

Sydney Metro

PITT STREET SOUTH OVER STATION DEVELOPMENT

Appendix T - Waste Management Plan

State Significant Development, Development Application (SSD DA)

Prepared for **Pitt Street Developer South Pty LTD**

19 May 2020

Revision C

Issue for SSD DA

SMCSWSPS-TTM-OSS-PL-REP-000001

About TTM

For 30 years, we've been at the centre of the Australian development and infrastructure industry. Our unique combination of acoustics, data, traffic and waste services is fundamental to the success of any architectural or development project.

We have over 50 staff, with an unrivalled depth of experience. Our industry knowledge, technical expertise and commercial insight allow us to deliver an exceptional and reliable service.

T: (07) 3327 9500






F: (07) 3327 9501

E: ttmbris@ttmgroup.com.au



Document Reference: SMCSWSPS-TTM-OSS-PL-REP-000001

Revision Record

No.	Author	Reviewed/Approved	Description	Date
01	R. Kochhan	S. Kenny 	Draft 1	17/12/19
02	A.Stamatiou	S. Kenny 	Draft 2	07/02/20
03	A.Stamatiou	S. Kenny 	P1	14/02/20
04	A.Stamatiou	S.Kenny 	Issue for Landowners Consents - Rev B	03/04/20
05	A.Stamatiou	S.Kenny 	Issue for SSD DA - Rev C	19/05/20

Executive Summary

This report represents the provision of Waste Management Planning for the Pitt Street South Over Station Development (OSD). The site is located within the Sydney CBD, on the corner of Bathurst Street and Pitt Street. Detailed site information can be found in the report introduction. The information below summarises the purpose and contents of the report.

SEARS

This report has been prepared in response to the requirements contained within the **Secretary's Environmental Assessment Requirements (SEARS)** Dated 28 October 2019. Specifically, this report has been prepared to respond to the SEARS requirements summarised in Table ES.1

Table ES.1: SEARS Requirements

Item	Description of Requirement	Section Reference (this report)
OSD South SEARS: Operational Waste Management	<ul style="list-style-type: none"> Identify, quantify and classify the likely waste streams to be generated during operation. Describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste. Identify appropriate servicing arrangements (including but not limited to, waste management, loading zones, mechanical plant) for the site. 	<p>Appendix A</p> <p>Section 2</p> <p>Section 2.1, Section 4</p>
OSD South SEARS: 7. Ecologically Sustainable Development (ESD)	<p>The Environmental Impact Statement shall:</p> <ul style="list-style-type: none"> Include a framework for how the proposed development will reflect national best practice sustainable building principles to improve environmental performance, including best practice in waste management strategy including any opportunity for food scraps/composting strategies. Demonstrate sufficient waste and recycling management facilities storage and holding areas for servicing. 	<p>All Sections</p> <p>Food Waste: Section 2, Appendix C.4</p> <p>Section 2</p>
NSW SEARs 2015: 20. Waste All wastes generated during the construction and operation of the project are effectively stored, handled, treated, reused, recycled and/or disposed of lawfully and in a manner that protects environmental values.	<p>1. The Proponent must assess predicted waste generated from the project during construction and operation, including:</p> <ul style="list-style-type: none"> a) classification of the waste in accordance with the current guidelines; b) estimates / details of the quantity of each classification of waste to be generated during the construction of the project, including bulk earthworks and spoil balance; c) handling of waste including measures to facilitate segregation and prevent cross contamination; d) management of waste including estimated location and volume of stockpiles; e) waste minimisation and reuse; f) lawful disposal or recycling locations for each type of waste; and g) contingencies for the above, including managing unexpected waste volumes. 	<p>Appendix A</p> <p>See Construction Waste Management report</p> <p>See Section 2</p> <p>See Construction Waste Management report</p> <p>Section 3, Appendix C.4</p> <p>See Construction Waste Management report</p> <p>Various section, in particular Section 2.</p>

Item	Description of Requirement	Section Reference (this report)
	2. The Proponent must assess potential environmental impacts from the excavation, handling, storage on site and transport of the waste particularly with relation to sediment/leachate control, noise and dust.	A separate plan needs to be provided for construction and demolition waste management.

CONDITIONS OF CONSENT

This report has also been prepared in response to the following condition of consent for the **State Significant Development (SSD)** concept (SSD 8876) for the OSD summarised in Table ES.2

Table ES.2: Concept Approval of Conditions of Consent

Item	Description of Requirement	Section Reference (this report)
CONSTRUCTION IMPACT ASSESSMENT	Future detailed development application(s) shall provide analysis and assessment of the impacts of construction and include:	Appendix F
B14.	(e) Construction Waste Management Plan	
ENVIRONMENTAL PERFORMANCE / ESD	For future detailed development application(s) the proposed minimum performance targets for environmental performance are:	Entire Report
B10.	(c) Green Star ratings: (i) If the building is predominantly residential, then 5 Star Green Star:	Providing OWMP.

LOCAL AUTHORITY REQUIREMENTS

In addition, the report satisfies the **City of Sydney Councils** requirements by providing the following information:

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

WASTE MANGEMENT PLAN SUMMARY

The report sections 2 -4 and Appendix A -F represent the operational waste management plan (OWMP) for the site. The OWMP outlines the waste management processes, equipment and construction requirements and identifies the various waste streams and volumes that are anticipated for the site.

The South OSD will consist of a residential tower with 39 levels and 234 residential apartments. The tower is built over the southern part of the new Pitt Street metro station. The building will also accommodate residential amenities including co-working space, a pool, a gym / wellness area, and a publicly accessible restaurant on level 2.

The provisions as outlined in this report are considered appropriate for this type of development. A summary of the proposed waste management processes and equipment is outlined below:

- Proposed bin and equipment numbers:
 - Residential Refuse (subject to collection frequency and equipment fit):
 - General waste: 5 x 1100L bins (Including exchange bins under chute during collections)
 - Commingled recycling: 7 x 1100L bins (Including exchange bins under chute during collections)
 - Dual-chute system for waste and recycling disposal
 - Under-chute waste compactor (ratio 2:1)
 - Overhead Waste Compactor: Single bin compactor
 - As required: bins for communal areas (e.g. office paper bins), back-of-house bins, refuse trolleys (e.g. for cleaners)
 - Optional: benchtop composters (e.g. for residential apartments)
 - Retail Refuse:
 - General waste: 2 x 1100L bins
 - Commingled recycling: 2 x 1100L bin
 - Cardboard & Paper 2 x 1100L bin
 - 7 x 140L food waste bins or.
 - Consideration of food waste processing system (e.g. for commercial kitchen)

- Refuse collection:
 - All refuse will be collected by private contractors on-site with the loading dock on the ground level of the building. Site access is via Pitt Street. Small rigid refuse vehicles are to be used.
 - The bin numbers shown are based on collection frequencies to match each waste stream and storage space available. Typical collections per week range from 3 to 7 collections per week depending on the refuse stream and source – i.e. retail food waste should be collected daily unless macerated and pumped through a sealed system to food waste tanks .
- Refuse storage:
 - All refuse storage is located on level 1 and includes residential, retail and bulky goods storage rooms.
- Refuse transfer:
 - A goods lift for bin transfer is provided connecting the main refuse room on level 1 with the loading dock below. Physical transfer of the refuse bins will be completed by either the building manager / staff or a refuse collection vehicle operator. Ideally, full bins should be placed in a temporary storage position on the loading dock level prior to collections in order to ensure efficient operations.
- Refuse disposal:
 - Residential Refuse:
 - Residents will be provided with sufficient space for storage of standard self-purchased waste and recycling receptacles. The receptacles will be used immediate disposal of their waste and recycling material within the apartments. Waste and recycling bins will be provided in appropriate residential common areas. Staff / cleaners or a building manager should assist with refuse disposal from the common areas.
 - Refuse from the residential apartments will be disposed via the refuse chutes provided. Refuse from level 1 and the ground floor can be disposed directly into the bulk bins on those levels.
 - Residents should be encouraged to adopt further refuse separation practices. Consideration may be given to apartment-style benchtop composters for separation of food waste.
 - Retail refuse:
 - Staff / cleaners should dispose refuse from the commercial kitchen / restaurant. The residential chute must not be used. Refuse should be disposed directly into the bins located within the retail refuse room. Bins ranging from 15L to 60L bins may be used for transfer from BOH areas.
 - Further refuse separation should be considered, in particular for food waste. Food waste can be transferred and decanted into larger bins in the Bulk Waste room using 15L caddy bins.

Contents

1	Introduction	10
1.1	Background	10
1.2	Site Information	11
1.2.1	The Site.....	11
1.2.2	Sydney Metro	12
1.2.3	Pitt Street South Over Station Development (OSD).....	15
1.3	Scope.....	17
1.4	Regulatory Considerations	18
1.4.1	Protection of the Environment Operations Act.....	18
1.4.2	Waste Avoidance and Resource Recovery	18
1.4.3	Council's Refuse Planning Scheme	19
1.4.4	Waste Levy	19
1.5	Development Summary.....	20
1.6	Development Refuse Profile.....	21
2	Refuse Management.....	22
2.1	Refuse Collection.....	22
2.1.1	Bin Quantities.....	22
2.1.2	Collection Cycle	23
2.1.3	Refuse collection Arrangements and RCV Access and Manoeuvring	23
2.2	Refuse Storage	24
2.3	Refuse Transfer	24
2.4	Refuse Disposal	24
2.4.1	Residential Apartments and Communal Area (Levels 2, 6-36)	25
2.4.2	Kitchen / Restaurant (Level 2)	26
2.4.3	Infrequent Waste	29
3	Recommended Operational Requirements.....	30
3.1	Operational Equipment Summary	30
3.2	On-going Management	31
3.2.1	Safety.....	31
3.2.2	Signage	31
3.2.3	Cleaning and Maintenance.....	31

3.2.4	Refuse Minimisation.....	32
3.2.5	Education and Communication	32
3.2.6	Monitoring and Review	33
4	Recommended Design Requirements.....	34
4.1	Temporary Bin Storage and Bin Servicing Point	34
4.2	Refuse Rooms.....	34
4.3	Bin Carting.....	35
4.4	Bin Wash	35
4.5	Refuse Chutes.....	36
4.6	Storm Water Prevention and Litter Reduction	37
4.7	Ventilation	37
Appendix A	Detailed Refuse Calculations.....	38
A.1	Residential Refuse Calculations.....	39
A.2	Retail Refuse Calculations	40
Appendix B	Site Plans and Drawings.....	41
B.1	Architectural Plans / Drawings	42
B.2	Refuse Collection and Transfer.....	49
B.3	Refuse Storage Room Configurations.....	52
Appendix C	Systems and Specifications	55
C.1	Typical Refuse Bins	56
C.2	Typical Refuse Management Equipment.....	58
C.3	Refuse Transfer and Disposal Methods.....	62
C.4	Refuse Minimisation Options	64
C.5	Refuse Management Equipment Suppliers	70
C.6	Refuse Management Service Providers.....	73
Appendix D	Refuse Signage	74
D.1	Refuse Signage	75
D.2	Other Refuse, Facility and Safety Signage	76
Appendix E	Terms and Abbreviations.....	77
Appendix F	Construction Waste Management Plan	81

Table Index

Table 1.1: Scope Items	17
Table 1.2: Waste Management Plan Compliance Checklist	19
Table 1.3: Development Summary	20
Table 1.4: Residential Refuse Summary	21
Table 1.5: Commercial Refuse Summary	21
Table 1.6: Waste Levy Costs	21
Table 2.1: Number of Bins or Items per Collection	22
Table 2.2: Estimated Refuse Collection Vehicle Demands – Residential Refuse	23
Table 2.3: Estimated Refuse Collection Vehicle Demands – Commercial Refuse	23
Table 2.4: Residential Refuse Disposal Details	25
Table 2.5: Restaurant Disposal Details	26
Table 2.6: Disposal of Infrequently Generated Waste	29
Table 3.1: Equipment Schedule	30
Table 3.2: General Refuse Management Checklist	31
Table 3.3: Safety Checklist	31
Table 3.4: Signage Checklist	31
Table 3.5: Cleaning and Maintenance Checklist	32
Table 3.6: Refuse Minimisation Checklist	32
Table 3.7: Education and Communication Checklist	33
Table 3.8: Monitoring and Review Checklist	33
Table A.1: Residential Generation Rates	39
Table A.2: Residential Refuse Calculations	39
Table A.3: Retail Generation Rates	40
Table A.4: Retail Calculations	40
Table A.5: Retail Refuse Volume to Weight Conversion	40

Figure Index

Figure 1.1: Location Plan	11
Figure 1.2: Sydney Metro Alignment Map	12
Figure 1.3: Pitt Street Station (North-South Section)	13
Figure 1.4: Pitt Street Station (North-South Section)	14
Figure 1.5: Pitt Street South Concept SSD DA – Building Section	15
Figure 1.6: Pitt Street South Concept SSD DA – North South Section	16
Figure 1.7: Pitt Street South Concept SSD DA – East West Section	16

1 Introduction

1.1 Background

This report has been prepared to accompany a detailed State Significant Development (SSD) development application (DA) for a residential Over Station Development (OSD) above the new Sydney Metro Pitt Street South Station. The detailed SSD DA is consistent with the Concept Approval (SSD 17_8876) granted for the maximum building envelope on the site, as proposed to be modified.

The Minister for Planning, or their delegate, is the consent authority for the SSD DA and this application is lodged with the NSW Department of Planning, Industry and Environment (NSW DPIE) for assessment.

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 28 October 2019.

The detailed SSD DA seeks development consent for the construction and operation of

- New residential tower with a maximum building height of RL 171.6, including residential accommodation and podium retail premises, excluding station floor space
- Use of spaces within the CSSI 'metro box' building envelope for the purposes of:
 - Retail tenancies.
 - Residential communal facilities, residential storage, bicycle parking, and operational back of house uses
 - Shared vehicle loading and service facilities on the ground floor
 - Landscaping
 - Utilities and services provision.
 - Stratum subdivision (Station/OSD).
- Integration with the approved CSSI proposal including though not limited to:
 - Structures, mechanical and electronic systems, and services; and
 - Vertical transfers.

1.2 Site Information

1.2.1 The Site

The site is located within the Sydney CBD, on the corner of Bathurst Street and Pitt Street. It has two separate street frontages, Pitt Street to the west and Bathurst Street to the north. The area surrounding the site consists of predominantly residential high-density buildings and some commercial buildings, with finer grain and heritage buildings dispersed throughout.

The site has an approximate area of 1,710sqm and is now known as Lot 10 in DP 1255507. The street address is 125 Bathurst Street, Sydney.

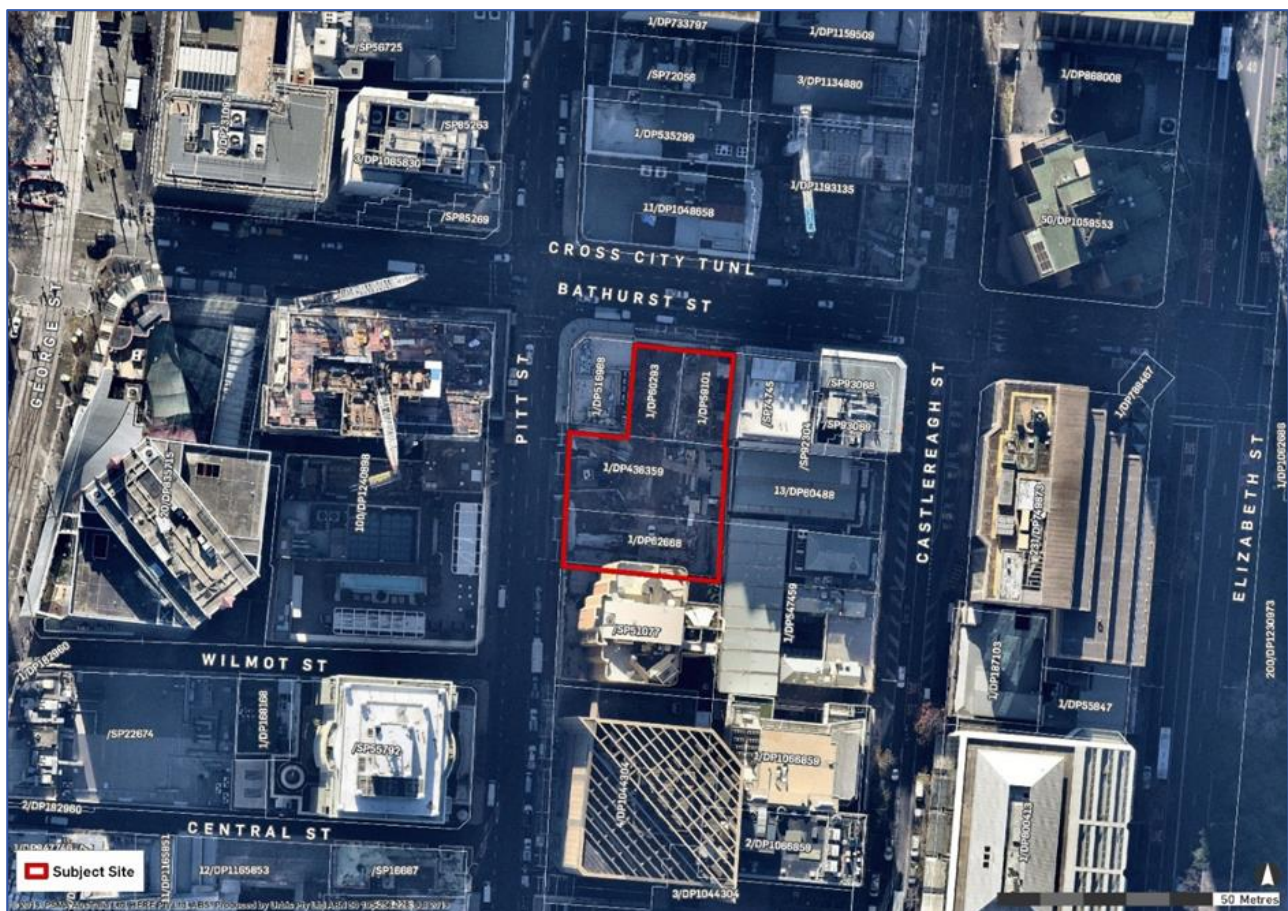
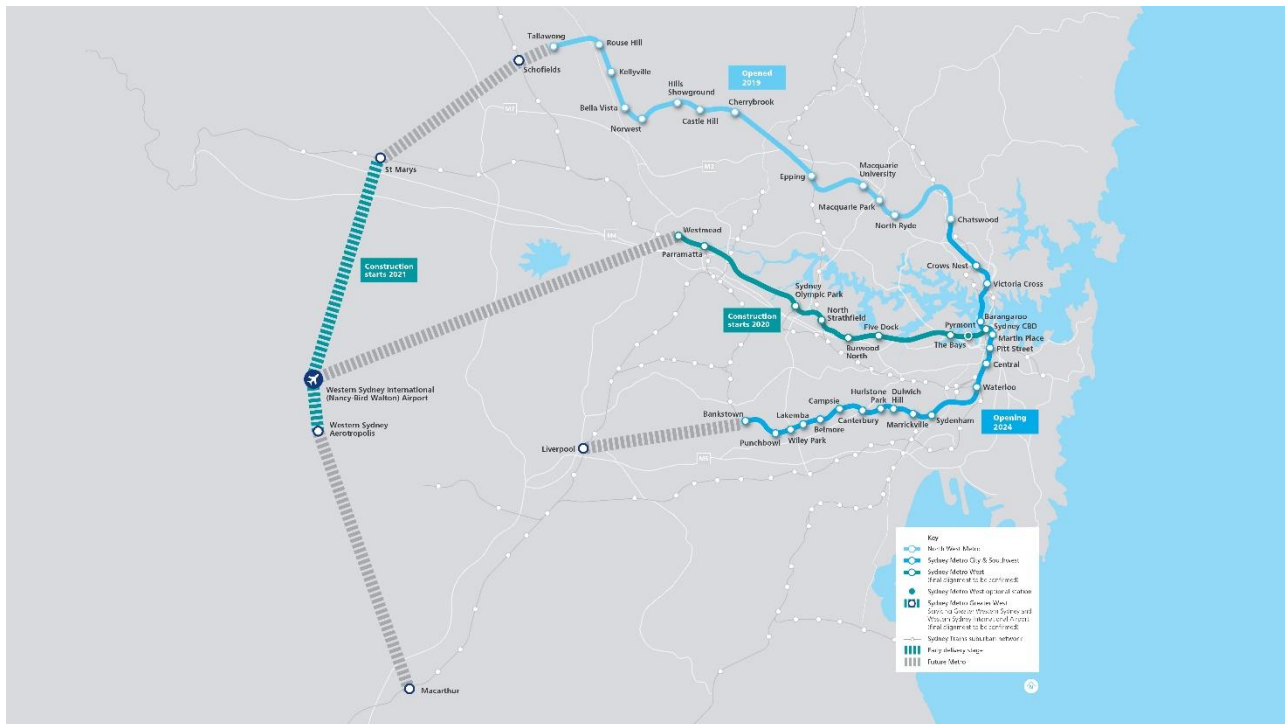


Figure 1.1: Location Plan

1.2.2 Sydney Metro

Sydney Metro is Australia's biggest public transport program. A new standalone railway, this 21st century network will revolutionise the way Sydney travels.

The Sydney Metro Project is illustrated in the Figure below.



Source: Sydney Metro

Figure 1.2: Sydney Metro Alignment Map

Sydney Metro is Australia's biggest public transport program. A new standalone railway, this 21st century network will revolutionise the way Sydney travels.

There are four core components:

Sydney Metro Northwest (formerly the 36km North West Rail Link)

This project is now complete and passenger services commenced in May 2019 between Rouse Hill and Chatswood, with a metro train every four minutes in the peak. The project was delivered on time and \$1 billion under budget.

Sydney Metro City & Southwest

Sydney Metro City & Southwest project includes a new 30km metro line extending metro rail from the end of Metro Northwest at Chatswood, under Sydney Harbour, through new CBD stations and southwest to Bankstown. It is due to open in 2024 with the ultimate capacity to run a metro train every two minutes each way through the centre of Sydney.

Sydney Metro City & Southwest will deliver new metro stations at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street, Waterloo and new underground metro platforms at Central Station. In addition it will upgrade and convert all 11 stations between Sydenham and Bankstown to metro standards.

In 2024, customers will benefit from a new fully-air conditioned Sydney Metro train every four minutes in the peak in each direction with lifts, level platforms and platform screen doors for safety, accessibility and increased security.

Sydney Metro West

Sydney Metro West is a new underground railway connecting Greater Parramatta and the Sydney CBD. This once-in-a-century infrastructure investment will transform Sydney for generations to come, doubling rail capacity between these two areas, linking new communities to rail services and supporting employment growth and housing supply between the two CBDs.

The locations of seven proposed metro stations have been confirmed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays.

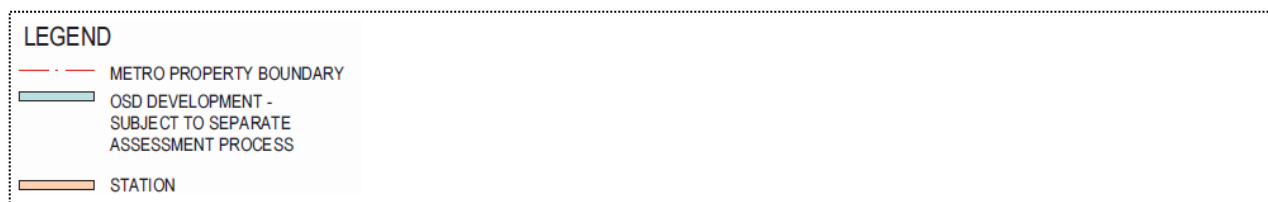
The NSW Government is assessing an optional station at Pyrmont and further planning is underway to determine the location of a new metro station in the Sydney CBD.

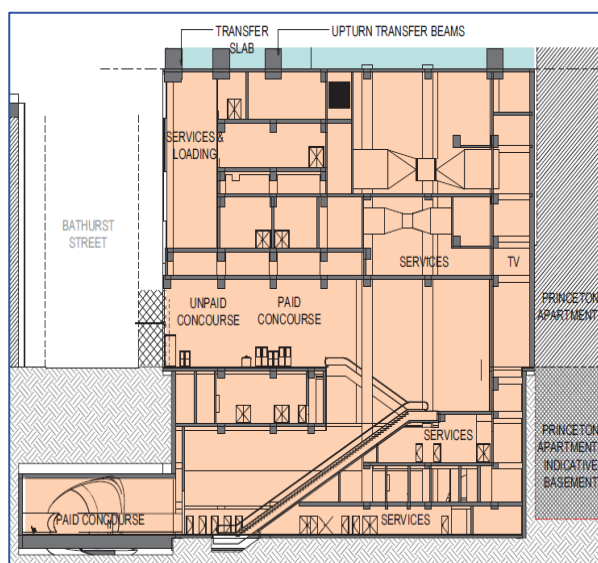
Sydney Metro Greater West

Metro rail will also service Greater Western Sydney and the new Western Sydney International (Nancy Bird Walton) Airport. The new railway line will become the transport spine for the Western Parkland City's growth for generations to come, connecting communities and travellers with the rest of Sydney's public transport system with a fast, safe and easy metro service. The Australian and NSW governments are equal partners in the delivery of this new railway

On 9 January 2017, the Minister for Planning approved the Sydney Metro City & Southwest - Chatswood to Sydenham project as a Critical State Significant Infrastructure project (reference SSI 15_7400) (CSSI Approval). The terms of the CSSI Approval includes all works required to construct the Sydney Metro Pitt Street Station, including the demolition of existing buildings and structures on both sites (North and South). The CSSI Approval also includes construction of below and above ground works within the metro station structure for appropriate integration with Over Station Developments.

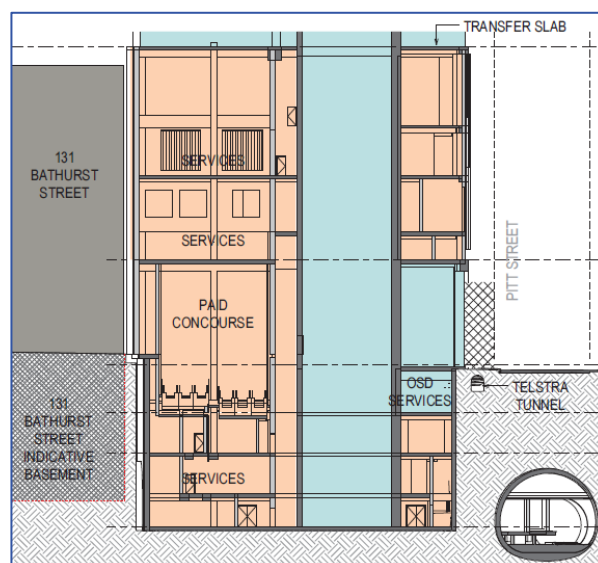
The CSSI Approval included Indicative Interface Drawings for the below and above ground works at Pitt Street South Metro Station site. The delineation between the approved Sydney Metro works, generally described as within the "metro box", and the Over Station Development (OSD) elements are illustrated below. The delineation line between the CSSI Approved works and the OSD envelope is generally described below or above the transfer slab level respectively.





Source: CSSI Preferred Infrastructure Report (TfNSW)

Figure 1.3: Pitt Street Station (North-South Section)



Source: CSSI Preferred Infrastructure Report (TfNSW)

Figure 1.4: Pitt Street Station (North-South Section)

The Preferred Infrastructure Report (PIR) noted that the integration of the OSD elements and the metro station elements would be subject to the design resolution process, noting that the detailed design of the “metro box” may vary from the concept design assessed within the planning approval.

As such in summary:

- The CSSI Approval provides consent for the construction of all structures within the approved “metro box” envelope for Pitt Street South.
- The CSSI Approval provides consent for the fit out and use of all areas within the approved “metro box” envelope that relate to the ongoing use and operation of the Sydney Metro.
- The CSSI Approval provides consent for the embellishment of the public domain, and the architectural design of the “metro box” envelope as it relates to the approved Sydney Metro and the approved Pitt Street South Station Design & Precinct Plan.
- Separate development consent however is required to be issued by the NSW DPIE for the use and fit-out of space within the “metro box” envelope for areas related to the OSD, and notably the construction and use of the OSD itself.

As per the requirements of clause 7.20 of the Sydney Local Environmental Plan 2012, as the OSD exceeds a height of 55 metres above ground level (among other triggers), development consent is first required to be issued in a Concept (formerly known as Stage 1) DA. This is described below.

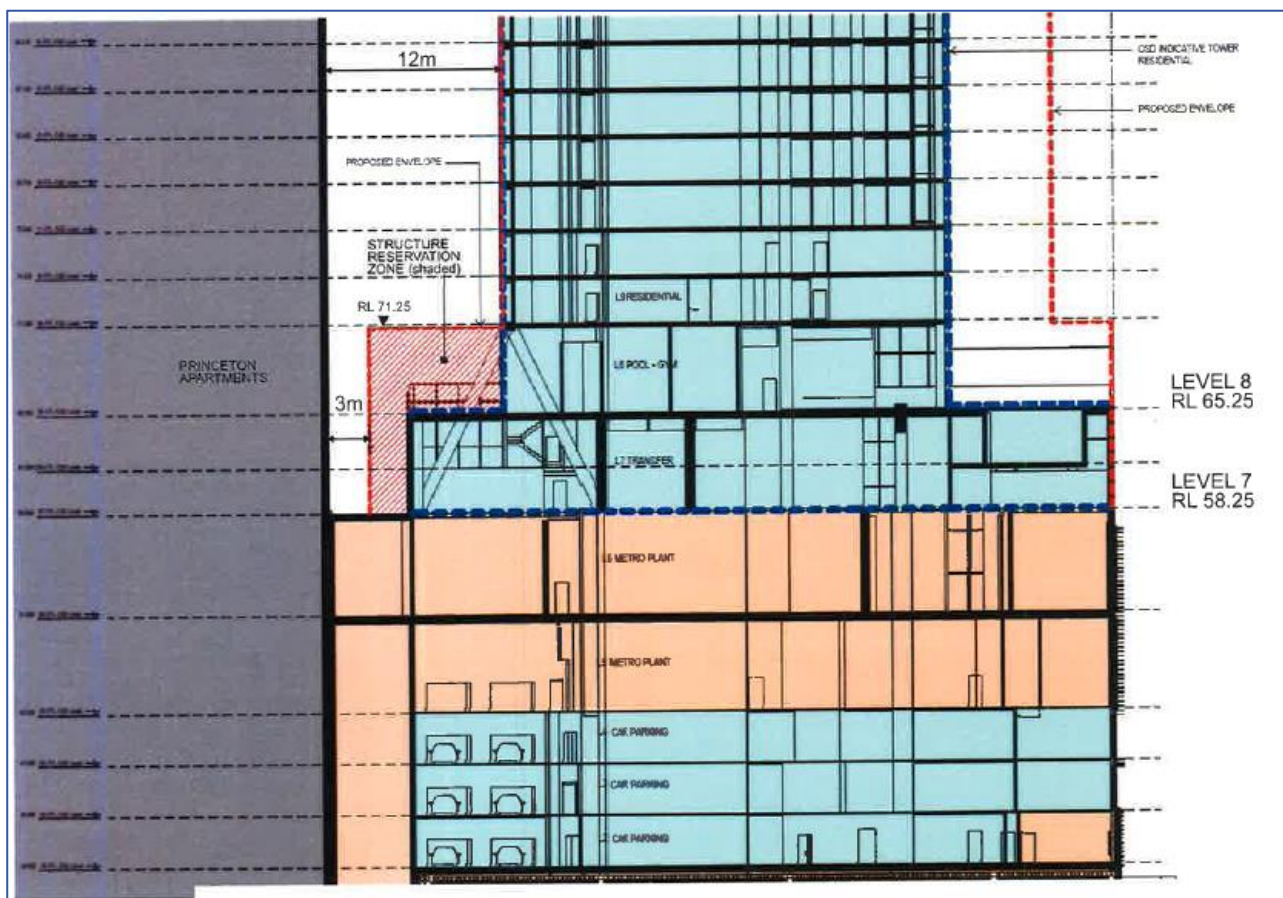
1.2.3 Pitt Street South Over Station Development (OSD)

Development consent was granted on 25 June 2019 for the Concept Development Application (SSD 8876) for Pitt Street South OSD including:

- A maximum building envelope, including street wall and setbacks for the over station development.
- A maximum building height of RL171.6.
- Podium level car parking for a maximum of 34 parking spaces.
- Conceptual land use for either one of a residential or commercial scheme (not both). NO maximum Gross Floor Area was approved as part of SSD 8876.

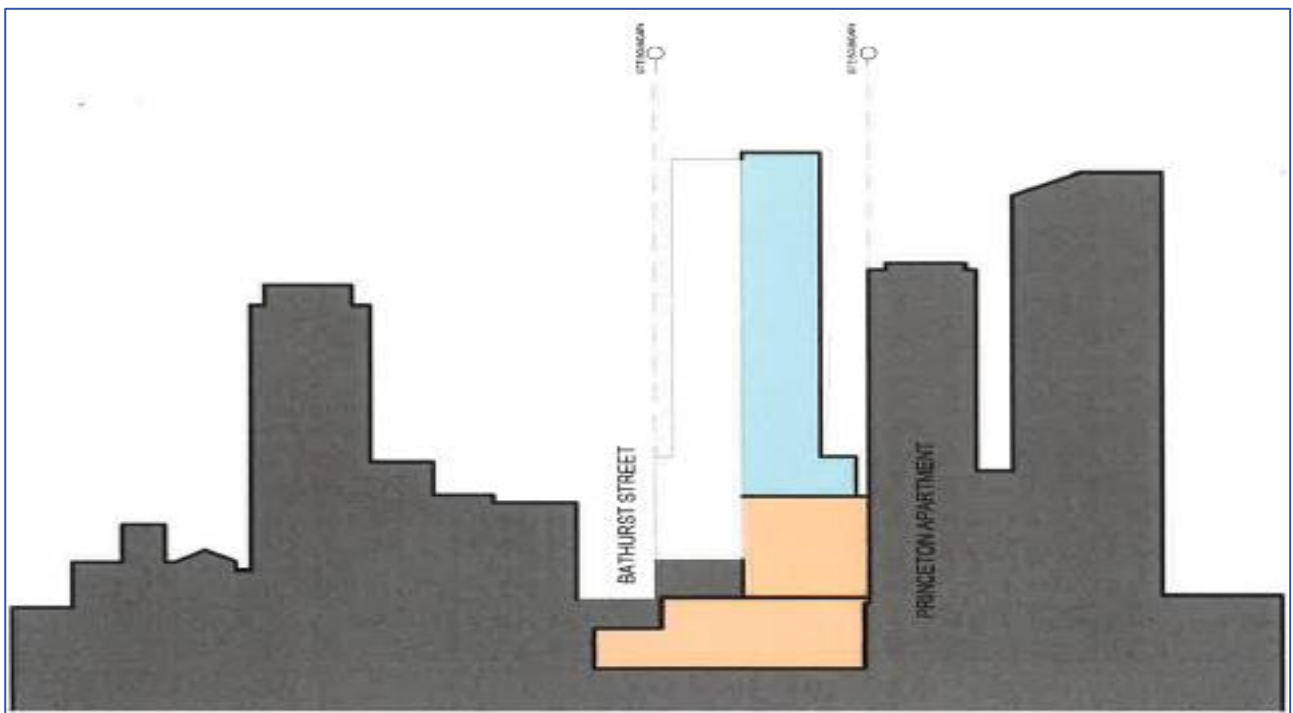
The building envelope approved within the Concept SSD DA provides a numeric delineation between the CCSI Approval “metro box” envelope and the OSD building envelope. As illustrated in the figures below, the delineation line between the two projects is defined at RL 58.25 (Level 7).

For the purposes of the Detailed (Stage 2) SSD DA, it is noted that while there are two separate planning applications that apply to the site (CCSI and SSD DA), this report addresses the full development across the site to provide contextual assessment.



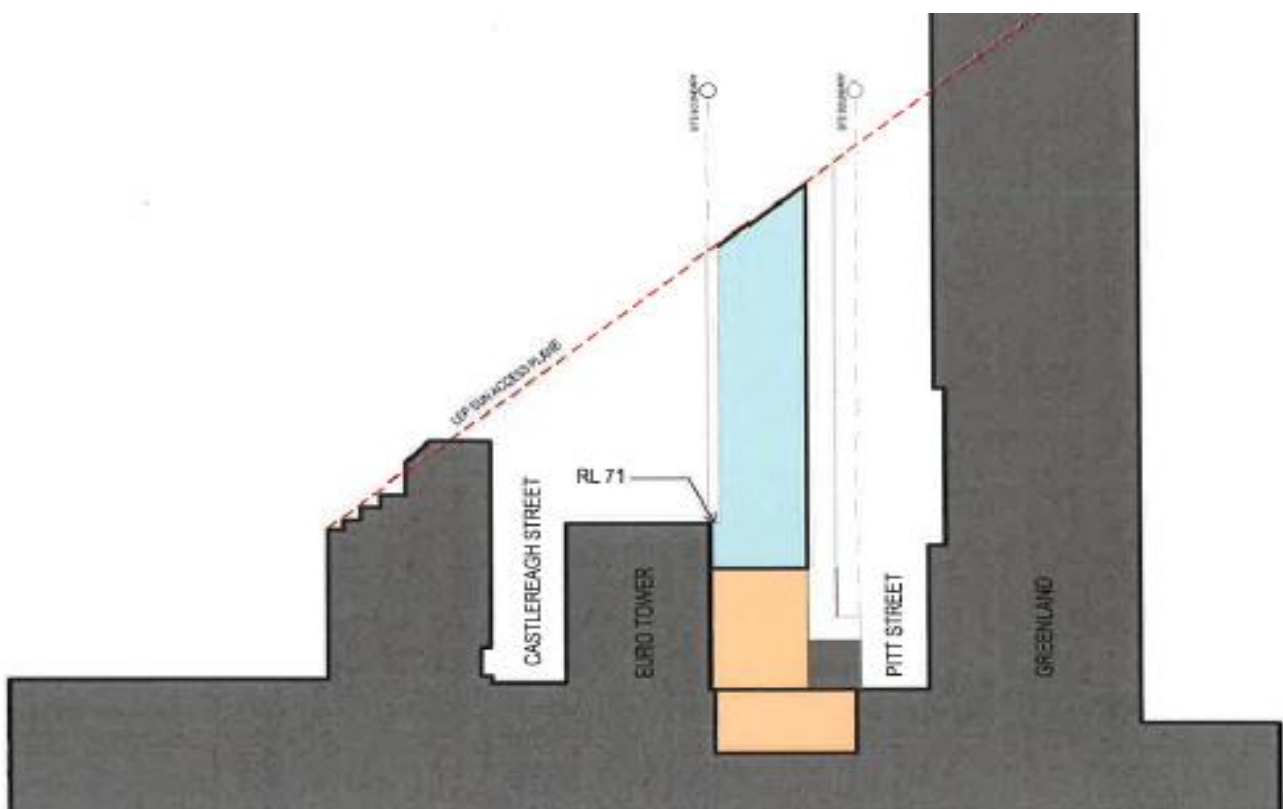
Source: SSD 8876 Concept Stamped Plans

Figure 1.5: Pitt Street South Concept SSD DA – Building Section



Source: SSD 8876 Concept Stamped Plans

Figure 1.6: Pitt Street South Concept SSD DA – North South Section



Source: SSD 8876 Concept Stamped Plans

Figure 1.7: Pitt Street South Concept SSD DA – East West Section

1.3 Scope

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

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

Table 1.1: Scope Items

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

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

The recommendations in this report relate to the operational phase of the development. Additional requirements for refuse management during or after demolition or construction phases are included in a separate construction waste management plan (CWMP). A template CWMP has been placed in Appendix F

1.4 Regulatory Considerations

1.4.1 Protection of the Environment Operations Act

The Protection of the Environment Operations Act 1997 covers the requirements for waste generators in terms of storage and correct disposal of waste. The act establishes the waste generator as having responsibility for the correct management of waste, including final disposal.

1.4.2 Waste Avoidance and Resource Recovery







A WMP is a requirement for new developments in NSW and must be written with reference to the NSW Waste Avoidance and Resource Recovery Strategy 2014-21, made under the Waste Avoidance and Resource Recovery Act. The objectives of the act are as follows:

- To encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecologically sustainable development (ESD);
- To ensure that resource management options are considered against a hierarchy of the following order:
 - Avoidance of unnecessary resource consumption;
 - Resource recovery (including reuse, reprocessing, recycling and energy recovery);
 - Disposal;
- To provide for the continual reduction in waste generation;
- To minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste;
- To ensure that industry shares with the community the responsibility for reducing and dealing with waste;
- To ensure the efficient funding of waste and resource management planning, programs and service delivery;
- To achieve integrated waste and resource management planning, programs and service delivery on a State-wide basis;
- To assist in the achievement of the objectives of the Protection of the Environment Operations Act 1997.

1.4.3 Council's Refuse Planning Scheme

In preparing this report, TTM has referred to Council requirements as outlined in City of Sydney Council planning scheme. Table 1.2 demonstrates the refuse management items addressed to align with Council's requirements for a waste and recycling management plan.

Table 1.2: Waste Management Plan Compliance Checklist

Requirements	Comments	Compliance
Plans and drawings of the proposed development that show the location and space allocated to the waste management systems and facilities and the nominated waste collection point for the site.	Refer to Appendix B for plans showing refuse management systems, facilities, collection points.	
Details of the types and estimated quantities of waste streams.	A summary of a refuse generated from this development is provided in Section 1.6. Details about refuse quantities and separation of refuse streams can be found in Section 2.1 and Appendix A.	
Identification of the path of access for users and collection vehicles.	Refuse vehicle site access and manoeuvring is described in Section 2.1. Refuse transfer and disposal arrangements can be found in Sections 2.3 and 2.4. Transfer paths are indicated on the plans in Appendix B.	
Details of ongoing management, storage and collection of waste, including responsibility for cleaning, transfer of bins between storage areas and collection points, implementation and maintenance of signage, and security of storage areas.	Ongoing management, storage and collection of waste are provided in Sections 2.2 to 2.4. Operational and design requirements are provided for refuse storage facilities are described in Sections 3 and 4. Example signage can be found in Appendix D.	
Where appropriate to the nature of the development, a summary document for tenants and residents to inform them of the building's waste management arrangements.	This report should be used as a basis for informational material for residents and tenants, in particular Section 3.2.	
Details of the handling of construction, demolition and ongoing waste outputs of the development.	This document provides details about the operational waste management arrangement. A separate plan needs to be provided for construction and demolition waste management.	

For further information, refer to the NSW Environment Protection Authority's (EPA) Better Practice Guide for Waste Management in Multi-unit Dwellings (2008), or the Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities (2013).

1.4.4 Waste Levy

Note: The waste levy will apply to commercial collections of residential waste.

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

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

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

1.5 Development Summary

Table 1.3 provides a summary of the development, including the refuse infrastructure areas as context for the volume information provided in Section 1.6.

Table 1.3: Development Summary

Level	Description	Measure *
Ground Level	Loading Dock Office Parcel Rooms OSD Lobby	144 m ² GFA**
Level 1	Plant Refuse Storage	Not Relevant
Level 2	Residential Amenity -Co-Working -Meeting Rooms -Social Lounge Kitchen / Restaurant	65m ² GFA 114m ² GFA 47m ² GFA 682m ² GFA
Level 3	Bicycle Parking / Storage -Bike Resident Storage Cages - Bike Storage Cages - Visitor Class 2 Bike Spaces	167 Qty 12 Qty 24 Qty
Level4-5	Plant	Not Relevant
Level 6	Recreation Deck (Wellness, Gym, Pool)	845m ² GFA**
Levels 7-36	Residentials Units	234 Units
Level 35	Rooftop Terrace	349m ² GFA**
Levels 37-39	Plant	Not Relevant

* Areas and unit numbers relevant for refuse calculations only.

** Individual areas GFA's not shown and therefore GFA for combined area or floor demonstrated

Note: "Not relevant" refers to areas that will not generate refuse, this includes waste rooms which will store refuse but not generate volumes of refuse.

1.6 Development Refuse Profile

The OSD – South will consist of a residential tower with 39 levels and 234 residential apartments, built over the southern part of the new Pitt Street metro station. The building will also accommodate residential areas including co-working space, a pool, a gym / wellness area, and a publicly accessible restaurant.

Table 1.4 and Table 1.5 demonstrate the anticipated volumes for each of the commonly separated refuse streams. All calculations and equipment requirements are based on the development schedules and common waste generation rates as outlined in the detailed information in Appendix A.

Table 1.4: Residential Refuse Summary

Level	Description	Measure	Quantity	General Waste (L / Week)	Commingled Recycling (L / Week)
Levels 7-36	Residential Apartments and Communal Areas	m ² GFA	234	29122	29122

Table 1.5: Commercial Refuse Summary

Description	Measure	Quantity	General Waste (L / Week)	Food Waste (L / Week)	All Recycling (L / Week)
Kitchen / Restaurant	m ² GFA	682	4848	4774	23944

Taking in consideration the waste levy as outlined in Section 1.4.4, examples of additional waste costs for this development are outlined in table 1.6. The calculation is based on the anticipated commercial refuse volumes as shown above.

Table 1.6: Waste Levy Costs

Description	Measure	General Waste	Food Waste *	All Recycling
Quantity (weight)	Tons/year	37.9	105.8	97.2
Estimated additional levy costs (1 st year)	A\$/year	\$ 5445	\$15,192	-

* Additional charge if food waste not separated from general waste.

Notes:

Assuming volume to weight conversion factors as per

[https://www.greenindustries.sa.gov.au/literature/165892/Waste_and_Recycling_Reporting_Template_\(2017\)](https://www.greenindustries.sa.gov.au/literature/165892/Waste_and_Recycling_Reporting_Template_(2017)).

2 Refuse Management

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

2.1 Refuse Collection

This section describes the refuse storage arrangements for this site. All refuse from this site will be collected by private contractors using small-rigid vehicles (SRV's) - see Section 2.1.3.

2.1.1 Bin Quantities

Table 2.1 below outlines the number of bins per collection, based on **three** collections per week as outlines in Section 2.1.2. As waste volumes may vary according to the development occupants' attitudes to waste disposal and recycling, bin numbers and sizes may need to be altered to suit the building operation.

Table 2.1: Number of Bins or Items per Collection

Component	Refuse Stream	Bin / Equipment Type or Size	Numbers of Bins / Items per Collection
Residential Collections	General Waste	1100L Bins	4 Bins
	Commingled Recycling	1100L Bins	12 Bins
Commercial Collections	General Waste*	1100L Bins	2 Bins
	Commingled Recycling	1100L Bins	2 Bins
	Cardboard	1100L Bins	2 Bins
	Food Waste (optional)	140L Bins	6 Bins
	Glass (optional)**	120 Bins	3 Bins

* Only 1 x 1100L bin required if food waste is separated from general waste.

**Comingled bin may be reduced in size or frequency of service if glass is separated.

2.1.2 Collection Cycle

Table 2.2 and Table 2.3 outline the vehicles and estimated collection frequencies or site entries required to service the site refuse. The final number of weekly site entries or collections will depend on the actual waste generation and will also be subject to final design and potential selection of volume reduction equipment. The figures demonstrated apply as a maximum demand.

Table 2.2: Estimated Refuse Collection Vehicle Demands – Residential Refuse

Residential Refuse Collections		Mon	Tue	Wed	Thu	Fri	Sat	Sun	Collections per Week
General Waste	Collection Days	✓	✓	✓	✓	✓	✓	✓	3-4
	Vehicle Type	REL RCV	REL RCV	REL RCV	REL RCV	REL RCV	REL RCV	REL RCV	
Commingled Recycling	Collection Days	✓		✓		✓			34
	Vehicle Type	REL RCV		REL RCV		REL RCV			
Total Collections per Week		2		2		2			6

Table 2.3: Estimated Refuse Collection Vehicle Demands – Commercial Refuse

Commercial Refuse Collections		Mon	Tue	Wed	Thu	Fri	Sat	Sun	Collections per Week
General Waste	Collection Days	✓		✓		✓			3-4
	Vehicle Type	REL RCV		REL RCV		REL RCV			
Food Waste *	Collection Days	✓	✓	✓	✓	✓	✓	✓	7
	Vehicle Type	REL RCV		REL RCV		REL RCV			
Commingled Recycling	Collection Days	✓	✓	✓	✓	✓	✓	✓	7
	Vehicle Type	REL RCV		REL RCV		REL RCV			
Cardboard	Collection Days	✓	✓	✓	✓	✓	✓	✓	7
	Vehicle Type	REL RCV		REL RCV		REL RCV			
Glass **	Collection Days	✓		✓		✓			3
	Vehicle Type	REL RCV		REL RCV		REL RCV			
Total Collections per Week		Up to 5		Up to 5		Up to 5			Up to 15

* Separate collections only required if food waste is separated from general waste.

** Separate collections only required if glass is separated from commingled recycling.

2.1.3 Refuse collection Arrangements and RCV Access and Manoeuvring

Refuse will be collected by private refuse collection contractors using SRV's. The RCV's will enter the site and loading dock via Pitt Street and drive forwards into one of the loading bays provided. If reversing into the loading bays, it has to be ensured that sufficient space is provided for transferring the bins to the rear of the vehicle and lifting the bins for emptying. At least 2m clearance are recommended at the rear of the RCV if parked against a wall.

The RCV drivers will retrieve full bins from the refuse storage room next to the loading dock or on level 1 via a lift and return them once emptied. Bin moving equipment is not required due to the short distances between the RCV loading position and the refuse rooms.

Details regarding refuse collections and bin movements are shown in the drawings on Appendix B.2.

2.2 Refuse Storage

All waste and recycling storage for the OSD South is located within refuse rooms located on Level 1 and accessible via the building goods lift. Drawings demonstrating configuration of equipment within the refuse rooms can be found in Appendix B.3.

Residential Refuse

Residential refuse storage includes bulky goods storage, furniture storage and a designated area for under refuse chute equipment and bins.

Standard 1100L Waste and Recycling bins are used to capture and store residential waste and recycling from the building dual refuse chutes. Bins are changed over as required and stored adjacent to the chutes awaiting transfer to the loading dock for collections as outlined in section 2.3. The refuse room is suitably sized to accommodate the storage of the 1100L bins and under chute compactor for waste.

Retail Refuse

Residential and Retail refuse must be disposed and stored separately. A refuse room for retail waste and recycling material is also located on level 1 and includes space for a mix of bins ranging in size from 60L to 1100L. Standard waste bin are used for demonstration of the room configuration however the room is suitably sized for the inclusion of either standard bins or alternative equipment such as balers, glass crushers and food waste systems.

2.3 Refuse Transfer

All bins will be transferred from Level 01 to the loading dock on Level 00 (ground floor) via the goods lift as demonstrated in Appendix B.2.

Ideally, full bins should be placed in the loading dock level prior to collections for each of the refuse streams by building staff and washed and returned post collection, however – bins may also be collected directly from the refuse rooms by collection vehicle operator using the same transfer method. Direct collection will ensure that bins do not hinder the manoeuvring area for all service and delivery vehicles.

Transfer of bulky goods and furniture should be completed on the day of collection and coordinated by the building manager and staff.

2.4 Refuse Disposal

The tables in this section summarise general recommended disposal arrangements for frequently generated and infrequently generated refuse for each area use within the development. **Frequently generated refuse**

(Sections 2.4.1 and 2.4.2) considers material streams that are generated in high volumes for any given period and require significant capacity for storage prior to collections. **Infrequently generated refuse** (Section 2.4.3) includes material streams that are generated in relatively low volumes, and where minimal provision for storage can be easily managed by collection frequency.

2.4.1 Residential Apartments and Communal Area (Levels 2, 6-36)

Residents will have receptacles within their individual units for collection and storage of at least one day of general waste and recycling. Bins should also be placed in communal areas (See Section 2.4.2).

Once receptacles are full, residents will dispose their waste via the **dual-chute system**, accessible on each residential level via hopper doors. The chutes discharge directly into the waste and recycling bulk bins located on level 1 in the residential refuse storage and chute discharge room.

Building management or cleaners should assist with disposal of waste from the residential communal areas.

Table 2.4: Residential Refuse Disposal Details

Refuse Stream	Disposal Details
WASTE	
General Waste	<p>Waste bins should always be lined with bags and the bags tied before removal. General waste should weigh approximately 3kg or less. Waste bins should be accompanied by a commingled recycling bin in order to facilitate separation of general waste and recycling (see below).</p> <p>Residential Apartments</p> <p>Residents in the residential apartments will have receptacles within their individual units for collection and storage of at least one day of general waste. Bins are typically placed under the kitchen sink. Additional bins can be placed in other areas as required.</p> <p>Communal Spaces (Co-Working, Gym, Pool)</p> <p>General waste from the communal spaces (e.g. recreational / pool deck, gym, meeting and co-working areas) may include small quantities of food waste, food packaging, drink bottles etc. and other non-recyclable materials. General waste bins should be sized to accommodate at least one day of waste located within the respective areas. Extra bins may be provided for special events.</p> <p>Some infrequent wastes such as bulky items, hazardous waste (e.g. printer cartridges) and electronic waste (e.g. computers and screens) may also be produced from office activities (see respective sections for disposal of infrequent wastes).</p>
Organic (Food) Waste	<p>Separating organic or food waste from general waste may be considered to reduce the total amount of general waste produced. Apartment style equipment such as organic household composter or worm farms are available for use where practical and space allows. Composting should be arranged with the building management. Refer to Appendix C.2 and https://www.urbancomposter.com.au.</p>
RECYCLING	
Commercial Comingled, including <ul style="list-style-type: none"> • glass • aluminium • steel cans • tins • paper • small cardboard 	<p>Items for recycling must not be bagged and disposed in loose form. This can be done by decanting the materials from the individual receptacles into the recycling chutes. Large items (e.g. cardboard boxes) should not be disposed via the chutes due to risk of blockages.</p> <p>Residential Apartments</p> <p>Residents will have receptacles within their individual units for collection and storage of at least one day of recycling. Recycling bins are typically placed under the kitchen sink next to the general waste bin. Additional recycling bins can be placed in other areas as required.</p>

Refuse Stream	Disposal Details
<ul style="list-style-type: none"> semi rigid plastics 	<p>Residential recycling bins will usually be used for all recycling materials (commingled recycling). However, residents are encouraged to make use of the container refund scheme and separate eligible containers from the commingled recycling material (see below).</p> <p>Communal Spaces (Co-Working, Gym, Pool)</p> <p>Recycling from the communal spaces (e.g. recreational / pool deck, gym, meeting and co-working areas) may consist of recyclable drink containers, food packaging, (clean) paper, cardboard etc. Recycling bins should be located next to waste bins within this area. Extra bins may be provided for special events.</p> <p>Recycling from office spaces largely consists of clean paper (and cardboard) which can be collected separately from comingled recycling if large quantities are produced. In addition, comingled recycling may originate from pantries and meeting / conference rooms where food is consumed (e.g. food containers). Recycling bins should generally be placed next to waste bins.</p>
Containers for Deposit	<p>Container deposit / refund schemes are currently in place in Queensland. Various models exist including bottle return facilities and (automated) reverse vending machines.</p> <p>Occupants should be encouraged to separate containers that qualify for the schemes from the waste or recycling streams and return them to one of the return points. Storage space or dedicated bins within the units or refuse rooms can be provided. For larger developments like this one, placement of a reverse vending machine on site may be considered in order to facilitate disposal.</p>
Clean Office Paper Secure Destruction Paper	<p>The office / co-working spaces may produce large amounts of clean (office) paper, e.g. from printers. This paper can be collected separately from general cardboard and paper using paper-only bins for better recycling options. 240L bins should be provided in the bins room.</p> <p>In addition, secure destruction paper / confidential paper documents may need to be disposed separately from general recyclable cardboard / paper. Special 240L bins are typically placed within the offices for disposal of secure destruction paper. The bins are collected from the individual levels by the respective contractor and replaced by empty bins. Alternatively, staff / cleaners may take the bins to the refuse room or loading bay prior to collection.</p>

2.4.2 Kitchen / Restaurant (Level 2)

Refuse from the restaurant is usually disposed by staff or cleaners who take the material from the individual receptacles to the commercial bulk bins in the refuse room. The residential chutes must not be used. Separation of food waste should be considered.

Table 2.5: Restaurant Disposal Details

Refuse Stream	Disposal Details
WASTE	
General Waste	<p>Waste bins should always be lined with bags and the bags tied before removal. Waste bins should be accompanied by a comingled recycling bin in order to facilitate separation of general waste and recycling (see below).</p> <p>Kitchen / Restaurant</p> <p>General waste from the kitchen / restaurant will be captured by bins typically ranging in size from 30L to 80L that will be placed within the kitchen or back-of-house area to meet the design or layout criteria of the operators. Food waste should be separated from general waste (See below).</p> <p>Waste bins should always be lined with bags and the bags tied before removal. Waste bins should be accompanied by a comingled recycling bin in order to facilitate separation of general waste and recycling (see below).</p>
Organic (Food) Waste	<p>Separating organic or food waste from general waste should be considered to reduce the total amount of general waste produced from the kitchen / restaurant. Depending on the amount of food waste expected and type of equipment used, food waste separation can occur under one of the following scenarios:</p> <ol style="list-style-type: none"> 140L bins should be used in the commercial kitchens of food and beverage outlets for disposal of food waste. The bins are then transferred to the refuse room for collection. Smaller bins of 60L-80L

Refuse Stream	Disposal Details
	<p>can be used and the content decanted into 140L bins in the refuse room. A purpose-built trolley should be used to transfer caddy bins.</p> <p>2. Benchtop style equipment such as organic household composter or worm farms are available for use where practical and space allows, e.g. in office pantries. Composting should be arranged with the building management.</p> <p>3. Optional instead of 140L bins: multiple caddy bins (typically 60L) can be used in kitchens or back-of-house areas. The caddy bins are then transferred to a food processing or pulping machine in the refuse room. Refer to Appendix C.2 and C.4 for further details about food waste processing options.</p>
Cooking Oil Waste	<p>Waste oils should be disposed separately from general waste if large quantities are produced. All waste liquids / oils (e.g. from commercial kitchens) should be separated and stored in clearly labelled containers. Typically, waste oils are removed during delivery of new oils by the supplying contractor.</p> <p>Bunded areas or bunded plastic pallets should be supplied for the storage of liquid waste / oils and stored in a levelled area (e.g. refuse room). Bunded pallets can be stored indoors or purpose built for outdoors. They should be routinely inspected to ensure maintenance of their integrity. Each pallet should be capable of storing of at least one-third of its contents if there is a leak.</p>
RECYCLING	
Commercial Comingled, including <ul style="list-style-type: none"> • glass • aluminium • steel cans • tins • paper • small cardboard • semi rigid plastics 	<p>Items for recycling must not be bagged and disposed in loose form. This can be done by decanting the materials from the individual receptacles into the bulk bins in the refuse room.</p> <p>Kitchen / Restaurant</p> <p>Commingled recycling from the kitchen / restaurant will be captured by bins up to 240L that will be placed within the kitchen or back-of-house area to meet the design or layout criteria of the cafe or restaurant operators.</p>
Cardboard / Paper and Plastic Film	<p>Cardboard / paper and plastic film should be disposed separately from comingled recycling if large quantities are expected. Cardboard and plastics must not be mixed. They must be stored individually (and baled individually if applicable).</p> <p>Where possible, large cardboard boxes and plastic film or packaging should be removed from the refuse stream prior to going into the building or individual tenancies. This involves decanting at the loading bay and providing trolleys or stackable containers for use in transporting the decanted goods to each level.</p> <p>Where this material does make it into the building or to each a level, a bin, trolley or mobile container should be placed for disposal. Cardboard, plastic film and packaging should not be placed on floors in refuse rooms or compartments. Additional areas have to be allocated for paper and cardboard storage if required. When already placed in a bin or trolley, this material is easily transferred to the refuse room and decanted into the appropriate bins or baling equipment.</p> <p>Baler</p> <p>Segregation and baling (compressing) of these materials is an option to reduce total waste output and may lower the total cost of refuse removal. Typically, a decision on the use of this equipment would be made at the start of the operational phase following review of the site final waste requirements and completion of appropriate risk assessments and operational procedures.</p> <p>A baler is recommended within the refuse room for this material. However, small back-of-house balers are also available as an option. Space for cardboard bales is considered in the configuration of the refuse room.</p>
Glass	<p>Glass (bottles) should be disposed separately from comingled recycling if large quantities are produced in the kitchen /restaurant. 120L bins or smaller should be provided due to the weight of glass (bottles). Full bins will be transferred to the refuse room by staff / cleaners. Empty change-over bins should be provided in the refuse room.</p> <p>Glass Crusher</p>

Refuse Stream	Disposal Details
	<p>Glass crushers are recommended as an alternative where large quantities of glass (bottles) are expected. The crushers reduce the storage volume of glass by about 75%.</p> <p>Glass crushers can be placed directly in the individual bar areas or kitchens or in the refuse room for use by all tenancies. Space is required for the crusher itself as well as a sufficient number of exchange bins for change-over during operating hours.</p> <p>Staff / cleaners will transfer glass waste to the glass crusher using small bins of up to 120L or refuse trolleys. The glass (bottles) are then placed into the crusher for compaction. Glass will be stored in small bins of 60L capacity due to the increased weight of crushed glass.</p>
Containers for Deposit	Refer to Table 2.4.

2.4.3 Infrequent Waste

Table 2.6: Disposal of Infrequently Generated Waste

Refuse Stream	Disposal Details
Green Waste	Green waste is not typically produced from a development of this type other than from surrounding landscaped areas or potted plants. Green waste is usually removed by the designated maintenance contractor. The contractor engaged for this work will be required to send this material to a composting or resource recovery facility rather than to a landfill if locally available.
Hard Waste / Bulky Goods	Hard waste may be stored in a designated part of the refuse room or in another designated room which should be located on the loading dock level. Alternatively, collections can be coordinated, and hard waste / bulky goods moved to the loading dock or a designated area for removal prior to collection. When storing bulky goods in a loading dock, it is recommended that items are placed on a pallet for easy loading via a pallet jack or forklift onto the collecting vehicle.
Hazardous Waste (paints, batteries and cartridges) Electronic Waste	Where applicable, occupants usually make their own arrangements for the disposal of specialised or hazardous waste and electronic waste such as recycling of toner cartridges and batteries. Please refer to local council and state government websites for disposal options. It is an expectation that the building management assist with disposal of hazardous, electronic or liquid waste and any paint or chemicals as required and requested. Hazardous waste must be handled with due care, separated and securely stored for collection by a specialist waste contractor. Please refer to local council and state government websites for further information.

3 Recommended Operational Requirements

3.1 Operational Equipment Summary

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

Table 3.1: Equipment Schedule

Component	Description	Quantity	Notes
Residential Apartments Refuse	Apartment waste and recycling bins	2	At least 1 waste and 1 recycling bin per unit
	Apartment-style Organics / Composting Systems (optional)	1	Optional benchtop composters. See Appendix C.2 and C.4.
	General Waste Bins (+ 1 under chute)	3+ 1	1100L bins
	Commingled Recycling Bins (+ 1 under chute)	6 + 1	1100L bins
	Dual Refuse Chutes	1	See Appendix C.2 and C.3.
	Under-Chute Waste Compactor (ratio 3:1)	1	See Appendix C.2 and C.4.
Residential Communal Refuse	Communal spaces waste and recycling bins	As required	30-240L bins as required for co-working spaces, gym etc. and for amenities See Appendix C.1
	Refuse Trolleys	1-2	See Appendix C.2 and C.3.
Retail Refuse	General Waste Bins	2	1100L bins
	Commingled Recycling Bins	2	1100L bins
	Food Waste Bins	6	140L bins
	Or Food Waste Processing System (optional)	1	See Appendix C.2 and C.4.
	Cardboard Bins Cardboard Baler (optional)	2	1100L bin Baler: see Appendix C.2 and C.4.
	Glass Waste Bins Or Glass Crusher with Caddy Bins if required (optional)	3	See Appendix C.2 and C.4. 60L bins to be used for crusher.

3.2 On-going Management

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

Table 3.2: General Refuse Management Checklist

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

3.2.1 Safety

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

Table 3.3: Safety Checklist

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

3.2.2 Signage

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

Table 3.4: Signage Checklist

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

3.2.3 Cleaning and Maintenance

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

Table 3.5: Cleaning and Maintenance Checklist

Objectives	Checked	Remarks
General cleaning of all refuse holding and transfer areas including <ul style="list-style-type: none"> Refuse rooms and storage areas Refuse bins Refuse transfer areas including lifts and staircases Refuse chutes and hopper doors Any other refuse management equipment 		Frequency depends on refuse generation and building operation.
Coordination of specialised cleaning contractors as required.		
Maintenance and servicing of refuse management equipment as per schedule.		Frequency depends on equipment and building operation.
Coordination of specialised equipment contractors as required.		

3.2.4 Refuse Minimisation

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

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

Table 3.6: Refuse Minimisation Checklist

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

3.2.5 Education and Communication

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

Table 3.7: Education and Communication Checklist

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

3.2.6 Monitoring and Review

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

Table 3.8: Monitoring and Review Checklist

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

4 Recommended Design Requirements

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

For more detailed information and specific requirements, refer to the City of Sydney Council's **Guidelines for Waste Management in New Developments**, in particular **Sections A, B, D, E and Reference D**.

4.1 Temporary Bin Storage and Bin Servicing Point

The RCV's will access the servicing point as described in Section 2.1. The bin service point will:

- Have sufficient access and clearance for the waste and recycling collection vehicles to service the bins, including no overhead obstructions.
- Allow bins to be serviced safely while minimising the impediment to traffic flow during servicing.
- Be clearly separated from car parking bays, footpaths and pedestrian access.
- Be of sufficient size to accommodate the bins.
- Be devoid of stairs, lips or ramps and allows bins to be manoeuvred easily.
- Not block the entry and exit to the property.
- Not be adjacent to a kitchen or eating area for public use.
- Over 5m from any door, window or fresh air intake within the development or any adjoining site.
- Be screened sufficiently to minimise the view of bins from neighbouring properties or passing vehicles and pedestrian traffic external to the site.
- Be positioned away from entrances to shops or residential premises.

4.2 Refuse Rooms

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

- Be insect and vermin proof.
- Be fire rated and ventilated in accordance with the National Construction Code – BCA.
- Doors must be wide enough to allow for the easy removal of the largest container to be stored.
- The walls, ceilings, floors and equipment are to be designed and constructed of impervious material with a smooth finish to allow for easy cleaning.
- The floors must be graded to fall to a drainage point.
- A hose cock must be provided for cleaning bins and the rooms.

- Drainage points must be connected to sewer in accordance with trade waste requirements.
- Adequate artificial lighting.
- Not located adjacent to or within any habitable portion of a building or place used in connection with food preparation (including food storage).
- Permit unobstructed access for removal of the containers to the servicing point and for positioning the containers correctly in relation to the refuse chutes (if fitted).
- Will be attractively designed to minimise their visual impact on the surrounding areas.
- Does not have any steps or lips.
- Is enclosed on all sides except for the gated entrance to ensure bins are not visible from a public place, neighbouring properties, passing vehicles or pedestrian traffic external to the site.
- Is of sufficient size to accommodate the bins with sufficient clearance around the combined bin area.
- Is positioned away from entrances to shops or residential premises.
- The height of the bin storage area allows for waste bins to be opened and closed.

4.3 Bin Carting

The bin carting route will the following features:

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

If bin moving equipment such as bin tug or bin trailers are required for transferring bins from the bin storage room(s) or chute discharge room(s) to the temporary bin storage or collection room from where bin will be serviced, space has to be provided for storing the bin moving equipment when not in use.

4.4 Bin Wash

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

- Constructed hardstand with a solid concrete base.
- Roofed and designed to prevent entry to rainwater.

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

4.5 Refuse Chutes

The requirements for a waste removal system incorporating waste chutes are as follows:

- Adequate strength for its purpose, including additional reinforcing where necessary at joints, bends and hopper intersections.
- Insect and vermin proof.
- Constructed and installed to prevent the following during use and operation of the system:
 - Transmission of vibration to the structure of the premises.
 - Excessive odour and noise to the occupants of the building.
- Installed in a fire rated duct and ventilated in compliance with building requirements of the Building Code of Australia.
- Comply with the waste chute manufacturer's technical specifications and / or operational limitations, including installation design features and ancillary equipment required to prevent blockages and noise disturbances.
- Fitted with a shutter at the base of the chute for closing off the chute manually during bin exchange and automatically in the case of fire.
- Discharge centrally above the waste containers in the waste storage room.
- Chute hoppers need to be:
 - Provided on each (residential) floor and be located in a freely ventilated position in the open air or in a dedicated room or compartment.
 - Be easily accessed by the occupants of each unit.
 - Be separate from any habitable room or place used in connection with food preparation or living areas.
 - Be designed and installed to:
 - Close off the service opening in the chute when the device is open for loading.

- Be between 1.0m and 1.5m above floor level.
 - Automatically return to the closed position after use.
 - Permit free flow into the chute.
 - Not project into the chute.
 - Allow easy cleaning of the device and the connection between the service opening and the chute.
- Have the largest dimension of the service opening (the diagonal of a rectangular opening) not exceeding 0.75m diameter of the chute with which the hopper is connected.
 - Have a surround on the wall around the hopper that is at least 0.3m wide and made of glazed tiling or other impervious material that can easily be cleaned.
 - Have a floor adjacent to the hopper that is paved with hard impervious materials with a smooth finished surface.
 - Be ventilated and finished with an impervious material covered at all angles, if located within a waste disposal room.

4.6 Storm Water Prevention and Litter Reduction

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

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

4.7 Ventilation

Natural or mechanical ventilation must be provided to waste storage areas unless refrigerated below 4°C. Natural ventilation means unobstructed, permanent openings direct to external air no less than one-twentieth (1/20) of floor area. Mechanical ventilation requires a minimum rate of 100L/sec and 5L/m² exhaust rate.

Appendix A Detailed Refuse Calculations

A.1 Residential Refuse Calculations

The generation rates used, as agreed with by Council, for the calculation of refuse produced uses rates from the superseded Council of the City of Sydney Policy for Waste Minimisation in New Developments and Better Practice Guide for Waste Management in Multi-unit Dwellings.

All co-working waste and recycling volumes are calculated based on a five day per week operations.

Table A.1: Residential Generation Rates

Type	Measure	General Waste	Food Waste	Commingled Recycling
Residential				
Residential Units	L / Unit / Week	120	-	120
Communal Spaces				
Cinema	L / Session / Seat	0.5	-	0.5
Co-Working / Offices	L / 100m ² / Day	15	5	25
Gym / Wellness	L / 100m ² / Day	10	-	10
General	L / 100m ² / Day	20	5	50

Table A.2: Residential Refuse Calculations

Description	Quantity	Measure	General Waste (L/Week)	Commingled Recycling (L/Week)
Communal Areas Level 2 (Co-Working etc.)	282	m ² GFA	450	630
Communal Areas Level 6 (Pool / Gym)	845	m ² GFA	592	592
Residential Apartments	234	m ² GFA	28080	28080
Uncompacted Volumes (L / Week)			29122	29302
Compacted Volumes (L / Week)			9707	-
Volumes per Day (L / Day)			1307	4186
Volumes per Collection (L / Collection)			4160	12558
Collection and Equipment Details	Collections Per Week		3	3
	Storage Capacity		3 Days	3 Days
	Equipment Size and Quantity		4 x 1100L bins + 1 x 1100L bin under chute	12 x 1100L bins + 1 x 1100L bin under chute
	Total Raw Equipment Area		6.9m ²	18m ²
	Refuse Storage Room Size		22m ²	

Note: figures exclude bulky waste.

A.2 Retail Refuse Calculations

The generation rates used, as agreed with by Council, for the calculation of refuse produced uses rates from the superseded Council of the City of Sydney Policy for Waste Minimisation in New Developments and Better Practice Guide for Waste Management in Multi-unit Dwellings. All kitchen / restaurant waste and recycling volumes are calculated on a seven day per week operations.

Table A.3: Retail Generation Rates

Type	Measure	General Waste	Food Waste	Commingled Recycling
Commercial Refuse				
Restaurant	L / 100m ² / Day	100	100	500
Rest Rooms / Toilets	L / 100m ² / Day	10	-	10

Table A.4: Retail Calculations

Description	Quantity	Measure	General Waste (L/Week)	Food Waste (L/Week)	Commingled Recycling (L/Week)	Cardboard / Paper (L/Week)
Kitchen / Restaurant	GFA (m ²)	682	4774	4774	14322	9548
Rest Rooms / Toilets	GFA (m ²)	105	74	-	-	74
Uncompacted Volumes (L / Week)			4848	4774	14322	9622
Volumes per Day (L / Day)			693	682	2046	1375
Volumes per Collection (L / Collection)			2078	682	2046	1375
Collection and Equipment Details	Collections Per Week		3	7	7	7
	Storage Capacity		3 Days	1.5 Days	1.5 Days	1-2 Days
	Equipment Size		1100L	140L	1100L	1100L
	Equipment Quantity Required		2 bins	6 bins	2 bins	2 bins
	Total Raw Equipment Area		2.8m ²	5.5m ²	2.8m ²	2.8m ²
	Refuse Storage Room Size		16m ²			

Note: figures exclude bulky waste.

Table A.5: Retail Refuse Volume to Weight Conversion

Description	Measure	General Waste	Food Waste	Commingled Recycling	Cardboard / Paper
Total Volumes	L / Week	4848	4774	14322	9548
	m ³ / Week	4.8	4.8	14.3	9.6
Conversion Factor	kg / m ³	150	425	63	100
Tonnes	T / Week	0.7	2.0	0.9	1.0
Tonnes per Year	T / Year	37.9	105.8	47.0	50.2
Diversion Potential	-	16%	44%	20%	21%
Waste Levy *	\$ / Year	5,444.50	15,192.50	-	-

* If 100% of food waste is diverted from general waste, the waste levy on food waste can be eliminated.

Appendix B Site Plans and Drawings

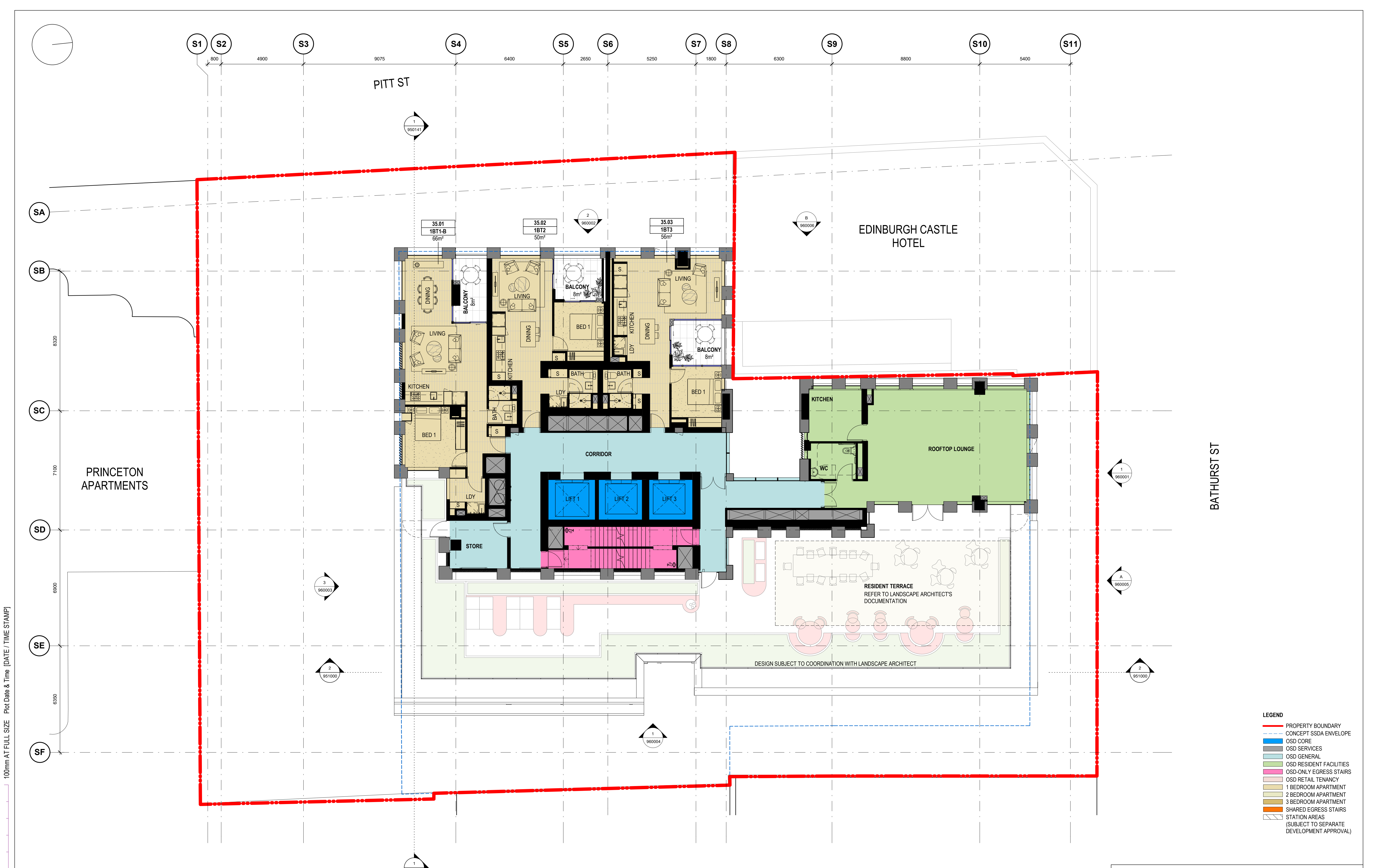
B.1 Architectural Plans / Drawings

Demonstrated Plans

SMCSWSPS-BAT-OSS-AT-DWG-930041-C	<i>L00 - GENERAL ARRANGEMENT PLAN</i>
SMCSWSPS-BAT-OSS-AT-DWG-930141-C	<i>L01 - GENERAL ARRANGEMENT PLAN</i>
SMCSWSPS-BAT-OSS-AT-DWG-930241-D	<i>L02 - GENERAL ARRANGEMENT PLAN</i>
SMCSWSPS-BAT-OSS-AT-DWG-930641-C,	<i>L06 - GENERAL ARRANGEMENT PLAN</i>
SMCSWSPS-BAT-OSS-AT-DWG-930941-C	<i>L09-13 - TYPICAL LOWRISE GENERAL ARRANGEMENT PLAN</i>
SMCSWSPS-BAT-OSS-AT-DWG-933541-C	<i>L35 - GENERAL ARRANGEMENT PLAN</i>

100mm AT FULL SIZE Plot Date & Time [DATE / TIME STAMP]

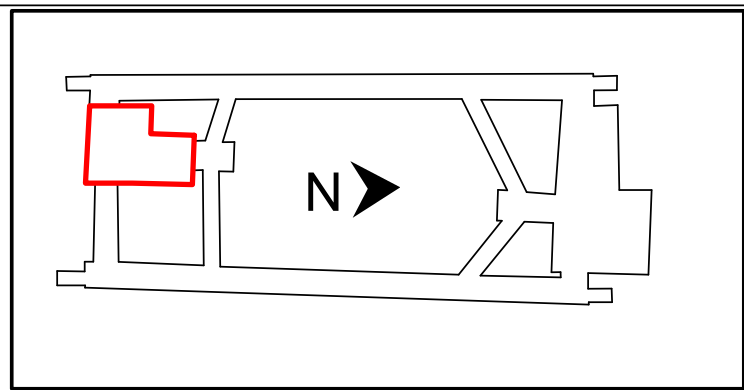
100mm AT FULL SIZE Plot Date & Time [DATE / TIME STAMP]



REV.	BY	DATE	DESCRIPTION	APPD.
C		31.03.20	SSDA Issue	
B		10.02.20	SSDA Issue	
P4		20.01.20	Preliminary - SSDA Issue	
P3		20.12.19	Preliminary - SSDA Issue	
P2		06.12.19	Preliminary - For Review and Coordination	
P1		29.11.19	Preliminary - For Review and Coordination	





REV.	BY	DATE	DESCRIPTION	APPD.
A1	Original		Co-ordinate System: MGA Zone 56	
			Height Datum: A.H.D.	
			This sheet may be prepared using colour and may be incomplete if copied	

SCALE
1:100 @ A1
0 1 2 3 4 5 m



NOTE: Do not scale from this drawing.

CLIENT
 
ISDP
 

The information shown on this drawing is for the purposes of the Sydney Metro Project only. No warranty is given or implied as to its suitability for any other purpose. The Service Providers accept no liability arising from the use of this drawing and the information shown thereon for any purpose other than the Sydney Metro Project.	
SERVICE PROVIDERS	
   	
DRAWN	Author
DESIGNED	Designer
DRG CHECK	Checker
DESIGN CHECK	Checker
APPROVED	Approver

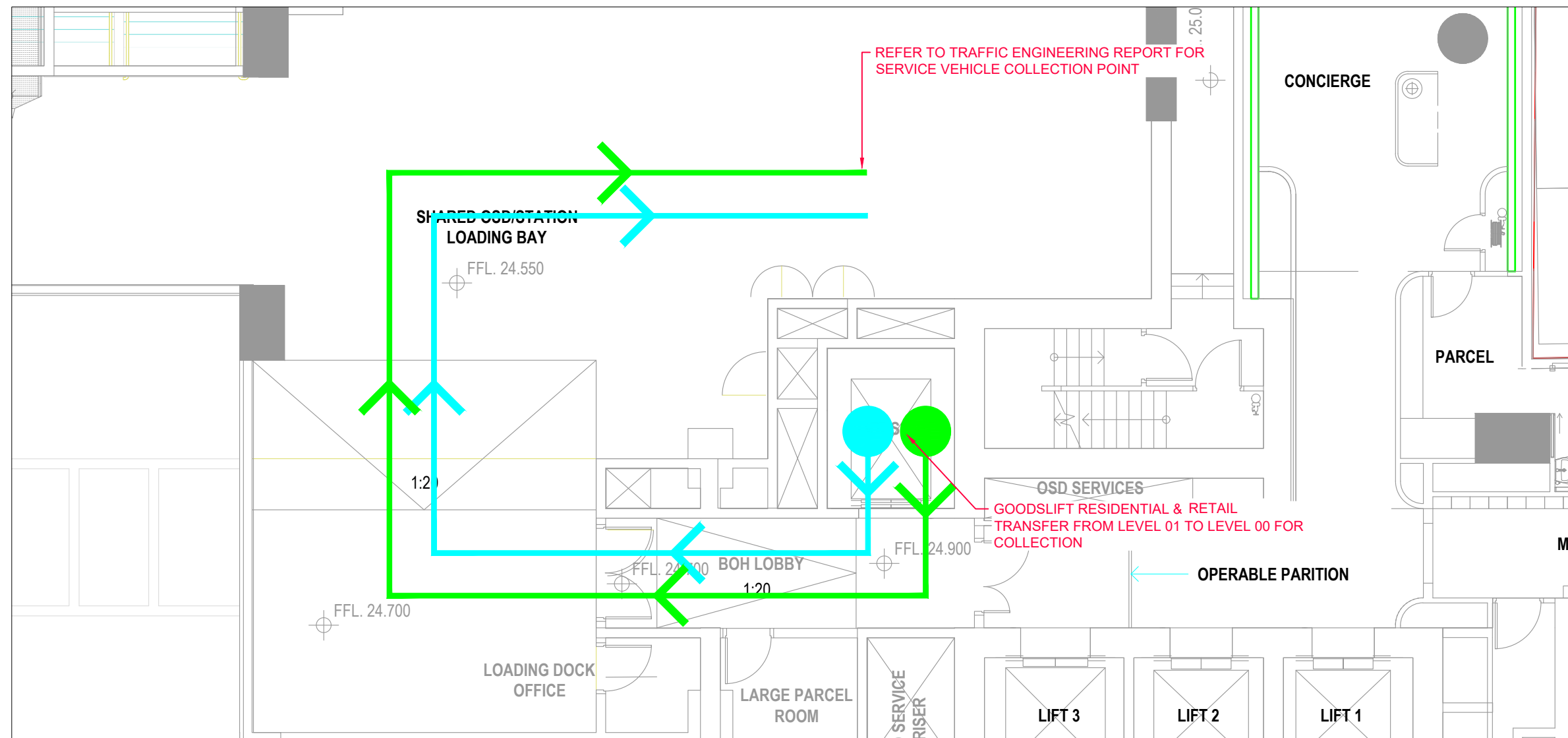
DRG No. SMCSWSPS-BAT-OSS-AT-DWG-933541	
PITT STREET INTEGRATED STATION DEVELOPMENT (PSISD)	
L35 - GENERAL ARRANGEMENT PLAN	
STATUS: SSDA Issue	SHEET OF
METRO DRG No.	REV. C

B.2 Refuse Collection and Transfer

Demonstrated Drawings

TTM - 19SYW0027-South-L01-RESI-COM-TRANSFER

TTM - 19SYW0027-South-L00-RESI-COM-TRANSFER



LEGEND:

RESIDENTIAL WASTE TRANSFER ROUTE



RESIDENTIAL FLOOR SPECIFIC START POINT



RESIDENTIAL WASTE TRANSFER DIRECTIONAL ARROW



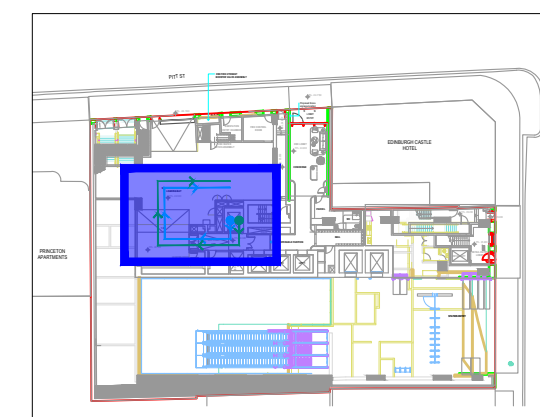
RETAIL WASTE TRANSFER ROUTE



RETAIL FLOOR SPECIFIC START POINT



RETAIL WASTE TRANSFER DIRECTIONAL ARROW

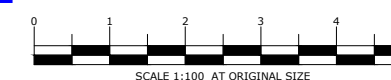


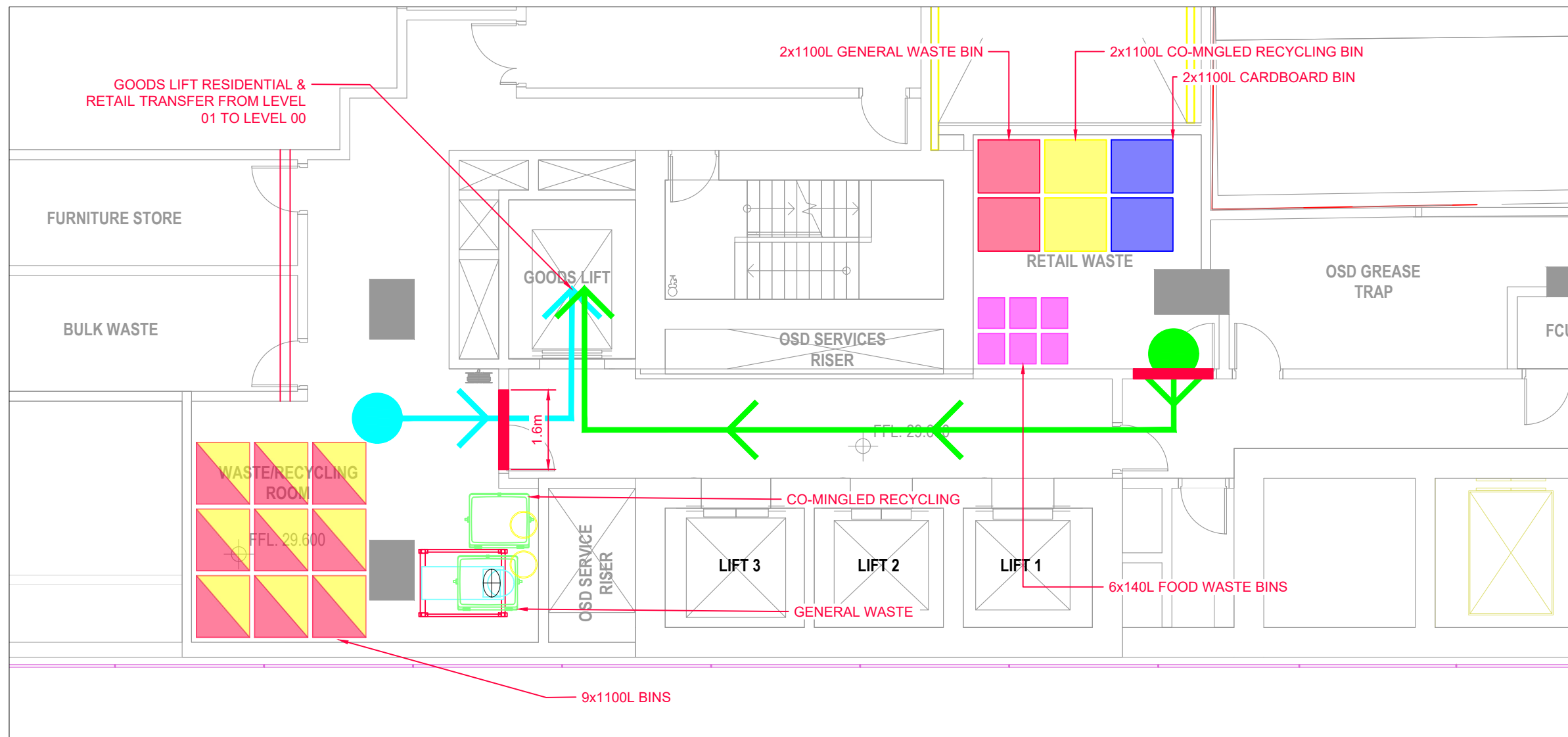
LEVEL 00 - LOCALITY PLAN
SCALE: N.T.S.

NOTE:
BASED OFF PDF. SUBJECT TO DETAILED DESIGN

OSD SOUTH - LEVEL 00 - RESIDENTIAL & RETAIL TYPICAL SERVICE ROUTE

WASTE TRANSFER ROUTE





OSD SOUTH - LEVEL 01 - RESIDENTIAL & RETAIL
SCALE 1:100

WASTE TRANSFER ROUTE

LEGEND:

RESIDENTIAL WASTE
TRANSFER ROUTE



RESIDENTIAL
FLOOR SPECIFIC
START POINT



RESIDENTIAL
WASTE TRANSFER
DIRECTIONAL
ARROW



RETAIL
WASTE TRANSFER
ROUTE



RETAIL
FLOOR SPECIFIC
START POINT



RETAIL
WASTE TRANSFER
DIRECTIONAL
ARROW



RECYCLING



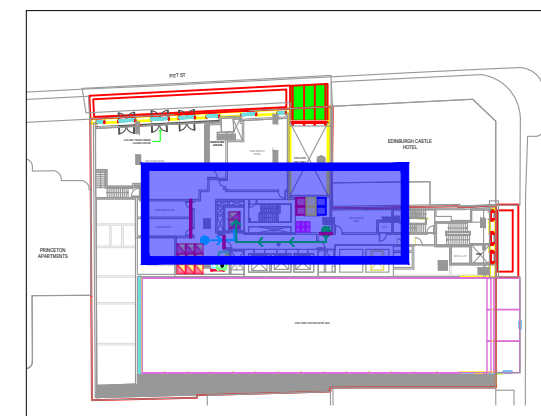
GENERAL WASTE



FOOD WASTE



PAPER/CARDBOARD



LEVEL 01 - LOCALITY PLAN
SCALE: N.T.S.

OSD SOUTH - LEVEL 01- RESIDENTIAL & RETAIL TYPICAL LAYOUT

WASTE TRANSFER ROUTE

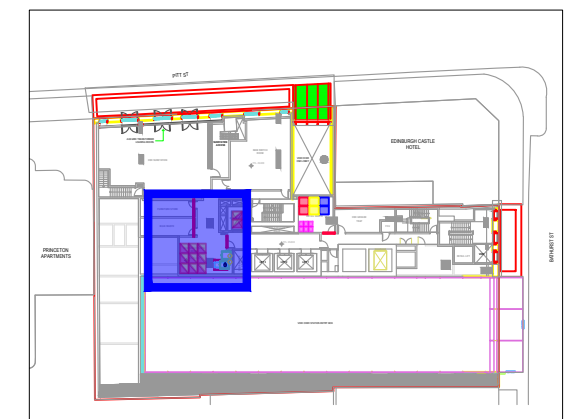
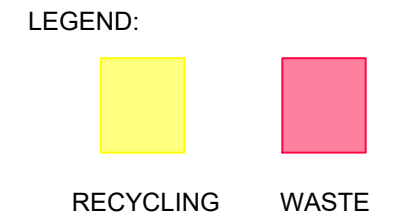
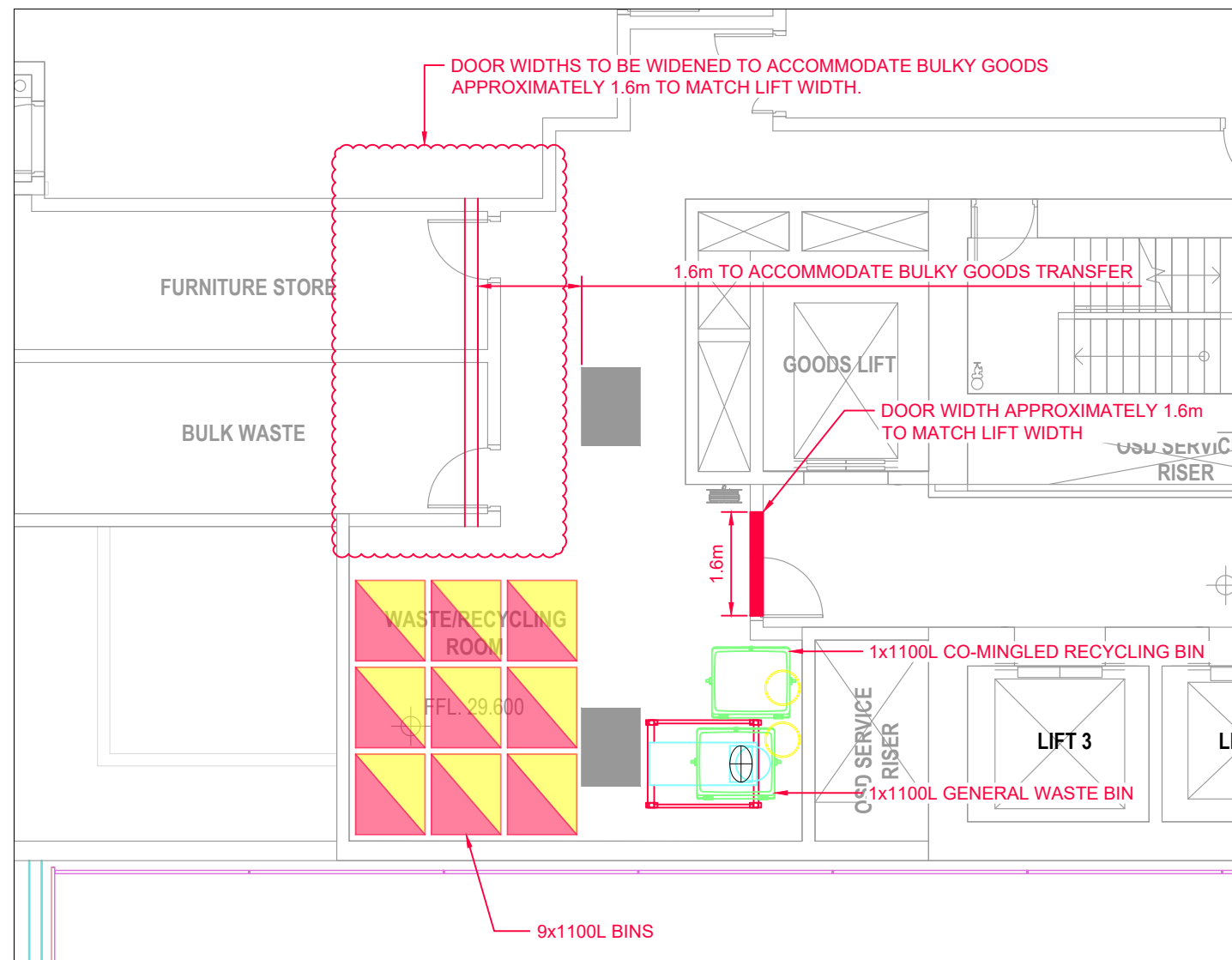


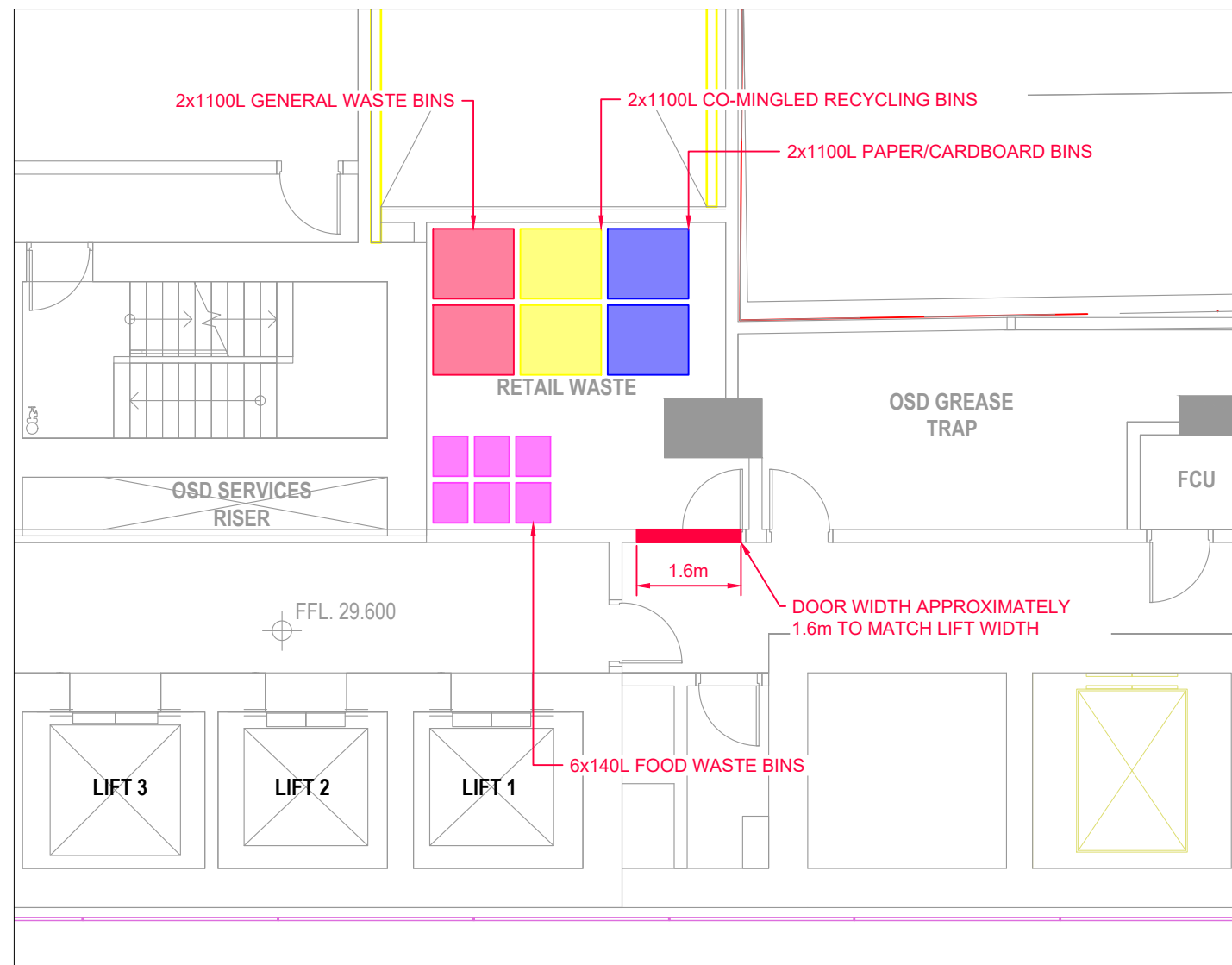
B.3 Refuse Storage Room Configurations

Demonstrated Drawings

19SYW0027-South-L01-WasteRoom.1

19SYW0027-South-L01-BulkWasteRoom





LEVEL 01-RETAIL WASTE ROOM
SCALE 1:100

LEGEND:



RECYCLING



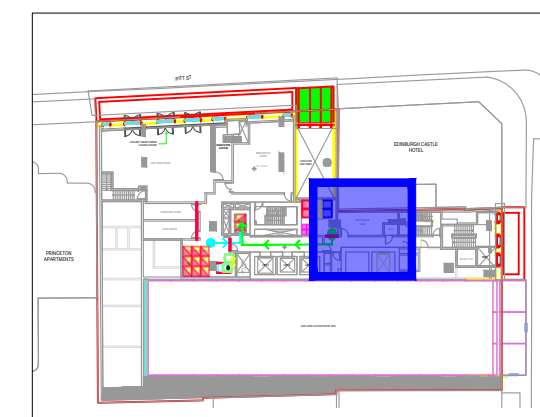
WASTE



FOOD

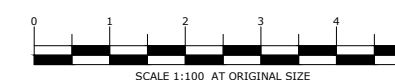


PAPER/
CARDBOARD



LEVEL 01 - LOCALITY PLAN
SCALE: N.T.S.




LEVEL 01- RETAIL WASTE ROOM CONFIGURATION TYPICAL LAYOUT



Appendix C Systems and Specifications

C.1 Typical Refuse Bins

Bin Types	Waste Streams	Examples	Information
Residential unit bins	General waste and recycling		Various options and sizes. Built and standalone bin available. Examples: https://www.bunnings.com.au
Back-of-house bins	General waste, recycling, food waste, paper / cardboard		Various options and sizes available. Tenant to supply depending on preference and space available. Example: 60L metro bins Dimensions approx. 559 x 279 x 635mm (L x W x H) Examples: https://www.spacepac.com.au
Caddy Bins	Food Waste		Example: https://pulpmaster.com.au/pulpmaster-caddy-system
60-80L bins	Glass		Dimensions approx. 500 x 460 x 640mm (L x W x H) (60L) 500 x 450 x 840mm (L x W x H) (80L) Example: http://wheeliebinonline.com.au/product/80-litre-wheelie-bin/
120-140L bins	Food waste, Uncrushed Glass		Dimensions approx. 550 x 480 x 930mm (L x W x H) (dimensions may depend on contractor) Examples: http://wheeliebinonline.com.au , https://ksenvironmental.com.au
240L bins	General waste, paper, recycling, green waste		Dimensions approx. 740 x 580 x 1080mm (L x W x H) (dimensions may depend on contractor) Examples: http://www.justwheeliebins.com.au , http://wheeliebinonline.com.au
660L bins	General waste, recycling, paper / cardboard		Dimensions approx. 780 x 1260 x 1330mm (L x W x H) (dimensions depend on contractor) Examples: http://www.justwheeliebins.com.au , https://www.australianwastemanagement.com.au



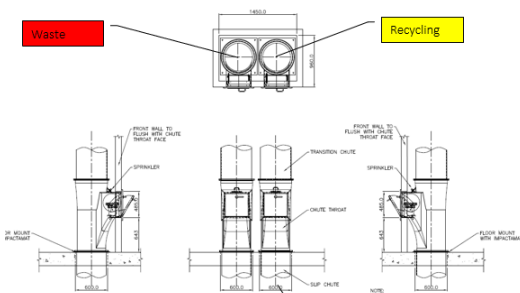


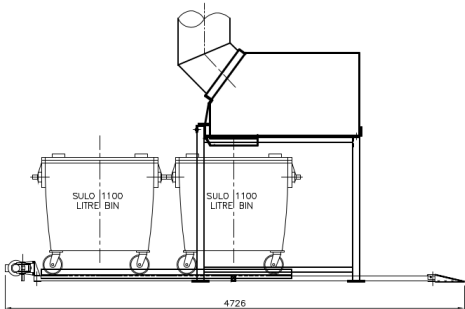
Bin Types	Waste Streams	Examples	Information
			
1100L bins	General waste, recycling, paper / cardboard		<p>Dimensions approx. 1070 x 1240 x 1330mm (L x W x H) (dimensions depend on contractor)</p> <p>Examples: http://www.justwheeliebins.com.au, https://www.australianwastemanagement.com.au </p>
Cigarette butt bins / ashtrays	Cigarette butts		<p>Various options and sizes available. Free-standing, wall / bin-mounted or integrated.</p> <p>Examples: https://www.spacepac.com.au, http://www.nobutts.com.au </p>

C.2 Typical Refuse Management Equipment










Systems	Waste Streams	Examples	Information
Organics Household Composting, Worm Farm, Digesters	Food waste / organics		<p>Organics / food waste separation, composting and digesting; household-type and commercial grade equipment available</p> <p>Examples</p> <p>Urban Composter https://www.urbancomposter.com.au</p> <p>Closed Loop https://closedloop.com.au/upcycling-products</p> <p>ORCA https://www.feedtheorca.com</p>
Food Waste Processing, Storage and Disposal	Food waste / organics		<p>Volume reduction and organics / food waste recycling through food waste separation and macerating</p> <p>Examples:</p> <p>Pulpmaster Food Processing and Storage https://pulpmaster.com.au</p> <p>Under-sink food waste macerators and disposers</p>



Systems	Waste Streams	Examples	Information
Cooking oil storage and recycling	Used cooking oil	 	<p>Cooking oil recycling</p> <p>Example:</p> <p>https://www.cookers.com.au</p> <p>Cooking oil delivery, used oil collection and provision of required equipment</p>
Bunded pallets	Liquid Waste	 	<p>Spill containment, e.g. for waste cooking oil containers</p> <p>Example:</p> <p>https://www.tradeenviro.com.au/bunded-pallets</p> <p>https://www.materialshandling.com.au/products/bunded-pallet</p>
Balers	Paper / cardboard, plastics		<p>Volume reduction of paper, cardboard, plastics by compaction (baling)</p> <p>Examples:</p> <p>https://www.miltek.com.au/balers-and-compactors</p> <p>https://www.wastech.com.au/products/balers</p> <p>https://wasteinitiatives.com.au/product/vertical-balers/wastepac-60</p>

Systems	Waste Streams	Examples	Information
Compactors / bin presses	General waste		<p>Volume reduction through refuse compaction</p> <p>Examples:</p> <p>Under-chute compactor https://www.wastech.com.au/products/chutes/ecopac-compactor</p> <p>Bin press https://wasteinitiatives.com.au/products/waste-compactors</p>
Glass bottle crushing	Glass (bottles)		<p>Volume reduction of glass bottles by crushing</p> <p>Example: http://www.bottlecycler.com</p>
Trolleys	General waste, recycling, food waste, paper / cardboard		<p>Assisted manual transfer of refuse</p> <p>Examples: https://rubbermaidcommercial.com.au/products/waste-management/mega-brute https://www.materialshandling.com.au/products/deluxe-compact-cleaning-carts</p>
Bin tugs / trailers	-		<p>Assisted transfer of refuse</p> <p>Examples: http://ev.spacepac.com.au/categories/tugger, https://www.spacepac.com.au/product/wheelie-bin-aluminum-steel-trailers</p>

Systems	Waste Streams	Examples	Information
Chute systems	General waste, recycling, food waste	  	<p>Refuse disposal in multi-storey buildings through refuse chutes: single chute for waste only, or single chute with diverter system or dual chute for disposal of waste and recycling</p> <p>Examples: https://www.wastech.com.au/products/chutes https://www.elephantsfoot.com.au/products/chutes </p>
Bin rotation	General waste, recycling, food waste	  	<p>Bin rotation (e.g. linear or carousel) to manage bin fill level and prevent overflow under chutes</p> <p>Example: https://www.elephantsfoot.com.au/products/compactors/carousel-linear https://wastech.com.au </p>

C.3 Refuse Transfer and Disposal Methods

Method	Examples	Description
Manual transfer / disposal	   	<p>Manual transfer is simply the process of physically carrying waste bags, food waste receptacles or recycling boxes and crates without assistance.</p> <p>From a safety perspective, this is acceptable for small quantities and initial disposal into refuse chutes, refuse compartments or, in the case of ground level activities, directly into the refuse storage room.</p> <ul style="list-style-type: none"> • Waste material should be bagged prior to any transfer from apartments, suites, offices, back-of-house areas etc. to waste storage compartments or rooms. • Food waste should be placed in receptacles such as a caddy style bin or bucket which will not allow leakage during transfer. • Recycling material should be placed in boxes or crates prior to transfer. • Cardboard and paper items can be placed within another cardboard box for transfer. <p>Examples: https://www.alamy.com</p>
Assisted manual transfer	  	<p>Assisted manual transfer includes the use of any wheeled container, wheelie bin or trolley with a capacity to carry refuse items with a combined weight of 20kg and above. The equipment bares the weight of the material, but it still requires physical force and or balance to move the bin or trolley.</p> <p>From a safety perspective, this type of equipment should be a minimum requirement for transfer of material greater than 20kg and when transferring between individual levels to the refuse storage room or loading areas. Use of enclosed or caged equipment will also eliminate 'litter or leakage trails' which can occur when using open or unsealed equipment.</p> <p>Examples: http://www.justwheeliebins.com.au, https://rubbermaidcommercial.com.au, https://www.materialshandling.com.au</p>
Assisted transfer	  	<p>Assisted transfer includes the use of any container with capacity to carry 20kg or more, pushed or towed by mechanical or electrical self-propelling equipment.</p> <p>Examples: http://ev.spacepac.com.au/categories/tugger, https://www.spacepac.com.au/product/wheelie-bin-aluminum-steel-trailers</p>

Method	Examples	Description
Gravity transfer / disposal	 	<p>Gravity transfer describes the use of refuse chutes. This typically includes access at all floors and discharging in bulk bins in ground floor or basement refuse rooms.</p> <p>Examples: https://www.elephantsfoot.com.au/products/chutes, https://www.wastech.com.au/products/chutes</p>
Sealed transfer		<p>Sealed transfer typically relates to the use of automated front end (pump) or back end (vacuum) equipment moving material through service pipes to a central tank or bulk storage or compaction equipment.</p> <p>Use of systems directly related to food waste processing and transfer are a cost-effective alternative and provide significantly less invasive requirements to build into final design and intrastate.</p> <p>Examples: https://pulpmaster.com.au</p>

C.4 Refuse Minimisation Options

Refuse Minimisation Options – Waste

Systems	Description
Food rescue	<p>OzHarvest and Second Bite are food rescue organisations working throughout Australia. The organisation collects surplus foods from businesses (including Woolworths, Coles, Goodman Fielder and other smaller companies) and redistributes the foods to welfare agencies. They provide regular scheduled collections or ad-hoc / on call collections, and they have refrigerated vehicles. Other accepted items include fresh fruit and vegetables, tinned goods, cold meats and deli items, and readymade meals (which will only be accepted frozen).</p> <p>Where food rescue organisations are available, consideration may be given to suitable space for the temporary storage of food stuffs, including dry storage and the placement of a small fridge if cold room space is not available. There is no associated collections cost. Hence, it can be considered a zero-cost option for disposal of what would otherwise be food waste, and it supports the community at the same time.</p>  <p>Sources: www.ozharvest.org, www.secondbite.org</p>
Composting	<p>Food waste composting is an option of reducing the amount of general waste going to landfill where organic waste can create methane gas due to anaerobic digestion, which contributes to global warming. Systems of different scales exist from small benchtop composters for individual households or apartments to commercial size systems. Examples are shown below.</p> <p>The process usually involves breaking down organic food scraps through natural processes. This includes systems such as worm farms or composters where microbes break down the food waste, with or without the aid of compost additives. The composted products are rich in nutrients and good bacteria, and they can be added to flower bed or gardens.</p> <p>Most food wastes and other organic (garden) material can be composted including meat, fish, vegetables, fruit, dairy, coffee or wilted flowers. However, large bones, excessive liquids such as cooking oil or seafood shells should not be placed in the composters.</p> 




Systems	Description
	<div data-bbox="355 365 1235 723"> </div> <p data-bbox="355 745 1283 801">Sources: https://www.urbancomposter.com.au, https://closedloop.com.au/upcycling-products, https://www.feedtheorca.com</p>
Food waste separation and collection	<p data-bbox="355 835 1422 1059">When considering separation of organic food waste, the handling and potential for volume reduction should also be considered. As an example, the Pulpmaster system can be used to reduce the stored volume of food waste produced, and to prepare the material for re-use. Typically, the system is placed in proximity to sink areas in the kitchen, particularly where food preparation waste or plate scrapings can be easily disposed. This provides a fully sealed transfer system for storage and collection. Pulping systems can also be placed back-of-house spaces for restaurants and cafes or placed within a refuse room for centralisation to multiple users. Pulped food waste is pumped into holding tanks for storage and collection via a 50mm pipe and collected by a liquid vacuum tanker.</p> <p data-bbox="355 1070 1410 1272">The images below provide visual context of the connection from pulping machine to storage tank and the option for decanting 120L bins into the machine via a bin lifter and auger feed. The tank may be up to 20m away from the pulping machine. The distance is increased when including vertical drops from upper levels of the building. The storage tank may be up to 30m from a loading area, with the only requirement being a service pipe with camlock end connection placed within proximity of the loading area. Collections are completed by a vacuum tanker which may range in size depending on the size of the storage tanks and the distance of the tank from the loading area.</p> <div data-bbox="355 1279 1393 1581"> </div>

Systems	Description
	 <p>Source: http://pulpmaster.com.au</p>
Waste compaction	<p>Various compaction equipment exists for reducing the volume of (general) waste. As a result, less bins and / or fewer bin collections and service vehicle trips are required, which helps to reduce costs and environmental impact.</p> <p>Examples of typical waste compaction equipment include the following:</p> <ul style="list-style-type: none"> • Under chute compactors can be installed in developments with waste chutes. This allows to compact waste material before it is discharged from the chute into the waste bins. • Bin presses can be used to annually compress waste material in bins of different sizes.  <p>Sources: https://www.wastech.com.au/products/chutes/ecopac-compactor, https://wasteinitiatives.com.au/products/waste-compactors</p>
Charity donations	<p>A good way of minimising waste is to reuse items that are still good to use. Several charity organisations exist that accept items such clothing, shoes, bedding, books, toys, furniture, kitchenware and other household items. The donated items must not be torn, damaged or broken. Electrical appliances such as white goods are usually not accepted.</p> <p>Common organisations operating in Australia include Saint Vincent de Paul Society (Vinnies) and Lifeline (see images below). Items can be placed into the organisations' charity / donation bins located in various public spaces such as near community or shopping areas. Alternatively, they can be dropped off at the organisations' shops during opening hours. Refer to https://www.lifeline.org.au or https://www.vinnies.org.au for further information.</p> <p>For larger developments and precincts where large amounts of donation items can be expected, the placement of charity bins within the development should be taken into consideration.</p>

Systems	Description
	 <p>Sources: https://www.vinnies.org.au, https://lifelinesouthcoast.org.au</p>

Refuse Minimisation Options – Recycling

Systems	Description
<p>Container deposit schemes</p>	<p>Container deposit / refund schemes are currently in place in several states in Australia. Various models exist including bottle return facilities and (automated) reverse vending machines.</p> <p>Residents, tenants, staff and cleaners should be encouraged to separate containers that qualify for the schemes from the waste or recycling streams, and return them to one of the return points. Storage space or dedicated bins within tenancies, apartments or communal areas should be provided.</p> <p>For larger developments or precincts where large amounts of empty containers are expected, consideration may be given to an on-site return point. The return points should be located near recycling bins so that cardboard boxes or plastic bags that have been used to transfer the empty containers to the return point can be disposed appropriately. This can prevent cluttering of the area around the return point.</p> <p>The images below show a typical return point and containers that commonly qualify for a deposit refund.</p> <div data-bbox="354 734 1428 1115"> </div> <div data-bbox="354 1131 957 1355"> </div> <p>Sources: https://returnandearn.org.au, https://envirobank.com.au/bottle-and-can-recycling-queensland, https://www.containersforchange.com.au/how-it-works</p>
<p>Glass crushing</p>	<p>Bottle crushers can reduce back-of-house and refuse room storage volumes by up to 80%. The machines are quiet and efficient. The inclusion of a glass crusher may either be designed into bar or kitchen areas, placed in back-of-house areas, or a machine may take the place of an existing recycling bin within a refuse storage room. Scanners are also being developed for these machines for scanning of bottles prior to crushing to align with government bottle return schemes. The images below show a typical setting of a glass crusher in a bar.</p> <div data-bbox="354 1585 1104 1966"> </div>

Systems	Description
	<div data-bbox="354 353 912 734">  </div> <div data-bbox="928 353 1391 734">  </div> <p data-bbox="354 757 1343 784">Sources: http://www.insideenterprises.com.au/bottlecycler/index.html, http://www.bottlecycler.com</p>
Baling	<p data-bbox="354 801 1396 913">Balers should be a consideration for use in reducing refuse volumes and creating safe environments by removing cardboard and plastic film which tends to overflow bins and clog up refuse room floors and doorways. The images below show a typical small baler that will produce a 60kg bale, easily removable by a trolley, as well as an option for multi chamber baler for baling multiple products.</p> <div data-bbox="354 922 890 1384">  </div> <p data-bbox="354 1411 938 1433">Source: https://www.miltek.com.au/balers-and-compactors</p>

C.5 Refuse Management Equipment Suppliers

Waste Management Equipment	Balers	Compactors	Shredders	Glass Crushers	Chutes	Bin Tugs / Trailers	Trolleys / Manual Handling Equipment	Bin Lifters / Tipplers	Bin Rotation	Weighing Systems	Spill Containment, Spill Response, Absorbents, Drain Protection	Food Waste Management / Vacuum Systems, Pulping, Digestors	Composting	Waste Cooking Oil Systems	Smoking Management	Bins (General), Bin Stands	Bin Cleaning Equipment
Elephants Foot Recycling Solutions http://www.elephantsfoot.com.au	✓	✓		✓	✓			✓	✓	✓							
Waste Initiatives https://wasteinitiatives.com.au	✓	✓	✓	✓													
Wastech http://wastech.com.au	✓	✓	✓		✓				✓								
Pakmor http://pakmor.com.au	✓	✓	✓					✓		✓							
Miltek http://www.miltek.com.au	✓	✓															
BottleCycler http://www.bottlecyclor.com				✓													
Materials Handling https://www.materialshandling.com.au						✓	✓	✓			✓					✓	✓
Spacepac http://ev.spacepac.com.au						✓	✓										
Spacepac Solutions http://www.spacepac.com.au						✓	✓								✓	✓	
Draffin https://draffin.com.au								✓							✓	✓	
Electrodrive / Lift Master http://www.electrodrive.com.au						✓		✓									

Waste Management Equipment	Balers	Compactors	Shredders	Glass Crushers	Chutes	Bin Tugs / Trailers	Trolleys / Manual Handling Equipment	Bin Lifters / Tipplers	Bin Rotation	Weighing Systems	Spill Containment, Spill Response, Absorbents, Drain Protection	Food Waste Management / Vacuum Systems, Pulping, Digestors	Composting	Waste Cooking Oil Systems	Smoking Management	Bins (General), Bin Stands	Bin Cleaning Equipment
Absorbenviro http://www.absorbenviro.com.au											✓						
Trade Environmental http://www.tradeenviro.com.au											✓						
Spillstationaustralia www.spillstation.com.au											✓						
Pulpmaster http://pulpmaster.com.au												✓					
Australian Vacuum Systems http://www.australianvacuumsystems.com.au												✓					
Meiko https://www.meiko.com.au												✓					
Closed Loop Organics https://closedloop.com.au/upcycling-products,													✓				
Compost Revolution https://compostrevolution.com.au													✓				
Urban Composter https://www.urbancomposter.com.au													✓				
ORCA Digester https://www.feedtheorca.com													✓				
Cookers https://www.cookers.com.au														✓			
Rubbermaid https://rubbermaidcommercial.com.au/products/waste-management							✓				✓				✓	✓	

Waste Management Equipment	Balers	Compactors	Shredders	Glass Crushers	Chutes	Bin Tugs / Trailers	Trolleys / Manual Handling Equipment	Bin Lifters / Tipplers	Bin Rotation	Weighing Systems	Spill Containment, Spill Response, Absorbents, Drain Protection	Food Waste Management / Vacuum Systems, Pulping, Digestors	Composting	Waste Cooking Oil Systems	Smoking Management	Bins (General), Bin Stands	Bin Cleaning Equipment
Sulo http://www.sulo.com.au							✓						✓			✓	
Australian Waste Management https://www.australianwastemanagement.com.au/products								✓								✓	

C.6 Refuse Management Service Providers

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

Appendix D Refuse Signage

D.1 Refuse Signage

Waste signage guidelines are provided by the New South Wales Environmental Protection Authority:

<https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/business-government-recycling/standard-recycling-signs>

General Refuse Signage



Other Refuse Signage



D.2 Other Refuse, Facility and Safety Signage

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

Example Refuse Room Signage



Example Facility Signage



Example Safety Signage



Appendix E Terms and Abbreviations

In this waste management plan, a term or abbreviation has the following meaning unless indicated otherwise:

TERM	ABBREVIATION	DEFINITION
Equipment		
Baler		A baler is a device that compresses waste into a mould to form bales which may be self-supporting or retained in shape by wire ties and strapping. It is commonly used to bale cardboard and soft plastics (plastic film).
Bin (Refuse Bin)		A (refuse) bin is a plastic or steel container for disposal and temporary storage of waste or recycling items. Various types and sizes exist for different items and purposes. Examples include residential unit bins, bulk bins, MGB, steely bins and specialised for medical waste or cigarette butts.
Bin Hitch		A bin hitch is a galvanized steel bar or similar which allows connection between a bin and a towing vehicle (ATV, UTV, or bin tug). The bin hitch is typically fixed to the base of the bin and designed to connect to a towing vehicle or another bin. Bin to bin connection allows for towing of multiple bins with the lead bin connected to the towing vehicle.
Bin Storage Area		A bin storage area in an enclosed area designated for storing on-site refuse bins or a refuse compactor within the property.
Bin Tug		An electric bin tug is a battery-powered and pedestrian-operated machine used to move heavy loads on wheels. If the load itself does not have wheels, it would be placed on a wheeled platform often referred to as a trolley, bogie or skate.
Bulk Bin		A bulk bin is a galvanized or steel bin receptacle that is greater than 360L in capacity generally ranging from 1.00m ³ to 4.50m ³ used for the storage of refuse that is used for on-site refuse collection.
Bulk Mobile Garbage Bin	Bulk MGB	A Bulk MGB is a plastic (polypropylene) receptacle that is greater than 360L in capacity generally ranging from 660L to 1100L used for the storage of refuse.
Chute Discharge		A chute discharge is the point at which refuse exits from the refuse chute.
Chute Discharge Room		The chute discharge room (separate to a bin storage area) is an enclosed area or room housing the discharge and associated equipment for the refuse chute.
Collection Point		The collection point is an identified position where refuse bins are stored for collection and emptying. The collection point can also be the bin storage area.
Compactor		A (refuse) compactor is a receptacle that provides for the mechanical compaction and temporary storage of refuse. It allows to reduce bin numbers and collection frequency.
Composter		A composter is a container or machine used for composting specific food scraps and/or organic materials.
Crusher (Glass Crusher)		A (glass) crusher is a machine that allows volume reduction by crushing them into small pieces. A glass crusher can reduce the volume of glass bottle by about 75%.
Food Waste Digester		A digester mimics the technology of a natural digestion process. For example, a digester can create a thermophilic biological environment for microorganisms to digest food waste into a liquid that can be drained and disposed via the sewerage system.
Food Waste Recycling System		A food waste recycling system is defined as a vacuum or pump-based system for shredding, macerating or pulping of food waste. The food waste is transferred through pressure (service) pipes to sealed liquid storage tanks.
Food Waste Macerator		A food waste macerator can shred all types of organic / food waste. It can be installed under sinks for direct disposal of food waste via the sewerage system. Household-type and commercial grade macerators exist.
Green Waste		All vegetated organic material such as small branches, leaves and grass clippings, tree and shrub pruning, plants and flowers.

TERM	ABBREVIATION	DEFINITION
Hopper		A hopper is a fitting into which waste is placed and from which it passes into a chute or directly into a waste container. It consists of a fixed frame and hood unit (the frame) and a hinged or pivoted combined door and receiving unit, and it is typically mounted on a wall.
Liquid Waste		Non-hazardous liquid waste generated by commercial premises should be connected to sewer or collected for treatment and disposal by a liquid waste contractor (including grease trap waste).
Mobile Garbage Bin	MGB	An MGB is a plastic (polypropylene) bin or bins used for the temporary storage of refuse that is up to 360L in capacity and may be used in kerbside refuse collection or on-site collection.
Putrescible Waste		Putrescible waste is the component of the waste stream liable to become putrid and usually breaks down in a landfill to create landfill gases and leachate. Typically applies to food, animal and organic products.
Recycling		Recycling contains all material suitable for re-manufacture or re-use, e.g. glass bottles and jars; plastics such as PET, HDPE and PVC; aluminium aerosol and steel cans and lids; milk and juice cartons; soft drink, milk and shampoo containers; paper, cardboard, junk mail, newspapers and magazines.
Refuse		Refuse is material generated and discarded from residential and commercial buildings including general waste, recyclables, green waste and bulky items.
Refuse Chute		A refuse chute is a ventilated, essentially vertical pipe passing from floor to floor of a building for the purpose of refuse disposal, with openings as required to connect with hoppers and normally terminating at its lower end at the roof of a central refuse room.
Refuse Collection Vehicle	RCV	An RCV is a vehicle that is specifically designed for collecting and emptying refuse bins and refuse compactors.
Refuse Storage Room		A refuse storage room is an area identified for storing on-site MGBs or Bulk Bins within the property.
Refuse Trolley		A refuse trolley is a cart on wheels that can be used to collect smaller quantities of refuse from different areas or rooms of a building or site, and wheel the collected refuse to a (bulk) bin storage area where it is disposed. Refuse trolleys are commonly used in hotels or offices.
Regulated Waste		Regulated waste is waste prescribed under legislation as regulated waste.
Transfer (Assisted Transfer)		Assisted transfer of refuse material and associated bulk bins or trolleys by tractor, ATV, UTV or bin tug.
Transfer (Manual Transfer)		Manual transfer means physical transfer of refuse material and associated bulk bins or trolleys without assistance.
Waste		Waste is referred to as refuse material with the exclusion of recycling, green waste, hazardous waste, special waste, liquid waste and restricted solid waste.
Waste (General Waste)		General waste is generally referred to as material free of any actual or apparent contamination such as pathological / infectious, radioactive materials and / or hazardous chemical. Reporting use is for material considered to be free of food waste.
Wheelie Bin		A wheelie bin is referred to as a MGB of up to 360L, usually with 2 wheels for easy transfer. A common type is a 240L wheelie bin used for kerbside collection in many residential areas.
Measures		
Cubic Metre	m ³	Volume in cubic metre(s) related to refuse management equipment.
Ground Floor Area	GFA	The GFA of all storeys of a building is measured from the outside of the external walls or the centre of a common wall. It is commonly measured in square metres.
Kilogram	kg	Kilogram(s) related to refuse weight.

TERM	ABBREVIATION	DEFINITION
Litre	L	Litre(s) related to refuse volumes.
Metre	m	Distance or dimensions related to bins, refuse management equipment and refuse transfer paths.
Square Metre	m ²	Square metre(s) related to refuse areas.
Ton	T	Ton(s) related to refuse weight.
Collection Vehicles		
Body Truck / Van		Body trucks and vans are conventional (heavy or light commercial) vehicles with a covered loading area. They are generally not specifically designed for emptying the content of bins into the truck during refuse collections, but can be used to carry entire (full) bins for servicing by bin swap-over. Vehicles with specialised equipment are available, e.g. for collection of secure destruction paper.
Rear-End-Loading Refuse Collection Vehicle	REL RCV	A REL RCV is a truck specially designed to collect municipal solid waste and recycling, typically 240L wheelie bins to 1100L bulk bins, from rear loading mechanism and haul the collected waste to a solid waste treatment facility.
Tank Truck		A Tank truck is a RCV that is specifically designed to collect liquid wastes such as waste cooking oil and food waste pulp. The waste is typically pumped from a waste storage tank into the truck via a hose. Liquid waste management equipment is often provided by the contractor who collects the waste and operates the truck.

Appendix F Construction Waste Management Plan

DRAFT CWMP DOCUMENT

At SSDA stage, TTM has provided a CWMP template populated with available information with a view to completing when quantities are better known. This document will also be aligned with Construction Traffic Management Plans. The Operational Waste Management Plan (OWMP) will also be updated through the detailed design and construction stages.