

WASTE MANAGEMENT PLAN

475 Badgerys Creek Road, Bradfield

Prepared for:

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Ingham Property Group Pty Limited (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. 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.

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1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Ingham Property Group (The Client) to prepare a Waste Management Plan (WMP) in support of the master plan for 475 Badgerys Creek Road development site. This WMP provides a high-level overview of the likely wastes that will be generated during construction and operation of the site. This WMP has been developed in accordance with the master plan requirements, relevant Development Control Plans as well as good safe practice principles for waste management.

1.1 Objective

The principal objective of this Waste Management Plan (WMP) is to provide a high-level overview and identify all potential wastes likely to be generated at the Development site during the site construction and operational phases, including a description of how waste should be handled, processed and disposed of, or re-used, in accordance with the *Western Sydney Aerotropolis Master Plan Guidelines – Guidelines to Master Planning in the Western Sydney Aerotropolis*.

The objectives of this Waste Management Plan are to:

- Identify, quantify, and classify the likely waste to be generated during construction and operation,
- Describe measures to be implemented to minimise, reuse, recycle and safely dispose of this waste.

1.1.1 Complying Development for Waste Management during demolition and construction

The Complying Development requirements for Waste Management applicable to the proposed development are listed below:

(1) A waste management plan for the work must be submitted to the principal certifying authority at least 2 days before work commences on the site

(2) The waste management plan must—

(a) identify all waste (including excavation, demolition and construction waste materials) that will be generated by the work on the site, and

(b) identify the quantity of waste material in tonnes and cubic metres to be —

(i) reused on-site, and

(ii) recycled on-site and off-site, and

(iii) disposed of off-site, and

(c) if waste materials are to be reused or recycled on-site—specify how the waste material will be reused or recycled on-site, and

(d) if waste materials are to be disposed of or recycled off-site—specify the contractor who will be transporting the materials and the waste facility or recycling outlet to which the materials will be taken.

(3) A garbage receptacle must be provided at the work site before works begin and must be maintained until the works are completed.

(4) The garbage receptacle must have a tight-fitting lid and be suitable for the reception of food scraps and papers.

1.2 Review of the Waste Management Plan

This WMP is not a static document. It is a working document that requires review and updating to ensure ongoing suitability for the proposed on-going operations at the site.

This WMP will be reviewed and updated:

- To remain consistent with waste and landfill regulations and guidelines
- If changes are made to site waste and recycling management, or
- To take advantage of new technologies, innovations and methodologies for waste or recycling management.

2 Development Description

2.1 Overview of the Proposed Development

The Site is located at 475 Badgerys Creek Road, Bradfield, legally known as Lots 99 and 100 in DP1287207 and comprises a total area of 182 ha along Badgerys Creek Road, centrally located within Western Parkland City. Lot 99 comprises of the zone substation and Lot 100 comprises of the remainder of the site. The site forms part of the Aerotropolis Core Precinct within the Western Sydney Aerotropolis and is predominately zoned for ENT Enterprise use under the State Environmental Planning Policy (Precincts – Western Parkland City) 2021 (WPC SEPP).

The site comprises a total area of 184 hectares along Badgerys Creek Road, strategically located within the heart of the Western Parkland City. The large majority of the site is under the ownership of IPG, with a small portion of land earmarked for the North Bradfield Zone Substation owned by Endeavour Energy. The site is largely defined by grass land and is largely clear of vegetation as it is currently used for agricultural purposes. There is also an internal road network within the site which had previously connected the now demolished sheds and ancillary structures dispersed across the site. The site is suitable for development and free of contamination which has been confirmed by environmental testing and site investigations.

The site is situated within the Western Sydney Aerotropolis, with a direct interface with the Western Sydney International Airport (WSI). The site is bound by two significant riparian corridors which define Western Sydney, with South Creek to the east and Badgerys Creek to the north-west. The immediate surroundings of the site are characterised by large rural landholdings used predominately for agricultural and light manufacturing purposes, all of which will redeveloped in accordance with the Aerotropolis Precinct Plan vision.

IPG is in the process of preparing a Master Plan, which have been endorsed by the TAP, for the site which will be formally lodged to the Department of Planning, Industry and Environment (DPIE) in accordance with the Western Sydney Aerotropolis Master Plan Guidelines.

The IPG Master Plan was informed by a detailed assessment of the site-specific considerations through preliminary site investigations. The Master Plan breaks down the general application of the Enterprise zone across the site and provides a more granular approach to land use planning with considerations made to the opportunities and constraints of the site. The structure plan is made up of three key land uses which include enterprise and light industry, business and enterprise, and employment zone centres.

IPG has engaged SLR Consulting Pty Ltd to prepare a Waste Management Plan to inform objectives included in Section 1.1 above of the master plan and co-design process.

The proposed site location is in **Figure 1** below.

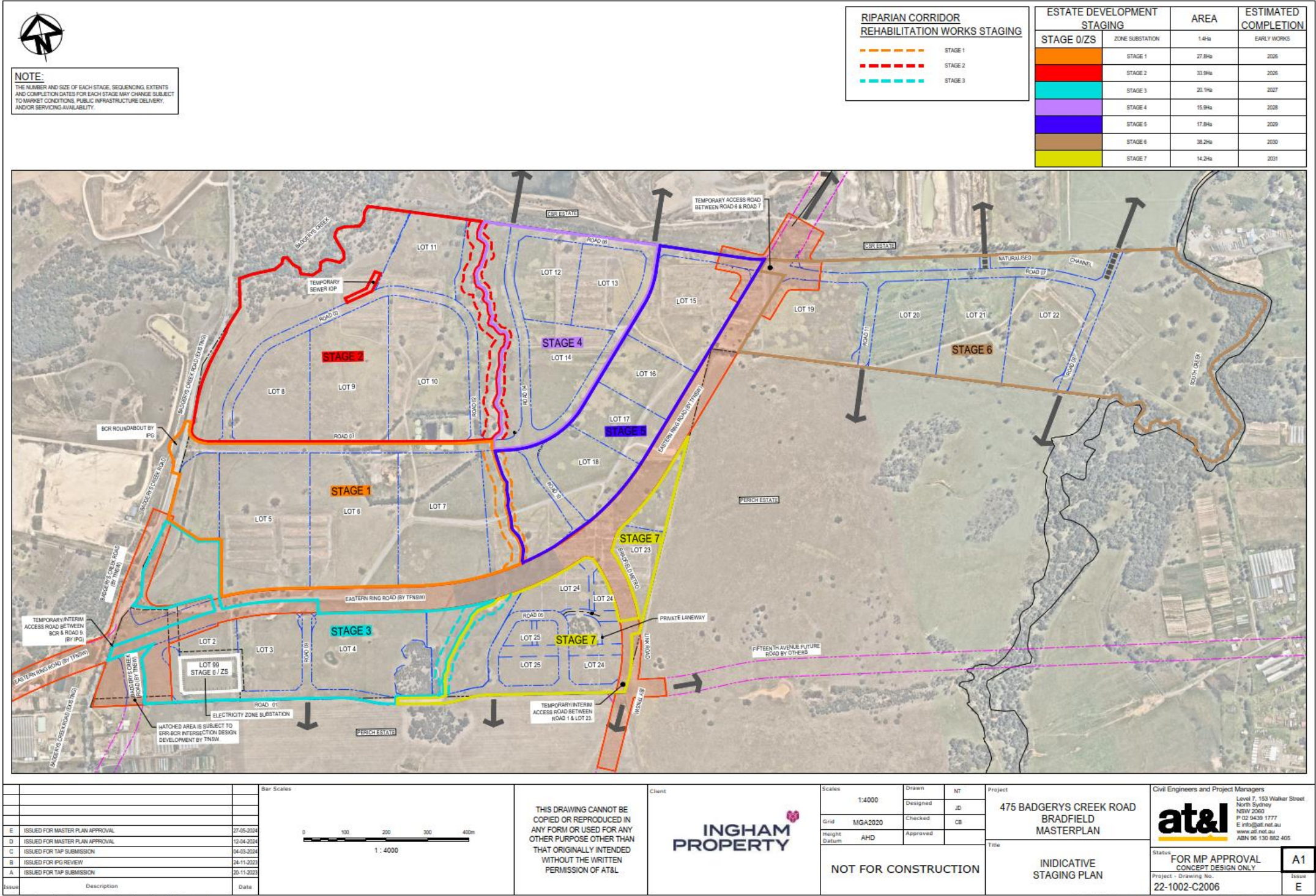


Source: PMSA 2021

Figure 1 - Site Location

The proposed master plan for the Subject Site will comprise an Enterprise Estate and Local Centre and is proposed to include:

- 481,960 m² of warehouse floorspace
- 24,570 m² of ancillary office floorspace
- 6,579 m² of business / enterprise floorspace
- 520 m² of café / amenity floorspace.
- 91,540 m² of commercial / retail floorspace
- 20,298 m² of business / enterprise floorspace.



2.2 Overview of the Proposed Operations

The majority proposed land use within the site consists of enterprise and light industrial uses. The south-eastern corner of the site is defined by business and enterprise uses, with an employment zone centre use to form the direct interface with Fifteenth Avenue.

Based on the *IPG Bradfield – Economic Assessment March 2024*¹, prepared by Urbis, the proposed Structure Plan is estimated to deliver approximately 7,144 jobs to the Aerotropolis Core Precinct. This is based on an approximate development area of 625,467 m². **Table 1** provides an estimated gross floor area and total jobs per land use type.

It was assumed that all commercial and retail areas and offices shown in the drawings *22104_DA-SK029_T_MASTERPLAN.pdf*² are referred to as *commercial and other services* and trade units as *retail trade* in the table given below.

Table 1 Estimated Potential GFA and targeted jobs

Land Use Mix	Approx. GFA (m ²)	Job Density (m ² /job)	Approx Total Jobs
Warehouse	481,960	300	1,607
Business / Enterprise (including Business Park)	26,877	60	448
Ancillary Office	24,570	50	491
Café	520	25	21
Commercial (includes retail)	91,540	20	4,577
Total	625,467		7,144

¹ IPG Bradfield – Economic Assessment, prepared for Ingham Property Group, Urbis, March 2024

² Drawing prepared by SBA Architects on 23.05.24, drawing no. SK029, revision T, *Masterplan IPG Badgerys Creek NSW*

3 Better Practice Waste Management and Recycling

3.1 Waste Management Hierarchy

This WMP has been prepared in line with the waste management hierarchy shown in **Figure 3**, which summarises the objectives of the *Waste Avoidance and Resource Recovery Act 2001*.

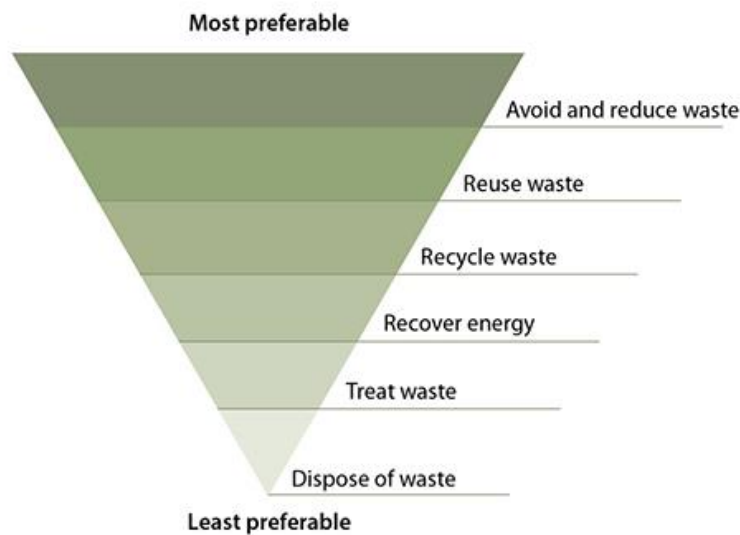


Figure 3 - Waste Management Hierarchy

The Waste hierarchy is:

- **Avoidance** including action to reduce the amount of waste generated by households, industry and all levels of government
- **Resource** recovery including re-use, recycling, reprocessing and energy recovery, consistent with the most efficient use of the recovered resources
- **Disposal** including management of all disposal options in the most environmentally responsible manner.

3.2 Benefits of Adopting Better Practice

Adopting better practice principles in waste minimisation offers significant benefits for organisations, stakeholders and the wider community. Benefits from better practice waste minimisation include:

- Improved reputation of an organisation due to social and environmental responsibility.
- Lowered consumption of non-renewable resources.
- Reduced environmental impact, for example, pollution, from materials manufacturing and waste treatment.
- Reduced expenses from lower waste disposal.
- Providing opportunities for additional revenue streams through beneficial reuse.

4 Waste Legislation and Guidance

4.1 Master Plan Requirements

The relevant requirements of the Master plan are addressed in this report as shown in **Table 2** below.

Table 2 Master Plan Requirements

Requirements for Waste Management	Relevant Sections in this WMP
<p>Waste and servicing:</p> <ul style="list-style-type: none"> identify, quantify, and classify the likely waste to be generated during construction and operation 	<p>Construction waste types and classifications can be found in Table 6 Construction waste quantities can be found in Section 5.3 Operational waste types and classifications can be found in Table 9 Operational waste quantities can be found in Table 11</p>
<ul style="list-style-type: none"> describe measures to be implemented to minimise, reuse, recycle and safely dispose of this waste. 	<p>Construction waste management and disposal is covered in Section 5 Methods for reuse and recycling of construction waste are provided in Section 5.5 Operational waste management and disposal is covered in Section 6 Methods for reuse and recycling of operational waste are provided in Section 6.6</p>

We have also referred to the following for guidance:

- Liverpool Development Control Plan (Liverpool DCP) 2008³
- In the absence of construction waste generation rates and industrial, commercial and mixed-use specific operational waste generation rates in Liverpool DCP, we have also adopted the guidance from the following:
 - Penrith Development Control Plan (Penrith DCP) 2014⁴
 - Penrith Council's Industrial, Commercial and Mixed-use Waste Management Guidelines.⁵
 - The Hills Development Control Plan 2012 (The Hills DCP).

4.2 Liverpool DCP 2008

Requirements for waste management in new commercial and / or industrial developments in Council's jurisdiction are outlined in Part 1 of the Liverpool Development Control Plan 2008 (DCP), General Controls for all Development, and Part 7 Development in Industrial Areas.

The DCP requires the operational WMP to:

- Predicted types of generated waste, and estimated volumes or weights of each; and
- List Reuse, recycling and disposal options for all likely waste types generated.

³ <https://www.liverpool.nsw.gov.au/development/liverpools-planning-controls/liverpool-development-control-plan>

⁴ <https://www.penrithcity.nsw.gov.au/building-development/planning-zoning/planning-controls/development-control-plans>

⁵ https://www.penrithcity.nsw.gov.au/images/documents/building-development/planning-zoning/planning-controls/Waste_Management_Guidelines_Industrial_Commercial_Mixed_Use.pdf

Council's DCP Part 1, Section 25 – Waste Disposal and Re-use Facilities stipulates each waste management area should be designed to ensure:

- Sufficient housing for the agreed number of bins as a consent condition
- Sufficient space for user access, bins, and manoeuvring of bins
- Storage and collection of waste and recyclables is easily and safely accessible for tenanted users, cleaners and collection contractors
- Collection on a level area less than 5% (1V:20H) gradient, and away from ramps and steps
- Collection servicing vehicles can efficiently and effectively service the development without reversing
- Compatibility with collection servicing vehicle dimensions, such as height, width and turning radius
- Distance between bin collection and storage is less than 15 metres, if applicable
- It is located to minimise noise impacts during use and collection
- It is well ventilated
- It is constructed using materials compatible with the proposed and adjoining development(s)
- Adequate lighting for safe use after dark
- It has a hose cock and a sewer drainage point in or adjacent to the storage area
- The hose cock should not impede or protrude into bin storage space
- FA fine grade drain cover is sufficiently installed to prevent coarse pollutants from entering the sewer
- Signage should:
 - Be in English and all other applicable languages
 - Includes illustrative graphics for at least half of the sign
 - Be posted in all waste management areas
 - Clearly identify the purpose and content of all bins, specifically what can be recycled
 - Signal Indicates for the area is to be maintained, tidy and clean
 - Displays a telephone number to arrange for bulky waste disposal.

Council's DCP Part 7, Section 6 - Building Design, Streetscape and Layout requires commercial or industrial service areas to be:

- Located away from principal street frontages, and
- Screened from view.

Furthermore, Part 7, Section 10 - Site Services stipulates:

- The owner must provide their own waste management services, and
- Waste management equipment must not be visible from the street.

4.2.1 Liverpool City Council Comments

Liverpool City Council has provided feedback and a set of comments on 11 October 2023, which should be addressed in this WMP. This WMP addresses these comments and a summary of the relevant sections is listed below.

Table 3 Liverpool City Council Comments

Comment	Relevant Sections of WMP
<p><i>Any public park areas within the master-planned area that have a children's playground or tables and chairs, picnic areas, any bus stops or areas of footpath adjacent to takeaway food premises, must have provision for a public litter bin, of a type to be nominated by Liverpool City Council. The bin housing must be capable of securely accommodating a 240 litre MGB. These public litter bins, positioned to serve the facilities mentioned above, must be within a 30 metres radius of where an HRV waste truck can legally pull up and stop to empty the litter bin.</i></p> <p><i>With regard to any street furniture to be provided within the master-planned areas this must be designed and positioned to facilitate efficient machine cleaning, and minimise the instances of litter or discarded items being trapped in or under that street furniture, or in hard-to-access corners created by paving or planter design.</i></p> <p><i>Any tree surrounds or planting grilles to be used around the base of trees to be planted in footpaths or paved areas within the master-planned areas must ensure that the ground surface up to the base of the tree remains level and easily cleanable over time. The ground level beneath the tree surround or grille must not drop over time, leaving an inaccessible pocket into which litter can fall and can't be easily cleaned.</i></p>	<p>Please refer to Section 7 of this WMP.</p>
<p><i>Council would like to reinforce that it is strongly our position that all waste collections should be:</i></p> <p><i>1) Designed around waste collection vehicles of dimensions and turning characteristics at least equal to a standard HRV; it is not reasonable to expect that properties will be serviced by smaller waste vehicles simply because they have tighter turning circles and smaller dimensions. Smaller vehicles are less efficient and more costly for waste companies to run.</i></p> <p><i>2) Designed so that all collection takes place within an enclosed portion of each proposed lot, not at kerbside, or on any area of public land. This will have a range of beneficial effects including:</i></p> <ul style="list-style-type: none"> <i>- reduction of litter dropping into the gutter – fewer call outs for street cleaning.</i> <i>- reduction of opportunistic dumping/contamination of waste bins with foreign materials.</i> <i>- reduction of damage/vandalism/theft of waste bins when they are in the public domain.</i> 	<p>Please refer to Section 6.5.3 and 6.5.3 of this WMP</p>
<p><i>If any proposed development within the master-planned area proposes to include any ancillary residential component (such as a care-takers unit) any complying or planning conditions must require that there will be two separate and distinct waste services needed, with separate facilities and equipment for each. Liverpool City Council provides only a residential waste service plus bulky household waste removal, whilst any waste services for the commercial and industrial portions must have separate bin rooms with waste removal by a licensed private waste contractor. Access arrangements must ensure that only occupants of the commercial/industrial portions of the development, and their agents or cleaners, have access to the commercial/industrial waste storage facilities, and the residents of any residential portion of the development only have access to the residential waste storage facilities. Waste materials must not be moved between the two.</i></p>	<p>This comment is not applicable to this development as no residential component of the development is proposed.</p>

4.3 Western Sydney Aerotropolis DCP 2022

The WSA DCP makes a number of references to waste management. Only those most relevant are detailed below, for example, references to residential developments are omitted. Where necessary, commentary is also provided on their application in this development.

4.3.1 Section 2.7 Parking design and access

PO7 Vehicle access arrangements and queuing areas on a site shall minimise any adverse impact on infrastructure, road networks, safety, adjoining properties, amenity, and street trees.

5. Where the entry to a parking space is also the entry to a waste collection area, access should be possible via a PIN pad and code, to avoid the need for waste truck drivers to carry keys or access cards/fobs with them.

Access for vehicles will be covered in the Traffic Management Plan.

4.3.2 2.9 Service and loading design

PO1 Provide on-site loading and servicing that meets the demand generated by the development.

2. All servicing, including waste and recycling collection, to be carried out wholly within the site with collection points at convenient locations.

This is the case for this development.

4.3.3 2.10.3 Wildlife Hazards

PO1 Development does not attract wildlife which would create a safety hazard to the operations of the Airport.

1. All waste bins are designed and installed with fixed lids.

2. Any bulk waste receptacle or communal waste storage area is contained within enclosures that cannot be accessed by birds or flying foxes.

The bins proposed will have fixed lids and suitable enclosures are proposed for waste storage.

4.3.4 2.11 Services and Utilities

PO5 Infrastructure allows for co-location of compatible similar uses.

1. Allow for the installation of the following within the utility corridor:

b. Vacuum waste collection system.

This is not relevant for this development.

4.3.5 2.16 Waste Management and Circular Economy

Objectives

- 01. Incorporate well-designed and innovative waste and recycling facilities in the building design stage.*
- 02. Encourage circular economy infrastructure including but not limited to reuse and repair facilities, sharing and leasing facilities, reverse vending machines and community recycling centres within the Aerotropolis.*
- 03. Minimise the amount of waste generated and going to landfill.*
- 04. Maximise waste separation and resource recovery.*
- 05. Provide innovative and best practice waste management collection systems and technologies for reuse, recycling, organics collection and product stewardship.*
- 06. Provide waste and recycling facilities that do not impact on amenity for residents, neighbours and the public, such as visually unpleasant areas, noise, traffic and odours from waste collection services, while also ensuring facilities are accessible, integrated wholly within the built form and easy to use.*

The aim of the waste system at this development is to achieve these requirements.

PO1 Waste management measures are implemented at lot and neighbourhood scale to support circular economy activities.

- 1. Submit a waste management plan to support circular economy activities that also details the quantity and type of waste generated and how this will be managed, reused and recycled. Where possible, incorporate technologies such as vacuum extraction or on-site food processing.*

A vacuum waste system is not proposed for this development given the limited quantities of putrescible type waste expected to be generated. Central on-site food processing, whether composting, worm farms, dehydrators or small-scale anaerobic digestion, is not proposed for development at this stage as the quantities of food waste expected would not justify such systems. The viability of an on-site food processing unit will depend on available quantities and types of food and the particular use for the development. Space is available should tenants wish to install an on-site food processing system in the future.

- 2. Co-locate and integrate waste infrastructure on sites with multiple uses by providing a single collection point for waste and recycling.*

This is the case for this development. Each warehouse will have a single collection point.

- 3. Demonstrate that organic waste can be managed in the building through measures such as:*
 - a. Multiple options for on-site organic waste to maximise recovery (e.g., communal composting, worm farms, individual composting, dehydrators);*
 - c. Energy generation from organic waste (anaerobic digestion) at lot and precinct scale.*

Please refer to the previous comment about on-site food processing. On-site food processing is not proposed unless tenants have suitable quantities and types of feedstock in which case it will up to the tenants to arrange.

PO2 Waste and recycling facilities promote waste separation and reduce contamination. Materials are separated at source to achieve higher value recovery.

Source separation is proposed.

Source separation is proposed according to Penrith Council's documentation.

1. *Collection points (including but not limited to reverse vending machines and e-waste drop-off) must be located with adequate space for servicing, ease of use and to encourage the separation of waste material. Collection points are documented in the waste management plan and are easily accessible.*

This is the case for this development.2. *Provide separate and enclosed storage for liquid, chemicals, and hazardous waste.*

Space has been allowed for these waste streams should they be generated during the operational stage.4. *Consolidated organic waste drop off points are designed to minimise any potential odour and vermin risks. This includes the provision of rooms that are temperature controlled and suitably ventilated.*

Specialised storage for organics waste is not proposed and its future installation will depend on individual tenants and the particular operations at the development.

PO3 The location of waste management is clearly indicated for each site and neighbourhood.

1. *Provide uniform waste management design and colour coding in accordance with AS 4123 across residential and commercial developments.*

This is the case for this development.

2. *Waste management systems and rooms are located inside buildings to support a heightened amenity and urban design outcome. Waste must not be left outside (excluding during collection) to avoid attracting animals.*

Screened waste areas are proposed to be adjacent to buildings.

PO4 Waste bins are provided to a level commensurate with waste produced for each development as outlined in Council's waste and recycling service.

1. *Waste storage areas are designed to:*
 - a. *Accommodate the required number and size of waste bins;*
 - b. *Provide space for the bins to be accessed, rotated and manoeuvred for emptying;*
 - c. *Allow for future waste separation practices; and*
 - d. *Account for different uses in mixed use development through the provision of separate and enclosed collection rooms for both residential and commercial uses.*

This is the case for this development.

PO5 Implement innovative waste management storage systems that are safe, healthy, and efficient.

1. Waste storage areas are to:

- a. Be well-lit and ventilated;*
- b. Include water and drainage facilities for cleaning the bins and bin storage area;*
- c. Be easily and conveniently accessible for all users and collection contractors;*
- e. Comply with Local Council Policy and contractual service provisions.*

2. Collection and loading points are to be:

- a. Level;*
- b. Free of obstructions;*
- c. Easily accessible from the nominated waste and recycling storage area;*
- d. Be integrated wholly within the built form to support a heightened amenity outcome;*
- e. Be accessible by heavy rigid collection vehicles to permit entry and exit of the site in a forward direction;*
- f. Comply with the Building Code of Australia and Relevant Australian Standards; and*
- g. Comply with Local Council Policy and contractual service provisions.*

3. Provide safe and easy access to waste and resource recovery areas for residents, building managers and collection contractors.

4. Ensure waste and recycling areas flexibly adapt to other types of waste and materials storage over time.

5. Design waste and recycling facilities to prevent litter and contamination of the stormwater drainage system.

This is the case for this development.

PO6 Waste management storage systems minimise negative impacts on the streetscape, public domain, building presentation or amenity of pedestrians, occupants, and neighbouring sites.

1. Waste storage and collection areas are to:

- a. Where possible, be integrated wholly within the developments-built form;*
- b. Not be visible from the street or public domain;*
- c. Not adjoin private open space, windows, habitable rooms, or clothes drying areas;*
- d. Not be located within front setbacks; and*
- e. Comply with Local Council Policy and contractual service provisions.*

2. *Collection points and systems are designed to minimise noise for occupants and neighbours during operation and collection.*

This is the case for this development.

PO7 Recognise waste types, generation rates and separation needs may change during the useful life of a building.

1. *Waste and resource recovery facilities are sited to enable possible future expanded floor area.*
2. *Design waste and resource recovery facilities to enable installation of new, potentially larger equipment*

This is the case for this development

4.3.6 3.2 Parking and travel management

PO2 To promote efficient and safe vehicle circulation, manoeuvring and parking (including service vehicles and bicycles).

6. *All loading and unloading areas are to be:*
 - b. *Separated from car parking and waste storage and collection areas.*

This is the case for this development.

4.4 Aerotropolis DCP 2022 – Appendices (November 2022)

This document makes a number of references to waste management. The most relevant are detailed below.

4.4.1 D.7 Aviation Safeguarding Assessment

Wildlife Hazards (Wildlife Hazard Assessment and Wildlife Management Plan)

- *A waste management plan for the operation of the use must be submitted for the following uses within the 3km, 8km and 13km buffer:*
 - a. *Agriculture;*
 - b. *Agricultural produce industry;*
 - c. *Aquaculture;*
 - d. *Camping Grounds;*
 - e. *Eco-tourist facility;*
 - f. *Food and Drink Premises;*
 - g. *Garden Centre;*
 - h. *Hotel;*
 - i. *Intensive plant agriculture;*
 - j. *Intensive livestock agriculture;*
 - k. *Kiosk;*

- l. Livestock processing industry*;*
- m. Plant Nursery;*
- n. Recreation facility (outdoor); and*
- o. Recreation facility (major).*

'Warehouse' is not among the listed uses so this condition does not apply

4.4.2 D.46 Waste Management Plan

- *A Waste Management Plan details the volumes and types of waste that will be generated by the development. It also details where waste containers will be stored, size of bin rooms, location of any planned equipment for treating waste, or systems for transferring waste (such as chutes), location of collection points and the ongoing management of collection of waste and recycling during operation. A waste management plan is also required for demolition and construction stage of the development.*
- *All new commercial, mixed use and residential flat buildings or additions to these development types are to prepare a waste management plan.*
- *Refer to the Better practice guide for resource recovery in residential developments for more information on how to prepare a waste management plan and for calculating commercial and industrial waste and residential waste and recycling generation rates.*

This waste management plan complies with these requirements.

4.5 Aviation Safeguarding Guidelines – Western Sydney Aerotropolis and surrounding areas. November 2022

This documents states that:

Under the Western Parkland City SEPP and the Aerotropolis DCP:

- 3. development applications for specified uses on land within the 13km buffer zone must be accompanied by a waste management plan for the operation of the use of the land.*

The preparation of this waste management plan complies with this condition.

4.6 Western Sydney Aerotropolis Precinct Plan

4.6.1 Precinct plan Objectives

O15. Facilitate the establishment of circular economy industries to reduce waste, leverage synergies between industries and circulate resources within and beyond the industrial supply and materials chains of the Aerotropolis.

4.6.2 Sustainability and Resilience

Objectives

- SRO1. Development is to support the transitioning to a net zero or net positive outcome over the medium to long term. This will be measured around performance regarding waste management, water management and carbon consumption benchmarks that are provided in the DCP or other relevant legislation.
- SRO5. Facilitate the design, construction and operation of environmentally sustainable buildings and precincts, including energy efficiency, renewable energy, efficient resource and energy use and reduced emissions and waste.
- SRO6. Effectively uses waste as a resource through its collection, transport and recycling in a manner that is safe, efficient, cost effective and does provide a positive impact on liveability and the environment.

Requirements

- SR1. Energy, water and waste systems are to use a circular economy approach to improve efficiency and result in low-carbon developments
- SR3. Plan for, and achieve, leading industry targets by 2025 and from 2026 beyond to achieve sustainable regenerative targets:

Table 4 Sustainable Regenerative Targets

Circular economy targets	Leading industry practice	Sustainable regenerative
	Target 2020 and 2025	Target 2026 and beyond
	10% reduction of waste generation 85% reduction in construction waste	100% recovery and re-use of organic waste 90% reduction in construction waste

- SR5. Circular economy activities must be located with consideration of:
 - proximity to major transportation routes, considering safe transportation of extractive and waste materials
- SR6. Incorporate accessible Circular Economy Infrastructure into mixed use developments to ensure adequate opportunity for people to participate in reuse and recycling schemes.

4.7 Other Legislation and Guidance

The legislation and guidance outlined in **Table 5** below should be referred to during the site preparation, construction and operational phases of the Project.

Table 5 Legislation and Guidance

Legislation and Guidance	Objectives
Local legislation and guidelines	
A Metropolis of Three Cities: Greater Sydney Regional Plan ⁶	The Greater Sydney Region Plan – A metropolis of Three Cities is a strategic plan for Sydney developed by the Greater Sydney Commission (GSC) which outlines the vision of Greater Sydney being defined by three integrated and connected cities, which include the Western Parkland City, Central River City and Eastern Harbour City.
Western City District Plan ⁷	The Western City District Plan was finalised by the GSC in conjunction with the Regional Plan in March 2018 and fulfills the directions and objectives of the Region Plan at a district level. The Western City District covers the Blue Mountains, Camden, Campbelltown, Fairfield, Hawkesbury, Liverpool, Penrith and Wollondilly local government areas
Liverpool Local Strategic Planning Statement 2020	The Liverpool Local Strategic Planning Statement was published by Liverpool City Council in April 2020 and provides a snapshot of the Liverpool LGA as well as setting out the 2040 vision for Liverpool, anchored on the key themes of creating connection, strengthening and protecting the environment, generating opportunity and leading through collaboration.
State and National legislation and guidelines	
State Environmental Planning Policy (Precinct – Western Parkland City) 2021	Policy that puts in place planning controls that will enable the Western Sydney Parklands Trust to Develop the Western Parklands into a multi-use urban parkland for the region of western Sydney.
State Environmental Planning Policy (Western Sydney Aerotropolis) 2020	Policy that aims to facilitate development in the Western Sydney Aerotropolis by promoting sustainable, orderly and transformation development compatible with the long-term growth and development of the Western Sydney Airport.
Council of Australian Governments National Construction Code 2019	The National Construction Code 2019 sets the minimum requirements for the design, construction, and performance of buildings throughout Australia.
NSW EPA's Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities 2012	These better practice guidelines present information on waste minimisation and resource recovery as well as information on commonly used waste management provisions. The guidelines also provide benchmarks for assessing waste production rates in Australia.
NSW EPA's Waste Classification Guidelines 2014	The NSW EPA <i>Waste Classification Guidelines</i> assists waste generators to effectively manage, treat and dispose of waste to ensure the environmental and human health risks associated with waste are managed appropriately and in accordance with the <i>POEO Act 1997</i> and its associated regulations.
The Work Health and Safety Regulation 2017	The Work Health and Safety Regulation 2017 provide detailed actions and guidance associated with the topics discussed in <i>The Work Health and Safety Act 2011</i> . The primary aim of the regulation is to protect the health and safety of workers and ensure that risks are minimised in work environments. Workplaces are to ensure that they are compliant with the requirements specified in the regulations. The regulations discuss items such as actions that are prohibited or obligated in work environments, the requirements for obtaining licences and registrations, and the roles and responsibilities of staff in workplaces.

⁶ [Introduction | Greater Cities Commission](#)

⁷ [About the Plan | Greater Cities Commission](#)

Legislation and Guidance	Objectives
Waste Avoidance and Resource Recovery Act 2001	<p>The <i>Waste Avoidance and Resource Recovery Act 2001</i> aims to promote waste avoidance and resource recovery and repeals the <i>Waste Minimisation and Management Act 1995</i>. Specific objectives of the <i>Waste Avoidance and Resource Recovery Act 2001</i> include:</p> <ul style="list-style-type: none"> • Encouraging efficient use of resources • Minimising the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste • Ensuring industry and the community share responsibility in reducing/dealing with waste, and • Efficiently funding of waste/resource management planning, programs and service delivery. <p>As of 2016, the addition to the Act of Part 5 defines the legislative framework for the 'Return and Earn Container Deposit Scheme' whereby selected beverage containers can be returned to State Government authorities for a monetary refund.</p>

5 Site Preparation and Construction Waste and Recycling Management

5.1 Targets for Resource Recovery

Targets for new development are expected to contribute to state specific targets. The NSW Waste and Sustainable Materials Strategy 2041 (DPIE, 2021) sets a target of 80% average recovery rate from all waste streams by 2030. Analysis by DPIE (2021) indicates that construction and demolition waste recovery rates in 2018-2019 were 77%.

In addition, construction at the Development is to contribute to the following objectives from the Western Sydney Aerotropolis Development Control Plan:

- Development is designed for effective waste and resource recovery by allowing for waste services to occur in a safe, seamless, and timely manner.
- Systems are designed to be innovative and maximise waste separation and resource recovery. Best Practice waste management collective systems and technologies are supported, where appropriate.
- Ensure facilities provided for waste and recycling services in developments and public places do not impact on amenity for residents, neighbours and the public such as visually unpleasant waste storage areas, noise, traffic and odours from waste collection services.
- Ensure waste and recycling collection infrastructure is integrated within developments and where possible across separate developments while addressing storage, safety, efficiency, accessibility to waste, reuse and recycling services without compromising the safety and amenity of the public domain.
- All streets providing access to waste and recycling services must be designed to accommodate the safe travel and manoeuvring of waste collection vehicles.
- Provide well designed waste and recycling facilities in all new developments to ensure waste management services are safe, efficient, cost effective, maximise recycling and reuse, and facilitates contribute to the built form and liveability of the community.

- Minimise the amount of waste generated and waste going to landfill, by designing waste out of developments and implementing circular economy principles within all developments.
- Implement resource recovery, re-use and recycling of waste in all stages of the development including construction and operation.
- Implement innovative waste management storage and collection systems that are healthy, efficient and minimise disruption to amenity.
- Utilise sustainable energy, water and waste systems to encourage a circular economy that improves efficiency and results in low-carbon developments.

It is anticipated that the waste minimisation measures in the following sections will assist the Development to meet these targets.

5.2 Waste Stream and Classifications

The site preparation and construction of the Development is likely to generate the following broad waste streams:

- Site clearance waste
- Construction waste
- Plant maintenance waste
- Packaging waste, and
- Work compound waste from on-site employees.

A summary of likely waste types generated from site preparation and construction activities, along with their waste classifications and proposed management methods, is provided in **Table 6** below and details of reuse recommendations for wider Western Sydney are available in the Western Sydney Recycling Directory – Construction and Demolition Waste 2017.

For further information on how to classify a waste type refer to the NSW EPA (2014) *Waste Classification Guidelines*⁸. Further information on managing site preparation and construction waste is available from the NSW EPA website⁹ and details of reuse recommendations for wider Western Sydney are available in the Western Sydney Recycling Directory – Construction and Demolition Waste 2017¹⁰.

Table 6 Potential Waste Types and Their Management Methods

Waste Types	NSW EPA Expected Waste Classification	Proposed Management Method
Site Demolition and Clearance		
Green waste including timber, pine and particle board	General solid waste (non-putrescible)	Separated, some chipped and stored on-site for landscaping, remainder to landscape supplies or off-site recycling. Stumps and large trees to landfill.
Clean fill	General solid waste (non-putrescible)	On-site re-use

⁸ Available online from <https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines>

⁹ <http://www.epa.nsw.gov.au/your-environment/waste/industrial-waste/construction-demolition>

¹⁰ <https://www.blacktown.nsw.gov.au/files/content/public/services/waste/demolition-and-construction-waste/western-sydney-recycling-directory-cd-updated-nov-2017.pdf>

Waste Types	NSW EPA Expected Waste Classification	Proposed Management Method
Contaminated fill	To be classified subject to the results of testing	Off-site treatment or disposal to landfill
Excavated natural material (ENM) or virgin excavated natural material (VENM)	General solid waste (non-putrescible)	On-site re-use of topsoil for landscaping of the site, off-site beneficial re-use or send to landfill site.
Construction and demolition		
Sediment fencing, geotextile materials	General solid waste (non-putrescible)	Reuse at other sites where possible or disposal to landfill
Concrete	General solid waste (non-putrescible)	Off-site recycling for filling, levelling or road base
Bricks and pavers	General solid waste (non-putrescible)	Cleaned for reuse as footings, broken bricks for internal walls, crushed for landscaping or driveway use, off-site recycling
Sandstone	General solid waste (non-putrescible)	Off-site recycling or sold for re-use
Gyprock or plasterboard	General solid waste (non-putrescible)	Off-site recycling or returned to supplier
Sand or soil	General solid waste (non-putrescible)	Off-site recycling
Metals such as fittings, appliances and bulk electrical cabling, including copper and aluminium	General solid waste (non-putrescible)	Off-site recycling at metal recycling compounds and remainder to landfill
Conduits and pipes	General solid waste (non-putrescible)	Off-site recycling
Timber	General solid waste (non-putrescible)	Off-site recycling, Chip for landscaping, Sell for firewood <i>Treated</i> : reused for formwork, bridging, blocking, propping or second-hand supplier <i>Untreated</i> : reused for floorboards, fencing, furniture, mulched second hand supplier Remainder to landscape supplies.
Doors, Windows, Fittings	General solid waste (non-putrescible)	Off-site recycling at second hand building supplier
Insulation material	General solid waste (non-putrescible)	Off-site disposal
Glass	General solid waste (non-putrescible)	Off-site recycling, glazing or aggregate for concrete production
Asbestos	Special waste	Off-site disposal at a licenced landfill facility.
Fluorescent light fittings and bulbs	Hazardous waste	Off-site recycling or disposal; contact <i>FluoroCycle</i> for more information ¹¹
Lead paint	Hazardous waste	Off-site recycling, Paintback collection ¹² or disposal
Synthetic Rubber or carpet underlay	General solid waste (non-putrescible)	Off-site recycling; reprocessed and used in safety devices and speed humps
Ceramics including tiles	General solid waste (non-putrescible)	Off-site recycling at a crushing and recycling company
Carpet	General solid waste (non-putrescible)	Off-site recycling or disposal; reused for landscaping, insulation or equestrian uses

¹¹ Available online from <http://www.fluorocycle.org.au/> or <http://www.environment.gov.au/settlements/waste/lamp-mercury.html>

¹² Available online from <https://www.paintback.com.au/>

Waste Types	NSW EPA Expected Waste Classification	Proposed Management Method
Plant Maintenance		
Empty oil and other drums or containers, such as fuel, chemicals, paints, spill clean ups	Hazardous waste: Containers were previously used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and residues have not been removed by washing or vacuuming. General solid waste (non-putrescible): Containers have been cleaned by washing or vacuuming.	Transport to comply with the transport of Dangerous Goods Code applies in preparation for off-site recycling or disposal at licensed facility Note: Discharge to sewer subject to Trade Waste Agreement with local Council
Air filters and rags	General solid waste (non-putrescible)	Off-site disposal
Drained Oil filters	General solid waste (non-putrescible)	Off-site recycling
Commercial Lead acid or Nickel cadmium Batteries	Hazardous waste	Off-site recycling, Contact the Australian Battery Recycling Initiative ¹³ for more information
Packaging		
Packaging materials, including wood, plastic, including stretch wrap or LLPE, cardboard and metals	General solid waste (non-putrescible)	Off-site recycling
Wooden or plastic crates and pallets	General solid waste (non-putrescible)	Reused for similar projects, returned to suppliers, or off-site recycling. Contact <i>Business Recycling</i> for more information ¹⁴
Work Compound and Associated Offices		
Food Waste	General solid (putrescible) waste	Dispose to landfill with general garbage
Recyclable beverage containers including glass and plastic bottles, aluminium cans and steel cans	General solid waste (non-putrescible)	Co-mingled recycling at off-site licensed facility or deliver to local NSW container deposit scheme 'Return and Earn' facility ¹⁵
Clean paper and cardboard	General solid waste (non-putrescible)	Paper and cardboard recycling at off-site licensed facility

5.3 Construction Waste Types and Quantities

The Liverpool DCP does not provide waste generation rates for construction activities. In the absence of readily available construction waste generation rates from Council, SLR has adopted the 'Factory' and 'Office' waste generation rates from The Hills Development Control Plan (DCP) 2012 for estimating the type and quantities of waste generated from construction of the Development.

We have also referred to *Light Duty Asphalt Pavements - Design, Specification and Construction 2002* published by the Australian Asphalt Pavement Association in calculating car park waste construction quantities.

The waste generation rates are shown in **Table 7** below.

¹³ <http://www.batteryrecycling.org.au/home>

¹⁴ Available online from <http://businessrecycling.com.au/search/>

¹⁵ Available online from <http://returnandearn.org.au/>

Table 7 Construction Waste Generation Rates

Rate Type	Floor Area (m ²)	Waste types and quantities (m ³)								
		Timber	Asphalt	Concrete	Granular Base	Bricks	Gyprock	Sand/Soil	Metal	Other
Factory	1,000	5.1		18.8		8.5	8.6	8.8	2.75	5
Office	1,000	0.25		2.1		1.65	0.45	4.8	0.6	0.5
Carpark	1,000	0	0.3	0.225	1.25	0	0	0	0	0
Hardstand	1,000	0		2.1	0	0		4.8	0.6	0.5

These waste generation rates can be used to estimate the waste generated from the construction of the Development. Based on the areas shown in drawing *22104_DA-SK029_T_MASTERPLAN.pdf* the anticipated approximate construction waste quantities for the development are approximately 11,784 m³.

While the final types and quantities of site preparation and construction waste material would be confirmed during the design stage, it is predicted that 85 per cent would be diverted from landfill either by being reused on site or recovered or recycled off site.

5.4 Waste Avoidance

The Building Contractor, Building Architect and/or those in equivalent roles should follow better practice waste management and the principles of Ecologically Sustainable Development.

Recommendations for the Building Architect include:

- Using prefabricated components
- Using low formaldehyde wood products, post-consumer reused timber and/or Forest Stewardship Council certified timber
- Using fittings and furnishings that have been recycled, are made from or incorporate recycled materials and have been certified as sustainable or environmentally friendly by a recognised third-party certification scheme
- Preferentially using building materials, fittings and furnishings, including structural framing, roofing and façade cladding, that have longer life and better re-use and recycling potential
- Reducing the use of polyvinyl chloride products
- Preferentially using paints, floor coverings and adhesives with low VOC (volatile organic compound) content
- Avoiding unsustainable timber imports
- Selecting materials based on low embodied energy properties that suit the Project, such as recycled materials including recycled steel and glass-wool insulation, or concrete with slag and fly ash content
- Centralising wet areas together to minimise piping, and
- Designing for deconstruction rather than demolition.

Recommendations for the Building Contractor include:

- Applying practical building designs and construction techniques
- Minimising excavation works
- Investigating leased equipment and machinery rather than purchase and disposal
- Sorting and segregating site preparation and construction waste to ensure efficient recycling of waste
- Preferentially selecting building materials, fittings and furnishings, including structural framing, roofing and façade cladding, that have longer life and better re-use and recycling potential
- Store waste on-site appropriately to prevent cross-contamination and/or mixing of different waste types
- Reducing packaging waste by:
 - Returning packaging to suppliers where practicable to reduce waste further along the supply chain
 - Purchasing in bulk
 - Requesting cardboard or metal drums rather than plastics
 - Requesting metal straps rather than shrink wrap, and
 - Using returnable packaging such as pallets and reels.
- Arranging deliveries 'as needed' to mitigate degradation, weathering or moisture damage, and
- Ensure subcontractors are informed of and implement site waste minimisation and management procedures.

5.5 Re-use, Recycling and Disposal

Effective management of materials and construction and demolition waste, including options for reuse and recycling where applicable and practicable, will be conducted. Only waste that cannot be cost effectively reused or recycled will be sent to landfill or appropriate disposal facilities.

In accordance with good practice waste management, the following specific procedures will be implemented:

- On-site source separation to ensure efficient recycling
- Concrete, tiles and bricks reused or recycled off-site
- Steel recycled off-site, and all other metals recycled where economically viable
- Framing timber recycled off-site
- Windows, doors and joinery off-site, where possible
- All glass that can be economically recycled will be recycled
- All solid waste timber, brick, concrete, rock that cannot be reused or recycled will be taken to an appropriate facility for treatment to recover further resources or for disposal to landfill in an approved manner
- Re-use of materials on-site where possible
- Separate waste bins for recyclable and non-recyclable general waste
- Assess excavation spoil for contamination status and beneficial re-use

- Retain used crates for storage purposes unless damaged
- Recycle cardboard, glass and metal waste
- Provide sufficient space for storage of garden waste and other waste materials on-site
- Dispose of all asbestos, hazardous and/or intractable waste in accordance with SafeWork NSW and NSW EPA requirements
- All used crates will be stored for reuse unless damaged
- Deliver batteries to drop off-site recycling facility, and
- Where source separation is utilised, materials are to be kept uncontaminated to guarantee the highest possible re-use value.

5.6 Waste Separation, Storage and Servicing

5.6.1 Waste Separation and Storage

Waste materials produced from site preparation and construction activities will be separated at the source and stored separately on-site. It is anticipated that there will be enough space on-site for separate storage, for example, separate skip bins or appropriately managed stockpiles, of the following waste types:

- Bricks, concrete and scrap metal
- Metal and steel, in a condition suitable for recycling at metal recycling facilities
- Timber
- Glass
- Hardstand rubble
- Uncontaminated excavation spoil, if present
- Contaminated excavation spoil, if present
- Hazardous waste, if present
- Paper and cardboard
- General co-mingled recycling waste, and
- Non-recyclable general waste.

If there is insufficient space on-site for full separation of waste types, the site manager, or equivalent role, should consult with the waste and recycling collection contractor to confirm which waste types may be co-mingled before removal from the site.

5.6.2 Waste Storage Areas

Waste storage areas will be accessible and allow sufficient space for storage and servicing requirements. The storage areas will also be flexible in order to cater for change of use throughout the project. Where space is restricted, dedicated stockpile areas will be delineated on the site, with regular transfers to dedicated skip bins for sorting.

All waste placed in skips or bins for disposal or recycling will be adequately contained to ensure that waste does not fall, blow, wash or otherwise escape from the site. Waste containers and storage areas will be kept clean and in a good state of repair. Applicable weather protection measures should be considered for storage spaces.

In accordance with good practice waste management, areas designated for waste storage will:

- Allow unimpeded access by site personnel and waste disposal contractors
- Take into account environmental factors which could potentially cause an impact to the waste storage, such as slope, drainage and the location of watercourses and native vegetation
- Allow sufficient space for the storage of garden waste and other waste materials on-site
- Employ adequate environmental management controls to prevent off-site migration of waste materials and contamination from the waste. For example, consideration of slope, drainage, proximity relative to waterways, stormwater outlets and vegetation
- Consider visual amenity, safety and accessibility in their selection, and
- Not present hazards to human health or the environment.

5.6.3 Waste Servicing and Record Keeping

The Site Manager or equivalent role will:

- Arrange for suitable waste collection contractors to remove any construction waste from site
- Ensure waste bins are not filled beyond recommended filling levels
- Ensure that all bins and loads of waste materials leaving site are covered
- Maintain waste disposal documentation detailing, at a minimum:
 - Descriptions and estimated amounts of all waste materials removed from site
 - Details of the waste and recycling collection contractors and facilities receiving the waste and recyclables
 - Records of waste and recycling collection vehicle movements, for example, date and time of loads removed, licence plate of collection vehicles, tip dockets from receiving facility, and
 - Waste classification documentation for materials disposed to off-site recycling or landfill facilities.
- Ensure lawful waste disposal records are readily accessible for inspection by regulatory authorities such as Liverpool Council, SafeWork NSW or NSW EPA, and
- Remove waste during approved hours.

If skips and bins are reaching capacity, removal and replacement will be organised as soon as possible. All site-generated building waste collected in the skips and bins will leave the site and taken to a site lawfully able to accept them.

5.6.4 Waste Servicing and Transport

The frequency of the waste removal will, in most cases, be dictated by the quantities of material being deposited into each of the dedicated skip bins. All skips leaving the site will be covered with a suitable tarpaulin to ensure that the spillage of waste from the skips while in transit is eliminated.

5.7 Contaminated and Hazardous Waste

Contaminated materials including fill materials and soils should be assessed by an appropriately qualified and experienced environmental consultant for remediation and management options.

All asbestos and other hazardous waste must be handled according to appropriate legislation and regulation including the Work Health and Safety Regulation 2011 and disposed of in accordance with the SafeWork NSW and relevant EPA requirements.

For further details on asbestos handling and storage, refer to the Western Sydney Recycling Directory – Construction and Demolition Waste 2017¹⁶.

5.8 Signage

Standard signage will be posted in all waste storage and collection areas. All waste containers will be labelled correctly and clearly to identify stored materials.

Signs approved by the NSW EPA for labelling of waste materials are available online¹⁷ and should be used where applicable. A selection of the EPA's signs is shown in **Figure 4**.



Figure 4 - Examples of NSW EPA labels for waste and skip bins

5.9 Site Inductions

All staff, including sub-contractors and labourers, employed during the site preparation and construction phases of the Development will undergo induction training regarding waste management.

Induction training will cover, as a minimum, an outline of the WMP including:

- Legal obligations and targets

¹⁶ <https://www.blacktown.nsw.gov.au/files/content/public/services/waste/demolition-and-construction-waste/western-sydney-recycling-directory-cd-updated-nov-2017.pdf>

¹⁷ NSW EPA approved waste materials signage <https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/business-government-recycling/standard-recycling-signs>

- Emergency response procedures on-site
- Waste priorities and opportunities for reduction, reuse and recycling
- Waste storage locations and separation of waste
- Procedures for suspected contaminated and hazardous waste
- Waste related signage
- The implications of poor waste management practices, and
- Responsibilities and reporting, including identification of personnel responsible for waste management and individual responsibilities.

5.10 Monitoring and Reporting

The following monitoring practices are to be undertaken to improve demolition and construction waste management and to obtain accurate waste generation figures:

- Conduct waste audits of current projects where feasible.
- Note waste generated and disposal methods.
- Look at past waste disposal receipts.
- Record this information to track waste avoidance, reuse and recycling performance and to help in waste estimations for future waste management plans.

Records will be maintained for all waste quantities that are recycled, reused or removed by a contractor. All demolition and construction waste dockets will be kept which show which facility received the material for recycling or disposal.

Daily visual inspections of waste storage areas will be undertaken by site personnel and inspection checklists and logs recorded for reporting to the site manager or equivalent role on a weekly basis or as required. These inspections will be used to identify and rectify any resource and waste management issues.

Waste audits should be carried out by the building contractor or equivalent role to gauge the effectiveness and efficiency of waste segregation procedures and recycling and reuse initiatives. Where audits show that the above procedures are not carried out effectively, additional staff training will be undertaken, and signage will be re-examined.

5.11 Roles and Responsibilities

All personnel have a responsibility for their own environmental performance and compliance with all legislation. It will be the responsibility of the site manager, or equivalent role, to implement the WMP, and the responsibility of employees and subcontractors to ensure that they comply with the WMP at all times.

Suggested roles and responsibilities for waste management at the site are provided in **Table 8**. Where possible, a construction environmental manager, or equivalent role, should be appointed for the site preparation and construction work. An equivalent construction environmental manager role is defined to be a person dedicated to overseeing the environmental compliance and performance of a development. Where a construction environmental manager is not appointed, responsibilities in **Table 8** for the construction environmental manager will become those of the site manager.

Table 8 Suggested roles and responsibilities

Role	Responsibilities
Site Manager	<ul style="list-style-type: none"> • Ensuring plant and equipment are well maintained • Ordering only the required amount of materials • Keeping materials segregated to maximise reuse and recycling • Ensuring that waste sorting and storage areas are maintained in a tidy and functional state and do not present hazards to human health or the environment • Ensure hazardous or contaminated materials are appropriately managed and disposed • Ensure site records and documentation is kept and is complete • Ensure this WMP are implemented, and • Liaise with Council and regulatory authorities as required.
Construction Environmental Manager or equivalent	<ul style="list-style-type: none"> • Ensuring staff and contractors are aware of site requirements for waste management • Establishing separate skips and stockpiles and recycling bins for effective waste segregation and recycling purposes • Developing or identifying, and using, local commercial opportunities for re-use of materials where re-use on-site is impractical • Facilitate correct waste collection • Engage suitable waste collection and disposal contractors • Approval of off-site waste disposal locations and checking licensing requirements • Arranging for the assessment of potentially hazardous or contaminated materials • Arranging for appropriate contaminated waste management and approval of off-site waste transport, disposal locations and checking licensing requirements • Monitor and maintain site environmental controls and • Monitoring, inspection and reporting requirements.

Daily visual inspections of waste storage areas may be delegated to other on-site staff. All contractors will be responsible for ensuring that their work complies with the WMP through the project induction and contract engagement process. It is the responsibility of the Site Manager to notify the relevant regulatory authorities of the appointment of waste removal, transport or disposal contractors.

6 Operational Waste Management

6.1 Targets for Resource Recovery

Targets for new development are expected to contribute to state-specific targets. The NSW *Waste and Sustainable Materials Strategy 2041* (DPIE, 2021) sets a target of 80% average recovery rate from all waste streams by 2030. Analysis by DPIE (2021) indicates that commercial and industrial waste recovery rates in 2019 were 53%.

It is anticipated that the waste minimisation measures in the following sections will assist the Development to achieve this recycling rate. Waste reporting and audits can be used to determine the actual percentage of waste that are being or have been recycled during operation.

6.2 Waste Streams and Classifications

The operation of the Development is anticipated to generate the following broad waste streams:

- Domestic waste generated by employees and residents, including food waste
- Bulk packaging waste, including polystyrene, plastic wrapping and cardboard boxes
- Office waste
- Garden organic waste from landscaped areas
- Bulky waste items such as furniture and e-waste and
- Stores, plant and general maintenance waste.

Potential ongoing waste types, their associated waste classifications, and management methods are provided in **Table 9**. For further information on how to determine a waste's classification, refer to the NSW EPA (2014) Waste Classification Guidelines. Suggestions for recycling drop off locations and contacts can be found on <https://businessrecycling.com.au/> for each waste type.

Table 9 Potential waste types, classifications and management methods for operational waste

Waste Types	NSW EPA Classification	Proposed Management Method
General Operations		
Clean office paper	General solid (non-putrescible) waste	Paper recycling at off-site licensed facility
Cardboard including bulky cardboard boxes	General solid (non-putrescible) waste	Cardboard recycling at off-site licensed facility
Recyclable beverage containers, glass and plastic bottles, aluminium cans, steel cans	General solid (non-putrescible) waste	NSW container deposit scheme 'Return and Earn', container recycling at off-site licensed facility
Food waste	General solid (putrescible) waste	Compost on or off-site or dispose to landfill with general garbage
Batteries	Hazardous waste	Off-site recycling, alternatively contact the Australian Battery Recycling Initiative for more information
Mobile Phones	Hazardous waste	Off-site recycling; can be taken to the Mobile Muster program. Contact Mobile Muster for more information
Bulky polystyrene	General solid (non-putrescible) waste	Off-site recycling or disposal at landfill
Furniture	General solid (non-putrescible) waste	Off-site reuse or disposal to landfill
E-waste	Hazardous waste	Off-site recycling
Printer toners and ink cartridges	Hazardous waste	Off-site recycling, free disposal box or bags and pickup service exists for printer toners and ink cartridges
General garbage, including non-recyclable plastics	General solid (putrescible and non-putrescible) waste	Disposal at landfill
Maintenance		

Waste Types	NSW EPA Classification	Proposed Management Method
Spent smoke detectors ¹⁸	General solid (non-putrescible) waste, or Hazardous waste (some commercial varieties)	Disposal to landfill, or off-site disposal at licensed facility
Glass, other than containers	General solid (non-putrescible) waste	Off-site recycling
Light bulbs and fluorescent tubes	Hazardous waste	Off-site recycling or disposal, contact FluoroCycle ¹⁹ or Lamp Recyclers ²⁰ for more information
Cleaning chemicals, solvents, area wash downs, empty oil or paint drums, chemical containers	Hazardous waste if containers used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and residues have not been removed by washing or vacuuming. General solid (non-putrescible) waste if containers cleaned by washing or vacuuming.	Transport to comply with the transport of Dangerous Goods Code applies in preparation for off-site recycling or disposal at licensed facility.
Garden organics – lawn mowing, tree branches, hedge cuttings, leaves	General solid (non-putrescible) waste	Reuse on-site or contractor removal for recycling at licenced facility

6.3 Estimated Quantities of Operational Waste

In the absence of a breakdown of the definitive type and number of tenants included in the proposed master plan, specifically Retail and Trade units' areas SLR has made informed assumptions to calculate the preliminary waste generation for the entire development. For estimating the type and quantities of waste generated from the operational activities of the Development, SLR has adopted the 'Warehouses', 'Offices', 'Shops (no food)' and 'Café' waste generation rates from the Penrith DCP, in the absence of waste generation rates in the Liverpool Council DCP. No residential dwellings are proposed as part of the master plan, therefore estimates for residential waste generation are not relevant to this development and not captured in this WMP. The operational waste generation rates used are shown below in **Table 10** below.

Table 10 Operational Waste Generation Rates

Type of Premises	Reference according to Penrith DCP ²¹	General Waste Generation (L/100 m ² /day)	Recycling Generation (L/100 m ² /day)
Warehouses	Warehouse (office)	10	10
Warehouse offices and Commercial tenancies	Offices	10	10
Trade units	Shops (no food)	50	50
Retail – cafes (food)	Cafe	300	200

Using the waste generation rates in **Table 10** above, the approximate weekly waste quantities for the Development have been calculated. The operational waste quantities were calculated based on the assumptions below:

¹⁸ The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) require that when more than 10 smoke alarms (particularly americium-241 sources) are collected for bulk disposal they must be treated as radioactive waste and the requirements of the National Health and Medical Research Council's Code of practice for the near-surface disposal of radioactive waste in Australia (1992) must be met.

¹⁹ <https://www.fluorocycle.org.au/>

²⁰ <https://www.lamprecyclers.com.au/>

²¹ [Industrial, Commercial and Mixed Use Waste Management Guidelines \(nsw.gov.au\)](https://www.nsw.gov.au/industrial-commercial-and-mixed-use-waste-management-guidelines)

- The floor areas were calculated based on the drawings 22104_DA-SK029_T_MASTERPLAN.pdf.
- A week comprising seven days of operation.
- The waste generation from amenities and substation is assumed to be minimal and therefore has not been added to the waste generation calculations.

The quantities of operational waste estimated to be generated by the Development are shown in **Table 11**.

Table 11 Estimated Quantities of Operational General Waste and Recyclables

Location	Type	Area m ²	General Waste (L/week)	Recyclables (L/week)
Lot 2	Warehouse	4,920	3,444	3,444
	Office	225	158	158
	Total	5,145	3,602	3,602
Lot 3	Warehouse	14,315	10,021	10,021
	Office	700	490	490
	Total	15,015	10,511	10,511
Lot 4	Warehouse	24,690	17,283	17,283
	Office	1,200	840	840
	Cafe	100	1,500	1,000
	Total	25,990	19,623	19,123
Lot 5	Warehouse	44,120	30,884	30,884
	Office	2,200	1,540	1,540
	Total	46,320	32,424	32,424
Lot 6	Warehouse	42,040	29,428	29,428
	Office	2,200	1,540	1,540
	Total	44,240	30,968	30,968
Lot 7	Warehouse	39,240	27,468	27,468
	Office	1,900	1,330	1,330
	Total	41,140	28,798	28,798
Lot 8	Warehouse	18,685	13,080	13,080
	Office	1,000	700	700
	Cafe	120	1,800	1,200
	Total	19,805	15,580	14,980
Lot 9	Warehouse	36,340	25,438	25,438
	Office	1,790	1,253	1,253
	Total	38,130	26,691	26,691
Lot 10	Warehouse	37,235	26,065	26,065
	Office	1,880	1,316	1,316
	Total	39,115	27,381	27,381
Lot 11	Warehouse	14,850	10,395	10,395
	Office	750	525	525
	Total	15,600	10,920	10,920
Lot 12	Warehouse	15,870	11,109	11,109
	Office	820	574	574
	Total	16,690	11,683	11,683
Lot 13	Warehouse	14,230	9,961	9,961
	Office	720	504	504
	Total	14,950	10,465	10,465

Location	Type	Area m ²	General Waste (L/week)	Recyclables (L/week)
Lot 14	Warehouse	13,110	9,177	9,177
	Office	925	648	648
	Cafe	200	3,000	2,000
	Total	14,235	12,825	11,825
Lot 15	Warehouse	28,170	19,719	19,719
	Office	1,400	980	980
	Total	29,570	20,699	20,699
Lot 16	Warehouse	13,185	9,230	9,230
	Office	660	462	462
	Total	13,845	9,692	9,692
Lot 17	Warehouse	11,780	8,246	8,246
	Office	600	420	420
	Total	12,380	8,666	8,666
Lot 18	Warehouse	15,010	10,507	10,507
	Office	740	518	518
	Total	15,750	11,025	11,025
Lot 19	Warehouse	26,700	18,690	18,690
	Office	1,360	952	952
	Total	28,060	19,642	19,642
Lot 20	Warehouse	20,235	14,165	14,165
	Office	1,000	700	700
	Cafe	100	1,500	1,000
	Total	21,335	16,365	15,865
Lot 21	Warehouse	22,330	15,631	15,631
	Office	1,200	840	840
	Total	23,530	16,471	16,471
Lot 22	Warehouse	24,905	15,631	15,631
	Office	1,300	840	840
	Total	26,205	16,471	16,471
Lot 23	Trade Unit	6,759	23,657	23,657
	Total	6,579	23,657	23,657
	Trade Unit	75,398	52,779	52,779
	Total	75,398	52,779	52,779
Lot 25	Office	10,595	7,417	7,417
	Trade Unit	25,845	90,458	90,458
	Total	36,440	97,874	97,874
Total		625,467		

The warehouses/trade units/commercial & retail is anticipated to produce minimal quantities of garden organics. This waste will be taken by a landscaping contractor for reuse on-site or sent for recycling at a suitably licenced facility.

6.3.1 Food Waste

It is anticipated that food waste, as a specific and separable stream will be generated by some tenancies in the proposed development. At this stage the tenancies are not known beyond an indicative type, and as such, it is difficult to estimate with confidence the amount of food waste generated by the proposed development. This has been noted and approved by the TAP. Calculations for general waste generated by the proposed development are calculated using the Penrith DCP waste generation rates (**Table 10**). The estimated quantities of operational general waste are assumed to include food waste mixed in with other general waste items.

Where future tenants' food waste volumes require separation, this would be via separation at the point of generation (kitchens, etc.) with food waste stored in separate bins to other general wastes. It is anticipated that tenants would enter into agreements for commercial food waste collection through a suitably licensed waste contractor. The food waste collected from each tenancy would be transported to and managed at a suitably licensed organic waste management facility.

The tenants may incorporate a central on-site food waste processing, such as dehydrators. The viability of an on-site food processing unit will depend on available quantities and types of food and the particular use for the development. Space is available within the proposed waste storage areas should tenants wish to install an on-site food processing system in the future. The typical footprint of a commercial dehydrator unit is approximately 3.8 m².

6.4 Waste Storage Area Size

6.4.1 Garbage and Recycling Bins

The waste storage areas for the Development must be large enough to adequately store all quantities of operational waste and recycling between collections. Given the nature of the Development and its size and scope, a front lift waste collection service is the most likely to be provided at this development. Bins of 3 m³ capacity are the most likely to be used and these have been assumed when calculating bin numbers and storage space.

SLR has adopted the 3 m³ front lift bin dimensions specified in Penrith Council's Industrial, Commercial and Mixed-Use Waste Management Guidelines, as shown in **Table 12** below.

Table 12 Dimensions and Approximate Footprint of Bins

Bin Capacity	Height (mm)	Depth (mm)	Width (mm)	Footprint (m ²)
3 m ³	1,540	1,520	2,060	3.13

To allow for ready movement of bins into and out of the bin storage area, the bin storage area is to provide a floor area of at least 150% of the total minimum bin footprint. This can also act as a contingency in the event of spikes in waste generation. This has been considered in the calculation of the waste storage area for each of the units in the Development.

The recommended storage areas do not include storage of bulky waste. For additional storage space for bulky waste, refer to Section 6.4.3.

The estimated number of bins required for weekly storage of operational waste and recycling generated by the Development are shown in **Table 13** and are based on:

- The estimated quantities of operational waste and recycling shown in **Table 11**, and
- Bin dimensions from the Penrith DCP shown in **Table 12**.

Table 13 Recommended Number of Bins and Storage Areas

Area	Weekly Collection Frequency		Actual Number of bins			Area Required m ²			
	Garbage	Recycling	Garbage	Recycling	Total	Garbage	Recycling	Total	Total including Manoeuvring
Lot 2	2	2	1	1	2	3.1	3.1	6.3	9.4
Lot 3	2	2	2	2	4	6.3	6.3	12.5	18.8
Lot 4	4	4	1	1	2	3.1	3.1	6.3	9.4
Lot 5	4	4	3	3	6	9.4	9.4	18.8	28.2
Lot 6	4	4	3	3	6	9.4	9.4	18.8	28.2
Lot 7	3	3	4	4	8	12.5	12.5	25.0	37.6
Lot 8	2	2	3	3	6	9.4	9.4	18.8	28.2
Lot 9	4	4	3	3	6	9.4	9.4	18.8	28.2
Lot 10	3	3	4	4	8	12.5	12.5	25.0	37.6
Lot 11	2	2	2	2	4	6.3	6.3	12.5	18.8
Lot 12	2	2	2	2	4	6.3	6.3	12.5	18.8
Lot 13	2	2	2	2	4	6.3	6.3	12.5	18.8
Lot 14	2	2	2	2	4	9.4	6.3	15.7	23.5
Lot 15	2	2	4	4	8	12.5	12.5	25.0	37.6
Lot 16	2	2	2	2	4	6.3	6.3	12.5	18.8
Lot 17	2	2	2	2	4	6.3	6.3	12.5	18.8
Lot 18	3	3	2	2	4	6.3	6.3	12.5	18.8
Lot 19	3	3	3	3	6	9.4	9.4	18.8	28.2
Lot 20	3	3	2	2	4	6.3	6.3	12.5	18.8
Lot 21	3	3	2	2	4	6.3	3.1	12.5	18.8
Lot 22	3	3	2	2	4	6.3	6.3	12.5	18.8
Lot 23	2	2	4	4	8	12.5	12.5	25.0	37.6
Lot 24	5	5	4	4	8	12.5	12.5	25.0	37.6
Lot 25	5	5	7	7	14	21.9	21.9	43.8	65.8
Total									624.8

6.4.2 Food Waste

As specified in the Liverpool DCP, A development will provide a waste storage area inside every food premises, and inside any shop that is capable of accommodating a food premises.

Whilst the specific tenancies are not fully defined at this stage, where general waste is required to be split into general waste and food waste bins, a portion of the area presented in **Table 13** above can be designated to accommodate the food waste bins (on the basis that general waste bin sizes would be expected to be reduced at the same time).

6.4.3 Bulky Waste

As specified in the Penrith DCP, additional storage space for the bulky waste must be provided. This stream would include broken pallets, broken furniture, e-waste, and other materials that may be difficult to dispose of in the garbage or recycling bins.

The Penrith DCP does not provide any advice on storage area dimensions for bulky waste for commercial developments. SLR recommends 4 m² be allocated for bulky waste storage for each unit. Therefore, in addition to the recommended waste storage area noted in, the total waste storage area recommended for the Development is shown in

Table 14 below.

Table 14 Total Waste Storage Areas

Area	Waste & Recycling Bins	Recommended Storage Area (m ²)	
		Bulky Waste	Total Storage Areas
Lot 2	9.4	4.0	13.4
Lot 3	18.8	4.0	22.8
Lot 4	9.4	4.0	13.4
Lot 5	28.2	4.0	32.2
Lot 6	28.2	4.0	32.2
Lot 7	37.6	4.0	41.6
Lot 8	28.2	4.0	32.2
Lot 9	28.2	4.0	32.2
Lot 10	37.6	4.0	41.6
Lot 11	18.8	4.0	22.813
Lot 12	18.8	4.0	22.8
Lot 13	18.8	4.0	22.8
Lot 14	23.5	4.0	27.5
Lot 15	37.6	4.0	41.6
Lot 16	18.8	4.0	22.8
Lot 17	18.8	4.0	22.8
Lot 18	18.8	4.0	22.8
Lot 19	28.2	4.0	32.2
Lot 20	18.8	4.0	22.8
Lot 21	18.8	4.0	22.8
Lot 22	18.8	4.0	22.8
Lot 23	37.6	4.0	41.6
Lot 24	37.6	4.0	41.6

Area	Waste & Recycling Bins	Recommended Storage Area (m ²)	
		Bulky Waste	Total Storage Areas
Lot 25	65.8	4.0	69.8
Total			720.7

6.4.4 Waste Storage Area Locations

The bins can be stored inside each unit and moved outside for collection. The waste collection areas should be located to allow forward access by a collection vehicle. Front lift collection vehicles require approximately 6.2 m overhead clearance when emptying bins. The waste collection area should be situated where there are no overhead structures or at least none that provide less than 6.2 m clearance.

According to the Penrith DCP, the waste collection room will need to incorporate the following into the design.

- The room is to be large enough to accommodate the entire fleet of bins plus 0.2m between bins to allow adequate manoeuvrability.
- 1.8m unobstructed clearance zone between the stored bins and the entrance to permit access and manoeuvrability.
- The room to provide suitable dual door access for the service of bins with a minimum width of 1.8m and accessed by a minimum 1.8m unobstructed access corridor.
- The room is to be located within close proximity to the on-site loading bay.
- The room is to be fully enclosed, walled and not permit through access to other on-site waste infrastructure.
- The floor is to be waterproofed, non-slip and sealed in accordance with the Building Code of Australia to permit the use of wash facilities.
- The floor is to be graded to a central drainage point connected to the sewer, enabling all waste to be contained and safely disposed of.
- The room is to be partitioned and enclosed with a minimum 2.7m unobstructed internal room height in accordance with the Building Code of Australia.
- The room is to be provided with an adequate supply of water through a centralised mixing valve and hose cock.
- The room to incorporate adequate lighting and natural/mechanical ventilation in accordance with the Building Code of Australia.

Considering the waste storage areas required, there is more than enough space in each unit for waste storage.

The proposed waste storage area locations are shown in **Appendix A**

6.4.5 Waste Vehicle access

The following access provisions will apply for collections:

- Collection vehicles will be able to enter and exit the site in a forward direction
- Unobstructed access, adequate driveways, and ramps of sufficient strength to support waste collection vehicle have been allowed for.

6.5 Waste Servicing

6.5.1 General Assumptions

Waste collections would be undertaken by a private contractor. In accordance with the Councils requirements, the following has been considered for the access provisions for waste collection vehicles:

- Collection on-site
- Access by a heavy rigid vehicle throughout the vehicle's entire onsite path of travel
- Collection will not impede access to, within or from the site for other users
- Collection vehicles will enter and exit the site in a forward direction

An example of the expected collection vehicle paths is shown in **Figure 5**. Entry paths to the proposed waste enclosure are shown in red and exit paths from the waste enclosure are shown in blue.

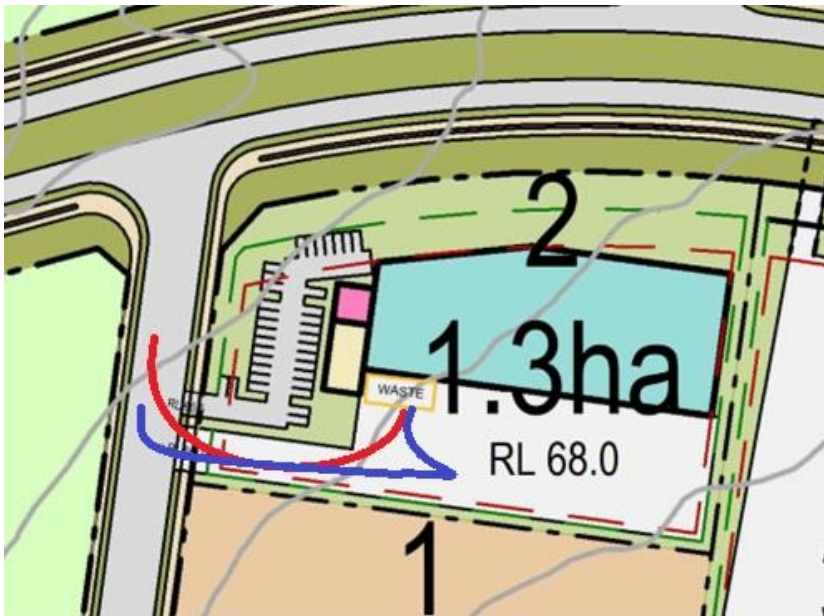


Figure 5 – Collection Vehicle Travel Path

6.5.2 Waste Collection Vehicle

It is assumed that the waste collection vehicle servicing the development would be a front loaded heavy rigid vehicle. A standard dimension of the front-loaded waste collection vehicle is provided in Table 15 and Figure 6 below and are based on the Australian Standard 2890.2.

Table 15 Standard dimensions in accordance with AS 2890.2

Vehicle Classifications	Heavy Rigid Vehicle Dimensions
Overall Length (m)	10.5
Operational Length (m)	12.5
Design Width (m)	2.8
Design Height (m)	4.1

Vehicle Classifications	Heavy Rigid Vehicle Dimensions
Operational Height (m)	+4.5 (specific to bin proposed)
Swept Circle (m)	22.5
Clearance Level (travel height) (m)	4.5
Roadway/ramp grade (max)	1:6.5 (15.4%)
Rate of change of grade (max)	1:16 (6.25%) in 7.0 m of travel
Gross Weight (max tonnes)	28.0
Front Chassis Clearance	13°
Rear Chassis Clearance	16°

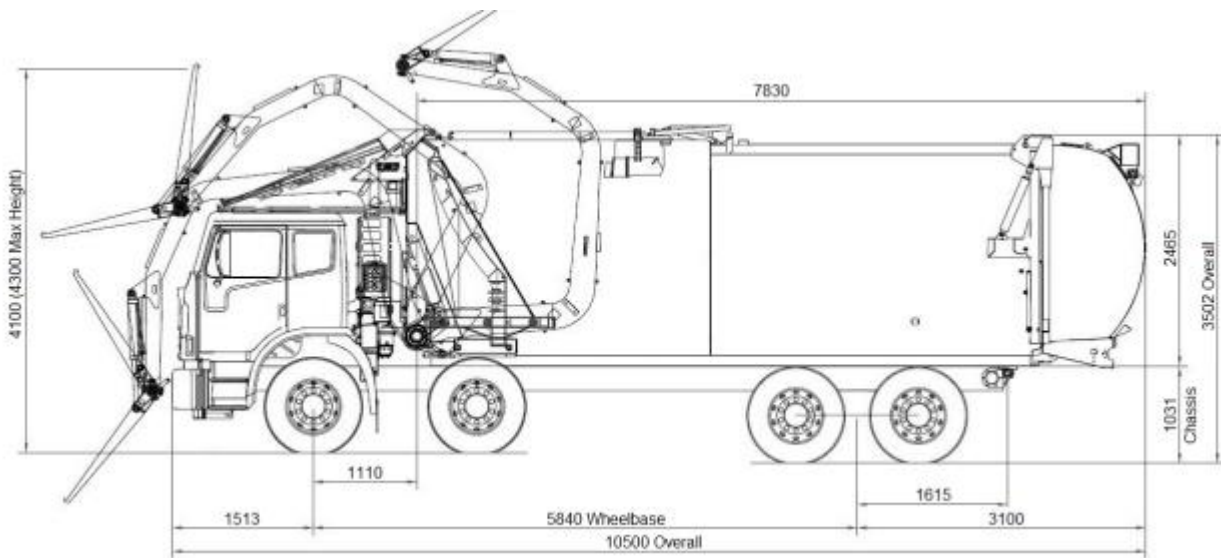


Figure 6 10.5m Heavy Rigid Waste Collection Vehicle specifications

6.5.3 Waste Collection and Waste Storage Considerations

SLR has received feedback from the Liverpool City Council on the 11 October 2023, as part of the Planning Report review process. The recommendations regarding the waste collection and servicing are addressed below.

Waste collection for the proposed development should be:

- Designed around waste collection vehicles and turning characteristics at least equal to standard HRV, as proposed in the Section 6.5.2 above. The type of bins proposed for this development are 3m³ front lift bins.
- Designed so that the collection takes place within an enclosed portion of each proposed lot. Each of the proposed warehouse, office or enterprise building would have a separate waste storage area, located wholly within the lot boundary. No waste collection is proposed at kerbside or any area including public land. The proposed indicative waste storage areas for the development can be found in Appendix A. Given the type of the proposed developments within the master plan boundary (commercial and industrial), all tenancies will be serviced by a licensed private waste contractor.

- Access arrangements must ensure that only occupants/tenants (including agents or cleaners) of the commercial and industrial portions of the development will have access to the waste storage facilities. Waste storage facilities would be designed to restrict public access.

6.6 Waste Avoidance, Reuse and Recycling Measures

Waste avoidance measures include:

- Participating in take-back services to suppliers to reduce waste further along the supply chain
- Avoiding printing where possible
- Review of packaging design to reduce waste but maintain 'fit for purpose'
- Providing ceramic cups, mugs, crockery and cutlery rather than disposable items
- Purchasing consumables in bulk to avoid unnecessary packaging
- Presenting all waste reduction initiatives to staff as part of their induction program, and
- Investigating leased office equipment and machinery rather than purchase and disposal.
- Minimising the time any waste materials are stored on site by maintaining a first in – first out policy for transfers into and out of the Development site.

6.6.1 Re-use

Possible re-use opportunities include establishing systems with in-house and supply chain stakeholders to transport products in re-useable packaging where possible.

6.6.2 Recycling

Recycling opportunities include:

- Collecting and recycling e-waste
- Flatten or bale cardboard to reduce number of bins required
- Paper recycling trays provided in office areas for scrap paper collection and recycling
- Providing separate receptacles for general waste, recycling and paper and cardboard throughout public areas, as well as within staff areas, to encourage source-separation of waste streams
- Work with tenants to investigate opportunities for the use of recycled paper bags or reusable bags in place of plastics bags
- Separating, by a reasonable distance, the storage areas for recyclables from the general waste storage areas to avoid cross contamination
- Collecting printer toners and ink cartridges in allocated bins for appropriate contractor recycling, and
- Development of 'buy recycled' purchasing policy.

6.6.3 Disposal of waste

There are several landfills and materials recovery facilities in the Western Sydney area accepting general waste, mixed and separated recyclables. The most appropriate recycling facilities will be determined by an appointed waste contractor. All waste and recyclables will be delivered to sites lawfully able to accept them.

Not all material could be recovered, as such there are suitable waste facilities in the Western Sydney area that are licensed to accept general putrescible and non-putrescible waste. Facilities closest to the project site are listed in Table 16 below.

A review of the waste infrastructure included waste streams accepted and the scale of facilities based on EPA licenses and shows that there is sufficient capacity to accept and process construction and operational waste for this development.

Table 16 Potential waste disposal and recycling facilities

Facility Name	Accepted Waste Streams	Distance by road from project site (km)
Cleanaway Erskine Park Landfill	Commercial and Industrial, General solid waste (non-putrescible), General solid waste soils (special asbestos), Construction and demolition waste (C&D waste) excluding asbestos,	12.5
Bingo Eastern Creek Recycling Ecology Park & Landfill	Construction waste including concrete, bricks, timber, asbestos, and mixed waste	18.3
Cleanaway Eastern Creek Solid Waste Services	Glass, liquid paperboard, steel, plastic and aluminium	18.2
Cleanaway Kemps Creek Resource Recovery	Scrap metal, General waste, Bagged asbestos dust	5.8
REMONDIS Seven Hills Resource Recovery Facility	General waste, scrap metal, co-mingled recycling, paper and cardboard	30.3
Cleanaway Auburn Resource Recovery Centre	Paper, cardboard, steel and aluminium cans, scrap metals, sump oil, white goods and vehicle batteries	38.3
Cleanaway Lucas Heights Resource Recovery Park	Paper and cardboard, steel and aluminium cans, e-waste, scrap metals, limited quantities of sump oil, white goods and vehicle batteries.	42.6
Veolia Eastern Creek Public Drop-off	General waste and organics	16.4
Camellia Recycling Centre	Non-putrescible waste	35.9
A.G.M. Recycling Environmental	Paper and Cardboard, plastics, packaging, wooden and plastic pallets	17.5
Shred-X-Secure Destruction	Paper – office and mixed	18.8
Cleanaway Erskine Park Transfer stations	General Solid Waste – Putrescible, General Solid Waste (non-putrescible), C&I (business/ commercial/industrial mixed dry waste), C&D – construction and demolition, Timber, Metals	12.5
Veolia Banksmeadow Transfer Terminal, NSW	Putrescible and non-putrescible dry waste	52.3

It is anticipated that arrangements for collection contractor and selection of waste facilities would be specified in the later stages of the development.

6.7 Communication Strategies

Waste management initiatives and management measures should be clearly communicated to building managers, tenants, employees, customers and cleaners. Benefits of providing this communication include:

- improved satisfaction with services
- increased ability and willingness to participate in recycling
- improved amenity and safety
- improved knowledge and awareness through standardisation of services
- increased awareness or achievement of environmental goals and targets
- reduced contamination of recyclables stream
- increased recovery of recyclables and organics material, if implemented, and
- greater contribution to targets for waste reduction and resource recovery, the environment and heritage conservation.

To realise the above benefits, the following communication strategies should be considered:

- Use consistent signage and colour coding throughout the Development
- Ensure all staff are trained in correct waste separation and management procedures
- Provide directional signage to show location of and routes to waste storage area
- General waste and co-mingled recycling bins should be clearly labelled and colour-coded to ensure no cross contamination, where applicable
- Employees and cleaners should adhere to the WMP for compliance, in consultation with management, and
- Repair signs and labels promptly to avoid breakdown of communications.

6.8 Signage

Waste storage and collection areas should be provided with appropriate signage. These signs should clearly identify waste management procedures and provisions to contractors, tenants and visitors should be distributed around the Development.

Signs which clearly identify waste management procedures and provisions to staff and visitors should be distributed around the Development. Key signage considerations are:

- Clear and correct labelling on all waste and recycling bins, indicating the correct type or types of waste that can be placed into a given bin, as shown in Figure 7
- Signposts and directions to location of waste storage areas
- Clear signage in all waste storage areas to instruct users how to correctly separate waste and recycling
- Maintaining a consistent style colour scheme and system for signs throughout the Development, and
- Emergency contact information for reporting issues associated with waste or recycling management.

Colour-coded and labelled lids are necessary for identifying bins. All signage should conform to the relevant Australian Standard and use labels approved by the NSW EPA²². The design and use of safety signs for waste rooms and enclosures should comply with Australian Standard AS 1319 Safety Signs for the Occupational Environment and clearly describes the types of materials designated for each bin.



Figure 7 - Example of bin labels for operational waste

6.9 Monitoring and Reporting

Monitoring is recommended to ensure waste and recycling management arrangements and provisions for the Development are functional, practical and are maintained to the standard outlined in this plan, at a minimum.

Visual assessments of bins and bin storage areas should be conducted by the building manager, at minimum:

- Weekly, in the first two months of operation to ensure the waste management system is sufficient for the operation, and
- Every six months, to ensure waste is being managed to the standards outlined in this document.

In addition, audits are to be conducted on a half-yearly basis to ensure WMP provisions are maintained.

Quantities of waste and recycling associated with disposal of waste and recycling, including dockets, receipts and other physical records should be recorded by the Building Manager. This is to allow reviews of the waste management arrangements and provisions at the site over time. Records of waste disposal should also be available to regulatory authorities such as the NSW Environmental Protection Authority and SafeWork NSW, upon request.

Any deficiencies identified in the waste management system, including, but not limited to, unexpected waste quantities, is to be rectified by the Building Manager as soon as it is practical. Where audits show that recycling is not carried out effectively, management should carry out additional staff training, signage re-examination and reviews of the waste management system where the audit or other reviewing body has deemed necessary. If this waste management plan no longer sufficiently meets the needs of the Development, review and updates to maintain suitability must be undertaken.

²² NSW EPA waste signage and label designs <http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm>

6.10 Roles and Responsibilities

It is the responsibility of the Building Manager, or equivalent role, to implement this WMP and a responsibility of all warehouse tenants and staff to follow the waste management procedures set out by the WMP. SLR recommends that all subcontractors enlisted by the Client are to have roles and responsibilities identified and the Development's waste management system clearly explained. A summary of recommended roles and responsibilities are provided in **Table 17**.

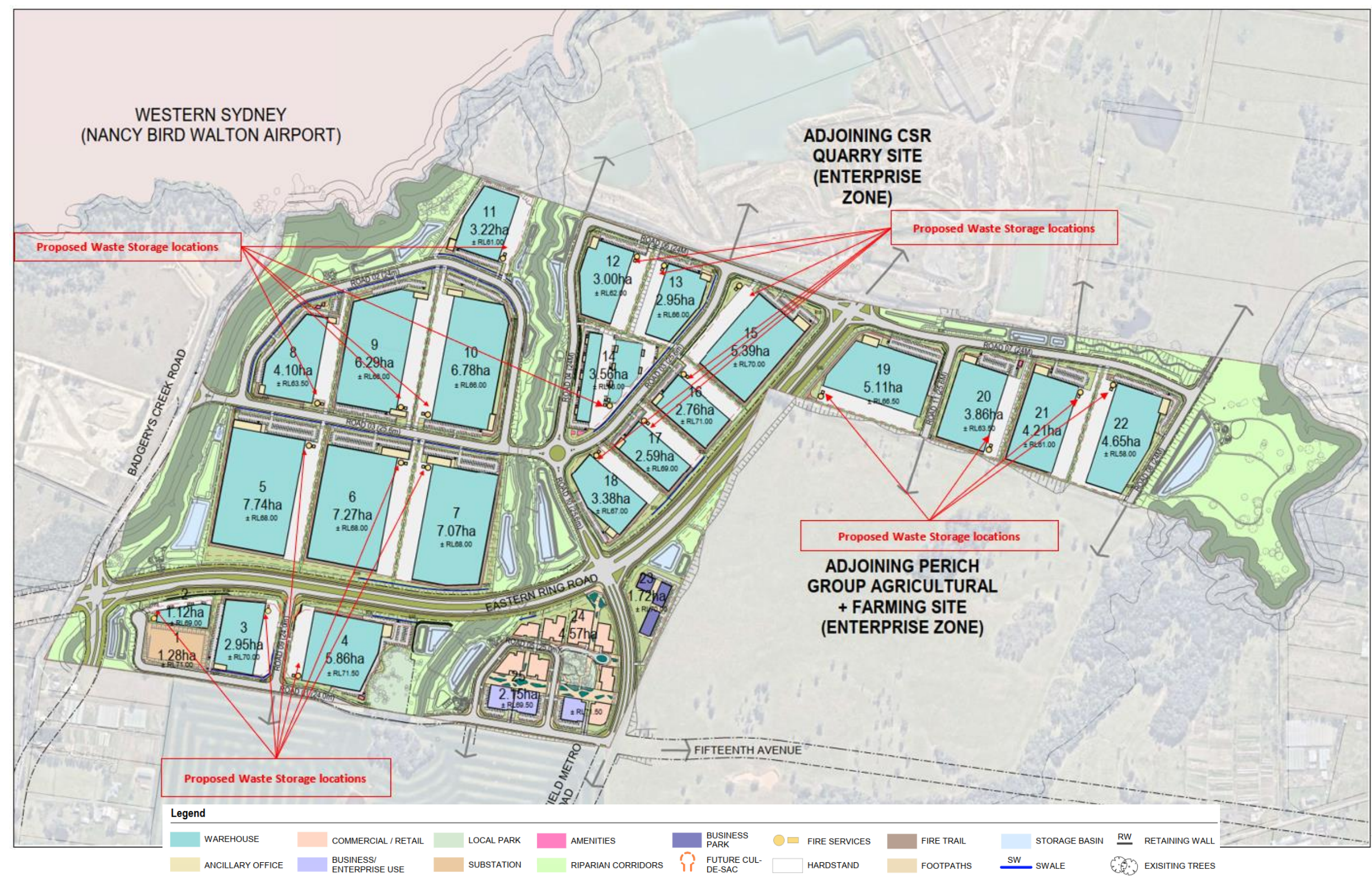
Table 17 Operational waste management responsibility allocation

Responsible Person	General Tasks
Management	Ensure the WMP is implemented throughout the life of the operation.
	Update the WMP on a regular basis (e.g., annually) to ensure the Plan remains applicable.
	Undertake liaison and management of contracted waste collections.
	Organise internal waste audits on a regular basis.
	Manage any complaints and non-compliances reported through waste audits etc.
	Perform inspections of all waste storage areas and waste management equipment on a regular basis.
	Organise cleaning and maintenance requirements for waste management equipment.
	Monitor bins to ensure no overfilling occurs.
	Ensure effective signage, communication and education is provided to alert visitors, employees and cleaners about the provisions of this WMP and waste management equipment use requirements.
	Monitor and maintain signage to ensure it remains clean, clear and applicable.
	Ensure waste and recycling storage rooms are kept tidy.
	Ensure that regular cleaning and daily transfer of bins is being undertaken by the cleaners
	Ultimately responsible for the management of all waste management equipment, cleaning requirements, waste transfer and collection arrangements.
Cleaners and Staff	Removal of general waste, recyclables, cardboard waste and hazardous waste from floor areas for transfer to centralised waste and recycling collection rooms daily or as required.
	Cleaning of all bins and waste and recycling rooms on a weekly basis or as required.
	Compliance with the provisions of this WMP.

7 Public Place Bins

As recommended by the Liverpool City Council in their comments from 11 October 2023:

- Any public park areas within the master plan area that have children's playground or tables and chairs, picnic areas, any bus stops or areas of footpath adjacent to takeaway food premises, would have provision for a public litter bin. The type of a bin will be as nominated by Liverpool City Council.
- The public litter bins, positioned to service the facilities mentioned above would be within 30 metres radius of where a HRV waste truck can legally pull up and stop to empty the bin.
- Any street furniture to be provided within the master plan area would be designed and positioned to facilitate efficient machine cleaning and minimise instances of litter or discarded items being trapped in or under that street furniture, or in hand-to-access corners created by paving or planter design.



²³ IPG Bradfield – Economic Assessment, Map 1.4 – Proposed Subject Site Master Plan, p. 17, prepared for Ingham Property Group, Urbis, 07/06/2024

²⁴ The proposed waste storage areas are indicative and were provided for the Master Plan purposes. A more detailed investigation should be conducted to specify the most appropriate locations further.

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