Operational Waste Management Plan

Penshurst Public School

At 18 Arcadia Street, Penshurst

On behalf of Grindley Construction Pty Ltd

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Executive Summary

This document is an Operational Waste Management Plan (OWMP) developed for a proposed mixed-use development to be located at the proposed Penshurst Public School.

The purpose of the OWMP is to provide compliance and design information relating to the handling, storage, and collection of refuse within the proposed development. Compliance relates to alignment with the City of Hurstville DCP. The content of the OWMP is written with the purpose of providing a guide for the design, construction and operational phases of the development and therefore may be updated to include detailed information as required for each phase. Sections included as "client information only" are removed or amended during the appropriate phase and therefore should not be reviewed as assessable items.

Compliance

The OWMP satisfies Hurstville DCP objectives as detailed in the compliance table in Section 1.3.1. The content of the OWMP provides the following information:

- Type of development uses and individual refuse streams for each development use;
- Anticipated quantities likely to be generated for each refuse stream under full occupancy and operation of the proposed development.
- Refuse collection, storage, transfer, and disposal arrangements during full occupancy of the completed development; and
- Recommended operational requirements for the operational phase of the development including design requirements for the site and building and refuse management facilities.

Waste Management Summary

The development consists of an existing educational facility (school) including administration, classrooms, library, communal halls, canteen areas and outdoor areas..

Access to the site loading dock is via Arcadia Street. The loading dock and associated service bay is located on the ground floor level via the car park. The waste room is located on the northern boundary of the ground floor and in proximity to the loading area.

All refuse will be managed by cleaners and the maintenance caretaker. All waste and recycling material will be transferred from each area (indoors and outdoors) to the refuse room.

Weekly waste volumes are estimated at 4,488L and can be further reduced by separation of food waste. Weekly recycling volumes are estimated at 3,295L and can also be reduced by separation and of cardboard and paper.

Note: The City of Hurstville DCP 2014 (Part 7.2) provides guidance on waste generation rates for a restaurant/café (for the canteen use), however rates have been sourced and applied from the Sustainability Victoria Better Practice Guide, to provide accurate volume information for educational / school developments (for classrooms and outdoor areas etc).

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1 Introduction

1.1. Background

TTM Consulting has been engaged by Grindley Construction Pty Ltd to prepare an OWMP to support the proposed Penshurst Public School development at 18 Arcadia Street, Penshurst. It is understood that a development application will be lodged with the Georges River Council (formerly City of Hurstville).

1.2. Scope

The content of this plan is intended to provide information in reverse order to the typical movement of waste streams from disposal to collection. The reverse order provides context for refuse collection, storage and transfer. Information about refuse disposal and disposal points is given for each use area within the development.

The items covered within the report are explained in Table 1.1. The key information for Council approval can be found in Section 2.

Table 1.1: Scope Items

Item	Explanation
Refuse streams	Identification of refuse streams and anticipated development refuse volumes to be produced
Refuse separation	Recommendations for appropriate segregation methods for each refuse stream
Refuse collections	Assessment of refuse collection vehicle (RCV) access and manoeuvering
Refuse storage	Detailed analysis of refuse storage facilities and design
Refuse transfer	Assessment of refuse transfer between refuse storage and collections areas
Refuse disposal	Recommendations for refuse disposal within the development
Refuse management equipment	Identification of recommended and optional refuse management systems and equipment
Refuse management operations	Recommendations for operational efficiency and ongoing management, including refuse minmisation, tenant education and safety
Building design	Recommendations for design of refuse management facilities

Detailed information including refuse calculations, site plans and drawings, recommended refuse management equipment and system specifications, common refuse signage as well as a list of terms and abbreviations are provided in the appendix.

The recommendations in this report relate to the operational phase of the development. Additional requirements for refuse management during or after demolition or construction phases are not included and require a dedicated plan.

1.3. Regulatory Considerations

1.3.1. Council's Refuse Planning Scheme

The plan satisfies the Hurstville DCP requirements by providing the following information:

- Type and quantity of refuse materials that would be generated during the occupancy of the proposed development.
- Refuse collection, storage, transfer and disposal arrangements during occupancy of the completed development.
- Recommended operational requirements for the operational phase of the development, and design requirements for the building and refuse management facilities.

TTM has referred to council requirements outlined in the Hurstville DCP – Part 5.0 Controls for Specific Non-Residential Development Types. Table 1.2 demonstrates the refuse management items addressed to align with these requirements.

Table 1.2: Waste Management Plan Compliance Checklist

Performance Criteria	Design Criteria	Comment	Compliance
PC9. Waste management: • provides for an efficient and environmentally sustainable means of storage and/or disposal of trade waste and recyclable products. • ensures the capacity, size, construction and placement of both trade waste and recyclable storage facilities is determined according to: – estimated amounts of trade waste and recyclables generated. – safe means of collection; and – unobtrusive effects on the building and neighbourhood. • ensures excavated material, demolition and builder's waste is disposed of on landfill sites approved by the EPA and acceptable to Council. • incorporates convenient access for waste collection.	DS9.1. Adequate storage for waste materials is to be provided on the site. This waste must be removed at regular intervals and not less frequently than once per week.	Adequate storage is provided and removed three times per week.	✓
	DS9.2. The garbage area is to be capable of accommodating trade waste and recyclables arising on the premises. Sufficient space is to be provided for a loading and unloading area and any associated handling equipment.	The garbage area can accommodate all trade waste and recyclables required, and all loading and handling.	✓
	DS9.3. The location of garbage area and bulk waste collection bins is to be shown on the development application plans.	The location of the garage and bulk bin area is shown on the plans.	✓
	DS9.4. Garbage areas are to be constructed of concrete floors or the like, graded and drained and connected to the sewer where appropriate. Solid walls are required, with or without the following - roof covering, doors, lighting, ventilation and water supply.	Garabage areas will be constructed to comply with all requirements.	✓
	DS9.5. Garbage areas are to enable safe and easy access by collectors and collection vehicles within proximity to street frontages, and are to be screened with appropriate landscaping measures.	Collections will remain as per existing arrangements.	✓
	DS9.6. For collection of waste, roadway curves are to be a minimum radius of 11 metres.		✓
	DS9.7. Sites for disposal of excavated material, demolition and builders waste are to be specified by the applicant with the development application.	Demolition and construction wate is provided seprately.	✓
	DS9.8. In addition to the above, applicants are required to comply with the Waste Management policy contained in Appendix 1 of the DCP.	The development will comply with all policies.	✓

1.3.2. Waste Levy

Licensed waste facilities in NSW to pay a contribution for each tonne of waste received at the facility. Referred to as the 'waste levy', the contribution aims to reduce the amount of waste being landfilled and promote recycling and resource recovery. The levy may be handed on to the waste generators.

The waste levy applies in the regulated area of NSW, which includes various metropolitan and regional areas. The Georges River Council is a metropolitan levy area where a waste levy of $143.60 per tonne applies (financial year 2019 / 2020).

The levy will normally be passed on by waste collection contractors to customers, possibly based on an assumed volume per bin or per actual weight of the waste material. Therefore, in order to reduce waste levy costs, waste generators should choose to avoid waste generation through a range of preventative measures, and separate recyclable material from general waste they do generate as much as possible.

1.4. Site Location

The subject site is located at 18 Arcadia Street and 510 Forest Road, Penshurst, as shown in Figure 1.1 and Figure 1.2. The property description is on Lot 15 on DP8173. The site has road frontages to Arcadia Street and Forest Road, with all site access via Arcadia Street.

Figure 1.1: Site Location (Map View)

Figure 1.2: Site Location (Satellite View)

1.5. Development Summary

The development consists of an existing educational facility (school) including administration, classrooms, library, communal halls, canteen areas and outdoor areas.

The School is a public school currently providing 413 enrolled students (October 2020) and the redevelopment is expected to provide education for 1,000 students. The School employs 59 full time equivalent (FTE) staff. School hours of operation are 9.00am to 3.00pm.

1.6. Development Refuse Profile

Table 1.3 demonstrate the anticipated volumes for each of the commonly separated refuse streams. All calculations and equipment requirements are based on the development schedules and common waste generation rates as outlined in the detailed information in Appendix A.

Table 1.3: Refuse Summary

Description	Measure	Quantity	General Waste (L / Week)	Commingled Recycling (L / Week)
Total	m^2 GFA	12,057	4,488	3,295

2 Refuse Management

This section describes the arrangements for the collection, storage, transfer and disposal of refuse within the development. This includes associated bin quantities, storage capacities, equipment details, collection frequencies and site access details.

2.1. Refuse Collection

All refuse from site is deemed commercial and will be collected by private refuse collection contractors.

2.1.1. Bin Quantities

Table 2.1 outlines the number of bins per collection. Noting that the equipment shown is considered a maximum volume, as waste volumes may vary according to the development occupants' attitudes to waste disposal and recycling, bin numbers and sizes may need to be altered to suit the building operation.

Table 2.1: Bin Arrangements

Refuse Stream	Bin / Equipment - Type or Size	Numbers of Bins / Items per Collection
General Waste	660L	2
Commingled Recycling	1100L	1
Small receptacles	60-80L	TBD prior to or during operation
Public space bins	120-240L	TBD prior to or during operation
Refuse Trolleys	60-120L	TBD prior to or during operation

2.1.2. Collection Cycle

Table 2.2 outline the vehicles and estimated collection frequencies or site entries required to service the site refuse. The type of vehicles allocated, and demand will be subject to final design and potential selection of volume reduction equipment. The figures demonstrated apply as a maximum demand.

Table 2.2: Estimated RCV Demands

Commercial Refuse Collections		Day 1	Day2	Day 3	Day 4	Day 5	Day 6	Day 7	Collections per Week
General Waste	Collection Days	✓		✓		✓			3
	Vehicle Type	REL RCV		REL RCV		REL RCV			
Commingled Recycling	Collection Days	✓		✓		✓			3
	Vehicle Type	REL RCV		REL RCV		REL RCV			
Total Collections per Week		**2**		**2**		**2**			**6**

2.1.3. RCV Arrangements

No change is proposed for service vehicle access, delivery and loading arrangements. Vehicular access for deliveries and waste vehicles will all be facilitated at the existing car park as per existing arrangements off

Arcadia Street. All refuse will be collected onsite by the existing private contractor. There will be no changes to existing service accesses and arrangements as a result of these additions.

In accordance with Condition 28 - part d, management and mitigation measures are required to be implemented in accordance with the Response to Submissions (RtS) report. As outlined in the noise impact and waste collection services responses in the operational phase (section 4.8) of the RtS, "waste collection services will be restricted to the daytime hours of between 7.30am and 6:00pm Monday to Friday, and a management plan will be implemented to ensure there is no clash with car parking". This will be implemented prior to development operation and enforced by appropriate staff / management during development operation.

2.2. Refuse Storage

All refuse from this development will be stored in bulk bins or appropriate refuse management equipment in the refuse room located on the ground floor. Storage of infrequently generated waste such as bulky items and electronic waste should be arranged with the caretaker.

The designated staff or cleaners will be responsible for cleaning the bins after collections. A hosecock and tap should be included in the refuse along with appropriate drainage. Staff and cleaners are able to access all bins without the need for rotation.

The refuse room is suitably sized to accommodate the waste generated and number of bins proposed based on standard storage and collection methods. The refuse rooms indicated will also accommodate all options for alternate equipment and disposal methods.

2.3. Refuse Transfer

Each classroom/area will be supplied with adequate space for storage of at least one full day accumulation of refuse. Typically, schools utilise up to 60L bin receptacles within the classrooms. These waste and recycling bins are placed within close proximity to classroom doors, desk areas, eating and washrooms. Several larger 240L / public place bins should be placed around the playground and school areas.

On completion of each day, or as required during the day, the caretaker / cleaners will transfer the waste and recycling from each room and playground area and decant into the appropriate bins in the refuse areas (see Appendix B).

2.4. Refuse Disposal

The tables in this section summarise general recommended disposal arrangements for frequently generated and infrequently generated refuse for each area use within the development. Frequently generated refuse considers material streams that are generated in high volumes for any given period and require significant capacity for storage prior to collections. Infrequently generated refuse includes material streams that that are generated in relatively low volumes, and where minimal provision for storage can be easily managed by collection frequency.

2.4.1. Frequent Waste

Table 2.3: Disposal of Frequently Generated

Refuse Stream	Disposal Details
WASTE	
General Waste	**General waste** should be collected in a dedicated receptacle within the allotted space and bagged or wrapped prior to disposal. Operationally, general waste should be bagged and weigh approximately 3kg or less and not exceed the dimensions of the waste receptacles.
Organic (Food) Waste	An alternate refuse disposal method, such as composting for **organic waste**, may be considered to reduce the total amount of general waste produced. Apartment style equipment is available for use where practical and space allows. Composting should be arranged with the building caretaker and further information can be found in Appendix C.
RECYCLING	
Commercial Comingled, including • glass • aluminum • steel cans • tins • paper • small cardboard • semi rigid plastics	**Recycling** should be collected in a dedicated receptacle to ensure separation from the waste material and must not be bagged.
Secure Destruction Paper	Offices often produce large amount of secure destruction paper / confidential paper documents which need to be disposed separately from general recyclable cardboard / paper. Special 240L bins are typically placed within the offices for disposal of secure destruction paper. The bins are collected from the individual levels by the respective contractor and replaced by empty bins. Alternatively, staff / cleaners may take the bins to the refuse room or loading area prior to collection.

2.4.2. Infrequent Waste

Table 2.4: Disposal of Infrequently Generated Waste

Refuse Stream	Disposal Details
Green Waste	Green waste is typically removed by a designated maintenance contractor.
Hard Waste / Bulky Goods	The development has several storage spaces on the ground floor for utilisation of storage and collection of hard waste/ bulky goods. Unless otherwise instructed by council, charitable organisations may be contacted by the waste caretaker/ cleaner as a mode for collections.
Hazardous Waste (paints, batteries and cartridges) Electronic Waste	Where applicable, occupants usually make their own arrangements for the disposal of specialised or hazardous waste and electronic waste such as recycling of toner cartridges and batteries. Please refer to local council and state government websites for disposal options. It is an expectation that the building management assist with disposal of hazardous, electronic or liquid waste and any paint or chemicals as required and requested. Hazardous waste must be handled with due care, separated and securely stored for collection by a specialist waste contractor. Please refer to local council and state government websites for further information.

3 Recommended Operational Requirements

3.1. Operational Equipment Summary

Equipment required or suitable for use as part of the operational phase of the development is outlined in Table 3.1. Lists of equipment, equipment suppliers and refuse management service providers for use during the operational phase of the development can be found in Appendix C.

Table 3.1: Equipment Schedule

Description	Quantity	Notes
General Waste Bins	1-2	1100L bins
Recycling Bins	2	1100L bins
Small receptacles	TBD	TBD prior to or during operation – see Appendix C.1
Public space bins	TBD	TBD prior to or during operation – see Appendix C.1
Refuse Trolleys	TBD	TBD prior to or during operation – see Appendix C.1

3.2. On-going Management

Responsibilities have to be assigned for all on-going refuse management operations. This is generally done by a building manager, staff and / or cleaners. The following lists (Table 3.2 to Table 3.8) are designed to help managing responsibilities and monitor the refuse operations in order to maintain efficient services and a safe environment.

Table 3.2: General Refuse Management Checklist

Objectives	Checked	Remarks
Organising of weekly pick-ups for all refuse streams.		Liaise with private contractors and Council as required.
Managing daily bin transfers between refuse storage / collection areas if required.		
Check bin fill levels and rotate / swap bins as required.		

3.2.1. Safety

Transferring refuse bins and using refuse management equipment are considered hazardous tasks. Therefore, contractors must ensure that a full risk assessment of equipment, surfaces and related gradients is complete. The contractor must provide procedural documentation to appropriate personnel prior to delivery of equipment and occupancy of the development.

Table 3.3: Safety Checklist

Objectives	Checked	Remarks
Abiding by all relevant occupational health and safety legislation, regulations and guidelines to ensure site safety for visitors, staff and contractors.		
Assessment of any manual handling risks and preparation of a manual handling control plan for waste and bin transfers.		
Provision of equipment manuals, training, health and safety procedures, risk assessments and personal protective equipment to staff / contractors in order to control hazards associated with all waste management activities.		

3.2.2. Signage

All receptacles, bins and other refuse management equipment will have adequate signage. Standard signage will be provided in and around waste collection and storage areas (see Appendix D).

Table 3.4: Signage Checklist

Objectives	Checked	Remarks
Ensuring compliance of signage with government local council regulations.		Use signage provided by Council's if available
Ensuring that labelling on bins, refuse room etc. is appropriate and clear and easy to read and updated if required.		

3.2.3. Cleaning and Maintenance

Regular cleaning and maintenance of all refuse management facilities is important to maintain a safe and hygienic environment for visitors, staff and contractors.

Table 3.5: Cleaning and Maintenance Checklist

Objectives	Checked	Remarks
General cleaning of all refuse holding and transfer areas including • Refuse bins, rooms and storage areas • Refuse transfer areas including lifts and staircases • Any other refuse management equipment		Frequency depends on refuse generation and building operation.
Coordination of specialised cleaning contractors as required.		
Maintenance and servicing of refuse management equipment as per schedule.		Frequency depends on equipment and building operation.
Coordination of specialised equipment contractors as required.		

3.2.4. Refuse Minimisation

Refuse minimisation is an important part of any site operation. At a minimum, the following should be implemented. Additional refuse minimisation options can be found in Appendix C.

Refuse minimisation requires regular reviewing to ensure operational sustainability of refuse volumes, equipment and economic feasibility. It is recommended that refuse weights and movements are noted and reviewed. An external review is usually conducted 12 to 18 months after the implementation of the plan.

Table 3.6: Refuse Minimisation Checklist

Objectives	Checked	Remarks
Regular review of material quantities to avoid over-ordering.		
Consideration of secondary and recycled materials where possible.		
Encouraging refuse minmisation through education and signage (see below).		
Reduce refuse through continuous monitoring and review (see below).		

3.2.5. Education and Communication

On-going education is important to ensure people continue to use the facilities as originally intended. All body corporate and leasing contracts should contain clauses pertaining to waste management arrangements and use of any associated equipment.

Table 3.7: Education and Communication Checklist

Objectives	Checked	Remarks
Communication of refuse management arrangements to staff and contractors as required.		
Consideration of promotional opportunities for any successes e.g. awards programs.		

3.2.6. Monitoring and Review

Regular monitoring and inspections of waste and related equipment and facilities from the development should be conducted by building management or designated staff for maintenance and sustainability.

Table 3.8: Monitoring and Review Checklist

Objectives	Checked	Remarks
Continual monitoring of equipment uses and scheduling to ensure best operational outcomes.		
Regular review of refuse management equipment and facilities such as bin volumes, refuse storage capacities and stormwater management arrangements.		

4 Recommended Design Requirements

This section lists general recommended design requirements for the building and refuse management facilities. They should be considered for optimal refuse management within the development, and to comply with relevant regulations and Council requirements.

4.1. Bin Storage and Bin Servicing Point

The RCV's will access the servicing point as described in Section 2. The bin service point will have the following features:

- Has sufficient access and clearance for the waste and recycling collection vehicles to service the bins, including no overhead obstructions.
- Allows bins to be serviced safely while minimising the impediment to traffic flow during servicing.
- Is clearly separated from car parking bays, footpaths and pedestrian access.
- Is of sufficient size to accommodate the bins.
- Is devoid of stairs, lips or ramps and allows bins to be manoeuvred easily.
- Does not block the entry and exit to the property.
- Is clear of speed control devices.
- If serviced from a public roadway:
  - Positioned on a level pad within the site, entire pad not more than 5m from the property boundary and 15m from the crossover, level with the kerbside and adjacent to a driveway or other approved crossover on the public roadway.
  - Connected to the crossover by a paved path so that the bin can be manoeuvred for servicing without lifting the bin over raised surfaces (pram ramp).
  - Not situated within 20m of an intersection or roundabout.
- Is not adjacent to a kitchen or eating area for public use.
- Is over 5m from any door, window or fresh air intake within the development or any adjoining site.
- Is screened sufficiently to minimise the view of bins from neighbouring properties or passing vehicles and pedestrian traffic external to the site.
- Is positioned away from entrances to shops or residential premises.

4.2. Refuse Room

The refuse room will have the following features in order to minimise odours, deter vermin, protect surrounding areas, and make it a user-friendly and safe area:

- The room must be of adequate dimensions to accommodate all waste containers, and any compaction equipment installed, and allow easy access to the containers and equipment for users and servicing purposes;
- The floor must be constructed of concrete finished to a smooth even surface, coved to a 25mm radius at the intersections with the walls and any exposed plinths, and graded to a floor waste connected to the sewerage system;
- The floor waste must be provided with a fixed screen in accordance with the requirements of Sydney Water Corporation;
- The walls must be constructed of brick, concrete blocks or similar solid material cement rendered to a smooth even surface and painted with a light-coloured washable paint;
- The ceiling must be constructed of a rigid, smooth-faced, non-absorbent material and painted with a light-coloured washable paint;
- The doors must be of adequate dimensions to allow easy access for servicing purposes and must be finished on the internal face with a smooth-faced impervious material;
- Any fixed equipment must be located clear of the walls and supported on a concrete plinth at least 75mm high or non-corrosive metal legs at least 150mm high;
- The room must be provided with adequate natural ventilation direct to the outside air or an approved system of mechanical ventilation;
- The room must be provided with adequate artificial lighting; and
- A hose cock must be provided in or adjacent to the room to facilitate cleaning (see Section 4.3 below).

Additional refuse room considerations:

- Be insect and vermin proof.
- Be fire rated and ventilated in accordance with the National Construction Code – Building Code of Australia.
- The floors must be graded to fall to a drainage point.
- Drainage points must be connected to sewer in accordance with trade waste requirements.
- Not located adjacent to or within any habitable portion of a building or place used in connection with food preparation (including food storage).
- Permit unobstructed access for removal of the containers to the servicing point.

- Will be attractively designed to minimise their visual impact on the surrounding areas.
- Does not have any steps or lips.
- Is enclosed on all sides except for the gated entrance to ensure bins are not visible from a public place, neighbouring properties, passing vehicles or pedestrian traffic external to the site.
- Is of sufficient size to accommodate the bins with sufficient clearance around the combined bin area.
- Is positioned away from entrances to shops or residential premises.
- The height of the bin storage area allows for waste bins to be opened and closed.

4.3. Bin Wash

A bin wash-down facility will need to be provided within or adjacent to the bin storage room. It will have the following features:

- Constructed hardstand with a solid concrete base.
- Roofed and designed to prevent entry to rainwater.
- Graded to fall to a drainage point that is connected to sewer in accordance with trade waste requirements.
- Provided with a hosecock for cleaning.
- Is in a purpose-built storage area which is air locked, fly and vermin proofed, and used solely for the storage of waste.
- Is in a well-ventilated portion of the basement and not within 10m of an opening to a food premises or food handling area.

4.4. Bin Carting

The bin carting route will the following features:

- Is via the hard stand pathways.
- Allows bins to be easily manoeuvred.
- Is clear of speed control devices or similar provisions.
- Does not impede traffic flow.
- Does not extend through any habitable parts of a building or food premises.
- Does not exceed 15m.
- Does not have any lips, stairs or steps for bins to be manoeuvred easily.

4.5. Storm Water Prevention and Litter Reduction

Designated staff / cleaners are responsible for on-site storm water pollution and litter reduction. To limit the impact on the environment and site, the following measures should be taken into account:

- Provide adequate signage to promote litter control.
- Provide sufficient refuse bins in appropriate areas.
- Prevent unauthorised entry to waste areas.
- Monitor waste and prevent waste overflow.
- Promote best practices for waste minimisation.
- Install litter traps in car parks for any unwanted discharge.

4.6. Ventilation

Natural or mechanical ventilation must be provided to waste storage areas unless refrigerated below 4˚C. Natural ventilation means unobstructed, permanent openings direct to external air no less than one-twentieth (1/20) of floor area. Mechanical ventilation requires a minimum rate of 100L/sec and 5L/m^2 exhaust rate.

Appendix A Detailed Refuse Calculations

The City of Hurstville DCP 2014 (Part 7.2) provides guidance on waste generation rates for a restaurant/café (for the canteen use), however rates have been sourced and applied from the Sustainability Victoria Better Practice Guide, to provide accurate volume information for educational / school developments (for classrooms and outdoor areas etc). Waste and recycling volumes indicated do not include compaction and can be further reduce if streams are separated (ie food waste, cardboard and paper). All volumes are calculated based on a 5 day per week operation.

Table A.1: Generation Rates

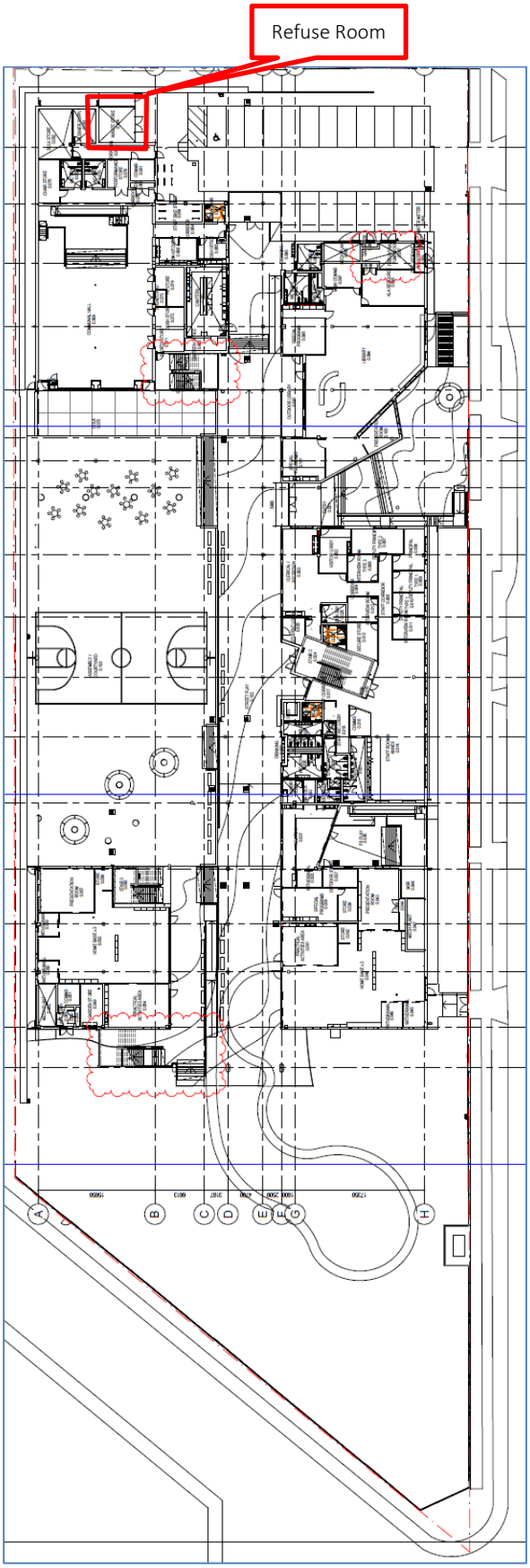
Type	Measure	General Waste	Commingled Recycling
Restaurant / Café (Canteen)	L / 100m² GFA / day	10L / 1.5m²	200
Education/Training (teaching space)	L / 100m² GFA / day	5	5

Table A.2: Refuse Calculations

Level	Description	Measure	Quantity	General Waste (L/Week)	Commingled Recycling (L/Week)
Level 0	Communal hall	GFA(m²)	360	90	90
Level 0	Canteen	GFA (m²)	45	1485	293
Level 0	Library	GFA (m²)	169	42	42
Level 0	Courtyards/Activities areas/Play areas	GFA(m²)	1918	480	480
Level 0	Staff rooms/offices	GFA (m²)	462	116	116
Level 0	Special programs/ presentation rooms	GFA (m²)	195	49	49
Level 0	Home base rooms	GFA(m²)	154	39	39
Levels 1 & 2	Communal hall	GFA (m²)	369	92	92
Levels 1 & 2	Outdoor learning	GFA (m²)	1547	387	387
Levels 1 & 2	Home base rooms	GFA(m²)	2127	532	532
Levels 1 & 2	Presentation/ practical activities /special programs	GFA(m²)	1317	329	329
Levels 1 & 2	Withdrawal rooms	GFA (m²)	279	70	70
Rooftop / level 3	Outdoor play	GFA (m²)	3115	779	779
Total (L / Week)			**12057**	**4488**	**3295**
Volumes per Day (L / Day)				**641**	**471**
Volumes per Collection (L / Collection)				**1282**	**942**
Collection and Equipment Details		Collections Per Week		3	3
		Storage Capacity		2 Days	2 Days
		Equipment Size		1100L	1100L
		Equipment Quantity		1-2	1
		Total Raw Area		m²	
		Refuse Storage Room Size		Approx. 16m²	

Note: figures exclude bulky waste.

Appendix B Site Plans and Drawings



Source: Perumal Pedavoli Architects, Drawing AT2003, dated 06/12/20 – Ground Floor Plan

Appendix C Systems and Specifications

The information in this section is included to demonstrate options for equipment, waste minimisation and potential suppliers and should not form part of assessment outside of providing details for the equipment specified throughout the waste management plan.

C.1 Typical Refuse Bins

Bin Types	Waste Streams	Examples	Information
60L-80L bins	General waste, recycling, food waste, paper / cardboard		Various options and sizes available. Tenant to supply depending on preference and space available. Example: 60L metro bins Dimensions approx. 559 x 279 x 635mm (L x W x H) Examples: https://www.spacepac.com.au
240L bins	General waste, paper, recycling, green waste		Dimensions approx. 740 x 580 x 1080mm (L x W x H) (dimensions may depend on contractor) Examples: http://www.justwheeliebins.com.au, http://wheeliebinsonline.com.au
1100L bins	General waste, recycling, paper / cardboard		Council Dimensions: 1470mm 1370mm 1245mm (H x W x D) (dimensions depend on contractor) Examples: http://www.justwheeliebins.com.au, https://www.australianwaste management.com.au
Public (litter) bins	General waste, recycling, paper / cardboard, glass		Various types and sizes available Examples: Public Litter Bins https://draffin.com.au Solar litter bin with compactor https://www.solarbins.com.au /features/big-belly-solar-bin

C.2 Typical Refuse Management Equipment

Systems	Waste Streams	Examples	Information
Organics Household Composting, Worm Farm, Digesters	Food waste / organics		Organics / food waste separation, composting and digesting; household-type and commercial grade equipment available Examples Urban Composter https://www.urbancomposter.com.au Closed Loop https://closedloop.com.au/upcycling-products ORCA https://www.feedtheorca.com
Trolleys	General waste, recycling, food waste, paper / cardboard		Assisted manual transfer of refuse Examples: https://rubbermaidcommercial.com.au/products/waste-management/mega-brute https://www.materialshandling.com.au/products/deluxe-compact-cleaning-carts

C.3 Refuse Transfer and Disposal Methods

Method	Examples	Description
Manual transfer / disposal	   	**Manual transfer** is simply the process of physically carrying waste bags, food waste receptacles or recycling boxes and crates without assistance. From a safety perspective, this is acceptable for small quantities and initial disposal into refuse chutes, refuse compartments or, in the case of ground level activities, directly into the refuse storage room. • **Waste** material should be bagged prior to any transfer from apartments, suites, offices, back-of-house areas etc. to waste storage compartments or rooms. • **Food waste** should be placed in receptacles such as a caddy style bin or bucket which will not allow leakage during transfer. • **Recycling** material should be placed in boxes or crates prior to transfer. • **Cardboard and paper** items can be placed within another cardboard box for transfer. Examples: https://www.alamy.com
Assisted manual transfer		**Assisted manual transfer** includes the use of any wheeled container, wheelie bin or trolley with a capacity to carry refuse items with a combined weight of 20kg and above. The equipment bares the weight of the material, but it still requires physical force and or balance to move the bin or trolley. From a safety perspective, this type of equipment should be a minimum requirement for transfer of material greater than 20kg and when transferring between individual levels to the refuse storage room or loading areas. Use of enclosed or caged equipment will also eliminate 'litter or leakage trails' which can occur when using open or unsealed equipment. Examples: http://www.justwheeliebins.com.au, https://rubbermaidcommercial.com.au, https://www.materialshandling.com.au

C.4 Refuse Minimisation Options

Refuse Minimisation Options – Waste

Systems	Description
Composting	Food waste composing is an option of reducing the amount of general waste going to landfill where organic waste can create methane gas due to anaerobic digestion, which contributes to global warming. Systems of different scales exist. Small benchtop composters for individual tenancies or offices are shown below. The process usually involves breaking down organic food scraps through natural processes. This includes systems such as worm farms or composters where microbes break down the food waste, with or without the aid of compost additives. The composted products are rich in nutrients and good bacteria, and they can be added to flower bed or gardens. Most food wastes and other organic (garden) material can be composted including meat, fish, vegetables, fruit, dairy, coffee or wilted flowers. However, large bones, excessive liquids such as cooking oil or seafood shells should not be placed in the composers.  Sources: https://www.urbancomposter.com.au, https://closedloop.com.au/upcycling-products,

Refuse Minimisation Options – Recycling

Systems	Description
Container deposit schemes	Container deposit / refund schemes are currently in place in several states in Australia. Various models exist including bottle return facilities and (automated) reverse vending machines. Tenants, staff and cleaners should be encouraged to separate containers that qualify for the schemes from the waste or recycling streams and return them to one of the return points. Storage space or dedicated bins within tenancies, apartments or communal areas should be provided. For larger developments or precincts where large amounts of empty containers are expected, consideration may be given to an on-site return point. The return points should be located near recycling bins so that cardboard boxes or plastic bags that have been used to transfer the empty containers to the return point can be disposed appropriately. This can prevent cluttering of the area around the return point. The images below show a typical return point and containers that commonly qualify for a deposit refund.    Sources: https://returnandearn.org.au, https://envirobank.com.au/bottle-and-can-recycling-queensland, https://www.containersforchange.com.au/how-it-works

C.5 Refuse Management Equipment Suppliers

Waste Management Equipment	Shredders	Bin Tugs / Trailers	Trolleys / Manual Handling Equipment	Bin Lifters / Tippers	Weighing Systems	Spill Containment, Spill Response, Absorbents, Drain Protection	Food Waste Management / Vacuum Systems, Pulping, Digestors	Composting	Waste Cooking Oil Systems	Medical Waste Equipment	Smoking Management	Bins (General), Bin Stands	Bin Cleaning Equipment	Sorting Equipment
Elephants Foot Recycling Solutions http://www.elephantsfoot.com.au				✓	✓									
Waste Initiatives https://wasteinitiatives.com.au	✓													✓
Wastech http://wastech.com.au	✓													
Pakmor http://pakmor.com.au	✓			✓	✓									
Materials Handling https://www.materialshandling.com.au		✓	✓	✓		✓						✓	✓	
Spacepac http://ev.spacepac.com.au		✓	✓											
Spacepac Solutions http://www.spacepac.com.au		✓	✓								✓	✓		
Draffin https://draffin.com.au				✓							✓	✓		
Electrodrive / Lift Master http://www.electrodrive.com.au		✓		✓										
Absorbenviro http://www.absorbenviro.com.au						✓								
Trade Environmental http://www.tradeenviro.com.au						✓								
Spillstationaustralia www.spillstation.com.au						✓								
Meiko https://www.meiko.com.au							✓							

Waste Management Equipment	Shredders	Bin Tugs / Trailers	Trolleys / Manual Handling Equipment	Bin Lifters / Tippers	Weighing Systems	Spill Containment, Spill Response, Absorbents, Drain Protection	Food Waste Management / Vacuum Systems, Pulping, Digestors	Composting	Waste Cooking Oil Systems	Medical Waste Equipment	Smoking Management	Bins (General), Bin Stands	Bin Cleaning Equipment	Sorting Equipment
Closed Loop Organics https://closedloop.com.au/upcycling-products,								✓						
Urban Composter https://www.urbancomposter.com.au								✓						
Cookers https://www.cookers.com.au									✓					
Rubbermaid https://rubbermaidcommercial.com.au/products/waste-management			✓			✓				✓	✓	✓		
Sulo http://www.sulo.com.au			✓					✓		✓		✓		
Australian Waste Management https://www.australianwastemanagement.com.au/products				✓								✓		

C.6 Refuse Management Service Providers

Specialist Waste Services	Food Waste	Waste Cooking Oil	Hazardous Waste	Liquid Waste	Electronic Waste	Industrial Waste	Construction & Demolition Waste	Wastewater	Secure Document Destruction
Cleanaway * https://www.cleanaway.com.au		✓	✓				✓	✓	
JJ Richards * https://www.jjrichards.com.au		✓	✓	✓		✓	✓	✓	
Veolia * https://www.veolia.com/anz			✓	✓	✓		✓	✓	✓
Suez * https://www.suez.com.au				✓	✓		✓	✓	
SecondBite https://www.secondbite.org	✓								
OZ Harvest https://www.ozharvest.org	✓								
Cookers https://www.cookers.com.au		✓							
ToxFree https://www.toxfree.com.au			✓		✓	✓			
AceWaste https://www.acewaste.com.au			✓			✓			

Appendix D Refuse Signage

D.1 Refuse Signage

Waste signage guidelines are provided by the New South Wales Environmental Protection Authority: https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/business-government-recycling/standard-recycling-signs

General Refuse Signage

Other Refuse Signage

D.2 Other Refuse, Facility and Safety Signage

Various signage including refuse area, safety and facility signage should be arranged through certified signage providers. Example signs can be found at http://www.signblitz.com.au, https://www.wayout.com.au or https://www.smartsign.com.

Example Refuse Room Signage

Example Facility Signage

Example Safety Signage

Appendix E Terms and Abbreviations

In this OWMP, a term or abbreviation has the following meaning unless indicated otherwise:

TERM	DEFINITION
Equipment	
Bin (Refuse Bin)	A plastic or steel container for disposal and temporary storage of waste or recycling items. Various types and sizes exist for different items and purposes. Examples include residential unit bins, bulk bins, MGB, steely bins and specialised for medical waste or cigarette butts.
Bin Storage Area	An enclosed area designated for storing on-site refuse bins or a refuse compactor within the property.
Bulk Bin	A galvanized or steel bin that is greater than 360L capacity generally ranging from 1.00m³ to 4.50m³ used for the storage of refuse for on-site refuse collection.
Bulk Mobile Garbage Bin (MGB)	A plastic (polypropylene) receptacle that is greater than 360L in capacity generally ranging from 660L to 1100L used for the storage of refuse.
Collection Point	An identified position where refuse bins are stored for collection and emptying. The collection point can also be the bin storage area.
Composter	A container or machine used for composting food scraps and/or organic materials.
Green Waste	All vegetated organic material such as small branches, leaves and grass clippings, tree and shrub pruning, plants and flowers.
Liquid Waste	Non-hazardous liquid waste generated by commercial premises should be connected to sewer or collected for treatment and disposal by a liquid waste contractor (including grease trap waste).
Mobile Garbage Bin (MGB)	A plastic (polypropylene) bin or bins used for the temporary storage of refuse that is up to 360L capacity and may be used in kerbside refuse collection or on-site collection.
Putrescible Waste	Putrescible waste is the component of the waste stream liable to become putrid and usually breaks down in a landfill to create landfill gases and leachate. Typically applies to food, animal and organic products.
Recycling	Recycling contains all material suitable for re-manufacture or re-use, e.g. glass bottles and jars; plastics such as PET, HDPE and PVC; aluminum aerosol and steel cans and lids; milk and juice cartons; soft drink, milk and shampoo containers; paper, cardboard, junk mail, newspapers and magazines.
Refuse	Material generated and discarded from residential and commercial buildings including general waste, recyclables, green waste and bulky items.
Refuse Collection Vehicle (RCV)	A vehicle that is specifically designed for collecting and emptying refuse bins and refuse compactors.
Refuse Storage Room	An area identified for storing on-site MGBs or bulk bins within the property.
Refuse Tolley	A cart on wheels used to collect smaller quantities of refuse from different areas or rooms of a building or site and wheel the collected refuse to a (bulk) bin storage area where it is disposed. Refuse trolleys are commonly used in hotels or offices.
Regulated Waste	Regulated waste is waste prescribed under legislation as regulated waste.
Transfer (Assisted Transfer)	Assisted transfer of refuse material and associated bulk bins or trolleys by tractor, ATV, UTV or bin tug.
Transfer (Manual Transfer)	Physical transfer of refuse material and associated bulk bins or trolleys without assistance.
Waste	Waste is referred to as refuse material with the exclusion of recycling, green waste, hazardous waste, special waste, liquid waste and restricted solid waste.

TERM	DEFINITION
Waste (General Waste)	Generally referred to as material free of any actual or apparent contamination such as pathological / infectious, radioactive materials and / or hazardous chemical. Reporting use is for material considered to be free of food waste.
Wheelie Bin	Referred to as a MGB of up to 360L, usually with 2 wheels for easy transfer. A common type is a 240L wheelie bin used for kerbside collection in many residential areas.
Measures	
Cubic Metre (m^3)	Volume in cubic metre(s) related to refuse management equipment.
Ground Floor Area (GFA)	The GFA of all storeys of a building is measured from the outside of the external walls or the centre of a common wall. It is commonly measured in square metres.
Kilogram (kg)	Kilogram(s) related to refuse weight.
Litre (L)	Litre(s) related to refuse volumes.
Square Metre (m^2)	Square metre(s) related to refuse areas.
Collection Vehicles	
Body Truck	A conventional heavy vehicle with a covered loading area. It is generally designed for emptying the content of bins into the truck during refuse collections but can be used to carry entire (full) bins for servicing by bin swap-over.
Rear-End-Loading RCV (REL RCV)	A truck specially designed to collect municipal solid waste and recycling, typically 240L wheelie bins to 1100L bins, from rear loading mechanism and haul the collected waste to a solid waste treatment facility.