

Final Report

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# Household Battery Collection Trials

## April 2005 – March 2008



WRAP helps individuals, businesses and local authorities to reduce waste and recycle more, making better use of resources and helping to tackle climate change.

**Written by:** WRAP Batteries Team, with input from Environmental Resources Management Limited

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**Front cover photography:** Collection of Batteries (WRAP)

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# Executive summary

WRAP was commissioned by Defra and the Devolved Administrations in Scotland, Wales and Northern Ireland to run a series of battery collection trials to gain an understanding of the most cost efficient ways to collect portable (household) waste batteries. In Scotland WRAP worked with the Scottish Waste Awareness Group to deliver the trials.

This report looks at each of the collection trials in more detail and provides information on the structure, operation and location of each of the trials. The results of each set of trials in terms of the weight and chemistry of batteries collected are provided, as is a breakdown of the cost to both set up and to run each scheme over the trial period. The report provides an insight into some of the factors critical to establishing and running a successful battery collection scheme. In addition, the report summarises the findings from independent market research undertaken during the trial period, which enables a valuable insight into householders' awareness and participation levels in the trial areas. The report closes with recommendations as to how a national infrastructure for battery collection might be established in the UK.

## Overview of collection schemes

### Kerbside collection

These trials were launched in April/May 2006 and operated in a total of 15 Local Authority areas during the trial period. Householders in participating areas were provided with either a sealable bag or a small cardboard box in which to store their used or unwanted batteries. Batteries were collected at the same time as the existing recycling collection service. As each existing collection service had its own frequency of collection (weekly, fortnightly, monthly or quarterly) the batteries were also collected at the same varying frequencies.

### Retail take-back

33 branches of Tesco, Argos, Homebase, B&Q, Currys, Currys Digital and PC World participated in the retail take-back trial across three geographical areas (Eastleigh, Swansea and Perth & Kinross). Launched in October 2006 and March 2007 (Scotland), this scheme enabled householders to drop off their batteries for recycling into special collection containers located in the participating stores.

### Community drop-off

Operating in three local authority areas (Falkirk, Camden and Cherwell), these schemes enabled householders to drop off their batteries for recycling into collection containers located in museums, local shops, council offices, sports centres, libraries and, in the case of Camden, on street. These trials were launched in spring 2007.

### Postal

Targeted at rural areas, the postal scheme was launched in Eden (Cumbria) and Dumfries & Galloway in June 2007 and covered approximately 38,000 households in total. In this scheme, strong, Royal Mail approved, polythene envelopes were supplied to participating householders into which their used or unwanted batteries could be placed. The batteries were then sent for recycling in the bag using a Business Reply Service (free of charge to the householder).

### NHS and Fire Service

A series of small scale collection trials were set up to understand the effectiveness of collecting batteries through NHS hospitals and the Fire Service. Three NHS bodies and a Fire Service participated in the trials and collected batteries. East Berkshire Audiology NHS Department collected batteries across six of their audiology departments; Dumfries & Galloway Fire Service collected batteries from home visits for smoke alarm checks and batteries from torches, walkie-talkies and other equipment used in their day to day work; Craigavon and Trafford NHS Trusts collected general batteries from within their hospitals.

None of these trials accepted batteries brought in by the general public although batteries produced by patients either as temporary residents (in-patients) or visitors for consultations etc were included.

## Collection results

The trials collected over 100 tonnes of batteries in total in the period covered by this report. The table below summarises the collection data by type of scheme. All collection data is from the start of each trial until the end of February 2008.

	Kerbside trial	Retail take-back	Community Drop off	Postal
Number of households served	482,000	201,000	219,400	38,000
Estimated population served	1,169,000	477,000	465,000	81,000
Trials started in	April 2006	Late October 2006 (Scotland March 2007)	March 2007 (Scotland May 2007)	June 2007
Maximum length of trial group (months) <sup>1</sup>	22	16 (12)	11 (9)	9
Total weight of batteries collected (tonnes)	95.0	10.4	5.7	2.7
Estimated number of batteries collected	3,802,000	415,000	230,000	109,000
Estimated number collected per household	7.9	1.7	1.04	2.9
Estimated weight collected per capita (grams)	81	22	12	34

<sup>1</sup> Not all trials ran for the complete period

It can be seen that the different types of trials had different collection rates. Individual trials within each type also had varying collection rates. The kerbside trials collected the greatest amount of batteries and covered the greatest number of households, but even allowing for this, and the longer trial period, were still significantly more effective.

### Chemistry breakdown

The chemistry breakdown of batteries collected through each type of scheme was also analysed. A summary breakdown of the percentage distribution of batteries is shown below.

	Kerbside	Retail Take-back	Community Drop-off	Postal
Alkaline/Zinc Carbon	92.85%	93.78%	91.34%	93.96%
Nickel Cadmium	2.74%	2.47%	2.40%	2.44%
Primary Lithium	0.27%	0.53%	0.44%	0.60%
Nickel Metal Hydride	1.04%	0.97%	1.57%	1.24%
Lithium Ion	0.48%	0.37%	0.97%	0.95%
Lead Acid	2.32%	0.29%	2.71%	0.45%
Button batteries	0.26%	0.73%	0.55%	0.36%
Other batteries	0.05%	0.86%	0.02%	0.00%
Total batteries	100.00%	100.00%	100.00%	100.00%

### Costs

The cost of setting up and running each of the WRAP trials was also analysed. This is NOT the same as the cost of running such schemes on a nationwide basis. This is because, due to the very nature of trials, WRAP has paid a premium in some instances for example for small print runs and new designs of bag and box.

Costs would be significantly reduced if battery collection schemes were rolled out nationally as economies of scale would be seen, with perhaps as much as up to a 40 - 50% reduction.

All costs were categorised as either an ongoing cost or a trial (set up) cost. An ongoing cost was deemed to be a cost which will be incurred more than once in the trial period. A trial cost is a cost associated with setting up an establishing an effective collection scheme.

The total spend across the programme covering the period April 2006 to March 2008 is just over £1.3 million for all the trial schemes. "Year 1 costs" include costs incurred from 1st April 2007 to 31st March 2007, but also include any costs incurred for the set up of the trials that took place prior to that date. "Year 2 costs" relate to 1st April 2007 to 31st March 2008.

A summary breakdown of costs is shown below.

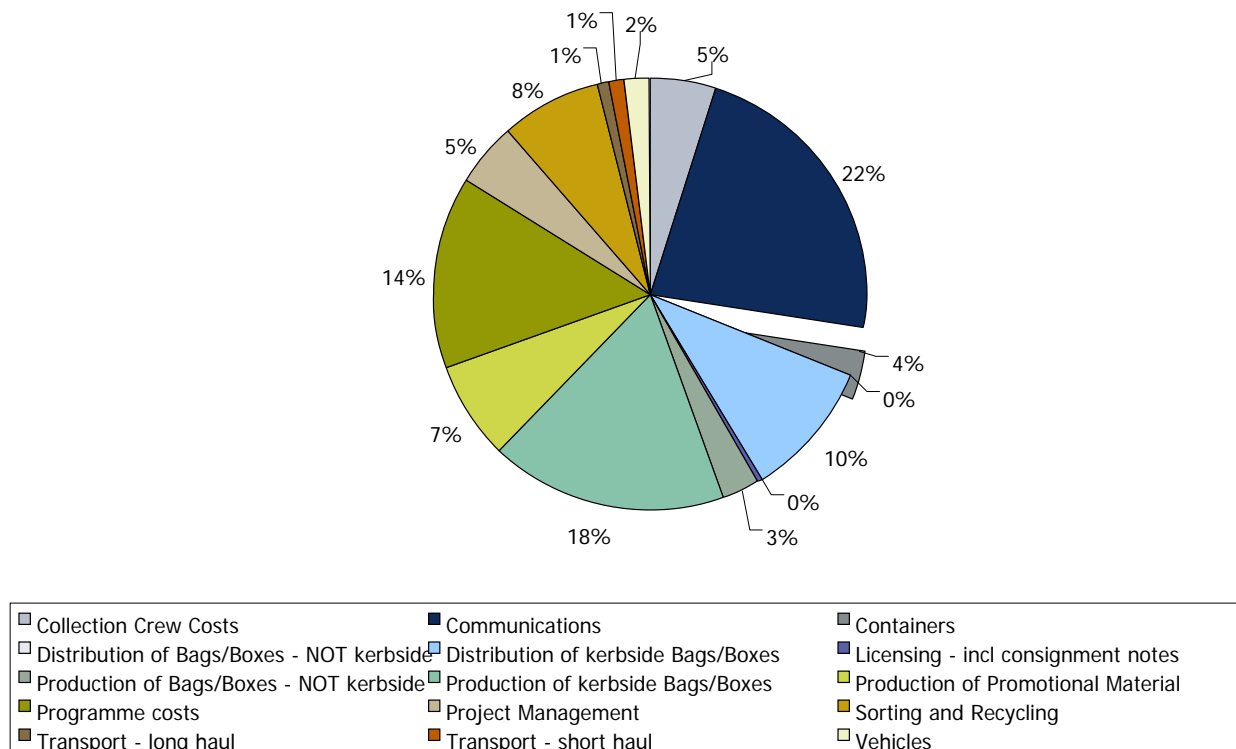
<b>Ongoing costs</b>	<b>Year 1</b>	<b>Year 2</b>
Kerbside – CS	211,688	145,924
Kerbside – LA	207,941	141,113
Retailer take-back	54,059	96,369
Community drop-off	12,860	39,623
Postal	14,151	21,964
NHS/Fire Service	n/a	16,731
<b>Total</b>	<b>500,699</b>	<b>461,364</b>

<b>Set up costs (£)</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Average per scheme<sup>2</sup></b>
Kerbside – CS	69,877	27,003	3,800
Kerbside – LA	63,928	26,363	5,300
Retailer take-back	51,202	24,230	8,100
Community drop-off	23,303	15,947	5,300
Postal	5,123	21,523	10,800
NHS/Fire Service	n/a	17,082	4,300
<b>Total</b>	<b>213,252</b>	<b>132,147</b>	<b>5,500</b>

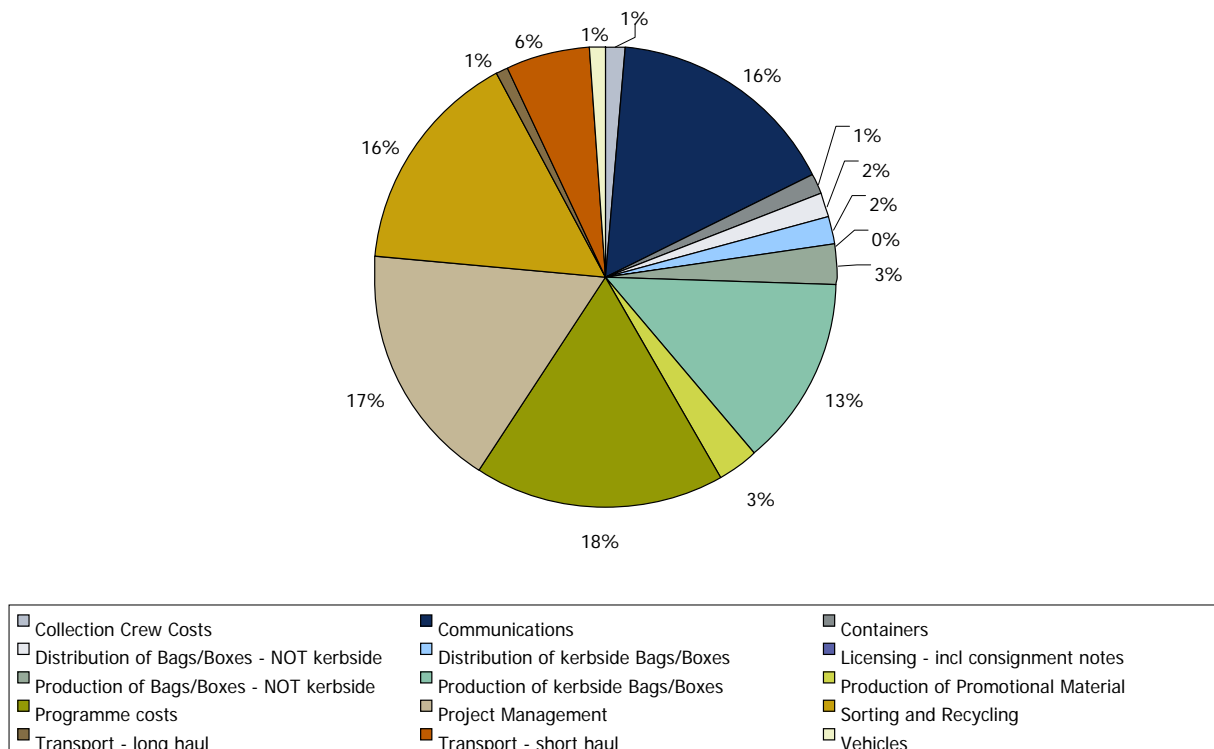
<sup>2</sup> Based on total set up costs. These costs are indicative only because practices in charging for set up costs varied between schemes and the initial costs varied depending on local circumstances.

The charts below indicate the overall breakdown of types of costs incurred for each type of scheme.

**Figure 1** Year 1 Costs



**Figure 2** Year 2 Costs



## Findings

From the trials and from its broader work promoting recycling of other materials, WRAP has identified a number of factors which help create a successful battery collection scheme. These are:

### Kerbside schemes

- Batteries can be collected successfully as additions to existing collection networks and require only very limited modifications to the collection vehicles and other facilities, if any;
- The public has grown used to kerbside collections of recyclables and respond favourably to the collection of additional materials;
- Well designed schemes reported only limited additional crew time costs;
- As with other recyclables, attention to the practicalities of the scheme for householders boosts participation and satisfaction with the service. Specially designed collection bags provided to each household in the scheme area act as in-home collection containers as well as a separation and containment device during collection. This reduces handling time for crews by making identification of the batteries simple and easing handling in all weather conditions;
- The distribution of both battery containers and scheme information can be expensive and is best planned as part of other distribution activities such as council newsletters or recycling calendars ;
- PR and Marketing – promotion of a kerbside battery scheme can be undertaken as part of the broader communications about recycling to limit costs. WRAP's wider experience, however, suggests that the promotion of battery recycling will be most effective if it is seen to be part of a larger campaign with standard messaging and linked to other recycling messages.
- Collection crews, as well as any other members of staff should be fully briefed on the scheme so that they can answer any questions by the public
- The success of the scheme is likely to be significantly enhanced if the collection crews are supportive of the scheme as they will continue to promote the scheme to the public.

### Retail take-back schemes

- Battery collections are only one of many promotional activities undertaken by stores and will be successful where stores receive clear and timely communications from Head Office regarding the importance of the scheme, its purpose and clear instructions on how to implement it;
- Store managers need to make suitable arrangements for implementing the collections and communicate those to customers. Information about the scheme and its launch should also be cascaded to all store staff, perhaps appointing a "battery recycling champion" if appropriate;
- Local press coverage incorporating the community or local high profile figures can be successful, but this should be linked to any broader campaign to maximise the impact of such activities;
- It is essential for a collection container to be provided at each collection point. This should be positioned in a highly visible and easily accessible location and that location needs to be consistent in order to build customer habits. Containers should be serviced regularly;
- The design of the container should be such that all normal types of batteries sold by the retailer can readily be deposited and since batteries are heavy, regard should be had to the practicalities of manual handling;
- Retailers need to ensure that suitable arrangements are made for the batteries collected in store to be transported to a consolidation point, from which the batteries can be collected for sorting and recycling.
- The trials were unable to test the benefits of reverse haulage, partly because of concerns about the regulatory requirements for the transfer of hazardous wastes, but it is likely that cost effective retailer take back schemes will need to address this issue.

## Community drop off schemes

- An appropriate container needs to be provided at each collection point for householders to use. The container needs to be serviced regularly and should take account factors such as weather and tamper-proofing;
- The design of the container should be such that all normal types of batteries can readily be deposited, otherwise large batteries could be left by or on the container which will need to be removed regularly to prevent their misuse. Clear instructions should be given on what to do with outsize batteries or where to obtain information on alternative recycling facilities;
- Since people are in general unlikely to want to make a special journey to recycle batteries the choice of location for community drop-off schemes should take account of the number of regular visitors that can be expected. This continual promotion of such schemes is particularly important, particularly in the early years until a national campaign is well established and local recycling habits have been established.
- Usage of the each collection site needs to be monitored closely so that appropriate container sizes and collection frequencies can be established in order to manage costs.

## Postal schemes

- Each household in the scheme area needs to be provided with, or have easy access to, specially designed collection envelopes, the specification of which must be agreed with the Royal Mail in advance.
- A network of points should be set up where householders can obtain replacement envelopes;
- Householders should also receive information about the scheme accompanying their supply of envelopes in order to ensure high participation;
- Provision needs to be made for batteries sent back through the post for recycling to be consolidated at a central location such as a Royal Mail or local depot before onward transport for recycling unless otherwise agreed with the reprocessing contractor.

## MRUK Householder Research

WRAP commissioned MRUK Research Ltd to conduct a large scale survey on a statistically valid and representative sample of householders across all WRAP battery collection scheme areas. The survey work took place at the end of 2007.

Key findings:

- The postal and kerbside schemes had both the highest awareness (over 40%) and the highest actual (reported) usage (30%);
- The retail take-back scheme had both the lowest awareness (less than one-third) and lowest actual (reported) usage by respondents (less than 20%);
- Lack of information on scheme operation was a common reason for not using the schemes;
- Respondents were most likely to use their scheme once or twice a year;
- Four-fifths of respondents who had used a scheme claimed to recycle all their batteries through their scheme;
- Kerbside collection was stated as the preferred method of battery recycling by 71.4% of current (kerbside) users and post back was preferred by 36.3% of current (postal) users;
- Community and retail take-back scheme users rated collection from outside their house (kerbside) as their most preferred method of recycling.

## Recommendations

The collection data and feedback from the householder survey suggests that a mixture of collection options will be needed to achieve the 2012 and subsequent targets.

Local Authorities, though not in any way obligated under the Batteries Directive to participate in or finance battery collection schemes after transposition, should be encouraged to collect batteries through, for example kerbside collection schemes, as these types of scheme have shown the best per capita collection rate.

However, the Battery Directive is a producer responsibility directive and local authorities should not expect to bear the costs of collecting batteries. A mechanism will be needed to reimburse local authorities for their additional costs but at the same time local authorities will need an incentive to manage total costs effectively.. This could either be achieved by separate negotiation between compliance schemes and individual authorities or through a central negotiation with national or regional representatives of local authorities. For simplicity a single national figure per collected tonnes could be agreed with LARAC, or another similar body, and if local authorities wished to participate at this level they could do so. If they did not then Compliance Schemes could use alternative collection routes.

Schemes need to be as easy and simple as possible to encourage participation and all forms of communications to end users will need to be clear and have simple instructions. WRAP's experience suggests that local awareness raising will be most effective where it builds on national or regional messaging and branding linked to wider recycling campaigns. It was clear from the market research for these pilots that many people were unaware that batteries could be recycled.

Retail Take-back should have been a good way to collect batteries, building on peoples' regular shopping habits; however, it hasn't proved the most popular or produced the highest capture rates. These schemes could still prove effective if they are adopted and promoted corporately by retailers so ensuring better locations of the collection containers; "buy in" from local managers and staff and resolution of transport issues.

Although relatively expensive to run and therefore not appropriate for all locations, the postal scheme has been found to be effective at collecting batteries from householders without adequate access to kerbside collection facilities or bring schemes. This collection method could also be extended for use in a number of other specific situations and potentially for obligated "remote sellers" eg internet sales.

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## 1.0 Overview of Schemes

This section of the report will look at the set up and the structure of each of the trials and give a brief overview of how each has been run.

The trials were set up to gain an understanding on the most efficient and cost effective way to collect portable (household) waste batteries. The EU Batteries Directive, which comes into force in the UK on 26th September 2008 states that by 2012 at least 25% by weight of all portable batteries put on the market for the first time in the UK need to be collected for recycling and this target increases to 45% by 2016. This is a very challenging target as the current collection rate in the UK is estimated to be between 2-3% (2007).

In addition to establishing the most efficient and cost effective methods to collect batteries a greater understanding of the chemistry composition and the quantity of batteries that can be collected through different schemes needed to be understood. The following types of schemes were set up:

- Kerbside collection
- Retail take back
- Community drop off
- Postal
- NHS and Fire Service collections

### 1.1 Kerbside trials

This scheme has been running since April 2006 and has operated in 15 Local Authority areas in the last two years.

The Local Authorities and Community Sector organisations which have been involved are:

**Table 1** Local Authorities and Community Sector organisations which have been involved in the trials

Area and Partners	Local Authority / Community Sector	Household Numbers*	Trial in operation as at February 2008?
Aberdeenshire	Local Authority	70,000	Yes
East Devon	Local Authority	61,000	Yes
Eastleigh	Local Authority	48,000	Yes
St Edmundsbury	Local Authority	42,000	Yes
Stockton on Tees	Local Authority	75,000	Yes
Armagh and Banbridge (Bryson House)	Community Sector	36,000	Yes
Caerphilly (CFE Caerphilly)	Community Sector	16,000	Yes
Calderdale (Kerbside Calderdale)	Community Sector	26,000	Yes
Harlow and Epping Forest (ECCO)	Community Sector	64,500	Yes
Liverpool (Energywise)	Community Sector	25,000	No
Falkirk (BTCV Action Recycle Scotland)	Community Sector	3,000	Yes
Barnsley (Rabbit Recycling North Barnsley Ltd)	Community Sector	8,500	No
Trafford (Emerge)	Community Sector	7,000	Yes
<b>Total</b>		<b>482,000</b>	

\* Household coverage increased during the trials in East Devon, St Edmundsbury and Aberdeenshire. The figures in Table 1 have been used in calculating per capita figures as they are representative of the figures applying for the trial as a whole.

Two of the community projects unfortunately did not retain non-WRAP funding throughout the period meaning they could not complete the trials; these were Rabbit Recycling North Barnsley Ltd (in Barnsley), which finished in March 2007, and Energywise (in Liverpool) which finished in August 2007.

However there have also been extensions to the trials. The initial 6,000 household trial in Harlow district operated by ECCO was extended to include an additional 58,500 households encompassing the rest of Harlow and the whole of the Epping Forest district, in September 2007.

Furthermore, an additional trial in St Edmundsbury borough was launched in September 2007 and covers all 42,000 households in the district. 40,000 of these houses have a co-mingled (wheelie bin) scheme for dry recyclable waste and this was the first trial to collect portable household batteries alongside such a collection method.

### *1.1.1 Method of Collection*

#### **Kerbside Sort**

All the trials, except St Edmundsbury, are run in conjunction with either a single material collection or a kerbside-sort scheme where the other recyclable materials are sorted and separated into the various fractions by the crews whilst out on the round.

The majority of these trials used a bag made of recycled polyethylene into which residents put their used or unwanted batteries for collection by the kerbside crews (See Appendix 1a). Two of the schemes used cardboard boxes as an alternative (Falkirk and ECCO in Harlow and Epping Forest) (See Appendix 1b). Falkirk used a heavy-weight reusable box which was emptied by the crew in to a pouch whilst ECCO used a lightweight single use box. The Falkirk scheme served high-rise and tenement properties where a "personal" door to door service was initially provided.

The batteries were collected alongside the normal dry recyclable material collection on a quarterly, monthly, two weekly or weekly basis depending on the particular arrangements of the collection partner.

Householders were asked to simply place the sealed bag or closed box in or on the collection container for the dry recyclables. The only exception to this was St Edmundsbury, where special instructions were issued as batteries must not be mixed with co-mingled dry recyclables (see below).

Initial distribution for all the collection bags was by the collection crews on normal rounds or via a door to door distribution run by the Royal Mail. Each household received a bundle of between 3 – 6 bags with a leaflet that described the trials, why it was running, what residents should do with their batteries and what type of batteries they should collect (See Appendix 1c).

Additional bags were either distributed in council newsletters, by crews on rounds or if residents called the collection partner directly then the bags were sent out by post.

#### **Co-mingled Sort**

St Edmundsbury was set up as the only trial to operate alongside a co-mingled collection scheme for dry recyclables and ran from September 2007 until the end of the trial period. To ensure the batteries were kept separate from other waste materials a special hook (See Appendix 1d) was designed to be fixed on the handle of a normal wheelie bin and a variation of the normal kerbside collection bag was designed with a small hole (like a child's party bag) towards the top. The bags are hung on the hook from which they are easily detached by the collection crews.

The hooks were designed so that they could not be taken off the bin handles. They were made in magenta in line with the Recycle Now colour for batteries and WEEE (Waste, Electronic and Electrical Equipment). It should be noted that different wheeled bin manufacturers have handles of different diameters and therefore if this type of collection is more widely adopted then different hooks and moulds will need to be made for different sized handles.

#### **"Textbac" Scheme**

In Harlow and Epping Forest the batteries were collected in conjunction with the existing successful "Text-Bac" charity textile collection scheme. In this scheme, special date-marked collection bags for textiles are delivered to householders every 13 weeks and they are collected exactly seven days later. Single use battery collection boxes

were provided for residents on this scheme, into which they placed their batteries. They were asked to put the box out for collection alongside the textile bag or on its own if they had no textiles to be recycled. A new box was delivered along with the new textile collection bag for collection on the next collection cycle thereby ensuring that every household always had a box for storing used batteries.

## **Vehicle Alterations**

The collection of mixed portable batteries from domestic properties can only be undertaken legally if the collected batteries, which are Hazardous Waste (Special Waste in Scotland), are separated at the point of collection and kept separate from the rest of the waste being carried until the vehicle is unloaded. Mixed batteries are also classified as Dangerous Goods and accordingly the batteries must be packed (contained) in a suitable container on the vehicle. Some of the schemes needed to alter their vehicles to allow for the additional collection of batteries. Depending on the Local Authority / Community Sector partner the vehicles were altered in different ways e.g. a new container under the vehicle or mounted on the rear of the vehicle. (See Appendix 2)

## **Collection, sorting and recycling**

Crews did not undertake any form of battery sorting; they simply placed the full bags or boxes containing the batteries into a hopper on the vehicle. In the case of the Falkirk kerbside the crews emptied their pouches into the hopper on the vehicle. The batteries were taken back to the depot where the vehicle hopper was discharged into a lidded magenta plastic pallet box (See Appendix 3). This was then collected by G&P Batteries Ltd as consignable Hazardous (Special) Waste under full ADR rules when it was full or on request.

## **Communications**

As these were new trials there needed to be a PR campaign to explain the trials to residents. A PR consultancy was recruited which managed the PR in England, Wales and Northern Ireland. In Scotland communications were managed jointly with the Scottish Waste Awareness Group and drew on the existing Scottish recycling campaign in order to maintain the link with broader recycling messages there.

Initially a launch was arranged for each partner, with media focused pre-press releases. Most partners had photo calls to launch their schemes which included the participation of local councillors and Portfolio Holders. The press and public were kept informed and updated on the trials at regular points, these were:

- Christmas Collections Article (December 2006)
- 1 year on collection – photo call with 6 partners (March 2007)
- Autumn Review (September 2007)
- New Year (January 2008)

Other information produced for the trial:

Kerbside toolkit (April 2006), this was an information pack to help local authorities and the community-run schemes manage publicity campaigns to heighten awareness of battery collections within their region.

Radio phone-ins to create the opportunity for members of the public to ask questions and debate the issue of collecting batteries (completed July 2006). This was held successfully in a couple of the trial areas where a member of the WRAP team answered questions in a live phone-in.

Website guidance (April 2007). This was a template to enable partners to make the most of their websites to promote the battery scheme.

### **Case Study - Aberdeenshire Kerbside Trial**

#### **Objective:**

To encourage residents in an urban setting to recycle their used batteries as part of their new kerbside collection. As with other kerbside schemes, the idea was that householders store their used batteries in the battery collection bag provided. Householders should place sealed bags in their Recycling Box with other recyclable materials. The target area of Aberdeenshire encompassed 102,000 households.[ check]

#### **Key Message:**

'Household Battery Recycling together lets get it sorted'

#### **Phase 1:**

Residents received a recycling guide about what could be collected in their kerbside recycling box, including a section on which batteries could be recycled. Central Aberdeenshire received this in addition to an existing kerbside collection service. North and South Aberdeenshire received this as part of the overall kerbside collection roll out.

#### **Phase 2:**

Regional radio advertising, supported by press adverts and bus adverts, continued to promote and raise awareness of the collection scheme. This phase was designed to ensure that people were aware what can go into their recycling box and encourage them to continue to recycle.

#### **Website:**

Press release throughout the trial featured on Waste Aware Scotland websites. In addition, the Sort-It tool added the scheme details for recognition within the Aberdeenshire Council Area. Aberdeenshire Council also update their website to include details of the scheme for those residents throughout the area.

#### **Outcome**

The kerbside collection scheme in Aberdeenshire achieved the largest total capture of batteries at the lowest cost per household.

## 1.2 Retailer take-back trials

This scheme allowed shoppers to drop their used and unwanted portable batteries in special containers placed in 33 stores across three areas in Swansea, Eastleigh (Southampton) and Perth & Kinross. The trials were successfully launched in 11 stores in Swansea on the 30th October 2006, 13 stores in Eastleigh on 31st October 2006 and 9 stores in Perth and Kinross on 16th March 2007.

WRAP was unable to launch the trials in Perth and Kinross in October 2006 because then existing legislation would have required a full Special Waste Management Licence to be issued for each collection point as mixed batteries are Special Waste. The Scottish Executive (now the Scottish Government) subsequently issued a new exemption on the storage of limited quantities of mixed batteries which allowed the trial to be launched in March 2007.

The retail chains that took part were:

- Home Retail Group plc (Argos and Homebase)
- B&Q Plc
- DSG International plc (Currys, Currys Digital and PC World)
- Tesco plc

It was estimated that the scheme was accessible to 200,000 households and just under 477,000 residents. Footfall data by store could not be obtained from the retailers and so getting a true reflection of the number of people living in the stores' catchment area in relation to the number of batteries collected could not be made.

Members of the public were supplied with small boxes (very similar to those used in the Harlow and Epping Forest kerbside collection) through the retail outlets so the public could collect and store their batteries at home and bring them back to store. In the stores, special collection tubes (See Appendix 4) were placed either inside or just outside the store as requested by the store management. The batteries were collected by G&P Batteries Ltd on a fortnightly basis as it was not possible to introduce the use of "reverse logistics" (returning batteries to regional distribution centres on empty deliver vehicles) for a variety of operational and regulatory issues. This increased the costs of the trials and is likely to affect the use of this approach in future unless new regulatory arrangements can be made.

## Containers

Tubes of various sizes were used as collection containers, ranging in size from small ones used on Customer Service counters, to extra large ones such as those located outside stores. These were branded with the appropriate battery recycling branding as well as the retailers' own logos.

Other instructional and promotional items such as floor stickers, shelf wobblers, poster, ceiling hangers, leaflets and leaflet dispensers (See Appendix 5) were made available to the stores and were used in some, but not all, stores as the store size, layout and products sold affected which promotional items could be used in which locations.

## Communications

Communications were also used in establishing the retail take back trials in the local community areas. There was an initial launch that involved local celebrity DJs and hired promotional teams outside some of the stores to hand out boxes and for photo calls for the local press.

Other events that took place were:

- Christmas releases, talking about the numbers of batteries bought at Christmas for new toys
- Autumn feature, how batteries are used for camping and out door lights etc
- One year on birthday party event

## 1.3 Community Drop-Off Trials

The community drop off scheme involved establishing a network of collection points around the districts where residents could drop-off their batteries. Areas that participated in the trial were Cherwell District, Camden Borough and Falkirk. Falkirk also had a small kerbside trial scheme run by BTCV who ran the community drop-off trial. However the scale of the Falkirk kerbside trial (3086 households) was not significant in comparison to the total number of residents who could access the community drop-off points.

The Cherwell and Camden schemes started in March 2007, whilst the Falkirk scheme started in May 2007. The battery containers were located at libraries, schools, bring banks, local shops and museums and, in the case of Camden, on -street (see Appendix 6).

## Containers

Both Falkirk and Cherwell use the same style of collection tubes as those in the retail drop-off scheme.

However, Camden had a slightly different container as the trial ran in a different way as 45 (out of the total of 90) mini on-street "recycling centres" had battery collection containers installed. In these cases the bin was attached to suitable lampposts or site information posts. These bins were carefully designed with special battery shaped apertures so that only batteries could be deposited in the containers. (See Appendix 6)

The batteries from each location were collected by the designated collection contractor on a milk-round basis (i.e. where pick ups take place from a number of sites on the same van round). In two cases (Cherwell and Falkirk) dedicated collection routes were established and the frequency of servicing adjusted to reflect usage of particular locations whilst in Camden the collection of batteries was part of the normal recycling centre servicing which occurred no less than twice a week. By special arrangement with the Environment Agency the two schemes in England did not have to complete Hazardous Waste Consignment Notes for every collection although an accurate paper record of every collection had to be kept. In Scotland every collection was made as Special Waste and Consignment notes completed even though the storage was exempt.

The collected batteries were deposited at a central depot into a magenta plastic pallet box which was collected by G&P Batteries Ltd as consignable Hazardous/Special Waste under full ADR. Again the collection crews did not undertake any form of sorting of the batteries.

## Communications

All three areas had two press releases for the local press and Camden and Cherwell had leaflets to give local residents. Other promotional activities included attendance at local events such as the Camden Green Fair and Kidlington Summer Fete.

### 1.4 Postal Trials

The aim of this trial was to assess an option for collecting batteries from rural areas in the UK where residents cannot easily access collection points at major shops or who are too remote to make it practical to provide a kerbside collection scheme.

The scheme was launched in Eden (Cumbria) and Dumfries and Galloway in June 2007 covering approximately 38,000 households in total.

Sturdy business reply service polythene bags were posted through Royal Mail in an initial distribution. These bags had to meet the Royal Mail criteria so that batteries which are both Hazardous Waste and Dangerous Goods could be transported through their systems. Continual redistribution of the bags took place through local sub post offices that were paid £50 to host a distribution point for the bags as well as schools and other community buildings. These distribution points were refilled with new bags by the local council staff on a regular basis.

## Communications

There were two press releases one for the launch and the other in late 2007 before Christmas with the latter supported by radio interviews in the Cumbria area from a WRAP team member.

### 1.5 NHS and Fire Service Trials

These trials were set up to understand the quantity of batteries that could be collected through the fire and rescue services and NHS hospital trusts. Both types of organisations have contact with the public and their used portable batteries. For instance, an audiology department will have hundreds of patients that return used hearing aid batteries and fire and rescue services replace batteries in domestic smoke detectors. Furthermore these types of organisations use considerable numbers of batteries in the conduct of their business in a wide range of equipment including medical monitoring, radios and pagers. Participating bodies were

- East Berkshire Audiology department NHS (August 2007)
- Craigavon NHS (June 2007) Now Southern Trust
- Dumfries and Galloway Fire Brigade (September 2007)
- Trafford NHS (only started in February 2008)

East Berkshire collected hearing aid batteries across six of their audiology centres; Dumfries & Galloway Fire Service collected batteries from home visits for smoke alarm checks and batteries from torches, walkie-talkies and other equipment used in their day to day work; Craigavon and Trafford NHS Trusts collected general batteries from within their hospitals.

None of these trials accepted batteries brought in by the general public.

## 2.0 Summary of Collection Results

This section deals with the overall collection figures for the trial schemes. There are many similarities in some of the figures such as chemical composition of collections, but each trial method varies greatly in the amounts collected.

### 2.1 Summary of all trials

**Table 2** Summary of All Trials (from start of each trial to end February 2008)

	Kerbside	Retailer Take-back	Community Drop-off	Postal
Number of Households served	482,000	201,000	220,000	38,100
Estimated Population	1,169,000	477,000	465,000	81,000
Total weight of batteries collected (tonnes)	95.06	10.39	5.74	2.72
Estimated number of batteries (AA equivalent)	3,802,000	415,000	230,000	109,000
Estimated number of batteries per household	7.9	1.7	1.04	2.9
Estimated weight collected per capita (g)	81.3	21.8	12.4	34.0
<b>Distribution of battery chemistries (%)</b>				
Alkaline/Zinc Carbon/Zinc Chloride	92.85%	93.78%	91.34%	93.96%
Nickel Cadmium	2.74%	2.47%	2.40%	2.44%
Primary Lithium	0.27%	0.53%	0.44%	0.60%
Nickel Metal Hydride	1.04%	0.97%	1.57%	1.24%
Lithium ion	0.48%	0.37%	0.97%	0.95%
Lead-acid	2.32%	0.29%	2.71%	0.45%
Button Batteries	0.26%	0.73%	0.55%	0.36%
Other Batteries	0.05%	0.86%	0.02%	0.00%
Total Batteries	100.00%	100.00%	100.00%	100.00%

### 2.2 Kerbside Trials

**Table 3** Kerbside Trials by country (from start of each trial to end February 2008)

	England & Wales	Scotland	Northern Ireland	All UK combined
Number of Households served	373,000	73,000	36,000	482,000
Estimated Population	884,700	182,000	102,300	1,169,000
Total weight of batteries collected (tonnes)	64.29	21.12	9.65	95.06
Estimated number of batteries (AA equivalent)	2,571,800	844,900	385,800	3,802,500
Estimated number of batteries per household	6.9	11.6	10.7	7.9
Estimated weight collected per capita (g)	72.7	116.1	94.3	81.3

<b>Distribution of battery chemistries (%)</b>				
Alkaline/Zinc Carbon/Zinc Chloride	92.39%	93.34%	94.77%	92.84%
Nickel Cadmium	3.00%	2.62%	1.29%	2.74%
Primary Lithium	0.27%	0.30%	0.15%	0.27%
Nickel Metal Hydride	1.17%	0.90%	0.54%	1.04%
Lithium ion	0.48%	0.55%	0.32%	0.48%
Lead-acid	2.35%	2.04%	2.76%	2.32%
Button Batteries	0.28%	0.24%	0.15%	0.26%
Other Batteries	0.06%	0.01%	0.02%	0.05%
<b>Total Batteries</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>

Figures as at the end of February 2008

Between April 2006 and February 2008, 95 tonnes of batteries have been collected across the 15 trial areas. The total amount includes the trials that have finished and those that have expanded or launched in the 22 month time frame. The number of households and estimated population are the total that has been serviced through the schemes.

An average of 81.3 grams per capita has been collected across the schemes over the 22 months period covered by this report, but the range varies from 39.5g in Liverpool to 117.8g in Aberdeenshire. It should be noted that the scheme in Liverpool ceased to collect batteries at the end of August 2007 and if the then collection rate was adjusted pro rata it would be equivalent to 54.3g which is still less than half that achieved in Aberdeenshire.

Of the various collection methods trialled, kerbside schemes appear to be the highest performing and such methods compare well against the findings of the Local Authorities survey undertaken in 2007, where local authorities were asked about the average weight of batteries gathered by their own (non-WRAP funded) collection schemes. Most authorities collected through a CA site scheme and collected on average VVVV per capita (See Appendix 7).

The chemical breakdown of the collections was reasonably consistent between the different trial schemes but with some variations between schemes and between pallet boxes. Alkaline groups batteries (including zinc manganese, zinc carbon, zinc chloride and alkaline manganese) made up about 93% by weight of the batteries collected.

Nickel Cadmium batteries were found in all but 3 of the 119 collections made from the bulking points where the vehicles emptied on a daily basis into the pink plastic pallet boxes. It must therefore be concluded that NiCad batteries are likely to be present in any particular collection and therefore all mixed portable battery collections should be treated as Hazardous Waste.

Primary Lithium and Lithium-ion batteries were also present in most, but not all pallet boxes which were sorted. It is therefore also reasonable to assume that they will also be present in any particular collection and therefore all mixed portable battery collections should be considered to be Dangerous Goods and packed in accordance with the relevant Authorisations or Instructions from the Department for Transport.

## 2.3 Retail Take Back Trials

**Table 4** Retail Take-Back trials (from start of each trial to end February 2008)

	Eastleigh	Swansea	Perth & Kinross	All UK combined
Number of Households served	48,000	94,400	58,300	200,700
Estimated Population	118,700	223,300	135,000	477,000
Collections from individual stores	351	286	192	829
Total weight of batteries collected (tonnes)	2.76	4.02	3.61	10.39

Estimated number of batteries (AA equivalent)	110,400	160,800	144,200	415,400
Estimated number of batteries per household	2.30	1.70	2.47	2.07
Estimated weight collected per capita (g)	23.2	18.0	26.7	21.8
<b>Distribution of battery chemistries (%)</b>				
Alkaline/Zinc Carbon/Zinc Chloride	90.33%	95.38%	94.65%	93.78%
Nickel Cadmium	4.92%	1.67%	1.47%	2.47%
Primary Lithium	0.78%	0.54%	0.32%	0.53%
Nickel Metal Hydride	1.29%	0.82%	0.88%	0.97%
Lithium ion	0.52%	0.25%	0.40%	0.37%
Lead-acid	0.09%	0.16%	0.59%	0.29%
Button Batteries	0.92%	0.25%	1.13%	0.73%
Other Batteries	1.15%	0.94%	0.56%	0.86%
Total Batteries	100.00%	100.00%	100.00%	100.00%

Figures as at the end of February 2008

The retail Take-back trials have collected approximately 10.3 tonnes of batteries across the 33 stores over the trial period since their launch in October 2006 (and March 2007 in Scotland).

Although each area had a different number of stores, Eastleigh (Hampshire) (13), Swansea (11) and Perth and Kinross (9) there was an even distribution of the types of stores (brands) between locations.

Swansea, with the largest target population collected the greatest quantity of batteries from fewer stores than in Eastleigh. However, Eastleigh is one of the two areas in the country where two schemes were run in conjunction with one another to understand whether collection rates could be affected, if different collection methods were co-located. Eastleigh's kerbside scheme is very popular scheme and whilst the assumption could be made that it has had an effect on the retail figures the evidence would appear to indicate that higher overall tonnages can be achieved by providing end-users with a variety of collection options.

## 2.4 Community Drop Off Trials

**Table 5** Community Drop-off trials (from start of each trial to end February 2008)

	Cherwell	Camden	Falkirk	All UK combined
Number of Households served	57,200	97,200	65,000	220,000
Estimated Population	135,000	200,000	130,000	465,000
Total weight of batteries collected (tonnes)	3.08	2.22	0.44	5.74
Estimated number of batteries (AA equivalent)	123,200	88,800	17,600	230,000
Estimated number of batteries per household	2.15	0.91	0.27	1.04
Estimated weight collected per capita (g)	23.0	11.1	3.4	12.4
<b>Distribution of battery chemistries (%)</b>				
Alkaline/Zinc Carbon/Zinc Chloride	90.38%	92.29%	93.08%	91.34%
Nickel Cadmium	2.34%	2.07%	4.55%	2.40%
Primary Lithium	0.37%	0.54%	0.34%	0.44%
Nickel Metal Hydride	1.51%	1.73%	1.14%	1.57%
Lithium ion	0.28%	2.05%	0.54%	0.97%
Lead-acid	4.31%	1.03%	0.00%	2.71%
Button Batteries	0.76%	0.29%	0.35%	0.55%
Other Batteries	0.05%	0.00%	0.00%	0.02%
Total Batteries	100.00%	100.00%	100.00%	100.00%

Figures as of the end of February 2008

The community drop-off trials were run from March 2007 (England) and May 2007 (Scotland) and, in the period under review just over 5.7 tonnes have been collected. The following number of drop-off points were set up in each area, Cherwell - 32 points, Falkirk – 29 points and Camden – 45 points. There have been 8 collections by G&P Batteries from the main depots, and a total of 82 milk-round collections were made by the partners from the drop-off points.

Falkirk's collection weights are significantly lower than the other two collection areas. This could partly be due to the fact that Falkirk also has a kerbside trial running but as this only covers 3,000 households out of 65,000 in the area this is unlikely to explain the difference in figures. Again each area received the same amount of communications and media activity over the trial period.

The per capita collection figures vary greatly from 3.4 to 23.0 grams per capita, which is considerably below any of the other schemes. It might be conjectured that, in general, the public are not in the habit of taking recyclables, in this case batteries, to places where they do not traditionally take recycling. However, this is not the case in Camden where half of all bring sites were provided with battery containers. Possibly the main factor why these schemes were not as successful was the lack of individual information provided to every household. Perhaps a much higher level of spending on communication and publicity would have improved the collection rates but this cannot be determined without further study.

## 2.5 Postal Trials

**Table 6** Postal trials (from start of each trial to end February 2008)

	Dumfries & Galloway	Eden Cumbria	All UK combined
Number of Households served	13,500	24,600	38,100
Estimated Population	29,500	51,500	81,000
Total weight of batteries collected (tonnes)	1.03	1.69	2.72
Estimated number of batteries (AA equivalent)	41,500	67,500	109,000
Estimated number of batteries per household	3.06	2.74	2.90
Estimated weight collected per capita (g)	35.13	32.75	33.94
<b>Distribution of battery chemistries (%)</b>			
Alkaline/Zinc Carbon/Zinc Chloride	93.41%	94.52%	93.96%
Nickel Cadmium	2.37%	2.52%	2.44%
Primary Lithium	0.43%	0.77%	0.60%
Nickel Metal Hydride	1.41%	1.07%	1.24%
Lithium ion	1.30%	0.59%	0.95%
Lead-acid	0.63%	0.27%	0.45%
Button Batteries	0.45%	0.26%	0.36%
Other Batteries	0.00%	0.00%	0.00%
Total Batteries	100.00%	100.00%	100.00%

Figures as of the end of February 2008

By January 2008 the postal trials had collected 2.72 tonnes of batteries which in a 6th month time frame across 38k households is a good rate and compares extremely favourably with kerbside collection schemes in terms of capture rate. Both of the postal trial areas have collected approximately the same amount of batteries over this period per capita, although the Scottish scheme has collected about 7.5% more per head. No attempt has been made to determine if any particular factors created this difference.

## 2.6 NHS and Fire Service Trials

**Table 7** NHS & Fire Service Trials (from start of each trial to end February 2008)

	Craigavon	Dumfries & Galloway	East Berkshire Audiology	All UK combined
Total weight of batteries collected (tonnes)	0.43	0.21	0.18	0.81
Estimated number of batteries (AA equivalent)	17,060	8,260	NA*	NA
<b>Distribution of battery chemistries (%)</b>				
Alkaline/Zinc Carbon/Zinc Chloride	83.00%	92.01%	61.53%	80.64%
Nickel Cadmium	5.86%	3.39%	6.27%	5.32%
Primary Lithium	0.00%	1.94%	0.01%	0.50%
Nickel Metal Hydride	3.64%	0.24%	6.55%	3.40%
Lithium ion	0.47%	0.00%	0.00%	0.25%
Lead-acid	5.39%	2.42%	0.28%	3.52%
Button Batteries	0.94%	0.00%	0.01%	0.50%
Other Batteries	0.70%	0.00%	25.35%	5.87%
Total Batteries	100.00%	100.00%	100.00%	100.00%

Figures as of the end of February 2008

\*A quarter of these were hearing aid batteries and a number of batteries cannot be estimated from the weight

These trials started across the latter months of 2007 and so the collected numbers are not expected to be very high by the time of writing. There could be little of the hoarding effect that can be seen in more public facing schemes as residents find their spare batteries and put them out for recycling. However, it is now known that Dumfries and Galloway had a small store of batteries prior to the start of the collection scheme.

Trafford NHS unfortunately didn't start collections until early 2008 for internal reasons and so there was no collection data for them at the end of the period being reviewed.

### 3.0 Growth Curves

This section looks at the growth curves for each of the individual trials as they have progressed through out the period of the trials. It is not possible to have an over arching chart as collection "events" (movement of a pallet box) on some of the schemes because the collection of the pallet boxes by G&P was on an as required basis rather than a on a scheduled frequency. This meant it is not possible to accurately assess the rate of battery collection throughout a year.

These charts demonstrate the growth in collection rate in certain areas of the country in relation to numbers of households involved in each trial.

Each of the dots on the chart represents a single collection of a pallet box from the depot and the linear trend of kg collected over time is represented by the straight line.

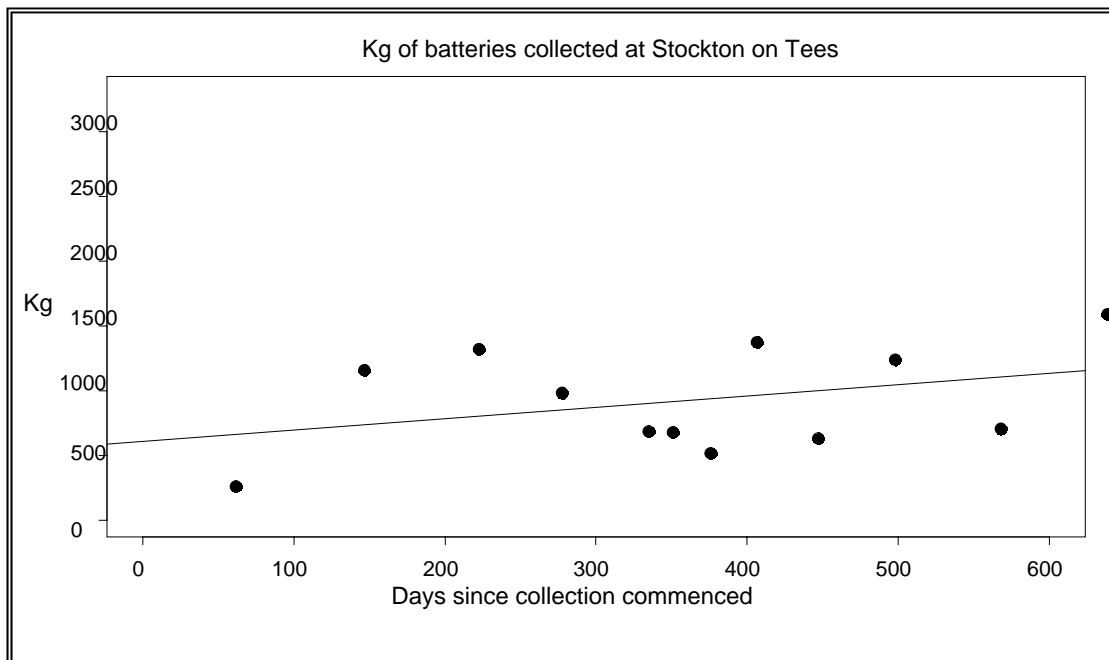
All data provided (apart from postal) is obtained from the weights logged by G&P Batteries Ltd throughout the year. Due to small amounts being collected by the community drop-off schemes growth curves cannot be calculated.

Overall the majority of kerbside schemes saw some form of growth in collection rate over the 20 month period monitored. However, there was no consistency between schemes. For instance some schemes had a very high collection rate to begin with and grew a small amount while others started on a smaller collection rate and increased significantly.

#### 3.1 Kerbside Trials

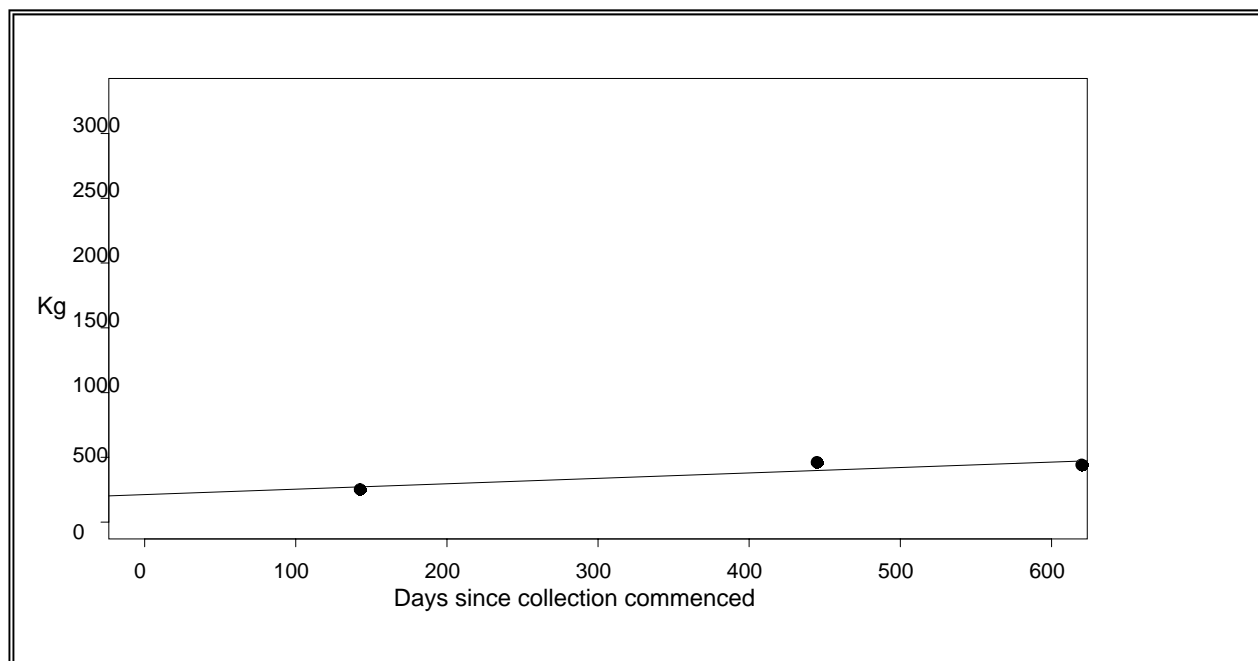
Figures 3 to 13 show the Kg of batteries collected for each collection, in each local authority area

**Figure 3** Kg of batteries collected from 75,000 households in Stockton on Tees



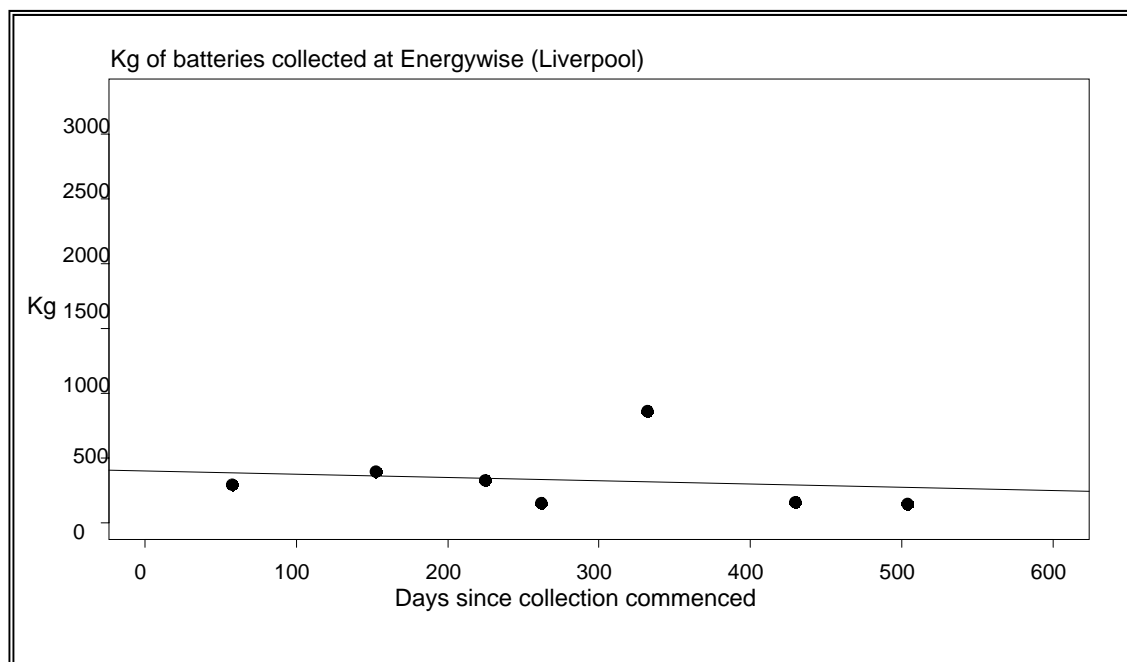
There have been 11 collections in total and the graph represents a steady growth across the time period.

**Figure 4** Kg of batteries collected from 7,000 households in Manchester



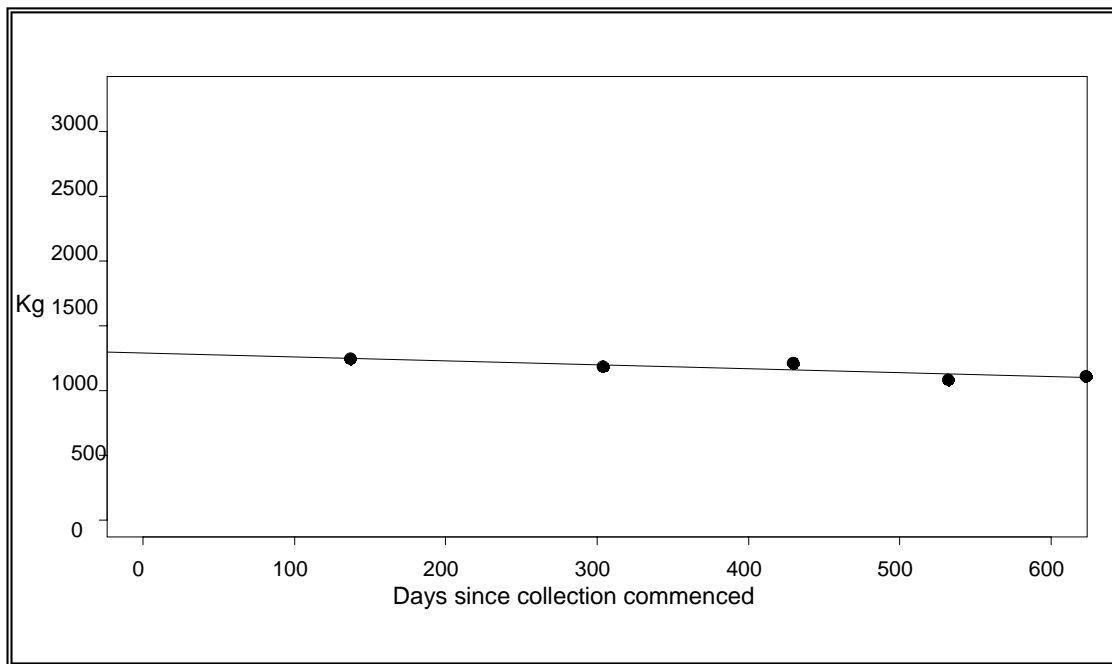
There have only been 3 collections and this is reflected in the small amounts collected. However there has been a small increase in the growth of collections.

**Figure 5** Kg of batteries collected from 25,000 households in Liverpool



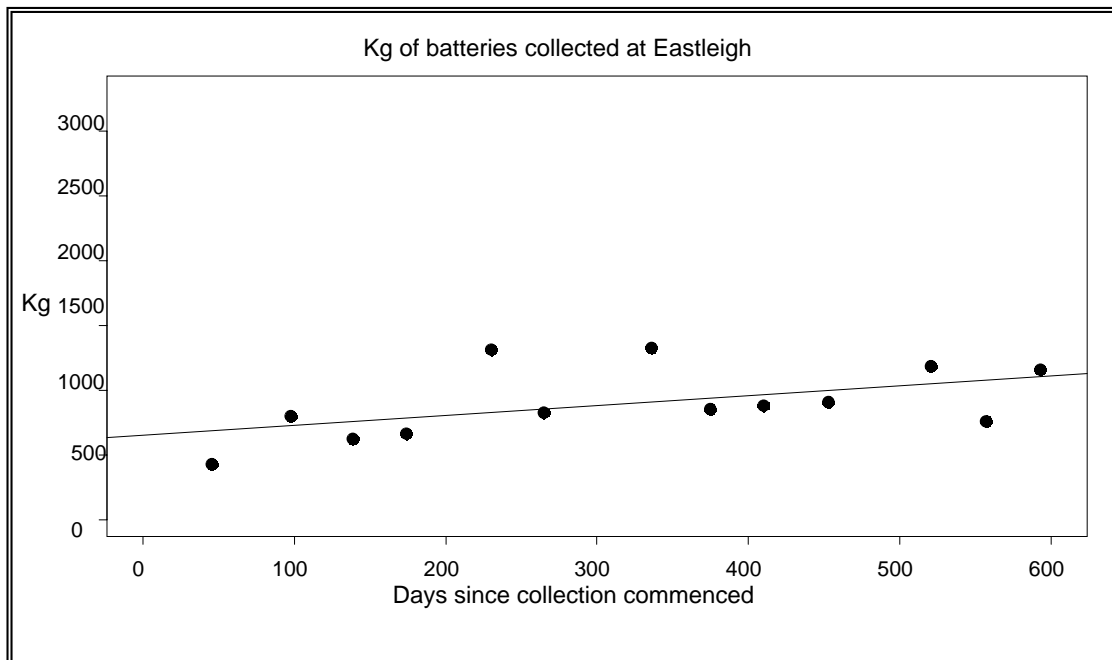
There have been seven collections over time. This scheme shows a small decrease in the batteries collected over time but this scheme ceased 5 months before the last date which explain the dip.

**Figure 6** Kg of batteries collected from 25,800 households in Calderdale



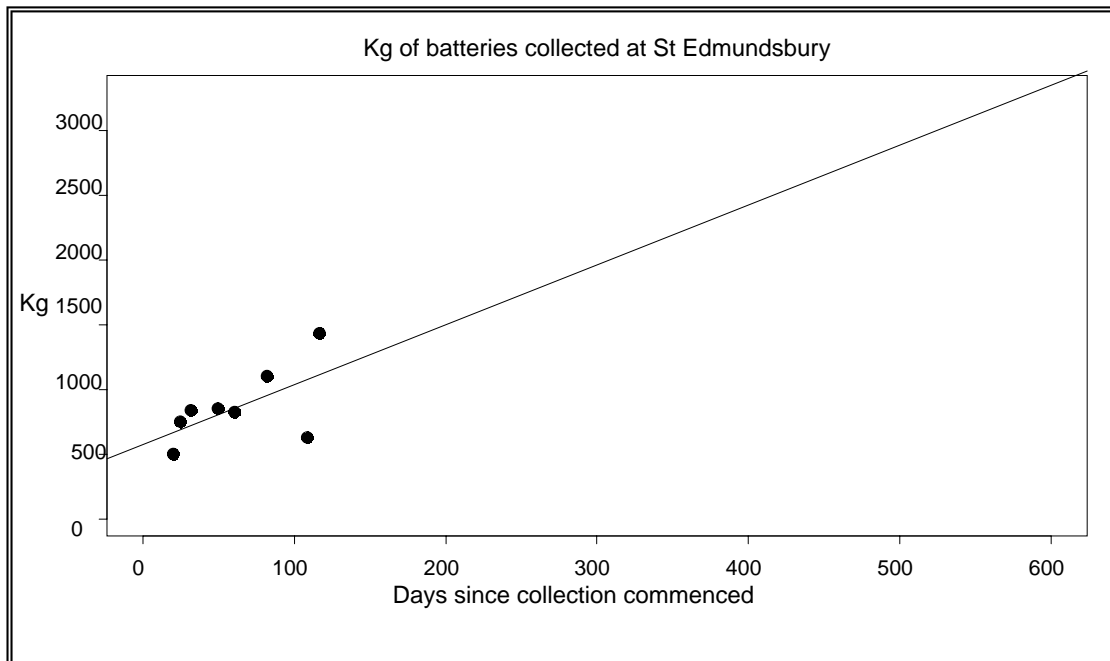
There have been 5 collections and the graph shows a slight decline in the collection figures. There is no obvious reason for this.

**Figure 7** Kg of batteries collected from 48,000 households in Eastleigh



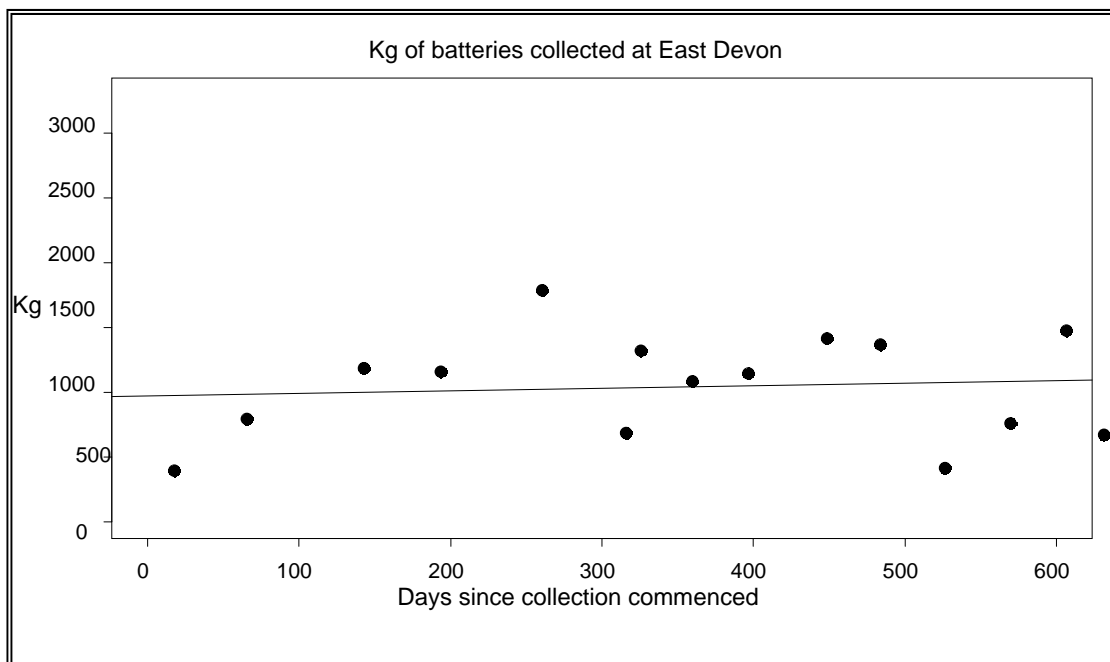
There have been 13 collections in total and good steady growth. This scheme also had competition from the retail take-back trial but does not seem to have been affected by this.

**Figure 8** Kg of batteries collected from 42,000 households in St Edmundsbury



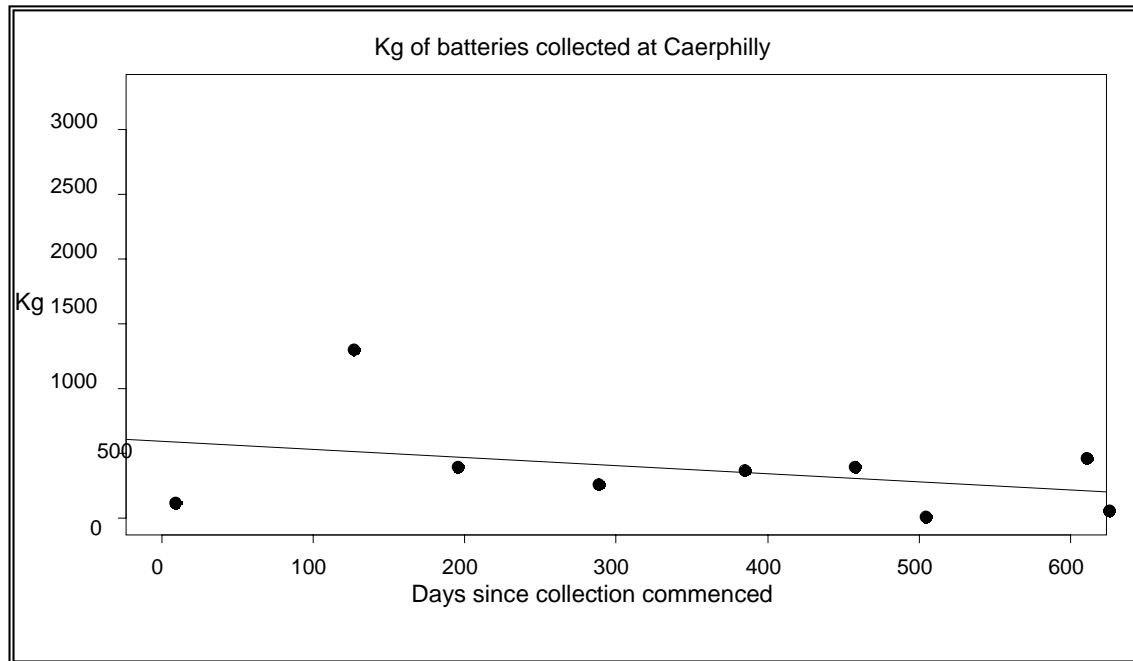
This scheme has recently started collections. This chart shows a very good initial collection rate which is high at an average of 500kg and increases rapidly. This will need to be monitored further to see if the growth continues or the curve is the result of the “hoarding” effect.

**Figure 9** Kg of batteries collected from 61,000 households in East Devon in both urban and suburban areas



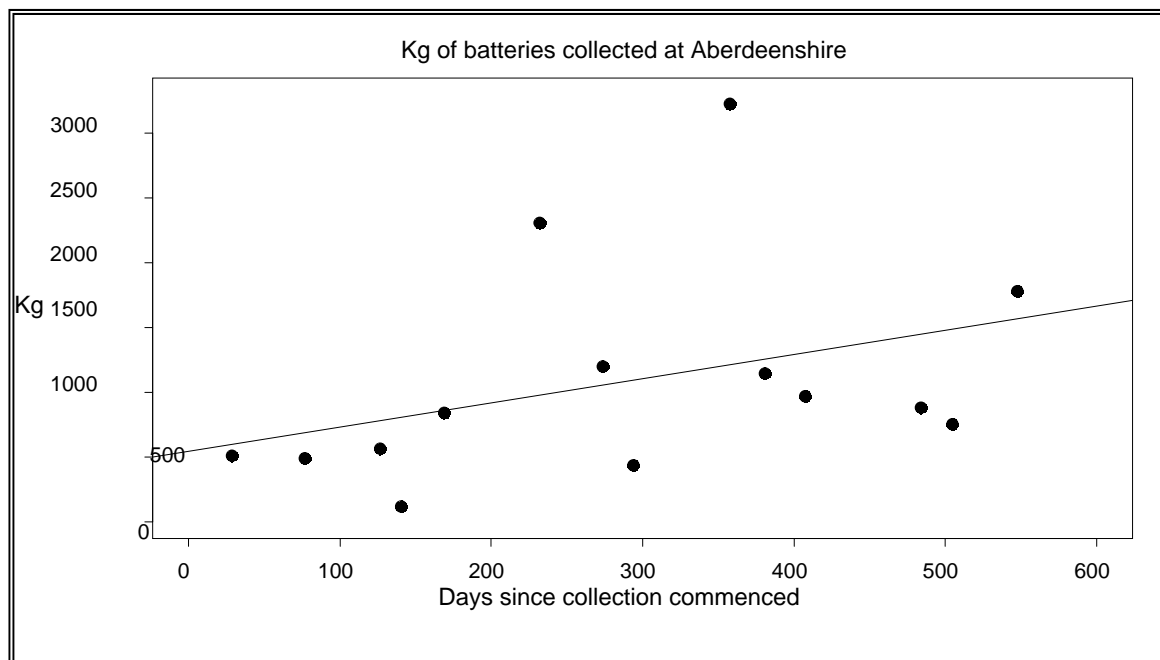
There have been 14 collections. This trial starts and maintains a very high rate of collection on average so the growth curve is not as steep as some trials.

**Figure 10** Kg of batteries collected from 16,000 households in Caerphilly



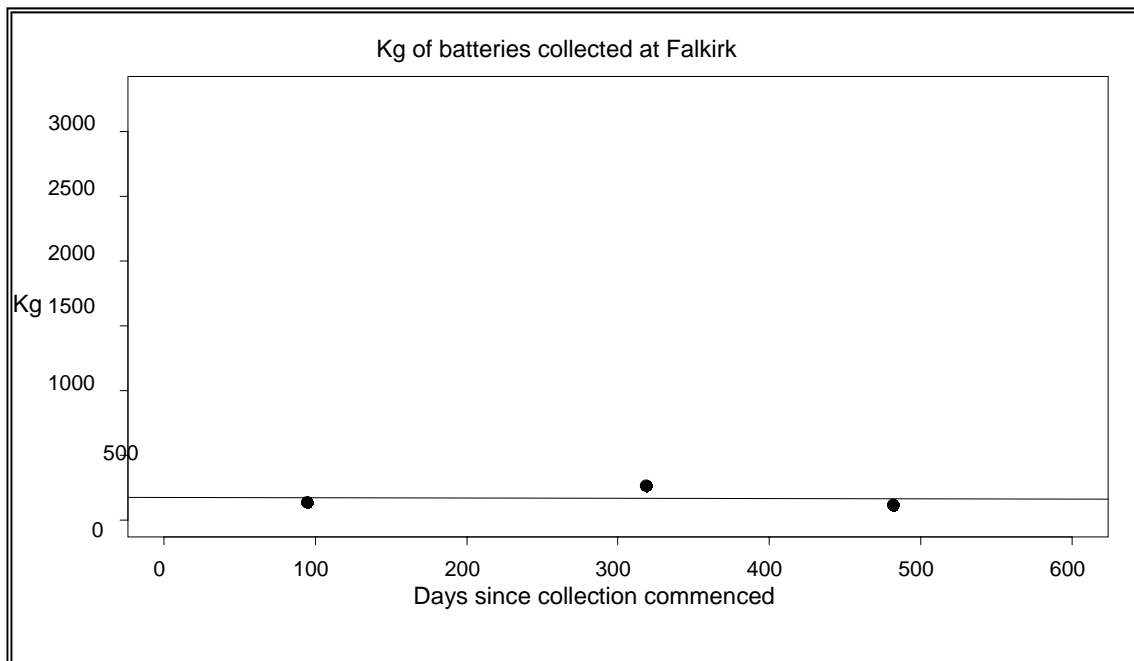
There have been 8 collections and this trial has shown a decline in collection rates. There have been some external factors for this in that 2 of the rounds for collections stopped during the project and a bring bank scheme was set up instead to continue to provide a route for householders previously on kerbside collections to recycle their batteries. The batteries collected through the bring bank were still included in the collection rates, but the reduction in service level could have affected the collection rate.

**Figure 11** Kg of batteries collected from 70,000 households in rural Aberdeenshire



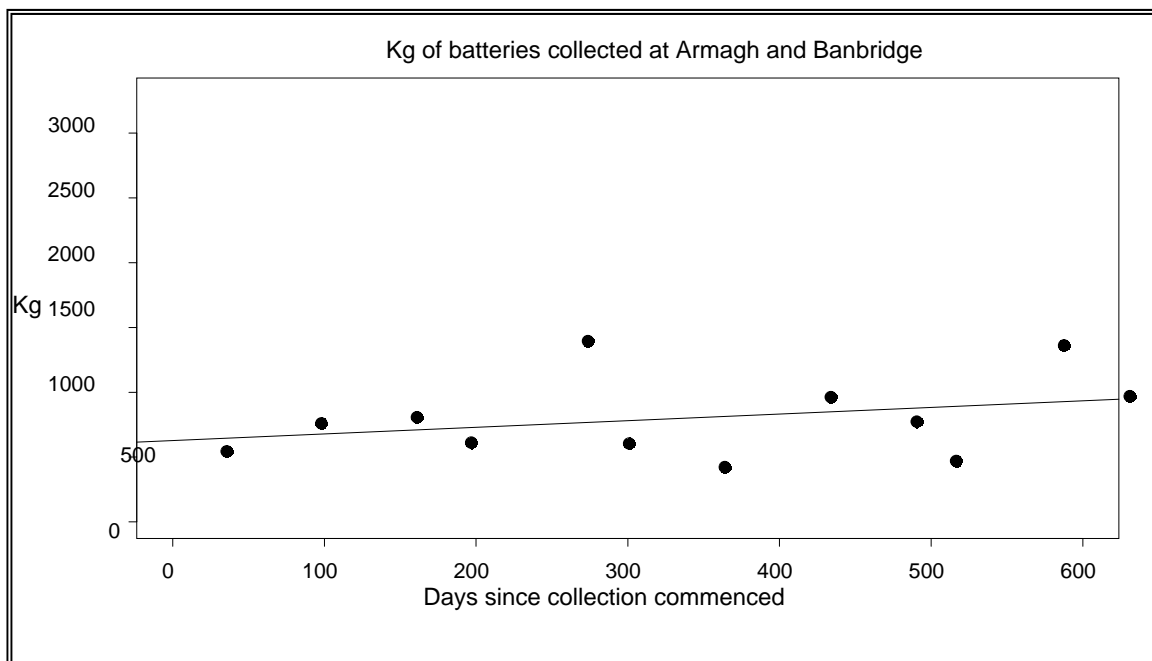
There have been 14 collections and has a relatively high collection rate from the outset but also has a steady growth, which in part reflects the fact that this scheme was rolled out in three phases. This scheme also provides drop-off points for those householders not served by the kerbside battery collection scheme.

**Figure 12** Kg of batteries collected from 3,000 households in a small tenement area in Falkirk



There have only been 3 collections and shows a low and static collection rate from a very small scheme.

**Figure 13** Kg of batteries collected from 36,000 households in Armagh and Banbridge



There have been 11 collections in total and has a high rate of collection to begin with and shows steady but shallow growth.

### Harlow & Epping Forest

The initially small scheme in Harlow was expanded to cover the whole district and extended in to the neighbouring district of Epping Forest where ECCO also operate "TextBac" their kerbside textile collection

scheme. However due to the huge change in the number of households involved in this scheme, any growth curve would provide little useful information and therefore no such curve has been produced.

### 3.2 Retail Take Back Trials

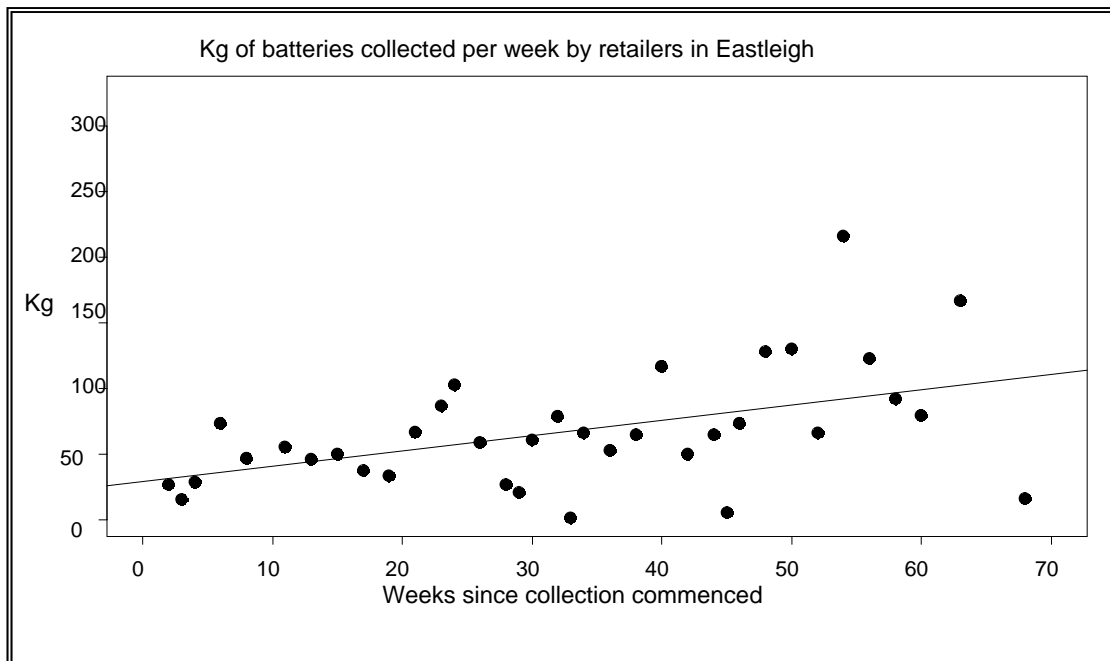
These following charts demonstrate the growth of the batteries collected through the retailers in each of the three location areas, Eastleigh, Perth and Kinross and Swansea. Two out of the three areas show a growth in the collection rates.

Perth and Kinross shows the highest initial collection rate to begin with at approximately 150kg. However this also shows the sharpest decrease, this could be explained by an initial hoarding effect, where people get rid of their stored unwanted or used batteries, but an incline after an initial dip would be expected. Perth and Kinross received the same on going press coverage for the trial but did not have the two large promotion pushes that Swansea and Eastleigh had during the first year. Though it is difficult to state if this is a significant factor it could have contributed to the decline. It should be noted that the end of the curve is at approximately 80kg and so only slightly behind Eastleigh's growth curve.

Swansea has had the most dramatic increase in batteries collected, but had a much lower starting point.

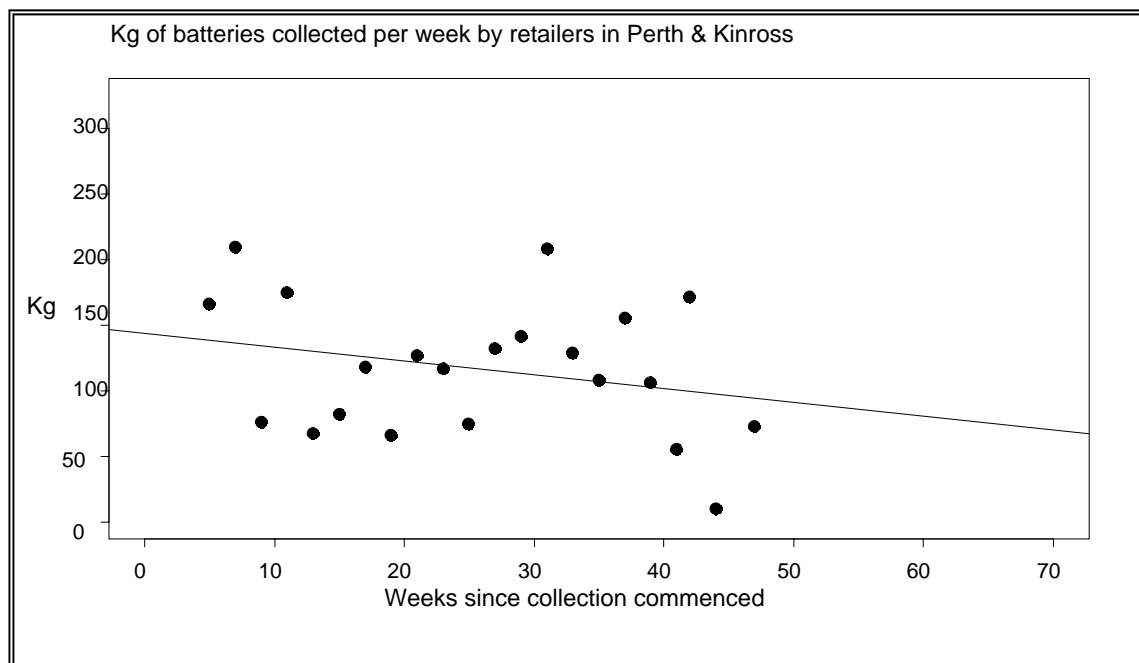
The second set of graphs show the same data but for weekly average collections.

**Figure 14** Kg of batteries collected by 13 retailers in Eastleigh



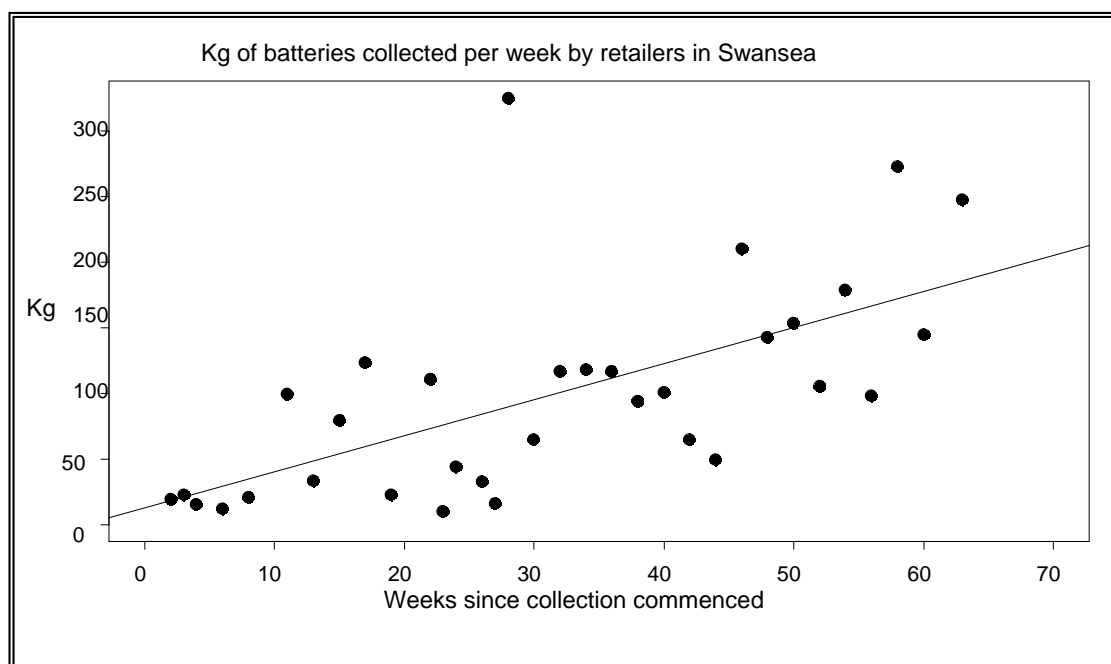
Each data point represents the total kg collected during one week (by one or more retailer) with the linear trend of kg collected over time represented by the straight line.

**Figure 15** Kg of batteries collected by 9 retailers in Perth



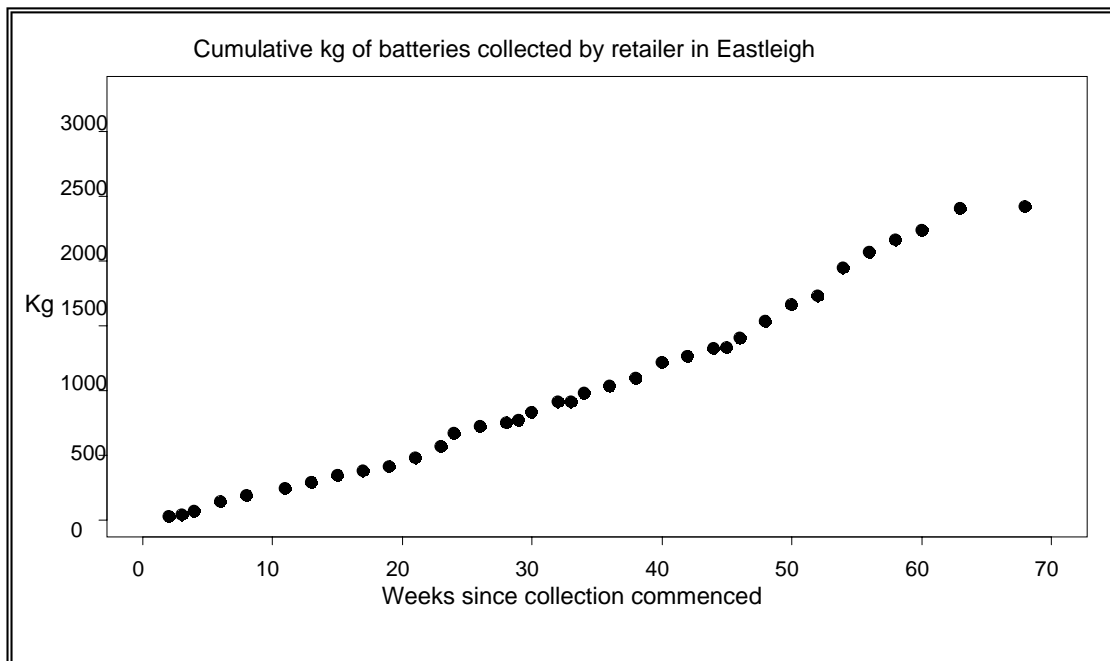
Each data point represents the total kg collected during one week (by one or more retailer) with the linear trend of kg collected over time represented by the straight line.

**Figure 16** Kg of batteries collected by 11 retailers in Swansea



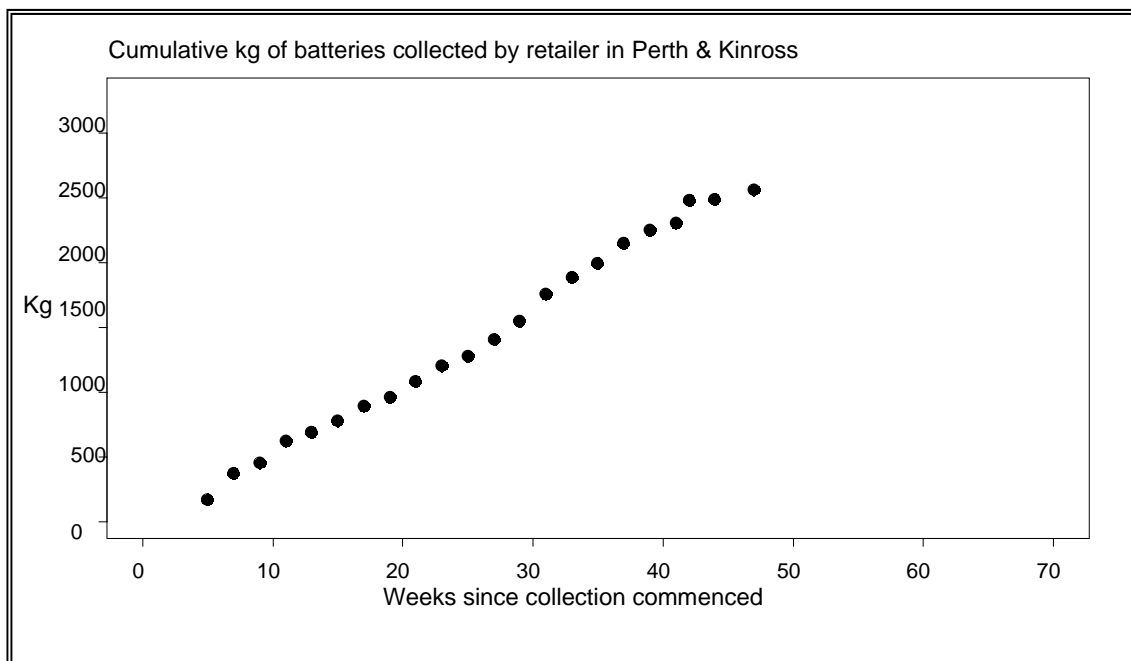
Each data point represents the total kg collected during one week (by one or more retailer) with the linear trend of kg collected over time represented by the straight line.

**Figure 17** Kg of batteries collected by 13 retailers in the Eastleigh area



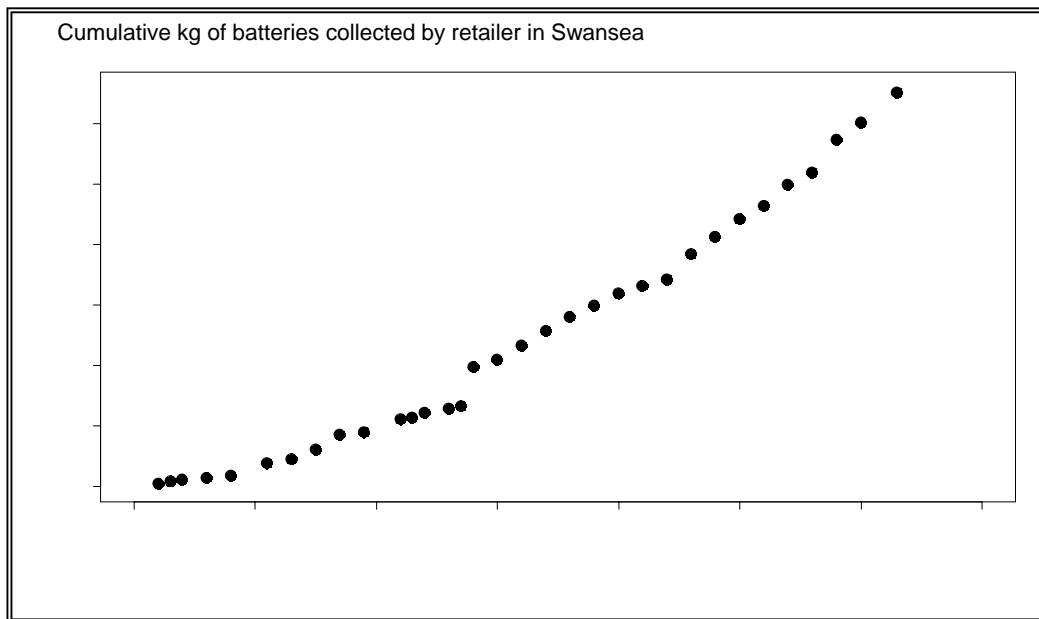
Each data point represents an additional weeks worth of collections (where more than one retailer may have contributed to the kg collected in that week).

**Figure 18** Kg of batteries collected by 9 retailers in the Perth area



Each data point represents an additional weeks worth of collections (where more than one retailer may have contributed to the kg collected in that week).

Figure 19 Kg of batteries collected by 11 retailers in the Swansea area



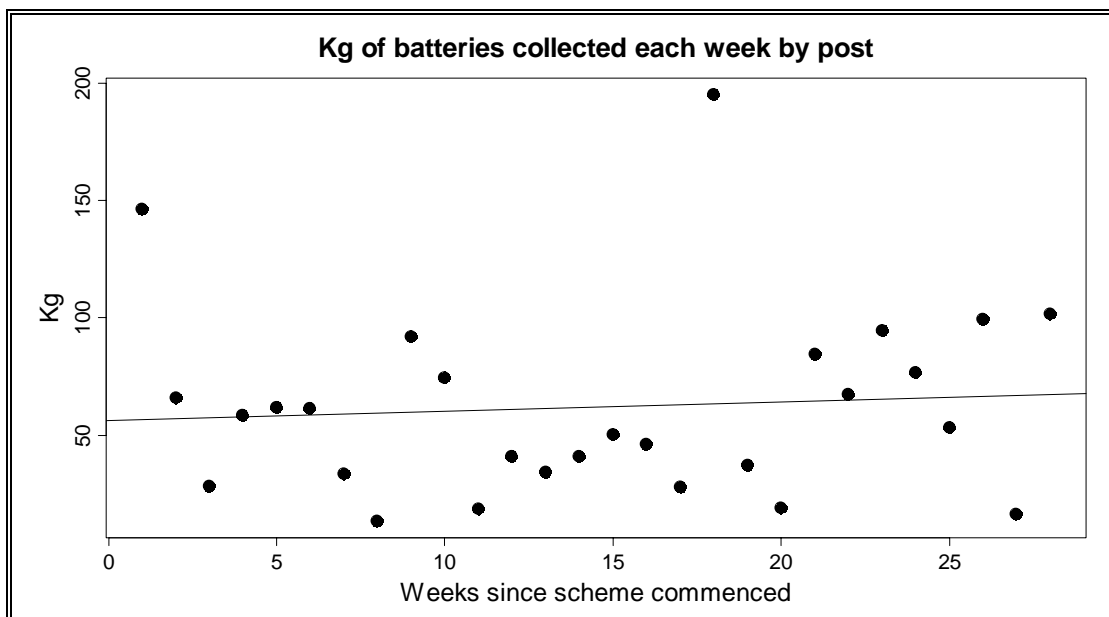
Each data point represents an additional weeks worth of collections (where more than one retailer may have contributed to the kg collected in that week).

### 3.3 Postal Trial

The data collated on the postal trials was done by using the average weight of the envelopes logged and weighed as they came through the Royal Mail system. As G&P Batteries Ltd had only made 5 collections in total there was not enough data to provide accurate information from that source.

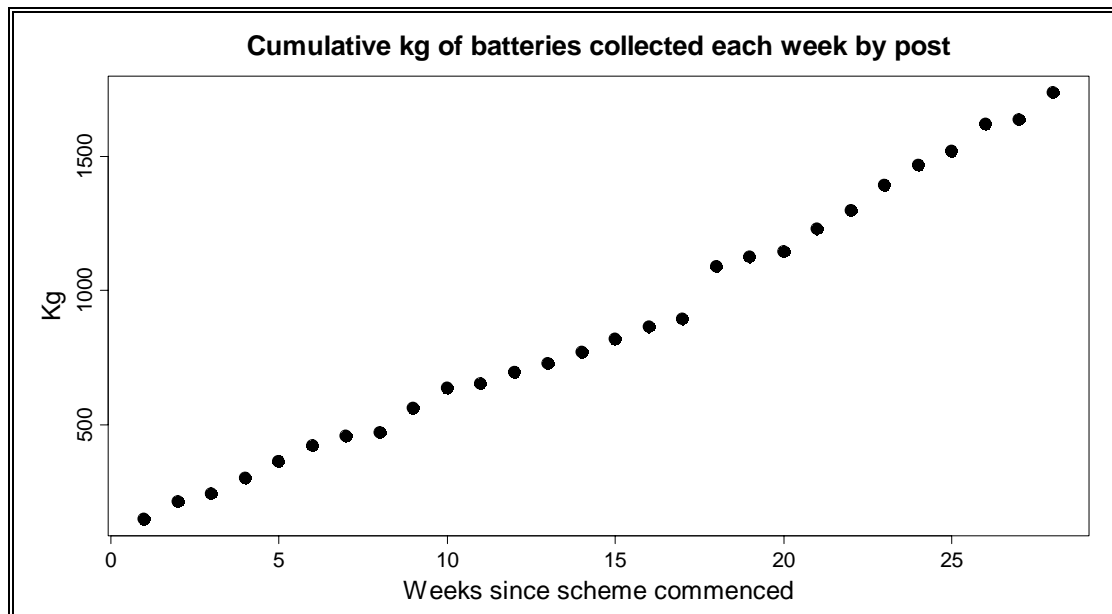
The chart shows that there has been a very small growth increase in collections over the time period monitored. There are some high collections on a couple of weeks and these are spikes after a postal strike and after Christmas when a rise was expected as there had been no service for a couple of days.

Figure 20 Kg of batteries collected per week through the postal scheme



The weight of batteries is taken as the mid point of postal weight range categories. The straight line represents the linear trend of Kg collected over time.

Figure 21 Cumulative kg collected each week through the postal scheme



Each point represents an additional week's contribution. The weight of batteries is taken as the mid point of postal weight range categories.

## 4.0 Cost Analysis

### 4.1 Approach used for analysis

This section deals with the breakdown of costs that have been incurred by WRAP in running the trials. This is NOT the same as it would cost to run such schemes on a nationwide basis. This is because, due to the very nature of trials, WRAP has paid premiums in some instances , for example for:

- The production of bags & boxes which were made on a “short run” basis, using 100% recycled materials (where possible);
- Distribution systems and timings, and therefore the costs incurred, were significantly skewed to suit needs of the trials and NOT of cost-efficiencies;
- Some crew costs were high due to the choice of locations for the trials which included hard-to-reach properties and the need to assess the amount of additional time taken by crews in undertaking battery collections;
- High sorting and recycling costs due to need for extra data capture and the small total (UK) tonnage of portable batteries which imposes higher costs.

It can be assumed that many costs would be reduced if battery collection schemes were rolled out nationally as economies of scale would be seen. With this in mind, various quotes were obtained from existing suppliers. Based on these quotes, the table below provides the estimated reductions in the applicable cost groups.

Cost Groups	Percentage Reduction
Promotional materials	47%
Production of Bags/Boxes	45%
Sorting & Recycling (cost per tonne)	29%

The total spend across the programme covering the period April 2006 – March 2008 is just over £1.3 million, this is for all the trial schemes. All Year 1 costs deal with the period of time from 1st April 2006 – 31st March 2007 but also include any costs incurred for the set up of the trials that took place prior to April 2006. All Year 2 costs relate to spend during the period 1st April 2007 – 31st March 2008.

Year 1 costs were £713,951 and Year 2 costs were £588,052

For analysis the costs were broken down into the following categories and definitions:

#### ■ Collection Crew Costs

Costs associated with the kerbside collection of batteries and internally provided crew training directly related to battery collection.

#### ■ Distribution of kerbside Bags/Boxes

Any costs associated with distributing the kerbside bags and boxes to partner organisations and the subsequent delivery to householders.

#### ■ Production of kerbside Bags/Boxes

The costs associated with the development and production of bags or boxes used in the kerbside schemes.

#### ■ Distribution of Bags/Boxes – not kerbside

Costs associated with the distribution of bags and boxes to the non-kerbside schemes.

#### ■ Production of Bags/Boxes - not kerbside;

Costs associated with the production of bags and boxes to the non-kerbside schemes.

#### ■ Licensing

Costs associated with issuing Hazardous / Special Waste consignment notes and registration as Producers of Hazardous Waste

#### ■ Communications

Costs associated with communication activities including agency overheads and local activity but not production of leaflets as this is production of promotional material.

#### ■ Production of Promotional Material

Costs associated with production of posters leaflets, torches, T-shirts, use of the "Can Car", signage etc.

#### ■ Programme costs

Costs associated with the overall collection programme e.g. H&S Audit, market research, development of branding and focus groups.

#### ■ Project Management

Project management costs incurred by the partner organisations.

#### ■ Sorting and Recycling

Costs associated with the sorting and recycling of batteries at the recycling company.

#### ■ Transport – long haul

Transport costs associated with the movement of batteries from bulking-up points through to the sorting & recycling company.

#### ■ Transport - short haul

Specific costs incurred due to smaller 'milk round' collections and bulking in rural areas and Royal Mail postage costs.

#### ■ Vehicles

Costs associated with alterations to vehicles and vehicle hire.

#### ■ Containers

Costs associated with tubes and "WASP" (specialised boxes for small collections such as local ward collections for the NHS and Fire Service Trial) and pallet boxes.

All costs were also categorised as either an ongoing cost or a trial (set up) cost. An ongoing cost was deemed to be a cost which will be incurred more than once in the trial period. A trial cost is a cost associated with setting up and establishing an effective collection scheme.

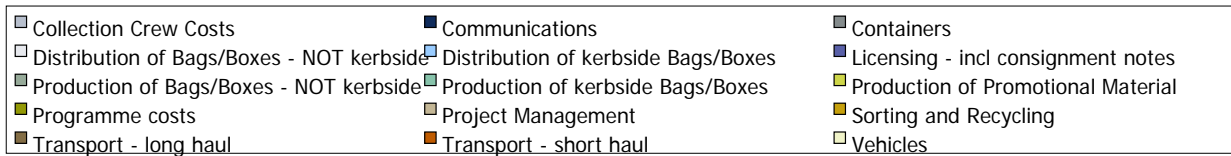
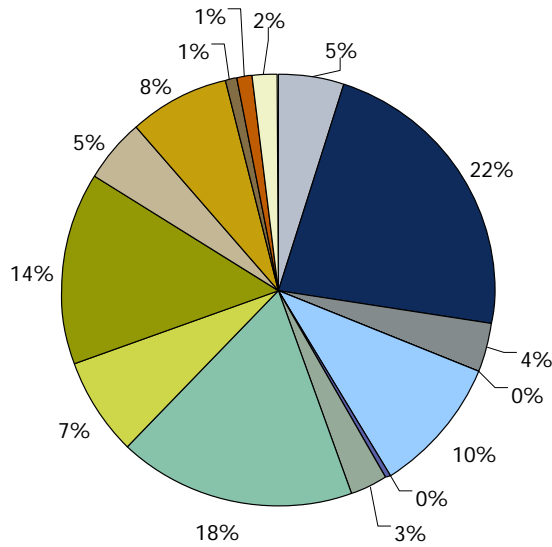
Programme costs were divided equally across all the schemes as they all benefited from the work that was undertaken provided there were other costs incurred during that Year.

WRAP's staff and overhead costs are not included in the analysis of costs.

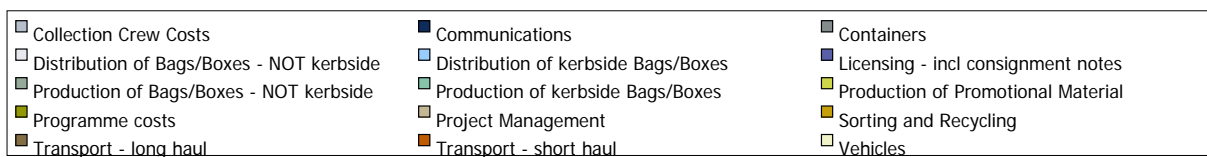
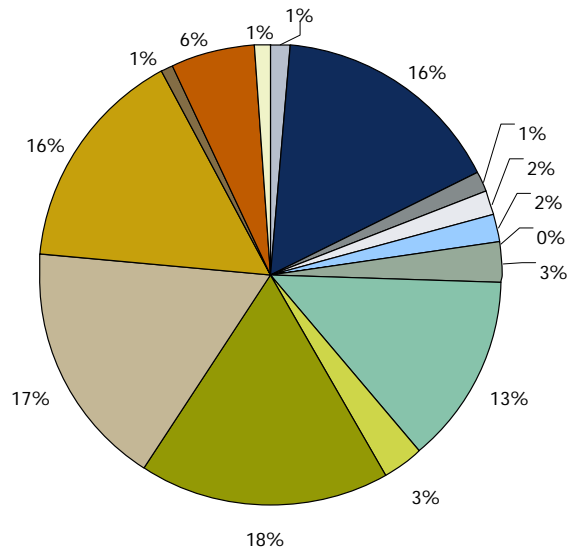
## 4.2 Overall Cost breakdown

The schemes run by the Community Waste Sector (Third Sector Organisations) are operated either directly or under contracts with the relevant local authority. The costs for these schemes have been shown separately from schemes run directly by local authorities because there are significant differences in the level of costs paid by WRAP for these schemes. The key differences are in the areas of crew collection costs and project management. These are significantly lower for local authorities which might be due to the terms of existing contracts with collection organisations or due to "job and finish" payment schemes for crews where a certain amount of additional crew time can be absorbed within the working day. It is understood that the full local authority costs have not been charged to WRAP while in general, and for understandable reasons, the community waste sector costs have been, particularly in areas such as project management. However, it is important to appreciate that whilst some local authorities chose to absorb some of the additional costs of introducing batteries to kerbside collection schemes in the course of these trials this would not be the case for all local authorities. Indeed there may be hidden "opportunity" costs for local authorities in terms of other activities which could not be undertaken and allowances for this must be made in any future negotiations to determine a "standard" value for local authority reimbursement and in comparing in-house and VCS options.

### 4.2.1 Year 1 Costs



### 4.2.2 Year 2 Costs



#### 4.3 Breakdown of the total ongoing and set up costs (£) in Year 1 and Year 2

<b>ONGOING COSTS</b>	<b>Year 1</b>	<b>Year 2</b>
Kerbside – CS*	211,688	145,924
Kerbside – LA*	207,941	141,113
Retailer collection	54,059	96,369
Community drop-off	12,860	39,263
Postal	14,151	21,964
NHS/Fire service	n/a	16,731
<b>Total</b>	<b>500,699</b>	<b>461,364</b>

It should be noted that the Ongoing Costs are higher for Year 2 than Year 1 in all but the kerbside schemes because the kerbside scheme launched at the beginning of Year 1 but the other schemes either launched towards the end of Year 1 or in Year 2, meaning that fewer Ongoing Costs were incurred in Year 1.

<b>SET UP COSTS</b>	<b>Year 1</b>	<b>Year 2</b>
Kerbside – CS*	69,877	27,003
Kerbside – LA*	63,928	26,363
Retailer collection	51,202	24,230
Community drop-off	23,303	15,947
Postal	5,123	21,523
NHS/Fire service	n/a	17,082
<b>Total</b>	<b>213,252</b>	<b>132,147</b>

#### 4.4 Breakdown of the total ongoing and set up costs (£) in Year 1 and Year 2 Kerbside – Local Authority Costs and Community Sector Costs

	<b>Year 1</b>	<b>Year 2</b>
<b>Community Scheme Kerbside Costs</b>	<b>Community Schemes Kerbside Costs</b>	<b>Community Schemes Kerbside Costs</b>
Collection Crew Costs	35,684	3,051
Communications	53,258	24,411
Containers	2,576	366
Distribution of kerbside Bags/Boxes	28,032	6,289
Licensing	1,763	0
Production of kerbside Bags/Boxes	46,871	31,844
Production of Promotional Material	3,252	1,076
Programme costs	48,757	27,603
Project Management	33,931	92,273
Sorting and Recycling	19,436	17,231
Transport - long haul*	2,087	1,551
Transport - short haul*	0	0
Vehicles	5,919	2,602
<b>Total</b>	<b>281,565</b>	<b>208,297</b>

- These include the consignment note costs

Costs are lower in the second year which is to be expected. Costs were renegotiated with the partners to take account of the increased level of knowledge and experience of the requirements of running a collection scheme for batteries.

The collection crew costs in the second year are significantly lower in Year 2 as some of these costs have been transferred to project management costs, so when looking at crew collection costs this should be taken into consideration.

	<b>Year 1</b>	<b>Year 2</b>
<b>Local Authority Kerbside Costs</b>	<b>Local Authority Schemes Kerbside Costs</b>	<b>Local Authority Schemes Kerbside Costs</b>
Collection Crew Costs	71	4,981
Communications	52,790	19,705
Containers	3,607	387
Distribution of kerbside Bags/Boxes	44,512	5,335
Licensing	0	0
Production of kerbside Bags/Boxes	79,224	46,112
Production of Promotional Material	12,291	4,398
Programme costs	30,473	22,503
Project Management	0	0
Sorting and Recycling	33,309	58,070
Transport - long haul	2,550	3,290
Transport - short haul	5,875	0
Vehicles	7,168	4,269
<b>Total</b>	<b>271,869</b>	<b>169,051</b>

There is a significant decrease in the costs for distribution of kerbside bags and boxes in Year 2. This is because after the initial large distribution in Year 1 another such distribution was not needed until Year 3.

#### 4.5 Retailer Take-back Costs

	<b>Year 1</b>	<b>Year 2</b>
<b>Collection Scheme</b>	<b>Retailer Collection Costs</b>	<b>Retailer Collection Costs</b>
Communications	38,630	24,461
Containers	7,411	2,661
Licensing – inc consignment notes	432	162
Distribution of Bags/Boxes	0	827
Production of Bags/Boxes	8,444	10,556
Production of Promotional Material	36,357	1,774
Programme costs	8,866	12,970
Project Management	0	0
Sorting and Recycling	1,462	12,948
Transport - short haul	3,478	17,294
<b>Total</b>	<b>105,079</b>	<b>83,653</b>

<b>Collection Scheme</b>	<b>Year 2 Average cost per participating store</b>
Communications	741
Containers	81
Licensing – inc consignment notes	5
Distribution of Bags/Boxes	25
Production of Bags/Boxes	320
Production of Promotional Material	54
Programme costs	393
Sorting and Recycling	392
Transport - short haul	524
<b>Total</b>	<b>2,535</b>

The changes between Year 1 and Year 2 costs for the retailer take-back scheme are as expected with less set-up costs, such as promotional material costs, containers etc. and more expenditure on sorting and recycling and the transport of the batteries. If reverse logistics were to be implemented then there would be an increase in “set-up” costs for this arrangement but an overall cost reduction should be seen as the transport costs would be cheaper. The regulations concerning the transporting of hazardous wastes are a significant barrier to back haul logistics for battery collections.

#### 4.6 Community Drop-off Costs

<b>Collection Scheme</b>	<b>Year 1 Community drop-off Costs</b>	<b>Year 2 Community drop-off Costs</b>
Collection Crew Costs	0	192
Communications	12,652	10,108
Containers	12,222	3,931
Production of Bags/Boxes	2,124	0
Production of Promotional Material	141	4,374
Programme costs	8,866	12,718
Project Management	0	9,644
Sorting and Recycling	0	5,820
Transport - long haul	0	360
Transport - short haul	0	7,887
Vehicle alterations	159	176
<b>Total</b>	<b>36,164</b>	<b>55,210</b>

Many of the costs fall into Year 2 as most of the activity occurred in this period. With costs such as project management costs these were only paid for the schemes in Cherwell and Falkirk because the collection contract let by the London Borough of Camden for servicing their bring bank network required the contractor to absorb the costs into their ordinary collection costs for any additional materials collected at these sites. The short haul costs have been incurred entirely by the Cherwell trial and their local collections.

#### 4.7 Postal Costs

Collection Scheme	Year 1	Year 2
	Postal Costs	Postal Costs
Communications	4,028	9,983
Distribution of Bags/Boxes	0	8,498
Production of Bags/Boxes	9,036	0
Production of Promotional Material	300	3,847
Programme costs	5,911	9,429
Project Management	0	0
Sorting and Recycling	0	2,879
Transport - long haul	0	281
Transport - short haul	0	8,448
<b>Total</b>	<b>19,275</b>	<b>43,487</b>

Costs have significantly increased in Year 2 as this is when the majority of the activity took place (June 2007 start) and only the set up costs fell into Year 1. The pattern of costs is as expected with a decrease in distribution costs and an increase in transport (postage), sorting and recycling costs.

#### 4.8 NHS and Fire Service Costs

Collection Scheme	Year 2
	NHS/Fire service
Communications	8,239
Containers	244
Distribution of Bags/Boxes	461
Production of Bags/Boxes	5,679
Production of Promotional Material	1,590
Programme costs	16,958
Project Management	0
Sorting and Recycling	548
Transport - long haul	94
<b>Total</b>	<b>33,813</b>

There are no Year 1 costs.

#### 4.9 Costs per kilogramme of Batteries Collected

This section looks at the costs per kilogramme of batteries collected, as well as the average cost per household. It is not appropriate to examine the NHS/fire service trials on the basis of households served as this scheme is not related to households served.

Household numbers for Harlow and Epping Forest have been averaged to allow for the much smaller trial area for the first six months of Year 2. Similarly the household numbers for Liverpool have been averaged over a full year (although the trial ceased approximately midway through Year 2).

The collection schemes varied greatly in terms of the number and types of households and geographical areas covered. The following table gives further details of the number of households in each of the geographical areas and the number of batteries collected, in order to calculate the average kilograms of batteries collected per household. It also gives the total cost for each area (including the relevant proportion of the All Scheme and All Kerbside costs) and the average cost per household per area.

The cost per household (per 1000 households) per scheme is dealt with later in this report.

**Figure 22** Kilograms of batteries collected per household and average cost per household in each of the trial areas in Year 2

Collection Scheme	Area	Number of Households in Year 2	YEAR 2 Total kg batteries	Year 2 - Kg Batteries per Household	YEAR 2 Total Cost	Year 2 - Average Cost per household
Kerbside - CS	Armagh & Banbridge	36,000	4,944	0.137	33,316	0.93
Kerbside - CS	Caerphilly	16,000	1,282	0.080	13,241	0.83
Kerbside - CS	Calderdale	25,800	3,404	0.132	25,202	0.98
Kerbside - CS	Falkirk	3,000	112	0.037	22,109	7.37
Kerbside - CS	Harlow & Epping Forest*	35,250	1,729	0.049	89,598	2.54
Kerbside - CS	Liverpool**	25,000	299	0.012	9,783	0.39
Kerbside - CS	Trafford	7,000	898	0.128	14,853	2.12
Kerbside - LA	Aberdeenshire	70,000	14,179	0.203	22,223	0.32
Kerbside - LA	East Devon	61,000	8,325	0.136	29,747	0.49
Kerbside - LA	Eastleigh	48,000	8,380	0.175	29,374	0.61
Kerbside - LA	Stockton-on-Tees	75,000	6,049	0.081	26,246	0.35
Kerbside - LA	St Edmundsbury***	42,000	6,936	0.165	61,462	1.46
Retailer collection	Eastleigh	48,000	2,158	0.045	27,567	0.57
Retailer collection	Perth	58,300	3,125	0.054	28,252	0.48
Retailer collection	Swansea	94,400	3,216	0.034	27,834	0.29
Postal	Cumbria (Eden)	24,600	1,686	0.069	25,747	1.05
Postal	Dumfries & Galloway	13,500	1,035	0.077	17,739	1.31
Community drop-off	Cherwell	57,200	3,078	0.054	18,673	0.33
Community drop-off	Camden (London)	97,247	2,225	0.023	13,122	0.13
Community drop-off	Falkirk	67,000	440	0.007	23,415	0.35
NHS - Fire service	Craigavon NHS	n/a	427	n/a	7,198	
NHS - Fire service	East Berkshire NHS	n/a	176	n/a	8,625	
NHS - Fire service	Trafford NHS	n/a	no data	n/a	7,396	
NHS - Fire service	Dumfries & Galloway	n/a	207	n/a	10,593	

\* Household numbers for Harlow and Epping Forest have been averaged as a result of the trial expansion, i.e. six months at 6,000 (Harlow) and six months at 64,500 household numbers (Harlow and Epping Forest)

\*\* Liverpool community run scheme ceased in August 2007 (i.e. midway through the 2nd quarter of Year 2)

\*\*\* Only 6 months of operations

There is a huge variation in the cost per household, especially within the kerbside collection trials. This is largely due to the diverse nature of the schemes in terms of their size and the housing stock served. There is also a significant difference between the costs charged by the scheme to WRAP by local authorities and community

waste sector organisations. CS organisations are unable to absorb extra costs, for example for additional management or crew time whereas some local authority contracts are operated under a “job and finish” regime where crews are not paid for the exact hours worked and some flexibility is built in to their working day. In the case of Falkirk, for example, the housing stock served by the kerbside scheme is high-rise and tenement properties and a door-to-door service involves extra crew time to go up and down the building and along each landing.

**Figure 23** Average cost per kilogramme of batteries collected and recycled

<b>Year 1</b>	<b>Total Cost (Ongoing and Set up) (£)</b>	<b>Total Weight of Batteries Collected (kg)</b>	<b>Average Cost per kg of Batteries Collected (£/kg)</b>
<b>Collection Scheme</b>			
Kerbside - CS	281,565	13,687	21
Kerbside - LA	258,307	21,324	12
Retailer collection	105,079	1,037	101
<b>Year 2</b>	<b>Total Cost (Ongoing and Set up) (£)</b>	<b>Total Weight of Batteries Collected (kg)</b>	<b>Average Cost per kg of Batteries Collected (£/kg)</b>
<b>Collection Scheme</b>			
Kerbside - CS	208,297	12,666	16
Kerbside - LA	169,051	43,869	4
Retailer collection	83,653	8,499	10
Community drop-off	55,210	5,742	10
Postal	43,487	2,721	16
NHS - Fire service	33,813	809	42

This table shows the average ongoing costs per Kg of collected batteries for each of the collection scheme types and for each of the different cost groups in Year 1 and Year 2. Again as the NHS/Fire service scheme is not household focused there is no relevant data available. These costs were calculated by taking the ongoing costs per household for each type of collection scheme, and subdividing them further by the different cost groups. The relevant proportion of the All Scheme and All Kerbside costs were also included.

**Figure 24** Average ongoing costs per 1000 households in £ for the five different types of collection scheme for Year 1 and Year 2

<b>Year 1 †</b>	<b>Kerbside - LA</b>	<b>Kerbside - CS</b>	<b>Retailer collection</b>	<b>Community drop-off</b>	<b>Postal</b>
<b>Cost Group</b>					
Collection Crew Costs	0.00	280.10	n/a	0.00	n/a
Containers	6.02	20.22	14.76	9.97	0.00
Distribution of kerbside Bags/Boxes	136.66	173.31	n/a	n/a	n/a
Licensing - inc consignment notes	0.00	0.00	2.15	0.00	0.00
Communications	217.82	175.26	171.35	47.93	45.09
Production of Bags/Boxes - not kerbside	n/a	n/a	0.00	8.97	225.15
Production of kerbside Bags/Boxes	295.65	353.28	n/a	n/a	n/a
Production of Promotional Material	6.72	1.94	62.23	0.64	7.87
Programme costs	13.84	13.84	13.84	13.84	13.84
Project Management	0.00	249.21	0.00	0.00	0.00
Sorting and Recycling	124.60	152.56	7.28	0.00	0.00
Transport - long haul	9.54	16.38	0.00	0.00	0.00
Transport - short haul	21.98	0.00	17.33	0.00	0.00
Vehicles	0.00	24.14	0.00	0.00	0.00
<b>Average Total Cost</b>	<b>832.83</b>	<b>1,460.24</b>	<b>288.94</b>	<b>81.35</b>	<b>291.95</b>

<b>Year 2 Cost Group</b>	<b>Kerbside – LA</b>	<b>Kerbside – CS †</b>	<b>Retailer collection</b>	<b>Community drop-off</b>	<b>Postal</b>
Collection Crew Costs	0.00	22.51	n/a	0.86	0.00
Communications	57.20	180.09	121.88	44.32	192.89
Containers	1.31	2.70	5.45	3.11	3.20
Distribution of Bags/Boxes - not kerbside	n/a	n/a	4.12	0.00	42.58
Distribution of kerbside Bags/Boxes	16.67	46.40	0.00	0.00	0.00
Licensing - inc consignment notes	0.00	0.00	0.81	0.00	0.00
Production of Bags/Boxes - not kerbside	n/a	n/a	52.60	0.00	0.00
Production of kerbside Bags/Boxes	134.90	234.93	n/a	n/a	n/a
Production of Promotional Material	13.69	7.29	8.65	19.58	27.15
Programme costs	1.94	5.07	2.97	1.55	6.01
Project Management	0.00	680.73	0.00	43.55	0.00
Sorting and Recycling	196.18	127.12	64.51	26.28	75.56
Transport - long haul	11.11	11.44	0.00	1.62	7.36
Transport - short haul	0.00	0.00	86.17	35.61	221.73
Vehicles	14.42	19.19	0.00	0.80	0.00
<b>Average Total Cost</b>	<b>447</b>	<b>1,337</b>	<b>347</b>	<b>177</b>	<b>576</b>

\* Year 1 household numbers for Aberdeenshire have been averaged, as a result of the phased rollout which saw the number of households increase over the 12 month trial period

† Year 1 costs per 1000 households differ from those in the first report, as a result of an amendment to the participating household numbers

‡ Household numbers for two community run kerbside schemes have been averaged to allow for the expansion of the trial in Harlow to incorporate Epping Forest and the cessation of the trial in Liverpool midway through Year 2

The average ongoing costs in the last table have been calculated using the actual ongoing costs incurred by each of the collection schemes. An assumption could be made that if schemes were rolled out nationally, costs per household would reduce.

## 5.0 Success Factors

Key success factors for battery collection schemes

### 5.1 Kerbside schemes

#### Collection bags/boxes

WRAP recommends that specially designed collection containers are produced and distributed to each household in the scheme area for householders to store their used or unwanted batteries in, prior to putting them out for collection. Research undertaken by WRAP in 2005 highlighted that 88% of respondents said it would encourage them to recycle their household batteries if they had a special container in which to store their batteries.

WRAP has trialled both collection bags and collection boxes (both single use and reusable) for its kerbside collection trials. These containers make it easy for the collection crews to identify the batteries in kerbside boxes. However, anecdotal evidence shows that the bags are stronger and easier for crews to handle, especially in wet and cold conditions. It is recommended that branded clear-polythene collection bags are used as these can be produced at a much cheaper cost than boxes and they have a higher degree of weather-proofness. The bags should be made from recycled polythene that can also be recycled after use and this should be stated on the bag. Reusable bags have proved successful with at least one non-WRAP funded scheme (East Dorset DC) but the return of the emptied bags to their correct "owners" needs to be carefully managed.

Households should receive an adequate supply of bags at the beginning of the scheme and it is crucial that there is a mechanism in place for regular re-distribution (or a suitable alternative method for householders to obtain more bags) to ensure continued interest and participation in the scheme. It is pertinent that in independent householder research in the kerbside trial areas, commissioned by WRAP in 2007, 40% of respondents did not know where to obtain additional bags from if they had run out. In addition, approximately 56% of battery related calls to the WRAP helpline between November 2007 and January 2008 were requests for information about where the caller could get supplementary bags from. Therefore the method to get more bags should be clearly communicated to householders.

The method used to distribute bags to householders needs to be carefully managed by scheme operators. Where possible, and where appropriate, distribution should take place alongside other activities (for example newsletters, recycling calendars, etc.) to minimise cost and resources.

In time it might be possible to use alternative distribution systems such as point of sale dispensers where batteries are sold.

#### PR and Marketing

Promotion of a kerbside scheme should be undertaken on a local level, but it is recommended that any local promotion efforts are supported by a national campaign which clearly encourages battery recycling as a safe, easy and beneficial activity.

WRAP has developed a portfolio of branding and iconography for battery recycling that has been market tested and therefore WRAP recommends that this is utilised for all schemes – all can be licensed to organisations free of charge. In Scotland similar branding is available from the Scottish Waste Awareness Group ([www.wasteawarescotland.org.uk](http://www.wasteawarescotland.org.uk)).

For the WRAP kerbside trials, local activities such as syndicated features, supported by photo calls with key members of the local community (residents, school children, councillors, collection crews etc) have worked well. Using photography brings the schemes to life and saying 'thank you' goes a long way!

A major success factor for the WRAP trials has been the strong relationships forged with collection partners and the key local contacts such as local councillors and officers. For both local and national campaigns the messages need to be kept simple – that battery recycling is safe and easy.

It is, however, strongly recommended that in areas with limited media outlets over-communicating with the key audiences is avoided, so as to ensure budgets are spent wisely and create the highest possible impact. Careful planning is crucial to ensure features in the media are placed at the most appropriate times, for example to ensure they do not clash with other major promotions or local events.

## Crew/staff training

Collection crews, as well as any other members of staff that may need to answer questions by the public on the scheme, should to be fully briefed on the scheme. The most typical types of questions asked by the public have been found to be regarding:

- The types of batteries that can be recycled (chemistry and size)
- What happens to the batteries after they have been collected
- Whether electrical and electronic equipment containing batteries (for example mobile phones, shavers, electric toothbrushes etc) can be recycled through the scheme.
- Where householders can obtain more collection battery bags from

## Vehicles

Any vehicle involved in the transportation of batteries collected from the kerbside will need to have a separate, secure, compartment on the vehicle into which the bags of waste batteries can be placed. The exact specification and location of the container will depend on the nature of the scheme and the vehicle and should be decided by the scheme operator in conjunction with the crews.

The vehicle storage container must comply with regulations covering the carriage of Dangerous Goods.

## 5.2 Retail take-back schemes

### Head Office communication and buy-in

Participating stores should receive clear and timely communications from Head Office regarding the purpose of the scheme and its importance, as well as clear instructions on how the collection container and supporting promotional material should be used in store.

### Store engagement

Once communications have been received in stores from Head Office, it is essential that the store manager, or designated person, makes suitable arrangements for the information about the scheme and any launch event to be cascaded to all store staff.

It is also recommended that each store appoints a 'champion' (not necessarily from management), who is responsible for the maintenance and day to day promotion of the battery collection scheme. This could include ensuring that the collection tube is mounted correctly in store, ensuring that the container is being serviced frequently enough and briefing new staff members about the scheme. The use of champions would help raise the profile and success of the scheme amongst both staff and customers.

### PR and Marketing

WRAP commissioned a market research survey in a sample of the stores participating in the WRAP retail take back trials. Nearly half of respondents who had deposited waste batteries for recycling in-store stated that they first found out about the scheme through seeing information or the collection container in store. It is therefore essential that participating stores display in-store promotional material to promote the scheme.

The WRAP trials have demonstrated that activities involving promotional staff only work effectively in high footfall stores such as large supermarkets. A more cost effective method of promotion is to utilise the use of store staff in their daily activities, for example by talking to customers about the scheme if they are purchasing new batteries and using reminders on till displays to get staff to talk to customers about battery recycling.

Local press coverage involving the community or local high profile figures can be successful, but this should be supported with a national campaign to maximise the impact of such activities.

### Collection containers

It is essential for a collection container to be provided at each collection point location for householders to deposit their waste batteries into; however there are a number of factors that should be taken into account:

## Delivery

If containers and other promotional material for the scheme are to be delivered to the store via courier or other external method, a named contact for the store should be contacted prior to the container arriving so that they are aware it is coming and therefore to prevent it being discarded once received.

## Positioning

The container should be sited in a prominent, visible and easily accessible position for example at the store entrance (next to current in-store recycling facilities is ideal), whilst taking account of any health and safety issues such as tripping hazards, etc. Where possible, the position of the container should not be changed unnecessarily in order to minimise confusion for householders.

If an outdoor location is chosen, a suitable container should be chosen to minimise the risk of issues such as water ingress. Containers in outdoor locations should be firmly secured to the ground or a fixed structure to minimise the risk of theft and vandalism. Regular checks should be made on the container's condition and the need for emptying and loose batteries not put into the container.

## Servicing

The collection container will need to be serviced (i.e. emptied) regularly. The level of servicing should be balanced to ensure that the containers are emptied sufficiently frequently so that the public can see that their deposited batteries are actually being taken for recycling, whilst ensuring that they are not emptied too often which could give the impression that no-one is taking part in the scheme as the container would always appear to be empty. Cost will also impact on the frequency of servicing. The responsibility for the servicing will be a retailer decision in conjunction with any contracted organisations including any compliance schemes.

## Health and Safety

When the container is being emptied the normal level of care should be taken to ensure that any lifting of the removed batteries does not exceed safe manual handling limits. Mechanical handling assistance should be provided where possible.

## Transport and collection arrangements

Retailers will need to ensure that suitable arrangements are made for the batteries collected in store to be transported to a consolidation point, from where the batteries can be collected for sorting and recycling.

The exact nature of these arrangements will depend on the type, size and operational set up of the retailer and also on the individual arrangements the retailer makes with, for example, compliance schemes.

However there are broadly two methods available for transportation namely utilising the company's reverse logistics to 'back-haul' batteries to a regional depot systems or using a 3rd party contractor to collect the batteries from each store. Each one is dependant on the compliance with relevant legislation surrounding the transportation of mixed waste batteries, in particular the Hazardous Waste and Carriage of Dangerous Goods regulations.

### 5.3 Community drop-off schemes

#### Containers

An appropriate collection container needs to be provided at each collection point location for householders to deposit their waste batteries into. The container should be clearly branded, visible and accessible. It should also be sturdy enough for the relevant location and considerations such as waterproofing, tamper-proofing and preventing contamination by non-battery material need to be taken into account.

The size of the container should be large enough so as to not get 'lost' in locations such as household waste recycling centres and large on-street collections of bring banks, particularly as containers are a useful way of new audiences finding out about the scheme.

#### Servicing of containers

Servicing – the collection container will need to be serviced (i.e. emptied) regularly. The level of servicing should be balanced to ensure that the containers are emptied often enough so that the public can see that their deposited batteries are actually being taken for recycling, whilst ensuring that they are not emptied too

frequently which could give the impression that no-one is taking part in the scheme as the container might appear to always be empty.

Some container designs have limited apertures which do not allow large portable batteries (such as laptop and lantern batteries) to be deposited into the container and accordingly consideration will need to be given to the regular removal of any batteries and other waste not placed in to the container.

## **PR and Marketing**

Market research commissioned by WRAP in 2007 to establish the public's awareness of the WRAP battery trials in participating areas highlighted that awareness of the community take-back schemes was low (at around 32.7%) in comparison to kerbside and postal collection schemes (40.9% and 52.4% respectively). This is likely to be due to the fact that for both the kerbside and postal schemes a communication was sent directly to each household in the participating area, whereas for the community drop-off schemes communications were restricted to broader methods such as press editorial, newsletters and posters. This demonstrates the importance of the on-going promotion of the scheme through other methods, particularly as some of the collection containers for community drop-off schemes are situated in locations with a much lower level of footfall than similar retail take-back schemes.

### **5.4 Postal schemes**

#### **Postal envelopes**

Each household in the scheme area was provided with specially designed high-strength, self-seal plastic envelopes. The specification for envelopes used to send batteries back through the post for recycling matched the Royal Mail Special Delivery envelope specification. However for other schemes must agree the specification with the Royal Mail individually in advance. Mixed waste batteries are classed as Dangerous Goods and therefore need to be packaged in a certain way to meet the legislation regarding the transportation of such batteries. The size must be limited to ensure that certain sizes of batteries, in particular lead-acid batteries, cannot be placed in the envelope. It must also be made of material strong enough to ensure that it does not tear in transit.

The envelopes should be pre-printed with the address where the battery envelopes need to be sent back to. The exact address will depend on the nature of the scheme. However WRAP recommends that a "Business Reply" address is used where possible as opposed to a Freepost address (both are free of charge to the end user) because this prevents unwanted items (such as large car batteries) being posted. The Business Reply service limit use to only those envelopes or stickers pre-printed with the address and account code.

As with the kerbside collection bags, it should be ensured that householders receive an adequate supply of envelopes bags and that a robust mechanism is in place for redistribution of the envelopes, which is clearly communicated to householders. In the WRAP trials sub-post offices held supplies of envelopes but other local shops, libraries (including mobile services) and council offices could be asked to host distribution points.

#### **PR and Marketing**

Awareness of the WRAP postal trials was relatively high according to the WRAP commissioned market research, at 52.4%. This is likely to be because an individual communication was sent to all households covered by the scheme along with the battery return envelopes. WRAP therefore recommends that this level of communication is undertaken for postal schemes.

For distance sellers, such as internet retailers or mail order companies, return envelopes could be provided with each order despatched.

#### **Consolidation points**

Provision needs to be made for batteries sent back through the post for recycling to be consolidated at a central location before onward transport for recycling. These arrangements ultimately need to be approved by the Royal Mail, and with the relevant environment agency, because they need to comply with the various legislative requirements surrounding Hazardous Waste and the Carriage of Dangerous Goods.

## 6.0 Legislative barriers

WRAP has faced a number of legislative constraints in the course of setting up and running the various collection trials. The trials were set up under existing legislation and do not take into account any changes to the law which might be made during the transposition of the Directive.

WRAP is grateful to colleagues from the Environment Agency, the Scottish Environmental Protection Agency, the Environment and Heritage Service in Northern Ireland, the Scottish Government and the Department for Transport for their help and assistance without which the trials would have been considerably more limited in scope.

Portable batteries use a variety of different chemistries. Some chemistries (Nickel Cadmium, Lead Acid and Mercury) are classified as Hazardous Waste (Special Waste in Scotland) and accordingly mixed battery waste, regardless of the quantities involved, is classified as Hazardous Waste under the European Waste Catalogue. Other chemistries (such as Lithium and Lead Acid) are classified as Dangerous Goods and mixed battery waste is therefore classified as Dangerous Goods. It should always be assumed that every collection of mixed battery waste contains these chemistries and therefore mixed collections should be considered as both Hazardous Waste and Dangerous Goods.

Legislation on Hazardous Wastes and the Carriage of Dangerous Goods pose their own issues in terms of the collection of waste batteries.

For example, in England Hazardous Waste legislation requires that each battery collection site should be registered as a producer of hazardous waste with the Environment Agency at a fee of £18 per site (on-line fee) and each movement of batteries (e.g. from a retail store to a depot) should be 'consigned' by a registered waste carrier and accompanied by Hazardous Waste Consignment Notes. There is a minimum fee payable of £10 per set of Notes, although individual collections of the same materials on a "milk-round" basis can be charged at £5 per additional site.

Different arrangements exist in Scotland and Northern Ireland and any organisations contemplating battery collections in Scotland or Northern Ireland should contact SEPA and the EHS to confirm the requirements of collecting and transporting mixed waste batteries in those jurisdictions.

In England the separate collection of domestic Hazardous Waste from the premises at which it is produced is permitted without the need for consignment notes under the Hazardous Waste (England & Wales) Regulations 2005 provided that the hazardous waste is separate(d) at the point of collection and that separation is maintained until it is delivered to a depot, treatment plant or sorting facility. Similar legislation exists in Wales, Northern Ireland and Scotland.

Carriage of Dangerous Goods legislation requires special arrangements for the packing and movement of mixed waste batteries. Normally mixed waste batteries must be treated as used lithium batteries and transported under UN codes 3090 and 3091 under full ADR regulations and all movements of full or partially full pallet boxes have been made under these codes and in compliance with full ADR rules.

However, applying this legislation to the movement of small loads of batteries between collection locations and bulking points, for example by reverse logistics implies a level of training and equipment which would make such transport costly and difficult. The Department for Transport issued an Authorisation (No 110 Rev) in July 2007 which permits the movement of small quantities of mixed waste batteries under less onerous conditions. However, these conditions must be met in full otherwise the full standard rules must be applied. Confirmation will be required from the Department for Transport that this Authorisation will continue to be available once the WRAP trials have been completed.

The conditions for the movement of small quantities of mixed (lithium containing) waste batteries are, inter alia, that the batteries must be contained a sealed plastic liner which must be contained in a drum and that the driver must have received, as a minimum, general awareness training.

Different rules may apply to carriage by road, air, rail and sea.

## Other issues

The WRAP trials were primarily focussed on batteries arising from households, although it is accepted that some batteries from businesses may have entered the collection schemes. The Batteries Directive does not distinguish between types of users of portable batteries and refers to them simply as “end-users”. UK waste legislations made significant distinctions between household waste and waste from commercial and industrial enterprises. It will be necessary to review a range of legislation surrounding waste management to ensure that the deposit of a battery into a container does not infringe the duty of care legislation (transfer notes) and does not impose additional bureaucracy and cost burdens on for example local authorities who operate collection schemes.

## 7.0 MRUK Householder Research 2007 summary

WRAP commissioned MRUK research to conduct a large scale survey on a statistically valid and representative sample of householders across all WRAP battery collection scheme areas. The aim of the research was to determine the awareness and householder views of the trial schemes.

The following schemes were covered by the research:

- Kerbside
- Community Drop-off
- Postal
- Retail Take-back

A total of 3,621 interviews were conducted with residents across the 4 schemes (including 21 different locations) during November and December 2007 in order to establish residents' use of, and satisfaction with, the battery collection schemes.

Interviews were conducted by trained and experienced MRUK interviewers using a both telephone (3,093 interviews) and face to face in-street (528 interviews) methodology.

### 7.1 Key results

Respondents were most likely to dispose of their household batteries as follows:

Kerbside collection:

- Put them out for recycling outside their home (38%)
- Put them in the bin with the other household rubbish (33.7%)

Community Drop-off:

- Put them in the bin with the other household rubbish (53.3%)
- Take them to a bring bank/recycling centre/civic amenity site (27.9%)

Postal:

- Put them in the bin with the other household rubbish (38%)
- Post them back (26%)

Retail take-back:

- Put them in the bin with the other household rubbish (53.5%)
- Take them to a bring bank/recycling centre/civic amenity (10.1%)

The postal and kerbside schemes had both the highest awareness (over 40%) and the highest reported actual usage (over 30%).

The retail take back scheme had both the lowest awareness (less than one-third) and lowest reported actual usage by respondents (less than 20%)

Respondents were most likely to use their scheme once or twice a year. Less than 20% used the schemes at least once a month.

A reasonably consistent number of batteries were reported recycled through each of the four schemes with less than half of scheme users recycling less than ten batteries per year. Kerbside and retail take-back scheme respondents recycled the most batteries while postal scheme respondents recycled the least, although it must be noted that at the time of the research the postal scheme had only been operating for a few months.

Four-fifths of respondents claimed to recycle all their batteries through their scheme. The kerbside scheme had the highest level of recycling all batteries (91.6%) while and retail take back scheme had the lowest level (82.7%).

Reasons given for not recycling all batteries through the scheme included the postal envelopes not being large enough, the kerbside scheme being stopped, collection points being too far away, other recycling method used and respondents not being bothered or forgetting to use the scheme.

Respondents within the retail take-back and kerbside scheme areas used bags and boxes to recycle their batteries. Bag and box usage was highest amongst kerbside users

The majority of respondents did not have any issues with the bags, boxes and envelopes. Suggested improvements included:

Postal:

- The need to state the quantity of batteries than can be recycled on the envelope and make them more available

Kerbside:

- Make them bigger and stronger and provide a better seal

Retail:

- Make them bigger and stronger and provide better lids

Over half of respondents knew where to get more bags / boxes.

Scheme satisfaction was extremely high across all four schemes; nine out of every ten users were either extremely satisfied or satisfied with the scheme:

- The kerbside collection scheme received the highest satisfaction rating (93.7%)
- Less than 4% of users were dissatisfied with the schemes

90% of all users rated the schemes as 'extremely easy' or 'easy' to use:

- The highest ease of use ratings were given to kerbside and postal schemes (both with over 96% ratings)
- Only 11 respondents rated any of the schemes as 'difficult' or 'extremely difficult' to use

The local council, leaflets and seeing the scheme in operation were most mentioned as places where respondents first found out about the scheme in operation in their local area.

Approximately one-quarter or less of all respondents stated that they would like more information on the battery scheme operating in their local area.

Postal and community drop-off schemes had the most respondents wanting further information. Respondents wanted further information on:

- General information on how the scheme operates
- Where to get special battery collection boxes / bags / envelopes
- Battery collection times / where to take batteries for recycling / collection points in area
- Types of batteries that can be recycled
- What happens to batteries after they are collected?

The preferred method of recycling was generally determined by what scheme was in current operation in the area and what recycling methods respondents were accustomed to:

- Kerbside collection was most preferred by 71.4% of current users and postal was most preferred by 36.3% of current users
- Community drop-off and retail take-back scheme users rated collection from outside their house as their most preferred method of recycling

Over 90% of respondents stated that general recycling is either very or fairly important to them.

Approximately three-quarters of respondents stated that they recycle if it requires additional effort while less than one-fifth recycle only if it does not require additional effort. Approximately 40% recycle everything that can be

recycled and 40% recycle a lot, but not everything that can be recycled. Less than 4% of respondents stated that they do not recycle anything.

## 7.2 Respondent demographics

Three-quarters of all respondents owned their own home, while less than one-fifth rented their home. Half of respondents lived in a semi-detached or detached house. A further 40% of respondents lived in a terraced house, a flat or maisonette or a bungalow.

Over one-fifth of respondents had lived in their current property for less than five years while the same number had lived there for over 21 years.

The sample consisted of more females than males (62.0% females and 36.8% males). 33.2% of respondents were aged 16 - 44 years, 55.5% were aged 45 - 74 years and 7.9% were aged 75 years or over. 88.3% of respondents identified themselves as White British.

## 8.0 Recommendations

The collection data and feedback from the householder survey clearly demonstrates that a mixture of collection options will be needed to achieve the 2012 and 2016 targets.

Local Authorities, whilst not legally obligated to participate in battery collection schemes, should be encouraged to add battery collections to their kerbside collections where this is contractually and physically practical as this has shown the best per capita collection rate. The trials have demonstrated that most types of kerbside collections, except survival bags, can collect batteries successfully.

However, local authorities must be fully reimbursed for all relevant additional expenditure, or in some cases opportunity costs. Alternatively a funding mechanism could be agreed which will allow them to decide whether or not to run battery collection schemes. One way in which this could be done would be to agree a "rate per tonne collected" through negotiations with LARAC, NAWDO and the local government associations. This payment would be made for all batteries collected from agreed depots.

Schemes need to be as easy and as simple as possible to encourage participation. All forms of communications to end users will need to be clear and have simple instructions.

A national awareness campaign is necessary to ensure the success of collection schemes. Local press releases are useful and personal but to build the momentum and awareness needed to meet the targets a national campaign will be needed.

For kerbside schemes specially designed and produced branded bags and boxes were distributed to householders. These containers perform the dual function of providing a storage place with the house and a containment device which is easy for the crews to separate and handle throughout the year. The bags and boxes also provide a means of providing instructional information.

However, the bags have proved much more successful than the boxes and so the recommendation is that bags, rather than boxes, be used for both practicality and cost.

Retail take-back proved an acceptable way to collect batteries due to the ease of accessibility; however it hasn't proved the most popular. For it to be successful retailers need to place more focus on the battery recycling facilities in the stores so that people become more aware of them. Store managers and staff need to be fully engaged with the message of recycling the batteries to promote it to customers.

Although relatively expensive to run and therefore not an appropriate collection method for all locations, the postal scheme has been found to be effective at collecting batteries from householders without adequate access to kerbside collection facilities or bring schemes. This collection method could also be extended for use in a number of other specific situations, for example for use by distance sellers of batteries (for example internet based retailers without a physical store presence) in order to fulfil their distributor take-back requirements.

A dedicated brand should be used across all types of schemes in all areas so that strong, cohesive and consistent messages are sent out to end-users whilst recognising the different recycling brands in each of the four nations of the UK.

Staff training needs to take place for schemes such as kerbside, retail take-back, community drop-off etc as this is a key element to getting the collection right. Staff guidance and a kick off meeting followed by regular updates is a good way of doing this. For retail take-back schemes, a "champion" should be appointed in each store, who would help with the smooth running of the scheme.

Containers for community drop-off trials need to be easy to use and empty but also in a visible place, and not "lost" amongst other much larger containers at bring bank sites or hidden away in the corner of shops.

A review of legislation covering such issues as waste transfer notes and the associated duty of care requirements, fees for Hazardous Waste Consignment Notes, the requirements of Dangerous Goods legislation etc is needed to allow all types of end-users to be able to make use of collection schemes without imposing additional burdens on end-users or scheme operators. This should be carried out during transposition and must be done in conjunction with all relevant regulatory authorities.

## 9.0 Other WRAP projects

In addition to the various collection trials, WRAP has also undertaken a number of other battery related projects. The majority are designed to remove some of the barriers to effective battery collection and also to improve the sorting and recycling infrastructure for batteries in the UK. Some of these projects include:

### Battery container project

Through its various collection trials, WRAP identified that there is not currently a battery collection container that is fit for purpose for use in a wide range of indoor and outdoor locations. WRAP published a tender invitation for the design and development of a new container based on the experiences of the trials. This contract was awarded to One 2 One Industrial Design Ltd. One 2 One I D Ltd have worked with the WRAP project team to design a new innovative battery collection container that meets a number of pre-defined requirements including weather-proofing and tamper-proofing. A final design has been produced and WRAP is currently working with the designers to identify how best to prototype the container, test it and ultimately get the product to market.

### “BattBox” project

In order to identify the how batteries could be collected from SMEs WRAP sponsored the launch of a commercial collection scheme run by G&P Batteries Ltd. The BattBox is a durable polypropylene container designed to store waste portable batteries on site which also acts as a reusable transport container. SME's pre-pay a fee of £25 plus VAT per box and once the box is full G&P Batteries Ltd collect the box and arrange for the batteries to be recycled.

### Generic risk assessment

A number of concerns were expressed to WRAP about the difficulties of collecting batteries in buildings and other public places. WRAP appointed a specialist contractor to develop a generic risk assessment for the collection of waste batteries in a variety of locations. Although this does not replace site specific risk assessments which should always be carried out by a competent person, this generic assessment is designed to assist with this process and provide general information on this topic.

The generic risk assessment will be made available of the WRAP website shortly.

### Small WEEE kerbside collection trial

WRAP has run a small scale kerbside collection trial of small Waste Electrical and Electronic Equipment (WEEE) items across 20,000 households in the St Edmundsbury Council Borough. The main objective of this project is to help investigate the potential for the recovery of batteries from WEEE and from small WEEE in particular which is not generally collected through CA sites. The number of items in each category have been counted and all batteries removed and sent for sorting and recycling. All the other materials in the WEEE are also being separated, analysed and then recycled. This work is not complete at the time of writing and will be published at a later date.

### London Theatres project

In partnership with the Greater London Authority WRAP has sponsored the creation of a small scale battery collection scheme in London's theatres. Theatres use many batteries in the course of their operations, for example in sound systems, microphones and usher's torches. Theatres have been provided with a collection tube or BattBox for theatre staff to deposit used batteries for recycling.

# Appendix 1a – Kerbside Bags



Bags for England and Wales

Bags for Scotland

# Appendix 1b – Kerbside boxes



# Appendix 1c – Kerbside leaflets

**Tune in to  
battery recycling**



Do the positive thing,  
recycle your batteries

[www.recyclenow.com](http://www.recyclenow.com) 

**Why recycle household batteries?**

In the UK, we throw away over 600 million batteries every year. By participating in this new recycling scheme, you can make a positive difference and help reduce the amount of battery waste being disposed of in landfill sites.

**About your scheme**  
East Devon District Council is working to enable householders to easily recycle their batteries through the kerbside recycling box scheme.

**What happens to the batteries once collected?**  
Once collected, batteries are taken to a recycling centre in the UK and then sorted into batches based on the chemical content of the battery. After sorting, the waste batteries are reprocessed to produce other products, or even new batteries.

**What types of batteries can be collected for recycling?**  
Most types of batteries can be collected including:

- All AAA and AA cells
- Sizes C and D
- Button batteries (e.g. watch batteries)
- Mobile phone batteries
- Laptop batteries

It doesn't matter if the batteries are full, partially used or out of date. We can also accept rechargeable batteries.

We CANNOT accept car or similar batteries for recycling through this scheme. These can be taken to household waste recycling centres.



**What do I need to do?**

- Use the accompanying bags to collect your used or unwanted batteries
- Seal the bag and place it in your green recycling box to be collected along with your other materials for recycling

For more information about household battery recycling call our helpline **08453 313131**  
Printed on 75% recycled paper



[www.recyclenow.com](http://www.recyclenow.com) 

# Appendix 1d – Co-mingled hook



# Appendix 2 – Collection containers on vehicles

Under the vehicle - Stockton



In Vehicle – Stockton



Under Vehicle – St Edmundsbury



## Appendix 3 – Pink pallet box at depots



# Appendix 4 – Retail Collection Tubes



# Appendix 5 – Retail point of sale items



# Appendix 6 – Camden Community bin



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Action Programme**

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