

OAKDALE WEST INDUSTRIAL ESTATE

Lots 4A and 4B
Waste Management Plan

Prepared for:
Goodman Property
The Hayesbery
1-11 Hayes St
Rosebery NSW 2018

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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 Goodman Property (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.

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1 Introduction

1.1 Background

SLR has been engaged by Goodman Property Services (Aust) Pty Ltd to provide a waste management plan to support the Development Application for the proposed industrial buildings 4A and 4B at the Oakdale West Industrial Estate (OWIE).

The Development consists of two new warehouse buildings each with ancillary office facilities, external hardstand spaces, staff carparking, landscaping and solar panels.

Approval is requested for the construction, operation and use, and fit-out of the buildings.

Building 4A spans 16,785 m² of warehouse space and 650 m² of office space, creating a total gross lettable area of 17,435 m². The building has a proposed ridge height of 13.7m.

Building 4B spans 14,700 m² of warehouse space and 850 m² of office space, creating a total gross lettable area of 15,550 m². The building has a proposed ridge height of 13.7m.

The facility is proposed to operate 24 hours a day seven days per week with a focus on warehouse and industrial use.

The proposed developments comply with MOD 11 of SSD 7348 Concept Plan that is currently with the Department of Planning and Environment for assessment. The applications will be submitted to Penrith City Council (Council) as a local council development application.

The proposed buildings form part of the larger OWIE which comprises 154 ha of land within the Western Sydney Employment Area and is owned by a Joint Venture between Goodman and Brickworks Limited.

The subject sites are benched, serviced and ready for aboveground construction. SSD 7348 approved the infrastructure to these development pads.

Lots 4A and 4B are adjacent to each other at the corner of the Future Southern Link Road and Cuprum Close (Estate Road 6). There are also car parking and hardstand areas.

The development application will include both precincts and so both are covered by this waste management plan. The design for the two lots is shown in Figure 1 below.



This waste management plan (WMP) covers the site preparation, construction and operational stages of the Development. We have also outlined relevant Council requirements for waste storage area size, location, design and access.

1.2 Objectives

The objectives of this WMP are to address Council's requirements and provide for good and safe practice principles for waste management. We have also referred to the following for guidance:

- Penrith Development Control Plan (Penrith DCP) 2014¹
- Penrith Council's Industrial, Commercial and Mixed-Use Waste Management Guidelines.²
- The Hills Development Control Plan 2012 (The Hills DCP).

¹ <https://www.penrithcity.nsw.gov.au/building-development/planning-zoning/planning-controls/development-control-plans>

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

2 Better Practice for Waste Management and Recycling

2.1 Waste Management Hierarchy

This WMP has been prepared in line with the waste management hierarchy shown in Figure 2. The hierarchy summarises the objectives of the Waste Avoidance and Resource Recovery Act 2001.

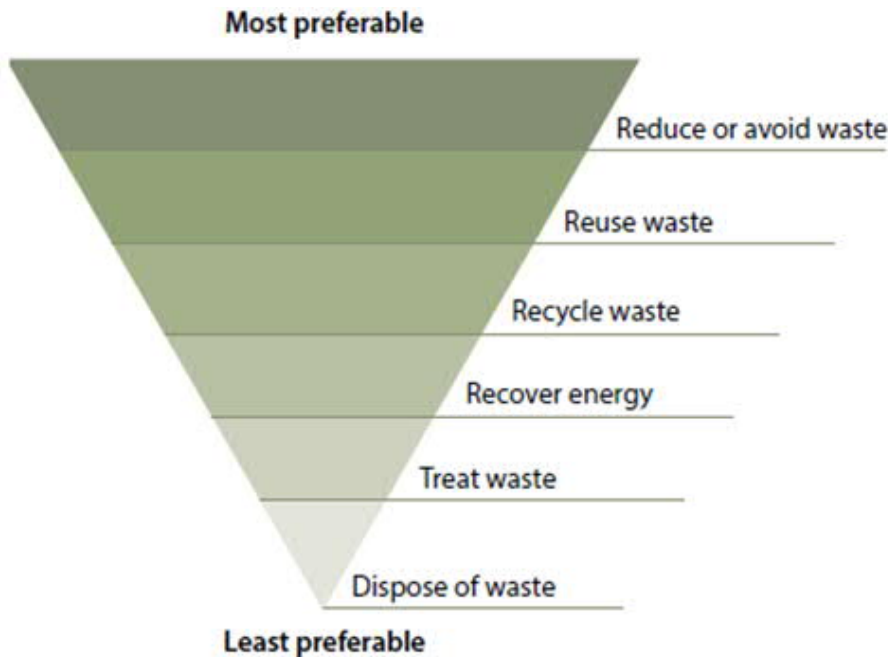


Figure 2 - Waste management hierarchy

The waste management hierarchy comprises the following principles, from most to least preferable:

- Waste avoidance, prevention or reduction of waste generation. Achievable through better design and purchasing choices.
- Waste reuse, reuse without substantially changing the form of the waste.
- Waste recycling, treatment of waste that is no longer usable in its current form to produce new products.
- Energy recovery, processing of residual waste materials to recover energy.
- Waste treatment, reduce potential environmental, health and safety risks.
- Waste disposal, in a manner that causes the least harm to the natural environment.

2.2 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.

3 Waste Legislation and Guidance

The waste legislation and guidance outlined in Table 1 below should be referred to during the operation of The Development.

Table 1 A list of legislation and guidance relevant to this report

Legislation and Guidance	Objectives
State and National legislation and guidelines	
Building Code of Australia (BCA) and relevant Australian Standards	The BCA has the aim of achieving nationally consistent, minimum necessary standards of relevant health and safety, amenity and sustainability objectives efficiently.
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 Waste and Sustainable Materials Strategy 2041: Stage 1 – 2021-2027	Replacing the NSW Waste Avoidance and Resource Recovery Strategy (2014-21), the NSW Waste and Sustainable Materials Strategy 2041 focuses on the transition of NSW to a circular economy. The strategy focuses on minimising what is thrown away, and to use and reuse resources more efficiently, making them as productive as possible. The strategy identifies the need to identify infrastructure needs, the mandating of separation of some organic waste streams, and incentivising biogas generation from waste materials.
NSW EPA Resource Recovery Orders and Resource Recovery Exemptions	<p>The NSW EPA has issued a number of resource recovery orders and resource recovery exemptions under the POEO (Waste) Regulation 2014 for a range of wastes that may be recovered for beneficial re-use. These wastes typically include those from demolition and construction works, as well as ongoing wastes such as food waste.</p> <ul style="list-style-type: none"> • Resource recovery orders present conditions which generators and processors of waste must meet to supply the waste material for beneficial re-use. • Resource recovery exemptions contain the conditions which consumers must meet to use waste for beneficial re-use.
NSW EPA's Waste Classification Guidelines 2014	The NSW EPA Waste Classification Guidelines 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 POEO Act 1997 and its associated regulations.
Protection of the Environment Operations Act (POEO) 1997 and Amendment Act 2011	The POEO Act 1997 and POEO Amendment Act 2011 are administered by the NSW EPA to enable the NSW Government to establish instruments for setting environmental standards, goals, protocols and guidelines. They outline the regulatory requirements for lawful disposal of wastes generated during the demolition, construction and operational phases of a development, as well as the system for licencing waste transport and disposal.

Legislation and Guidance	Objectives
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 The Work Health and Safety Act 2011. 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.
Waste Avoidance and Resource Recovery Act 2001	<p>The Waste Avoidance and Resource Recovery Act 2001 aims to promote waste avoidance and resource recovery and repeals the Waste Minimisation and Management Act 1995. Specific objectives of the Waste Avoidance and Resource Recovery Act 2001 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 and 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>

4 Site Preparation and Construction Waste and Recycling Management

4.1 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%.

It is anticipated that the waste minimisation measures in the following sections will assist the Development to meet these targets. Waste reporting and audits can be used to determine the actual percentage of wastes that are being, or have been, recycled during the site preparation, demolition and construction stages of the Development.

The Penrith DCP proposes that reducing the volume of demolition and construction waste going to landfill by 76% would be a way in which applicants could demonstrate additional commitment to waste avoidance and management.

4.2 Waste Streams and Classifications

The site preparation and construction activities are anticipated to generate the following broad waste streams:

- Site preparation wastes as outlined in Section 4.3
- Construction waste as outlined in Section 4.4

- Packaging waste, and
- Work compound waste from on-site employees.

A summary of likely waste types generated from demolition and construction activities, along with their waste classifications and proposed management methods are provided in Table 2. For further information on how to determine a waste's classification refer to the NSW EPA (2014) Waste Classification Guidelines.³ Further information on managing site preparation, demolition and construction wastes is also available on the NSW EPA website⁴ and the Western Sydney Recycling Directory – Construction and Demolition Waste 2017.⁵

Table 2 Potential waste types, classifications and management methods for demolition and construction

Waste Types	NSW EPA Waste Classification	Proposed Management Method
Site preparation and Construction		
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
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 Treated: reused for formwork, bridging, blocking, propping or second-hand supplier Untreated: reused for floorboards, fencing, furniture, mulched second hand supplier, and remainder to landscape supplies.
Doors, windows, fittings	General solid waste (non-putrescible)	Off-site recycling at second hand 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	Hazardous waste	Off-site disposal to a licensed landfill facility.
Fluorescent light fittings and bulbs	Hazardous waste	Off-site recycling or disposal, contact FluoroCycle for more information ⁶

³ Available online from <https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines>

⁴ Available online from <http://www.epa.nsw.gov.au/your-environment/waste/industrial-waste/construction-demolition>

⁵ <https://www.blacktown.nsw.gov.au/files/content/public/services/waste/demolition-and-construction-waste/western-sydney-recycling-directory-cd-updated-nov-2017.pdf>

⁶ Available online from <http://www.fluorocycle.org.au/> or <http://www.environment.gov.au/settlements/waste/lamp-mercury.html>

Waste Types	NSW EPA Waste Classification	Proposed Management Method
Paint	Hazardous waste	Off-site recycling, Paintback collection ⁷ or disposal
Synthetic rubber or carpet underlay	General solid waste (non-putrescible)	Off-site recycling, reprocessed for other uses
Ceramics including tiles	General solid waste (non-putrescible)	Off-site recycling
Carpet	General solid waste (non-putrescible)	Off-site recycling, disposal or reuse
Packaging		
Packaging materials, including wood, plastic, including stretch wrap or LDPE, 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 Business Recycling for more information ⁸
Work Compound and Associated Offices		
Food Waste	General solid (putrescible) waste	Dispose to landfill with general garbage
Recyclable beverage containers, such as glass and plastic bottles, aluminium cans and steel cans	General solid waste (non-putrescible)	Recycling at off-site licensed facility or at NSW container deposit scheme 'Return and Earn' facility ⁹
Clean paper and cardboard	General solid waste (non-putrescible)	Paper and cardboard recycling at off-site licensed facility
General domestic waste generated by workers such as soiled paper and cardboard, food and polystyrene	General solid waste (non-putrescible) mixed with putrescible waste	Disposal at landfill

4.3 Site Preparation Waste Types and Quantities

The site is currently vacant, undeveloped and comprising mostly grass and trees. Some excavation is proposed at the site, but all soil will be reused on site for site levelling and landscaping. There are no structures on site so no demolition waste will be generated.

4.4 Construction Waste Types and Quantities

The Penrith DCP provides no assistance for construction waste quantities. SLR has adopted the 'Factory' and 'Office' waste construction generation rates from Appendix A of The Hills' DCP for estimating the type and quantities of waste generated from construction of the Development. SLR has also referenced Light Duty Asphalt Pavements - Design, Specification and Construction 2002 Australian Asphalt Pavement Association, specifically Table 10 Passenger Car Parking Areas, up to 50-500 Bays, for estimating the amounts of materials required for car park construction and assumed 10% waste.

The construction waste generation rates used are shown in Table 3 below.

⁷ Available online from <https://www.paintback.com.au/>

⁸ Available online from <https://businessrecycling.com.au/>

⁹ Available online from <http://returnandearn.org.au/>

Table 3 Construction waste generation rates

Rate Type	Per Area (m ²)	Waste types and quantities (m ³)								
		Timber	Concrete	Bricks	Gyprock	Sand or Soil	Metal	Other	Asphalt	Granular Base
Factory	1,000	0.25	2.1	1.65	0.45	4.8	0.6	0.5	0	0
Offices	1,000	5.1	18.8	8.5	8.6	8.8	2.75	5.0	0	0
Car Park 50-500 bays	100	0	0.225	0	0	0	0	0	0.3	1.25
Hardstand	1,000	0	2.1	0	0	4.8	0.6	0.5	0	0

Estimates of the quantities of construction waste generated from the Development are shown in Table 4 below.

Table 4 Estimated types and quantities of construction waste

Development Component	Area (m ²)	Waste types and quantities (m ³)								
		Timber	Concrete	Bricks	Gyprock	Sand or Soil	Metal	Other	Asphalt	Granular Base
Warehouse 4A	16,785	42	352	277	76	806	101	84	-	-
Office and Dock Office 4A	650	33	122	55	56	57	18	33	-	-
Car park 4A	1,865	5	39	31	8	90	11	9	-	-
Hardstand 4A	12,560	-	28	-	-	-	-	-	31	126
Warehouse 4B	14,700	37	309	243	66	706	88	74	-	-
Office and Dock Office 4B	850	43	160	72	73	75	23	43	-	-
Car park 4B	2,305	-	5	-	-	-	-	-	7	29
Hardstand 4B	5,370	-	113	-	-	258	32	27	-	-
Total	55,085	160	1,129	678	279	1,991	274	269	38	154

The areas shown in Table 4 are based on the floor areas shown on the drawings in

- 22171_OWE_MOD_11_4A_&_4B_DA10_A_Site_&_Warehouse_Plan_comments.pdf and
- 22171_Drawing_Set_220826.pdf.

4.5 Waste Avoidance Strategies

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

Recommendations for the Building Designer 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 including western red cedar, oregon, meranti, luan or merbau
- Selecting materials based on low embodied energy properties that suit the Development, 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 wastes to ensure efficient recycling of wastes
- 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 wastes 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.

4.6 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 wastes
- Assess excavation spoil for contamination status and beneficial re-use
- Retain used crates for storage purposes unless damaged
- Recycle cardboard, glass and metal wastes
- Provide sufficient space for storage of garden waste and other waste materials on-site
- Dispose of all asbestos, hazardous and/or intractable wastes 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.

4.7 Waste Separation

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 in, 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.

4.8 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 Development. 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.

4.9 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 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.

4.10 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 online¹⁰ and should be used where applicable. A selection of the EPA's signs is shown in Figure 3.



Figure 3 - Examples of NSW EPA labels for waste and skip bins

4.11 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
- Emergency response procedures on-site
- Waste priorities and opportunities for reduction, reuse and recycling

¹⁰ NSW EPA approved waste materials signage <https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/business-government-recycling/standard-recycling-signs>

- Waste storage locations and separation of waste
- Procedures for suspected contaminated and hazardous wastes
- 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.

4.12 Monitoring and Reporting

During the demolition and construction phases, the following monitoring practices will 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.

4.13 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 5. 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 5 for the construction environmental manager will become those of the site manager.

Table 5 Suggested roles and responsibilities for site preparation and construction waste management

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.

5 Operational 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 the commercial and industrial waste recovery rate in 2019 was 53%.

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

5.2 Waste Streams and Classifications

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

- Bulk packaging waste, including plastic wrapping and cardboard
- Food and food and drink packaging from staff eating areas

- Garden organic waste from landscaped areas
- Bulky waste items such as furniture and e-waste, and
- Stores, plant and general maintenance waste.

Potential waste types, their associated waste classifications, and management methods are provided in Table 6. For further information on how to determine a waste's classification, refer to the NSW EPA (2014) Waste Classification Guidelines.¹¹ Recycling drop-off locations and contacts can be found on <https://businessrecycling.com.au/> for each waste type.

Table 6 Potential waste types, classifications and management methods for operational waste

Waste Types	NSW EPA Classification	Proposed Management Method
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	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
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
Packaging materials, including wood, plastic, including stretch wrap or LDPE, 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.
Sanitary waste, nappies	General solid (putrescible) waste	Contractor disposal at licensed facility
General garbage, including non-recyclable plastics	General solid (putrescible and non-putrescible) waste	Disposal at landfill

¹¹ Available online from <https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines>

Waste Types	NSW EPA Classification	Proposed Management Method
Spent smoke detectors ¹²	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 for more information
Air-conditioning parts and filters	General solid (non-putrescible) waste	Off-site recycling or disposal to landfill
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. Discharge to sewer likely to be subject to Trade Waste Agreement with Sydney Water.
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

5.3 Estimated Quantities of Operational Waste

SLR has used the 'Offices' and 'Warehouse' waste generation rates from Penrith Council's Industrial, Commercial and Mixed-Use Waste Management Guidelines for estimating the type and quantities of waste generated from the operational activities of the Development. The operational waste generation rates used are shown below in Table 7.

Table 7 Waste generation rates applied

Type of Premises	General Waste Generation (L/100 m ² /day)	Recycling Generation (L/100 m ² /day)
Warehouse	10	10
Offices	10	10

Using the waste generation rates in Table 7 above, the approximate weekly waste quantities for the Development have been calculated. The operational waste quantities were additionally calculated based on the below assumptions:

- The floor areas shown on the drawings
 - 22171_OWE_MOD_11_4A_&_4B_DA10_A_Site_&_Warehouse_Plan_comments.pdf and
 - 22171_Drawing_Set_220826.pdf.
- A week comprising seven days of operation.

The estimated quantities of operational waste generated by the Development are shown in Table 8.

¹² 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.

Table 8 Estimated quantities of operational waste and recycling

Warehouse	Project area	Area (m ²)	(L/day)		(L/week)	
			Garbage	Recycling	Garbage	Recycling
4A	Warehouse	16,785	1,679	1,679	11,750	11,750
	Office and Dock office	650	65	65	455	455
	Total	17,435	1,744	1,744	12,205	12,205
4B	Warehouse	14,700	1,470	1,470	10,290	10,290
	Office and Dock office	850	85	85	595	595
	Total	15,550	1,555	1,555	10,885	10,885

5.4 Bin numbers and areas

5.4.1 Garbage and Recycling Bins

The waste storage area 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. The most common front lift bin capacity is 3 m³ and these have been assumed when calculating bin numbers and storage space.

All waste storage area calculations have considered the bin dimensions listed in the Penrith DCP, as outlined in Table 9.

Table 9 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 200% of the total minimum bin footprint. This can also act as a contingency in the event of spikes in waste generation. Additionally, in accordance with the Penrith DCP, an additional 0.2 m is to be permitted between the bins to allow for manoeuvrability. This has been considered in the calculation of the waste storage area for each of the buildings in the Development.

The recommended bin storage areas do not include storage of bulky waste. For the additional storage space for bulky waste, refer to Section 5.4.2.

The estimated number of bins required for weekly storage of operational waste and recycling generated by the Development are in Table 10 and are based on:

- The estimated quantities of operational waste and recycling as shown in Table 8
- Bin dimensions from the Penrith DCP as shown in Table 9.

Table 10 Recommended number of bins and storage area

Lot	Bin Capacity	Collection Frequency per Week		Number of Bins Required		Total Number of Bins	Recommended Storage Area (m ²)
		Garbage	Recycling	Garbage	Recycling		
4A	3 m ³	3	3	2	2	4	25.0
4B	3 m ³	2	2	2	2	4	25.0

5.4.2 Bulky Waste

As outlined in the Penrith DCP, additional storage space for the bulky waste stream must be provided. This stream includes broken pallets, broken furniture, e-waste and other materials that cannot be disposed of in the general or recyclable waste stream.

Council's guidelines do not provide storage area dimensions for bulky waste. In the absence of dimensions provided by Council, 8 m² will be allocated for bulky waste storage for each warehouse. Therefore, in addition to the recommended waste storage area noted in Table 10, the total waste storage areas proposed for the Development are shown in Table 11.

Table 11 Total recommended operational waste storage area

Lot	Recommended Storage Area (m ²)		
	Waste and Recycling Bins	Bulky waste	Total Storage Area
4A	25.0	8	33.0
4B	25.0	8	33.0

This additional space can also act as a contingency in the event of spikes in waste generation and allow for additional bins. Depending on the Development's operations, this may include additional bins for the separate storage of items such as hard and soft plastics, timber, glass and metals and aluminium. Hook bins may be brought to site as required to remove bulky waste items.

The drawings show waste storage areas of 33 m² for both proposed warehouses.

6 Waste Storage

6.1 Location

The waste storage areas are located so that they:

- Are away from primary street frontages
- Are convenient, safe, functional and directly accessible to users and collection vehicles but inaccessible to the public
- Avoid pedestrian or vehicular traffic.

The proposed waste storage locations for Lots 4A and 4B are shown in Figure 4 below.

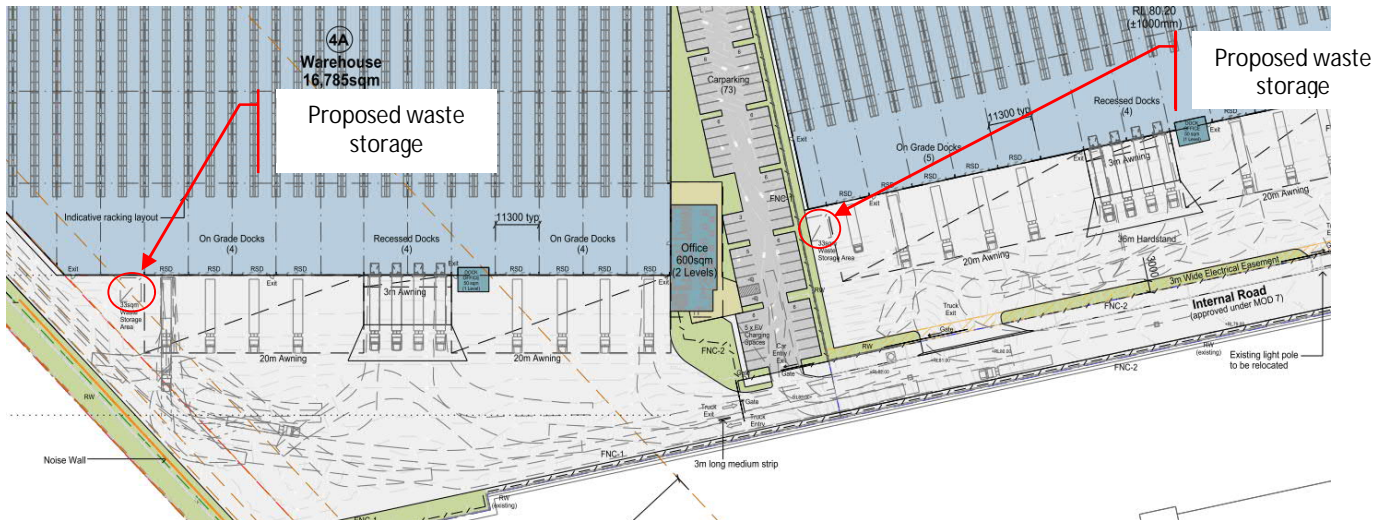


Figure 4 – Lots 4A and 4B showing waste storage

6.2 Waste Storage Area Features

In accordance with good practice waste management, the Development's waste storage areas will have the following features:

- Blend in with the design of the wider development and the surrounding streetscape
- Be well lit and well-ventilated
- Have adequate vermin prevention measures
- Reduce potential noise and odour impacts
- Be connected to a water outlet for washing purposes
- Have water discharge from washing flow to a sewer approved by the relevant authority
- Protected from theft and vandalism
- Be enclosed or screened, preferably with landscape buffer planting, from public areas to reduce the impacts of noise, odour and visual amenity, and
- Flexible in design to allow for future changes in operation, tenancies and uses.

6.3 Waste Servicing

The following access provisions will apply:

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

The proposed frequency of waste bin collection is shown in Table 10. There is some flexibility in the waste collection frequency that will allow adjustment of the number of bins and waste storage areas if necessary.

Waste collection vehicles will enter the site, drive through the hardstand area and onto the bins in their positions. The operator will empty the bins reverse back from the bins and then leaving the site in a forward direction.

6.4 Waste Avoidance, Reuse and Recycling

6.4.1 Waste avoidance

Waste avoidance measures include:

- Returning packaging materials like cardboard to the suppliers through the services of the supplier delivery trucks, allowing the reduction of waste further along the supply chain
- Providing ceramic cups, mugs, crockery and cutlery rather than disposable items
- Bulk purchasing and the purchasing of items that use minimal packaging
- Presenting all waste reduction initiatives to staff and tenants as part of their induction program, and
- Leasing equipment and machinery rather than outright purchase and disposal.

6.4.2 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.

6.4.3 Recycling

Recycling opportunities include:

- Collecting and recycling e-wastes
- Printer toners and ink cartridges, if purchased, are collected in allocated bins for appropriate contractor recycling
- Providing separate receptacles for general waste, recycling and paper and cardboard throughout office and amenity areas to encourage source-separation of waste streams
- Development of a 'buy recycled' purchasing policy.

6.5 Communication Strategies

Education and communication on waste management initiatives and measures will be regularly and clearly conveyed to staff, cleaners and visitors. 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 which can incur a collection contractor penalty fee

- Increased recovery of recyclables and organics material, if implemented, and
- Greater contribution to state-wide targets for waste reduction and resource recovery.

To realise these benefits, the following communications strategies are recommended:

- Use consistent signage and colour coding for bins and waste systems throughout the Development
- Ensure all staff are informed of correct waste separation and management procedures
- Provide directional signage to show locations and routes to bins and waste storage areas
- Repair signs and labels promptly to avoid a breakdown in communication
- Clearly label bins to ensure no cross contamination and to identify the types of waste that may be disposed of in each bin, and
- Educate all staff and contractors associated with the Development, ensuring they adhere to this WMP.

6.6 Signage

Signs which clearly identify waste management procedures and provisions to contractors, staff and customers will be distributed around the Development.

The design and use of safety signs for waste rooms and enclosures will comply with Australian Standard AS 1319 Safety Signs for the Occupational Environment and clearly describe the types of materials designated for each bin.

Colour-coded and labelled bin lids are necessary for identifying bins and the Australian Standard AS 4123.7-2006 (R2017) Mobile waste containers Part 7: Colours, markings, and designation requirements provides recommendations for the designated colours for waste bins depending on the type of waste the bins are to receive. The colours that will apply to ongoing waste generated by the Development are:

- Blue: Paper and cardboard
- Yellow: Recyclables (other than paper and cardboard)
- Red: General waste.

All bin signage should also follow the NSW EPA's standard signage.¹³

Other key signage considerations include:

- 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 5
- 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 that complies with AS 4123, and a system for signs throughout the Development, and
- Emergency contact information for reporting issues associated with waste or recycling management.

¹³ NSW EPA waste signs/posters <http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm>



Figure 5 - Example NSW EPA labels for ongoing waste

6.7 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.

During operation, visual assessments of bins and bin storage areas will be conducted, 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 should be conducted every six months 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 will be recorded by tenants. 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 Council, the NSW EPA and SafeWork NSW, if required.

Any deficiencies identified in the waste management system, including, but not limited to, unexpected waste quantities, is to be rectified by the tenants as soon as it is practical. Where audits show that recycling is not carried out effectively, tenants 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.

6.8 Roles and Responsibilities

It is the responsibility of the tenants to implement this WMP and a responsibility of all staff, visitors and contractors to follow the waste management procedures set out by the WMP. SLR recommends that all staff have the roles and responsibilities of all waste management personnel identified and the Development's waste management system clearly explained. A summary of recommended roles and responsibilities are provided in Table 12.

Table 12 Suggested operational waste-related roles and responsibilities

Responsible Person	General Tasks
Managers or equivalent roles	Ensure the WMP is implemented throughout the life of the operation.
	Update the WMP as needed to ensure the plan remains applicable to the site.
	Undertake liaison and management of contracted waste and recycling collections with contractors and any relevant authorities.
	Regularly conduct waste audits to review system performance and identify any additional materials that could be recovered.
	Manage any complaints and non-compliances reported through waste audits and other sources.
	Ensure all monitoring and audit results are well documented and conducted as specified in this WMP.
	Conduct regular waste sorting, physical condition and cleanliness inspections of bins, waste storage rooms and all other waste management equipment for functionality, hygiene and safety.
	Organise cleaning and maintenance requirements for waste management equipment as required.
	Ensure waste and recycling storage areas are kept tidy.
	Monitor bins to ensure no overfilling occurs and manage unexpected waste quantities to mitigate waste overflow in storage areas
	Ensure effective signage, communication and education is provided to alert visitors, employees, site management staff 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.
	Manage ongoing education on correct source separation and waste management at least every three months.
	Ensure that regular cleaning and daily transfer of bins is correctly being undertaken by staff or cleaners.
	Ensure all bins are in good condition and operational.
	Ultimately responsible for the management of all waste management equipment, cleaning requirements, waste transfer and collection arrangements.
Staff or cleaners	Transfer general waste, recyclables, cardboard waste and hazardous waste from public spaces to the waste and recycling storage areas each day or as required.
	Cleaning of all bins and waste and recycling rooms as per the direction of managers, or equivalent roles.
	Monitor bins to ensure no overfilling occurs.
	Ensure bins and waste storage areas are kept tidy and clean.
	Compliance with the provisions of this WMP.

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