BURO HAPPOLD

STŌK CAE RAS STADIUM: KOP Stand Redevelopment

Waste Management Technical Note

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Glossary

Term	Definition
BRE	Building Research Establishment
CEMP	Construction, Environment Management Plan
CDE	Construction, Demolition & Excavation
OWMP	Operational Waste Management Plan
SWMP	Site Waste Management Plan

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1 Summary

The Wrexham A.F.C Kop Development will comply with all relevant national and local waste management legislation to ensure that waste is appropriately segregated, stored, and managed in a way that prevents environmental harm. During the construction phase of the proposed development, it is anticipated that approximately 1,325 m^3 of construction waste and 9,311 m^3 of excavation waste will be generated. This material will be properly segregated and stored by the principal contractor to maximise recovery and recycling. In the operational phase, it is estimated that approximately 29,052 litres of waste will be produced on a typical match day. This waste will be separated into residual, organic, paper/card, metal/plastic, clinical and glass streams, and stored in designated bin stores and compactors. External waste collection services will then remove the waste for appropriate transfer and treatment.

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2 Introduction

This technical note has been produced to support an additional planning application for the Wrexham A.F.C Kop Development. The consented development provides for the addition of a new standing terrace with capacity for up to 5,500 spectators, including a viewing platform for disabled supporters, raising the overall capacity of the stadium to approximately 15,500 for league games. It will also include provision for new hospitality space for both match and non-match days, club offices, community space and a club store. This technical note supports an application for additional measures to increase the capacity of the new Kop stand capacity for up to 7,750 spectators. The red line boundary is shown in Figure 2-1.

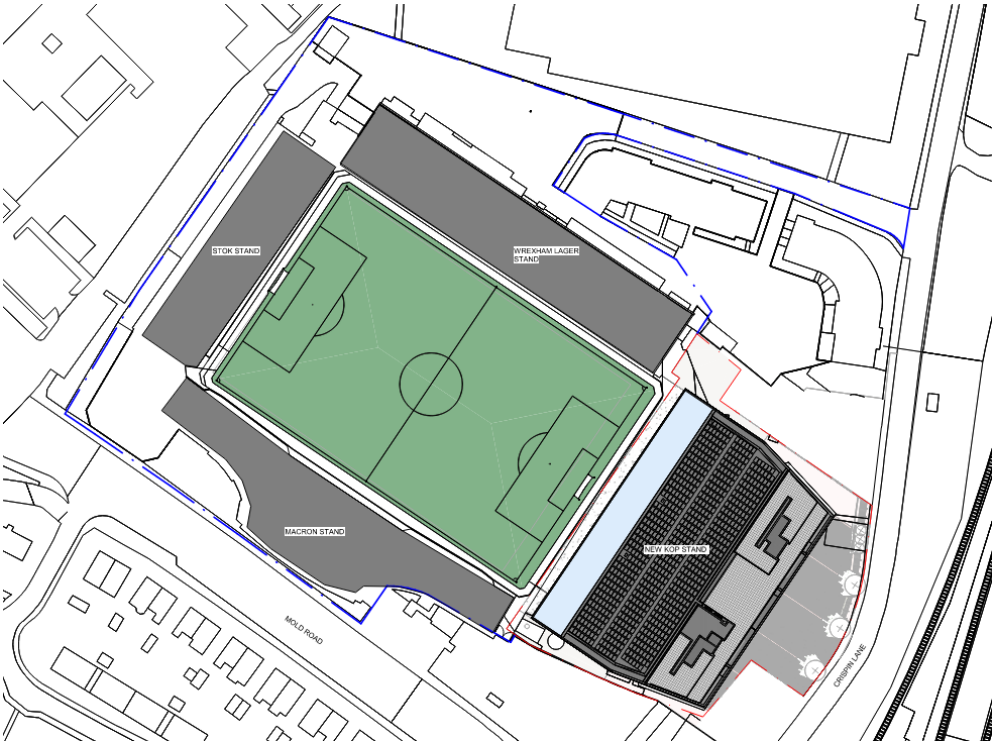


Figure 2-1 Red line boundary for Kop stand

Buro Happold has been scoped to prepare a waste management technical note to summarise the waste management strategies planned for the design and operation of the Wrexham A.F.C Kop Development. This note supersedes the previously prepared Waste Management Statement (June 2022) and covers:

- **Construction, demolition & excavation waste** – A high-level overview of the amount and composition of waste to be produced, in addition to the strategies to be employed by the principal contractor (McLaren) to maximise potential waste segregation and recovery.
- **Operational waste** – A high-level summary of the waste management strategy during the Kop stand's operational phase, highlighting how the design effectively supports appropriate waste segregation, storage, and collection.

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3 Construction, Demolition & Excavation Waste

The following policy documents listed have been considered when preparing the construction, demolition and excavation waste management strategy.

3.1 Policy

National

- The Waste Framework Directive (2008/98/EC)
- The Landfill Directive (1999/31/EC)
- Waste (England and Wales) Regulations 2016 (amended)
- Towards Zero Waste One Wales: One Planet – The Overarching Waste Strategy Document for Wales (2010)
- Hazardous Waste (England and Wales) (Amendment) Regulations 2016 SI
- The Circular Economy Package: Policy Statement, DEFRA (2020)
- The Waste (Circular Economy) (Amendment) Regulations (2020)
- Noise Emission in the Environment by Equipment for use Outdoors Regulations (2001)
- Levelling-up and Regeneration Act (2023)
- Environmental Permitting Regulations (England and Wales) (Amendment) (2023)
- Environment Act 2021 (Wales) Regulations (UK Parliament, 2025)
- Towards Zero Waste One Wales: One Planet – The Overarching Waste Strategy Document for Wales, Draft Construction and Demolition Sector Plan (2012)

Local

- Wrexham County Borough Council – Local Development Plan 2013-2028

3.2 Waste generation and composition

This section provides outline estimations of likely construction, demolition and excavation waste generation.

3.2.1 Demolition waste

All site demolition has been completed prior to the works proposed within this application, and as such no demolition wastes are expected to be generated within the scope of this application.

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3.2.2 Construction waste

The total estimated construction waste generation quantity is given in Table 3-1 and has been calculated based on area schedule provided by Populous for RIBA Stage 3; and Building Research Establishment (BRE) waste benchmarking data, obtained through the use of the SMARTWaste tool[1].

Table 3-1 Construction waste benchmark compositions

Building Material	Leisure	
	Tonnes/100m²	%
Bricks	0.401	3%
Tiles and ceramics	0.021	0%
Concrete	0.845	7%
Inert	3.001	23%
Insulation materials	0.035	0%
Metals	0.179	1%
Packaging materials	0.225	2%
Plasterboard / gypsum	0.375	3%
Binders	0.009	0%
Plastic (excluding packaging waste)	0.205	2%
Timber	0.759	6%
Floor coverings (soft)	0.008	0%
Electrical and electronic equipment	0.008	0%
Furniture	0.033	0%
Canteen/office/ad hoc waste	0.221	2%
Liquids	0.012	0%
Oils	0	0%
Bituminous mixtures	0.262	2%
Hazardous waste*	0.071	1%
Other waste	0.933	7%
Mixed construction and/or demolition waste	5.286	41%
Total	**12.89**	**100%**

[1] BRE. *SMARTWaste: BRE benchmark data, accessed 2025.*

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Table 3-2 shows the likely material breakdown and approximate quantities of construction waste that will arise from the proposed development.

Table 3-2 Construction waste generated by proposed development

Material breakdown	Waste generation	
	Tonnes	m^3
Bricks	95	64
Tiles and ceramics	4	2
Concrete	141	95
Inert	297	199
Insulation	11	8
Metals	14	10
Packaging	30	20
Gypsum	40	27
Binders	6	4
Plastics	4	3
Timber	58	39
Floor coverings (soft)	2	2
WEEE	2	1
Furniture	1	0
Canteen/office/ad hoc	6	4
Liquids	12	8
Oils	0	0
Soil	1,088	727
Asphalt and tar	71	47
Hazardous	0	0
Other	0	0
Mixed	96	64
Total	**1,977**	**1,325**

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3.2.3 Excavation waste

A cut and fill analysis has been conducted by Buro Happold civil engineering team to determine the amount of excess cut to be generated on site. The analysis is included in Appendix A. Minimal fill is required on site, resulting in an excess cut of 9,311 m^3 to be generated and requiring reuse, recovery or disposal off site.

3.3 Waste recovery and savings

Further savings could potentially be achieved throughout the construction stage if targets for waste recovery and segregation are set. The potential savings indicated in Table 3-3 have been derived from WRAP guidelines[2].

In line with Wales' Towards Zero Waste plan, waste should be segregated as standard practice with an aim to achieve good practice diversion rates. In most cases, good practice methods are easily achievable, cost neutral and do not require a fundamental change in working practice.

Table 3-3 Potential waste savings

	No recovery (tonnes)	Standard practice segregation (tonnes)	Good practice segregation (tonnes)	Best practice segregation (tonnes)
Waste recovered	-	1,541	1,712	1,772
Waste disposed of	1,878	337	166	106

3.4 Waste reduction and recovery

Sustainable waste management techniques will be considered throughout the site preparation, demolition and construction phases. As noted in McLaren's Construction, Environment Management Plan (CEMP), a nominated waste champion will oversee the implementation plan and will ensure the project adopts the following sustainable waste management principles.

3.4.1 Materials management on-site

- A system will be established so that the correct quantities of materials are ordered. This will reduce the volume of unused materials going to landfill
- Dedicated areas will be created that allow for the correct storage of new building materials. This will reduce the risk of contamination/spoiling
- Timely ordering of materials will reduce the time that materials are stored on site. This will also reduce the risk of spoiling
- Provision of clearly marked segregated bins/skips for construction materials to avoid cross-contamination and to facilitate recycling

[2] WRAP, *Practical solutions for sustainable construction: Achieving goods practice Waste Minimisation and Management. Guidance for construction clients, design teams and contractors.*

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- All waste generated will be stored in designated areas that are isolated from surface drainage. Waste containers will be covered to prevent dust and litter being blown out and rainwater accumulating. Containers will be inspected regularly and replaced when full.

3.4.2 Waste segregation on-site

Waste will be segregated on-site wherever possible. However, when this is not viable, mixed materials will be stored and sent to a local construction recycling facilities. The following recommendations should be considered to minimise the amount of waste produced and increase the proportion of waste that is segregated:

- A specific area will be allocated and labelled to facilitate the segregation of waste materials for potential re-use, recycling and recovery
- Efforts should be made to recover and recycle packaging waste in accordance with packaging legislation
- Different waste streams should be segregated. At a minimum, containers/skips for hazardous/non-hazardous waste and plasterboard waste should be provided on-site. Some examples are shown in
- Recycling and waste skips will be kept clean and clearly marked to reduce contamination of materials. The labelling shall use 'Waste Stream Colour Codes'
- Training will be provided for all site personnel, informing them of the correct disposal routes for materials. A site waste champion will be appointed to oversee correct segregation/disposal and keep a record of all waste generated

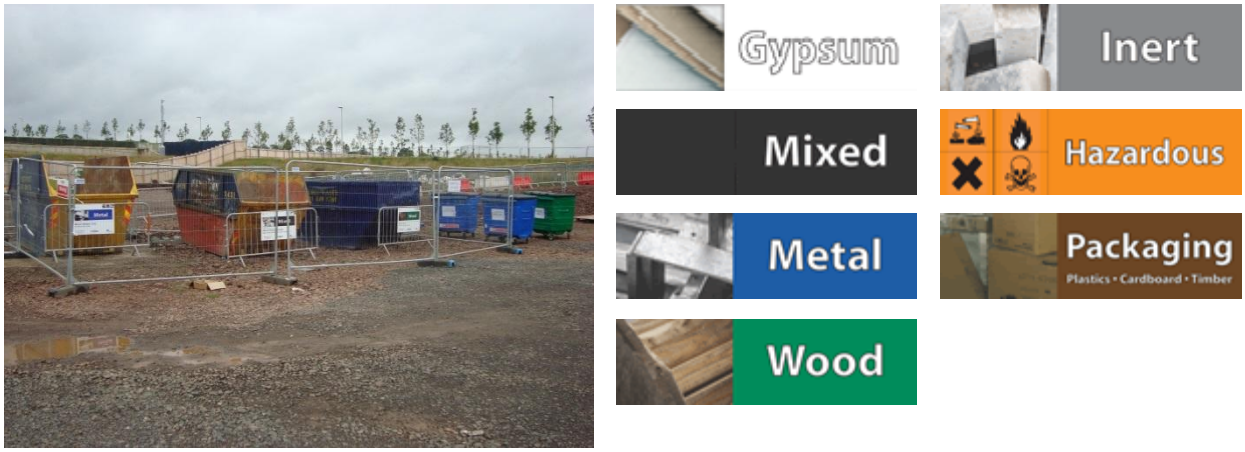


Figure 3-1 Examples of on site waste segregation

Site waste management responsibilities

The Principal Contractor (McLaren) will be responsible for waste management upon appointment. The SWMP will be updated at least every 6 months. All waste removal dockets or consignment notes must be collected and stored on-site. On completion of the development, a report shall be produced by the Principal Contractor that will detail total waste produced and actual recycling rate achieved. This will be added to this document and filed in a separate section.

The full SWMP will also include information and copies of data recording forms detailing the information recorded when any waste material leaves the site. In addition, the following aspects of site waste management should be audited:

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- Delivery recording arrangements
- Materials handling and storage
- Use of materials (including surplus materials)
- Auditing of disposal areas (i.e. skip auditing)
- Site staff awareness of waste management procedures.

Prospective waste management companies tendering for waste management work shall be audited and interviewed before any agreement is made between the client and waste management company.

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4 Operational Waste

This section summarises the proposed waste management strategy for operational waste produced on a day-to-day basis throughout the operations of the stand. It summarises how waste generations have been estimated, what policy has been considered and how the architectural design accommodates the waste management strategy design.

4.1 Policy and guidance

The following policy documents listed have been considered when preparing the operational waste management strategy.

National context

- Environmental Protection (Duty of Care) Regulations (1990)
- Environmental Protection Act 1990 (Part II)
- Towards Zero Waste One Wales: One Planet – The Overarching Waste Strategy Document for Wales (2010)
- The Controlled Waste (England and Wales) Regulations 2012
- Guidance on Applying the Waste Hierarchy (2012)
- Towards Zero Waste One Wales: One Planet – The Waste Prevention Programme for Wales (2013)
- Waste (England and Wales) Regulations 2016
- Environmental Permitting (England and Wales) Regulations 2016 (amended)
- Environment (Wales) Act 2016
- The Waste (Miscellaneous Amendments) (EU Exit) (No.2) Regulations 2019The Waste (Circular Economy) (Amendment) Regulations 2020
- The Waste and Environmental Permitting etc. (Legislative Functions and Amendments etc.) (EU Exit) Regulations 2020
- Beyond Recycling: A Strategy to Make the Circular Economy in Wales a Reality (2021)
- Environment Act 2021 – UK Parliament (2021) (Commencement No. 9 and Transitional Provisions) Regulations 2024 (Simpler Recycling to be implemented in 2025)
- The Waste Separation Requirements (Wales) Regulations (2023) and associated Code of Practice
- Workplace Recycling Regulations (2024)
- Planning Policy Wales (2024)

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Local context

- Wrexham County Borough Council – Local Development Plan 2013-2028

Other relevant guidance

- BS 5906:2005 Waste Management in Buildings – Code of Practice
- Building Regulations 2010 Drainage and Waste Disposal 2015 Edition (HM Government, 2015)
- Association of Directors of Environment, Economy, Planning and Transport (ADEPT) – Designing Waste Management in New Developments: A Practical Guide for Developers and Local Authorities (2016)

4.2 Waste generation and composition

Benchmarks used to estimate solid waste generation at the KOP Stand redevelopment are provided in Table 4-1. Various sources were utilised in the absence of Wrexham County Borough Council guidance for waste generations. Benchmarks used to estimate solid waste percentage composition at the KOP Stand redevelopment are provided in Table 4-2.

Table 4-1 Waste generation benchmarks

Land use	Waste Generation Benchmarks		
	Generation	Unit	Sources
Stadium	0.38	kg/fan/game	Manchester City Football Club Waste data, 2023
Retail	0.05	kg/m2/day	Manchester City Football Club Waste data, 2023
Leisure	0.02	kg/m2/day	The Gym Group, 2021
Office	0.037	kg/m2/day	BH study of UK Offices, 2019
Public Spaces	0.0015	kg/m2/day	Central Park 2016
Medical	0.28	kg/doctor/day	WHO Guidance, 2014
Food & Beverage	0.311	kg/m2/day	BH study of London restaurants, 2018

Table 4-2 Waste composition benchmarks

Land Use	Composition					
	Residual	Plastic and Metal	Paper and Card	Food	Glass	Clinical
Stadium	48.5%	20%	5%	11.5%	15%	-
Retail	28%	23%	43%	3%	3%	-
Leisure	58%	27%	10%	5%	0%	-
Office	29%	30%	16%	13%	12%	-
Public Spaces	5%	30%	30%	19%	16%	-
Medical	40%	3%	2%	3%	1%	51%
Food & Beverage	13%	17%	19%	28%	23%	

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The benchmarks outlined have been applied to the land use and also the total number of fans (7,500 fans). It should be noted that while the maximum total number of spectators for the current planning application is listed as "up to 7,750", within the current Stage 3 design the seating capacity is 7,500 spectators. As such the waste generation and waste storage capacity has been designed to 7,500. See Table 4-3 for further information.

Table 4-3 Number of fans per level (Stage 3)

Land Use	Level	No. fans
General Admission	Level 00	4,750
The Dragon Pit	Level 00	250
Players	Level 01	0
Hospitality	Level 02	525
GA+	Level 03	1,450
Hospitality	Level 04	525
Total	**-**	**7,500**

The total waste generation is estimated at approximately 29,052 litres of waste per match day event. Figure 4-1 shows the waste generated by each land-use by waste stream in the KOP Stand. The results show that residual waste is the highest waste generating stream, with the stadium land use (fans) generating the majority of the waste.

Table 4-4 Waste generation from the whole site

Description	Residual	Plastic & Metal	Paper & Cardboard	Food	Glass	Clinical	Total
Daily anticipated waste generation (kg/day)	1,387	574	146	329	429	1	2,866
Daily anticipated waste generation (litres/day)	17,344	8,201	1,307	1,097	1,099	4	29,052

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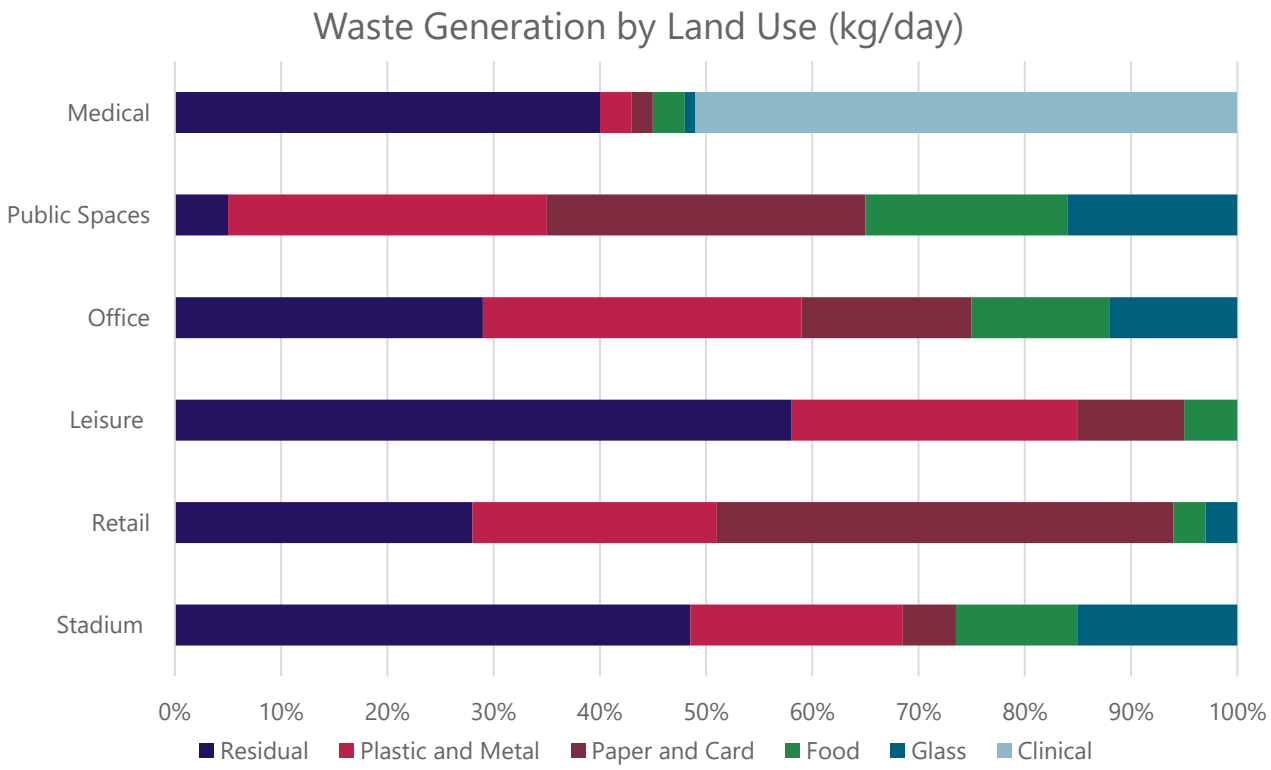


Figure 4-1 Waste generation by land use

4.3 Waste management strategy

Waste throughout the stand will be source segregated into the streams outlined in Section 4.2. The overarching flow of waste is shown in Figure 4-2. Once operational, Wrexham AFC are committed to exploring options (e.g. reusable cups, water bottle refill stations etc.) to reduce waste from the offset in line with Welsh Towards Zero (2010) policy.

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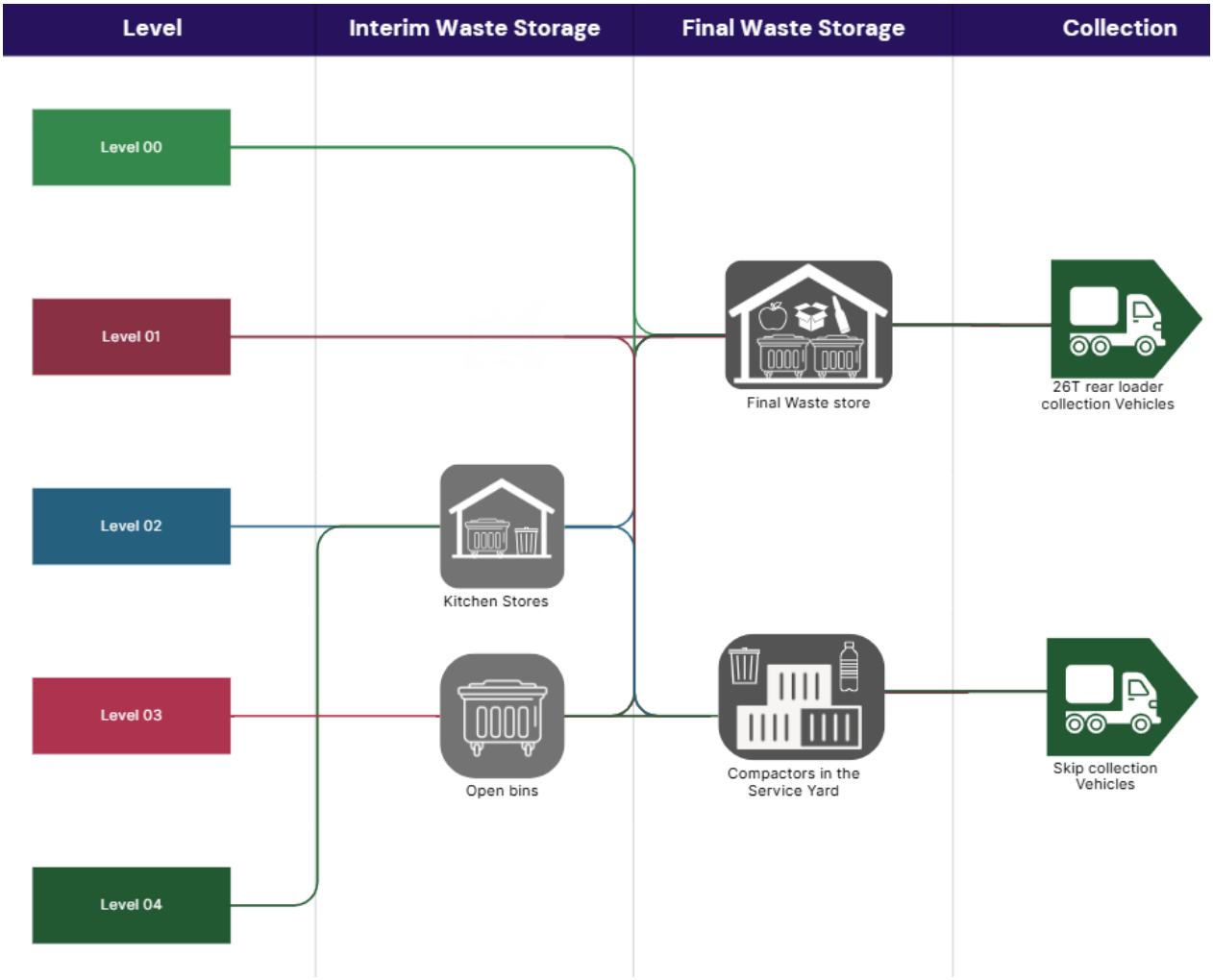


Figure 4-2 Overarching waste management strategy

Concessions and concourse (Level 00): Throughout match day, staff will manage waste generated on the ground floor by transferring it either directly to the final waste store or to the compactors located in the service yard. Paper and card, food, and glass waste are taken to the final waste store, while residual waste and plastic and metal waste are transported directly to the compactors.

Media and changing rooms (Level 01): Waste generated on Level 01 will be collected from point of generation bins by staff at the end of each match day using cleaning carts stored on Level 03, before being transferred to either the final waste store or the compactors within the service yard depending on the waste stream.

Hospitality (Level 02 & 04): Level 02 holds the kitchen servicing/prep areas which sends food and beverages to level 02 and Level 04. During match day, kitchen wastes generated will be transferred to the intermediate waste stores on Level 02 (direct or via the kitchen lift).

Both intermediate waste stores have been designed to accommodate: 2 x 1,100L residual bins, 1 x 1,100L plastics & metals bin, 1 x 120L food waste bin, 1 x 120L glass bin, 1 x 120L paper & card bin. At the end of match days, bins held in the intermediate waste stores will be transferred by staff either to the final waste store or to the compactors via passenger lifts or the kitchen lift.

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Concessions and concourse (Level 03): During match day, for example after half time, staff will collect waste from point of generation bins and litter, and store waste in bins. At the end of match day staff will then transfer paper & card, food and glass wastes to the final waste store using cleaning carts via either passenger lifts or the kitchen lift. Residual waste, and plastic & metal wastes bins are transferred directly to the compactors.

Final waste store

The final waste store (Level 00) is sized to 32m^2 and will accommodate the bins outlined in Table 4-5. A configuration of the bin layout is illustrated in Figure 4-3.

Table 4-5 Waste storage capacity

Waste Stream	Bin size	No. bins	Compactor size	No. Compactors
	Final Waste Store	Service Yard		
Residual	-	-	10m^3	1
Plastics & Metals	-	-	10m^3	1
Paper & Card	1,100L	4		
	240L	1		
	120L	2		
Food	240L	5		
	120L	1		
Glass	240L	5		
	120L	2		
Clinical	240L	1		

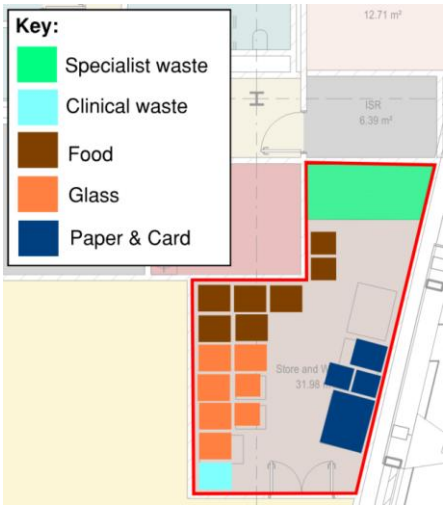


Figure 4-3 Final waste store bin layout

Waste collection

Waste will be collected following a match day from the final waste store by the waste contractor using a traditional 26 tonne waste vehicle as seen in Table 4-6. The final waste store is currently located 16 metres away from the waste collection point.

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Table 4-6 Waste collection vehicles

Vehicle	Image	Dimensions (m)	Height Clearance (m)
26T vehicle – standard rear loader		Height: 3.8m Length: 10.5 Width: 2.5m	4.5m
Skip Vehicle		Height: 3.8m Length: 7.5m Width: 2.1-2.5m	4.5m when in transit 5m when lifting

Vehicle tracking has been conducted by Buro Happold to assess the feasibility of a 26-tonne waste collection vehicle accessing the final waste store to ensure that the vehicle has sufficient access for waste collectors to collect waste from the final waste store. The 10m^3 compactors holding residual waste and plastic & metal waste will be collected following a match day by the waste contractor using a skip collection vehicle as shown in Table 4-6. Vehicle tracking for the skip truck has also been conducted to ensure that the skip vehicle has sufficient access for waste collectors to collect waste from the compactors.

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Appendix A Cut and Fill Analysis

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