Appendix 3.2

OPERATIONAL WASTE MANAGEMENT STRATEGY (EIA APPENDIX)



BURO HAPPOLD

The People's Project

Operational Waste Management Strategy

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Glossary

Term	Definition
BMD	Bramley-Moore Dock
DMR	Dry Mixed Recyclables
FM	Facilities Management
GA	General Admission
LCC	Liverpool City Council
LDF	Local Development Framework
MSW	Municipal Solid Waste
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
OWMS	Operational Waste Management Strategy
SWMP	Site Waste Management Plan
UDP	Unitary Development Plan
WEEE	Waste Electrical and Electronic Equipment

Introduction 1

1.1 **Preamble**

Everton Stadium Development Limited (hereafter referred to as Everton / the Club) are seeking to relocate from Goodison Park, Goodison Road, Liverpool L4 4EL to a proposed new stadium (52,888 seated capacity) with associated infrastructure and facilities at Bramley-Moore Dock (BMD), Regent Road, Liverpool L3 0AP (hereafter referred to as the application site). The site is located within the administrative area of Liverpool City Council (LCC).

The red line boundary for the application site is shown in Figure 1.1.



Figure 1.1 Application site red line boundary

This Operational Waste Management Strategy (OWMS) has been prepared by Buro Happold on behalf of the Club to accompany a full planning application for the proposed development.

The Club and the design team have been fully involved in the process of developing this OWMS and acknowledge that the future management of solid waste is an important element to consider when buildings are designed. Planning for future operational waste management ensures that the stadium and associated public realm will be able to operate efficiently, sustainably and safely, all while minimising impacts on building performance, the users of the site, and the application site environment.

In line with this, the key objectives of this document are as follows:

- To provide an estimate of the anticipated waste generation for the proposed development during operation;
- To provide guidance on the future management of waste to ensure that adequate spatial provision for clean and efficient storage and collection of waste is incorporated into the design;
- To allow waste and recycling to be easily collected, stored and managed by the Facilities Management (FM) team • in a sustainable, efficient and discreet manner;

- To ensure that national and local policies, as well as all of the Club's waste management aims and aspirations, are met. Relevant national, regional and local waste management policies are detailed in full in Appendix A; and
- To provide a suite of measures for integrating the principles of the waste hierarchy and circular economy into the • development's design and operations.

It should be emphasised that developing the waste strategy is an iterative process. There is a clear commitment to keep the OWMS under review to ensure that new methods, attitudes and models in waste management are incorporated into final operations.

2020 ES Update 1.2

Due to the relevance and scale of the proposed development amendments, limited technical assessment has been undertaken relating to operational waste management to confirm the validity of the previous conclusions. The relevant assessment information is presented/discussed within this appendix and this report has been revised to reflect these updates.

The following sections have been updated:

Section 4 Waste Generation and Storage.

This ES technical appendix relating to operational waste management has also been reviewed against the following aspects and for each it has been confirmed that there are no substantial amendments required to the content of the appendix:

- Baseline data validity: there have been no relevant changes to the baseline data and it remains valid;
- Legislation/policy revisions: there have been no related updates to legislation/policy that have affected either the methodology or findings of this assessment; and
- There were no statutory consultee comments received in relation to the information presented in this appendix . that required a response.

The Waste Hierarchy and Circular Economy 2

Introduction 2.1

Everton has a statutory requirement to apply the waste hierarchy (see Figure 2.1) to all aspects of its operations, first looking to prevent and reduce waste generation, before re-using, recycling or recovering value from discarded material. Only after these options have been deemed unfeasible should the safe treatment and final disposal of waste be considered.





Figure 2.1 The waste hierarchy

The proposed development's waste management strategy will facilitate staff and fans in making sustainable choices and will look to move beyond the traditional linear approach of 'make, use, dispose'. Instead, a circular economy model will be promoted, with the aim of keeping resources in use for as long as possible, so that the maximum value possible can be extracted from them. In line with this ambition, attention will be paid to all stages of product packaging design and use, with the necessary provision made in the design and strategy to enable the effective segregation and recycling of materials.

The key principles of a circular economy model are illustrated schematically in Figure 2.2.

Figure 2.2 Principles of a circular economy

In terms of waste, a number of initiatives can be adopted to minimise the production of waste and improve recycling rates.

2.2 **Reduce/Re-use**

The preferred waste management approach is to, first and foremost, minimise the amount of waste produced and to avoid producing waste to begin with. The Club have already introduced reusable cups in place of single-use plastic cups at Goodison Park to help achieve this ambition. Plastic cutlery and straws have also been swapped for biodegradable alternatives, while single-serve condiment packets have been eliminated from the Club's product supply chain altogether.

To help further reduce waste generation, it is recommended that the following initiatives are implemented by the Club during the operational phase of the proposed stadium scheme:

- Using a stock inventory system to monitor and provide control over the use of supplies, helping the Club to ٠ identify opportunities for removing waste are source, streamlining materials and removing single-use plastics;
- crates;
- Reducing food waste through tracking food sales/consumption to avoid over-ordering; and ٠

Reuse/Repair

avoid over-ordering and producing unnecessary waste. This should be complemented by a supply chain audit to

Procuring products from suppliers that allow for the backhauling of packaging waste or the re-use of packaging

• Reviewing and developing supplier guidance on how goods are packaged (e.g. using no packaging, edible materials, less packaging or packaging that is made up of a proportion of recycled materials).

2.3 Recycle

Where possible, waste that can no longer be re-used or that is no longer needed should be recycled. Staff already undertake a positive pick within the stadium bowl at Goodison Park, with mixed recyclables collected separately from residual waste. The OWMS for the new stadium at BMD will take these existing operational practices further, with an emphasis on reducing the contamination of waste streams and, in doing so, increasing the quality of recyclate. This can be achieved by the following:

- Committing waste contractors to monitoring and inspecting the final destination of sorted material.
- Ensuring that the packaging materials of any procured goods are streamlined to increase the recycled content of disposed waste;
- Training staff to ensure that those working at the stadium are fully aware of how the waste management and disposal system works;
- Engaging and educating fans to encourage proper disposal of waste and to reduce the potential for contamination; and
- Providing clear signage with recycling and disposal guidance.

2.4 Duty of Care

In line with the Environmental Protection (Duty of Care) Regulations 1990, the Club has a duty of care to ensure that their waste is managed properly. All waste materials will therefore be stored safely and securely on-site and, when removed from the site, will go to an appropriate permitted facility, with all relevant documentation completed.

Waste Movement and Collection 3

3.1 Introduction

The following section describes the proposed strategy to segregate, store, move and collect all waste generated within the stadium and associated public realm areas.

The Club currently operates a 'compartmentalised' approach to waste management, with the existing stadium split into a number of zones, each one managed by a dedicated cleaning team. During match play, the cleaning team conducts a positive pick of the concourse areas, with residual waste and mixed recyclables segregated and placed into bags. Full bags are then moved manually to the stadium's waste and recycling area, where portable compactors are provided for residual waste and mixed recyclables. Food waste and glass are collected separately in 240 litre bins.

There are currently no dedicated lifts for waste movement in the existing Goodison Park stadium and, as such, the cleaning team often use the public stairwells for moving waste. In addition, while litter bins for fans are distributed throughout the concourses, historically, these have not provided fans with the opportunity to segregate waste streams at source.

LCC currently support the Club on match days with the management of waste generated in the neighbouring public realm areas. The council provides a street sweeping service to clear the public realm once all fans have left the stadium. LCC also provide the Club with a number of bins for fans to use in the surrounding public realm areas. However, as with the concourses, these have historically not provided fans with the opportunity to segregate recyclables at source.

It should be emphasised that the waste management strategy for the proposed new stadium at BMD provides the Club with an opportunity to extend and improve on existing operational practices from Goodison Park.

The strategy has been developed with a peak waste generation scenario in mind (assumed to be a football match where the stadium is at maximum capacity). However, the guiding principles of the strategy will remain the same for other types of non-football events.

3.2 Waste Segregation and Movement

Waste will be segregated at source into a number of streams. This section outlines the segregation and movement strategy for the following areas:

- Public realm areas;
- General admission areas;
- Away fan areas;
- Hospitality areas;
- The seating bowl; and
- Other areas. •

Public Realm Areas

The Club aspires to create an environment in the fan zone plaza and other public realm areas where fans can enjoy congregating and socialising both before and after the game, as well as on non-match days. In order to realise this ambition, a number of challenges associated with the application site will need to be overcome. Football matches have historically generated high volumes of waste in short time periods and can be difficult environments in which to

encourage fans to use bins and to correctly segregate recyclables. A different littering culture exists at these events, where it is generally deemed more socially acceptable to drop litter than in a traditional public realm context.

This potential issue is compounded by the practical challenges of the application site, with the stadium located adjacent to the River Mersey and dock system. If effective mitigation measures are not put in place, then the windiness of the site has the potential to pollute waterbodies, cause a visual impact and harm biodiversity.

The waste strategy for the site has been developed in line with the waste hierarchy and the principles of a circular economy. As such, the preferred approach is to, first and foremost, minimise the amount of waste produced and to avoid producing waste in the first instance, in doing so, reducing the risk of littering in the public realm areas. In line with this, careful consideration will be given to the way in which products that are sold to fans are packaged. As a starting point, it is recommended that the suite of measures outlined in Section 2.2 are considered by the Club when the stadium becomes fully operational.

While eliminating waste is the preference in the first instance, the next priority is to reduce the detrimental impacts of litter in the public realm areas. The strategy will seek to encourage behavioural change in fans in order to further limit the generation of waste and encourage appropriate disposal and segregation. Consideration will be given to the provision of information to users of the stadium – for example, through a waste management policy/code – to help avoid litter generation.

The latest research from The Behavioural Insights Team (2019) presents a number of additional ways in which littering can be prevented. Harnessing local and national pride to protect wildlife and reduce river pollution is one effective means of encouraging engagement and compliance. This can be done through local awards for participation, or through signage and other communications.

To help further reduce the risk of littering, 80 litre bins will be provided throughout the fan zone plaza and other public realm areas, with residual waste and dry mixed recyclables (DMR) segregated. For security reasons, hoop-style bins with clear plastic bags will be used.

The site FM team will regularly service the litter bins and undertake litter picks to ensure that waste does not become an environmental or visual nuisance. When the bins are nearly full, they will transfer bags to the central waste and recycling area in the stadium's north-west corner, as is illustrated in Figure 3.1.



Figure 3.1 Illustration of waste strategy in public realm areas

The careful consideration of bin placement and focus on altering fan behaviours provide an effective means of mitigating the impacts of wind-blown litter. However, a safe backstop still needs to be put in place to prevent litter from entering the waterways that surround the stadium. A 1.1m high weld mesh litter trap balustrade will therefore be used around the dock edge (see precedent example in Figure 3.2).



Figure 3.2 Precedent image of weld mesh litter trap balustrade

General Admission Areas

General admission (GA) concourses give access to the seating bowl and also provide facilities for fans, including toilets, food concessions, bars and merchandising outlets.

It is expected that the quantities of organic waste generated from food preparation in the GA concourses will be minimal. At this stage, a separate organic waste collection is therefore not deemed necessary in these areas. Instead, two streams will be segregated: residual waste and mixed recyclables (primarily consisting of plastic bottles, cardboard packaging and paper).

As a minimum, two-stream litter bins will be provided throughout the concourses. When these areas are less congested (i.e. during the first and second halves and post-match), the stadium's FM team will empty the litter bins and transfer bagged waste using mobile waste containers to 660 litre bins in the GA intermediate stores. The intermediate stores provide a space for temporary waste storage during a match.

The bins in the intermediate stores will also be used to store waste from the GA bars and concession units. Staff will initially dispose of waste in bins provided in each unit's footprint. When these bins are near full, staff will empty them and transfer the bagged waste to the nearest intermediate waste room, as is shown in Figure 3.3.

Figure 3.3 Illustration of waste strategy for GA concourses, bars and concession units

When spectator areas are less congested (e.g. once all fans have left the stadium), the FM team will move the 660 litre bins from the GA intermediate stores to the central waste and recycling area at Level 00. Bins will mainly be transferred to Level 00 using the freight lift in the north-west corner, although, on an occasional basis, passenger lifts might also be used. The FM team will move bins from the intermediate stores directly to the waste and recycling area and will ensure that no waste or equipment is left unattended in the lifts. Figure 3.4 highlights these lifts and the main routes that will be used for waste movement for both L00 and an example floor (L01). The stadium's main freight lift is capable of holding two 660 litre bins and a member of staff, while the passenger lifts are capable of holding one 660 litre bin and a member of staff.





FM team move bins to waste and recycling area at Level 00 via service lifts

Bins emptied into compactors at Level 00 and bins returned to intermediate stores



Figure 3.4 Illustration of main waste movement routes (L00 and L01)

The movement of bins from the intermediate stores to Level 00 will be staggered so as to avoid bottlenecks around the central waste and recycling area. In addition, the compactors in the central waste and recycling area will each be fitted with a bin hoist to improve the efficiency of waste management operations. Once bins have been emptied into the compactors, the FM team will return them to the appropriate intermediate waste room.

Away Fans

The waste segregation and movement strategy for the away fan areas will be the same as that for the GA concourses. Residual waste and DMR will be segregated and moved to dedicated intermediate stores during the course of each match. These stores will be designated exclusively for the away fan areas. At the end of a match, once all fans have left the stadium, bins from these stores will be moved down to the central waste and recycling area by the stadium's FM team.

Hospitality Areas

The hospitality areas will be separated from the GA concourses and will be located on Level 00, Level 01, Level 02 and Level 03. It is expected that more waste will be generated per person in the hospitality areas than in the GA concourses, due to the increased presence of heavier waste streams, namely glass and plate waste (organics).

The tables in these areas will be cleared by catering staff, with waste 'backhauled' to the kitchens on each level, where residual waste, DMR, organics and glass will be segregated. Catering staff will be provided with adequate training to ensure that they are aware of the procedure for separating waste streams. It is also recommended that a food waste tracking system is used to monitor the main sources of organic waste.

One 240 litre bin will be provided for each waste stream by the dishwash section in each kitchen. When full, bins will be swapped with empties from the interim hospitality stores, with staff ensuring that they are not moved through areas where food preparation takes place. These stores have been located as close as possible to the hospitality kitchens. Where possible, these areas have been sized to ensure that waste from the hospitality areas can be held locally during the match, before being moved to the central waste and recycling area post-match, once all fans have left the stadium. Where spatial constraints preclude this, it is proposed that bins from the stores are moved down to the L00 waste area on one occasion during a match, most likely during the first half when the concourse areas are less congested.

The waste segregation and movement strategy for the hospitality areas is illustrated schematically in Figure 3.5.



Figure 3.5 Illustration of waste strategy for hospitality areas

Seating Bowl

Any waste left in the seating bowl will be moved directly to the compactors at Level 00 once fans have left the stadium. The FM team will carry out a positive pick in order to collect mixed recyclables. The residual waste that remains will be bagged and moved manually to the compactors in the central waste and recycling area, as illustrated in Figure 3.6.





Figure 3.6 Illustration of waste strategy for the seating bowl

Football Pitch

Grass cuttings will be moved by the groundskeeping team to an enclosed skip with lid in the central waste and recycling area. The skip will have the following dimensions: 2.22m (H) x 1.91m (W) x 4m (L).

Other Areas

The Level 00 commissary kitchen will be the main area in which food preparation is undertaken. It is therefore proposed that organic waste is segregated in this area, in addition to residual waste and DMR. When full, residual and DMR bins will be emptied into the compactors, while organic bins will be swapped with empties from the stadium's central waste and recycling area.

Waste generated in the offices, media facilities and player areas will be stored locally on match days in small bins and will be segregated into the following two streams: residual waste and DMR. Bags will be collected and moved to the central waste and recycling area post-match by the stadium's FM team.

3.3 Waste Collection

All waste will be collected by a private contractor from the waste and recycling area in the stadium's north-west corner. Collection vehicles will access the site using the dedicated servicing route that runs parallel to the northern edge of the stadium.

A hook-lift truck will be used to collect each of the compactors. A schematic of this vehicle is shown in Figure 3.7.





A minimum head clearance of 5.3m will be provided above the point where the compactors are collected. The compactors have also been placed at an angle within the central waste and recycling area to ensure that the truck can reverse into a position to collect them. Swept path analysis has been undertaken to demonstrate how the compactors will be collected, as is shown in Appendix B. It should be noted that, due to the practical constraints of the site, the trucks may have to straddle the roller shutter at the front face of the waste and recycling area when making collections. To mitigate the risk of any vehicle clashes, a banksman will be present to supervise all waste collections.

A rear-end loader refuse vehicle will be used to collect the organic and glass bins. These bins will be held in the central waste and recycling area and moved out to the servicing road when the collection vehicle arrives. After each collection, the FM team will return the empty bins back to the central waste and recycling area. The swept path manoeuvre for this vehicle is shown in Appendix B. For the purposes of this analysis, a refuse vehicle with the following dimensions has been tested: 10.32m (H) x 2.53m (W) x 3.76m (L). The vehicle will again access the site using the northern servicing route. After collections, waste vehicles will make an anti-clockwise loop of the site, exiting via the southern access point.

The grass waste skip will also be stored in the stadium's central waste and recycling area and will be collected by a skip-lift swing-arm truck, an example of which is shown in Figure 3.8.



Figure 3.8 Example of skip-lift swing-arm truck

Due to the spatial constraints of the site, it will not be possible for this vehicle to collect the grass waste skip from within the central waste and recycling area itself. It is therefore proposed that the skip is stored on a powered dolly (see example in Figure 3.9), before being moved out to the service road for collection using a pendant control system.



Figure 3.9 Example of powered dolly system

3.4 Waste Treatment/Disposal

As outlined in Section 2.1, the Club will look to apply the principles of the waste hierarchy to all aspects of their operations, prioritising waste prevention, reduction, re-use, recycling and energy recovery over landfill disposal.

Mixed recyclables will be directed to a materials recovery facility (MRF) for sorting and onward transfer to recycling processing facilities, while organic wastes will be diverted to a bio-treatment facility and residual waste to an energy-from-waste plant.

There is currently sufficient regional waste infrastructure capacity for managing the waste that is generated from operations at Everton's existing stadium. Once the Club leaves Goodison Park, some of this capacity will be freed up. The proposed development at BMD will therefore already be catered for to a certain extent by existing waste infrastructure in the region.

It is anticipated that there will also be sufficient waste infrastructure capacity in the surrounding area to manage any potential uplift in waste generation brought about by an increase in stadium capacity. The region's Joint Waste Local Plan (see Appendix A) states that Merseyside is well served by commercial and industrial MRFs and waste transfer stations, along with "a number of privately operated open windrow composting facilities and a plethora of re-processors which serve both the commercial and industrial sectors". In addition, there is substantial energy recovery capacity for residual commercial waste at the Ineos Chlor Energy from Waste plant at Runcorn.

On this basis, it is considered that the proposed development will incur no significant adverse impacts on regional waste infrastructure. On the contrary, the proposed development will offer an opportunity to improve on existing practices at Goodison Park and affect real cultural change among staff and fans, with improved facilities and space provided for managing operational waste.

Waste Generation and Storage 4

Introduction 4.1

In order to determine the spatial requirements for waste storage, outline waste quantities have been estimated. These have been based on the seat manifest for the stadium, along with a number of additional metrics informed by existing operations at Goodison Park, along with benchmarking work done on other sporting stadia. These metrics are outlined in Section 4.2.

4.2 **Key Metrics**

Site-Wide

For the purpose of conservative assessment, waste arisings have been estimated for an assumed peak waste generation scenario (i.e. a football match where the stadium is at maximum capacity (52,888 seats)).

All waste will be collected from the central waste and recycling area in the stadium's north-west corner. Outline storage requirements for this area have been based on the following metrics:

- A conservative site-wide waste generation metric of 0.32kg per fan per match. This generation rate has been extrapolated from existing operations at Everton's current stadium, Goodison Park, along with benchmarking work done on other sporting stadia; and
- A composition split (by mass) of 41% residual waste, 41% mixed recyclables, 8% organics and 10% glass. This split has again been based on existing operations at Goodison Park, along with benchmarking work done on other sporting stadia.

Based on past project experience, it is expected that achieving high recycling capture rates at the Club's new stadium will be challenging. A capture rate of 60% has therefore been assumed. In other words, as a baseline estimate, it is anticipated that 40% of recyclables will be disposed of incorrectly in the residual waste bins.

General Admission Areas

As outlined in Section 3.2, waste from the GA concourses, bars and concessions will be stored temporarily in intermediate waste rooms.

Outline bin numbers for the GA intermediate storage areas have been based on the following assumptions, which have been informed by benchmarking work done on Goodison Park and other sporting stadia:

- A generation rate of 0.22kg of waste per GA fan per match. This accounts for waste generated in the GA concourses, bars, concession units and supporting facilities;
- A composition split (by mass) of 50% residual waste and 50% mixed recyclables, based on industry knowledge;
- In total, approximately 70% of GA waste will be moved to the intermediate stores;
- The remaining 30% of waste will be left in the seating bowl and will be cleared at the end of each match; and
- Residual waste and mixed recyclables will be stored in 660 litre bins which will have an average maximum bin fill weight of 80kg.

Hospitality Areas

Waste from the hospitality areas will be held temporarily in dedicated waste storage spaces in close proximity to each of the satellite kitchens.

Outline bin numbers for the hospitality area interim waste stores have been based on the following metrics, which have been informed by benchmarking work done on Goodison Park and other sporting stadia:

- A generation rate of 0.63kg of waste per hospitality fan per match. This accounts for waste generated in the hospitality areas themselves and the satellite kitchens on each level. It does not account for waste generated in the main commissary kitchen at Level 00;
- A composition split (by mass) of 24% residual waste, 24% mixed recyclables, 11% organics and 41% glass. This is generated in the hospitality areas. The remaining organic waste will be produced in the main commissary kitchen at Level 00; and
- Residual waste, mixed recyclables, organics and glass from the hospitality areas will be stored in 240 litre bins which will have an average maximum bin fill weight of 50kg.

Waste Generation 4.3

Site-Wide

Based on the assumptions set out in Section 4.2, it is expected that approximately 16,700kg of waste will be produced during a match, as is illustrated in Table 4.1.

Table 4.1 Estimated waste generation per match (site-wide)

Land use	Stadium capacity	Estimated waste generation (kg/match)				
		Residual*	Recyclables	Organics	Glass	Total
Site-wide	52,888	9,717	4,165	1,337	1,527	16,746

*assuming 60% recycling capture rate

General Admission Areas

Two primary waste streams will be segregated in the GA areas: residual waste and mixed recyclables. Table 4.2 details the expected waste generation per match for each of the GA concourses.

Table 4.2 Estimated waste generation per match (GA areas only)

Fan zone	GA concourse	No. of GA fans	Estimated waste generation (kg per match)		
			Residual*	Recyclables	Total
HOME FANS	GA Level 00	13,301	2,081	892	2,973
	GA Level 01	2,858	447	192	639
	GA Level 02	24,511	3,835	1,643	5,478
	GA Level 03	3,186	498	214	712
AWAY FANS	GA Level 00	0	0	0	0
	GA Level 01	3,003	470	201	671
	GA Level 02	0	0	0	0
	GA Level 03	0	0	0	0
	Total	46,859	7,331	3,142	10,473

*assuming 60% recycling capture rate

As specified in Section 4.2, it is anticipated that approximately 70% of GA waste will be moved to the intermediate stores, with the remaining waste from fans using these areas left in the seating bowl, and therefore inaccessible during event mode. The total quantity of waste to be stored in each of the intermediate stores is shown in Table 4.3.

split is based on the assumption that 100% of the stadium's glass waste and 30% of the stadium's organic waste

Table 4.3 Estimated quantity of waste to be stored in GA intermediate waste rooms

Fan zone	GA concourse	Total estimated waste generation (kg/event)	Waste to be stored in intermediate rooms (kg/event)			
			Residual	Recyclables	Total	
HOME FANS	GA Level 00	2,973	1,457	624	2,081	
	GA Level 01	639	313	134	447	
	GA Level 02	5,478	2,684	1,150	3,835	
	GA Level 03	712	349	150	498	
AWAY FANS	GA Level 00	0	0	0	0	
	GA Level 01	671	329	141	470	
	GA Level 02	0	0	0	0	
	GA Level 03	0	0	0	0	
	Total	10,473	5,132	2,199	7,331	

Hospitality Areas

In the hospitality areas, it is anticipated that four primary waste streams will be segregated: residual waste, mixed recyclables, organics (from plate waste) and glass. Table 4.4 details the expected waste generation per match for each of the hospitality areas.

Table 4.4 Estimated waste generation per match (hospitality areas only)

Fan zone	Hospitality	No. of	Estimated waste generation (kg/match)				
	area	hospitality fans	Residual*	Recyclables	Organics	Glass	Total
WEST SIDE PREMIUM,	Hospitality 00	150	29	12	11	42	95
SUITES AND	Hospitality 01	1,202	233	100	89	340	761
BOXES	Hospitality 02	637	123	53	47	180	403
	Hospitality 03	2,136	413	177	158	604	1,353
EAST SIDE PREMIUM,	Hospitality 00	0	0	0	0	0	0
SUITES AND	Hospitality 01	1,171	227	97	87	331	742
BOXES	Hospitality 02	108	21	9	8	31	68
	Hospitality 03	0	0	0	0	0	0
	Total	5,404	1,046	448	401	1,527	3,422

*assuming 60% recycling capture rate

Waste Storage 4.4

Site-Wide

All waste will be brought to the central waste and recycling area in the stadium's north-west corner post-match. Residual waste and mixed recyclables will be stored in portable compactors, while glass and organics will be stored in 240 litre Eurobins.

The central waste and recycling area must be properly equipped and maintained, with adequate pedestrian buffer zones, markings and signage, supervision and security.

The central waste and recycling area includes space for the following:

- Storage space for 240 litre Eurobins;
- Temporary storage space for handling 660 litre Eurobins brought down from the levels above;
- be properly marked, with safe and secure containers used. Safe working methods are to be adopted by any operatives handling hazardous wastes;
- . (8.12m with bin hoist). This compactor has an operating height clearance of 5.3m;
- A portable roll-on roll-off compactor for DMR (with an approximate capacity of 20 m³ and pay load of up to • 4,000kg¹). The typical dimensions of the compactor would be 2.56 m (H) x 2.55 m (W) x 6.60 m (L) (8.12m with bin hoist), with an operating height clearance requirement of 5.3m;
- . generated;
- A skip for grass cuttings with the following approximate dimensions: 2.22m (H) x 1.91m (W) x 4m (L). It is • proposed that the skip would be stored on a powered dolly in the north-east corner of the central waste and recycling area;
- A bin wash-down area with appropriate drainage provision. •

It is anticipated that each compactor will need to be collected twice between each match, as is shown in Table 4.5. There is flexibility to adapt the weekly compactor collection frequency depending on the matches/events that are scheduled for each week.

Table 4.5 Residual and recyclables compactor requirements

	Residual	Recyclables
Estimated waste generation (kg/event)*	9,717	4,165
Maximum compactor fill weight (kg)	6,000	4,000
Number of compactors provided	1	1
Number of collections required between matches	2	2

*assuming 60% recycling capture rate

The storage requirements for glass and organic waste are shown in Table 4.6.

Table 4.6 Glass and organic bin requirements

	Organics	Glass
Estimated waste generation (kg/event)	1,337	1,527
Maximum bin fill weight (kg)	50	50
Number of 240 litre Eurobins required	29*	32

*this number includes the 240 litre bins from the hospitality area kitchens and the bins needed to store organic waste from the main commissary kitchen

A dedicated secure cabinet for the storage of any hazardous wastes. All areas for hazardous waste storage are to

A portable roll-on roll-off compactor for residual waste (with an approximate capacity of 20m³ and payload of up to 6,000kg). The typical dimensions for this piece of equipment are as follows: 2.56m (H) x 2.55m (W) x 6.60m (L)

Space for the storage of a small quantity of Waste Electrical and Electronic Equipment (WEEE) wastes that will be

¹ The maximum payload for the recyclables compactor is lower than that of the residual compactor. This is because the recyclable waste stream is less dense than residual waste. Also, in order to improve the quality of the recyclate, it is advised that recyclable waste is not

compacted as much as residual waste.

An indicative plan of the central waste and recycling area, with the compactors, bins and other waste storage equipment drawn in situ, is shown in Figure 4.1.



Figure 4.1 Indicative layout of central waste and recycling area

General Admission Areas

Intermediate waste stores have been provided in various locations to help keep waste management operations as discreet and efficient as possible. These stores are located in close proximity to the GA concourses and will allow waste from these areas to be held locally until the concourses are less congested.

Based on the assumptions outlined in Section 4.2, it is anticipated that intermediate stores will need to accommodate the bin numbers shown in Table 4.7. In some areas, it is anticipated that bins from the stores may need to be moved down to the L00 waste area on one occasion during a match, most likely during the first half when the concourse areas are less congested.

Table 4.7 Expected intermediate waste storage requirement (GA areas)

Fan zone	GA concourse	Waste to be	No. of 660 litre Eurobins required			
		stored in intermediate rooms (kg/event)	Residual	Recyclables	Total	
HOME FANS	GA Level 00	2,081	19	8	27	
	GA Level 01	447	4	2	6	
	GA Level 02	3,835	34	15	49	
	GA Level 03	498	5	2	7	
AWAY FANS	GA Level 00	0	0	0	0	
	GA Level 01	470	4	2	6	
	GA Level 02	0	0	0	0	
	GA Level 03	0	0	0	0	
	Total	7,331	66	29	95	

All waste rooms will have adequate ventilation and lighting and will be sealed to prevent vermin entering. Rubber buffers or stainless steel plating should also be incorporated in all waste rooms and service lifts to avoid damaging the walls.

Hospitality Areas

Interim waste stores have also been provided to serve the stadium's hospitality areas. These have been incorporated adjacent to or in close proximity to each of the satellite kitchens.

Based on the assumptions outlined in Section 4.2, it is anticipated that the kitchens and interim hospitality stores will need to accommodate the bin numbers shown in Table 4.8.

Table 4.8 Expected intermediate waste storage requirement (hospitality areas)

Fan zone	Hospitality	Waste to be	No. of 240 litre Eurobins required					
	area	stored in kitchens and interim stores (kg/event)	Residual	Recyclables	Organics	Glass	Total	
WEST SIDE PREMIUM,	Hospitality 00	95	1	1	1	1	4	
SUITES AND	Hospitality 01	761	5	2	2	7	16	
BOXES	Hospitality 02	403	3	1	1	4	9	
	Hospitality 03	1,353	9	4	3	12	28	
EAST SIDE PREMIUM,	Hospitality 00	0	0	0	0	0	0	
SUITES AND BOXES	Hospitality 01	742	5	2	2	7	16	
	Hospitality 02	68	1	1	1	1	4	
	Hospitality 03	0	0	0	0	0	0	
	Total	3,422	24	11	10	32	77	

5 Conclusions

This OWMS has described how operational waste generated from the proposed new stadium at Bramley-Moore Dock and its associated public realm will be managed in compliance with relevant national, regional and local waste management policy requirements (see Appendix A).

In line with the requirements set out in the National Planning Policy for Waste (Ministry of Housing, Communities and Local Government, 2014), the waste management strategy will look to maximise recycling and re-use, with waste segregated at source into a number of streams. As a minimum, residual waste and mixed recyclables will be separated, although some areas will also segregate glass and organic waste.

The stadium will be at its busiest on a match day and it is at these times that most waste will be generated. In total, it is estimated that approximately 16,700kg of waste will be produced when the stadium reaches maximum capacity.

Adequate provision has been made in the stadium's central waste and recycling area for the on-site storage of all operational waste, in compliance with Policy WM9 of the Joint Waste Local Plan for Merseyside and Halton (Waste Planning Merseyside, 2013) and Policy EP9 of the Liverpool Unitary Development Plan (2002).

The provision of intermediate waste storage rooms in various locations across the stadium will provide further resilience and also improve the efficiency of waste management operations. These rooms will be located in close proximity to those areas that generate the most significant quantities of waste (i.e. the GA concourses) and will enable waste to be held locally until the fan circulation areas are less congested. Wherever possible, the intermediate stores have been sized to provide sufficient storage space for waste to be held locally for the duration of a match. When fans have left the stadium, bins will be moved down to the central waste and recycling area via the nearest lift.

Residual waste and mixed recyclables will be stored in portable compactors in the central waste and recycling area, with an approximate capacity of 20m³, while glass and organics will be stored in 240 litre bins. A hook-lift truck will be used to collect each of the compactors, while the 240 litre bins will be collected by a small refuse vehicle from the designated servicing route that runs parallel to the north of the stadium.

Appendix A Waste Management Policy and Guidance

A.1 Introduction

This appendix provides an overview of the most relevant national, regional and local policies and guidance relating to the management of waste in the proposed development.

A.2 **National Context**

National Planning Policy Framework (Ministry of Housing, Communities and Local Government, 2019)

The National Planning Policy Framework (NPPF) notes that the purpose of the planning system is to contribute to the achievement of sustainable development. In paragraph 8, the document identifies three dimensions to sustainable development: economic, social and environmental. It states that these should be pursued in mutually supportive ways, so that opportunities can be taken to secure net gains across each of the three objectives. As part of its environmental role, the planning system should help to use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.

The 2012 NPPF did not contain specific waste policies, since national waste planning policy was published as part of the National Waste Management Plan for England. Similarly, the revised NPPF should be read in conjunction with the government's separate planning policy for waste. Where waste is mentioned, there is little difference between the 2012 and revised versions of the Framework. Both documents note that efforts must be made to minimise waste generation and to facilitate the sustainable use of recycled materials.

National Planning Practice Guidance: Waste (Ministry of Housing, Communities and Local Government, 2015)

The National Planning Practice Guidance (NPPG) for waste provides information further to the NPPF to support local authorities in implementing waste planning policy. For example, it sets out the role of waste planning in meeting the obligations of the European Union Waste Framework Directive (2008/98/EC) and implementing the waste hierarchy, and gives guidance on how to develop and identify waste requirements in Local Plans. It also provides details on determining planning applications, the regulatory regimes controlling waste management planning, and the requirement for inspections and monitoring to be carried out by local authorities to ensure compliance with the Waste Framework Directive.

National Planning Policy for Waste (Ministry of Housing, Communities and Local Government, 2014)

The National Planning Policy for Waste document states that non-waste planning applications should consider the impact on existing and planned waste infrastructure and that suitable provision should be made for managing waste within new developments. It stresses the need to ensure that the handling of waste arising from construction and operation of nonwaste developments maximises re-use/recovery opportunities and minimises off-site disposal.

Our Waste, Our Resources: A Strategy for England (Department for Environment, Food and Rural Affairs, 2018)

This strategy sets out plans to double resource productivity and eliminate avoidable wastes of all kinds by 2050. It includes details of how waste will be minimised and managed to reduce damage to the environment. The strategy gives a policy direction in line with Defra's (2018) 25 Year Environment Plan, with a particular focus on moving away from a traditional linear economic model towards a more sustainable and efficient circular model.

Relevant targets from this document include the following:

- To work towards achieving a 65% recycling rate for municipal solid waste (MSW) by 2035;
- To work towards sending 10% or less of MSW to landfill by 2035; and
- To eliminate all avoidable waste by 2050.

A.3 **Regional Context**

Joint Waste Local Plan for Merseyside and Halton (Waste Planning Merseyside, 2013)

The Joint Waste Local Plan for Merseyside and Halton, adopted in 2013, focuses on collaborative waste management planning between Halton, Knowsley, Liverpool, St. Helens, Sefton, and Wirral Councils, all of which form part of the Liverpool City Region. The plan sets the direction for the region's future waste management development for the period between 2013 to 2027, both in terms of site allocations for new waste processing/management sites and the development of detailed management policies. Upon adoption of the Waste Local Plan, its policies and allocations became part of each partnered authority's Local Development Frameworks (LDF).

The following policies set out in the Waste Local Plan are relevant to this OWMS:

Policy WMO – Presumption in Favour of Sustainable Development

Planning applications that accord with the policies in this Waste Local Plan (and other relevant Local Plan documents including policies in Neighbourhood Plans) will be approved without delay, unless material considerations indicate otherwise.

Policy WM8 – Waste Prevention and Resource Management

Any development involving demolition and/or construction must implement measures to achieve the efficient use of resources, taking into account the following:

- 0 recycling materials, as far as practicable on-site;
- recycled and secondary sources; and
- minimisation, recycling, management and disposal.

Evidence demonstrating how this will be achieved must be submitted with development proposals of this type.

Policy WM 9 - Sustainable Waste management Design and Layout for New Development

The design and layout of new built developments and uses must, where relevant, provide measures as part of their design strategy to address the following:

- Facilitation of collection and storage of waste, including separated recyclable materials;
- treatment; and
- schemes, where appropriate.

Joint Recycling and Waste Management Strategy for Merseyside (2011)

This report addresses resource efficiency, a subject that is also promoted by the Local Plan. It aims to provide the headline strategic route map to deliver sustainable waste management on Merseyside, transform the waste agenda and move towards greater resource efficiency.

Construction and demolition methods that minimise waste production and encourage re-use and

Designing out waste by using design principles and construction methods that prevent and minimise the use of resources and make provision for the use of high-quality building materials made from

Use of waste audits or site waste management plans (SWMP), where applicable, to monitor waste

Provide access to enable waste and recyclable materials to be easily collected and transported for

• Facilitate small scale, low carbon combined heat and power in major new employment and residential

A.4 Local Context

Liverpool Unitary Development Plan: A Plan for Liverpool (2002)

LCC's Unitary Development Plan (UDP) is a statutory document that forms part of the city's Local Plan framework, the aim of which is to help the local authority in their decision-making capacity and to provide guidance on development and how to best protect/enhance the city's environment. It provides authorities with information on a wide range of land use issues which have the potential to arise over the plan period, which in turn provides a basis for development control decisions.

With the adoption of the Merseyside and Halton Joint Waste Local Plan, a number of waste related policies within Liverpool's UDP were superseded and replaced. The UDP policies replaced by the Waste Local Plan relate specifically to landfill gas (Policy EP3), landfill (Policy EP4), waste related uses (Policy EP5), waste reception centres (Policy EP6), recycling (Policy EP7) and fly-tipping (Policy EP8).

The UDP policy relevant to the proposed development that has been saved following the adoption of the Joint Waste Local Plan is set out below:

• Policy EP9 – Waste Storage

Planning permission will only be granted for development generating commercial waste where there is:

- Adequate provision for the on-site storage of all waste arising from the operation of the premises; and
- Adequate access to enable waste to be transferred effectively to a licensed waste disposal contractor.

The Draft Liverpool Local Plan (2019)

LCC is currently preparing a new Local Plan which, once adopted, will replace the UDP. The Pre-Submission Draft of the Local Plan has undergone numerous consultations in 2013/2014, 2016, and most recently in 2018. It has now been submitted for to the Planning Inspectorate for independent examination. As of October 2019, no examination hearings had been scheduled. As such, it is unclear when the new Local Plan will be formally adopted. In accordance with NPPF paragraph 48, the current submission draft has substantive, but not full, weight in decision-making given that it remains under examination and so there may remain 'unresolved' objections to the strategy.

The Local Plan will help guide the long-term spatial vision, strategic priorities and policies for future development in Liverpool over the next 15 to 20 years. The Plan will focus specifically on the quantity and location of new homes, employment, retail and commercial services, transport and other infrastructure provision, climate change mitigation and adaptation, and conservation/enhancement of the natural and historic environment.

The Local Plan does not contain any detailed policies relating to waste as these are all set out in the Joint Waste Local Plan for Merseyside and Halton (2013). However, some policies outlined in the draft Local Plan are of relevance to waste management. For example:

• Policy H13 (New Housing – Physical and Design Requirements outside the City Centre)

Sufficient provision for waste management should be made and the proposal should promote good design to secure the integration of waste management facilities with the rest of the development including waste storage facilities. All proposals will be expected to have regard to the City Council's latest Recycling and Waste Management guidance.

• Part J of Policy UDP 2 (Development Layout and Form)

Requires that waste and recycling storage are designed in a positive manner and are integrated into the development.

• Part E of Policy SP4 (Food and Drink Uses and Hot Food Take-aways)

Requires that an appropriate location for commercial trade waste, including recycling facilities, has been identified. Bins must be contained within the curtilage of the premises and should be stored so to not cause odour nuisance, be convenient for refuse collection and be screened to protect visual amenity. Any bin provision should be retained in perpetuity.

Planning advice note on refuse storage and recycling facilities in new developments (2005)

This note provides advice on the Council's recommended standards for refuse storage and recycling in all new developments. The guidance will ensure that the right number and size of refuse containers are provided for particular developments and are located externally where possible. Larger schemes will be required to provide a storage area for the recycling of materials too.

Appendix B Waste Collection Vehicles Swept Path Analysis







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