waste is sent for reuse and recycling, adding to the current weight. This is a high expectation. A target is also evident for household waste: '*by 2020, preparing for re-use and recycling of solid municipal waste materials from households shall be increased to a minimum of 50% by weight*' (European

Commission; 2010). Stookes (2009) discussed that the most important aspects were to reduce the negative impact of waste from production and disposal, through recycling. To ensure these targets are met, new household waste management schemes have been initiated.

The UK is legally obliged to transfer EU directives into UK law. The UK government produced a National Waste Strategy at the start of the new millennium from other EU Directives such as the Landfill Directive of 1999. DETR (2000) worked with LAs within the UK to pilot schemes encouraging householders to reduce waste and participate in recycling. This was over a decade ago, and since then strategies have been amended with stricter targets being introduced. DEFRA (2012) shows how targets have been revised since the 1975 EU Waste Framework Directive. An additional target requires the member states to recycle, compost or reuse 50% of household waste by 2020.

According to DEFRA (2012a) there are several waste regulations and policies in place in the UK. These include waste electrical and electronic equipment (WEEE), restriction of hazardous substances (ROHS) directives, packing and packaging regulations, and end of life vehicles regulation. This represents how an individual member of the EU deals with its own waste, introducing its own national regulations, in order to comply with EU regulations and law.

2.3 Recycling Rates

Increased pressure from the UK government is put on all LAs to increase recycling, composting and re-use. Rogers (2011) stated that recycling is not the same rate around the country. The current rates are used to compare each LA, giving a positive perception to those meeting the targets, and a negative perception to those that don't. In turn, LAs may change the way the systems operate, to try to gain a positive perception.

There are many factors influencing different recycling rates between LAs. A report from WRAP (2010) implies that the factors fall into four main groups:

1) Socio-economic, lower rates in areas of high deprivation.
2) Range of materials collected, LAs that target a higher range of dry recycling materials will achieve a higher rate.
3) Kerbside collection characteristics - with a less frequent fortnightly collection and a container with a large capacity achieves higher yields.
4) Regional, some regional variations that cannot be explained using other factors.

Of these factors, the most influential during the report was found to be the deprivation, range of materials collected and fortnightly collection. Another factor that varies within LAs is the different types of households. Households across a LA can differ from high-rise buildings, to more spacious, rural detached housing. With these variations, different collection methods within a system must be considered. For example, Robinson and Read (2005) discuss how residents in high-rise flats usually have communal waste systems where waste is disposed of in paladin bins (extra large communal storage container) or similar. This can cause issues for the introduction of new systems. This was highlighted by Mattsson *et al* (2003) in the new '4 bin' system introduced into Daventry, England. It was suggested that the majority of rural housing had the storage space required for 4 separate containers, while in urban areas, where terraced housing is more common, 4 containers would cause a problem. This is due to the insufficient space for storage, and few having a rear entrance in order to take containers to kerbside. With these issues, then a different system for the collection of waste may be needed. Omran *et al* (2009) used Malaysia as a case study, stating that kerbside collection is common in low-rise housing areas, which include terraced, semi-detached and detached houses. While high-rise flats use paladin bins, along with alternate systems such as roll-on-roll-off bins (RORO) or Rear End Loaders (REL).

Before a new system is introduced, it may be beneficial to trial the system first. However, as made evident by Williams and Cole (2013) the trials in Kings Bromley, Staffordshire, England excluded high rise flats, older terraced properties with no front gardens and modern apartment blocks with communal bins. Should trials not include all household types then it will not provide an accurate representation of all potential issues within an area.

It can be argued that the introduction of schemes has had a positive effect by increasing UK recycling rates, as made evident by DEFRA (2012b): '*Around 40% of waste from households is currently recycled, as of 2011, compared to 11% in 2000/01'* During November 2012, new statistics were released by DEFRA (2012c) showing the recycling rate of UK households in 2011/12 being 43%. Although it is positive that the rate has increased by approximately 3%, the increase is beginning to level off. In fact, 2011/12 is the lowest year on year increase for 10 years, which may be due to a greater difficulty and potential high costs.

In comparison to other member states, 43% is a small figure. For example, Flanders in Belgium has a recycling and composting rate of over 70% (Laing; 2007). Hickman (2011) showed a

comparison between Germany and the UK. The town of Neustadt has the best recycling system within Germany, 16% higher than the German target of 70%. Hickman (2011) stated the reason for the success is provision of financial incentives and education. Germany have less that 300 landfills and according to Bersi (n.d), the country plans to increase the use of EfW, ceasing the operation of all current landfills. This shows how small the figure of 43% is within the UK. It can be argued that methods need to be more productive and efficient to match other member states on recycling and composting efforts. However, the UK is ahead of many European countries which figure 7 shows.

Figure 7: Municipal Waste Management in the EU, 2010. Obtained from DEFRA (2011a)

The EU27 figures represent the European average. DEFRA (2011a) states that from these 2010 figures, the UK landfills around 12% more municipal waste than the EU27 average. However, many other member states are far from the average figures, which can provide a negative perception e.g. should landfill rates be higher. It must be noted that these figures represent broad comparisons due to differences in definitions of waste management. Overall the UK needs to continue to decrease the use of landfill as it is seen to have a negative effect on the environment. In comparison to a majority of EU countries, the UK currently represents better methods of managing waste.

It can also be argued that the target of 50% for EU countries is not ambitious enough, with some countries already surpassing the rate with ease, with time available before the target needs to be reached. With aims to surpass current targets, UK LAs may need to change the

recyclable collection from households, frequency of recyclable collection, and the way in which separation occurs at kerbside, or afterwards.

Furthermore, additional collection of recyclable materials such as food waste will help to increase recycling rates and reduce the use of landfill. Changes have been, and are being made across the UK. An example can be seen in Staining, in Lancashire. Winstanley (2011) studied '*how efficiently householders engage with kerbside collections by measuring variations in recycling rates following the introduction of a wheeled bin scheme*.' The scheme changed from 2 collection boxes (size of 55 litres) to comingled wheeled bin collections (size of 240 litres) to gain a higher volume of recyclable and compostable waste from collection. Winstanley (2011) stated that the new scheme aimed to follow a large number of UK LAs which reported dramatic increases in their recycling rates following the introduction of a comingled system.

2.4 Behaviour/Attitude and Participation of Households

Social Acceptability	Temporary Storage	Collection Transport	Treatment
1 - ODOUR	Yes	No	Yes
2- VISUAL IMPACT	Yes	No	Yes
3 - CONVENIENCE	Yes	No	No
4 - URBAN SPACE	Yes	No	Yes
5 - PRIVATE SPACE	Yes	No	No
6 - NOISE	Yes	Yes	Yes
7 - COMPLEXITY	Yes	No	No
8 - TRAFFIC	No	Yes	Yes
9 - RISK PERCEPTION	No	No	Yes
Social Equity			
10 - DISTRIBUTION/LOCATION	Yes	No	No
11 - EMPLOYMENT QUALITY	No	Yes	Yes
Social Function			
12 - RECYCLING/DESTINATION	No	No	Yes
13 - EMPLOYMENT QUANTITY	No	Yes	Yes

Table 2: List of the social criteria and indicators obtained from den Boer *et al* (2005 p 58)

All Waste Management systems should fulfil specific social obligations. Table 2 shows the social criteria and indicators that should be taken into account to measure social sustainability of the Municipal Solid Waste Management System (MSWMS).

The criteria represent negative social barriers that are present within waste collection and treatment systems. Research from WRAP (2008) relating to influencing behaviour of householders included the identification of barriers that prevent the task of recycling. These include:

- Situational barriers – not having adequate containers, lack of space, unreliable service, physical problems.
- Behavioural – being pre occupied, difficulties in sorting
- Lack of knowledge – not knowing ‘what goes where’
- Attitudes and perceptions – being resistant to sorting, no motivation due to lack of rewards.

These barriers can be overcome to increase participation. For example if containers cause physical problems, add wheels, or provide an assisted service. If not knowing ‘what goes where’ is a problem, then education via leaflets or online updates may be useful. According to Davis *et al* (2006) high participation rates are an essential component of any effective kerbside collection scheme.

Figure 8 shows the Triad Model, which represents the base of resident behaviour management towards waste separation in kerbside recycling schemes.

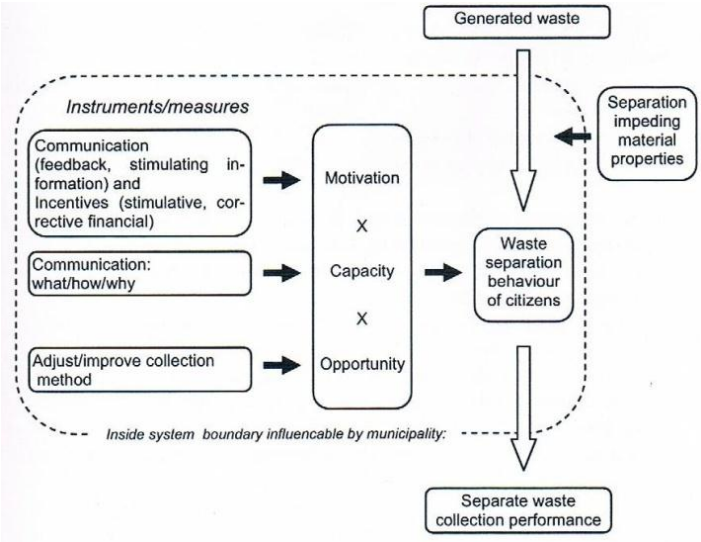


Figure 8: The Triad Model applied to waste separation behaviour. Obtained from den Boer *et al* (2005)

Poiesz (1999) state in the Triad model, resident behaviour is influenced by 3 factors:

1) Motivation – are citizens motivated to separate waste?
2) Capacity – are citizens physically and mentally capable to separate waste?
3) Opportunity – are opportunities provided to separate waste?

Different behavioural patterns will change levels of participation. Should households have motivation, capacity and opportunity to participate, then participation rates will be high. Other factors may affect participation rate, such as affluence within an area. Research by Wilson and

Williams (2007) in England showed differences between more and less affluent areas. In general, residents from less affluent areas did not recycle as much as residents in more affluent areas. The waste collection system that is in place needs to be convenient for as many households within the LA as possible, to achieve the greatest participation rate. A study on attitudes to recycling by Martin *et al* (2006) in Burnley, England showed that residents were willing to participate, however it was agreed that local recycling services were too unreliable and inconsistent to allow them to do so.

Woodard *et al* (2005) argued that public perception of household waste collection appears to be: '*a system dominated by collection of general household waste with an additional recycling service included.*' This perception needed changing, with recycling collection becoming the main focus. This is being applied through the introduction of new kerbside separation collection schemes across the UK. According to Let's Recycle (n.d), kerbside separation has been introduced mainly due to the EU Waste Framework Directive having a requirement of separate collection of at least paper, metal, plastic and glass by 2015.

2.5 Household Collection of Waste

The UK government is trying to encourage LAs to introduce new schemes that will increase recycling rates. An example, stated by DEFRA (2012d), is the changes in penalties and entitlement during 2012. This includes fixed penalties in place for putting the wrong bin out on collection day, or not putting the bin out at all. An example can be seen in the London Borough of Brent, as Brent Council (2011) have a fixed penalty of £100 should residents refuse to recycle. These penalties can encourage residents to follow procedure.

The types of waste collection containers range from larger wheeled bins to sacks to boxes. This shows variations between different schemes provided by LAs. With funding becoming available, and with targets to meet, many authorities have altered their waste collection system. An example can be seen in the Somerset Waste Partnership (2012), with additions to kerbside recycling collections in 2011/12. During autumn 2011 plastic bottles and cardboard were added, and in July 2012 aerosols, kitchen towel, and textiles were also added. Adding items will cause costs to increase, but the increase in recycling rates depends upon participation.

An example within Wales, in Bridgend County Borough Council (2013) represents a new system that was brought in during June 2010. Weekly collection for recycling and a fortnightly collection for general waste were introduced. This helped the borough move from being the second worst

performing Welsh LA to the most improved. This represents how LAs are encouraged to increase recycling rate through comparison to others. In West Oxfordshire during November 2010, a new service brought in collection of food and garden waste. The general waste service was changed to fortnightly. According to May Gurney (2012) the new service aimed at saving the council taxpayers more than £500, 000 a year in operational costs by increasing the amount of waste that is recycled. It was also expected to save the more than £2 million in landfill costs over the 7 year contract. This represents a positive perception to change in recycling service.

Sorting into separate boxes at kerbside may not be needed if a Materials Recovery Facility (MRF) is available. An example is Farington Waste Recovery Park, Lancashire, which serves South Ribble, Preston, Chorley, Ribble Valley and West Lancashire. Lancashire County Council (2013) states that the park sorts recycling into separate waste streams after collection. It also includes a Mechanical Biological Treatment (MBT) plant that recovers materials from the general waste such as paper, plastic and metal. It also includes the aerobic and anaerobic treatment of biodegradable waste. However, it was suggested in BBC News (2012) that using kerbside sorting avoids the building of sorting site, which can have negative economic impacts.

WRAP (2009) presents 3 options that are currently available for LA household waste collection:

1) Kerbside sort – sorting materials on kerbside into different compartments of a specifically designed vehicle
2) Single stream co-mingled – collection in a single compartment with sorting of materials taking place at an MRF.
3) Two stream co-mingled – households are provided with 2 containers, with different materials placed in each. Collection by one vehicle, with 2 separate compartments.

Importance is placed upon the quality of materials gained from collection. WRAP (2009) highlights that kerbside separation prevents contamination, giving the most reliable stream of quality materials. It is taken into account that there may be practical and operational barriers to kerbside sorting. When left with a choice of single or two stream co-mingled; the latter has advantages of higher material quality and value. However, BBC News (2012) states that a new European Directive, which comes into force in January 2015, may leave authorities with little option but to scrap the co-mingled approach. This could have a negative impact, for example, councils in Wales currently using the co-mingled system have found that residents favour the simplicity.

The collection of waste by the LA can differ in terms of; how frequent each container is collected, and the range of materials that are collected (e.g. heavy bulky items, or small items like household batteries). Woodard *et al* (2005) noted that the most common frequency for collection of recyclable materials in England and Wales was fortnightly. According to Icaro Consulting (2011) this still remains, with the most common collection combination being fortnightly alternate collection for general household waste and recyclables, and new weekly collection of kitchen food waste. Woodard *et al* (2005) explains 2 main reasons for authorities not being able to collect everything more frequently, including; the higher cost of operating a weekly service, and the yields of materials being too small to validate a weekly service.

Noehammer and Byer (1997 cited in Woodard *et al* 2005) suggested that LAs have 3 options when providing waste collection containers; to provide them free of charge, at a cost or not to provide them at all. All UK LAs provide containers free of charge, which will encourage participation due to fewer costs to the householder. Woodard *et al* (2005) studied the kerbside scheme in the area of Horsham, South East England. It was found the most popular container was a plastic box with a lid. This is contrasted today as many authorities are changing from boxes to wheeled bins, (see 2.3). Despite the box preference in Horsham, Woodard *et al* (2005) noted the advantages of wheeled bins, which include; no required lifting and availability in a variety of sizes. Therefore wheeled bins have fewer difficulties physically, and size can be altered to accommodate different waste streams. Woodard *et al* (2005) also mentioned disadvantages to wheeled bins which include a greater expense than boxes and the larger size may cause an issue for storage, especially in areas with dense housing.

LAs also use large bags or sacks for disposal. Wilson and Williams (2007) found that fewer people complained about the size of the sack in comparison to a box. More residents were happy with the design of the wheeled bin for garden waste, rather than the design of a box. This study also found that the LA and the public seem to use different indicators to establish the success of a scheme. The public is more influenced by personal preferences and behaviours, while LAs rely on specific performance indicators, such as the tonnage of waste collected, and how legislation is met.

Chapter 3 – Methodology

Literature relating to this study has been reviewed in the previous chapter. To obtain data for this study, it was decided to develop and carry out 2 surveys within the location (see appendix 1 and 2). The first survey was posted in May 2012 before the new recycling service was rolled out in Saughall. The second survey was posted in November 2012, after the new service had been rolled out.

Further research found CWCC (2010) conducted a waste collection survey in the summer of 2010 (as discussed in the previous 2 chapters), with intentions to alter the system that was in place. The survey had a response rate of 15%. Figure 9 shows the location of the respondents.

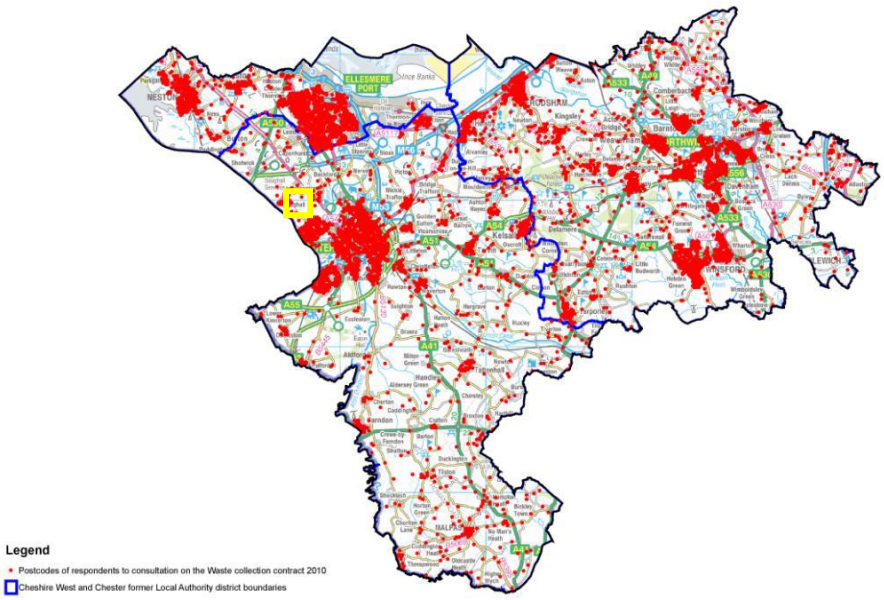


Figure 9: Map of CWCC with the postcodes of the respondents to consultation of the waste collection contract. Obtained from CWCC (2010)

The majority of respondents in red are within the urban areas such as Chester and Ellesmere Port. Fewer respondents are evident in rural areas such as Malpas and Tattenhall. This includes the rural village of Saughall used for this study. With fewer responses from rural areas, it can be suggested that the perceptions of these residents may have been overlooked and not well represented. For this reason, Saughall was selected for the study. The village is highlighted in yellow on figure 9. Following the previous research from CWCC (2010) survey, this study will also use quantitative and qualitative methods to gain results required for analysis.

Quantitative analysis will be applied to comparative questions through statistical software 'Minitab'. A chi squared test will be performed in order to obtain a p value. This will then be used to determine if there are any differences in perceptions between surveys and housing types.

3.1 Method Development

Several different methods could have been chosen to obtain results for this study. Firstly, the survey could have been online. Bethlehem (2009 p3) states that paper surveys are being replaced by online surveys as they increase response speed and reduce costs. However, it would have been difficult to target specific residents, and not all will have the internet available. Door-to-door interviews could have been conducted. An issue here is the public are often reluctant to answer, leading to a low response rate. A face-to-face questionnaire may have been another option, however many do not have the time to stop and answer questions. Bethlehem (2009 p3) suggested face-to-face interviews are time consuming and expensive. Also, choosing the correct day and time to ask a variety of respondents would be difficult as residents each have different routines.

Using postal surveys is beneficial as it will not have the same issues described above, although Bethlehem (2009 p3) stated they lack the persuasive power of face-to-face interviews. The data gathered from both surveys is primary data. Parsons and Knight (2005 p63) states an advantage of obtaining primary data is that it is more specific to the problem. The surveys are also a mix of qualitative and quantitative approaches. Roberts (2004 p113) discusses how qualitative and quantitative approaches combined in a study complement each other by providing results with greater breadth and depth.

3.2 Techniques Used

The purpose of using surveys is to gather accurate information required for analysis through the use of quantitative and qualitative methods. To obtain perception of the change of system, 2 surveys will be conducted. The first being conducted in May 2012, before the change was in place within Saughall. The second was conducted in November 2012 after the new service has been rolled out. Attitudes towards each system will be analysed and compared. In turn, the results from these 2 surveys will be compared with the 2010 CWCC survey. Each survey will be separated into different sections for easier layout, and structure for respondents to follow.

A pilot survey was carried out to ensure the respondents could fully understand each question and the language throughout. Several residents within Saughall were provided with the pilot survey, and any suggestions or additional changes were applied.

Each finalised survey was delivered in a post-out and post-back format to residents, with a letter providing a brief about the study, and how any contribution will help (see appendix 3). A pre-paid addressed envelope was included, allowing residents to respond without cost.

A risk assessment of the research methodology was carried out before the surveys were posted (see appendix 4). Possible risks included slips, trips and falls and the weather. There were also the ethical issues of data protection and consent issues. These were all of low risk, and the assessment was accepted, allowing the study to take place.

Survey 1 was posted in May 2012, before the new service was rolled out in Saughall during October 2012. There were 100 surveys for each housing type. Every survey was coded depending on household type it was posted to, with T for terraced, SD for semi-detached and D for detached. Different housing types were included so different perceptions may be gained. For example, a detached house may be more spacious, and have more room to store recycling containers when compared to more compact terraced house. Certain questions within survey 1 are from secondary sources. Questions 6, 8, 15 and 17 were obtained from the original CWCC 2010 summer waste collection survey, allowing comparison. Questions 1, 24 and 25 were obtained from a Manchester study by Cotterill *et al* (2008). Question 7 was obtained from a similar survey by Eastleigh Borough Council (2010).

Survey 2 was posted in November 2012; one month after the new service was rolled out. There were also 100 surveys for each housing type, with the same coding system as survey 1. Within survey 2, questions 5, 10, and 20 to 25 are in the same format as survey 1. Questions 6 to 9, 11, 13 and 14 were based on comments from survey one about the new food waste caddy, the potential high costs of the new service and the assisted service for elderly or disabled residents. New questions were included due to the change of system, particularly the introduction of kitchen food waste. Each survey also gave the respondent the option to leave a comment about the recycling system in place within the study area.

3.3 Criticisms of Techniques Used

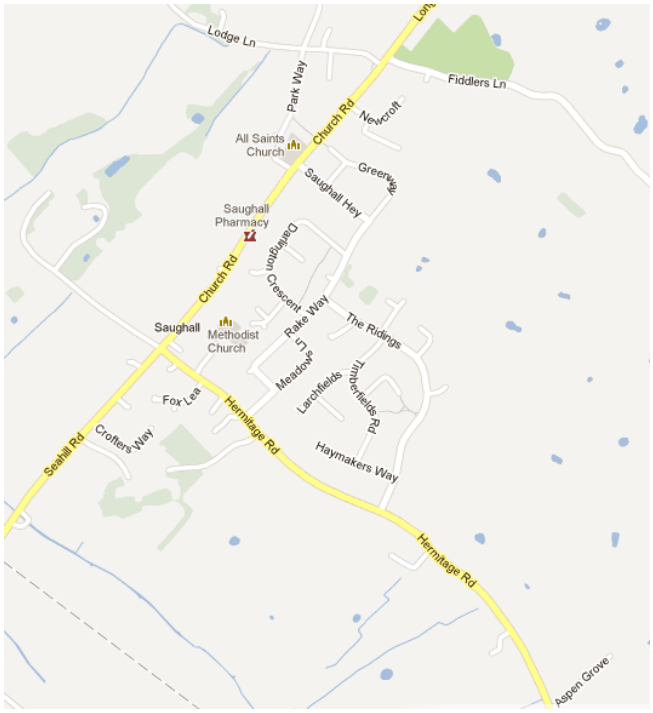
The disadvantages of using primary data, as suggested by Parsons and Knight (2005 p63) are: it provides only a small data set, data collection can be tedious and it is time consuming. This amount of surveys requires a vast amount of paper, producing a high cost. This format may also restrict the amount of responses, as residents generally find it much quicker and easier to fill in a survey online.

The household coding of the surveys may be useful, but the study area includes other housing types such as bungalows, flats and a nursing home. All of which were left out of the study, not gaining a full representation of the entire area. The flats and nursing home may also have a different variation of the waste collection system in place, which may alter the perception.

3.4 Details of Sampling Procedure

It was ensured that each street within the study area was covered in order to gain a representative example of the entire area. The figure below shows the street view of the study area.

Figure 10: Street view of Saughall, Chester, Cheshire. Obtained from Google Maps (2013)



Appendix 5 shows the number of housing types per street. Random sampling was used on each street, ensuring they matched the coded system (see 3.2). This way, each house will have equal chance of being selected and the results gained will be unbiased. For survey 2, the same households from survey 1 were chosen to obtain a more accurate change in perception from the same respondents.

Chapter 4 – Results and Discussion

The previous chapter discussed the methods by which data was obtained for this study. Survey one had a high response rate of 42%, while survey 2 had a lower response rate of 35%. These are deemed as high rates, as stated by Saunders *et al*. (1997 cited in Lefever *et al*. 2007) rates as low as 30% have been considered reasonable in posted surveys. Also Bethlehem (2009 pp, 3) specified rates tended to be lower in a postal survey. High rates may be due to the emotive nature of the subject. All raw data can be seen in appendix 6 and 7. Firstly, a profile of the respondents from both surveys is provided and then selected results from the first survey are analysed before comparisons are made between both surveys and the CWCC 2010 summer survey.

Following this, questions specific to survey 2 are discussed. Finally limitations of the study are discussed, along with possible future work. Throughout this chapter, discussion focuses on three key aspects: - 1) housing types, 2) perceptions on kitchen food waste and 3) issues caused by the different collection systems.

4.1 – Profile of Respondents

There was a higher response rate with survey 1. Figure 11 below shows the amount of respondents per household type from survey 1.

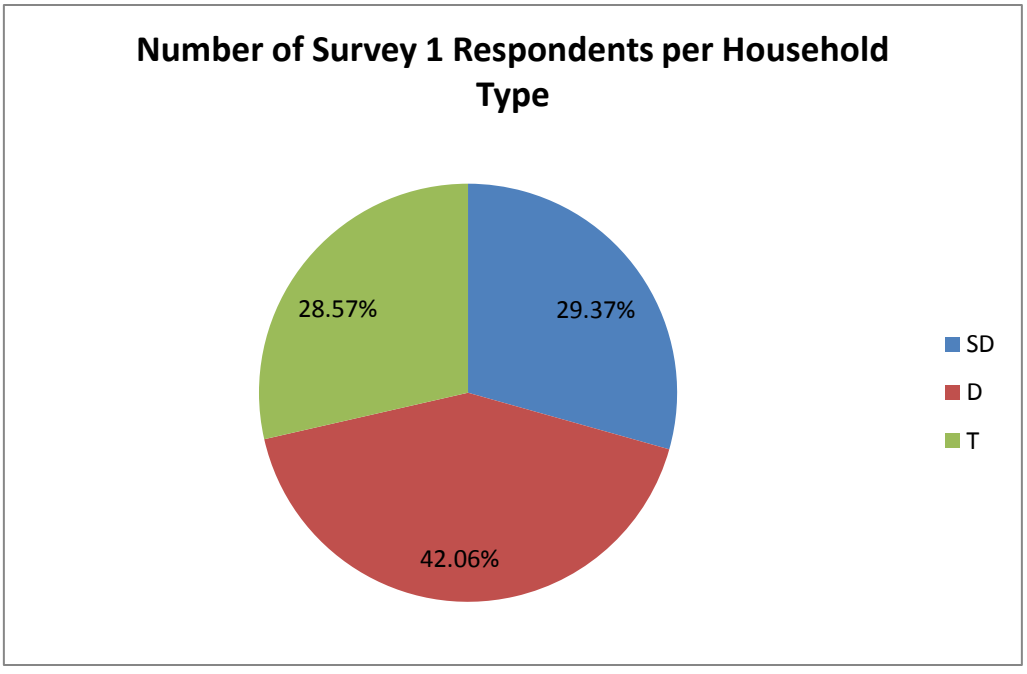


Figure 11 – Amount of Respondents per Household Type From Survey 1

More responses were gained from detached housing within the study area. Looking at the profile of survey one respondents, 42% of all households were occupied by at least 2 people, with no respondents having 6 or more occupants. There was a range of ages, with 53% being aged 60 or more. Three quarters of households did not have any members under the age of 18, and 48% were of a retired working status. This indicates the respondents were more of an elderly population, which reflects the situation within Saughall. Almost all respondents (99.21%) were of White British ethnicity.

The profile of survey 2 respondents per household type is very similar to that of survey 1

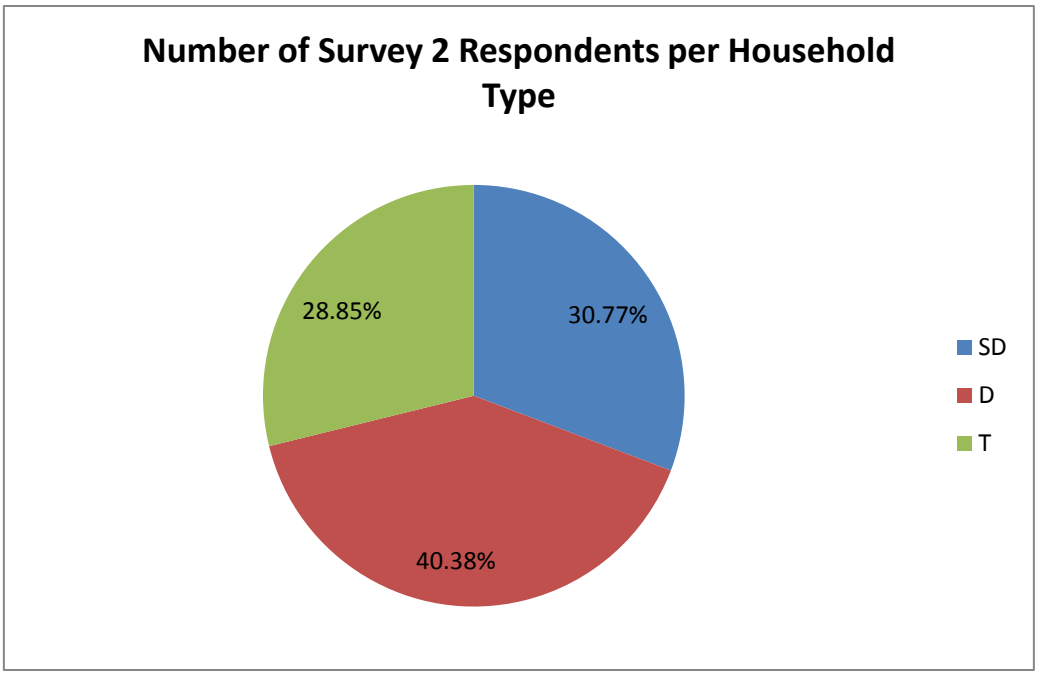


Figure 12 – Amount of Respondents per Household Type From Survey 2

The majority of households were occupied by only 2 people, but results were more varied, and households with 6 or more residents were included. 10% more respondents were female. As in survey 1, slightly over half of respondents were aged 60 or over, but no respondents were under the age of 30. 74% of respondents have no household members under 18, which again indicates an elderly population within Saughall.

4.2 – Qualitative Analysis of Survey 1

One section in survey 1 asked about issues, or potential issues with the wheeled bin system. Question 8 highlighted the importance of potential issues within the system as seen in figure 13

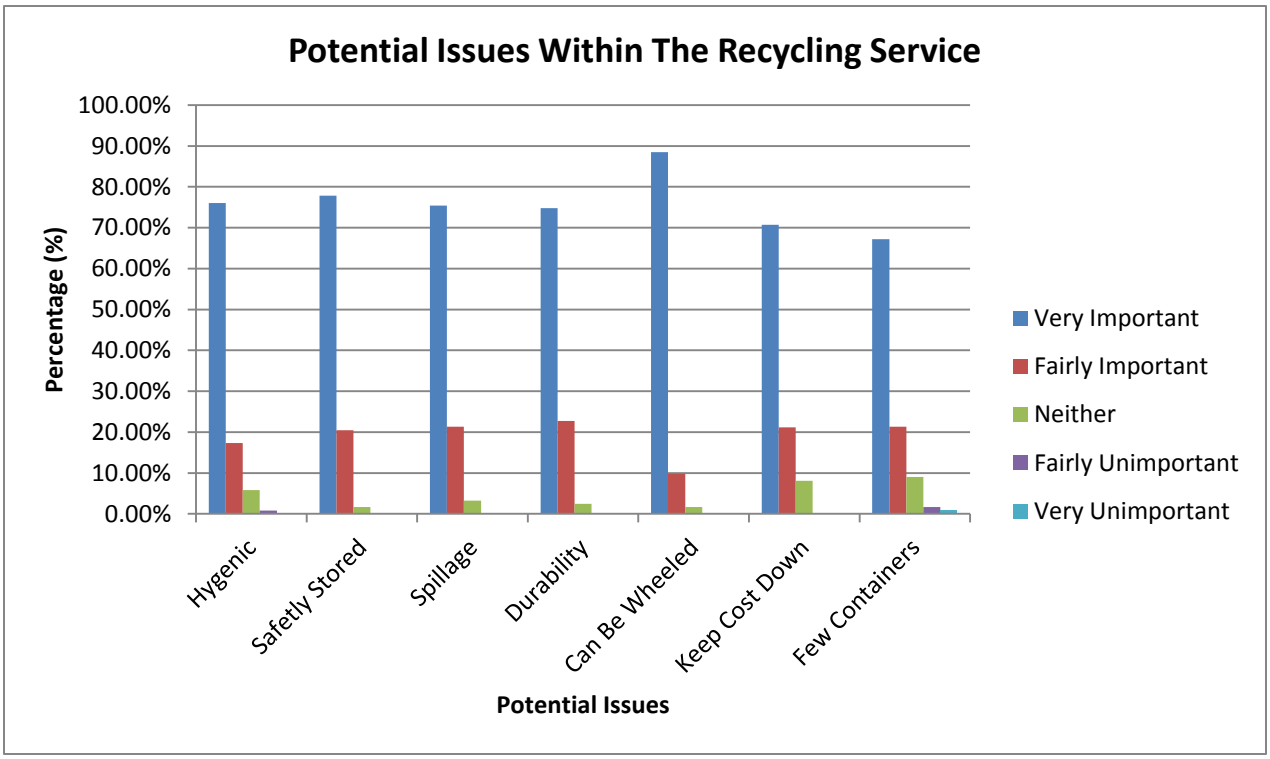


Figure 13 – The Importance of Potential Issues.

Participants rated all issues to be very important, with 6 having a response of over 70%. The issue of having as few containers as possible was very important with a response of 67%, however it had the highest response of neither and fairly unimportant, and the only response for very unimportant. This shows a small range of opinions; with disagreements as to whether there should be as few recycling containers as possible within the system.

Question 9 showed a majority of respondents in disagreement with all the potential issues listed (see appendix 6). 71% disagreed that the wheeled bin is not easy to handle, and the remaining issues had a minimum of 57% disagreement. This illustrates the wheeled bin system is seen to have minimal issues when in use.

The next section focused on the boxed system. 60% of respondents had not heard of the new service until this study was carried out. This could be due to the lack of sources of information respondents may have e.g. they may not buy the local newspaper. After introduction to the new system, question 13 asked for the respondent's preference of wheeled bins or boxes for the service. Figure 14 shows the results.

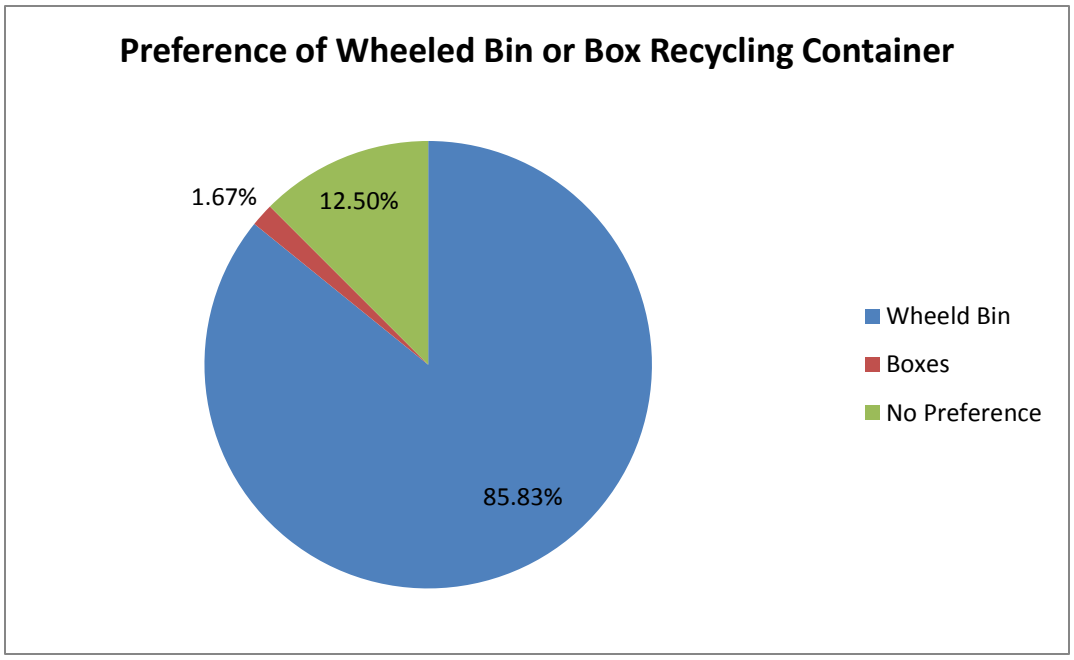


Figure 14 – Preference of Wheeled Bin or Box Recycling Container.

It is clear the over 85% of respondents prefer the use of wheeled bins to boxes. Arguably this is based on an assumption, as the boxes had not yet been in use. However wheeled bins do have several advantages, as discussed in the Chapter 2, Woodard *et al* (2005) stated that they do not require any lifting and they are available in a variety of sizes. This would particularly benefit elderly residents, who struggle to lift and manoeuvre boxes. Further advantages are described by Birmingham City Council (n.d), which introduced a wheeled bin system due to: '*increased cleanliness and avoidance of recyclables being blown down streets on a windy day.*'

Question 26 provided the option for respondents to leave a comment on the wheeled bin recycling system, and the new system that was being rolled out. Figure 4 in Chapter 1 shows the change of collection service. The majority of comments were negative towards the new system, as shown in table 3:

Negative Comments on New System	Semi-Detached	Detached	Terraced	Totals
The new food caddy will be unhygienic	4	3	2	9
New system costs are too high	3	3	4	10
Limited space to store new containers	1	2	4	7
Elderly residents will struggle with new system	0	5	1	6
Happy with wheeled bin system	0	5	2	7

Table 3: number of respondents per household type relating to each negative comment in survey 1

The issues stated most often are highlighted in yellow. Members from all 3 household types believed that the new food waste caddy will be unhygienic and the new system as a whole will cost too much. Respondents, particularly from detached households, believe that elderly residents will struggle to cope with the new system, and they were happy with the wheeled bin system. As discussed in chapter one, these views may be due to the LA generally having an elderly population, as discussed by CWCC (2013) the number of residents aged over 65 is expected to increase by over 50% by 2029. Also, a larger driveway may have been easier to wheel bins down, rather than carry several boxes.

There were also several positive perceptions about the new system. This includes the introduction of kitchen food waste collection, the preference of smaller boxes to bulky wheeled bins and the increased frequency of recycling collection. There were also other suggestions to go along with the future changes such as encouraging composting, increase in local facilities such as communal recycling points, and a change of system throughout the different seasons. These suggestions could have been recommended at a public consultation of the new system.

4.3 Comparison Questions

This section will compare and discuss questions repeated in both surveys. Some questions are also comparable to CWCC 2010 survey questions. Statistical analysis was carried out comparing survey 1 and 2, and different housing types on 3 sections (as discussed in chapter 3). The data was entered into the 'Minitab' statistical package, with results gained through chi squared. From this, should the p value be less than 0.05, then the result would be significant and the stated null hypothesis will be accepted. It should be noted that Minitab only shows results to 3 decimal places. Comparison data can be seen in appendix 8.

4.3.1 – Materials That Can Be Recycled

Question 2 from each survey asked respondents how often different materials are recycled. Table 4 shows the results.

	Always		Occasionally		Rarely		Never	
MATERIALS	**S1**	**S2**	**S1**	**S2**	**S1**	**S2**	**S1**	**S2**
Glass	**94.87%**	**95.19%**	**4.27%**	**2.88%**	**0.85%**	**1.92%**	**0.00%**	**0.00%**
Paper	**98.36%**	**97.12%**	**1.64%**	**2.88%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Cardboard	**95.93%**	**95.19%**	**4.07%**	**4.81%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**

Cans	94.31%	96.15%	4.07%	3.85%	1.63%	0.00%	0.00%	0.00%
Aluminium Foil	61.90%	67.65%	23.81%	25.49%	8.73%	3.92%	5.56%	2.94%
Household Plastic	80.95%	85.00%	14.29%	11.00%	3.17%	2.00%	1.59%	2.00%
Garden Waste	91.80%	91.35%	1.64%	7.69%	2.46%	0.00%	4.10%	0.96%
Textiles	49.59%	56.57%	33.88%	26.26%	10.74%	14.14%	5.79%	3.03%
Kitchen Food Waste	32.54%	75.25%	7.94%	11.88%	10.32%	5.94%	49.21%	6.93%
Used Cooking Oil	6.35%	29.29%	5.56%	17.17%	17.46%	7.07%	70.63%	46.46%
Printer Cartridges	26.40%	35.05%	12.00%	15.46%	9.60%	15.46%	52.00%	34.02%
Batteries	65.08%	64.00%	13.49%	20.00%	8.73%	11.00%	12.70%	5.00%
Spectacles	23.58%	19.59%	9.76%	14.43%	10.57%	14.43%	56.10%	51.55%
Shoes	37.30%	33.33%	19.84%	22.22%	12.70%	13.13%	30.16%	31.31%
Used Engine Oil	12.50%	24.74%	0.83%	7.22%	1.67%	4.12%	85.00%	63.92%
Electrical Items	28.23%	33.66%	21.77%	18.81%	14.52%	11.88%	35.48%	35.64%
Mobile Phones	20.97%	21.21%	10.48%	15.15%	21.77%	21.21%	46.77%	42.42%
Tetrapacks	47.58%	56.44%	17.74%	22.77%	9.68%	11.88%	25.00%	8.91%

Table 4: S1 represents survey 1 results and S2 represents survey 2 results

The key differences are highlighted in yellow. The introduction of the kitchen food waste caddy clearly increased food waste recycling as the option of always is up by 42%. However, there are other options for recycling kitchen food waste such as composting and feeding scraps to pets. Recycling of used cooking oil and engine oil also increased, which is evident through 'always' responses. Cooking oil recycling has more than quadrupled to just over 29%. This is a newly introduced item that can be collected within the new system, which residents appear to be making good use of. This also applies to the increased collection of printer cartridges, with a small increase to 35%. However, there is also the option to reuse printer cartridges rather than recycle, with refill schemes available. For example Canon (2013) recently rolled out a system in Europe, which allows customers to recycle or reuse 97% of each inkjet cartridge. The remaining 3% is being used to generate EfW. The recycling of Tetrapacks has also increased slightly, with a reduction in the 'never' column from 25% to just under 9%.

Looking at the quantitative analysis, key materials were selected for comparison, including glass, paper, cardboard, plastic, garden waste and kitchen food waste. The hypotheses are stated below:

Null hypothesis: There is no influence of change in waste management collection scheme on behaviour towards recycling these materials

Alternate hypothesis: There is an influence of change in waste management collection scheme on behaviour towards recycling these materials

Glass, paper, cardboard and plastic obtained a p value of 0.685, 0.526, 0.786 and 0.820 respectively. All of these values are above the 0.05 level; therefore the null hypothesis is accepted for these materials. This shows how these materials are still perceived as being key materials to recycle, despite the system change.

Garden and kitchen food waste obtained a p value of 0.026 and 0.000 (keeping in mind Minitab only shows the first 3 decimal places) respectively. Both of these values are below the 0.05 level; therefore the null hypothesis is rejected and the alternate hypothesis is accepted. It is evident in table 4 that these materials have increased importance within the new system due to fewer respondents claiming to never recycle, and an increase of respondents claiming to always recycle both materials.

4.3.2 Issus/Potential Issues

Issues or potential issues with each service were obtained from each survey (see appendix 1 and 2) and compared to CWCC 2010 survey results.

ISSUE/POTENTIAL ISSUE	2010 SURVEY	SURVEY 1	SURVEY 2
Long/ Steep Driveway	13.00%	3.36%	15.69%
Directly onto Pavement	7.00%	10.92%	7.84%
Collection at the Rear	6.00%	2.52%	8.82%
No Issues	63.00%	76.47%	54.90%

Table 5: The 3 Main Issues/Potential Issues Within Survey 1, 2 and the CWCC 2010 Survey.

Approximately 10% fewer responses noted a long or steep driveway as an issue with the wheeled bin service within survey 1 and the 2010 survey. This may be due to survey one only being a small representation of CWCC, while the 2010 survey represented the entire borough.

The survey 2 response is 2% higher, showing that respondents find it more of an issue with a boxed system. Response to the issue of having a property that opens directly onto the pavement is higher in survey 1. This suggests that respondents, without long or steep driveways, find it easier to place boxes directly onto the pavement rather than wheeled bins, however the response rate only 0.84% larger than the 2010 survey. Collection at the rear of the property appears to be much more of an issue in survey 2, with the boxed service.

There is a clear difference between survey 1 and 2, with 76% of residents in survey one claiming no issues with the wheeled bin system, while 54% of respondents in survey 2 claimed no issues with the new boxed system. Therefore, respondents find more issues within the new system. This could be because respondents are simply not used to the new system as of yet, and a survey conducted at a later date may have shown fewer issues.

The quantitative analysis of issues/potential issues compared responses from different household types within survey 1 and survey 2. The hypotheses are stated below:

Null hypothesis: There is no difference in issues/potential issues that may arise in waste management collection schemes.

Alternate hypothesis: There is a difference in issues/potential issues that may arise in waste management collection schemes.

Semi-detached housing and detached housing obtained a p value of 0.013 and 0.011 respectively. Both values are below the 0.05 level; therefore the null hypothesis is rejected and the alternate hypothesis of is accepted. This is represented by the values (see appendix 9) showing more issues were noted by respondents from semi-detached and detached households, with the new system.

Terraced housing obtained a p value of 0.646. This is above the 0.05 level; therefore the null hypothesis is accepted. The values (see appendix 9) show there is minimal difference in the number of issues highlighted by respondents from terraced households

4.3.3 Methods of Kitchen Food Waste Disposal

Question 14 from survey 1 and question 7 from survey 2 both asked about the different methods used to dispose of food waste. The results are shown in figure 15.

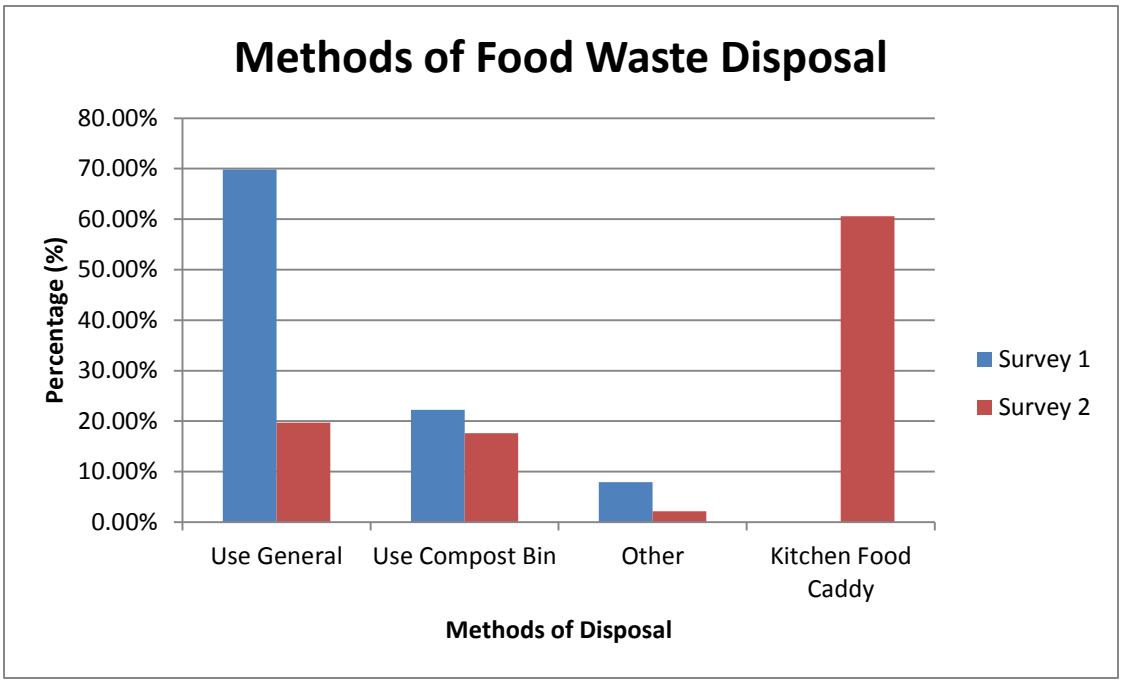


Figure 15: Different methods that are used by respondents to dispose of kitchen food waste.

Before the new kitchen food waste caddy was introduced, 70% of residents used the general household waste bin to dispose of their kitchen food waste. When the caddy was introduced, approximately 60% of respondents use it, giving a large decrease of 50% using the general household waste bin. Another option available is composting at home or in a shared facility. This dropped slightly from 22% to 17%. WRAP (2008a) suggests that 88% of food waste is collected by UK LAs, and not all of this is recycled, some will still be going to landfill. The remaining 12% will is composted at home, fed to animals or disposed of down the sink.

Quantitative analysis was also obtained for methods of kitchen food waste disposal, with the hypotheses stated below:

Null hypothesis: There is no influence of change in waste management collection scheme on behaviour towards kitchen food waste disposal

Alternate hypothesis: There is influence of change in waste management scheme on behaviour towards kitchen food waste disposal

The options of food waste disposal between both surveys obtained a p value of 0.000. As this is below the 0.05 level, the null hypothesis is rejected. Therefore the alternate hypothesis is accepted. This will be due to the introduction of the kitchen food waste caddys in the new service.

4.4 Qualitative Analysis of Survey 2 Questions

One section asked about the separation of waste. A majority at least 30% of respondents in question 5 agreed with most of the statements. However 37% disagreed that there is not enough room to store separate recycling boxes. There was a slight majority of 27% in strong agreement that separating materials is too complicated. This may be due to lack of practice, and should become less complicated in time. Research from WRAP (2008) suggested several barriers preventing householders from recycling. These barriers represent struggles of separating waste. A behavioural barrier is evident with householders being pre occupied, and finding it difficult to store waste. Along with this, a barrier of not knowing which materials go where will influence separation. However, the new system was provided with information leaflets stating 'what goes where' (see appendix 10).

The following section focused on the introduction of the kitchen food waste caddy. Question 6 asked how food waste was currently disposed of. Figure 16 shows the responses.

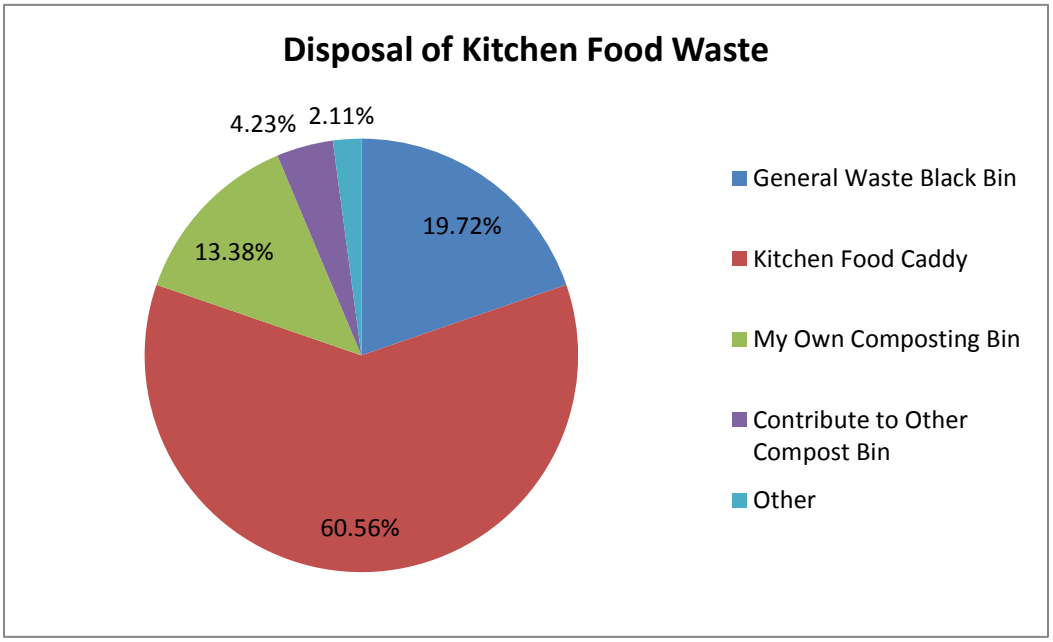


Figure 16: How Survey 2 Respondents Dispose of Kitchen Food Waste

It is clear that the new kitchen food waste caddy is being put to use, with over 60% of respondents using it. 19% of respondents use the general waste bin instead, this could be due to negative perception of the small caddy being unhygienic discouraging use, or perhaps a lack of storage space.

Question 9 asked for agreement with several statements relating to the liner used within the small food waste caddy. These can either be compostable bags or newspaper. Figure 17 displays the results.

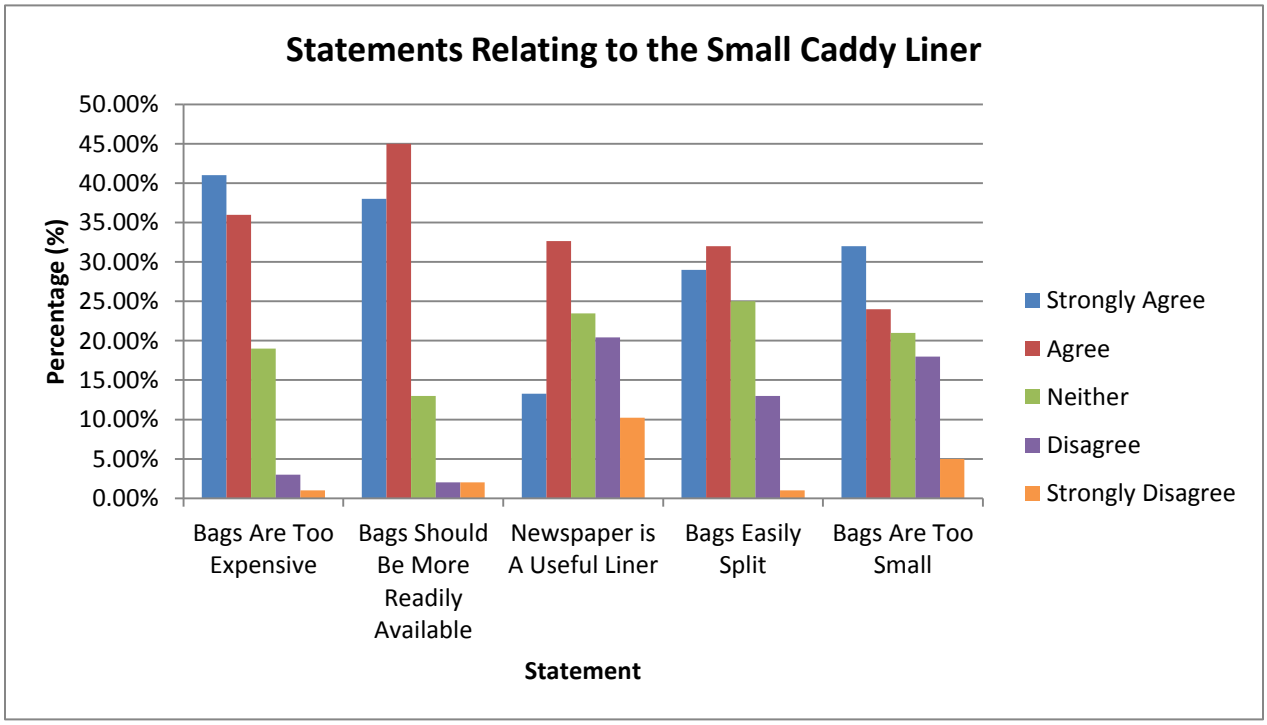


Figure 17: Agreement in Statements Relating to the Small Caddy Liner

41% strongly agreed that the bags are too expensive and should be more readily available. However, it may be difficult for the council to provide free compostable bags due to the potential increased costs. An example can be seen with Tandridge District Council (2013), which stated buying 100 compostable bags for every property in Tandridge would cost £200 000. To prevent this, it was suggested that residents use newspaper, or use no liner at all. In comparison to CWCC, Tandridge is a much smaller borough with approximately 34 300 households compared to approximately 146 600 in CWCC. Therefore, it can be assumed that the costs of providing compostable bags will be a lot higher. Results varied in that bags easily split, however a total of 61% were in agreement. 32% strongly agreed that the bags are too small.

Question 11 discussed the issues/potential issues with the caddy and boxes. For the food waste caddy, a majority at least 54% disagreed with all but one statement. 48% agreed that the caddy is unhygienic, as discussed previously. In comparison, a majority of 62% disagree that the boxes are unhygienic, but 62% agreed that there is not enough storage space for them, and 64% agreed they are not easy to handle. As discussed in the previous chapter, a study in

Daventry by Mattsson *et al*. (2003) proposed 4 bins would cause a problem for terraced housing due to insufficient storage space.

Question 12 asked about any pests that respondents may have dealt with in the new system. Figure 18 shows the responses.

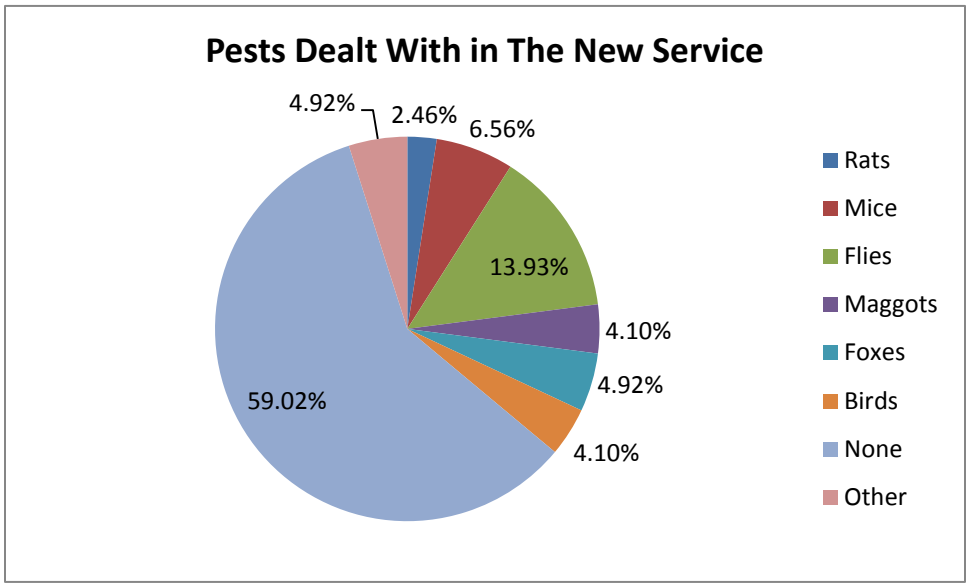


Figure 18 – Possible Pests that have been dealt with in the Boxes and Food Caddies

59% of respondents have yet to deal with any pests. Out of all the pests, flies have the greatest prominence, at 13.9%. Results were obtained in the winter, and more pests are expected in the summer, when food waste will be subject to higher temperatures. However, Birmingham City Council (n.d) noticed more pest problems with woven sacks. Pests, such as foxes, easily tear through them. This may be prevented due to the increased durability of the caddy material. Using plastic, rather than woven sacks prevents certain pests from being able to gnaw through to the kitchen food waste.

Question 25, like with survey 1, allowed respondents to leave a comment relating to the new system. Once again the majority of comments were negative towards the new system. This is evident in table 6.

Negative Comments on New System	Semi Detached	Detached	Terraced	Totals
New system is awkward for elderly to use	4	5	3	12
Litter is left down the street after collection	4	2	5	11
Preferred the old wheeled bin system	4	5	8	17
Separating materials is too complicated	3	3	4	10
Separating materials is too time consuming	1	5	0	6

Lack of storage space	**0**	**5**	**0**	**5**
All containers are of a low quality	**1**	**5**	**3**	**9**

Table 6: Negative Comments per Household Types.

The results highlighted in yellow were stated most often. Respondents from all household types believe the elderly will struggle with the new system, litter is constantly left down streets after collection, and separating materials is too complicated. Along with this, there is a clear preference to the old wheeled bin system. Unexpectedly, more respondents from detached households claim there is a lack of storage space for the boxes, despite detached houses often being bigger than semi detached or terraced.

Despite more negative comments gained from survey 2, there are also several positive perceptions. These included; collection of food waste as an improvement from the previous system and the new service is now running smoothly. From this, it can be seen that the new service was not introduced to the study site with full consultation of respondents, but complaints have settled down over time. This may have been avoided through the use of a trial service over a short time period. A consultation after the trial would then gain a perception for the new service, which could then be used to determine which changes are necessary, if at all. A case study of Cardiff City Council's trial scheme from the University of Wales (2002) concluded that it is of high importance to focus on results from a pilot study so that the council can examine the potential options more rigorously.

4.5 Study Limitations

This study included several limitations which may affect the results. The majority of respondents are elderly; therefore perceptions gained throughout will be dominated by the elderly. A different method ensuring a more equal response rate from all age groups could have been used. The area of Saughall is too small to represent the entire CWCC. This could have been altered through increasing the size of the study, posting surveys in several areas around the borough for a better representation. Many issues throughout the study related to system being affected by the harsh winter weather. A different option may have been to deliver each survey in both summer and winter to compare seasonal effects. However there was a limited time period for the study, and this was not viable. Along with the survey study, inclusion of interviews and attending council road shows would have been beneficial in gaining the perspective of council members as well as residents.

4.6 Future Work

Should the study be developed further, it could include other housing types such as flats, bungalows and nursing homes. These may have different recycling systems in place, which would lead to different perceptions. For example, Wain Court is a nursing home within the study area, where waste is comingled. Unlike the rest of Saughall, there are no separation containers provided by the council to the nursing home, due to several obstacles preventing this. Perceptions on the system in place at this nursing home may differ to other housing types.

Chapter 5 – Conclusion

This chapter brings the final conclusions from the results obtained from survey 1 and survey 2. Each survey gained a high response rate of 42% and 35% respectively due to household waste management being an emotive subject. Handling household waste is a part of resident's everyday lives, and it is one of the top environmental priorities. Particular focus was put on different housing types, kitchen food waste and issues/potential issues with the recycling service. Results met the aims of the study through showing a difference in public perception on the wheeled bin service and the new recycling boxes.

5.1 Conclusions

Results suggest that there is a positive perception towards the old wheeled bin system. Just over 76% of respondents claimed no issues with the wheeled bin system compared to with the new box system. The major positive feature of this system is the bins come with wheels, which makes moving the bins from one place to another arguably easier. Another positive feature is the capacity of the bins, particularly the 240 litre blue bin, which is larger than both boxes in the new system.

There was a strong negative perception towards the new box system for many reasons. This includes an increase of potential issues, with only 54% of respondents claiming to have no issues in survey 2 (the boxes system). While in the first survey a greater number (76%) claimed no issues with the wheeled system. One issue is the capacity of each box being 55 litres, totalling 110 litres. Respondents see this as too small, despite the increased frequency of collection. A strong negative perception of the new system was the introduction of the kitchen food waste caddy. Generally, respondents see the caddy as unhygienic as it will cause bad odours and look unsightly. Along with this, respondents commented that the caddy has the potential to attract pests such as flies and foxes. Another issue is the difficulty the elderly and disabled have lifting and moving the boxes regardless of the assisted service that is in place, as seen in the negative comments given for each survey (see chapter 4). This is due to lack of wheels on the boxes, and how low down the boxes are. Helper trolleys are a solution to this, however they are not provided by the council.

Despite the negatives, there are also a number of positive perceptions with the new system. A small number of respondents suggested the introductory period of the system caused the highest negative perception, but now the system is in place, issues have reduced, and the

system is running more smoothly. It is suggested that a trial period of the new system and an increased amount of public consultation was needed before the new system was introduced to alleviate initial concerns. The CWCC 2010 survey managed a 15% response rate, from this it would be assumed many residents would know about the new system. However, 60% of respondents in survey 1 stated they had not heard of the new system. The new system is remaining on a 14 year contract; therefore change will not occur again for a long period of time. Residents within CWCC must now live with the new system, and hope for increased consultation when, and if, future changes occur. Results have not yet been gained showing a change in recycling rates within CWCC since the new service, in order to meet UK and EU legislation. However, despite the negative perception, participation (particularly with kitchen food waste) has increased and may continue to do so.

Reference List

BBC News (2012) *'Sorting recycling' EU rule concerns Welsh Councils.* [online] Available via: <http://www.bbc.co.uk/news/uk-wales-politics-19066123> [Accessed 21 January 2013]

Bersi, E. (n.d) *Landfills a thing of the past in Germany where advanced waste management rules.* [pdf] Available via <http://www.seas.columbia.edu/earth/wtert/sofos/Evridiki_Bersi_Kathimerini.pdf> [Accessed 10 January 2013]

Bethlehem, JG (2009). *Applied Survey Methods: A Statistical Perspective* New Jersey. Wiley.

Birmingham City Council (n.d) *Consultation with householders regarding new wheelie bin services in Birmingham* [online] Available via: <https://www.ors.org.uk/online/index.php?sid=891449&lang=en> [Accessed 14 March 2013]

Brent Council (2011) *Environment and Planning: Enforcement of compulsory recycling.* [online] Available via: <http://www.brent.gov.uk/streetcare2.nsf/Recycling%20collections/LBB-176> [Accessed 18 February 2013]

Bridgend County Borough Council (2013) *Environment and Planning* [online] Available via: <http://www.bridgend.gov.uk/web/groups/public/documents/services/071606.hcsp> [Accessed 1 March 2013]

Canon (2013) *Canon rolls out inkjet cartridge recycling scheme to 15 markets in Europe* [online] Available via: <http://www.canon-europe.com/About_Us/Press_Centre/Press_Releases/Consumer_News/News/Canon_inkjet_cartridge_recycling.aspx> [Accessed 22 March 2013]

Cheshire Structural Changes Order (2008) *Single tier local government in West Cheshire* [pdf] Available via <http://www.legislation.gov.uk/uksi/2008/634/pdfs/uksi_20080634_en.pdf> [Accessed 20 January 2013]

Coopland P (2006) *Is it Waste? Understanding the Definition of Waste*.[online] Available via: <http://www.sepa.org.uk/waste/waste_regulation/is_it_waste.aspx> [Accessed 12 January 2013]

CWCC (2010) *Waste Collection Survey Summer 2010 Report* [pdf] [Accessed 17 February 2013]

CWCC (2011) *Saughall and Mollington Ward Profile*. [pdf] Available via: <http://www.westcheshiretogether.org.uk/pdf/20110428-SaughallandMollingtonWardProfile-v01.pdf> [Accessed 20 January 2013]

CWCC (2012) *Waste and Recycling* [online] Available via: <http://www.cheshirewestandchester.gov.uk/residents/waste_and_recycling.aspx> [Accessed 20 October 2012]

CWCC (2013) *Key statistics and Data* <http://www.cheshirewestandchester.gov.uk/your_council/key_statistics_and_data.aspx> [Accessed 19 January 2013]

Davis, G. Phillips, PS. Read, AD. Iida, Y. (2006) *Demonstrating the need for the development of internal research capacity: Understanding recycling participation using the Theory of Planned Behaviour in West Oxfordshire, UK.* Elsevier.

DEFRA (2008) *Local Authorities Waste Collection, England.* [online] Available via <http://www.defra.gov.uk/statistics/environment/waste/wrfg18-compostion/> [Accessed 20 January 2013]

DEFRA (2011) *Applying the Waste Hierarchy: evidence summary* [pdf] Available via: <http://www.defra.gov.uk/publications/files/pb13529-waste-hierarchy-summary.pdf> [Accessed 17 December 2011]

DEFRA (2012) *Household waste recycling, by material – England* [online] Available via: <http://www.defra.gov.uk/statistics/environment/waste/wrfg15-hhmaterial/> [Accessed 16 December 2011]

DEFRA (2012a) *Waste Legislation* [online] Available via: <http://www.defra.gov.uk/environment/waste/legislation/> [Accessed 3 January 2012]

DEFRA (2012b) *Waste and Recycling* [online] Available via: <http://www.defra.gov.uk/environment/waste/> [Accessed 20 January 2013]

DEFRA (2012c) *Local Authority collected waste for England – quarterly statistics.* [online] Available via: <http://www.defra.gov.uk/statistics/environment/waste/wrfg22-wrmswqtr/> [Accessed 22 January 2013]

DEFRA (2012d) *Waste and Recycling: Local Authorities* [online] Available via: <http://www.defra.gov.uk/environment/waste/local-authorities/> [Accessed 22 January 2013]

den Boer, E. den Boer J and Jager, J. (2005) *Waste Management planning and optimisation.* Stuttgart: ibidem.

DETR (2000) *The Waste Strategy* [online] Available via: <http://www.publications.parliament.uk/pa/cm199900/cmselect/cmenvtra/903/903m12.htm> [Accessed 16 December 2011]

Eastleigh Borough Council (2010) *Waste & Recycling Services Viewpoint Survey 6 July 2010* [online] Available via: <https://selfserve.eastleigh.gov.uk/AF3/an/default.aspx/RenderForm/?ID=sYmFXones1r&F.Name=BzwyXUoVvU5&fs2s=Tp8NhsLmvCa&fs2c=reqxZCiwhUk&fs2svr=AFE#1> [Accessed 16 December 2011]

EU Waste Framework (1975) *Council Directive of 15 July 1975 on waste* [pdf] Available via: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1975:194:0039:0041:EN:PDF [Accessed 3 January 2012]

EU Waste Framework Directive (2008) *Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives* [online] Available via: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:312:0003:0030:en:PDF> [Accessed 3 January 2012]

Europa (2009) *Summaries of EU Legislation – Environment – Waste Management.* [online] Available via: <http://europa.eu/legislation_summaries/environment/waste_management/ev0010_en.htm> [Accessed 16 March 2012]

European Commission (2010) *Being Wise With Waste: The EU's approach to Waste Management [pdf] Luxemburg Publications Office of The European Union.* [pdf] Available via <http://ec.europa.eu/environment/waste/pdf/WASTE%20BROCHURE.pdf> [Accessed 17 December 2011]

European Commission (2012) *Directive 2008/98/EC on waste (Waste Framework Directive)* [online] Available via: <http://ec.europa.eu/environment/waste/framework/index.htm > [Accessed 3 January 2012]

FOE (2009) *Briefing: Pyrolysis, Gasification and Plasma* [pdf] Available via <http://www.foe.co.uk/resource/briefings/gasification_pyrolysis.pdf> [Accessed 17 February 2013]

Google Maps (2013) *Saughall, Cheshire West and Chester* [online] Available via <http://maps.google.co.uk/maps/place?q=Saughall&hl=en&ftid=0x487adc5e2bc4869d:0x961f69099b688b8d> [Accessed 23 March 2013]

Hickman L (2011) *A small town in Germany where recycling pays*. The Guardian [online] 18 March. Available via: <http://www.guardian.co.uk/environment/2011/mar/18/recycling-waste> [Accessed 1 September 2012]

Icaro Consulting (2011) *Attitudes to Waste and Recycling in Great Britain* 2011 [pdf] Available via: <http://icaro-consulting.co.uk/wp/wp-content/uploads/2011/11/Attitudes-to-Waste-and-Recycling-in-Great-Britain-2011-Web.pdf> [Accessed 17 February 2013]

Laing F (2007) *City's Recycling targets are just not good enough.[online] Available via* <http://franceslaing.wordpress.com/about/columns/> [Accessed 22 February 2012]

Lancashire County Council (2013) *Lancashire's Waste Network: Farington Waste Recovery Park* [online] Available via: <http://www.lancashire.gov.uk/corporate/web/?siteid=6043&pageid=34767> [Accessed 23 January2013]

Lefever, S. Dal, M and Matthíasdóttir, A (2007). Online data collection in academic research: advantages and limitations. *British Journal of Education Technology.* 38 (4) pp 574 - 582

Li, W. Ju, M. Liu, L. Wang, Y and Li, T (2011) The Effects of Biomass Solid Waste Resources Technology in Economic Development. *Energy Procedia*. (5) pp 2455 - 2460

Lyas, JK. Shaw, PJ. Vugt, MV (2005) Kerbside recycling in the London borough of Havering: progress and priorities. *Resources, Conservation and Recycling* 45 (1) pp 1–17

Martin, M. Williams, ID and Clark, M. (2006) Social, cultural and structural influences on household waste recycling: a case study. *Resources Conservation and Recycling* 48 (4) pp. 357 – 395.

Mattsson, CH. Berg, PEO. Clarkson, PA (2003) The development of systems for property close collection of recyclables: experiences from Sweden and England*. Resources, Conservation and Recycling* 38 (1) pp 39 – 57.

May Gurney (2011) *Environmental Services Cheshire West & Chester* [online] Available via: <http://www.maygurney.co.uk/recycling/cheshire.php> [Accessed 25 January 2013]

May Gurney (2012) *West Oxfordshire District Council* [online] Available via: <http://www.maygurney.co.uk/customers/47.html> [Accessed 25 January 2013]

McDougall, Forbes R. White, Peter R. Franke, Marina (2008) *Integrated Solid Waste Management: A Life Cycle Inventory*. Chichester, England. Wiley.

Noehammer, HC and Byer PH (1997). Effect of design variables on participation in residential curbside recycling programs. *Waste Management and Research*, 15 pp 407 – 427.

Omran, A. Mahmood, A. Abdul Aziz, H. Robinson, GM. (2009) Investigating Households attitude toward recycling of solid waste in Malaysia: a case study. *International Journal of Environmental Research*. 3 (2) pp 275 – 288.

Ordnance Survey (2013) *Interactive Mapping Cheshire West and Chester* [online] Available via: <http://maps.cheshire.gov.uk/CWAC/interactivemapping/# > [Accessed 19 January 2013]

Parsons, T and Knight, PG (2005) *How to do your dissertation in geography and related disciplines.* Second Edition. New York: Routledge.

Poiesz TBC (1999) *Gedragsmanagement, waarom mensen zict (niet) gedragen, Imerc by Wormer* [pdf] available via: <http://triade-model.nl/Gedragsmanagement_het_boek.pdf> [Accessed 20/01/2012]

Read, A and Reed, S. (2003) *Daventry's high diversion recycling programme: how to engage the public, recycle and compost domestic waste and meet government targets ahead of schedule Proceedings of the 18th International Conference on Solid Waste Technology and Management*, Philadelphia, PA, USA, 23–26 March

Rebitzer G, Schiller U, Schmidt WP. (2000) Methode euroMat'98—Grundprinzipien und Gesamtmethode. *In: Fleischer et al. (Eds.);* 2000. pp. 4 – 22;

Rebitzer, G. Ekvall, T. Frischknecht, R. Hunkeler, D. Norris, G. Rydberg, T. Schmidt, WP. Suh, S. Weidema, BP. Pennington, DW (2004). Life cycle assessment part 1: Framework, goal and scope definition, inventory analysis and applications. *Environmental International*. 30 (5) pp. 701 – 720.

Roberts, CM (2004). *The dissertation journey: a practical and comprehensive guide to planning, writing and defending your dissertation*. California: Corwin Press

Rogers S (2011) *Recycling Rates in England: How Does Your Town Compare?* The Guardian [online] 4th November. Available via: <http://www.guardian.co.uk/news/datablog/2011/nov/04/recycling-rates-england-data> [Accessed 7 November 2011]

Saunders, M., Lewis, P. & Thornhill, A. (1997). *Research methods for business students.* London: Pitman Publishing.

Somerset Waste Partnership (2012) *Waste management strategy* [online] Available via < http://www.somersetwaste.gov.uk/about/strategy/ > [Accessed 10/ January 2013]

Stookes P (2009) *A Practical Approach To Environmental Law*. 2nd ed. Oxford. Oxford University Press.

Tandridge District Council (2013) *FAQs: Are compostable caddy liners being provided free of charge by the council?* [online] Available via:

<http://www.tandridge.gov.uk/faq/faq.htm?mode=20&pk_faq=689> [Accessed 14 March 2013]

University of Wales (2002) *Cardiff City County Council Public Consultation Pilot Waste Management Scheme – Report of Findings* [pdf] Available via: <http://www.cardiff.gov.uk/F&FResearchReports2002PilotWasteManagementScheme.pdf> [Accessed 14 March 2013]

Williams, ID and Cole C (2013). The impact of alternate weekly collections on waste arisings. *Science of the Total Environment.* 445 – 446 pp 29 – 40.

Wilson, CDH and Williams, ID (2007) Kerbside collection: a case study from the North West of England. *Resources, Conservation and Recycling* 52 (2) pp. 381 – 394

Winstanley K (2011) *An Investigation into the Introduction of Larger Recycling Containers in The Village of Staining, Fylde – Is Bigger Really Better?* MSC. University of Central Lancashire.

Woodard, R. Bench, M. Harder, MK (2005) The development of a UK kerbside scheme using known practice. *Journal of Environmental Management* 75 (2) pp. 115 – 127.

WRAP (2008) *Barriers to recycling at home* [pdf] Available via: <http://www.wrap.org.uk/sites/files/wrap/Barriers_to_Recycling_Summary_Report.pdf> [Accessed 23 January 2013]

WRAP (2008a) *Food Waste Report – The food we waste* [pdf] Available via <http://wrap.s3.amazonaws.com/the-food-we-waste.pdf> [Accessed 14 March 2013]

WRAP (2009) *Choosing the right recycling collection system* [pdf] Available via: <http://www.wrap.org.uk/sites/files/wrap/Choosing%20the%20right%20recycling%20collection%20system.pdf> [Accessed 21 January 2013]

WRAP (2010) *Analysis of kerbside dry recycling performance in the UK 2008/09* [pdf] Available via: <http://www.wrap.org.uk/sites/files/wrap/EVA143-000%20Kerbside%20Dry%20Benchmarking%20UK%2008-09%20Report%20FINAL%20for%20publication%20V2%201.pdf> [Accessed 21 January 2013]

WRAP (2012) *Household Waste Recycling Centre (HWRC) Guide* [pdf] Available via: <http://www.wrap.org.uk/sites/files/wrap/INH0449_HWRC_Guide_%20final.pdf> [Accessed 21 January 2013]

Appendix 1

Recycling Survey One

Part One – The Current Recycling System

1) **Which of the following statements best describes how much you recycle?**

   ☐ I recycle everything that can be recycled

   ☐ I recycle a lot, but not everything that can be recycled

   ☐ I recycle very little

   ☐ I do not recycle

2) **The new service intends to collect 18 recyclable materials at kerbside. Which of these do you currently recycle?**

Material	Always	Occasionally	Rarely	Never
Glass				
Paper				
Cardboard				
Cans				
Aluminium Foil				
Household Plastic Packaging				
Garden Waste				
Textiles				
Kitchen Food Waste				
Used Cooking Oil				
Printer Cartridges				
Batteries				
Spectacles				

Shoes				
Used Engine Oil				
Small Electrical Items				
Mobile Phones				
Tetrapacks/Food Cartons				

3) Apart from kerbside recycling, do you currently use any of the other recycling services available within the area? (tick all that apply)

☐ Supermarket Recycling Sites

☐ Local Household Recycling Centre

☐ Local Glass Collection Point

☐ Local Textile Collection Point

☐ None of The Above

☐ Other (please specify).....

4) How do you currently deal with food waste at your household?

☐ I use the general household waste bin

☐ I use the recycling bin

☐ I use my own household composting bin

☐ I contribute to another composting bin

☐ Other (please specify).....

5) How do you currently deal with garden waste at your household?

☐ I use the garden waste household bin

☐ I use the general household waste bin

☐ I use my own household composting bin

☐ I contribute to another composting bin

☐ Other (please specify).....

Part Two – Current Issues

6) **Which of the following issues do you have with waste collection, if any? (tick the most appropriate)**

	Long or Steep Driveway
	Property opens directly onto pavement
	Waste collection from the rear of property
	Shared waste facility
	Registered for an assisted service
	None of the Above

7) **Overall how satisfied are you with the following aspects of your current waste and recycling services?**

Aspects	Very Satisfied	Satisfied	Neither Satisfied or Unsatisfied	Unsatisfied	Very Unsatisfied	No Opinion
The range of materials that can be collected for recycling						
Frequency of household recycling collections						
Cleanliness and tidiness of your roadside after waste collection						
The information CWCC provide about waste						
The information CWCC provide						

about recycling						

8) How important are the following issues regarding recycling containers?

Issue	**Very Important**	**Fairly Important**	**Neither Important or Unimportant**	**Fairly Unimportant**	**Very Unimportant**
Is hygienic and keeps smell to a minimum					
Can safely be stored outside					
Reduces the risk of spillage					
The durability of the container					
Can be wheeled to collection point					
Helps keep the cost of the service down					
There are as few containers as possible					

9) Which of the following, if any, do you agree are problems with the current 240L recycling waste bin and glass caddy(blue bin)?

i) The glass caddy is not large enough

☐ Agree ☐ Disagree ☐ Unsure

ii) Both are unhygienic

☐ Agree ☐ Disagree ☐ Unsure

iii) The recycling bin is not large enough

☐ Agree ☐ Disagree ☐ Unsure

iv) The recycling bin is not easy to handle

☐ Agree ☐ Disagree ☐ Unsure

v) Collection should be more regular

☐ Agree ☐ Disagree ☐ Unsure

10) In general, how often is your recycling put out for collection?

☐ Every 2 weeks

☐ Monthly

☐ Occasionally

☐ Never

11) If your recycling is occasionally or never put out for collection, please state the reason(s) for this: (Please choose all that apply)

☐ Lack of storage space for the containers

☐ The containers are not suitable for my household

☐ I am physically unable to do so

☐ I use recycling banks within the local area

☐ I am not interested in recycling

☐ I do not have the correct recycling containers

☐ I do not produce much recyclable waste

☐ Other (please specify).....

<u>Part Three – The New System</u>

12) i) Below is the new waste collection service for the Chester area, including Saughall from October 2012.

ii) Were you aware that a new service was coming into the area in October 2012?

☐ Yes

☐ No

iii) If yes, how did you hear about the new service?

☐ Word of Mouth

☐ Television

☐ Radio

☐ Newspaper

☐ CWCC Website

☐ Other (please specify).....

13) The image below shows the new service that will be coming into the Chester area in October 2012. The green bin is for garden waste, the black bin is for general waste, the boxes are for recyclable waste and the Brown caddy is for food waste.

Currently, would you prefer wheeled bins or boxes for recycling collection?

☐ Wheeled Bins ☐ Boxes ☐ No Preference

14) To meet recycling targets councils are required to collect food waste from residents. How would you like to see food waste collected?

☐ Be collected in the same recycling container

☐ Be collected in its own recycling container

☐ Be collected with non recyclable household waste

☐ Be composted at the household

☐ No Preference

<u>Part Four – Opinion on Recycling</u>

15) How important is it to you that the council can collect from your home the following key materials for recycling, providing they can find an affordable and sustainable way of recycling them?

Key Materials	Very Important	Fairly Important	Neither Important or Unimportant	Fairly Unimportant	Very Unimportant
All plastic packaging (bottles, trays, pots)					
Textiles and shoes					
Tetra packs					
Kitchen Food					
Cans and tins					
Glass bottles and jars					
Paper					
Garden waste					
Waste Cardboard (all types)					

16) In terms of separating recyclable waste, how much do you agree or disagree with the following statements?

Statement	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
Separating materials into separate recycling containers is time consuming					
Food waste should have a separate container to avoid contamination with other recyclable materials					

One single wheeled bin for all recyclable waste is not enough as it fills up too quickly					
There isn't enough room to store more than one recycling box					
It is easier to handle one container rather than several					
Having separate containers will increase the recycling rate within the local area					
Separate containers will increase household participation in recycling					

17) In your opinion, how frequently should <u>non</u> recyclable waste be collected?

☐ Alternate Weekly Collection ☐ Weekly Collection ☐ No Preference

18) In your opinion, how frequently should <u>recyclable</u> waste be collected?

☐ Alternate Weekly Collection ☐ Weekly Collection ☐ No Preference

<u>Part Five – Additional Information</u>

19) What is the size of your household in terms of occupants?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6+

20) What is your gender?

☐ M ☐ F

21) Which of the following age range do you fall into?

☐ 10 – 19
☐ 20 – 29
☐ 30 – 39
☐ 40 – 49
☐ 50 – 59
☐ 60+

22) How many children under the age of 18 currently live in your household?

☐ None

☐ One

☐ Two

☐ Three or more

23) How many adults aged 18 and over currently live in your household?

☐ None

☐ One

☐ Two

☐ Three or more

24) What is your current working status?

☐ Full Time Working - (30+ hours per week)

☐ Part Time Working - (8 - 29 hours per week)

☐ Unemployed

☐ Retired

☐ Student

☐ Unable to work due to ill health/disability

☐ Rather Not Say

25) What is your ethnic group?

White

☐ British

☐ Irish

☐ Other

Mixed/ multiple ethnic group

☐ White and Black Caribbean

☐ White and Black African

☐ White and Asian

☐ Other

Asian/Asian British

☐ Indian

☐ Pakistani

☐ Bangladeshi

☐ Other

Black or Black British

☐ African

☐ Caribbean

☐ Other

☐ **Other**

☐ **Rather Not Say**

26) Any other comments?

Thanks very much for your time

Please return the completed form in the pre paid envelope provided

Jamie Pope

Appendix 2

Survey Two

Introduction

1) **Did you, or a member of your household complete and return a waste management survey distributed during May 2012?**

   ☐Yes ☐No ☐Don't Know

2) **Which of these do you currently recycle?**

Material	Always	Occasionally	Rarely	Never
Glass				
Paper				
Cardboard				
Cans				
Aluminium Foil				
Household Plastic Packaging				
Garden Waste				
Textiles				
Kitchen Food Waste				
Used Cooking Oil				
Printer Cartridges				
Batteries				
Spectacles				
Shoes				
Used Engine Oil				
Small Electrical Items				

Mobile Phones				
Tetra Packs				

3) Please indicate how much you agree or disagree with the following statements about the general waste black wheeled bin?

Statement	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
It is not collected regularly enough					
It is difficult to store					
It is durable					
It should be used when recyclable materials can no longer fit into the boxes.					
It is where kitchen food waste should be disposed of					

4) In your opinion how often do you think that each bin, box or caddy should be collected?

Box/Bin/Caddy	Weekly	Fortnightly	Other
Grey Box			
Green Box			
Food Waste Caddy			
Black Wheeled Bin			
Green Wheeled Bin			

Separating Waste

5) **Please indicate how much you agree or disagree with the following statements regarding separating recyclable materials from your waste?**

Statement	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
Separating materials into individual recycling containers is time consuming					
Placing food waste in a separate container prevents contamination of other recyclable materials					
There is not enough space in the provided containers for all of my recyclable materials					
There isn't enough room where I live to store the recycling boxes					
The new recycling system is too complicated					
Having separate containers will increase the recycling rate within the local area					
It is difficult to remember that some items (such as cooking oil) must be placed outside the recycling boxes					
It is difficult to remember that some items (such as carrier bags) should not be placed inside the recycling boxes					
Separate containers will increase household participation in recycling					

The Food Waste Caddy

6) **How do you currently deal with food waste at your household? (Please select all that apply)**

	I use the general household waste bin
	I use the kitchen food waste caddy
	I use my own household composting bin
	I contribute to another composting bin
	Other (please specify) .....

7) **To meet recycling targets councils are required to collect food waste from residents. How would you prefer to dispose of your food waste?**

	In the current recycling caddy system
	With non-recyclable household waste
	Composted at Home
	No Preference
	Other (please specify) .....

8) **Where do you currently store the large and small food caddy on your property?**

	Large Food Waste Caddy	**Small Food Waste Caddy**
Outside, on the Driveway		
Outside in the Garden		
Inside the Garage		
Inside the Kitchen/utility		
In a Newly Built Storage Area		
Other		

9) **Please indicate how much you agree or disagree with the following statements about the compostable bags and newspaper used with the kitchen food waste caddy?**

Statement	**Strongly Agree**	**Agree**	**Neither Agree or Disagree**	**Disagree**	**Strongly Disagree**
Compostable Bags are too expensive to buy					

Compostable bags should be more readily available in local stores					
Newspaper is a useful caddy liner					
Compostable bags easily split/rip.					
The compostable bag is not large enough for the amount of food waste generated					

Issues/Potential Issues

10) Which of the following practical issues (if any) do you have with waste collection?

(please select all that are appropriate)

	Long or Steep Driveway
	Property opens directly onto pavement
	Waste collection from the rear of property
	None of the Above
	Other (please specify) .....

11) Which of the following, if any, do you agree are problems with the kitchen food waste caddy and recycling boxes?

	Food Waste Caddy			**Recycling Boxes**		
	Agree	Disagree	Unsure	Agree	Disagree	Unsure
They are not large enough						
They are unhygienic						
They are difficult to handle						
Collections are not frequent enough						
They are not durable						

12) Have your new recycling boxes and food waste caddys led to you dealing with any of the following pests? (please select all that apply)

	Rats
	Mice
	Flies
	Maggots
	Foxes
	Birds
	None of the Above
	Other (please specify) .....

13) There are several methods to reduce the costs of the recycling system. These include:

- Kitchen food waste being sold and burned for energy production and remains composted, saving on landfill costs.
- Bins from the previous system were reused, and/or melted down and recycled into new products, offsetting the costs of the current system.

Which of the following (if any) represents your views on the perceived overall costs of the current system?

	They are too high
	There is no problem with overall costs
	No opinion

Additional Services

14) i) Do you currently use the assisted recycling collection service?

☐ Yes ☐ No ☐ Don't Know

ii) If you are currently registered, how much do you agree or disagree with the following statements?

Statement	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
The assisted service is currently running effectively					
Wheeled or Helper Trolleys should have been readily available before the system changed.					

Despite the assisted service being in place, the new boxes still cause physical problems					
After Collection, boxes are easy to access and move back to their original position					
The new containers are easier to handle and use					

15) Would you have preferred a trial of the new service before it was introduced?

☐ Yes ☐No ☐Don't Know

Education/Provision of information

16) How did you find out about the proposed changes to your waste collection service? (select all that are appropriate)

	Newspaper
	Magazine
	Online
	Word of Mouth
	Council Leaflet
	At a Council Road show
	Was not informed
	Other (please specify) .....

17) Providing information on the changes to the waste collection service can be given in different ways. Which of the following options would you like to see in place? (tick all that are appropriate)

	Constant updates via posted newsletters
	Regular updates online on the council website
	Regular updates in newspapers
	Regular road shows throughout the year run by the council
	None of the above
	Other (please specify) .....

18) **On a scale of 1 to 5, where 5 is fully informed and 1 is uninformed, please rate the level of information provided on the following items related to the new waste recycling system:**

	1	2	3	4	5
About the change of system from bins to boxes					
When the new system was being introduced to your home					
Materials that can be recycled in the new system					
Dates of collection					

19) Overall, how satisfied are you with the new recycling system?

	Very satisfied
	Satisfied
	Neither satisfied or unsatisfied
	Unsatisfied
	Very unsatisfied

Additional Questions

20) What is your Gender?

☐M ☐F

21) What is your age?

☐10 – 19 ☐20 – 29 ☐30 – 39 ☐40 – 49
☐50 – 59 ☐60+

22) How many people currently live in your household?

☐1 ☐2 ☐3 ☐4 ☐5 ☐6+

23) How many members of your household are currently under the age of 18?

☐None ☐1 ☐2 ☐3 ☐4+

24) What is your current working status?

	Full Time Working - (30+ hours per week)
	Part Time Working - (8 - 29 hours per week)
	Unemployed
	Retired
	Student
	Unable to work due to ill health/disability
	Rather Not Say

25) Please use the space below to provide any further comments on your current waste collection service?

Thanks for your time

Jamie Pope

Appendix 3

This Is Not Junk Mail, Please Read On

Village of Saughall Kerbside Recycling Survey One 2012

Dear Householder,

My name is Jamie Pope and I am currently studying Environmental Management at the University of Central Lancashire (UCLan) in Preston. For my final year I am undertaking a dissertation project into the new recycling system being introduced by the Cheshire West and Chester Council (CWCC). A new system is coming into the Chester area, including the village of Saughall, during October 2012. This includes removing the current blue and brown bins, and replacing them with 2 recycling boxes and a food waste collection caddy. The frequency of both collections is also changing. For more information visit: http://www.cheshirewestandchester.gov.uk/residents/waste_and_recycling/single_waste_collection_contra.aspx

For my project, I am looking to gain public opinion and perception on the current and new system, before it is rolled out and afterwards. To do this I am sending two surveys to the same households, one before and one after the new system is in place, to monitor a change in public attitudes. Attached to this letter is the first survey. I would appreciate, if it is possible, for you to take five minutes of your time to fill out the questions within this survey, and post them back using the pre paid envelope provided.

Whatever your views and opinions are please make them known, whether you are currently a knowledgeable recycler, or you are against recycling all together. All opinions are more than welcome.

I need as many responses as possible, if you could please send it back as soon as you can, that would be very much appreciated. It is important that you understand that all submitted information is completely confidential and cannot be linked to any individual or household.

If you have any queries about this research please do not hesitate to contact me using the details shown below.

Thanks for your time,

Jamie Pope
Department of Environmental Management
University of Central Lancashire
Preston PR1 2HE

Mobile: 07812416271
Email: JBPope@uclan.ac.uk

This Is Not Junk Mail, Please Read On

Village of Saughall Kerbside Recycling Survey Two 2012

Dear Householder,

My name is Jamie Pope and I am currently studying Environmental Management at the University of Central Lancashire (UCLan) in Preston. For my final year I am undertaking a dissertation project into the new recycling system that has been introduced by the Cheshire West and Chester Council (CWCC) in Saughall during October 2012. A new system is coming into the Chester area, including the village of Saughall, during October 2012. For more information visit: http://www.cheshirewestandchester.gov.uk/residents/waste_and_recycling/single_waste_collection_contra.aspx

For my project, I am looking to gain public opinion and perception on the current and new system, before it is rolled out and afterwards. To do this I am sending two surveys to the same households, one before and one after the new system is in place, to monitor a change in public attitudes. Attached to this letter is the second survey. I would appreciate, if it is possible, for you to take five minutes of your time to fill out the questions within this survey, and post them back using the pre paid envelope provided.

Whatever your views and opinions are please make them known, whether you are currently a knowledgeable recycler, or you are against recycling all together. All opinions are more than welcome.

I need as many responses as possible, if you could please send it back as soon as you can, that would be very much appreciated. It is important that you understand that all submitted information is completely confidential and cannot be linked to any individual or household.

If you have any queries about this research please do not hesitate to contact me using the details shown below.

Thanks for your time,

Jamie Pope
Department of Environmental Management
University of Central Lancashire
Preston PR1 2HE

Mobile: 07772197060

Email: JBPope@uclan.ac.uk

Appendix 4

Ethics and Risk Assessment

Student Name: Jamie Pope

Supervisor: Chris Lowe

Proposed title: Public perception of current and future household recycling waste methods: A case study of the Village of Saughall, Chester

Risk Assessment:	**YES**	**Approved:**	**YES**
Ethics:	**YES**	**Approved:**	**YES**

Accept Proposal Outright: **YES**

Proposal Comments

Proposal is deemed to be feasible and has academic merit – please refer to supervisors comments

1 Project synopsis | Approver: | Cmte number:

1.1 Title	Public perception of current and future household recycling waste methods: A Case study of the Village of Saughall, Chester.									
1.2 Project type	Original research		Research degree		PG taught		UG taught	X	Commercial	
1.3 Short description in layman's terms [no acronyms or jargon]	This undergraduate dissertation project aims to investigate the public perception on the new recycling scheme being rolled out within Chester, using the village of Saughall as a representation. 2 surveys will be undertaken, one before the rollout in October 2012, and one after.									
1.4 Dates	Start: May 2012		End: April 2013							
1.5 School of …..	Built and Natural Environment									

2 Participants

2.1 Project supervisor /principal investigator: name, position and original signature	Project Supervisor: Christopher Lowe Principle Investigator: Jamie Pope
2.2 Co-workers: names and positions [eg student]	Staff of the Cheshire West and Chester Council Waste Management department

3 External collaborators

3.1 List external collaborating bodies

N/A

3.2 Provide evidence of any ethical approvals obtained [or needed] by external collaborators

N/A

3.3 Indicate whether confidentiality agreements have been or will be completed

N/A

Read any associated procedures and guidance or follow any associated checklist, and delete, Yes or No, for each characteristic in A) to F) below.

If you respond **No**, then in your judgment you believe that the characteristic is irrelevant to the activity.

If you respond **Yes**, then you should **provide relevant documentation** [including risk assessments] with the application, and cross-reference to it, eg A2 or B9. **Use reference numbers of standard** forms, protocols and approaches and risk assessments where they exist.

A) Does the activity involve field work or travel to unfamiliar places? If Yes: 1. Does the activity involve field work or leaving the campus [eg overseas]? 2. Does the field work involve a 'party' of participants or lone working ? 3. Does the activity involve children visiting from schools?	A) ~~No~~ YES 1. ~~No~~ YES 2. Yes 3. No
B) Does the activity involve humans other than the investigators? If Yes: 1. Will the activity involve any external organisation for which separate and specific ethics clearance is required (e.g. NHS; school; any criminal justice agencies including the Police, CPS, Prison Service)? – start this now [CRB	B) Yes 1. No

clearance process at Loughborough; Uclan contact Carole Knight]	
2. Does the activity involve participants who are unable to give their informed consent (e.g. children, people with severe learning disabilities, unconscious patients etc.) or who may not be able to give valid consent (e.g. people experiencing mental health difficulties)?	2. No
3. Does the activity require participants to give informed consent? [consent guidance at City U]	3. No
4. Does the activity raise issues involving the potential abuse or misuse of power and authority which might compromise the validity of participants' consent (e.g. relationships of line management or training)?	4. No
5. Is there a potential risk arising from the project of physical, social, emotional or psychological harm to the researchers or participants?	5. Yes
6. Does the activity involve the researchers and/or participants in the potential disclosure of any information relating to illegal activities; the observation of illegal activities; or the possession, viewing or storage (whether in hard copy of electronic format) which may be illegal?	6. No
7. Will deception of the participant be necessary during the activity?	7. No
8. Does the activity (e.g. art) aim to shock or offend?	8. No
9. Will the activity involve invasion of privacy or access to confidential information about people without their permission?	9. No
10. Does the activity involve medical research with humans, clinical trials or use human tissue samples or body fluids?	10. No
11. Does the activity involve excavation and study of human remains?	11. No
C) Does the activity involve animals and other forms of life? If Yes:	C) No
1. Does the activity involve scientific procedures being applied to a vertebrate animal (other than humans) or an octopus?	1. No
2. Does the activity involve work with micro-organisms?	2. No
3. Does the activity involve genetic modification?	3. No
4. Does the activity involve collection of rare plants?	4. No
D) Does the activity involve data about human subjects? If Yes:	D) Yes
1. After using the data protection compliance checklist, have you any data protection requirements?	1. No
2. After answering the data protection security processing questions, have you any security requirements? [Data storage] [keep raw data for 5 years]	2. No
E) Does the activity involve hazardous substances? If Yes:	E) No
1. Does the activity involve substances injurious to human or animal health or to the environment? Substances must be disposed properly.	1. No
2. Does the activity involve igniting, exploding, heating or freezing substances?	2. No
F) Other activities:	F)
1. Does the activity relate to military equipment, weapons or the Defence Industry?	1. No
2. Are you aware of any ethical concerns about the company/ organisation, e.g. its product has a harmful effect on humans, animals or the environment; it has a record of supporting repressive regimes; does it have ethical practices for its workers and for the safe disposal of products?	2. No
Note: in all cases funding should not be accepted from tobacco-related industries	

If you respond **Yes**, then you should **provide relevant documentation** [including risk assessments] with the application, and cross-reference to it, eg A2 or B9. **Use reference numbers of standard** forms, protocols and approaches and risk assessments where they exist.

These standard forms are being followed [cross reference to the characteristic, eg A2]:

A1+ A2) See Risk Assessment
B5) See Risk Assessment
D) – The research will not rely on audio, video, photographic or any other recording medium and participants will not be identified from the responses they provide. Informed consent will be will be sought from all participants in accordance to the guidelines set out in the UCLan: ethical principles for teaching, research, consultancy, knowledge transfer and related activities.

Health, Safety and Environment Section

RISK ASSESSMENT FORM

University of Central Lancashire

Risk Assessment For
Service / Faculty / Dept: SBNE
Location of Activity: Village of Saughall, Chester
Activity: 2 posted surveys before and after October 2012 to 300 households within the Village of Saughall **REF:** Surv1/Before and Surv2/After

Assessment Undertaken By
Name: Jamie Pope
Date:
Signed by Head of Dept / equivalent
Date 12/04/12

Assessment Reviewed
Name:
Date:

List significant hazards here:	List groups of people who are at risk:	List existing controls, or refer to safety procedures etc.	For risks, which are not adequately controlled, list the action needed.	Remaining level of risk: high, med or low
A2) Lone Walking or	Jamie Pope	Avoid Lone Walking when possible or Take a third party to assist in survey Location and time estimates given to friend or family member Always carry full charged mobile phone		Low
B5) Slips, Trips and falls while walking	Jamie Pope	Use of appropriate clothing and footwear. Mobile phone available to contact emergency services. Take into account the environment at the time and the kind of clothing and footwear required.		Low
B5) Personal Security	Jamie Pope	Mobile phone number and location given to friend/family member with estimated time of return.		Low

http://www.uclan.ac.uk/other/hseo/risk/coshh.htm

B5) Aggression	Jamie Pope Participants	Make sure surveys are posted in a safe environment, with a reasonable timetable arranged. Ensure mobile phone is carried at all times.		**Low**
B5) Weather	Jamie Pope	Avoid skin and eye exposure using a high factor sun block and sun glasses. Carry suitable clothing for change in conditions. Stop work if conditions are intolerable and increase risk. Be aware of signs of hyperthermia and/or heat exhaustion.		**Low**
D) Data Protection and Consent Issues	Participants	The research will not rely on audio, video, photographic or any other recording medium and participants will not be identified from the responses they provide. Informed consent will be sought from all participants in accordance to the guidelines set out in the UCLan: ethical principles for teaching, research, consultancy, knowledge transfer and related activities.		**Low**

http://www.uclan.ac.uk/other/hseo/risk/coshh.htm

Appendix 5

Housing Types per Street

STREET	Detached	Semi Detached	Terraced	Main Housing Type
Church Rd (VI to School)a	30	22	3	
Church Rd (School to Park)b	5	18	9	
Church Rd (After Park)c	5	22	0	
Sea Hill	9	15	0	
Crofters Way	30	0	0	
Fox Lea Court	0	8	0	
Fiddlers Lane	15	12	0	
Meadowcroft and Newcroft	18	0	0	
Darlington Crescent	35	0	28	
Chapel Close	9	0	0	
The Ridings	44	47	0	
Fairholme Close	23	0	0	
Rosewood Grove	16	0	0	
Thornberry Close	9	0	0	
Haymakers	6	12	0	
Timberfield	18	21	0	
Aldersey Close	0	6	0	
Lodge Lane	0	29	0	
Park Avenue	0	8	11	
Fieldway	0	5	12	
Greenway	0	24	28	
Rakeway	0	14	32	
Meadow Lane	0	18	13	
The Close	0	18	0	
Eastfields	0	20	0	
Larchfields	0	20	0	
Hermitage Road	22	120	4	
Aspen Grove	25	0	0	
Vernon Close	6	8	4	
Hermitage Court	5	0	0	
Fox Lea	10	0	0	
Parkway	0	12	26	
Saughall Hey	0	0	18	
TOTALS	**346**	**473**	**188**	**1007**

Key:	
Semi Detached	
Detached	
Terraced	

Appendix 6

1)

I recycle everything	47.62%
I recycle a lot	50.79%
I recycle very little	1.59%
I do not recycle	0.00%

Survey 1 Percentages
Total - 126

2)

	Always	Occasionally	Rarely	Never
Glass	94.87%	4.27%	0.85%	0.00%
Paper	98.36%	1.64%	0.00%	0.00%
Cardboard	95.93%	4.07%	0.00%	0.00%
Cans	94.31%	4.07%	1.63%	0.00%
Aluminium Foil	61.90%	23.81%	8.73%	5.56%
Household Plastic	80.95%	14.29%	3.17%	1.59%
Garden Waste	91.80%	1.64%	2.46%	4.10%
Textiles	49.59%	33.88%	10.74%	5.79%
Kitchen Food Waste	32.54%	7.94%	10.32%	49.21%
Used Cooking Oil	6.35%	5.56%	17.46%	70.63%
Printer Cartridges	26.40%	12.00%	9.60%	52.00%
Batteries	65.08%	13.49%	8.73%	12.70%
Spectacles	23.58%	9.76%	10.57%	56.10%
Shoes	37.30%	19.84%	12.70%	30.16%
Used Engine Oil	12.50%	0.83%	1.67%	85.00%
Electrical Items	28.23%	21.77%	14.52%	35.48%
Mobile Phones	20.97%	10.48%	21.77%	46.77%
Tetrapacks	47.58%	17.74%	9.68%	25.00%

3)

Supermarket	31.75%
HWRC	53.17%
Local Glass	10.32%
Local Textile	36.51%
None	22.22%
Other	4.76%

4)

General	77.78%
Use Boxes	6.35%
Use Compost Bin	24.60%
Other Compost	2.38%
Other	7.94%

5)

Garden Waste Bin	91.27%
General Waste Bin	2.38%
My Own Bin	19.84%
Use Other Compost	2.38%

6)

Long/Steep	3.36%
Direct	10.92%
Rear	2.52%
Shared	0.84%
Registered	5.88%
None	76.47%

7)

	Very Satisfied	Satisfied	Neither	Unsatisfied	Very Unsatisfied	No Opinion
The Range of Materials	35.00%	54.17%	6.67%	4.17%	0.00%	0.00%
Frequency of Recycling Collection	48.36%	41.80%	4.10%	5.74%	0.00%	0.00%
Cleanliness of Roadside	31.40%	46.28%	9.92%	12.40%	0.00%	0.00%
Info About Waste	19.67%	46.72%	22.95%	8.20%	1.64%	0.82%
Info About Recycling	19.83%	47.93%	21.49%	9.09%	0.83%	0.83%

8)

	Very Important	Fairly Important	Neither	Fairly Unimportant	Very Unimportant
Hygienic	76.03%	17.36%	5.79%	0.83%	0.00%
Safely Stored	77.87%	20.49%	1.64%	0.00%	0.00%
Spillage	75.41%	21.31%	3.28%	0.00%	0.00%
Durability	74.80%	22.76%	2.44%	0.00%	0.00%
Can Be Wheeled	88.52%	9.84%	1.64%	0.00%	0.00%
Keep Cost Down	70.73%	21.14%	8.13%	0.00%	0.00%
Few Containers	67.21%	21.31%	9.02%	1.64%	0.82%

9)

	Agree	Disagree	Unsure
Glass Caddy	31.40%	57.85%	10.74%
Both Unhygienic	16.39%	67.21%	16.39%
Not Large Enough	27.27%	64.46%	8.26%
Not Easy To Handle	19.67%	71.31%	9.02%

Regular Collection	25.00%	60.83 %	14.17%

10)

Every 2 Weeks	98.26%
Monthly	0.87%
Occasionally	0.00%
Never	0.87%

12)ii)

Yes	39.83%
No	60.17%

iii)

Word Of Mouth	29.79%
TV	0.00%
Radio	0.00%
Newspaper	44.68%
Website	2.13%
Other	23.40%

14)

Same Container	13.49%
Own Container	48.41%
None Recyclable	15.87%
Composted	11.90%
No Preference	10.32%

11)

Lack Of Space	0.00%
Not Suitable	0.00%
Physically Unable	1.59%
Recycling Banks	0.00%
Not Interested	0.00%
Don't Have Correct	0.00%
Do Not Produce	0.00%
Other	0.00%

13)

Wheeled Bin	85.83%
Boxes	1.67%
No Preference	12.50%

15)	Very Important	Fairly Important	Neither	Fairly Unimportant	Very Unimportant
All Plastic	84.68%	12.90 %	2.42%	0.00%	0.00%
Textiles	33.87%	31.45 %	22.58%	10.48%	1.61%
Tetrapacks	60.00%	26.67 %	12.50%	0.83%	0.00%
Kitchen Food Waste	49.60%	20.80 %	18.40%	5.60%	5.60%
Cans	86.07%	11.48	2.46%	0.00%	0.00%

		%			
Glass	88.62%	9.76 %	0.81%	0.00%	0.81%
Paper	88.33%	11.67 %	0.00%	0.00%	0.00%
Garden Waste	80.00%	15.83 %	3.33%	0.00%	0.83%
Cardboard	86.29%	11.29 %	2.42%	0.00%	0.00%

16)	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
Separating	20.66%	28.93%	24.79%	22.31%	3.31 %
Food Waste	53.66%	32.52%	11.38%	0.00 %	2.44 %
One Single	25.20%	18.70%	25.20%	27.64%	3.25 %
Isn't Enough Room	25.20%	27.64%	28.46%	17.07%	1.63 %
Easy To Handle	38.40%	36.80%	13.60%	11.20%	0.00 %
Increase Rate	12.10%	21.77%	44.35%	12.90%	8.87 %
Inc Participation	12.90%	21.77%	44.35%	14.52%	6.45 %

17)

Alternate	30.00%
Weekly	65.83%
No Preference	4.17%

19)

1	19.66%
2	49.57%
3	14.53%
4	10.26%
5	5.98%

18)

Alternate	63.03%
Weekly	31.93%
No Preference	5.04%

20)

M	45.00%
F	55.00%

22)

None	76.98%
1	11.11%

6+	0.00%

21)

10 to 19	0.00%
20 – 29	1.59%
30 – 39	12.70%
40-49	16.67%
50-59	15.87%
60+	53.17%

23)

None	0.00%
1	26.19%
2	56.35%
3+	17.46%

2	7.94%
3+	3.97%

24)

Full Time	30.95%
Part Time	14.29%
Unemployed	1.59%
Retired	48.41%
Student	1.59%
Unable	1.59%
Rather Not Say	1.59%

25)

British	99.21%
Irish	0.00%
Other	0.00%
W/B Caribbean	0.00%
W/B African	0.00%
White and Asian	0.00%
Other	0.00%
Indian	0.79%
Pakistani	0.00%
Bangladeshi	0.00%
Other	0.00%
African	0.00%
Caribbean	0.00%
Other	0.00%

Appendix 7

1)

Survey 2 Percentages
Total - 104

Yes	40.91%
No	45.45%
Don't Know	13.64%

2)

	Always	Occasionally	Rarely	Never
Glass	95.19%	2.88%	1.92%	0.00%
Paper	97.12%	2.88%	0.00%	0.00%
Cardboard	95.19%	4.81%	0.00%	0.00%
Cans	96.15%	3.85%	0.00%	0.00%
Aluminium Foil	67.65%	25.49%	3.92%	2.94%
Household Plastic	85.00%	11.00%	2.00%	2.00%
Garden Waste	91.35%	7.69%	0.00%	0.96%
Textiles	56.57%	26.26%	14.14%	3.03%
Kitchen Food Waste	75.25%	11.88%	5.94%	6.93%
Used Cooking Oil	29.29%	17.17%	7.07%	46.46%
Printer Cartridges	35.05%	15.46%	15.46%	34.02%
Batteries	64.00%	20.00%	11.00%	5.00%
Spectacles	19.59%	14.43%	14.43%	51.55%
Shoes	33.33%	22.22%	13.13%	31.31%
Used Engine Oil	24.74%	7.22%	4.12%	63.92%
Electrical Items	33.66%	18.81%	11.88%	35.64%
Mobile Phones	21.21%	15.15%	21.21%	42.42%
Tetrapacks	56.44%	22.77%	11.88%	8.91%

3)

	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
Not collected regularly enough	13.86%	17.82%	17.82%	37.62%	12.87%
Difficult to store	12.75%	16.67%	15.69%	43.14%	11.76%
Durable	19.81%	49.06%	14.15%	20.75%	10.38%
Materials can not fit	19.80%	32.67%	14.85%	21.78%	10.89%
Where food waste should be disposed	12.87%	21.78%	5.94%	34.65%	24.75%

4)

	Weekly	Fortnightly	Other
Grey Box	88.24%	11.76%	0.00%
Green Box	92.16%	7.84%	0.00%
Food Waste Caddy	96.97%	1.01%	2.02%
Black Bin	51.96%	47.06%	0.98%
Green Bin	15.31%	81.63%	3.06%

5)

	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
Time consuming	32.35%	40.20%	13.73%	10.78%	2.94%
Prevents Contamination	33.98%	44.66%	15.53%	3.88%	1.94%
Not enough space in boxes	31.00%	33.00%	15.00%	17.00%	4.00%
Not enough room to store	16.00%	23.00%	14.00%	37.00%	10.00%
too complicated	27.00%	26.00%	19.00%	21.00%	7.00%
will increase rate	17.17%	37.37%	22.22%	14.14%	9.09%
Some items placed outside boxes	22.45%	32.65%	20.41%	16.33%	8.16%
Materials not to be placed inside boxes	23.76%	40.59%	10.89%	17.82%	6.93%
increase household participation	7.92%	30.69%	26.73%	21.78%	12.87%

6)

General Waste Black Bin	19.72%
Kitchen Food Caddy	60.56%
My Own Composting Bin	13.38%
Other Compost Bin	4.23%
Other	2.11%

7)

In caddy	57.26%
None recycling	24.79%
At home	11.11%
No preference	4.27%
Other	2.56%

8)

	Large Caddy	Small Caddy
Driveway	20.00%	5.05%
Garden	52.00%	18.18%
Garage	11.00%	4.04%
Kitchen	6.00%	67.68%
storage area	4.00%	1.01%
Other	7.00%	4.04%

9)

	Strongly Agree	Agree	Neither	Disagree	Strongly D
Bags Are Too Expensive	41.00%	36.00%	19.00%	3.00%	1.00%
More Readily Available	38.00%	45.00%	13.00%	2.00%	2.00%
Newspaper is A Useful Liner	13.27%	32.65%	23.47%	20.41%	10.20%
Bags Easily Split	29.00%	32.00%	25.00%	13.00%	1.00%
Bags Are Too Small	32.00%	24.00%	21.00%	18.00%	5.00%

10)

long or steep driveway	15.69%
direct onto pavement	7.84%
collection from rear	8.82%
None	54.90%

Other	12.75%

11)

	Food Caddy			Recycling boxes		
	Agree	Disagree	Unsure	Agree	Disagree	Unsure
not large enough	35.16%	54.95%	9.89%	62.64%	31.87%	5.49%
Unhygienic	48.42%	37.89%	13.68%	26.74%	62.79%	10.47%
difficult to handle	27.47%	67.03%	5.49%	64.89%	32.98%	2.13%
collections aren't frequent	15.91%	78.41%	5.68%	20.69%	73.56%	5.75%
not durable	12.37%	63.22%	22.99%	31.76%	52.94%	15.29%

12)

Rats	2.46%
Mice	6.56%
Flies	13.93%
Maggots	4.10%
Foxes	4.92%
Birds	4.10%
None	59.02%
Other	4.92%

14i)

Yes	20.00%
No	75.00%
Don't Know	5.00%

13)

Too high	42.57%
No problem	5.94%
No opinion	51.49%

14ii)

	Strongly A	Agree	Neither	Disagree	Strongly D
Currently efficient	10.00%	30.00%	25.00%	15.00%	20.00%
helper trolleys avail	55.00%	30.00%	15.00%	0.00%	0.00%
still cause physical problems	40.00%	45.00%	10.00%	0.00%	5.00%
easy to move back	5.00%	55.00%	5.00%	30.00%	5.00%
easy to handle and use	10.00%	20.00%	5.00%	40.00%	25.00%

15)

Yes	58.70%
No	26.09%
Don't Know	15.22%

16)

Newspaper	20.00%
Magazine	2.86%
Online	0.71%
Word of Mouth	8.57%
Council Leaflet	61.43%
At Council Roadshow	5.00%
Was not informed	0.71%
Other	0.71%

17)

Newsletter updates	46.72%
Regular online updates	8.76%
Regular newspaper updates	30.66%
Regular road shows	3.65%
None	7.30%

Other	2.92%

18)

	1	2	3	4	5
The Change Was Happening	11.88%	14.85%	24.75%	19.80%	28.71%
When The Change Was Happening	15.84%	14.85%	16.83%	20.79%	31.68%
Materials That Can Be Recycled	14.85%	17.82%	23.76%	24.75%	18.81%
Dates Of Collection	10.89%	8.91%	16.83%	32.67%	30.69%

19)

Very Satisfied	3.96%
Satisfied	37.62%
Neither	13.86%
Unsatisfied	22.77%
Very Unsatisfied	21.78%

20)

Male	40.38%
Female	59.62%

21)

10 to 19	0.00%
20 to 29	0.00%
30 to 39	10.58%
40 to 49	18.27%
50 to 59	19.23%
60+	51.92%

22)

1	23.08%
2	39.42%
3	17.31%
4	13.46%
5	4.81%
6+	0.96%

23)

None	74.04%
1	10.58%
2	10.58%
3	3.85%
4+	0.96%

24)

Full Time	33.98%
Part Time	12.62%
Unemployed	0.97%
Retired	46.60%
Student	0.00%
Unable to work	0.97%
Rather Not Say	4.85%

Appendix 8

Survey Comparison Tables

How Often Key Materials Are Recycled

GLASS	Always	Occasionally	Rarely	Never
Survey 1	111	5	1	0
Survey 2	99	3	2	0

PAPER	Always	Occasionally	Rarely	Never
Survey 1	120	2	0	0
Survey 2	101	3	0	0

CARDBOARD	Always	Occasionally	Rarely	Never
Survey 1	118	5	0	0
Survey 2	99	5	0	0

CANS	Always	Occasionally	Rarely	Never
Survey 1	116	5	2	0
Survey 2	100	4	0	0

PLASTIC	Always	Occasionally	Rarely	Never
Survey 1	102	18	4	2
Survey 2	85	11	2	2

GARDEN	Always	Occasionally	Rarely	Never
Survey 1	112	2	3	5
Survey 2	95	8	0	1

FOOD	Always	Occasionally	Rarely	Never
Survey 1	41	10	13	62
Survey 2	76	12	6	7

Issues/Potential Issues - (Based on Housing Type)

	Long/ Steep	Directly onto Pavement	Collection at the Rear	None
Semi-Detached Survey 1	2	6	1	28
Semi- Detached Survey 2	10	2	2	15

	Long/ Steep	Directly onto Pavement	Collection at the Rear	None
Detached Survey 1	1	4	0	46
Detached Survey 2	4	2	5	26

	Long/ Steep	Directly onto Pavement	Collection at the Rear	None
Terraced Survey 1	1	3	2	24
Terraced Survey 2	2	4	2	15

Methods of Food Waste Disposal

	Use General	Use Compost Bin	Kitchen Food Caddy	Other
Survey 1	88	28	0	10
Survey 2	28	0	86	3

Appendix 9

Chi Squared Results

Question 2 (comparing both surveys)

Glass

Chi-Square Test: Always, Occasionally, Rarely, Never

```
Skipping rows and/or columns filled with zeros.


Expected counts are printed below observed counts
Chi-Square contributions are printed below expected counts

       Always  Occasionally  Rarely  Total
    1     111             5       1    117
       111.18          4.24    1.59
        0.000         0.138   0.218

    2      99             3       2    104
        98.82          3.76    1.41
        0.000         0.155   0.245

Total     210             8       3    221

Chi-Sq = 0.757, DF = 2, P-Value = 0.685
4 cells with expected counts less than 5.
```

Paper

Chi-Square Test: AlwaysP, OccasionallyP, RarelyP, NeverP

```
Skipping rows and/or columns filled with zeros.


Expected counts are printed below observed counts
Chi-Square contributions are printed below expected counts

       AlwaysP  OccasionallyP  Total
    1      120              2    122
        119.30           2.70
         0.004          0.181

    2      101              3    104
        101.70           2.30
         0.005          0.212

Total      221              5    226

Chi-Sq = 0.402, DF = 1, P-Value = 0.526
2 cells with expected counts less than 5.
```

Cardboard

Chi-Square Test: AlwaysCb, OccasionallyCb, RarelyCb, NeverCb

Skipping rows and/or columns filled with zeros.

Expected counts are printed below observed counts
Chi-Square contributions are printed below expected counts

	AlwaysCb	OccasionallyCb	Total
1	118	5	123
	117.58	5.42	
	0.001	0.032	
2	99	5	104
	99.42	4.58	
	0.002	0.038	
Total	217	10	227

Chi-Sq = 0.074, DF = 1, P-Value = 0.786
1 cells with expected counts less than 5.

Plastic

Chi-Square Test: AlwaysPl, OccasionallyPl, RarelyPl, NeverPl

Expected counts are printed below observed counts
Chi-Square contributions are printed below expected counts

	AlwaysPl	OccasionallyPl	RarelyPl	NeverPl	Total
1	102	18	4	2	126
	104.26	16.17	3.35	2.23	
	0.049	0.208	0.128	0.024	
2	85	11	2	2	100
	82.74	12.83	2.65	1.77	
	0.062	0.262	0.162	0.030	
Total	187	29	6	4	226

Chi-Sq = 0.923, DF = 3, P-Value = 0.820
4 cells with expected counts less than 5.

Garden

Chi-Square Test: AlwaysGa, OccasionalyGa, RarelyGa, NeverGa

Expected counts are printed below observed counts
Chi-Square contributions are printed below expected counts

	AlwaysGa	OccasionalyGa	RarelyGa	NeverGa	Total
1	112	2	3	5	122
	111.74	5.40	1.62	3.24	
	0.001	2.139	1.177	0.958	
2	95	8	0	1	104
	95.26	4.60	1.38	2.76	
	0.001	2.509	1.381	1.123	
Total	207	10	3	6	226

Chi-Sq = 9.288, DF = 3, P-Value = 0.026

Food

Chi-Square Test: AlwaysF, OccasionallyF, RarelyF, NeverF

```
Expected counts are printed below observed counts
Chi-Square contributions are printed below expected counts

       AlwaysF  OccasionallyF  RarelyF  NeverF  Total
    1       41             10       13      62    126
         64.94          12.21    10.55   38.30
         8.827          0.400    0.571  14.666

    2       76             12        6       7    101
         52.06           9.79     8.45   30.70
        11.012          0.500    0.712  18.297

Total      117             22       19      69    227

Chi-Sq = 54.985, DF = 3, P-Value = 0.000
```

Issues/Potential Issues Comparison per Household Type

Semi-detached

Chi-Square Test: Long/ Steep Driv, Directly onto Pa, Collection at th, None

```
Expected counts are printed below observed counts
Chi-Square contributions are printed below expected counts

                  Directly
       Long/ Steep     onto   Collection
          Driveway  Pavement  at the Rear   None  Total
    1            2         6           1     28     37
              6.73      4.48        1.68  24.11
             3.322     0.512       0.276  0.629

    2           10         2           2     15     29
              5.27      3.52        1.32  18.89
             4.238     0.653       0.353  0.803

Total           12         8           3     43     66

Chi-Sq = 10.786, DF = 3, P-Value = 0.013
4 cells with expected counts less than 5.
```

Detached

Chi-Square Test: Long, Direct, Rear, None D

```
Expected counts are printed below observed counts
Chi-Square contributions are printed below expected counts

        Long  Direct   Rear  None D  Total
    1      1       4      0      46     51
        2.90    3.48   2.90   41.73
```

```
       1.243   0.079  2.898   0.438

    2      4       2      5      26     37
         2.10    2.52   2.10   30.27
       1.713   0.108  3.994   0.603

Total      5       6      5      72     88

Chi-Sq = 11.075, DF = 3, P-Value = 0.011
6 cells with expected counts less than 5.
```

Terraced

Chi-Square Test: Long T, Direct T, Rear T, None T

```
Expected counts are printed below observed counts
Chi-Square contributions are printed below expected counts

       Long T  Direct T  Rear T  None T  Total
    1       1         3       2      24     30
         1.70      3.96    2.26   22.08
        0.287     0.234   0.031   0.168

    2       2         4       2      15     23
         1.30      3.04    1.74   16.92
        0.374     0.305   0.040   0.219

Total       3         7       4      39     53

Chi-Sq = 1.657, DF = 3, P-Value = 0.646
6 cells with expected counts less than 5.
```

Where Food Waste is Disposed

Chi-Square Test: Use General, Use Compost Bin, Kitchen Food Caddy, Other

```
Expected counts are printed below observed counts
Chi-Square contributions are printed below expected counts

                   Use
           Use  Compost     Kitchen
       General      Bin  Food Caddy  Other  Total
    1       88       28           0     10    126
         60.15    14.52       44.59   6.74
        12.897   12.519      44.593  1.576

    2       28        0          86      3    117
         55.85    13.48       41.41   6.26
        13.889   13.481      48.023  1.697

Total      116       28          86     13    243

Chi-Sq = 148.674, DF = 3, P-Value = 0.000
```

Appendix 10

Council Leaflet – What Goes Where in New System.

Cheshire West & Chester Council

Your Quick Start Guide

What goes where

Grey box

- ✔ Plastic bottles (lids can be left on but please squash the bottle first)
- ✔ Household plastic pots, tubs and trays
- ✔ Food and drinks cans and lids
- ✔ Aerosols and foil

Green box

- ✔ Paper and envelopes (including windowed)
- ✔ Cardboard
- ✔ Food and drink cartons eg tetrapaks
- ✔ Phone directories and magazines
- ✔ Glass bottles and jars, clothes and shoes
- ✔ Batteries (car batteries must go beside the box)
- ✔ Cooking and engine oil (in a sealed container left upright beside the box)
- ✔ Small electrical items (smaller than a toaster)
- ✔ Spectacles, empty printer cartridges, mobile phones

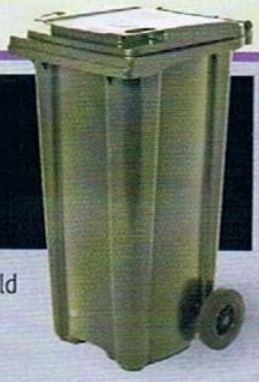
Brown food bin

- ✓ Meat and fish - raw and cooked including bones.
- ✓ Fruit and vegetables - raw and cooked.
- ✓ All dairy products such as eggs and cheese.
- ✓ Bread, cakes and pastries.
- ✓ Rice, pasta and beans.
- ✓ Uneaten food from your plates and dishes.
- ✓ Tea bags and coffee grounds.

Green wheeled bin

- ✓ Leaves
- ✓ Small branches and twigs
- ✓ Grass cuttings
- ✓ Plants and hedge clippings
- ✓ Cut flowers

Black wheeled bin



- ✓ Any other household waste that can not be recycled

For more information please tel: **0300 123 7 026**
or email: **enquiries@cheshirewestandchester.gov.uk**
Visit: **cheshirewestandchester.gov.uk/recyclefirst**

working in partnership

MAY GURNEY | Cheshire West and Chester

recycle for Cheshire West and Chester

recycle 1st