



London Plan Waste Forecasts and Apportionments

Task 3 – Strategic Waste Data

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1.0 OVERVIEW

The Greater London Authority's responsibilities in respect of waste management include oversight of Waste Planning Authority provision of land for waste infrastructure. To this end, the London Plan establishes waste tonnage Apportionments for each borough, accounting for

- projected total waste arisings (including local authority collected waste, and commercial and industrial waste); and
- the apportionment methodology (determined by a range of criterion – for example availability of suitable land, and proximity to sustainable transport modes).

To support the current review of the London Plan the GLA has appointed consultancies SLR and LUC to provide support in respect of these elements. The GLA's requirements have been addressed through the following discrete tasks:

- Task 1 – GLA Arisings Model Critical Friend Review
- Task 2 – CDEW and Hazardous Waste Forecasts
- Task 3 – Strategic Waste Data
- Task 4 – Updating the Apportionment Methodology
- Task 5 – Apportionment Forecasts by Waste Stream

This paper sets out SLR and LUC findings in undertaking Task 3, which includes the following subtasks:

- an assessment of current waste imports to London, and exports to surrounding authorities (Task 3.1);
- projection estimates for future household and commercial and industrial waste tonnages generated by management route (Task 3.2); and
- review and commentary on data published via the London Waste Map (Task 3.3).

These aspects are expounded in sections 2, 3 and 4.

2.0 TASK 3.1 – IMPORT / EXPORT ANALYSIS

The statutory duty to cooperate (defined in the Localism Act 2011) requires the GLA to understand waste tonnage flows out of and in to Greater London. This quantitative understanding of waste exports and imports allows the GLA to work with surrounding waste planning authorities in planning for future waste management provision.

Estimates of waste movements within England can be derived from the Environment Agency's Waste Data Interrogator (WDI). The WDI is a searchable MS Access database including waste tonnage information recorded by waste facility operators under environmental permitting requirements.

The latest available version of the WDI released in October 2016 includes waste tonnage information for calendar year 2015. WDI data covers inputs to, and outputs from permitted facilities. Data which can be accessed includes tonnage, waste code, source point and destination. By extracting and analysing data for waste management facilities across England, it is possible to estimate levels of waste export from and import to London.

In presenting findings derived from the WDI, it must be emphasised that the accuracy of import/export data is contingent on accurate reporting of waste movements by facility operators. Provision of information on origin / destination of waste is not mandated by the EA. Across England as a whole, the WDI shows that for 4.9 Mt of inputs to permitted facilities in 2015, no point of origin is recorded. This amounts to 2.7% of the total 181 Mt of inputs to facilities in England recorded via the WDI. More locally, across London, the South East, and East of England, 563 kt of waste was accepted with no recorded point of origin. Furthermore, waste facility operators within London failed to report the destination of 307 kt of facility outputs.

While it is important to acknowledge these limitations, quantities for which origin/destination are unknown are relatively small when set in the context of total interregional waste flows. The WDI is widely used by waste planning authorities to characterise waste movements, and provides a valuable scale of London's waste exports and imports. Below, Table 2-1 to Table 2-5 summarise WDI-derived findings on waste tonnage flows in and out of the Capital.

Table 2-1 begins by providing a high level summary of estimates of London's exported and imported tonnages, differentiated by the type of receiving facility. In total exports amount to circa 11.4 Mt, while approximately 3.6 Mt of waste is imported.

Of the exported total, the WDI records 1.3 Mt as being managed outside the UK. The majority of this material is stated as being destined for 'recovery' (this term encompasses recycled material, but may potentially include energy from waste) or 'incineration'.

Table 2-1: Estimated Waste Exports and Imports Inferred using the Waste Data Interrogator, 2015 (kt)

	Exported from London	Imported to London	
Managed in UK	Transfer	750	1,156
	Reuse	55	0
	Recycling	615	1,255
	Anaerobic digestion	22	0
	Composting	55	25
	Mechanical biological treatment	0	0
	Other treatment ¹	830	447
	Landfill	5,356	452
	Other	1,609	223
	Incineration	785	72
	Subtotal managed in the UK	10,078	3,630
	Exported outside UK	Transfer	12
Recovery		597	-
Treatment		0	-
Incinerator		487	-
Landfill		0	-
Unknown		183	-
Subtotal exported outside UK		1,279	0
Total	11,357	3,630	

To further resolve London's waste exports and imports, findings presented in Table 2-1 are expanded by waste material type in Table 2-2 and Table 2-3. Table 2-2 shows London's waste exports by waste type and destination facility type, while Table 2-3 presents the same information for waste imported to London. Data included in these tables is based on a detailed assessment of substance oriented classification (SOC) codes recorded for all waste inputs to permitted facilities in England and Wales.

Export estimates in Table 2-2 indicate that in 2015, the waste type exported from London on the greatest scale was mineral waste (6.4 Mt exported), mixed waste being the next largest category (3.2 Mt exported). Estimated waste imports to London shown in Table 2-3 are likewise dominated by mixed waste (1.2 Mt) and mineral waste (1.5 Mt).

¹ For brevity a number of facility categories are combined under heading 'other treatment', including chemical, WEEE, and clinical waste treatment. For full details please refer to Table 2-7, page 11.

Table 2-2: Waste Exports from London by Summary Waste Type and Destination Facility, 2015 (kt)

		Summary waste types													
		Paper and cardboard wastes	Glass wastes	Plastic wastes	Wood wastes	Textile wastes	Rubber wastes	Waste containing PCBs	Metallic	Discarded equipment	Animal and vegetable	Mixed	Mineral	Other	Total
Exported from London and Managed in UK	Transfer	8	50	20	19	0	0	0	70	4	3	176	385	15	750
	Reuse	0	0	0	0	0	0	0	0	0	0	0	55	0	55
	Recycling	19	26	26	39	0	2	0	144	27	5	16	311	1	615
	Anaerobic digestion	0	0	0	0	0	0	0	0	0	22	0	0	0	22
	Composting	0	0	0	2	0	0	0	0	0	51	2	0	1	55
	MBT	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other treatment	0	79	6	39	0	2	0	1	7	54	148	400	93	830
	Landfill	0	25	2	11	0	0	0	0	1	1	1,564	3,751	1	5,356
	Other	0	0	0	0	0	0	0	45	0	10	0	1,542	11	1,609
Incineration	0	0	0	57	0	0	0	0	0	0	722	4	3	785	
Exported outside UK	Transfer	11	0	0	1	0	0	0	0	0	0	0	0	0	12
	Recovery	305	64	18	50	0	0	0	130	0	0	30	0	0	597
	Treatment	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Incinerator	1	0	0	0	0	0	0	0	0	0	486	0	0	487
	Landfill	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unknown	51	0	3	22	0	0	0	0	0	0	105	0	0	183
Total	395	243	74	240	1	4	0	391	40	146	3,248	6,450	125	11,357	

Table 2-3: Waste Imports to London by Summary Waste Type and Destination Facility, 2015 (kt)

		Summary waste types													
		Paper and cardboard wastes	Glass wastes	Plastic wastes	Wood wastes	Textile wastes	Rubber wastes	Waste containing PCBs	Metallic	Discarded equipment	Animal and vegetable	Mixed	Mineral	Other	Total
Imported to London from UK	Transfer	83	8	16	25	0	5	0	8	2	26	472	487	25	1,156
	Reuse	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Recycling	5	0	58	1	0	0	0	539	98	1	294	258	0	1,255
	Anaerobic digestion	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Composting	1	0	0	0	0	0	0	0	0	24	0	0	0	25
	Mechanical biological treatment	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Other treatment	0	0	0	0	0	0	0	1	2	5	72	330	37	447
	Landfill	0	0	0	0	0	0	0	0	0	0	250	190	11	452
	Other	0	0	0	0	0	0	0	5	11	0	0	207	0	223
	Incineration	0	0	0	0	0	0	0	0	0	0	72 ²	0	0	72
Total	88	8	74	26	0	5	0	554	112	57	1,160	1,473	73	3,630	

² For the specific case of inputs to incineration facilities in London, it has not been possible to derive waste types – however mixed waste is here assumed to be the dominant type.

For an estimated breakdown of the destinations of this exported waste by region and management method, please refer to

Table 2-4.

Table 2-4: Destinations of Waste Exported from London to the UK, 2015 (kt)

		Destination facility type										Total exported ¹	Fraction of total exported
		Transfer	Reuse	Recycling	Anaerobic digestion	Composting	Mechanical biological treatment	Other treatment	Landfill	Other	Incineration		
Destination region	East Midlands	25	0	7	0	0	0	80	19	0	26	156	2%
	East of England	292	54	238	21	22	0	239	2,879	1,140	92	4,976	49%
	North East	2	0	10	0	0	0	4	4	0	0	20	0%
	North West	0	0	10	0	0	0	1	9	0	1	23	0%
	South East	360	1	221	0	31	0	419	2,170	383	650	4,234	42%
	South West	3	0	11	1	2	0	32	1	0	0	50	0%
	West Midlands	16	0	27	0	0	0	33	11	85	1	174	2%
	Yorks & Humber	48	0	64	0	0	0	23	264	0	15	413	4%
	Wales, Scotland and Northern Ireland	3	0	28	0	0	0	0	0	0	1	33	0%
Total exported		750	55	615	22	55	0	830	5,356	1,609	785	10,078	100%
Fraction of total exported		7%	1%	6%	0%	1%	0%	8%	53%	16%	8%	100%	

Complementing this data on regional export destination, Table 2-5 shows destination facility types for waste originating in London, and managed at facilities in London. Please note that in order to avoid double counting, destination facility types set out in Table 2-5 exclude transfer stations (since much of the input to transfer stations in London will be transported on to treatment and disposal facilities also located in London).

Table 2-5: Destinations of Waste Originating in London and Managed in London, 2015

	Destination facility type										Total
	Reuse	Recycling	Anaerobic digestion	Composting	Mechanical biological treatment	Other treatment	Landfill	Other	Incineration		
Waste originating in London and managed in London (kt)	1	1,695	0	118	0	2,811	1,266	1,195	416	7,502	
Fraction of total	0.01%	23%	0%	2%	0%	37%	17%	16%	6%	100%	

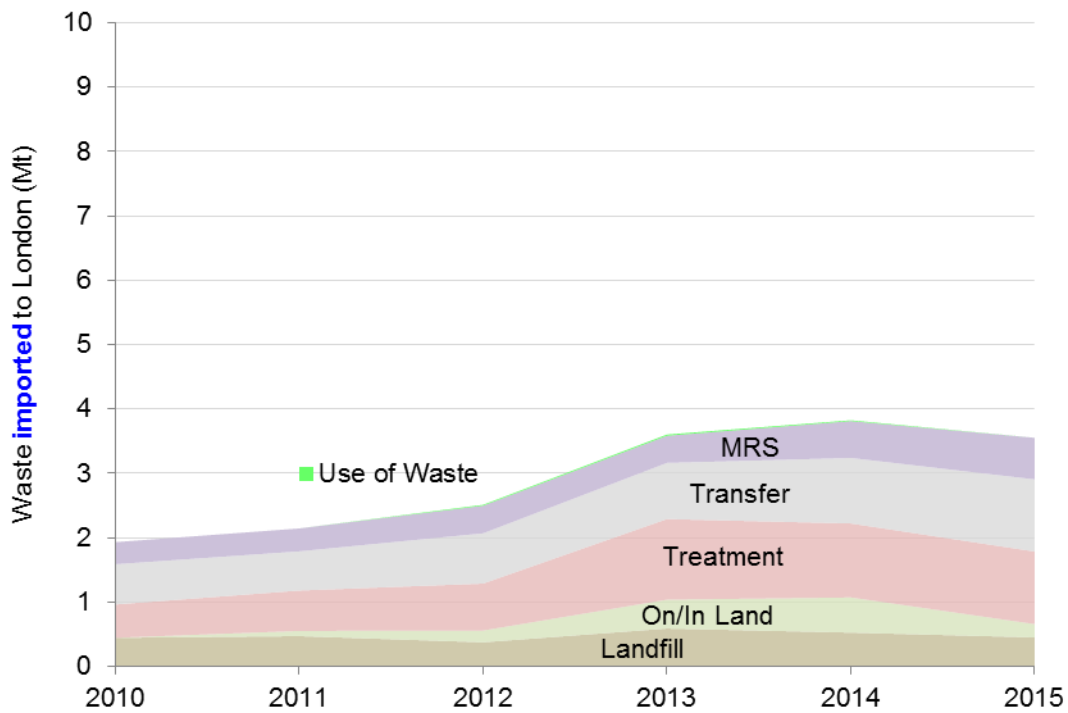
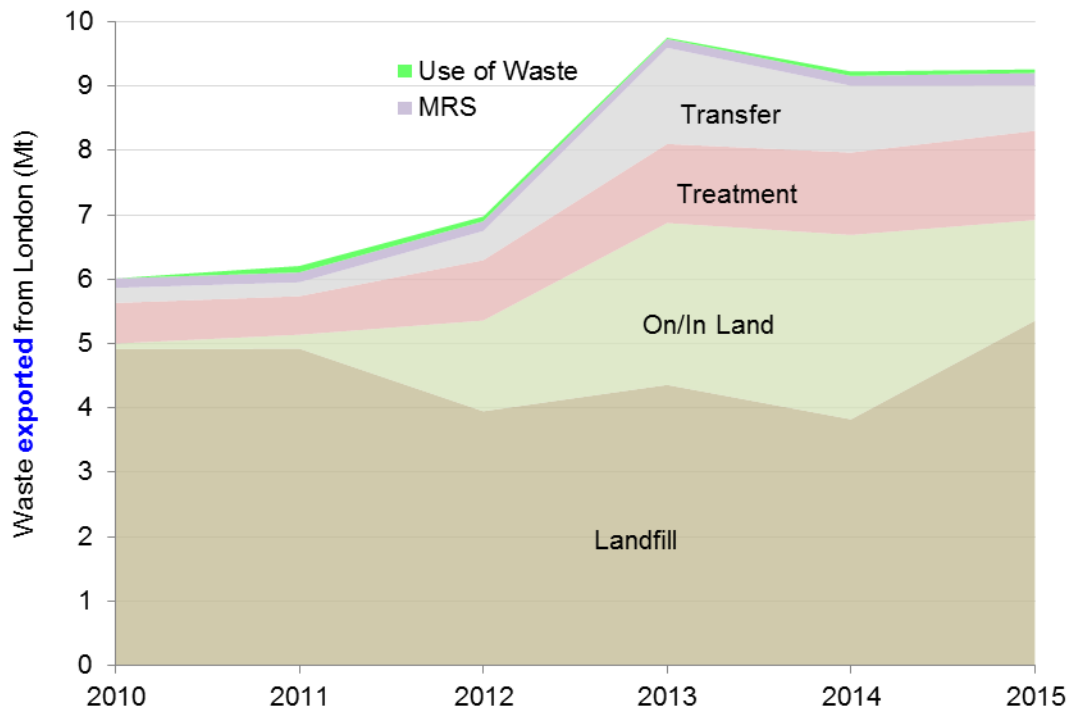
In addition to the analysis above, the GLA has requested that SLR resolves contributions to material exported from London by waste stream, including household/industrial/commercial waste, construction and demolition waste, and hazardous waste types. Through Further analysis of data extracted from the Waste Data Interrogator, Table 2-6 provides a breakdown of the waste exports from London by waste stream.

Table 2-6: Waste Exports from London by Material Category, 2015 (kt)

		Export destination			Total
		English regions	Devolved administrations	Outside UK	
Waste stream	Hhold/Ind/Com	3,449	12	1,207	4,668
	Inert/C+D	6,413	15	66	6,494
	Hazardous	183	6	6	194
Total		10,045	33	1,279	11,357

Further to characterising London's current (2015) waste imports and exports, through compilation of data published via previous versions of the WDI, it is possible to estimate trends. Below, Figure 2-1 illustrates the Capital's estimated waste import/exports over the past six years. Here, exports from London (lower chart) are estimated on the basis of the origin of waste received at facilities outside London. Imports to London (lower chart) are then indicated by the recorded origin of waste received at facilities inside London.

Figure 2-1: Estimate Historical Waste Exports/Imports to/from London³



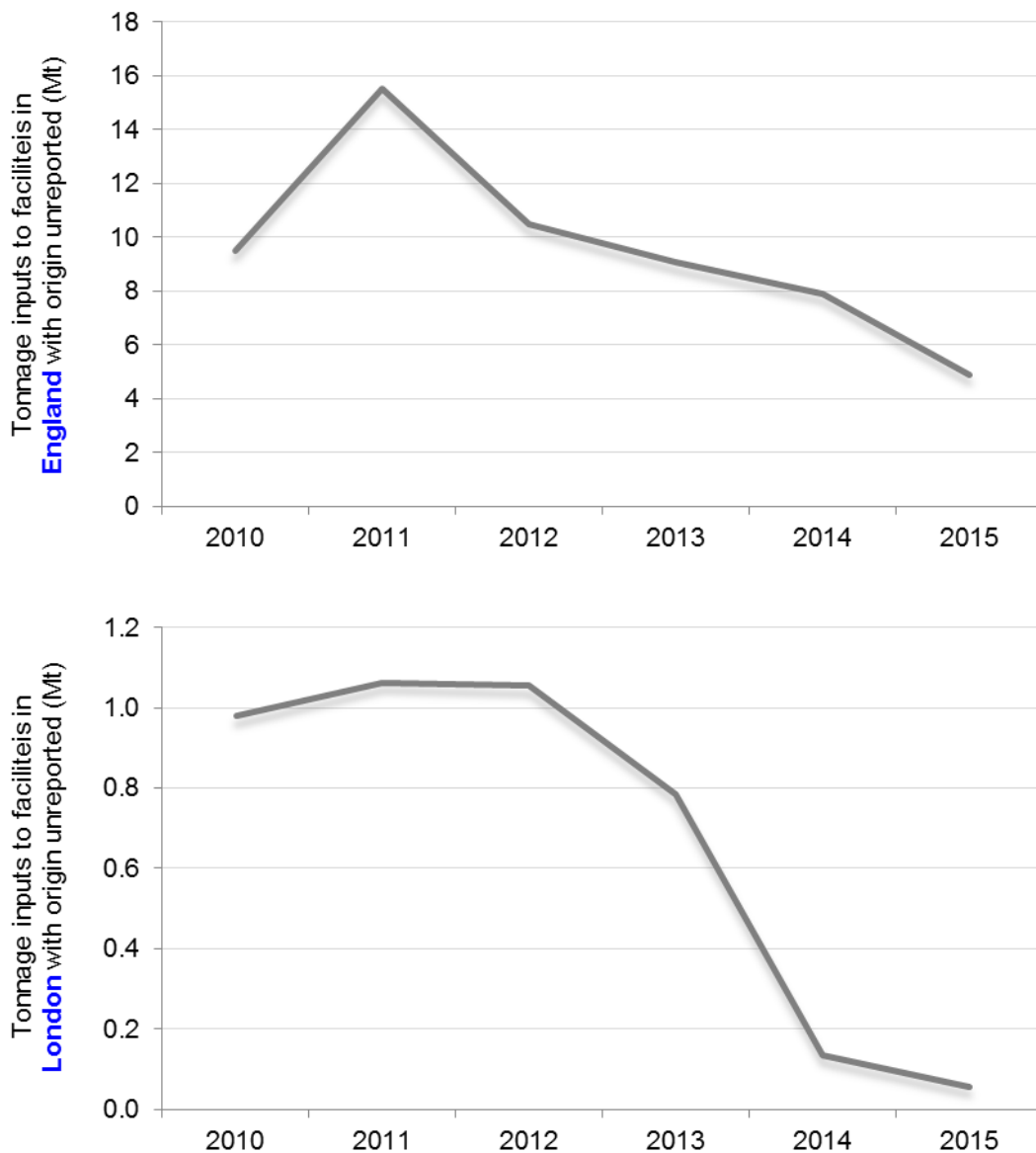
³ Please note that here MRS is an abbreviation of metals recycling site. 'Use of waste' includes facilities permitted by as 'use of waste for reclamation', 'use of waste in construction', 'use of waste to manufacture timber').

This analysis of historical WDI tonnages indicates an increase of circa 3.7 Mt in waste tonnages exported from London between 2010 and 2013. Over the same period, findings also suggest an increase of circa 1.9 Mt in exports from London.

As noted above, findings on waste movements derived from the WDI are contingent on accurate coding of geographical origin and destination by waste operators. To explore this issue further, Figure 2-2 illustrates historical waste tonnages for which no point of origin has been recorded by operators.

The upper chart in Figure 2-2 shows the total tonnage in England with no recorded origin, while the lower chart shows the tonnage accepted in London having no origin details. Notably, for both England, and London specifically, these historical time series indicate a reduction in the received waste tonnage for which the point of origin is unknown. It therefore appears that waste facility operators are becoming increasingly diligent in recording information on origin.

Figure 2-2: Facility Inputs Reported with No Record of Geographical Origin (Upper Chart – England, Lower Chart – London)



Given this improving geographical coding, trends in waste exports and imports indicated in Figure 2-1 should be interpreted with caution. Apparent increases in exports or imports may, at least in part, be due to improvement in operator's reporting practices.

Further details of the methodology used in calculating the export / import tonnages included in the tables above are as follows:

- Data presented in Table 2-1 to Table 2-6 relies on details of the geographical origin of waste inputs reported by operators to the Environment Agency. As noted above, these details are omitted in some cases, such that exports / imports are not captured in their totality.
- Inputs to incineration facilities are not recorded in the WDI. As such, tonnages to incineration are instead inferred from the fate of facility outputs recorded by facility operators.
- The WDI includes data for England only. Exports to Wales, Scotland and Northern Ireland are therefore estimated on the basis of reported destinations of outputs from waste facilities in London.
- Facility types stated for waste managed in the UK summarise the more detailed categorisation used by the Environment Agency. Please see Table 2-7 overleaf for an overview of the mapping between EA categories and the summary types listed. Waste recorded as received at a 'transfer' facility, may ultimately be destined for recycling, treatment, energy recovery or landfill.
- Estimated tonnages in Table 2-1 'Exported outside UK' specifically refer to material exported direct from London to non-UK destinations. WDI data does not allow estimation of waste tonnages exported outside the UK *indirectly* (for example via a waste management facility in Kent). As such, the inferred total of 1.3 Mt exported outside the UK from London is potentially and under estimate.
- The WDI only captures data on waste flows via facilities operating under an Environmental Permit. Waste managed at sites exempt from permitting requirements is not included in the above totals.

Table 2-7: Allocation of EA Facility Categories to Summary Types

Environment Agency detailed facility category	Summary facility type
CA Site	
Clinical Waste Transfer	
Haz Waste Transfer	Transfer
Inert Waste Transfer	
Non-Haz Waste Transfer	
Non-Haz Waste Transfer / Treatment	
Construction	Reuse
Reclamation	
Car Breaker	
Metal Recycling	Recycling
Material Recycling Facility	
Timber Manufacturing	
Anaerobic Digestion	Anaerobic digestion
Composting	Composting
Mechanical Biological Treatment	Mechanical biological treatment
Biological Treatment	
Chemical Treatment	
Haz Waste Transfer / Treatment	
Inert Waste Transfer / Treatment	Other treatment
Physical Treatment	
Physical-Chemical Treatment	
WEEE treatment facility	
Clinical Waste Transfer / Treatment	
Inert LF	
Non Haz (SNRHW) LF	
Non Hazardous LF	Landfill
Restricted LF	
Hazardous Merchant LF	
Hazardous Restricted LF	
Vehicle Depollution Facility	
Deposit of waste to land (recovery)	Other
Lagoon	
Deep Injection	

3.0 TASK 3.2 – INDICATIVE PROJECTIONS BY MANAGEMENT ROUTE

Projections presented in the Task 1 report focus on the forecasted total arising of household waste, and commercial and industrial waste (C&IW). This approach allows for calculation of Apportionments, which are derived from forecasted overall generation of these waste streams.

In planning future waste infrastructure it is also important to understand what types of waste management infrastructure may be required in future. To this end, this section presents illustrative scenarios for generation of household waste and C&IW by management route, including recycling, residual waste treatment and landfill.

3.1 Household Waste Management Routes

In estimating household waste tonnages by management route, critical assumptions are the future level of separate materials for recycling, and diversion of residual waste from landfill. In these respects, London's municipal waste management strategy 2011⁴ sets the following targets:

- the combined recycling/composting rate must reach 45% by 2015, rising to 50% in 2020, and 60% in 2031; and
- energy recovery is the preferred option for remaining residual waste, with 'about' 40% of London's municipal waste to be managed by this route by 2031.

It is understood that in setting these targets, the term 'municipal waste' was used to apply to what is has latterly been defined by Defra as 'local authority collected waste' (LACW). In practice, recycling rates are currently relatively low for commercial waste collected by local authorities. As such, achievement of targets set for LACW implies that required recycling rates must be met or exceeded for the specific case of household waste. While stipulated for LACW in totality, for modelling purposes these targets are therefore assumed to also be achieved for the case of household waste.

Figure 3-1 sets London's recycling targets in the context of historical performance data published by Defra⁵. Historical household and municipal recycling rates (grey lines) appear to have plateaued from 2011/12 onwards – and in fact data for 2014/15 and 2015/16 indicates a marginal reduction in recycling rates. In 2015/16, Defra data indicates that London recycled 32.0% of household waste, and 29.6% of municipal waste.

Set against this historical data in Figure 3-1 are the strategy 2011 recycling targets (green circles). Notably, performance in 2015/16 fell short of the 2015 target for 45% recycling. Furthermore, achievement of the 2020 target for 50% recycling would require a sharp break with the historical trend (red dotted line).

While achievement of 50% recycling by 2020 may be highly challenging, it is assumed that the GLA remains committed the long term objective of achieving a 60% recycling rate by 2031. For modelling purposes a linear trajectory is assumed from the current recycling rate to 60% in 2031 (in practice the trajectory taken will depend on the timing of investment in new recycling services, and will deviate from this line).

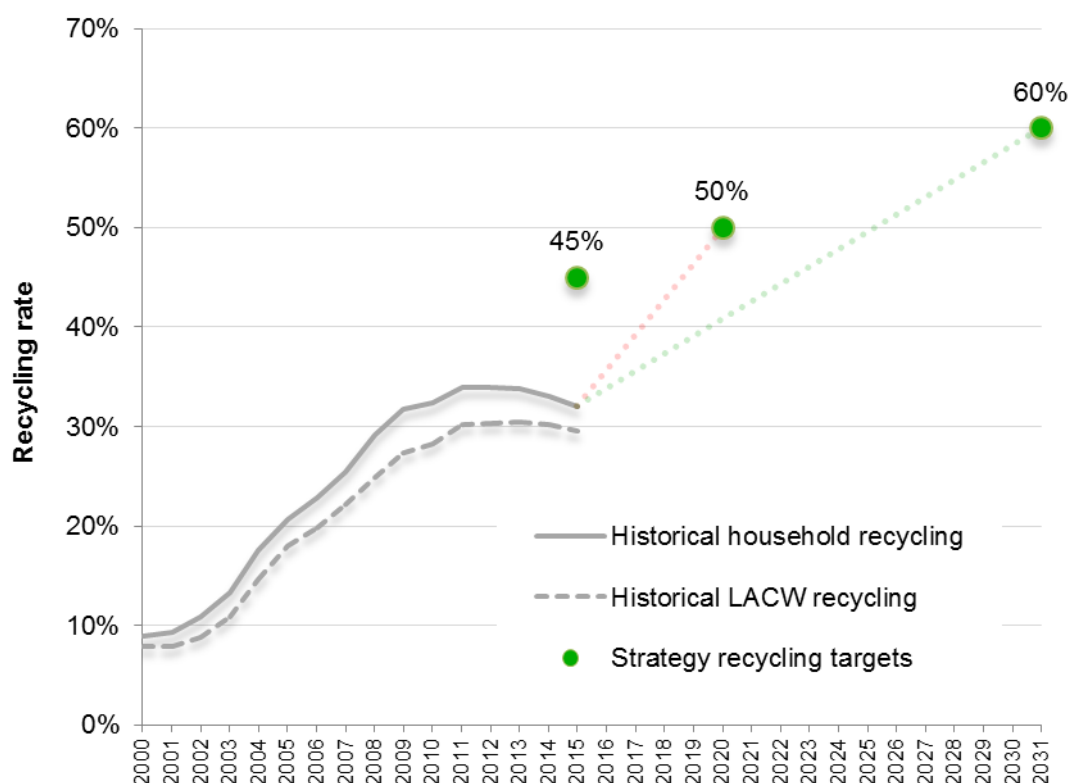
⁴ https://www.london.gov.uk/sites/default/files/municipal_waste_final.pdf

⁵ <https://www.gov.uk/government/statistical-data-sets/env18-local-authority-collected-waste-annual-results-tables>

In practice some boroughs may fall short of the target, while others exceed it. However since these borough differences cannot be meaningfully projected, as a simplifying assumption, recycling performance of all boroughs is assumed to converge at the 60% target by 2031.

Further to the above LACW specific targets, the existing London Plan aims to achieve zero biodegradable waste direct to landfill by 2026. To achieve this target, all residual waste remaining after recycling is assumed to be treated by 2026.

Figure 3-1: Historical Recycling Rate and London’s Waste Strategy 2011 Targets



Household waste tonnages by waste management route projected on this basis are illustrated in Figure 3-2 to Figure 3-5. Focussing on London in totality, projected household waste tonnages by principal management route are shown overleaf in Figure 3-2, while management route proportions are illustrated in Figure 3-3. For a tabulation of tonnage data values illustrated in these Figures for key target years, please refer to Appendix A.

For a summary of borough level household waste management route tonnages for 2015/16, and 2031, please see Figure 3-4. Corresponding borough management route proportions are then illustrated in Figure 3-5.

It should be noted that in modelling future recycling performance, recycling targets are assumed to be achieved via segregation of materials at source. Depending on the adopted definition of recycling, this could potentially also include contributions from residual treatment, including incinerator bottom ash. If an allowance is assumed for contributions to recycling from residual treatment, the requirement for source segregation would be reduced.

Figure 3-2: Projected Household Waste Tonnes by Management Route – London Totals

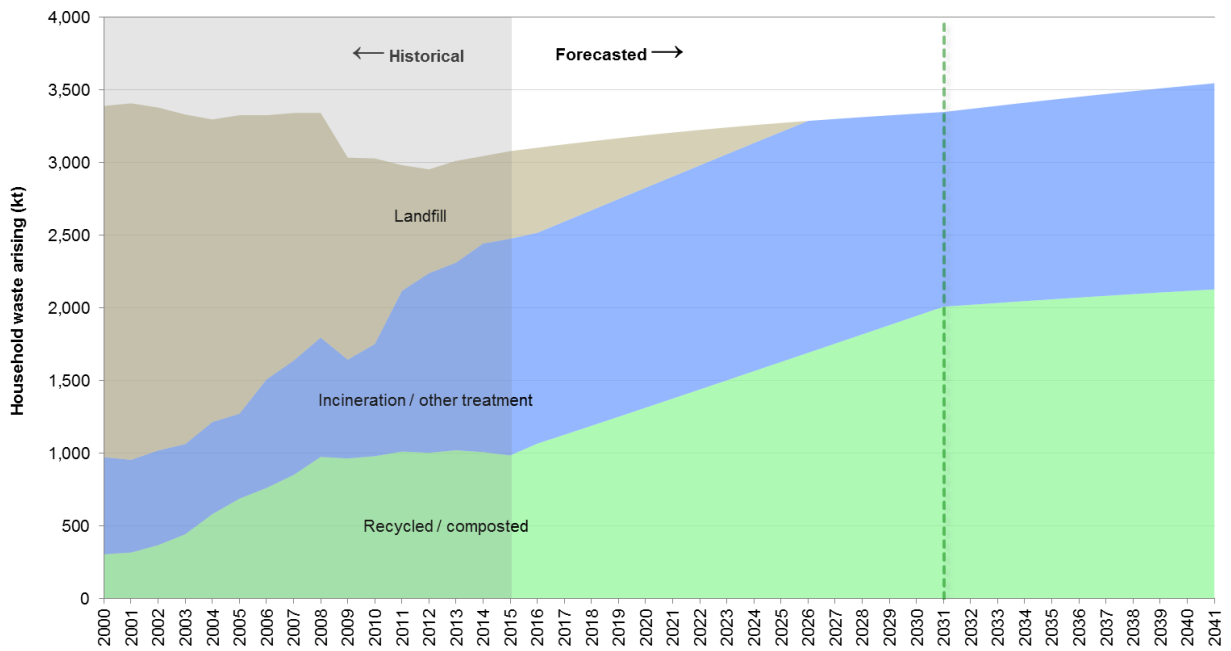


Figure 3-3: Projected Household Waste Management Route Proportions – London Totals

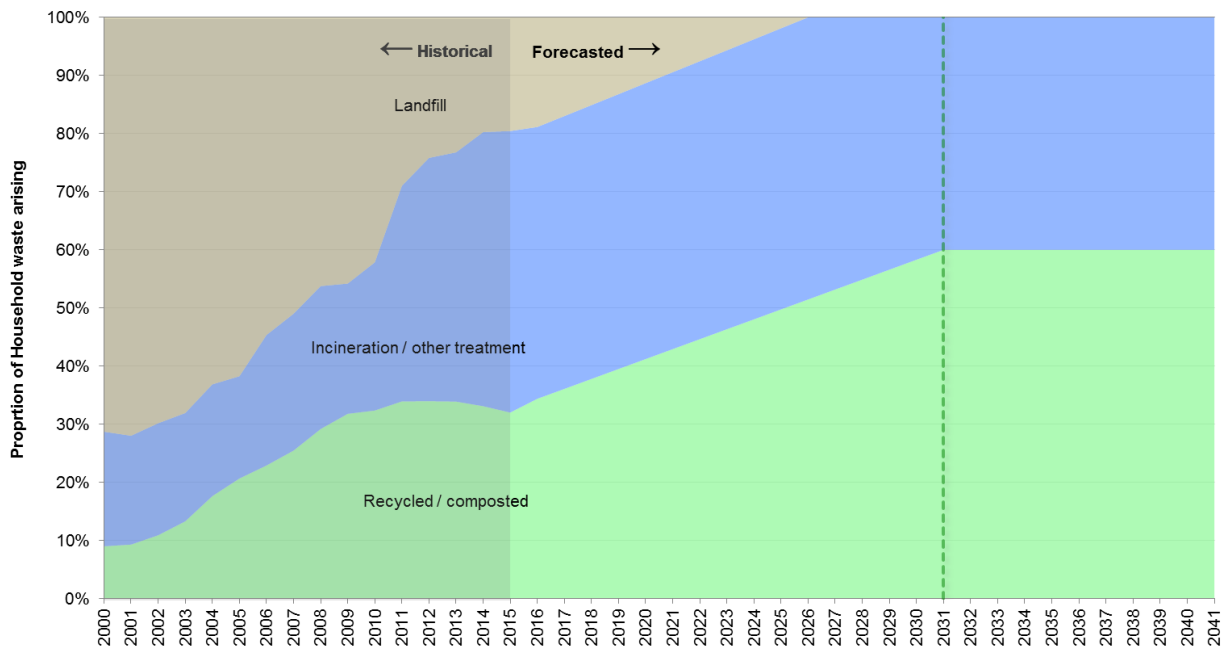


Figure 3-4: Projected Borough Level Household Waste Tonnages by Management Route

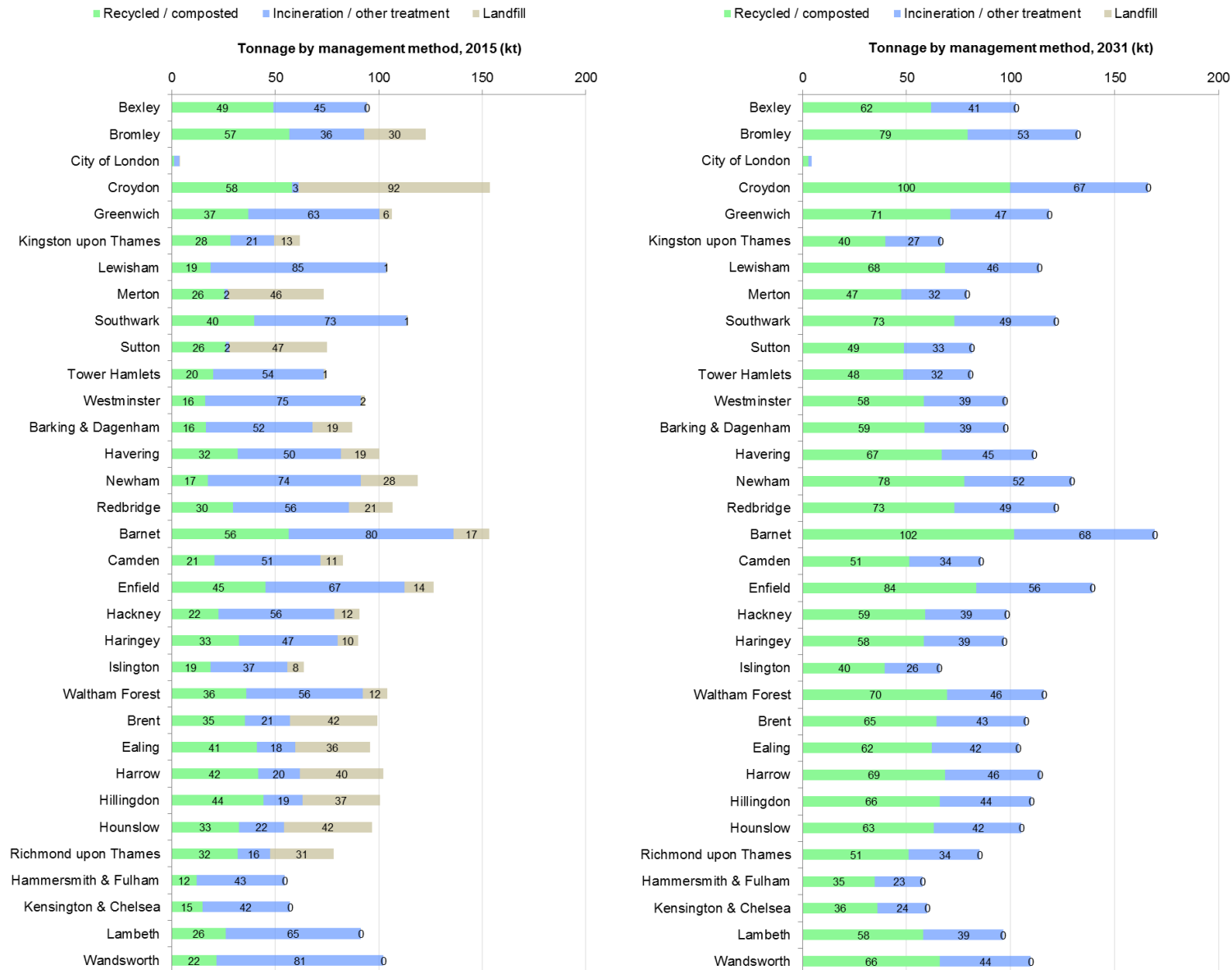
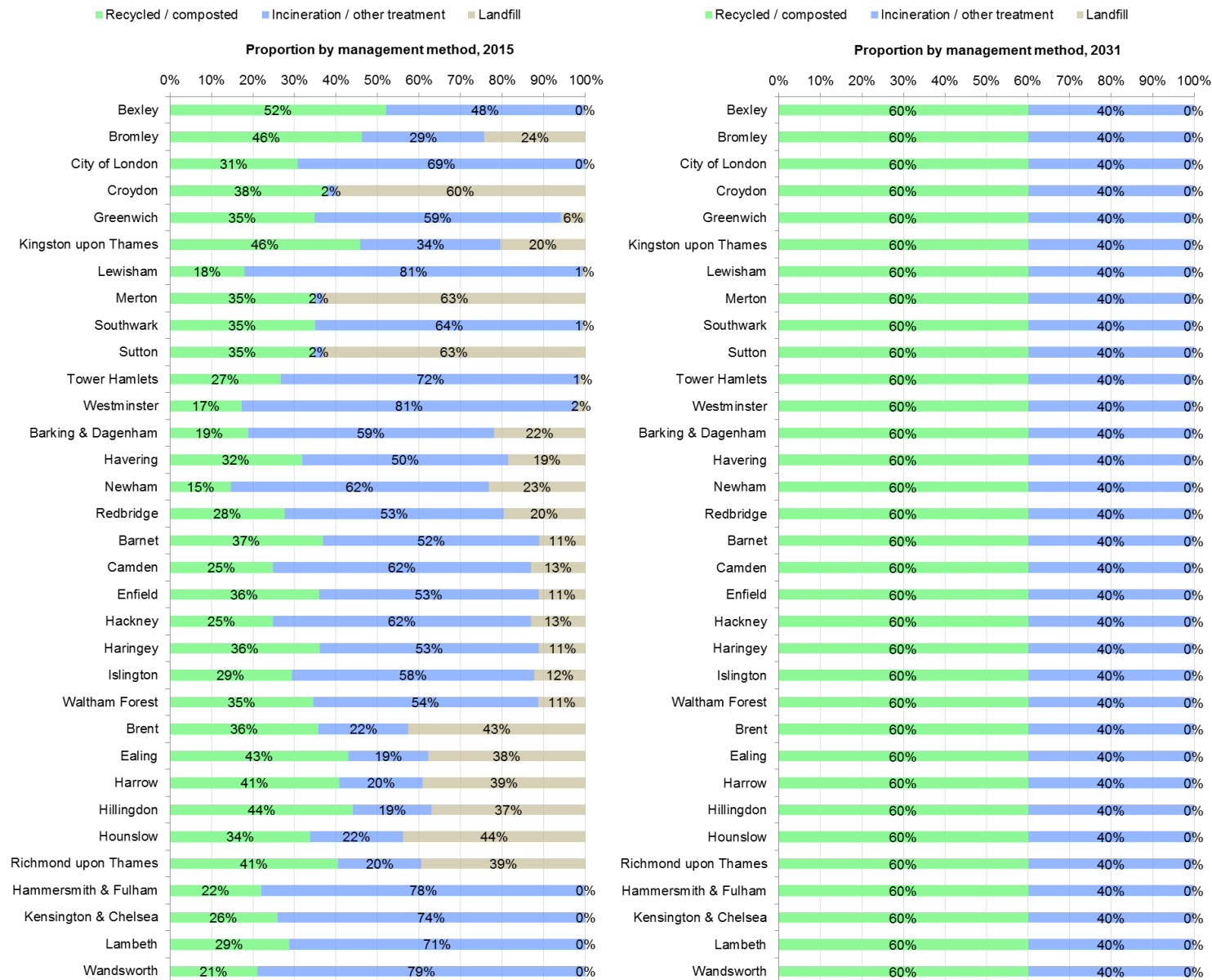


Figure 3-5: Projected Household Waste Management Route Proportions



3.2 Commercial and Industrial Waste Management Routes

Following the approach adopted for household waste, in projecting indicative management routes for C&IW, the following targets set for this waste stream in the business waste strategy⁶ and existing London Plan are assumed to be achieved:

- commercial and industrial waste recycling is assumed to increase to meet the business strategy target of 70% by 2031;
- the existing Waste Plan policy of zero waste to landfill by 2026 is applied; and
- further to recycling and composting, additional required landfill diversion is assumed to be achieved by incineration and other forms of residual waste treatment.

Projected total London C&IW tonnages predicted on this basis by primary management route are illustrated overleaf in Figure 3-6. Proportions of London's waste allocated to each route then illustrated below in Figure 3-7. Please refer to Appendix A for a tabular summary of data shown in these charts.

Further to these London totals, borough level estimated C&IW tonnages by management route are summarised in Figure 3-8. Corresponding borough management route proportions are then given in Figure 3-9.

In estimating waste management route allocations for C&IW, particular consideration should be given to current waste management route proportions. There are two alternative starting points for London's management route apportionments, dependent on interpretation of the findings of Defra's 2009 C&IW survey. To illustrate this point, Defra's findings for London's management of C&IW tonnages are summarised below in Table 3-1. Of London's total C&IW arising, 52% has a recorded route of recycling / composting, consistent with the value quoted in the business waste strategy for London⁷. However, notably 891 kt has a management route recorded as unknown / transfer. If this unknown/transfer category is excluded from the C&IW total in calculating management route proportions, the recycling/composting fraction increases to 64%. Conservatively, management route proportions calculated in the updated model and presented below assume the lower baseline recycling rate.

Table 3-1: Summary of Defra 2009 Survey Management Route Tonnages for London

Summary management route	Total London tonnage, 2009 (kt)	Proportion of total	Proportion of total, excluding unknown / transfer
Recycled / composted	2,357	52%	64%
Incineration / other treatment	495	11%	13%
Landfill / land recovery	830	18%	23%
Unknown / transfer	891	19%	-
Total	4,574	100%	100%

⁶ <https://www.london.gov.uk/file/6226/download?token=6EXMhldX>

⁷ Making Business Sense of Waste – the Mayor's Business Waste Strategy for London, November 2011, page 13.

Figure 3-6: Projected C&IW Tonnages by Management Route – London Totals

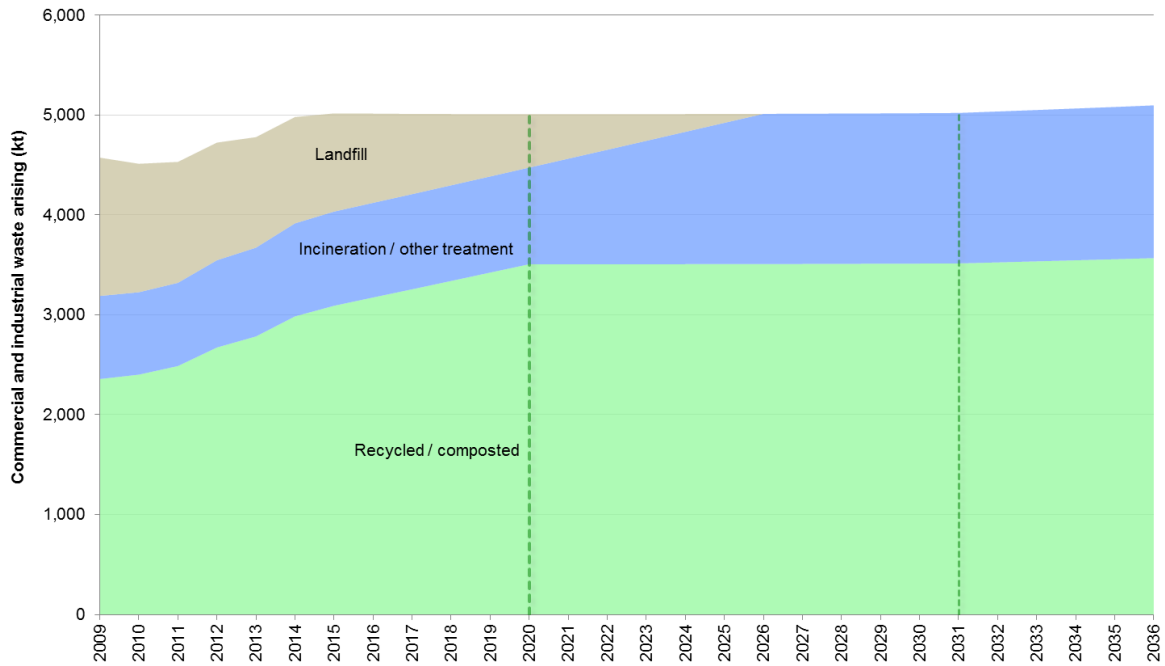


Figure 3-7: Projected C&IW Management Route Proportions – London Totals

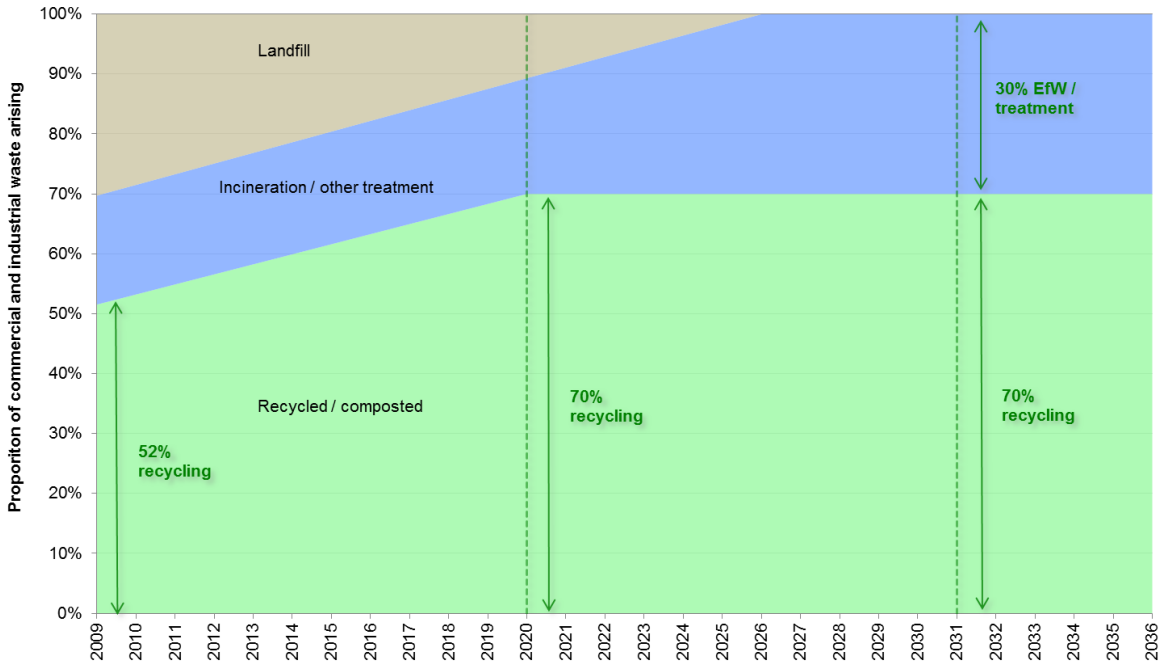


Figure 3-8: Projected Borough Level C&IW Tonnages by Management Route

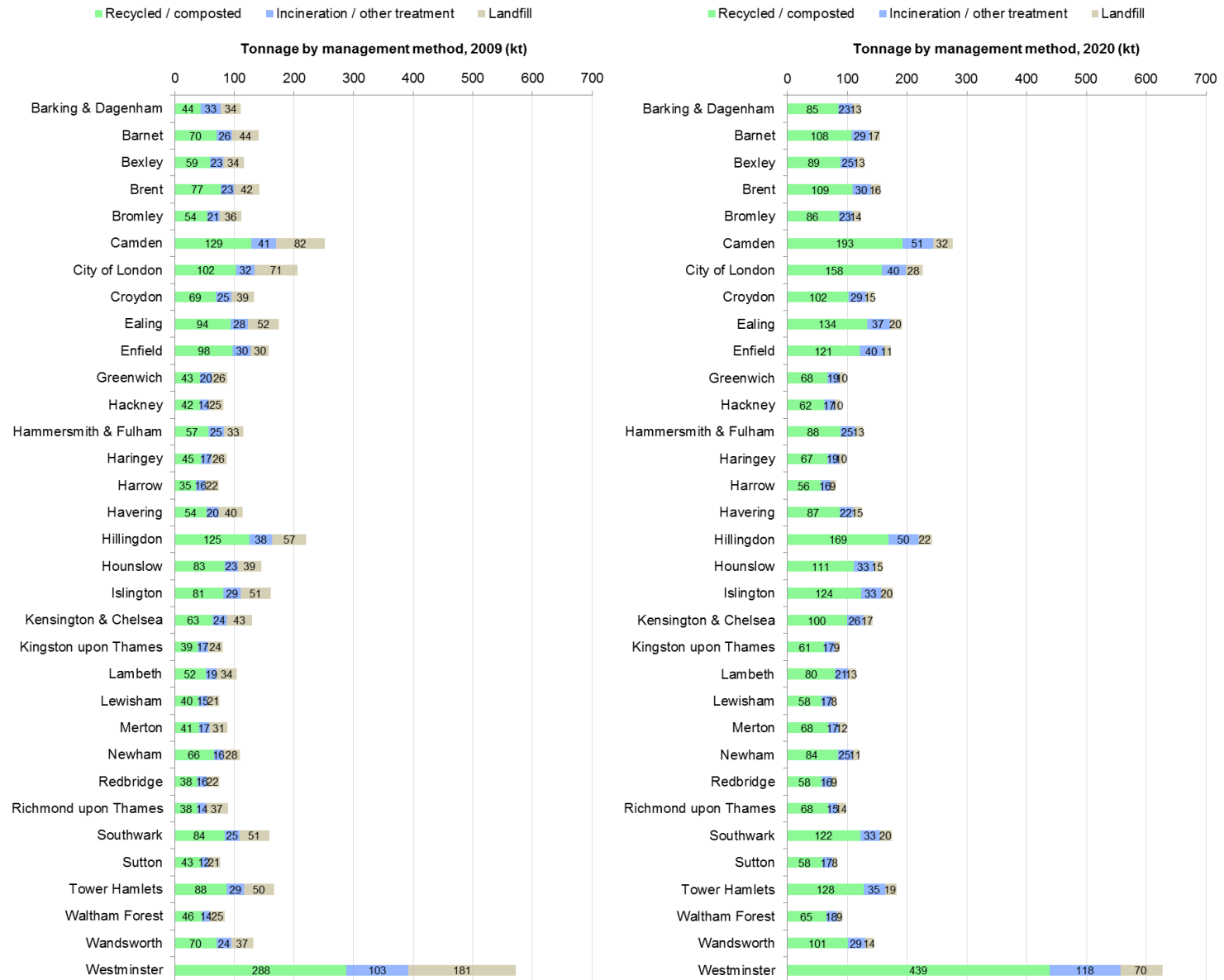
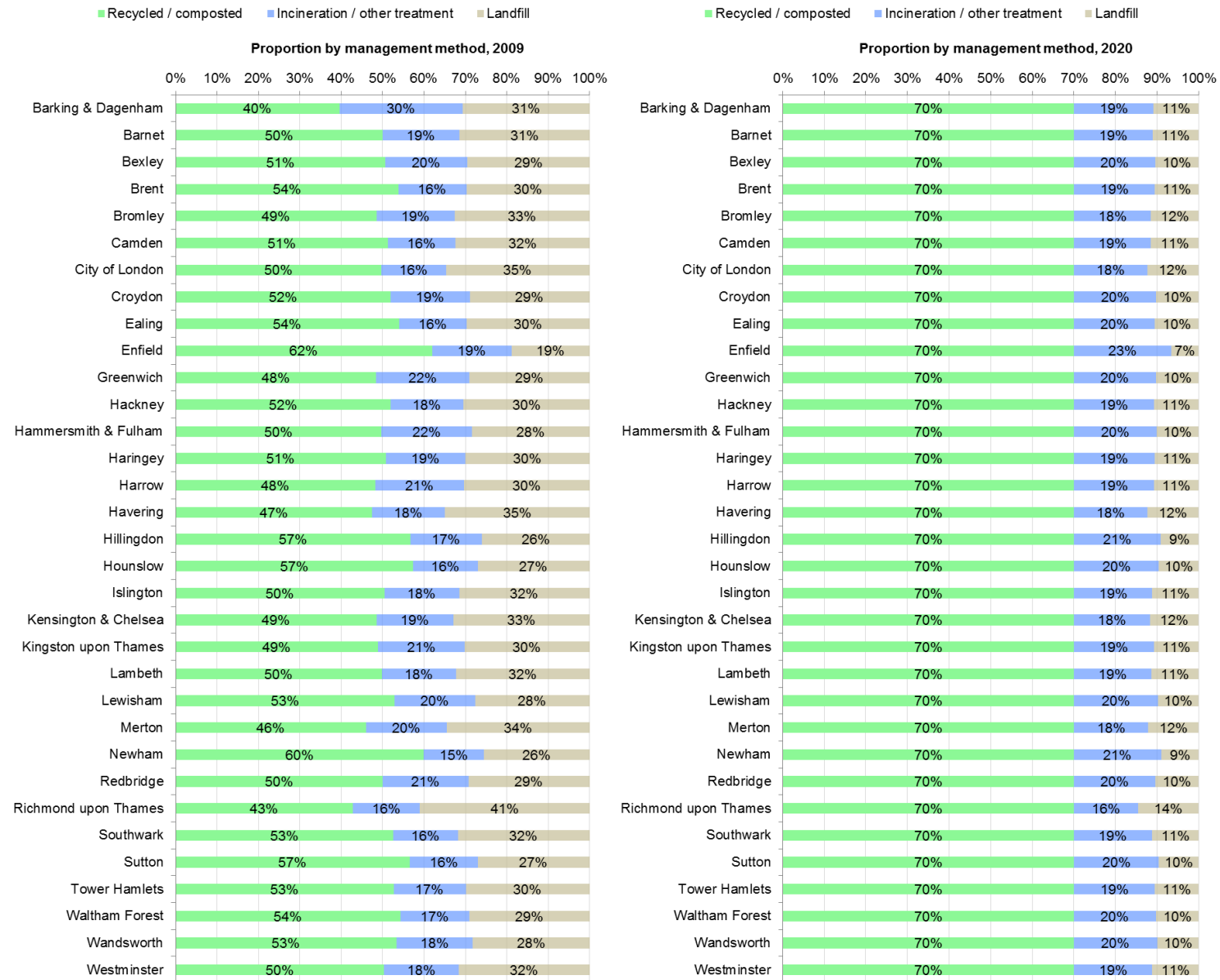


Figure 3-9: Projected C&IW Management Route Proportions



Findings presented above focus on the implications of targets defined in the existing GLA waste strategy 2011⁸. Further to these targets for LACW and C&IW, the Mayor's ambition is now to achieve a combined municipal waste recycling rate of 65% by 2030.

Consistent with European legislation, in setting this target, the term 'municipal waste' is defined broadly to include household waste, as well as similar commercial and industrial waste. In supporting the GLA in developing its in-house waste strategy model, SLR has modelled municipal waste recycling performance excluding estimated non-municipal fractions (largely industrial process wastes).

Model findings indicate that if existing strategy 2011 targets referenced above (60% recycling of LACW, and 70% recycling of C&IW) are met, the Mayor's 65% target for municipal waste is also likely to be achieved.

⁸ https://www.london.gov.uk/sites/default/files/municipal_waste_final.pdf

4.0 TASK 3.3 – REFRESHING AND AUGMENTING THE LONDON WASTE MAP

Working with the Environment Agency, the GLA has compiled a list of existing waste facilities in London, provided to SLR and LUC in the file 'london_waste_sites_20170314.csv' (herein referred to as the 'GLA sites list'). This information is summarised graphically and made available publically via the London Waste Map⁹. Furthermore, this GLA sites list is also required for the calculation of London's waste apportionment, since existing apportionment criteria include consideration of each borough's existing waste capacity.

As part of Task 3, SLR has undertaken a review of the GLA sites list, objectives being to

- test the integrity of the list; and
- identify those facilities considered to contribute towards apportionment requirements.

Further to SLR's review, LUC has also assessed the dataset from a spatial perspective.

4.1 SLR Review

4.1.1 GLA Sites List Integrity Check

To confirm that all facilities currently operating under an environmental permit are included in the GLA sites list, SLR has validated the list against facility details obtained from the Waste Data Interrogator (WDI):

- Extraction of WDI data on all London waste facilities indicates that 345 sites operated under an environmental permit in 2015.
- SLR has confirmed that of these WDI sites, 344 are included in the GLA sites list. One facility which appears to be excluded from the list is a composting facility operated by West London Composting Limited in Hillingdon (under permit number NP3034WL, with a throughput of 11,838 tonnes in 2015.
- For the 344 sites matched against the WDI dataset, SLR has compared the 2015 annual tonnage throughput reported in the GLA site list against that derived from the WDI. For 330 of the matched sites, annual throughputs are identical to within a tolerance of +/- one tonne (it appears that GLA entries are rounded up or down to the nearest tonne in some cases).

In total, the GLA sites list includes 475 unique waste facilities:

- This total excludes facility GLA_374, which appears to be a duplicate of GLA_263.
- The GLA list includes three separate entries for Veolia's Greenwich Integrated Waste Management Facility (GLA_97, GLA_443, and GLA_479) we understand that these entries are separate operations, though they appear to fall under a single environmental permit number.

Of the total 475 sites, 346 entries have been successfully cross referenced against the WDI, and are therefore understood to operate under an environmental permit. The GLA site list then includes a further 129 sites which are not captured by the WDI:

⁹ <https://maps.london.gov.uk/webmaps/waste/>

- 47 of these facilities include the word ‘identified’ within the license number field, and have no stated annual throughput. It is understood that these list entries are sites cited in local plans as suitable for waste meeting borough apportionment requirements.
- Five of the remaining sites are incineration / combustion facilities (being regulated under the Industrial Emissions Directive, these sites are not included in the WDI dataset, which is limited to facilities operating under an environmental permit).
- 59 of the sites have no reported inputs in 2015, and are thus not included in the WDI dataset (it is not clear whether these facilities are closed or mothballed). We note that the GLA sites focusses on the three year average input, and therefore includes sites which were active in 2013 and 2014, but have not subsequently received waste.
- Eight facilities are described as mobile plant for solid treatment of landspreading.
- Six facilities which appear to be operating under exemptions from environmental permitting requirements.
- The four remaining sites included in the GLA sites list, but not included in the WDI dataset are
 - Veolia’s South Integrated Waste Management Facility – it is unclear why this site is not referenced in the WDI;
 - A transfer station operated by Hunt Skips in Edmonton;
 - SUEZ’s Arkwright in-vessel composting facility – we understand that this is located in Derbyshire; and
 - An IBA facility operated by Ballast Phoenix at Raynham.

As detailed in the preceding Task 2 report (Construction, Demolition & Excavation Waste and Hazardous Waste Forecasts, May 2017) the Environment Agency has provided SLR with a list of exemptions from waste management licence requirements. Within this list, SLR has identified circa 400 exemptions in London relevant to the management of construction, demolition and excavation wastes. While these exemptions may be considered relevant to the London Waste Map, this dataset has the following limitations:

- Since the process of securing an exemption is not onerous, a significant proportion of exemptions may not ultimately be exploited.
- No record is kept of tonnages managed via exemptions. While exemptions stipulate permitted upper tonnage limits by waste code, in practice waste tonnages received are likely to often be substantially lower than these limits. Any attempt at attributing capacity to exempt facilities is therefore speculative.

Further to the above comments, SLR has undertaken a more detailed site-by-site review of the GLA sites list. Given the length of the GLA sites list (475 unique facilities) this more in-depth review is not included in this report. Instead, SLR has provided a markup of the original GLA sites list, identifying proposed modifications. Provided in file ‘170509-1222 416-01183-00008 Task 3-3 - london_waste_sites_20170314 + SLR comments.xlsx’, this markup focusses on cases where site data may require modification, including facility type, and facility capacity.

For each relevant entry on the GLA sites list, SLR has linked waste tonnage inputs by type (household/ industrial/commercial, inert, and hazardous) sourced from the Waste Data Interrogator 2015. On the basis of this data, combined with SLR’s in-house knowledge of

specific sites, SLR has identified cases where the GLA may wish to reconsider the classification of facilities in field 'site_broad_group'. Most notably, Waste Data Interrogator records indicate that a significant proportion of facilities classified as transferring household and commercial waste in fact predominantly process inert waste.

4.1.2 Facility Contributions to Apportionment Requirements

The existing London Plan sets an aspiration to achieve 'net self-sufficiency for household and commercial waste by 2026'¹⁰. To achieve this goal, sites must be identified within London to deal with the totality of waste that is apportioned to boroughs. Further to the above test of the completeness of the GLA sites list, the GLA has requested SLR to opine on the potential contribution of listed facilities to the self-sufficiency target.

Within the existing London Plan, waste is deemed to be managed in London (and therefore contribute to the self-sufficiency target) if it¹⁰

- is used in London for energy recovery;
- relates to materials sorted or bulked in London facilities for reuse, reprocessing or recycling;
- is material reused, recycled or reprocessed in London; or
- is a 'biomass fuel' as defined in the Renewable Obligation Order.

To assist the GLA in quantifying capacity relevant to the self-sufficiency target, in reviewing the GLA sites list, SLR has identified facilities potentially contributing to these defined waste management routes.

The GLA sites list includes field 'site_broad_group' identifying the following high level facility types:

- materials recycling / sorting;
- organic treatment;
- thermal treatment;
- waste transfer (household & commercial);
- household reuse and recycling centres;
- fuel preparation, MBT;
- metals and Vehicle Recycling;
- other; and
- disposal.

As noted above, SLR has reviewed facility classifications attributed in field 'site_broad_group', and put forward suggested modifications. Drawing on the proposed modified version of this field, SLR has then estimated capacity relevant to London's self-sufficiency target – for a summary of findings, please refer to Table 4-1 overleaf. For each facility category, Table 4-1 details

- the total annual tonnage throughput (based on the most recent reported annual tonnage throughputs for each facility);
- the proportion of capacity estimated to contribute to self-sufficiency (in line with the above definition);
- the consequent estimated tonnage contribution to self-sufficiency; and
- SLR comments on the interpretation of data in each case.

¹⁰ https://www.london.gov.uk/sites/default/files/the_london_plan_2016_jan_2017_fix.pdf (please see para. 5.67, p. 206, and para. 5.79, p. 212).

Table 4-1: Summary of GLA Sites List Capacity by Facility Category

GLA site_broad_group	Total annual throughput (ktpa)	Indicative proportional contribution to self-sufficiency	Indicative self-sufficiency tonnage contribution (ktpa)	Comments
Materials Recycling / Sorting	980	100%	980	Category dominated by materials recycling facilities processing mixed dry recyclables.
Organic treatment	229	100%	229	Please note that open windrow composting undertaken under exemption T23 is excluded from the London Plan list. The stated capacity is therefore likely to be a significant underestimate. (SLR estimates indicates an arising of circa 400 kt of segregated organic waste in London in 2015.)
Thermal treatment	1,738	100%	1,738	Please note that here GLA site_broad_group category is split into contributions from 'Fuel preparation, MBT' and 'thermal treatment' to differentiate contributions to self-sufficiency targets.
Waste Transfer (Household & Commercial)	3,700	30%	1,110	<p>The assumption that 30% of transfer throughputs consists of recyclables originates from the GLA, and is considered by SLR to be reasonable.</p> <p>However it is possible that a significant proportion of commercial and industrial recyclables may not be processed via transfer stations (please see main text for discussion). Example waste flows where this is the case include:</p> <ul style="list-style-type: none"> • retailer back-haulage of recyclables for bulking at regional distribution centres; • export of bulked industrial process waste direct from the point of production to a reprocessor or other end use. <p>While these activities would qualify as contributing to self-sufficiency under GLA definitions, they are not captured by available datasets.</p> <p>In practice all source segregated recyclables currently arising in London are likely to be bulked/transferred prior to delivery with reprocessors. As first approximation, capacity for transfer of recyclables might therefore be equated with the current arising of recyclables.</p>

				Taking this approach SLR modelling undertaken on behalf of the GLA indicates dry recycling and reuse capacity at circa 2.2 Mtpa – please note that this estimate is subject, to uncertainty being inferred indirectly from findings of Defra’s 2009 commercial and industrial waste survey.
Household Reuse and Recycling Centres	475	50%	237	50% is suggested as a conservative average for CA sites, though performance varies substantially across London. Since household reuse and recycling centres effectively undertake waste transfer, it is suggested that this capacity is quantified as part of recyclables bulking capacity, as outlined above.
Fuel preparation, MBT	767	0%	0	No London facilities within this category are known to produce a biomass fuel as defined in the ROO. Therefore it is understood that capacity under this category is not relevant to the self-sufficiency target.
Metals and Vehicle Recycling	1,280	0%	0	Caution is suggested in interpreting tonnages managed at metals recycling sites: <ul style="list-style-type: none"> • The possibility exists of some double counting - for example where material is received from civic amenity sites, for which recycled metals are already quantified as part of capacity contributing to self-sufficiency targets.. • It is understood that end-of-life vehicles are not fully captured by waste arisings datasets (either local authority, or commercial / industrial). ELV processing should therefore arguably be excluded.
Disposal	1,742	0%	0	It is understood that all landfills in London accepting household, commercial and industrial waste will be closed by 2026.
Waste Transfer (Construction, Demolition & Excavation)	5,246	0%	0	Excluded as not relevant to household, commercial and industrial waste.
Other	6,636	0%	0	This category captures a wide range of miscellaneous facility types which are not considered relevant to apportionment targets. Examples include (but are not limited to) IBA processing facilities, use of waste for land recovery, sewage treatment, and mobile plant treating CDEW.

4.2 LUC Review

The London Waste Map effectively displays Greater London’s waste data. The user interface is clean, clear and easy to use, and the spatial data is presented well. Therefore, no changes are proposed to the layout or style of the web map. However, LUC recommended performing a review of the spatial data to ensure that it, and the tabular data underlying it, are accurate.

Future consideration could be given to augmenting the web map to provide:

- Access to the tabular data underling it, for example through a link to where the data is stored on the London Datastore. This should also include coordinates for the sites so that they can be mapped in GIS.
- Contextual metadata on the web map interface. For example, this could include popups that appear over the type of facility in the map legend, to explain what types of waste that type of facility processes.
- The ability to download GIS data (shapefiles or KML files) of the boundaries of the sites. As with the tabular data, this could be as a link to where the data is held on the London Datastore.

A review of the spatial locations of the facilities against the postcodes and other location attributes recorded in their address data was performed in GIS. This was intended to identify facilities that are either located in the wrong place or facilities that have incorrect address details recorded against them. This review of the data identified the following anomalies:

- Five sites are attributed as being in a different borough than their spatial location.

Site Number	Correct Borough
GLA_25	Newham
GLA_99	Tower Hamlets
GLA_309	Richmond Upon Thames
GLA_363	Wandsworth
GLA_369	Hammersmith and Fulham

- Because of this, two of those (GLA_25 and GLA_99) may also have an incorrect Waste Authorities Planning Group recorded against them.
- Four sites (all mobile - GLA_460, GLA_461, GLA_462 and GLA_463) are located along the River Thames near Tower Bridge. These are not currently shown on the online version of the London Waste Map.

5.0 CLOSURE

This report has been prepared by SLR Consulting Limited with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Greater London Authority; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

APPENDIX A – APPORTIONMENT FORECAST DATA VALUES

Table A1: London Household Waste Tonnage by Management Route (kt)

	2011	2016	2021	2026	2031	2036
Recycled / composted	1,012	1,067	1,377	1,692	2,009	2,072
Incineration / other treatment	1,106	1,451	1,528	1,595	1,339	1,381
Landfill	865	585	303	0	0	0
Total	2,983	3,103	3,207	3,287	3,348	3,453

Table A2: London Household Waste Management Route Proportions (kt)

	2011	2016	2021	2026	2031	2036
Recycled / composted	34%	34%	43%	51%	60%	60%
Incineration / other treatment	37%	47%	48%	49%	40%	40%
Landfill	29%	19%	9%	0%	0%	0%

Table A3: London Commercial and Industrial Waste Tonnage by Management Route (kt)

	2009	2016	2021	2026	2031	2036
Recycled / composted	2,357	3,174	3,507	3,508	3,515	3,568
Incineration / other treatment	832	948	1,057	1,504	1,506	1,529
Landfill	1,385	893	446	0	0	0
Total	4,574	5,015	5,009	5,012	5,021	5,097

Table A4: London Commercial and Industrial Waste Management Route Proportions (kt)

	2009	2016	2021	2026	2031	2036
Recycled / composted	52%	63%	70%	70%	70%	70%
Incineration / other treatment	18%	19%	21%	30%	30%	30%
Landfill	30%	18%	9%	0%	0%	0%

AYLESBURY

7 Wormal Park, Menmarsh Road,
Worminghall, Aylesbury,
Buckinghamshire HP18 9PH, UK
T: +44 (0)1844 337380

BELFAST

Suite 1 Potters Quay, 5 Ravenhill Road,
Belfast BT6 8DN, UK, Northern Ireland
T: +44 (0)28 9073 2493

BRADFORD-ON-AVON

Treenwood House, Rowden Lane,
Bradford-on-Avon, Wiltshire BA15 2AU,
UK
T: +44 (0)1225 309400

BRISTOL

Langford Lodge, 109 Pembroke Road,
Clifton, Bristol BS8 3EU, UK
T: +44 (0)117 9064280

CAMBRIDGE

8 Stow Court, Stow-cum-Quy,
Cambridge CB25 9AS, UK
T: +44 (0)1223 813805

CARDIFF

Fulmar House, Beignon Close, Ocean
Way, Cardiff CF24 5PB, UK
T: +44 (0)29 20491010

CHELMSFORD

Unit 77, Waterhouse Business Centre,
2 Cromar Way, Chelmsford, Essex
CM1 2QE, UK
T: +44 (0)1245 392170

DUBLIN

7 Dundrum Business Park, Windy
Arbour, Dundrum, Dublin 14 Ireland
T: +353 (0)1 2964667

EDINBURGH

4/5 Lochside View, Edinburgh Park,
Edinburgh EH12 9DH, UK
T: +44 (0)131 3356830

EXETER

69 Polsloe Road, Exeter EX1 2NF, UK
T: +44 (0)1392 490152

GLASGOW

4 Woodside Place, Charing Cross,
Glasgow G3 7QF, UK
T: +44 (0)141 3535037

GRENOBLE

BuroClub, 157/155 Cours Berriat,
38028 Grenoble Cedex 1, France
T: +33 (0)4 76 70 93 41

GUILDFORD

65 Woodbridge Road, Guildford
Surrey GU1 4RD, UK
T: +44 (0)1483 889 800

LEEDS

Suite 1, Jason House, Kerry Hill,
Horsforth, Leeds LS18 4JR, UK
T: +44 (0)113 2580650

LONDON

83 Victoria Street,
London, SW1H 0HW, UK
T: +44 (0)203 691 5810

MAIDSTONE

Mill Barn, 28 Hollingworth Court,
Turkey Mill, Maidstone, Kent
ME14 5PP, UK
T: +44 (0)1622 609242

MANCHESTER

8th Floor, Quay West, MediaCityUK,
Trafford Wharf Road,
Manchester M17 1HH, UK
T: +44 (0)161 872 7564

NEWCASTLE UPON TYNE

Sailors Bethel, Horatio Street,
Newcastle-upon-Tyne NE1 2PE, UK
T: +44 (0)191 2611966

NOTTINGHAM

Aspect House, Aspect Business Park,
Bennerley Road, Nottingham NG6 8WR,
UK
T: +44 (0)115 9647280

SHEFFIELD

Unit 2 Newton Business Centre,
Thornccliffe Park Estate, Newton
Chambers Road, Chapeltown,
Sheffield S35 2PW, UK
T: +44 (0)114 2455153

SHREWSBURY

2nd Floor, Hermes House, Oxon
Business Park, Shrewsbury SY3 5HJ,
UK
T: +44 (0)1743 239250

STAFFORD

8 Parker Court, Staffordshire Technology
Park, Beaconside, Stafford ST18 0WP,
UK
T: +44 (0)1785 241755

STIRLING

No. 68 Stirling Business Centre,
Wellgreen, Stirling FK8 2DZ, UK
T: +44 (0)1786 239900

WORCESTER

Suite 5, Brindley Court, Gresley Road,
Shire Business Park, Worcester WR4
9FD, UK
T: +44 (0)1905 751310