Waste Management Plan

NEXTDC SC2

Rev_2

Project No. 24-1628

NEXTDC Limited

28 November 2024

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Revision	Drafted by	Reviewed by	Date issued
Rev_0	J Bradbury	J Campbell	14 October 2024
Rev_1	J Bradbury	J Campbell	14 November 2024
Rev_2	J Bradbury	J Ferguson	28 November 2024

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1 Development details

This Waste Management Plan (WMP) has been prepared for the following project:

Project name / address	**NEXTDC SC2, Lot 10 South Sea Islander Way, Maroochydore, QLD**
Client	NEXTDC Limited
Architect	Architectus
Main point of contact	Katie Demack, Turner & Townsend
Planning status	DA submitted. WMP conditioned and required for building permit application.
Overview of development	A 6-level data centre building consisting of office space, data halls, storage spaces and associated plant and equipment. The site is located within the Maroochydore Priority Development Area and will be required to connect to the Automated Waste Collection System (AWCS) that is in place.
Sustainability objectives and targets	Target goal of at least 90% diversion of solid waste from its operation, with ongoing commitment to prevention, elimination or reduction of wasteful practices, and recycling in all facilities
Architectural plans / area schedule / development information	Architectural plans received from Ryan Tucker, Architectus on 12 November 2024 Demolition and construction waste estimates provided by the project Quantity Surveyor Cian Sheehan, WT Partnerships.
Local Government discussions	Pre-design meeting with Conor Walsh, Technical Officer Capital Program & Contracts and Martina McGregor, Senior Officer, Sunshine Coast Council regarding waste management requirements, 20 September 2024

1.1 Context

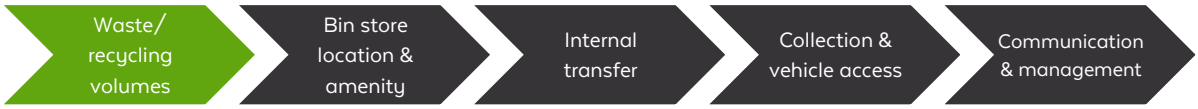
For efficient and effective waste management, the collection and centralisation of waste and recyclables has been carefully considered at the building design phase. Key factors considered at the design phase include:

- Local government requirements
- Waste and recycling volumes likely to be generated during building operation
- Number and types of bins required
- Bin stores size, location and amenity (odours and noise)
- Internal transfer and access to bins and storage areas from within the building
- Access for vehicles for waste collection
- Safety for all operatives involved in waste management
- Communication and ongoing management of waste and recycling services

1.2 Key components of the Waste Management Plan

This Waste Management Plan (WMP) consists of five core components. It presents detailed information on each of the following components.

2 Estimated waste and recycling volumes



The quantity and management of waste and recycling has been considered for the following:

1. Demolition phase
2. Construction phase
3. Operational phase

2.1 Demolition phase

The demolition phase will primarily consist of earth works for preparing and levelling the site. Table 1 shows the estimated volume, tonnes and destination of waste anticipated by the project's Quantity Surveyor to be generated from the demolition phase of the project.

Table 1: Estimated volume (m^3) and destination of materials from the demolition phase

Type of materials	Est. Vol. (m^3)	Est. Wt. (t)	On-site	Off-site	Disposal
Excavated materials	1,000	2,000	Reuse on site for fill	-	-
Garden organics	0	0	-	-	-
Bricks	0	0	-	-	-
Tiles	0	0	-	-	-
Concrete	0	0	-	-	-
Timber	0	0	-	-	-
Plasterboard	0	0	-	-	-
Metals	0	0	-	-	-
Asbestos	0	0	-	-	-
Other waste	0	0	-	-	-

2.2 Construction phase

The construction elements will consist of pre-cast concrete columns and sheer walls, and post tensioned reinforced concrete slabs, with only level one of the administration area having steel columns and steel roof framing.

The managing contractor will engage a licensed waste contractor to service the construction site and manage all waste streams. The approach is that all construction waste is placed into skips, which are sorted at a resource recovery facility.

The appropriate types of receptacles for waste/recyclables will be leased from the waste contractor by the managing contractor as needed throughout the construction phase.

The managing contractor will develop a detailed project specific waste management plan for the construction phase prior to commencement of construction. The plan will incorporate details of waste disposal and storage areas, strategies for waste avoidance / reduction / reuse / recycling, personnel inductions, and guidance to contractors for reducing packaging.

Bin will be located in places that do not affect the neighbouring community and are not close to any surrounding premises.

Table 2 shows the estimated volume, tonnes and destination of waste anticipated to be generated from the construction phase of the project. The quantity of materials has been provided by the quantity surveyor,

Table 2: Estimated volume (m^3) and destination of materials from the construction phase

Type of materials	Est. Vol. (m^3)	Est. Wt. (t)	On-site	Off-site	Disposal
Excavated Materials	3,718	7,000	Re-use for fill where applicable	-	TBC
Garden Organics	0	0	-	-	-
Bricks	217	200	-	Recycling	-
Tiles	0	0	-	-	-
Concrete	100	250	-	Recycling	-
Timber	17	5	-	Recycling	-
Plasterboard	200	120	-	Recycling	-
Metals	222	200	-	Recycling	-
Asbestos	0	0	-	-	-
Other waste e.g. ceramic tiles, paints, PVC tubing, cardboard, fittings	333	50	-	-	Waste Contractor

2.3 Operational phase

2.3.1 Project parameters

The development when operational will include the following waste generating areas:

- Data halls over 2 floors (3,355 m^2)
- Office areas (1,236 m^2)

2.3.2 Local Government Guidelines

The following have been used in the development of this report:

- Prescribed Waste Infrastructure Standards (No 4), Sunshine Coast Council (September 2022)
- Sunshine Coast Council - SC6.18 Planning Scheme Policy for Waste Management, code version 27 (Dated 23 January 2024)

2.3.3 Waste generation rates

Sunshine Coast Council waste generation rates have been used to calculate waste and recycling generated in the office areas that will be disposed of via the AWCS.

Waste generation from the data halls and associated non-office areas are calculated based on Encycle experience of other data centres operating in Australia, in conjunction with operational data and information provided by NEXTDC.

A number of assumptions have been applied in developing this WMP:

- General waste and commingled recycling will use the AWCS
- Waste generation for office spaces and data halls is based on a 7-day working week
- The food waste volume generated has been included in the general waste stream to ensure the AWCS has been sized appropriately. In practice, food waste will be disposed of via in-sink macerators
- Areas occupied by plant / equipment, corridors, storage areas, water closets and void spaces are considered non-waste generating areas and have been excluded from the calculations
- There will be a Facility Manager (FM) on-site to oversee waste management systems.

Specifically, the office generation rates used are presented below. The rates do not include a breakdown of material streams included in the 'recycling' stream. The final column presents Encycle Consulting's in-house estimate of the material streams present in the recycling stream based on our working experience of operational buildings within Australia.

Premises type	Waste generation rate	Recycling generation rate	Percentage breakdown of recycling stream by material
Office	10 L / 100m^2 / day	10 L / 100m^2 / day	7% commingled 79% paper 14% cardboard Additional 10% soft plastics

2.3.4 Number of bin stores required

The building will have two bin stores to service the data centre:

i. AWCS room

ii. Bin store

2.3.5 Number of bins required

The majority of the waste at data centres is derived from unpacking servers and equipment in the unpacking and staging rooms adjacent to the loading dock. Waste generation from the process of unpacking and installing servers in the data halls is determined by the rate and quantity of servers being installed. This fluctuates day to day, week to week and month to month.

The ground floor will be utilised by small groups for tours, client meetings and training and has the ability to host NEXTDC events in-house. Usage of the ground floor is anticipated to be less than once per week, with the commitment that any large events (estimated to be less than twice per year), will have additional waste services engaged as required.

Space and bin allowances for recycling streams in addition to commingled recycling are included in this WMP in order to futureproof the building and increase resource recovery as opportunities arise.

The bin systems proposed have the capacity to accommodate higher waste generation through increasing the collection frequencies on an as-needs basis.

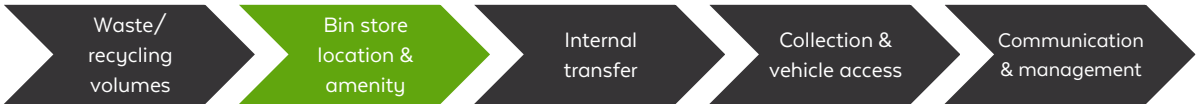
The AWCS bin room will house two general waste and two commingled recycling collection points and the air inlet. The waste generation anticipated from the office and data hall areas which will be disposed via the AWCS is 224 L per day of general waste and 258 L per day of commingled recycling.

The number of bins to be stored in the bin store are set out in Table 3.

Table 3: Number of bins to be stored in the bin store

Waste stream	Service Provider	Bin size (L)	Number of bins	Collection frequency	Colour code*
Cardboard recycling	Council	660	3	2 x weekly	**CB**
Confidential paper	Private	240	2	As required	**P**
Electronic waste – secure (e-waste)	Private	660	2	As required	**E**
CDS	Private	240	1	As required	**CDS**
Expanded Polyethylene and Polystyrene recycling	Private	660	1	As required	**EPS**
Battery recycling	Private	20	2	As required	**B**
***Ad hoc* recyclables/ reusables and bulk general waste**	Private	2 m^2	1	As required	**Ah/BGW**

3 Operational phase bin store locations and amenity



3.1 AWCS room and bin store location

The data centre site plan is provided in Figure 1. The AWCS room will be located in the lower ground floor (refer Figure 2) and the bin store will be located on the ground floor next to the loading dock (refer Figure 3).

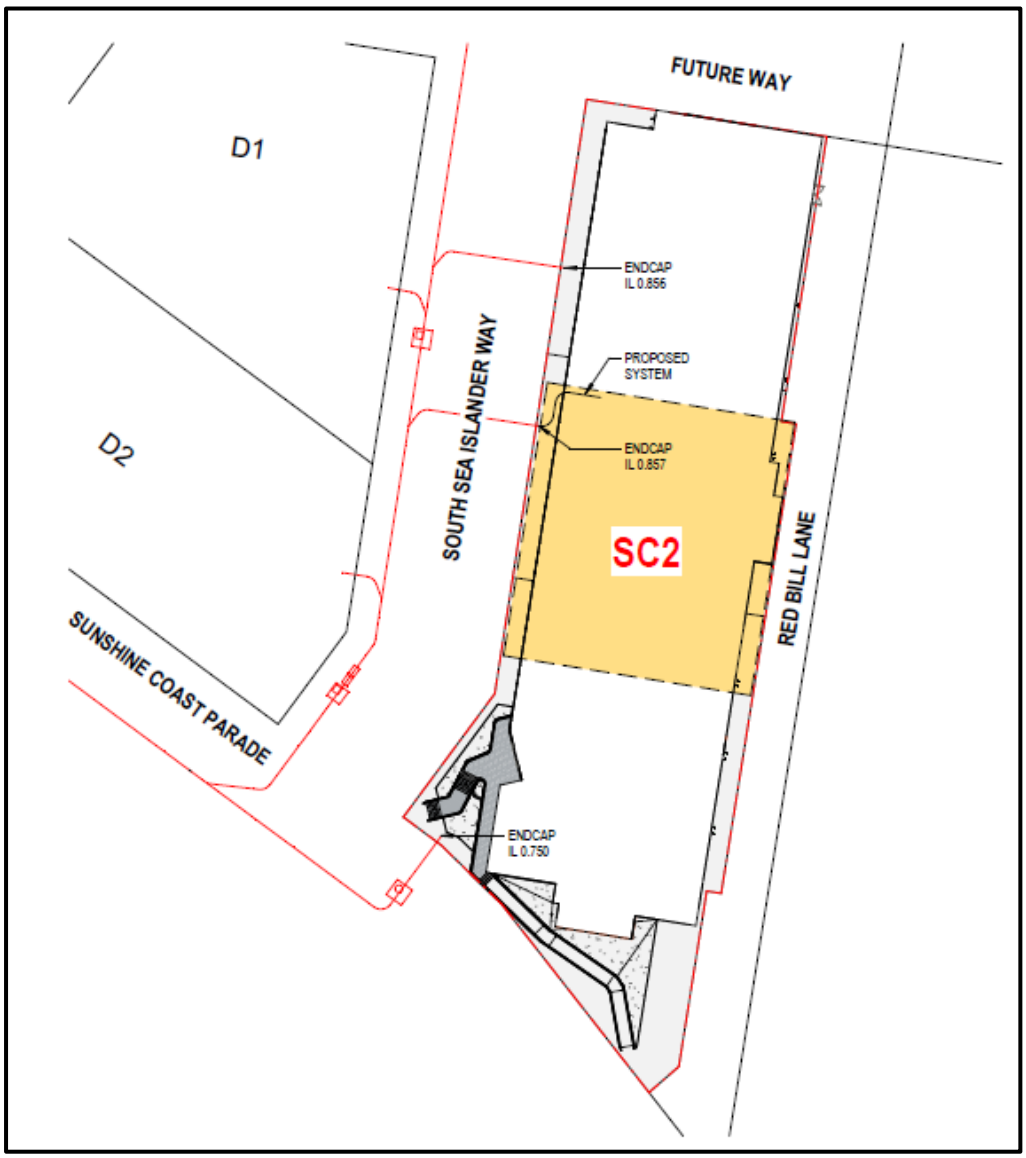


Figure 1: Site plan

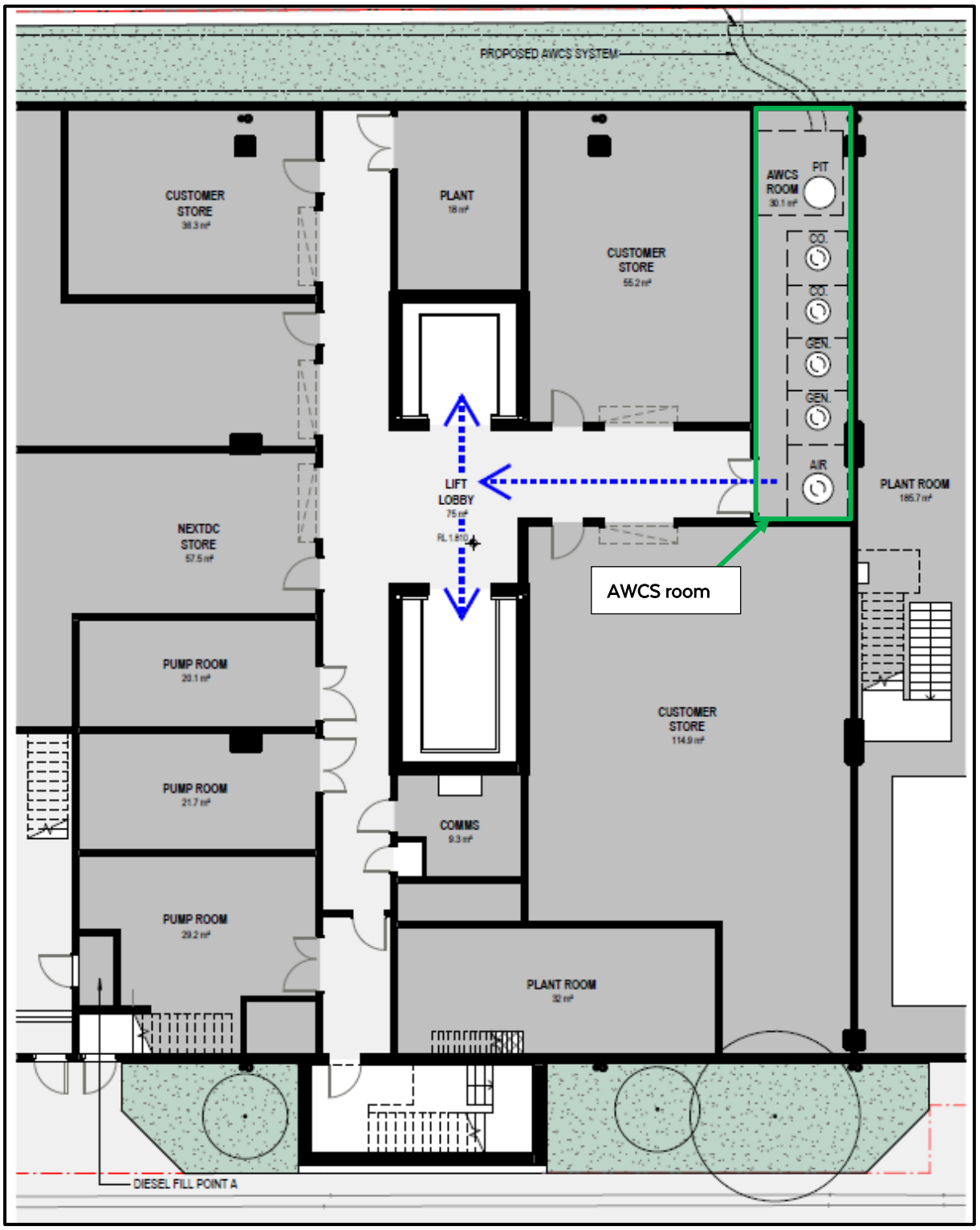


Figure 2: AWCS room location on lower ground floor

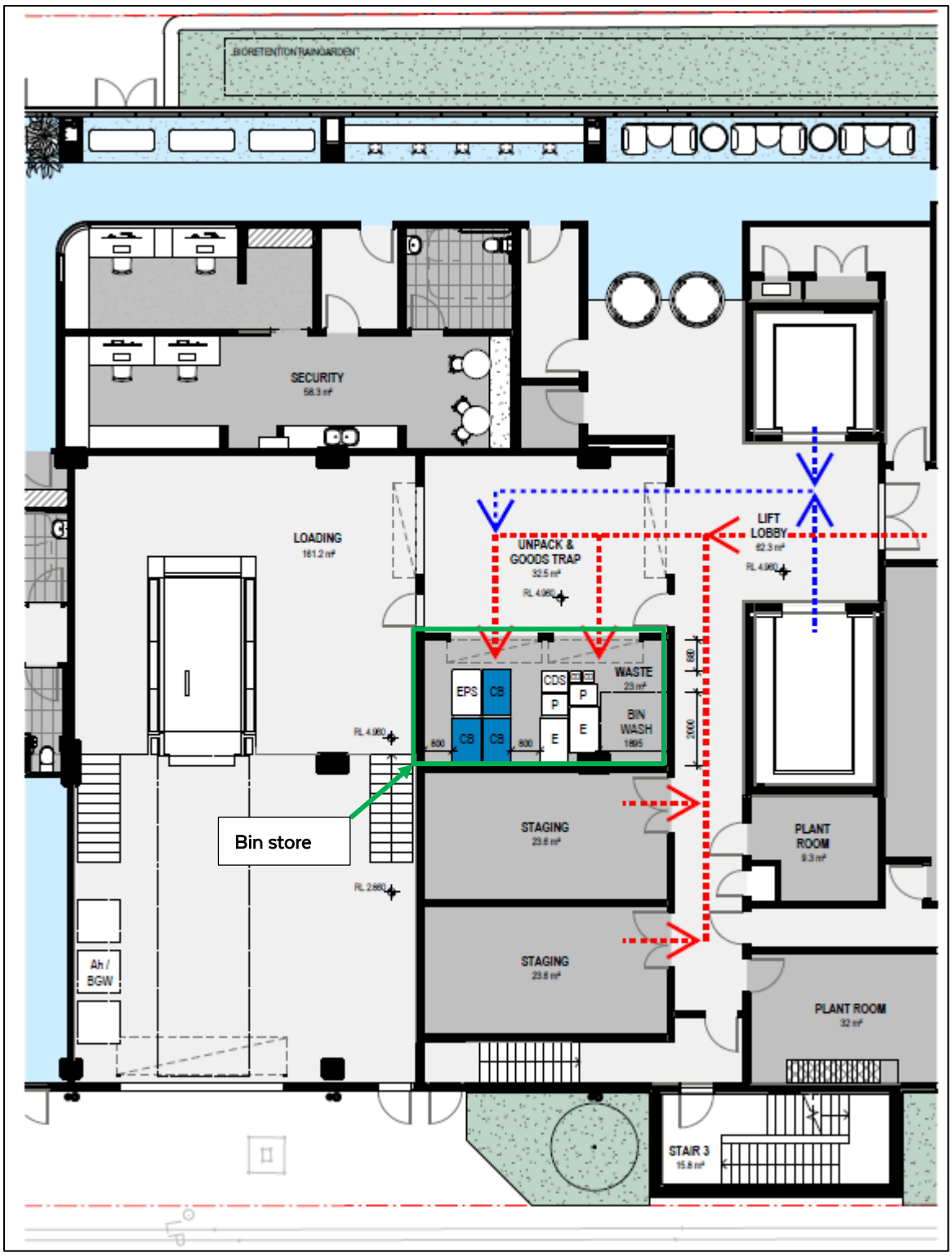


Figure 3: Bin store location and layout on ground floor

3.2 Bin store amenity

The AWCS room and bin store have been designed to include the following requirements in Table 4.

Table 4: Bin store amenity requirements

Aesthetics	The AWCS and bin store are consistent with the overall aesthetics of the development.
AWCS	The AWCS room has four collection points (2 x general and 2 x commingled recycling), an air inlet and inspection hatch. The room has sufficient space for the operation and maintenance of the AWCS with a room size of 12.2m x 2.6m. The room is also located as close as possible to the AWCS connection point which will reduce the need for additional bends.
Fully enclosed	The AWCS and bin store are fully enclosed and weatherproof, and only accessible by staff, data centre users, cleaners, building management and waste service providers.
Spatial requirements	The bin store allows sufficient space to accommodate, manoeuvre and wash the bins and equipment specified.
Bin wash	The bin store has impermeable walls and floors grading to an industrial floor waste (including a charged 'water-trap' connected to sewer/an approved septic system), with a hose cock to enable bins and/or the enclosure to be washed out. A 100 mm floor waste gully to waste outlet is included. Both hot and cold water is available.
Doors	Doors are ventilated both internally and externally to the AWCS room and bin store. Self-closing doors are installed to the bin store to eliminate access to vermin. Doors from the bin store to the servicing/collection area can be locked open. Doors are designed to fit the largest bin, to enable bins to be easily wheeled into and out of the bin store.
Security	Security measures are designed to limit access to the bin stores, e.g. PIN code that can be easily changed and reduces loss of key cards etc.
Walls and ceilings	The AWCS and internal bin store walls are cement rendered (solid and impervious) to enable easy cleaning. Ceilings are finished with a smooth faced,

	non-absorbent material that can be easily cleaned. Walls and ceilings are finished or painted in a light colour.
Floors	Floors are constructed in concrete in accordance with AS 2870. Floors are evenly graded to an approved liquid refuse disposal system. Slab thickness is a minimum of 100 mm, impervious and with a brush finish treatment.
Ventilation and odour	The design of the AWCS room and bin store provides for adequate separate ventilation with a system that complies with Australian Standard 1668 (AS1668). The ventilation outlet is not in the vicinity of windows or intake vents associated with other ventilation systems.
Lighting	The AWCS room and bin store are provided with artificial lighting, with sensor or switch controls both internal/external to the bin stores. Artificial lighting in laneways/loading bays and access walkways to bin store will ensure staff safety.
Noise	Noise is minimised through considering the location of the bin store and collection point and the timing of collections to prevent disruption to occupants or neighbours.
Signage	Visual aids and signage will be provided when the bin stores is operational to ensure that the area works as intended.

4 Operational phase - internal transfer

4.1 Transfer of waste to AWCS and bin store

Facility Management/cleaners will be responsible for transferring office full general waste and recycling bins and bags (limited to 50 L) from the point of generation to the AWCS inlet points and bin store. Full bins or bags will be taken via internal corridors and the lift to the bin store and decanted or swapped out for empty bins (refer Figure 3). Note: Commingled recycling will put into the AWCS system loose and not bagged.

Items from the unpacking areas such as cardboard will be taken directly to adjacent bin store and e-waste will be taken from the data halls to the bin store via the elevator and corridors.

Clear, safe access between internal waste generating areas and the AWCS room and bin store is provided.

4.2 Bin transfer requirements

All bin transfer routes have been designed to include the following requirements in Table 5.

Table 5: Bin transfer requirements

Bin transfer requirements	
User access route	Waste transfer routes avoid stairs/steps and steep ramps (grade of slope <1:14) and other potential hazards between points of waste generation, AWCS room/bin store and collection. Waste transfer routes are designed to ensure that bins (particularly when full) are not moved over any significant distances.
Transfer route width	All doors, corridors and lifts on the transfer route are designed to fit the largest bin.
Access for waste collection vehicles	Waste collection vehicles will safely enter, operate and exit the development with minimal reversing or manoeuvring.
Walkways	Safe access to waste collection vehicles have been provided to reduce the risk of accidents.

5 Operational phase - collection and vehicle access

Waste/ recycling volumes | Bin store location & amenity | Internal transfer | **Collection & vehicle access** | Communication & management

The council will service the general waste and commingled recycling via the AWCS and bulk cardboard using a rear-lift truck. A private service provider will service the other recycling streams. A range of rear-lift and flat-bed vehicles will access to the building's loading dock.

There is one loading bay for the collection vehicles to use in the loading dock, which is adjacent to the waste room and unpacking area. The collection vehicles will enter Red Bill Lane and then reverse into the loading dock to service the bins in the bin store. Note: As part of the redevelopment the Red Bill Lane is expected to be widened around the entry and exit to the loading dock.

A height clearance of 4 m is provided to accommodate a range of waste and recycling vehicles accessing the loading dock. Swept path analysis for vehicle ingress and egress has been completed by TTM taking into consideration the specifications of the largest waste collection vehicle (see Figure 4).

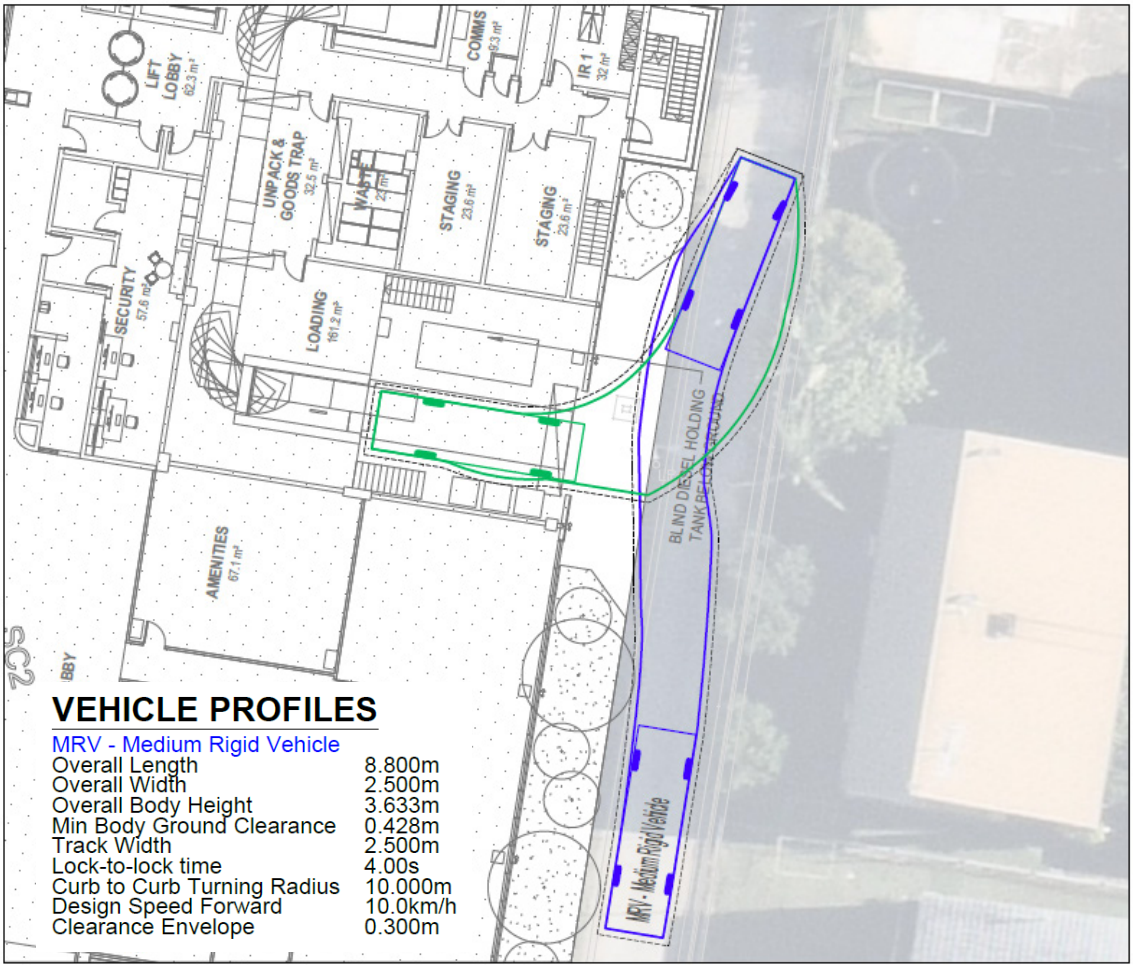
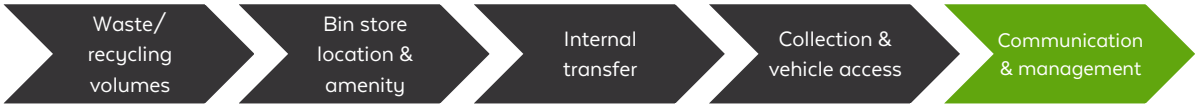


Figure 4: Swept path analysis showing access for waste collection vehicles

6 Ongoing communication and management



6.1 Management

The Facilities Manager will be responsible for overseeing the waste management systems. The Facilities Manager will be trained and informed about their responsibility to work closely with the Council and private service providers regarding the schedule for collection and presentation of bins in the bin store. The Facilities Manager will be responsible for maintaining the bin store in a clean and tidy condition at all times and ensuring bins are washed regularly.

The Facilities Manager will liaise with AWCS maintenance contractors and the council on servicing the AWCS system and provide escorted access to the AWCS room when required.

6.2 Communication

All relevant staff and data centre users will be made aware through a building users guide (or equivalent) of the waste and recycling systems and how they should be used. Education of staff on how to use the AWCS and which items can be placed in the system will be provided. An Operational Waste Management Plan suitable for presenting to building users will be developed and implemented and will include information relevant to both the initial occupation and ongoing management of the building.

Appendix A: Glossary of terms and acronyms

Bulk waste	Bulk waste includes old and broken furniture, white goods and large electronic items. Commercial developments/tenancies are generally responsible for removing bulk waste via skip bins or organising transport to a waste transfer facility or landfill. Bulk waste collection is included in the Waste Management Plan where specified by the Local Government as part of the planning requirements.
Bulky waste storage	An area designed to store any unwanted bulky waste items from residential, retail, commercial or industrial developments.
Collection point	The permitted area on a footpath, roadway or private property (where applicable) that waste, recyclables and bulky waste are loaded into collection vehicles.
Commingled recycling	Common recyclables, mostly packaging; such as glass, plastics, aluminium, steel, liquid paper board (milk cartons). Commingled recycling may include paper but often, and particularly in offices, paper and cardboard are collected separately.
Container Deposit Scheme (CDS)	Where 'eligible containers' (usually for soft and alcoholic drinks) have a 10 cent deposit which can be refunded when the container is redeemed at a refund facility.
E-waste	Discarded electronic appliances such as mobile phones, computers, and televisions.
Food organics	Waste food in commercial kitchen/food service settings, generated from preparation (peelings etc.), storage (out of date) or service (leftovers) that can be separated from the general waste stream for a more beneficial use.
General waste	Material that is intended for disposal to landfill (or in some States, incineration), normally what remains after the recyclables have been collected separately.
Organic waste	Waste derived from material that was once living (excluding petroleum-based materials).
Recyclable	Material that can be collected separately from the general waste and sent for recycling. The precise definition will vary, depending upon location (i.e. systems exist for the recycling of some materials in some areas and not in others).
Recycling	Where a material or product undergoes a form of processing to produce a feedstock suitable for the manufacture of new products.

Appendix B: Waste calculation methodology

The waste generation for the site has been calculated using the method outlined below.

Areas:

- Data halls over 2 floors (3,355 m^2)
- Office areas (1,236 m^2)

Assumptions:

A number of assumptions have been applied in developing this WMP:

- General waste and commingled recycling will be managed through the AWCS
- Waste generation for office spaces and data halls is based on a 7-day working week
- Food waste volumes have been included in the general waste stream to ensure the AWCS is sized appropriately. In practice, food waste will be disposed of via in-sink macerators
- Areas occupied by plant / equipment, corridors, storage areas, water closets and void spaces are non-waste generating areas and have been excluded from the calculations
- There will be a Facility Manager (FM) on-site to oversee waste management systems.

The floor areas have been multiplied by the waste generation rates, as detailed in Table 6, for seven days of operation. The conservative waste volumes designated for the AWCS system are outlined in Table 7, while the non-AWCS materials are summarised in Table 8.

Table 6: Waste generation rates

Premises type	Waste generation rate	Recycling generation rate	Percentage breakdown of recycling stream by material
Office	10 L / 100m^2 / day	10 L / 100m^2 / day	7% commingled 79% paper 14% cardboard Additional 10% soft plastics
Data Centre	3 L / 100m^2 / day	4 L / 100m^2 / day	0.1 % commingled 99.9% cardboard

Table 7: AWCS waste volumes

Volume of material generated	L/Day	L/Day
General Waste	224	1569
Commingled recycling	258	1804

Table 8: Non-AWCS waste volumes

Volume of material generated	L/Day	L/Day
Paper recycling	98	683
Cardboard	151	1060
Soft plastic	12	86
CDS	7	46

The waste volumes in Table 8 have been manually adjusted based on previous experience and invoice data from comparable sites to provide an updated waste generation volume, as detailed in Table 9. The adjustments made are as follows:

- It is assumed that 50% of the paper will be non-confidential paper and disposed of via the AWCS system. The remaining confidential paper will be placed in designated confidential waste bins for secure collection.
- The quantity of cardboard quantity has been increased to reflect anticipated volumes.

Table 9: Adjusted Non-AWCS waste volumes

Volume of material generated	L/Day	L/Day
Paper recycling	49	342
Cardboard	283	1980
Soft plastic	12	86
CDS	7	46

Based on data from other sites, the number of e-waste, batteries, bulk waste and expanded polyethylene/polystyrene bins have been estimated.

The total number of bins is detailed in Section 2.3.5, Table 3.