

Waste Management Plan Construction and Post Development

NOVEMBER 2010

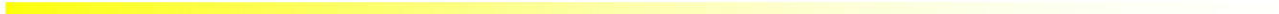
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This report is based on information provided by Santel architects Pty Ltd and Waste Audit and Consultancy Services general knowledge of waste generated within the commercial and industrial sectors. To that extent this report relies on the accuracy of the information provided to our consultant. It has been compiled by Waste Audit and Consultancy Services (Aust) Pty Ltd on behalf of Santel architects Pty Ltd.

This report is not a substitute for legal advice on the relevant environmental and health related legislation, which applies to businesses, 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. Background

The Glenmore Park Town Centre, owned by Village Fair Glenmore Park Pty Ltd is proposing an expansion of the shopping precinct to incorporate additional retail specialty shops, major outlets, commercial offices and a multi unit residential development.

This waste management plan covers the management of waste generated during the Construction and Demolition stages as well as from the ongoing operations of this new expansion.

This waste management plan has been prepared in line with the requirements of the Penrith City Council Development Control Plan 2006.

Specifically, the aim of this Plan is to ensure that all waste is managed in an effective and environmentally aware manner. A focus on resource recovery and sustainability objectives will be applied.

The waste management systems as outlined in this document should be reviewed in consultation with industry experts at the completion of the development. This will allow Centre Management to review any new opportunities that may have arisen that improves the segregation or diversion of materials.

2. Proposed Development

2.1 Existing Development

The existing shopping centre, located to the south of the proposed new site, consists of a 4,282m² Woolworths, approximately 2,443m² of specialty retail, and 349m² of commercial banks - a total GLA of 7076 m². This area will remain largely untouched by this development. Systems for managing the waste from this existing Centre will continue.

2.2 Proposed Development

The proposed new development consists of an additional 16,133m². This new development will include:

Tenancy Type	GLA (m ²)
Discount Department Store (Major)	7321
Supermarket (Major)	1559
Specialty retail stores	4622
Kiosks	108
Restaurants	737
Community Space	257
Total Retail	14604
Commercial	272
Residential	1257
Total proposed GLA	16133

This report is prepared specifically to address the management of waste collection and removal from the new development in compliance with the waste management requirements of Penrith City Council DCP 2006.

Note: The major tenants (supermarket and DDS) are responsible for their own waste management systems and practices. Space has been provided in the plans for these tenancies in line with their stated waste management requirements.

3. Demolition and Construction Waste Management Plan

As part of the project management, the successful contractor will be required to demonstrate how they will comply with this plan and their capacity to ensure maximum reuse and recycling of materials.

Dependent on the contractor the site will either establish a system of separate bins per material type, enabling direct transport to the appropriate facility. Or, where the contractor has a C&D yard, mixed materials will be captured at site and taken to the yard for sorting and subsequent recycling. Large quantities of single type material will be segregated for direct diversion to recycling facilities to maximize efficiency of handling.

The following quantities are based on estimates provided by the quantity surveyor and based on the current plans for the development.

Note; Final recycling facilities will be determined in consultation with the successful contractor based on their existing relationships.

Table 1 Demolition waste

Materials		Destination		
		Re-use and recycling		Disposal
Material	Estimated volume (m3)	On-site	Off-site	Facility
Masonry/Bricks	60		60 – Boral recycling/Concrete recyclers	
Steelwork	25		15 – metal recyclers	
Tiles	5		5 – recyclers	
Aluminium	10		3 – metal recyclers	
Glazing	10			5 – Eastern creek
Timber (hard wood)	15	Some on-site reuse as required	Reuse or chipped	

Other (mixed internal surfaces)	25			35 – Kemps creek/Eastern creek
Bitumen paving	250	Some on-site reuse		
Brick/concrete paving	200	Some crushing and re-use on site	Concrete recyclers	Kemps creek
Total	600			

Table 2 Construction Waste

Materials		Destination		
		Re-use and recycling		Disposal
Material	Estimated volume (m3)	On-site	Off-site	Facility
Excavation material	55,000		Clean-fill re-use	
Masonry	100		Boral recycling/Concrete recyclers	
Steelwork	50		Metal recyclers	
Plasterboard	75		Return to CSR	
Tiling	50		Crushed for recycling or reused	
Cardboard	10		Visy/Amcor	
Plastic	5		Recycled	
Mixed waste	10			Kemps creek/Eastern creek
Total	55,300			

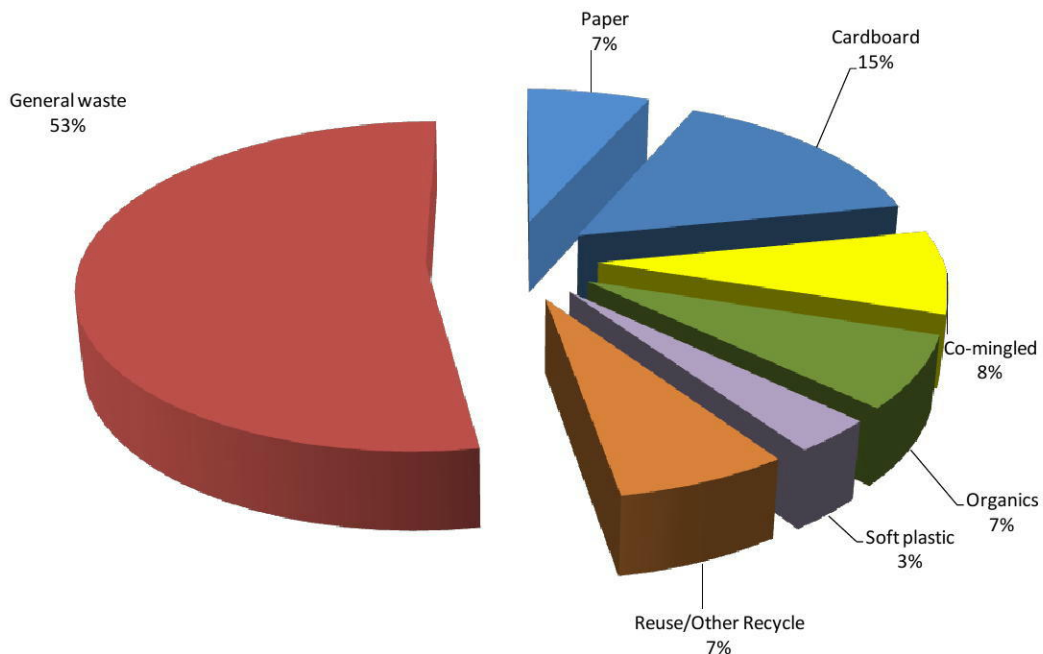
4. Ongoing Use Waste Management Plan for Commercial and Retail

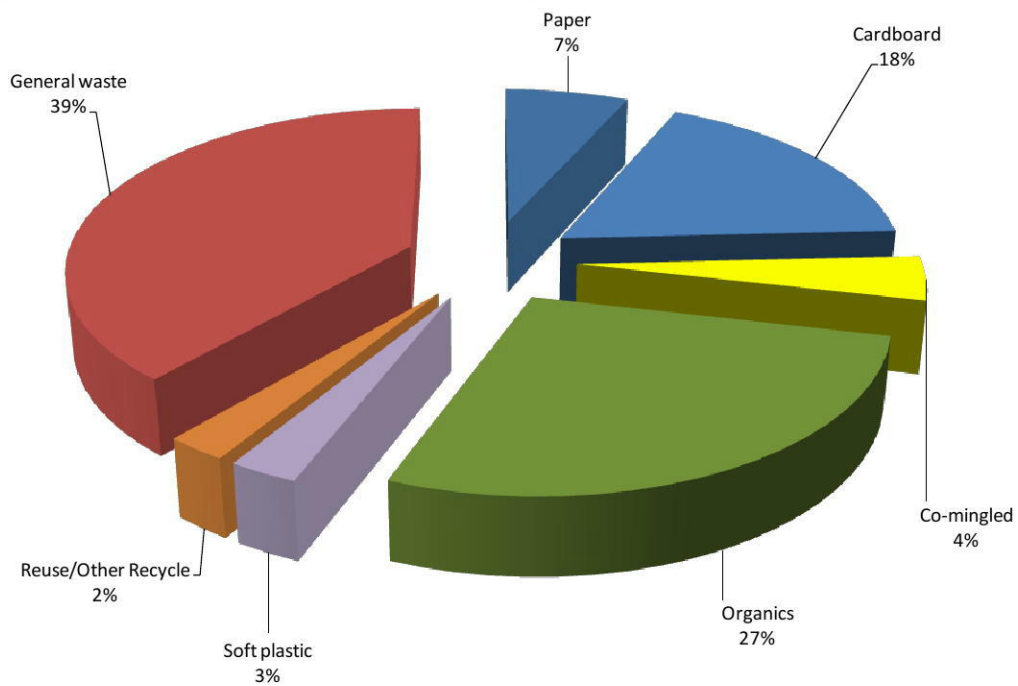
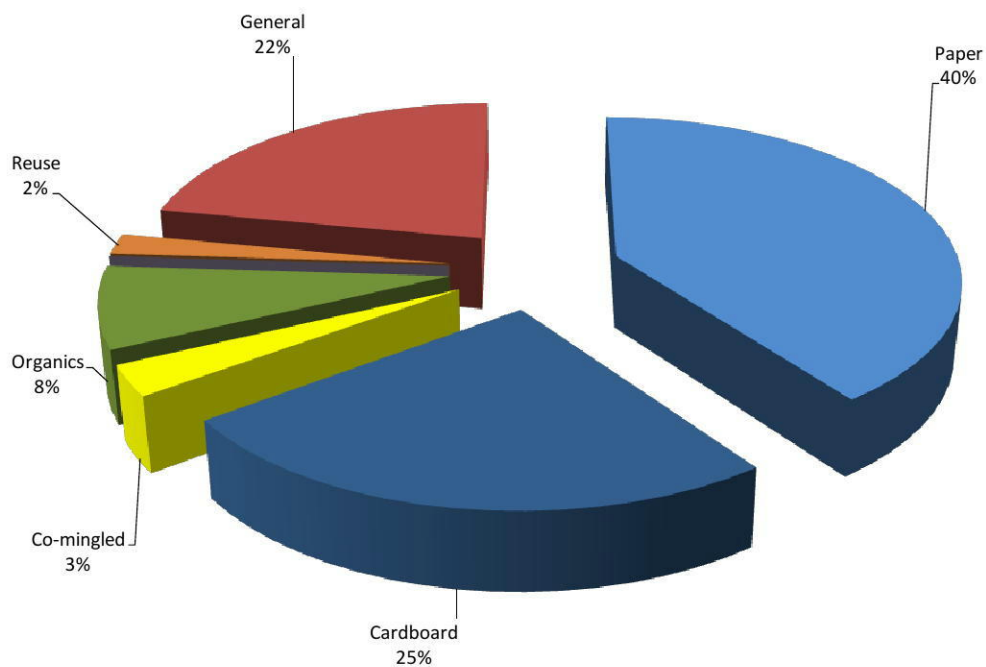
4.1 Estimated Waste Profile

Based on the types of outlets as proposed by the developers, and utilizing waste metrics from previous waste audits of shopping centres and retail outlets, an estimated waste profile for the new development was calculated as shown in the pie chart following.

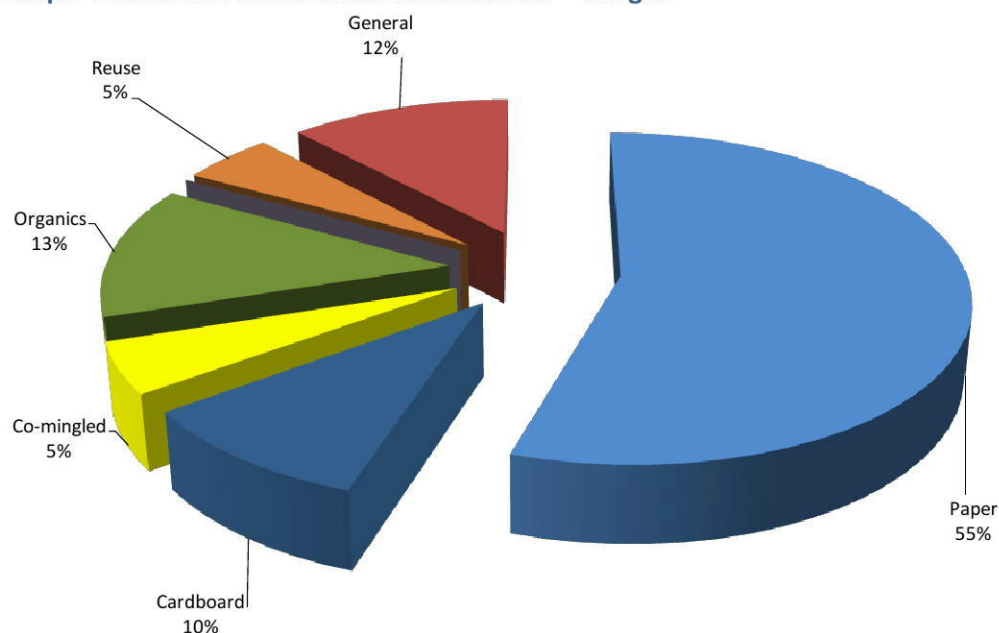
Graph 1 and 2 – Waste Profile – Main Retail Centre (excludes Majors and mini-majors)

Graph 1 Estimated Retail Waste Profile – Volume



Graph 2 Estimated Retail Waste Profile (weight)**Graph 3 Estimated Commercial Waste Profile – Volume**

Graph 4 Estimated Commercial Waste Profile – Weight



4.2 Estimated Waste Quantities

The estimated weekly waste quantities by weight and volume are shown in Table 3 and Table 4 below.

There are two waste areas that will be managed by Centre Management. Additional dock space is allocated to the major tenants for their waste management systems. These tenants manage their own waste streams and have provision within their dock areas for waste management systems.

Table 3 Estimated Retail Weekly Waste Quantities (excludes Min-majors and Majors)

	Retail			
	kg/day	Litres/day	kg/week	Litres/week
Paper	80.35	1,033.14	562.45	7,232.01
Cardboard	210.27	2,336.34	1,471.89	16,354.35
Co-mingled	51.47	1,263.48	360.28	8,844.35
Organics	329.13	1,097.12	2,303.94	7,679.81
Soft plastic	33.45	514.66	234.17	3,602.64
Reuse/Other Recycle	29.84	1,061.75	208.88	7,432.22
General waste	464.18	8,143.45	3,249.24	57,004.15
Total	1,198.69	15,449.93	8,390.86	108,149.53

Table 4 Estimated Commercial Weekly Waste Quantities

	Commercial			
	kg/day	Litres/day	kg/week	Litres/week
Paper	4.49	45.34	22.44	226.70
Cardboard	0.82	28.34	4.08	141.69
Co-mingled	0.41	3.40	2.04	17.00
Organics	1.06	9.07	5.304	45.34
Reuse/Other Recycle	0.41	2.27	2.04	11.33
General waste	0.98	24.94	4.896	124.68
Total	8.16	113.35	40.8	566.75

Table 5 Estimated Weekly Waste Quantities Retail and Commercial Total

	Retail and Commercial Total			
	kg/day	Litres/day	kg/week	Litres/week
Paper	84.84	1,078.48	584.89	7,458.71
Cardboard	211.09	2,364.67	1,475.97	16,496.04
Co-mingled	51.88	1,266.88	362.32	8,861.36
Organics	330.20	1,106.18	2,309.25	7,725.15
Soft plastic	33.45	514.66	234.17	3,602.64
Reuse/Other Recycle	30.25	1,064.02	210.92	7,443.55
General waste	465.16	8,168.39	3,254.13	57,128.84
Total	1,206.85	15,563.28	8,431.66	108,716.27

4.3 Waste Streams

Based on the estimated waste profile as detailed above, the following waste streams are proposed. Due to the location of the Centre and relatively small quantities of some streams, not all services may be available, or may not be economically viable. Where this is the situation, Centre management will monitor the market and internal demand and when appropriate introduce these services.

Cardboard and paper recycling:

Cardboard and paper represent a significant proportion of the general waste stream and is generated from most tenancies. Systems will be implemented in the waste area that allows tenants to easily dispose of this material into recycling facilities.

Co-mingled recycling:

While co-mingled recycling is marginal in terms of cost benefit, the diversion of these materials does represent an environmental benefit. As such back of house recycling systems will be implemented.

The cafes and restaurants will be the main generators. These retailers will be instructed in the segregation of recyclable containers and advised as to the most practical way to setup effective systems within their tenancy. For example a coffee shop/cafe may find that the volume of milk containers, in particular warrants a separate bin to be located in their back of house area. For these outlets they may prefer a wheelie bin located in their back of house area. These can then be wheeled to the waste room when full and exchanged for a new bin

Soft Plastics recycling:

The focus for this system will be on non-food retailers, principally fashion and personal goods, where a large percentage of their waste is either soft plastics or cardboard.

These retailers will be assisted in separating their plastics for consolidation in the waste area.

Used Cooking Oil

Used cooking oil cannot be disposed of in the general waste stream. Separate facilities will be established in the waste area to allow tenants to dispose of this material safely and in compliance with legislative requirements. A system similar to that established in the existing centre will be implemented.

Organics Recycling:

The daily quantities of this material would justify a separate system. During contract negotiations, Centre management will explore opportunities for organics recycling and if feasible implement a system across the total centre. An alternative option is to look at opportunities for residue waste to be diverted to an alternative waste facility where organic material is captured and processed for compost or energy.

Fluorescent Tube Recycling;

Fluorescent tube recycling will be implemented throughout the Centre. Specialised containers will be provided by the contractor for the consolidation of these tubes prior to collection.

Other Opportunities

Given the developing nature of the waste industry, it is likely that additional diversion options may be available when the waste tender is issued. Centre management will actively encourage contractors to propose additional diversion systems or more effective ways to manage and divert material from landfill.

5. Waste Management Systems for Commercial and Retail

There are four areas which will be used for waste and recycling located throughout the development, as follows:

- Western loading area & North Western compactor: Located on the Ground Floor. Will be used by the BIG W (DDS) exclusively.
- Northern loading area: Located at Under Croft 1. Will be used by the ALDI supermarket (includes ALDI compactor), the specialty retail located on UC1, as well as the North eastern Residential and commercial components.
- South western loading area: Located on Ground Floor. Will be used by the specialty retail on Ground Floor, the restaurants and specialty retail located on the top deck carpark, and the Eastern Terrace retail.

The BIG W and ALDI will manage their own waste systems in the dock areas as outlined above, and as such their waste is not covered as part of this report.

The main waste and recycling area to be used for the retail component is the South Western loading area, located adjacent to the Specialty retail area on the Ground Floor. The commercial component and specialty retail on the eastern part of the development will use the Northern loading area for their waste and recycling.

The areas assigned for waste management have been allocated sufficient space to allow appropriate waste and recycling systems to be installed.

The waste and recycling areas are easily accessible by tenants. It is preferable to locate the waste and recycling close to each other as this encourages tenants to better manage their waste, by providing one destination area for both waste and recycling. Where tenants are required to walk to two different areas there is greater likelihood that they may not recycle and will dispose of all material into general waste bins.

The waste area is easily accessed by both tenants and cleaners through the centre and back-of-house hallways. Sufficient space is available for waste vehicles to enter and safely turn within the dock areas.

The docks are level docks with no raised platforms or steps. This allows tenants, cleaners and contractors to easily maneuver waste bins throughout this area.

Hot water is provided to allow for washing of waste bins. The area is appropriately drained.

5.1 Waste Systems

The systems outlined below represent currently available services. At the time of tendering new opportunities may become available, these will be reviewed at that time in terms of feasibility and suitability to the Centre's needs, and importantly their ability to enhance the diversion of materials from landfill.

Where available and effective, recycling materials are contained in one system. This minimizes truck movements to the site and keeps the systems simple for tenants to follow. In this instance paper and cardboard are combined, and mixed containers (co-mingled) are combined.

South Western Loading Dock

Table 6 details the estimated quantities of waste generated by the retail tenancies using the South Western loading dock (as detailed above). Table 7 details the proposed waste management systems to be implemented at this dock. In accordance with the Council's DCP 2006, attention has been placed on the implementation of recycling systems where feasible.

Table 6 Estimated waste quantities handled South eastern loading dock

Ground Level retail, Eastern Terraces, Roof Top retail				
	kg/day	Litres/day	kg/week	Litres/week
Paper & Cardboard	272.0	3,150.6	1,904.3	22,054.4
Co-mingled	50.5	1,241.3	353.8	8,689.2
Organics	328.5	1,095.0	2,299.4	7,664.8
Soft Plastic	30.9	476.0	216.6	3,332.0
Reuse/Other Recycle	29.1	1,042.5	203.9	7,297.4
General waste	460.1	8,071.1	3,220.4	56,498.0
Total	1,171.2	15,076.5	8,198.4	105,535.8

Table 7 South Western loading dock Waste Management Systems

Stream	Waste System	Units	Collection Frequency
Paper and Cardboard	Auto Bailer	1	Weekly
General Waste	Compactor	1	weekly
Co-mingled	660 Litre MGBS	4	3 x Weekly
Organics – to be reviewed with contractor			
Soft Plastics	Bale bag	1	Weekly
Used cooking oil	Tank	1	Weekly

Northern Loading Dock

Table 8 details the quantities of waste generated by the retail and commercial tenancies using the South Western loading dock (as detailed above). Table 7 details the proposed waste management systems to be implemented at this dock. In accordance with the Council's DCP 2006, attention has been placed on the implementation of recycling systems where feasible.

Table 8 Estimated waste quantities handled at Northern loading dock

Under croft 1 specialty retail and commercial				
	kg/day	Litres/day	kg/week	Litres/week
Paper & Cardboard	32.9	406.7	220.0	2,699.8
Co-mingled	1.7	33.3	10.8	226.1
Organics	1.1	9.2	5.5	46.1
Soft Plastic	1.9	29.0	13.2	202.8
Reuse/Other Recycle	1.2	31.2	7.8	213.6
General waste	8.3	153.2	56.1	1,022.5
Total	47.1	662.5	313.4	4,410.8

Table 9 Northern loading dock Waste Management Systems

Stream	Waste System	Units	Collection Frequency
Paper and Cardboard	240 Litre MGB	2	Weekly (Commercial)
	660 Litre MGB	2	2 x weekly (Retail)
General Waste	240 Litre MGB	1	Weekly (Commercial)
	660 Litre MGB	2	Weekly (Retail)
Co-mingled	240 Litre MGB	1	Weekly (Commercial)
	240 Litre MGB	1	Weekly (Retail)

6. Management of Waste Commercial and Retail

Centre Management will provide suitable waste systems for tenants to effectively manage their waste.

Ease of access to the waste area will enable tenants to safely transport and dispose of the material. The waste area will be well planned to ensure equal access to the recycling and general waste systems. All systems will be well signed and maintained.

The cleaning contractor will be responsible for cleaning all the waste handling areas and ensuring they stay litter free.

Waste from common areas will be collected in dedicated bins and relocated to the main collection points by the cleaning contractor.

The cleaning contractor and tenants will be approved and trained to operate all waste equipment.

Waste Stream	Management Protocol
General	Transported to dock area by tenants and cleaners and deposited into compactor (SW waste area) or into appropriate MGBs (N waste area).
Cardboard	Segregated by tenants, transported to dock and loaded directly into auto baler (SW waste area) or appropriate MGBs (N waste area). Cleaners to remove full bales and store in holding area awaiting collection.
Co-mingled	Tenants to segregate co-mingled materials in back-of-house areas and transport to waste area. Where wheelie bins are used, full bins will be exchanged for empty bins.
Soft Plastics	Retail tenants to segregate and collect in plastic bags for transfer to docks. Cleaners to monitor bale bags and change over when full.
Used cooking oil	Tenants to transport in tins to waste area for storage and collection. Oil area to be bunded to contain any spills. .

Trade Waste

Two stainless steel grease arrestors with a capacity of 2,000 L each (total 4.000L), will be installed in the carpark to provide trade waste pre-treatment.

The grease arrestors will be installed in dedicated rooms. Grease pump out lines will be provided to allow for connection of grease pump out trucks. Pumps will be provided to allow for the pumping of the grease from the grease arrestors to the pump out points.

Major Tenants

The major tenants are responsible for their own waste management systems. Dock space has been made available for their designated waste systems. The following details the systems identified for each major tenant.

On-Going Management of Waste

The waste management plan outlines systems that are available today based on quantities generated and material type. As the industry is in an evolving stage in terms of new technologies, it is likely that new opportunities will become viable for the Centre that will allow greater diversion and avoidance. To ensure these opportunities are identified, and to ensure ongoing best practice waste management initiatives are implemented, the following is recommended to Centre Management:

Monthly waste reporting – an accurate and detailed reporting system will allow management to monitor total tonnes generated as well as the percentage of waste diverted from landfill. A waste monthly report should be included as part of the monthly management reporting process. The report should link waste to key indicators such as turnover; occupancy; foot traffic. This will allow comparisons to be made from one period to another and waste practices to be effectively tracked.

Tenant education and awareness – a tenant education and awareness program will be instigated to ensure that tenants are aware of their responsibilities in relation to segregation of recyclables, and buy-in to the centre's program.

Contractor terms – the waste contractor and cleaning contractors are essential to the ongoing effective management of waste at the site. So as to ensure full co-operation and participation by these contractors appropriate Key Performance Indicators should be included in their contracts. Such KPIs may include a requirement to participate in monthly waste meetings; active monitoring and feedback of the systems in place; development of a waste management action plan etc.

Signage – clear and easily recognizable signage is essential in terms of correct system use and low contamination rates. Each system should be colour coded and signed. Signage should be placed on bins and in the waste areas. A copy of the signs should be included in the tenant education material.

The waste management systems as outlined in this document should be reviewed in consultation with industry experts at the completion of the development. This will allow Centre Management to review any new opportunities that may have arisen that improves the segregation or diversion of materials.

7. Residential Waste Management

7.1 Waste Generation

The residential component located on the north eastern corner of the development consists of four levels ; 2 levels with 4 x 2 bedroom apartments each, and 2 levels with 2 x 3 bedroom apartments each - a total of 14 apartments.

Table 10 below details the estimated waste and recycling quantities generated per apartment, and for the entire apartment block. The estimates are based on information published in The Department of Environment NSW "Better Practice Guide for Waste management in Multi Unit Dwellings, 2006". The figures may vary slightly and are used as a guide only.

Table 10 Estimated waste generation rates for the residential apartments

Waste Type	Estimated waste per unit/week		Estimated waste for all units/week	
	kg/week	Litre/week	Kg/week	Litre/week
General Waste	8.5	80	119	1120
Recycling	6.4	40	89.6	560
TOTAL	14.9	120	208.6	1680

Table 11 below details the number of general waste and recycling bins required for each level and the space required in the waste room to house the bins. These estimates are based on the Penrith City Council Collect & Return Domestic Waste Service - for Multi-unit Dwellings' service, in which general waste is collected twice weekly and recycling is collected weekly. The space allowance is based on the dimensions of a 240L MGB, occupying roughly 0.5 m².

Table 11 General waste and recycling bin number and space requirements

	Number of 240L MGBs			Space required (m ²)
	General Waste	Recycling	Total	
Level 1	1	2	3	1.5
Level 2	1	2	3	1.5
Level 3	1	2	3	1.5
Level 4	1	2	3	1.5
Total	4	10	12	6

7.2 Waste Management

Residents within each unit will be required to sort the waste generated in their dwelling into the appropriate waste and recycling streams. It is then to be taken by the resident to the waste room located on their level. This room will contain three 240L MGBs; one for general waste, one for paper/cardboard and one for comingled recycling. Each room

will have appropriate signage detailing acceptance criteria and correct procedures for handling and storage of the various streams. Residents will be responsible for disposing of their waste correctly into the appropriate systems which will be in place.

The bins from individual levels will be transported by the caretaker/cleaner and placed in the loading dock located on Undercroft 1 at an agreed specified location for collection by Council trucks. Access to the loading dock is via Glenmore Parkway.

Large waste items (clean up type rubbish) will be placed in the main waste room, during prescribed times and transported by cleaners for collection by council at the prescribed times. Additional space has been allocated in the main waste room for this purpose.

Caretaker/Cleaners role

The cleaning contractor will be responsible for the following:

- Transporting 240L MGBs from waste rooms located on each level to the the loading dock located on Undercroft 1 for collection by council.
- Returning the empty 240L MGBs from the loading dock to waste rooms located on each level;
- Transporting large bulky items from waste rooms on each level to the main waste room located on Undercroft 2, for storage and disposal at specified council pick up dates.
- Cleaning and maintaining all waste rooms and waste bins
- Report to building management regarding contamination and efficiency of system.

An organic waste stream has not been proposed however should an organics service become available in the future, separate bins would be provided. This service should be discussed in more detail with Council at an appropriate time.

Waste Services

Preliminary discussions have been held with Penrith City Council, in regards to the waste collection services, the most appropriate service for this development is the 'Collect & Return Domestic Waste Service - for Multi-unit Dwellings'. Further discussion with Penrith City Council will be held post DA to finalise the most effective and convenient waste collection services.

Should an organics service become available in the future, separate bins would be provided. This service would be discussed in more detail with Council at an appropriate time.

Education

All residents will receive information regarding the waste collection systems including how to use the system, which items are appropriate for each stream and collection times. Appropriate signage and updated information will also be provided.

Waste Area

Space has been allocated on each level for a waste and recycling storage room. Waste and recycling from each level will be placed in the appropriate bins by residents in the waste room located on their corresponding level and will then be transported by cleaners to the loading dock located on Undercroft 1, as detailed on the site plans (see Appendix 1).

The cleaners will transport the bins to the loading dock at night for collection by council trucks the next morning. The bins will be returned to the waste rooms after collection days.

The main waste room is in a contained space with access by tenants and cleaners through a side door.

The main waste room located on Undercroft 2 will be mechanically exhausted as required by AS 1668.2.

OH&S issues such as slippery floors in waste rooms will need to be monitored. A non-slip surface on the hallway floor is recommended. Cleaners will monitor this area and all spills will be attended to immediately by cleaners.

The materials and finishes for the waste area are as follows:

Floor	Structural concrete slab with smooth epoxy topping finish with coved wall and floor junctions. Graded drains to approved sewer connections subject to final design.
Walls	Masonry walls
Ceiling	Structural concrete slab over
Lighting	Base building lighting
Water Supply	Hose cocks and hose connections



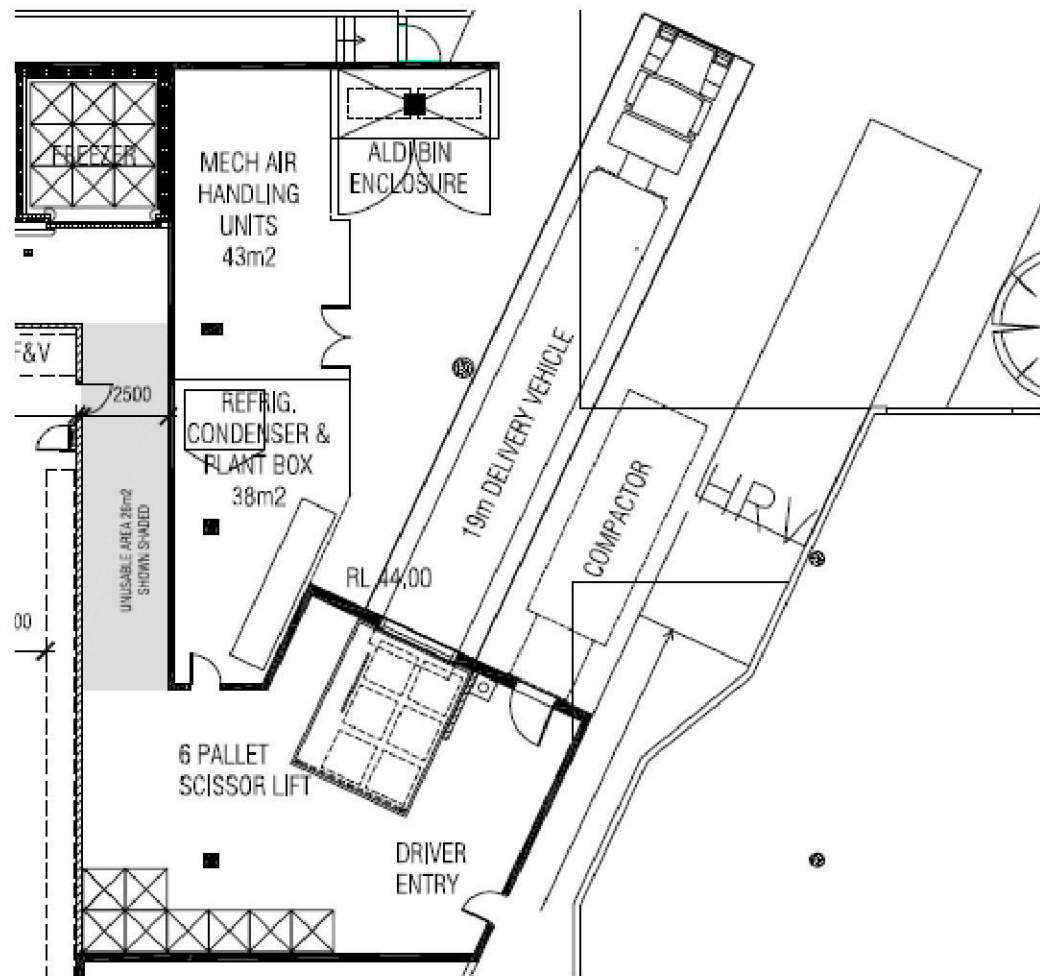


Figure 3 Layout of the North dock waste and recycling area.