

Sydney Metro

PITT STREET NORTH OVERSTATION DEVELOPMENT

Appendix T - Waste Management Plan

**State Significant Development,
Development Application (SSD DA)**

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

9 July 2020

Revision C

Issue for DPIE

SMCSWSPS-TTM-OSN-PL-REP-000001

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Executive Summary

This report represents the provision of Waste Management Planning for the Pitt Street North Over Station Development (OSD). The site is located within the Sydney CBD, at 252 Pitt Street, Sydney. 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 25 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 North 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. 	Appendix A Section 2 Section 2.1, Section 4
OSD North SEARs: 7. Ecologically Sustainable Development (ESD)	<p>The Environmental Impact Statement shall</p> <ul style="list-style-type: none"> Detail how ecologically sustainable development principles (as defined in clause 6(4) Schedule 2 of the Environmental Planning Assessment Regulation 2000) will be incorporated in the design, Construction and operation of the development. Include a framework for how the proposed development will reflect national best practice sustainable building principles to improve environmental performance, including energy and water efficient design and technology, use of renewable energy and 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>The Sustainability Strategy for the development should be prepared in line with concept approval.</p>	All Sections Food Waste: Section 2, Appendix C.4 Section 2

Item	Description of Requirement	Section Reference (this report)
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.	1. The Proponent must assess predicted waste generated from the project during construction and operation, including: 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.	Appendix A See Construction Waste Management report See Section 2 See Construction Waste Management report Section 3, Appendix C.4 See Construction Waste Management report Various section, in particular Section 2.
	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- to be completed by building and construction company (CPB).

CONDITIONS OF CONSENT

This report has also been prepared in response to the following Condition of Consent for the **State Significant Development Concept (SSD 8875)** 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.

UPDATES SINCE PREVIOUS SUBMISSION

Table ES.3 summarises all amendments completed between submission of revision 2 and revision 3 of this report.

Table ES.2: Report Amendments Summary

Item	Description of Amendment	Section Reference (this report)
Report Description	Addition of Sydney Metro cover page	Pre- TTM Cover / Revision Record Page
SEARS Requirements	SEARs Requirements Summary and Table added to executive summary	Executive Summary – SEARS (Page 2)
	SEARs Requirements Section, Summary and Table removed from Introduction	Introduction – Section 1.33 (Previous Page 11)
Conditions of Consent	Conditions of Consent - Summary and Table added to executive summary	Executive Summary – SEARS (Page 3)
	SSD Section, Summary and Table removed from Introduction	Introduction – Section 1.34 (Previous Page 12)
Local Authority Requirements	Added to Executive Summary	Executive Summary – (Page 5)
Waste Management Plan Summary	Amendment to previous waste management information including new heading	Executive Summary – (Pages 5 -8)
Background and Site Information	Amendment to Background and Site information including updated and additional figures	Introduction (Pages 12 -18)
Introduction Headings	Scope – amended from 1.2 to 1.3	Introduction (Previous Page 9 to Page 19)
	Regulatory Considerations from 1.3 to 1.4	Introduction (Previous Page 10 to Page 20)
Report Contents	Remaining contents unchanged - page re-alignment as per table of contents	Page 22 to 39
Appendices	Drawing reference change Page	Page 44
	Remaining appendices unchanged - page re-alignment as per table of contents	Page 40 to 82

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 MANAGEMENT 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 North OSD will consist of a commercial building with retail tenancies on the ground floor and commercial offices on upper levels (levels 5-35). All refuse generated by this development is considered as commercial refuse.

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:

The following information represents the total number of bins to be presented for collection each day for the OSD North only – details on full waste operations including the total number of bins required for storage and exchange are outlined in various sections throughout the report.

- Proposed bin and equipment numbers
 - General waste: 4 x 1100L bins
 - Food Waste 1 x 6000L Tank (Using Food Waste System e.g. Pulpmaster with food waste macerator and storage tank, or ORCA digester) – Note: Tenancy types to be determined and food waste separation only required for F&B outlets if nominated for tenancies
 - Commingled recycling: 4 x 1100L bins
 - Cardboard: Use of Cardboard Baler producing 2-3 x 100KG bales per collection
 - Glass: 8 x 60L (Assumes separation and crushing of glass)
 - Recycled Office Paper: 9 x 240L Bins (Office bins fill at different rates therefore collection cycles vary. The bin numbers nominated are for exchange with bins as they fill and will be presented for service daily to ensure empty bins are available for exchange for each business day)

- (Secure) Office Paper: 1 x 240L per office level as required. Security or confidential paper bins are typically collected directly from each level or office by the collecting driver.
- Refuse collection
 - All refuse will be collected on-site from the MRV bay within the loading dock on the ground level of the building.
 - Site access to the loading dock is via Castlereagh Street. Maximum MRV sized rigid refuse vehicles are to be used. There are “NO” residential collections in this building and therefore council vehicle access is not required.
 - Recommendations for equipment and number of bins have been calculated based on a specific number of collection days for each refuse stream. Typically, collection are 5-7 days per week for each refuse stream and subject to opening days for the building (Note all waste areas allow for at least one day of storage capacity to match either a 5 or 7 day operation – the collection frequency will align with the operations of the building (i.e. Office may be 5 days whilst the Retail may operate for 6-7 days per week depending on demand).
 - If required, food waste, separated and pulped can be serviced by a vacuum tanker once every 7 – 14 days depending on tank size and volumes generated. The tank location does not need to be in close proximity to the loading dock area as tanks may be emptied via service pipe connection which terminates at the MRV bay and includes a pipe end with camlock fitting for easy connection to the service vehicle pipes and pump. The service pipe may be up to 30m in length.
- Storage Areas / Rooms
 - Retail refuse is stored on level 2
 - Office refuse is stored on Level 9 with further processing of cardboard and if required, food waste refuse streams can be completed on level 2 utilising baling and food waste processing equipment on that level.
 - Exchange bins are held in a refuse room on Level 00 within the loading dock area. These bins are used for the exchange of bins - “full for empty” – from the level 2 & 9 refuse rooms as required.
 - Level 00 also provides temporary storage space for the OSD processed - cardboard (Bales), Glass (Crushed Glass Bins) & if required Food Waste (storage tank, Bags or Bales – depending on the system used).
 - All refuse rooms and temporary storage areas are suitably sized to accommodate the recommended equipment, as demonstrated in waste room configuration drawings, within the appendices of the report.
 - Refuse rooms are configured to hold waste generated over one 24-hour period. It should be noted that this allows for collections to align with a 5-day or 7-day operation.

- The refuse room proposed use a combination of standard and volume reduction equipment.
- If required, food waste separated and pulped can be stored in tanks. Depending on the number and size of the tanks that can be installed food waste can be stored between 7-14 days between collection cycles
- Storage of infrequently generated waste such as bulky items, electronic waste will be arranged with the building management. Given the restrictions on loading dock size and storage capacity these items will likely be stored within each office or tenancy and collected directly from source by the collection driver.
- Hazardous waste such as batteries, bulbs containing mercury or florescent bulbs will be stored and collected as outlined above or immediately removed by the associated maintenance, electrical service supplier.

Example: OH&S typically requires light bulbs or florescent lights to be replaced by an electrical or maintenance contractor – the contractor will remove all replaced lights and dispose of them off site as part of that particular contract.

- Refuse transfer

- Office level transfer is typically completed by cleaners and refuse placed in the level 9 refuse room noting that all bulk cardboard, glass (if separated) and food waste will then be transferred to the level 2 waste rooms for processing.
- Refuse from the level 9 and Level 2 waste rooms will then be transferred by building staff to the ground level and exchanged for empty bins from the ground floor refuse room as they are serviced cleaned and made available for re-use. Level 9 includes transfer of Office Recycled Paper bins.
- In the case of a pulping system, food waste transfer would be completed via a 50mm pressurised pipe from the upper levels and delivered to holding tanks on the ground level.
- As previously described the OSD loading dock is used as part of the transfer and collection of the Station Refuse stored in Basement 4 (north)

Note: The loading bay is also used for servicing of the Station Refuse which is transferred from basement 4 via the station lift. Transfer is to align with exact time of service (appendices drawings are shown for station refuse transfer for the purpose of context).

- Refuse disposal
 - Each office tenancy / occupant will be provided with space within the kitchen or kitchenette areas for placement of bins to dispose of waste recycling and possibly food waste by staff, subject to specific tenant fit out.
 - Office fit outs typically include space for 240L bins in proximity to printers and small recycling bins either under or beside desks for disposal of office recycled paper.
 - Management of office paper bins will include 31 x 240L bins, one for each office level, and space for 16 exchange bins within the level 9 waste room. Not all office levels fill bins at the same rate and therefore bins will be exchanged full for empty as required and the full bins on level 9 transferred to the loading dock for service as required by the building staff.
 - Retail tenancies will have allowance for placement of bins within the back of house areas for disposal of all waste and recycling streams and this is typically determined by the fit-out design that suites each retail operation.
 - All provisions as mentioned above should allow for a least on 24-hour period of storage for all refuse streams with the exception of food waste which is typically collected and transferred to appropriate waste rooms after each operational period or after close of business each day.

Contents

1	Introduction	12
1.1	Background	12
1.2	Site Information	13
1.2.1	The Site.....	13
1.2.2	Sydney Metro Description	14
1.3	Scope.....	19
1.4	Regulatory Considerations	20
1.4.1	Protection of the Environment Operations Act.....	20
1.4.2	Waste Avoidance and Resource Recovery	20
1.4.3	Council's Refuse Planning Scheme	21
1.4.4	Waste Levy	21
1.5	Development Summary.....	22
1.6	Development Refuse Profile.....	22
2	Refuse Management.....	24
2.1	Refuse Collection.....	24
2.1.1	Bin Quantities.....	24
2.1.2	Collection Cycle	25
2.1.3	Refuse collection Arrangements and RCV Access and Manoeuvring	25
2.2	Refuse Storage	29
2.3	Refuse Transfer	29
2.4	Refuse Disposal	29
2.4.1	Frequently Generate Refuse (All Levels)	29
2.4.2	Infrequent Waste	32
3	Recommended Operational Requirements.....	33
3.1	Operational Equipment Summary	33
3.2	On-going Management	33
3.2.1	Safety.....	34
3.2.2	Signage	34
3.2.3	Cleaning and Maintenance.....	35
3.2.4	Refuse Minimisation.....	35

3.2.5	Education and Communication	36
3.2.6	Monitoring and Review	36
4	Recommended Design Requirements.....	37
4.1	Temporary Bin Storage and Bin Servicing Point	37
4.2	Refuse Rooms.....	37
4.3	Bin Wash	38
4.4	Storm Water Prevention and Litter Reduction	39
4.5	Ventilation	39
4.6	Bin Carting.....	39
Appendix A	Detailed Refuse Calculations.....	40
A.1	Refuse Generation Rates.....	41
A.2	Commercial Refuse Calculations	41
A.3	Commercial Refuse Volume to Weight Conversion.....	42
Appendix B	Site Plans and Drawings.....	43
B.1	Preliminary SSDA Drawings	44
B.2	Refuse Collection, Storage and Transfer	48
B.3	Refuse Storage Room Configurations.....	53
Appendix C	Systems and Specifications	57
C.1	Typical Refuse Bins	58
C.2	Typical Refuse Management Equipment.....	60
C.3	Refuse Transfer and Disposal Methods.....	63
C.4	Refuse Minimisation Options	64
C.5	Refuse Management Equipment Suppliers	69
C.6	Refuse Management Service Providers.....	72
Appendix D	Refuse Signage	73
D.1	Refuse Signage	74
D.2	Other Refuse, Facility and Safety Signage	75
Appendix E	Terms and Abbreviations.....	76
Appendix F	Construction Waste Management Plan.....	80

Table Index

Table 1.1: Scope Items	19
Table 1.2: Waste Management Plan Compliance Checklist	21
Table 1.3: Development Summary	22
Table 1.4: Commercial Refuse Summary	23
Table 1.5: Waste Levy Costs	23
Table 2.1: Number of Bins or Items per Collection	24
Table 2.2: Estimated Commercial Refuse Collection Vehicle Demands	25
Table 2.3: Disposal Details	30
Table 2.4: Disposal of Infrequently Generated Waste	32
Table 3.1: Equipment Schedule	33
Table 3.2: General Refuse Management Checklist	33
Table 3.3: Safety Checklist	34
Table 3.4: Signage Checklist	34
Table 3.5: Cleaning and Maintenance Checklist	35
Table 3.6: Refuse Minimisation Checklist	35
Table 3.7: Education and Communication Checklist	36
Table 3.8: Monitoring and Review Checklist	36
Table A.1: Generation Rates	41
Table A.2: Refuse Calculations	41
Table A.3: Waste Levy - Refuse Volume to Weight Conversion	42

Figure Index

Figure 1.1: Location Plan	13
Figure 1.2: Sydney Metro Alignment Map	15
Figure 1.3: Pitt Street Station – North (East-West Section)	16
Figure 1.4: Pitt Street Station – North (North-South Section)	16
Figure 1.5: Pitt Street North Concept SSD DA – Envelope – South Elevation	17
Figure 1.6: Pitt Street North Concept SSD DA – Envelope – East Elevation	18
Figure 1.7: Pitt Street North Concept SSD DA – Envelope – West Elevation	18
Figure 2.1: Small sized commercial collection vehicle	26
Figure 2.2: Typical Food Waste Collection Vehicle and Connections	26
Figure 2.3: Typical Glass Waste Collection Vehicle	27
Figure 2.4: Typical Bulky Goods / Hazardous Waste Collection Vehicle	28

1 Introduction

1.1 Background

This report has been prepared to accompany a detailed State Significant Development (SSD) development application (DA) for a commercial mixed-use Over Station Development (OSD) above the new Sydney Metro Pitt Street North Station. The detailed SSD DA is consistent with the Concept Approval (SSD 17_8875) 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 25 October 2019.

The detailed SSD DA seeks development consent for:

- Construction of new commercial tower of approximately 38 storeys
- The tower includes maximum GFA, excluding floor space approved in the CSSI.
- Integration with the approved CSSI proposal including though not limited to:
 - Structures, mechanical and electronic systems, and services; and
 - Vertical transfers.
- Use of spaces within the CSSI 'metro box' building envelope for the purposes of:
 - Retail tenancies;
 - Commercial lobby and commercial amenities;
 - Car parking spaces within the podium for the purposes of the commercial premises; and
 - Loading and services access.
- Utilities and services provision.
- Stratum subdivision (staged).

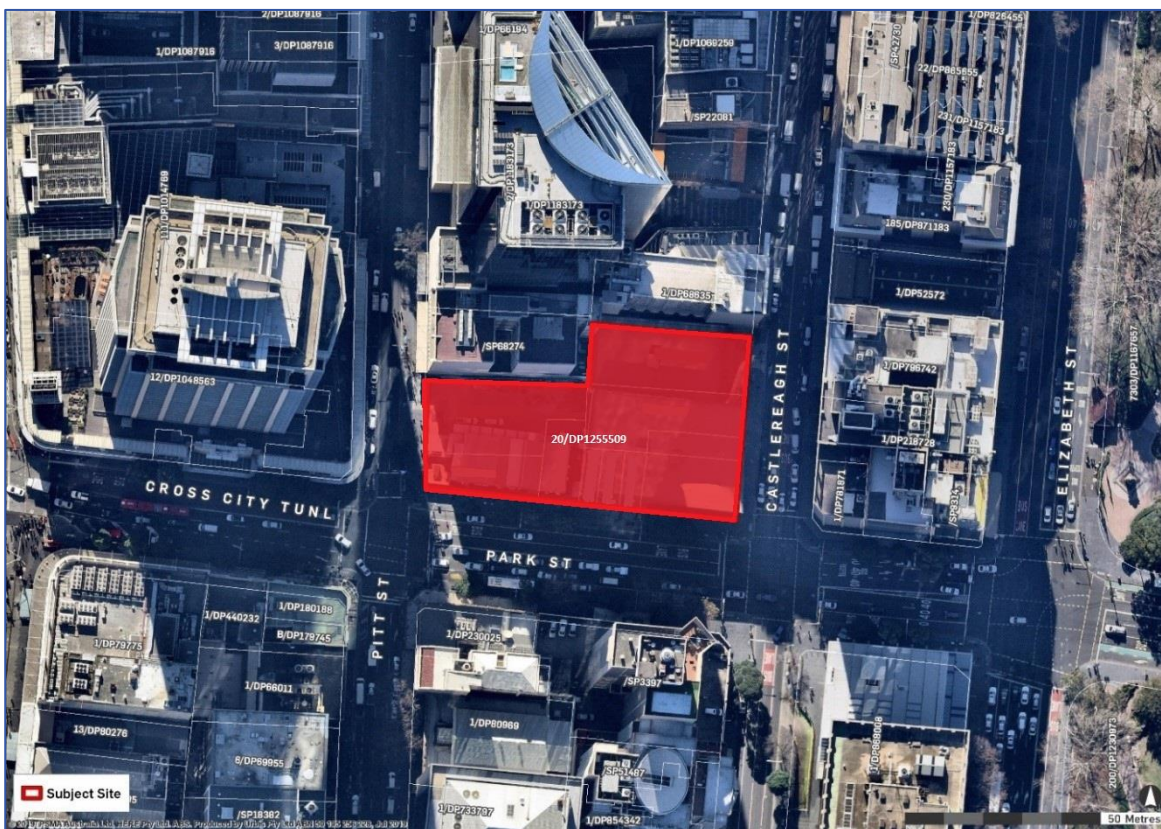
1.2 Site Information

1.2.1 The Site

The site is located within the Sydney CBD. It has three separate street frontages, Pitt Street to the west, Park Street to the south and Castlereagh Street to the east. The area surrounding the site consists of predominantly commercial high-density buildings and some residential buildings, with finer grain and heritage buildings dispersed throughout.

The site has an approximate area of 3,150.1sqm and is legally described as follows:

- 252 Pitt Street (Lot 20 in DP1255509)



Source: Urbis

Figure 1.1: Location Plan

1.2.2 Sydney Metro Description

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:

1. 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.

2. 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.

3. 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.

4. Sydney Metro – Western Sydney Airport

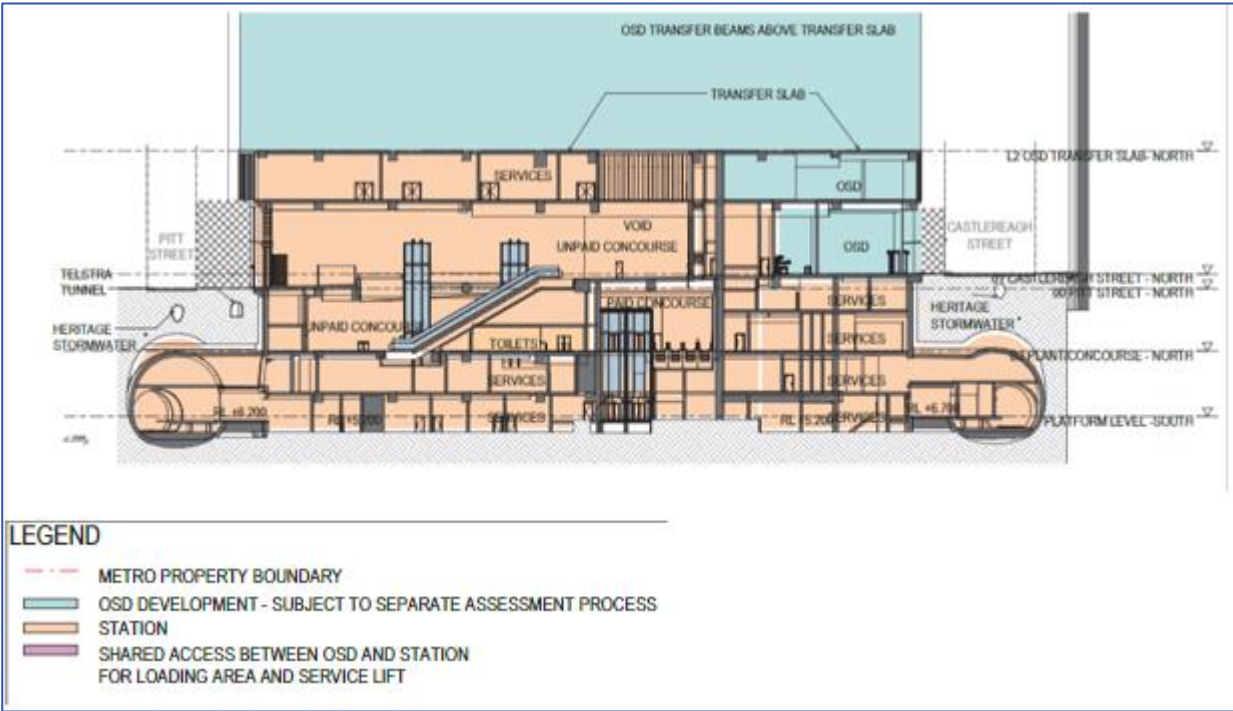
Metro rail will also service Greater Western Sydney and the new Western Sydney International (Nancy Bird Walton) Airport. The new railway line will become the transport spine for the Western Parkland City's growth for generations to come, connecting communities and travellers with the rest of Sydney's 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.



Figure 1.2: Sydney Metro Alignment Map

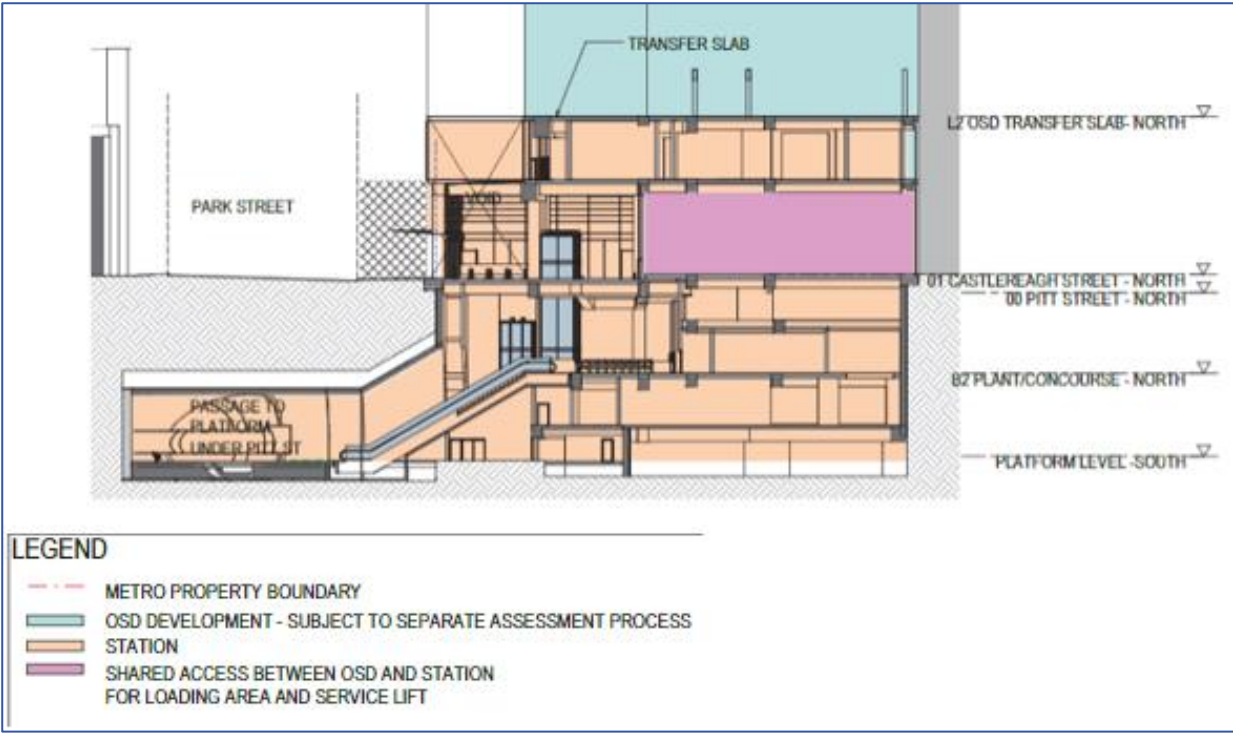
On 9 January 2017, the Minister for Planning approved the Sydney Metro City & Southwest - Chatswood to Sydenham project as a Critical State Significant Infrastructure project (reference SSI 15_7400) (CSSI Approval). The terms of the CSSI Approval includes all works required to construct the Sydney Metro 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 North 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 (East-West Section)



Source: CSSI Preferred Infrastructure Report (TfNSW)

Figure 1.4: Pitt Street Station – North (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:

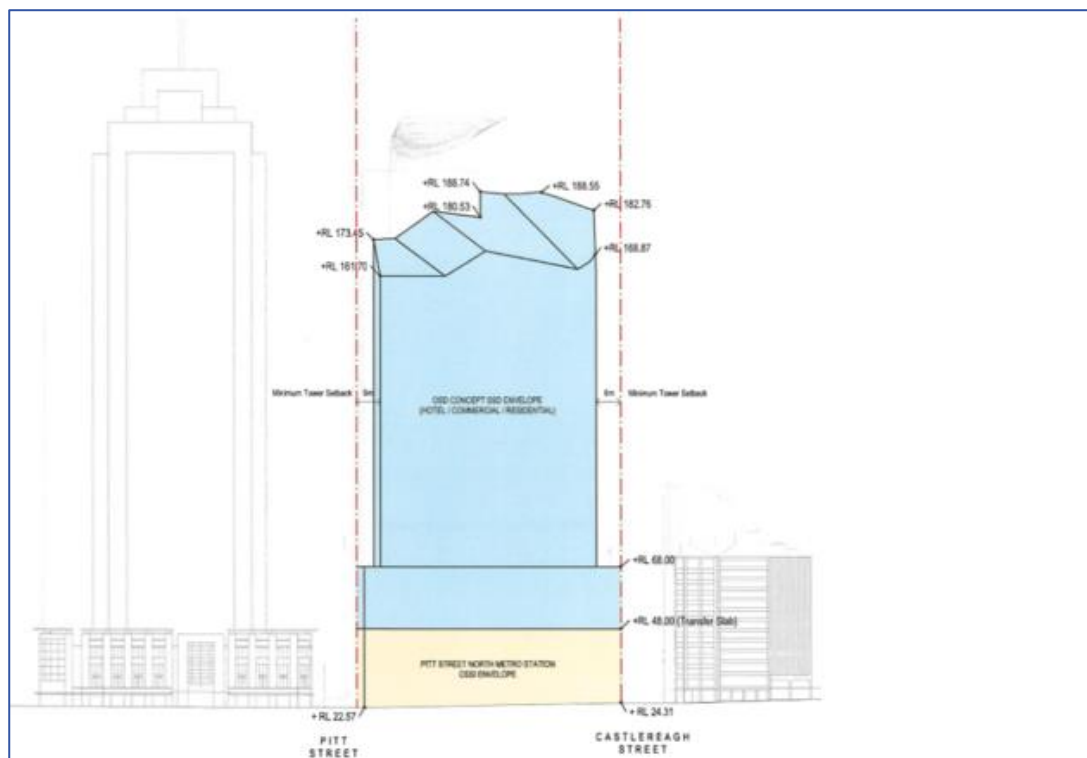
The CSSI Approval provides consent for the construction of all structures within the approved “metro box” envelope for Pitt Street North.

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 North Station Design & Precinct Plan.

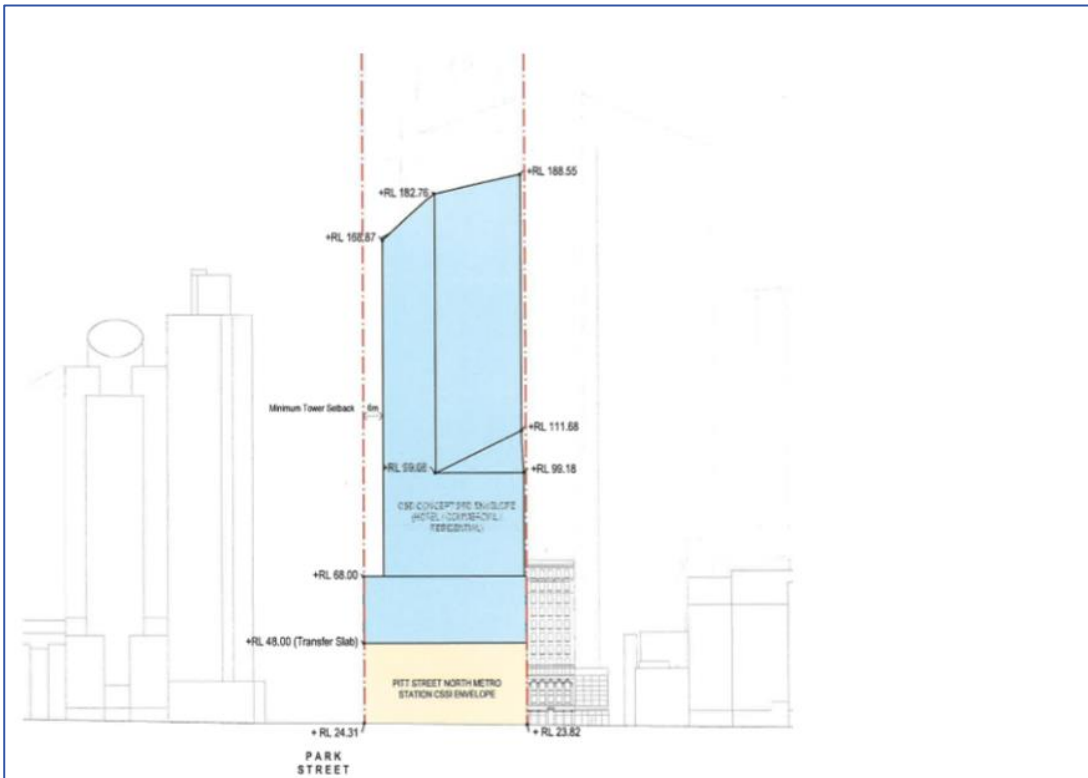
Separate development consent however is required to be issued by the NSW DPIE for the use and fit-out of space within the “metro box” envelope for areas related to the OSD, and notably the construction and use of the OSD itself.

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.



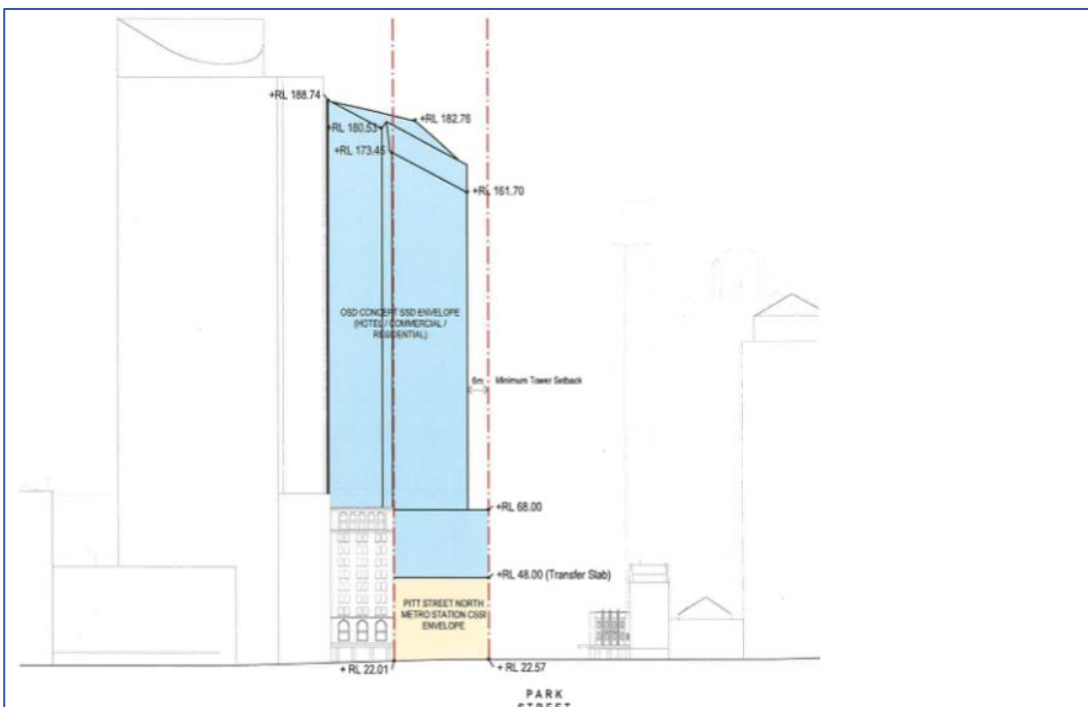
Source: SSD 8875 Concept Stamped Plans

Figure 1.5: Pitt Street North Concept SSD DA – Envelope – South Elevation



Source: SSD 8875 Concept Stamped Plans

Figure 1.6: Pitt Street North Concept SSD DA – Envelope – East Elevation



Source: SSD 8875 Concept Stamped Plans

Figure 1.7: Pitt Street North Concept SSD DA – Envelope – West Elevation

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 vehicular collection and associated bulk storage prior to describing internal transfer and specific disposal points. 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 is 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. A construction waste management plan (CWMP) is under development and will be included in the appendices in line with amendments to the WMP during the latter design and construction stages. A CWMP template can be made available for review where and if required for assessment

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 waste management plan (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 below 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 signed 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

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	Retail Refuse Storage	329m ² GFA Refer to Appendices
Level 1	Plant	N/A
Level 2	Retail	995m ² GFA
Level 3	Commercial / Podium Lift Lobby	Public Space
Level 3	OSD Office	20m ² GFA
Level 4	Plant	N/A
Level 5-8	Commercial Offices	46,762m ² GFA
Level 10-34	Commercial Offices	
Levels 9	Plant – Includes Refuse Room for Commercial Offices	N/A
Levels 35	Roof Pavilion	N/A

* Areas and unit numbers relevant for refuse generating areas and used as part of waste generation calculations only.

1.6 Development Refuse Profile

THE OSD – North will consist of a commercial building with retail and food and beverage tenancies on the lower levels (ground level and podium level 2) and commercial offices on upper levels (levels 5-35). Level 1 is primarily Plant and however includes end of trip facilities that may generate some refuse. Level 3 is designated as the Commercial and Podium Lifts Lobby and treated as a public space for waste generation purposes. Level 3 also includes the OSD Management Office.

Table 1.6 demonstrates 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: Commercial Refuse Summary

Level	Description	Measure	Quantity	General Waste (L / Week)	Food Waste (L / Week)	All Recycling (L / Week)
Ground	*Food and Beverage (Restaurant)	GLAR (m ²)	165	1152	1152	5758
	Retail	GLAR (m ²)	165	288	58	2303
Level 2	*Food and Beverage (Restaurant)	GLAR (m ²)	249	1741	1741	8706
	*Food and Beverage (Takeaway)	GLAR (m ²)	249	2786	697	2612
	Retail	GLAR (m ²)	498	871	174	6965
Level 3	Lobby (Reception)	NLA (m ²)	20	28	0	35
Typical Office	Levels 5-8 & 10 - 35	NLA (m ²)	46762	26304	11691	233381
Total	Volume Per Week			33169	15512	49760
	Volume Per Day			4738	2216	7108

*Food and Beverage considered as maximum however allocation and type of tenancies are to be determined and standard retail will produce significantly less refuse.

**Demonstrated volumes before volume reduction (compaction, crushing or processing). Recycling includes % of Cardboard and Glass that can be baled or crushed which significantly reduces volumes per day.

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

Table 1.5: Waste Levy Costs

Description	Measure	General Waste	Food Waste *	All Recycling
Quantity (weight)	Tons/year	45.5	133.8	188.2
Estimated additional levy costs (1 st year)	A\$/year	3,414.35	2,007.28	1,246.25

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).)

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

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 medium-rigid vehicle (MRV) or smaller (see Section 2.1.3).

2.1.1 Bin Quantities

Table 2.1 below outlines the number of bins, bales or litres per collection, based on the number collections per week, per refuse stream 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
Commercial Collections	General Waste	1100L Bins	7 Bins
	Commingled Recycling	1100L Bins	4 Bins
	Cardboard	1100L Bins	2-3 Bales
	Food Waste (optional)	Storage Tank	6000L
	Glass (optional)	60L Bins	8

2.1.2 Collection Cycle

Table 2.2 outlines 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 Commercial Refuse Collection Vehicle Demands

Commercial Refuse Collections		Mon	Tue	Wed	Thu	Fri	Sat	Sun	Collections per Week
General Waste	Collection Days	✓	✓	✓	✓	✓	✓	✓	5-7
	Vehicle Type	REL RCV	REL RCV	REL RCV	REL RCV	REL RCV	REL RCV	REL RCV	
Food Waste *	Collection Days	✓							(1 *)
	Vehicle Type	VT							
Commingled Recycling	Collection Days	✓	✓	✓	✓	✓	✓	✓	5-7
	Vehicle Type	REL RCV	REL RCV	REL RCV	REL RCV	REL RCV	REL RCV	REL RCV	
Cardboard	Collection Days	✓				✓			2
	Vehicle Type	REL RCV				REL RCV			
Glass **	Collection Days	✓		✓		✓	✓		(3 **)
	Vehicle Type	SL RCV		SL RCV		SL RCV	SL RCV		
Total Collections per Week		5	2	4	2	4	3	2	Up to 22

* Separate collections only required if food waste is separated from general waste. VT= Vacuum Tanker

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

Note: Sat & Sun only required for retail operations if required to align with 7-day operation

2.1.3 Refuse collection Arrangements and RCV Access and Manoeuvring

Refuse will be collected by private refuse collection contractors MRV sized vehicles or smaller as shown in Figure 2.1. The RCVs will enter the site and loading dock via Castlereagh Street and drive forwards onto the loading bay turntable. Once rotated to the appropriate position the RCV's will reverse into the designated MRV bay. Sufficient space is provided for transferring bins to the rear of the vehicle and lifting the bins for emptying.

Waste & Comingled and Office Paper Recycling

The RCV drivers will retrieve full bins from the refuse storage room or temporary storage area at the rear of the MRV Bay and return them once emptied. Bin moving equipment is not required due to the short distances between the RVC parking position and the refuse rooms.



Source: <https://www.capitalcitywaste.services/>

Figure 2.1: Small sized commercial collection vehicle

Food Waste

Food waste will be collected by a vacuum tanker or similar. The tanker driver will connect to a service pipe with camlock fitting attached to the wall in proximity to the MRV bay. The service pipe is connected to the food waste storage tank.)



4" Kamlock (lid off)



4" kamlock (lid on)



Tanker Hose with 4" Kamlock

Source: <https://pulpmaster.com.au/>

Figure 2.2: Typical Food Waste Collection Vehicle and Connections

Cardboard

Baled cardboard will be stored on pallets. The pallets are moved by either the driver or building staff from the designated storage area to the rear of the MRV bay at the time of collection. The collecting driver will load bales into the rear loading RCV (as per waste and recycling Rear loading RCV) will remove bales from the pallets prior to loading. If bales are collected by a body truck with tail lift, an exchange pallet will be left for the next cycle of storage and collection.

Glass

The bins are moved by either the driver or building staff from the designated storage area to the southern side of the MRV bay at the time of collection. The collecting driver will load bins using a grab arm at the front left side of the Side Loading Collection Vehicle noting that this particular vehicle will be required to park “front-in” to the bay and reverse on to the turntable for rotation and exit in a forward direction.



Source: <http://www.bottlecycler.com/>

Figure 2.3: Typical Glass Waste Collection Vehicle

Bulky / Hazardous

All bulky or hazardous refuse will be transferred to the rear of the MRV bay on or just prior to entry of the servicing vehicle. Typically, the servicing vehicle will be an SRV or MRV body truck with rear barn doors and a tail lifter. All items will be loaded onto the vehicle by the collecting driver using equipment contained in or attached to the vehicle. In this instance the use of a flatbed vehicle if rear crane is also acceptable, subject to height restrictions in the use of the crane.



Figure 2.4: Typical Bulky Goods / Hazardous Waste Collection Vehicle

Details regarding refuse collections, bin movements and permanent or temporary storage areas are demonstrated in Appendix B.2 & B.3 drawings.

2.2 Refuse Storage

The refuse rooms are suitably sized to accommodate the waste generated within a 24-hour period with the number of bins and waste management equipment proposed based on a combination of standard and volume minimisation, storage and collection methods.

Two rooms are located on Level 2 for storage of retail waste and recycling streams. The most northern room has been configured to hold standard 1100L general waste bins and placement of a food waste macerator (or similar). The southernmost room is dedicated to as centralised recycling minimisation and storage and includes 1100L comingled bins, a cardboard baler for cardboard and soft plastics baling and a glass crusher. The total space provided also accounts for storage of full bins for crushed glass and bale storage on pallets at ground level (no stacking)

Storage of infrequently generated waste such as bulky items and electronic waste will be done within the offices or retail tenancies and moved to the loading bay for collection in coordination with the building management.

2.3 Refuse Transfer

A centralised goods lift is provided for transfer of all waste and recycling from the OSD North. The lift provides access to Level 2 and Level 9 for transfer of waste and recycling from the commercial waste rooms on the respective levels. In addition, access is provided for all other associated levels between Level 00 and Level 9.

All waste and recycling will be transferred using the goods lift by building personnel / staff. Typically, operational scheduling will occur that allows the use of the lifts to either align with collection vehicle times or during certain periods to minimise impact on inbound deliveries. This also allows for the lifts to be cleaned after transfer of waste bins and some recycling material.

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) 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 2.4.2) includes material streams that that are generated in relatively low volumes, and where minimal provision for storage can be easily managed by collection frequency.

2.4.1 Frequently Generate Refuse (All Levels)

Refuse from the entire building will usually be disposed by building staff, retail staff or cleaners who take the material from the individual receptacles on every level to the bulk bins or waste minimisation equipment in the refuse room. Separation and processing of food waste is essential for this operation and configuration of refuse rooms.

Table 2.3: Disposal Details

Refuse Stream	Disposal Details
WASTE	
General Waste	<p>Depending on the type of operations of the individual tenancies, different wastes may be produced. Waste bins should always be lined with bags and the bags tied before removal. Waste bins should be accompanied by a recycling bin in order to facilitate separation of general waste and recycling.</p> <p>Retail / Food & Beverage Tenancies</p> <p>For general waste from non-food and beverage outlets, bins of at least 60L capacity should be located in staff rooms, back-of-house or pantry areas. Larger bins can also be placed in areas accessible to the public, e.g. near entrance and exit doors.</p> <p>General waste from food and beverage outlets or areas such as restaurants, takeaways, cafés or the bar 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 café or restaurant operators.</p> <p>Commercial Offices</p> <p>Office waste typically includes food waste in pantry / kitchen areas or in meeting rooms, general non-recyclable material from office activities as well as infrequent wastes such as bulky items, hazardous waste (e.g. printer cartridges) and electronic waste (e.g. computers and screens) (see respective sections for disposal of infrequent wastes). Bins are typically placed near or under desks or workstations, in meeting rooms and in pantries.</p>
Organic (Food) Waste	<p>Separating organic or food waste from general waste is recommended to reduce the total amount of general waste produced.</p> <p>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"> 1. 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 can be used and the content decanted into 140L bins in the refuse room. A purpose-built trolley may be used to transfer caddy bins. 2. Benchtop style equipment such as organic household composter or worm farms are available for use where practical and space allows, e.g. in the commercial offices. Composting should be arranged with the building management. 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.
Cooking Oil Waste	<p>Waste oils should be disposed separately from general waste if large quantities are produced.</p> <p>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 	<p>Depending on the type of operations of the individual tenancies, different recycling materials may be produced. 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 a larger container / bin on a trolley for transport to the refuse room.</p> <p>Retail / Food & Beverage Tenancies</p> <p>For comingled recycling material from non-food and beverage outlets, bins of at least 60L capacity should be located in staff rooms, back-of-house or pantry areas. Larger bins can also be placed in areas accessible to the public, e.g. near entrance and exit doors.</p>

Refuse Stream	Disposal Details
<ul style="list-style-type: none"> semi rigid plastics 	<p>Commingled recycling from food and beverage outlets or areas such as restaurants, takeaways, cafés or the bar 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> <p>Commercial Offices</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>
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 will 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>
Clean Office Paper Secure Destruction Paper	<p>Offices often 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>
Glass	<p>Glass (bottles) should be disposed separately from comingled recycling if large quantities are produced, in particular from the food and beverage tenancies. 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> <p>Glass crushers are recommended as an alternative where large quantities of glass (bottles) are expected, e.g. from restaurants or bars. 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 Refund	Refer to Appendix C.4.

2.4.2 Infrequent Waste

Table 2.4: 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. Equipment, equipment's 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
Commercial & Retail	General Waste	17	1100L bins See Appendix C.2 and C.3.
	Commingle Recycling Bins	9	1100L bins See Appendix C.2 and C.3.
	Food Waste Processing System	1	Commercial Macerator
	Pulpmaster (Recommended) or equivalent	1	Storage Tank See Appendix C.2 and C.4.
	Cardboard Bins (for holding prior to baling)	5	1100L bin Baler: see Appendix C.2 and C.4.
	Cardboard Baler	1	
	Cardboard – Half Pallets (For storage and transfer of Bales)	2	
	Glass Bins	8	See Appendix C.2 and C.4. 60L bins to be used for glass crusher.
	Glass Crusher	1	
	(Secure Destruction) Paper Bins (As required and supplied by tenants)	Up to 30	240L bins
	Refuse Trolleys	As required by cleaning staff	See Appendix C.2 and C.3.

3.2 On-going Management

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

Table 3.2: General Refuse Management Checklist

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

3.2.1 Safety

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

Table 3.3: Safety Checklist

Objectives	Checked	Remarks
Abiding by all relevant occupational health and safety legislation, regulations and guidelines to ensure site safety for 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 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.. An external review is usually conducted 12 to 18 months after the full operation of the building commences.

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 tenant guides & building rules 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 tenants, 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 and loading areas, with regards to post collection cleaning procedures (removal of accumulated loose waste)		

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.

The recommended design requirements are in accordance with 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 RCVs will access the servicing point as described in Section 2.1. The bin service point will have the following features:

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

4.2 Refuse 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 sealable in a way that deters insect and vermin infestation.
- Be fire rated and ventilated in accordance with the National Construction Code – Building Code of Australia.
- Doors must be wide enough to allow for the easy removal of the largest container to be stored (1100L MGB).

- 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 (see Section 4.3 below).
- 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 Wash

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

- Constructed hardstand with a solid concrete base.
- Roofed and designed to prevent entry by 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 solely for the storage of waste and is as much as practicable air locked and deters fly and vermin infestations.
- Is in a well-ventilated portion of the ground floor area and not within 10m of an opening to a food premises or food handling area.

Note: This hard stand with appropriate drainage may be a shared use space such as a van bay – providing the gradient floor sits inside the boundaries of a parked vehicle and does not affect the normal function of the bay. In this instance wide drainage grating is recommended.

4.4 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.

4.5 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.

4.6 Bin Carting

The bin carting route will have 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 have any lips, stairs or steps for bins to be manoeuvred easily.

Appendix A Detailed Refuse Calculations

A.1 Refuse Generation Rates

The generation rates used for the calculation of refuse produced has been generally applied from the City of Sydney's 'Guidelines for Waste Management in New Developments'. These generation rates are based on data from the Commercial Waste Data Review commissioned by the City of Sydney, document dated 22 February 2017. General waste (uncompacted putrescible) and co-mingled recycling waste density factors are applied according to Western Australia Waste Authority figures. Food waste generation is based on a 2016 analysis of the City of Sydney businesses.

Table A.1: Generation Rates

Type	Measure	General Waste	Food Waste	Commingled Recycling
Commercial Refuse				
Co-Working / Offices	L / 100m ² / Day	15	5	25
Restaurant / Dining	L / 100m ² / Day	100	100	500
General Retail	L / 100m ² / Day	20	5	50

A.2 Commercial Refuse Calculations

General waste volumes do not include a compaction ratio. Comingled recycling compaction is prohibited and therefore has not been applied. Compaction may be considered for glass and cardboard / paper. All volumes are calculated based on an operation of 7 days per week.

Table A.2: Refuse Calculations

Description	Quantity	Measure	General Waste (L/Week)	Food Waste (L/Week)	Commingled Recycling (L/Week)	Glass (L/Week)	Cardboard (L/Week)
Retail (General)	662	GFA	1159	232	2780	0	6488
Retail (Food & Beverage)	662	GFA	5707	3589	5645	4050	7381
Commercial Offices	46762	GFA	8768	3507	23381	0	11691
Uncompacted Volumes (L / Week)			14599	3507	31806	4050	25560
Volumes per Day (L / Day)			2080	1047	4544	579	3651
Volumes per Collection (L / Collection) *			2080	1832	4544	374	2921
Collection and Equipment Details	Collections Per Week		7		7	3	3
	Equipment Size		1100	4000	1100	60	Baled
	Equipment Quantity Required		2	1	7	6	2 Pallets
	Total Raw Equipment Area (m ²)		3m ²	4m ²	10.0m ²	4m ²	3m ²
	Refuse Storage Room Size	Multiple Rooms – Refer to Appendices for waste room configurations					

Note: Figures exclude office paper recycling as volumes are determined by the independent office tenants. Design includes rotation bins for offices on level 9 allowing all office level bins to be turned over once every two days if required.

* Cardboard, glass and food waste collection volumes shown are demonstrated as compacted or processed values

A.3 Commercial Refuse Volume to Weight Conversion

Table A.3: Waste Levy - Refuse Volume to Weight Conversion

Description	Measure	General Waste	Food Waste	Commingled Recycling	Glass	Cardboard / Paper
Total Volumes	L / Week	6865	3821	8453	4050	13875
	m ³ / Week	6.9	3.8	8.5	4.0	13.9
Conversion Factor	kg / m ³	150	425	63	174	100
Tonnes	T / Week	1.0	1.6	0.5	0.7	1.4
Tonnes per Year	T / Year	53.7	84.7	27.8	36.7	72.3
Diversión Potential	-	20%	31%	10%	13%	26%
Waste Levy *	\$ / Year	143.60	-	-	-	-

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

Appendix B Site Plans and Drawings

B.1 Preliminary SSDA Drawings

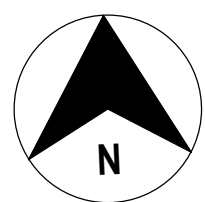
Demonstrated Drawings

Pitt Street Integrated Station Development SSDA

SMCSWSPS-FOS-OSN-AT-DWG-930013_*GENERAL ARRANGEMENT PLAN*_Ground Level_ Revision-P1

SMCSWSPS-FOS-OSN-AT-DWG-930213_ *GENERAL ARRANGEMENT PLAN*_Level 02_ Revision-P1

*SMCSWSPS-FOS-OSN-AT-DWG-930913_ GENERAL ARRANGEMENT PLAN*_Level 09_ Revision-P1



KEY

RETAIL

COMMERCIAL

STATION AREAS (SUBJECT TO SEPARATE DEVELOPMENT APPROVAL)

LEGEND

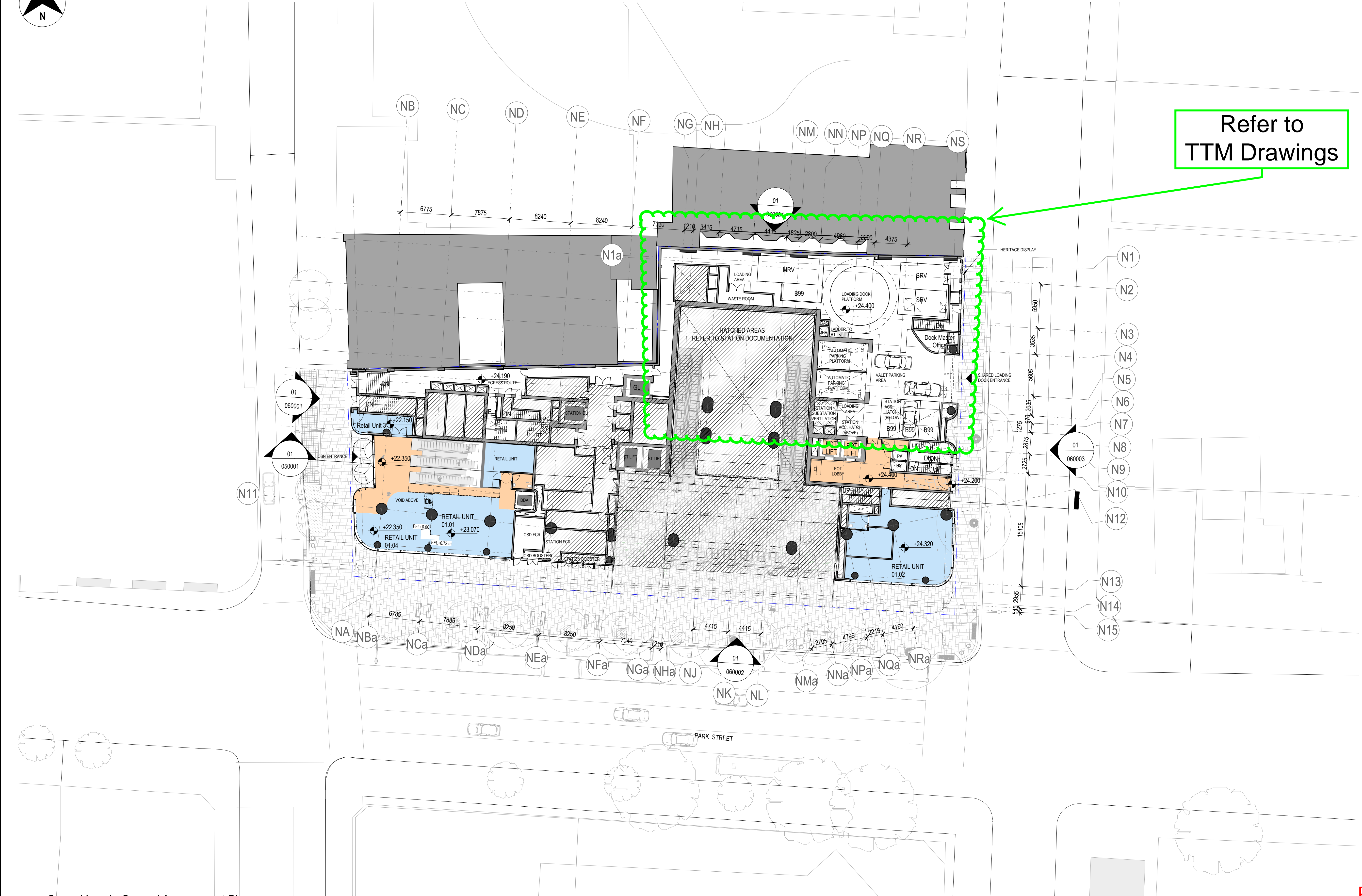
SITE BOUNDARY

WEIGHTED AVERAGE SETBACK

ENVELOPE LINE

NOTE:
01. BUILDING ENVELOPE BOUNDARY UNDER REVIEW BY CPB/CXFORD.
02. SITE SURVEY FILE: NWL/SRT-PPS-OPN-SR-DWG-000003.A.01-INF.DWG, RECEIVED ON 15/11/2019.
NOTE:
DRAWING SUBJECT TO CHANGE AND UNDER COORDINATION DUE TO REVISED SUBSTATION LOCATION TO B1.

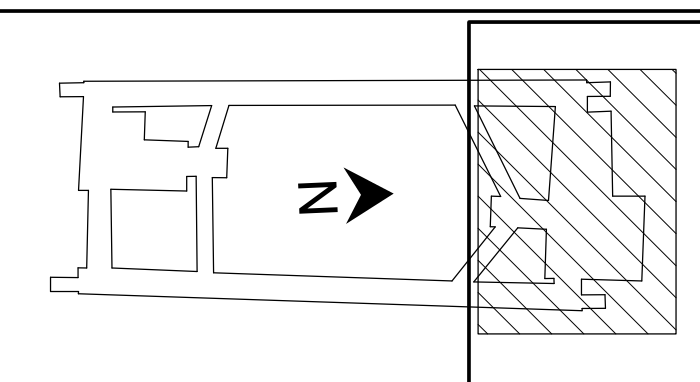
Refer to
TTM Drawings



01 Ground Level - General Arrangement Plan
1:250

PRELIMINARY

REV	BY	DATE	DESCRIPTION	APPD.
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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



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sydney METRO

ISDP
oxford
CPB CONTRACTORS

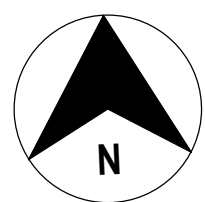
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DRG CHECK
DESIGN CHECK
APPROVED

DRG No: SMCSWSPS-FOS-OSN-AT-DWG-930013
PITT STREET INTEGRATED STATION DEVELOPMENT - OSN
SSDA
GENERAL ARRANGEMENT PLAN
GROUND LEVEL

STATUS:
METRO DRG No.

SHEET 1 OF 1
REV. P1



Refer to
TTM Drawings

KEY

RETAIL

COMMERCIAL

STATION AREAS (SUBJECT TO SEPARATE DEVELOPMENT APPROVAL)

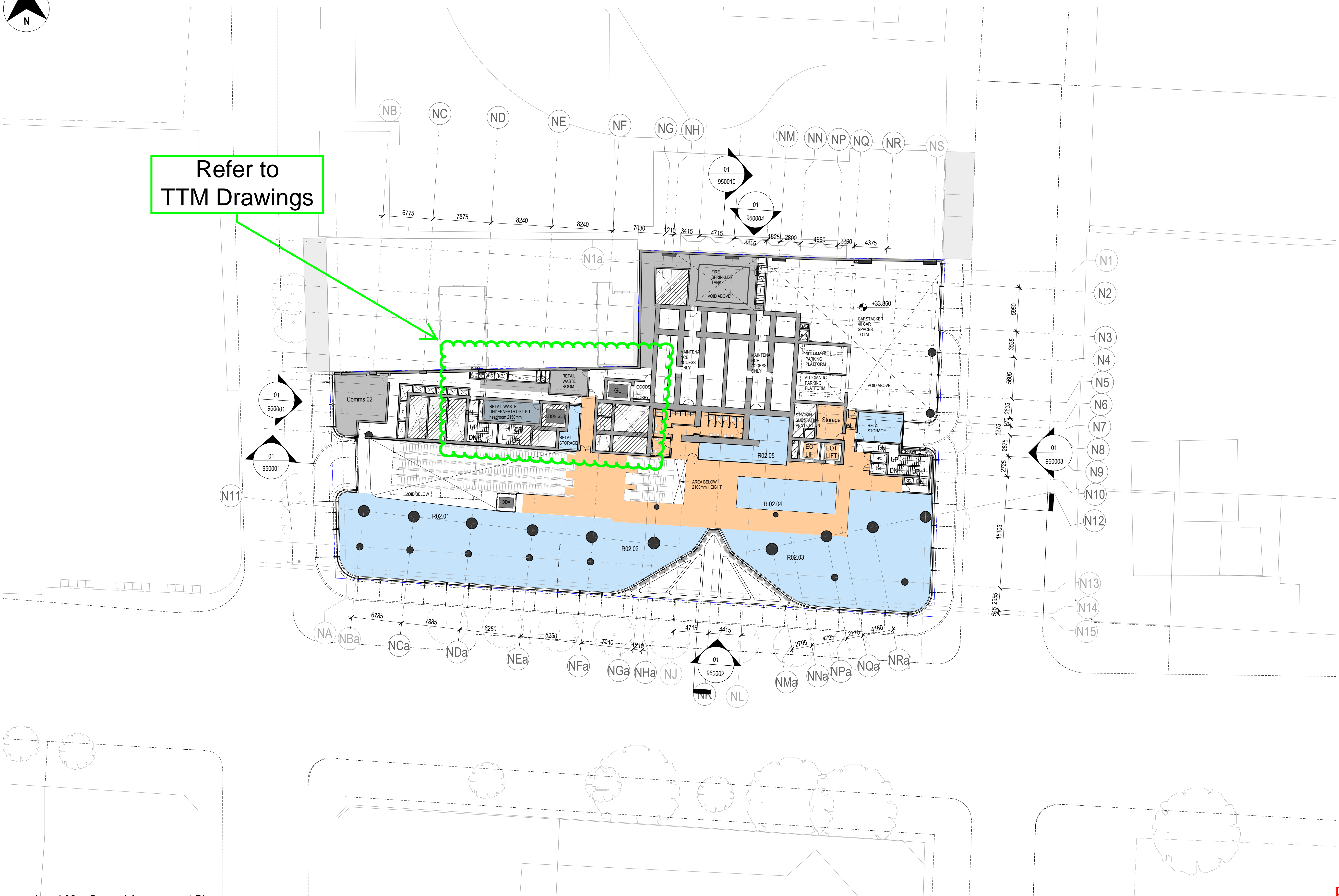
LEGEND

SITE BOUNDARY

WEIGHTED AVERAGE SETBACK

ENVELOPE LINE

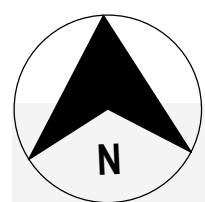
NOTE:
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02. SITE SURVEY FILE NWL/SRT/PPS/OPN/SR.
DWG-000003.A/01.NF.DWG, RECEIVED ON 15/11/2019.
NOTE:
DRAWING SUBJECT TO CHANGE AND UNDER COORDINATION DUE TO REVISED SUBSTATION LOCATION TO B1.



01 Level 02 - General Arrangement Plan
1:250

PRELIMINARY

<table><tr><td>REV</td><td>BY</td><td>DATE</td><td>DESCRIPTION</td><td>APPD.</td></tr><tr><td>P1</td><td>F+P</td><td>17/01/20</td><td>PRELIMINARY - SSDA ISSUE</td><td></td></tr><tr><td>A1</td><td>Original</td><td></td><td>Co-ordinate System: MGA Zone 56</td><td></td></tr><tr><td></td><td></td><td></td><td>Height Datum: A.H.D.</td><td></td></tr><tr><td colspan="5">This sheet may be prepared using colour and may be incomplete if copied</td></tr></table>				REV	BY	DATE	DESCRIPTION	APPD.	P1	F+P	17/01/20	PRELIMINARY - SSDA ISSUE		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					<div>1:250 @ A1</div> <div>0 2.5 5 7.5 10 12.5 m</div>		<div></div> <div>NOTE: Do not scale from this drawing.</div>		<div>CLIENT</div> <div></div> <div>ISDP</div> <div></div>		<div><small>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.</small></div> <div>SERVICE PROVIDERS</div> <div></div> <div>DRAWN F+P</div> <div>DESIGNED F+P</div> <div>DRG CHECK</div> <div>DESIGN CHECK</div> <div>APPROVED</div>		<div>DRG No: SMCSWSPS-FOS-OSN-AT-DWG-930213</div> <div>PITT STREET INTEGRATED STATION DEVELOPMENT - OSN</div> <div>SSDA</div> <div>GENERAL ARRANGEMENT PLAN</div> <div>LEVEL 02</div> <div>STATUS:</div> <div>METRO DRG No.</div> <div>SHEET 1 OF 1</div> <div>REV. P1</div>	
REV	BY	DATE	DESCRIPTION	APPD.																																		
P1	F+P	17/01/20	PRELIMINARY - SSDA ISSUE																																			
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																																						



LEGEND

SITE BOUNDARY

WEIGHTED AVERAGE SETBACK

ENVELOPE LINE

NOTE:

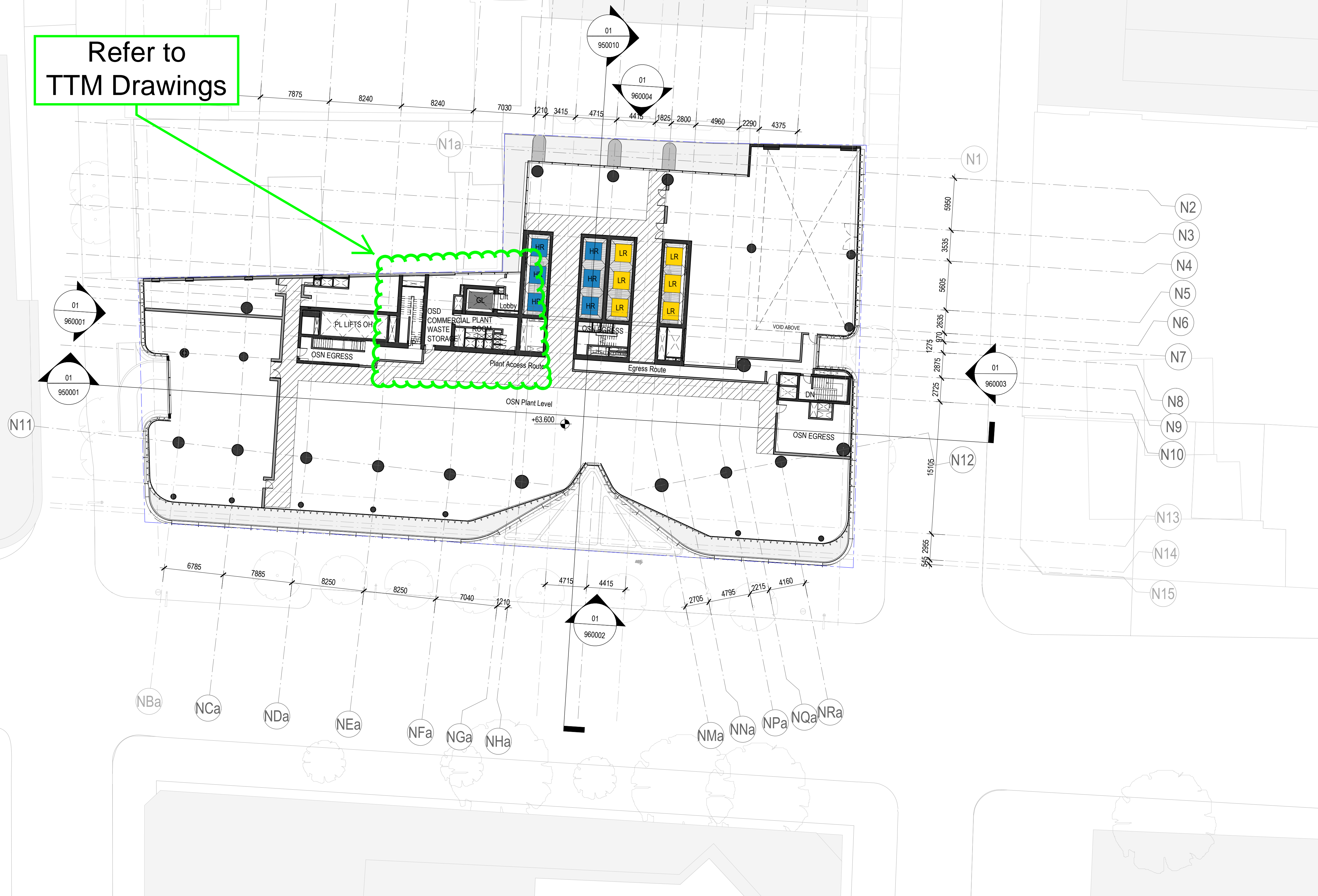
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02. SITE SURVEY FILE NWRL-SRT-RPS-OPW-SR-DWG-000003.A.01 INF.DWG, RECEIVED ON 15/11/2019.

NOTE:

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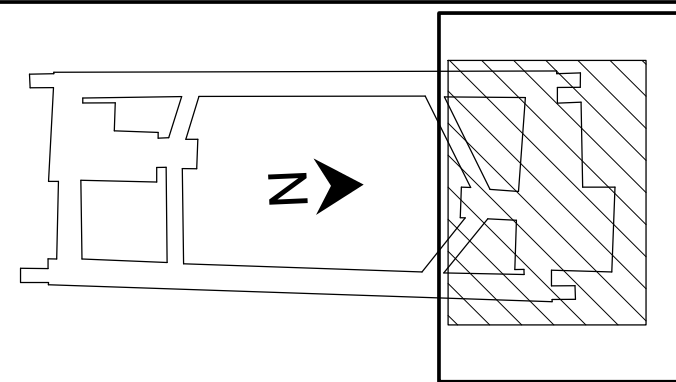
Refer to
TTM Drawings



01 Level 09 - General Arrangement Plan
1 : 250

PRELIMINARY

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ISDP

SERVICE PROVIDERS

DRAWN

DESIGNED

DRG CHECK

DESIGN CHECK

APPROVED

F+P

F+P

DRG No. SMCSWSPS-FOS-OSN-AT-DWG-930913

**PITT STREET INTEGRATED
STATION DEVELOPMENT - OSN**
SSDA
GENERAL ARRANGEMENT PLAN
LEVEL 09

STATUS:

METRO DRG No.

SHEET 1 OF 1

REV. P1

B.2 Refuse Collection, Storage and Transfer

Demonstrated Drawings

Note: drawings include transfer routes for Station North to integrate with the OSD North Loading Dock.

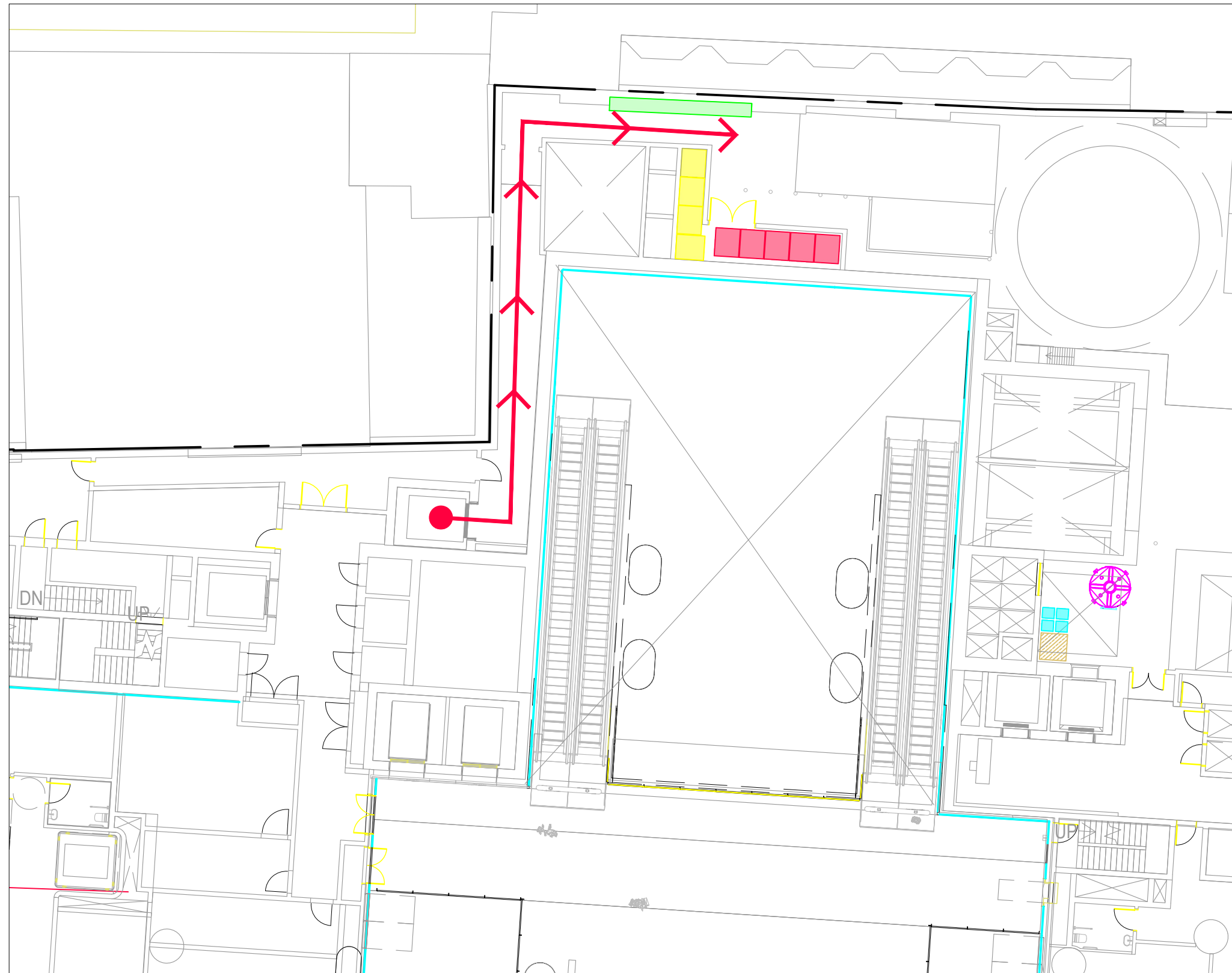
MRV Swept Paths – Refer to Submission Appendix V.1 Transport and Accessibility Impact Assessment Report

TTM -19YW0034-North-LEVEL00-WASTE-TRANSFER

TTM -19YW0034-North-LEVEL02-WASTE-TRANSFER

TTM - 19YW0034-North-LEVEL09-WASTE TRANSFER

MRV Swept Paths – Refer to Aurecon traffic engineering report .



LEGEND:

TRANSFER ROUTE



SPECIFIC START POINT



TRANSFER DIRECTIONAL ARROW



RECYCLING



GENERAL WASTE



TEMP STORAGE FOR PAPER OR STATION BINS

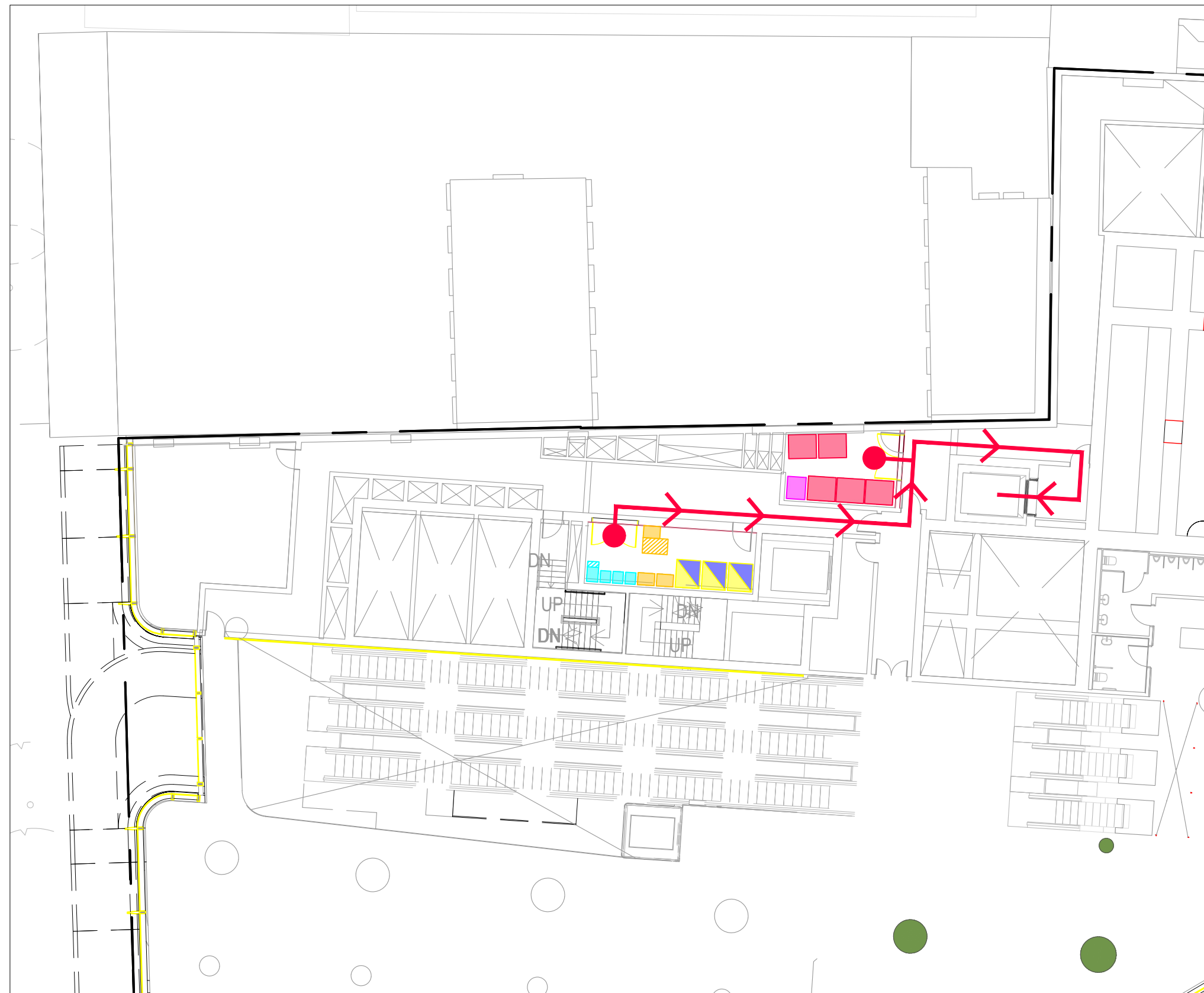


GROUND FLOOR - LOCALITY PLAN
SCALE: N.T.S.

GROUND FLOOR - TRANSFER ROUTE

TRANSFER FROM GROUND FLOOR TO COLLECTION POINT





LEGEND:

TRANSFER ROUTE



SPECIFIC START POINT



TRANSFER DIRECTIONAL ARROW



RECYCLING



GENERAL WASTE



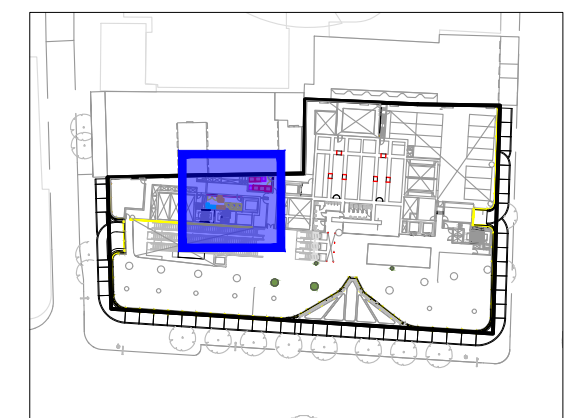
BALER/BALES



FOOD WASTE

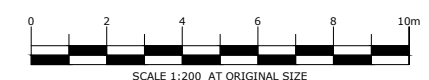


GLASS



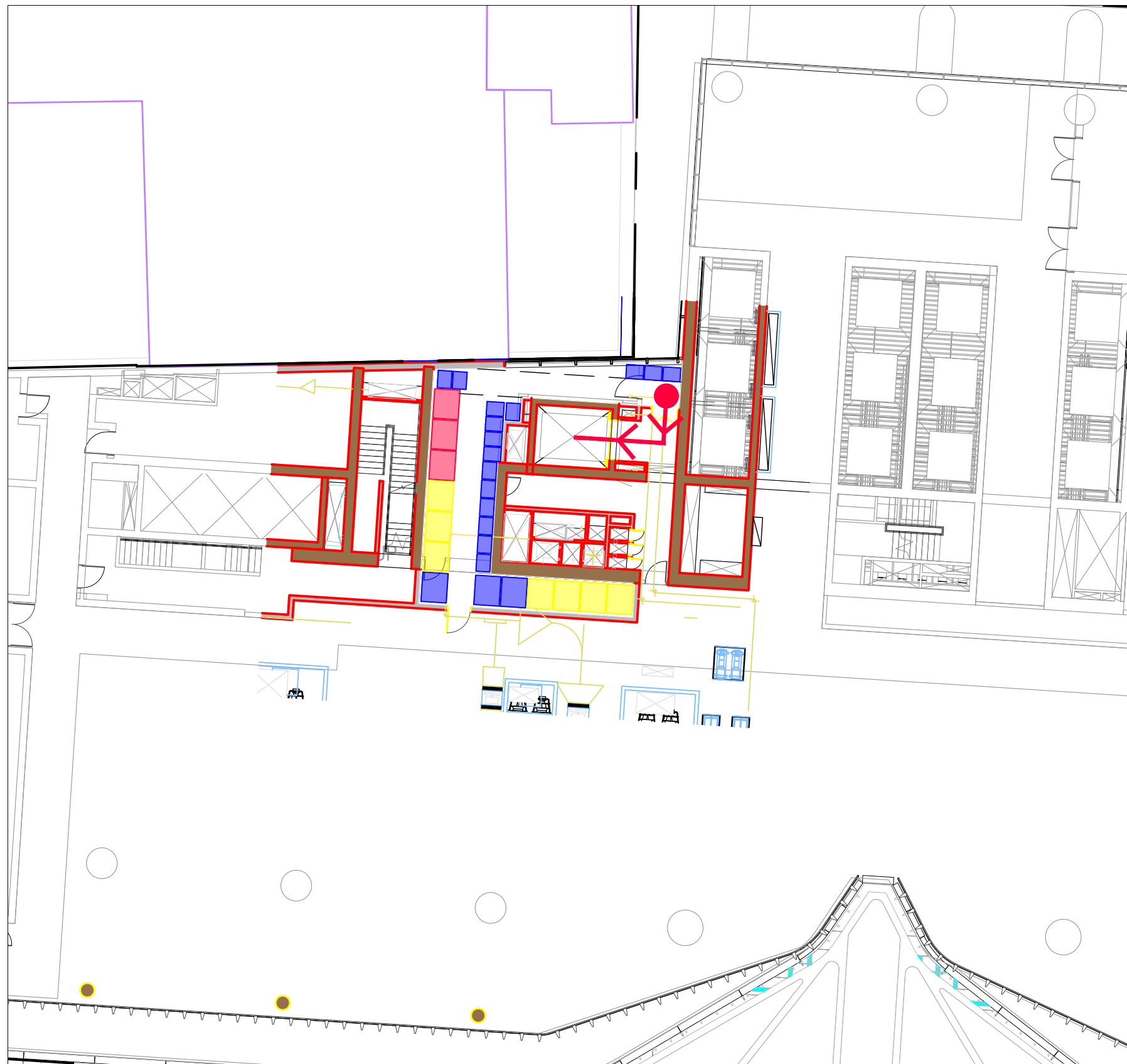
LEVEL 02 - LOCALITY PLAN

SCALE: N.T.S.



LEVEL 2 - TRANSFER ROUTE

TRANSFER FROM LEVEL 2 TO GROUND FLOOR



LEGEND:

TRANSFER ROUTE



SPECIFIC START POINT



TRANSFER DIRECTIONAL ARROW



RECYCLING



GENERAL WASTE



PAPER/CARDBOARD



NOTE:
WASTE COLLECTION FREQUENCY IS EVERY TWO DAYS.



LEVEL 09 - LOCALITY PLAN
SCALE: N.T.S.

LEVEL 9 - TRANSFER ROUTE

CARDBOARD TRANSFER FROM LEVEL 9 TO LEVEL 2
ALL OTHER WASTE TRANSFERRED FROM LEVEL 9 TO GROUND

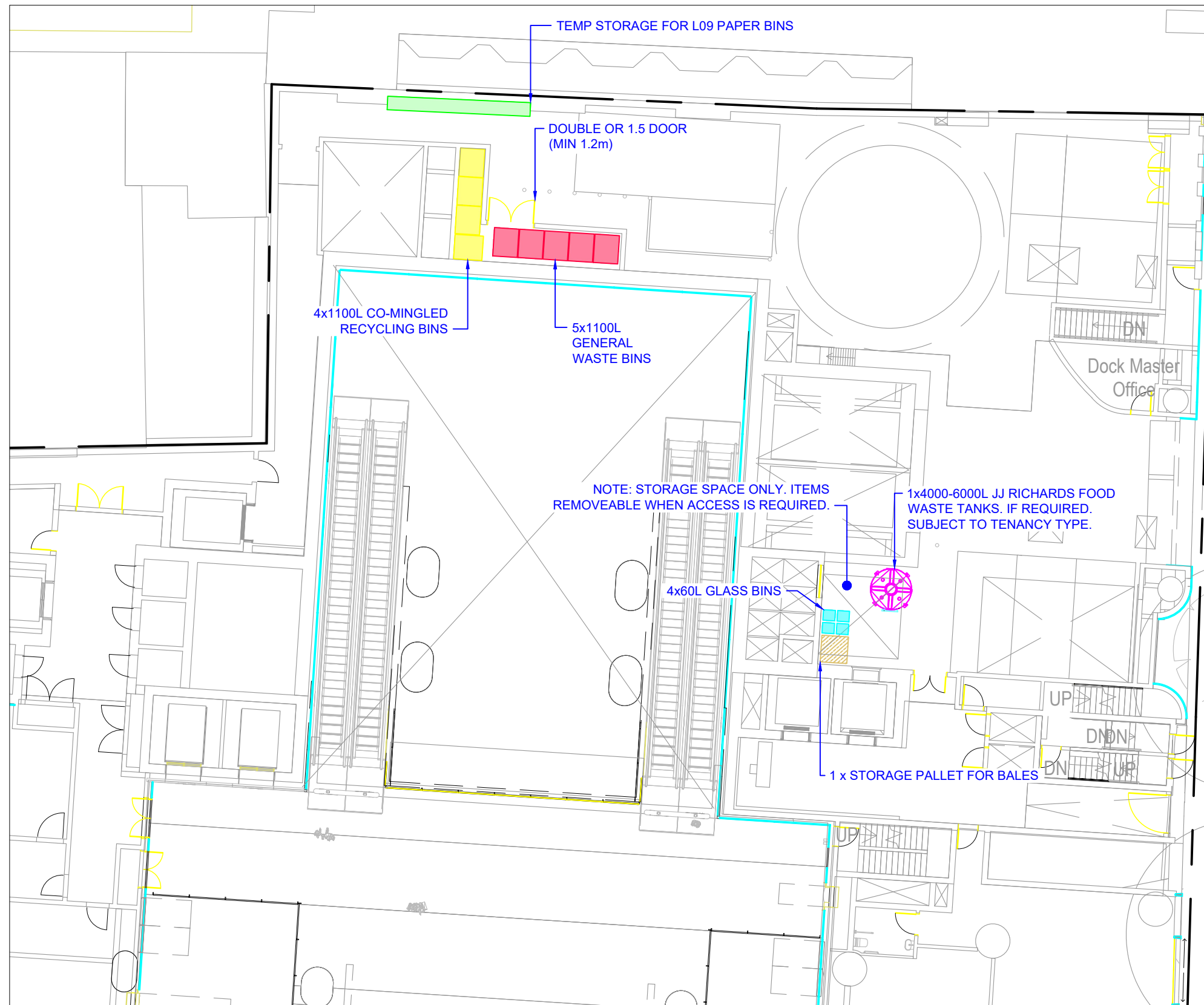
B.3 Refuse Storage Room Configurations

Demonstrated Drawings

TTM – 19SYW0034 -Level 00-Waste-Room

TTM – 19SYW0034 -Level 02-Waste-Room

TTM – 19SYW0034 -Level 09-Waste-Room



LEGEND:



RECYCLING



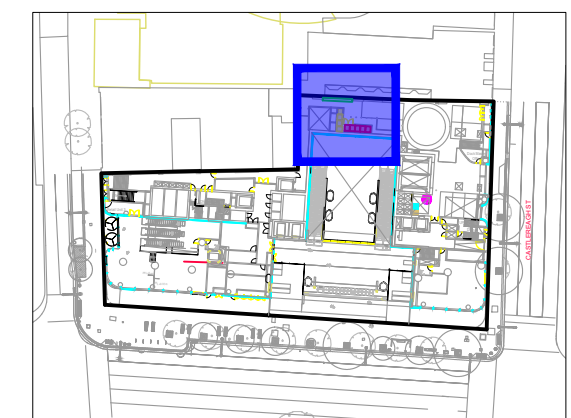
WASTE



FOOD



GLASS

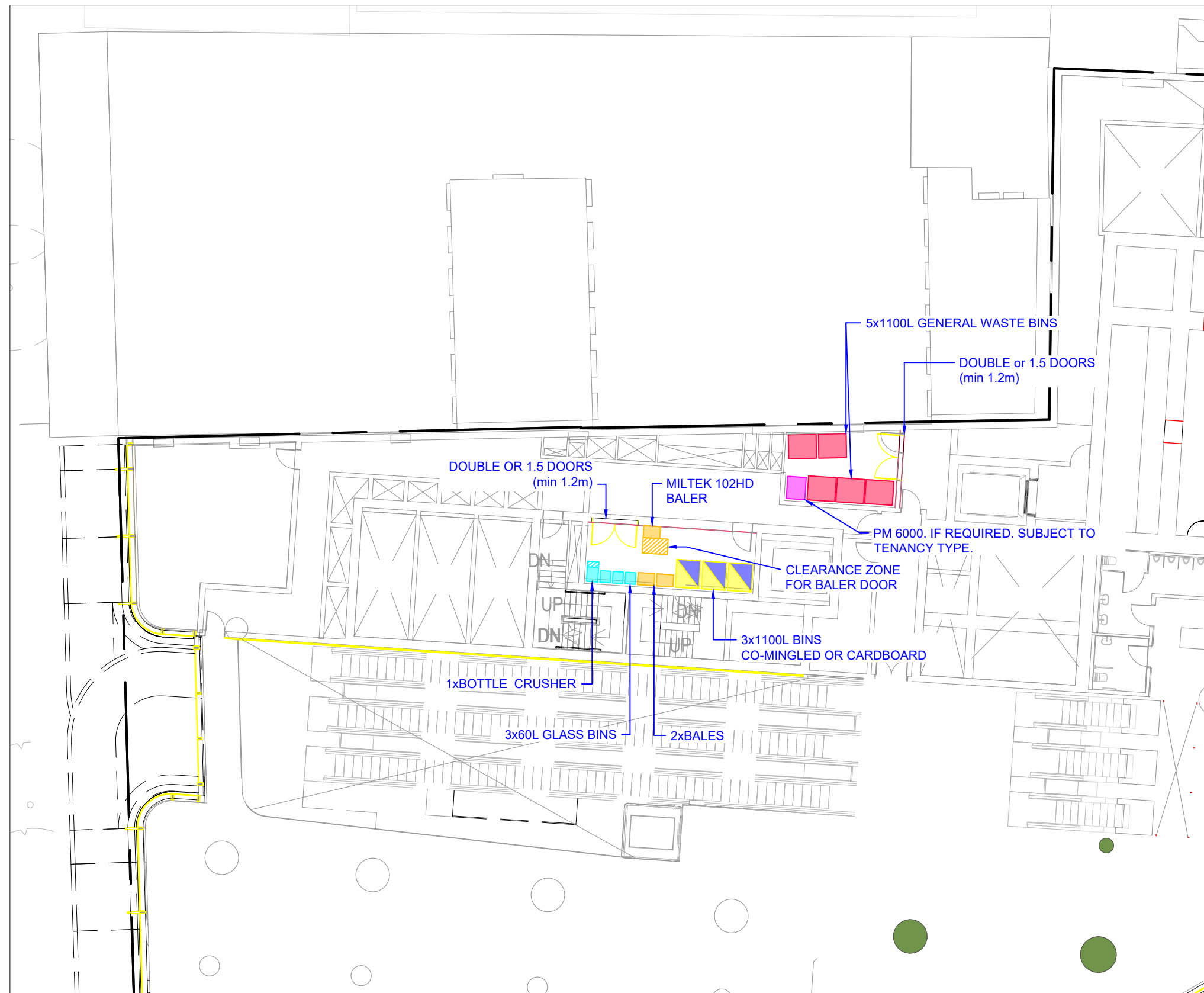


GROUND FLOOR - LOCALITY PLAN
SCALE: N.T.S.

GROUND FLOOR WASTE ROOM

TYPICAL LAYOUT





LEGEND:



RECYCLING



WASTE



FOOD



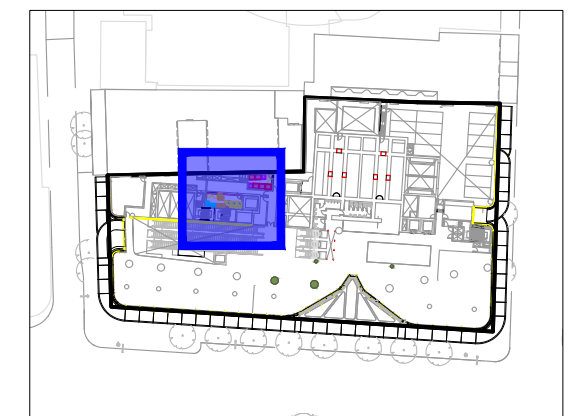
PAPER/
CARDBOARD



PLASTIC
FILM



GLASS



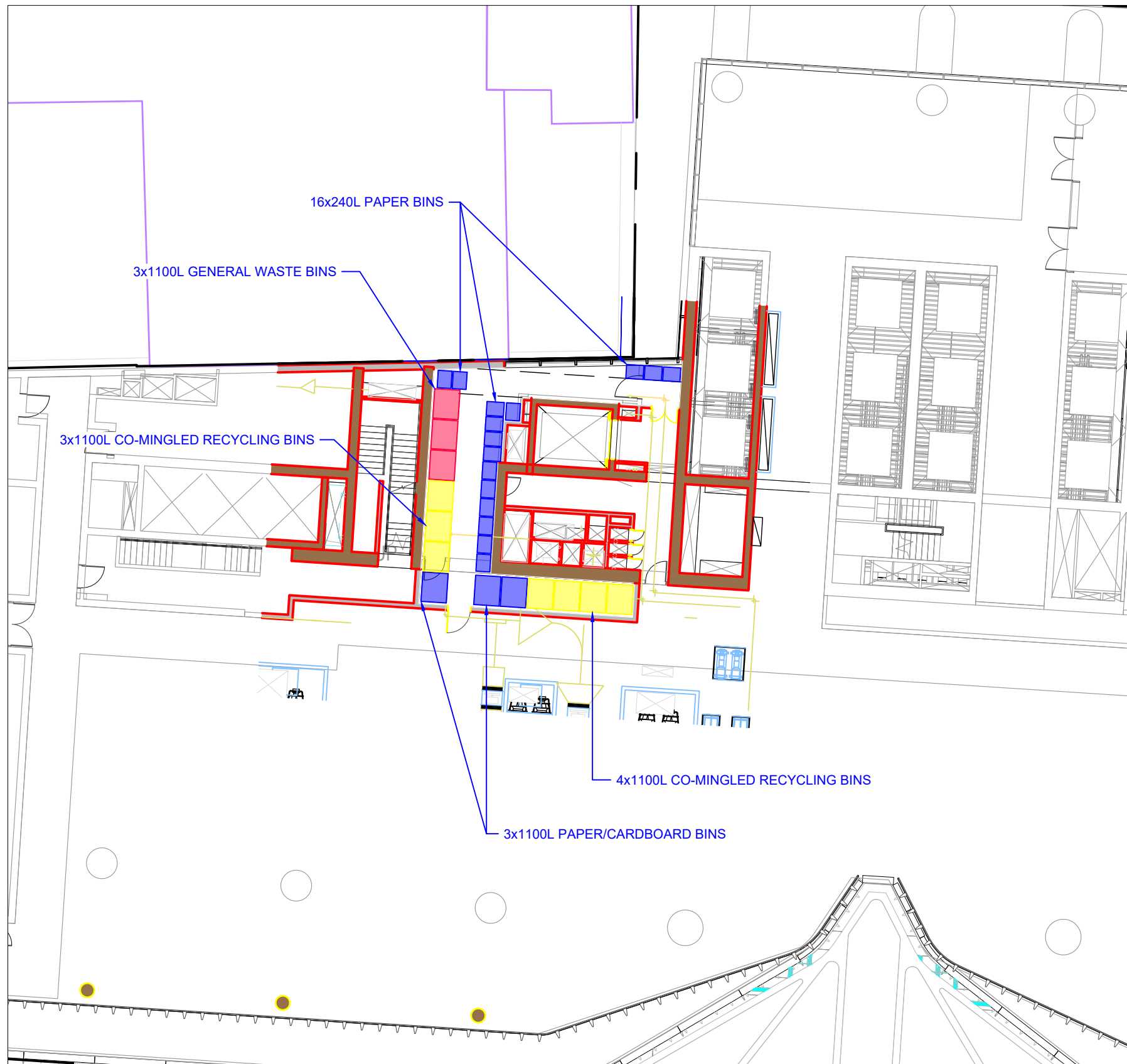
LEVEL 02 - LOCALITY PLAN

SCALE: N.T.S.



LEVEL 2 WASTE ROOM

TYPICAL LAYOUT



LEGEND:



RECYCLING

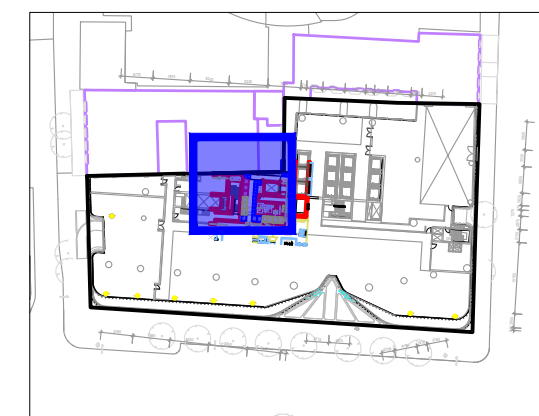


WASTE



PAPER/
CARDBOARD

NOTE:
WASTE COLLECTION FREQUENCY IS EVERY TWO DAYS.



LEVEL 09 - LOCALITY PLAN
SCALE: N.T.S.




LEVEL 9 WASTE ROOM

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.australianwaste-management.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>

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>
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="354 362 1235 725" data-label="Image"> </div> <p data-bbox="354 743 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="354 833 1423 1061">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="354 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="354 1276 1394 1904" data-label="Image"> </div> <p data-bbox="354 1926 689 1957">Source: http://pulpmaster.com.au</p>

Systems	Description
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>

Refuse Minimisation Options – Recycling

Systems	Description
Glass crushing	<p>Bottle crushers can reduce back-of-house and refuse room storage volumes by up to 75%. 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>    <p>Sources: http://www.insideenterprises.com.au/bottlecycler/index.html, http://www.bottlecycler.com</p>
Baling	<p>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>

Systems	Description
	 <p>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

	Food Waste	Waste Cooking Oil	Hazardous Waste	Liquid Waste	Electronic Waste	Industrial Waste	Construction & Demolition Waste	Waste Water	Secure Document Destruction
Specialist Waste Services									
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.
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 shredder 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.
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.

TERM	ABBREVIATION	DEFINITION
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 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.
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		

TERM	ABBREVIATION	DEFINITION
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 collaborated with CPB to provide 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.

Construction Waste management plan template to be inserted