APPENDIX FOUR e

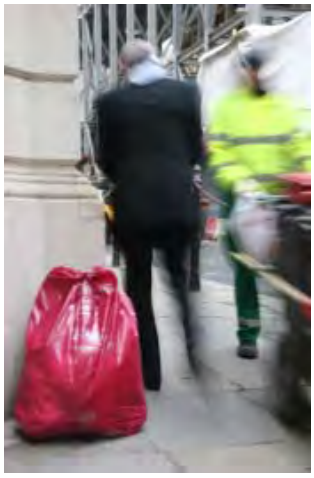
THE PERFORMANCE OF LONDON'S MUNICIPAL WASTE RECYCLING AND COMPOSTING COLLECTION SERVICES

Greater London Authority

PN495 The Performance of London's Municipal Recycling Collection Services

Hyder Consulting Report

Final Report



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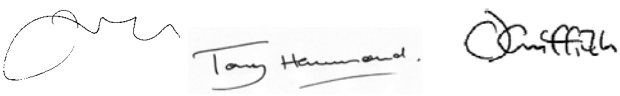
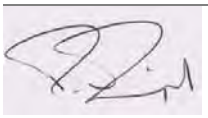
Authors	Ian Poyser, Carmel Griffith and Tony Hammond	
Checkers	Patrick Pierrepont & John Peake	
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1 Executive Summary

1.1.1 INTRODUCTION

The Greater London Authority (GLA) has identified the need to develop the current understanding of recycling performance and service provision across London in order to help inform the Mayor's Draft Municipal Waste Management Strategy. The strategy aims to meet and exceed European Union Landfill Directive and United Kingdom recycling targets.

This report was commissioned to inform Policy Section Four of the aforementioned waste management strategy. The strategy challenges London boroughs to achieve performance of 45 per cent municipal waste recycling or composting by 2015, 50 per cent by 2020 and 60 per cent by 2031 .This report aims to show case good practice and identify high quality and cost effective collection services that achieve high rates of recycling. A key objective is the identification of participation and capture rates by collection method, housing type and waste composition within each London borough. The following housing types were selected to be the subject of this study.

- doorstep –flats (including maisonettes and houses concerted into flats);
- doorstep – houses (attached / semi / detached);
- near entry – flats (including low, medium and high rise blocks);
- flats above shops

In addition, this report provides information on business waste recycling services offered by or on behalf of the London boroughs.

Acknowledgements

Hyder would like to thank all boroughs that have contributed to this study by responding to the questionnaire, attending stakeholder workshops and assisting the development of case studies. We would also like to thank everyone that has contributed to research in this field where your research has been used to support the study.

1.1.2 METHODOLOGY

The research methods utilised for this study were as follows:

- a bespoke survey and questionnaire issued to all London boroughs
- a stakeholders workshop
- a review of waste statistics through WasteDataFlow (WDF)
- a literature search and evaluation of waste information on council websites.

A review of the responses to the surveys, questionnaires and data requests enabled data strengths and weakness to be highlighted. As a result it was revealed that there are limitations on the available information on waste composition and participation specific to the four target housing types.

Despite significant gaps in specific data relating to the housing types, it was agreed with the Project Team that the methodology developed, could still provide beneficial information for a high level analysis of recycling performance and the production of qualitative case studies. These studies and analysis provide information that indicates likely contributing factors to high recycling performance by way of identifying both reasons for success as well as barriers. This information and analysis has been used to build the evidence base for recycling performance in London and to demonstrate where management methods can improve performance, thereby achieving the original project aims.

1.1.3 KEY FINDINGS

Research Gaps

The literature search and review identified that there is only limited research and performance data available in the field of dry recycling and organics collection systems for the housing types required by this study, especially in relation to the London boroughs.

Greater London's Recycling Performance

In 2008/09 over 600,000 tonnes of kerbside collected material was sent for recycling, composting or anaerobic digestion. This was almost 21 per cent of all household waste and 72 per cent of London's recycling/composting performance. When looking at reported BVPI82a for 2007/08 London boroughs perform well in comparison to other English Authorities such as the Metropolitan boroughs.

Material Capture

Based on the 2010 Defra review of Municipal Waste Composition[1] we estimate the following capture rates;

- The average recycling yield for London collection systems is 140kg/hh/yr with an estimated capture rate of 37% at kerbside.
- The highest food waste yield is 43Kg/hh/yr achieved by Richmond with a food waste capture rate of 20% at kerbside.

Housing Profiles and Performance

The estimated housing profile for London is 47% flats and 53% doorstep properties. The study found that flats provide a range of challenges and opportunities for the boroughs. Generally flats perform less favourably than doorstep houses, often suffering from low participation and capture rates. A report commissioned by WRAP on Barriers to Recycling at Home[2] outlines these issues and provides evidence that residents in flats are less committed recyclers as a result of these barriers.

This study shows there is a relationship between the percentage of purpose built flats (PBF) and the overall percentage of waste arisings sent for reuse, recycling, composting or anaerobic digestion.(NI192 [3]). Where the percentage of PBF is higher, there is a corresponding reduction

[1] Municipal Waste Composition: A Review of Municipal Waste Component Analyses.2010.Defra.

[2] Barriers to Recycling at Home, WRAP.2008

[3] (NI192 2008/09) Indicator measuring the percentage of household waste arisings which have been sent by an Authority for reuse, recycling, composting or treatment by anaerobic digestion

in overall NI192 performance. This reflects the various additional barriers to recycling associated with this type of property and which affect service coverage as well as participation and capture rates.

Inner London boroughs are more densely populated, have a higher percentage of purpose built flats and should therefore have lower household recycling performance. However, average dry recycling yields for both inner and outer London are very similar in terms of performance. This may reflect how boroughs have adapted household recycling service provision to suit the majority housing type, thus overcoming some of the barriers associated with flats.

It is also noted that the outer London boroughs collect more garden waste and food waste where they have a larger percentage of properties with gardens and a wider coverage of organic collection services.

Contamination

The London average for contamination is calculated at 7% which is significantly below the national average. Surveyed authorities identified a very wide variation in contamination levels ranging from 0% to as high as 17%. There is a need to identify the causes and solutions to contamination to help improve the efficiencies of recycling collections. It is likely that recycling arising from co-mingled communal flat facilities will have higher levels of contamination largely as a result of:

- Issues with 'point of collection' quality checks at communal near entry facilities where larger containers can conceal contamination
- Barriers to communicating with residents in flats due to access,
- Practical issues such as container storage, resulting in insufficient capacity for recycling and/or refuse.

Boroughs with a higher percentage of purpose built flats may experience higher levels of contamination if the necessary and appropriate type and level of communications support, resources and planning are not provided to adequately address these barriers and issues.

1.1.4 Evaluation of Overall Kerbside Dry Recycling Collection Performance

The study has identified a number of different factors that influence and impact upon kerbside dry recycling collection performance namely:

- Socio-economic factors
- Service related factors such as:
    i. Type of collection system
    ii. Material types collected
    iii. Container types and capacity
    iv. Frequency of collections and relationships with other services
    v. Communications

The research identifies that there is no single variable or characteristic that can explain all of the variation in kerbside recycling performance across all boroughs. Rather it is a combination of the above factors that give rise to differences in performance.

Socio-economic Factors

A WRAP report produced in 2009[4] focused on the performance of dry recycling. It identifies that demographic and socio-economic factors and the prevailing 'characteristics' of an area have a significant influence on recycling performance - just over a quarter of the variation in local authority dry recycling performance can be explained by the characteristics of the local area and population. Some local authorities typically those in high density areas with high levels of deprivation face a series of additional challenges or barriers that others do not.

This study shows a direct correlation between dry recycling yields, NI192 performance and the Index of Multiple Deprivation (IMD) score for each London borough, where lower IMD scores give rise to higher dry recycling collection yields and overall higher NI192 performance.

Socio-economic factors play an important part in the recycling performance of each London borough.

Isolating these socio-economic factors to determine the influence of the service related factors refered to at 1.1.4 above is not straight forward. However this study has identified a number of boroughs that appear to perform above or below the trend whereby lower IMD scores give rise to higher dry recycling yields and higher NI192 performance. These variances may signify the influence of service related factors.

1.1.5 Doorstep Properties

Type of collection system

The study revealed that the most common type of collection system used by boroughs is co-mingled weekly collections. Co-mingled collections appear to deliver the widest range of collection system performance, and compare favourably with kerbside and multi stream systems.

A review of various research identified that no one report advocates the use of a particular collection system for a particular housing type. Where there are practical and operational barriers to kerbside sorting, two stream co-mingled collections have significant advantages over single stream collections, mainly through improved material quality and value as a result of keeping paper and card separate from other materials, particularly glass. Single stream co-mingled collections may be appropriate in circumstances where the other options are impractical. These might be the densest urban areas where on-street parking and heavy traffic require fast loading without the need to return containers to the point of collection or for high density flats, transient areas and multi-occupied properties[5]

However the research did highlight that while guidance is useful, it can be taken too literally by contractors when implementing services, and is not always suitable for all properties. It is clear that flexibility is a key requirement in service provision for each housing development

Material Types Collected

The boroughs provide a range of services often dependent upon the type of collection system and available transfer and MRF infrastructure. Kerbside systems in general offer a greater

[4] Analysis of kerbside dry recycling performance in England 2007/08, WRAP.2009

[5] WRAP. 2009. Choosing the Right Collection System

range of material collections than co-mingled collection. London collection systems that collect one or more additional materials on average collect 20kg/hh/yr more.

Container Types

London boroughs use a variety of containers that are compatible with their collection method. The most popular containment methods in London are reusable boxes, bags and single use sacks. WRAP[6] state that residents would recycle more if they had more and/or bigger recycling containers.

The study found that there is a correlation between available capacity and performance, where increased provision of capacity leads to higher yields. However, the range of materials collected, frequency of collection and relationship with other services as part of the overall service provision is likely to determine total capacity.

Single use sacks appear to have the widest performance ranges. Access to sacks is essential to maintaining participation if a borough fails to deliver sacks and relies on residents to collect them then they are likely to see a diminished participation rate over time.

In general, a range of containers are suitable for doorstep properties as they tend to have more curtilage and in-property storage space than in purpose built flats.

The use of co-mingled single use sacks may be favourable for more densely housed areas where street space is restricted and reusable containers can go missing. Single use sacks also allow flexibility in capacity, i.e. more sacks can be used over busy Holiday periods when more recycling is generated.

The use of boxes and reusable bags is also suitable. As with wheeled bins these types of collection systems are better suited to less densely housed areas where there is more street space. This may be particularly relevant where boroughs have a higher percentage number of doorstep flats (houses converted to flats) where space for containers on collection day can be an issue.

Frequency of Recycling & Residual Collections

The impact of fortnightly residual collections appears to give rise to higher yields, which is consistent with WRAP studies. Boroughs with a weekly or fortnightly collection of recycling and a fortnightly collection of residual appear to have slightly higher recycling yield than those with a weekly residual collection. Boroughs providing a fortnightly residual collection use wheeled bin for refuse containment.

Communications

Determining the impact of communications on recycling performance is a difficult assessment. Where possible we have drawn upon the information provided by boroughs, however whilst this information is not measured we have provided some anecdotal information on its impact. Based on the information provided, the review has identified that where four boroughs offer ongoing communications support these appear to be higher performing boroughs.

A review of the information provided by boroughs in response to the questionnaire along with a review of the WRAP report - Barriers to Recycling at Home[6] indicates that communications plays an important role in the success of service delivery and ultimately the performance of a recycling scheme regardless of housing type.

[6] Barriers to Recycling at Home, WRAP.2008

1.1.6 Near Entry Flats (Purpose Built Flats)

Evidence from survey returns and case studies suggests that not all flats receive a near entry or doorstep collection and therefore residents rely on Community Recycling Banks, Bring Banks and Household Waste Recycling Centres (HWRCs). The coverage of services to flats could not be easily identified from our surveys or from borough websites.

Near Entry Systems

No one collection system appears to deliver higher yields for flats. It is more likely to be attributed to other service factors such as container type and the range of materials collected.

Material Types

The majority of boroughs collect a full suite of five or more materials, some with the addition of drinks cartons. A full suite of recyclables: paper, card, glass, plastic bottles and cans, plus one additional item give rise to higher yields as long as there is sufficient storage capacity to suit frequency of collection. The collection of bulkier items such as plastics and cardboard often requires more communal bins; with space constraints this is not always possible.

Container Types

The provision of resident's internal storage containers to contain and carry waste to communal areas has a positive impact on the yields. There is evidence to suggest that higher performing boroughs include the provision of reusable sacks.

Frequency of collection

The frequency of collection is relative to the capacity of the containers. Where space does not allow for sufficient or additional containers then more frequent collection is required to maintain empty capacity.

Doorstep Collections

Data provided for doorstep collections appears to be inconclusive, with one borough showing yields for doorstep collection to be lower than communal near entry systems, while another borough shows the opposite.

A study carried out by Western Riverside[7] found that door-to-door recycling systems recover the highest weight of material when compared to Near Entry Systems. In addition, those schemes using single-use sacks or carrier bags for collection recover almost three times more recycling than those using boxes or baskets.

Chute systems

The specific topic of chute based systems was also investigated. There is limited detail on the performance of chute based systems and therefore inadequate guidance on this collection method.

The conversion of existing chutes to accommodate recycling can bring about positive benefits. Existing research from trials suggests that yields of up to 200kg/hh/yr can be achieved[8].

[7] Western Riverside, 2005. Estates Recycling Research. Produced by London Remade

[8] http://www.wrap.org.uk/downloads/Performance_Summary_Table.649a8991.6893.pdf

Residents without chutes for residual waste have a higher yield[9]. Issues with chutes include increased levels of contamination when the recycling chute is a considerable distance away from the refuse chute.

1.1.7 Organic Waste Collection Performance

The research also investigated garden and food waste collection services. It identified that on the whole food waste collections are not as firmly established in London as dry recycling. Food waste collections only cover 26% of London households, the majority being DSPs. Green waste collections are more established and cover 62% of London's households, and are provided largely though dedicated services, although approximately 10% are provided via a mixed food and green waste service.

Food Waste

WRAP provide guidance[10] to assist Local Authorities plan, implement and deliver food waste services. Drawing from local authority schemes currently in operation including WRAP trials and other research to date WRAP identifies that:

- Refuse collection frequency is a statistically significant factor in the performance of food waste collections. Areas with fortnightly collections of refuse have higher weekly food waste participation and yields
- Participation and yields can decline over time in areas with weekly refuse collections, whilst in areas with fortnightly refuse collections yield and participation is maintained
- Areas with weekly black sack collections provide higher food waste yields than areas with weekly 240 litre wheeled bin refuse collections
- Food waste yields may also be influenced by the size of the wheeled bin provided for refuse
- Higher food waste yields will be found in more affluent areas

This WRAP study found that the type of collection system does not appear to have a major impact upon the performance of food waste collections. The methods of collection are largely the same and include the collection of an external caddy which is emptied manually directly into the vehicle or emptied into a slave container.

As part of the 2009 WRAP food waste collection trial[11] all the trial rounds used liners with the exception of two rounds in Surrey. Previous research undertaken by Eunomia[12] has suggested that providing residents with liners can improve the performance of food waste schemes, primarily because it makes the scheme cleaner and easier for residents to participate.

Generally source segregated food and residual waste is collected on a weekly basis using sacks and in some case sacks and wheeled bins. It's not possible to determine the impact of wheeled bin collections, however existing research indicates that this will result in lower yields.

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[9]WRAP.http://www.wrap.org.uk/local_authorities/research_guidance/collections_recycling/recycling_collections_for_flats/operation_of_different_collection_schemes/bring_schemes.htm

[10] Food Waste Collection Guidance, WRAP. 2009.

[11] WRAP 2009. Evaluation of the WRAP Separate Food Waste Collection Trials

[12] Eunomia, 2006. Kitchen Waste Collections: Optimising Container Selection.

None of the boroughs collect residual on a fortnightly basis where food is source segregated, with the exception of Kingston; Kingston's higher performance may be attributed to fortnightly collection of refuse, where fortnightly collections of residual waste and black sack collections are likely to increase performance[35.]

Any communications specific to food waste collection will have a positive impact upon performance; however it is difficult to determine the relative impact of communications between each borough without details on pre and post campaign monitoring. Ealing carried out a large scale communications campaign in 2007 which increased participation in food waste collections by 2.7%[13].

It is important to ensure that the right level of resourcing, communications and customer support is in place from the start. Underestimating resources from the outset can lead to service failures and result in reduced participation

Organics services to flats is an area that is developing fast with little robust performance data to support claims that near entry systems for flats can compare favourably with kerbside collections from DSPs. With effective planning, good location of communal bins, provision of internal containers and effective targeted communications food waste collections can produce high yields.

Mixed Food and Green

Mixed food waste collections cover approximately 360,000 London households or 10%of dwellings.. Limited performance data was been provided for mixed food waste collections with only Greenwich providing data for this service. This study has identified that the authorities which collect either green waste or mixed green and food waste have a higher overall performance. However, when compared to weekly food waste only collections combined food and garden waste schemes achieve a much lower food yield per household and hence lower level of diversion. A recent WRAP report concludes that combined organic waste collections are less effective in diverting food waste for recycling compared to food only collections. As a result it will be much more difficult to achieve high diversion / recycling targets with combined food and garden collections systems.

Garden Waste

Green waste collection yields are largely affected by charging, frequency of collection, seasonal collections and container type. Systems which include free or unconstrained garden waste collection services tend to be more costly than those which target food waste only. The key reason is that additional garden waste otherwise composted at home can be pulled into the formal waste management system.

The additional cost associated with adding food waste to an existing garden waste collection can be significant. This is because all the material must be treated in accordance with Animal By-Products Regulations requiring treatment through either in-vessel composting or anaerobic digestion at gates fee considerably higher than are charged for the relatively simple open windrow composting of green waste alone.

[13] Figure provided courtesy of Ealing Borough Council.

1.1.8 Operational Costs

We carried out a review of dry recycling collection cost data provided by boroughs against indicative cost[14] data. This is summaries in Table 1.1 below.

Table 1.1 Comparison between indicative costs and actual costs (Hyder Survey 2009 / WRAP 2007)

	London Borough Actual Cost		WRAP Indicative Costs	
	£/T	£/H	£/T	£/H
Kerbside Sort	156 - 209	19-29	79 - 131	9 – 23
Multi Stream	81 -139	14 -31	61 – 78	11
Single Stream	89 - 157	14 -26	61 -80	10 - 11

Both the indicative costs and the actual cost for kerbside sort have the highest cost range which reflects the additional time, labour, and vehicles required to undertake kerbside sorting of materials. In both cases the cost for multi stream and single stream are lower. There is very little difference between multi stream and single stream cost's; this is also reflected in the indicative and actual costs. Higher actual costs probably reflect the market rate and contract price for the delivery of services rather than baseline costs used in the WRAP Kerbside Analysis Toolkit[15]

From the data collected there is evidence to suggest that;

- Higher yields incur a higher operational cost per household
- Higher yields result in a lower operational cost per tonne
- Operational costs per household increase with overall NI92 performance increases
- There does not appear be a corrolation between cost per tonne and overall NI192

1.1.9 Commercial Collections

A summary of existing research including the GLA: Best Practice Guidance, Trade Waste Recycling[16] identified that there are several factors that are likely to give rise to a scheme's success, higher participation and material capture and these and other considerations are summarised below;

- Initial, targeted research and market assessment is essential when considering setting up a trade waste recycling scheme
- Contract reviews for trade ups should be investigated

[14] WRAP 2007. Kerbside Collection: Indicative Costs and Performance.

[15] KAT enables projections of infrastructure requirements and associated costs for the implementation of different kerbside recycling and composting collections ("kerbside collections") within a local authority. WRAP 2007

[16] GLA: Best Practice Guidance, Trade Waste Recycling.Entec, 2005.

- Flexibility in the frequency of collections and the range of materials for collection and recycling should be investigated
- Targeting different business types for specific materials
- Identification of markets to increase profitability
- Reliability of the service including availability of resources
- Financial arrangements for service delivery including income and pricing structure
- Development of pilot schemes
- Promotional activities
- Monitoring of collection materials, participation and cost is essential to determine the operational efficiency of the scheme as well as providing feedback

This study indicates that participation rates range between 2% and 44%. The two lowest participation rates appear to be for boroughs offering only limited material collections i.e. glass, paper and cardboard.

Higher participation rates appear to be for boroughs offering a wider range of material collections. The boroughs with participation rates of between 24% and 25% appear to be for boroughs offering financial incentives for businesses to recycle and a wide range of materials. However the highest participation which is 44% is for a flat rate pricing structure whereby residual is the same price as recycling. It must be noted that this Borough has the lowest overall customer base and therefore we cannot rule out the impact that marketing and promotions will have on increasing participation.

1.1.10 RECOMMENDATIONS

The following recommendations identify both short and long term proposals to improve recycling performance in London.

1.1.11 Research Data

The research has identified a lack of available and verifiable data; however this could be overcome by undertaking selected participation monitoring of recycling schemes amongst the housing types. This would provide information to run targeted communications campaigns to encourage occupants who are not participating in schemes to take part. Carrying out waste composition analysis of recycling schemes would help understand current capture rates and contamination and this could be used to increase the quality of dry recyclables collected, by targeting those households that are unsure of which items they are able to recycle.

In addition, It is also recommend that a dedicated study be commissioned to be focused solely on determining collection cost data by collection system, and where possible housing type. The study could also look at revenue and income sharing arrangements to determine the net cost of recycling.

1.1.12 Communications

Increasing the level of communications across all the housing groups will bring about improved performance; this could include the re-launching or rebranding of a borough wide dry recycling or food waste scheme. Improving customer contact and service resolution responses rates. It could also comprise of focused door knocking targeted at lower performing areas.

1.1.13 Contamination

One issue that has an impact on the performance of municipal household and business recycling services offered by London boroughs is contamination. In particular with a majority of the boroughs collecting co-mingled material from either kerbside houses or flats and using MRFs there is a need to identify the causes of contamination and the measures that can be reduced to eliminate them. To reduce contamination, the following should be considered;

- Development of specific communication campaigns
- Training sessions for collection crews in the pilot areas so that they are able to understand why contamination is a problem and how this should be communicated to residents

1.1.14 Enforcement/Incentives

Compulsory recycling and active enforcement is a relatively new initiative and at present is limited in its use by boroughs.

As the pressure to recycle more waste increases, it is likely that more boroughs will explore compulsory recycling. However, for those boroughs who have implemented the policy, the emphasis has been very much on communicating with the public and using enforcement officers as a means of education on the ground. Enforcement and fixed penalty notices are very much a final option.

The alternative is to promote reward schemes which are also being promoted within London and provide an opportunity to encourage more recycling by giving something back to people who put in the effort to waste less and recycle more things, more often. Reward schemes are popular and widely used by consumers, so it is a natural extension to see how they can be used to help the environment.

Pilot projects should be investigated providing a mix of both incentives and enforcement.

1.1.15 Commercial Waste

There is a clear need for a dedicated study into the potential to expand the coverage of commercial recycling services; including partnership with the private sector to deliver a wide range of material collections . The study should identify Borough support for commercial initiatives, barriers to service provision, collection infrastructure and capacity to manage municipal commercial recycling and the net cost of service delivery.

1.1.16 Quick Wins for collection systems

Based on the findings from the survey responses, the workshop, case study Interviews and existing research we have identified a number of quick wins that could go some way to improving household recycling performance and meet the Mayors first draft waste strategy target of 45% recycling and composting by 2015. These have been presented in Section 17 of the main report where we have provided recommendations for each collection services by housing type. In summary the following quick wins were identified for each housing type.

Dry Recycling Doorstep Properties

- Provision of sufficient container capacity for collection systems, including the provision of single use sacks and boxes. In some cases additional materials have been added to collection systems without additional capacity which may displace other materials rather

than increase yield. It is likely that heavy materials are left out in favour of lighter bulkier packaging materials.

- Not all boroughs provide a full suite of materials in their collection arrangements. Dependant on MRF arrangements there is still significant room for improved glass and card material capture. Currently two boroughs do not collect card and two do not collect glass, which would bring about immediate performance improvement. Notwithstanding the above , where possible the collection of textiles should be considered where compatible with existing collection systems. These are already a common feature of kerbside sort collections in London.
- Increasing the level of communications across the housing groups. This could include re-launching or rebranding a dry recycling scheme to the whole borough, improving customer contact and service resolution response rates or addressing issues associated with contamination via better communication. Targeting lower performing areas through door knocking can increase awareness of recycling and services. Some boroughs are already undertaking this on an ongoing basis.

Dry Recycling Near Entry Purpose Built Flats

- Expanding the coverage of recycling services to PBFs to include those flats that do not currently have near entry or door to door services as result of access issues, ongoing safety concerns or long standing contamination issues. We have identified that several boroughs are undertaking or have already undertaken site planning projects to introduce services to more hard to reach locations. Improved location of containers, security and communication will improve access to recycling services.
- Providing collection for a greater range of materials collected at flats, where space is available. Some boroughs have maintained consistency with kerbside systems, while others have not included bulkier items such as cardboard and plastic bottles at some flat sites. There is significant potential here to increase yield by increasing the range of recyclables by reviewing existing services, site locations and rationalising services.
- Undertake a review of current communal near entry collection arrangements to ensure there is sufficient container capacity at communal bin stores, which is proportionate to the frequency of collection
- Address the suitability of container location. Islington undertook a comprehensive planning process for near entry systems before new services were launched
- Find solutions to address ongoing problems such as vehicle access, contamination, security and vandalism, thereby improving the availability of recycling containers, storage capacity and improving performance
- Strengthen stakeholder involvement through engaging with housing associations, resident groups and interested parties in the planning or delivery stages of new and existing services
- Improve communications with residents at near entry facilities to increase capture and reduce contamination issues
- The provision of reusable sacks to residents where near entry systems are in operation to help improve participation
- Where possible undertake the conversion of existing chute systems and provide a good level of communication to ensure their correct use. (See the Islington Case Study)

Dry Recycling Flats Above Shops

- There is potential to expand this service to sixteen other boroughs. Expanding kerbside collections for FASs will increase city wide coverage by approx 36,000 households , this could be achieved by;
- Making use of existing co-mingled collection schemes within boroughs
- Where possible the service to be consistent with other kerbside collections i.e. similar material types collected.
- Where possible make use of single use sacks to avoid on and off street storage issues, pre and post collection.
- Set workable collection time bands to avoid traffic congestion and improve the reliability of collections
- Provide dedicated communications to residents using leaflets, posters and signs and via bag delivery
- Continue to provide local recycling banks, so that there is sufficient flexibility with collections, where space, capacity and restrictions on collections constrict service delivery
- Seek to combine collections with commercial waste/recycling collections to reduce cost and minimise traffic issues.

Organic Collections and Doorstep Properties

- There is significant potential to expand source segregated collections of food waste across the capitals DSPs, however this would need to be linked with a wider strategy to provide food treatment infrastructure and capacity to manage this waste stream
- The relevant factors are discussed in the WRAP 2009 food waste trials report[17]:;
    i. Collection vehicles;
    ii. Collection crews;
    iii. Collection rounds;
    iv. Re-processors and quality of collected food waste;
    v. Containers and liners;
    vi. Distribution (initial roll-out of collections); and
    vii. Communicating with residents and promoting the service.

WRAP also offers guidance[18] on the introduction of food waste collections which provides essential advice on the provision of such services.

[17] WRAP 2009 food waste trials report

[18] WRAP. 2009 Food Waste Collection Guidance.

- Where participation and capture rates have dropped boroughs may wish to consider re-launching the scheme or providing a communication campaign in conjunction with the provision of free caddy liners to help raise yields and the efficiency of the collection system. This can be repeated at a frequency best judged by the borough, taking into account other communications, service changes and longer term strategies
- The provision of kitchen caddies where they are not currently provided may promote ease of use and increase collection performance at relatively little additional cost
- The collection of food waste with the use of split bodies, modified stillages or pods on vehicles enables the collection of other materials such as residual or dry recycling in a single pass. Where this is currently not practiced and vehicle access allows, this option should be investigated further to potentially reduce collection costs. This will depend on the configuration of other waste services, the current fleet and delivery points.

Organic Collections and Purpose Built Flats

Capturing food waste from flats in the capital poses a significant benefit to overall performance for London and those boroughs that have already started to collect material from flats should be praised as being pathfinders. However, the expansion of collection services and capture of food waste from DSP should remain a priority as a quick win. Organics services to flats are developing fast but with little robust performance data to support claims that near entry systems for flats can compare favourably with kerbside collections from DSPs. With effective planning,the good location of communal bins, provision of internal containers and effective targeted communications, food waste collections can be successful. We have included details of food waste collection from flats within case studies for Islington and Hackney. Islington is planning to increase its food waste collections to a further 10,000 properties in 2010.

Commercial Waste

- From our study it would appear that services collecting a wide range of materials and offering businesses a financial incentive to recycling appear to have higher participation rates.
- Participation rates can also be enhanced through the promotion of services and where commercially and operationally viable trials have been successfully undertaken these should be expanded to provide borough wide coverage.
- Expanding services for dry recycling and food waste where there is existing capacity within existing collection infrastructure could be commercially attractive to boroughs where it is not to the detriment of household waste services.
- Consideration should be given to undertaking a study into the potential to expand the coverage of commercial recycling services provided by the boroughs including partnership(s) with the private sector to deliver a wide range of material collections. The study should identify Borough support for commercial initiatives, barriers to service provision, collection infrastructure, available capacity to manage municipal commercial recycling and the net cost of service delivery

2 Introduction

The Greater London Authority (GLA) has identified the need to develop the current understanding of municipal waste recycling performance and service provision across London. The main driver for this research is to inform the Mayor's new Municipal Waste Management Strategy, which will seek to both meet and exceed the landfill directive and recycling targets as set out in the UK Waste Strategy 2007, and to significantly improve London's municipal waste recycling rate to 60% by 2031. In addition the Mayor believes that London's recycling performance must greatly improve if London is to become an "exemplary" sustainable city. More specifically this report serves to inform Policy Section Four of the Mayors draft waste strategy, by showcasing good practice and identifying high quality and cost effective collection services that achieve high rates of recycling.

It is recognised that while some London boroughs achieve recycling rates as high as 50%, there are still opportunities to improve service provision and raise recycling rates amongst flats, estates and businesses. It is thought recycling rates and the cost of providing the service, varies across the boroughs with likely contributing factors being housing type and service provision.

To develop the current understanding of recycling performance and service provision across London Hyder were commissioned to undertake an evidence based study on municipal waste recycling. The report looks at capture rates by collection method and housing type within each borough. Capture rate in this context means the proportion of a targeted material that has been collected for recycling rather than sent for disposal. In parallel to this report Eunomia carried out a study to better understand the economic barriers to improving London's waste performance and identify the costs to meet the strategies recycling targets.

3 Aims and Objectives

The objectives of this evidence based study are:

- To provide evidence on the performance of municipal household recycling services offered by the London boroughs. Four collection classifications were defined by the GLA for this study:
- (A) doorstep –flats (DSFs), including maisonettes and houses converted into flats
- (B) doorstep – houses (DSHs), attached / semi / detached houses
- (C) near entry – flats (NEFs) including low, medium and high rise blocks
- (D) flats above shops (FASs)
- To provide evidence on the performance of municipal business recycling services offered by the London boroughs
- To inform the predictors of recycling performance through qualitative case studies and where possible to identify the contributing factors to recycling performance

4 Methodology

This study was undertaken utilising a number of data and information collection methods and sources. The research made use of existing and newly presented data through a bespoke questionnaire and survey issued to boroughs, a stakeholder engagement workshop, review of WasteDataFlow[19] (WDF), a literature search and an investigation of council websites. A series of definitions for housing types, collection systems and capture rates can be found in Appendix One. Full details on the project methodology and data assumptions can be found in Appendix Two

Survey and Questionnaire

24 boroughs out of 33 returned survey forms, producing a 73% response rate which is almost three quarters of all London boroughs. A further five boroughs returned the questionnaire, which equals an 88% response rate.

Where there was no response we used ONS data sources to determine housing profiles and made use of WasteDataFlow returns for 2008/09 as part of our overview assessment of collection systems in relation to housing type. A copy of the questionnaire and details of those boroughs participating in the survey are provided in Appendix Three.

Where enough information has been provided by the borough we have provided a summary of each service provision along with a review against Best Practice. In addition, we have summarised questionnaire responses regarding perceived 'Successes' and 'Recent or planned changes to services'. We have included Appendix Four.

We have also provided a 'Lessons Learned Log' based on questionnaire responses to help identify how service issues can be addressed in the future. This log can be found in Appendix Five.

Stakeholder Workshop

Hyder facilitated the workshop, held at City Hall and attended by 8 borough councils, on the 9th December 2009. The aim of the workshop was to determine the following for collection systems in relation to housing type;

- ✓ Identify themes common to successful service delivery
- ✓ Identify common themes to services less successful

Hyder incorporated borough specific workshop responses and feedback into the evaluation process, along with the desk top research and borough interviews. Full workshop notes are located in Appendix Six.

[19] WasteDataFlow is the web based system for municipal waste data reporting by UK local authorities to government. The system went live on 30 April 2004

4.1 Data Gaps.

Upon return of all surveys and data requests a thorough review of the information provided by boroughs was undertaken, this enabled us to identify its strengths and weakness. The review highlighted a number of limitations on the availability of data. This was overcome by using alternative sources, wherever possible, such as, ONS data to determine housing profiles and WasteDataFlow returns for 2008/09 as part of our overview assessment of collection systems in relation to housing type.

5 Greater London's Recycling Performance

5.1 Overall Performance

In order to understand the performance of municipal household recycling services offered by London boroughs it is important to understand how it fits within London's overall recycling performance and how it relates to other metropolitan areas in the UK. In 2008/09, London generated 3.98 million tonnes of municipal waste, of which 25 per cent was sent for reuse, recycling, composting or anaerobic digestion as defined under N192[20].Household waste comprises 77 per cent of municipal waste and includes household residual waste, recycling, bulky waste, street litter and park litter. Of the 3.1 million tonnes of household waste generated in 2008/09, 29 per cent was sent for recycling, composting or anaerobic digestion.

An overview of London's performance can be found in Appendix Seven which sets the scene for the project and provide details on the following area;

- London's overall recycling and composting performance
- Waste composition and material capture
- A national BVPI82a bench mark review
- The performance of inner and outer London boroughs
- An overview of Performance by borough
- A review of contamination and material quality.

6 London Housing Profile Overview

In summary London housing profile is approximately 47% flats and 53% doorstep properties. Full details on how this has been calculated can be found in Appendix Eight. A breakdown of the four housing types defined for this project, Doorstep flats (DSFs); Doorstep houses (DSHs); Near entry flats (NEFs) and Flats above shops (FASs) was either obtained from boroughs

[20] National Indicator: NI192 Percentage of household waste sent for reuse recycling and composting. The indicator measures percentage of household waste arisings which have been sent by the Authority for reuse, recycling, composting or anaerobic digestion.

estimating the percentage of each housing type in their survey responses or through using Neighbourhood Statistics data[21]. Not all boroughs that responded were able to provide a housing profile in this format, in some cases Doorstep flats and Doorstep houses were combined as a single group, Doorstep Properties (DSP). The definitions have been linked to definitions used by WRAP[22], these are as follows;-

- Doorstep Houses
- Flats in converted properties (Doorstep Flats)
- Purpose built blocks (Near Entry Flats)
- Flats in commercial buildings (Flats above shops)

For the purpose of the study Hyder have identified the Majority Housing Type for each borough, i.e. the housing type that is most represented within each borough. For instance, most of Westminster comprises DSFs and the borough also has a high percentage of Flats Above Shops. Sixteen boroughs are comprised of a majority of DSHs and a further 10 are comprised of majority of either DSFs or DSHs (split unknown). Therefore 17 of all London Borough's are comprised of a majority of DSPs. Six boroughs are comprised of a majority of NEFs (also known as Purpose Built Flats PBF).

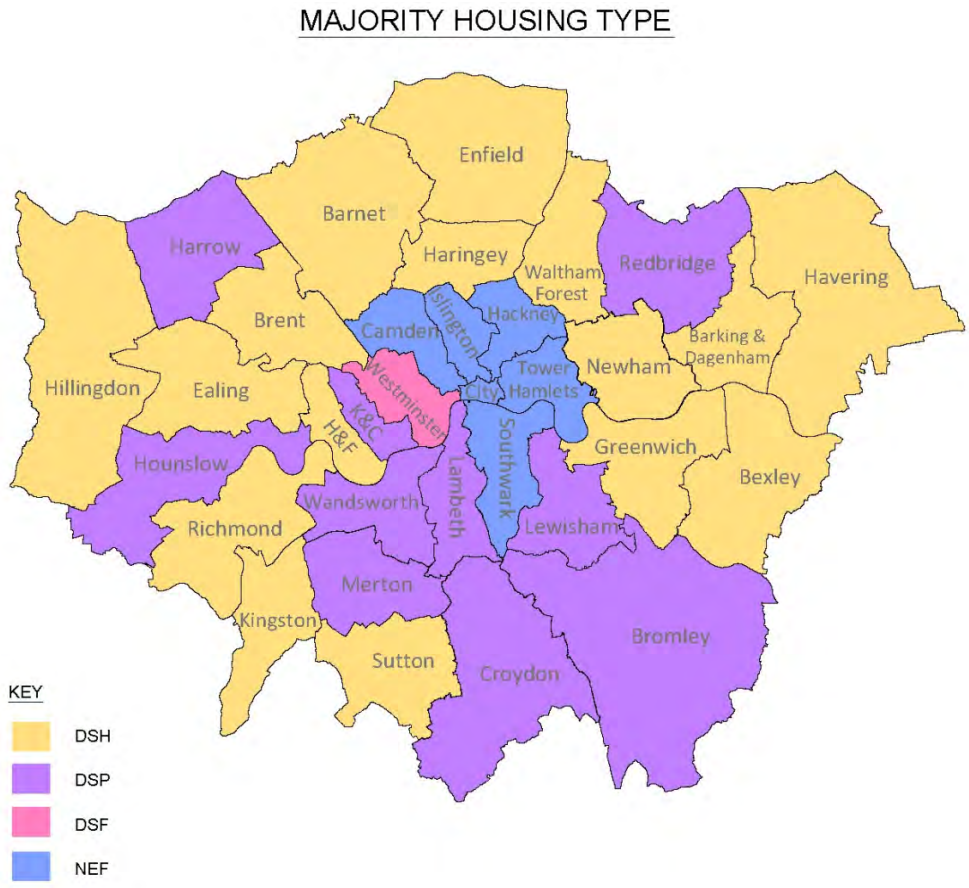
Categorising boroughs by majority housing type allows for further comparison against various waste collection systems and recycling performance to determine the best performing systems by housing type.

The map in Figure 6.1 shows a majority of NEF boroughs within London's inner city area, while those boroughs with a majority DSH/ DSP are situated in outer London.

[21] Office for National Statistics, available e online at www.neighbourhood.statistics.gov.uk, accessed 28/01/2010

[22] WRAP Website http://www.wrap.org.uk/local_authorities/research_guidance/collections_recycling/recycling_collections_for_flats/strategic_planning/understanding_flats.html

Figure 6.1 Map showing London geography by majority housing type



6.1.1 NI192 Performance v Purpose Built Flats

Housing profile, specifically in relation to Purpose Built Flats is an overarching contributing influence to recycling performance. Figure 6.3 shows that there is a relationship between the percentage of Purpose Built Flats (PBF) and overall NI192 (2008/9), where the higher the percentage of PBF, the lower the NI192. This perhaps reflects the various additional barriers to recycling that are caused by this type of property thus affecting service coverage, participation and capture. It is also worth noting that Inner London boroughs have a higher population density and corresponding higher percentage of PBF. However inner London boroughs have approximately the same average kerbside recycling performance, which perhaps reflects how inner London boroughs have adapted collection systems to overcome barriers and increase performance. Conversely, outer Boroughs have provided collection systems that best suit lower density populations with a majority DSHs or DSPs.

Commitment to recycling and property type

Commitment to recycling also varies strongly with property type[23]. Figure 6.2 shows details of a committed recycler survey response by housing type. In detached households 83% are

[23] Barriers to recycling at Home, WRAP. 2008

committed to recycling with just 2% stating they do not recycle. Semi detached households are the next likely category to be committed to recycling. Low rise flats recorded more non recyclers at 24% than other housing types, possibly associated with three main barriers:

- No collection service;
- Space to recycle; and
- Difficulties in carrying materials down flights of stairs.

Figure 6.2 Commitment to recycling and housing type (Courtesy of WRAP 2008)

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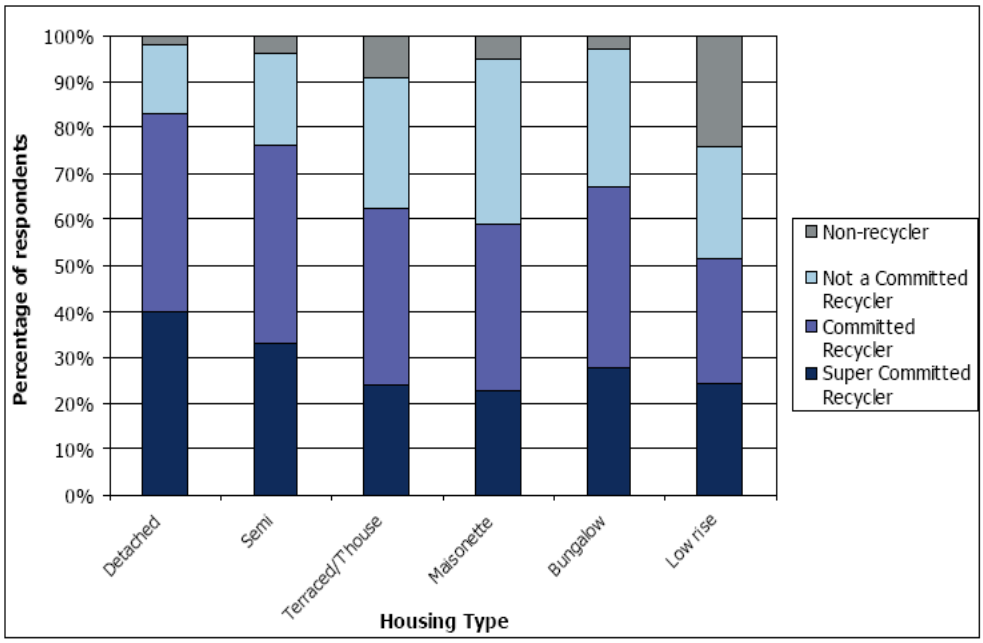


6.2 Challenges for Flats

Flats provide a range of challenges for boroughs. As previously mentioned, flats can be categorised into 3 main types;

- Purpose Built Flats (Near Entry Flats)
- Flats Converted in properties (Doorstep Flats)
- Flats in Commercials Buildings (Flats above shops)

A WRAP[24] information sheet outlines some of the possible issues that boroughs face when providing recycling services to flats. Additional, barriers have also been identified at the stakeholder workshop and have been included below.

[24] Opportunities and challenges with different types of flats. WRAP.

6.2.1 Purpose Built Flats

This could be because many purpose built flats (PBFs) were constructed at a time when recycling was not a priority so the buildings themselves do not always meet present day recycling needs. Some barriers to recycling from these properties have been identified by WRAP[25], however many were identified at the stakeholder workshop, these include;

- On site management– some concierges or site wardens not always responsible for container storage areas
- Container Storage restricts the provision of recycling and food containers.
- Container space and capacity
- Only one chute for refuse, so unable to convert a chute for recycling
- Fire risk with dry recyclable containers in communal areas
- Recycling bins often used as an overspill of refuse
- Landlord consultation on private/HA estates can slow up the process.
- Common issues of nuisance in bin stores including noise, odour, litter and vermin which can make them unappealing to use
- Fly tipping
- Location of bin stores or parked cars blocking service access
- Bin locking mechanisms jamming
- Private Landlords not allowing door knocking/monitoring which would enable recycling schemes to be promoted.

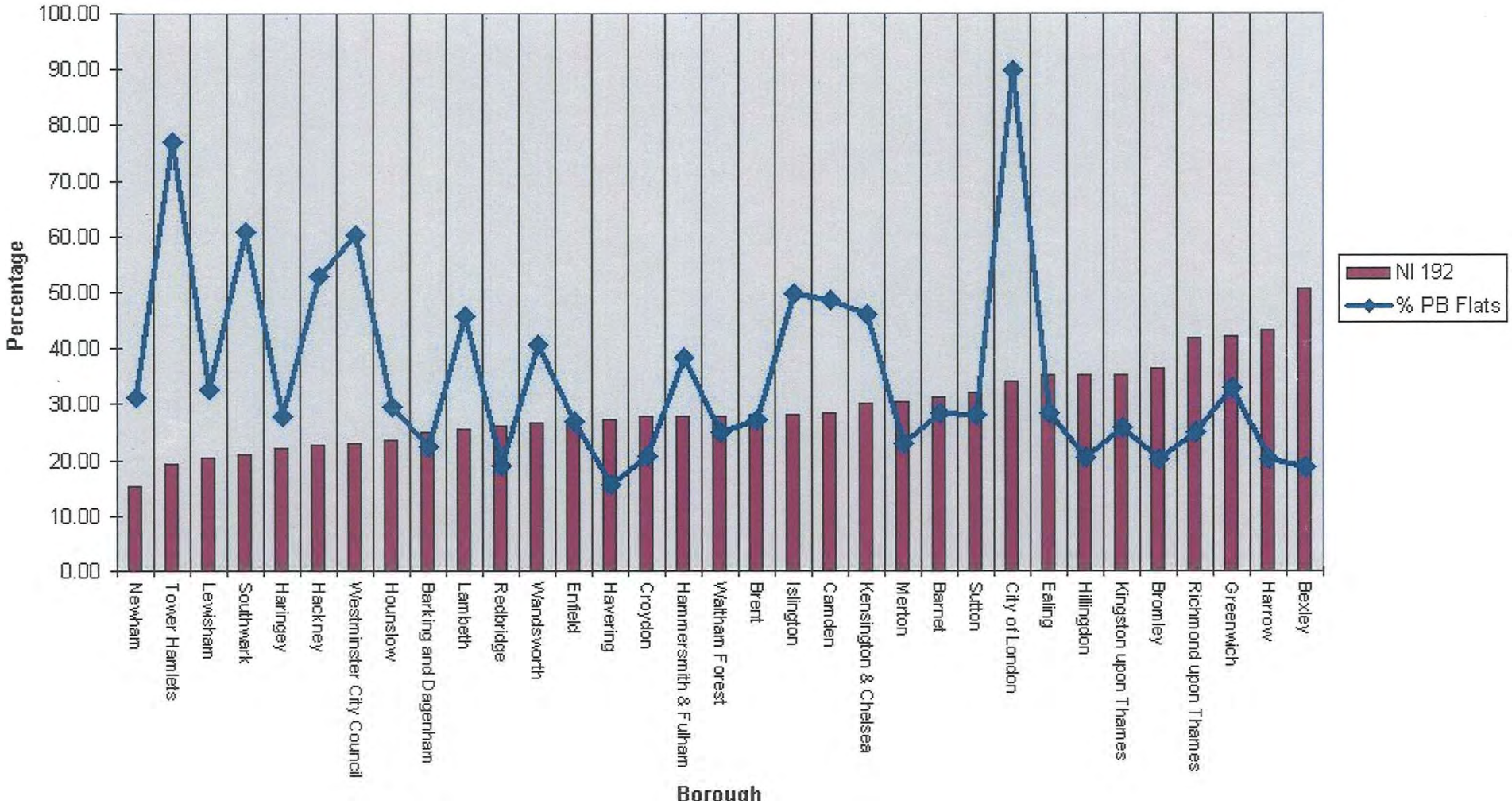
In addition the workshop and WRAP[26] also identified challenges for

- Flats Converted in properties (Doorstep Flats)
- Flats in Commercials Buildings (Flats above shops)

[25] Opportunities and challenges with different types of flats. WRAP.

[26] Opportunities and challenges with different types of flats. WRAP.

Figure 6.3 NI192 Performance (WDF 2008/09) v Purpose Built Flats (ONS 2001 Census)



6.2.2 Doorstep Flats

As with purpose built blocks, the design of converted properties does not always meet present day recycling needs. The original building will usually not have been designed with the storage of domestic refuse and recycling from multiple properties in mind[30]. DSF often experience some of the following issues and barriers;

- Short terms lets and high turnover of tenants leads to containers going missing and poor communications[30]
- Container space and capacity
- Space for containers on collection day, particularly in houses which have been split into several flats, meaning several boxes set out on collection day
- Bag/box distribution can be difficult, unable to identify the resident or number of residents
- More difficult to target residents for communications i.e. leaflets can get swept up by the first person home if they are not addressed to individual households within the building
- Converted houses are usually smaller premises than purpose built blocks and may have no regular caretaker or cleaner who can support recycling and food collections by maintaining the communal areas

6.2.3 Flats Above Shops

This type of property is often located on a busy street with little external space for recycling and refuse storage[27].FABs often experience some of the following issues and barriers;

- Container space and capacity
- Containers set out on streets in busy shopping areas
- Recycling and food waste containers left on the streets contaminated by passersby who use them as litter bins, particularly if there is a take away nearby[30]
- Collections crews limited by collection timeslots to avoid busy periods of traffic and congestion.
- Confusion with who is responsible for collection: dedicated collection crews, street cleaners
- Container delivery: often no letter boxes
- External storage: often dumped on the street
- Recyclables mixed up with commercial waste, particularly if flat is lived in by shop owners below
- Shops mixing residual commercial waste with household residual waste
- Quantities collected are not easy to quantify as they may be collected by a contractor who services local businesses

[27] Opportunities and challenges with different types of flats. WRAP

It is not just the different types of property or flat that present challenges for recycling. It's normal for each block of flats to differ in terms of the social make up and management and this can demand very different approaches to recycling and communications.

7 Evaluation of Overall Kerbside Dry Recycling Collection Performance

This Section provides an overview on the performance of dry recycling collection systems across London. The definitions of collection systems can be found in Appendix One

7.1 Dry Recycling Collection Systems

Table 7.1 Performance of London's Kerbside collections by collection method 2008/9 (WasteDataFlow)

Collection System by Majority Housing Type	Number of Authorities	Average KS HH Dry Recycling (kg/hh)
Kerbside sort weekly	6	130
Co-mingled weekly	19	132
Co-mingled fortnightly	2	205
Multi Stream Weekly*	4	160
Multi Stream fortnightly	2	142

*Note: Hackneys majority housing type is NEF, therefore we have used the multi stream co-mingled definition for services provided to Hackneys NEFs as part of this overview. Hackney also provides kerbside sorted doorstep collection services to doorstep house properties (DSPs) Therefore providing two types of service depending on the housing type.

Table 7.1 summarises collection yields by system. The most prevalent system is weekly co-mingled collection. The second most used system is weekly kerbside sort, followed by multi stream partially co-mingled systems on a weekly and fortnightly basis. Average yields for Kerbside and Co-mingled collections appear to be similar. Figure 7.1 displays a map of London's collection systems by majority housing type. Inner London systems are mainly co-mingled collections, while a majority of the cities kerbside sort and multi-stream collection separate in outer London. Although it must be noted that Hackney, in inner London, operates a kerbside sort to its Doorstep Properties (DSPs)

For the purpose of the overview collection yields have been calculated based in total annual tonnage reported as dry recycling collected at kerbside against total dwelling stock on the assumption that all properties receive some form of household collection service. This has been done for two reasons, firstly because data sets for dwelling numbers and total kerbside coverage are not consistent and secondly to use a consistent data set so a comparison can be made between boroughs.

The highest average yields appear to be from fortnightly co-mingled, although there are only two boroughs providing this services (Harrow and Sutton) so the data may not be representative of this type of collection In addition both boroughs have below average Index of Multiple Deprivation (IMD) scores so they are statistically more likely to perform better. Both boroughs utilise wheeled bins for the storage of recyclables with yields of 222 and 189 kh/hh/yr respectively.

The next highest performing system is multi stream partially co-mingled, with weekly collections out performing fortnightly collections. The highest performing weekly collection is Bexley with 224kg/hh/yr, while the lowest is Hackney, which was a majority NEF housing stock. The second highest performing system is Richmond yielding 201 kg/hh/yr. Redbridge is the lowest performing system of this type with 116 kg/hh/yr.

The third best performing system is fortnightly multi stream partially co-mingled. There are two boroughs providing this service, Bromley and Croydon with collections with respective yields of 176 and 108 kg/hh/yr.

The most prevalent London collections system, weekly co-mingled, has a yield range of 199 to 26 kg/hh/yr. The top four best performing collection systems in order of highest to lowest are RB Kensington and Chelsea, Wandsworth, Hammersmith and Fulham and Hillingdon. The bottom four collection systems in order of lowest to highest are Newham, Havering, Barking and Dagenham and Southwark.

A small number of boroughs operate chute systems for flats, but their coverage is too small to enable meaningful comparison between boroughs. This study has identified that Westminster, Hammersmith & Fulham, and Islington & Newham operate chute based systems. Other boroughs may operate chute systems however these were not identified in the survey responses.

A summary of London boroughs collection systems including material types collected, container type, number, capacity and relationship with residual collections can be found in table 7.2. This has been used for the basis of further analysis. Dry Recycling collection yields across London boroughs have been presented in figure 7.2.

Figure 7.1 Collection systems in London by majority housing type (Hyder 2010)

Table 7.2 Summary of London Collection Systems by Majority Housing type

	Performance	Housing details	Recycling													Residual Arrangements	
Borough	KS HH Dry Recycling (kg/hh)	Majority housing type	Collection System by Majority Housing service	Paper	Card	Cans	Glass	Plastic Bottles	Other	Container Types	Number of Containers	Est Volume (Ltr)	Vehicle type	Frequency	Compulsory	Frequency	Container
Barking and Dagenham	61	DSH	Comingled	✓	✓	✓	F	✓		Single use sack / Box	2	100	RCV	Weekly	No	weekly	wheeled bin
Barnet	138	DSH	Kerbside Sort	✓	✓	✓	✓	✓	1,2,3	Box	2	99	Stillage	Weekly	Yes	weekly	wheeled bin
Bexley	224	DSH	Multi Stream	✓	✓	✓	✓	✓		Box	3	150	Rotopress and Split body	Weekly	No	fortnightly	wheeled bin
Brent	96	DSH	Kerbside Sort	✓		✓	✓	✓	1,3	Box	1	44	Unknown	Weekly	Yes	weekly	wheeled bin
Bromley	176	DSP	Multi Stream	✓	✓	✓	✓	✓		Box	2	100	RCV	Fortnightly	Yes	weekly	sacks
Camden	102	NEF/DSF	Comingled	✓	✓	✓	✓	✓		Reusable bag	1	50	RCV	weekly	No	>weekly	wheeled bin
City of London	181	NEF	Comingled	✓	✓	✓	✓	✓	4	Single use sack	1	100	Unknown	>weekly	No	>weekly	sacks
Croydon	108	DSP	Multi Stream	✓	✓	✓	✓	✓	1	Box	2	110	Split bodied RCV	Fortnightly	No	weekly	wheeled bin
Ealing	144	DSH	Kerbside Sort	✓	✓	✓	✓	✓	1,3	Box	1	50	Stillage	weekly	No	weekly	variable
Enfield	114	DSH	Comingled	✓	✓	✓	✓	✓		Box	1	50	Split bodied RCV / Food & Garden	Weekly	No	weekly	sacks
Greenwich	170	DSH	Comingled	✓	✓	✓	✓	✓		Wheeled Bin	1	140	RCV	Weekly	No	weekly	wheeled bin
Hackney	101	NEF	Multi Stream / Kerbside Sort	✓	✓	✓	✓	✓	1,2,3,4	Reusable bag	1	55	RCV	Weekly	Yes	weekly	variable
Hammersmith and Fulham	190	DSH/DSF	Comingled	✓	✓	✓	✓	✓	4	Single use sack	1	100	Split bodied RCV / Refuse	Weekly	No	weekly	sacks
Haringey	120	DSH/DSF	Comingled	✓	✓	✓	✓	✓		Box	1	50	Split bodied RCV / Food & Garden	Weekly	No	weekly	wheeled bin
Harrow	222	DSP	Comingled	✓	✓	✓	✓	✓	2,4	Wheeled Bin	1	240	RCV	Fortnightly	Yes	fortnightly	wheeled bin
Havering	60	DSH	Comingled	✓	✓	✓		✓		Single use sack	1	50	RCV (flats mixed with refuse)	Weekly	No	weekly	sacks
Hillingdon	184	DSH	Comingled	✓	✓	✓	✓	✓		Single use sacks	1	50	RCV	Weekly	No	weekly	sacks
Hounslow	119	DSP	Kerbside Sort	✓	✓	✓	✓	✓	1,2F,3, 4	Box and Bag	3	169	Stillage	Weekly	No	weekly	sacks

Continued	Performance	Housing details	Recycling													Residual Arrangements	
Borough	KS HH Dry Recycling (kg/hh)	Majority housing type	Collection System by Majority Housing service	Paper	Card	Cans	Glass	Plastic Bottles	Other	Container Types	Number of Containers	Est Volume (Ltr)	Vehicle type	Frequency	Compulsory	Frequency	Container
Islington	140	NEF	Comingled	✓	✓	✓	✓	✓	2,4	Reusable bag	1	55	Split bodied RCV / Food & Garden	Weekly	No	weekly	sacks
Lambeth	156	DSP	Comingled	✓	✓	✓	✓	✓	4	Single use sacks	1	50	RCV	Weekly	No	weekly	wheeled bin
Lewisham	154	DSP	Comingled	✓	✓	✓	✓	✓		Box	1	50	RCV	Weekly	No	weekly	wheeled bin
Merton	179	DSP	Comingled	✓	✓	✓	✓	✓	4	Box	2	100	RCV	Weekly	No	weekly	sacks
Newham	26	DSH	Comingled	✓	✓	✓		✓		Single use sacks	1	100	RCV	Weekly	No	weekly	wheeled bin
Redbridge	116	DSP	Multi Stream	✓		✓	✓	✓		Box	1	55	RCV	Weekly	No	weekly	variable
Richmond upon Thames	201	DSH	Multi Stream	✓	✓	✓	✓	✓		Box	2	110	RCV / Food Pod	Weekly	No	weekly	sacks
Royal Borough of Kensington and Chelsea	199	DSP	Comingled	✓	✓	✓	✓	✓	4	Single use sacks	1	100	Split bodied	Weekly	No	weekly	sacks
Royal Borough of Kingston upon Thames	170	DSH	Kerbside Sort	✓	✓	✓	✓	✓	1	Box/Bag	2	105	Kerbsider	Weekly	No	fortnightly	variable
Southwark	82	NEF	Comingled	✓	✓	✓	✓	✓		Single Use Sack	2	100	Kerbsider	Weekly	Yes	weekly	wheeled bin
Sutton	189	DSH	Comingled	✓	✓	✓	✓	✓		Wheeled Bin/Box	2	290	RCV	Fortnightly	No	weekly	wheeled bin
Tower Hamlets	101	NEF	Comingled	✓	✓	✓	✓	✓	4	Single use sack	1	50	RCV	Weekly	No	>weekly	variable
Waltham Forest	114	DSH	Kerbside Sort	✓	✓	✓	✓	✓	1	Box	1	50	Kerbsider	Weekly	Yes	weekly	sacks
Wandsworth	197	DSP	Comingled	✓	✓	✓	✓	✓	4	Single use sack	1	100	RCV	Weekly	No	weekly	variable
Westminster City Council	101	DSF/FAS	Comingled	✓	✓	✓	✓	✓		Box	1	50	RCV	Weekly	No	>weekly	variable

Additional Material Key

1 = Textiles and Shoes

2 = Mixed Plastic

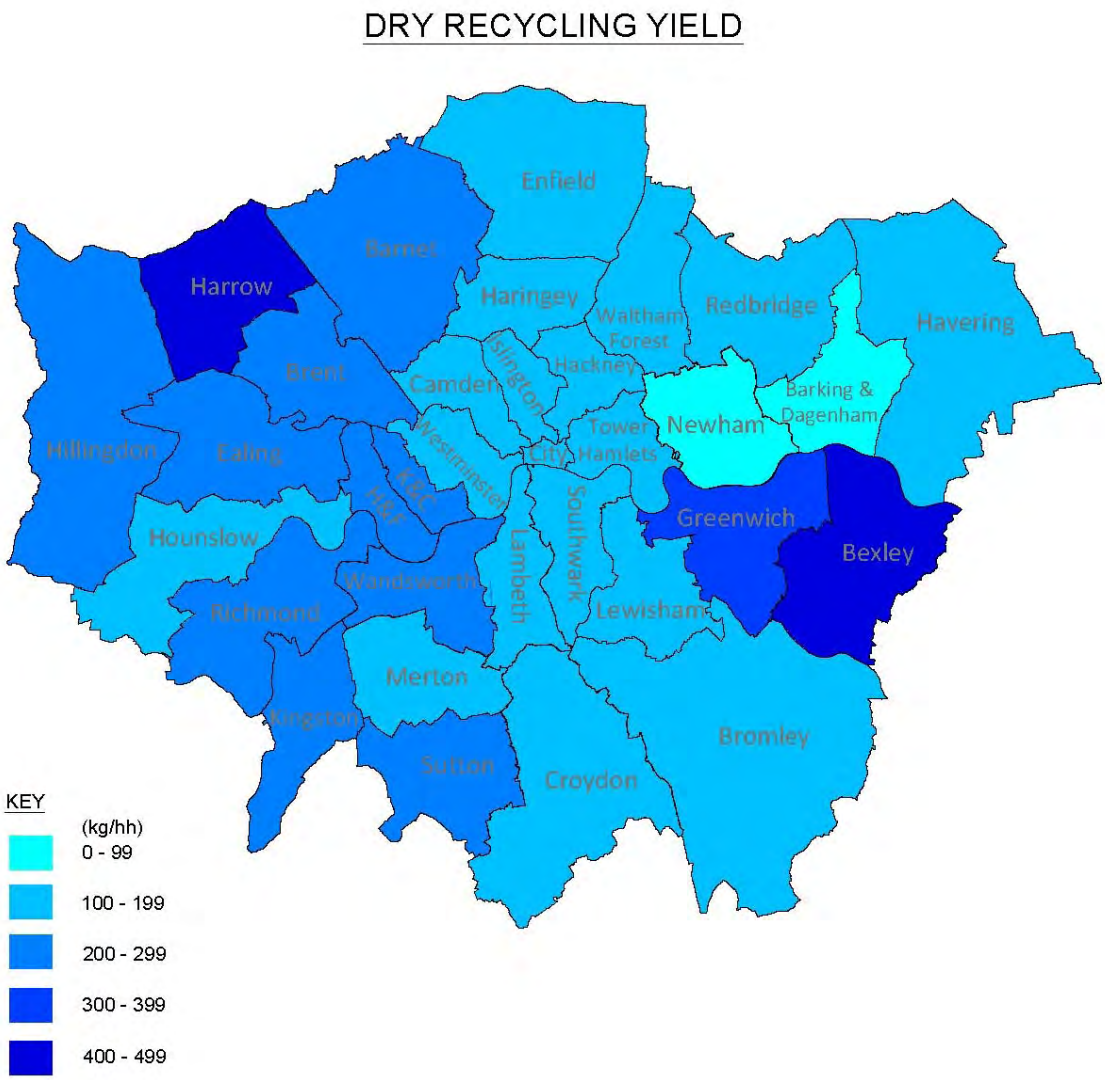
3 = Batteries

4 = Drinks Cartons

F= Fortnightly

Other small items that are not categorised in the table include engine oil, books, foil, plastic bags, and mobile phones as they only contribute negligible recycling tonnages.

Figure 7.2 London's kerbside dry recycling yield 2008/9 (WasteDataFlow)



7.2 Evaluation of Collection System Performance

This Section provides an overview of the factors effecting performance, draws on existing research and evaluates London collection systems against socio-economic factors and Service Level factors. A review of existing research can be found in Desk Top Study in Appendix Nine

7.2.1 The Factors Effecting Recycling Performance

Evidence from existing WRAP studies[28] [29] shows that there are a number of factors that are likely to affect the overall performance of a collection system. There are two main types of influence on performance;

- Service Level Factors – These are factors that make up the delivery of services and have been categorised into five key areas, namely
  i. Type of collection System
  ii. Material types collected
  iii. Container Types / Capacity
  iv. Frequency of Collections / relationships with other services
  v. Communications

- Socio-economic factors – According to WRAP demographic and socio-economic factors play a role in influencing recycling performance. They state that the more urban, less prosperous and more deprived an authority the lower their recycling performance is likely to be however they go on to state that other factors also contribute. For the purpose of this study we have used the Index of Multiple Deprivation (IMD) scoring to identify these areas.

Service Level Factors can be adapted, changed and modified to give rise to changes in performance for specific housing types. For example, a switch to reusable bags and more accessible collections points, may give rise to higher performance.

In 2009 WRAP commissioned a report[34] into the performance of dry recycling collection systems in England. This report looks at data for 2007/08, and examines the range of performance of these collections and the factors which influence them. It is therefore, essential that these factors are considered when looking at the performance of collection systems in relation to housing type in order to identify other contributing factors to high performance. The report found that;

- ✓ The kerbside scheme type (e.g. kerbside sort, single stream co-mingled or two stream co-mingled), acting in isolation, was not a defining influence, in that no one type performed consistently better than the others.

[28] Barriers to recycling at Home, WRAP. 2008

[29] Analysis of kerbside dry recycling performance in England 2007/08, WRAP.2009

- ✓ The Frequency of recycling collections alone did not play a dominant role in determining recycling performance, but did in conjunction with other service characteristics. (Rather it is the service profile overall (i.e. refuse, recycling and organic services and policy and enforcement) as well as a number of socio-economic factors and local authority type that influence recycling performance). However those authorities with a fortnightly refuse collection performed better.

- ✓ The report found that the container type alone was also not a significant factor in determining service performance.

In summary there is no single variable or characteristic that can explain all of the variation in kerbside recycling performance across local authorities. Rather it is a combination of factors, the importance of which will change depending on the type of authority. While it is a relatively straight forward task to identify a number factors affecting recycling performance at the national level, it is a much more complex task to identify their relative influence as performance may also be affected by additional and less easily quantifiable factors such as communications activity. WRAP's research draws upon a wider data set than the 33 used for London so is therefore likely to be statistically more representative. In addition, it sets out the difficulty in attributing performance to any one factor as performance is distorted by local factors such as affluence, overall service provision and levels of communication. This report attempts to go one step further by isolating these factors using available data to demonstrate the contributors to higher performance. Not only is it looking at overall borough performance it is drilling down to performance at housing type level. Given the complexity of this study Hyder has provided suitable justification where contributing factors to performance cannot be clearly identified.

Another 2008 WRAP report[30] which looks at barriers to recycling at home highlights a number of 'Situational' factors that may also affect system performance which may be particularly relevant to different types of housing stock. A review of these two WRAP reports can be found in Appendix Nine. The report concludes that householders would, recycle "a little or a lot more" if they had;

- Collections of a wider range of materials (52%)
- Bigger recycling containers (23%)
- More recycling containers (20%)
- More space to store their recycling container (19%)
- More frequent recycling collections (18%)
- Containers that are easier to move (16%)

The report[26] also states that there are motivators and barriers to recycling derived from external environmental 'enablers' and 'disablers' – to help (enable) or hinder (disable) people from recycling such as the type of household collection scheme provided. During the in-depth interviews a range of local authority schemes were encountered.

Recurring barriers to recycling that came out of the in-depth interviews relating to external environmental enablers and disablers were:

- Unsuitable recycling containers
- Unreliable collection scheme

[30] Barriers to Recycling at Home, WRAP.2008

- Inconvenient bring banks
- Limited range of materials collected
- Issues of smell and hygiene

Considering these factors we have reviewed WasteDataFlow in our collection system review in Table 7.2 to identify any trends between London collection systems associated with collection system type, container type, capacity, material types and frequency of collection. The WRAP report also identifies a number of behavioural, knowledge and attitudinal barriers that influence recycling participation and collection system performance which can be addressed via enhanced communications.

Isolating the influence or contribution that socio-economic factors have on kerbside recycling performance to identify Service Level factors that give rise to higher performance for specific housing types is not a straight forward task, and will largely be guided by WDF data, Office of National Statistics (ONS) [5]data and anecdotal evidence provide by boroughs. It is likely the same service level factors will apply to collection systems for all housing types.

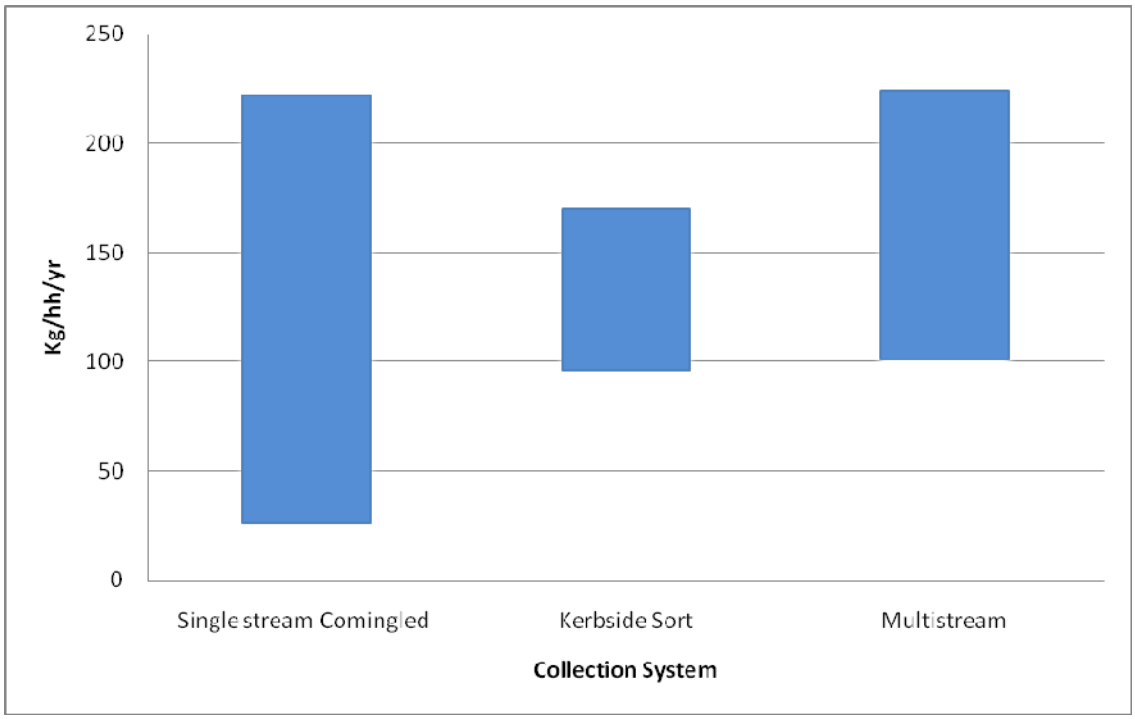
7.2.2 Service Level Factors

The overall performance of London collections systems by majority housing type have been evaluated against the five key Service Level Factors to identify any high level trends that might indicate one or more factors giving rise to higher performance for London Collection systems

Collection System Type

Figure 7.3 shows the range of recycling performance for the three main collection systems. Co-mingled collections appear to deliver the widest range of collection system performance. A wide range of container types are used including, single use sacks, box / bags and wheeled bins. This type of collection is the most common within London and its wide performance range may be attributed to variations in affluence between boroughs, this is explained further in Section 7.2.3. Kerbside sorted collections appear to yield a mid range performance, while they typically offer a wider range of materials for collection, their performance maybe limited by the container type, number and capacity where residents may deposit recycling with refuse when recycling capacity is reached. An analysis of performance and container capacity can be found later in this Section. Multi-stream collection systems yield a mid to upper performance range. Typically these collection systems provide two or three containers for the collection of co-mingled plastic / cans and a second for paper and card. In some cases a third box is provided for glass collection.

Figure 7.3 Kerbside recycling performance – All boroughs , according to the type of kerbside scheme. (2008/09 WasteDataFlow / Hyder Survey 2009)



The top three high performing single stream collections systems are Harrow, Kensington & Chelsea and Wandsworth all are majority doorstep property boroughs, the lowest is Newham and Havering. The top three kerbside side sort collection systems are Kingston, Ealing and Barnet; all are majority doorstep property boroughs. The top three multi-stream systems are Bexley, Richmond and Bromley; again all are majority doorstep property boroughs .

Newham and Havering operated a system of recycling and refuse co-collection in 2008/09 whereby co-mingled recycling sacks are sorted from back refuse sacks at the MRF. While there is no direct evidence from this study that this effects recycling performance, it is likely that the co-collection of refuse and recycling evokes negative connotations about recycling being disposed to landfill and may result in lower public participation. However, co-collection means there are fewer collection vehicles on the road, lowering the cost and impact of collection on the environment.

Material Types

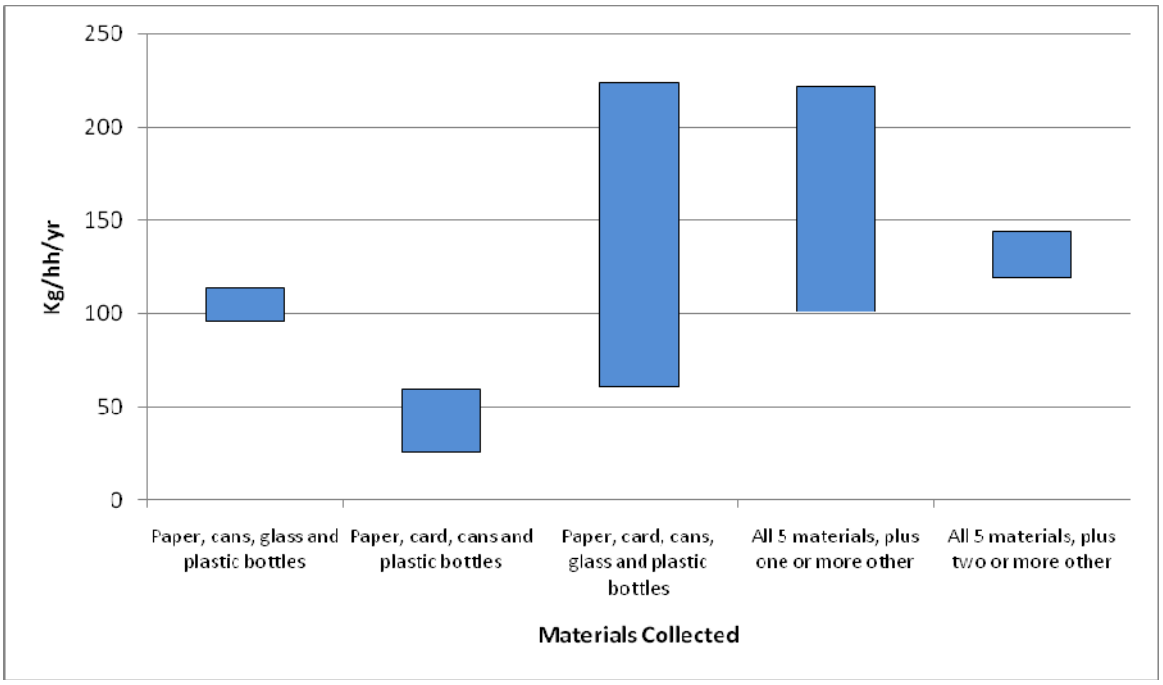
The boroughs provide a range of services often dependent upon the type of collection system and available transfer and MRF infrastructure. Performance my material type is displayed in figure 7.4. Kerbside systems in general offer a greater range of material collections than co-mingled. In summary;

- Havering and Newham do not collect glass and have overall yields of 60 and 26 kg/hh/yr respectively. These systems do not collect additional materials such as drinks, cartons, mixed plastics or textiles. These are the two lowest performing collection systems in London.

- Brent and Redbridge are the only boroughs that do not to include cardboard in their collections.
- Eight boroughs collect Textiles and/or shoes; these are mainly kerbside sort systems with the exception of Islington's co-mingled system.
- Five boroughs collect mixed plastic packaging; these are in Barnet, Hounslow, Harrow, Hackney and Islington. All are kerbside sort with the exception of Islington which is co-mingled. Hounslow provide a dedicated container for plastics that is collected fortnightly.
- Four boroughs collect batteries, all of which are kerbside sort.
- Eleven boroughs collect drinks cartons using mainly co-mingled systems, with the exception of Hounslow which is kerbside sort.

In general, all boroughs collect a full suite of recyclables (all five main materials), with the exception of Brent, Redbridge, Havering and Newham. Systems that collect at least six on average collect 20kg/hh/yr more. In the majority of cases the additional material collected is drinks cartons. It is difficult to determine the relative performance benefits of the material range without looking at material capture in more detail as borough affluence has a distorting affect on performance. WRAP [31] states that residents would recycle more if their service collected a wider range of materials, thus increasing collection yield.

Figure 7.4 London recycling collection system performance by material. (2008/09 WasteDataFlow / Hyder Survey 2009)



Of the boroughs collecting all five materials Bexley, Richmond and Sutton are the highest performing, two of which are multi stream systems while Sutton's collection system is fortnightly co-mingled . Harrow, Kensington and Chelsea and Wandsworth are the highest performing boroughs collecting at least six items for recycling. .

[31] Barriers to Recycling at Home, WRAP.2008

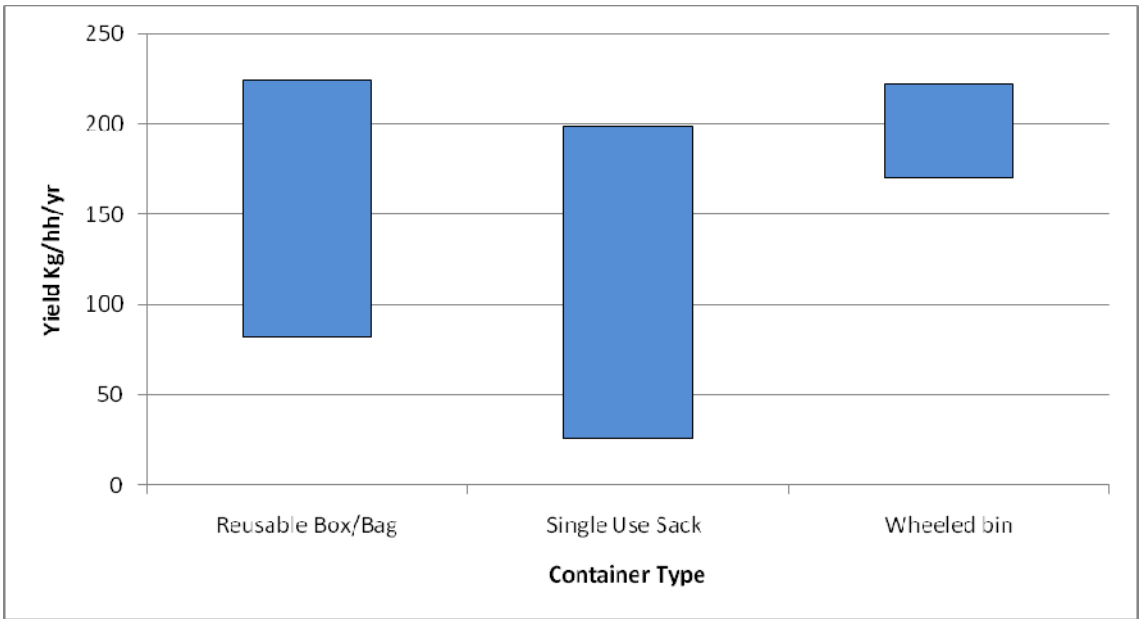
Container Types

London boroughs use a variety of containers, from reusable boxes and bags utilised for kerbsides sort, multi stream and co-mingled collections, and single use sacks and wheeled bins used for co-mingled collections. Figure 7.5 provides a summary of collection performance in relation to container type. Only three systems use wheeled bins for containment, all of which are high performing. Harrow is the highest performing borough using a wheeled bin system which also operates an alternate weekly collection with refuse and enforces compulsory recycling. The most popular containment methods in London are reusable boxes, bags and single use sacks. Reusable boxes and sacks show a performance range that may be attributed to the number of containers (overall capacity) provided. WRAP[32] states that residents would recycle more if they had more and/or bigger recycling containers. Single use sacks appear to have the widest performance ranges.

The number of single use sacks distributed to residents in London varies between boroughs at 65-120 sacks per year. The method of distribution also varies being either replenished on collection day or delivered annually, biannually or quarterly. Residents can also collect sacks from public buildings and Council offices. Access to sacks is essential to maintaining participation. If a council fails to deliver sacks and relies on residents to collect then they are likely to see a diminished participation rate over time. While undertaking this research we contacted customer support teams at a number of Councils to find out how replacement sacks are obtained. Mixed advice was offered ranging from household delivery to obtaining them at public buildings. This may be one reason to explain the wide variations in performance.

The highest performing single use sack systems are in Kensington and Chelsea, Wandsworth and Hammersmith and Fulham. The lowest performing systems are in Barking, Havering and Newham.

Figure 7.5 Recycling Container Performances in London.(2008/09 WasteDataFlow / Hyder Survey 2009)

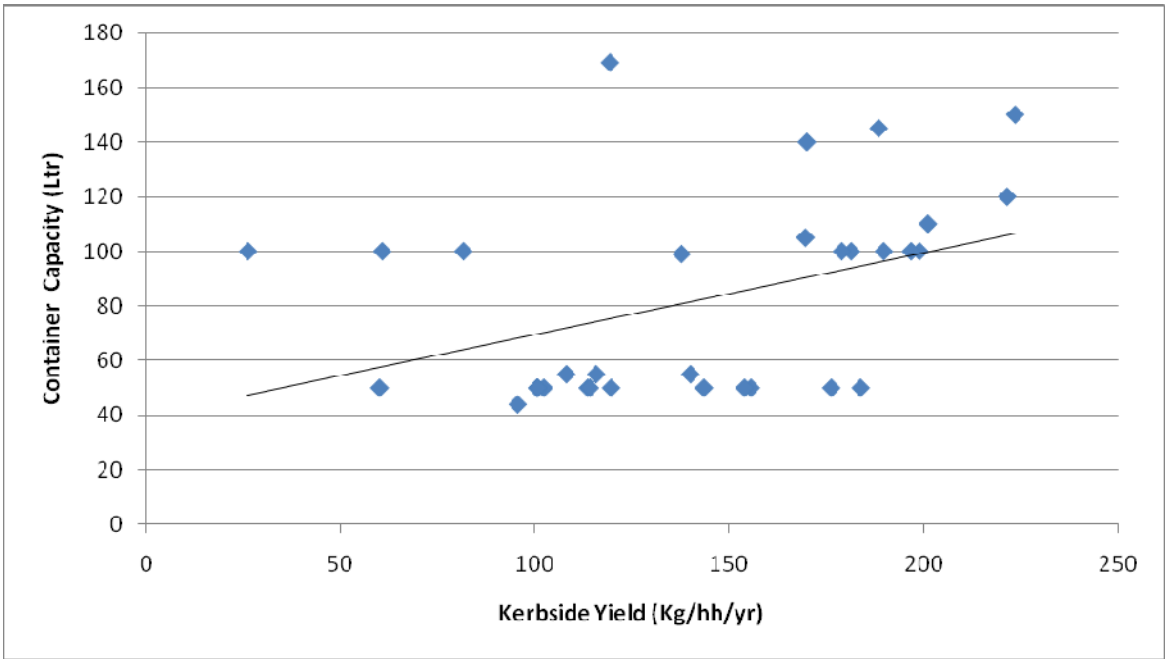


[32] Barriers to Recycling at Home, WRAP.2008

Figure 7.6 shows there is a moderately positive correlation of 0.408 between performance and available capacity, where increased provision of capacity leads to higher yields. However, the range of materials collected, frequency of collection and relationship with other service as part of the overall service provision is likely to determine total capacity. The average weekly capacity for London boroughs is approximately 80 litres.

Where the council has provided approximately two sacks a week for the year we have allowed for a weekly 100 litres capacity. For fortnightly collection systems we have halved the capacity so the comparison is for weekly collection capacity. However, it is recognised that given the flexibility of the system residents can present unlimited recycling sacks, which is useful during busy periods such as Christmas when additional recycling might be generated.

Figure 7.6 Container Capacity against yield. (2008/09 WasteDataFlow / Hyder Survey 2009)



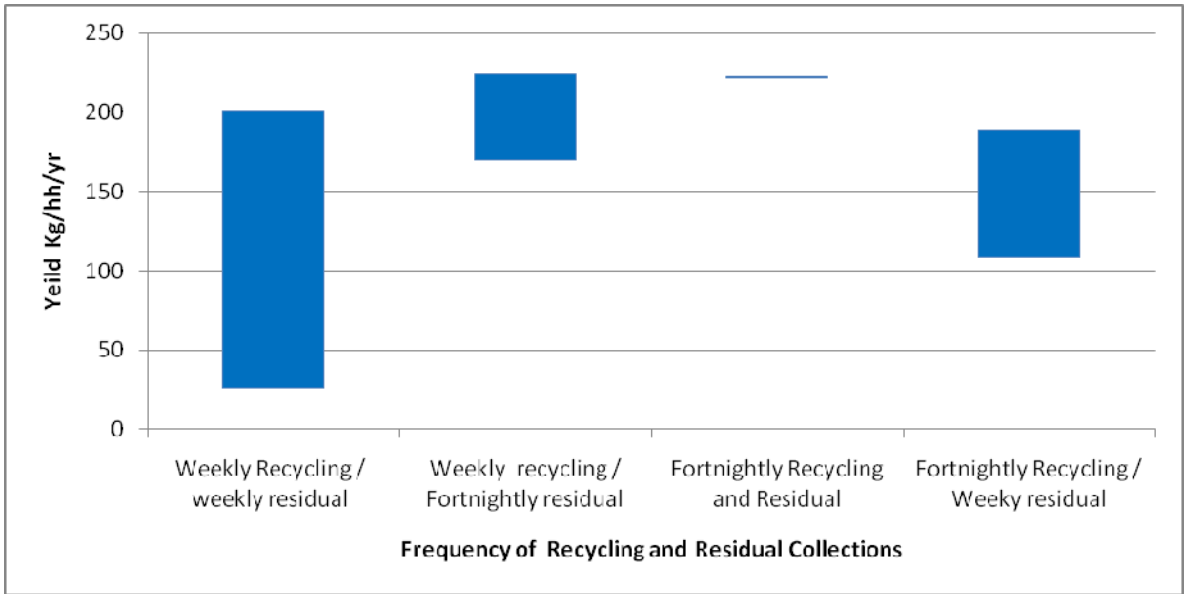
Frequency of Recycling & Residual Collections

A majority of London's recycling collection systems are weekly, or in a few cases twice, three times a week or daily depending on type of housing. This is particularly relevant to collections from commercial areas, flats above shops or in blocks of flats where communal containers require more frequent emptying. WRAP[33] identifies that frequency of recycling collections alone did not play a dominant role in determining recycling performance, but did in conjunction with other service characteristics. The report found that weekly recycling collection with fortnightly residual performed similarly to services offering fortnightly recycling and residual collections. Therefore it is important we don't look at recycling collection frequency in isolation as the frequency of residual collection, organics collections and policy / enforcement measures will have an impact on performance. Figure 7.7 demonstrates the relationship between frequency of collection and performance. Weekly recycling and refuse collection systems have the widest performance ranges with collection systems in the London boroughs of Richmond, Kensington & Chelsea and Wandsworth performing highest.

[33] Analysis of kerbside dry recycling performance in England 2007/08, WRAP.2009

Those boroughs with a weekly or fortnightly collection of recycling and a fortnightly collection of residual appear to have slightly higher recycling yield than those with a weekly residual collection. Boroughs providing a fortnightly residual collection use wheeled bin for containment. Only three boroughs operate these arrangements, Bexley, Kingston and Harrow. Harrow is the only borough to collect residual and dry recycling on an alternate weekly basis. It should be noted that Greenwich operated a fortnightly residual collection arrangement during 2008/09. This has since been restored to a weekly collection.

Figure 7.7 Performance of collection systems in relation to recycling and residual collection frequency.(2008/09 WasteDataFlow / Hyder Survey 2009)



Communications

WRAP state that through well targeted communication strategies and campaigns which address Behaviour, Knowledge, Understanding and Motivation a number of barriers can be overcome. They indicate that effective campaigns[34] can greatly improve the level of participation in recycling; therefore boroughs should not under estimate the impact of communications as a contributing factor to higher performance for dry and organic collections. Table 7.4 summarises the findings of the Hyder survey.

[34] WRAP Barriers to Recycling at Home. (2008)

Table 7.4 Summary of Communications provided by boroughs (Hyder Survey 2009)

	2007/08	2008/09	2009/10
Barking and Dagenham			
Barnet			
Bexley	C		
Brent			
Bromley			
Camden			
City of London			
Croydon			
Ealing	C		C
Enfield		S	
Greenwich	R	R	R
Hackney			S
Hammersmith and Fulham			
Haringey			C
Harrow			
Havering			
Hillingdon			
Hounslow			C
Islington		C	
Lambeth	R	R	R
Lewisham			C
Merton		C	C
Newham			C
Redbridge			
Richmond upon Thames			
Kensington and Chelsea	R	R	R
Kingston upon Thames			
Southwark			C
Sutton			
Tower Hamlets			
Waltham Forest			
Wandsworth	R	R	R
Westminster	C	C	C

Following a review of the information provided by boroughs in response to the questionnaire we were able to conclude that there are three main categories of communication campaign;

- 'C' – Short term targeted Communications aimed at increasing performance. Mainly lower performing areas
- 'S' – Communications that coincide with service changes
- 'R' – Longer term Significant on-going level communications for resources

It must be noted that not all boroughs provided a response to this question and some responses were incomplete so we are only able to provide high level evaluation.

Short term targeted campaigns can be effective at improving performance for delivering quick wins but should be backed up with ongoing communications messages, customer support and operational reliability to have a longer term impact. Longer term ongoing levels of

communication resource, although not on the same scale, can be affective at maintaining participation and capture rates on a scheme.

Communications that are required for periods of service change or introduction should be well timed using a range of tools to ensure residents have sufficient 'Opportunity to See' information. WRAP provide guidance[35] on the planning, design, management and monitoring of communications campaigns.

Based on the information provided, the review has identified that four boroughs offer ongoing communications support; these are Greenwich, Lambeth, Kensington and Chelsea and Wandsworth. In general these appear to be higher performing boroughs . Some of this support may be provided through partnership working with the WDA. Ten of the boroughs provided some form of high profile short term targeted communication campaign using a range of tools aimed at increasing performance. Five of this these were either on or in the year preceding 2008/09, the year in which recycling performance data has been used for this report.

7.2.3 Socio-economic Factors

The overall performance of London collections systems by majority housing type have been evaluated against socio- economic factors, and for the purpose of this study we have used 2007 ONS IMD scores[36] by borough. This Section explores the trends between IMD scores and performance. To identify which collection systems appear to be performing above or below the trend, for further investigation. The evaluation is based on the hypothesis that 'Collection systems that go against the IMD versus performance trend may demonstrate different approaches to one or more of the service Level factors that give rise to higher levels of performance.

Index of Multiple Deprivation (IMD)

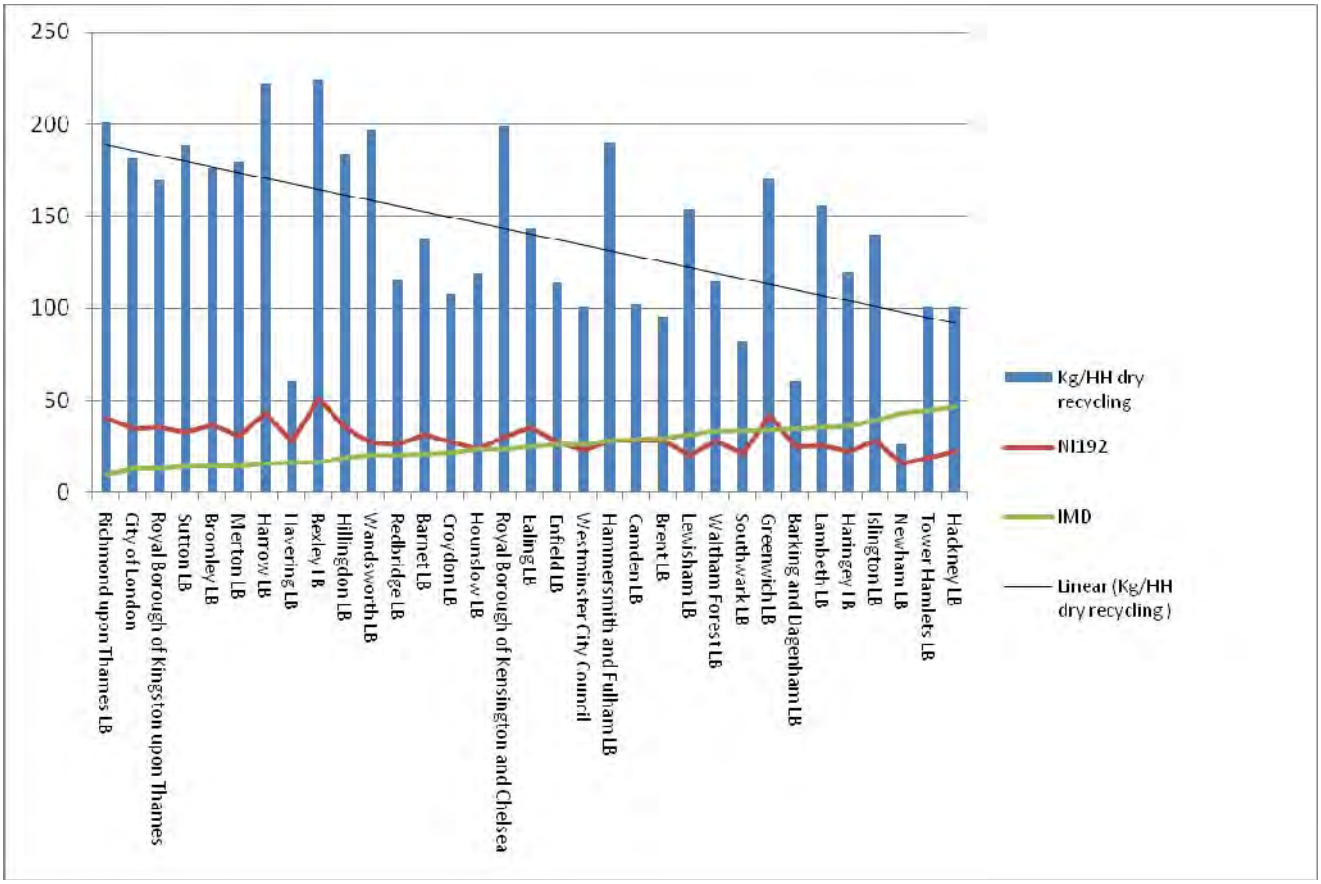
The Index of Multiple Deprivation (IMD) 2007 combines a number of indicators, chosen to cover a range of economic, social and housing issues, into a single deprivation score for each small area in England. This allows each area to be ranked relative to one another according to their level of deprivation. As with the 2004 Indices, the Indices of Deprivation 2007 have been produced at Lower Super Output Area level, of which there are 32,482 in the country. The average score is 10, where the lower the score the lower the level of deprivation. We have used the 2007 data from ONS[37] as the data in WDF appears to be from the 2004 data set.

[35] http://www.wrap.org.uk/local_authorities/research_guidance/communications/index.html

[36] http://www.communities.gov.uk/communities/neighbourhoodrenewal/deprivation/deprivation07/

[37] http://www.communities.gov.uk/communities/neighbourhoodrenewal/deprivation/deprivation07/

Figure 7.8 Dry Recycling Yields against IMD and NI192 performance 2008/09 (WasteDataFlow/ONS)



A WRAP study[38] focused on the performance of dry recycling. It identified that socio-demographic factors and the prevailing 'characteristics' of an area have a significant influence on recycling performance - just over a quarter (26.5%) of the variation in local authority dry recycling performance can be explained by the characteristics of the local area and population. Some local authorities (i.e. typically those in high density areas with high levels of deprivation) face a series of additional challenges. For this reason we have used IMD to help us examine which collection systems are performing better than expected for their IMD score. WRAP indicates that the remainder of performance is attributed to;

[38] Analysis of kerbside dry recycling performance in England 2007/08, WRAP.2009

- The interrelationships between kerbside dry recycling collections and bring site recycling; between kerbside collections and overall household dry recycling (i.e. bvpi82a) and overall dry and organic recycling (i.e. BVPI82a, b); and between kerbside collections and overall household residual waste arisings
- The nature of the kerbside recycling scheme (e.g. kerbside sort, single stream co-mingled, two stream co-mingled), the frequency of collection and type of container

We have already looked at some service level factors in relation to London's collection systems with the addition of communications, which has a significant influence on performance.

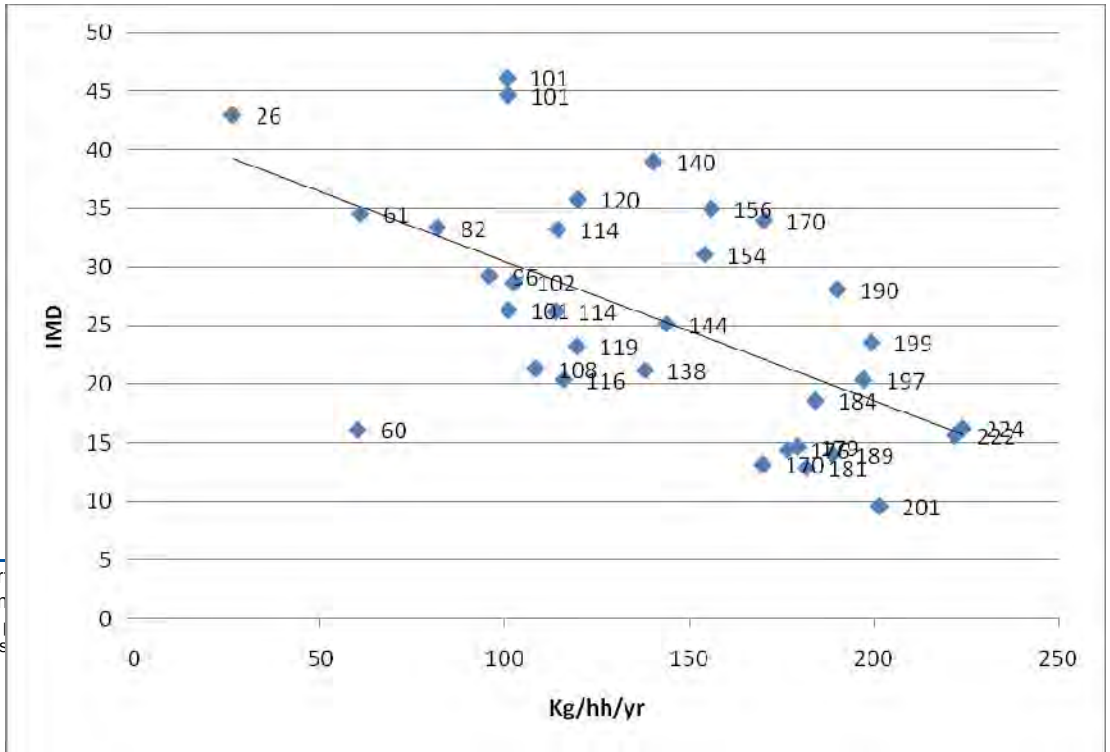
Figure 7.8 shows a moderate negative correlation of -0.591 between dry recycling yields and IMD, where higher IMD score give rise to lower yields per Kg. This is also true for NI192 and IMD, which produces a moderate negative correlation of -0.645 where higher NI192 performance produced for lower IMD scores i.e boroughs with lower levels of deprivation tend to be higher performing. The Boroughs have been ranked in order of IMD score on the x axis from the lowest on the left (least deprived) to the highest on the right (most deprived), this is also signified by the green graph line. Yield has been plotted as Kg per Household in the blue columns with a trend line added to show the above correlation.

The graph shows that collection systems in boroughs such as Hackney and Tower Hamlets, which are the most deprived boroughs in London, are clearly performing well above the likes of boroughs with similar levels of deprivation, such as Newham. Looking at the Kg per Household trend line, other collection systems that notably stand out for higher performance i.e. above the trend line are Islington, Lambeth, Greenwich, Lewisham and Hammersmith and Fulham, RB Kensington and Chelsea, Ealing, Wandsworth, Hillingdon, Bexley and Harrow.

It must be noted that four of these collection systems (Lambeth, Hammersmith and Fulham, Kensington and Chelsea and Wandsworth) operate under Western Riverside WDA, which may indicate a consistent approach to service level factors, such as container type, consistent and sustained level of communications over the contract period.

Collection systems in boroughs that appear to deliver lower yields than expected fall below the trend line. Havering in particular appears to have a lower than expected yield, relaying on recycling handled via Bring Bank and HWRCs.

Figure 7.9 All boroughs 2008/9 kerbside dry recycling performance against IMD (WasteDataFlow/ONS)



It must be noted that the average London IMD score for London is 26 and the average yield for London is approximately 140 kg/hh/yr based on total number of Households, not coverage. Figure 7.9 shows that those boroughs in the top right of the trend line, against the average yield and IMD are performing higher than expected for their IMD score. This would indicate that their higher performance may be attributed to other factors such as frequency of refuse collection, range of materials collected, or communications previously referred to as service level factors. Boroughs with collection systems plotted above both of these averages 140 kg and 26 IMD score are Hammersmith and Fulham, Greenwich, Lambeth, Lewisham and Islington. Those boroughs below both of these averages are Barnet, Hounslow, Redbridge, Enfield, Croydon, Westminster and Havering. Of particular note is Havering's collection system which appears to be performing significantly lower than expected for its IMD score.

7.2.4 Performance by Majority Housing Type

Table 7.5 2008/9 Yield statistics according to majority housing type by kg/hh (WasteDataFlow)

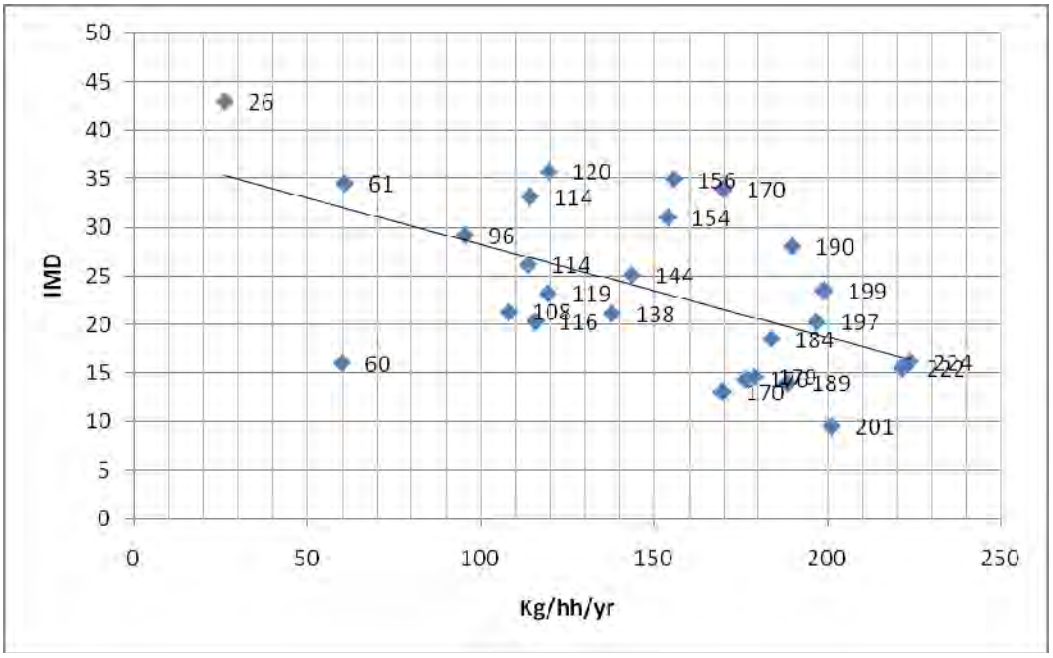
	Majority housing type		
Dry Rec Yield statistic	DSP*	NEFs	DSF
MAX	224	181	140
MIN	26	82	140
AVERAGE	147	118	140
MEDIAN	155	102	140
No. of boroughs in group	26	6	1

*Includes Doorstep Houses and Doorstep properties combined. Where the split between doorstep houses and flats cannot be identified by borough it has been combined to form the door step properties category.

Exploring the relationship between recycling collection performance and housing type we can identify that DSPs provide the highest yields, followed by NEFs and then DSFs. This reflects the higher deprivation average scores associated with NEFs. No boroughs have a housing profile which is a majority FASs. Figures 7.10 & 7.11 show the relationship between performance by majority housing type and IMD.

Doorstep Properties

Figure 7.10 2008/9 Recycling performance of majority doorstep property boroughs against IMD (WasteDataFlow/ONS)



Again, as in figure 7.9, boroughs that are plotted in figure 7.10 above the average yield and IMD by housing type located in the top right above the trend line are performing higher than expected for their IMD score. There are five boroughs that have been identified as higher performing for this housing type, these are; Kensington and Chelsea, Hammersmith and Fulham, Greenwich, Lambeth and Lewisham. All of these boroughs operate a weekly co-mingled collection system with a weekly refuse collection. None of these boroughs enforce compulsory recycling. Three of the boroughs operate under Western Riverside and two are Unitary Authorities. Based on our review of service level factors in Section 11.3.2 we are able to determine that collection systems in Greenwich, Lambeth, Kensington and Chelsea all provide some form of ongoing communications support. Kensington and Chelsea is the highest performing single use sack system in London, while both Kensington and Chelsea and Lambeth collect a full suite of recyclables plus drinks cartons both are estimated to have approximately 100 litres of weekly collection capacity, based on the provision of approx two sacks a week.

Greenwich, reported one of the highest contamination rates to WDF in 2008/09, which was 12%. This may be attributed to service change issues during this period, which could lead to the confusion of householders about their collection arrangements during the bedding in period. Greenwich operated a fortnightly collection of residual waste during this reporting period which may account for higher levels of recycling performance in 2008/09. NI192 performance at Greenwich increased from 30.5% to 42.1% in a single year owing to weekly mixed food and green waste collections ,weekly collections of dry recycling and fortnightly collection of residual waste. The borough reverted to a weekly collection of residual waste in 2009 after suffering issues with contamination. Greenwich ascribes this contamination level to the following factors :-

- Reduction in the frequency of the residual collection from weekly to fortnightly and the associated movement of the Mixed Dry Recycling (MDR) service from fortnightly to weekly - many of our residents used the MDR bin to get rid of their residual waste on a weekly basis
- Ongoing confusion surrounding the newly introduced weekly garden/food waste service - again some residents chose to put this stream in with their MDR, rather than in the separate bin provided.
- Market conditions - mixed plastics and low grade papers (which are in our stream and were previously saleable) were deemed to be no longer saleable as recyclates so were effectively reclassified as contaminants.

Table 7.6 The same collection system with similar performance against IMD.

Collection System	The same Collection System with similar performance against IMD
Greenwich (Wheeled bin)	None
Lambeth, Hammersmith & Fulham & RBKC (Single use sacks)	Wandsworth, Hillingdon
Lewisham (Box)	None

Table 7.6 indicates that there are two other collection systems that have a similar profile to the five identified. Hillingdon operates a single use co-mingled collection service, collects a similar yield and range of materials, but has a slightly lower IMD score. Wandsworth is the fourth borough under Western Riverside WDA, which operates the same service as Lambeth, Hammersmith & Fulham, & RBKC. There are no other collection systems similar to Lewisham or Greenwich with a similar performance to IMD.

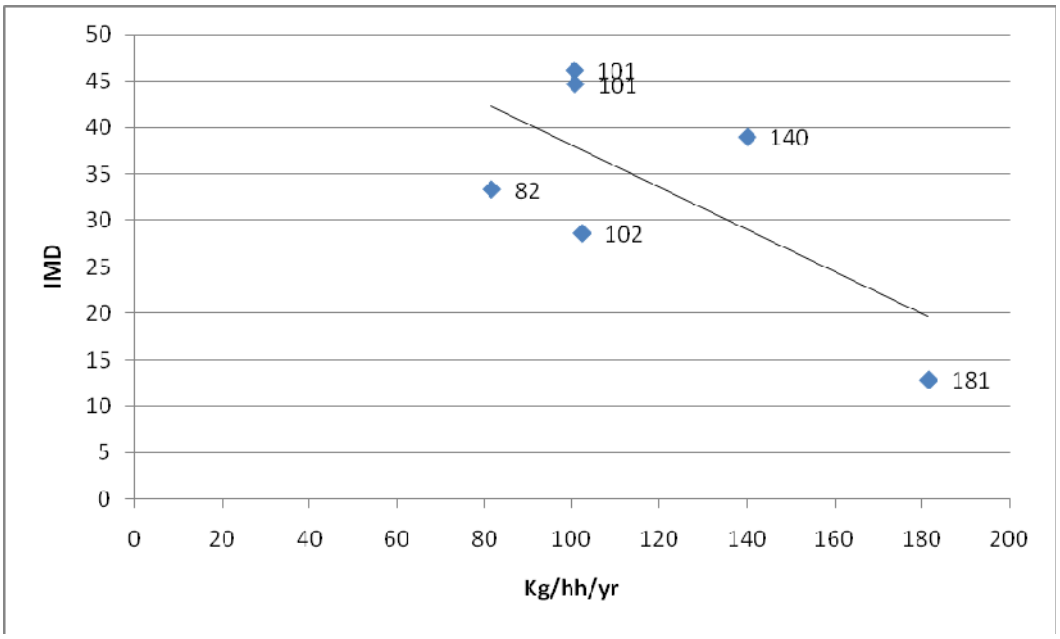
While kerbside sort collection systems in London produce slightly lower yields compared to co-mingled , kerbside sort collection systems in Ealing and Kingston produce yields which are comparable to co-mingled systems. Kingston has a lower IMD scores, which should dictate higher yields, it also it provides 105 litres of weekly container capacity which is above the average 80 litre capacity and operates a fortnightly collection of refuse which is likely to drive up recycling yields. Ealing and Kingston report impressively low contamination rates of 3% and 1% respectively in WDF.

Three of the five boroughs serving DSPs that operate Multi Stream systems have low IMD scores, and as expected return higher yields in line with the trend. In order of highest to lowest yield, these collection systems are in Bexley, Richmond and Bromley and report contamination in WDF of between 2-5%. The other two systems are in Croydon and Redbridge, both have higher IMD scores and lower yields consistent with the trend; however Redbridge reports zero contamination in WDF.

Overall Richmond has the lowest IMD score, but not the highest yield, while at the other end of the scale Newham has the Highest IMD score and the lowest yield, which follows the trend.

Near Entry Flats

Figure 7.11 2008/9 Recycling performance of majority near entry flat boroughs against IMD (WasteDataFlow/ONS)



A similar exercise has been repeated for Majority NEF boroughs and is presented in Figure 7.11. Islington's collection service has been identified as being a higher performing collection system with 140kg/hh/yr. Islington operates a co-mingled collection using a mixture of chutes, door step collections and near entry bring systems. Chutes systems are limited to six estates. Islington NEF system collects a full suite of materials plus the addition of textiles, mixed plastic and drinks cartons using reusable bags. The borough has undertaken a comprehensive review of flats and on street recycling banks prior to introducing new services, this included the upgrade of Chutes and strategic location of recycling banks in low to high rise blocks. In addition, the borough provided significant resource for a targeted door stepping campaign for 12 months in 2008/09, which is likely is likely to have impacted upon performance. Overall the Borough record 11% contamination on WDF in 2008/09.

In general boroughs identified as majority Near Entry Flats are provided a co-mingled near entry service. All systems collect five or more materials, some with the addition of drinks cartons. Containers used are a mix of single use sacks and reusable bags for storage in flats.

Doorstep collections from flats operate in City of London, Islington, Southwark and Tower Hamlets. Generally, where doorstep collections have been introduced, near entry recycling has been withdrawn. Southwark is currently expanding its door to door collection for flats, but intends to retain is near entry facilities so that residents have additional capacity to recycle, if required. Southwark returned a contamination rate of 14% on WDF during 2008/09, while Tower Hamlets produced a higher yield and lower contamination rate of just 3%.

Doorstep Flats

Only Westminster has been identified as being a Majority Doorstep Flats (DSF) borough, which makes its performance for this study rather unique. The borough provides a weekly co-mingled service using a 50 litre box. The borough's performance is consistent with the IMD yield trend. Our review of communications has highlighted that Westminster has provided short term communications campaigns each year for the last three years to help overcome barriers associated with DSF such as transient residents.

Coverage

Service coverage for doorstep properties is reported at 100% coverage, while flats serviced via a combination of near entry systems, doorstep collection and chutes systems have less overall coverage. There is evidence from survey returns and case studies that not all flats receive a near entry service and so therefore these residents rely on Community Recycling Banks, Bring Banks and HWRCs.

Flats Above Shops (FASs) appear to have a varied service coverage, and in some boroughs residents are largely dependent of on local community banks or larger bring facilities. Based on the information provide by boroughs it is estimated that approximately seventeen boroughs provide some form of doorstep FASs service, of these one is a trial while others offer a service to a limited number of flats. A further two systems are to be rolled out in 2010 in London.

7.2.5 Performance Summary

Following our high level analysis of Service Level and Socio-economic Factors we have summarised a long list of twenty boroughs with collection systems that may have service attributes that overcome barriers to recycling and give rise to higher performance yields. These are summarised in Table 7.7 below.

Table 7.7 Summary of collection systems following evaluation by socio-economic and service factors (Hyder)

Borough	BVPI82a Rank 2007/08 (Section 9.2)	Collection System (Majority Housing type)	Inner / Outer London	Majority Housing Type	Comments in relation to Service Level and Socio-economic Factors.
Westminster	Upper Middle	Co-mingled	Inner	DSF/FAS	Higher Performance may be linked to communications
Hackney	Lower	Kerbside Sort / Multi-stream	Inner	NEF/DSP	High performing for IMD score. May also be linked to Service change communications
Tower Hamlets	Lower	Co-mingled	Inner	NEF	High performing for IMD score
Islington	Lower Middle	Co-mingled	Inner	NEF/DSF	High performing for IMD score may be linked to communications.

Borough	BVPI82a Rank 2007/08 (Section 9.2)	Collection System (Majority Housing type)	Inner / Outer London	Majority Housing Type	Comments in relation to Service Level and Socio-economic Factors.
Lambeth	Upper middle	Co-mingled	Inner	DSP	High performing for IMD score, maybe linked to communications
Greenwich	Upper	Co-mingled	Inner	DSH	High performing for IMD score, may be linked to frequency of collection and residual arrangement, communications
Lewisham	Upper Middle	Co-mingled	Inner	DSP	High performing for IMD score.
Hammersmith & Fulham	Upper Middle	Co-mingled	Inner	DSH/DSF	High performing for IMD score, may be linked to container type and number
Kensington and Chelsea.	Upper	Co-mingled	Inner	DSP	High performing for IMD score may be linked to single stream system, container type, communications, and material types.
Wandsworth	Upper Middle	Co-mingled	Inner	DSP	High performing for IMD score may be linked to single stream system, container type, communications, and range of material types.
Hillingdon	Lower Middle	Co-mingled	Outer	DSH	High performing for IMD score
Bexley	Upper Middle	Multi Stream	Outer	DSH	High performing for IMD score may be linked to material type, frequency of collection and residual arrangements, Multi stream collection.
Harrow	Lower Middle	Co-mingled	Outer	DSP	High performing for IMD score may be linked to single stream system, container type, and frequency of collection and residual arrangements, material types
Richmond	Upper Middle	Multi Stream	Outer	DSH	High performance may be linked to range of material types collected. Multi stream collection.
Sutton	Upper Middle	Co-mingled	Outer	DSH	High performance may be linked to range of material types collected.
Kingston	Lower	Kerbside	Outer	DSH	High performing may be linked to kerbside sort, frequency of collection and

	Middle	Sort			residual arrangements,
Borough	BVPI82a Rank 2007/08 (Section 9.2)	Collection System (Majority Housing type)	Inner / Outer London	Majority Housing Type	Comments in relation to Service Level and Socio-economic Factors.
Ealing	Lower Middle	Kerbside Sort	Outer	DSH	Higher performance maybe linked to kerbside sort system
Barnet	Lower Middle	Kerbside Sort	Outer	DSH	Higher performance may be linked to kerbside sort, communications,
Bromley	Upper	Multi-stream	Outer	DSP	Higher performance may be linked to Multi stream collection
Merton	Upper Middle	Co-mingled	Outer	DSP	Higher performance may be linked to communications

A long list of twenty boroughs for further investigation has been identified, this includes an even mix of Inner and Outer London boroughs , three majority flat (NEFs) boroughs and one majority Doorstep Flats borough (DSFs) which also has a large number of Flats Above Shops (FASs), plus two boroughs with a higher percentage of DSFs. Sixteen boroughs are Majority Doorstep Properties or Houses (DSPs/DSHs)

A further level of evaluation was undertaken in Section Eight where boroughs have provided data sets by Housing type. This was then used to determine service approaches that give rise to higher performance yields and the development case studies.

7.3 Evaluation of Overall Organic Collection Performance

Based on service information provided by boroughs in response to our survey we have provided details on the coverage of organic collections in the capital in Table 7.8. Where data has not been provided by boroughs we have tried to establish service provision information from the Authorities public facing web site. On the whole, food waste collections are not firmly established in London in the same way that dry recycling is. Source separated food waste collections only cover 26% of London households, the majority being DSPs. Green waste collections are more established and cover 62% of London's households, and are provided largely though dedicated services, although approximately 10% are provided via a mixed food and green waste service. Approximately 47-49% of London's properties are made up of flats. Green waste services are offered to doorstep flats where there are gardens, plus a small number of flats where there are communal gardens, hence higher service coverage for green waste.

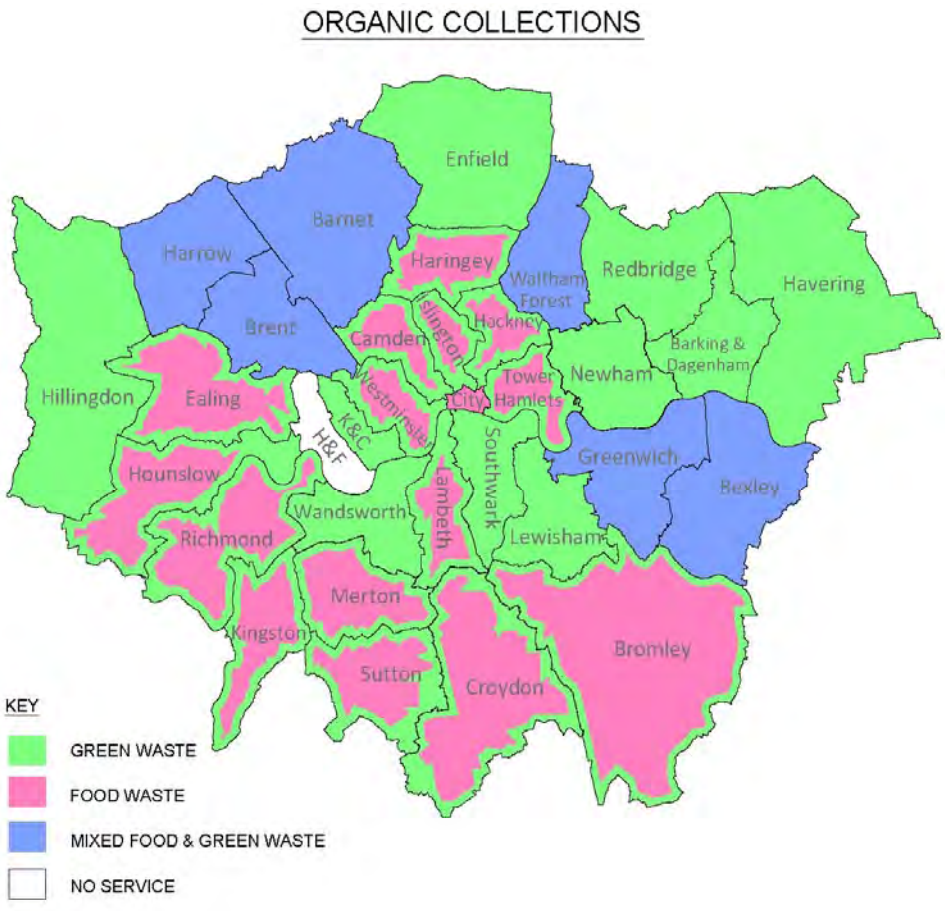
Table 7.8 Coverage of organic services in London (Hyder Survey 2009)

Organic Service	Total Coverage (hh)
Green waste	1657938
Food Waste	492433
Mixed Food and Green	359118

Hammersmith and Fulham is the only borough that does not provide an organics collection. As a result of a major public consultation with existing and past garden waste service users, separate garden waste collections were stopped in favour of home composting. Each week up to five bags of garden waste can be presented in refuse sacks for collection along with ordinary household refuse. Figure 7.12 show a map of organics collection service coverage across London.

In some cases boroughs have reported co-collected food and green waste under the 'Other Compostable' category in WDF; in this case we are unable to determine tonnages for food and green fractions. Haringey and Islington collect food and garden waste in separate containers but co-collect in the same vehicle. Camden also provide this service but on a small trial basis

Figure 7.12 Map of London's Organic household collection services 2008/9 (Hyder Survey 2009)



Organics collections have been introduced across the capital since the 2008/9 WasteDataFlow reporting period used for this study. For Example Enfield has recently introduced a food and garden waste collection to 14,000 properties in October 2009..

Food waste collections have a wider coverage in outer London, and mixed food and garden waste collections are also largely located in outer London with the exception of Greenwich. In some inner London boroughs such as Islington, Haringey and Tower Hamlets food and garden is co-mingled in the same vehicle, but collected in separate containers so the frequency of green and food collection can vary. Ten boroughs provide some kind of chargeable system for green waste. Table 7.9 provides an overview of London's organic collection systems and performance as recorded in WDF. A summary of performance by coverage is presented in Table 7.10.

It is likely that the same Service Factors identified for dry recycling will apply to the performance of food waste collections.

Table 7.9 Summary of organics collection systems and their 2008/9 performance (Hyder Survey 2009 / WasteDataFlow)

			Housing details	Geography		Green Waste						Food Waste				Mixed Food and Green				Residual Arrangements	
Borough	KS HH WDF 'Green waste only' (kg/hh)	KS HH WDF 'Other compostable waste' (kg/hh)2	Majority housing type	Inner / Outer	Dry Collection System by Majority Housing service	Green Waste Collections	Yield kg/hh/year (Coverage)	Container	Frequency	Coverage	Charge	Food Waste Collections	Yield kg/hh/year (Coverage)	Container	Coverage	Mixed	Yield kg/hh/year (Coverage)	Container	Coverage	Frequency	Container
Barking and Dagenham	24	0	DSH	Outer	Co-mingled	G	24.72	WB	F	97%	No	f	Unknown	NK	1%					weekly	wheeled bin
Barnet	0	135	DSH	Outer	Kerbside Sort											M, P,C	200.28	WB, KC	67%	weekly	wheeled bin
Bexley	0	211	DSH	Outer	Multi Stream											M, P,C	249.95	WB, KC	84%	fortnightly	wheeled bin
Brent	0	121	DSH	Outer	Kerbside Sort	G	267.02	Single use	R	100%	No					M,C	unknown	WB, KC	55%	weekly	wheeled bin
Bromley	0	4	DSP	Outer	Multi Stream	G	NK	Stickers	R	92%	Yes	f, P	110.44	KC	4%					weekly	sacks
Camden	7	1	NEF/DSF	Inner	Co-mingled	G	7.39	NK	R	98%	No					M	17.62	EC,WB	5%	>weekly	wheeled bin
City of London	0	5	NEF	Inner	Co-mingled							f	32.92	KC	16%					>weekly	sacks
Croydon	51	2	DSP	Outer	Multi Stream	G	60.03	Reusable Sack	F,S	84%	yes	f	84.40	KC,EC	2%					weekly	wheeled bin
Ealing	55	36	DSH	Outer	Kerbside Sort	G	73.17	Reusable Sack		76%	No	f,P	47.19	KC	76%					weekly	variable
Enfield	1	79	DSH	Outer	Co-mingled	G	1.11	Green box	W	91%	No									weekly	sacks
Greenwich	2	180	DSH	Inner	Co-mingled											M,P	260.01	WB, KC	69%	weekly	wheeled bin
Hackney	30	15	NEF	Inner	Multi Stream / Kerbside Sort	G	178.83	WB/Reusable sack	F	17%	No	f,X	29.16	KC,EC	52%					weekly	variable
Hammersmith and Fulham	13	0	DSH/DSF	Inner	Co-mingled			Home composting												weekly	sacks
Haringey	1	45	DSH/DSF	Outer	Co-mingled	G	2.05	Reusable Sack	W,C	65%	No	f	Unknown	KC,EC	70%					weekly	wheeled bin
Harrow	0	229	DSP	Outer	Co-mingled											M	272.30	WB	84%	fortnightly	wheeled bin
Havering	46	0	DSH	Outer	Co-mingled	G	326.67	WB	F,S	14%	Yes									weekly	sacks
Hillingdon	93	0	DSH	Outer	Co-mingled	G	106.27	Reusable Sack	F	88%	No									weekly	sacks

Table 7.9 (Continued) Summary of organics collection systems and their performance

			Housing Details	Geography		Green Waste						Food Waste				Mixed Food & Green				Residual	
Borough	KS HH WDF 'Green waste only' (kg/hh)	KS HH WDF 'Other compostable waste' (kg/hh)2	Majority housing type	Inner / Outer	Dry Collection System by Majority Housing service	Green Waste Collections	Yield kg/hh/year (Coverage)	Container	Frequency	Coverage	Charge	Food Waste Collections	Yield kg/hh/year (Coverage)	Container	Coverage	Mixed	Yield kg/hh/year (Coverage)	Container	Coverage	Frequency	Container
Hounslow	21	3	DSP	Outer	Kerbside Sort	G	29.22	Reusable Sack	NK	73%	yes	f	3.64	KC, EC	91%					weekly	sacks
Islington	31	0	NEF	Inner	Co-mingled	G	61.28	Reusable Sack	W,C	51%	No	f	Unknown	K,EC	51%					weekly	sacks
Lambeth	12	2	DSP	Inner	Co-mingled	G	143.16	Reusable Sack/ single use	R	8%	No	f	16.97	KC,EC	11%					weekly	wheeled bin
Lewisham	0	0	DSP	Inner	Co-mingled	G	NK	Single use	R	67%	yes									weekly	wheeled bin
Merton	14	2	DSP	Outer	Co-mingled	G	16.24	Single use	R	88%	yes	f	12.86	KC, EC	12%					weekly	sacks
Newham	4	0	DSH	Outer	Co-mingled	G	5.18	None	R	81%	No									weekly	wheeled bin
Redbridge	19	14	DSP	Outer	Multi Stream	G	23.34	Reusable Sack	NK,S	80%	No									weekly	variable
Richmond upon Thames	44	43	DSH	Outer	Multi Stream	G	55.06	WB/Reusable sack	F	81%	yes	f	53.52	KC,EC	81%					weekly	sacks
Kensington and Chelsea	9	0	DSP	Inner	Co-mingled	G	8.91	Reusable Sack/ single use	F	100%	yes									weekly	sacks
Kingston upon Thames	5	38	DSH	Outer	Kerbside Sort	G	8.91	WB/Reusable sack	F,S	No	Yes	f	47.39	KC, EC	80%					fortnightly	variable
Southwark	40	0	NEF	Inner	Co-mingled	G	95.11	Reusable Sack/ single use	F	42%	No									weekly	wheeled bin
Sutton	30	2	DSH	Outer	Co-mingled	G	38.32	Single use	F	79%	No	f	68.01	NK	3%					weekly	wheeled bin

Table 7.9 (Continued) Summary of organics collection systems and their performance

			Housing Details	Geography		Green Waste						Food Waste				Mixed Food & Green Waste				Residual	
Borough	KS HH WDF 'Green waste only' (kg/hh)	KS HH WDF 'Other compostable waste' (kg/hh)2	Majority housing type	Inner / Outer	Dry Collection System by Majority Housing service	Green Waste Collections	Yield kg/hh/year (Coverage)	Container	Frequency	Coverage	Charge	Food Waste Collections	Yield kg/hh/year (Coverage)	Container	Coverage	Mixed	Yield kg/hh/year (Coverage)	Container	Coverage	Frequency	Container
Tower Hamlets	2	6	NEF	Inner	Co-mingled	G	7.97	Reusable Sack	F	19%	No	f	77.03	KC	8%					>weekly	variable
Waltham Forest	0	63	DSH	Outer	Kerbside Sort											M	169.35	F, WB, KC.	37%	weekly	Sacks
Wandsworth	4	0	DSP	Inner	Co-mingled	G	5.89	Single use	R	65%	Yes									weekly	variable
Westminster City Council	9	0	DSF/FAS	Inner	Co-mingled	G	93.00	Reusable Sack	F	9%	No	f	15.18	NK	1%					>weekly	variable
Average	**17**	**37**																			

KEY

R = Request G =Green C= Co-collected F=Fortnightly f = Food S= Seasonal M = Mixed Food and Green p = Paper NK = Not Known

WB = Wheelie Bin KC= Kitchen Caddy EC = External Caddy

Table 7.10 Summary of London's Organic Collections systems by yield and coverage (Hyder Survey 2009/WasteDataFlow)

	Number of Authorities	Authorities	Kg/hh/yr (Total Dwellings)	Tonnage data (WDF Q10)	Service Coverage	Yield kg/hh/yr (coverage)	Total hh	% Coverage	Charge
Green Waste	26	Bromley	Unknown	Unknown	122742	Unknown	133298	92%	Yes
		Lewisham	Unknown	Unknown	77627	Unknown	115083	67%	Yes
		Brent (inc food waste from 60,000 hh)	Unknown	Unknown	108850	Unknown	108850	100%	No
		Hillingdon	93	9564	90000	106	102500	88%	No
		Enfield	79	121	109000	86	119497	91%	No
		Ealing	55	6951	95000	73	125356	76%	No
		Croydon	51	7165	119365	60	141868	84%	Yes
		Havering	46	4573	14000	327	98732	14%	yes
		Richmond upon Thames	44	3579	65000	55	80594	81%	Yes
		Southwark	40	4851	51000	95	122467	42%	No
		Islington (Co-collection with food waste)	31	2942	48000	61	93437	51%	No
		Sutton	30	2395	62500	38	78792	79%	No
		Hackney	30	2861	16000	179	96532	17%	No
		Barking and Dagenham	24	1681	68000	25	70030	97%	No
		Hounslow	21	1987	68000	29	93008	73%	Yes
		Redbridge	19	1842	78899	23	98431	80%	No
		Merton	14	1137	70000	16	79327	88%	Yes
		Lambeth	12	1489	10400	143	128662	8%	No
		Kensington and Chelsea	9	766	86000	9	86000	100%	Yes
		Westminster	9	1023	11000	93	118716	9%	Not known
		Camden	7	716	97000	7	99015	98%	No
		Tower Hamlets	6	152	19000	8	99188	19%	No
		Kingston upon Thames	5	334	Unknown	Unknown	80594		Yes
		Newham	4	419	81000	5	100373	81%	Yes
		Wandsworth	4	498	84561	6	130577	65%	Yes
		Haringey (Co-collection with food waste)	1	133	65000	2	100444	65%	No

Food Waste	14	Westminster	unknown	18	1200	15	118716	1%	
		Richmond upon Thames	43	3479	65000	54	80594	81%	
		Kingston upon Thames	38	2417	51000	47	63681	80%	
		Ealing	36	4483	95000	47	125356	76%	
		Hackney	36	1476	50600	29	96532	52%	
		City of London	5	32	957	33	5839	16%	
		Bromley	4	532	4818	110	133298	4%	
		Hounslow	3	310	68,000	4.55	93008	73%	
		Sutton	2	170	2500	68	78792	3%	
		Tower Hamlets	2	578	7500	77	99188	8%	
		Lambeth	2	246	14500	17	128662	11%	
		Merton	2	126	9796	13	79327	12%	
		Croydon	2	216	2562	84	141868	2%	
		Barking and Dagenham	0	Unknown	1000	Unknown	70030	1%	
Mixed Food and Green	9	Harrow	229	19333	71000	272	84614	84%	
		Bexley	211	19884	79551	250	94277	84%	
		Greenwich	180	18200	70000	260	101146	69%	
		Barnet	135	18275	91246	200	135618	67%	
		Brent (mixed with green)	unknown	unknown	60000	Unknown	108850	55%	
		Waltham Forest	63	6097	36000	169	96582	37%	
		Camden (co-collection of food and green) Trial	1	94	5321	18	99015	5%	
		Islington (Co-collection with Green waste)	unknown	Unknown	48000	Unknown	93437	51%	
		Haringey (Co-collection with Green waste)	unknown	Unknown	70000	Unknown	100444	70%	

Unknown = Tonnage Not identifiable in WasteDataFlow due to co-collection or mixed with other waste streams.

7.3.1 Food Waste Collection Performance

WRAP have drafted a food waste collection Guidance Document[39] to assist Local Authorities in the planning, implementation and delivery of food waste services.

[39] Food Waste Collection Guidance, WRAP. 2009.

Drawing from local authority schemes currently in operation including WRAP trials and other research to date the WRAP report draws the following conclusions:

- Refuse collection frequency is a statistically significant factor in the performance of food waste collections. Areas with fortnightly collections of refuse have higher weekly food waste participation and yields
- Participation and yields can decline over time in areas with weekly refuse collections, whilst in areas with fortnightly refuse collections yield and participation is maintained
- Areas with weekly black sack collections provide higher food waste yields than areas with weekly 240 litre wheeled bin refuse collections
- Food waste yields may also be influenced by the size of the wheeled bin provided for refuse
- Higher food waste yields will be found in more affluent areas

It is likely that these Service Related Factors will give rise to higher performance and have therefore been considered as part of this study. Although given the study is based on only a small number of London boroughs it is hard to extrapolate.

WRAP food waste trial[40] areas including those in Sutton, Croydon, Merton and Kingston Upon Thames produced typical yields where in the range of 1.9- 2.5 Kg per household per week (for those participating in the scheme) with participation rates of approximately 70%. The trial in Kingston was focused on door to door multi-occupancy property collections (purpose built flats), which reported typical yields of 1.6 Kg/hh/wk with much lower participation rates of approx 30%. Participation rates from flats can be expected to be lower than for other housing stock where barriers to recycling have not been overcome. These barriers include cultural or language barriers, therefore appropriately designed communications to suit the target audience is required.

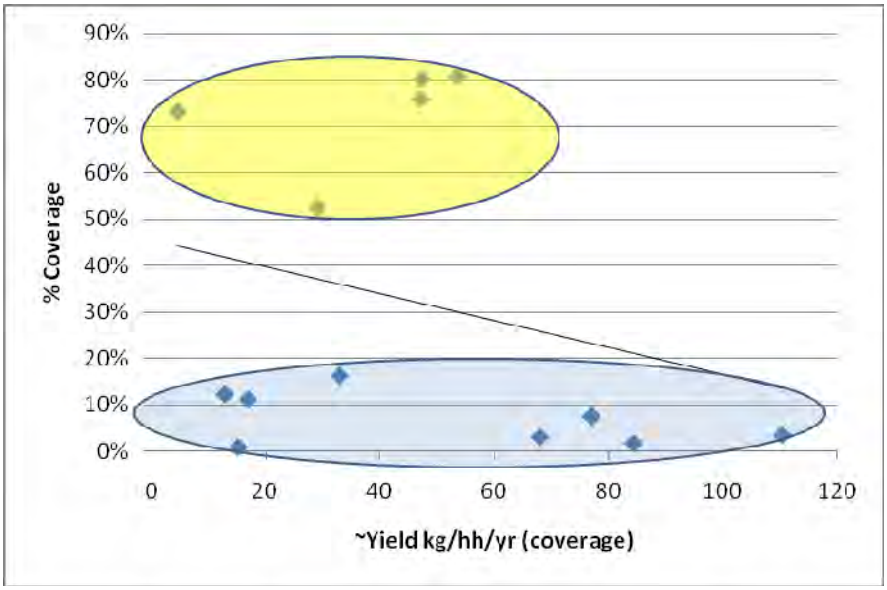
7.3.2 Evaluation of Food Waste Collections

26% of households in London boroughs receive a food waste collection service, approximately 886,000 households. Based on data provided by boroughs an estimated 28,000 households in flats receive a food waste collection services in the form of near entry or doorstep collections. Food waste collections are predominantly provided to Doorstep properties in London.

There are seven established food waste schemes in London offering wide coverage within each borough, we have WDF data for five of these; in addition there are nine trial food waste collection services, we have data for eight of these. Where data is unavailable it is due to the co-collection or reporting of food and green wastes. Figure 7.13 below shows food waste yields by coverage in each borough, it clearly shows the trial areas with high yields are in the blue circle. Established schemes with generally lower yields are identified in the in the yellow circle. The collection system in Hounslow is an established scheme with over 71% coverage, but appears to have a significantly lower yield. This is largely due to service roll out during March 2009, as a result only one month's data was recorded on WDF. Two collection systems (Islington and Haringey) commingle food with garden waste at collection and as a result do not appear on this graph. No data was available for Barking and Dagenham's trial for this period. Richmond, Ealing and Kingston appear to be higher performing established collection systems. Bromley, Croydon, Tower Hamlets and Sutton appear to be the higher performing trial areas.

[40] WRAP 2009. Evaluation of the WRAP Separate Food Waste Collection Trials.

Figure 7.13 Food Waste Collections. Performance by number of households covered plotted against % coverage. (Hyder Survey 2009/WasteDataFlow)



Details of established and trial collection systems have been set out in Tables 7.11 and 7.12. Average yields for trial systems appear to be considerably higher than those of established system, perhaps reflecting the additional and more intensive communication resources applied to trial areas to increase participation and capture. Lower yields for established systems perhaps support the evidence for diminishing yields where participation and yields can decline over time in areas with weekly refuse collections[41]. All food waste collection systems operate a weekly collection of food and residual waste, with the exception of Kingston which operates a fortnightly collection of residual. Caddy liners are generally accepted, but not supplied free by the borough. A range of residual collection containers are used across the food waste collection systems, however it is difficult to determine the impact of residual collection arrangements on such a small data set. For example Kingston's higher performance may be attributed to fortnightly collection of refuse, where fortnightly collections of residual waste and black sack collections are likely to increase performance[42]. This is largely due to residual capacity being restricted. Of the five systems evaluated, Richmond, Kingston and Ealing are the highest performing. Again, from such a small data set we are unable to determine the impact of affluence through IMD scoring; however it is likely that this Socio-economic factor will considerably influence performance, where higher food waste yields will be found in more affluent areas[43].

[41] Food Waste Collection Guidance, WRAP. 2009.

[42] Food Waste Collection Guidance, WRAP. 2009.

[43] Food Waste Collection Guidance, WRAP. 2009.

Table 7.11 Established food waste collections (Hyder Survey 2009 / WasteDataFlow)

Borough	Food Waste Collections	Yield kg/hh/year (Coverage)	Container2	Coverage	Residual Frequency	Residual Container
Ealing	F,P	47.19	KC	76%	weekly	variable
Hackney	F,X	29.16	KC,EC	52%	weekly	variable
Haringey	F	Unknown	KC,EC	70%	weekly	wheeled bin
Hounslow	F	3.64	KC, EC	91%	weekly	sacks
Islington	F	Unknown	K,EC	51%	weekly	sacks
Richmond upon Thames	F	53.52	KC,EC	81%	weekly	sacks
Kingston upon Thames	F	47.39	KC, EC	80%	fortnightly	variable

Table 7.12 Trial food waste collections or low coverage systems (Hyder Survey 2009 / WasteDataFlow)

Borough	Food Waste Collections	Yield kg/hh/year (Coverage)	Container	Coverage	Residual Frequency	Residual Container
Barking and Dagenham	F	Unknown	NK	1%	weekly	wheeled bin
Bromley	F, P	110.44	KC	4%	weekly	Sacks
City of London	F	32.92	KC	16%	>weekly	Sacks
Croydon	F	84.40	KC,EC	2%	weekly	wheeled bin
Lambeth	F	16.97	KC,EC	11%	weekly	wheeled bin
Merton	F	12.86	KC, EC	12%	weekly	sacks
Sutton	F	68.01	NK	3%	weekly	wheeled bin
Tower Hamlets	F	77.03	KC	8%	>weekly	variable
Westminster l	F	15.18	NK	1%	>weekly	variable

F = food X = Excludes raw meat and bones P = Includes paper as a liner (where stated)

KC= Kitchen Caddy EC = External Caddy NK= Not Known

Housing Type

Food waste collection systems are predominantly provided to DSPs however based on information provided in our survey an estimated 28,000 flats in London receive collections from a combination of Near Entry and Doorstep collected arrangements. Bexley, City of London, Hackney, Islington, Lambeth, Kingston, Tower Hamlets and Westminster all provide food waste collections to some of their flats. Of these, Tower Hamlets, Kingston and City of London provide

some form of doorstep collection. Survey returns indicate that only Tower Hamlets offers a food waste collection services to Flats Above Shops.

7.3.3 Food & Green Waste Collections Performance

WRAP commissioned a report on mixed food and green waste collections[44] in England to look at the effectiveness of recycling food waste via mixed food and garden waste collections. Six Authorities, including three London boroughs, with established organic waste collection services were selected for monitoring. The residual and organic waste collection services in these authorities covered both weekly and fortnightly collection frequencies. In all the authorities residents were provided with caddies to encourage the separation of food waste in the kitchen. The report[46] produced the following conclusions;

- Overall residual waste per household was significantly lower in those authorities where residual waste collections were fortnightly. Where residual waste was collected fortnightly it also contained less food waste than in weekly collections.
- If food waste is collected with garden waste then fortnightly collections of residual waste and weekly collections of food & garden waste facilitate more diversion of food waste at the kerbside for recycling than the other service configurations reviewed.

The amount of food in the organic waste bin was much lower where bins were collected fortnightly (0.55kg/hh/wk) as opposed to weekly (1kg/hh/wk). Food waste made up around 25% (by weight) of the waste in the organic waste bin where collections of mixed food and garden waste were weekly; where collections were fortnightly collections food waste was on average 9.3% . Residents with weekly collections of food & garden waste captured more food waste (31.5%) than those on fortnightly collections (21.8%)

When compared to weekly food waste only collections combined food and garden waste schemes achieve a much lower food yield per household and hence lower level of diversion[36]. The report[46] concludes that combined organic waste collections are less effective in diverting food waste for recycling compared to food only collections. As a result it will be much more difficult to achieve high diversion / recycling targets with combined food and garden collections systems. Furthermore the food waste remaining in the residual bin will need to be managed at increasingly higher disposal costs.

Establishing these trends for London boroughs is difficult given that there are only seven identified as mixed organic collections which are predominantly collected on a weekly basis, with the exception of Waltham Forest which is fortnightly. In addition, residual collections for these seven are weekly, with the exception of Bexley and Harrow which are fortnightly. Greenwich operated a fortnightly residual under the 2008/09 data reporting period.

[44] WRAP 2010. Performance analysis of mixed food and garden waste collection schemes

7.3.4 Evaluation of Food & Green Waste Collections

Approximately 10% of London Households are provided via a mixed food and green waste service. Table 7.13 provides a summary. All services are provided using a combination of wheeled bins sizes, plus kitchen caddy. Enfield recently introduced a food and garden waste collection service t 14,000 properties in October 2009, however a full years performance data from WDF was not available for this study. Therefore, only five boroughs offer an established mixed organic collection, of these five Waltham Forest, which operates a fortnightly collection of organics and a weekly collection of residual using sacks, has the lowest yield. Harrow has the highest yield and operates a weekly collection of organics and fortnightly collection of residual using wheeled bins. Bexley has the second highest yield and provides a weekly collection of organics and fortnightly collection of residual. These performances would appear consistent with the findings in the WRAP report[45] discussed in Section 8.3. Again, the impact of socio-economics is likely to have strong influence on performance.

Table 7.13 Summary of Food and Green Waste Collections 2008/9 (Hyder Survey 2009 / Wastedatflow)

Borough	Mixed	Yield kg/hh/year (Coverage)	Container	Coverage	Residual Frequency	Residual Container
Barnet	M, P,C	200.28	WB, KC	67%	weekly	wheeled bin
Bexley	M, P,C	249.95	WB, KC	84%	fortnightly	wheeled bin
Brent (inc other green)	M,C	Unknown	WB, KC	55%	weekly	wheeled bin
Camden (co-collected)	M	17.62	EC,Sack	5%	>weekly	wheeled bin
Greenwich	M,P	260.01	WB, KC	69%	weekly	wheeled bin
Harrow	M	272.30	WB	84%	fortnightly	wheeled bin
Waltham Forest	M	169.35	F, WB, KC.	37%	weekly	Sacks

M= Mixed food and green P = Paper C = Card

KC= Kitchen Caddy EC = External Caddy

Collection systems in Barnet, Bexley, Brent and Greenwich include the collection of paper (P) and or card (C)

[45] WRAP 2010. Performance analysis of mixed food and garden waste collection schemes

Figure 7.14 Mixed Food and Green Waste Collections. Performance yields by household coverage 2008/9. (Hyder Survey 2009 / Wastedatflow)

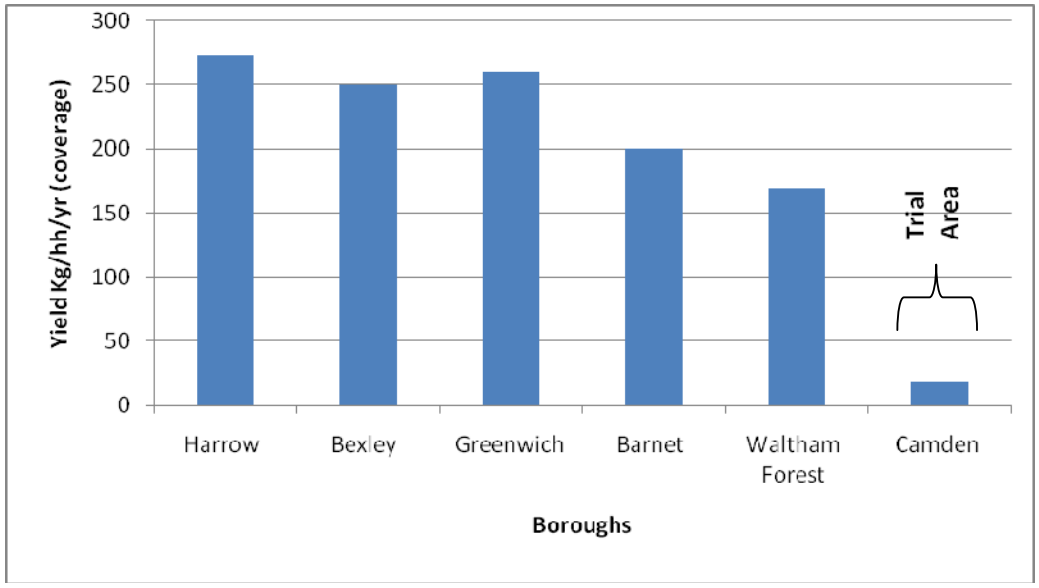


Figure 7.14 above displays performance of all mixed food and green waste collections, with the exception of Brent's service, where this material is mixed and recorded in WDF with other green waste under 'other compostable material'. It should be noted that Waltham Forest covers 36,000 Households (37% coverage).

Co-collection

Camden is a trial area covers approximately 5,300 households (5% coverage). This trial is technically a co-collection of food and green waste using separate containers. A similar collection is provided by Haringey and Islington; however we are unable to clearly identify tonnages in WDF to determine performance. Both Islington and Haringey are established services with wide coverage of 51% and 70% respectively. It should also be note that Islington has is a majority NEF borough, hence the lower service coverage.

Housing Type

Mixed food and green waste collections are largely provided to Doorstep Properties, but several boroughs also offer this service to a limited number of residents in flats. Bexley is the only borough to provide this service to a small number of flats that have gardens. Greenwich is the only borough to provide this service to Flats above Shops.

7.3.5 Green Waste Collections

All boroughs provide some form of Green Waste collection, either as a dedicated service, co-collected with food or mixed with food, with the exception of Hammersmith and Fulham. In total 26 boroughs provide a dedicated green waste service. Coverage in boroughs was general high, with the exception of Havering, Hackney and Lambeth. Services are provided with a range of containers, including wheeled bins, reusable sacks, single use sacks or stickers. Havering is the only borough to use wheeled bins and Bromley the only borough to use a sticker based system. Ten boroughs provide chargeable services, three of which are on a seasonal basis, collected mainly on fortnightly or request basis. Charging structures vary from an annual charge dependant on the size of the container or a pay for use sack/sticker service. Details of those boroughs providing a season collection are in Table 7.14 below. On average, chargeable

systems collect 63 kg/hh/yr based on service coverage. The highest yield was achieved by Havering, which is a fortnightly seasonal system. This may indicate that targeting collection to a small number of gardened properties (14% coverage) during spring and summer months brings about performance and operational efficiencies.

Table 7.14 Chargeable Green Waste Collections 2008/9 (Hyder Survey 2009 / Wastedatflow)

Borough	Green Waste Collections	Yield kg/hh/year (Coverage)	Container	Frequency	Coverage	Charge	Residual Frequency	Residual Container
Bromley	G	unknown	Stickers	R	92%	Yes	weekly	sacks
Croydon	G	60.03	Reusable Sack	F,S	84%	yes	weekly	wheeled bin
Havering	G	326.67	WB	F,S	14%	Yes	weekly	sacks
Hounslow	G	29.22	Reusable Sack	NK	73%	yes	weekly	sacks
Lewisham	G	unknown	Single use	R	67%	yes	weekly	wheeled bin
Merton	G	16.24	Single use	R	88%	yes	weekly	sacks
Richmond upon Thames	G	55.06	WB/Reusable sack	F	81%	yes	weekly	sacks
Royal Borough of Kensington and Chelsea	G	8.91	Reusable Sack/ single use	F	100%	yes	weekly	sacks
Royal Borough of Kingston upon Thames	G	8.91	WB/Reusable sack	F,S	No	Yes	fortnightly	variable
Wandsworth	G	5.89	Single use	R	65%	Yes	weekly	variable

R = Request G =Green C= Co-collected F=Fortnightly S= Seasonal NK = Not Known

Details of boroughs that provide a free service are located in Table 7.15. Sixteen boroughs provide this service, either weekly, fortnightly or on request. Where the green waste is collected weekly it is often co-collected with food waste. Redbridge collects on a seasonal basis. Boroughs use a range of containers including wheeled bins, reusable sacks and single use sacks, with the exception of Enfield which provides a green box, but also accepts green waste in open untied sacks and Newham, where no container is provided. On average, non-chargeable systems collect 70 kg/hh/yr based on service coverage.

It is clear from this research that non-chargeable collection systems result in increased green waste yields. However, the benefits of Home composting and the use of HWRC networks to manage green waste should not be overlooked in the management of organic wastes.

WRAP research indicated that home composting makes a significant contribution to the management of garden waste and other home compostable household wastes in the UK[46].Home composting can have a significant contribution to the reduction in organic waste sent to landfill with participating households estimated to divert between 150-160 kg/hh/yr. This includes diversion away from green waste collections, kerbside residual, HWRC residual and garden skips.

[46] Home Composting Diversion: District Level Analysis. WRAP 2009.

Table 7.15 Non chargeable Green Waste collections 2008/9 (Hyder Survey 2009 / Wastedatflow)

Borough	Green Waste Collections	Yield kg/hh/year (Coverage)	Container	Frequency	Coverage	Charge	Residual Frequency	Residual Container
Barking and DagenhamB	G	24.72	WB	F	97%	No	weekly	wheeled bin
Brent (inc. some food from 60,000 households)	G	267.02	Single use	R	100%	No	weekly	wheeled bin
Camden	G	7.39	NK	R	98%	No	>weekly	wheeled bin
Ealing	G	73.17	Reusable Sack		76%	No	weekly	variable
Enfield	G	86.38	Green box	W	91%	No	weekly	sacks
Hackney	G	178.83	WB/Reusable sack	F	17%	No	weekly	variable
Haringey	G	2.05	Reusable Sack	W,C	65%	No	weekly	wheeled bin
Hillingdon	G	106.27	Reusable Sack	F	88%	No	weekly	sacks
Islington	G	61.28	Reusable Sack	W,C	51%	No	weekly	sacks
Lambeth	G	143.16	Reusable Sack/ single use	R	8%	No	weekly	wheeled bin
Newham	G	5.18	None	R	81%	No	weekly	wheeled bin
Redbridge	G	23.34	Reusable Sack	NK,S	80%	No	weekly	variable
Southwark	G	95.11	Reusable Sack/ single use	F	42%	No	weekly	wheeled bin
Sutton	G	38.32	Single use	F	79%	No	weekly	wheeled bin
Tower Hamlets	G	7.97	Reusable Sack	F,C	19%	No	>weekly	variable
Westminster	G	93.00	Reusable Sack	F	9%	No	>weekly	variable

R = Request G =Green C= Co-collected F=Fortnightly S= Seasonal NK = Not Known

Housing Type

Green waste collections are more commonly associated with DSPs to target households with gardens; therefore boroughs may be selective with their service coverage to ensure they capture as much material as possible. From our survey we have identified that ten boroughs also included a small number of flats on their collection rounds where communal gardens generate sufficient garden wastes. Three boroughs provide green waste services to Flats Above Shops on a request basis.

7.3.6 Performance Summary

Of the established food waste collection services, collection systems in Richmond, Ealing and Kingston delivery the highest yields where data can be clearly identified from WDF. Of the seven mixed food and green waste systems, Harrow, Bexley and Greenwich provided the highest yields. Green waste collection yields are largely affected by charging, frequency of collection, seasonal collections and container type, with this in mind Havering produced the

highest yield with a fortnightly chargeable wheeled bin collection which operates on a seasonal basis to 14% of its residents. The second highest is Brent, which operates a non-chargeable request collection system to 100% of its residents, although some of Brent's reported tonnage data may include food as it is mixed with its mixed food and green waste trial.

8 Recycling Performance by Housing Type

This Section focuses on the type of recycling services in place for each housing type and examines data provided by boroughs to determine any performance trends relating to each housing type. This Section is based on data provided by participating authorities and is used in conjunction with WDF data evaluated in Section Seven of this report to try to identify Service Level Factors that give rise to higher performance levels.

A summary of the best and average yields (kg/hh), where data was available, is presented below.

Table 8.1 Summary of collection performance by housing type (Hyder Survey 2009)

		DSPs	NEFs	FASs
Dry recycling	Best	233 (Wandsorth)	157 (Bromley)	58 (Ealing)
	Weighted average	179	85	53
Food	Best	115 (Bromley)	no data	no data
	Weighted average	50	no data	no data
Garden/mixed	Best	260 (Greenwhich)	no data	no data
	Weighted average	121	no data	no data

This section is a summary of the survey results. With trials and existing research in dispersed.

Dry recycling for Doorstep Flats and Doorstep houses are considered together in this Section due to the format in which boroughs provided information. In all cases, dry recycling collections are provided to DSFs as part of the same service to DSHs. Where performance data has been provided, in all cases it is amalgamated across the two housing types.

While we were able to access data for all boroughs in WDF to evaluate collection systems by Majority Housing Type, not all boroughs were able to provide data that accurately reflects the performance of services to each housing type. As result we are unable to provide a thorough analysis for all housing types. Where we have been able to identify possible Service Level Factors that give rise to high performance making use of WDF data for a particular borough, in some case we are unable to corroborate this in the absence of borough data.

8.1 Dry Recycling Collections

8.1.1 Doorstep Properties Evaluation

Descriptions of collection systems for dry recyclables from door step properties were provided by participating authorities and are provided below in figure 8.2.

Table 8.2 Summary of kerbside recycling collections in London (Hyder Survey 2009)

Collection container	Collection method	Recycling collection frequency	Residual collection frequency	No. of authorities
sack and/or box	co-mingled	>weekly	>weekly	2
		Weekly	>weekly	1
		Weekly	weekly	10
		weekly/fortnightly	weekly	1
	kerbside sort	Weekly	fortnightly	1
		Weekly	weekly	5
		weekly/fortnightly	weekly	1
	multi stream partially co-mingled	Fortnightly	weekly	2
		Weekly	fortnightly	1
		Weekly	weekly	2
sack and/or box/wheeled bin	co-mingled	Weekly	>weekly	2
		Weekly	weekly	2
wheeled bin		Fortnightly	fortnightly	1
		Weekly	weekly	1
wheeled bin/sack/box		Fortnightly	weekly	1

Ten boroughs were able to provide data for this type of property as part of their survey return. A full breakdown of this data can be found in table 8.4 which comprises of the following recycling collection system types;

- Four Multi stream systems (All outer London)
- Two Kerbside Sort Schemes (One inner and one outer London)
- Four Co-mingled Systems (Three inner and one outer London)

Yield data is based on kg/hh covered. All yield data is excluding contamination rejected following delivery to the MRF or transfer facility. The average yield for doorstep properties dry recycling is 179 kg/hh/yr, based on the data provided by participating authorities.

The top three performing authorities for this data set are;

- Wandsworth (233 kg/hh/yr),
- Richmond upon Thames (207 kg/hh/yr) and
- Merton (203 kg/hh/yr).

On evaluation of WDF data for 2008/09 for total kerbside dry recycling in Section Seven, we identified sixteen majority DSP boroughs linked to service level factors that might give rise to higher performance. All three boroughs appear in this long list.

Of those sixteen it would also appear that Hammersmith and Fulham, which also operates a similar dry recycling system to Wandsworth, is classified as a majority DSP borough and has a similar dry recycling performance (190kg/hh/yr). Both Hammersmith and Wandsworth operate under Western Riverside WDA, along with Lambeth and the Royal Borough of Kensington and Chelsea (RBKC). Of all these boroughs Lambeth has the lowest performance (156Kg/hh/yr) and RBKC has the highest (199 Kg/hh/yr). Western Riverside is the highest performing WDA in London for dry recycling with an average of 185 Kg/hh/yr collected at Kerbside.

Geographically, all three boroughs are located in SW London, with Richmond and Merton being an outer London borough and Wandsworth inner London.

All three boroughs have been classified as being majority DSP or DSH, as opposed to NEF and appear in the upper middle banding of for BVPI 82a performance which shows that they are also generally high dry recycling performers.

It must be noted that it was not possible to determine contamination levels for Wandsworth as none appears to be recorded under WDF for the 2008/09 return. Total contamination levels for Richmond are record as 2% and Merton as 1%. It is also difficult to determine the kerbside reject rates as this information is not recorded by boroughs in WDF.

Kerbside sort systems in Ealing and Hackney compare favourably to co-mingled and multi-stream collections in Southwark, Tower Hamlets and Bromley.

Redbridge is the lowest performing collection system and operates a weekly multi-stream collection (partial kerbside sort) using only a 55L box for all recyclable materials, but does not collect cardboard. Croydon also operates a multi-stream collection and is the second lowest performing borough, but provides two boxes and includes cardboard. Given the relationship between container capacity and performance it could be possible that Redbridge's lower performance may be attributed to limited container capacity. However, Croydon also offer a multi-stream stream collection with two boxes that includes cardboard and offers a marginally better performance yield.

Service Level Factors

Both Wandsworth and Merton operate similar collection system for this housing type: a co-mingled weekly collection from a sack and/or box. Wandsworth uses an orange single use sack while Merton uses two boxes for a majority of households. Both services provide approximately 100 litres of capacity on a weekly basis. Both Authorities collect a full suite of five materials and food and drinks cartons,. Neither borough collects 'other' materials such mixed plastic packaging.

Wandsworth is the one of the highest performing single co-mingled stream collection systems using a single use sack in London. The service is consistent across the DSP category and across a range of housing types.

Richmond is a weekly multi stream partially co-mingled collection system. Richmond uses two boxes to collect materials totalling 100 litres capacity, one for mixed paper and card the other for glass, cans& aerosols, drinks bottles and foils. Again, they do not collect mixed plastic.

Richmond, Wandsworth and Merton do not operate a compulsory recycling scheme and provide a weekly refuse collection in sacks. Merton and Richmond provide food waste collection with a 12% and 81% coverage respectively. All three provide Green Waste Collections.

Ealing and Hackney both operate weekly kerbside sort systems, both systems collect the same materials, but Hackney also collects mixed plastic and drinks cartons using 55L boxes.

However, Ealing produces a slightly higher yield. Overall Hackney has a total contamination rate of 11% while Ealing's is just 3%.

In general, co-mingled collection systems in London appear to have a wider performance range when compared to kerbside sort systems, while twin stream systems appear to collect higher average yields with higher end performance range.

Based on information provided by boroughs in table 7.4, Wandsworth have on-going communications campaigns, while Merton has undergone significant targeted campaigns in 2008/09 and 2009/10.

Merton are currently undertaking door knocking campaigns on doorstep recycling rounds, coupled with an overarching recycling advertising campaign focussing on non committed recyclers aimed at improving capture of the key materials – paper, tins and cans, and glass.

Socio-Economic Factors

Richmond has an IMD score of 10 which is the lowest of all London boroughs. We would therefore expect Richmond to have the highest recycling performance however this wasn't found. Merton has a score of 15, and Wandsworth has a score of 20 which is closer to the London average of 26, therefore Wandsworth, the highest performing borough in this study is typically more representative than Richmond and Merton. Lambeth has a IMD score of thirty five and RBKC has a score of twenty four. Unfortunately, these boroughs could not provide performance details in relation to DSP so we are unable to corroborate the WDF evaluation.

Ealing's IMD score is 25 which are significantly lower than Hackney's which is 46, Hackneys score is the highest in London signifying the highest level of deprivation.

Looking at the Overall performance evaluation, Ealing's collection system performance is consistent with the IMD performance trend, while Hackney is performing better than expected for its IMD score.

Redbridge and Croydon have similar IMD scores and are both underperforming for their IMD scores.

Selection of Case Studies.

A further in depth review of boroughs selected for Case Study was carried out to further define contributing factors to higher performance. We selected the following recycling case studies as examples of high performance:

- **Wandsworth (within Western Riverside WDA) -** an inner London borough using a **co-mingled single use sack for its DSP**.
- **Richmond** - an **outer London borough using a twin stream** collection system.
- **Hackney** - an inner London borough using a **kerbside sort collection** system

These case studies signify some of the factors that lead to **higher performance** and perhaps point to **quick wins** that can be achieved by other boroughs when looking to improve performance.

It should also be noted we have previously identified Greenwich as a high performing **wheeled bin co-mingled system** in **Inner London** which was performing well above what is expected its IMD score, where fortnightly collections of residual waste are likely to have increased performance. Greenwich however declined to provide performance data.

Contributing Factors to High Performance

In spite of the small sample size we are able to draw some conclusions based on existing research, from the WDF review in Section Seven and information provided by Councils in the **Survey/questionnaire**, **Case Study Interviews** and **Workshop**.

From our overall evaluation we have made a number of observation that address how some service level issues have been addressed to overcome barriers to recycling, and so give rise to higher levels of performance for London's DSPs; these have been set out in Table 8.3.

Table 8.3 Contributing factors giving rise to high performance in DSPs (Hyder Survey, workshop, case studies and desktop review 2009)

Service Level criteria	Observations
Type of collection System	Single stream co-mingled collections using either a box/bag or single use bag would appear to generate high yields in London. Ensuring the provision of single use bags is crucial to maintain participation/capture. Multi stream collections also give rise to higher yields in London. However, it is not possible to say that one system is better than another; it is more attributed to the reliability of service which if unreliable would discourage the public from recycling[47]. Kerbside sort system in more densely populated areas may struggle with traffic congestion, parked cars and narrow streets where the collection process is manual and slower than co-mingled collections. Dense urban areas where on-street parking and heavy traffic requires fast loading without the need to return containers to the point of collection[48]. There is no evidence to suggest the type of collection system directly effects performance. However, service consistency across all housing types in the borough or disposal authority as offered in Western Riverside can be delivered with a single and consistent communications

[47] Barriers to Recycling at Home, WRAP.2008

[48] Choosing the Right Collection System, WRAP 2009

	message which is more coherent for residents which could increase performance.
Service Level criteria	**Observations**
Material types collected	In London five recyclables: paper, card, glass, plastic bottles and cans, plus one additional item can give rise to higher yields as long as there is sufficient storage capacity to suit frequency of collection. The collection off bulky mixed plastic would undoubtedly require additional container capacity. Unsubstantial container capacity may result in material displacement, where bulkier items such as plastic, displace heavier items such as glass, cans and paper. Wandsworth is one of several boroughs that are moving towards a mixed plastic collection in 2010, however there are no plans to increases the number of sacks distributed.
Container Types / Capacity	Doorstep Flats (DSF) are more abundant in more densely populated Inner London The use of co-mingled single use sacks may be more suited to **densely populated areas** where on street or property space is restricted therefore there is a higher risk of reusable containers going missing or becoming damaged. The stakeholder workshop identified the lack of containers as a significant barrier to recycling. As carried out in Wandsworth Quarterly Delivery of sacks act as a prompt to recycling. Sacks are easy to store and provide flexible capacity, i.e. more sacks can be used over busy holiday periods where more recycling is generated. The use of boxes for multi stream collections is suitable and consistent with good practice. These types of collection system are better suited to less densely populated areas. Box capacity would seem to play an important role in material capture. Sufficient capacity should be allowed for the range of In materials collected.

	In general, box containers are suitable for doorstep properties as they tend to have more curtilage and on property storage space.
Service Level criteria	**Observations**
Frequency of Collections / relationships with other services	For single stream co-mingled a weekly collection of recyclables, would appear to generate high yields in London. Recycling collections on the same day as refuse are good practice and act as prompt to present recycling containers. A fortnightly collection of refuse is likely to further increase diversion, as seen in Greenwich, Harrow and Bexley. Recycling is collected on the same day as residual is likely to give rise to higher participation and capture and is consistent with good practice. In Richmond residual, dry recycling and food collections are made on the same day for simplicity
Communications	Long running communication campaigns in Wandsworth and Hammersmith and Fulham may have given rise to higher performance over a sustained period. Western Riverside provide communications support to its affiliated boroughs, this support was significant within the first 5 years of the Waste Disposal Contract up to 2007/08. Support in reduced capacity is still ongoing and includes door stepping Merton has been undertaking targeted campaigns to increase material capture. Increased communications can raise awareness, increase motivation and correctly instruct resident to use collection systems. The use of pictorial representation as well as text for recycling instructions can assist with material segregation. In Wandsworth quarter sack deliveries acts as a prompt to recycling and new residents to the borough are given information packs with details of waste and recycling. Estate agents are also given information packs to distribute.

	Wandsworth also highlighted the need for good customer management and communications with Contractor. The borough is the first point of contact for all residents. . Richmond uses contamination tags to inform residents about contamination to avoid ongoing service issues and maintain participation. As previously mentioned, service consistency across all housing types in a borough or Disposal Authority may give rise to higher performance. For example Western Riverside offers a consistent service across all boroughs which can be delivered with a single and consistent communications message which is more coherent for residents.
Other	The use of compulsory recycling may increase recycling performance. It is likely that Hackney's Compulsory Recycling scheme has been a factor in its high performance. This was successfully introduced to street based households using the approach originally taken by Barnet. In Hammersmith & Fulham compulsory recycling was introduced to the North of the borough which increased recycling by 9%, this has remained consistent for 2 years since the introduction. Compulsory recycling is planned to be introduced to the rest of the borough by June 2010

As mentioned in the WRAP report[49], it is a contribution of a number of varying factors that gives rise to higher performance. Essentially, the reliability of the service[50] can affect the performance of the system.

Quick wins and Easy Deliverables

Based on the finds from the questionnaire responses, the workshop, case study interviews and the desk top study we have identified a number of quick wins that could go some way to

[49] WRAP 2009. Analysis of kerbside dry recycling performance in England 2007/08

[50] Barriers to Recycling at Home, WRAP.2008

improving performance for DSPs, boroughs and London as a whole to meet the Mayors first draft waste strategy target of 45% recycling and composting by 2015, these are;

- Provision of sufficient container capacity for collection systems, including the proviso of single use sacks, box etc. In some cases additional materials have been added to collection systems without additional capacity which my displace other materials rather than increase the yield. I.e. it may be possible that heavy materials are left out of favour for lighter bulkier packaging materials.
- Not all boroughs provide a full suite of materials (all five main materials), in their collection arrangements. Dependant in MRF arrangements there is still significant room for improved glass and card material capture. Currently two boroughs do not collect card and two do not collect glass, which would bring about performance improvement for those boroughs notwithstanding the above bullet point, where possible the collection of textiles should be considered where compatible with existing collection systems. These are already a common feature of kerbside sort collections in London.
- Increasing the level of communications across the housing groups. This could include re-launching or rebranding a dry recycling scheme to the whole borough, improving customer contact and service resolution responses rates or addressing issues associated with contamination via better communication. Targeting lower performing areas through door knocking can increase awareness of recycling and services. Some boroughs are already undertaking this on an ongoing basis. WRAP have developed guidance for LAs to assist with the development of communications to help increase recycling[51].

[51] http://www.wrap.org.uk/local_authorities/research_guidance/communications/resources_for.html

Tables 8.4 Kg/hh/yr Yield data provided by boroughs for Doorstep properties (Hyder Survey 2009)

					Dry recycling system details					Materials collected					
Borough	majority housing type	Index of social deprivation	Inner/ outer	Yield (kg/hh)	Container	Collection method	Collection frequency	Compulsory	No. of containers	Paper	Card	Cans	Glass	Plastic	Other
Bromley	DSP	13	Outer	182	sack and/or box	multi stream partially co-mingled	weekly	Yes	2	A		B	B	B	
Croydon	DSP	20	Outer	119	sack and/or box	multi stream partially co-mingled	weekly	NS	2	B	B	A	A	A	B
Ealing	DSH	23	Outer	187	sack and/or box	kerbside sort	weekly	NS	1	A	A	A	A	A	A
Hackney	NEF	45	Inner	169	sack and/or box	kerbside sort	weekly	Yes	1	A	A	A	A	A	A
Merton	DSP	15	Outer	203	sack and/or box	co-mingled	weekly	NS	1	A	A	A	A	A	A
Redbridge	DSP	18	Outer	112	sack and/or box	multi stream partially co-mingled	weekly	No	1	A		A	A	A	
Richmond upon Thames	DSH	10	Outer	207	sack and/or box	multi stream partially co-mingled	weekly	NS	2	A	A	B	B	B	B
Southwark	NEF	35	Inner	165	sack and/or box	co-mingled	weekly	Yes	2	A	A	B	B	B	B
Tower Hamlets	NEF	46	Inner	178	sack and/or box/wheeled bin	co-mingled	>weekly	No	1	A	A	A	A	A	A
Wandsworth	DSP	21	Inner	233	sack and/or box	co-mingled	weekly	No	1	A	A	A	A	A	A

	Residual details		
Borough	**Residual collection frequency**	**Collection policies**	**Enforcement polices**
Wandsworth	weekly	Y	Y
Richmond upon Thames	weekly	Y	Y
Merton	weekly	Y	Y
Ealing	weekly	Y	Y
Bromley	fortnightly	Y	Y
Tower Hamlets	weekly		
Hackney	weekly	Y	Y
Southwark	weekly		
Croydon	fortnightly	Y	Y
Redbridge	weekly		

Partnerships

Developing partnership working is a key issue on the agenda of Richmond and WLWA. The management of residual waste treatment/disposal and sorting/sale of recyclable materials collected on a WLWA level could provide significant benefits. The development of both infrastructure and framework contracts for the sale and treatment of waste and recycling at the waste authority level could provide a greater opportunity to improve the economics of waste management. As previously mentioned Western Riverside and its boroughs have made some considerable progress towards the harmonisation of collection services which has resulted in improved performance.

Richmond is consulting with the community waste sector on how it can increase partnership working to support collection for reuse. The borough is currently looking at opportunities to expand on existing work to maximise the reuse of bulky waste collections and reuse at the CA site.

The development of greater partnership working with the community waste sector and wider 3rd Sector could be based on the better understanding and valuing of the multiple outcomes from associated activities within the borough and wider community. The hope being that the value of and the value that can be added to products as well as the need for outcomes such as jobs & training opportunities can support a more sustainable resource management strategy which could strengthen the local economy

8.1.2 Near Entry Flats (Purpose Built Flats)

The most common type of dry recycling service offered to NEFs (Purpose Built Flats or PBFs) in London is a weekly co-mingled collection. Most NEFs (purpose built flats) with recycling services are provided with communal recycling facilities, with varying but congruent definitions such as ‘bring’, ‘communal’, and ‘central’. This study identifies ‘communal’ recycling areas as being dedicated and resourced for the purpose of serving the flats for which it has been provided; as opposed to public bring bank facilities. Based on survey information provided by boroughs , 24 provide co-mingled collections, seven source separated and two multi-stream partially co-mingled, this is summarised in Table 8.5.

Several boroughs offer a door to door collection to PBFs. It is assumed that these are offered in place of communal facilities, with the except of Southwark which is maintaining its near entry services as it rolls out doorstep collections to flats. We have also identified a number of boroughs that make use of chutes to manage waste; in particular we have focused on Islington as a case study to look at these types of systems in more detail.

Table 8.5 Summary of NEF (Purpose Built Flats) collection systems (Hyder Survey 2009)

Disposal method	Collection method	Collection frequency	No. of authorities
Communal / Near Entry	co-mingled	unknown	5
		>weekly	6
		unknown	3
		weekly	4
	multi stream partially co-mingled	weekly	2
	source separated	>weekly	5
		weekly	2
communal + door to door (sacks/basket)	co-mingled	>weekly	4
		unknown	1
		weekly	1

Eight boroughs were able to provide total quantities or average yields per household for dry recycling services offered to PBF. Boroughs with yield information for both communal and door to door services are listed twice (Tower Hamlets and Southwark) Again, as part of our further evaluation we have made use of the high level review where we have short listed borough for assessment, stakeholder input and questionnaire returns. Where data provided by boroughs becomes scarce, we rely more heavily on WDF data evaluation at the higher level.

Of the eight boroughs (10 collection systems) able to provide data for this type of property we can identify the following system types;

- Six co-mingled
- Two Multi-stream partially co-mingled.
- Two Source separated

Yield data, presented in Table 8.9 is based on kg/hh covered. All yield data is excluding contamination rejected following delivery to the MRF or Transfer facility. Based on data provided by participating authorities the average dry recycling yield for Near Entry flats is 175 kg/hh/yr,

The top three performing authorities are;

- **Bromley** (157 kg/hh/yr),
- **Wandsworth** (115kg/hh/yr)
- **Richmond upon Thames** (111 kg/hh/yr)

All three boroughs have been classified as being majority DSP or DSH and appear in the upper and upper middle banding of for BVPI 82a performance which shows that they are also generally high dry recycling performers. The three boroughs operate multi stream, co-mingled and source separated systems respectively at NEFs.

Evaluation of 2008/09 WDF data 2008/09for total kerbside dry recycling , we identified three Majority NEF boroughs linked to service level factors that might give rise to higher performance. Of these three Hackney and Tower Hamlets have provided data, but are not in the top three best performing borough data set. The other majority NEF Borough was Islington, which performs well above what is expected for its IMD score.

It must be noted that it was not possible to determine contamination levels for Wandsworth as none appears to be recorded under WDF for the 2008/09 return. Total contamination levels for Richmond are recorded as 2% and Bromley as 5%. It is not possible to determine contamination rate at housing type level.

Service Level Factors

Bromley, Wandsworth and Richmond operate multi-stream, co-mingled and source separated scheme respectively. Wandsworth and Bromley have stated in their survey return that they provide residents with reusable sacks so that they can store and transport their recycling to NEF banks. Richmond has not stated the use of containment in their survey response, but their website states that canvas bags are available on request. All three Authorities collect five materials for recycling, Wandsworth collects food and drinks cartons in addition to the five recyclables.

Tower Hamlets, Hackney and Ealing are the lowest performing systems using co-mingled, multi stream, source separated system respectively. They have not indicated they provide containers for residents for the storage of materials. Tower Hamlets and Hackney provide collections for a full range of materials including drinks cartons, Hackney also includes mixed plastics. Ealing provides a source separated collection of glass, paper and cans at communal sites where there are more than twenty five flats in a block. Properties with 13-24 flats in the block receive a clear sack collection that includes plastic and cardboard.

Six Authorities in London provide some kind of a door to door service for flats. Southwark and Tower Hamlets have provided performance data for their communal and door to door services which can be found in Table 8.6. We are unable to draw definitive conclusions about the relative performance benefits of door to door and communal service without having access to more robust data. Southwark are currently in a period of transition and are rolling out doorstep collections for flats, in addition to retaining near entry system, therefore we are unable to use this survey data. Door to Door systems in Tower Hamlets appear to perform marginally better than Near Entry services.

Socio-economic Factors

Richmond and Bromley have the lowest IMD scores, of 10 and 14. Bromley has a high recycling performance, which is expected for its IMD score; however NEF recycling systems in Richmond would appear to be under performing.

Tower Hamlets and Hackney have the highest IMD scores (forty six and forty five) in London and therefore their collection performance is consistent with the IMD performance Trend. Wandsworth has an IMD score of 20, which is slightly below the average London score of 26, but is performing better than expected.

Ealing is the lowest performing NEF system but has an IMD score of 25, which is close to the London average, therefore should in contrast to Hackney and Tower Hamlets have a higher performance. Lower performance at Ealing, may be attributed to the limited range of materials collected at communal flat blocks.

Door to Door Collections

Table 8.6 Comparison of yields for communal and door to door NEFs dry recycling (Hyder Survey 2009)

Communal service				Door to door service			
Borough	**Service**	**Collection frequency**	**Yield (kg/hh/year)**	**Borough**	**Service**	**Collection frequency**	**Yield (kg/hh/year)**
City of London	Communal	>Weekly	No data	City of London	door to door (basket)	>Weekly	No data
Islington	communal	not specified	No data	Islington	door to door (sacks)	weekly	No data
Kensington and Chelsea	communal	>weekly	No data	Royal Borough of Kensington and Chelsea	door to door (sacks)	Weekly	No data
Southwark	communal	>weekly	108	Southwark	door to door (Sacks)	weekly	93
Tower Hamlets	communal	weekly	64	Tower Hamlets	door to door (sacks)	weekly	77
Westminster	communal	weekly	No data	Westminster City Council	door to door, (sacks / basket)	weekly	No data

Of the boroughs offering both communal and door to door recycling services, only two were able to provide yield data for each service, detailed below. It is interesting to note that Tower Hamlets' door to door service delivers a higher yield than the communal service but that the yield from Southwark's door to door service is lower than communal services.

Southwark is currently undergoing service change involving the roll out of door to door collections for flats, so data from this period may not be reliable. As previously mentioned Southwark are retaining Near Entry collections while introducing door to door collections, this may result in lower door to door collection performance in comparison to other boroughs

A study carried by Western Riverside[52] found that door-to-door recycling systems recover the highest weight of material of all the approaches researched at an average of 103 kg/hh/yr. Those schemes using single-use sacks or carrier bags for collection recover almost three times

[52] Western Riverside, 2005. Estates Recycling Research. Produced by London Remade

more recycling than those using boxes or baskets. Although actual participation rates for door-to-door schemes were not measured by any authorities contacted as part of this research authorities have made estimates based on number of containers set out. These estimates average 57%. A summary of the advantages and issues for each type of container used can be found on our desk top study in Appendix Nine.

Hammersmith and Fulham flat trials and chute systems

Hammersmith and Fulham carried out trials in flats to determine the most cost effective collection method, a summary of results can be found in table 8.7. Working with several other bodies, it included eighteen blocks on the Clem Attlee estate in Fulham and chose appropriate schemes for each. The options were: doorstep collections by building caretakers; central collection points on each corridor; a dedicated recycling chute in buildings; and an enhanced ground-level system with residents given sacks for recyclables. The trial identified that door to door collections produced the highest yields, followed by mini banks on each floor and chutes and smart banks producing roughly the same yields. Higher yields perhaps reflect how barriers to recycling have been overcome. I.e. access to recycling services. However, for this trial the cost of collecting door to door has been kept artificially low by using on site caretakers.

Table 8.7 Results from the Clem Attlee Estate trials (Courtesy of Hammersmith and Fulham)

	Number of households	Estimated tonnes/year	Estimated Kg/hh/year	Capital costs £/1000 hh	Revenue costs £/year/1000 hh (including care taker over time)	Revenue costs £/year/1000 hh (excluding care taker over time)	Landfill cost savings £/1000 households (2010/11)
Chute	121	10201	84.31	3,000	2,070	2,070	
Door to door collection	142	26143	184.11	1,000	30,150	7,600	17,995
Mini-banks on each floor	166	17717	106.73	6,220	28,620	2,070	10,432
Smart Bank (Near Entry commingled)	146	12850	88.01	n/a	n/a	na	8,602

Selection of Case Studies

A further in depth review of collection systems selected as Case Study has been carried out to further define contributing factors to higher performance. The results are in Section…

Based on the above analysis Islington's co-mingled single stream collection system for NEFs and has been selected as a case study example for Purpose Built Flats in London. Islington also offers recycling Chute based systems to small number of flats blocks and also offers door to door collection to some flats blocks. The borough is exceeding its expected performance in relation to IMD score. Wandsworth has a high NEF yield and offers a range of solutions that might improve performance; therefore it has also been identified as a case study,

Richmond operates a source separated scheme and is the third highest performing borough of the . Richmond collection system has therefore been selected as a case study that focuses on source – separated material segregation and improved quality of the materials collected.

Full details of Case Studies can be founding in Appendix Ten, and out outline possible factors that have contributed to higher recycling performance.

Factors contributing to high performance

Despite the small sample size, we are still able to draw some conclusions based in existing research, our WDF review in Section 7 and information provided by Councils in the survey/questionnaire, Case Study Interviews, and Workshop.

As previously mentioned, WRAPs points to a number of potentially Service Level Factors that give rise to performance variation.

We have made a number of observations that address how some service level issues have been addressed to overcome barriers to recycling, and so give rise to higher levels of performance for Greater London's NEFs (Purpose Built Flats) ; these have been set out in Table 8.8 below.

Table 8.8 contributing factors giving rise to high performance in NEFs (Hyder Survey, workshop, case studies and desktop review 2009)

Service Level criteria	Observations
Type of collection System	No one collection system appears to deliver higher yields for flats. It is more likely to be attributed to other service factors such as container type and range of materials collected. In general, the method of collection should best suit the type of building. In Islington, a variety of collection methods such as Near Entry, door to door and chute systems are used to best suit the estate or flat block. NEF collection systems in general will be collecting materials in bulk from communal bins, which if collected co-mingled, partially or source separate will have little bearing on performance. Source separated collections may suffer from staggered 'bin full' periods as result of varying material mass and bulk. This may lead to overflowing if servicing is not also staggered to reflect this.

	In Richmond, there has been a move away from source separated collections of materials to commingled banks for glass, cans and plastics bottles, which is more consistent with the kerbside collection service. In some cases this has allowed the installation of new services where there was previously insufficient space to store the range of containers required for a fully segregated collection. It is thought that this may also bring about some efficiency savings as collection will become integrated other household collections. Data provided for doorstep collections appear to be inconclusive. In Southwark doorstep collections produced lower yields than their communal near entry, while the opposite trend was observed at Tower Hamlets (refer Table 12.7) Door step collection for both authorities ranged between 77 and 93 Kg/hh/yr. Trials in Hammersmith and Fulham produced the highest yields for door to door (184Kg/hh/yr) and mini banks on each floor (106kh/hh/yr), however partnership with building care taker in the door to door trials may have substantially improved performance and kept cost to a minimum. The conversion of existing chutes to accommodate recycling can bring about positive benefits. Existing research from trials suggests that yields of up to 200kg/hh/yr can be achieved[53]. Residents without chutes for residual waste have a higher Kg/hh/yr[54] See Islington Case Study

[53] http://www.wrap.org.uk/downloads/Performance_Summary_Table.649a8991.6893.pdf

[54]WRAP.http://www.wrap.org.uk/local_authorities/research_guidance/collections_recycling/recycling_collections_for_flats/operation_of_different_collection_schemes/bring_schemes.htm

	.
Material types collected	A full suite of recyclables: paper, card, glass, plastic bottles and cans, plus one additional material give rise to higher yields as long as there is sufficient storage capacity. Wandsworth, Islington and Hackney collect a full range of materials, plus additional items. Ealings lower performance maybe due to the absence of cardboard and plastic collections. The collection of bulkier items such as plastics and cardboard often requires the provision of additional communal bins, however with space constraints in bin stores this is not always possible. Ealing's collection system excludes bulkier items as part of communal services, which may result in lower yields. However the absence of data to present a strong evidence base for this case is not possible.
Container Types / Capacity	The provision of internal storage containers to resident's to contain and carry waste to communal areas has a positive impact on yield. Performance data suggests that the top three collections systems include the provision of reusable sacks, while the lower three do not reference them on their survey returns. Average yields were higher where an internal receptacle was provided to residents[59]. In Islington, residents are provided with a reusable bag to store their recycling. It was also found that reusable sacks used for door to door collections often go missing post collection, i.e. blown from balconies. This was found to lower participation. Again, communal bin capacity is likely to influence performance in terms of yield and quality. This will be dependent upon the materials collected.
Frequency of Collections / relationships with other services	Where space does not allow for sufficient or additional containers then more frequent collection is required to maintain empty capacity. This should be assessed on a block by block basis. Wandsworth has arrangements in place with its contractor to adjust frequency as required.

	Ensuring sufficient communal capacity will increase participation and reduce contamination. Islington offers consistency in service delivery i.e. the some material types makes collection operations simple. Also, a simple message to residents, with no major variation in services between housing types
Communications	Long running communication campaigns in Wandsworth in parternship Western Riverside may have given rise to higher performance. Islington has also undertaken substantial communications campaigns including door stepping to address service issues and improve performance.
Other	The pre planning and roll out of services to Purpose Built Flats (PBF) can have a substantial affect on the customer satisfaction and performance of services. It is likely that this is a key factor that gives rise to higher performance as indicated in Islington where pre-planning may be one factor that has given rise to higher performance. Reviewing the location & aesthetic of NEF recycling facilities could bring about considerable performance improvements. Authorities should try to install bring sites in the most convenient locations and / or as close to possible to refuse collection points. Research by Waste Watch (1996) indicates participation in near entrance bring sites is much higher than that in centralised collection facilities[55] Low rise blocks were found to recycle more than high rise. This could be explained by the barrier of additional distance and effort and / or perceptions of additional effort required by residents to take their recycling down to recycling bins[56]. There is limited research into the performance and cost benefits of installed

[55]WRAP.http://www.wrap.org.uk/local_authorities/research_guidance/collections_recycling/recycling_collections_for_flats/operation_of_different_collection_schemes/bring_schemes.htm

[56]WRAP.http://www.wrap.org.uk/local_authorities/research_guidance/collections_recycling/recycling_collections_for_flats/operation_of_different_collection_schemes/bring_schemes.htm

	collection containers on each floor of flat blocks. Alternatively, treatment of residual waste via energy from waste or mechanical biological treatment could be seen as an alternative to food waste collection and Biodegradable Municipal Waste (BMW) diversion. This approach could alleviate pressure on recycling/composting services for flats and other hard to service properties/premises. A small scale trial in **Richmond** sending residual waste to a mechanical treatment facility have delivered up to 80% diversion from landfill and >30% recycling of treated residual waste.

WRAP indicates, it is the contribution of a number of factors that gives rise to higher performance[57]: the reliability of the service,[58] number of staff, training, vehicles, vehicle capacity, collection round planning and communication will all play a large role in overall system performance.

Quick Wins and Easy Deliverables

Based on the findings from the Questionnaire responses, the Workshop, Case Study Interviews and desktop study we have identified a number of quick wins that could go some way to improving performance for London boroughs These are;

- Expanding the coverage of recycling services to PBFs to include those flats that do not current have near entry or door to door services as result of access issues, ongoing safety concerns or long standing contamination issue. We have identified that several boroughs are undertaking or have already undertaken site planning projects to introduce services to more hard to reach locations. Improved the location of containers, security and communication will improved access to recycling services.
- Providing collection for a greater range of materials collected at flats, where space is available. Some boroughs have maintained consistency with kerbside systems, while other have not included bulkier items such as cardboard and plastic bottles at some flat sites. There is significant potential here to increase yield by increasing the range of recyclables by reviewing existing services, site locations and space.
- Undertake a review of current communal near entry collection arrangements to ensure there is sufficient container capacity at communal bin stores, which is proportionate to the frequency of collection. In Wandsworth a project is underway to

[57] WRAP 2009. Analysis of kerbside dry recycling performance in England 2007/08

[58] Barriers to Recycling at Home, WRAP.2008

address those flats that don't have access to Near Entry Banks, (approx 1000-2000) due to access issues or long standing problems such as high contamination or issue with litter and flytipping. The project plans to target flat blocks with communications to reduce contamination, improve signage, and introduce banks with lid locks

- Address suitability of container location. Islington council carried a comprehensive planning process for near entry systems before new services were launched. Authorities should try to install bring sites in the most convenient locations and / or as close to possible to refuse collection points. Research by Waste Watch (1996) indicates participation in near entrance bring sites is much higher than that in centralised collection facilities[59]
- Find solutions to address ongoing problems such as vehicle access, contamination, security, nuisance and vandalism, thereby improving the availability of recycling services, containers, storage capacity and performance. Improving the appearance and ease of use of sites has been found to increase participation and the amount of materials recycled. The use of noise reduction kits should be considered not only to reduce noise but also to alleviate residents concerns and reduce opposition to sites[60] Hyder recommend that further guidance with solutions should be developed to help boroughs tackle these issues which is beyond the scope of this report.
- Strengthen stakeholder involvement through engaging with housing associations, resident groups and interested parties in the planning or delivery stages of services
- Improve communications to residents at near entry facilities to increase capture and reduce contamination issues
- The provision of reusable sacks to residents where near entry systems are in operation to help improve participation. Average yields were higher where an internal receptacle was provided to residents[59]. This may help overcome the additional distance and effort and / or perceptions of additional effort required by residents to take their recycling down to recycling bins.
- Where possible undertake conversion of existing chute systems and provide a good level of communication to ensure their correct use. See Islington Case Study

[59] Western Riverside, 2005. Estates Recycling Research

[60] Western Riverside, 2005. Estates Recycling Research.

Table 8.9 Kg/hh/yr Yield data (coverage) provided by boroughs for Near Entry properties (Hyder Survey 2009)

Borough	Majority housing type	Index of social deprivation	Inner/outer	Yield (kg/hh)	Coverage to NEFs	Collection system	Collection frequency	Paper	Card	Cans	Glass	Plastic	Other
Bromley	DSP	13	Outer	157	100%	multi stream partially co-mingled	fortnightly	Y	Y	Y	Y	Y	Y
Wandsworth	DSP	21	Inner	115	100%	co-mingled	>weekly	Y	Y	Y	Y	Y	Y
Richmond upon Thames	DSH	10	Outer	111	75%	source separated	>weekly	Y	Y	Y	Y	Y	Y
Southwark (communal)	NEF	35	Inner	108	44%	co-mingled	>weekly	Y	Y	Y	Y	Y	Y
Southwark (door to door)	NEF	35	Inner	93	56%	co-mingled	weekly	Y	Y	Y	Y	Y	Y
Croydon	DSP	20	Outer	88	90%	co-mingled	fortnightly	Y	Y	Y	Y	Y	Y
Tower Hamlets (door to door)	NEF	46	Inner	77	50%	co-mingled	weekly	Y	Y	Y	Y	Y	Y
Tower Hamlets (Communal)	NEF	46	Inner	64	50%	co-mingled	weekly	Y	Y	Y	Y	Y	Y
Hackney	NEF	45	Inner	59	100%	Multi stream partially co-mingled.	weekly	Y	Y	Y	Y	Y	Y
Ealing	DSH	23	Outer	46	71%	source separated	weekly	Y		Y	Y		

Note: Yields are for all households with service i.e. Coverage – not all households in the borough

8.1.3 Flats Above Shops and Doorstep Flats

In total seventeen boroughs provide services to flats above shops, these are summarised in Table 8.10. Service coverage is estimated to be approximately 20,000 properties, across an estimate 56,000 (2001 census data). In their survey returns, boroughs have indicated that there may be up to 79,000 households above shops or commercial establishments taking into account that additional properties may have been converted above shops since the 2001 Census.

Dry recycling services offered to FASs tend to vary between boroughs more than with services offered to other housing types. The most common service across this housing type is a single stream co-mingled single use sack collection. Variable containers and variable services across one housing type are also common due to site-specific space or access restrictions. E.g. Westminster City Council provides residents with a basket or sacks to some FASs and directs others to the nearest 'bring' facility.

For the purpose of this study, 'bring' facilities available to FASs do not form part of this study. Unlike NEFs these 'bring' facilities are not necessarily specific to the FASs in question, but for wider public use. FASs tend to share they same characteristics and issues as Doorstep Flats (DSFs), however, obtaining data on their performance is hard to find, as generally they are integrated to other collection services.

Table 8.10 Overview of recycling services offered to FASs (Hyder Survey 2009)

Container / disposal method	Collection method	Recycling collection frequency	Residual collection frequency	No. of authorities
unknown	unknown	weekly	weekly	1
sack and/or box	co-mingled kerbside	fortnightly	weekly	1
sack and/or box	sort	weekly	weekly	2
sack and/or box	co-mingled	unknown	>weekly	5
sack and/or box	co-mingled	unknown	weekly	2
sack and/or box + public bring	co-mingled	weekly	>weekly	1
sack and/or box + bring	co-mingled	weekly	weekly	1
sack and/or box + bring	kerbside sort	weekly	>weekly	1
sack and/or box and/or wheeled bin	co-mingled	unknown	>weekly	1
wheeled bin	co-mingled	unknown	weekly	2

Services to flats above shops face a number of barriers which either prevents effective service provision or reduces public participation. In summary, common issues include;

- Container space, capacity in the property,
- Set out on streets in busy shopping areas; recycling is contaminated by passersby who use them as litter bins, particularly if there is a take away nearby, issues with container delivery: often no letter boxes
- Confusion with who is responsible for collection: dedicated collection crews, street cleaners
- Shops mixing business and commercial waste
- Quantity collected not easy to quantify as waste and recycling is often collected by contractors who also services local businesses, mixing household and commercial waste

- Adhering to strict collection time slots - this is a barrier to recycling for many residents as material must be placed in the right place at the right time

As a result of these issues participation in service where provided is often low. Finding cost effective solutions to overcome these issues to deliver doorstep collections will help increase material capture. Solutions to these include increased communication to residents. In 2007, West Riverside[61] commissioned London Remade to carry out a study to examine the recycling operations for flats above shops across the WRWA. The report indicated that only **Wandsworth**, had designed communication materials specifically targeting flats above shops. A leaflet was produced and distributed to all flats above shops located in town centres and on main roads, through the Behavioural Change Local Fund WRAP funded project to raise awareness and improve recycling in these high density areas of Wandsworth.

From the overview evaluation and long list of boroughs we have identified that **Westminster Borough Council's** housing profile is made up of 15% FAS, which is the highest in London. Limited performance information is available for this housing type. This is not surprising given that many FASs services are combined with services for other housing types and that several authorities are unsure of the number of FASs within the borough. Two boroughs have been able to provide yield data for flats above shops, these are displayed in Table 8.11. Both boroughs provided yields of 47 and 58 kg/hh/yr which are substantially lower than the average NEF service yield which is 85kg/hh/yr and significantly lower than then the DSP yield which is 179 kg/hh/yr. It could be assumed that residents also use recycling banks as an alternative to doors step collections, however it shows that there is significant room for improvement. Studies in **Richmond** have indicated that FASs have a participation rate of between 6% and 15%[62].

Hammersmith and Fulham provides a tailored service for 7,000 – 8,000 high multiple occupancy households. These households have been identified as only having a small amount of storage space and therefore have a twice weekly collection of refuse and from February 2010 will start having a twice weekly collection of recycling. Additional orange sacks will be delivered to each House of Multiple Occupancy (HMO) whereas previously the resident had to collect the sacks from a Council office, library etc. It is expected that the increase in collections and having the orange sacks more readily available will help the residents to fully participate in the recycling scheme.

Table 8.11 Performance yields for FASs (Hyder Survey 2009)

Borough	Majority housing type	Index of deprivation	Inner / outer	Yield (kg/hh/year)	Same as other round	Coverage	Container / disposal method	Collection method	Recycling collection frequency	Residual collection frequency
Ealing	DSH	23	outer	58	No	25%	sack and/or box	co-mingled	weekly	unknown
Merton	DSP	15	outer	47	No	100%	sack and/or box + public bring	co-mingled	weekly	weekly

[61] Western Riverside, 2007. Recycling Operations for flats above shops in the WRWA area and other London boroughs.

[62] Western Riverside, 2007. Recycling Operations for flats above shops in the WRWA area and other London boroughs

Selection of Case Studies.

We have identified **Westminster, Wandsworth and Islington** as boroughs that provide innovative solutions to overcome issues associated with recycling collections from FASs. Because of the following;

- Corex boards placed on lamp posts stating when the new collection day is
- Packs have been made to contain recycling sacks which fit through the letterbox, ensuring that each flat receives its sacks.
- Previously letters to resident's in FASs were sent using mail merge to address the envelopes as a result these were often sent to 'The Occupier' which led to some residents not reading them. However, checking the mail merge, using the occupiers name and sending the letter in a Westminster City Council envelope has led to a better response.
- They recognise that a lot of the flats above shops have a high turnover of residents with a 23% change each year. In order to ensure the participation of new residents additional letters will need to be sent out every six months
- Westminster sets strict time bands for residents to place their recycling out and sometimes these have been missed by the contractor which has discouraged residents' participation. they are working with their contractor to ensure that, as far as possible, these times are adhered to

In addition, Westminster, Wandsworth and Islington Case Studies can be founding in Appendix Ten. Hammersmith and Fulham have been identified as a case study for addressing the needs of residents in Doorstep Flats (or Houses of Multiple Occupancy).

Quick wins and Easy Deliverables

Based on the findings from the questionnaire responses, the workshop, case study interviews and desk top study we have identified a number of quick wins that could go some way to improving performance for FASs in London. These are:,

- Potential to expand service to sixteen other boroughs. Expanding kerbside collections for FASs will increase city wide coverage by approx 36,000 households , this could be achieved by;
- Making use of existing co-mingled collection schemes within boroughs
- Where possible the service be consistent with other kerbside collections i.e. similar material types collected.
- Where possible make use of single use sacks to avoid on and off street storage issues, pre and post collection.
- Set workable collection time bands to avoid traffic and reliability of collections
- Provide dedicated communications to residents using leaflets, posters and signs and via bag delivery
- Continue to provide local recycling banks, so that there is sufficient flexibility with collections, where space, capacity and restrictions on collections constrict service delivery
- Seek to combine collections with commercial waste/recycling collections to reduce cost and minimise traffic issues

8.2 Food Waste Collections

Food waste collections services are relatively embryonic in London with only seven boroughs with established schemes offering services with over 50% coverage, nine other boroughs offer a service on a trial basis, with up to 16% Coverage. 26% of London households receive a food waste collection. Based on 2008/09 WDF returns we are able to determine the following performance;

- Yields in trial areas range from 13 to 110 kg/hh/yr
- Yields in Established areas range between 47 to 54 Kg/hh/yr*

*Excluding Hounslow, which only reported one month worth of food collections in WDF during 2008/09 as a result of service roll out during this period.

In some circumstances food waste is co-collected with green waste in the same vehicles but using a separate container. Islington and Haringey undertake this practice so we were unable to isolate their food waste tonnages in the WDF returns. Tower Hamlets also now co-collects however it is not covered by the reporting period.

This Section evaluates the data provided by boroughs by Housing type, building upon our initial overview evaluation. It must be noted that only seven data sets were provided for food collections by housing type, all of which cover DSP performance, but no data has been obtained for FAS and NEFs (purpose built flats).

As with dry recycling services, boroughs with food waste services provide the collections to DSFs and DSHs as part of the same service. This Section therefore considers DSFs and DSHs together as Doorstep Properties (DSPs).

8.2.1 Doorstep Properties

Of the boroughs who took part in this study, twelve provide dedicated food waste collection services and seven were able to provide data sets for the performance of food waste services for DSPs. Of the seven collection systems, three are trials in Bromley, Croydon and Merton, which typically have higher performing yields. Details have been provided in table 8.12.

The WRAP food waste trial[63] areas including DSP in Sutton, Croydon, and Merton and produced typical yields where in the range of 1.9- 2.5 Kg per household per week (for those participating in the scheme) with participation rates of approximately 70%. Our data is based on Kg/hh/yr by service coverage due to the absence of participation data, so we are unable to make comparison between WRAP data and ours. Merton yields in our study are lower than those provided to in the WRAP report, this is consistent with the variation in yield calculation for coverage and participating households.

Four of the data sets cover established schemes in Richmond, Ealing, Hackney and Hounslow. These collection systems offer lower yields per household, which is consistent with WRAP findings[64] that participation and yields can decline over time in areas with weekly refuse collections, whilst in areas with fortnightly refuse collections yield and participation is maintained.

[63] WRAP 2009. Evaluation of the WRAP Separate Food Waste Collection Trials.

[64] WRAP 2009. Evaluation of the WRAP Separate Food Waste Collection Trials

Table 8.12 Food Waste Performance yields for Doorstep Properties 2008/9 (Hyder Survey 2009)

Borough	Index of deprivation	Yield (kg/hh/year) (Coverage)	Coverage to DSPs	Container	Materials accepted	Collection frequency
Bromley (Trial)	13	115	4%	5l KC + 40l EC	food and paper	weekly
Croydon (Trial)	23	84	2%	7l KC + 25l EC	no bones, paper	weekly
Merton (Trial)	15	80	15%	7l KC + 25l EC	uncooked food accepted, paper	weekly
Richmond upon Thames	10	52	100%	5l KC + 25l EC	includes meat, paper	weekly
Ealing	23	47	97%	23l KC	includes meat & news paper to line	weekly
Hackney	46	29	100%	7l KC + 20l EC	Cooked meat is included, raw meat and bones are excluded	weekly
Hounslow (New service)	23	18	100%	KC + 23l EC	not specified	weekly

KC = kitchen caddy

EC = external caddy

In addition to the more dominant influence of affluence, where higher food waste yields will be found in more affluent areas[65], the performance of food waste systems are likely to be affected by the following service related factors;

- Refuse collection frequency, container type and capacity
- The provision of internal and external storage containers including liners
- Communications and customer support
- The overall reliability of the service attributed to operational requirements

Service Level Factors

All collection systems collect broadly the same materials, with some variation the acceptance of raw meat and bones. All systems accept paper for the wrapping of food materials or to line the caddy. Starch caddy liners are not normally provided free of charge, but are available to purchase. In some cases caddy liners have been provided during service roll out or as part of a promotional campaign. Richmond is currently undergoing a promotional campaign with WRAP that includes a kitchen caddy liner give away with a view to re-launching the food waste scheme and increasing participation.

All boroughs provided kitchen and external containers for the storage of food waste, however Ealing only provides a 23 litre external caddy. All other boroughs provide 5 litre or 7 litre unvented kitchen caddies to temporarily store waste internally. WRAP Guidance[66] suggest that providing practical ways for householders to manage food waste inside the house as well as outside is important in encouraging use of the system and it is recommended that local authorities provide all residents with kitchen caddies (free of charge). Kitchen caddies reduce the amount of food waste stored inside the household and may increase participation; boroughs

[65] Food Waste Collection Guidance, WRAP. 2009.

[66] Food Waste Collection Guidance, WRAP. 2009.

can also advise residents to transfer food waste direct to their external caddy. Despite Ealing not providing a kitchen caddy it has a relatively high yield for its IMD score when compared to Richmond. Ealing also plans to provide free kitchen caddies during 2010 to all participating households free of charge with a one off supply of liners. Once the initial liner supply has been exhausted residents will need to purchase their own.

The 40 litre caddy proved to be the most popular size in the Bromley food trial Although Bromley residents produce a relatively high volume of food waste, this is generally less than the full 40 litre capacity provided to residents. However, since Bromley combined the introduction of food waste with a move to fortnightly refuse, Bromley reports that residents are 'comforted' by the perception that they will have plenty of storage for food waste. The scheme has been introduced with minimal complaints and positive feedback. It has an 80% participation and excellent diversion from landfill with residual waste tonnages down by 45%. Bromley are currently supplying free liners, based on 2 liners per week. Residents can obtain additional free liners from libraries

All four boroughs that provided data for this survey offer weekly refuse collections, participation and yields can decline over time in areas with weekly refuse collections, whilst in areas with fortnightly refuse collections yield and participation is maintained[67]. Consequently these boroughs may need to provide ongoing communications to increase or maintain higher levels of participation and capture. Hackney and Ealing offer a mix of wheeled bins and sack collections, while Richmond and Hounslow provide sack collections to all DSPs. Areas with weekly black sack collections provide higher food waste yields than areas with weekly 240 litre wheeled bin refuse collections and food waste yields may also be influenced by the size of the wheeled bin provided for refuse[68].

Socio-economic Factors

Highest performing boroughs are Richmond and Ealing, which is consistent with their lower IMD scores. Richmond and Ealing also have well established food waste collection systems in London. Lower performing collection system, are again consistent with higher IMD scores, however it would appear that Hackney is out performing Hounslow based on the IMD performance trend. Hounslow implemented it food waste collection service in March 2009 which may be why it is producing lower yields.

Selection of Case Studies.

A further in depth review of collection systems for each collection system selected as Case Study has been carried out to further define contributing factors to higher performance.

Based on the above analysis we have identified several food waste collection systems that demonstrate service related factors that give rise to higher performance. **Richmond, Hackney and Islington** have been identified as case studies. **Richmond** is one of the longest running collection systems in London, while **Hackney** performs well for its IMD score. In addition **Islington** operates a constant service across DSPs and co-collects food and green waste in the same vehicle.

Full Case Studies can be founding in Appendix Ten, and outline possible factors that have contributed to higher recycling performance for each collection system.

[67] WRAP 2009. Food Waste Collection Guidance

[68] WRAP 2009. Food Waste Collection Guidance

Contributing Factors to High Performance

Despite a small data set we were still able to draw some conclusions from the WDF review in Section Seven and information provided by Councils in the **survey/questionnaire**, **case study interviews** and **workshop**. WRAP reports point to a number of potential **Service Level Factors** that give rise to performance variations as previously indicted in the dry recycling section.

From our overall evaluation we have made a number of observations that address how some service level issues have been addressed to overcome barriers to using food waste collection services, and so give rise to higher levels of performance for Greater London's DSPs, these have been set out in table 8.13 below.

Table 8.13 contributing factors giving rise to high food waste collection performance in DSPs. (Hyder Survey, workshop, case studies and desktop review 2009)

Service Level criteria	Observations
Type of collection System	The type of collection system does not appear to have a major impact upon the performance of food waste collections. The method of collection is largely the same between boroughs which includes the collection of an external caddy that is emptied manually directly into the vehicle or emptied into a slave container. Therefore, there is no variation in performance attributed to collection vehicle and material type.
Material types collected	In general, all the boroughs collect cooked foods, with some exceptions where raw meat and bones are excluded. The addition of paper used to line the caddies is also accepted. Therefore, there is no variation in performance attributed to material type.
Container Types / Capacity	With the exception of Ealing all boroughs offer kitchen caddies as recommended by WRAP, however based on available data the absence of Kitchen caddies does not appear to have lowered performance for Ealing, suggesting that higher performance may be attributed to other factors, such as communications. With the Exception of Bromley, none of the boroughs currently provide free liners although a number of promotional activities are being undertaken in 2010 which includes the provision of free

	liners. In Hackney DSP participation is about 23%. One reason for low participation could be that compostable liners are not provided free for residents, but these can be bought from local retailers. It is anticipated that in line with the communications campaign in 2010 a sample of free liners may be given out to each resident to encourage them to start using the scheme.
Frequency of Collections / relationships with other services	On the whole source segregated food waste is collected on a weekly basis and residual waste collected on a weekly basis using sacks and in some case sacks and wheeled bins. It's not possible to determine the impact of wheeled bin collections in this study due to the small sample size of boroughs, however existing research undertaken by WRAP indicates that that fortnightly collection of residual with weekly food waste will result in higher capture rates[69]. None of the boroughs collect residual on a fortnightly basis where food is source segregated, with the exception of Kingston, however they were unable to provide details on performance for this housing type. Looking at Kingston's performance data in WDF, it is difficult to determine if higher performance is attributed to greater affluence (Kinston is the second most affluent borough in London) or residual collection frequency. However, based on evidence from WRAP this is likely to be a contributing factor to higher food waste capture.
Communications	Any communications specific to food waste collection will have a positive impact upon performance; however it is difficult to determine the relative differences in communications between each borough as part of this study without the available pre and post monitoring information. However, Ealing

[69] WRAP 2009. Food Waste Collection Guidance

	carried out a large scale communications campaign in 2007 which increased participation in food waste collections by 2.7%[70], this may by the factor that have increased performance during 2008/09. Richmond reinforce messages throughout the year and focusing on key waste streams at opportune times – e.g. top tips on food waste storage in the summer
Other	The type of vehicle did not lead to increased recycling performance. However vehicle access is an important factor that affects the reliability of the service. The size of the vehicle should considered to access target housing stock, where as food waste capacity will need to be sufficient to avoid service complaints. Where organic collections are provided some boroughs have opted to collect food or garden waste on the same vehicle as dry recycling. Volume is split on the vehicles according to the material type. Typically this is split 70% dry recycling and 30% food waste. Where stillage or kerbsider vehicles are provided for kerbside sort, pods can be attached for the collection of food wastes. The sizes of the pods vary depending on anticipated capture. See lessons learned from Richmond in the box below. The successful introduction of services will play a large role to ensure collections get off to the right start and participation is maximised from the outset. This will involve ensuring the right level of resourcing (staff/vehicles/capacity) communications and customer support. Underestimating resources from the outset can lead to service failures and result in reduce participation. When Richmond launched its food waste collections in 2005 and capture rates were much higher than expected. This resulted in some resourcing issues.

[70] Figure provided courtesy of Ealing Borough Council.

	Initially, when the service was planned it was thought that the food waste could be collected on existing non compaction stillage collection vehicles by freeing up one of the storage containers for food waste. However when the trial started the following difficulties were encountered: - Vehicles exceeded gross weights - Increased manual handling implications were observed. - Collection teams were bottlenecking at the vehicles to dispense waste, - Wrong containers were returned to properties, - Poor working/hygiene conditions were observed. A combination of these problems lead to a much slower operation and efficient service overall. To over come these issues dedicated collection round was formed, using modified second hand top loaders, This enabled the use of slave bins which increased round eliminated wrong container returns. As part of a scheduled fleet refreshment in 2007 further efficiencies were made by combining the collection of food waste with paper and card collections to reduce the number of crews required to collect both materials separately .The scheme currently yields approximately 52 Kg/hh/yr for households covered, which is one of the highest performing food waste schemes in London. Again, the treatment of residual waste via Energy From Waste or Mechanical Biological Treatment could be seen as an alternative to food waste collection and Biodegradable Municipal Waste (BMW) diversion. This approach could alleviate pressure on recycling/composting services for flats and other hard to service properties/premises. A small scale trial in Richmond sending residual waste to a mechanical treatment facility have delivered up to 80% diversion from landfill and >30% recycling of treated

	residual waste.

Caddy Liners

Boroughs participating in the 2009 WRAP food waste collection trial[71] all used liners with the exception of two rounds in Surrey. Previous research undertaken by Eunomia[72] has suggested that providing residents with liners can improve the performance of food waste schemes, primarily because it makes the scheme cleaner and easier for residents to participate. However the long term provision of liners would be at considerable cost, especially as the 2009 Trial report[64] highlighted from attitudinal surveys that 27% of trial residents used more than three kitchen caddy liners a week. None of the London boroughs currently provide free liners, but provide the option to purchase. Periodically issuing free liners combined with updated communications as part of a promotional campaign in targeted areas, or borough wide may be a useful way of boosting participation, where the service has experienced a reduction in capture since its inception.

Figure 8.1 Kerbside food waste containers, caddies and liners

Quick wins and Easy Deliverables

It is clear from existing research[73] that lower yields are produced where food waste collections operate in conjunction with week residual collections, this is also evident in the higher yields collected in London trials compared to more established schemes, where participation may reduce over time. When making the change from weekly residual collections to fortnightly

[71] WRAP 2009. Evaluation of the WRAP Separate Food Waste Collection Trials

[72] Eunomia, 2006. Kitchen Waste Collections: Optimising Container Selection.

[73] WRAP 2009. Evaluation of the WRAP Separate Food Waste Collection Trials

collection each borough will need to consider the practical implications of providing residual containers, their footprint and suitability in relation to housing type. Where wheeled bins are suitable , such as in less densely populated areas with adequate on and off street storage space, boroughs should consider the option of introducing fortnightly residual collections with a weekly food waste collection to maximise food waste yields. This option should be considered as part of a wider waste management strategy when deciding the most cost effective management of bio-degradable wastes.

We have identified a number of quick wins that could go some way to improving performance for food waste collections for DSPs;

- There is significant potential to expand source segregated collections of food waste across the capitals DSPs, however this would need to be linked with a wider strategy to provide food treatment infrastructure and capacity to manage this waste stream
- Where participation rates and capture rates have reduce over time boroughs may like to consider re-launching the scheme or providing a communication campaign in conjunction with a free caddy liner give away to help raise yields and the efficiency of the collection system. This can be repeated at a frequency best judged by the Borough, taking into account other communications, service changes and longer term strategies. Richmond experienced greater take-up of free liners via postal coupons distributed door to door in a 2008 campaign compared to 2010 where orders could be made via text messages, email address that was advertised in the council magazine, website and street signage,
- The provision of kitchen caddies where they are not currently provided may promote ease of use and increase collection performance at relatively low cost
- The collection of food waste with the use of split bodies, modified stillages or pods on vehicles enable the collection of other materials such as residual or dry recycling in a single pass. Where this is currently not practiced and vehicle access allows this option should be investigated further to potentially reduce collection costs. This will depend on the configuration of other waste services, current fleet and delivery points

WRAP also offers guidance[74] on the introduction of food waste collections based on lessons learned from previous trials. The guidance provides essential advice on the provision of such services.

8.2.2 Near Entry Flats (Purpose Built Flats)

Based on our Survey we have estimated that approximately 28,000 flats receive some form of food waste collection service either via a communal collection system or door to door arrangements. Table 8.14 below provide a brief summary of those boroughs that provide these services.

[74] WRAP. 2009 Food Waste Collection Guidance.

Table 8.14 Summary of food waste collection services for flats (Hyder Survey 2009)

Borough	Flats Coverage	Disposal method	Materials accepted	Collection frequency
Bexley	NK%	Communal	meat, some newspaper	unknown
City of London	18%	KC	no bones	unknown
Hackney	9%	Communal +7l KC	Cooked meat is included, raw meat and bones are excluded	>weekly
Islington	4%	Communal	NK	weekly
Lambeth	13%	communal + EC	NK	weekly
Tower Hamlets	7%	door to door & communal	NK	weekly
Kingston upon Thames	37%	KC + EC (door to door)	includes meat	weekly
Westminster	1.5%	Communal	includes meat	weekly

Hackney was the only borough that was able to provide data for this type of housing, this displayed in table 8.15 Food waste services are currently provided to 4600 flat properties using a Near Entry Bring system.

Table 8.15 Food Waste Performance yields for Near Entry Flats (Hyder Survey 2009)

Borough	Index of social deprivation	Yield for participating hh (kg/hh/year)	Coverage to NEFs	Collection method	Containers	Materials accepted	Collection frequency
Hackney	46	1.7	9% (4600HH)	Communal	7l KC	Cooked meat is included, raw meat and bones are excluded	Weekly

During 2007/08 WRAP provided funding to nineteen local authorities to carry out separate food waste collection trials. The trials involved collecting food waste from multi-occupancy housing[75]. within areas with high proportions of communal flats / high rise properties. In London these trials took place in;

- ✓ Royal Borough of Kingston-upon-Thames (RBKT), and
- ✓ London Borough of Hackney.

RBKT's trial covered high and low rise multi-occupancy housing in both council and private ownership. Hackney's trial involved high rise properties. An overview of the results can be seen in Table 8.16

[75] WRAP 2007. Food Waste Collection Trials – food waste collections from multi-occupancy dwellings.

Table 8.16. An overview of the three trial food waste collection areas focused on Flats (Courtesy of WRAP) .

	RBKT	Hackney
Number of households in trial area	4,500	4,600
Number of collection crew per vehicle	2	2
Residual collection frequency	Weekly	Weekly
Container presentation	Doorstep	Food waste taken to communal wheeled bins
Container type	25L container and liners	7L caddy and liners
Vehicle Type	3.5t hopper vehicle in 3 Sections to allow collection of food waste and dry recyclables	Farid Micro7.5t
Reprocessing	IVC	IVC
Number of households monitored for participation	698	n/a
Participation Rate	Phase 1 – 28.5% (No second phase of monitoring)	No participation monitoring
Kgs per household served per week, first half of the trial	0.50	0.24
Kgs per household served per week, second half of the trial	0.42	0.34

The collection yields and participation rates for the multi-occupancy properties are relatively low compared to kerbside services. Several anecdotal factors[55]have been highlighted throughout the trials that could help explain this:

- Royal Borough of Kingston upon Thames (RBKT) carried out door step collections of food waste while, in the majority of cases, refuse is deposited in communal containers within external bin storage areas. This meant residents had to keep their food waste containers within the confines of their properties over the course of the week where previously they could dispose of refuse at their convenience.
- All the authorities worked alongside landlords and housing bodies to ensure access to the flats by the crews was not inhibited and that key fobs / access codes were obtained in advance. However in practice access still proved problematic on occasions, especially when crews were carrying out multiple trips into blocks. The crews often had to rely on tradesmen's buttons or wait for residents to give them access. Additionally some landlords only provided access for collection crews to car park areas, and not to individual blocks.
- RBKT initially experienced problems with the liners being too small for the collection container.This was rectified with larger liners more suited for the 25 litre containers provided.

Hackney's collection trial was unique. Performance data from Hackney show weekly yields were lower in comparison with the door-to-door schemes. Feedback was obtained from residents via focus groups[76], but gave no clear indications as to the reasons for this, although a number of points were raised which are worthy of mention:

- The aperture on the 'bring' container was considered too small. Residents attending the focus groups expressed concern that the liner bags could split if they had to push them through the aperture. At the time of writing Hackney intended to trial a different bin design with larger apertures, which should address this concern.
- There were no complaints of smell at the collection points.
- There was a noticeable reduction in odours from the refuse bins following the introduction of the food collection trial.
- There were no reports of the 'bring' containers being too full for food waste to be deposited.
- Some residents thought it would be more convenient if the food waste containers were located next to the refuse bins (as opposed to the recycling bins), as they could deposit food waste and refuse at the same time.

Quick wins and Easy Deliverables for NEFs

Capturing food waste from flats in the capital poses a significant benefit to overall performance for London and those boroughs that have already started to collect material from flats should be praised as being pathfinders. However, the expansion of collection services and capture of food waste from DSP should remain a priority as a quick win. Organics services to flats area is developing fast with little robust performance data to support claims that near entry systems for flats can compare favourably with kerbside collections from DSPs. With effective planning, good location of communal bins, provision of internal containers and effective targeted communications food waste collections can be successful. We have included details of food waste collection from flats within case studies for Islington and Hackney. Islington is planning to increase its food waste collections to a further 10,000 properties in 2010.

8.3 Green or Mixed Green and Food Collections

Mixed food waste collection cover approximately 360,000 (10%) of London's households. Limited performance data was provided for mixed food waste collections with only Greenwich providing data for this service. The provision of mixed collections brings about obvious collection cost savings by combining garden and food collections into one. However, recent research[77] indicates that food waste capture for mixed collections is lower than dedicated food waste collections, unless weekly collections of mixed food and green wastes are combined with fortnightly residual collection. Food waste made up around 25% (by weight) of the waste in the organic waste bin where collections of mixed food and garden waste were weekly; where collections were fortnightly collections food waste was on average 9.3%. Yield data provided by boroughs is found in Table 8.17 and include yield data for five dedicated green waste collections.

[76] WRAP, 2007. Food Waste Collection Trials – food waste collections from multi-occupancy dwellings.

[77] WRAP 2010. Performance analysis of mixed food and garden waste collection schemes

It should also be noted that the comingling of food and green will result in higher treatment costs, where Animal By-Product Regulations[78] require the in-vessel (IVC or AD) treatment of food wastes, a process that has higher cost per tonne than conventional open windrowing of green wastes. In some cases boroughs are co-collecting food and mixed waste using separate containers, but mixing in the same vehicle in the short term. In the longer term collection can be easily adapted to collect food and green waste separately should new treatment infrastructure become available.

In 2007 WRAP [79] looked at the comparative costs and benefits, including monetised environmental costs and benefits, of different approaches to managing household bio wastes (garden and food waste). The study looked at different collection and treatment systems including schemes in which food and garden wastes were collected separately from one another and schemes in which they were collected mixed. Different levels of home composting uptake and promotion were also considered in the various options examined.

The main finding was that the design of the collection system and the way in which the waste is collected will influence the amount of material captured and will have implications for how it is treated, which in turn will impact on overall costs and the diversion of material from the residual waste stream. In particular, the report concluded that collecting food waste separately at kerbside and weekly could increase the capture of food, would help keep processing costs for food waste to a minimum and was overall the more financially and environmentally attractive option.

The research[72] suggested that there would be significant additional costs associated with adding food waste to an existing garden waste collection due to low captures of food waste and very high captures and quantities of garden waste (particularly for fortnightly collections) and the requirement to treat all the organic waste a facilities compliant with the requirements of the Animal By-Products Regulations.

Two key findings of the report[72] include;

- Systems which include free or unconstrained garden waste collection services tend to be more costly than those which target food waste only. The key reason is that additional garden waste otherwise composted at home can be pulled into the formal waste management system.

- The additional cost associated with adding food waste to an existing garden waste collection can be significant. This is because all the material must be treated in an in-vessel composting facility.

[78] The Animal By-Products Regulations 2005

[79]Eunomia Research and Consulting, 2007. Managing Biowastes from Households in the UK: Applying Life-cycle Thinking in the Framework of Cost-benefit Analysis,

Typical Collection Yields

Table 8.17 Performance information provided by boroughs for Food and Green Waste collections (Hyder Survey 2009)

Borough	Majority housing type	Index of social deprivation	Inner outer	Yield	Coverage to DSPs	Materials accepted	Container	Charge	Collection frequency
Greenwich	DSH	31	Inner	260	100%	food + garden	KC + wheeled bin	yes	weekly
Richmond	DSH	10	Outer	192	100%	Garden	sacks/wheeled bin	yes	fortnightly
Hackney	NEF	45	Inner	105	36%	Garden	sacks/wheeled bin	no	fortnightly
Redbridge	DSP	18	Outer	98	96%	Garden	reusable sacks	no	Seasonal
Ealing	DSH	23	Outer	73	97%	Garden	reusable sacks	no	weekly
Merton	DSP	15	Outer	35	100%	Garden	sacks	yes	on request

KC = kitchen caddy

9 Operational Costs

Operational and capital cost data was requested from boroughs as part of the survey. The following sections provide analysis of data provided for dry recycling operational cost data only as limited data was provided for capital costs and other collection services. Given the limited cost data provided it is not possible to determine the cost per tonne or household for each type of collection system in London with any certainty. However we are able carry out analysis of overall dry recycling costs against yield and NI192 performance and draw comparisons with cost data produced by the WRAP's, Kerbside Analysis Tool (KAT)[80].

WRAP indicative costs

In 2007 WRAP[81] published a report to provide a systematic appraisal of the characteristics of the principal kerbside recycling collection systems looking at both their cost and effectiveness making use of the Kerbside Analysis Tool (KAT). The report does not attempt to identify a "best value" or "best" system. The report delivered the following conclusions;

- In current market conditions kerbside sort schemes show lower costs – net of income from material sales - than single stream co-mingled schemes.
- The net costs of co-mingled schemes are heavily affected by MRF gate fees and the costs of kerbside sort by income from the sale of materials.
- Two stream co-mingled collections which keep paper separate from containers have similar net costs to kerbside sort schemes.
- There is little variation in material yields between the three main scheme types but, within schemes, variants which collect glass and have an alternate weekly collection of refuse exhibit the greatest diversion rates.
- Recycling collections are maximised when customers are provided with adequate capacity through more or larger containers and/or weekly collections of recyclable materials.
- There appears to be no systematic advantage for one recycling system based on the 'urban or 'rural' nature of the areas served.

In summary, dry recycling urban collection costs 'only' were calculated by KAT for each system collecting cans, glass, paper and plastic over a combination of container types, collection frequencies and residual collection arrangements. The following collection cost ranges were identified in the report;

- **Kerbside sort system** in an urban setting collection cost only ranges between £8.97 and £22.76 per household per year? and £79.34 to £131.33 per tonne. Fortnightly refuse collection gives rise to higher recycling yields, but additional recycling collection resources increases cost.

[80] KAT is written in a Microsoft © ExcelTM workbook. It enables projections of infrastructure requirements and associated costs for the implementation of different kerbside recycling and composting collections ("kerbside collections") within a local authority and has been designed to require only a very limited amount of data before projections are possible

[81] WRAP 2007. Kerbside Collection: Indicative Costs and Performance.

- **Two (multi) stream collections** in urban setting ranges between £60.77 and 78.11 per tonne and £10.87 to £10.95 per household were fortnightly refuse gives rise to a lower cost per tonne.

- **Single stream co-mingled** collection has the highest net cost after collection, sorting and handling of contamination. Urban collection costs per tonne range between £61.55 and £80.37 per tonne, and £9.91 to £11.35 per household per year.

It must be noted that the costs identified in this WRAP study are 'Standard Costs' which are not the same as 'Contract Price', and are therefore indicative and do not reflect actual cost paid by the Authorities.

The report goes on to calculate net costs of collection based on MRF gate fees and material prices in 2007. However, to make a comparison with borough survey data we require collection cost only data.

9.1 Dry Recycling Collections

Boroughs were asked to base cost on the following operational expenditure (Opex) cost criteria for 2008/09 as requested during the survey

- Vehicle Maintenance (if not part of lease scheme)

- Fuel

- Containers

- Labour (FT Equiv)

- Equipment

- Additional Vehicle Hire/Lease Costs

- Other (Please specify)

The following cost data was collected from eight boroughs for a range of collection systems including two kerbside sorted, four single steam co-mingled and two multi stream;

- Cost per household ranges between £ 14 to £31 based on eight on boroughs providing data, and

- Cost per tonne ranges from £81 to £209 based on eight boroughs providing data.

- Kerbside Sort Costs per tonne range from £156 -£209, and between £19 and £29 per household. The highest collection cost per tonne for all the systems was £209.

- Twin Steam costs per tonne range from £81 and £139, and between £14 and £31 per household. The Highest collection cost per household for all systems was £31. The lowest collection cost per tonne for all systems was £81.

- Single Stream co-mingled cost per tonne range from £89 and £157, and between £14 to £26 for cost per household. The lowest collection cost per household for all systems was £14.

Table 9.1 Comparison between indicative costs and actual costs 2008/9 (Hyder Survey 2009)

	London Borough Actual Cost		WRAP Indicative Costs	
	£/T	£/H	£/T	£/H
Kerbside Sort	156 - 209	19-29	79 - 131	9 – 23
Multi Stream	81 -139	14 -31	61 – 78	11
Single Stream	89 - 157	14 -26	61 -80	10 - 11

Table 9.1 provides a summary of actual and indicative costs. In general all actual collection costs are higher than WRAP indicative costs. Both the indicative costs and the actual cost for kerbside sort have the highest cost range which reflects the additional time, labour, vehicles required to undertake kerbside sorting of materials. On both case cost for multi stream and single stream are lower. There is very little difference between multi stream and single stream cost's; this is also reflected in the indicative and actual costs.

9.1.1 Collection Cost Performance by Household

Figure 9.1 identifies that there is a correlation of 0.262 between operational cost per household and total household collected recycling yield where increased yields incur a higher operational cost. This would reflect the additional resources required to collect such as containers, vehicles and Labour. A similar trend emerges in figure 9.2, where operational costs per household increase with NI92 performance increases; this corroborates the previous statement with a stronger correlation of 0.628.

Figure 9.1 Dry Recycling Opex cost per Household against kg/hh/yr (Hyder Survey 2009 / WasteDataFlow 2008/9)

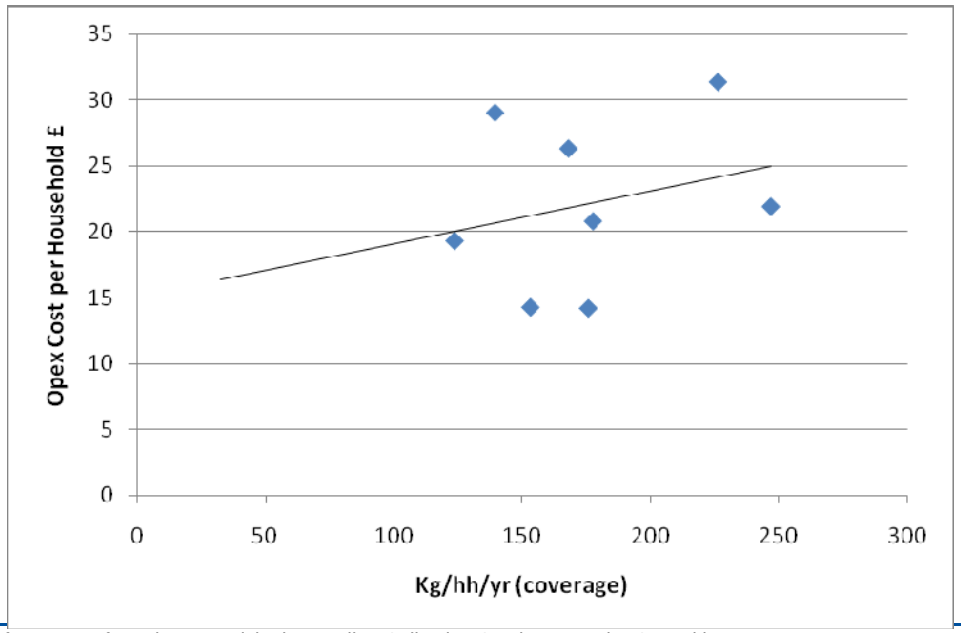
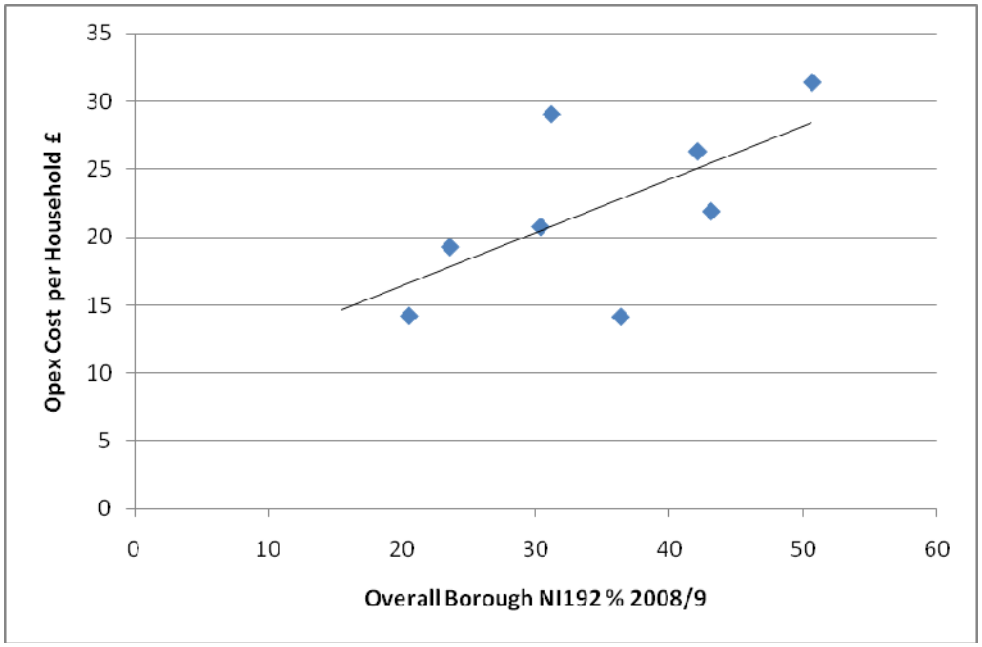


Figure 9.2 Dry Recycling Opex cost per Household against Overall N192% (Hyder Survey 2009 / WasteDataFlow 2008/9)



9.1.2 Collection Cost Performance by Tonnage

Figure 9.3 identifies a moderate negative correlation of -0.479 between cost per tonne and yield, where higher yields result in a lower cost per tonne which reflects cost efficiencies gained from higher yields, where higher participation, improved capture and use of collection resources lowers the cost of material collected. In figure 9.4, there appears to be a correlation of -0.025 between cost per tonne and overall NI192, which perhaps reflects the tonnage contributions that are made from other collection infrastructure such as brings sites/HWRCs which are not reflected in these operational costs.

Figure 9.3 Dry Recycling Opex cost per Tonne against kg/hh/yr (Hyder Survey 2009 / WasteDataFlow 2008/9)

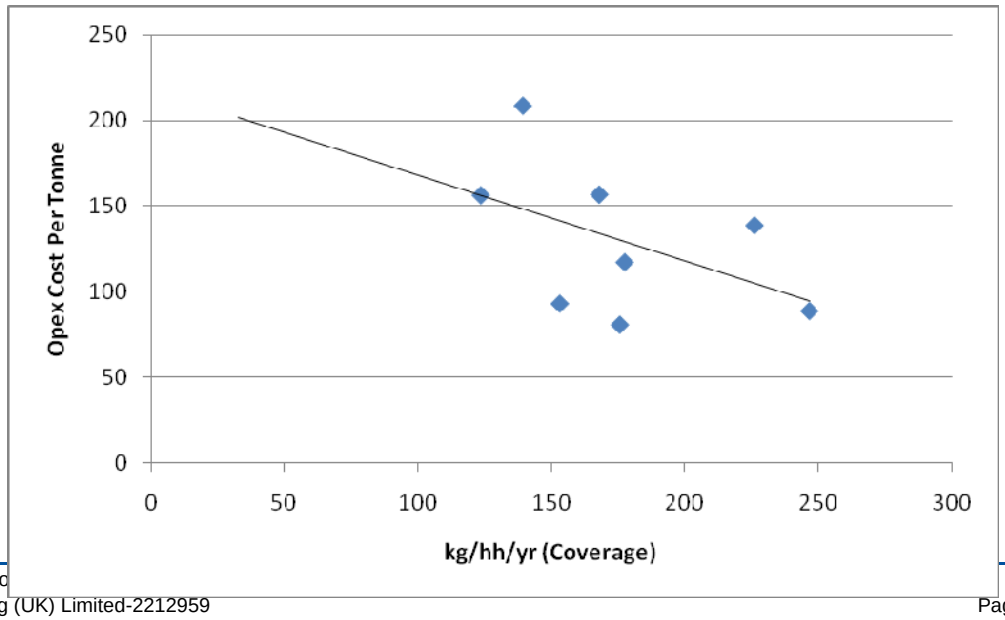
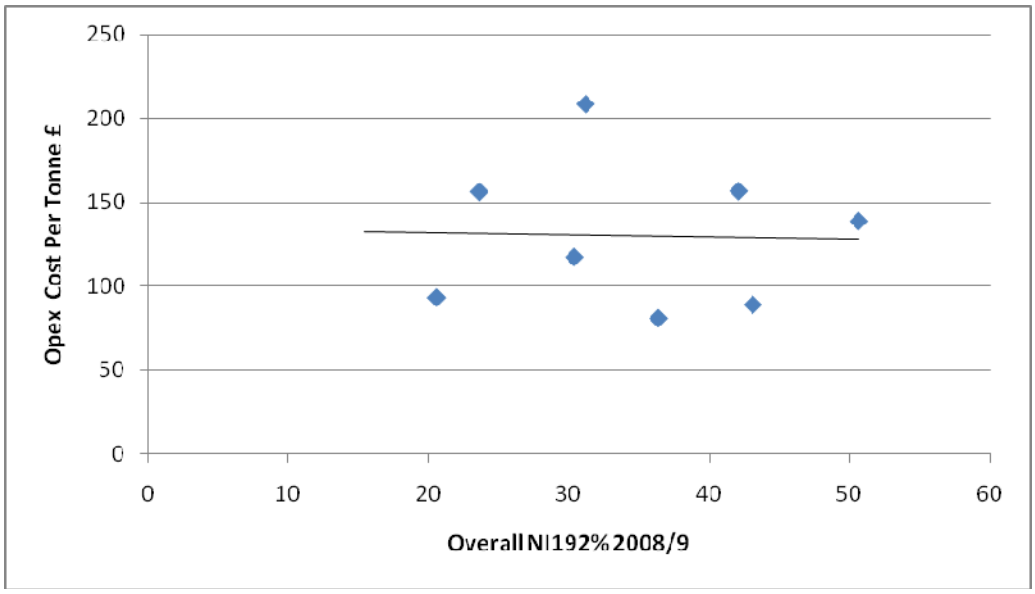


Figure 9.4 Dry Recycling Opex cost per Tonne against Overall N192% (Hyder Survey 2009 / WasteDataFlow 2008/9)



In conclusion, the data shows that recycling collection yield increases the cost per household also increases, but the cost per tonne decreases. This would infer that investment in collection systems (i.e. cost per household) could be one factor that results in higher performance, this also offers collection efficiencies by lowering the cost per tonne by increasing tonnage collected. The data also infers that investment in collection systems could be one factor that results in higher overall NI192 performance.

Clearly there are similarities between the WRAP findings based on KAT modelling and the cost data obtained through the Hyder Survey, although the Hyder cost data reflects the actual contracted cost for the delivery of collection services.

The data does not reflect the net cost of recycling collection i.e. the inclusion of avoided landfill disposal, revenue from the sale of recyclate and the cost of sorting at MRF. Due to the limited data sets for each collection system type we are unable to determine net costs for kerbside collections and commingled collections.

9.1.3 Cost Data Recommendations

The survey was unable to provide sufficient operational and capital cost data for each collection system. Costs for service provision to different housing types was not obtainable, largely due to the budgeting arrangements within local authorities, where collections services are provided across housing types and also service community bring banks. In many case cost data was not provided due to commercial sensitivity despite the assurances of confidentiality. There were a number of issues that were considered when collecting this data and will need to be considered again should this exercise be repeated, these issues were;

- Contractual arrangements with service providers can significantly determine the cost depending on;

I. Integrated arrangements with other service such as street cleaning and refuse.

II. Fixed costs per household including a range of service enhancements such as communications and customer support.

- Vehicle and fleet maintenance arrangements can be on a lease arrangement or capital purchase programme, or a combination of both.

In addition, It is also recommend that a dedicated study be commissioned to focused solely on determining collection cost data by collection system, and where possible housing type. The study could also look at revenue and income sharing arrangement to determine the net cost of recycling.

10 Commercial Recycling Collections

A key driver for the development of trade waste recycling is the Landfill Allowance Trading Scheme (LATS) which sets challenging targets to reduce the tonnage of biodegradable municipal waste which is sent to landfill. Currently, commercial wastes collected by an Borough are classified as Municipal Waste, and so is managed under the LATS regime. Therefore, the recycling or composting of the biodegradable element of trade waste, diverting it from landfill, presents an opportunity to both increase recycling and a contribution towards meeting LATS targets. Landfill tax is also becoming an increasing more persuasive driver, where the increasing cost of disposal to landfill is incentivising recycling. In addition the collection of commercial materials may be an attractive option as a commercial venture if at no extra cost to the Borough or without impeding progress towards meeting targets. Historically, London boroughs have been reluctant to collect trade waste as it does not contribute towards recycling targets. At the time of writing this report Defra is undertaking a consultation on meeting EU Landfill Diversion Targets[82]. The consultation addresses the changes necessary to enable the UK to report to the European Commission on a revised approach to the landfill diversion targets. This includes setting out the new interpretation of the definition of municipal waste. This may have implications for how Municipal Waste – household and commercial is managed by Local Authorities.

10.1.1 Survey Responses

Information on commercial waste collection services was requested as part of our bespoke survey, of the 24 survey responses, 22 provide some Information on residual commercial waste recycling collection services, of this 12 provided recycling services. Information on aspect of service delivery, operational costs, monitoring, charging, customer base and tonnages was generally limited, with many boroughs not providing information or stating commercial sensitivity. This has limited the evaluation of commercial services provided within the capital. Details of those boroughs that have provided information are located in figures 10.1, 10.2 and 10.3.

Using the limited information gathered from our survey we have updated information provided on Capital Waste Facts[83] to provide an up to date overview of collection system. Details of this

[82] http://www.defra.gov.uk/corporate/consult/landfill-diversion/index.htm

[83] http://www.capitalwastefacts.com/boroughserviceInfo/SummaryTable/tabid/58/Default.aspx Capital Waste Facts is a website that provides information and data about recycling and waste management in London.

can be found in Appendix Eleven. An electronic version of the document has also been supplied with this report.

10.1.2 Legal Requirement

The Environmental Protection Act 1990[84] states that it shall be the duty of each waste collection borough if requested by the occupier of premises in its area to collect any commercial waste from the premises or to arrange for the collection of the waste. Therefore borough's have a duty to make provision for the collection of commercial waste by providing a direct service or appointing a contractor. Some boroughs have interpreted the duty as advising businesses on the appropriate means of collection within its area by providing a list of local service providers. We are unable to determine the level of direct service provision from the survey and there is no such duty to provide arrangement for the separate collection of commercial recycling. Commercial waste collected directly by a borough is classified as municipal waste[46] where all waste that comes into the possession or under the control of Waste Disposal or Waste Collection Authorities, with the exception of construction or demolition wastes, is classified as municipal waste[85].

10.1.3 Service Provision

All boroughs make arrangements for the collection of commercial wastes as required by the Environmental Protection Act 1990[86]. Reviewing the updated Capital Waste Facts information we can determine that 21 of the boroughs provide some form of commercial waste recycling collection either borough wide, on a selective basis or on a trial basis. There are currently two trials in operation and two boroughs provide a limited service to selected businesses. Eight of the boroughs provide collections, but with a limited range of materials such as cardboard/paper or glass only, or a combination of glass, paper, cardboard and cans. Other boroughs offer a more comprehensive collection which is consistent with the household collection service offering a collection of between five and nine materials. City of London also offers a food waste collection service, shredded confidential waste and partnered with other organisations to collect Waste Electrical and Electronic Equipment (WEEE), office furniture and used cooking oils. Dry recycling is collected in a wide range of containers from single use sacks to 1280 litres wheeled bins.

Charging Tariffs

Details on charging tariffs can be found in figure 13.2 where the charging structure for refuse and recycling have been set out. We have kept the charging structures anonymous by labelling each participating borough as Authorities one to seven.

Collection services are charged on an annual bin hire with a set number of lifts or charged by the lift on account with a monthly invoice. Pay as you throw services using single use sacks are also offered by some boroughs Annual charge arrangements require less administration than

[84] Environmental protection Act Section 45 (1)(b)

[85] Waste and Emissions Trading Act 2003 (amended)

[86] Environmental protection Act Section 45 (1)(b)

conventional invoice arrangements. For residual waste collection some boroughs offer a reduction for the second collection during the same week.

Price data has been provided for a range of recycling containers, the most prevalent being single use sacks, 240 litres and 1100 litres wheeled bins. The highest charges would appear to be for borough seven; these prices are significantly higher than other Authorities services which are likely to be significantly higher than the current market rates therefore being prohibitive to businesses. Recycling charges have been set equal to the price of refuse, or at a reduced rate to financially incentivise businesses to recycle. Reduced prices for recycling are offered by boroughs one, four and five. Based on prices provided by boroughs the cost of recycling is approximately 30% to 60% lower than residual prices depending on container type. Borough five offers greater cost savings for larger recycling containers. Borough one also offers service packages for smaller business that include a combination of recycling and refuse services for one price. Providing a financial incentive for business is likely to increase service participation.

Performance Data

Given the limited amount of performance data available to commercial services provided by London boroughs we are unable to undertake a full performance analysis. We have therefore relied mainly on information gathered as a part of our survey in Tables 10.1, 10.2 & 10.3 and existing data in Capital Waste Facts to carry out our review.

Participation has been calculated based on the number of residual waste customers and recycling customers using borough arranged recycling services. This is not entirely an accurate reflection of participation as some trade customers may use private sector recycling collections or some recycling service users may use private sector refuse collections. Participation rates range between 2% and 44%. The two lowest participation rates appear to be for boroughs offering only limited material collections i.e. glass, paper and cardboard. Higher participation rates appear to be for boroughs offering a wider range of material collections. Participation rates of between 24% and 25% appear to be for boroughs offering financial incentives for businesses to recycle wide range materials. However the highest participation which is 44% is for a flat rate pricing structure. I.e. residual is the same price as recycling. It must be noted that this borough has the lowest overall customer base and therefore we cannot rule out the impact that marketing and promotions will have on increasing participation.

Waste Reduction and Business Support

A number of boroughs provide support to businesses by offering waste minimisation advice including free on-site waste audit and information packs. Business are increasingly wishing to drive down cost and improve environmental performance, providing waste reduction support forms part of a package of waste management solutions.

Private Sector

Commercial services provided by the private sector, offer a wide range of multi material, paper, cardboard, glass, confidential paper, waste oil and other specialist items such as computer equipment. Boroughs providing direct commercial services are in competition with the private sector. Private sector companies that offer both collection and disposal solutions will benefit from controlling costs associated with disposal and treatment, where cost savings could be passed on to businesses. This synergy allows the private sector to be more competitive as the cost of waste disposal and treatment increases. The private sector may also have access to a wider range of recycling markets because of the quantity of materials they handle allowing them to command higher prices for commodities, therefore lowering the net cost of services. Where capacity exists, boroughs providing direct services could take advantage of household collection infrastructure to keep collection costs down. However the co-collection of household

and commercial waste is prohibited by the requirement to report household recycling tonnages separately for National Indicators (NIs).

10.1.4 Factors Contributing to Higher Performance

The GLA commissioned a report in 2005 that:[87] identified several factors that are likely to give rise to a schemes success, higher participation and material capture. We have identified some of these service related factors with evidence of good practice from our Case Study. These are summarised below;

- ✓ Target Businesses - Targeting different sectors will yield different volumes of each material, for example services to restaurants, hotels, pubs and clubs will usually yield significant volumes of glass, whereas office collections will yield possibly a range of paper waste but also various other materials in smaller volumes. City of London offers a range of collection options ranging from sticker tape, single use sacks to various sized wheeled bins to suit all businesses. This is combined Flexible collections which can be made 24 hours a day, 6 days a week

- ✓ Markets – The location of the market will affect transport costs, this will be increasingly significant if the market is not local and an existing outlet. The City of London has highlighted issues associated with proximity to treatment facilities for food waste, this has an impact upon the overall cost of the service, costs are then passed on to customers. It is thought that once a treatment facility is made available in close proximity to the City these costs will be reduced, in turn this will lower the charges for businesses.

- ✓ Materials – Dependant on markets, making existing systems more efficient, and diverting biodegradable trade waste from landfill will contribute to the LATS targets. More significantly, heavier dense waste will bring about greater avoided disposal costs. The City of London offers commercial co-mingled collections which are integrated with household collections, collecting the same materials as household services for consistency. Separate collections of cardboard and paper are provided.

- ✓ Resources - The resource requirements of a trade waste recycling scheme need to be considered, particularly when the scheme uptake increases. Ensuring that sufficient staffing, vehicle and fleet capacity and containers are available will increase the reliability of the service. City of London provides dedicated fleets for the collection of commercial paper and cardboard

- ✓ Costs and Funding - The majority of collection authorities who develop such an initiative do so via funding through their internal mainstream budgets or through cost recovery from existing collections. The possible purchase of additional infrastructure such as bins or sacks, and the use of vehicles and staff to operate the scheme will need to be taken into account. Some of this infrastructure may already exist as part of household or commercial scheme. The City of London has made use of existing household collection infrastructure to provide commercial dry and food waste collections services.

- ✓ Charging - Trade waste recycling schemes operated in the public sector are in direct competition with private sector organisations offering similar services. Collection services therefore need to remain financially competitive. The cost to businesses can also determine level of participation or take up of a scheme - From our evaluation of survey information provided by boroughs there is evidence to suggest that charging systems that financially incentivise recycling bring about higher participation rates of between 24% and 25%.

[87] GLA: Best Practice Guidance, Trade Waste Recycling. Entec, 2005.

- ✓ Promotion – sufficient financial and staffing resource should be applied to get the scheme up and running and maintaining on-going promotions using existing customer data basis to target via phone, mail or at the point of collection via collection teams.- The City of London has a sales team who market the collection facilities and letters are regularly sent out to customers to inform them of any changes

- ✓ Customer Service – On going resources to delivery high quality levels of customer service will lead to customer loyalty. This can be incorporated into existing trade service provision support, but will require some additional staffing capacity. This should not be under estimated. – As above The City of London has a dedicated team that offers support to customers.

- ✓ Research & market assessment – Initial, targeted research is essential when considering setting up a trade waste recycling scheme. Differences in emphasis may apply depending on whether the scheme is to be built on an existing trade waste collection or if starting from scratch.

- ✓ Contracts - The ability to extend an existing customer contract should be checked with the borough's legal advisors. The contract could include clauses for the contractor to provide or rent bins, flexibility in the frequency of collections and the number of clients and flexibility in the range of materials for collection and recycling.

- ✓ Monitoring, Measuring and Feedback - Monitoring of collection materials, participation and cost is essential to determine the operational efficiency of the scheme. It is also important to get feedback from customers to determine where he scheme can be improved. Customer performance feedback is becoming increasingly more popular so that companies can report on their environmental objectives for accreditation purposes, such as ISO14001[88].

- ✓ Pilot Schemes - a pilot scheme may identify problems with a proposed collection scheme prior to any significant investment in infrastructure, such MRFs and fleets capacity. Collection scheme built on pilots general have the opportunity to address issue early before committing to further resource.

10.1.5 Case Study

Both Westminster and City of London provide services to approximatly1000 customers with a comprehensive range of materials collected. In addition, City of London also provides a commercial food waste collection and other items such as office furniture, WEEE and waste cooking oils. We have therefore selected City of London as a case study. Full details of the case study can be found in Appendix Ten.

10.1.6 Quick Wins and Easy Deliverables

There may be some benefits in using existing collection infrastructure to offer commercial recycling services. Some boroughs such as Hackney are planning to introduce additional commercial recycling services such as cardboard recycling in 2010. From our study it would appear that services collecting a wide range of materials and offering businesses a financial

[88] ISO (International Organization for Standardization). ISO 14001:2004 specifies requirements for an environmental management system to enable an organization to develop and implement a policy and objectives which take into account legal requirements and other requirements to which the organization subscribes, and information about significant environmental aspects.

incentive to recycling appear to have higher participation rates. Participation rates can also be enhanced through the promotion of services and where commercially and operationally viable trials should be expanded to cover borough wide coverage.

Expanding services for dry recycling and food waste where there is existing capacity within collection infrastructure could be commercial attractive to boroughs where it is not to the detriment of household waste services. It should be noted that public money cannot be used to subsidise or support commercial services that are in direct competition with the private sector, this is governed by the Competition Act 1998.

Hyder recommend that a dedicated study into the potential to expand coverage of commercial recycling services provided by boroughs be investigated. This should include partnerships with the private sector to deliver a wide range of material collections. The study could identify borough support for commercial initiatives, barriers to service provision, collection infrastructure and capacity to manage municipal commercial recycling and the net cost of service delivery.

Table 10.1 Survey Response for commercial residual and recycling services (Hyder Survey 2009)

	Residual services				Recycling services			
Borough	**Coverage**	**container**	**collection frequency**	**Yes / No**	**coverage**	**container**	**collection frequency**	**materials**
Barnet	not specified	various	>weekly	✗				
Bexley	not specified	not specified	fortnightly	✓	Not Specified	240 litre wheelie bins or 1100 litre eurobins, bulk containers	fortnightly	Source Separated Aerosols, aluminium foil, books, cardboard, glass bottles & jars, mixed cans, paper, plastic bottles, yellow pages
Brent	not specified	not specified	not specified	✗				
Bromley	bwide	various	>weekly	✗				
Croydon	commercially sensitive	various	as required	✓	commercially sensitive	commercially sensitive	on request	commercially sensitive
City of London	City wide	Various	As required	✓	City Wide	Various	As required	Paper, cardboard, glass, cans plastic , food waste
Ealing	not specified	not specified	not specified	✗				
Greenwich	Borough wide	sacks	Daily or as required	✓	Borough wide	Sacks	Daily or as required	Co-mingled Aerosols, aluminium foil, cardboard, glass bottles & jars, mixed cans, paper, plastic bags, plastic bottles, yellow pages.
Hackney	Borough wide	various	various	✓	not specified	Wheeled bin	as required	Glass bottles and jars.
Hammersmith and Fulham	not specified	various	not specified	✓	not specified	sacks	not specified	Cardboard, drinks cartons, glass bottles & jars, mixed cans, paper, plastic bottles, yellow pages
Harrow	Borough wide	various	variable	✓	Borough Wide	Wheeled bins	weekly	Co-mingled Cardboard, drinks cartons, glass bottles & jars, mixed cans, paper, plastic bottles, yellow pages
Havering	Borough wide	various	weekly	✓	Not specified	Bundles	weekly	Cardboard, Collected in Bundles or in cage (businesses own)
Hounslow	Borough wide	various	>weekly	✓	Borough wide	various	variable	Paper and cardboard
Islington	not specified	not specified	not specified	✓	Trial	Sacks, boxes and tape	>weekly	Cardboard, glass bottles and jars, paper
Lambeth	Borough wide	various	variable	✗				
Lewisham	Borough	various	weekly	✓	Borough	Wheeled bins	weekly	Source Separated Cardboard /

	wide				wide			glass bottles and jars
Merton	not specified	various	variable	✓	not specified	various	weekly	Cardboard, drinks cartons, glass bottles & jars, mixed cans, paper, plastic bottles, and yellow pages. Bags exclude glass.
Redbridge	Borough wide	various	variable	✗				
Richmond upon Thames	Borough wide	various	variable	✓	Borough wide	various	variable	Mixed glass, cardboard/paper
Kensington and Chelsea	Borough wide	various	variable	✓	Borough wide	various	>weekly	cardboard, paper, glass, plastics
Kingston upon Thames	not specified	various	not specified	✗	Borough wide	Sacks, box and bins	Variable	Co-mingled Cardboard, glass bottles & jars, mixed cans, paper, plastic bottles, yellow pages
Southwark	not specified			not specified				
Tower Hamlets	not specified	various	>weekly	✓	not specified	Various	Varies	Co-mingled Cardboard, glass bottles & jars, mixed cans, paper, plastic bottles, yellow pages
Wandsworth	Borough wide	various	weekly	✓	Borough wide	various	weekly	Co-mingled paper, card, cans, glass, plastic bottles, food/drinks cartons
Westminster	Borough wide	various	variable	✓	Borough wide	various	variable	Source separated: glass, paper/card, WEEE. Also co-mingled materials paper/card, glass, plastics, glass, and metals.

Table 10.2 Charging tariffs for residual and recycling collection services. (Hyder Survey 2009)

All charges are for one lift with weekly bin hire shown separately.

	Borough 1			Borough 2			Borough 3		Borough 4				Borough 5		Borough 6		Borough 7	
	Refuse charge	bin hire	Recycling Charge*	Refuse charge	bin hire	Recycling charge	Refuse charge	Recycling charge*	Refuse charge	bin hire	Recycling charge	bin hire	Refuse charge	Recycling charge	Refuse charge ***	Recycling charge ***	Refuse charge	
Sack Collection	1.22**			2.00			1.40	1.40	2.30	NK	1.28		1.9	0.95	6.72	6.72		
240L			2.96	4.53					6.25	NK	2.77		7.26	2.5	16.28	16.28	3.84	
360L													8.34	3.5	23.73	23.73	4.71	
660L				7.47	1.95	NK						NK	8.83	5.57	42.73	42.73	7.26	
940L																	8.82	NK
1100L	12.50	2.00	7.53	11.94	2.13				11.56	NK	4.94		11.87	NA	69.13	69.13	10.15	
1280L														7.95				
Compactor																	127.38	
Material types	Residual		Source Sep. 9 materials	Residual		NS	Residual	Co-mingled. 9 materials	Residual		Co-mingled. 7 materials		Residual	Co-mingled 6 materials	Residual	Co-mingled 7 materials	Residual	

* no bin hire
** based on charge of 2.44 for two sacks
*** weekly service including annual service charge
NK = Not known
NS = No Service

Figure 10.3 Commercial residual and recycling tonnages including participation (Hyder Survey 2009)

	Residual waste			Recycling			
Borough	**customers**	**tonnes/year**	**tonnes/ customer/ year**	**customers**	**tonnes/year**	**tonnes/ customer/ year**	**Participation Rate***
Barnet	not specified	20,000		Not offered			
Bexley	not specified	not specified		300			
Brent	not specified	not specified		Not offered			
Bromley	not specified	10,900		Not offered			
City of London	not specified	not specified		1000			
Croydon	not specified	not specified		Commercial Sensitive			
Ealing	not specified	not specified		Not offered			
Greenwich	450	2,015	4.5	200			44%
Hackney	3,053	27,001	0.9	97			3%
Harrow	1,200	not specified		50			4%
Havering	not specified	5,844		200			
Hounslow	269	not specified		not specified			
Islington	Not Specified	not specified		85	Trial		
Lambeth	2,470	12,500	5.1	Not offered			
Lewisham	3,250	11,000	3.4	50			2%
Merton	1,580	not specified		380			24%
Redbridge	1,750	16,989	9.7	Not offered			
Richmond upon Thames	not specified	7,355		not specified	920		
Kensington and Chelsea	not specified	not specified		200			
Kingston upon Thames	not specified	not specified		Not offered			
Southwark	not specified	not specified		not specified			
Tower Hamlets	1,898	not specified		476			25%
Wandsworth	not specified	not specified		not specified			
Westminster City Council	14,000	110,000	7.9	1,000	20,000	20.0	7%

11 Key Findings

Research Gaps

The literature search and review has identified that there is limited research in the field of dry recycling and organics collection systems for the housing types required by this study, especially in relation to the London boroughs. In all cases studies by housing type did not draw robust conclusions as they were based on small data sets. These is significant research in the field of barriers to recycling at home, guidance documents and indicative cost data, which is mostly provided by the Waste Resources Action Programme (WRAP).

Greater London's Recycling Performance

In 2008/09 over 600,000 tonnes of kerbside collected material was sent for recycling, composting or anaerobic digestion, which was almost 21 per cent of all household waste and 72 per cent of London's recycling/composting performance. This shows that kerbside collection has a significant contribution to the performance of London's reuse, recycling and composting performance.

When looking at reported BVPI82a for 2007/08 London boroughs perform well in comparison to other English Authorities such as Metropolitan boroughs, but there is still room for improvement to raise kerbside dry recycling performance to meet the Mayors recycling targets.

Material Capture

The 2010 Defra study to review Municipal Waste Composition[89] includes compositional estimates for all kerbside waste in England based on WasteDataFlow for the period 2006/07. Using this data in combination with our survey results, we found;

- The lowest dry recycling yield [Newham] produced in London is 26kg/hh/yr which would suggest a capture rate of 9% based on all five materials.
- The highest yield is 224kg/hh/yr (Bexley), with an estimated capture of 59%.
- The average yield for London collection systems is 140kg/hh/yr with an estimated capture of 37% at kerbside.
- The highest food waste yield is 43Kg/hh/yr (Richmond) with a food waste capture of 20% at kerbside.

This high level analysis would suggest that there are still significant improvements to increase capture rates for dry recycling and food waste. These could be achieved by increasing the coverage of collection services, especially to purpose built flats and flats above shops, providing bespoke communications to residents, improving access to services and ensuring there is adequate container provision for the internal storage of materials

[89] Municipal Waste Composition: A Review of Municipal Waste Component Analyses.2010.Defra.

Housing Profiles and Performance

Of the 3.3 million households in London approximately 47% are comprised of flats and 53% doorstep properties.

The study found that flats provide a range of challenges and opportunities for boroughs. Generally flats perform less favourably to doorstep houses, often suffering from low participation and capture. A report commissioned by WRAP on Barriers to recycling at home[90] outlines these issues and provides evidence that residents in flats are less committed recyclers as a result of these barriers.

To support this finding our study shows there is a relationship between the percentage of Purpose Built Flats (PBF) and overall NI192 (2008/09), where the higher the percentage of PBF, the lower the overall NI192. This perhaps reflects the various additional barriers to recycling[91] that are caused by this type of property, which in summary include;

- No collection service;
- Space to recycle; and
- Difficulties in carrying materials down flights of stairs.

Inner London boroughs are more densely populated and have a higher percentage of purpose built flats (PBFs) and should therefore have lower household recycling performance. However, average dry recycling yields for Inner and outer London appear to be relatively the same in terms of performance. This may reflect how boroughs have adapted household recycling service provision to suit the majority housing type, thus overcoming some of the barriers associated with flats. This is likely to be a result of additional communications, the use of commingled collections using single use sacks and improved access to recycling facilities such as near entry systems or doorstep collections to flats.

It is also noted that outer London boroughs collect more garden waste and food waste. This reflects both the wider coverage of organic service in Outer London and properties with gardens, assuming that more densely populated areas have smaller gardens.

Contamination

The London average is calculated at 7% which is significantly below the national average. Surveyed authorities identified a very wide variation in contamination amounts – from 0% to 17%. Contamination has an impact on the performance of municipal household and business recycling services. In particular with a majority of the boroughs collecting co-mingled material from either kerbside houses or flats using MRFs there is a need to identify the causes of contamination and the measures that can be reduced to eliminate them.

It is likely that recycling arising from co-mingled communal flat facilities will have higher levels of contamination largely as a result of:

- Issues with ‘point of collection’ quality checks at communal near entry facilities where larger containers can conceal contamination
- Barriers to communicating with residents in flats such as social demographics, as poor communication can lead to low participation.

[90] Barriers to Recycling at Home, WRAP.2008

[91] Barriers to Recycling at Home, WRAP.2008

- Practical issues such as container storage, resulting in insufficient capacity for recycling and/or refuse.

Therefore without the right type of communications, resources and planning required to address these barriers, boroughs with a higher percentage of purpose built flats may give rise to higher levels of contamination.

11.1.1 Evaluation of Overall Kerbside Dry Recycling Collection Performance

An overview on the performance of dry recycling collection systems across London. It looks at the relationships between kerbside dry recycling collection performance in relation to;

- Socio -economic factors
- Service related factors

The research identifies that there is no single variable or characteristic that can explain all of the variation in kerbside recycling performance across all the local authorities. Rather it is a **combination of the above factors that give to change in performance**. Socio-economic factors such as affluence and deprivation appear to have a strong influence over borough performance. The frequency of refuse and recycling collection and the type and capacity of containers also have a strong influence.

Our study shows a direct correlation between dry recycling yields, NI192 performance and the Index of Multiple Deprivation (IMD) score for each borough, where lower IMD scores give rise to higher dry recycling collection yields and overall higher NI192 performance. This is an overarching dominant factor that contributes to borough recycling performance.

11.1.2 Doorstep Properties

Type of collection system

The Study revealed that the most common type of collection system used by boroughs is co-mingled weekly collections. Co-mingled collections appear to deliver the widest range of performance, but compare favourably with kerbside and multistream systems. Kerbside sorted collections appear to yield a mid range performance, while they typically offer a wider range of materials for collection. Multi-stream collection systems yield a mid to upper performance range.

A review of various research identified that no one report advocates the use of a particular collection system for a particular housing. Where there are practical and operational barriers to kerbside sorting, two stream co-mingled collections have significant advantages over single stream collections, mainly through improved material quality and value as a result of keeping paper and card separate from other materials, particularly glass. Single stream co-mingled collections may be appropriate in circumstances where the other options are impractical. These might be the densest urban areas where on-street parking and heavy traffic require fast loading without the need to return containers to the point of collection or for high density flats, transient areas and multi-occupied properties[92]

However, the use of Best Practice Guidance WRAP[93] can be used to help Local Authorities make choices that best suits their local needs. However the research did highlight that while

[92] WRAP. 2009. Choosing the Right Collection System

[93] http://www.wrap.org.uk/local_authorities/research_guidance/collections_recycling/index.html

guidance is useful, it can be taken too literally by contractors when implementing services, and is not always suitable for all properties. Flexibility is a key requirement in service provision for each housing development.

Material Types Collected

The boroughs provide a range of collection services often dependent upon the type of waste transfer and MRF infrastructure. Kerbside systems in general offer a greater range of material collections than co-mingled collection.

Container Types

London boroughs use a variety of containers but the most popular containment methods in are reusable boxes, bags and single use sacks. WRAP [76] states that residents would recycle more if they had more and/or bigger recycling containers. WRAP also found that there is a correlation between available capacity and performance, where increased provision of capacity leads to higher yields. However, the range of materials collected, frequency of collection and relationship with other service as part of the overall service provision is likely to determine total capacity. Unsubstantial capacity may result in material displacement, where bulkier items, make space of heavier items.

Single use sacks appear to have the widest performance ranges. Access to sacks is essential to maintaining participation; if a council fails to deliver sacks and relies on residents to collect then they are likely to see a diminished participation rate over time. This may be one reason to explain the wide variations in performance.

In general, a range of containers are suitable for doorstep properties as they tend to have more curtilage and in-property storage space than Purpose Built Flats.

The use of co-mingled single use sacks may be favourable in more densely housed areas where there is restricted street space and reusable containers can go missing, which is common barrier for doorstep flats. Quarterly delivery of sacks acts as a prompt to recycling, sacks are easy to store in home when not in use. Single use sacks also allow flexibility in capacity, i.e. more sacks can be used over busy Holiday periods where more waste & recycling is generated.

The use of boxes and reusable bags are also suitable . As with wheeled bins these types of collection system are better suited to less densely housed areas where there is more street space. This may be particularly relevant where boroughs have a higher percentage number of Doorstep Flats (Houses converted to flats) where space for containers on collection day can be an issue, particularly in houses which have been split into several flats, meaning several boxes are set out on collection day and boxes can go missing.

Frequency of Recycling & Residual Collections

The impact of fortnightly residual collections appears to give rise to higher yields, which is consistent with WRAP studies. Boroughs with a weekly or fortnightly collection of recycling and a fortnightly collection of residual appear to have slightly higher recycling yield than those with a weekly residual collection. Boroughs providing a fortnightly residual collection use wheeled bin for refuse containment. Only three boroughs operate these arrangements, Bexley, Kingston and Harrow. Harrow is the only borough to collect residual and dry recycling on an alternate weekly basis.

Communications

This review has identified that four boroughs offer ongoing communications support; which appears to result in higher performance.

A review of the information provided by boroughs in response to the questionnaire along with a review of WRAP studies[76] indicates that communications plays an important role in the performance of a recycling scheme regardless of housing type.

11.1.3 Near Entry Flats (Purpose Built Flats)

The study identified that not all Flats within borough receive a near entry or doorstep collection. There is anecdotal evidence from survey returns and case studies to suggest that not all flats receive these services and residents instead rely on Community Recycling Banks, Bring Banks and HWRCs. The coverage of services to flats could not be easily identified.

Near Entry Systems

In general boroughs identified as majority Near Entry Flats are provided a co-mingled near entry Bring Bank service. Materials are collected in bulk from communal bins, which if collected co-mingled, partially or source separated have little bearing on performance. No one collection system appears to delivery higher yields for flats. It is more likely to be attributed to other service factors such as container type and range of materials collected. co-mingled source separated collections may suffer from staggered 'bin full' periods as result of varying material mass and bulk. This may lead to overflowing if servicing is not also staggered to ensure containers are emptied.

Material Types

A majority of boroughs collect a full suite of five or more materials, some with the addition of drinks cartons. A full suite of recyclables: paper, card, glass, plastic bottles and cans, plus one additional item gives rise to higher yields as long as there is sufficient storage capacity to suit the frequency of collection. The collection of bulkier items such as plastics and cardboard often means the provision of more communal bins; with space constraints this is not always possible. One boroughs collection system excludes such items in the communal services, which may be why lower yields where evident. However, with the absence of data it is not possible to determine a strong evidence base for this.

Container Types

The provision of resident's internal storage containers to contain and carry waste to communal areas has a positive impact on the yields. Existing research suggests that average collections yield were higher where an internal receptacle was provided to residents to store their recyclables[45.] Again; communal bin capacity is likely to influence performance in terms of yield and quality of material.

Frequency of collection

The frequency of collection is relative to the capacity of the containers. Where space does not allow for sufficient or additional containers then more frequent serving is required to maintain empty capacity. Boroughs may have arrangements in place with contractors to adjust frequency if required. Ensuring sufficient communal capacity will increase participation and reduce contamination.

Doorstep Collections

Data provided for doorstep collections appear to be inconclusive, with one borough showing yields for doorstep collection to be lower than communal near entry system, while another borough shows the opposite.

A study carried by Western Riverside[94] found that door-to-door recycling systems recover the highest weight of material when compared to Near Entry System. In addition, those schemes using single-use sacks or carrier bags for collection recover almost three times more recycling than those using boxes or baskets.

The Hammersmith and Fulham flat trials identified that door to door collections produced the highest yields, followed by mini banks on each floor and chutes and smart banks producing roughly the same yields. Higher yields perhaps reflect how barriers to recycling have been overcome. I.e. improved access to services. However, for this trial the cost of collecting door to door has been kept artificially low by using on site caretakers

Reusable sacks used for door to door collections often go missing post collection, i.e. blown from balconies which can lead to lower participation.

Chute systems

The conversion of existing chutes to accommodate recycling can bring about positive benefits. Existing research from WRAP trials suggests that yields of up to 200kg/hh/yr can be achieved[95]. Residents without chutes for residual waste have a higher yield[96]. However increased levels of contamination were observed when the recycling chute is a considerable distance away from the refuse chute. i.e. at the opposite end of the balcony. There is limited detail on the performance of chute based systems and therefore inadequate guidance on this collection method.

11.1.4 Organic Waste Collection Performance

The research also investigated garden and food waste collection services. It identified that on the whole food waste collections are not as firmly established in London as dry recycling. Food waste collections only cover 26% of London households, the majority being DSPs. Green waste collections are more established and cover 62% of London's households, and are provided largely though dedicated services, although approximately 10% are provided via a mixed food and green waste service.

Food Waste

WRAP have drafted a food waste collection Guidance Document[97] to assist Local Authorities in the planning, implementation and delivery of food waste services. The document covers food waste capture and factors affecting capture;

Drawing from local borough schemes currently in operation including WRAP trials and other research to date the WRAP report draws the following conclusions:

- Refuse collection frequency is a statistically significant factor in the performance of food waste collections. Areas with fortnightly collections of refuse have higher weekly food waste participation and yields

[94] Western Riverside, 2005. Estates Recycling Research. Produced by London Remade

[95] http://www.wrap.org.uk/downloads/Performance_Summary_Table.649a8991.6893.pdf

[96]WRAP.http://www.wrap.org.uk/local_authorities/research_guidance/collections_recycling/recycling_collections_for_flats/operation_of_different_collection_schemes/bring_schemes.htm

[97] Food Waste Collection Guidance, WRAP. 2009.

- Participation and yields can decline over time in areas with weekly refuse collections, whilst in areas with fortnightly refuse collections yield and participation is maintained
- Areas with weekly black sack collections provide higher food waste yields than areas with weekly 240 litre wheeled bin refuse collections
- Food waste yields may also be influenced by the size of the wheeled bin provided for refuse
- Higher food waste yields will be found in more affluent areas

26% of households in London boroughs receive a food waste collection service, approximately 886,000 households. An estimated 28,000 households in flats receive a food waste collection services in the form of near entry or doorstep collections.

This study found that the type of collection system does not appear to have a major impact upon the performance of food waste collections. The methods of collection are largely the same and include the collection of an external caddy which is emptied manually directly into the vehicle or emptied into a slave container. Therefore, there is no variation in performance attributed to collection system type.

With the exception of Ealing all boroughs offer kitchen caddies as recommended by WRAP, however based on available data the absence of kitchen caddies does not appear to have lowered performance for Ealing, suggesting that higher performance may be attributed to something else, possibly communications. With the Exception of Bromley, none of the boroughs currently provide free liners although a number of promotional activities are being undertaken in 2010.The Bromley trial provides a 40 litre external caddy. This size proved to be the most popular. Bromley combined the introduction of food waste with the move to fortnightly refuse and reports that residents are 'comforted' by the perception that they will have plenty of storage for food waste.

As part of the 2009 WRAP food waste collection trial[98] all the trial rounds used liners with the exception of two rounds in Surrey. Previous research undertaken by Eunomia[99] has suggested that providing residents with liners can improve the performance of food waste schemes, primarily because it makes the scheme cleaner and easier for residents to participate. However the provision of liners longer term by London boroughs would be at considerable cost.

Generally source segregated food and residual waste is collected on a weekly basis. Residual waste is collected using sacks and in some case sacks and wheeled bins. We were unable to determine the impact of wheeled bin collections, however existing research indicate that this will result in lower yields. None of the boroughs collect residual on a fortnightly basis where food is source segregated, with the exception of Kingston; Kingston's higher performance may be attributed to fortnightly collection of refuse[35.]

Any communications specific to food waste collection will have a positive impact upon performance; however it is difficult to determine the relative impact of communications between each borough. Ealing found a large scale communications campaign in 2007 increased participation in food waste collections by nearly 3%[100], 2008/09.

[98] WRAP 2009. Evaluation of the WRAP Separate Food Waste Collection Trials

[99] Eunomia, 2006. Kitchen Waste Collections: Optimising Container Selection.

[100] Figure provided courtesy of Ealing Borough Council.

Ensuring the right level of resourcing (staff/vehicles/capacity) communications and customer support will play a large role in ensuring collections get off to the right start and participation is maximised from the outset. . Underestimating resources from the outset can lead to service failures and result in reduced participation.

Organics services to flats is an area that is developing fast in London with little robust performance data to support claims that Near entry systems for flats can compare favourably with kerbside collections from DSPs. With effective planning, good location of communal bins, provision of internal containers and effective targeted communications food waste collections can be successful.

Mixed Food and Green

Mixed food waste collection cover approximately 360,000 (10%) of London's Households. Limited performance data was provided for mixed food waste collections with only Greenwich providing data. This study has identified that authorities that collect either green waste or mixed green and food waste have a higher overall NI192 performance. However, when compared to weekly food waste only collections combined food and garden waste schemes achieve a much lower food yield per household and hence lower level of diversion.

WRAP[101] concludes that combined organic waste collections are less effective in diverting food waste for recycling compared to food only collections. As a result it will be much more difficult to achieve high diversion / recycling targets with combined food and garden collections systems. Another WRAP commissioned study found[102] there would be significant additional costs associated with adding food waste to an existing garden waste collection due to low captures of food waste and very high captures and quantities of garden waste (particularly for fortnightly collections) and the requirement to treat all the organic waste compliant with the requirements of the Animal By-Products Regulations would lead to additional treatment costs.

Green Waste

Green waste collection yields are largely affected by charging, frequency of collection, seasonal collections and container type. On average, chargeable systems collect 63 kg/hh/yr and on average, non-chargeable systems collect 70 kg/hh/yr. The collection of garden waste on a seasonal basis targeted at properties with garden may bring about targeted performance improvements. Havering offers a chargeable wheel bin service on a seasonal basis to 14% of the borough which yields over 320 Kg/hh/yr (WDF 2008/9).

[101] WRAP 2010. Performance analysis of mixed food and garden waste collection schemes

[102] Eunomia Research and Consulting, 2007. Managing Biowastes from Households in the UK: Applying Life-cycle Thinking in the Framework of Cost-benefit Analysis,

11.1.5 Operational Costs

A review of cost data provided by boroughs against indicative cost[103] data

Table 11.1 Comparison between indicative costs and actual costs (Hyder 2009 / WRAP 2007)

	London Borough Actual Cost		WRAP Indicative Costs	
	£/T	£/H	£/T	£/H
Kerbside Sort	156 - 209	19-29	79 - 131	9 – 23
Multi Stream	81 -139	14 -31	61 – 78	11
Single Stream	89 - 157	14 -26	61 -80	10 - 11

Table 11.1 provides a summary of actual and indicative costs. Actual collection costs are higher than WRAP indicative costs. Both the indicative costs and the actual cost for kerbside sort have the highest cost range which reflects the additional time, labour, vehicles required to undertake kerbside sorting of materials. On both case cost for multi stream and single stream are lower. There is very little difference between multi stream and single stream cost's. Higher actual costs probably reflect the market rate and contract price for the delivery of services rather than baseline costs used in the KAT tool.

From the data collected there is evidence to suggest that;

- Higher yields incur a higher operational cost per Household.
- Higher yields result in a lower operational cost per tonne
- Operational costs per household increase with overall NI92 performance increases
- There does not appear be a trend between cost per tonne and overall NI192

11.1.6 Commercial Collections

A summary of existing research[104] identified that there are several factors that are likely to give rise to a schemes success, higher participation and material capture, these and other considerations are summarised below;

- Initial, targeted research and market assessment is essential when considering setting up a trade waste recycling scheme
- Contract reviews for trade ups should be investigated
- Flexibility in the frequency of collections and the range of materials for collection and recycling should be investigated
- Targeting different business types for specific materials
- Identification of markets to increase profitability

[103] WRAP 2007. Kerbside Collection: Indicative Costs and Performance.

[104] GLA: Best Practice Guidance, Trade Waste Recycling. Entec, 2005.

- Reliability of the service including availability of resources
- Financial arrangements for service delivery including income and pricing structure
- Development of pilot schemes
- Organizing promotional activities
- Monitoring of collection materials, participation and cost is essential to determine the operational efficiency of the scheme as well as providing feedback

This study indicates that participation rates range between 2% and 44%. The two lowest participation rates appear to be for boroughs offering only limited material collections i.e. glass, paper and cardboard.

Higher participation rates appear to be for boroughs offering a wider range of material collections. The boroughs with participation rates of between 24% and 25% appear to be for boroughs offering financial incentives for businesses to recycle and a wide range of materials. However the highest participation which is 44% is for a flat rate pricing structure. I.e. residual is the same price as recycling. It must be noted that this Borough has the lowest overall customer base and therefore we cannot rule out the impact that marketing and promotions will have on increasing participation.

12 Recommendations

12.1.1 Research Data

There is a lack of available and verifiable data, by housing type. Therefore specific research should be undertaken to identify the best types of collection system for specific housing types.

The following information would be beneficial:

- Composition data by housing type (not socio-economic groupings)
- Participation data by housing type, especially for flats
- Capture rate analysis by housing type
- Operational costs for overall household services by housing type and commercial services
- Tonnage data by Housing type
- Details on service provision, such as vehicle type, containers and general service delivery
- Waste composition analysis of schemes would help understand current capture rates and contamination monitoring and could also be used to increase the quality of dry recyclables collected, by targeting those households that are unsure of which items they are able to recycle.
- Cost data on collection systems including revenue and income sharing arrangement to determine the net cost of recycling.

12.1.2 Communications

Increasing the level of communications across the housing groups could include re-launching or rebranding recycling schemes to the whole borough, improving customer contact and service resolution responses rates. In addition it could also comprise of targeting lower performing areas through targeted door knocking. In developing communication campaigns there is a need to link research such as participation monitoring to run targeted campaigns.

12.1.3 Contamination

One issue that has an impact on the performance of municipal household and business recycling services offered by London boroughs is contamination. With a majority of boroughs collecting co-mingled material from either kerbside houses or flats using MRFs there is a need to identify the causes of contamination and the measures that can be reduced to eliminate them.

To reduce contamination, the following should be considered.

- Development of specific communication campaigns focussing on contamination and materials
- Training sessions for collection crews in the pilot areas so that they are able to understand why contamination is a problem and how this should be communicated to residents

12.1.4 Enforcement/Incentives

Compulsory recycling and active enforcement is a relatively new initiative and at present is limited in its use by boroughs, however there is some evidence to suggest that it have improved recycling performance.

As the pressure to recycle more waste increases, it is likely that more boroughs will explore compulsory recycling. However, for those boroughs who have implemented the policy, the emphasis has been very much on communicating with the public and using enforcement officers as a means of education on the ground. Enforcement and fixed penalty notices are very much a final option.

The alternative is to promote reward schemes which provide an opportunity to encourage more recycling by giving something back to people who put in the effort to waste less and recycle more things, more often. Reward schemes are popular and widely used by consumers, so it is a natural extension to see how they can be used to help the environment. Pilot projects should be investigated providing both incentives and enforcement.

12.1.5 Dry Recycling Collections Quick Wins

The following 'quick wins' have been summarised by property type

Doorstep Properties

- Ensure there is sufficient container capacity for collection systems, including the provision of single use sacks, box etc. In some cases additional materials have been added to collection systems without additional capacity which my displace other materials rather than increase the yield. I.e. it may be possible that heavy materials are left out of favour for lighter bulkier packaging materials.
- Not all boroughs provide a full suite of materials in their collection arrangements. Dependant on MRF arrangements there is still significant room for improved glass and card material capture. Currently two boroughs do not collect card and two do not collect glass where capacity allows the collection of textiles should be considered where than can be stored clean and dry and this is compatible with existing collection systems. These are already a common feature of kerbside sort collections in London.
- Increasing the level of communications across the housing groups this could include re-launching or rebranding a dry recycling scheme to the whole borough, improving customer contact and service resolution responses rates or addressing issues associated with contamination via better communication. Targeting lower performing areas through door knocking campaigns can increase awareness of recycling and services. Some boroughs are already undertaking this.

Near Entry Flats (Purpose Built Flats)

- Expanding the coverage of recycling services to PBFs to include those flats that do not current have near entry or door to door services. We have identified that several boroughs are undertaking or have already undertaken site planning projects to introduce services to more hard to reach locations
- Providing collection for a greater range of materials collected at flats, where space is available. Some boroughs have maintained consistency with kerbside systems, while others have not included bulkier items such as cardboard and plastic bottles at some flat sites. There is significant potential here to increase yield by increasing the range of recyclables be reviewing existing services, site locations and space.

- Undertake a review of current communal near entry collection arrangements in each Borough to ensure there is sufficient container capacity at communal bin stores, which is proportionate to the frequency of collection
- Determine the potential to expand services i.e. additional materials
- Address suitability of container location. Islington council carried a comprehensive planning process for near entry systems before new services were launched
- Find solutions to address ongoing problems such as vehicle access, contamination, security and vandalism. This includes viewing the location of sites, targeted and improved communications, improved security such as bin locks, noise abatement, improving the aesthetic of facilities so they are more welcoming to visit.
- Strengthen stakeholder involvement through engaging with housing associations, resident groups and interested parties in the planning or delivery stages of service
- Improve communications to residents to increase capture and reduce contamination
- The provision of reusable sacks to residents where near entry systems are in operation to help improve participation
- Where possible undertake conversion of existing chute systems and provide communication to ensure their correct use.

Flats Above Shops

- Potential to expand service to sixteen other boroughs. Expanding kerbside collections for FASs will increase city wide coverage by approx 36,000 households , this could be achieved by Making use of existing co-mingled collection schemes
- Where possible service to be consistent with other kerbside collections
- Where possible make use of single use sacks to avoid on and off street storage issues, pre and post collection
- Set workable collection time bands to increase the reliability of collections
- Provide dedicated communications to residents using leaflets, posters and signs
- Continue to provide local recycling banks, so that there is sufficient flexibility with collections, where space, capacity and restrictions on collections constrict service delivery
- Seek to combine collections with commercial waste/recycling collections to reduce cost and minimise traffic issues
- Provide ongoing communications to FASs via bag delivery

12.1.6 Organic Collections Quick Wins

The following ‘quick wins’ have been summarised by property type

Doorstep Properties

- There is significant potential to expand source segregated collections of food waste across the capitals DSPs, however this would need to be linked with a wider strategy to provide food treatment infrastructure and capacity to manage this waste stream
- Particular attention should be made to lessons learned when introducing or expanding food waste collection scheme, notably the WRAP 2009 food waste trials report which provides good background on;
    - Collection vehicles;

- Collection crews;
- Collection rounds;
- Reprocessors and quality of collected food waste;
- Containers and liners;
- Distribution (initial roll-out of collections); and
- Communicating with residents and promoting the service.

WRAP also offers guidance[105] on the introduction of food waste collections which provides essential advice on the provision of such services.

- Where participation rates and capture rates have reduced overtime boroughs should consider re-launching the scheme or providing a communication campaign in conjunction with a free caddy liner give away to help raise yields and the efficiency of the collection system. This can be repeated at a frequency best judge by the Borough, taking into account other communications, service changes and longer term strategies
- The provision of kitchen caddies where they are not currently provided may promote ease of use and increase collection performance at relatively little additional cost
- The collection of food waste with the use of split bodies, modified stillages or pods on vehicles enable the collection of other materials such as residual or dry recycling in a single pass. Where this is currently not practiced and vehicle access allows this option should be investigated further to potentially reduce collection costs. This will depend on the configuration of other waste services, current fleet and delivery points

12.1.7 Commercial Recycling Collections

The Following should be considered when establishing commercial waste collection services.

- Undertake targeted research when setting up a trade waste recycling scheme.
- Ensure contract flexibility in the range of materials for collection and recycling.
- Identify markets
- Review the materials to be collected targeting different sectors will yield different volumes of each material
- Ensure that sufficient staffing, vehicle, fleet capacity and containers are available to increase the reliability of the service
- Provide incentives for recycling trade wastes the charge for the collection of trade wastes could offset the cost of recycling
- Develop pilot schemes to assess service
- Ensure targeted promotions/ communications
- Create a focused customer service with sufficient support and communications to deal with requests and service complaints swiftly.
- Develop monitoring and feedback systems to ensure that the service can be improved

[105] WRAP. 2009 Food Waste Collection Guidance.

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Appendix 1

Definitions

Appendix 2

Methodology and data assumptions

Appendix 3

Questionnaire and responses

Appendix 4

Survey Response Review

Appendix 5

Lessons Learned Log (Communications)

Appendix 6

Workshop Notes

Appendix 7

Overview of London’s Performance

Appendix 8

Housing Profile

Appendix 9

Desktop Study

Appendix 10

Case Studies

Appendix 11

Commercial Waste Overview