Doran Drive Precinct, Castle Hill NSW

Mixed-Use Development

OPERATIONAL WASTE MANAGEMENT PLAN

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Report No. SO620
Revision D

Client

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REVISION REFERENCE

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A	7/10/2020	W Brunson	A Armstrong	Draft
B	27/05/2021	W Brunson	A Armstrong	Amendment
C	02/07/2021	W Brunson	A Armstrong	Final
D	08/07/2021	W Brunson	A Armstrong	Updated Plans

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PART 1 – OPERATIONAL WASTE STRATEGY

1.0 INTRODUCTION

Elephants Foot Recycling Solutions (EFRS) have been engaged to prepare the following Operational Waste Management Plan (OWMP) for the mixed-use development located at Doran Drive Precinct, Castle Hill NSW.

This OWMP outlines the best practice operational waste systems to be integrated into overall building management. These waste management systems have been designed to optimise waste and recycling practises to divert waste from landfill and support resource recovery. This OWMP will help ensure the completed development will comply with the principles of Green Star Design & As Built– Credit 8a Operational Waste.

Since this OWMP aims to establish waste management procedures for the future operation of the development, it is the responsibility of the building caretaker to review and update this document as needed. This may first occur once tenant, waste collection, and cleaning contracts have been established, and when operational data is available.

It is EFRS's belief that a successful waste management strategy contains three key objectives:

i. ***Promote responsible source separation*** to reduce the amount of waste that goes to landfill by implementing convenient and efficient waste management systems.

ii. ***Ensure adequate waste provisions and robust procedures*** that will cater for potential changes during the operational phase of the development.

iii. ***Comply*** with all relevant council codes, policies, and guidelines.

To assist in providing clean and well-segregated waste material, it is essential that this waste management plan is integrated into the overall management of the building and is clearly communicated to all relevant stakeholders including building management, tenants, cleaning staff, and waste contractors.

1.1 SCOPE OF REPORT

This operational waste management plan (OWMP) only applies to the **operational** phase of the proposed development; therefore, the requirements outlined in this OWMP must be implemented during the operational phase of the site and may be subject to review upon further expansion of, and/or changes to the development. The objectives for this OWMP are as follows:

- Establishing waste management procedures for the future operation of the development;
- Minimising material generation from site operations;
- Maximising waste diverted from landfill;
- Minimising contamination in waste streams;
- Outlining the individual roles and responsibilities of all stakeholders in the implementation the OWMP;
- Outlining measures for reporting, monitoring and reviewing operational waste management procedures to ensure that there is continuous improvement in waste management strategies;
- Outlining the role of education in implementing waste management;
- Ensuring that hygiene, safety and cleanliness is the centre of all waste management operations;
- Improving overall sustainability of the site.

1.2 REPORT CONDITIONS

The purpose of this report is to document an OWMP as part of a development application, which is supplied by EFRS with the following limitations:

- Drawings, estimates and information contained in this OWMP have been prepared by analysing the information, plans and documents supplied by the client and third parties including Council and other government agencies. The assumptions based on the information contained in the OWMP is outside the control of EFRS,
- The figures presented in the report are an estimate only – the actual amount of waste generated will be dependent on the occupancy rate of the building/s and waste generation intensity as well as the building management's approach to educating residents and tenants regarding waste management operations and responsibilities,
- The building manager will adjust waste management operations as required based on actual waste volumes (e.g. if waste is greater than estimated) and increase the number of bins and collections accordingly,
- The report will not be used to determine or forecast operational costs or prepare any feasibility study or to document any safety or operational procedures,
- The report has been prepared with all due care; however no assurance is made that the OWMP reflects the actual outcome of the proposed waste facilities, services, and operations, and EFRS will not be liable for plans or results that are not suitable for purpose due to incorrect or unsuitable information or otherwise,
- EFRS offer no warranty or representation of accuracy or reliability of the OWMP unless specifically stated,
- Any manual handling equipment recommended in this OWMP should be provided at the recommendation of the appropriate equipment provider who will assess the correct equipment for supply,
- Design of waste management chute equipment and systems must be approved by the supplier,
- EFRS cannot be held accountable for late changes to the design after the OWMP has been submitted to Council,
- EFRS will provide specifications and recommendations on bin access and travel paths within the OWMP, however it is the architect's responsibility to ensure the architectural drawings meet these provisions,
- EFRS are not required to provide information on collection vehicle swept paths, head heights, internal manoeuvring or loading requirements. It is assumed this information will be provided by a traffic consultant,
- Council are subject to changing waste and recycling policies and requirements at their own discretion.

This OWMP is only finalised once the Draft Watermark has been removed. If the Draft Watermark is present, the information in the OWMP is not confirmed.

2.0 LEGISLATION & GUIDANCE

Waste management and resource recovery regulation in Australia is administered by the Australian Constitution, Commonwealth laws, and international agreements. State and territory governments maintain primary responsibility for controlling development and regulating waste. The following legislation has been enacted in New South Wales and provides the lawful underpinnings of this OWMP.

- NSW Environmental Planning & Assessment Act 1979
- NSW Protection of the Environment Operations Act 1997
- NSW Waste Avoidance & Resource Recovery Act 2001

At the local level, councils or Local Government Areas (LGAs) require OWMPs to be included in new development applications. This OWMP is specifically required by:

- The Hills Development Control Plan 2012
- The Hills Local Environmental Plan 2019

The primary purpose of a development control plan (DCP) is to guide development according to the aims of the corresponding local environmental plan (LEP). The DCP must be read in conjunction with the provisions of the relevant LEP.

Information provided in this OWMP comes from a wide range of waste management guidance at the local, state, and federal levels. The primary sources of guidance include:

- NSW *Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities 2012*
- Green Building Council of Australia, Green Star Design & As Built v1.3, Operational Waste 8A Performance Pathway
- NSW *Better practice guide for resource recovery in residential developments 2019*
- City of Sydney *Guidelines for Waste Management in New Developments*
- NSW *Waste Avoidance and Resource Recovery (WARR) Strategy 2014-2021*
- NSW Waste Classification Guidelines 2014
- Australia's National Waste Policy 2018

2.1 COUNCIL OBJECTIVES

The Hills Shire Council recognises waste management as a key component to providing sustainable living for residents in terms of economic, social, and environmental outcomes. In this regard, Council aims to:

- Minimise the overall impact environmental impacts of waste;
- Maximise, through appropriate design, the opportunities to deal with domestic waste according to the Waste Hierarchy as given in Council's ESD objective 6;
- Provide domestic waste management systems that allow for ease of use by occupants and safe and efficient service by collection contractors;
- Encourage on-site waste collection;
- Provide waste storage and collection areas that are integrated with the design of the development;
- Ensure minimum visual impact of the waste storage facilities;
- Assist in achieving Federal and State Government waste minimisation targets.

3.0 DEVELOPMENT SUMMARY

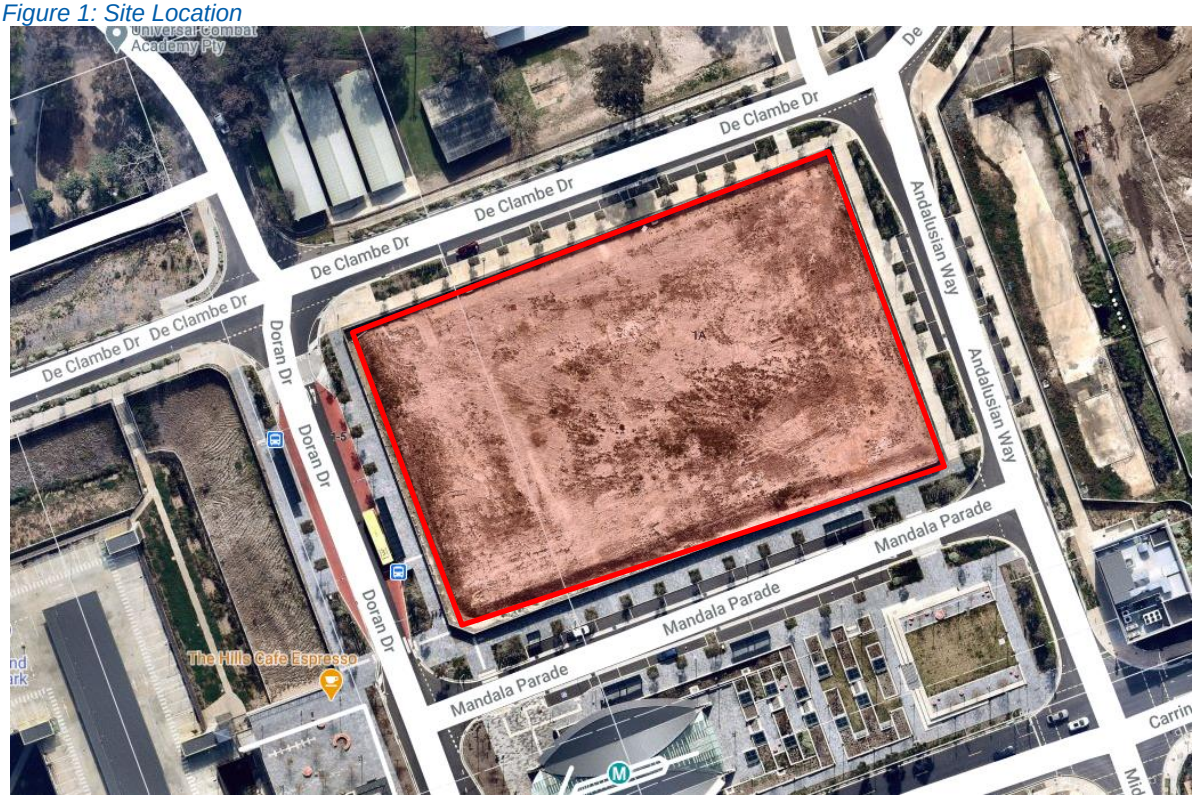
The proposed development falls under the Local Government Area (LGA) of The Hills Shire Council. It is categorised as a mixed-use development with residential and commercial components including:

- Residential flat building with 4 cores and 431 dwellings
- Commercial and retail tenancies with a total of 4888m^2,
- Supermarket with a total of 3496m^2

1.3 SITE LOCATION

The site is located at Doran Drive Precinct, Castle Hill NSW as shown in Figure 1. The development will have frontage to De Clambe Drive, Andalusian Way, Doran Drive, and Mandala Parade. Vehicle entryway is accessible via De Clambe Drive and Andalusian Way.

Figure 1: Site Location



Source: nearmap.com/au

4.0 RESIDENTIAL WASTE MANAGEMENT

The following section outlines best practice waste management for the residential development, including waste generation estimates and waste disposal and collection procedures.

4.1 WASTE GENERATION ESTIMATES

The waste generation rates used in the table below have been advised by The Hills Development Control Plan. Calculations are based on generic figures, and waste generation rates may differ according to the boarders' waste management practice.

During operation, it is the responsibility of the building manager to monitor the number of bins required. Waste and recycling volumes may change according to residents' attitudes to waste disposal and recycling, building occupancy levels or development's management.

The following tables show the estimated volume (L) of waste and recyclables generated by the residents when it becomes operational. All figures and calculations are based on area schedules as advised by our client and shown on architectural drawings.

Table 1. Estimated Waste and Recycling Volumes

Bldg/ Core	# Units	Waste Generation Rate (L/unit/week)		Compacted Waste 2:1 (L/week)	Recycling Generation Rate (L/unit/week)		Generated Recyclables (L/week)
Core A	128	120		7680	60		7680
Core B	99	120		5940	60		5940
Core C	108	120		6480	60		6480
Core D	96	120		5760	60		5760
TOTAL	**431**			**25860**			**25860**
Collections		Waste Bin Size (L)		1100	Recycling Bin Size (L)		1100
		Waste Collections/Week		2	Recycling Collections/Week		2
		Bins Per Day	Core A Waste Room	1.0	Bins Per Day	Core A Waste Room	1.0
			Core B Waste Room	0.8		Core B Waste Room	0.8
			Core C Waste Room	0.8		Core C Waste Room	0.8
			Core D Waste Room	0.7		Core D Waste Room	0.7
		Bins Per Collection	Core A Waste Room	**4**	Bins Per Collection	Core A Waste Room	**4**
			Core B Waste Room	**3**		Core B Waste Room	**3**
			Core C Waste Room	**3**		Core C Waste Room	**3**
			Core D Waste Room	**3**		Core D Waste Room	**3**

4.2 BIN SUMMARY

The recommended bin quantities and collection frequencies for the entire residential component of the development are as follows:

General Waste: 13 x 1100L MGBs collected **2 x weekly**

Commingled Recyclables: 13 x 1100L MGBs collected **2 x weekly**

The building caretaker is responsible for monitoring the waste and recycling volumes, and adjusting bin sizes and/or collection frequencies in accordance with Council's collection service.

4.3 WASTE DISPOSAL PROCEDURES

One dual waste chute will be installed in each core of the residential component of the development. Residents will have access the chute on each level, and must wrap or bag their general waste before placing in the chute. Bagged waste should not exceed 3kg in weight, or 35cm x 35cm x 35cm. Recyclables must not be bagged, and instead must be loosely deposited into the chute.

The general waste and recyclables will discharge from the chute into 1100L MGBs on linear tracks (see APPENDIX A). Cores A, C, & D will discharge into Basement 4, and Core B will discharge onto Basement 5. General waste will be compacted, and recyclables will not be compacted.

Refer to Council guidance for the types of materials accepted in the general waste and recycling streams.

4.4 WASTE COLLECTION PROCEDURES

Council will designate a day for the twice weekly collection of general waste, and twice weekly collection of commingled recyclables.

Prior to collection, it will be the caretaker's responsibility to transport the 1100L MGBs from the chute discharge rooms to the Residential Waste Holding Room on Level 1. This will be accomplished with a dedicated in-shaft goods personnel hoist as provided in AS1418.8

On the day of collection, a Council vehicle will enter the site from Andalusian Way and park in the designated loading bay. The driver will access the Waste Holding Room and service the bins. Once the bins are serviced, the collection vehicle will exit the site onto Andalusian Way in a forward direction.

It will be the responsibility to return the bins to the chute discharge rooms to resume operational use.

Clearances for access and loading should allow for a standard 12.5m long HRV per AS2890.2.

4.5 BULKY GOODS PROCEDURES

Council requires a dedicated area for the temporary storage of unwanted bulky items (e.g. furniture, mattresses, appliances, etc.) for residents only. These areas are crucial to prevent illegally dumped bulky waste on the footpath outside of Council's scheduled collection days. Regular illegal dumping can attract other dumped waste, generate litter, detract significantly from the quality and appearance of the development, and reduce amenity of the street.

Residents will need to liaise with building management regarding the transportation of bulky items and the availability of the Bulky Goods Room on Level 1 (see APPENDIX A.3).

It will be the caretaker's responsibility to schedule a collection day with Council and communicate that information to the residents.

On the day of collection, a Council vehicle will enter the site from Andalusian Way and park in the designated loading bay. The driver will access the Bulky Goods Room and load the items onto the vehicle. When loading is complete, the driver will be able to exit the site onto Andalusian Way in a forward direction.

Per Council requirements the Bulky Goods Storage Room must be a minimum of $4m^2$ per 50 apartments. For this development the Bulky Goods Storage Room should be a minimum of $35m^2$.

Refer to Council's website for scheduling collections, and for a list of acceptable bulky items.

5.0 COMMERCIAL AND RETAIL WASTE MANAGEMENT

The following section outlines best practice waste management for the development, including waste generation estimates and waste disposal and collection procedures.

5.1 WASTE GENERATION ESTIMATES

Because this development is aiming to achieve a 70% waste diversion rate and will strive towards zero waste, it is proposed that food waste is also diverted from the commercial/retail component. As such, the waste generation rates from the City of Sydney *Guidelines for Waste Management in New Developments* have been used since food waste estimates are incorporated into this document.

It is assumed that retail tenancies will share general waste bins, the waste storage room, and the waste collection service.

The following table shows the estimated volume (L) of general waste and recyclables that will be generated by the commercial and retail tenants. Estimates are based on a 7-day operating week, except for the medical centre and childcare centre which are based on a 5-day operating week.

Table 2. Estimated Waste and Recycling Volumes

Tenancy Type	Area m^2	Waste Generation Rate (L/100m^2/Day)	Compacted Waste 2:1 (L/Week)	Recycling Generation Rate (L/100m^2/Day)	Paper/ Cardboard (L/Week)	Commingled Recyclables (L/Week)	Food Waste Generation Rate (L/100m^2/Day)	Generated Food Waste (L/Week)
General retail	5466	25	4782.5	200	51012.9	25506.5	5	1913.0
Restaurant	1264	100	4423.3	500	29488.9	14744.5	100	8846.7
Medical/ Radiology	820	15	307.5	25	683.3	341.7	5	205.0
Community space	545	20	381.5	50	1271.7	635.8	5	190.8
Childcare	1064	50	1330.0	50	1773.3	886.7	15	798.0
TOTALS	**9158**		11224.8		**84230**	**42115**		**11953**
Collections		Bin Size (L)	1100	Bin Size (L)	Bales	1100	Bin Size (L)	120
		Bins/Day	1.5	Bins/Day	NA	5.5	Bins/Day	14.2
		Collections/Wk	2	Collections/Wk	2	3	Collections/Wk	4
		Total Bins	**6**	Total Bins	**7**	**13**	Total Bins	**25**

5.2 BIN SUMMARY

Based on the estimated waste generated by the residential component of this development, the recommended bin quantities and collection frequencies are as follows:

General Waste: 6 x 1100L MGBs collected **2 x weekly**

Recycled Cardboard/Paper: 7 x bales collected **2 x weekly**

Commingled Recyclables: 13 x 1100L MGBs collected **3 x weekly**

Food Waste: 25 x 120L MGBs collected **4 x weekly**

Bin sizes, quantities, collection frequencies, and/or equipment must be reviewed and updated to manage the actual waste volumes generated by the tenancies when the development becomes operational.

5.3 WASTE DISPOSAL PROCEDURES

Commercial and retail tenants will be responsible for storing their waste and recyclables back of house on a daily basis. General waste, recycling, and food waste receptacles should be paired next to each other in convenient locations such as kitchens and tea rooms.

On completion of each trading day or as required, nominated staff or contracted cleaners will use the service lift to transport all general waste, recyclables, and food waste to the Retail Waste Room on Level 1 and place into the appropriate receptacles (see APPENDIX A.3).

5.4 WASTE COLLECTION PROCEDURES

A private waste collection contractor will be engaged to collect the general waste, cardboard bales, commingled recyclables, and food waste on an agreed schedule.

On the day of collection, a private collection vehicle will enter the site from Andalusian Way and park in the designated loading bay. The driver will access the Retail Waste Room and service the bins. Once the bins are serviced, the collection vehicle will exit the site onto Andalusian Way in a forward direction.

5.5 OTHER WASTE MANAGEMENT CONSIDERATIONS

Based on the types of tenancies anticipated for this development, the following waste management practices are recommended.

5.5.1 KITCHEN, TEA ROOMS, & FOOD PREP AREAS

Any food preparation area, including kitchens and office tea rooms will be provided with dedicated source separation bins including a general waste bin, recycling bin, and food waste bin. Cleaners or nominated staff will be responsible for monitoring these bins and emptying them as required.

5.5.2 BULKY GOODS

Any bulky waste generated by the childcare centre will be stored back of house until building management can arrange for a collection service. It is recommended that bulky items in useable condition are first donated where possible.

5.5.3 PRINTING & PHOTOCOPYING ROOMS

It is recommended that printing rooms and photocopying rooms are supplied with bins for the collection of paper, as well as separate receptacles for ink toner cartridges for recycling. The cleaners or nominated staff are responsible for monitoring these bins and ensuring the items are collected and recycled by an appropriate contractor.

5.5.4 MEDICAL WASTE

The medical centre will have dedicated medical waste bins supplied as per the medical waste contractor's recommendations for the site. Waste from out-of-date and partly used medicines, infectious medical wastes, hazardous wastes, and radioactive wastes must be stored and disposed of according to specific industry-based regulations. Medical waste will be stored back of house in designated containers, and collected by contractors on a collect-and-return basis.

5.5.5 LIQUID WASTE

Liquid wastes such cleaning products, chemicals, paints, and cooking oil, etc., will be stored in a secure space that is bunded and drained to a grease trap in accordance with State government authorities and legislation.

5.5.6 PROBLEM WASTE

The building manager is responsible for making arrangements for the disposal and recycling of problem waste streams with an appropriate contractor. Problem wastes cannot be placed in general waste as they can have adverse impacts to human health and the environment if disposed of in landfill. Retail and commercial tenants will need to liaise with the building manager when disposing of problem waste streams.

Problem waste streams include:

- Chemical Waste
- Liquid wastes
- Toner cartridges
- Lightbulbs
- eWaste
- Batteries

6.0 SUPERMARKET TENANCY

A separate waste management plan will be prepared for the anticipated supermarket, in accordance with their nationwide store policies and procedures. The supermarket tenant will also nominate their preferred waste equipment (e.g. compactors, balers, and/or bins) as part of designing the layout of their loading docks.

Waste and recyclables generated by the supermarket are usually stored and managed separately from all other tenancies. In general, it is expected that the supermarket staff will dispose of waste and recyclables near the loading area, and an appointed waste collection contractor will remove the waste from the loading area or waste room on an arranged schedule.

6.1 WASTE GENERATION ESTIMATES

To be outlined separately in the Woolworths Operational Waste Management Plan.

7.0 WASTE ROOM SUMMARY

The areas allocated for waste storage and collection areas are detailed in the table below and are estimates only. Final areas will depend on room and bin layouts.

Table 4. Waste Room Areas

Level	Waste Room Type	Equipment	Bins	Estimated Area Required (m^2)	Actual Area Provided (m^2)
B4	Core A Waste Room	Dual chute Dual 2-bin 1100L linear track system Ceiling-mounted compactor	4 x 1100L MGBs for general waste 4 x 1100L MGB commingled recyclables 2 x 1100L service bins	42	46
B5	Core B Waste Room	Dual chute Dual 2-bin 1100L linear track system Ceiling-mounted compactor	3 x 1100L MGBs for general waste 3 x 1100L MGB commingled recyclables 2 x 1100L service bins	36	36
B4	Core C Waste Room	Dual chute Dual 2-bin 1100L linear track system Ceiling-mounted compactor	3 x 1100L MGBs for general waste 3 x 1100L MGB commingled recyclables 2 x 1100L service bins	36	44
B4	Core D Waste Room	Dual chute Dual 2-bin 1100L linear track system Ceiling-mounted compactor	3 x 1100L MGBs for general waste 3 x 1100L MGB commingled recyclables 2 x 1100L service bins	36	43
1	Residential Waste Holding Room	NA	13 x 1100L MGBs for general waste 13 x 1100L MGB commingled recyclables	75	79
1	Residential Bulky Goods Room	NA	Bulky cardboard bins (as needed)	35	46
1	Retail Waste Room	1100L MGB single-bin compactor Cardboard baler & pallet jack	6 x 1100L MGBs for general waste 7 x bales paper/cardboard 13 x 1100L MGBs for commingled recyclables 25 x 120L MGBs for food waste	90	106

EFRS recommends these bins/sizes/collections frequencies and/or equipment for best practice waste management at this site, however EFRS also acknowledges there are a range of other suitable options that may alter waste room requirements (e.g. floor area, accessibility, head height, etc.)

The waste room areas have been calculated based on equipment requirements and/or bin dimensions with an additional 70% of bin GFA factored in for manoeuvrability. Per Council's requirements, all doorways and passageways facilitating the movement of bins and/or bulky waste items are at least 1500mm wide. The following table further outlines waste room requirements.

Table 5. Waste Room Requirements

Waste Room Type	Waste Room Requirements
Chute Discharge Room	• Ceiling clearance height must be a minimum of 3000mm • The chute penetration must have a minimum 500mm clearance of any service pipes or other overhead obstacles • All waste discharge points, and equipment should be caged off to ensure the safety of any personnel accessing the waste room • 200mm clearance is required around compaction equipment • Where a chute offset is required, the angle of the offset must not exceed 40 degrees
Residential Bin Holding Room	• Bins should not be stacked in rows that are more than two bins deep • There should be adequate space between bins (e.g., 0.2m)
Retail Waste Room	• All bins must be accessible without moving other bins out of the way.
Bulky Goods Waste Storage Room	• Must be in close proximity to the collection area • Doorway should be a minimum of 1500mm wide

7.1 EQUIPMENT SUMMARY

Table 6. Equipment Summary

Component	Part	Qty	Notes
Equipment A	Dual chute + ceiling mounted compactor	4	See Appendix B.1
Equipment B	Dual 2-bin 1100L linear tracks	4	See Appendix B.2
Equipment C	1100L MGB Single bin compactor	1	See Appendix B.3
Equipment D	Cardboard baler	1	See Appendix B.4
Equipment E	Hand pallet jack	1	See Appendix B.5
Equipment F	Bin tug (optional)	-	See Appendix B.6

7.2 BIN MOVEMENTS

The transfer of bins should minimise manual handling where possible, and must be assessed by the building caretaker. The following recommendations are from the NSW Better Practice Guide.

The routes along the bin moving path should:

- Allow for a continuous route that is wholly within the property boundary
- Be free from obstruction and obstacles such as steps and kerbs
- Be constructed of solid materials with a non-slip surface
- Be A minimum of 300mm wider than the largest bin used onsite
- If bins are moved manually, the route must not exceed a grade of 1:14
- If a bin moving device is used, the route cannot exceed the maximum operating grade of the device. This is typically a grade of 1:4, however this will vary depending on the model of bin moving device acquired for the site.

The developer is responsible for suppling all equipment required for moving bins this includes any bin lifters, bin moving devices and waste transfer bins. Once the site is operational (and the developers is no longer involved) the building proprietors/strata will be responsible for maintaining, repairing and replacing waste management equipment.

7.3 CONSTRUCTION REQUIREMENTS

Waste room construction must comply with the minimum standards as outlined in Council's planning policy in order to minimise odours, deter vermin, protect surrounding areas, and make it a user-friendly and safe area.

The *NSW Better Practice Guide for Resource Recovery in Residential Developments (2019)* also states that better practice bin storage areas should achieve more than the minimum compliance requirements, which are as follows:

- Ensuring BCA compliance, including ventilation. Where required, ventilation system must comply with AS1668.4-2012 The use of ventilation and air conditioning in buildings.
- Ensuring storage areas are well lit (sensor lighting preferred) and have lighting available 24 hours a day.
- Provision of bin washing facilities, including taps for hot and cold water provided through a centralised mixing valve. The taps must be protected from bins and be located where they can be easily accessed even when the area is at bin capacity.
- Floor constructed of concrete at least 75mm thick.
- Floor graded so that any water is directed to a sewer authority approved drainage connection to ensure washing bins and/or waste storage areas do not discharge flow into the stormwater drain.
- Provision of smooth, cleanable and durable floor and wall surfaces that extend up the wall to a height equivalent to any bins held in the area.
- Ensuring ceilings are finished with a smooth-faced non-absorbent material capable of being cleaned.
- All surfaces (walls, ceiling and floors) finished in a light colour.

ADDITIONAL CONSIDERATIONS

- Waste room floor to be sealed with a two-pack epoxy;
- All corners coved and sealed 100mm up, this is to eliminate build-up of dirt;
- Tap height and light switch height of 1.6m;
- Storm water access preventatives (grate);
- All walls painted with light colour and washable paint;
- Equipment electric outlets to be installed 1700mm above finished floor level;
- The room must be mechanically ventilated;
- Optional automatic odour and pest control system installed
- If 660L or 1100L bins are utilised, 2 x 820mm (minimum) double-doors must be used;
- All personnel doors are hinged, lockable and self-closing;
- Conform to the Building Code of Australia, Australian standards and local laws; and
- Childproofing and public/operator safety shall be assessed and ensured

VENTILATION

Waste and recycling rooms must have their own exhaust ventilation system either;

- Mechanically - exhausting at a rate of 5L/m² floor area, with a minimum rate of 100L/s minimum; or
- Naturally - permanent, unobstructed, and opening direct to the external air, not less than one-twentieth (1/20) of the floor area

Mechanical exhaust systems shall comply with AS1668.4.2012 and not cause any inconvenience, noise, or odour problem.

8.0 STAKEHOLDER ROLES & RESPONSIBILITIES

All stakeholders have a responsibility for their own environmental performance and compliance with all legislation. It is the responsibility of building/strata management, residents, tenant managers, staff members, contracted cleaners, and waste collection contractors to be knowledgeable about the OWMP developed by EFRS, and carry out their nominated duties as stakeholders.

Table 7. Stakeholder Roles and Responsibilities

Roles	Responsibilities
Strata or Management	• Measuring and monitoring waste reduction and diversion targets. If required, adjusting operational waste management strategies to support achieving the targets. • Ensuring that all waste service providers submit monthly reports on all equipment movements and waste quantities/weights. • Manage any non-compliances/complaints reported through waste audits. • Establish that contracts with cleaners and private waste contractors detail their responsibilities in the implementation of the operational waste management plan. • Establish leases with building tenants that outline and ensure tenants' responsibilities in the operational waste management plan. • Educating stakeholders regarding waste management procedures. • Reviewing waste management data against the KPIs on an annual basis and implementing improvements to OWMP.
Building Manager or Waste Caretaker	• Ensuring that effective signage, communication, and education is provided to tenants, staff, contractors and cleaners. • Providing staff/contractors with equipment manuals, training, health and safety procedures, risk assessments, and PPE to control hazards associated with all waste management activities. • Ensuring site safety for staff, visitors, and contractors. • Abiding by all relevant WH&S legislation, regulations, and guidelines. • Assessing any manual handling risks and prepare a manual handling control plan for waste and bin transfers. • Preventing stormwater pollution by taking necessary precautions (securing bin rooms, preventing overfilling of bins). • Cleaning and transporting bins as required. • Organising, maintaining and cleaning the general and recycled waste holding area. • Organising general waste and recycling collections as needed. • Organising replacement or maintenance requirements for bins. • Organising bulky goods collection when required. • Investigating and ensuring prompt clean-up of illegally dumped waste materials. • Rectifying contamination issues.
Nominated Staff/Contracted Cleaners	• Provide a reliable and appropriate waste collection service. • Adhere to all health as safety requirements. • Report all incidents of contamination. • Provide feedback to building manager in regard to contamination of recyclables. • Work with building manager to customise waste systems where possible. • Provide data regarding weights of waste streams to building manager.
Private Waste Contractor	• Provide a reliable and appropriate waste collection service; • Provide feedback to building managers/residents regarding contamination of recyclables; and • Work with building managers to customise waste systems where possible.
Retail/Commercial Tenants	• Reporting on waste outcomes to the building management. • Educating staff as to their responsibilities to the operational waste management plan. • Separating waste into the required waste streams.
Staff	• Disposing of all general waste and recyclables in the allocated bins provided. • Ensuring adequate separation of general waste and recyclables. • Following any health and safety requirements.

9.0 SOURCE SEPARATION

Waste streams likely to be generated during the operation of the site are identified in the table below. Based on the OWMP, the table also indicates how each waste stream will be managed, and where the materials are destined. Please refer to the OWMP by EFRS for more detail.

Table 8. Operational Waste Streams

Waste Stream	Description	Destination	Waste Stream Management
General Waste	The remaining portion of the waste stream that is not recovered for re-use, processing, or recycling. May include soft plastics, food scraps, polystyrene, etc.	Landfill	Residential waste is deposited in waste chutes. Waste generated by tenancies is placed in allocated waste bin in commercial/retail waste room.
Commingled Recyclables	A mixture of items that can be commonly recycled, and is usually segregated through a MRF. Typically include food and beverage containers (e.g. aluminium, glass, steel, hard plastics, cartons).	Materials Recovery Facility (MRF)	Residential recyclables are deposited in recycling chutes. Recyclables generated by tenancies is placed in designated recycling bin in commercial/retail waste rooms.
Recycling Paper and Cardboard	Cardboard and paper products are recyclable materials that can be re-processed into new products.	Paper and/or cardboard recycling facility	Bulky cardboard generated by residents will be stored in the bulky waste room. Tenancies will transport their paper/cardboard to the commercial/retail waste room and place into the allocated paper/cardboard bin.
Garden Organics	Garden organics consists of discarded green waste materials that are easily compostable and biodegradable (e.g. lawn clippings, leaves, etc).	Resource recovery facility	A private contractor will be engaged to recover green waste from landscaping activities.
Food Waste	Food waste consists of discarded kitchen scraps (e.g. fruit and veggie off-cuts, egg shells, coffee grounds, etc.)	Food waste processor	Residential food waste can be composted independently, or else included in the general waste stream. Retail food waste will be decanted into the designated food waste bins and collected by a private collection contractor.
E-Waste	Discarded electronic components and materials (e.g. computers, mobile phones, keyboards, etc.).	Resource recovery facility	Residents and tenancies liaise with building manager. Building manager arranges collection with appropriate recycling contractor when required.
Bulky Items	Items that are to too large to place into general rubbish collection. This includes disused or broken furniture.	Resource recovery facility or landfill	Residents place bulky waste in allocated bulky waste storage room. Caretaker arranges with Council for collection. Tenancies arrange their own bulky waste collection, or else liaise with building management for assistance.
Sanitary Waste	Feminine hygiene waste generated from female bathrooms.	Incineration or landfill	Sanitary bins are serviced by sanitary waste contractor.
Other	Other recyclable items that require special recovery may include ink cartridges, batteries, chemical waste, light bulbs	Resource recovery facility	Building manager arranges residential collection by appropriate recycling services when required. Tenants can arrange for the collection of other discarded items for recycling by an appropriate contractor. Building management may assist.

10.0 EDUCATION

Educational materials encouraging correct separation of general waste and recyclables must be provided to all residents, commercial/retail personnel, and contracted cleaners. This should include the correct disposal process for bulky waste such as old furniture, large discarded items, and other materials including electronic and chemical wastes.

Education and communication must be provided consistently on a regular basis to encourage behaviour change (including patrons and visitors). Information should include:

- Descriptions of items accepted in the recycling and general waste streams,
- How to dispose of bulky goods and any other items that are not general waste or recycling,
- Staff obligations to health and safety as well as building management.

10.1 SIGNAGE

Signage and education are essential components to support best practice waste management including resource recovery, source separation, and diversion of waste from landfill.

Signage should include:

- Clear and correctly labelled waste and recycling bins,
- Instructions for separating and disposing of waste items. Different languages should be considered,
- Locations of, and directions to, the waste storage areas with directional signs, arrows, or lines,
- The identification of all hazards or potential dangers associated with the waste facilities, and
- Emergency contact information should there be issues with the waste systems or services in the building.

The building manager is responsible for waste room signage including safety signage (see APPENDIX C.2). Appropriate signage must be prominently displayed on doors, walls and above all bins, clearly stating what type of waste or recyclables is to be placed in each bin.

All signage should conform to the relevant Australian Standards.

10.2 POLLUTION PREVENTION

Building management shall be responsible for the following to minimise dispersion of site litter and prevent stormwater pollution to avoid impact to the environment and local amenity:

- Promoting adequate waste disposal into the bins
- Securing all bin rooms (whilst affording access to staff/contractors)
- Prevent overfilling of bins, keep all bin lids closed and bungs leak-free
- Taking action to prevent dumping or unauthorised use of waste areas
- Require collection contractor/s to clean up any spillage when clearing bins

PART 2 – GREEN STAR 8A STRATEGY

1.0 WASTE MANAGEMENT PRINCIPLES

During operational activities, effective waste management will be easier to achieve if stakeholders are made aware of basic waste management principles including waste avoidance, recovery, and reuse of discarded materials.

In addition, planning for effective waste management practices in new developments significantly improves environmental, social, and economic outcomes on both a local and regional scale. Managing waste and valuing the materials that are disposed of can help:

Support the economy by generating jobs in the recycling industry and saving money through resource recovery;

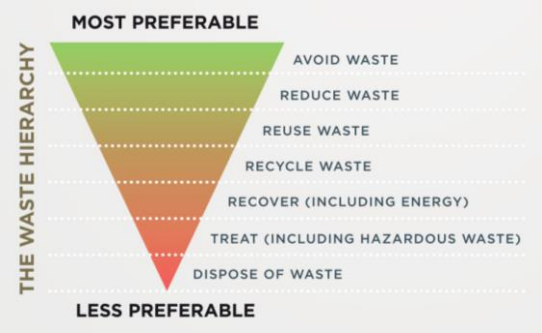
Reduce environmental impacts by controlling litter, illegal dumping, and other potential contaminants of land and water, and;

Protect the health of our communities by reducing odour, noise, dust, vermin, and exposure to toxic substances.[1]

1.1 CONCEPTS

Aiming to achieve the targets set by NSW is everyone's responsibility, and the waste hierarchy is a common reference to guide society in the most preferable to least preferable waste management practices. The figure below illustrates this concept.[2]

Figure 2. The Waste Hierarchy



The choices individuals make in purchasing, using, and disposing of products is central to improving the way waste is managed in Australia. By following the waste hierarchy, we can:

Avoid waste by purchasing products with excessive or unnecessary packaging;

Reduce waste by repairing or reusing items instead of discarding them;

Reuse items and choose to purchase products that can be used multiple times;

Recycle materials by sorting waste properly in recycling and compost bins and purchasing items that are easily recyclable and include recycled content.

In terms of waste disposal, operational facilities that manage general waste items will ideally recover energy from the waste first, before treating and disposing of the waste in a landfill.

[1] NSW Environment Protection Authority. *NSW Waste Avoidance and Resource Recovery Strategy 2014-2*.

[2] Australian Government, Department of the Environment and Energy. *National Waste Policy. Less Waste, More Resources. 2018*.

1.2 CATEGORISING WASTE

Understanding the different waste streams and the variety of materials that typically comprise each waste stream is an essential aspect of waste management. The three main waste streams are outlined below.[3]

Municipal Solid Waste (MSW)
MSW is primarily collected from households through kerbside waste and recycling services. This includes biodegradable material (e.g. food waste), recyclable materials (e.g. paper, bottles), and non-degradable material (e.g. paint, furniture).

Commercial and Industrial (C&I) Waste
C&I waste is produced by institutions and businesses such as schools, restaurants, offices, retail shops, and manufacturing industries. The C&I stream generally consists of the same materials as the MSW stream, however it may present a greater opportunity for resource recovery due to the larger quantities of homogenous waste (e.g. cardboard or food).

Construction and Demolition (C&D) Waste
C&D waste is produced by demolition and construction activities such as rail construction, road maintenance, and land excavation for new developments. Typical waste generated by these activities includes concrete, scrap metals, timber, plastics, and soil, to name a few.

1.3 WASTE MANAGEMENT TARGETS

To quantify and measure this sustainable approach to waste management, the NSW WARR Strategy 2014-2021 outlines specific targets in order to clarify the state's long-term goals and priorities. These targets were supported by industry, community, state, and local governments during the Strategy's consultation phase, and include:

- Increasing municipal solid waste recycling rates from 52% (in 2010-11) to 70% by 2021-22
- Increasing commercial recycling rates from 57% (in 2010-11) to 70% by 2021-22
- Increasing construction and demolition waste from 75% (in 2010-11) to 80% by 2021-22
- Increasing waste diverted from landfill from 63% (in 2010-11) to 75% by 2021-22
- Reducing litter by 40% compared to 2011-12 levels
- Reduce illegal dumping incidents by 30% compared to 2010-11 levels

NSW annually gathers information on resource recovery, recycling, and disposal rates, which is then compared to baseline data and reported every two years. Strategy targets are reviewed and updated as new best practice opportunities emerge.

It is intended that this site will aim to achieve the goal of diverting 70% residential municipal solid waste from landfill, and 70% commercial solid waste from landfill. Although there is a commitment to divert 70%, there is also an ongoing goal of striving for zero municipal solid waste to landfill. Aiming for zero waste to landfill is an aspirational target whereby 90%-100% of solid waste is diverted from landfill or incineration. This would have to be accomplished by adhering to the waste hierarchy by rethinking materials purchasing, avoiding material consumption, repairing materials to extend their useful life, and reusing materials as many times as possible before sending them for recycling.

[3] Australian Government, Department of the Environment and Energy. *National Waste Reporting 2013: Overview – National Waste Stream Profiles.*

2.0 WASTE DIVERSION OVERVIEW

To successfully meet the waste diversion target for the site, building management must develop baseline data for the volume of waste and recyclables generated once the development becomes operational. This will then be calculated into a waste diversion rate, which will be monitored over time to detect changes, and inform management whether new strategies must be implemented to improve resource recovery. In sum:

1. Baseline data will be used to calculate the waste diversion rate, which is the key performance indicator (KPI) to assess the overall performance of waste management at the site.

2. When the baseline diversion rate is established and evaluated, other strategies can be implemented to help increase resource recovery and improve waste diversion.

3. Waste and recycling volumes will continue to be monitored, recorded, and reported on a regular basis, and evaluated quarterly to determine any changes.

The following sections further examine how each of these steps will be achieved.

2.1 DATA COLLECTION

Waste management data is used to benchmark the performance of waste management over the reporting period and track long-term trends in waste generation. It can also be used to enable management and cleaning staff to make more informed decisions on collection frequencies and waste management costs.

Waste and recycling data will be collected by nominated staff, cleaners, or waste contractors, and will be reported to the building manager. The building manager will be responsible for ensuring the data is completed and accurate.

This data will be recorded in the reporting as per *Table 12. Waste Management Reporting Schedule.*

In addition to the weights of each waste stream, the following sources of data may be useful when reviewing the waste management systems:

- Frequency of collections
- Capacity of bins when collected
- Cost of collection
- Waste Management incidents
- Contamination Incidents
- Feedback from cleaners, private contractors, or other stakeholders.

WEIGHT OF WASTE STREAMS – BULK BIN METHOD

For the waste streams collected through bulk bins (general waste, commingled recycling and paper/cardboard recycling) the weight of each waste stream will be recorded by private waste contractors.

Waste contractors use scales on their waste collection vehicles to enable accurate weights to be determined for validate charges. This information will be made available to building management on a monthly basis. The building management will be responsible for recording and tracking waste volumes when provided by the private waste contractors.

To allow for data collection through this method:

- Scales on the collection vehicles must be calibrated and tested by the National Measurement Act.

- When setting up the contracts with the private contractor, the building manager must make sure that services are charged by weight. In addition, the contracts must stipulate that weight data is provided to the Building Management.

WEIGHT OF WASTE STREAMS – VOLUME & DENSITY METHOD

For waste streams where weight data is not collected by a private contractor, weight can be estimated by the volume of bins, the approximate amount of waste in each bin, and the density of that waste stream. This may be most useful for estimating e-waste, bulky goods, batteries, toner cartridges, etc., although estimated any waste stream with this method is possible.

Nominated staff or contracted cleaners should be engaged to conduct a visual audit of the waste and recycling bins prior to collection.

Nominated staff or cleaning contractors should routinely monitor all waste bins prior to collection, maintain a record sheet of their observations, and make note of any bin contamination (e.g. recyclable materials have been disposed of in the general waste bin, or vice versa).

With this method two items of data are required:

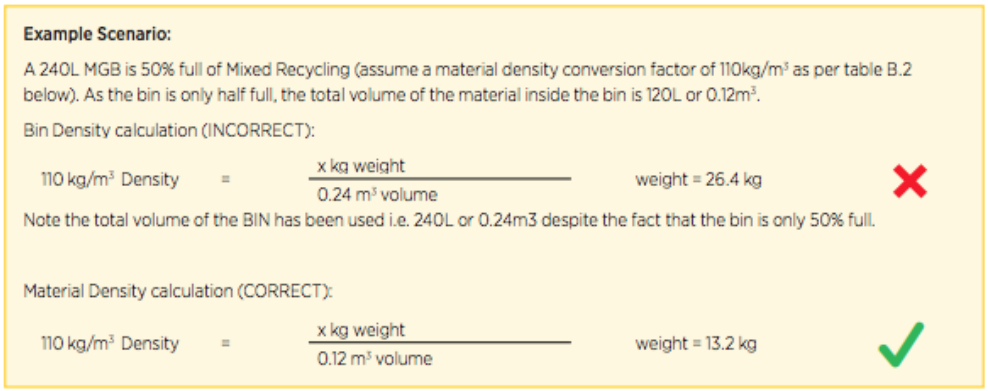
1. The volume of waste in that waste stream: This can be determined from the size of the bins & fullness of the bin.

2. The density of that waste stream. Where possible the actual weights or material density should be used to calculate the weight of these waste streams. However, if this information is not available, the industry standard densities provided in APPENDIX D.7 should suffice.

The formula to determine weight is as follows:

Weight (kg) = density factor (kg/m^3) x volume of material (m^3)

Figure 3: Example of Bin Density Method



ESTIMATED WASTE DIVERSION RATES - RESIDENTIAL

The table below is an example of the waste and recycling volumes that residents may generate when the site becomes operational. It should be noted that the waste generation rates provided by Council are the volumes that residents are entitled to generate and dispose of through Council's kerbside collection program, as per Council's fees and charges.

However, the actual waste and recycling generation rates will inevitably vary from what is presented below, and real operational volumes should be used based on the audits conducted by nominated staff, and/or information provided by private waste contractors.

These estimates are provided below in order to demonstrate how to calculate the waste diversion rate.

Table 9. Estimated Waste Generated by Residents

# Units	Waste Generation Rate (L/unit/week)	Generated Waste (L/week)	Recycling Generation Rate (L/unit/week)	Generated Recyclables (L/week)
431	**120**	**51720**	**60**	**25860**

FORMULA

The diversion rate will be calculated based on the following formula:

$$\frac{\text{Recyclables (kg)}}{\text{Recyclables (kg)} + \text{General Waste (kg)}} \times 100$$

SAMPLE CALCULATION 1

Conversion rates for "General waste, uncompacted, dry (excluding organics)," and "Mixed recycling (commingled)," have been applied as shown in APPENDIX D.7.

General waste conversion factor: 70kg/m^3

51720L x (1m^3/1000L) x (70kg/m^3)= **3620 kg/week**

Recycling conversion factor: 110kg/m^3

25860L x (1m^3/1000L) x (110kg/m^3) = **2885 kg/week**

Formula calculation: (diverted kg) / (total kg) x 100

$$\frac{2885}{3620 + 2885} \times 100 \approx \textbf{44\% diversion}$$

As demonstrated above, these waste generation rates would translate into 44% diversion of waste from landfill. In order to increase this diversion rate to reach the 70% target, additional waste would need to be recovered from the waste stream. Based on *South Australia's strategy to reduce and divert household and business food waste 2020*, approximately 40% of the general waste stream consists of food waste (by weight). If this additional waste stream was segregated and diverted from landfill, then reach the 70% waste diversion goal is more feasible.

The following calculation demonstrates the diversion rate of waste from landfill if food waste was segregated.

SAMPLE CALCULATION 2

Conversion rates for “General waste, uncompacted, dry (excluding organics),” “Mixed recycling (commingled),” and “Organic, food waste” have been applied as shown in APPENDIX D.7.

General waste conversion factor: 70kg/m^3

51720L x (1m^3/1000L) x (70kg/m^3) x 0.6 = **2172 kg/week**

Recycling conversion factor: 110kg/m^3

25860L x (1m^3/1000L) x (110kg/m^3) = **2845 kg/week**

Food waste conversion factor: 350kg/m^3

51720L x (1m^3/1000L) x (350kg/m^3) x 0.4 = **7241 kg/week**

Formula calculation: (diverted kg) / (total kg) x 100

$$\frac{2172 + 7241}{2172 + 2845 + 7241} \times 100 \approx \textbf{76.8\% diversion}$$

As demonstrated above, if food waste was segregated, it is possible to achieve the 70% waste diversion target. Therefore, it is recommended that additional facilities and strategies for food waste management are implemented in the residential component of development in order to aim for 70% diversion of total waste from landfill.

ESTIMATED DIVERSION RATES – COMMERCIAL/RETAIL

Based on the waste generation rates from the City of Sydney *Guidelines for Waste Management in New Developments*, the anticipated volumes of general waste and recyclables generated by the commercial/retail tenancies are outlined in Table 3. These estimates are provided in order to demonstrate how to calculate the diversion rate.

Table 10. Estimated Waste Generated by Commercial/Retail Tenants

Tenancy Type	Area m²	Waste Generation Rate (L/100m²/Day)	Generated Waste (L/Week)	Recycling Generation Rate (L/100m²/Day)	Generated Recyclables (L/Week)	Food Waste Generation Rate (L/100m²/Day)	Generated Food Waste (L/Week)
General retail	5466	25	9564.9	200	76519.4	5	1913.0
Restaurant	1264	100	8846.7	500	44233.4	100	8846.7
Medical/ Radiology	820	15	615.0	25	1025.0	5	205.0
Community space	545	20	763.0	50	1907.5	5	190.8
Childcare	1064	50	2660.0	50	2660.0	15	798.0
TOTALS	**9158**		**22450**		**126345**		**11953**

FORMULA

The diversion rate will be calculated based on the following formula:

$$\frac{\text{Recyclables (kg)} + \text{Food Waste (kg)}}{\text{Recyclables (kg)} + \text{Food Waste (kg)} + \text{General Waste (kg)}} \times 100$$

SAMPLE CALCULATION

The following volumes will be used to demonstrate the diversion rate calculation. Please note that these volumes are estimates from Table 3, and actual operational volumes should be used based on the audits conducted by nominated staff, and/or information provided by private waste contractors. Conversion rates for "General waste, uncompacted, dry (excluding organics)," "Mixed recycling (commingled)," and "Organic, food waste" have been applied as shown in APPENDIX D.7.

General waste conversion factor: 70kg/m³

22450L x (1m³/1000L) x 70kg/m³ = **1572 kg/week**

Recycling conversion factor: 110kg/m³

126345L x (1m³/1000L) x 110kg/m³ = **13898 kg/week**

Food waste conversion factor: 350kg/m³

11953L x (1m³/1000L) x 350kg/m³ = **4184 kg/week**

Formula calculation: (diverted kg) / (total kg) x 100

$$\frac{13898 + 4184}{1572 + 13898 + 4184} \times 100 \approx \textbf{92\% diversion}$$

As demonstrated above, based on estimated waste generation rates, it is feasible that approximately 92% of commercial/retail waste may be diverted from landfill, and the 70% waste diversion target can be reached.

3.0 WASTE MANAGEMENT STRATEGIES

To improve waste diversion rates during operational activities on site and strive to meet the established targets, a range of waste management strategies can be implemented. These may include:

1. Education of site personnel, residents, and visitors on proper waste segregation
2. Establishing behaviour change strategies
3. Segregating other streams from general waste for reprocessing/recycling (e.g. food waste)
4. Employing waste minimisation initiatives
5. Managing bin contamination

It is recommended that nominated staff implement the desired waste strategies on an ongoing basis and maintain records of their operation. Strategies for implementing waste minimisation initiatives and management of bin contamination are further described below.

3.1 WASTE MINIMISATION INITIATIVES

Operational waste minimisation initiatives can be implemented by residents as well as by the retail and commercial tenancies to reduce waste generation from daily activities. The following outlines the primary goals of the waste hierarchy that can be implemented during the operational phase of the development.

Avoid and/or Reduce:

- Purchase items without packaging, or with limited packaging
- Buy in bulk where possible, and avoid single-serve containers
- Purchase items that can be reused several times
- Use digital media rather than printed media where possible
- Print documents double-sided (set photocopiers and printers to print on both sides by default)
- Distribute mail electronically
- Return unsolicited mail to sender

Reuse:

- Repair items rather than replacing them
- Donate usable items to charity
- Reuse envelopes for internal mail
- Use single-sided printed paper as note paper
- Reuse cardboard boxes for other packaging and transport needs
- Return cardboard cartons to suppliers for reuse

Recycle:

- Purchase products (or packaging) that can easily be recycled
- Segregate materials from packaging for recycling (e.g. paperboard & plastic packaging)
- Consider recycling programs for unusual items (oral care packaging, batteries)

3.2 CONTAMINATION MANAGEMENT

Contamination occurs when general waste items are placed in the recycling streams. Depending on the level of contamination (e.g. 25% means a quarter of the recycling bin is general waste) a recycling bin may be rejected by the recycling facility, and sent to landfill as a result. Contamination may also lead to a breach of compliance with Section 143 of the Environment Operation Act for both the waste processing facility and the site as the original 'owner' of the waste.

The management of contamination should occur at two or more points in the collection and disposal process, normally on site by the site contractors or cleaners and off site at the waste processing facility.

The acceptable level of contamination in each waste stream will depend on the facility accepting and processing that waste stream. The private contractor should provide this information to the head contractor or building manager, who should communicate this to site personnel, office staff and contracted cleaners as part of their training. This will help staff identify and respond to incidents of contamination so they may be prevented in the future.

The following procedures should be followed to manage contamination:
Signage must be placed on each bin (or the wall above the bin) indicating which waste stream the bin is used for.

1. Nominated staff or contracted cleaners should visually inspect each bin before the contents are transported off-site or to a designated waste collection area.

2. If contamination occurs –one of the two courses of action should be followed:

    a) If the contamination is minimal and easy to remove without risk to personnel, the waste stream should be decontaminated.

    b) If contamination is significant or may cause risk to human or environmental health. The load must be rejected, and the contents should be treated as landfill waste.

3. If contamination is identified on site, the cleaner or waste contractor must note the waste stream, type of contamination and the originating location and the incident should be logged in the contamination log (see APPENDIX D.6). This information should be provided to management within 24hours of an incident occurring.

4. If the waste stream has left the site and had been rejected by the waste processing facility, the waste processing facility must note the type of contamination and provide feedback to the site manager through a contamination report within 24 hours. The report can be submitted by photo and email or via a more formal report. A rejection by the waste facility should be logged in the contamination log.

5. The contamination log should be used to identify any areas where contamination is occurring frequently. Measures should be put in place to help reduce contamination in that area such as better signage or re-educating staff.

3.3 MONITORING

After the desired waste management strategies have been implemented, it is recommended that nominated staff or cleaning contractors visually audit the waste and recycling bins (e.g. weekly before each collection). Visual auditing should include: approximate percentage of full waste and recycling bins, quantity and size of bins to be serviced, approximate percentage recyclables in waste bin, approximate percentage of waste in recycling bin.

Auditing and monitoring of residential bins must remain separate from the auditing and monitoring of commercial/retail bins.

Based on the recorded data, the waste diversion rate will be calculated, which is the key performance indicator that the implemented waste management strategies are successful.

Building management will evaluate the data and review if any waste management strategies require modification in order to reach the target of 70% diversion by 2020-21. This target may be adjusted as needed (e.g. increase 2% each year after 2021).

KEY PERFORMANCE INDICATORS

In addition to the primary key performance indicator of calculating the waste diversion rate, the building manager may consider the following KPIs to improve overall waste management.

Table 11. Key Performance Indicators

#	KPI	Description	Evaluation
1.	Target: Diversion Rate	70% of all waste generated within the site is removed from the waste stream for re-use, re-processing, or recycling.	Systems should be reviewed, identifying areas to improve waste recovery. Inspections of general waste should occur to identify if any material should be recovered.
2.	Target: Total Waste	Total waste (all waste streams) generated on site is decreased by 2% from previous reporting period (e.g. one year)	Systems should be reviewed, identifying areas to reduce waste generation.
3.	Target: Contamination (waste processing facility)	<5 incidents of contamination resulting in load rejection at waste processing facility per month.	Internal system should be review and cleaners re-educated to increase contamination identification on site.
4.	Target: Contamination (on-site)	<20 incidents resulting in load rejection on site per month.	Contamination logs should be reviewed to identify any locations or waste streams with frequent contamination. Improve educational strategies.
5.	Reporting	Nominated staff or cleaning contractors must provide reports of waste records.	Ensure nominated staff or cleaning contractors provide waste records to building manager as required (e.g. monthly).
6.	Waste management Plan Improvement	Areas of improvements identified in last reporting period have been resolved	If any KPIs are continually not met over 3 annual reviews, it is recommended that an independent waste auditor is engaged to review the Site's waste management and the OWMP.

3.4 REPORTING

Reporting on waste management performance is valuable for monitoring costs, operation efficiency, and effectiveness waste management strategies.

Building management is responsible for the collation of reporting and the review process. Cleaners, waste contractors, the building manager, office management and staff are responsible for providing the relevant data to building management for both residential and commercial/retail components of the development.

All bin monitoring should be recorded on data sheets and submitted to building management for review. This will help determine approximate waste recovery rates, identify opportunities for waste recovery, and establish what additional training or education programs should be implemented.

For more complete and accurate data regarding waste diversion, it is recommended that the site engage third-party auditors on a bi-annual basis. This will further assess waste diversion rates and if the site is on target to meet the goal outlined in the WARR Strategy.

On an annual basis, the entire waste management system should be reviewed. The results of the review should be reported to all stakeholders. This will help maintain stakeholder engagement in implementing the waste management strategies and help encourage improvement in waste reduction and recycling efforts.

In addition, once a year all stakeholders should meet annually to discuss and agree on the following:

1. Initiatives to demonstrate commitment to waste management for
    a. Retail and Commercial Tenants
    b. Building owners
    c. Contractors
    d. Cleaning staff
2. Sustainability initiatives
3. Enhancements to the operational waste management plan including
    a. Education plans
    b. Signage
    c. Infrastructure and equipment such as bins
    d. Monitoring regimens

Building management, and contracted cleaners should continue monitoring waste management during operations. Reporting on waste management performance is valuable for monitoring costs, operation efficiency, and effectiveness waste management strategies.

EXAMPLE REPORTING AND REVIEW PROCESS

Table 12. Waste Management Reporting Schedule

Reporting	Description	Review Frequency	Example of Reporting
Contractor details	Details of the cleaning contractor & waste contractor, including expiry dates of contracts.	At initial contact and as services or contractor information is updated.	
Current recycling streams	Records of the current waste streams managed on site, the contractor who collects the waste, the facility it is transported to (address and license number) and recovery rate.	At inception of waste management and annually thereafter (or as services or facility information is updated).	APPENDIX D.1 WASTE & RECYCLING TEMPLATE
Waste Stream Bins & Collection	• The type of waste stream • Location point for the bins • Size of bins • Number of bins • Stakeholder responsible for bins • Number of collections weekly	This should be reviewed on a 6 month basis to adjust bin numbers and collection frequency to suit the volumes of waste and recycling generated from the site. This should also be compared to collection cost to identify opportunities for cost savings.	APPENDIX D.2 WASTE EQUIPMENT & RECYCLING FREQUENCY
Monthly operational waste management	The weight of each waste stream collected in the previous month.	Waste stream data must be collated once a month. On annual basis the monthly data will analysed for the year as assessed against the KPIs	APPENDIX D.3 MONTHLY WASTE REPORT
Education and training	A log of the training and education each staff member and stakeholder has received in regard to the waste management strategy. This should include if the person demonstrates competency at understanding their responsibilities in the implementation of the waste management plan.	The log should be reviewed every 6 months to ensure all personnel are trained adequately.	APPENDIX D.4 EDUCATION & TRAINING LOG
Incident Management	A log of all health and safety incidents that occur regarding the management of waste.	Whenever an incident occurs.	APPENDIX D.5 WASTE INCIDENT MANAGEMENT LOG

Contamination Management	A log of contamination incidents, including the waste stream that was contaminated, the location of contamination, type of inspection, percentage of contamination, type of contamination, action taken and feedback.	Whenever a contamination incident occurs. The log should also be reviewed every 6 months to identify areas of improvement.	APPENDIX D.6 CONTAMINATION MANAGEMENT LOG
Facility Acceptance Criteria	The information regarding the level of contamination the waste processing facility will allow in a waste stream.	At instigation and whenever information changes.	
Annual waste management strategy review	A review of the waste management strategy as a whole. Including all of the reporting discussed above. This review should also take into account any feedback from stakeholders. Includes: • Assessment to waste data trends for the past year. • Review of KPIs. • Assessment of areas of improvement including educational plans, signage, unflustered and waste equipment, contracts with cleaners and waste collection contractors, and accuracy of data.	Annually	A review of the waste management plan for the year should be written as a report with specific commentary regarding waste generation, and waste diversion rates, and KPIs.

4.0 TRAINING & EDUCATION

In order to sustain effective waste management practices, all stakeholders must be appropriately trained and educated based on their roles. Training and education should occur on a regular basis and when there is a transition of site personnel, contractors, building management, and/or residents.

Educational material encouraging correct separation of general waste and recycling items must be provided to all staff, cleaners, residents, tenants, and other stakeholders by building management. This should include the correct disposal process for each of the waste streams. It is recommended that the building caretaker provides information in multiple languages to support correct practice.

Training will be conducted at least annually and as part of new employee inductions. Training should be recorded and validated to ensure that those responsible are competent and fully aware of their responsibilities.

Information on proper waste management should be included in new residents' welcome packs, and distributed periodically throughout the building via digital screens, email distributions, and the body corporate website if applicable.

5.0 CONTRACTS

Construction contractors, site personnel, cleaners, private waste contractors, residents and tenants are a vital part of the implementation of waste management strategies. The structure of waste service contracts is important to ensure that the building is effectively serviced.

Each contract should outline the responsibilities for waste management as well as monitoring and reporting procedures. It is the responsibility of the building manager to arrange contracts to best suit the desired management of the building. Example clauses and further information regarding the setup of waste contracts can be found at:

- Better Buildings Partnerships (2015) *Operational Waste Guidelines: Procurement, Management and Reporting.* http://cdn.sydneybetterbuildings.com.au/assets/2016/05/BBP-Operational-Waste-Guidelines.pdf

- NSW EPA. (2012) *Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities*. http://www.epa.nsw.gov.au/-/media/A5EB094C4C744A62A0499EC335A088D9.ashx

6.0 HEALTH & SAFETY

The measures outlined in the table below should be implemented to prevent potential risk of injury or illness associated with the management, collection, and disposal of waste. The collection methods and systems used for waste management in commercial buildings must comply with the *Work Health and Safety Act 2011* and any associated regulations.

The health and safety measures outlined in the table below provide general information. A complete risk and hazards analysis should be undertaken by a certified health and safety professional.

Table 13. Health & Safety Measures

Risk	Control Measures
Hygiene Issues and Vermin	• Bins must be washed a minimum of once a month. • The waste room must be washed down and cleaned a minimum of once a month. • Avoid overfilling bins. • Clean up any waste spillage as per the waste spill protocols.
Manual Handling injury form moving bins	• Ensure adequate storage space is available for easy manoeuvring of bins to and from the storage area and collection point. • Moving bins or large waste items from the offices to the waste room should be aided with a bin moving device or trolley. • Bins should be maintained in good condition. Any damaged, split or incomplete bins should be repaired or disposed of. • The correct size and type of bins and equipment should be used, and only for the purposes in which they were designed or intended. • Mobile garbage bins and wheelie bins are designed for mechanical lifting, and must not be lifted by hand. • Ensure there is sufficient space for manoeuvring bins, and that they are of sufficient capacity to receive daily waste and recyclables. Bins must not become overloaded or overcrowded. Collection frequency of bins should be modified if they are regularly overloaded or overflowing. • Bin carting routes should be free from steps and inappropriate grades.
Cut and lacerations, or contact with unknown hazardous substances	• Maintain waste areas so that all general waste and recycling is contained within appropriate bins. • Personal protective equipment (PPE), such as gloves, must be provided to all people handling waste or bins. • Educational programs must address the safe and appropriate disposal of general waste and recyclables. • Avoid carrying bagged waste long distances. Bagged waste should be placed immediately into another appropriate container when removed from bins.
Incident during waste collection	• Ensure vehicle access and turning areas are free from obstacles that may impair driver visibility. • Collection point must be free from obstacles and traffic hazards.

Injury arising from motor vehicle use	• The risks associated with the use of tow motors, forklifts and other mobile equipment by cleaners and facility managers should be assessed. • Undertake appropriate training for the use of motor vehicles and implement suitable controls as well as risk mitigation measures.
Injury from using stored bins and equipment	• Waste and recycling bins must be stored securely and safely when not in use. • Only authorised personal (such as cleaners and building manager) will be allowed to enter the waste room. • Damaged or faulty bins, especially for public use, should be removed and repaired/replaced.
Injury from using bags	• Do not use plastic bags where safer options are available. • Bags should be used as bin liners only and not for transporting waste. • Once removed from bins, bags should be placed directly into a wheeled bin, trolley or other container for transport.

6.1 INCIDENTS

Health and safety incidents include injury to personnel due to waste management procedures, spillage of waste materials, or exposure to hazardous waste in the waste streams.

Any incident or injury should be recorded in an incident log and immediately reported to the building manager or principal safety officer (see APPENDIX D.5). Photographic evidence should be obtained where possible and applicable.

6.2 WASTE SPILL PROTOCOLS

The following protocols should be followed when a waste spill occurs.

Table 14. Waste Spill Protocols

Waste Spill Within Site Perimeter	Waste Spill After Waste Leaves The Site
1. Prevent the spill from escaping into the surrounding environment – bund spills to prevent flowing into storm water drains or on to land; enclose/cover bins to prevent windblown litter. 2. Take action to stop further spilling/leakage if safe to do so. Use Appropriate PPE if required to handle waste or waste equipment. 3. Notify building manager or principal safety officer immediately. 4. Ensure area is secured to prevent access by the public. 5. Await further direction by senior site personnel.	1. Contractor should follow their spill procedure to limit environmental impacts. 2. Comply with any corporate reporting/response procedures. 3. Comply with any regulatory reporting procedures. 4. Notify principal, in writing with 24 hours of the spill occurring.

7.0 SUMMARY

To effectively manage waste across the entire site for the residential and commercial/retail components of the development, it has been demonstrated that utilising the key waste management principles will reduce overall waste generation and waste volumes going to landfill. As outlined in this document, not only will a proactive and preventative approach to waste management help meet waste diversion targets identified in the WARR Strategy 2014-2021, it also aligns with the direction provided by the NSW *Better practice guide for resource recovery in residential developments 2019.*

It must also be recognised that a successful waste management program depends largely on the behaviours exhibited by all stakeholders, so the implementation of a consistent education and training program throughout each of the development phases is integral and should be reviewed regularly. Monitoring and reporting waste collection data will help gauge the success of the program, which must be re-evaluated routinely to inform how waste avoidance, waste reduction, reuse, and recycling programs and strategies can continually be improved.

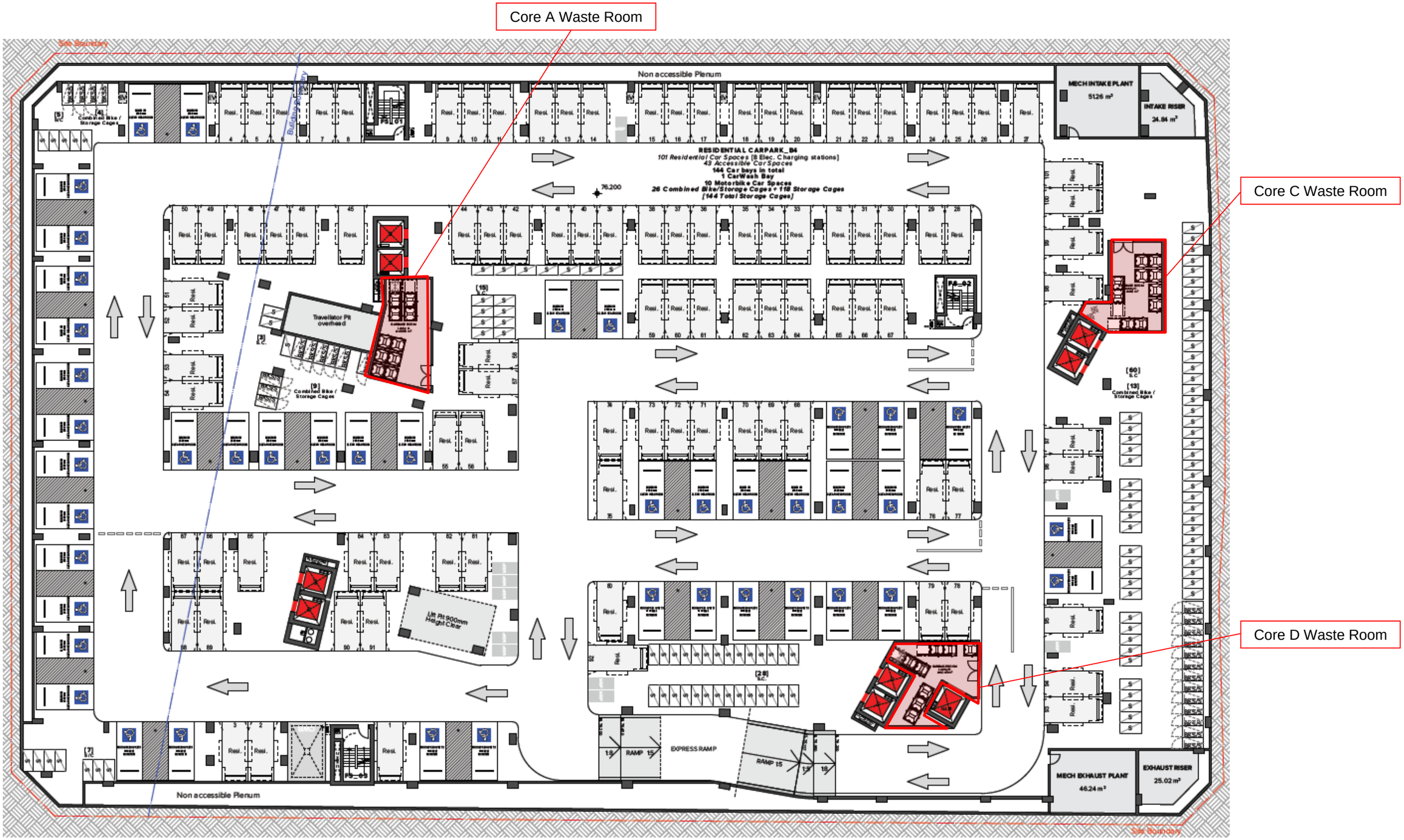
APPENDIX A: ARCHITECTURAL DRAWINGS

APPENDIX A.1 FLOOR PLANS: BASEMENT LEVEL 5

Dwg No. DA-110-003, Rev. 02, 06/07/2021

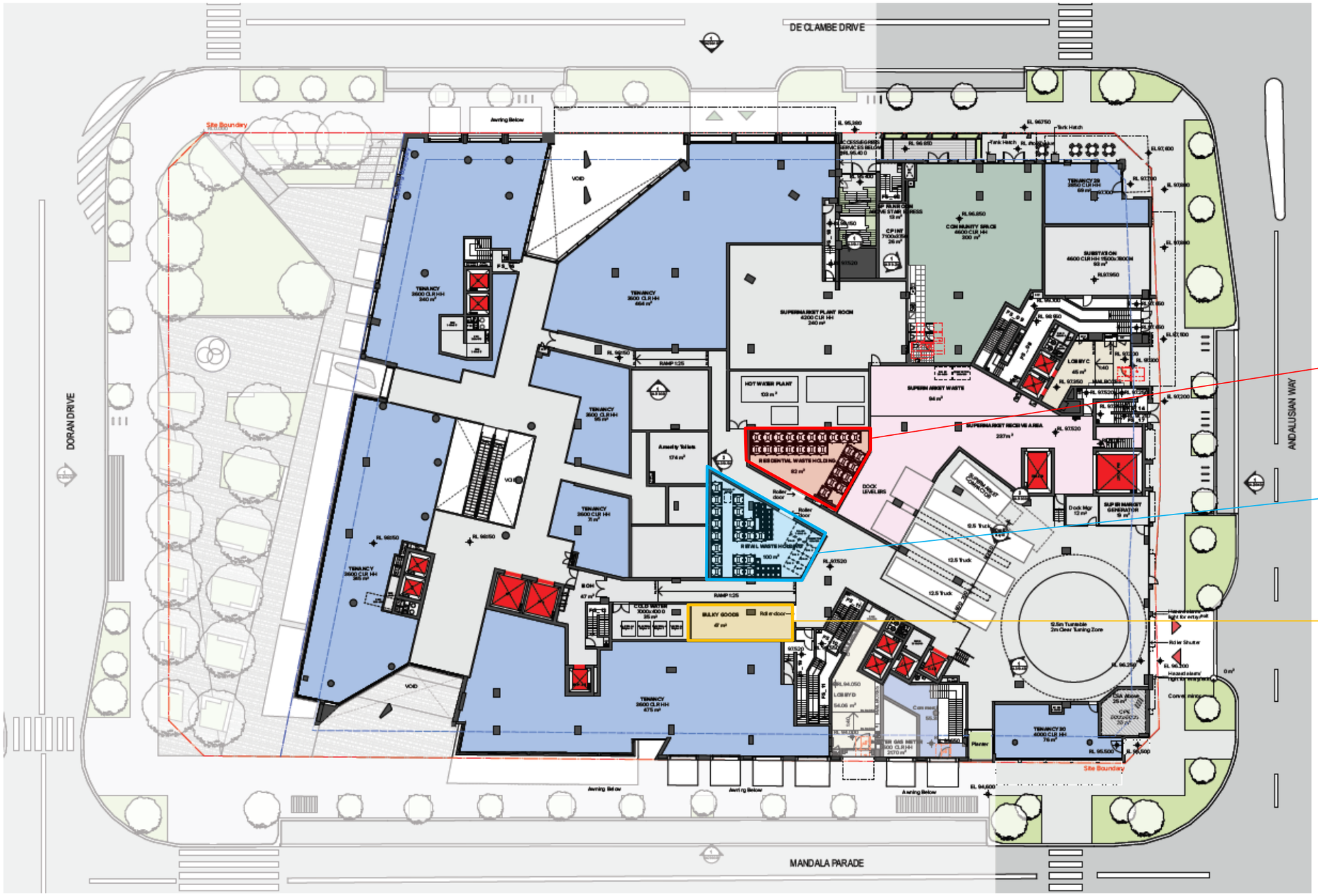
APPENDIX A.2 FLOOR PLANS: BASEMENT LEVEL 4

Dwg No. DA-110-004, , Rev. 02, 06/07/2021



APPENDIX A.3 FLOOR PLAN: LEVEL 1

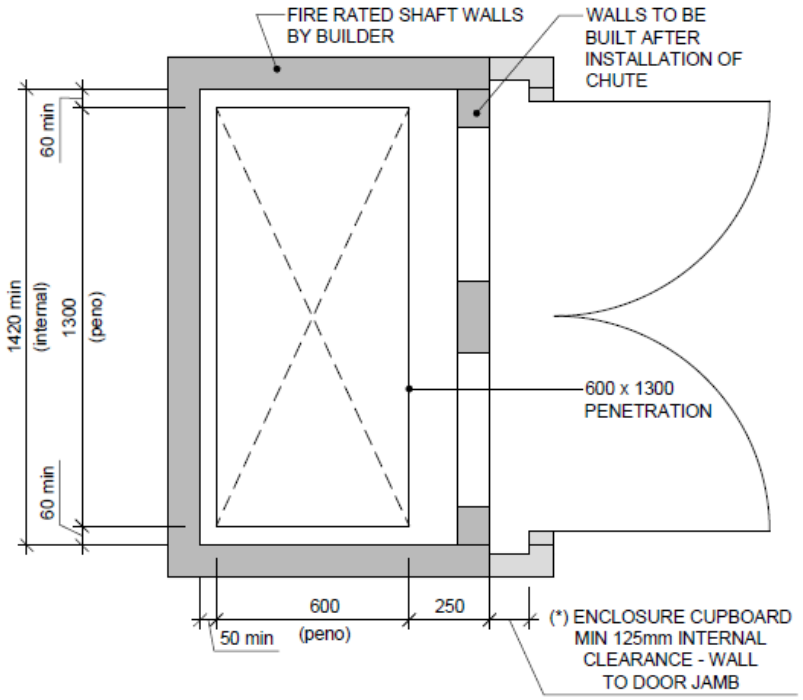
Dwg No. DA-110-010, Rev. 03, 06/07/2021



APPENDIX B: EQUIPMENT

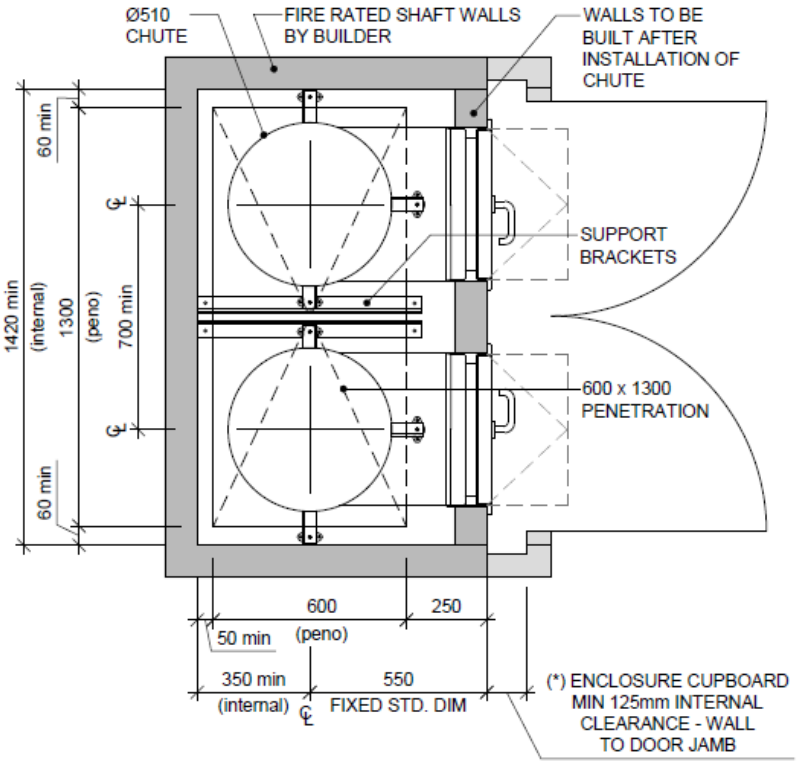
APPENDIX B.1 TYPICAL DUAL WASTE CHUTE SPECIFICATIONS

Refer to supplier's information and specification.



DUAL 510Ø CHUTE - PENETRATION SET-OUT with ENCLOSURE CUPBOARD (*)
SCALE 1:20

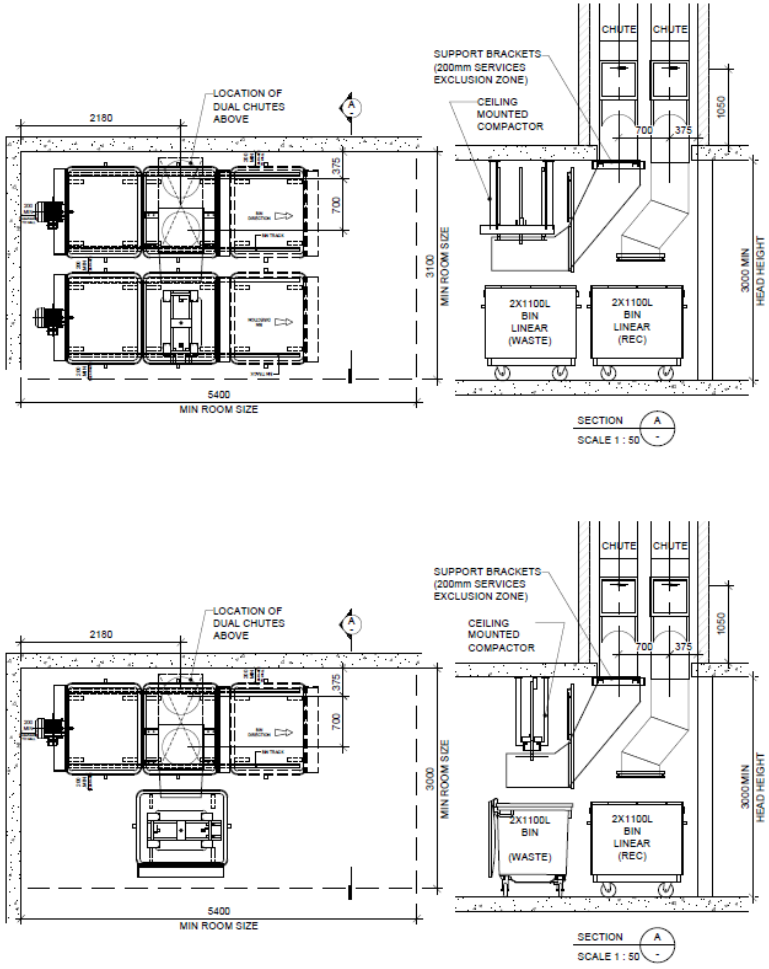
(*) NOTE: ENCLOSURES ARE RECOMMENDED IF THE CHUTE OPENS DIRECTLY TO A CORRIDOR OR IS NOT LOCATED IN A WASTE ROOM. IF CHUTE ACCESS IS WITHIN A WASTE ROOM THEN THE CUPBOARD ENCLOSURES ARE NOT REQUIRED.



DUAL 510Ø GALVANISED STEEL CHUTE LAYOUT with ENCLOSURE CUPBOARD (*)
SCALE 1:20

(*) NOTE: ENCLOSURES ARE RECOMMENDED IF THE CHUTE OPENS DIRECTLY TO A CORRIDOR OR IS NOT LOCATED IN A WASTE ROOM. IF CHUTE ACCESS IS WITHIN A WASTE ROOM THEN THE CUPBOARD ENCLOSURES ARE NOT REQUIRED.

APPENDIX B.2 TYPICAL DUAL LINEAR TRACK SYSTEM



SERVICES NOTES

CO-ORDINATE WITH FIRE CONTRACTOR FOR SPRINKLER LOCATIONS

POWER REQUIREMENTS:
POWER REQUIREMENTS:
1 x 240V / 10A WATER PROOF GPO (1700mm AFFL) IN WASTE ROOM FOR WASH DOWN SYSTEM
1 x 240V / 10A WATER PROOF GPO (1700mm AFFL) IN WASTE ROOM PER E-DIVERTER
1 x 415V / 5 PIN / 20A WATER PROOF SWITCHED SOCKET OUTLET (1700mm AFFL) IN WASTE ROOM PER CAROUSEL OR LINEAR UNIT

VENT

Ø 100mm PVC VENT PIPE TO BE CAST INSITU (IN CONCRETE ROOF SLAB) OR DEKTITE FLASHED (WHERE METAL ROOF IS BUILT).

ACCESS HATCH TO BE SUPPLIED ON TOP LEVEL FOR SERVICING OF THE WASH DOWN SYSTEM.

CHUTE DOORS

FIRE-RATED WALLS TO BE BUILT UP TO AND AROUND HOPPER OPENING BY BUILDER AFTER INSTALLATION OF CHUTE.

SUPPLY AND FIT BRUSHED STAINLESS STEEL, TWO HOUR FIRE-RATED (AS1530.4-2005) CHUTE DOORS AT EACH SERVICE LEVEL.

HOPPER DOORS TO BE INSTALLED ON COMPLETION OF THE BUILDING WALL STRUCTURE, AFTER PAINT/FINISHES APPLIED.

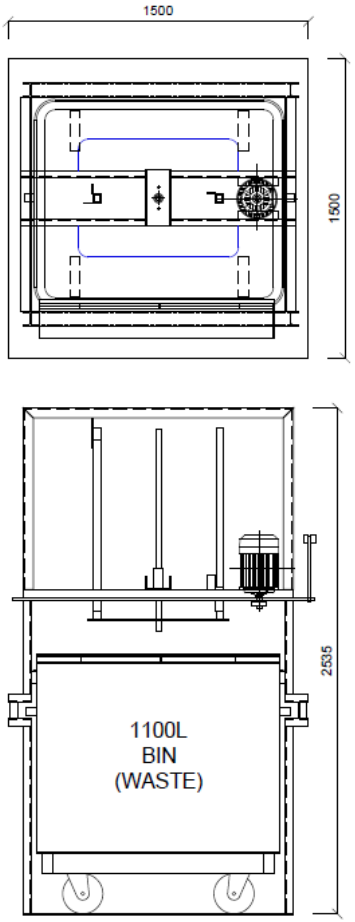
ALL DOORS ARE HAND-OPERATED WITH A SELF-CLOSING MECHANISM TO MEET BCA AND AUSTRALIAN STANDARDS.

Example only. Refer to supplier's information and specification.

APPENDIX B.3 SINGLE BIN COMPACTOR

FEATURES & BENEFITS
Power supply: 240 Volt standard power point required
No installation required
12 Months warranty - Reliable after sales service
Fully automatic operations
Plug into a standard power point
Complies with Australian safety standard
Compaction ratio 2:1 upto 5:1

MACHINE TYPE	120 - 240LITRE	660LITRE
BIN CAPACITY	240ltrs	660ltrs
MACHINE SIZE	W900 x D850 x H2400mm	W1500 x D1100 x H2850mm
DAILY CAPACITY	Up to 20 bins	Up to 20 bins
POWER	240 volts	240 volts



1100L WHEELIE BIN COMPACTOR

Example only. Refer to supplier's information and specification.

APPENDIX B.4 EXAMPLE CARDBOARD BALER

EF 500W Recycling Baler

This baler is a wider version of the EF500V LUD. The benefit of this baler is its large feed opening giving it the capability to take larger material without the need to fold it. This saves time when loading the baler. The EF500W produces larger bales, up to 550kg bale of cardboard. It can bale a range of material including plastic, hard plastic & cardboard.

Benefits

- Slide up door for minimum operating space & easy loading
- Wide feed opening so machine can be loaded with bulkier material
- Advanced tying system so baler can be placed against wall
- Press plate support for minimal downtime
- Two hand safety for bale ejection
- Visual bale full indicator informs operator when bale is full
- Produces up to 550 kg bale cardboard which can be sold
- Automatic cycle saves labour time
- User friendly push button controls
- Robustly constructed for long life
- CE Marked
- IP55 rated so machine can be situated outdoors

Description	Specification
Machine Dimensions H x W x D (mm)	3060x2110x12000
Transport height (ram dropped) (mm):	2210
Machine Weight (kg):	2300
Feed Opening H x W (mm):	600 x 1480
Bale Size H x W x D (mm):	1050x1550x830
Bale Weight:	Up to 550 kg
Compaction Force:	50 T
Motor:	5.5kW
Electric Supply:	3 phase, 415v, 5 pin 32A plug (machine rated breaker required) 3 P+E
Cycle Time (sec):	55
Type of Tie/No. off:	3 mm cut and loop wire / 4 off*
Approx. Length of Tying wire (m):	3.9

Refer to supplier's information and specification.

APPENDIX B.5 EXAMPLE HAND PALLET JACK

Standard

The standard PTH is a hand operated pallet truck with a 2300 kg capacity regardless of the selected fork length.

Power	Manual
Load Capacity	2300 kg
Max. Lift Height	200 mm
Width	450 - 685 mm
Fork Length	795 - 1150 mm

Specifications / Brochure

Powered Scissor Lift

The PTH hand pallet truck with powered scissor lift can be electrically raised to a maximum work height of 800 mm, avoiding unnecessary bending and heavy lifting.

Power	Manual/Electric
Load Capacity	1000 kg
Max. Lift Height	800 mm
Width	540 mm
Fork Length	1150 mm

Specifications / Brochure

Scissor Lift

The PTH hand pallet truck with scissor lift is used to raise skids and open bottom pallets to a maximum work height of 800 mm.

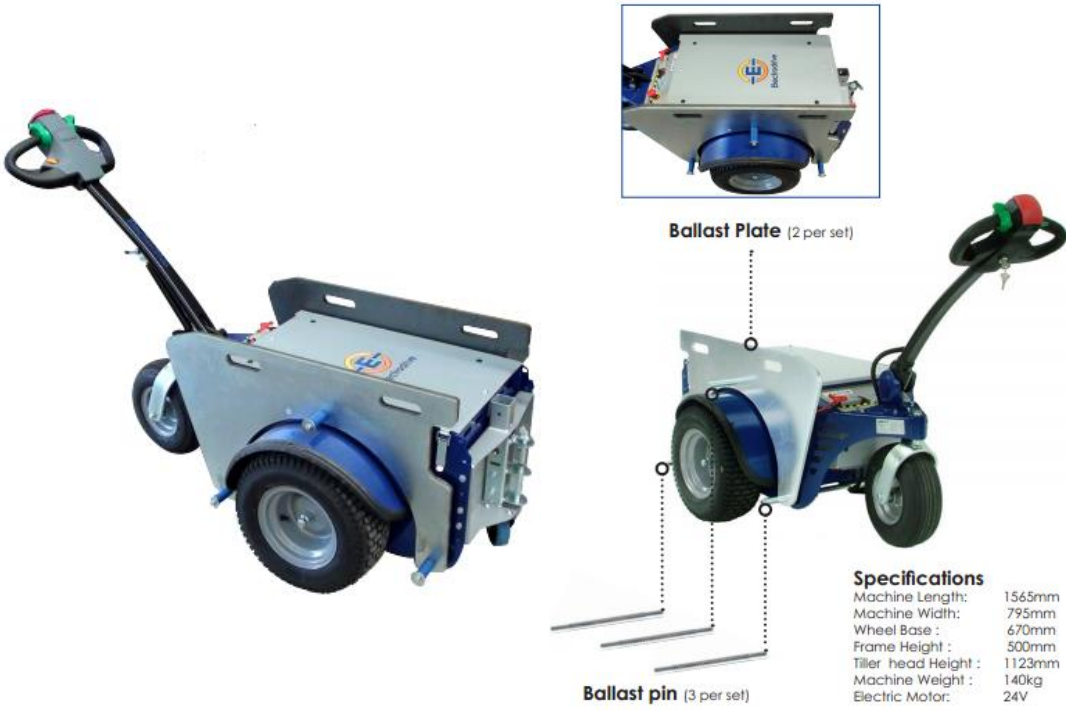
Power	Manual
Load Capacity	1000 kg
Max. Lift Height	800 mm
Width	540 mm
Fork Length	1150 mm

Specifications / Brochure

Source: https://www.crown.com/en-au/forklifts/pth-hand-pallet-truck.html

Refer to supplier's information and specification

APPENDIX B.6 TYPICAL BIN MOVERS



Typical applications:

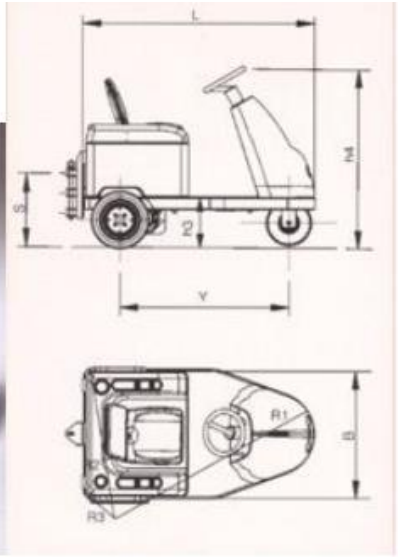
- Move trolleys, waste bin trailers and 660/1100L bins up and down a ramp incline.
- Quiet, smooth operation with zero emissions and simple to use, no driver's licence required
- Suitable for:
    - High rise building & apartment basements
    - Large factories & warehouse with sloped ground
    - Caravan parks & other large outdoor areas

Features:

- 1 tonne tow capacity of inclines up to 8 degrees
- 500kg tow capacity if inclines up to 14 degrees
- CE Compliant
- 4.5 km/h max speed
- 2 x 80amp batteries – includes charger
- Powerful transaxle
- Hitch to suit 660L bins

Safety Features:

- Intuitive paddle lever control
- Stops and repels the unit if activated when reversing.
- Site assessment recommended to assess ramp incline steepness *(see Useful Contacts)*



		UNIT M.	BULL 2	BULL 4
Manufacturer	DEC			
Model	BULL			
Platform loading cap.	Nominal capacity	kg	-----	-----
Pull capacity	Pull nominal capacity	kg	2000	4000
Power type	Electric - endotermic		electric	electric
Controltype	Standing / seated thiller / steer		seated / steer	seated / steer
Tyres	Pn=pneum. Se=superelastic		Pn	Pn
Wheels	N. front/rear - x drive	n.	1/2X	1/2X
Platform dimensions	L x B (lengh x width)	mm	-----	-----
Platform hight	h6 = unload clearence	mm	-----	-----
Overal dimensions	L = lenght B = width h1 = foot leve h3 = Seat height h4 = Steer height	mm mm mm mm mm	1500 900 1820 310 1250	1600 930 1960 340 1330
Turning radius	R1 = front min. external R2 = rear min. external R3 = front min. internal	mm mm mm	1400 1000 400	1500 1000 400
Aisle width	A = 180° turn	mm	2200	2300
Tow hook height	s = center from ground	mm	220-350-490	240-380-520

Please note: this is an example only – refer to supplier's information and specification

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APPENDIX C: WASTE MANAGEMENT PROVISIONS

APPENDIX C.1 EXAMPLE BIN SPECIFICATIONS

Mobile bins

Table G1.3: Average dimension ranges for bulk bins over 1700L in capacity

Bulk bins greater than 1700L

Bin capacity)	1m³	1.5m³	2m³	3m³	4.5m³	6m³
Height (mm)	1000	910–1250	865–1000	1020–1580	1440–2014	1650
Depth (mm)	1000	905–1000	1300–1400	1470–1700	1605–1900	1900
Width (mm)	1400	1805–2010	1830–2000	1400–2010	1800–2010	2000
Approximate footprint (m²)	1.4	1.63–2.01	2.4–2.8	2.1–3.4	2.9–3.8	3.8

Sources include TORO Waste Equipment, SUEZ, Signal Waste, Perth Waste and ACT Industrial

Wheelie bin

Bin capacity	80L	120L	140L	240L	360L
Height (mm)	870	940 1065	1080 1100		
Depth (mm)	530	530	540	735	820
Width (mm)	450	485	500	580	600
Approximate footprint (m²)	0.24	0.26–0.33	0.27-0.33	0.41–0.43	0.49
Approximate weight (kg)	8.5	9.5	10.4	15.5	23
Approximate maximum load (kg)	32	48	56	96	Not known

Sources include Sulo, Single Waste, Cleanaway, SUEZ, just wheelie bins and Perth Waste for two-wheel mobile bins

Table G1.2: Average dimension ranges for four-wheel bulk bins

Dome or flat lid container

Bin capacity	660L	770L	1100L	1300L	1700L
Height (mm)	1250	1425	1470	1480	1470
Depth (mm)	850	1100	1245	1250	1250
Width (mm)	1370	1370	1370	1770	1770
Approx footprint (m²)	0.86–1.16	1.51	1.33–1.74	2.21	2.21
Approx weight (kg)	45	Not known	65	Not known	Not known
Approx maximum load (kg)	310	Not known	440	Not known	Not known

Sources include Sulo, Signal Waste, Cleanaway, SUEZ, Just Wheelie Bins and Perth Waste

SOURCE: https://www.securewastesolutions.com.au/bin-sizes

APPENDIX C.2 SIGNAGE FOR WASTE & RECYCLING BINS

Waste signs

Signs and educational materials perform several functions including:

- informing residents why it is important to recover resources and protect the environment
- providing clear instructions on how to use the bins and services provided
- alerting people to any dangers or hazards within the bin storage areas.

All waste, recycling and organic bins should be Australian Standard colours and clearly and correctly labelled, such as by a sticker on the lid and/or the body of the bin.

Communal bin storage areas should be clearly signposted with signs outlining how to correctly separate waste into the bins provided. The local council responsible for waste services may be a good source of signs and posters and can advise on what signs are suitable.

Information on who to contact to find out more about the recycling and/or other resource recovery services in the building should also be displayed in communal areas, such as on a noticeboard.

The Planet Ark website also has resources available free of charge for use by businesses and councils. These signs can be found at businessrecycling.com.au/research/signage.cfm

Figure I1.1: Examples of waste wall posters (EPA supplied)

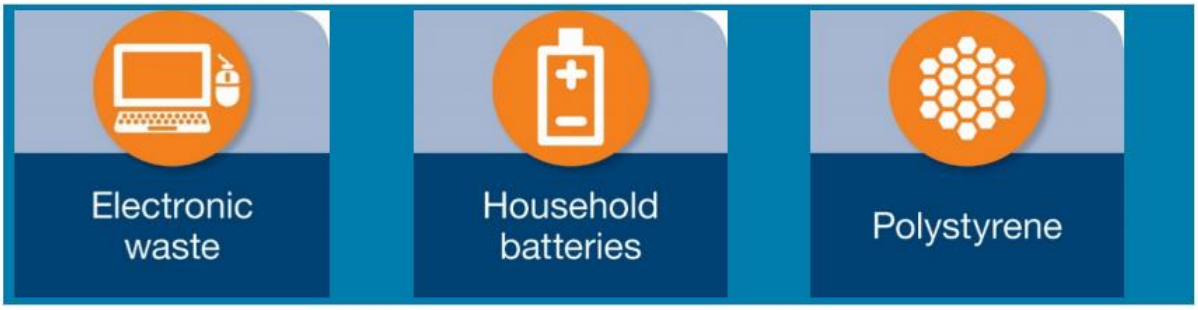
Figure I1.2: Examples of bin lid stickers (EPA supplied)

SOURCE: Better practice guide for resource recovery in residential developments 2019, NSW Environmental Protection Authority

Problem waste signs

The EPA has also produced a range of images and signs that can be used for problem wastes, such as fluoro globes and tubes, household and car batteries, e-waste and smoke detectors. To access these resources, contact the NSW EPA. Some examples are shown below.

Figure I2.1: Problem waste signs



Safety signs

The use of safety signs for waste resource recovery rooms must comply with *AS1319 Safety signs for occupational environments*. Safety signs must be used to regulate and control safety related to behaviour, warn of hazards and provide emergency information, including fire protection information. Suitable signs should be decided for each development as required.

Figure I3.1: Example safety signs

SOURCE: Better practice guide for resource recovery in residential developments 2019, NSW Environmental Protection Authority

APPENDIX C.3 TYPICAL COLLECTION VEHICLE

General

Appropriate heavy rigid vehicle standards should be incorporated into the road and street designs in new developments where onsite collections are proposed. Road and street designs must comply with relevant Acts, regulations, guidelines, and codes administered by Austroads, Standards Australia, NSW Roads and Maritime Services, WorkSafe NSW and any local council traffic requirements.

Applicants and building designers should consult with councils and other relevant authorities before designing new roads or streets and access points for waste collection vehicles to establish specific design requirements.

Table H4.1: Australian Standards for turning circles for medium and heavy rigid class vehicles

Vehicle class	Overall length (m)	Design width (m)	Design turning radius (m)	Swept circle (m)	Clearance (travel) height (m)
Medium rigid vehicle	8.80	2.5	10.0	21.6	4.5
Heavy rigid vehicle	12.5	2.5	12.5	27.8	4.5

Large collection vehicles

Waste collection vehicles may be side-loading, rear-loading, front-lift-loading, hook or crane lift trucks. Vehicle dimensions vary by collection service, manufacturer, make and model. It is not possible to provide definitive dimensions, so architects and developers should consult with the local council and/or contractors.

The following characteristics represent typical collection vehicles and are provided for guidance only. Reference to *AS2890.2 Parking facilities: off-street commercial vehicle facilities* for detailed requirements, including vehicle dimensions, is recommended.

Table B2.1: Collection vehicle dimensions

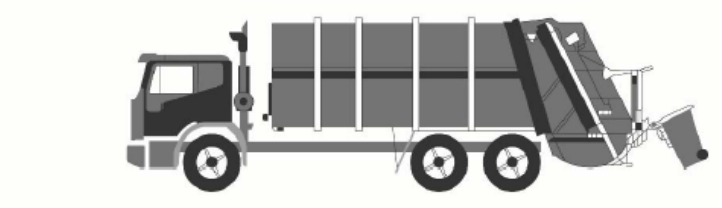
Vehicle type	Rear-loading	Side-loading*	Front-lift-loading	Hook truck	Crane truck
Length overall (m)	10.5	9.6	11.8	10.0	10.0
Width overall (m)	2.5	2.5	2.5	3.0	2.5
Travel height (m)	3.9	3.6	4.8	4.7	3.8
Operational height for loading (m)	3.9	4.2	6.5	3.0	8.75
Vehicle tare weight (t)	13.1	11.8	16.7	13.0	13.0
Maximum payload (t)	10.0	10.8	11.0	14.5	9.5
Turning circle (m)	25.0	21.4	25.0	25.0	18

* The maximum reach of a side arm is 3 m.

Sources: JJ Richards, SUEZ, MacDonald Johnson, Cleanaway, Garwood, Ros Roca, Bingo and Edbro. Figures shown represent the maximum dimensions for each vehicle type.

Rear-loading collection vehicles

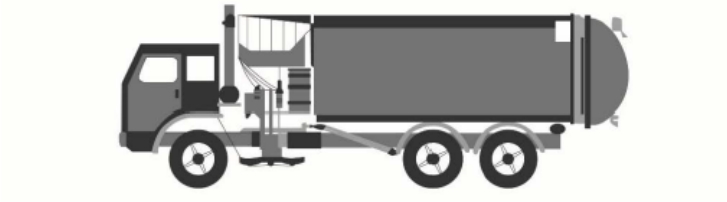
These vehicles are commonly used for domestic waste collections from MUDs and RFBs and sometimes for recycling. They can be used to collect waste stored in mobile bins or bulk bins, particularly where bins are not presented at the kerbside. They are also used for collecting bulky waste.



Rear-loading waste collection vehicle

Side-loading collection vehicles

This is the most commonly used vehicle for domestic waste, recycling and organics collections. It is only suitable for collecting mobile bins up to 360L in capacity.



Side-loading waste collection vehicle

Front-lift-loading collection vehicles

These vehicles are commonly used for collecting commercial and industrial waste. They can only collect specially designed front-lift bulk bins and not mobile bins.

Front-lift-loading waste collection vehicle

Small collection vehicles

Typically, councils and their contractors operate with large collection vehicles (heavy rigid class vehicles) because they carry greater payloads and allow for more cost-effective collection services. Some councils, or their contractors, may have smaller collection vehicles in their fleet. Early discussion with the council is important to confirm this, but it should not be assumed that the council will have access to small collection vehicles.

The waste management systems and the location of the collection point should always be designed so that the council can provide the standard domestic waste service.

SOURCE: Better Practice Guide For Resource Recovery In Residential Developments 2019, NSW Environmental Protection Authority

APPENDIX C.4 TYPICAL BOH BINS FOR RETAIL/COMMERCIAL USE

APPENDIX C.5. SAMPLE FOOD WASTE CONTAINER

Apartment Style Compost bin – available from hardware stores

Suitable for:

- Vegetables
- Coffee grounds and filters
- Tea and tea bags
- Crushed eggshells (but not eggs)
- Nutshells
- Houseplants
- Leaves
- Cardboard rolls, cereal
- Boxes, brown paper bags
- Clean paper
- Shredded newspaper
- Fireplace ashes
- Wood chips, sawdust,
- Toothpicks, burnt matches
- Cotton and wool rags
- Dryer and vacuum cleaner lint
- Hair and fur
- Hay and straw

APPENDIX D: WASTE MONITORING TEMPLATES & RESOURCES

APPENDIX D.1 WASTE & RECYCLING TEMPLATE

Stream category	In place	Managed by	Covered by current contract	Interim facility / address / license	Destination facility / address / license	Recovery rate
Mixed recycling	*Yes*	*Cleaning contractor*	*Yes*	*eg. Bailey Tip, 123 George Street, Sydney NSW 2000, License No. 12345*	*eg. Bailey Tip, 123 George Street, Sydney NSW 2000, License No. 12345*	*eg. 90%*
Organic						
Paper						
Secure paper						
Cardboard						
Liquid						
Other						
Mixed residue						
General waste						

APPENDIX D.2 WASTE & RECYCLING FREQUENCY

Dock	Stream	System in place	How many?	Management protocols	Collection frequency
eg. 1	*General waste*	*240 L MGB*	*6*	*Cleaners transport bagged waste from tenancies to bins in docks*	*Mon to Fri*
	Mixed	*1.1 m³*			
	Choose	Choose			

Source: Better Buildings Partnerships (2015) *Operational Waste Guidelines: Procurement, Management and Reporting.* http://cdn.sydneybetterbuildings.com.au/assets/2016/05/BBP-Operational-Waste-Guidelines.pdf

APPENDIX D.3 MONTHLY WASTE REPORT

Site address			
State		**Month/year**	
Person completing		**Company**	
Contact number		**Email**	
Email completed form to			

Material	Weight or volume	Data type	Weight	Facility name	Link to evidence (see C12)	Facility recovery Rate	Adjusted recovery weight
Organics							
Food waste	25	AW		eg. Darling Harbour Organics Facility		70%	17.5
Other organics (fish, meat, etc.)							
Rubber							
Wood							
Other							
Fluoroscent tubes/light globes							
Toner cartridges							
e-waste							
Batteries							
Textiles							

Source: Better Buildings Partnerships (2015) *Operational Waste Guidelines: Procurement, Management and Reporting.* http://cdn.sydneybetterbuildings.com.au/assets/2016/05/BBP-Operational-Waste-Guidelines.pdf

APPENDIX D.4 EDUCATION & TRAINING LOG

Staff name	Role	Training 1 – date	Training 1 – competence assessment	Training 2 – date	Training 2 – competence assessment
			PASS		PASS

APPENDIX D.5 WASTE INCIDENT MANAGEMENT LOG

Incident	Location	Volume of spill	Specific type of waste	Action taken	By whom	Date	Link to photo-graphic evidence	Reported to	Regulatory reporting require-ment?
Injury									
Hazardous waste									

APPENDIX D.6 CONTAMINATION MANAGEMENT LOG

Date	Stream	Cleaner/ collector name	Building level/ location (if known)	Type of inspection	Contam-ination %	Contam-ination type	Bin action taken	Notification action / feedback
	Mixed		Tenancy level 3	Visual	5%	Coffee cups	Decontam inated	Tenants advised
	Paper		Dock 1	Visual	10%	Hazard-ous waste	Rejected	Property Manager advised. Incident report completed
	Organic		Facility	Visual	17%	Paper	Rejected	Property Manager advised

Source: Better Buildings Partnerships (2015) *Operational Waste Guidelines: Procurement, Management and Reporting.* http://cdn.sydneybetterbuildings.com.au/assets/2016/05/BBP-Operational-Waste-Guidelines.pdf

APPENDIX D.7 WASTE CONVERSION FACTORS

Stream	Sub-category	Specific Material	Material Conversion density factor kg/m³)
Mixed recycling	Mixed recycling (commingled)	Paper and containers (eg. paper, plastic, glass, metals)	110
		Containers (eg. plastic, glass, metals)	60
	Aluminium/metals	Aluminium cans	65
		Non-ferrous metals	140
		Tin cans	85
	Glass	Glass	200
	Plastics	Soft (eg. film)	35
		Hard	170
		Polystyrene	20
		Containers	45
Fibre	Paper	Paper	115
		Secure paper (eg. collected for secure document destruction)	300
	Cardboard	Loose	55
		Compacted	130
Organic	Food waste	Food waste	350
		Other food organics (eg. fish, meat, etc)	Varies
	Other organics	Rubber	200
		Wood (wood, crates, etc.)	185
Liquid	Cooking oil	Cooking oil	n/a
Other	Fluorescent tubes/ light globes	Fluorescent tubes/light globes	230
	Toner cartridges	Toner cartridges	190
	E-waste	Appliances and electrical goods	230
		Computers and office equipment	265
	Batteries	Batteries	Varies
	Textiles	Textiles	90
AWT mixed residue	Mixed residue	Dry (excluding organics)	70
		Wet (including organics)	115
General waste for landfill	General waste, uncompacted	Dry (excluding organics)	70
		Wet (including organics)	115

Source: Better Buildings Partnerships (2015) *Operational Waste Guidelines: Procurement, Management and Reporting.* http://cdn.sydneybetterbuildings.com.au/assets/2016/05/BBP-Operational-Waste-Guidelines.pdf