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ESQ 1818 Stages 4 & 5

Operational Waste Management Plan

RFI letter, 30 June 2023

September 2023

This report contains confidential information. It has been compiled by Waste Audit and Consultancy Services (Aust) Pty Ltd for the ESQ1818 Mixed Use Development.

This Waste Management Plan is not a substitute for legal advice on the relevant environmental legislation, which applies to the developers, its contractors or other bodies. Accordingly, Waste Audit and Consultancy Services (Aust) Pty Ltd will not be liable for any loss or damage that may arise out of this project, other than loss or damage caused as a direct result of Waste Audit and Consultancy Services (Aust) Pty Ltd's negligence.

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1. Introduction

This Waste Management Plan (WMP) has been prepared to accompany a Development Application specifically for the ESQ1818 Stages 4 & 5, Residential Development for Buildings H (stage 4) and J (stage 5). This stage of the development consists of 349 residential apartments and 5,720 m² of retail premises and communal areas.

The following diagram illustrates the location of Stages 4 & 5 with the other Stages either had a Development Application submitted or will at a later time.



Waste audit and management strategies are recommended for new developments to provide support for the building design and promote strong sustainability outcomes for the building. All recommended waste management plans will comply with council codes and any statutory requirements. The waste management plan has three key objectives:

1. **Ensure waste is managed to reduce the amount of waste and recyclables to land fill** by assisting staff and visitors to the buildings to segregate appropriate materials that can be recycled; displaying signage to remind and encourage recycling practices; and through placement of recycling and waste bins to reinforce these messages.
2. **Recover, reuse and recycle** generated waste wherever possible.
3. **Compliance** with all relevant codes and policies.

This Plan has been developed with reference to the Penrith City Council's Development Control Plan 2014: Section C5 Waste Management (including Residential Flat Building Waste Management Guidelines), and Appendix F5 Technical Information.

This updated plan addresses RFI criteria highlighted by Penrith Council, dated 30 June 2023;

Waste generation rates updated for both 8 residential cores and for commercial tenancies (restaurant/ general retail)
Safe and efficient waste collection. Detailing how bins and bulky waste are moved from the basement storage rooms.
Review and provide separate details for the 8 chute systems and unit numbers.
Revised loading bay and use of collection trucks
Amended use of bin-tug to collect and store bulky goods
Separated residential and commercial waste collection facilities at both basement and ground floor

2. Waste Generation

2.1 Waste Streams

Based on the number of apartments for this development (as per Section 1), the following are the predominant waste streams that would be expected on a regular basis:

- Paper/cardboard recycling;
- Comingled recycling (glass and plastic container); and
- General waste.

Paper, Cardboard and Commingled recycling will be consolidated into the one bin – this is to ensure that the system is economically viable. However, once the waste contractor has been appointed this may be reviewed depending on management costs and potential for rebates for materials.

Other wastes may be generated, but these would be irregular in terms of when generated and as such the quantities not able to be estimated. These would be materials such as furniture, e-waste, and other materials. Space will be provided for recycling of these other streams as required.

In addition, residents will be able to access Councils hard waste collection.

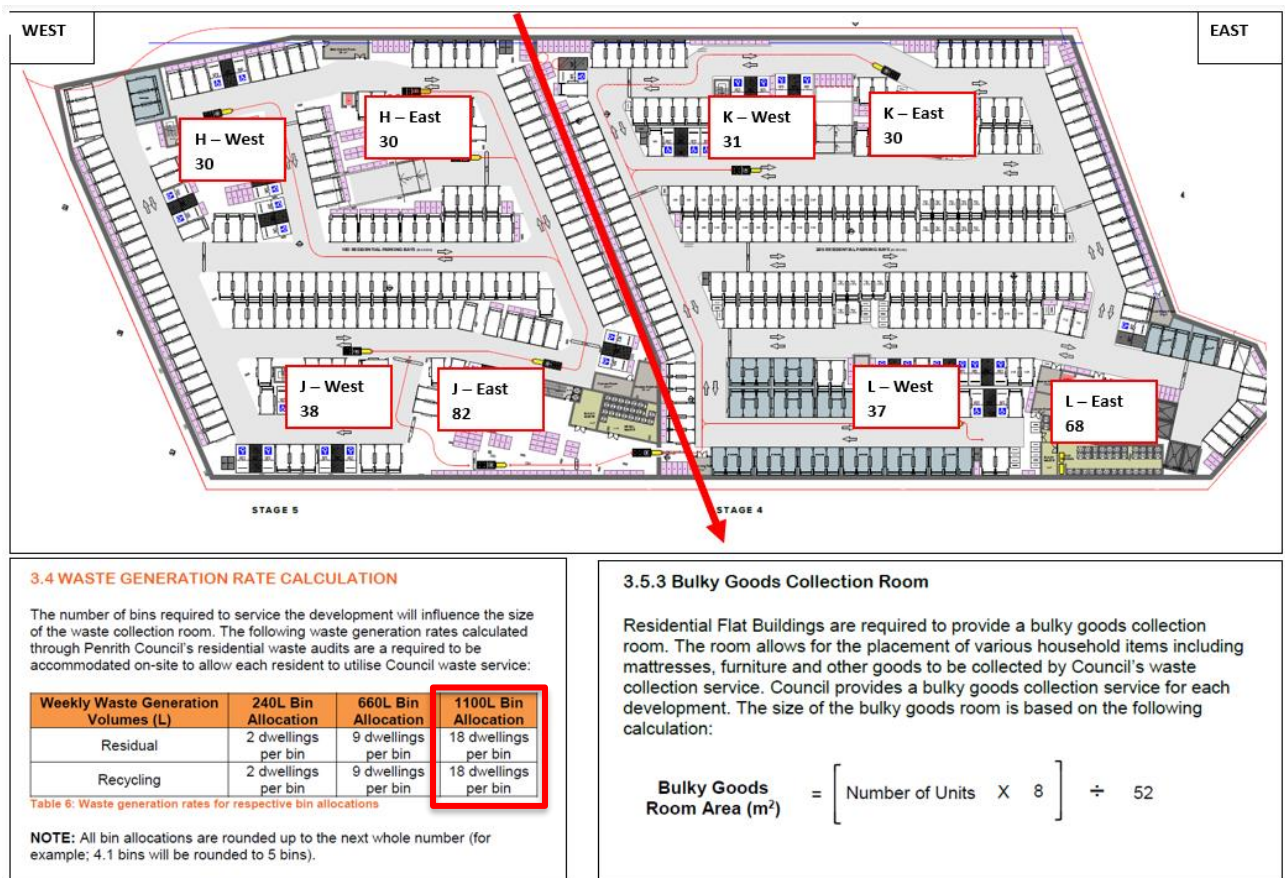
2.2 Waste Generation Estimates

Calculations for the types and quantities of waste that will be generated are based on the estimates are provided in the City of Penrith's *Development Control Plan 2014: Appendix F5 Technical Information*. In addition, averages for quantity of waste generated and composition as determined by industry data (ie., data/information provided by WACS' waste audits conducted in a broad range of sectors).

The following table shows the estimated waste generated for the development – these estimates are based on averages for quantity of waste generated and composition as determined by industry data (ie., data/information provided by WACS' waste audits conducted in a broad range of sectors) as well as consideration of waste management requirements as specified by the City of Penrith. Waste generation rates for commercial areas are based upon the proposed uses for the tenancies.

2.3 Residential Development

These estimates are based on averages for quantity of waste generated and composition as determined by industry data (ie., data/information provided by WACS' waste audits conducted in a broad range of sectors) as well as consideration of waste generation rates as indicated by Penrith City Council.



Waste generation estimate – Residential Dwellings

Building	Dwellings	General Waste/week (L)	Recyclables/week (L)	Total/week (L)	Bulky Goods Required (m2)
H-West	31	1,891	1,891	3,782	< 9 m2
H-East	33	2,013	2,013	4,026	
J-West	35	2,135	2,135	4,270	< 18 m2
J-East	79	4,819	4,819	9,638	
K-West	34	2,074	2,074	4,148	< 10 m2
K-East	36	2,196	2,196	4,392	
L-West	35	2,135	2,135	4,270	< 16 m2
L-East	66	4,026	4,026	8,052	
Total	349	21,289	21,289	42,578	

For the Restaurant, Retail, Club & Resort Pool/ Podium and Paved Communal sectors, the following is the estimated generation rate per week

2.4 Commercial Development

Classification	GFA (m2)	General Waste/week (L)	Recyclables/week (L)	Organics/week (L)
Retail General	1,365	2,389	19,110	478
Restaurant	720	5,040	25,200	5,040
Resort Pool/ Podium	2,280	798	798	-
Paved Communal/ Garden	1,153	404	404	-
Gym/ Lounge	202	71	71	-
Total	5,720	8,702	45,583	5,518

Waste	Litres/Week	Bin Size	No.	Collection/ Week	Capacity/ Week	Bin Footprint m2
General Waste	8,702	1100	5	2	11,000	8.5
Recycling	45,583	1100	21	2	46,200	35.8
Organics	5,518	1100	4	2	8,800	6.8
Total	59,803		30		66,000	51.2
*Based upon a lowest case scenario of 2 x collection per week						

3. Waste Management Storage Calculations

Overall storage area requirements for (a) basement 1 holding area and (b) ground floor storage area are as follows;

Basement 1		> 116 m2	Maximum of 70 Bins at one time
Ground Level		> 116 m2	Maximum of 70 Bins at one time

These storage areas maps are indicated in Appendix E.

The following table show the recommended waste storage requirements (based on 1100 litre mobile garbage bins). This is based on Council's requirement for:

3.1 Residential Dwellings - Bin storage estimate

Chute	Dwellings	Waste – 1 x 1100 litre MGB per 18 apartments	Recycling – 1 x 1100 litre MGB per 18 apartments	Bin Footprint m ²	Actual Storage m ²
H-West	31	2	2	6.8m ²	42 m ²
H-East	33	2	2	6.8m ²	52 m ²
J-West	35	2	2	6.8m ²	48 m ²
J-East	79	4	4	13.6m ²	55 m ²
K-West	34	2	2	6.8m ²	30 m ²
K-East	36	2	2	6.8m ²	25 m ²
L-West	35	2	2	6.8m ²	35 m ²
L-East	66	3	3	10.2m ²	43 m ²
Total	349	19	19	64.6m ²	

In addition, there should be an allowance of 20% space for bin movement (within each storage room), and a minimum 8.0m² for bulky goods.

Based on Council's bin requirements the following summarises the *Total number of 1100 litre MGB required, as opposed to per chute (for this section only):

Waste	Litres/Week	Bin Size	No.	Collection/ Week	Capacity/ Week	Bin Footprint m ²
General Waste	21,289	1100	19	2	41,800	32.3
Recycling	21,289	1100	19	1&2	41,800	32.3
Total	42,578			4	83,600	64.6
*Based upon a lowest case scenario of 2 x collection per week						

Bulky waste is broken down into components/ per building rather than per bin chute. In regards to storage space for "bulky waste", Council requires space based on the calculation of from 41 to 100 units: a minimum size of 8 m² + 1 m² per 20 additional units (or part thereof) above 40 units. This is for the following buildings:

Bulky Waste	Core location			
	H-W&E	J-W&E	K-W&E	L-W&E
	9 m ²	33 m ²	17 m ²	20 m ²

*Based upon the cumulative bulky waste floor area for Stage 4 and Stage 5

4. Waste Management Systems

4.1 Apartments

The following summarises the recommended waste and recycling systems that will be implemented for the buildings. These recommendations are based on the City of Penrith's requirements and systems implemented for similar developments (and tenants).

To ensure that the proposed management actions occur management requirements will be contained within the Strata By-laws as well as within the service contract for the maintenance/cleaning contractor(s).

Essentially all wastes and recyclables will be collected by the Council or qualified waste contractor from the dedicated storage room located on the Ground Level of the development (various Buildings). Waste and recycling will be collected from the Storage Rooms where the service trucks can park alongside whilst servicing the bins. The buildings will utilise a dual chute system which will be accessible from each residential level and will terminate in one of the Basement or Ground Level waste storage rooms.

A dual chute access will be provided for residents on each floor of the buildings. The chute system allows both general waste and recyclables to be deposited into the chute – (refer to Appendix C for indicative chute information). General waste will be collected under the chute into 1100 litre MGB. These and the waste bins will be transported to the ground level by cleaning staff (via a lift), for collection by Council. Building management/onsite cleaning staff will be responsible for monitoring all chute waste rooms and transporting full bins (as required), to the central waste room located on the ground level.

In addition, a motorised “tug” will be provided to assist in the safe movement of the bins. An example is illustrated below. The following represents the types of bins that will be used for the residential aspect of the development:



Bin Tug & Caretaker Storage

A secure location for the bin tug is to be located on basement 1.

A separate and enclosed residential caretaker/cleaner's cupboard is to be provided within basement 1 for the storage of chemicals and associated cleaning items.

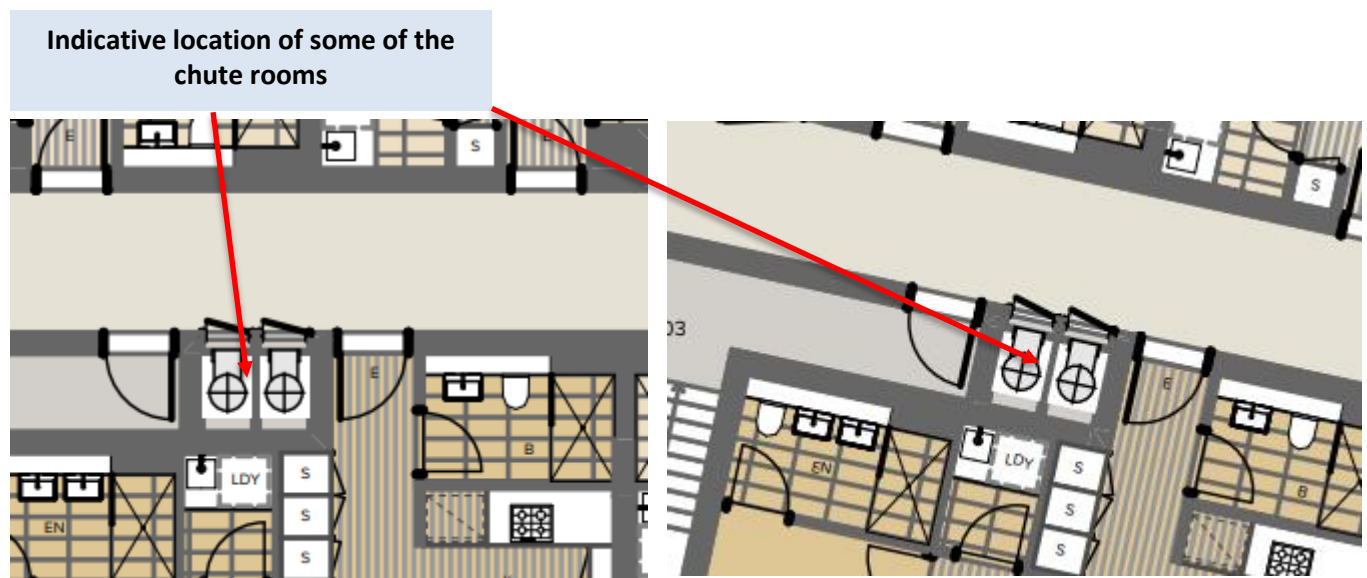
The room provides a minimum area of 2.5 sqm and minimum internal width of 1.8m and is to be located close to the secure location for the bin tug device.

Residents will be briefed on the proper use of the chute system and any contamination of the recycling stream will be monitored and reported by cleaners/building management as it is imperative that the recycling stream remain free of contamination to ensure compliance with collection protocols. Residents will be encouraged to maximise the separation of general waste and mixed recyclables within their apartments to aid the proper disposal of all materials.

Prior to each collection, building management/onsite cleaning staff will transfer all bins from the waste storage room to the central bin consolidation area. The service vehicle will service the bins from this area and it will be the responsibility of building management/onsite cleaning staff to return the bins to the waste rooms as required.

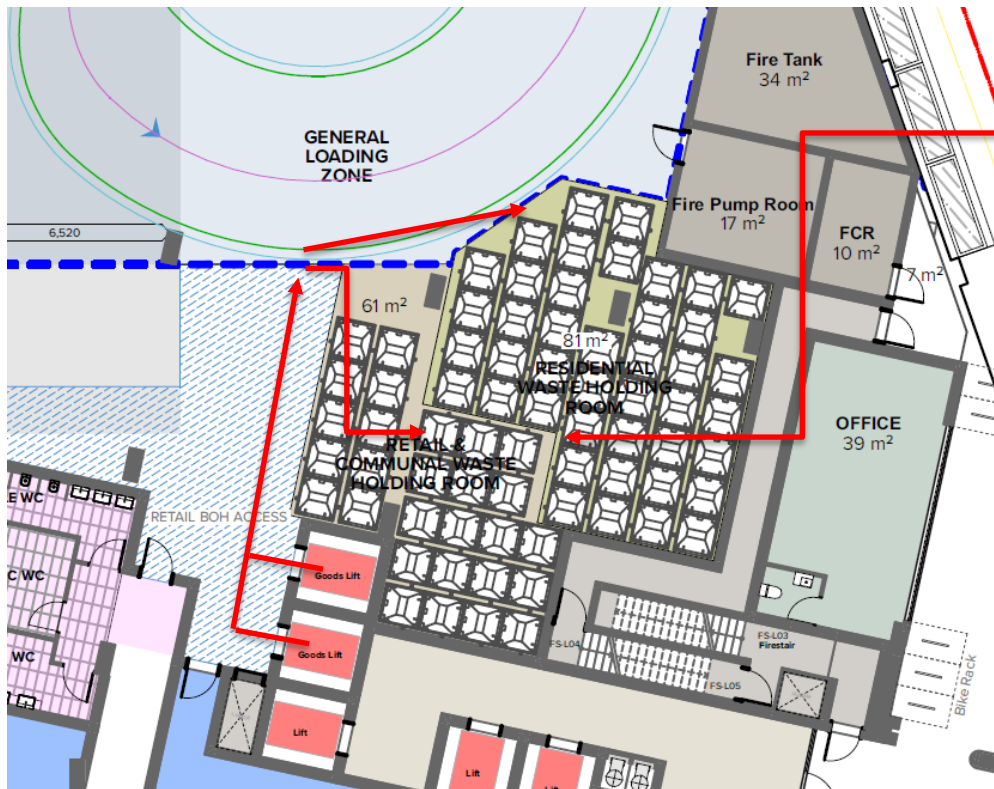
Items such as furniture/whitegoods stored within the bulky items storage cage/room will be managed by building management and offered to other residents for reuse if desired. If items remain unclaimed, appropriate collection organisations will be called to collect the items for recycling/reuse as required. Bulky goods storage rooms have been provided for, and are located adjacent to the loading bay.

The following diagrams illustrate some of the chute rooms that are located on the 2nd Floor in Stage 5, Building H.



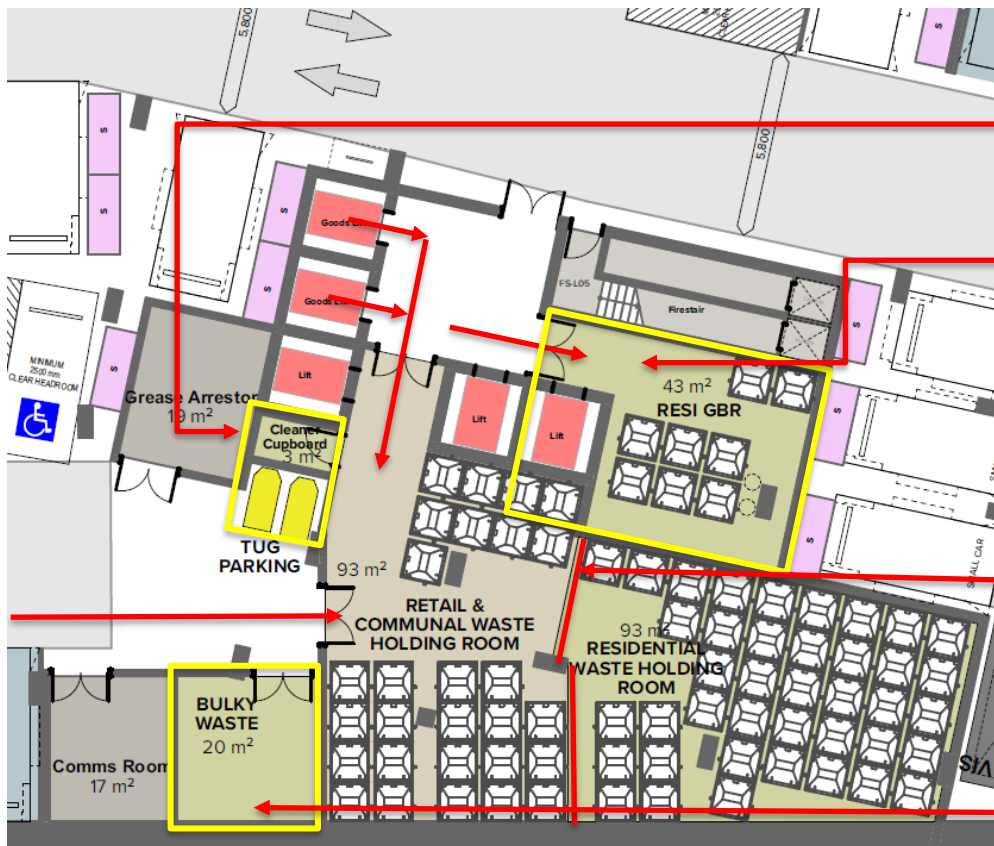
The following illustrates safe and efficient waste collection between basement storage rooms and Residential Waste Collection Room, Commercial Waste Collection Room and Residential Bulky Goods Collection Room adjacent to the loading area noted on Ground Floor.

Ground Floor – Waste transport through the lifts to ground floor holding area



Demarcated residential waste from and retail waste

Lower Basement– Though to basement bin holding rooms



Cleaners' cupboard and dedicated bin-tug storage area

Residential bin room and storage separate from retail waste

Waste rooms separation

Separate bulky waste storage area

Retail waste movement– through the lifts (1), & waste hoists (2) to waste storage rooms



Appendix A; contains illustrations of other waste management equipment that could be used within the buildings. The pictures provide examples of the different options for equipment such as MGB, bins placed within the commercial areas, tugs for transporting bins, trolley unit and a wheelie-safe trolley. Signage will be a crucial element of the waste management system. Appendix B contains examples of signage. These are the type of signs that should be used throughout the buildings and waste storage area. Other signs can be accessed from the NSW EPA website at: <http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm>.

4.2 Commercial Tenants

The commercial tenancies will be designed so as to allow effective segregation of recyclables. These tenancies will be provided with sufficient smaller bins to allow for effective segregation of wastes/recyclables. This will include:

- Paper and Cardboard recycling
- Comingled recycling
- General waste

Waste and recycling collection services for the commercial tenancies will be provided by a commercial waste contractor (TBA). Utilising a commercial waste contractor affords the tenants greater scheduling flexibility and the appropriate collection frequencies will be determined in consultation with the waste contractor once appointed – however once operational, collection schedules may need to be adjusted accordingly depending on actual waste generation.

In addition, tenants will be provided with ad hoc systems such as e-waste; batteries; mobile phones etc. Systems for these streams will be located within each tenancy or in common areas or be available upon request from building management. Signage will be a crucial element of the waste management system. Appendix B contains examples of signage. These are the type of signs that should be used throughout the retail tenancies and waste storage area(s).

4.3 Collection Frequency

The residential waste bins are emptied twice weekly and recycling bins are emptied weekly by the contractors directly from the bin storage area¹. However, as indicated above collection frequencies for the commercial tenancies may be adjusted once tenant's generation rates are reviewed.

4.4 Storage

In keeping with best practice sustainability programs, all waste areas and waste and recycling bins will be clearly differentiated through appropriate signage and colour coding to Australia Standards to reflect the materials contained.

There will be a need to ensure that there is sufficient space to allow for bin movement. As a general rule, it is recommended that an additional 30% of the estimated footprint for bins be allocated to this and this has been factored into the waste storage area space calculations. The waste areas will be accessed by cleaning staff only.

4.5 Caretaker & Bulky Goods Requirements

The caretaker is to manage the movement of both bins and bulky goods from the interim waste rooms, underneath each chute for example, to the loading bay area where they are to be collected by a waste collection contractor. To achieve and maintain best practice, the site's caretaker will be strictly required to demonstrate high standards of service and to comply with the following requirements:

- Reliable and efficient servicing, and meeting all agreed service requests;
- Caged Bulky Goods trailers for use to minimise multiple handling (Appendix A)
- Monitor and service the bin storage room containing a linear track system to move full bins from under their respective chute outlets and replace these with empty ones;
- Transferring waste and shifting bins shall require the minimum possible manual handling. The caretaker will assess manual handling risks as per regulatory requirements and provide appropriate documentation to the building manager;
- The caretaker must provide a bin-tug service, where appropriate, for the movement and storage of bulky household waste (whitegoods, mattresses, furniture etc.) awaiting collection – to and from the ground floor temporary collection area, as indicated in Appendix A; and
- The bulky goods area should be in addition to and adjacent to the developments waste storage area/s and the collection area.

This is to be managed using Bin Tug which will be situated close to the residential caretaker/cleaner's cupboard, located on basement 1. A separate and enclosed residential caretaker/cleaner's cupboard is to be provided within basement 1 for the storage of chemicals and associated cleaning items. The room will provide a minimum area of 2.5 sqm and minimum internal width of 1.8m and is to be located close to the secure location for the bin tug device.

¹<https://www.penrithcity.nsw.gov.au/Waste-and-Environment/Waste/Bin-services/#About%20the%20C&R%20Service>

The waste and recycling bins will be colour coded and clearly signed. Each stream will be located in a designated area. This will assist in easy identification of correct bins by those with authorised access.

Photographs 1 & 2 - Examples of waste room colour coding



The waste room will contain the following to minimise odours, deter vermin, protect surrounding areas, and make it a user-friendly and safe area:

- waste room floor to be sealed with a two pack epoxy;
- waste room walls and floor surface is flat and even;
- all corners coved and sealed 100mm up, this is to eliminate build-up of dirt;
- a water facility with hose and tap height of 1.6m, must be provided for washing the bins;
- any waste water discharge from bin washing must be drained to sewer in accordance with the relevant water board;
- storm water access preventatives (grate);
- all walls painted with light colour and washable paint;
- equipment electric outlets to be installed 1700mm above floor levels;
- the room must be mechanically ventilated;
- light switch installed at height of 1.6m;
- waste rooms must be well lit (sensor lighting recommended);
- optional odour/ pest control systems installed to eliminate odour/ pests;
- all personnel doors are hinged and self-closing;
- waste collection area must hold all bins – and facilitate ease of access;
- conform to the Building Code of Australia, Australian Standards and local laws; and
- childproofing and public/operator safety shall be assessed and ensured.

Occupational Health and Safety issues such as slippery floors in waste rooms and the weight of the waste and recycling receptacles will need to be monitored. Cleaners will monitor the bin storage area and all spills will be attended to immediately by cleaners. A similar design will be incorporated into the chute rooms located on each floor of each building.

Ground level waste collection area

All waste and recycling containers will be clearly differentiated through appropriate signage and colour coding to reflect the materials contained, with each stream located in a designated area within storage rooms, with large and clear signage to assist in easy identification by users, as shown in Appendix B.

Ground level temporary collection area best practice standards would include:

- Colour coded line markings showing the loading area and positions of bins within the area according to general waste, recycling, green waste and bulky waste.
- Ensuring the waste loading areas are level and free of kerbs, steps, etc.
- Highly visible signage as shown in Appendix B.

4.6 Bin Requirements

Containers located within the development for waste and recycling should be consistent. The following table outlines the colour coding that has been developed by Standards Australia.

Standards Australia waste/recycling container colour coding

Waste Stream	Bin Body Colour	Lid Colour
Paper/cardboard Recycling	Blue	Blue
Commingled Recycling	Green	Yellow
Food Organics	Burgundy	Burgundy
General Waste	Green	Red

5. Education

All tenants and cleaning staff will receive information regarding the waste collection systems including how to use the system, which items are appropriate for each stream and collection regimes.

Large and clear signage will be provided within all waste rooms room and other areas of the development (eg., lobby and on each floor), educating residents on how to recycle – this will be accompanied by a brochure located within each apartment. Appropriate signage and updated information will also be provided.

All waste receptacles will be appropriately signed and additional room signage is usually provided from most waste contractors during implementation of the waste contract. Examples of signage is included in Appendix B.

It is recommended that all signs should;

- Clearly identify the waste/recycling stream;
- Use correct waste/recycling stream colour coding;
- Identify what can and cannot be disposed of in the receptacle; and
- Include highly visual elements to accommodate for individuals with inadequate English literacy.
- As part of the staff induction process, a waste and recycling toolkit will be provided. This toolkit will include the details of each of the systems in place; acceptance criteria for each stream and how each stream is managed.

On a quarterly basis waste and recycling performance reports will be reported back to tenants so that they are aware of their performance and areas for improvement. An active waste monitoring program will be employed. The waste and cleaning contracts will ensure that contractors actively participate in the waste reduction program for the site and meet monthly to identify performance and new opportunities for diversion and avoidance.

6. Ongoing Management

Having suitable systems in place is only one element of an effective waste management system. Compliance by all stakeholders is essential.

Cleaners are a key element in the effectiveness of the systems in place. Prior to acceptance of the cleaning contract, the contractor will be required to demonstrate how the management of waste and recycling will be carried out so as to ensure that segregated materials are placed in the correct systems. This process will be agreed and a training program implemented by the cleaning contractor to ensure full understanding by all cleaners. Monitoring of the system will be carried out by the cleaning supervisor and site management throughout the term of the contract.

In addition, cleaners will be required to feed back to site management any non-compliance issues they observe during their cleaning activities. This may include contamination of recycling; non-participation in the recycling system, or missing or damaged bins. In this way issues can be promptly dealt with by management.

Waste and recycling contractors will be required to report actual volumes collected by stream so that site management can monitor performance and feed this back to stakeholders.

It is highly recommended that a reporting program be set up at the site which would include bin tally sheets that detail the number of bins collected and how full they are at the time of collection, in addition to communication procedures to allow waste contractors to provide feedback regarding contamination and leakage.

All tenants/staff should be educated and made aware of any changes to the existing waste systems.

If a public place recycling system was implemented it would need to be accompanied by clear signage and colour coding to help differentiate the systems. It is likely that staff would also be required to inform the public about the systems and to guide their waste disposal practices.

7. Public Place Recycling

With public open spaces, consideration needs to be taken regarding public place recycling (PPR). General waste and recycling facilities will be provided in public realm areas throughout the precinct. The final number of bins will be determined in consultation with the City of Penrith and Building management.

Simple, colour-coded and consistent representation of common recycling and waste streams makes it easier for people to know how and what to recycle - whether at work, school or a public event. Introducing a public recycling system has environmental, social and financial benefits including:

- Responding to community expectations to 'Do the Right Thing'.
- Reducing the amount of waste sent to landfill and recovering valuable resources to be made into new products.
- Financial benefits over time as materials are diverted from landfill and into recycling.
- Contributing to triple bottom line reporting.

It is important that general waste and recycling bins are always located together in order to make recycling as accessible as general waste disposal. Recycling bins should never be located on their own in isolation from a general waste bin as patrons are likely to contaminate the recycling bin with general waste if there is no other option to dispose their general waste.

The implementation of organics recycling bins is not recommended in public places due to the high levels of contamination commonly observed in such systems.

All bins should be clearly signed and appropriately colour-coded to ensure the streams are readily identifiable. Signage for PPR should be:

- Colour-coded: red for general waste and yellow for recycling
- Large and easily viewed from all angles: this may mean that signs are placed on all sides of the bin or above the bin.
- Simple: don't use jargon (words such as PET, comingled, HDPE and even the recycling triangle can be confusing as this symbol can appear on a number of items that are not necessarily recyclable.
- Unambiguous and uses visual imagery

All public domain waste and recycling bins will be managed and collected by the appointed waste contractor as part of their existing waste and recycling operations (if not specifically addressed in site cleaning/maintenance contracts).

Appendix A – Waste Management Equipment

The following diagrams illustrate colours and sizes of different bins that could be used within the development.

Figure 1 – MGB bin



Figure 2 – MGB bin



Figure 3 – Indicative size of MGB



Figures 4, 5, 6, 7 and 8 – Bin movers, Bin tugs and Caged Waste Trailers





Bin Tugs in use delivering 1100 MGB



Caged Waste Trailers for use in the movement of Bulky Waste



Appendix B – Example Signage



Don't waste YOUR future



Don't waste YOUR future



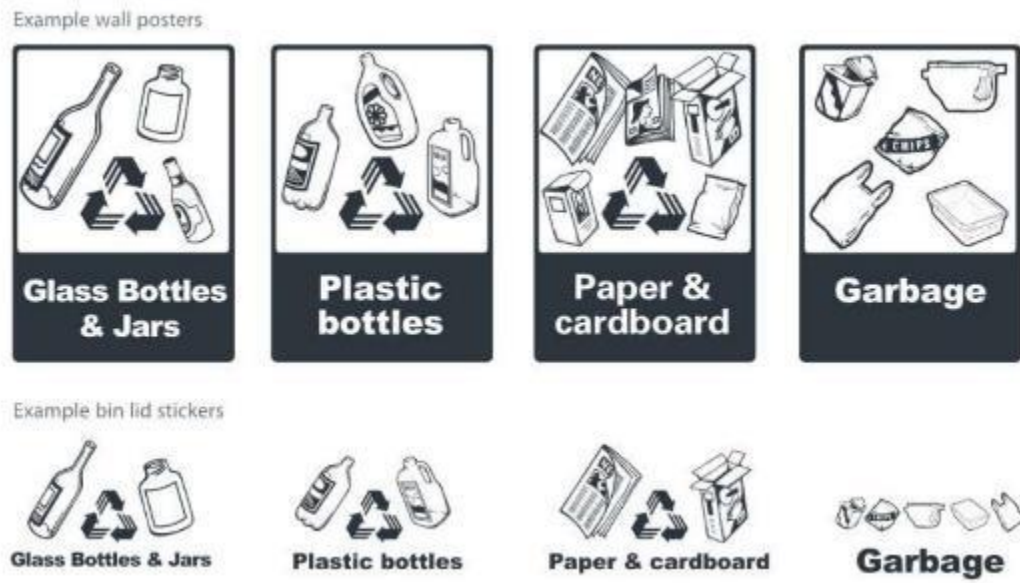
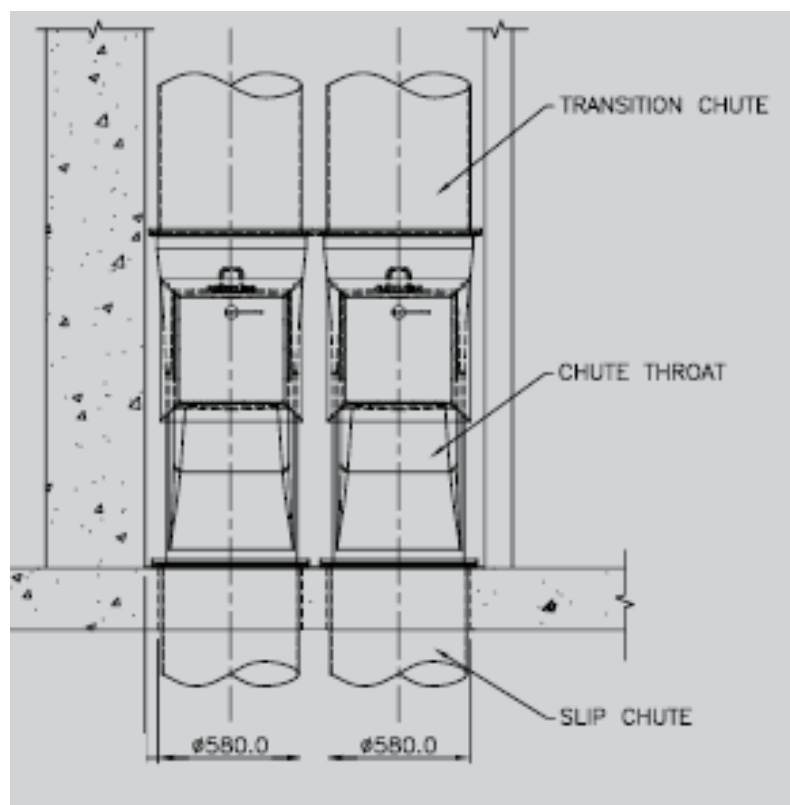
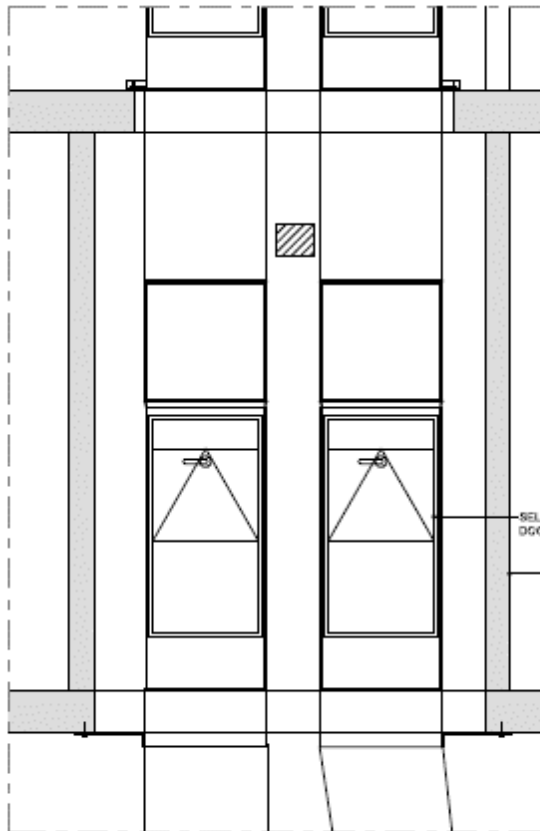


Figure 8 – Example Ground Floor waste stream area line marking

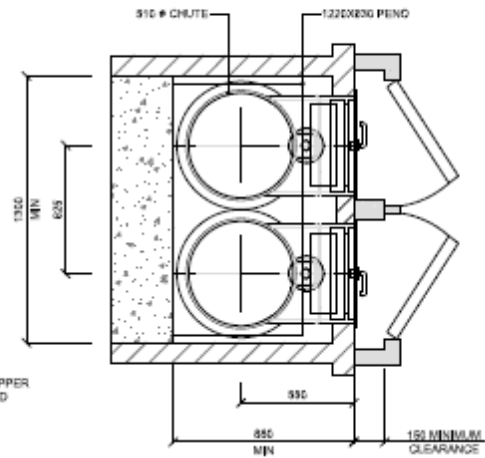


Appendix C – Indicative Dual Chute Designs





TYPICAL DUAL CHUTE LAYOUT
(5102)
SCALE 1:20



TYPICAL LLDPE PLASTIC TWIN CHUTE LAYOUT
w/ADDED ENCLOSURE (5102) (STEEL SIMILAR)
SCALE 1:20

NOTE: ENCLOSURES ARE REQUIRED IF THE CHUTE OPENS
DIRECTLY TO A CORRIDOR OR IS NOT LOCATED IN A WASTE ROOM.

Appendix D – Waste Vehicle Dimensions

2.3 DESIGN SPECIFICATIONS REAR LOADED WASTE COLLECTION VEHICLES

The following dimensions are provided for a standard heavy rigid vehicle as identified in Australian Standard 2890.2:

Vehicle Classification	Dimensions
Overall Length (m)	10.5
Operational Length (m)	12.5
Design Width (m)	2.8
Design Height (m)	3.7
Swept Circle (m)	22.5
Clearance (travel height) (m)	4.5
Roadway/ramp grade (max)	1:6.5 (15.4%)
Rate of change of grade (max)	1:16 (6.25%) in 7.0m of travel
Weight Fully Loaded (tonnes)	22.5
Capacity (m ³)	24
Front Chassis Clearance	13 ⁰
Rear Chassis Clearance	16 ⁰

Table 1: Standard dimensions sourced from AS 2890.2 Parking Facilities: Off-Street Commercial Vehicle Facilities

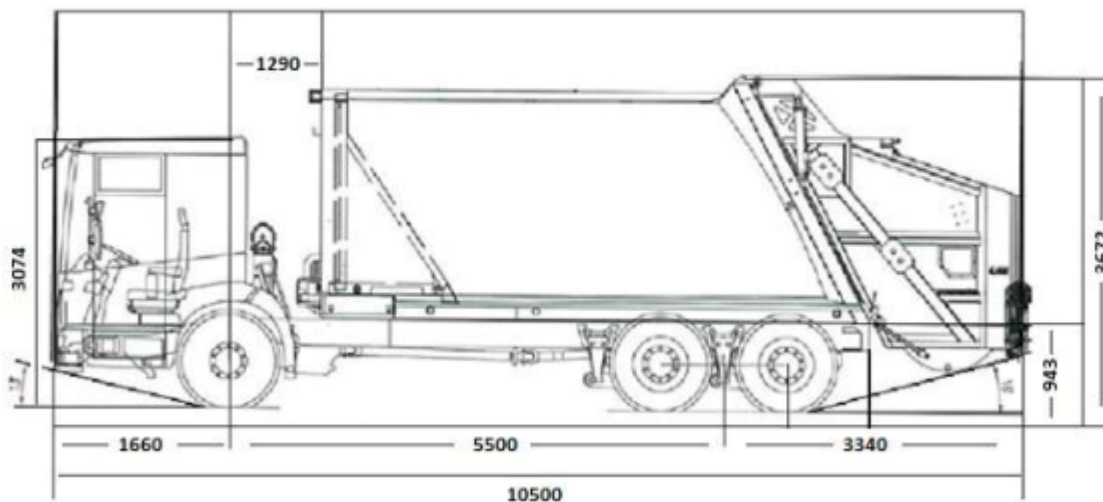
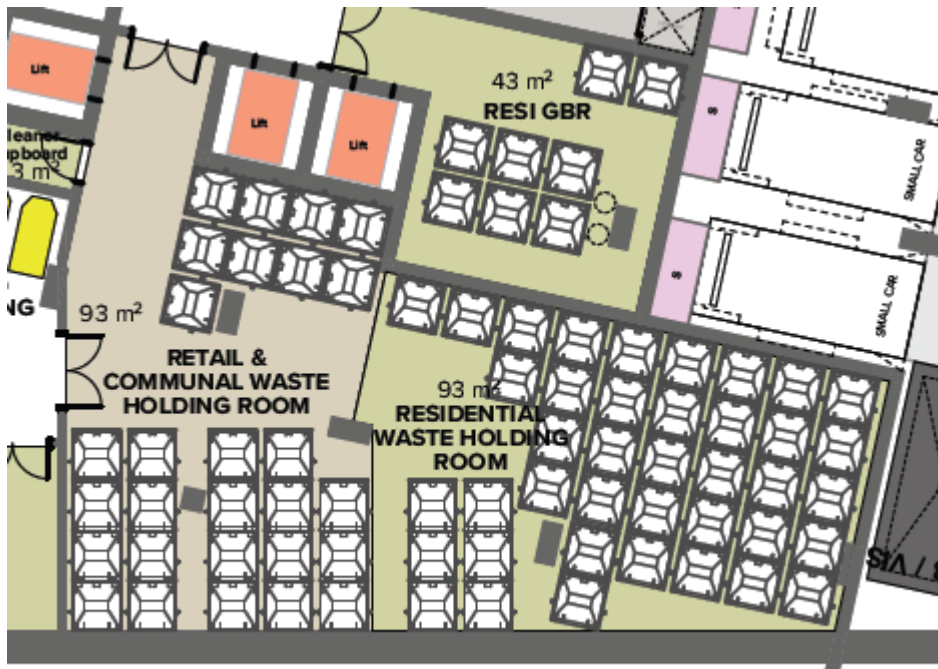


Figure 1: 10.5m Heavy Rigid Waste Collection Vehicle specifications

Appendix E – Waste Area Maps

(a) Basement 1 holding area



(b) Ground floor storage area

