Newham London

Waste management in developments: automated vacuum waste collection systems

Topic Paper

LB Newham (2024)

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Contents

Introduction

This topic paper has been prepared as part of the refresh of Newham's draft Local Plan.

This paper aims to:

- Set out the policy context around the delivery of automated vacuum waste collection systems;
- Set out the need for automated vacuum waste collection systems in Newham and any associated benefits of their provision; and
- Set out and justify the specific policy approach in Newham's Regulation 19 draft Local Plan, including any viability impacts of delivering this technology.

What are automated vacuum waste collection systems?

Automated vacuum waste collection systems are an innovative way to dispose of waste in large residential and mixed use developments. Residents dispose of waste via an inlet[1]. Waste is then 'vacuumed' into underground pipes, and transported to a collection hub building. The inlets and pipe network collect different waste streams separately. Waste transported to the collection hub building are then distributed into containers for each waste stream, compacted, and then transported via specialised collection vehicles to waste management facilities. A monitoring system is installed to support the effective operation of the system. This monitors the fill level of the inlets and containers and allows efficient running of the system and the avoidance of issues such as blockages.

These systems differ from other waste collection systems currently used in the borough. These include traditional bin stores, where waste is collected in Eurobins contained within a dedicated store room, and Underground Refuse Systems, where typically waste is disposed of in a bin on street that is linked to underground storage. Waste is then collected from the storage using a specialised collection vehicle.

Figure 1: Example of an on street disposal inlet

[1] Inlet is the broad term used for the disposal/input point for the waste. This can be located on each floor, in a lobby, against a wall or as an external independent inlet. There would one inlet point per waste stream per location. The inlet is also the external location for the disposal of waste. A chute is the tube behind the inlet door. It is also the transport method for bringing waste down from individual floors in a core/building.

Automated vacuum waste collection systems can be designed for schemes of 450 residential or above, so can be delivered at a range of scales of development including high-density areas like Newham. Two systems currently operate in London, one at Wembley Park and the other at Barking Riverside.[2]

Policy context

National Planning Policy Framework

The National Planning Policy Framework (2023) sets out that one of the overarching objectives of achieving sustainable development is 'an environmental objective', which includes minimising waste and pollution.

The National Planning Policy for Waste (2014), requires new, non-waste development to make sufficient provision for waste management and promote good design to secure the integration of waste management facilities with the rest of the development. This includes providing adequate storage facilities at residential premises, for example by ensuring that there is sufficient and discrete provision for bins, to facilitate a high quality, comprehensive and frequent household collection service.

London Plan 2021

The London Plan Policy D6 seeks to ensure that housing is designed with adequate and easily accessible storage space that supports the separate collection of dry recyclables (for at least card, paper, mixed plastics, metals, glass) and food waste as well as residual waste.

London Plan Policy SI 7 seeks to ensure that developments are designed with adequate, flexible, and easily accessible storage space and collection systems that support, as a minimum, the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food.

Regulation 19 draft Newham Local Plan

As part of the Regulation 19 draft Local Plan, we have introduced a requirement to provide an automated vacuum waste collection system on the following site allocations:

- Beckton Riverside.
- Silvertown Quays.
- Connaught Riverside.
- Thameside West.

[2] See the ENVAC website for further details related to these two schemes: https://www.envacgroup.com/uk/project/wembley-park/ and https://www.envacgroup.com/uk/project/barking-riverside/

- Parcelforce.

We have also introduced the following requirement in policy W3 (waste management in developments):

> *Developments that propose alternative waste management technologies, including those site allocations that require the delivery of an automated vacuum waste collection system, should be discussed at an early stage of design with the waste and recycling team. Automated vacuum waste collection systems should be able to collect dry recyclables, organics and residual waste as separate streams.*

Why are automated vacuum waste collection systems being considered in Newham?

We have chosen to explore the feasibility of delivering automated vacuum waste collection systems given the scale of development being planned for through the Regulation 19 draft Local Plan.

Newham's housing target in the draft Regulation 19 Local Plan seeks to deliver between 51,425 and 53,784 new homes between 2023 and 2038. The majority of planned housing delivery during this period will be through the development of sites allocations in the Local Plan. Therefore, it is important that the largest development sites in the borough deliver sustainable waste management practices that do not place undue pressures on traditional waste collection services.

Vacuum technology allows the efficient collection of individual waste streams to a single point of collection. Users have a clean convenient point of disposal which allows recycling rates to be optimised and the uplifting of waste to be rationalised. Vehicle movement and emission rates can be reduced by over 90%. Both Wembley Park and Barking Riverside have seen space released for alternative uses.

The delivery of automated vacuum waste collection systems also accords with the objectives of Newham Just Transition Plan, which was adopted in December 2023. In particular, delivering these systems will help to meet the following objectives:

- Delivering homes which are comfortable, healthy and efficient, to address Newham residents' high vulnerability to the effects of climate change and poor air quality.
- Facilitating the safe movement of goods without polluting. This should facilitate access to socioeconomic opportunities and enhance community cohesion.
- Increasing the sharing and reducing of waste, building a sharing and circular economy. In a context of economic challenge for communities, households and individuals, focusing on circularity to reduce and divert waste from landfill and incineration addresses materials and waste sector emissions on a systemic level. This objective also seeks to promote conscious consumption, sharing resources and good waste sorting practice within communities and neighbourhoods.

The impact of delivering automated vacuum waste collection systems in Newham

In order to understand the impact of delivering automated vacuum waste collection systems in Newham, we requested that a provider in the field (ENVAC) prepare a conceptual design that showed how a system could be delivered on a site allocation. ENVAC are a notable company who have delivered a number of pneumatic waste collection systems in different countries. This conceptual design not only informed conclusions on the impacts of an automated vacuum waste collection system, but also informed expected costings of delivering such technology.

In this instance, an indicative design incorporating vacuum technology was compared with the proposed refuse collection approach for an approved scheme, which relied on waste collection from residential units in 1,100l Eurobins. In terms of waste collection capacity in the approved scheme we have assumed a range of proposed bin storage of between 681 x 1,000l Eurobins and 1,150 x 1,100l Eurobins. These assumptions are based on the levels of bin storage in the approved permission, and assumptions for a typical number of bins needed for a development of this scale. Noting emerging best practice in relation to developments of this density, the latter figure has been assumed in the event the scheme were to come back in for planning permission and an increased number of bins were required to address any associated management issues with a development of this scale.

The following assumptions were used in conceptual design:

- the system would manage three waste streams: general waste, organic waste and dry mixed recyclables;
- A 2C1F ENVAC system was used, which has a capacity to service 10,000 units[3];
- Maximum walking distance for residents to a disposal point would be 30m;
- The location of the collection station was positioned on the margin of the development to reduce refuse collection vehicle (RCV) vehicle movements and emissions on the development and to reduce activity across all blocks as much as possible;
- 5,000 units would be serviced by the system;
- all proposed inlets were located without chute systems, i.e. on street; and
- Station capacity for commercial waste exists, but it was excluded from the design.[4]

The following benefits were identified from the conceptual design:

- **Reduced bin numbers:** The delivery of the vacuum system replaced the need to use between 681 and 1,150 1,100l euro bins.
- **Reduced storage space:** the traditional collection system needed between 817m^2 and 1380m^2 of space for bin storage, compared with the vacuum system which required 320m^2 plus a 440m^2 collection station off plot.

[3] Smaller collection stations can be used for 500-1500 units and 1500-3500 units.
[4] Commercial waste can be collected on a pay by throw/by weight basis.

- **Fewer collections:** 7 vacuum system collections would be required per week taking 7 hours, compared with between 3.5 and 6 full day RCV collections for a traditional collection system.
- **Fewer vehicle journeys, resulting in better air quality, safety and reduced congestion:** 7 return journeys on one of Newham's main routes were required with the vacuum system in comparison with between 14 and 24 RCV return journeys for a traditional collection system. Similarly, less HGV movements within a site will lead to improved pedestrian safety within developments with a vacuum waste collection system.
- **Improved recycling rates:** it is anticipated that there would be an improved recycling rate delivered through a vacuum system, given the convenience of using the system, easy to maintain inlets and conveniently located disposal inlets. With an effective induction for residents, and continued user engagement, ENVAC suggests recycling rates would be anticipated to be above 45%.[5] This is significantly above Newham's average household recycling rates of 25.6%.
- **Better located collection points:** There would be no need for routine weekly waste collection vehicles on the development, and collections from the vacuum system could be made from the margin of the development. Given such systems need to be designed into developments at an early stage, roads can be designed within a development accordingly and turning circles eliminated. This would allow for efficiencies in service delivery for the Council's waste collection service, particularly related to reduced collection vehicle movements around a site. Euro bin collection requires multiple stops all around the development, and while Underground Refuse Storage (URS) may offer an opportunity for reduced collections, automated vacuum waste collection systems would be from a single, central point in a development.[6]
- **Lower operating expenses and impacts on service charges:** These were assumed to be circa £55 per unit per annum including reinvestments, equating to a total cost of £253k per annum.[7] This showed a favourable outcome when compared with the porterage required to recycle/present and clean bins in traditional storage and collection systems.
- **Public realm improvements:** Reduction in waste storage and collection can have positive impacts on street cleanliness, as well as reduced noise from collection vehicles and a reduced risk of vermin. In some instances, the increased space allows for improvements in urban design, recognising large scale traditional big storage can have the impact of sterilising the ground floors of large-scale major developments.

More broadly, the following list sets out potential logistical concerns that may arise through the use of automated vacuum waste collection systems:

- The **operational and maintenance costs** associated with running the system;

[5] Note ENVAC are able to monitor their recycling rates on other developments, using the technology which monitors the ENVAC system. The anticipated recycling rate figure is calculated comparing average recycling rates at Barking Riverside.
[6] Each URS bin is 5000 litres capacity. However, URS needs emptying multiple times per week with a bespoke vehicle. All URS bins would be in public realm so the collection station space can be saved; however, the external space would exceed a vacuum system in respect of space take and vehicle space for servicing.
[7] Figures based off of comparable costs at Barking Riverside, for a similar sized station and external inlets.

- Potential for **blockages** within the system, albeit this can be targeted through increased suction being used in the system;
- The need for a **specialist collection vehicle**, which may not be cost-effective if only servicing a limited number of residential units.

What is the cost of automated vacuum waste collection system in Newham?

The Planning Policy team have worked with representatives of ENVAC group to understand the cost of delivering an automated vacuum waste collection system. ENVAC have provided costings for providing an ENVAC system on a range of scales of development, between 500 and 10,000 homes. The costings include:

- The type of collection station required;
- The approximate amount of piping required proportionate to the size of the development;
- The required number of collection hubs; and
- Anticipated cost of civils.

The cost calculations assume a single point of disposal per collection hub and the capacity for the system to manage three waste streams (dry recyclables, organics and residual waste). The costs are as of 2023 for a bring system to externally located inlets and a single inlet per waste stream at each location. The costings exclude the cost of chutes on individual floors (which are optional, depending on the design of a development), and the cost of the building that houses the collection station building. It is anticipated the latter would be adequately be compensated for via saved space that would typically be required for the conventional delivery of waste stores..

The costings compiled by ENVAC were further refined through the creation of an indicative design for a scheme in Newham. This has informed both the costings, and the conclusions around the assumed benefits of delivering an ENVAC scheme (see ‘The impact of delivering automated vacuum waste collection systems in Newham?’).

The assumed costs for different scheme sizes have been kept sensitive for the purposes of this topic paper; however, the costs are discussed in broad terms in the viability report that has informed the Regulation 19 Local Plan policies.

Which site allocations are considered suitable to deliver automated vacuum waste collection system?

The Council have tested the assumed costings on a number of sites that were deemed suitable to deliver automated vacuum waste collection system. These were identified based on the size of the schemes in question (being above the minimum number of units needed to

deliver an ENVAC system), as well as those sites where the ownership wasn't fragmented or overly complex. This testing showed that for most tested sites, the delivery of an ENVAC had a minor impact on the viability of site allocations.

Based on the Local Plan viability testing feedback, we have introduced a requirement to provide an automated vacuum waste collection system on the following site allocations:

- Beckton Riverside.
- Silvertown Quays.
- Connaught Riverside.
- Thameside West.
- Parcelforce.

Viability testing these sites showed the percentage change in residual land values resulting from the introduction of ENVAC was between 0.00% and 18.68%. The Viability report sets out that "This reflects a modest increase to overall development costs and has a very limited impact on viability." On this basis, we considered the impact of requiring ENVAC systems was justified, and the viability impact was outweighed by the multiple benefits of delivering an ENVAC system.

Conclusions and recommendations

In summary, the amendments made to the Regulation 19 draft Local Plan to require the delivery of automated vacuum waste collection systems are considered to be justified, taking into consideration:

- The efficiencies that can be achieved in terms of site design and space saving that would otherwise have been used for refuse storage spaces;
- Positive effects in terms of reduced vehicle movements, which will have an improved impact on air quality and traffic in the locality;
- The potential for improved recycling rates and monitoring in some of the largest developments in the borough; and
- The relatively small impact of delivering these systems on site viability.

While there are some concerns related to the logistics of the operation and use of the systems, it is considered these concerns are outweighed by the multiple benefits of delivering these systems. There delivery will also reduce any future strain on existing waste collection infrastructure, recognising their delivery will only be required on the largest site allocations in the borough.