

Making recycling work for people in flats

A research project on recycling in London's purpose-built flats
January 2020



Resource London

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Acknowledgments

- Brand Narrative, John Haynes
- Brook Lyndhurst, Jayne Cook
- Cutting Edge Marketing Ltd., Natasha Poole
- Department for Environment Food and Rural Affairs
- Get it Sorted Ltd, Stefan Wilczak and Sam Wilczak
- Greater London Authority
- London Boroughs of Camden, Hackney, Islington, Lambeth, Tower Hamlets, Westminster
- Peabody, with special thanks to James Glass
- Radley Yeldar
- Resource Futures, with special thanks to Coralline Dunedin, Agnieszka Chruszcz, Susan Gow
- Resource London, Julia Bragg, Antony Buchan, Cathy Cook, Rachel Devine, Mark Roberts, Gemma Scott and Beverley Simonson
- Revealing Reality, with special thanks to Becky Rowe
- Veolia Environmental Services, with special thanks to Lawrence Folley, Nikki Mills and Michael Froggatt
- Winning Moves

Resource London

Resource London was established in 2015 as a jointly funded partnership between London Waste and Recycling Board (LWARB) and the Waste and Resources Action Programme (WRAP) to maximise the resources of both organisations for the benefit of London.

The aim of the programme is that by 2020 London will have more harmonised, consistent and efficient waste and recycling services that will:

- reduce the city's waste footprint and reinvigorate recycling to make a significant contribution towards the Mayor's ambition for London to achieve 65% recycling by 2030; and
- make a significant contribution towards England achieving its 50% household waste recycling target by 2020.

In 2017-18 Resource London established a new three-year, £1 million flats initiative to reinvigorate London's household recycling efforts for residents living in purpose-built flats, specifically targeting housing estates and large blocks of social housing.

More information about Resource London can be found on our website.

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In support of the paper

LWARB's priority is to reduce London's consumption-based CO2e emissions by reducing waste and increasing recycling, and the capital faces a number of unique challenges to achieving this. Our recycling rate lags behind the English average, but we are striving to improve. The number of flats in the capital is a particular challenge, where we see recycling performance well below what we need if we're going to achieve our vision of a circular city - and this is not just an issue for London boroughs, but all English authorities with urban centres. I'm immensely proud of this piece of work. The Resource London team has tackled this project with a fresh approach; bringing all stakeholders together and putting residents' needs at its heart. I welcome the recommendations and look forward to LWARB supporting London to deliver these.

Dr Liz Goodwin OBE, Chair, London Waste and Recycling Board

The Mayor welcomes the recommendations of this report. London needs major improvements in recycling from flats to achieve the Mayor's 65 per cent waste recycling target by 2030. Immediate action is required to make it easier for people in flats to recycle. This is vital for two reasons. Firstly, the increasing number of flats being built in London. Secondly, the fact that recycling rates from flats are well below those from houses and kerbside properties. We need to ensure every Londoner can access good recycling services, no matter what type of property they live in. This will help make recycling a normal thing to do for everyone in the capital. I encourage every borough to follow this report's recommendations, particularly those around the Flats Recycling Package. These complement the Mayor's minimum standard for recycling services for every single household.

Shirley Rodrigues, Deputy Mayor for Environment and Energy, Greater London Authority

The Government's Resources and Waste Strategy sets huge ambitions that can only be met through Local Authorities and their partners providing new and comprehensive recycling services to all properties in their areas. Flats have traditionally lagged far behind in terms of the service offering and suffer from low diversion of waste when compared to kerbside properties. Considering that over 20% of current housing stock are flats and the majority of new housing build will be high density properties, it is increasingly important to design effective resource management programmes that incorporate convenient and inclusive services for residents. I welcome this excellent report as an important step forward in this area, and call for continued leadership and commitment from all stakeholders so we can make real progress and implement real changes that work for residents and maximise our stewardship of the planet's resources.

Peter Maddox, Director WRAP

Peabody is committed to working with our residents to improve our local environments. As part of this we have been working in partnership with Resource London and six London boroughs to improve recycling services in 12 pilot locations. We've been part of the design, delivery and the learning. I firmly believe it is important for all housing providers to recognise that they have a pivotal role to play in improving the existing low recycling performance of flats.

We fully support this report's key finding that providing clearer information about recycling and making recycling and waste areas look more desirable to use will improve these recycling rates. We have already started to implement some of the recommendations, for example, working with Resource London on new recycling facilities for textiles and food waste, and we are planning to do a lot more.

Brendan Sarsfield, Chief Executive, Peabody

The government's landmark Resources and Waste Strategy sets out how we will go further and faster to reduce, reuse, and recycle, and help leave the environment in a better state than we found it for future generations. Recycling more is a key part of that and this report can help us achieve this aim. It provides a useful guide to local authorities that are ramping up efforts to increase the quality and quantity of recycling materials they collect from blocks of purpose-built flats.

Chris Preston, Deputy Director of Resources and Waste, Department for Environment Food and Rural Affairs

London boroughs work hard to provide the best recycling services they can, but flats present a real challenge. Ensuring residents have access to the best services is not just the role of local authorities; and this project shows how much more can be achieved when all stakeholders work together. I'm hugely proud of this piece of work delivered by the Resource London team, particularly as this report provides local authorities and housing providers with a set of genuinely practical recommendations to improve recycling services for people living in flats. I look forward to working with organisations across London to make these changes, for the benefit of residents, the capital and the planet.

Cllr Clyde Loakes, Chair of Resource London Partnership Board and Deputy Leader Waltham Forest Council

We welcome the findings of the project and are keen to look at how the improvements recommended in this report could be delivered in partnership with housing providers in London in order to improve services for our residents and to help address the climate emergency.

Ian Davis, Chief Executive, London Borough of Enfield

The London Environment Directors' Network (LEDNet) welcomes this research, which has sought to identify robust, evidence-led approaches to increasing recycling from flats. In London boroughs, recycling rates in flatted properties remain low, despite many efforts to increase participation and reduce contamination. We support all efforts to increase recycling, and to support boroughs to meet the Mayor of London's and the Government's recycling targets. We recognise that the Flats Recycling Package has been demonstrated to make a real difference in the estates included in this study and we look forward to working with Resource London, and with social housing providers, to help roll these interventions out more widely.

Victoria Lawson, London Environment Directors' Network Lead of Waste and Resources

Executive summary

People who live in flats recycle much less than those who live in houses, though there is a lack of substantive evidence about exactly why this is or how it might be improved.

Increasing recycling rates is a priority for London to help combat global climate change. The Mayor has set a target of 50% of local authority collected waste to be recycled by 2025 and an aspirational target of 50% household waste by 2030. The national target is to achieve 50% household waste recycled by 2020.

Resource London set up this two-year project in partnership with housing association Peabody and six inner London boroughs¹ to better understand the barriers to recycling for people who live in purpose-built flats and discover what practical measures could be taken by housing providers, building managers and service providers to help overcome them.

The results provide rich insight into factors that influence levels of recycling in purpose-built flats and how to effect changes. They offer a valuable, practical resource that will help those who commission, manage and deliver waste and recycling services to better understand what deters people in flats from recycling, and to make improvements.

This project is the first of its kind to include in-depth research with residents as well as those operating and managing services. It is also the first to include comprehensive measurement of the amount and composition of recycling and residual waste.

Detailed inventories carried out at 132 estates of purpose-built flats in London revealed that there was a general lack of consistency in the quality of waste services provided. In the main, services had evolved for the benefit of operators rather than for the residents who use them. In-depth ethnographic research with residents highlighted the complexity of the issues faced by residents and clearly showed that good intentions to recycle are not enough: effective recycling is only achieved when residents want to recycle, know how to recycle and find it easy to do so.

In the project a series of changes was made to the recycling arrangements on 12 selected estates of purpose-built flats² in London to see how they might influence recycling behaviour and increase the amount recycled. These ‘interventions’ were based on the research and designed in consultation with those responsible for managing and delivering waste and recycling and housing services. They included a common Flats Recycling Package applied to all 12 estates to standardise the look and feel of the bin areas, and five behavioural interventions introduced on 10 of the estates in various combinations.

The results showed that overall capture and recycling rates were substantially increased over the course of the project, mainly thanks to the improvements made in bringing all 12 estates up to the standard of the Flats Recycling Package.

Table 1: Flats Recycling Package

Flats Recycling Package
<ul style="list-style-type: none">• Clean and well-maintained bins and bin areas• Adequate collections to prevent overflows and appropriate recycling capacity (minimum 60l/hh/wk)• Appropriate apertures on recycling bins big enough to accept plastic bags of recycling and with locked reverse lids• Collection of the six main recyclable materials³• Clear and visible signage on and above the bins• Convenient location of recycling bins for residents• Recycling leaflet sent to residents once a year• Posters highlighting recycling messages displayed in a central location (where possible)• Residents informed of what they should do with bulky waste items

Over the course of the project the overall capture rate increased by 22%, the recycling rate increased by 26% and the contamination rate decreased by 24%. However, it is important to note that these increases were from a very low base. At the end of the project the capture and recycling rates were still low (46% and 13% respectively) and contamination remained high at 24%.

There was wide variation in the levels of improvements from one estate to another. Those estates that had a poorer quality service before the changes showed the greatest improvement.

Results of the five behavioural interventions were less conclusive, but the research did offer some insights. For instance, feedback from residents indicated that the provision of plastic bags for in-home storage of recycling were effective at influencing recycling behaviour and in some cases additional small recycling bins placed near estate entrances were also effective.

1 London boroughs of Camden, Hackney, Islington, Lambeth, Tower Hamlets and Westminster

2 Case study estates were selected to be comparable to each other. The cases included in this study are not representative of purpose built flats in London, a London borough or Peabody estates.

3 Paper, card, glass, food and drink cans, plastic bottles, and mixed rigid plastics (tubs, pots and trays)

6

The project showed that purpose-built flats with higher numbers of renters and people aged between 15 and 34 have lower capture rates.

Notably, this project highlights the scale of the challenge represented by the London and national recycling targets. Despite the improvements achieved, rates at the end of the trial were still not as good as the average kerbside collections for low-rise properties in London. Assuming that all purpose-built flats in London have similar performance to the 12 in the project, with current collection and recycling systems, purpose-built flats would need to achieve a near 100% capture rate of the six key recyclable materials as well as food in order to achieve recycling targets.⁴ This seems unlikely given the complexity of the issues and behavioural inconsistencies of people living in purpose-built flats revealed by this project.

Whilst this project has proven valuable in understanding how to increase recycling performance in purpose-built flats, there are clearly limitations to the research and methodology used. The findings of the project have highlighted a number of areas for further investigation, including gaining a better understanding of the recycling performance of a representative sample of flats, and the effect of age and tenure type and other societal factors on recycling performance.

The recycling target set by the Mayor of London in the London Environmental Strategy to recycle 50% of local authority collected waste by 2025 is ambitious. In order to achieve it, capture rates will need to be significantly improved, new systems introduced to broaden the range of household waste materials that can be recycled and new policies to reduce non recyclable waste. This will be challenging with current resourcing and existing legislation.

Key recommendations:

- Housing providers, building managers and service providers can improve recycling capture rates in purpose-built flats by working together to put in place and maintain the standards defined in the Flats Recycling Package on every estate.
- The Resource London Flats Recycling Package toolkit offers practical advice and guidance to help housing providers, building managers and services providers to implement the Flats Recycling Package in purpose-built flats. The toolkit will be available in March 2020.

⁴ The combined average maximum recycling rates for the 12 flats are 32% dry recyclables only and 60% dry recyclables and food.

1. Introduction

This report is the result of a two-year project into the opportunities for improving recycling rates in purpose-built flats in London carried out between August 2017 and July 2019 by Resource London in partnership with housing association Peabody and the London boroughs of Camden, Hackney, Islington, Lambeth, Tower Hamlets and Westminster.

The project builds on earlier research to better understand the factors that might deter people who live in flats from recycling. It is the first of its kind to look at the issues from the point of view of residents, as well as those managing housing and operating collection services.

This report presents the project development, delivery, results and research conclusions.

1.1 Project partners

Peabody is London's largest housing association. It owns and manages 66,000 homes in London and the south-east of England, including properties in all but three London boroughs. As a social landlord, the association has a unique understanding of the pressures and motivations of social housing tenants.

The local authority is responsible for local recycling and waste services in each borough. Peabody is responsible for the accessibility, viability and awareness of those services for the residents living on its estates. Both are able to play an important role in influencing the behaviour of residents and optimising the impact of change initiatives.

1.2 Policy landscape

To combat global climate change, it is essential that consumption-based greenhouse gas emissions generated by our everyday activities are cut significantly. By recycling and managing waste further up the waste hierarchy i.e. packaging being recycled rather than landfilled/incinerated, significant emissions can be prevented.

Improving recycling rates is a priority for London where the Mayor and 26 London boroughs (at the time of writing)⁵ have declared a climate emergency⁶. London recycles about 33% of its household waste⁷. The UK government target, as set out in the National Resources and Waste Strategy⁸ is to recycle 50% of household waste by 2020. In London, the Mayor's London Environment Strategy⁹ has set targets of 50% Local Authority Collected Waste by 2025, with an aspirational target of 50% for household waste by 2030.

The national and London strategies both highlight the need for a consistent minimum standard of recycling services for all households, including flats, comprising the collection of six main recyclable materials; glass, cans, paper, card, plastic bottles and mixed rigid plastics (tubs, pots and trays), as well as a separate food waste collection. In London all boroughs are required to deliver this service by 2020, with the provision of a food waste collection for flats where practical and cost effective.

Providing a consistent minimum standard of recycling services goes hand-in-hand with the Good Growth by Design¹⁰ initiative in the London Plan to deliver successful, inclusive and sustainable places and good housing design policy.

Earlier research has shown that recycling rates are significantly lower for flats than they are for houses. According to research by WRAP¹¹ (2018), even well established communal schemes yield around 50% less recycling than equivalent kerbside collections for low-rise properties. Data also shows a correlation between higher population density and lower recycling rates. (Fig 1).

5 <https://www.climateemergency.uk/london-boroughs/>

6 A climate emergency declaration or plan, declaring a state of climate emergency, are issued organisations and other jurisdictions to set priorities to mitigate climate change. In declaring a climate emergency, the organisation admits that global warming exists and that the measures taken up to this point are not enough to limit the changes brought by it.

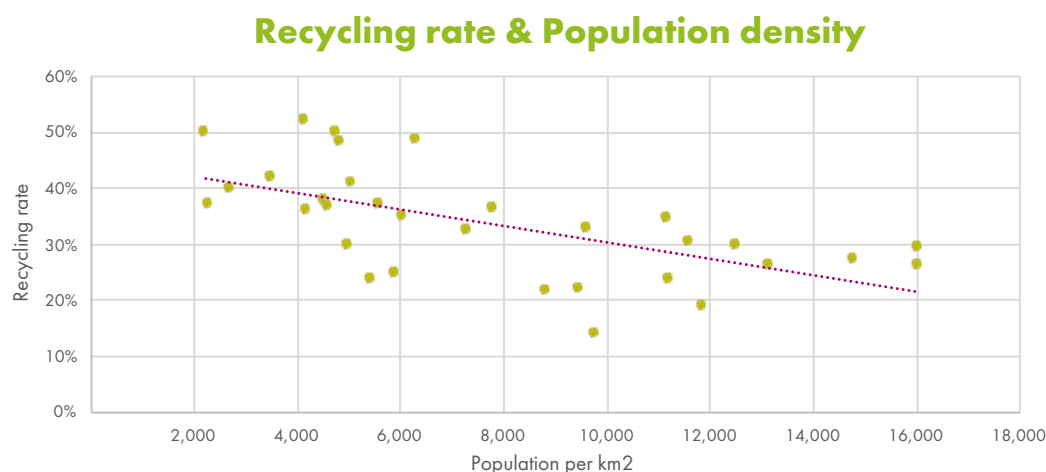
7 www.gov.uk/government/statistics/local-authority-collected-waste-management-annual-results

8 <https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england>

9 <https://www.london.gov.uk/what-we-do/environment/london-environment-strategy>

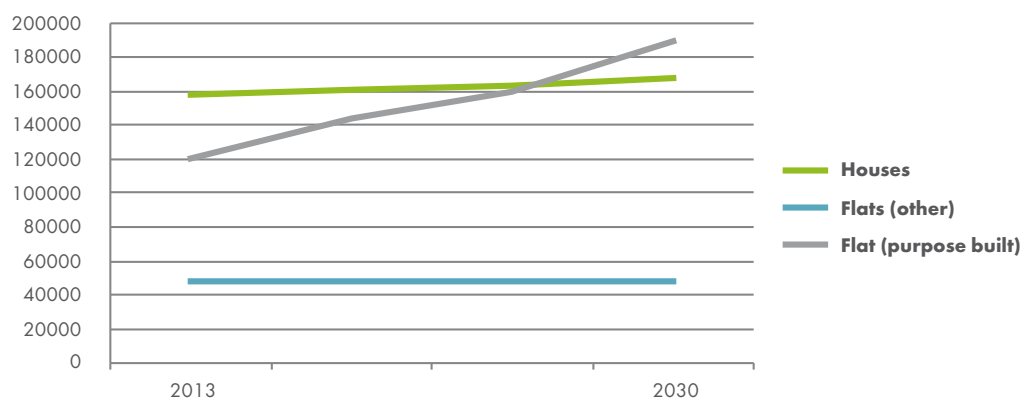
10 <https://www.london.gov.uk/what-we-do/regeneration/advice-and-guidance/about-good-growth-design>

11 WRAP Increasing Recycling in Urban Areas 2018

Fig 1: Graph showing correlation between recycling rates and population density [Resource Futures 2019]

This presents a particular challenge for London where the proportion of households living in flats is rising and consequently the population density is increasing. By 2030, it is expected that 46% of the capital's households will be living in purpose-built flats (Fig 2).

Accordingly, alongside the Mayor's pledge to reinvigorate recycling in the city is the recognition that improving recycling services for people living in this type of accommodation is key to achieving London's targets.

Fig 2: Change in the number of London households living in different types of accommodation [GLA]

At the same time, London boroughs have come under intense financial pressures in recent years. London's core funding from central government has been cut by 63% in real terms over the course of the decade 2010-11 to 2019-20, and even with additional funding announced in Spending Round 2019, boroughs will have to make over £200 million of savings in 2020/21 to close the gap between funding and demand.

1.3 Historical context

Many of London's flats are in large developments built before there was a requirement for provision of recycling services. On these estates the communal bin areas, were often housed away from the main entrances and walkways of the building. As collection services evolved to include recycling, the focus was on operational compatibility and access for waste collection vehicles rather than on residents' needs. While housing providers are in a good position to understand what the needs of their residents are, they have not historically been involved in the design and delivery of services.

Today, despite the fact that dry recycling services are provided for the majority of such estates in London, recycling rates remain stubbornly low.

It is not just the physical layout of purpose-built flats that is challenging. Earlier research by WRAP¹² shows that societal factors in urban environments are associated with lower recycling rates. These include: transient populations; language and cultural barriers; higher levels of deprivation and property tenure (more properties being rented than owned). Other practical considerations such as internal storage space and wide variations in access to and quality of recycling services may also be important.

1.4 Making sense of complexity

This project used a combined quantitative and qualitative analysis technique to extract useful learning from this complex, interdependent picture. It provides a rich source of information about the physical and social factors affecting recycling rates in purpose-built flats and a robust set of findings that offer potential to make improvements in recycling rates for London.

2. Project summary

2.1 Objective

Resource London created this project in order to give policy makers, housing providers, building managers and service providers the information and real-world insights they need to improve capture and recycling rates in purpose-built flats, in line with the London Environment Strategy and National Resources and Waste Strategy targets.

2.2 Approach

From the outset it was clear that the project would need to focus on the issues from the point of view of residents, in order to better understand their views and behaviours around waste and recycling and to discover what practical measures could be taken by housing providers, building managers and service operators to help change attitudes and practices.

Specifically, the project was interested in measures that would influence the volume and quality of recycling, as measured by the capture rate (the proportion of the six main recyclable materials: glass, cans, paper, card, plastic bottles and mixed rigid plastics, collected for recycling) and the recycling rate (the proportion of household waste recycled). The contamination rate (the proportion of non-recyclable materials arising in the recycling collection) was also measured.

2.3 Method

Understanding the complexity of the research challenge and the measurement difficulties faced by earlier projects, a case study-based Qualitative Comparative Analysis (QCA) approach was chosen. This is believed to be the first time that QCA has been used in waste research and evaluation.

QCA is an analysis technique that allows researchers to draw useful conclusions about how a range of factors may affect different outcomes, even when the picture is complex and factors may be interdependent, or outside the project's scope of influence. Unlike strict statistical methods of analysis, QCA is tolerant of different types of data and those which may be difficult to measure and small sample sizes.

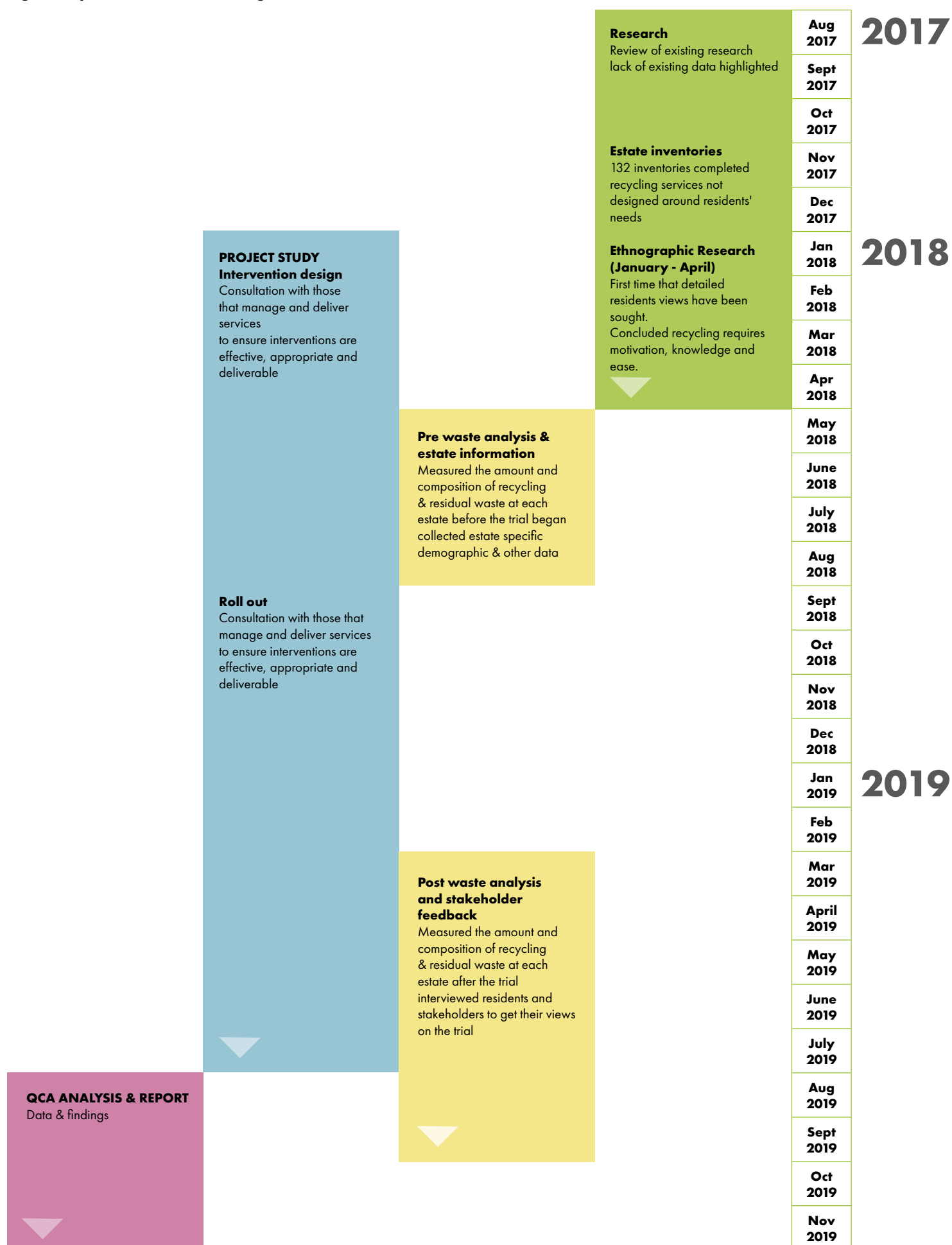
The project began with a review of the existing research on recycling in flats. Following this a detailed research was carried out at 132 Peabody estates of purpose-built flats across inner London, including physical surveys of the buildings and their waste and recycling facilities, and in-depth ethnographic research with residents.

From all of this information, and in consultation with housing providers, local authorities and waste management providers, a set of changes to the recycling arrangements was designed for QCA. These 'interventions' were introduced on 12 selected Peabody estates of purpose-built flats in London and trialled over a nine month period.

The trial estates selected were in the London boroughs of Camden, Hackney, Islington, Lambeth, Tower Hamlets and Westminster, all of which had recycling rates below 30% (2016/17) and where more than half the housing is flats.

Detailed quantitative and qualitative data were collected from the trials to create the 12 case studies for analysis. The results enabled identification of the interventions that were most effective at improving capture and recycling rates on the selected estates and provided a series of valuable operational insights.

Fig 3: Project outline to show stages and outcomes



3. Research

The project began with a comprehensive review of the existing literature, followed by in-depth research at estates of purpose-built flats in London, including the physical environment and with residents.

3.1 Review of existing research

The literature review showed there is a lack of substantiated data on how improvements in urban recycling rates are achieved. No previous research has looked specifically at improving recycling in purpose-built flats. The most relevant work is a report by WRAP¹³ on urban recycling which included international research and concluded that improving recycling rates in dense urban areas is not straight forward; it requires significant resource and legislative drivers and that measurement and quantifying of results is a particular challenge.

The research showed that a project to improve performance would need to appeal to those not currently recycling effectively, with well-targeted communications tailored to local needs. Additionally, a good understanding of existing recycling arrangements and barriers would be vital in order to create tailored interventions, backed up by a robust and appropriate monitoring and evaluation methodology.

3.2 Estate inventories

In order to gain a good understanding of existing arrangements, detailed inventories were carried out at 132 Peabody estates of purpose-built flats across eight inner London boroughs. They looked at the physical layout of each estate, including walking routes, signage, location and quality of the waste management facilities. Relevant community factors were noted, such as whether or not there was an active tenants' association, if the estate had a caretaker on site and what methods were being used to communicate with residents.

The inventories revealed wide variation in the standard of waste and recycling facilities provided across the estates surveyed. Signage was consistently poor, much of it put up ad-hoc by caretakers or residents. Problems with overflowing bins and fly-tipping of bulky waste were common, especially in the evenings and at weekends. Additionally, the services tended to be designed and delivered around operational compatibility i.e. the bins were located to enable easy access for waste collection vehicles.

Many of the older buildings in the survey had waste chutes, though not all were operational. Of these buildings, most had separate recycling facilities in communal courtyards. Some had no facilities for recycling because of lack of space.

An example of an inventory is included in Appendix 1.

Key research findings:

- There was a lack of consistency in the quality of waste and recycling services provided.
- Services tend to be based around operational compatibility, which does not always make them easy for residents to use.

Fig 4: Examples of recycling and waste facilities in purpose-built flats



3.3 Ethnographic research with residents

In order to understand what prevents people who live in flats from recycling it was important to consider the issues from the residents' perspective, within the wider context of their daily lives.

In-depth ethnographic research was commissioned to discover more about people's attitudes and practices around waste management and recycling (Fig 5).

Fig 5: The ethnographic research process



A copy of the full report entitled 'Recycling in real life - Ethnographic research with residents of purpose-built flats in London' is available on our website.

In order to make sure that the picture was as accurate as possible, the research was initially framed for residents as being about household chores in general. Unlike in previous studies, those who took part were not told until later in the research that it was about recycling.

The research investigated:

- how waste management routines fit into everydaylife and family dynamics
- how people interact with the public and private spaces they inhabit
- what the social norms are and how they impact on individual recycling behaviour
- the justifications people make for not recycling effectively
- what people think and feel about the communications they receive regarding waste and recycling.

What emerged from the research was a complex picture. There are many reasons why people living in flats might not recycle. What was clear was that effective recycling is only achieved

when residents want to recycle (motivation), know how to recycle (knowledge) and find it easy to do so (ease). All three interdependent conditions are needed before people change their behaviour and if any one of them is not met, it will undermine the other two. There are numerous possible interventions that could help strengthen an individual's motivation, knowledge or the ease with which they can recycle. Tackling all three as a system represents a huge opportunity to improve recycling.

Motivation

Most people were positive about the idea of recycling, even though they did not always do it. Some people recycled more than others and many were inconsistent in their recycling behaviour, indicating that their motivation was easily undermined.

The research showed that people tended to think of their recycling behaviour as anonymous or invisible. Residents were not used to seeing other people at the bin stores, which were often in out of the way places at the back of the estate or away from main pathways and often dirty. Most people did not have close relationships with their neighbours or the residents' association so there was little opportunity for feedback, adding to the feeling of not being accountable and further undermining residents' motivation to recycle correctly.

Knowledge

People were not very knowledgeable about what materials could be recycled. Most relied on what they thought of as 'common sense' and did not go out of their way to find out more. The few that did look for more information were left confused by the apparently conflicting messages they found on packaging, bin liners and the signage in communal bin areas.

Residents felt they had no relationship with or responsibility for their waste services. Residents were mostly unaware of which day the waste and recycling was collected from their building, what happened to it when it was collected or what role they might have in the process.

Ease

Even those that wanted to recycle and knew how to do it did not always put their good intentions into practice.

Lack of storage space inside the flat was often cited as a reason not to recycle. People thought that items for recycling left out on display looked untidy, though some were happy to use a plastic bag or to allocate an area under the kitchen worktop for storage.

People did not like to make a special trip to take their recycling to the bin. Instead, they would take it on their way out of the building, which meant that residents regularly stored recycling in plastic bags in their kitchen and put the non-recyclable plastic bags directly into the recycling bin.

Even those that set out to recycle correctly were sometimes frustrated by overflowing or dirty bins, leaving them unsure what to do, with many resorting to putting their recycling into the residual waste bin or even fly-tipping.

Key research findings:

- The reasons why some people living in flats do not recycle as much as they might are many and complex.
- Good intentions to recycle are often thwarted.
- Effective recycling is achieved when residents;
 - are motivated – poor experiences and an apparent lack of accountability can be demotivating
 - have the correct knowledge – lack of easy access to accurate information can undermine confidence
 - find it sufficiently easy – services that fit with people's existing routines will feel easier to use.

4. Project

The research stages of the project provided a good understanding of the factors that affect recycling rates in purpose-built flats and substantive resident-focused data on which to base the project. The next stage of the project was to use this data to design a set of carefully-defined interventions that could be tested using QCA, for their potential to improve capture rates.

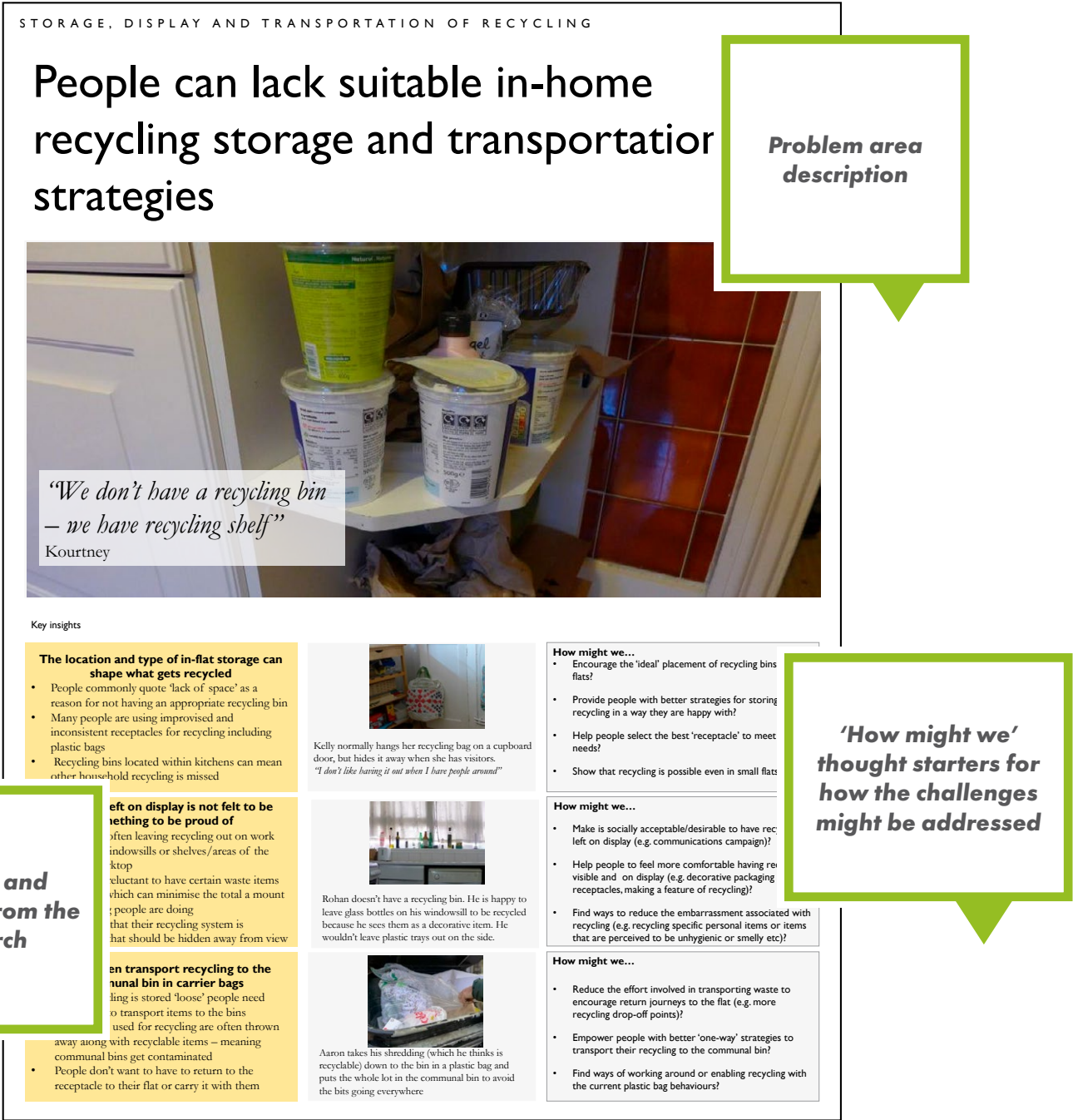
4.1 Intervention design

In order to ensure the interventions were effective, appropriate and replicable, they were designed in consultation with

all those responsible for waste and recycling services management, implementation and policy, including Resource London, the housing association Peabody, the London boroughs of Camden, Hackney, Islington, Lambeth, Tower Hamlets and Westminster, waste contractor collection crews, Defra and the Greater London Authority (GLA) [Appendix 2: project participants].

First, the data from the research phase of the project was distilled to create a long list of the recycling challenges, framed as opportunity areas (Fig 6), and corresponding possible interventions.

Fig 6: Example of an opportunity area.



With expert advice from ethnographic researchers and behaviour change advisors, interventions were selected that would be likely to have the biggest impact on:

Motivation: motivating residents to recycle more and making their experience of it more positive

Knowledge: improving residents’ knowledge of what can and can’t be recycled

Ease: making recycling feel easier for residents

From this, a series of recycling interventions, the Flats Recycling Package, was created to be applied at all 12 estates in the trial as a baseline of good practice. A further five behavioural interventions were identified, to be introduced in various combinations to ten of the estates.

Flats Recycling Package

The Flats Recycling Package was designed to bring the look and feel of the bin areas up to a common standard and to provide residents with clear and reliable information about recycling and waste services. They addressed problems that had been identified in the research stages of the project as being fundamental to residents’ motivation to recycle, their knowledge about recycling and how easy it was to do (Table 2).

For example, the research showed that people wanted to drop off their waste with minimal interruption to their routine. This meant they would take their recycling to the communal bins on their way out of their estate in a non-recyclable plastic bag that they would put straight into the communal bin instead of decanting items. The project worked with the local authority and their waste contractors to change the system to accept plastic carrier bags for recycling, to make it easier for residents.

The Flats Recycling Package consisted of:

- Clean, well-maintained bins and bin areas
- Adequate collections to prevent overflows and appropriate recycling capacity (minimum 60l/hh/wk)
- Appropriate apertures on recycling bins big enough to accept plastic bags of recycling and with locked reverse lids
- Collection of the six main recyclable materials
- Clear and visible signage on and above the bins
- Recycling bins conveniently located for residents
- Recycling leaflet sent to residents once a year
- Posters highlighting recycling messages displayed in a central location (where possible)
- Residents informed of what they should do with bulky waste items.

Fig 8: Photos of Flats Recycling Package

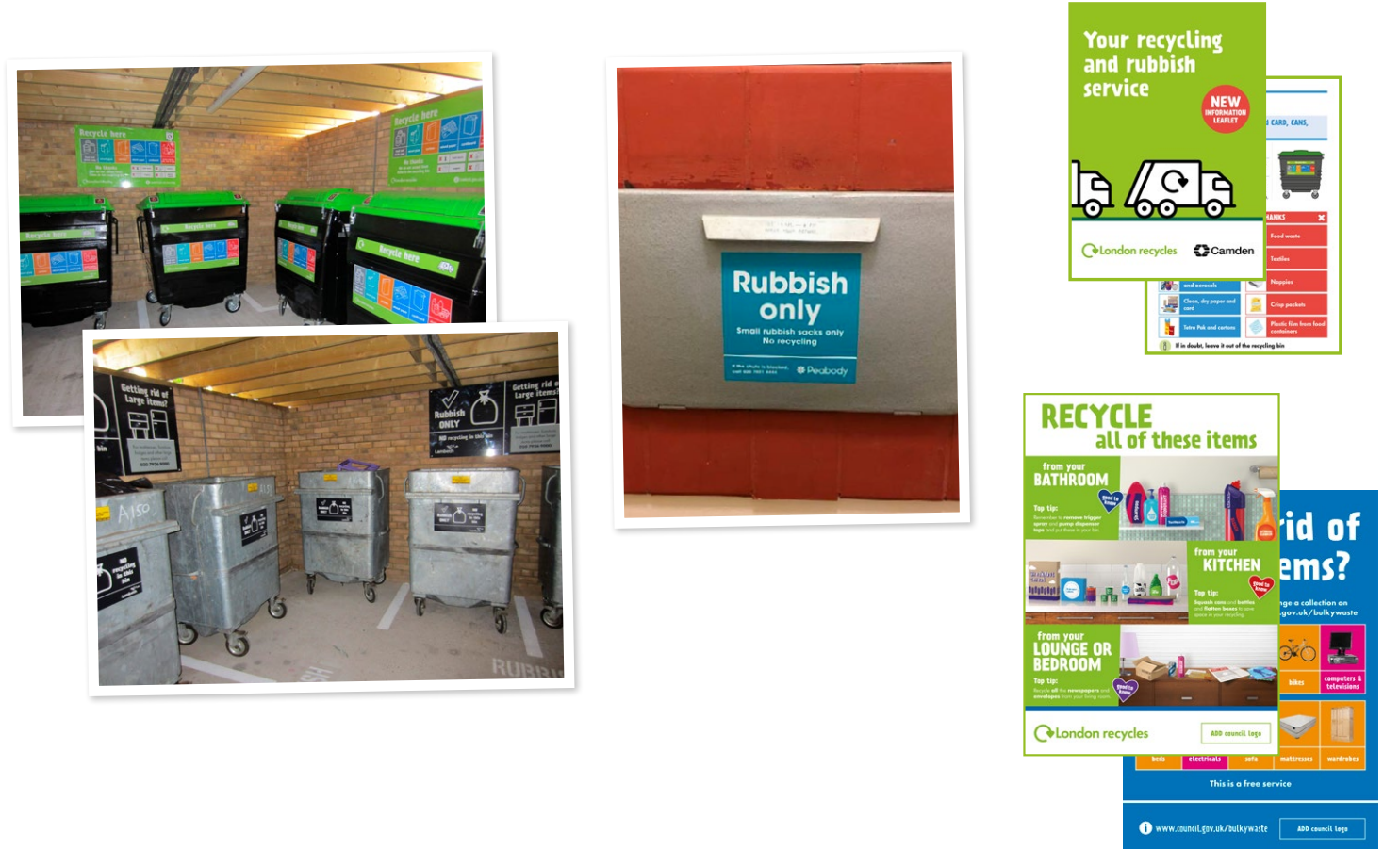


Table 2: Flats Recycling Package for recycling and rubbish facilities in purpose built flats

Challenge addressed	Flats Recycling Package	Anticipated outcome
Operational		
<p>Inventories highlighted the poor state of many bins and bin areas. Communal bin areas were seen to be unsafe, dirty and not well looked after.</p> <ul style="list-style-type: none"> Dark and uninviting communal bin areas made some residents feel uneasy, especially on some estates where respondents said they had seen anti-social behaviour. People wanted to move away from the communal bin area as quickly as possible and were not taking time to consider what they were doing with their waste. 	Clean, well maintained bins and bin areas (rubbish and recycling)	<p>Using the bins is a more positive experience.</p> <p>Residents are more motivated to recycle.</p>
<p>Residents expressed frustration that communal bins were often overflowing and there was no space for them to put their waste. They were not sure what to do in these situations, often resorting to using the incorrect bins or leaving rubbish on the ground.</p> <ul style="list-style-type: none"> If residents feel that their recycling efforts are wasted, then their individual motivation is likely to be affected. It can be difficult to restore confidence in the system when it appears 'broken' by others. Some people felt that a lack of bins and inadequate collections were indication that the council doesn't care about recycling, prompting people to wonder why they should care themselves. 	Adequate collections to prevent overflows (rubbish and recycling) and appropriate recycling capacity (minimum 60 litres/hh/wk)	<p>Using the bins is a more positive experience.</p> <p>Residents are more motivated to recycle.</p>
<p>Residents use carrier bags to transport recycling to the communal bin and often threw them away along with recyclable items, meaning communal bins were getting contaminated. They did not want to return to the bag to their flat or carry it with them.</p> <ul style="list-style-type: none"> The apertures on many of the existing recycling bins were not big enough to accommodate a full carrier bag of recycling. 	Appropriate aperture on recycling bins big enough to accept plastic bags of recycling and with locked reverse lids	<p>Residents can use the same carrier bag to store, transport and dispose of their recycling.</p> <p>They find it easier to recycle.</p>
<p>Inventories highlighted numerous examples of recycling bins located in areas that were less easily accessible e.g. at the back of the building.</p> <p>Residents wanted to be able to drop off their recycling on their way out of the building, using their normal preferred routes, including back routes or cut-throughs</p>	Recycling bins conveniently located for residents	<p>Residents do not have to make a special trip to drop off their recycling.</p> <p>They find it easier to recycle.</p>
Communications		
<p>Inventories highlighted poor quality signage on the bins that had deteriorated over time. Most bin stores had no signage on the doors or walls. None of the waste chutes had signage.</p> <ul style="list-style-type: none"> Residents perceived information from different channels as contradictory and were unlikely to take time to go through information if it looked complex or overwhelming. Instead they used their own 'rules of thumb' based on physical characteristics (e.g. feel, weight) and associations with other items People think they already know what's recyclable, but don't know where that knowledge comes from. They do not tend to investigate if they are unsure. Tonnage monitoring before the project showed high levels of contamination (average 30.7%). 	Clear and visible signage on recycling and residual bins and at bin storage areas.	<p>Residents have easy access to clear and reliable information.</p> <p>They know which items should go into the recycling bin and that the recyclable materials collected are the same no matter what purpose built flat they live in.</p>
	Collection of six main recyclable materials	
	Posters highlighting recycling messages displayed in a central location (where possible).	
	Recycling leaflet sent to residents once a year.	
	Residents informed of what they should do with bulky waste items (signage/posters).	

Behavioural interventions

The five behavioural interventions selected were those that were felt would be the most effective at improving recycling rates in purpose-built flats, and the most replicable (Table 3).

1. Additional small recycling bins - to make it easier for residents to recycle
2. Emotive signage - displayed in prominent places on or around rubbish bins
3. Feedback posters - displaying up to date information about recycling and performance, changed regularly to catch residents' attention
4. In-home storage solution – a pack of plastic bags and hooks for storing recycling in the home, with additional bags available from dispensers located at block entrances
5. Tenant pack – recycling information from the landlord informing residents what is expected of them

Other interventions considered included a 'pay as you throw scheme', were not pursued because they were not easily replicable or because of associated legal issues.

Fig 9: Photos of behavioural interventions

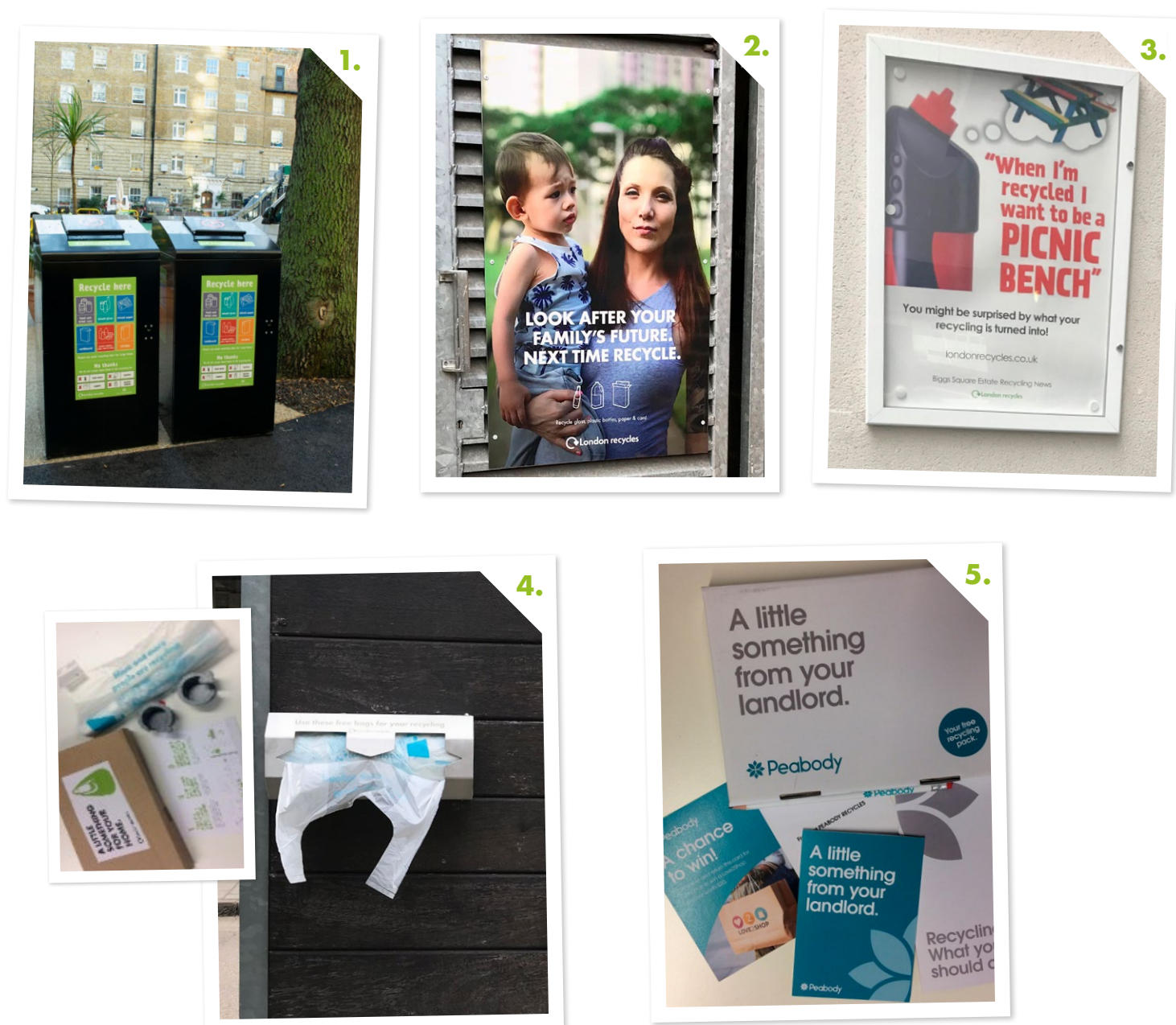


Table 3 : Behavioural interventions rationale and implementation

	Additional smaller recycling bins	Emotive signage	Feedback posters	In-home storage solution	Tenant pack
Rationale for behavioural mechanisms for interventions	<p>Bin journeys are inconvenient, and bins are inaccessible</p> <ul style="list-style-type: none"> Ease – make access to bins easier and nearer to home Ease – enable use of carrier bags to transport and dispose of recycling Ease – proximity aims to prompt more frequent deposits, to help space constraint at home Knowledge – residents have a better idea of what can and can't be recycled 	<p>Residents don't feel responsible or accountable for their own recycling, or any involvement with the waste collection system. The rubbish bin is the default.</p> <ul style="list-style-type: none"> Disruption – interrupt habits during use of the residual bins and chutes Trigger - to separate recycling next time Self-identity – as a recycler not binner Focus on main materials not captured in WCA – paper, card, bottles and glass 	<p>No direct visual feedback or reminders in communal recycling systems. No reason for residents to feel scrutinised.</p> <ul style="list-style-type: none"> Scrutiny – feedback shows that residents efforts are being monitored Importance of social norms – messaging conveys the whole community has a contribution to make and it is making a difference Reward – feedback shows residents' efforts are appreciated 	<p>No space for a second bin, combined with hygiene concerns over use of re-usable bag/container</p> <ul style="list-style-type: none"> Ease – help residents find space in the home to store recycling Ease and motivation - make it cleaner and easier to recycle Salience – visibility of recycling in home 	<p>Residents don't feel responsible for recycling and for properly disposing of their waste and may not listen to their council</p> <ul style="list-style-type: none"> Descriptive norm - landlord informs residents what is expected Messenger – changing to someone with more perceived relevance and authority <p>Nudge/disruption – start separating out recycling at home</p> <ul style="list-style-type: none"> Commitment device – questionnaire and entry to a prize draw Salience – notepad with reminders
How the interventions were implemented	<p>New smaller bins placed at convenient locations – these were put in place 1-4 weeks before any other changes were made that would be seen by residents.</p> <p>Emptied regularly to prevent overflows.</p> <p>Highly visible signage to show what bins can be used for.</p>	<p>Prominent signage on or around rubbish bins and chutes.</p> <p>Unexpected tone and emotive messaging to challenge sense of responsibility.</p>	<p>Estate-specific feedback A1 and A2 posters that change on a monthly cycle – amount of target materials recycled in year, where recycling goes, rating of estate, things that have gone wrong recently. (All estates receive the same poster, but with 'name of estate Recycling News' to show it wasn't just generic and someone was interested in what was happening on the estate.)</p>	<p>Pack delivered on day 1 -contains adhesive plastic hooks and initial roll of plastic bags.</p> <p>New recycling bins take full recycling bags. Free refill rolls of bags in dispensers on entrance to blocks (although for estate E due to anti-social behaviour these had to be moved inside the bin rooms).</p>	<p>Pack delivered to home one week after roll-out</p> <p>Contains: A5 expectations booklet, questionnaire and notepad with reminders</p> <p>Focus on paper, card, plastic bottles and glass.</p>
	Ease and knowledge	Motivation and knowledge	Motivation and knowledge	Motivation and ease	Knowledge and motivation

4.2 Estate selection and roll out

In conjunction with Peabody, 12 of their estates of purpose-built flats were selected for the project. Two estates for comparison purposes and 10 for the behavioural interventions (Table 4).

Estates in the London boroughs of Camden, Hackney, Islington, Lambeth, Tower Hamlets and Westminster were chosen. These boroughs all had recycling rates below 30% (2016/17) and flats made up more than half the housing. The estates all had

between 100 and 200 flats and were either gated or situated on quiet roads where the likelihood that non-residents would use the bins was low. They all had provision for dry recycling and either a caretaker or a cleaner. Initially only estates that would not have major building work taking place at the time of trial were to be included but in the end this was not possible. Estates were selected to be comparable to each other allowing a clear understanding of factors that influenced any observed changes in the overall performance metrics.¹⁴

Table 4: Project estate characteristics

Estate reference letter	Household Numbers	Photo	Age	Layout	Residual Chutes	Selection differences
A	144		c.1900	Courtyard	✗	Estate split into two parts several roads apart. Only one suitable for project. Near main high street.
B	129		2009	Roadside blocks with rear courtyard	✗	Gated estate. No full-time caretaker - cleaning delivered by contractor.
C	132		1913	Courtyard	✓	Gated estate off main road.
D	104		1910	Courtyard	✓	Estate could be used as local thoroughfare.
E	109		2015	Tower and smaller blocks	✗	All bin rooms have key code access
F	181		1865	Courtyard	✓	Near main high street.

¹⁴ As such the estates are not representative of London, any particular borough or Peabody housing stock.

Estate reference letter	Household Numbers	Photo	Age	Layout	Residual Chutes	Selection differences
G	121		c.1960	Tower + two smaller blocks	✓	Smaller blocks are gated.
H	128		c.1900	Courtyard	✓ some blocks no chutes	Two blocks gated. Food waste.
I	114		1885	Courtyard	✓	Food waste.
J	122		c.2000	Tower + smaller blocks around courtyard	✗	Food waste. Caretaking managed by arm's length company.
K	221		c.1900	Courtyard	✓	Building work finishing at start of project.
L	158		c.1880's and 1 block 2014	Courtyard + blocks along a road	✓ (new block no chute)	Split into two distinctive sections – 4 blocks across the road from main estate.

The Flats Recycling Package was applied to all 12 estates, including the comparison estates, A and B. The other 10 estates C - L were each subject to a different combination of five behavioural interventions (Table 5).

All changes were implemented over a seven-week period from 17th September 2018, with the help of a contractor. The project was live from September 2018 to July 2019.

Table 5: Implementation of Flats Recycling Package and behavioural interventions across the 12 project estates

Case Study Ref No	Flats Recycling Package	Behavioural interventions				
		Additional smaller recycling bins	Emotive signage	Feedback posters	In-home storage solution	Tenant pack
A / B (comparison)	1	0	0	0	0	0
C / D	1	0	1	1	0	1
E / F	1	0	1	0	1	0
G / H	1	0	0	1	1	1
I / J	1	1	1	1	0	1
K / L	1	1	0	0	1	0

0 = absence of intervention and 1 = presence of intervention

4.3 Data collection and analysis

The project was interested in measures that could be used to influence the volume and quality of recycling in purpose-built flats, as indicated by:

- Capture rate (the proportion of the six main recyclable materials collected for recycling)
- Recycling rate (the proportion of household waste recycled)

Also measured was:

- Contamination rate (the proportion of non-recyclable materials arising in the recycling collection)

Recycling rate is commonly used in the waste management sector as a primary indicator of recycling performance even though it is affected by the volume of residual waste and other factors such as changes in purchasing behaviour of residents. This project focuses on the capture rate as a more accurate indication of residents' recycling behaviour as it measures how much residents are actually recycling by 'putting the right things into the right bin'.

In order to evaluate the efficacy of the interventions introduced on the twelve trial estates, quantitative data was collected, including waste tonnage, composition and estate specific information, and qualitative data gathered from interviews with residents and others involved in delivering and managing the trial. The data collected for each estate are summarised in the case study document.

Waste tonnage monitoring and composition analysis

The amount and the composition of recycling and residual waste at each estate before the project began and at the end of the trial period was measured. This data was used to calculate comparative 'before and after' capture rates, recycling rates and contamination rates for each estate. This was the first time in the UK that such detailed and accurate information had been collected from purpose-built flats.

The recycling and residual waste collected on each estate was weighed for every scheduled collection for a period of eight weeks before the project (7th May - 29th June 2018) and again for eight weeks at the end of it (6th May - 28th June 2019). For one week during both periods the composition of the waste was also analysed.

The contents of the additional small recycling bins, introduced on some of the estates as one of the interventions, was analysed separately from the main recycling bins. Food waste from those estates that had separate food waste collections was also weighed and analysed.

Estate specific information

Peabody provided detailed demographic and ownership data information on each estate which was combined with layout and waste management arrangements gathered as part of the estate inventories in the research phase (2.2 Estate inventories).

Feedback from residents, managers and service providers

Interviews were conducted with 77 residents (six or seven from each estate) and 35 managers and service providers involved in the project in order to gather people's views of, and responses to, the Flats Recycling Package, the behavioural interventions, and how this influenced capture rates, recycling rates and level of contamination.

The residents interviewed were individually recruited to ensure a good demographic range and incentivised with a £75 shopping voucher. They were asked to complete a detailed questionnaire about themselves and their approach to household chores, then interviewed in-depth about their recycling routines, the recycling services on their estate and the interventions introduced in the project.

The managers and service providers interviewed included Resource London managers involved in the design and delivery of the project, waste managers from the London boroughs in which the project estates were located, collection crew supervisors and Peabody caretakers and managers. The interviews were conducted by telephone or face-to-face to gather feedback on the interventions and roll out as well as perceptions of residents' responses to the interventions.

Analysis

The waste tonnage and composition data and the estate specific data were used in the QCA to look at which factors affected capture rate and capture rate change.

The feedback from residents, managers and service providers was used to understand more about how and why the interventions, including the Flats Recycling Package, influenced recycling rates, capture rates and level of contamination.

4.4 Results

The overall performance metrics show that the trial was successful in improving recycling performance across the estates in the project. The overall capture rate and recycling rate both increased substantially, and contamination was reduced (Table 6).

The data for individual estates shows that the level of improvements varied widely from one estate to another. All the estates saw some improvement in capture rate and recycling except for Estate G where there was a decrease in both rates (Tables 7 and 8). Contamination rates improved on all estates except estates I, J and K which all saw small increases in contamination rate (Table 9).

Table 6: Overall performance metrics pre and post interventions (average across all 12 estates)

Key measure	Pre-intervention	Post-intervention	% point change between pre & post-intervention	% change between pre & post intervention
Capture rate	38.2%	46.8%	8.6%	22%
Recycling rate excluding contamination	10.7%	13.4%	2.7%	26%
Contamination rate	30.7%	23.4%	7.2%	24%

Table 7: Capture rates for each estate pre and post interventions

Intervention Area	Estate	Pre intervention	Post intervention	% point change between pre & post intervention	% change between pre & post intervention
Control	A	46.2%	51.5%	5.3%	11%
	B	65.1%	76.3%	11.2%	17%
Tenant Pack / Emotive Signage	C	41.0%	48.1%	7.1%	17%
	D	37.3%	45.6%	8.3%	22%
In-home / Emotive Signage	E	38.2%	41.7%	3.5%	9%
	F	37.8%	42.7%	4.9%	13%
In-home / Tenant Pack / Feedback	G	49.3%	43.4%	-5.9%	-12%
	H	27.6%	52.6%	25.0%	91%
Tenant Pack / Smaller bins / Emotive Signage / Feedback	I	35.1%	55.4%	20.3%	58%
	J	26.2%	39.3%	13.1%	50%
In-home / Smaller bins	K	40.7%	52.0%	11.3%	28%
	L	26.8%	31.5%	4.7%	17%
	OVERALL	38.2%	46.8%	8.6%	22%
* all estates have the Flats Recycling Package					

Table 8: Recycling rates for each estate pre and post interventions

Intervention Area	Estate	Pre intervention	Post intervention	% point change between pre & post intervention	% change between pre & post intervention
Control	A	13.6%	18.5%	4.9%	36%
	B	21.2%	27.5%	6.3%	30%
Tenant Pack / Emotive Signage	C	13.5%	15.7%	2.2%	17%
	D	9.4%	12.1%	2.7%	29%
In-home / Emotive Signage	E	11.1%	12.4%	1.3%	11%
	F	9.5%	11.3%	1.8%	19%
In-home / Tenant Pack / Feedback	G	13.9%	11.4%	-2.5%	-18%
	H	6.8%	13.3%	6.5%	95%
Tenant Pack / Smaller bins / Emotive Signage / Feedback	I	11.9%	16.7%	4.8%	40%
	J	8.4%	11.1%	2.7%	33%
In-home / Smaller bins	K	11.7%	16.5%	4.8%	41%
	L	5.8%	7.8%	2.0%	34%
	OVERALL	10.7%	13.4%	2.7%	26%
* all estates have the Flats Recycling Package					

Table 9: Contamination rates for each estate pre and post interventions

Intervention Area	Estate	Pre intervention	Post intervention	% point change between pre & post intervention	% change between pre & post intervention
Control	A	27.5%	21.5%	-6.0%	-22%
	B	16.0%	9.5%	-6.5%	-40%
Tenant Pack / Emotive Signage	C	42.1%	23.4%	-18.7%	-44%
	D	32.8%	26.2%	-6.6%	-20%
In-home / Emotive Signage	E	34.4%	25.7%	-8.7%	-25%
	F	45.8%	35.0%	-10.8%	-24%
In-home / Tenant Pack / Feedback	G	18.0%	16.0%	-2.0%	-11%
	H	44.6%	20.4%	-24.2%	-54%
Tenant Pack / Smaller bins / Emotive Signage / Feedback	I	12.1%	19.5%	7.4%	62%
	J	8.4%	11.1%	2.7%	33%
In-home / Smaller bins	K	14.2%	16.0%	1.8%	13%
	L	42.7%	29.8%	-13.0%	-30%
	OVERALL	30.7%	23.4%	-7.2%	-24%
* all estates have the Flats Recycling Package					

Improving the contamination rate was not a primary objective of this project. However, given the high 30.7% contamination rate revealed in the waste tonnage monitoring, and the confusion and lack of knowledge that residents showed in the surveys, many of the aspects of the Flats Recycling Package directly and indirectly addressed this issue, for example the reverse lidded recycling bins and better quality signage. The project reduced contamination to 23.4%.

Resource London is working on other projects specifically looking to reduce contamination.

QCA results showed that the Flats Recycling Package, especially the provision of clean, well maintained bins and bin areas, adequate collections to prevent overflows and a minimum recycling capacity of 60 litres/hh/wk led to higher capture rates on the case study estates. Estates that had lower quality services before the project started experienced the greatest change in capture rate.

The analysis showed that estates with lower numbers of those aged between 15 and 34 were associated with higher capture rates, as were estates with higher levels of home ownership.

It also showed that there are other factors that influence capture rates that cannot be explained from the project data. These might be societal factors, such as affluence, employment status, environmental attitudes and beliefs, or contextual factors such as means of access to the building or access to the bins by non-residents.

The QCA found that there is little statistical evidence that the five behavioural interventions led to capture rate change. This is likely to be because the Flats Recycling Package had a bigger impact than the behavioural interventions.

The data collected was used to calculate a theoretical maximum recycling rate for the 12 estates, assuming a capture rate of 100%. The results show a theoretical maximum recycling rate of 32% if all six main dry recyclable materials are collected, and 60% if food waste is also collected (Table 10). These figures are comparable with other data available for flats in London¹⁵.

I	35.5%	65.8%
J	34.1%	63.7%
K	34.5%	61.2%
L	26.8%	59.0%
OVERALL	32.1%	60.2%
* Assumes 100% capture of 6 key materials currently collected		
** Assumes 100% capture of 6 key materials currently collected and food		

Key project findings:

- Overall recycling rates were significantly improved over the course of the project.
 - The capture rate increased by 22%.
 - The recycling rate increased by 26%.
 - The contamination rate decreased by 24%.
- There was wide variation in the levels of improvements from one estate to another.
- The Flats Recycling Package led to higher capture rates on the case study estates. The Package was more effective at improving recycling rates than the five behavioural interventions.
- Estates with lower numbers of those ages between 15 and 34 and those with higher levels of home ownership were associated with higher capture rates.
- There are other factors that influence capture rates that cannot be explained by this project.
- The average maximum recycling rate achievable on the 12 estates in the project is 32% (six main dry recyclable materials only) or 60% (six main dry recyclable materials and food waste).

Table 10: Maximum recycling rates for each estate

Estate	Dry recyclables *	Dry recyclables and food **
A	36.6%	63.1%
B	37.5%	64.2%
C	35.6%	60.3%
D	29.3%	60.1%
E	33.0%	60.6%
F	30.8%	56.0%
G	31.0%	56.4%
H	27.8%	58.8%

5. Discussion

This project provides rich insight into factors that influence levels of recycling in purpose-built flats and the intervention delivery process. It is the first project of its kind to include in-depth research with residents as well as those operating and managing services and the first to include such detailed measurement of the amount and composition of recycling and residual waste.

5.1 Flats Recycling Package

The Flats Recycling Package was designed to bring the look and feel of the bin areas up to a common standard and to provide residents with clear and reliable information about recycling and waste services (3.1 Intervention design).

A key finding from the estate inventories research was a lack of consistency in the quality of waste and recycling services provided for purpose-built flats. In the past, when many of these flats were built, the focus was on containing rubbish, typically away from the main entrances and walkways of the building, for hygiene reasons. This often means that the locations of bin areas are not particularly convenient for residents. Recycling services have been delivered in the same vein, with limited space for recycling facilities and consequently limited capacity. There is also widespread evidence of the bin areas not being well maintained.

The results show that the estates that had particularly poor standards before the trial started (Estate B, D, I and H) experienced the greatest increases in capture rate, supporting the finding that the Flats Recycling Package was instrumental in improving levels of recycling on the estates in the trial.

Further, residents' feedback shows that the Flats Recycling Package had a positive effect, improving motivation and knowledge in those who already recycled as well as those who did not, and making them feel that it was easier to do. The cleaner bins and better more consistent service disrupted old habits and prompted residents to think differently about waste and recycling, for the first time in some cases. They said the signage improved their knowledge of what can and cannot be recycled and reported that recycling felt easier since they could use a carrier bag to store and transport their recycling with no need to sort or decant items. The cleaner, tidier bin areas were said to be more pleasant to use.

There are capital and operating costs associated in delivering the Flats Recycling Package. Each local authorities' costs are reliant on key local variables (including collection frequency, rounds configuration and deployment, the number of properties per block, site cleansing frequency and the quality of the existing bins and signage etc.). It has therefore not been feasible to calculate a meaningful cost for either installation or maintenance of the Flats Recycling Package for a typical local authority area. Housing providers, building managers and service providers will need to work collaboratively to manage additional costs. But given the intense financial pressures on local councils, government must also invest in the delivery of effective local interventions of this kind, to achieve its ambitions set out in the Resources and Waste Strategy.

Using the data, the project has modelled what the impact on recycling rates, costs and carbon savings might be if the Flats Recycling Package were applied across London's purpose-built flats at the same time. The results show that there could be a 0.36%¹⁶ increase in London's overall recycling rate (for individual boroughs the increase is dependent on the percentage of flats and can be as high as 2.46%) with carbon savings of 64,000 tonnes of CO₂ equivalent per year.

These results come with a number of qualifications. First, it should be noted that QCA is a case study-based approach that provides results unique to the estates used in the analysis. As such, its results cannot be used to accurately quantify what the effect on capture rates would be on other estates (Appendix 6: Limitations of QCA in this project).

Further, this project has shown the age profile and ownership of flats is a significant factor in determining performance and the flats in the project cannot be said to be representative of the Peabody or London flats stock as a whole. Additionally, it is not possible to model the social norming impact of applying the Flats Recycling Package across London, which is likely to make recycling more habitual across the capital.

Key project findings:

- The standards of existing recycling services in purpose-built flats are highly variable.
- The Flats Recycling Package has shown to improve capture rates in the purpose-built flats in this project.

¹⁶ Due to difficulties in modeling the impact of reductions in dry recycling contamination, this figure is likely to be an underestimation of the overall impact on London's recycling rate.

5.2 Five behavioural interventions

The QCA showed the Flats Recycling Package to be more effective at improving levels of recycling on the estates in the project than the five behavioural interventions. While there was no conclusive evidence that any of the behavioural interventions was effective at influencing levels of recycling, the feedback from residents leads us to believe that some of the interventions did influence behaviour.

Additional small recycling bins

Feedback from residents indicates that the additional smaller bins made it easier for some residents to recycle, but this depended on how close they lived to the main recycling bins, and whether they preferred to recycle little and often, as the aperture on the smaller bins was designed to fit only small bags of recycling.

The data shows that contamination rates in the smaller recycling bins were similar to those in the larger recycling bins and that on average residents put a fifth of their recycling by weight into the small bins and the remainder in the large bins.

Residents were mostly satisfied with the additional smaller bins, but the research did identify potential for improving this intervention by having larger apertures on the bins and by consulting with residents to ensure that the smaller bins are in the most appropriate locations.

Emotive signage

Residents did not generally attribute changes in their recycling practices to the emotive signage but findings from the resident feedback suggests that, used to support the Flats Recycling Package it may have helped to motivate some residents to recycle.

Feedback suggests that emotive messages on their own are unlikely to be persuasive enough to engage non-recyclers. They may even have alienated a minority of people who do not think recycling is worthwhile. Emotive signage is most likely to appeal to those who are already willing to recycle, and might have more impact if the posters were larger, more visible and with harder-hitting messages.

Feedback posters

The research showed that the feedback posters did not have a direct impact on recycling behaviours. It indicates that this intervention is unlikely to influence behaviour on its own, but the resident feedback indicates they could be effective in supporting other interventions.

In-home storage solution

The in-home storage solution, particularly the bags provided in the pack, appears to have been well received by residents, providing them with a simple, end-to-end solution for storing, transporting and disposing of their recycling. Many people used the bags for recycling but only a few used the hooks, either because they couldn't find a suitable place for them or because the hooks broke. Some people used the bags for residual waste.

All estates using the in-home storage solution had recycling bag dispensers at the entrance to each block apart from Estate E where the dispensers were in the bin rooms because of issues with anti-social behaviour. Estate E was the only estate where the bags were not used for recycling, indicating that the location of the bags may have influenced their use on this estate. On average, households used 0.42 bags per week for recycling (Table 11).

Table 11: Average number 'in-home solution' bags used per flat per week

Estate	Bag use in recycling stream /hh/wk	Bags in residual stream/hh/wk
E	0.00	0.36
F	0.59	0.29
G	0.69	0.39
H	0.45	0.30
K	0.46	0.42
L	0.60	0.25
Average	0.42	0.33

Most of the residents were satisfied with the in-home storage solution although some thought the bags should be stronger and available in different sizes. Some suggested including a list of recyclables accepted on the bag and others thought that the appearance of the bag dispensers could be improved.

In-home storage solution packs should be sized to make sure they will fit through all types of letter box. The bag dispensers, which were installed outside entrances because of fire regulations, should ideally be put inside the entrance of each block to prevent the bags getting wet.

Tenant pack

Feedback from residents indicates that the tenant pack was the least effective intervention. It did not influence recycling behaviour because most residents failed to notice it or dismissed it. It did not have the desired effect of creating a sense of expectation or social contract between the landlord and resident and the fact that it did not include anything practical to help with recycling efforts, such as recycling bags, left some residents disappointed.

The research suggests that the tenant pack might be more effective if it was (a) not delivered by post, causing some residents to reject it out of hand as junk mail and (b) if it included something practical, such as recycling bags. Some residents suggested a pack should be sent to new tenants when they move in, setting out recycling expectations and explaining the recycling facilities on the estate.

Key project finding:

- Of all the five behavioural interventions used in the project, the in-home storage solution appears to have had the most influence on recycling behaviours, according to feedback from residents.

5.3 Societal factors

The results show that those estates with the highest proportion of people aged between 15 and 35 and lowest levels of home ownership had the lowest capture rates before and after the trials. These findings reflect those of WRAP’s Recycling Tracker for London¹⁷ that age profiles affect recycling rates and that home owners tend to recycle more than people who rent their homes.

According to the WRAP Tracker 2019:

- 51% of London households missed an opportunity to recycle one or more items that are collected by the council. 63% of 18-34s missed one or more items compared to 40% of those aged 55 or over.
- 81% of London households put one or more items in the recycling that are not accepted in the council collection. 90% of 18-34s contaminated the recycling with one or more items compared to 74% of those aged 55 or over.
- Respondents defined their outlook on recycling by selecting one of four statements that best describes them: 46% of London household selected the statement “I want to be a really good recycler and I take the trouble to ensure that I’m doing everything right” Of these, 38% are 18-34s and 57% are aged 55 or over.

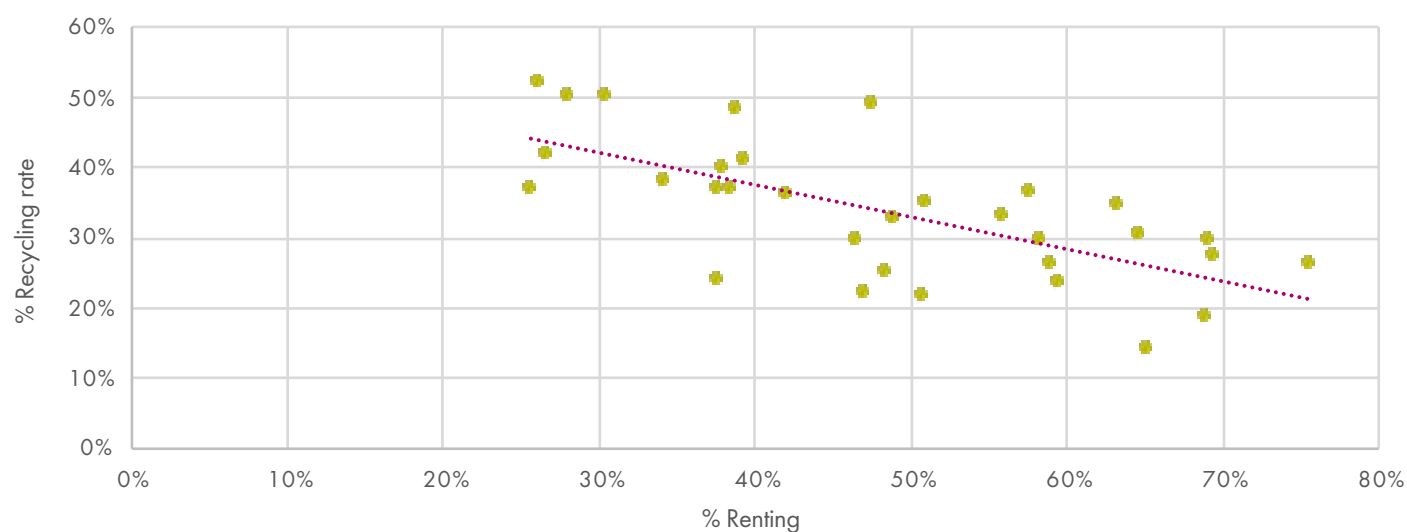
Previous research has shown that there is a strong correlation between areas with lower levels of home ownership and lower levels of recycling (Fig 10).

Fig 10: Graphs showing correlation between home ownership and recycling rate in London boroughs



17 Note that the WRAP Recycling Tracker for London uses the age range 18-34 year olds.

Combined renting (Social and Private)



It is likely that a whole range of other societal factors that were not looked at in this project also influenced capture rates and recycling rates. For example, levels of affluence, an active tenants' association or embedded beliefs about recycling may all affect recycling rates. It is possible that the particularly high capture rate (71%) achieved on Estate B is as a result of such factors not recorded in this trial.

Key project finding:

- More research is required to understand why those aged between 15 and 34 tend not to recycle as much as older people and what might be done to address this.

5.4 Recycling targets

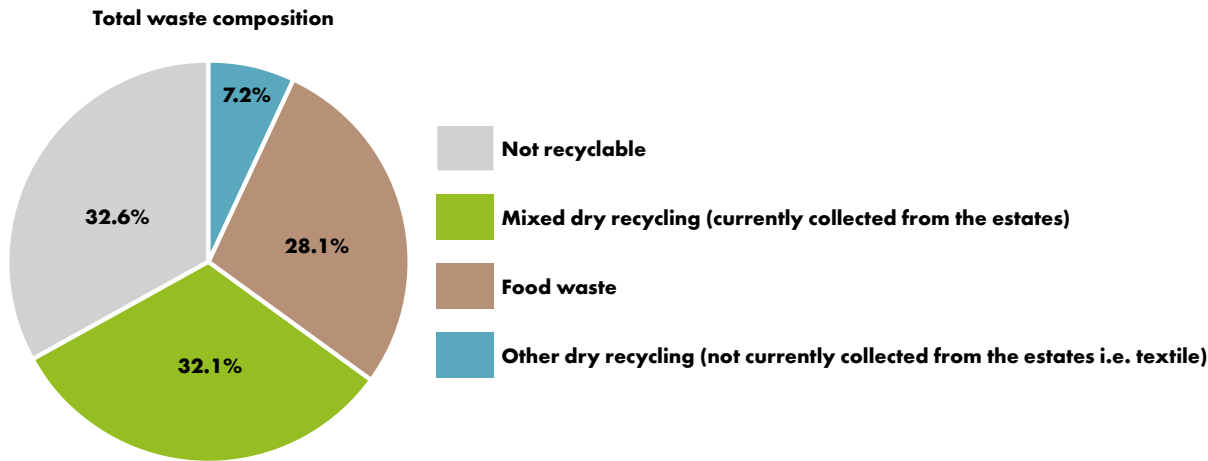
Despite the improvements achieved in this project, rates at the end of the trial were still not as good as the average kerbside collections for low-rise properties in London. Post intervention, the overall capture rate for all estates in the trial was 46.8%, slightly higher than the estimated average for London flats¹⁸. The recycling rate was 13.4%, similar to the average for London flats and well short of London's aspirational target to recycle 50% of household waste by 2030 (see 1. Introduction).

The overall contamination rate at the end of the trial was 23.4%, which is similar to the estimated average for London flats. The main contaminants in order of percentage composition of the recycling were textiles/shoes, food, nappies and electrical and electronic waste. This, and the feedback from residents, shows that people still lack the knowledge to recycle items correctly. For example, many residents do not empty or rinse packaging or remove absorbent pads and food waste from items for recycling.

If the results of the project are representative of London's purpose-built flats as a whole, then the scale of the challenge represented by the recycling targets is significant. The maximum theoretical recycling rate for the six main recyclable materials and food calculated for the estates in the trial is 60%. For estates that do not have a food waste collection, from the case study data the maximum theoretical recycling rate for the six main recyclable materials only, is 32%. A further 7.2% of the total waste, mostly textiles, shoes, garden waste and electrical items can theoretically be recycled outside the home if they are taken to an appropriate collection point, such as a municipal recycling centre or charity shop. This leaves 32.6% of total waste, including non-recyclable paper, nappies, sanitary products and plastic film that is not currently recyclable via any existing collection systems (Fig 12).

With current collection and recycling systems there would need to be a near 100% capture rate of all six main recyclable materials including food in order to achieve overall recycling targets. Given the levels of inconsistency in the behaviour of people living in purpose-built flats revealed in this project, even among committed recyclers this is unlikely (Appendix 4. Storyboard showing inconsistent recycling behaviour of a resident).

Fig 11: Pie chart showing composition of total waste (Appendix 5 shows further breakdowns)



Further context for the targets is provided when the composition of waste from the purpose-built flats in the project is compared with the average composition of household waste¹⁹ in London (Table 12). The maximum potential recycling rate for London waste is 85%, nearly 20 percentage points higher than the

figure of 67% for the case study estates. This is because there was less garden waste, less recyclable material and more non-recyclable waste. While it is easy to understand why flats have less garden waste, the reasons for the other two are not clear.

Table 12: Average London and Peabody estate waste composition

Material	% by weight for London	% by weight Peabody estates
Food	26%	28%
Main dry recyclables (paper/ card, PTT, cans and glass)	40%	32%
Other recyclables (WEEE, 9% textiles)	9%	6%
Garden waste	10%	1%
Other (non-recyclables)	15%	33%
Maximum recycling rate	85%	67%

It is important to note that the information above is based on data from 12 case study estates. There is a wide variety of estates and resident profiles across London. Further work is planned to understand the performance of a representative sample of London purpose-built flats.

There are a number of opportunities and policy initiatives on the horizon, including reusable nappies, deposit return schemes, extended producer responsibility and food waste initiatives that could impact both the volume and composition of household waste in London in the future and ultimately help to reduce the fraction that is currently not recyclable.

Key project finding:

- With current systems London would need to achieve a near 100% capture rate of the six main recyclable materials and food in order to meet the London’s recycling targets.²⁰

19 London Environment Strategy 2018 – GLA (combined flats and kerbside analysis - data from various sources)
20 From our case study estates

5.5 Limitations of the project

QCA was chosen for this project because of its ability to cope well with complexity. It should be noted, however, that since QCA is a case study-based approach, the results are unique to the estates used in the analysis (Appendix 6: Limitations of QCA in this project).

5.6 Opportunities for further work

The project showed the importance of residents' age profile on recycling performance. Specifically, it showed that populations with more people aged between 15 and 34 tend to recycle less. More work is required to better understand why this is the case and what measures might be used to improve results with this age group.

This project looked at purpose built flats on 12 estates in London owned and managed by Peabody. Further work is required to understand the waste and recycling performance of other types of flats in London including the potential of the Flats Recycling Package to make improvements. Resource London is already working with a research and evaluation expert to develop a methodology for gathering waste and recycling performance data that is representative of all types of flats in London, and expects to report on this by the end of 2020.

New food and textiles recycling facilities have been provided on some of the case study estates and Resource London have committed to conducting further monitoring to understand the impact on recycling performance of these services. Given 28% of the overall waste in the case study flats by weight was food waste and that many existing food waste schemes in flats are poorly performing, further work is required to look at how to implement and maintain high performing food waste services in flats.

The project revealed several anecdotal findings that offer opportunities for further study, such as the effect of the cleanliness of bin apertures on residents' behaviour. In addition, the project has shown that contamination was dramatically reduced and whilst this is likely to be due to a combination of improvements that were made as part of the Flats Recycling Package i.e. reverse lid recycling bins and better signage, it would be useful to understand this further.

The London Borough of Hackney recently introduced England's first reverse vending machine on an estate. Residents deposit cans and plastic bottles into the machine in return for a credit slip to use in local shops. Resource London will work with Hackney to understand the impact of this on recycling rates and waste composition.

Whilst improvements were made to recycling, capture and contamination rates on the 12 estates in this project, clearly more research is required to understand how to improve these still further in order to meet regional and national recycling targets. Resource London will work closely with policy makers, building managers and service providers to develop further research

opportunities. This could include trailing the existing interventions with the changes identified in this project or considering interventions that were previously discounted from this project but have the potential to make significant changes based on international research, for example pay-as-you-throw.

Research is also needed to understand the opportunities for waste reduction and promotion of circular businesses targeting food, textiles and nappies.

Given the continuing financial pressures on local government and housing providers it is essential that they understand the costs and benefits of introducing the Flats Recycling Package. Resource London will work with these stakeholders to help them calculate the cost of improving flats recycling and will assist them in implementing the Package on their estates.

LEDNet is committed to working with Resource London to investigate further opportunities arising from this project. "As this report highlights, there are a number of areas where further work is needed to support the implementation of the research findings. Most importantly, we are keen to work with LWARB to understand how well these interventions map into the diversity of London's flatted properties, and the costs of implementation. With local authority budgets continuing to see real pressures, the cost benefit of these interventions needs to be clearly established. There are also a number of new questions that the research throws up, notably the lower recycling performance of 15 – 34 year olds. Again, we would be keen to engage with further work to understand the drivers of behaviour here, and how they can be effectively addressed. Finally, we must not forget the wider factors that influence recycling rates, including funding and planning rules, and we will continue to work on these issues – in collaboration with LWARB and others – to secure the most effective end-to-end system for household recycling." (London Environment Directors' Network)

6. Conclusion

This project is the first of its kind to look at the issue of recycling performance in purpose-built flats from the point of view of residents, as well as those managing housing and operating collection services. It confirms that the reasons why some people living in flats do not recycle as much as they might are many and complex, and that good intentions to recycle do not always convert to action. People do not recycle consistently unless they are motivated to do so, have an appropriate level of knowledge about what they can recycle and how, and have a practical infrastructure that makes recycling easy.

The project shows the existing standards of recycling services in purpose-built flats are highly variable and that the most important factor for improving capture rates is the provision of a good service standard, as described by the Flats Recycling Package. At the time of the research, most of the 132 estates where inventories were carried out for this project were not meeting those standards. All building managers and service providers are encouraged to critically review their service provision to purpose-built flats in the light of this report.

It is recommended that building managers and service providers put in place and maintain the Flats Recycling Package in every estate in London, including clean, well-maintained bins and bin areas conveniently located with sufficient capacity, and the collection of a full range of mixed recyclables. Good information should be clearly displayed. A toolkit for delivering the Flats Recycling Package will be available shortly. It provides practical advice and guidance to help housing providers, building managers and service providers implement improvements in purpose-built flats.

Other interventions, including the provision of plastics bags for in-home storage of recycling, emotive signage and feedback posters, may be effective in marginally improving the capture rate. In some cases additional small recycling bins might also be useful. Interventions should be tailored to the needs of individual estates.

Societal factors are important in influencing recycling performance in flats. This project shows that estates with higher numbers of renters and people aged between 15 and 34 have lower capture rates. More work is needed to better understand these and other societal factors and their effect on recycling performance and to design appropriate interventions.

The recycling target set by the Mayor of London in the London Environmental Strategy to recycle 50% of local authority collected waste by 2030 is ambitious. In order to achieve it, capture rates will need to be significantly improved and new systems introduced to broaden the range of household waste materials that can be recycled.

Key recommendations:

- Housing providers, building managers and service providers can improve recycling capture rates in purpose-built flats by working together to put in place and maintain the Flats Recycling Package on every estate.
- The Resource London Flats Recycling Package toolkit offers practical advice and guidance to help housing providers, building managers and services providers to implement the Flats Recycling Package in purpose-built flats. The toolkit will be available in March 2020.

APPENDICES

Appendix 1: Example of an estate inventory

Created	2018-01-19 09:01:06 UTC by RF 257
Updated	2018-02-10 13:46:29 UTC by Coralline Dundon
Location	51.5247345331, -0.125905573368

General details

Date	2018-01-19
Time started	09:01
Site reference number	138
Name of site	
Address	
Borough	Camden
Caretaker met?	Yes
Number of households within Estate	114
Does part of the estate receive a kerbside collection?	No

Photos

Take general site photos in this section. Photos of bin areas and recycling signage should be added in the bin store/area section

General pictures of site



Map of site & local amenities

Notice board 5

Please geotag the following locations: • Entrances • Site office • Notice boards • Litter Bins • Any businesses or transport within the estate
Remember you can adjust the location manually if needed. The location of buildings and bin stores will be logged automatically within the bin store section.

Name of logged site item	Notice board 5
Type of site item	Notice Board

Entrance 1

Appendix 2: Project participants

Brand Narrative

Assistance with the review of current recycling facilities and supervision of sign installation.

Cutting Edge Marketing Ltd.

Contractor responsible for brand development and content of the signage and promotional material.

Defra

Steering Group member.

Get it Sorted Limited

Contractor responsible for the project management of the design of promotional material, sourcing print/manufacture and installation of signage, setting of the case study studies, flats toolkit and this report.

Greater London Authority

Steering Group member.

London Boroughs of Camden, Hackney, Islington*, Lambeth, Tower Hamlets*, Westminster*

Local authorities where the estates of purpose-built flats used in the project are located, responsible for waste and recycling services. *Steering Group member.

Peabody

Housing association, owns and manages the estates of purpose-built flats used in the project.

Steering Group member.

Radley Yeldar

Behaviour change consultancy responsible for helping to develop and deliver the interventions.

Resource Futures

Contractor responsible for the estate inventories, waste monitoring and composition analysis.

Resource London

Project lead and majority funder.

Steering Group member.

Revealing Reality

Contractor responsible for the ethnographic research.

Veolia Environmental Services

Collection contractor for eight of the estates of purpose-built flats used in the project. Provision of waste composition analysis sorting site (in partnership with the London Borough of Lambeth).

Steering Group member.

Winning Moves

Contractor responsible for the qualitative research – resident and stakeholder feedback.

Appendix 3: Glossary

Capture rate

The proportion of the six main recyclable materials collected for recycling.

Contamination rate (not one of the six main recyclable materials)

The proportion of non-recyclable materials arising in the recycling collection.

Purpose-built flat

Flats in buildings which were constructed as flats rather than those which have been converted from their original purpose into flats for example, a Victorian house or repurposed industrial building. Purpose-built flats can be of any tenure (rented or owned), be a stand-alone block or several blocks together making up an estate.

Recycling rate

The proportion of total household waste recycled.


Six main recyclable materials

Glass, cans, paper, card, plastic bottles and mixed rigid plastics (tubs, pots and trays).

Qualitative Comparative Analysis


QCA is a rigorous method that enables a systematic comparison across case studies to reveal which causes contribute to differences in outcomes across the cases studies. The analysis seeks to identify factors or combinations of factors that appear necessary and/or sufficient for the outcome of interest to be observed. QCA can combine quantitative and qualitative data to cover different theorised causes, and it has been used in other policy areas including health and education. It uses Boolean logic to determine which factors or combinations thereof must be present to observe a particular outcome.

Appendix 4. Storyboard showing inconsistent recycling behaviour of a resident




It's 5pm and Mary is hungry!


She makes herself some pasta in the microwave...



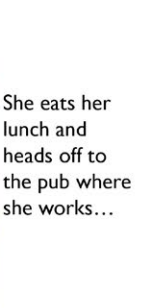
She knows plastic film isn't recyclable, so she throws it in the residual bin! ✓




She rinses out the black plastic tray.




She throws it in the recycling bin. Mary is our star recycler!




She eats her lunch and heads off to the pub where she works...




Later that night, back from work, Mary decides to have some more microwavable pasta...




But wait! What is Mary doing?! She opens the residual bin...



And this time, places the dirty black tray in the residual bin!

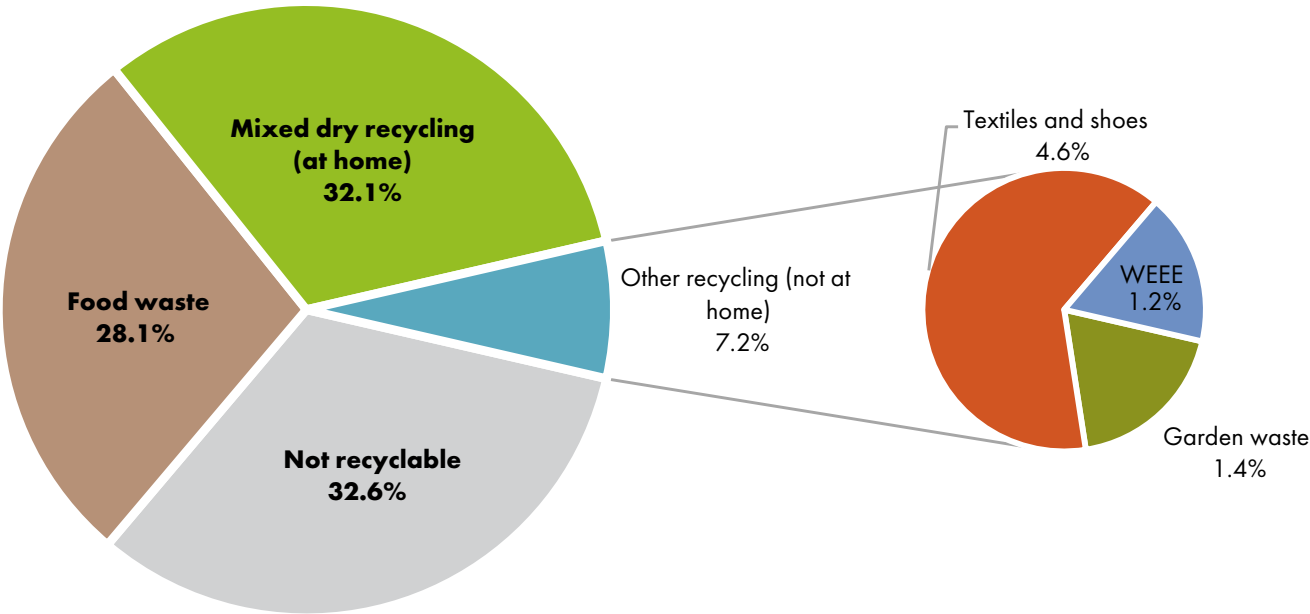


And gives it a good push all the way down to the bottom of the bin!

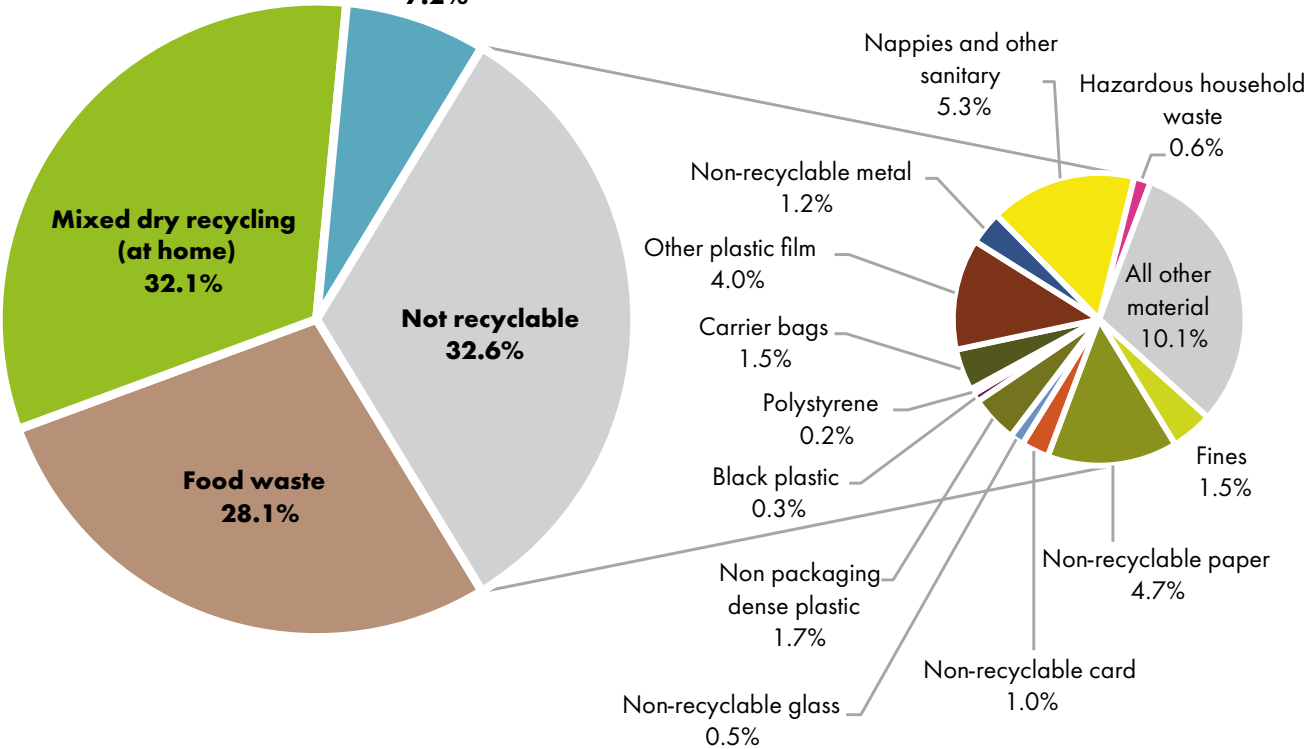


Appendix 5. Pie charts showing composition of total waste

Other recycling (not at homes)

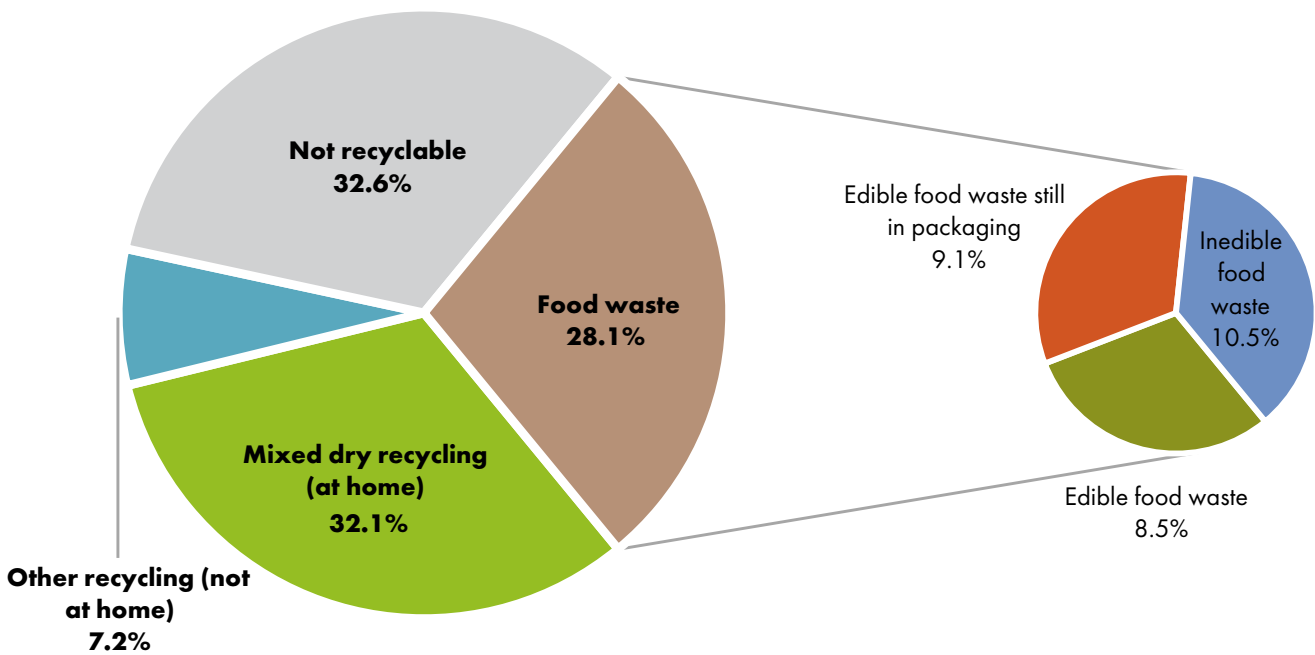


Other recycling (not at home) Not recyclable

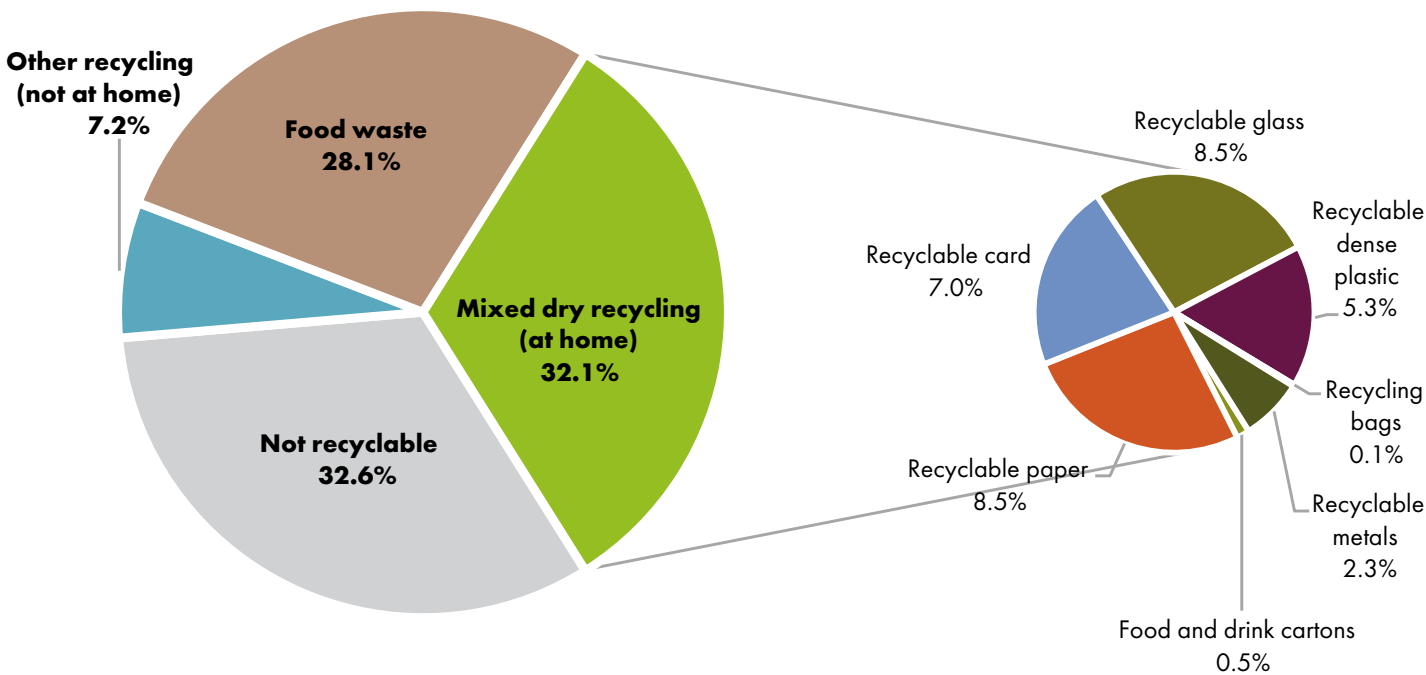


Appendix 5. Pie charts showing composition of total waste

Food waste



Mixed dry recycling (at home)



Appendix 6: Limitations of QCA in this project

QCA was chosen for this project because of its ability to cope well with complexity. It should be noted, however, that since QCA is a case study-based approach, the results are unique to the estates used in the analysis.

As a result, it is not possible to recommend a threshold for a particular condition that would increase recycling performance at an estate outside of this project. It is also not possible to place a level of confidence or percentage likelihood that if a condition or combination of conditions were put in place at an estate, recycling performance would increase, or indeed by how much. This is because each case is seen as an entire unique population, rather than a representative sample of a greater whole. The 12 cases instead provide a rich evidence base for those who commission, manage and deliver recycling services.

In this project the analysis is conducted on a small number of estates that will not be perfectly representative of the population as a whole (e.g. all flats estates in London or the UK)

The comparisons estates were higher performing pre-intervention and in the case of Estate B, its pre intervention capture rate was higher than the post-intervention capture rates for each of the other cases. This does not pose a problem in a QCA, however, Estate B clearly shows that there may be additional conditions that go beyond what would be expected based on the conditions included in this QCA. These additional conditions could be contributing to the presence of higher capture rates. Some differences may be explained by conditions not included in the project as they did not fulfil the fundamental criteria for inclusion in the analysis (section 2.3.1). The analysis is not designed to provide statistical results, rather it is to explore what factors or combinations thereof are necessary and/or sufficient to generate higher capture rates.

It will not be possible to scale up the findings in a statistically robust way - for example, if we spend X in total across London's flats then the recycling rate will increase by Y. Similarly, it is not possible to recommend a threshold for a condition that is necessary for the outcome - for example, if the proportion of those aged between 15 and 34 is X, then recycling will increase by Y. This is because each case is seen as an entire unique population, rather than a representative sample of a greater whole. The 12 cases instead provide a rich evidence base for local authorities and landlords to understand "causes" of poor recycling performance in other comparable situations, and to take relevant action.

In many cases it has not been possible to bench mark the outcomes or conditions against the wider population and as such many conditions are ranked relative to each other. This presents a weakness in the analysis since it is not possible to extrapolate the finding to a wider population.

The number of interventions or combinations of intervention, large variation in the estate and resident profile characteristics, and small number of cases mean that it has not been possible to get clear insights into the impact of individual interventions.

There has been a limit to how far it has been possible to take the analysis within the time available within the project. There were issues with the quality of data provided for inclusion in the QCA and as such a re-run the full range of analysis was required which meant that it has not been possible to conduct any additional analysis. Recommendations for further analysis that may help explain the conditions driving capture rates and capture rate change are outlined in the full evaluation report available on the website.

Contacts and further help

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