Appendix AA

Waste Management Plan

Sydney Metro West

Sydney Olympic Park Over and Adjacent Station Development Waste Management Plan

Appendix AA

July 2022

NSW GOVERNMENT

sydney METRO

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Glossary

Term	Definition
ASD	Adjacent Station Development
CBD	Central business district
Comingled recycling	A mixture of items that are commonly recycled usually segregated through a material recovery facility. Typically include food and beverage containers (e.g. aluminium, steel, hard plastics, cartons).
Concept and Stage 1 CSSI Approval	SSI-10038, approved 11 March 2021, including all major civil construction works between Westmead and The Bays, including station excavation and tunnelling, associated with the Sydney Metro West railway line
Concept SSDA	A concept development application as defined in Section 4.22 the EP&A Act, as a development application that sets out concept proposals for the development of a site, and for which detailed proposals for the site or for separate parts of the site are to be the subject of a subsequent development application or applications.
Council	City of Parramatta
CSSI approval	Critical State Significant Infrastructure Approval
Chute	A ventilated, essentially vertical pipe passing from floor to floor of a building with openings as required to connect with hoppers and normally terminating at its lower end at the roof of the waste room
Chute discharge	The point where waste or recycling exits from the chute
DCP	Development Control Plan
DPE	Department of Planning and Environment
EIS	Environmental impact statement
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPA	NSW Environment Protection Authority
ESD	Ecologically Sustainable Design
General waste/residual waste	The remaining portion of the waste stream that is not recovered for re-use, processing, or recycling. May include soft plastics, food scraps, polystyrene etc.
GFA	Gross floor area
Green waste	Organic materials that are biodegradable and/or compostable (e.g. lawn clippings, plant trimmings)
LEP	Local Environmental Plan
LGA	Local Government Area
OSD	Over Station Development
POEO Act	*Protection of the Environment Operations Act 1997*
SEARs	Secretary's Environmental Assessment Requirements
SSDA	State Significant Development Application
SSI	State Significant Infrastructure
Sydney Metro West	Construction and operation of a metro rail line and associated stations between Westmead and the Sydney CBD as described in section 1.1

Term	Definition
TfNSW	Transport for New South Wales
WMP	Waste Management Plan

Executive summary

This Waste Management Plan (WMP) supports a Concept State Significant Development Application (Concept SSDA) submitted to the Department of Planning and Environment (DPE) pursuant to part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Concept SSDA is made under section 4.22 of the EP&A Act.

Sydney Metro is seeking to secure concept approval for an over station development (OSD) and adjacent station development (ASD) on an area defined as Site 47 within the Central Precinct of Sydney Olympic Park (referred collectively as the 'proposed development'). The proposed development will comprise of one new commercial and retail building (Building 1) above the Sydney Olympic Park metro station and two residential accommodation buildings (Buildings 2 and 3) with retail and commercial space, adjacent to the Sydney Olympic Park metro station.

The Concept SSDA seeks consent for a building envelope and mixed-use purposes, maximum building height, a maximum gross floor area (GFA), pedestrian and vehicular access, circulation arrangements and associated car parking and the strategies and design parameters for the future detailed design of development.

This WMP covers:

- waste management requirements relating to construction and operation including how the concept design satisfies the requirements
- identification of the various waste streams which may be generated from construction and operation
- provision of relevant management strategies for effective storage, reuse/recovery, treatment and/or disposal of waste generated.

The WMP forms the framework for the management of operational and construction waste for the proposed development and has been prepared as part of the environmental impact statement (under Appendix AA) for the Concept SSDA to specifically respond to the Secretary's Environmental Assessment Requirements (SEARs) issued on 18 February 2022.

This WMP satisfies the Parramatta Council Waste Management Guidelines for new Development Applications. Construction and operational waste management will be further assessed as part of future detailed SSD design, staging and delivery, demonstrating how the requirements have been met in the final building design

Construction waste assessment

In accordance with the waste hierarchy and all relevant legislation, the construction waste assessment has concluded that eliminating waste at source is the best way to reduce the impact on the environment. This can be achieved through:

- careful procurement of materials
- better utilisation of materials already available on site
- reducing the amount of waste generated where it cannot be eliminated completely
- re-using and then recycling as much as possible once it is not possible to reduce the waste any further.

The impact of waste produced by demolition and bulk excavation activities has been assessed under the Stage 2 CSSI Application and the impact of station construction up to transfer level will be assessed under the Stage 3 CSSI Application.

Operational waste assessment

This assessment identified the waste infrastructure required to manage the residual and recycling waste streams expected to be generated from the operation of the proposed development.

A summary of waste management requirements for the proposed development is outlined below:

- Commercial/ retail buildings: Individual premises will be allocated with bins for temporary holding of residual and recycling waste. Staff/ facilities management would transfer / dispose of these directly into the appropriate 660L bins provided within the central waste room located on the ground floor for Building 1, and in the basement for Buildings 2 and 3, accessed via service lifts. Residual waste will need to be compacted prior to disposal using the compaction facility within the central waste room. It is assumed that retail waste and commercial waste would be collected twice a week from the ground floor via Precinct Street B.
- Residential: Individual premises will be allocated with bins for temporary holding of residual and recycling waste. Owners/occupiers would transfer dispose of these directly into the nearest chute (dual chute system) available on each residential level of the tower, the chute will terminate at the central waste room located in the basement, where it will be deposited in 660L bins. A linear or circular carousel can be used to move the bins when full. Waste chute compactors for residual waste should be used to reduce manual handling of waste. It is assumed that waste would be collected twice a week. Collection points are located within the basement where the trucks would enter the buildings through entry points located on Precinct Street A.

Based on the expected waste generation from the concept design and assumptions, the area and spaces allocated for operational waste storage and collection from the three buildings are considered appropriate.

1 Introduction

1.1 Sydney Metro West

Sydney Metro West will double rail capacity between Greater Parramatta and the Sydney Central Business District (CBD), transforming Sydney for generations to come. The once in a century infrastructure investment will have a target travel time of about 20 minutes between Parramatta and the Sydney CBD, link new communities to rail services and support employment growth and housing supply.

Stations have been confirmed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays, Pyrmont and Hunter Street.

Sydney Metro West station locations are shown in Figure 1-1.

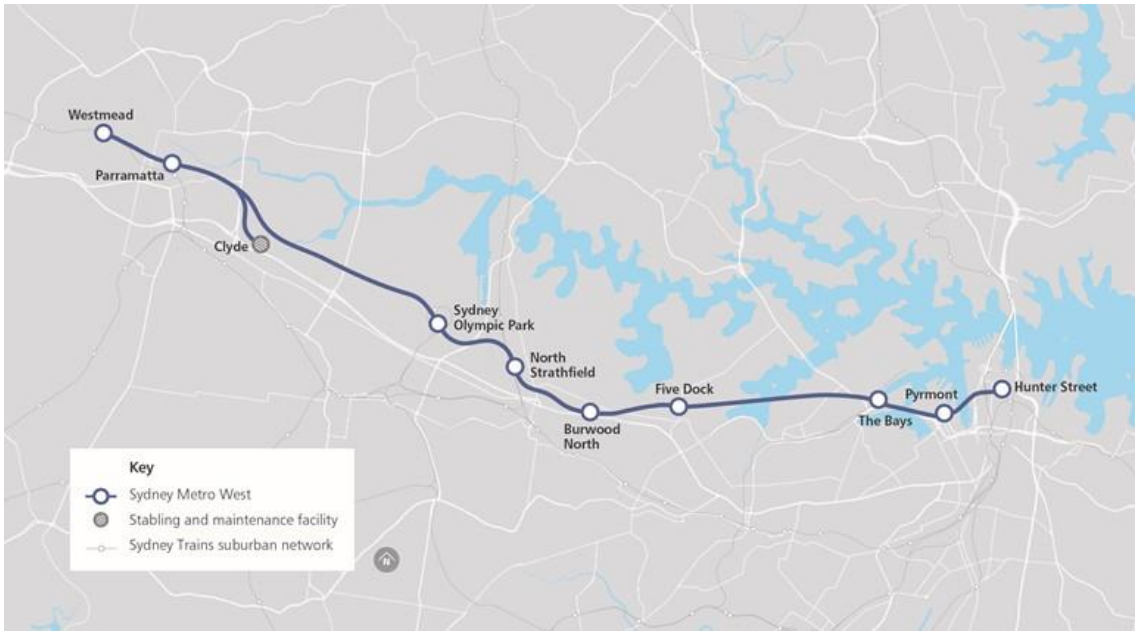


Figure 1-1 Sydney Metro West

1.2 Background and planning context

Sydney Metro is seeking to deliver Sydney Olympic Park metro station under a two-part planning approval process. The station fit-out infrastructure is to be delivered under a Critical State Significant Infrastructure (CSSI) application subject to provisions under division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), while the over and adjacent station developments are to be delivered under a State Significant Development (SSD) subject to the provisions of part 4 of the EP&A Act.

1.2.1 Critical State Significant Infrastructure

The State Significant Infrastructure (SSI) planning approval process for the Sydney Metro West metro line, including delivery of station infrastructure, has been broken down into a number of planning application stages, comprising the following:

- Concept and Stage 1 CSSI Approval (SSI-10038) – All major civil construction works between Westmead and The Bays including station excavation, tunnelling and demolition of existing buildings (approved 11 March 2021).

- Stage 2 CSSI Application (SSI-19238057) – All major civil construction works between The Bays and Hunter Street Station (under assessment).
- Stage 3 CSSI Application (SSI-22765520) – Tunnel fit-out, construction of stations, ancillary facilities and station precincts between Westmead and Hunter Street Station, and operation and maintenance of the Sydney Metro West line (under assessment).

1.2.2 State Significant Development Application

The SSD will be undertaken as a staged development with the subject Concept State Significant Development Application (Concept SSDA) being consistent with the meaning under section 4.22 of the EP&A Act and seeking conceptual approval for a building envelope, land uses, maximum building heights, a maximum gross floor area, pedestrian and vehicle access, vertical circulation arrangements and associated car parking. A subsequent Detailed SSD/s is to be prepared by a future development partner which will seek consent for detailed design and construction of the development.

1.3 Purpose of the report

This WMP supports a Concept SSDA submitted to the Department of Planning and Environment (DPE) pursuant to part 4 of the EP&A Act. The Concept SSDA is made under section 4.22 of the EP&A Act.

This WMP has been prepared to specifically respond to the Secretary's Environmental Assessment Requirements (SEARs) issued for the Concept SSDA on 18 February 2022 which states that the environmental impact statement (EIS) is to address the following requirements:

SEARs requirement	Where addressed in report
17. Waste management • Identify, quantify and classify the likely waste streams to be generated during construction and operation	Section 4.2 and Section 4.3
• Provide the measures to be implemented to manage, reuse, recycle and safely dispose of this waste.	Section 5
• Identify appropriate servicing arrangements for the site	Section 4.3

This WMP aims to identify and quantify the various waste streams which may be generated from construction and operation and identify the waste management infrastructure required to service retail, residential and commercial areas in the proposed development. It also outlines legislative and policy requirements under current planning and environmental legislation for the proposed development and provides relevant management strategies for effective storage, re-use and/or disposal of waste generated.

2 The site and proposal

2.1 Site location and description

The site is located within Sydney Olympic Park and is situated within the City of Parramatta Local Government Area. The site is in the Central Precinct of Sydney Olympic Park and defined as Site 47 in the proposed SOP Master Plan (Interim Metro Review). The broader metro site is bound by Herb Elliot Avenue to the north, Olympic Boulevard to the west and Figtree Drive to the south as shown in Figure 2-1.

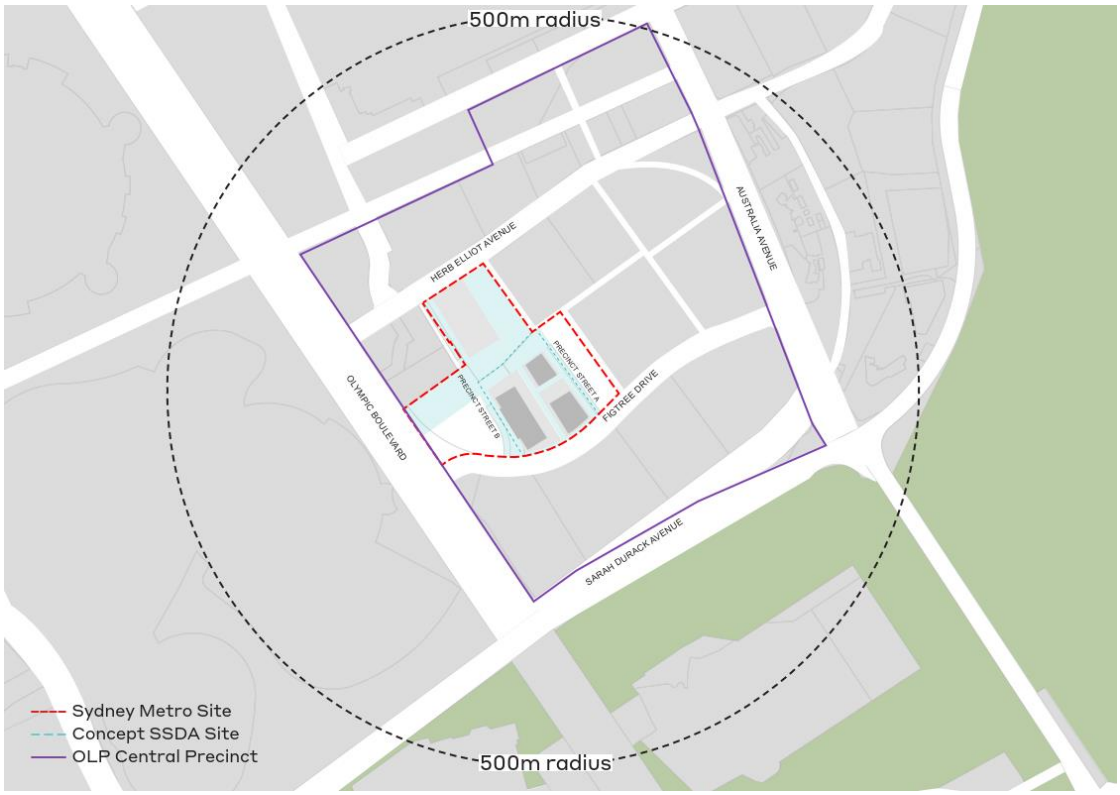


Figure 2-1 Sydney Olympic Park metro station location precinct

As described in Table 2-1, the site comprises part of Lot 59 in DP 786296 and Lot 58 in DP 786296, and comprises approximately 11,407m^2 of land.

Table 2-1 Site legal description

Street address	Legal description
5 Figtree Drive, Sydney Olympic Park	Lot 58 in DP 786296
7 Figtree Drive, Sydney Olympic Park	Lot 59 in DP 786296

2.2 Overview of this proposal

The Concept SSDA will seek consent for three building envelopes and the delivery of Precinct Street A as detailed in Table 2-2 and Figure 2-2.

Table 2-2 Sydney Olympic Park proposed development overview

Item	Description
Land use	**Building 1:** Commercial and retail **Building 2:** Commercial, retail and residential **Building 3:** Commercial, retail and residential
Building height (RL) / Number of storeys	**Building 1:** 120.20 / 21 storeys **Building 2**: 116.90 / 27 storeys **Building 3:** 171.50 / 45 storeys
Gross floor area (m^2)	**Building 1:** 28,517 **Building 2:** 12,089 **Building 3:** 27,384 **TOTAL: 68,000**
Car parking spaces	358

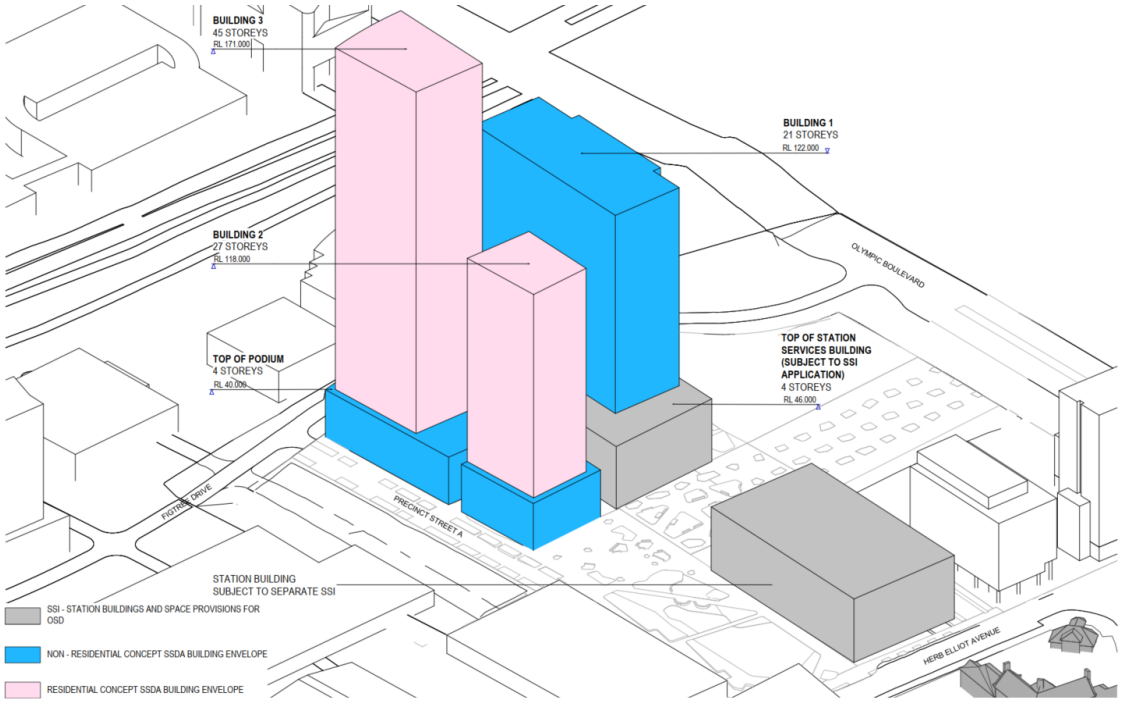


Figure 2-2 Proposed Concept SSDA development and CSSI

3 Scope of assessment

3.1 Methodology

This report assesses the waste management requirements relating to the construction and operational activities of the proposed development. It takes into consideration the area schedule and development mix (e.g. the proposed composition of residential, commercial and other land uses). Key operational waste modelling assumptions have been included in Appendix A of this report.

Relevant management measures for effective storage, recycling, re-use/recovery, treatment and/or disposal of waste generated from the concept design have been proposed in accordance with applicable guidelines and regulatory requirements specifically to address the requirements of the SEARs provided in section 1.3.

As per the SEARs, this WMP addresses the likely waste streams, concept quantities, and management measures for the storage, re-use/recovery, treatment and/or disposal of waste generated from the proposed development. The WMP assessment involved:

- a review of relevant legislation, policies and guidelines associated with waste management
- identifying and classifying likely waste generating activities and likely waste types during the construction and operation of the proposed development
- quantifying construction and operation waste volumes likely to be generated during construction and operation of the proposed development
- assessing and identifying appropriate operational waste disposal, storage and collection systems and servicing arrangements
- identifying management measures to manage potential impacts associated with waste management.

3.2 Legislation, policy and guidelines

This section summarises key legislation, policies, and guidelines relevant to managing waste generation from the proposed development. These include:

- state legislation
- local government requirements
- Green Star Buildings Version 1.

3.2.1 State legislation

Key NSW regulatory and policy requirements which are of relevant to the construction and operational phase of the proposed development are outlined below.

Protection of the Environment Operations Act 1997

Section 88 of the *Protection of the Environment Operations Act 1997* (POEO Act) sets a levy on waste disposed to landfill. The levy aims to reduce the amount of waste being disposed and promote resource recovery and varies between different areas of NSW. The landfill levy significantly increases over time and therefore presents a financial driver for minimising waste generation and increasing waste recovery.

The POEO Act sets out requirements for the management for all waste material excavated and removed from the construction sites. The act places accountability on

waste generators to correctly manage waste, including final disposal. These requirements include:

- ensuring waste is classified appropriately and in accordance with relevant guidelines
- waste is disposed at licensed landfill facilities
- recoverable and other materials for recycling are sent to facilities lawfully able to accept and/or process such materials.

Protection of The Environment (Waste) Operations Regulation 2014

The Protection of the Environment (Waste) Operations Regulation 2014 sets out the requirements relating to non-licensed waste activities and waste transporting. The proposed works on the site are not required to be licensed. However, section 70 of the regulation requires that waste is stored in an environmentally safe manner. It also stipulates that vehicles used to transport waste must be covered when loaded.

This regulation exempts certain waste streams from full waste tracking and record keeping requirements as waste tracking is required only for industrial and hazardous waste.

Waste Avoidance and Resource Recovery Act 2001

The *Waste Avoidance and Resource Recovery Act 2001* establishes the waste hierarchy to ensure that resource management options are considered against the following principles:

- Avoidance – actions to reduce unnecessary resource consumption.
- Resource recovery – which includes reuse, reprocessing, recycling and energy recovery.
- Disposal – to minimise any negative environmental outcomes.

State Environmental Planning Policy (Precincts - Central River City) 2021

The State Environmental Planning Policy (Precincts - Central River City) 2021 provides objectives to facilitate the development and protection of important urban sites that hold an economic, environmental or social significance. The WMP uses the principles outlined in:

- Appendix 4 Sydney Olympic Park site: 30 Design excellence
    - Whether the building meets sustainable design principles in terms of resource efficiency.

NSW Waste and Sustainable Materials Strategy Stage 1: 2021-2027

The NSW Waste and Sustainable Materials Strategy Stage 1: 2021-2027 provides strategic direction on future waste reduction and recycling in NSW to work towards the transition to a circular economy over the next 20 years. The strategy sets the following state targets:

- reduce total waste generated by 10% per person by 2030
- have an 80% average recovery rate from all waste streams by 2030
- significantly increase the use of recycled content by governments and industry
- phase out problematic and unnecessary plastics by 2025
- halve the amount of organic waste sent to landfill by 2030.

This strategy has been referred to in preparing the WMP.

NSW Waste Classification Guidelines

The NSW Waste Classification Guidelines provides direction to organisations in appropriately classifying, recovering, treating or disposing the waste generated from the activities.

NSW Circular Economy Policy 2019

The NSW Circular Economy Policy Statement provides a framework for implementing initiatives throughout the product life cycle, from design, manufacturing, and retail to end-of-life-disposal. These initiatives will promote long-lasting design, maintenance, repair, re-use, sharing, transforming products into services, remanufacturing, and recycling. The NSW Government will be an early adopter, implementing those opportunities where the benefits are clear.

3.2.2 Local government requirements

Sydney Olympic Park Master Plan 2030 (2018 review)

The aims of this plan are to establish guidelines and controls for all future development of Sydney Olympic Park. This WMP is in line with the following sections of the plan to satisfy the waste requirements set by Sydney Olympic Park Authority:

- 4.0 General controls and guidelines
    - 4.6.16 Waste management controls.

Environmental Guidelines for Sydney Olympic Park 2008

The Environmental Guidelines for Sydney Olympic Park 2008 act as a foundation for all environmental management plans implemented in the area. These guidelines carry legislative force under the *Sydney Olympic Park Authority Act 2001.* The sections of these guidelines which are relevant to this WMP are:

- 4.4 Waste Management
    - Waste Management Objectives.

Parramatta Local Environmental Plan and Development Control Plan

The proposed development is located within the City of Parramatta which is governed by the Parramatta Local Environmental Plan (LEP) 2011 and the Parramatta Development Control Plan (DCP) 2011. Although, the proposed development is not subject to the LEP 2011 and DCP, the requirements outlined have been used as a reference during the preparation of this WMP. This WMP aims to align as close as possible with the LEP and DCP requirements.

The City of Parramatta DCP outlines the waste management guidelines and objectives for the waste and recycling produced during construction and operation activities. The relevant guidelines which are applicable to the WMP include:

- Section 3.3.7 of the DCP: Waste management – This section sets out the waste management objectives of the DCP and provisions required by all development applications that includes demolition, construction (including earthworks), alteration/addition and/or change of use of buildings for all types of developments in City of Parramatta.
- Appendix 8.1 of the DCP: Waste management guidelines for new development Applications 2016 – This section provides detailed provisions of the waste management requirements for new development applications lodged with the City of Parramatta.

Key DCP requirements which have informed this development of this WMP for the proposed development are summarised below.

- Expected volumes and types of waste to be generated from use of the site. Waste generation rates of 80 litres/unit/week for general garbage and 40 litres/unit/week for co-mingled recycling should be applied when calculating this figure.
- Details of how this waste will be stored on site, including provisions for the separation of waste and recycling, and details of any garbage chutes or compaction equipment.
- Separate waste facilities must be provided for residential and commercial tenants. These are to be designed and located so that the residential tenants cannot access the commercial waste facilities and vice versa.
- Each commercial unit must be provided with a clearly defined storage area that is of a size that easily accommodates all waste and recycling generated from that unit for at least one day.
- A caretaker must be appointed to manage the separate residential and commercial waste facilities and ensure ongoing management of the development.

City of Parramatta Environmental Sustainability Strategy

The City of Parramatta Environmental Sustainability Strategy outlines key environmental sustainability directions and priorities. The strategy aims to ensure that as the city grows, the natural environmental improves with it. The Environmental Sustainability Strategy objectives relevant to the WMP are to:

- reduce resource consumption from 8.2 kilograms to 6.1 kilograms per person by 2038 (based on 2015 levels)
- increase diversion from landfill to 85% by 2038.

3.2.3 Green star buildings

A sustainability rating strategy has been established for Sydney Metro West packages and station development. The Green Star tool rates buildings on all relevant aspects of their environmental performance and the required environmental ratings that apply to developments in Sydney Olympic Park are as per section 4.2 of Sydney Olympic Park Master Plan 2030. A minimum of 5 Star rating from the Green Building Council of Australia is required. To achieve the desired rating, certain credits should be met, each credit addresses an initiative that improves or has the potential to improve a design, project, or building's environmental performance.

The following credits have identified as the minimum expectations that must be achieved by all projects to achieve a Green Star Buildings rating:

- Credit 2.3 Construction and Demolition Waste
- Credit 4.1 Collection of Waste Streams
- Credit 4.2 Dedicated Waste Storage Area
- Credit 4.3 Sign-off by Waste Specialist and/or Contractor

This WMP will provide the preliminary evidence required to meet the credits criteria listed above.

4 Assessment

4.1 Method of assessment

The following assessment method has been used to develop an understanding of the waste characteristics of the proposed development and to assess potential construction and operational phase requirements and environmental impacts.

Key steps in the waste management assessment are shown in Figure 4-1.

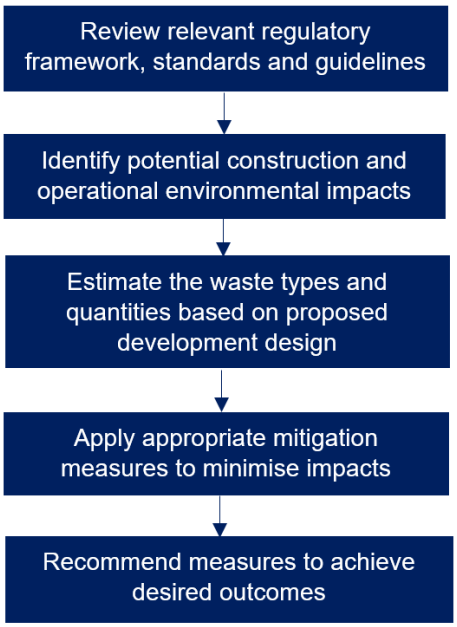


Figure 4-1 Method of assessment

This WMP, including the estimation of waste generations, have been completed based on the concept design, the regulatory and legislative requirements outlined in section 3.2 and NSW Environment Protection Authority (EPA) waste hierarchy.

The principles of the EPA waste hierarchy are shown in Figure 4-2 and have been adopted where possible. The waste hierarchy gives top priority to preventing waste in the first place. When waste is created, it gives priority to preparing it for re-use, then recycling, then recovery, and last of all disposal (e.g. at landfills). The higher up the waste hierarchy waste is managed, the greater the cost and resource savings would be.

Figure 4-2 NSW EPA waste hierarchy

The following has been considered in the development of the assessment:

- review of relevant legislation, policies and guidelines associated with waste management
- estimation of waste types and quantities (where possible)
- description of waste storage requirements, including bin sizes, storage room sizes and other infrastructure
- collection frequencies and specifications of collection vehicles (where possible)
- description of how the waste streams will be managed, from point of generation to collection
- design requirements for waste storage rooms and collection vehicle access.

The operational waste management assumptions used for this WMP are based on the proposed development's concept designs. A summary of the built area and development mix proposed are provided in Table 2-2. Waste generation estimations have been made using City of Parramatta Waste Management Guidelines.

4.2 Construction waste assessment

This section outlines the waste management approach for the construction phase of the proposed development which aims to manage and minimise potential environmental impacts of waste management.

4.2.1 Construction waste management objectives

Construction waste management objectives for the proposed development are to:

- minimise waste throughout the project life cycle
- reduce the demand for waste disposal to landfill during construction
- maximise avoidance and resource recovery of construction waste through minimisation, reuse and recycling

- support in achieving resource recovery targets in line with the NSW Waste and Sustainable Materials Strategy Stage 1: 2021-2027
- maximise the recycling and reuse of waste generated during the construction phase.

The proposed development aims to achieve 90% diversion of construction and demolition waste from landfill. This aligns to the sustainability objectives outlined in the Ecologically Sustainable Development report (Appendix S of the EIS).

4.2.2 Construction waste management

Construction waste would be generated during construction and fit out activities. The proposed development will require construction materials (such as concrete, steel and sheet piles) to be imported to the work site. However detailed specifications of materials to be used in the construction of the proposed development are yet to be confirmed, therefore common waste streams generated by a similar scale project has been considered this assessment.

Anticipated construction waste streams generated by the proposed development are presented in Appendix B. Existing buildings and utilities will be cleared along with bulk excavation of the tunnel, cavern and station box prior to commencement of station construction activities. It is important to note that waste generated the demolition of existing buildings and excavation and construction of the station box, basement, ground plane and podium elements required for the station is subject to separate CSSI application/s and therefore has not been assessed in this report.

4.2.3 Waste storage and collection

An area for onsite storage for waste, construction materials and newly procured materials must be identified, appropriately secured, and meet all relevant Work Health and Safety requirements.

Additional site controls such as odour covers, and secondary containment areas should be considered to manage any noise, odour, erosion, surface water runoff, and dust issues resulting from extreme weather events.

The waste management area should be laid out and labelled to facilitate the separation of materials for potential recycling, salvage, reuse and return. Recycling, salvage, and waste bins should be kept clean and clearly marked to avoid contamination of materials.

Onsite workers should be trained about waste segregation, sorting and handling requirements on site throughout the duration of construction.

Different coloured skips should be used (or clearly labelled) to ensure that all onsite workers are clear about where to put each type of waste. This will aid to reduce the level of cross-contamination in the skips and decrease the likelihood that a load being rejected once it is sent off-site for processing.

4.2.4 Collection and transportation logistics

The contractor must identify appropriate site access and haulage routes, as well as measures to maintain transport capacity and limit construction haulage in peak periods. Site access and potential traffic impacts are considered in the Transport and Access Report Appendix T of the EIS.

The contractor must implement and maintain a traffic management plan to ensure localised traffic disruptions would be managed, the plan should include temporary access arrangements (including signage) to maintain access for road users, waste collection and deliveries schedules.

Construction of the proposal may overlap with the construction of other developments within the same area, these projects may include government infrastructure upgrades or private developments. Developers should coordinate their construction activities to minimise impacts on the community and to provide safe and efficient access to the worksites and maintain safe access for adjacent occupied buildings. The cumulative impacts of other projects if they were to proceed, can be adequately managed through project planning and coordination so they would not have a significant impact on traffic and transport within the proposal area.

4.2.5 Hazardous waste

Hazardous waste must be managed and handled appropriately, kept separate and removed off site in accordance with legislation and disposed of or treated at an EPA licensed facility by an authorised contractor in accordance with all relevant regulations. For certain types of hazardous wastes, an authorised transporter should be engaged to transport the waste to ensure compliance with waste tracking requirements (when applicable).

An unexpected finds protocol must be developed and implemented should hazardous waste and other contaminants be encountered. Hazardous waste and other contaminants will be managed and handled appropriately, kept separate and removed off site in accordance with legislation and disposed of or treated at a correctly permitted facility by a licensed contractor in accordance with all relevant regulations.

4.2.6 Monitoring and waste records

The contractor must maintain and retain waste transfer records showing the quantity of waste materials removed from site. As a minimum the waste records should detail the following:

- type and quantity of wastes reused, recycled and/or disposed
- waste receipt certificates from the lawful place to which waste was taken to
- waste classification reports, laboratory analysis reports (when required)
- procedures and plans for managing waste, including handling and storage procedures, and incident response plans should be prepared and updated as necessary
- waste records and waste management procedures should be readily accessible for internal audits and regulatory authorities' inspections.

4.2.7 Training and communications

In order to develop a culture of promoting best practice and increase knowledge and awareness of waste management issues at the site, waste management procedures and training material should be developed by the contractor.

4.3 Operational waste assessment

This section outlines the waste management approach to the operational phase of the proposed development which aims to manage and minimise potential environmental impacts of waste management.

Estimates in this section have been used to inform the infrastructure requirements for servicing the proposed development. Note that waste servicing requirements outlined for the buildings may be subject to further design development as part of future Detailed SSDAs.

4.3.1 Operational waste generation assumptions

Waste volumes for the proposed development have been estimated to determine the waste infrastructure requirements. These waste storage areas and bins have been allowed for in the concept design of the proposed development.

Waste generation estimates have been made using the City of Parramatta Waste Management Guidelines for New Development Applications 2016 and where appropriate waste generation rates were adopted from the assumptions contained within Appendix A of this report. The guidance requires that the waste generated be segregated into two streams, recycling, and residual waste. The waste storage area required was based on the concept proposal-built area and development mix.

A room or caged/screened area would be made available for the storage of discarded bulky items and problem waste for recycling such as e-waste and chemical/liquid waste. This room would have a minimum doorway width of 1.5m and minimum 1.2m aisle space for manoeuvrability to allow for easy movement of large waste items in and out of the room.

A summary of the waste generation assumptions is presented in tables below.

Table 4-1 Waste generation rates assumptions

Use	Units	Residual waste	Recycling
Commercial	Litres / 100m^2 / day	8	6
Retail (non-food sales)	Litres / 100m^2 / day	80	70
Residential	Litres / Unit / week	80	40

Table 4-2 Bin dimensions

Capacity (L)	Width (mm)	Depth (mm)	Height (mm)	Area (m^2)
120	485	560	940	0.27
240	580	735	1080	0.43
660	1370	850	1250	1.16

Table 4-3 Bin collection frequency

Use	Waste stream	Collections per week
Commercial*	Residual waste	2 x weekly
	Recycling	2 x weekly
Retail*	Residual waste	2 x weekly
	Recycling	2 x weekly
Residential*	Residual waste	2 x weekly
	Recycling	2 x weekly

*Bulky waste would be collected from the premises as required
Collections per week are indicative only and may be subject to further development as part of future Detailed SSD applications.

4.3.2 Building 1

This section outlines the waste assessment and infrastructure requirements for servicing 1,200m^2 of retail and 26,690m^2 of commercial space located in Building 1. The concept building design proposed is shown in the Figure 4-3.

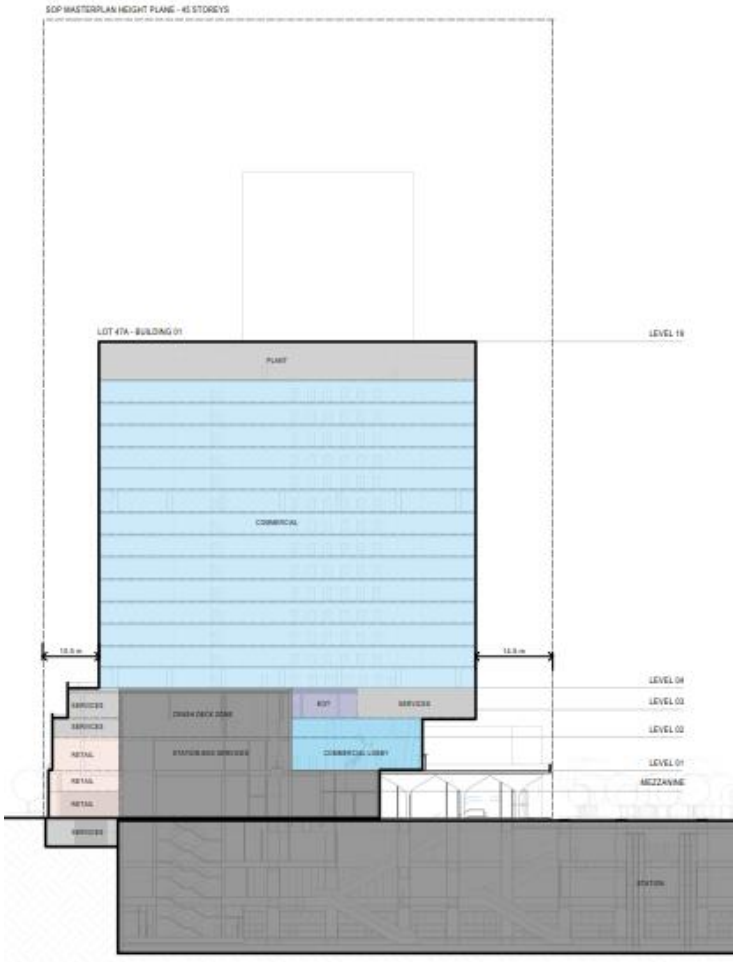


Figure 4-3 Proposed Building 1 design

Waste type and quantities

Estimates of key waste streams generated by the operation of Building 1 is provided in Table 4-4 below.

Table 4-4 Waste types and generation rates for Building 1 (day/week)

Use	GFA (m^2)	Residual waste (litres)		Recycling (litres)	
		Day	Week	Day	Week
Retail*	1,200	960	6,720	840	5,880
Commercial*	26,690	2,135	10,676	1,601	8,007

*7-day week operation for retail uses & 5-day week operation for commercial uses

Waste storage and internal waste management

Individual premises will be allocated with bins for temporary holding of residual waste and recycling. Staff / facilities management would transfer / dispose of these directly into the appropriate 660L bins provided within the central waste room located in the basement, accessed via service lifts. Residual waste would need to be compacted prior to disposal using the compaction facility within the central waste room. Waste storage requirements for each waste stream are shown Table 4-5.

Paper and cardboard balers should be considered if waste generation is very high, in these cases it is recommended that paper and cardboard be segregated out at the source so that it can be baled separately from other recyclables.

The ongoing operation and maintenance of the central waste room and compaction facility will be the responsibility of the facilities management. A bin wash area will be provided within or adjacent to the central waste room to enable cleaning of bins. The facilities management will also be responsible for the application of the internal waste management procedures.

Table 4-5 Waste storage and handling space requirements for Building 1

Use	Waste stream	Bin Size (litres)	No. of bins after compaction	Area required m^2 (excluding manoeuvring space)	Area required m^2 (including manoeuvring space and **)
Retail	Residual waste*	660	3	9	21
	Recycling	660	5		
Commercial	Residual waste*	660	5	14	31
	Recycling	660	7		
Retail and Commercial	Bulk waste	N/A	N/A		12

* Residual waste compaction ratio 2:1 assumed
** 0.15m clearance in between bins has been included for manoeuvring and cleaning
** Minimum aisle space of 1.2m
** Bin wash area 4m^2
** Stationary compactor/bin press 4m^2

A concept design layout of the central waste room located on ground floor of Building 1 (highlighted in red) is shown in Figure 4-4. The area allocated for waste storage and handling space requirements for the central waste room within Building 1 is appropriate and meets the requirements.

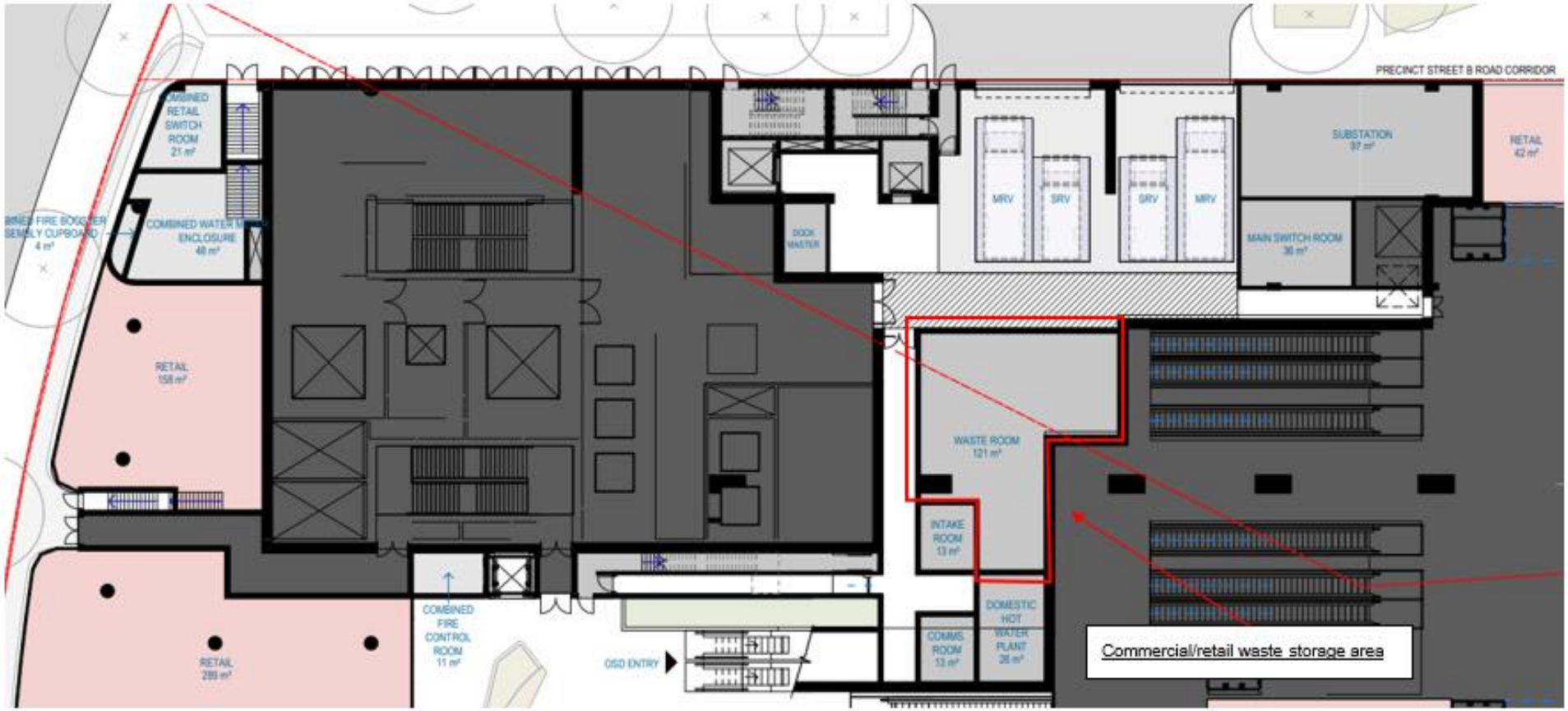


Figure 4-4 Building 1 waste storage room, ground floor design

Waste collection

Assumed collection frequencies for each commercial and retail waste stream are provided in Table 4-6 below.

Table 4-6 Waste collection frequency for Building 1

Use	Waste stream	Collection
Retail	Residual waste	2 x weekly
	Recycling	2 x weekly
Commercial	Residual waste	2 x weekly
	Recycling	2 x weekly

Collections per week are indicative only and may be subject to further development as part of future Detailed SSD applications.

Based on the quantity of waste expected to arise from each building on a daily basis, it is noted that a medium sized waste collection vehicle (two axle rigid truck) would be suitable for collecting the waste from each building. The medium sized vehicles may include a compaction system.

Waste from Building 1 will be collected directly from the central waste storage room located the ground floor closer to loading dock area as depicted in Appendix C . The trucks would enter through Precinct Street B loading dock to collect the waste and exit. A swept path analysis will be completed for Building 1 as a part of the Detailed SSDA.

4.3.3 Building 2

This section outlines the waste assessment and infrastructure requirements for servicing approximately 9,460m^2 of residential, 2,380m^2 of commercial and 250m^2 of retail areas located in Building 2. The concept building design proposed is shown in the Figure 4-5.

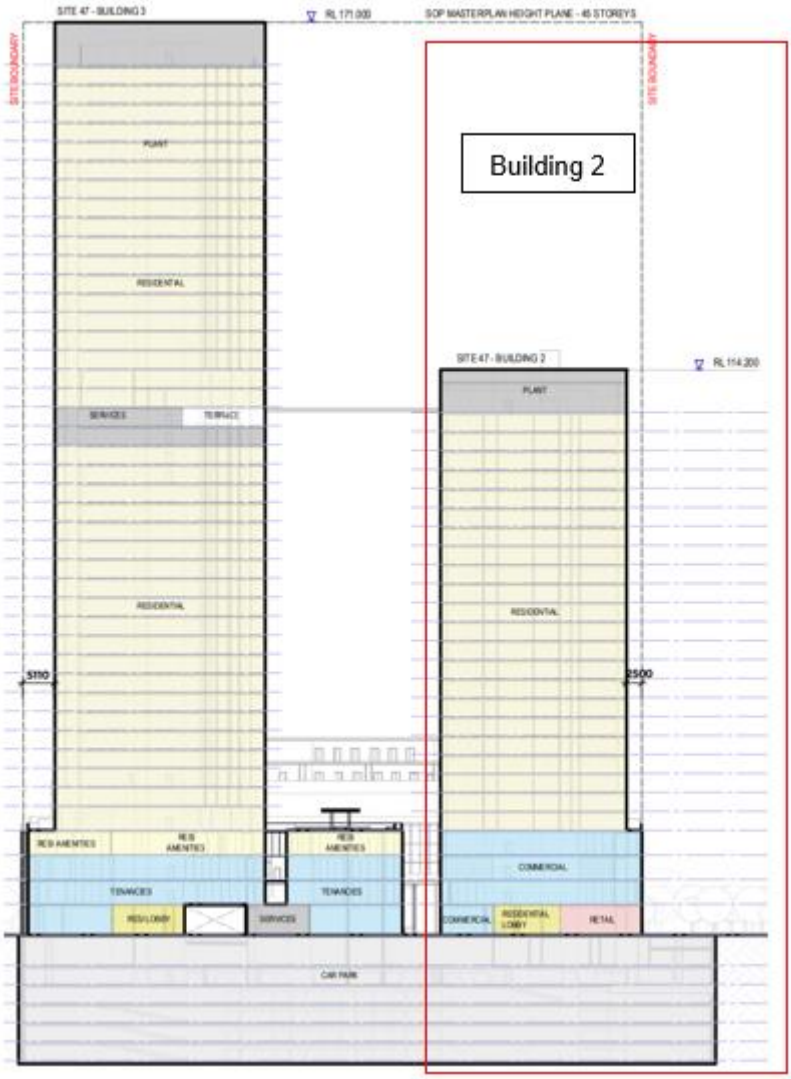


Figure 4-5 Proposed Building 2 design

Waste type and quantities

Estimates of key waste streams generated by the operation of building are provided in Table 4-7.

Table 4-7 Waste types and generation rates for Building 2 (day/week)

Use	GFA (m^2)	Residual waste (litres)		Recycling (litres)	
		Day	Week	Day	Week
Residential	9,460	1,006	7,040	503	3,520
Commercial *	2,380	190	1,333	143	1,000
Retail*	250	200	1,400	175	1,225

*7-day week operation for commercial and retail uses

Waste storage and internal waste management

Commercial and retail spaces within building will be allocated bins for temporary holding of residual waste and recycling. Staff/ facilities management would transfer / dispose of these directly into the appropriate 660L bins provided within the central waste room located in the basement, accessed via service lifts. Residual waste would need to be compacted prior to disposal using the compaction facility within the central waste room.

Paper and cardboard balers should be considered if waste generation is very high, in these cases it is recommended that paper and cardboard is segregated out at source so that it can be baled separately from other recyclables.

The residential owners/occupiers in the building would transfer / dispose the generated waste directly into the nearest chute (dual chute system) available on each residential level of the building, the chute will terminate at the central waste room located in the basement, where it will be deposited in 660L bins. A linear or circular carousel can be used to move the bins when full. Waste chute compactors for residual waste should be used to reduce manual handling of waste.

Bulky household waste storage would need to be transferred directly by the owners/occupiers to storage area provided within the central waste room located in the basement, accessed via service lifts. A separate bulky paper and cardboard storage cage can be located on the ground floor within close proximity to the route typically taken by residents when leaving the building

The ongoing operation and maintenance of the central waste room and compaction facility will be the responsibility of the facilities management. A bin wash area will be provided adjacent to the central waste room to enable cleaning of bins. The facilities management will also be responsible for the application of the internal waste management procedures.

Waste storage requirements for each waste stream are shown Table 4-8.

Table 4-8 Waste storage and handling space requirements for Building 2

Use	Waste stream	Bin Size (litres)	No. of bins after compaction	Area required m^2 (excluding manoeuvring space)	Area required m^2 (including manoeuvring space and **)
Residential	Residual waste*	660	3	7	16
	Recycling	660	3		
	Bulk waste	N/A	N/A	-	20
Commercial	Residual waste*	660	1	2	5
	Recycling	660	1		
Retail	Residual waste*	660	1	2	5
	Recycling	660	1		
Retail and Commercial	Bulk waste	N/A	N/A	-	8

* Residual waste compaction ratio 2:1 assumed
** 0.15 m clearance in between bins has been included for manoeuvring and cleaning
** Minimum aisle space of 1.2m
** Bin wash area $4m^2$
** Stationary compactor/bin press $4m^2$

A concept design layout for the central waste room in the basement of the building is shown in Figure 4-6. The area allocated for waste storage and handling space requirements for the residential waste room and commercial waste room within Building 2 is appropriate and meets the requirements.

A concept layout of garbage chute room at each level of the building is shown in Figure 4-7.

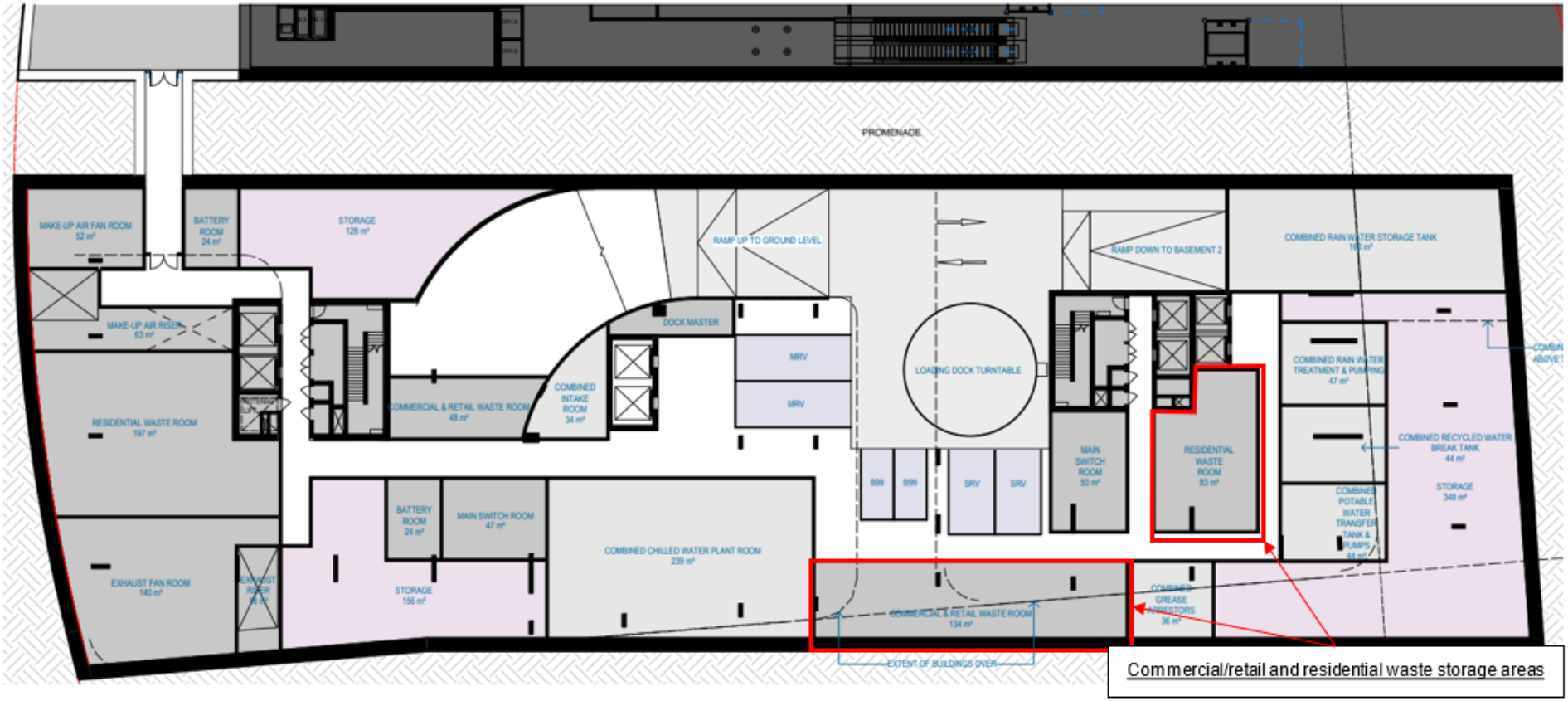


Figure 4-6 Building 2 Main waste storage room, basement level 1 design

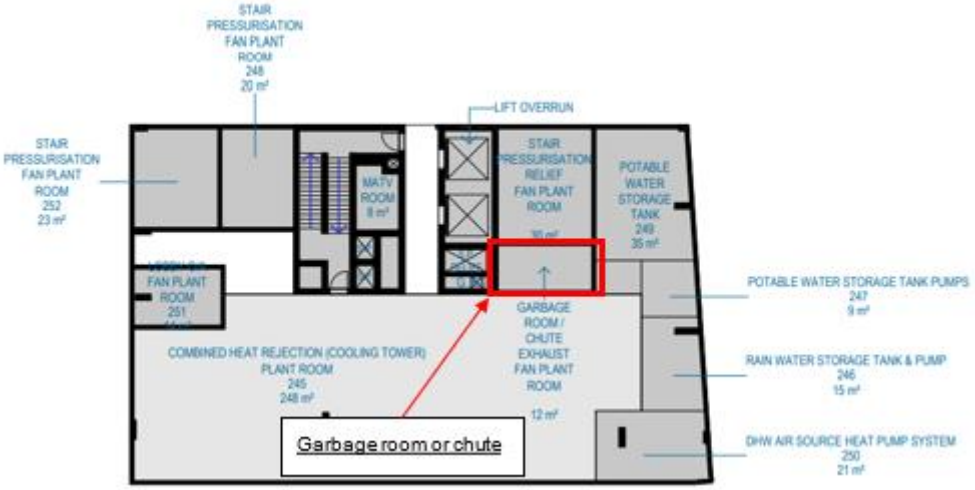


Figure 4-7 Building 2 chute room, roof plan

Waste collection

Assumed collection frequencies for each commercial and retail waste stream are outlined in Table 4-9 below.

Table 4-9 Waste collection frequency for Building 2

Use	Waste stream	Collection
Residential	Residual waste	2 x weekly
	Recycling	2 x weekly
Commercial	Residual waste	2 x weekly
	Recycling	2 x weekly
Retail	Residual waste	2 x weekly
	Recycling	2 x weekly

Collections per week are indicative only and may be subject to further development as part of future Detailed SSD applications.

Based on the quantity of waste expected to arise from each building on a daily basis, it is noted that a medium sized waste collection vehicle (two axle rigid truck) would be suitable for collecting the waste from each building. The medium sized vehicles may include a compaction system. The waste from Building 2 will be collected directly from the central waste storage room located in the Basement Level 1. A swept path analysis has been completed which demonstrates the capacity for an 8.8m by 2.5m truck to safely manoeuvre through the space. This is depicted in Appendix D which illustrates the truck entering through Precinct Street A. The swept path analysis will be updated for Building 2 as a part of the Detailed SSDA as the design progresses.

4.3.4 Building 3

This section outlines the waste assessment and infrastructure requirements for servicing approximately 23,330m^2 of residential, 3,750m^2 of commercial and 310m^2 of retail areas located in Building 3. The proposed building design is shown in the Figure 4-8.

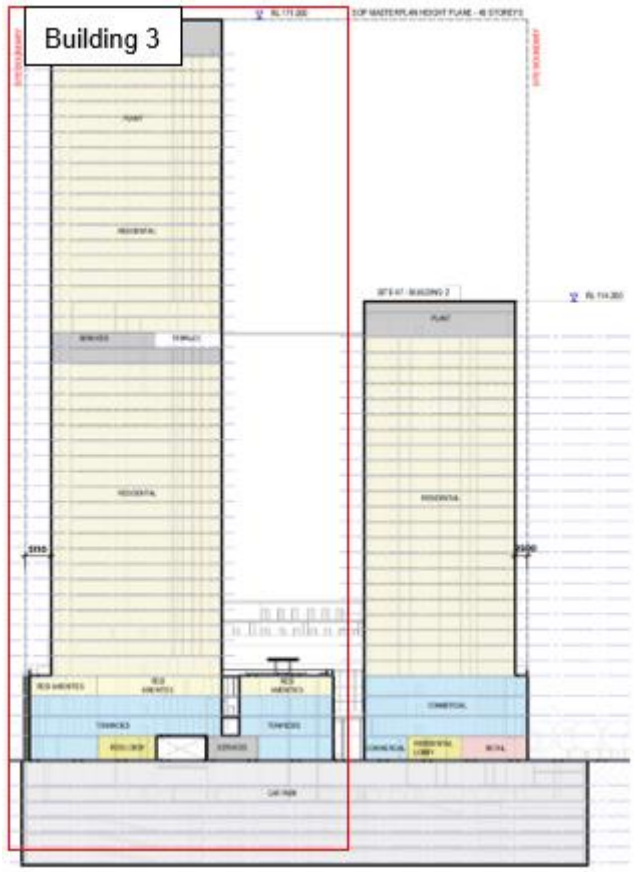


Figure 4-8 Proposed Building 3 design

Waste type and quantities

Estimates of key waste streams generated by the operation of building are provided in Table 4-10 below.

Table 4-10 Waste types and generation rates for Building 3 (day/week)

Use	GFA (m^2)	Residual waste (litres)		Recycling (litres)	
		Day	Week	Day	Week
Residential	23,330	2,606	18,240	1,303	9,120
Commercial	3,750	300	1,500	225	1,125
Retail	310	248	1,736	217	1,519

*7-day week operation for retail uses and 5-day week for commercial use

Waste storage and internal waste management

Commercial and retail spaces within the building will be allocated space and bins for temporary holding of residual waste and recycling. Staff/ facilities management would transfer / dispose of these directly into the appropriate 660L bins provided within the central waste room located in the basement, accessed via service lifts. Residual

waste would need to be compacted prior to disposal using the compaction facility within the central waste room.

Paper and cardboard balers should be considered if waste generation is very high, in these cases it is recommended that paper and cardboard be segregated out at the source so that it can be baled separately from other recyclables.

The residential owners/occupiers in the building would transfer / dispose the generated waste directly into the nearest chute (dual chute system) available on each residential level of the building, the chute will terminate at the central waste room located in the basement, where it will be deposited in 660L bins. A linear or circular carousel can be used to move the bins when full. Waste chute compactors for residual waste should be used to reduce manual handling of waste.

Bulky household waste storage would need to be transferred directly by the owners/occupiers to storage area provided within the central waste room located in the basement, accessed via service lifts. A separate bulky paper and cardboard storage cage can be located on the ground floor within close proximity to the route typically taken by residents when leaving the building

The ongoing operation and maintenance of the central waste room and compaction facility will be the responsibility of the facilities management. A bin wash area will be provided adjacent to the central waste room to enable cleaning of bins. The facilities management will also be responsible for the application of the internal waste management procedures.

Waste storage requirements for each waste stream are shown Table 4-11.

Table 4-11 Waste storage and handling space requirements for Building 3

Use	Waste stream	Bin Size (litres)	No. of bins after compaction	Area required m^2 (excluding manoeuvring space)	Area required m^2 (including manoeuvring space and **)
Residential	Residual waste*	660	7	16	37
	Recycling	660	7		
	Bulk waste	N/A	N/A	-	48
Commercial	Residual waste*	660	1	2	5
	Recycling	660	1		
Retail	Residual waste*	660	1	3	8
	Recycling	660	2		
Retail and Commercial	Bulk waste	N/A	N/A	-	8

* Residual waste compaction ratio 2:1 assumed
** 0.15 m clearance in between bins has been included for manoeuvring and cleaning
** Minimum aisle space of 1.2m
** Bin wash area $4m^2$
** Stationary compactor/bin press $4m^2$

A concept design layout for the central waste room in the basement level of the building is shown in Figure 4-9. Garbage chute room location in the building is shown in Figure 4-10. The area allocated for waste storage and handling space requirements for the residential waste room and commercial waste room within Building 3 is appropriate and meets the requirements.

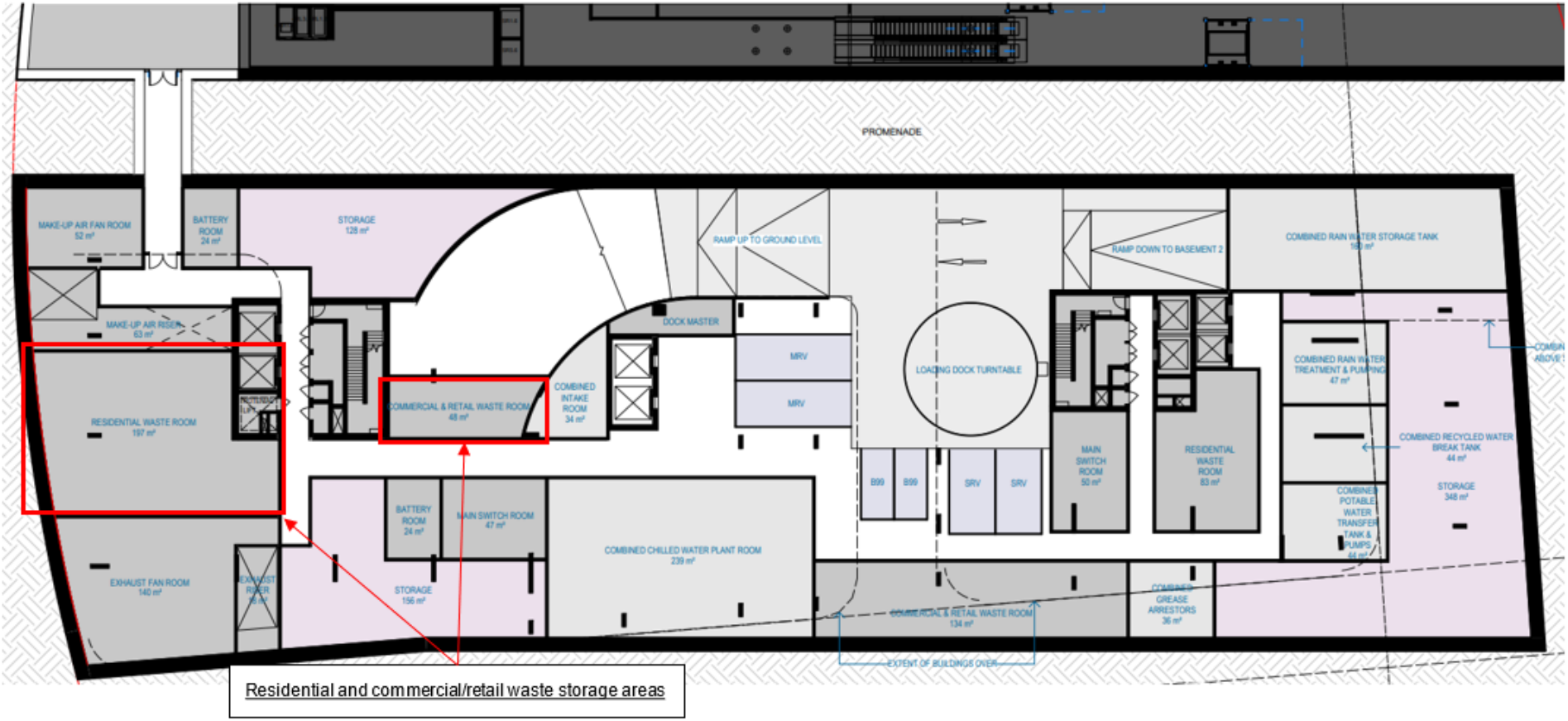


Figure 4-9 Building 3 Main waste storage room, basement level 1 design

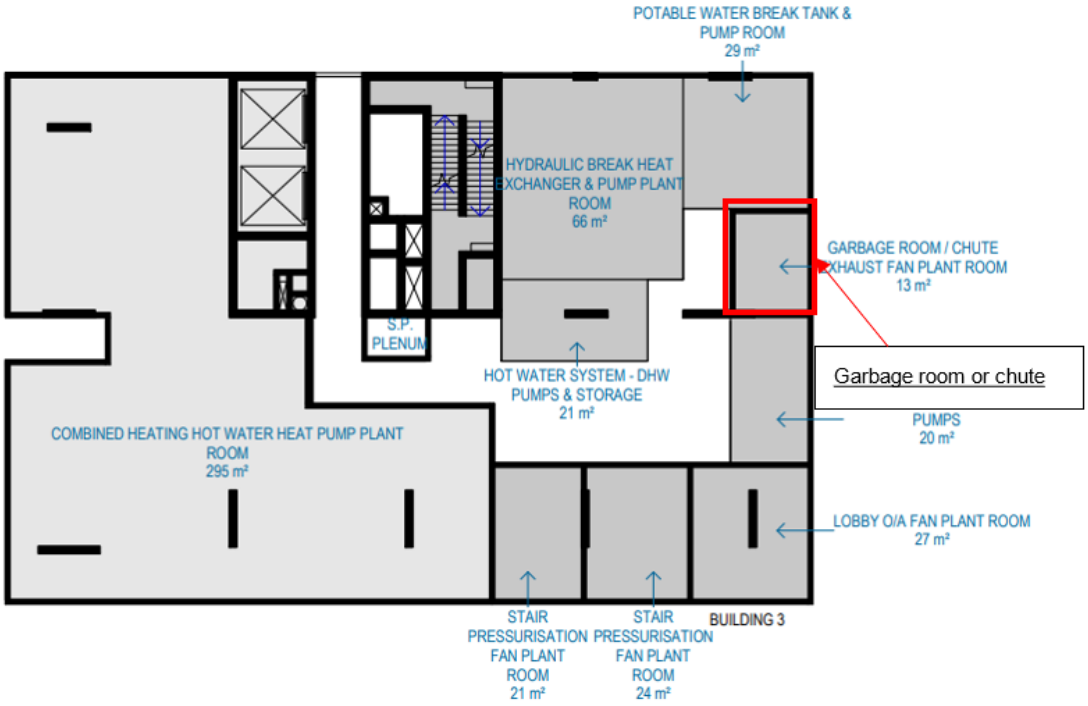


Figure 4-10 Building 3 chute room, roof plan

Waste collection

Assumed collection frequencies for each commercial and retail waste stream are outlined in Table 4-12 below.

Table 4-12 Waste collection frequency for Building 3

Use	Waste stream	Collection
Residential	Residual waste	2 x weekly
	Recycling	2 x weekly
Commercial	Residual waste	2 x weekly
	Recycling	2 x weekly
Retail	Residual waste	2 x weekly
	Recycling	2 x weekly

Collections per week are indicative only and may be subject to further development as part of future Detailed SSD applications.

Based on the quantity of waste expected to arise from each building on a daily basis, it is noted that a medium sized waste collection vehicle (two axle rigid truck) would be suitable for collecting the waste from each building. The medium sized vehicles may include a compaction system. The waste from Building 3 will be collected directly from the central waste storage room located on the Basement Level 1. A swept path analysis has been completed which demonstrates the capacity for an 8.8m by 2.5m truck to safely manoeuvre through the space. This is depicted in Appendix D which illustrates the truck entering through Precinct Street A. The swept path analysis will be updated for Building 2 as a part of the Detailed SSDA as the design progresses.

4.3.5 Waste Collection

The transfer of waste and all bin movements should require minimal handling and if required, the operator must assess the risks associated with manual handling and provide any relevant documentation to building management.

A bin-tug, trailer or tractor consultant should be contacted by the developer to provide equipment recommendations, if required.

The delivery of bins to/from the loading dock from the buildings should be coordinated with the private collection company responsible for the transfer of waste to treatment and disposal facilities. As a minimum, a two-day waste storage capacity should be designed into central waste room if a collection is delayed or missed.

The loading dock and access points for the collection areas should be further reviewed by a traffic consultant as the concept design progresses, this is necessary to ensure that height and manoeuvring clearances for collection vehicles is suitable to service the buildings. It is noted that a medium sized waste collection vehicle would be suitable for waste collection from each building.

Obstructions to turning circles, clearances to kerbs, existing buildings or other hindrances should be designed to accommodate the largest collection vehicle that could service the proposed development. At minimum, turning circles should comply with AS2890.2 Parking facilities: off-street commercial vehicle facilities which provides specifications for turning path and reverse entry manoeuvres for medium and heavy rigid class vehicles, these specifications are provided in Table 4-13.

Table 4-13 Australian standard for turning circles for medium and heavy rigid class vehicles

Vehicle class	Length (m)	Width (m)	Turning radius (m)	Swept circle (m)	Clearance height (m)
Medium rigid vehicle	8.80	2.5	10.0	21.6	4.5
Heavy rigid vehicle	12.5	2.5	12.5	27.8	4.5

4.3.6 Station waste

All station waste will be collected and managed by Sydney Metro. Station cleaning staff will collect and dispose of waste/recyclables in the back of house station services to be incorporated in the station design. Station waste collection may share the use of loading bays allocated for the proposed development outlined in this WMP, although collection times and contractors may differ. Station management and the proposed development's building operators will liaise to ensure there are no conflicts in shared use of loading bays.

4.3.7 General design principles

General design principles and specifications for the central waste rooms and waste chute system as provided in the City of Parramatta Waste Management Guidelines for new Development Applications and. Specifications are detailed below:

Central waste rooms

- The size being large enough to accommodate all waste generated on the premises, with allowances for the separation of waste types.

- Be located on either the ground floor or basement with a minimum 1.2m aisle space for access.
- The floor being graded and drained to an approved drainage outlet connected to the sewer and having a smooth, even surface, coved at all intersections with walls.
- The walls being cement rendered to a smooth, even surface and coved at all intersections.
- Cold water being provided in the room with the outlet located in a position so that it cannot be damaged, and a hose fitted with a nozzle being connected to the outlet.
- The room shall be adequately ventilated (either natural or mechanical) in accordance with the Building Code of Australia.
- The maximum travel distance from any dwelling to the waste services room is not to exceed 75m.

Dual chute system

- Chutes, service openings and inlet hoppers are to be constructed of metal or other smooth-faced, durable, fire-resistant and impervious material of a non-corrosive nature, capable of being easily cleaned.
- Chutes are to be cylindrical in cross-section and the internal diameter is to be a minimum 500mm and adequate for material being deposited.
- Chutes are to be vertical without bends or 'off-sets' and not reduce in diameter over the fall.
- Chutes are to be ventilated to ensure that air does not flow from the chute through any service opening.
- A cut-off is to be provided at or near the base of the chute to effectively close off the chute while the storage container or compacting device is withdrawn.
- Chute rooms are to be provided with an inlet hopper and be in a convenient, well-lit and ventilated positions.
- The floor below each charging device and service opening is to be finished with a smooth impervious material with a minimum area of not less than one square metre ($1m^2$) situated centrally below the inlet hopper.
- Inlet hoppers are to be designed to:
    - effectively close off the service opening in the chute when the device is opened for loading
    - automatically return to the closed position after use
    - permit free flow of waste into the chute
    - not project into the chute
    - permit easy cleaning of the device and connection between the service opening and the chute
    - be not less than one metre (1m) or more than one and one-half metres (1.5m) above the floor level.
- Inlet hoppers are to be capable of delivering the waste to the chute without using force.

5 Management measures

This section outlines management measures for consideration to reduce construction and operating waste through appropriate recovery, re-use and recycling practices, minimise environmental impacts from the proposed development and to meet waste objectives and targets noted in this WMP and the Ecologically Sustainable Design Report (Appendix S of the EIS).

5.1 Strategies for waste reduction in the construction phase

5.1.1 Waste avoidance in design

Sustainable design should be thoroughly considered detailed design phase where it presents opportunities to incorporate waste minimisation and resource efficiency. Measures may include:

- Specifications relating to incorporation of used materials or materials with recycled content which contribute to landfill diversion targets set by the City of Paramatta.
- Enabling the purchase of materials in shape/dimension and form that minimises the creation of off-cuts/waste.
- Consideration should be given to what will happen to the materials specified when they reach the end of their useful life. Where possible, elements should be designed for repair, modular repair, recycling at the end of life or safe disposal. The use of hazardous materials should be minimised.

5.1.2 Reuse and recycling in construction

The following measures are recommended for minimising construction waste:

- Use of prefabricated elements where possible.
- Material reuse (such as concrete, tarmac, timber and landscaping features).
- Any excavated materials will be carefully stored in segregated piles for subsequent reuse on the site wherever possible. These excavated materials should be reused as deposition material for infilling or landscaping.
- Avoiding over-purchasing and accurate delivery times, ensuring materials are ordered for delivery shortly before they are used on the project would also avoid possible damage and therefore wastage.
- Use of take back schemes, some suppliers offer a take back scheme, which should be utilised where practicable, particularly for packaging and pallets.

5.2 Strategies for waste reduction in the operational phase

In line with the reduce, reuse, recycle hierarchy to waste management, it is recommended that the following measures are taken to allow owners and occupiers to participate in best practice operational waste management.

- Exploring segregation of organic waste from the residual stream within commercial premises.
- Exploring the viability of small-scale organic waste treatment. Treatment via composting has the potential to recycle the organic waste into a product which may be used within the development green areas, offset the use of imported materials and reduce emissions due to transport and disposal.

- Introduction of paper and cardboard balers in buildings with high paper and cardboard arisings.
- Facilities management to engage with City of Parramatta in delivery of waste handling training to increase awareness of waste avoidance activities for both staff, residents and visitors.

6 Conclusion

This WMP has been prepared to outline the potential impacts from waste generation, storage and collection of the proposed development and to specifically respond to the SEARs issued for the Concept SSDA.

The proposed development concept design has considered relevant planning and regulatory requirements as detailed in section 3.2 during both construction and operation.

This WMP forms the framework for waste management measures for future detailed design and planning stages of the development.

The area and spaces allocated for operational waste storage and collection for the proposed development are considered to be appropriate based on the expected waste generation from the proposed development design and assumptions.

It is noted that approval is only being sought for the Concept SSDA and the waste requirements of the development should be considered further during the detailed design phase. Future detailed design should be generally consistent with the minimum waste area requirements proposed in this WMP, and a detailed waste management plan should be submitted with future Detailed SSDAs demonstrating how the requirements in this report have been addressed in the final building design.

7 References

Australian Standard AS2890.2 Parking facilities: off-street commercial vehicle facilities

City of Parramatta, 2011, Parramatta Development Control Plan, https://www.cityofparramatta.nsw.gov.au/sites/council/files/inline-files/DCP%202011_2.pdf

City of Parramatta, 2011, Parramatta Local Environment Plan, https://legacy.legislation.nsw.gov.au/~/pdf/view/epi/2011/540/whole

City of Parramatta, 2016, Parramatta Waste Management Guidelines for new Development Applications 2016, https://www.cityofparramatta.nsw.gov.au/sites/council/files/2017-05/Waste%20Management%20Guidelines%20for%20new%20Development%2024%20March%202017.pdf

City of Parramatta, 2017, City of Parramatta Environmental Sustainability Strategy, https://www.cityofparramatta.nsw.gov.au/environment/environmental-sustainability-strategy

Green Building Council Australia, 2017, Green Star Design and As Built Manual v1 (version B), https://new.gbca.org.au/green-star/rating-system/design-and-built/

NSW EPA 2012, Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities, https://www.epa.nsw.gov.au/~/media/EPA/Corporate%20Site/resources/managewaste/120960-comm-ind.ashx

NSW EPA 2019, Better practice guide for resource recovery in residential developments, https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/warrlocal/19p1559-resource-recovery-in-residential-developments.pdf?la=en&hash=C29AFB3B95D416F29A6F711B684C620900174075

NSW EPA 2021, Waste Classification Guidelines, https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines

NSW Department of Planning and Environment 2021, NSW Waste and Sustainable Materials Strategy 2041 Stage 1: 2021-2027, https://www.dpie.nsw.gov.au/our-work/environment-energy-and-science/waste-and-sustainable-materials-strategy

Sydney Olympic Park Authority 2008, Environmental Guidelines Sydney Olympic Park 2008, https://www.sopa.nsw.gov.au/environment/

Sydney Olympic Park Authority 2018, Sydney Olympic Park Master Plan 2030 (2018 Review), https://www.sopa.nsw.gov.au/Developing-our-Park/Master-Plan-2030

Sydney Metro, 2017, Sydney Metro City and Southwest Sustainability Strategy 2017-24, Sydney Metro City and Southwest Sustainability Strategy 2017-24

Appendix A Operational waste modelling assumptions

A.1 Waste generating areas

Waste generating area		GFA (m^2)	Residential units
Building 1	Retail	1,200	
	Commercial	26,690	
Building 2	Retail	250	
	Commercial	2,380	
	Residential	9,460	88
Building 3	Retail	310	
	Commercial	3,750	
	Residential	23,330	228

Notes: The floor area is the basis for estimating the scale of waste generation. Residential units are an exception to this rule, where waste generation is based on number of units.

A.2 Waste generation rates

Waste generating area	Residual	Recycling	Units
Retail[1*]	80	70	Litres / 100m^2 / day
Commercial[2*]	8	6	Litres / 100m^2 / day
Residential[3]	80	40	Litres / unit / week

Source:
[1]Retail (Average non-food and food retail outlets generation rate): Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities EPA 2012
[2]Commercial (Commercial office generation rate): Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities EPA 2012
[3]Residential and bulky waste: Paramatta Waste Management Guidelines for new Development Applications 2016.
*Bulky waste for non-residential: City of Sydney Guidelines for waste management in new developments

A.3 Bin dimensions

Capacity (L)	Width (mm)	Depth (mm)	Height (mm)	Area (m^2)
120	485	560	940	0.27
240	580	735	1080	0.43
660	1370	850	1250	1.16

Appendix B Construction waste management plan

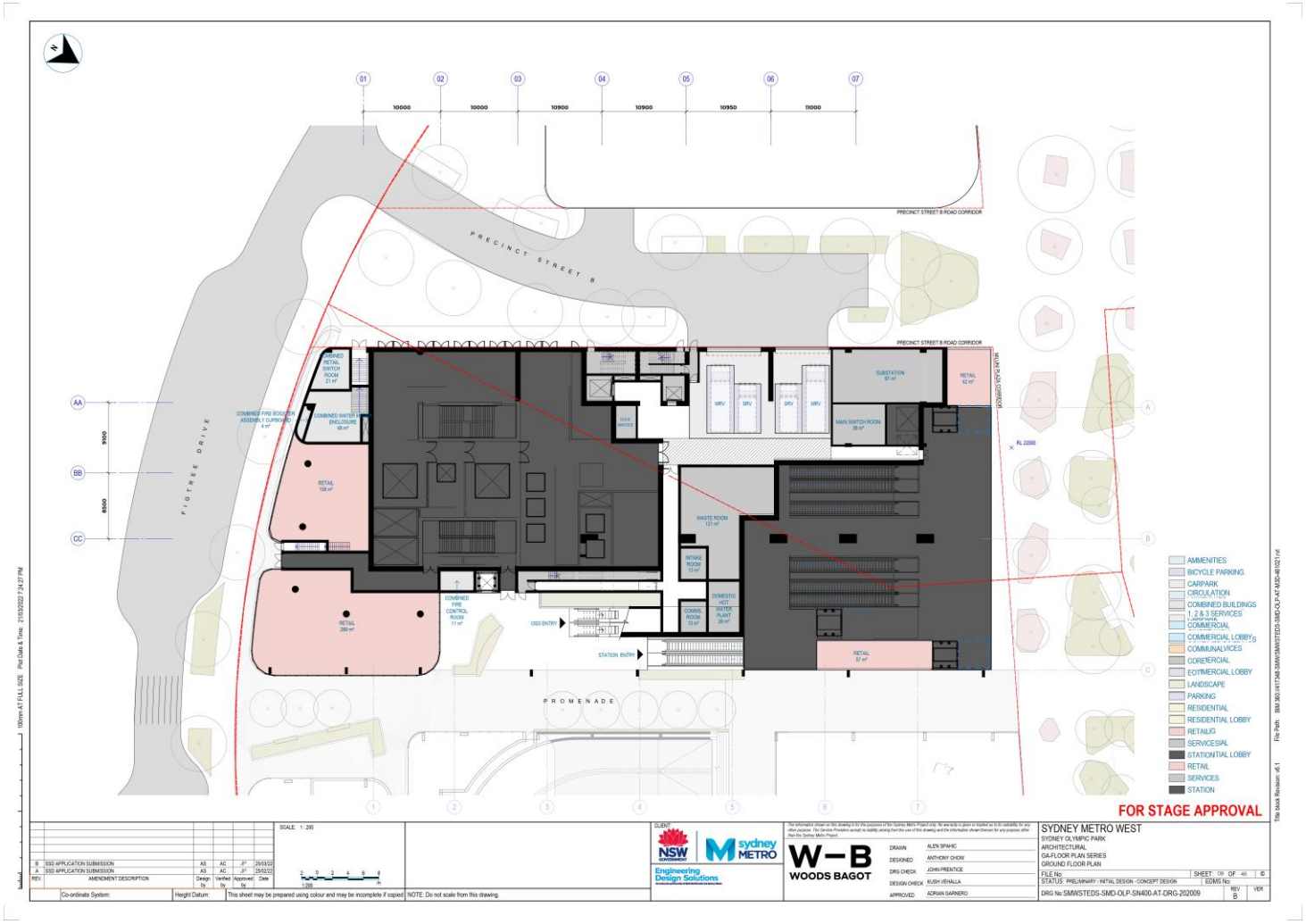
Waste stream	Anticipated volume	Recovery potential	Onsite reuse/recycling	Offsite reuse/recycling	Disposal/treatment
Excavation material	Medium	High	Topsoil has excellent potential for reuse opportunities in landscaping around the development.	Due to the properties of anthropogenic fill, opportunities to reuse the material compared to natural, or topsoil are more limited. However, reuse where possible within the project or send off site for recycling.	All soil extracted (whether contaminated or not) will be stockpiled at the site and subject to laboratory analysis prior to reuse or removal to an off-site waste facility to identify whether the material can be reused as fill material or will require landfilling at an appropriately permitted facility.
Timber	Low	High	Any timber taken down at the site shall in the first instance be re-used on site, e.g., for formwork, bridging, blocking and propping. Timber off-cuts to be used in landscaping.	Small timber offcuts and untreated timber should be placed in skips and sent to local recycling facilities, where it can be mulched. Opportunities should be explored for supplier packaging take back schemes	Disposal of treated timber however minimal disposal requirements expected.
Concrete	Low	High	Small quantities may arise, components will be pre-casted prior to arrival on site to minimise waste generation on site in the first place. Crushed concrete can be used as clean fill or aggregate in pavements.	Concrete waste should be placed in skips and sent to a local recycling facility for crushing and subsequent reuse on other developments.	No disposal required.
Bricks	Low	High	Waste /surplus bricks can used as clean fill or aggregate in pavements and/or landscaping around the development.	Brick waste should be placed in skips and sent to a local recycling facility for crushing and subsequent reuse on other developments.	No disposal required.

Waste stream	Anticipated volume	Recovery potential	Onsite reuse/recycling	Offsite reuse/recycling	Disposal/treatment
Tiles	Low	High	Waste /surplus tiles can used as clean fill or aggregate in pavements and/or landscaping around the development.	Tile waste should be placed in skips and sent to a local recycling facility for crushing and subsequent reuse on other developments.	No disposal required.
Metal	Low	High	Limited opportunities for onsite reuse of offcuts or excess metal strips.	Metal waste should be placed in skips and sent to a specialty metal recycler for processing. Opportunities should be explored for supplier buy back schemes.	No disposal required.
Glass	Low	High	Limited opportunities for onsite reuse	Glass waste should be placed in skips and sent to a specialty glass recycler and subsequent reuse on other developments or products (reused as glazing or aggregate for concrete production)	No disposal required.
Plasterboard	Low	High	Limited opportunities for onsite reuse	Plasterboard waste should be placed in skips and sent to a specialty recycler	No disposal required.
Fixtures and fittings	Low	High	Limited opportunities for onsite reuse	Opportunities should be explored for supplier buy back schemes.	No disposal required.
Floor coverings	Low	High	Limited opportunities for onsite reuse	Opportunities should be explored for supplier buy back schemes.	Minimal disposal required.
Packaging	High	High	This waste will predominantly consist of plastic sheeting, shrink-wrap, wooden pallets, metal strips. Opportunities should be explored for each material reuse potential.	Segregate each waste stream into skips and remove offsite to an appropriate local facility for recycling. Opportunities should be explored for supplier take back schemes.	Minimal disposal required.
Vegetation	Low	High	Opportunities for site vegetation to be reused in landscaping around the development.	Potential for site vegetation to be composted at composting facilities	No disposal required.

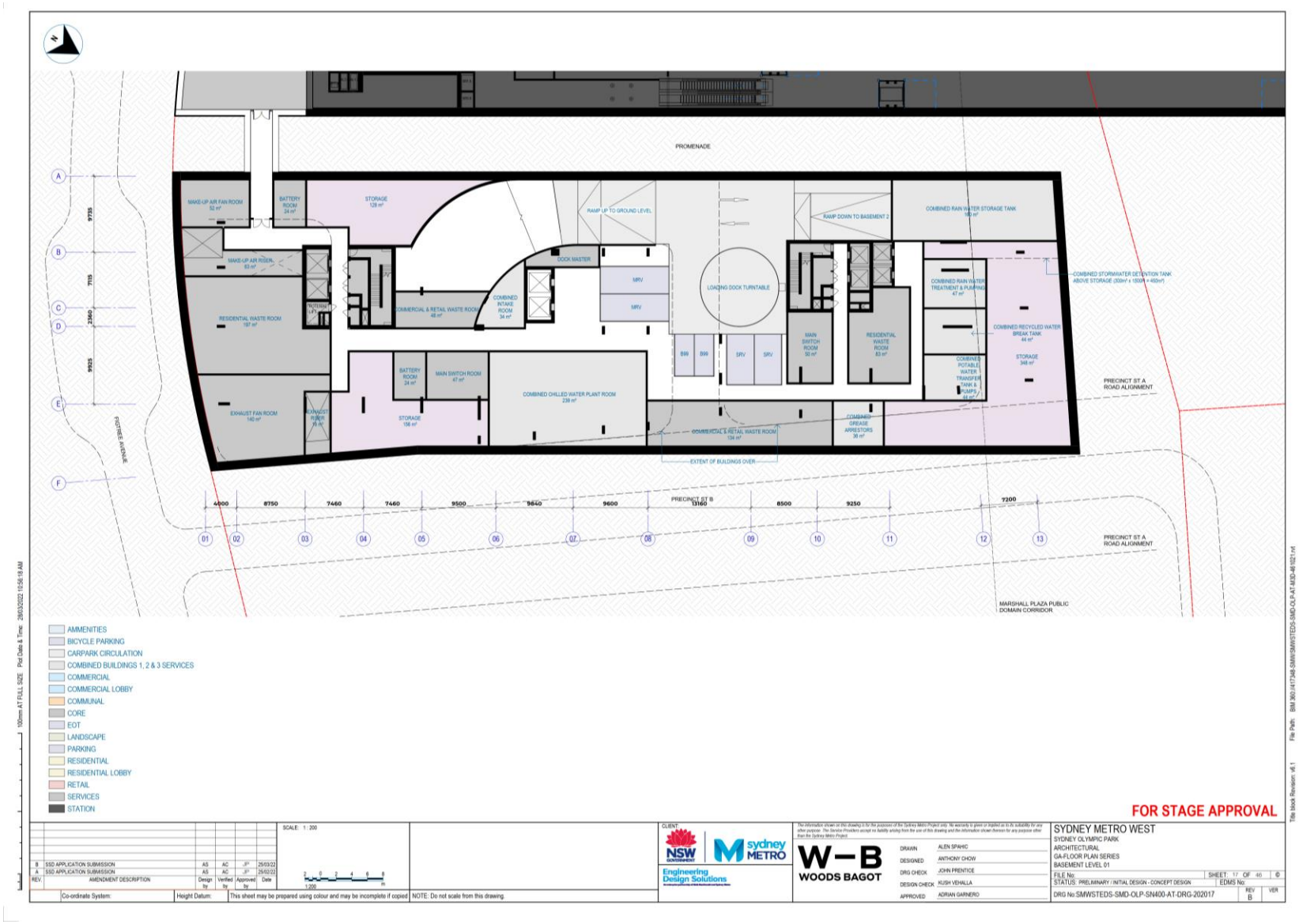
Waste stream	Anticipated volume	Recovery potential	Onsite reuse/recycling	Offsite reuse/recycling	Disposal/treatment
Containers	Low	High	Opportunities should be explored for reuse on site, e.g., temporary storage	Opportunities should be explored for supplier take back schemes	No disposal required.
Paper/cardboard	Low	High	Limited opportunities for onsite reuse.	Maintain clean waste stream by segregating each waste stream into skips and remove offsite to an appropriate local facility for recycling. Opportunities should be explored for supplier take back schemes.	No disposal required.
General waste (residual waste)	Medium	Medium	Likely to comprise food waste and non-recyclable materials. Consideration should be given for providing separate bins for the collection of food waste, newspapers and non-recyclable materials.	Segregate each waste stream into skips and remove offsite to an appropriate local facility for disposal.	Disposal required for general waste.
Hazardous/special waste	Low	Low	Not applicable	These waste streams should be segregated from other waste streams and stored in appropriately designed and secure bunded storage areas/cupboards for subsequent identification and removal for treatment off-site at a hazardous waste facility.	These waste streams should be segregated from other waste streams and stored in appropriately designed and secure bunded storage areas/cupboards for subsequent identification and removal for treatment off-site at a hazardous waste facility.
Other	N/A	N/A	Reuse opportunities to be explored for other material streams as appropriate	Segregate each waste stream into skips and remove offsite to an appropriate local facility for recycling where feasible	Drop-off non-recyclables items at local transfer or disposal facilities

Appendix C Concept design drawings

C.1 Building 1 ground floor design



C.2 Building 2 and 3 basement design



Appendix D Swept path analysis for Building 2 and 3