

# RESIDENTIAL FLAT BUILDING WASTE MANAGEMENT GUIDELINES

## BACKGROUND

Council is responsible for the collection and disposal of domestic waste within the Penrith Local Government Area (LGA).

Waste management practices of all proposed developments need to consider resident, public amenity and safety at all stages of the waste management process, including storage, transfer and collection.

## 1. INTRODUCTION: DESIGN PRINCIPLES

### 1.1 WASTE MANAGEMENT CONSIDERATIONS

It is essential that new **Residential Flat Building (RFB)** developments select and provide a waste management system that is responsive to the development's needs and that is able to be integrated with Council's standard waste management service.

To ensure new developments are able to access Council's waste service in an efficient and effective manner, the following must be taken into consideration in the assessment of development applications:

- Site planning of the development accommodates on-site waste collection and allows the waste collection vehicle to enter/exit, manoeuvre within the site and access the nominated collection point in a safe and efficient manner.
- Site planning of the development ensures amenity and safety of all users (including residents, caretakers, cleaners and waste collection staff) at all stages of the waste management process.
- Waste management system selection ensures that it is safe and convenient for resident use; and
- Adequate waste storage area(s) are provided within the development site to store all required waste bins.

### 1.2 UNDERSTANDING COUNCIL'S WASTE SERVICE

New developments are required to provide future residents with access to waste and recycling services. The design of proposed developments will need to consider how the waste management systems will be integrated with Council's existing standard waste collection service.

Council's standard waste service for RFB development is an on-site collection service, where a nominated bin collection point and loading area is provided. To enable a safe and efficient service, the waste collection vehicle will be required to enter and exit the site in a forward direction.

## 2. ON-SITE SERVICE REQUIREMENTS

### 2.1 DEVELOPMENT CLASSIFICATION

**Residential Flat Building** developments as outlined in the C5 Waste Management DCP 2014, Section 5.2.2.4;

*Subsection 2: Developments comprising three or more storeys, the development is to incorporate a waste chute system.*

*Subsection 5: On-site collection is required to service the development. Adequate and safe access must be provided for Council's Standard Waste Collection Vehicles and waste collection staff.*

### 2.2 DESIGN FOR WASTE COLLECTION VEHICLES

The development will need to accommodate Council's current waste collection vehicles to permit on-site waste collection within the development. The following will need to be addressed and reviewed:

Council's standard collection vehicles available for on-site collection include:

- 9.7m Heavy Rigid Rear-Load Vehicle (Figure 1)
- 10.5m Heavy Rigid Rear-Load Vehicle (Figure 2)
- 7.0m Hook Lift Vehicle (Figure 33)
- 8.3m Hook Lift Vehicle (Figure 41)
- 9.1m Hook Lift Vehicle (Figure 48)

#### 2.2.1 On-site Collection

Council's standard waste collection vehicle must be able to safely and efficiently access the site and nominated collection point in accordance with section 5.3.4.1, subsection 3 of the C5 Waste Management DCP:

*"There must be sufficient manoeuvring area on-site to allow collection vehicles to enter and leave the site in a forward direction and service the development efficiently with little or no need to reverse."*

#### 2.2.2 Architectural Plans

Scaled architectural plans are required to be submitted supporting the proposed development application. The plans are to demonstrate the site's entry point, vehicle's route of travel, on-site waste collection infrastructure and an integrated waste collection solution responsive to urban design principles.

#### 2.2.3 Swept Path Models

Swept path models are to be provided illustrating how Council's standard waste collection vehicle will enter, service and exit the site. A 0.5m unobstructed clearance is required from all obstructions for the vehicle's ingress and egress manoeuvres. The model is to provide on-street parking on both sides of the road adjacent to the development to demonstrate unobstructed access during a 'business as usual' configuration.

#### **2.2.4 Service Clearances**

For rear-load vehicles an additional 2m unobstructed loading zone is required behind the vehicle for the loading of 660L and 1,100L bins. Additionally, a 0.5m side clearance is required on either side of the vehicle for driver movements and accessibility.

#### **2.2.5 Route of Travel for Collection Vehicle**

The travel route of the collection vehicle to the designated loading bay is to satisfy the dimensions of Council's waste collection vehicles outlined in section 2.2. To support unobstructed access adequate driveways and ramps of sufficient strength are required to support waste collection vehicle movements.

A structural engineer's report is required to be submitted accompanying the Waste Management Plan. The report is to confirm all infrastructure used for vehicle ingress and egress movements can support the vehicle's 'gross weight' consistent with Council's heavy rigid waste collection vehicles outlined in section 2.2.

#### **2.2.6 Waste Collection Loading Areas**

All on-site loading bays are to be integrated wholly within the building's built form and enclosed. The bays are to be accessed via a restricted opening (roller door or sliding retractable door). The room to provide adequate light, ventilation and acoustic attenuation treatments in accordance with the Building Code of Australia.

Council's waste collection vehicles are required to enter and exit the designated loading bay in a forward direction. Reverse manoeuvres proposed within an active carriageway are not permitted. Alternative vehicle manoeuvres will be reviewed in accordance with section 2.5.

#### **2.2.7 Turntables**

Turntables are to incorporate a hydraulic override or similar assisted override system. This will allow the turn table to be rotated in the event of a system's malfunction, alleviating the collection vehicle from becoming lodged during collection manoeuvres. Specifications of this feature are required to be outlined within the Waste Management Plan and Plan of Operations.

#### **2.2.8 Multi-Use On-site Loading Areas**

The integrated on-site loading bay is to be designed to facilitate use by removalist and other service vehicles when not utilised by Council's standard waste collection vehicles. The loading bay is required to be located within close proximity to the elevator core to facilitate unobstructed access. The access corridor must be a minimum 1.8m wide with a maximum gradient of 1:24.

#### **2.2.9 Commercial On-Site Collection Infrastructure**

For commercial and industrial developments integrated on-site waste collection infrastructure is to be provided in accordance with the '*Industrial, Commercial and Mixed-Use Waste Management Guideline*' document.

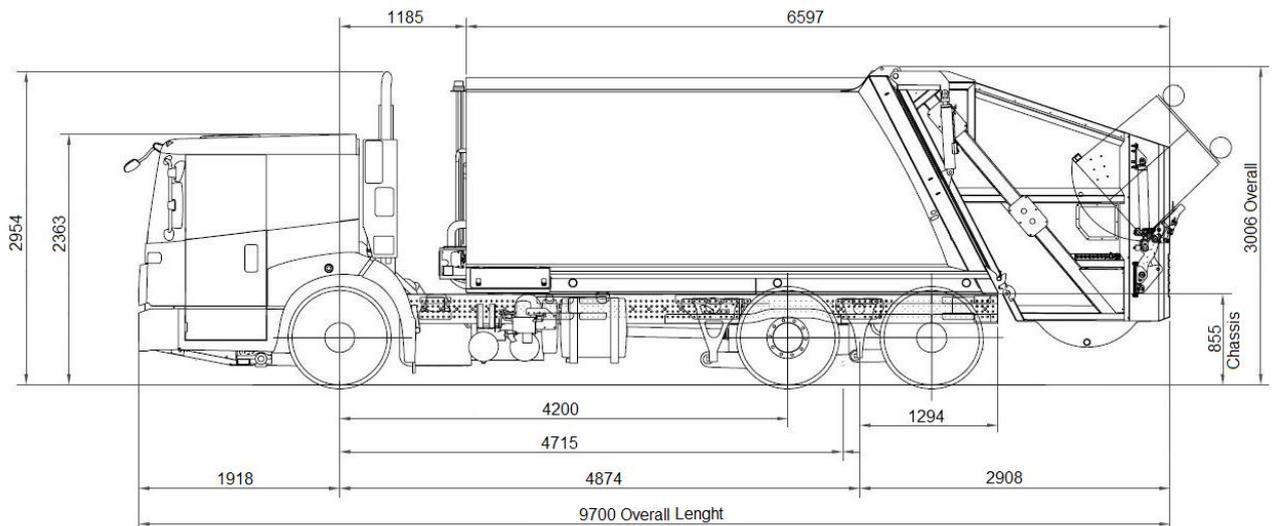
## 2.3 DESIGN SPECIFICATIONS REAR LOAD WASTE COLLECTION VEHICLES

The following dimensions are provided for a standard heavy rigid vehicle as identified in Australian Standard 2890.2:

### 2.3.1 Low Entry Heavy Rigid Waste Collection Vehicle

Vehicle Classifications	Heavy Rigid Vehicle Dimensions
Overall Length (m)	9.7
Operational Length (m)	11.7
Design Width (m)	2.8
Design Height (m)	3.1
Swept Circle (m)	17.0
Clearance (travel height) (m)	3.5
Roadway/ramp grade (max)	1:6.5 (15.4%)
Rate of change of grade (max)	1:12 (8.3%) in 4.0m of travel
Gross Weight (max tonnes)	28.0
Front Chassis Clearance	13°
Rear Chassis Clearance	16°

**Table 1: Standard dimensions in accordance with AS 2890.2**



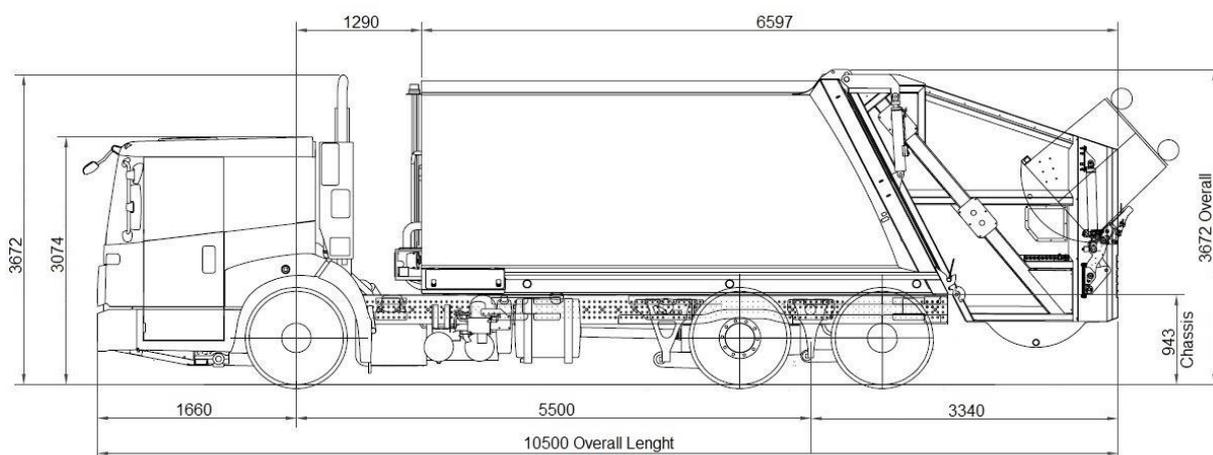
**Figure 1: 9.7m Heavy Rigid Rear Load Waste Collection Vehicle specifications**

### 2.3.2 Heavy Rigid Waste Collection Vehicle

**Note:** The following vehicle to be used for developments comprised of 80 or more dwellings. Alternate solutions which propose the use of the low entry 9.7m heavy rigid waste collection vehicle (section 2.3.1) will be reviewed in accordance with section 2.5.

Vehicle Classifications	Heavy Rigid Vehicle Dimensions
Overall Length (m)	10.5
Operational Length (m)	12.5
Design Width (m)	2.8
Design Height (m)	3.7
Swept Circle (m)	22.5
Clearance (travel height) (m)	4.5
Roadway/ramp grade (max)	1:6.5 (15.4%)
Rate of change of grade (max)	1:16 (6.25%) in 7.0m of travel
Gross Weight (max tonnes)	28.0
Front Chassis Clearance	13°
Rear Chassis Clearance	16°

**Table 2: Standard dimensions in accordance with AS 2890.2**



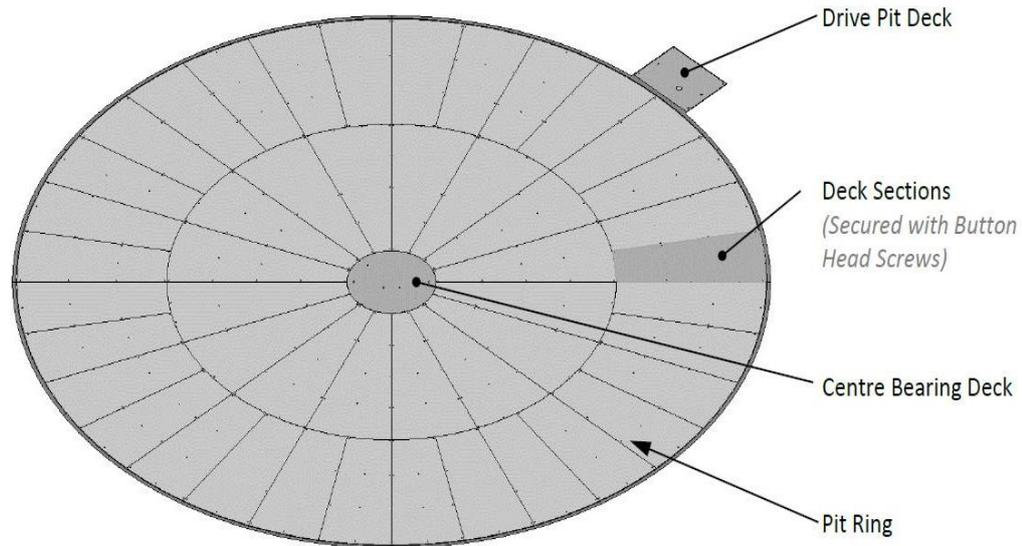
**Figure 2: 10.5m Heavy Rigid Rear Load Waste Collection Vehicle specifications**

## 2.4 TURNTABLE SPECIFICATIONS

### 2.4.1 Turntable Overview

Turntables are typically characterised into the following:

- a) **400mm Thick Truck Turntables:** Consist of support wheels arrayed in circular rings about the centre point. The support wheels are fixed to the concrete pit and the turntable structure revolves on the wheels.
- b) **250mm Thick Truck Turntables:** Consist of support wheels arrayed in circular rings about the centre point. The support wheels are fixed to the turntable structure and they move with the turntable as it revolves.



**Figure 3: Turntable reference diagram depicting key components and terminology**

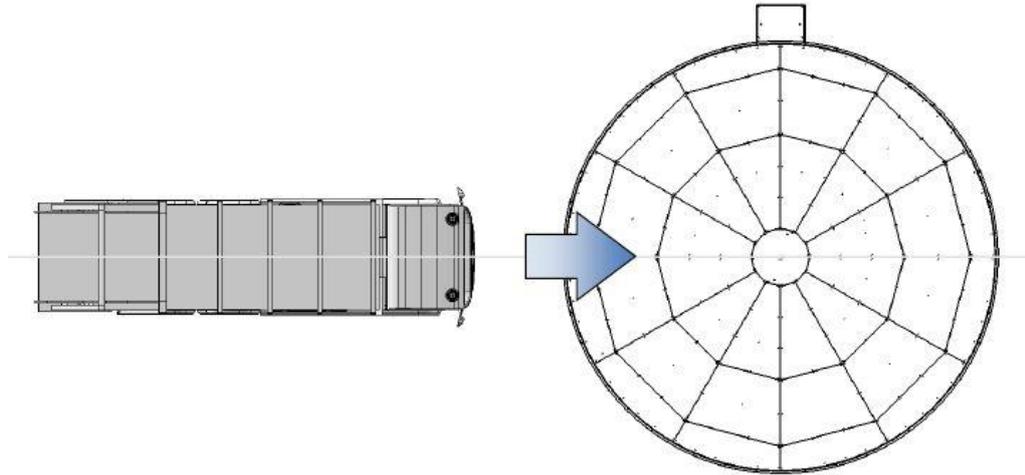
Turntables are fitted with hatches and decks to provide access for inspection and maintenance including:

- **Dive Pit Deck:** Provides access to the Drive Wheels and Motors
- **Centre Bearing Deck:** Provides access to the Centre Bearing
- **Inspection Deck:** Provides access to the support wheels

## 2.4.2 Vehicle Alignment

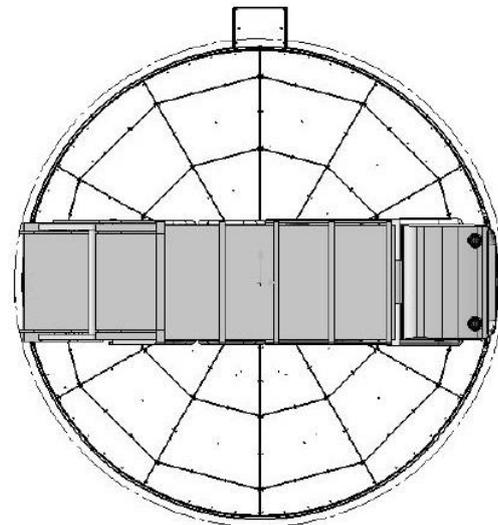
Approach the turntable at a safe speed and align the vehicle so that the centreline of the vehicle aligns with the centreline of the turntable. Where permissible, all turning manoeuvres are completed prior to driving onto the turntable. The vehicle stops when all wheels are fully on the turntable, the vehicle is positioned centrally and the handbrake is applied. No overhang is permitted during turntable manoeuvres.

### 2.4.2.1 Vehicle Entry Alignment



**Figure 4: Central alignment of a heavy rigid collection vehicle onto the turntable**

### 2.4.2.2 Vehicle Loading Alignment



**Figure 5: Vehicle positioned centrally on the turntable with no overhang**



**Figure 6: Correct vehicle loading alignment showing central alignment and no vehicle overhang**

### 2.4.3 Turntable Operation (model system)

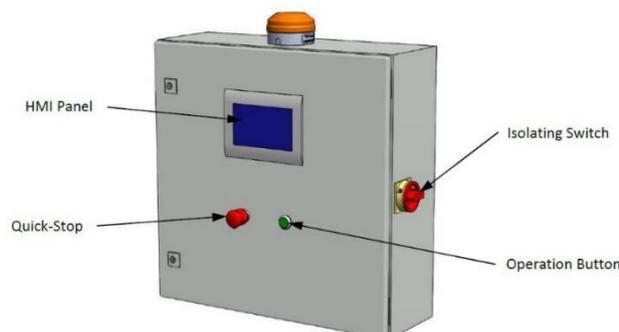
#### 2.4.3.1 Pre-operation Procedure

- a) Position the vehicle on the turntable such that all the wheels of the vehicle are fully seated on the turntable deck
- b) Ensure that the vehicle parking brake is applied to prevent movement of the vehicle during turntable operation
- c) Ensure that the vehicles outer limits and the turntable perimeter is free of any kind of obstacle

**Note:** An abloy key lock is to be applied to the isolating switch (figure 7) to restrict access of the turntable to Stata and Council's Collection Contractors.

#### 2.4.3.2 Operation Procedure

- a) Select desired direction HMI panel (Clockwise or Anti-Clockwise)
- b) Press and hold the operation button
- c) Remain at the control panel while the turntable is operation
- d) Release the operation button when the vehicle is in the required position
- e) Safely drive the vehicle off the turntable, only after the turntable has reached a stationary position



**Figure 7: Turntable operation box**

## 2.4.4 Turntable Space Saving Provisions

Turntables provide spatial savings compared to traditional loading facilities. The following provides a comparison between the area required for a truck to enter/exit a dock facility between traditional configurations and a turntable loading bay arrangement.

### 2.4.4.1 Conventional Loading Bay

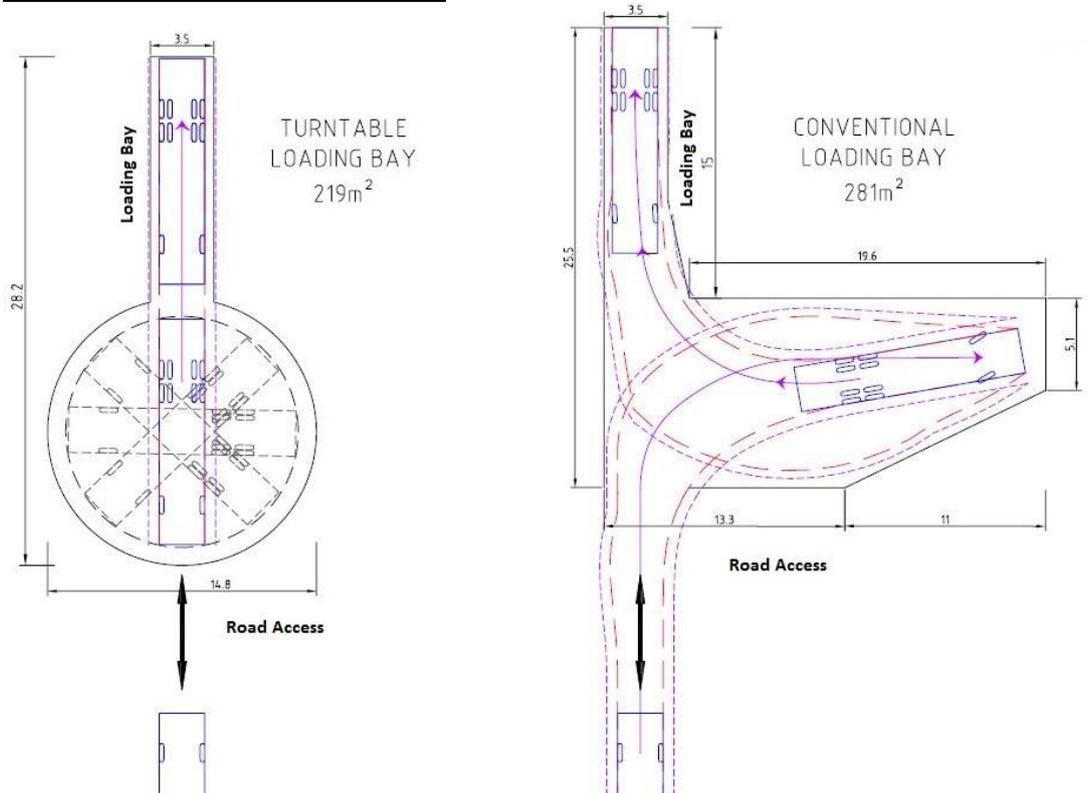


Figure 8: Swept path model showing the area requirements between two loading bay configurations utilising a 12.5m Heavy Rigid Waste Collection Vehicle (AS2890.2)

Conventional Loading Bay	Figures
Truck Size	12.5
Turntable loading Bay Area (m <sup>2</sup> )	219
Conventional loading Bay Area (m <sup>2</sup> )	281
Site Area Saving (%)	28%

Table 3: Area analysis of two loading bay configurations

**Note:** The diagram is designed to highlight the floor area savings attributed to the implementation of a turntable. The area saving (m<sup>2</sup>) will vary dependent upon the waste collection vehicle (section 2.2) proposed to service the respective development.

### 2.4.4.2 Depth Restricted Loading Bay

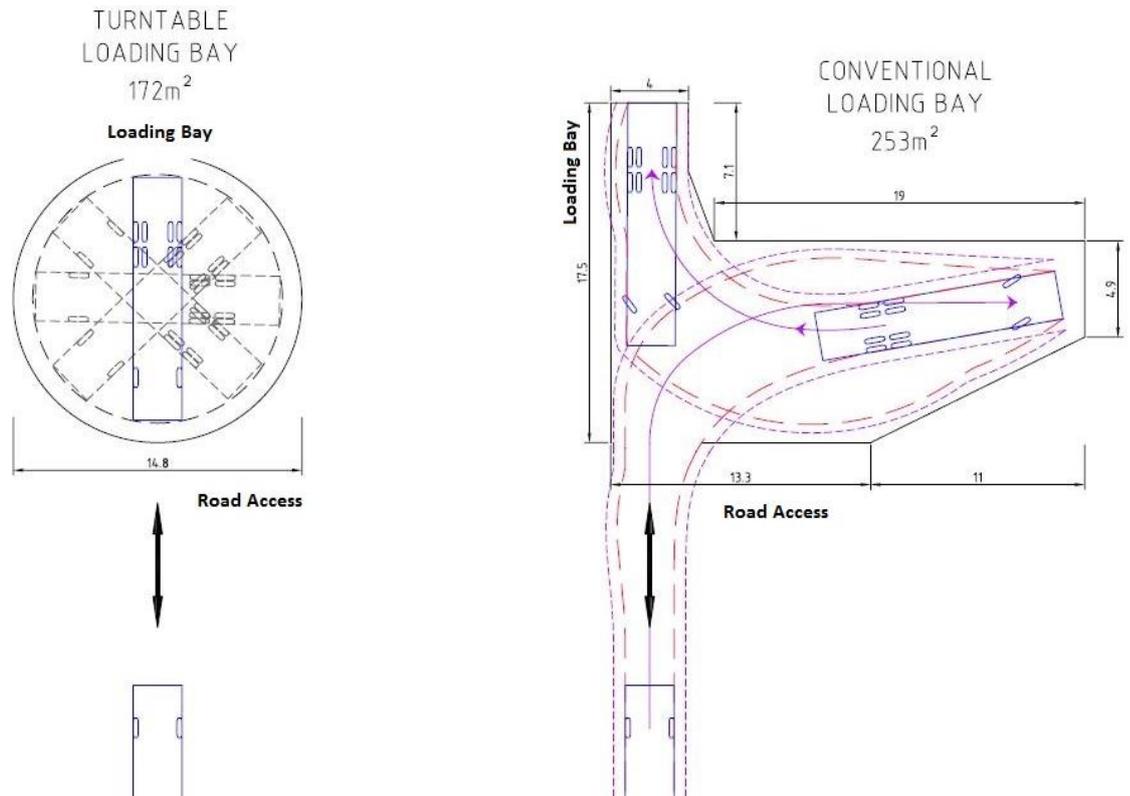


Figure 9: Swept path model showing the area requirements between two loading bay configurations utilising a 12.5m Heavy Rigid Waste Collection Vehicle (AS2890.2)

Depth Restricted Loading Bay	Figures
Truck Size	12.5
Turntable loading Bay Area (m <sup>2</sup> )	172
Conventional loading Bay Area (m <sup>2</sup> )	253
Site Area Saving (%)	47%

Table 4: Area analysis of two loading bay configurations

**Note:** The diagram is designed to highlight the floor area savings attributed to the implementation of a turntable. The area saving (m<sup>2</sup>) will vary dependent upon the waste collection vehicle (section 2.2) proposed to service the respective development.

## 2.5 SITE RESTRICTED SERVICE ACCESS

There may be site characteristics that restrict the opportunity for the developments design to accommodate Councils waste collection vehicle entering and exiting the site in a forward direction. These site characteristics may include the width of the development site and its topography. There may be circumstances where the applicant is able to demonstrate an improved design outcome is achieved responsive to urban design, planning and waste collection operational specifications on-site by not accommodating the vehicle entering and exiting the site in a forward manner.

**NOTE:** This outcome is not acceptable on arterial roads, high vehicle and pedestrian movement areas and developments adjacent to schools.

### 2.5.1 Alternative Solutions

To apply for alternative solutions on restricted sites the following will need to be addressed and submitted:

- The onus is on the applicant to demonstrate that:
  - An improved planning and waste operational outcome is achieved for the site; and
  - Site characteristics restrict or limit the development accommodating waste collection vehicles entering and exiting in a forward direction
- The applicant must also demonstrate that the waste collection vehicles alternative access manoeuvre to the proposed on-site loading bay does not compromise public, resident and contractor safety.
- The development application must be supported by scaled plans illustrating the swept paths required for Councils standard waste collection vehicle to enter the site in a single movement. The plans are to identify any features on-site or within the road reserve (such as essential services, street furniture, bus stops and street trees, and parked cars) that may restrict or inhibit vehicle movements.
- All alternative solutions will be reviewed and assessed by Council's Waste and Resource Recovery Department.

### 2.5.2 Alternative Solution Proposals

Alternative solutions may be proposed to Council for review. These solutions are permitted in circumstances where all options to accommodate vehicle entry and exit in a forward direct have been explored and deemed unviable by Council's Waste and Resource Recovery Department.

### 3. WASTE COLLECTION INFRASTRUCTURE

#### 3.1 DEVELOPMENT CLASSIFICATION

**Residential Flat Building developments** as outlined in the C5 Waste Management DCP 2014, Section 5.2.2.4;

*Subsection 2: Developments comprising three or more storeys, the development is to incorporate a waste chute system.*

*Subsection 5: On-site collection is required to service the development. Adequate and safe access must be provided for Council's Standard Waste Collection Vehicles and waste collection staff*

#### 3.2 LIFTING THE BAR PROVISIONS

Alternative and innovative waste collection solutions and technologies can be proposed for new developments. These solutions will need to address and exceed the objectives outlined in Penrith's C5 Development Control Plan. A meeting is advised with Council's Waste and Resource Recovery Department to explore the innovative solutions proposed prior to pre-lodgement and formal submission of the development application.

#### 3.3 BIN INFRASTRUCTURE

The bin dimensions provided reflect the bins currently used to serve Penrith's residential waste streams:

- Council's standard bin allocations for RFB developments are 660L and 1100L bins for both general and recycling waste streams.
- Where the development incorporates a **dual waste chute system**, Council may allocate 240L **mobile garbage bins** for the development to allow safe disposal of cardboard boxes and larger cardboard objects that cannot be placed in the chute system.

Size	Height (mm)	Width (mm)	Depth (mm)
240L Bin	1100	600	740
660L Bin	1400	800	1260
1100L Bin	1330	1090	1240

Table 5: Standard Bin Size and Dimensions



Figure 10: Image of typical 240L, 660L and 1100L waste collection bins

### 3.4 WASTE GENERATION RATE CALCULATION

The number of bins required to service the development will influence the size of the waste collection room. The following waste generation rates calculated through Penrith Council's residential waste audits are a required to be accommodated on-site to allow each resident to utilise Council waste service:

Weekly Waste Generation Volumes (L)	240L Bin Allocation	660L Bin Allocation	1100L Bin Allocation
Residual	2 dwellings per bin	9 dwellings per bin	18 dwellings per bin
Recycling	2 dwellings per bin	9 dwellings per bin	18 dwellings per bin

Table 6: Waste generation rates for respective bin allocations

**NOTE:** All bin allocations are rounded up to the next whole number (for example; 4.1 bins will be rounded to 5 bins).

Dwellings that implement a **dual chute system** are **required to add service bins** to the total bin allocation for the respective development. Service bins are the extra bins that remain under the chute while the full bins are presented for collection. The number of service bins allocated to each dwelling are based on the following calculation; **2 service bins are required for every dual chute system** implemented within the development.

### 3.5 ON-SITE WASTE COLLECTION INFRASTRUCTURE

#### 3.5.1 Waste Chute System

Residential Flat Buildings are required to install **dual chute systems** for residual and recyclable waste streams. Access to the dual chutes is required on each residential level. Developments may incorporate an adjacent chute cupboard for the storage of 240L recycling bins for the placement of irregular shaped items. A caretaker is required to rotate and empty the bins.

The room will need to incorporate the following requirements into the design:

- Incorporate linear or circular carousel device under each individual chute (refer to section 3.8 for design specifications).
- Minimum 0.9m clearance around the linear or circular carousel system to allow for maneuverability and system maintenance.
- 1.8m unobstructed clearance zone between the linear/circular track system and the entrance for access and manoeuvrability.
- The room to provide suitable dual door access for the service of bins with a minimum width of 1.8m and accessed by a 1.8m unobstructed access corridor.
- Accommodate two additional 1,100L service bins in each chute room with a minimum access clearance of 1.8m wide for the loading of 1100L bins onto the track system.
- The room is to be fully enclosed, walled and not permit through access to other on-site waste infrastructure. Separate unobstructed access is required.
- The floor is to be waterproofed, non-slip and sealed in accordance with the Building Code of Australia to permit the use of wash facilities.

- Floor is to be graded to a central drainage point connected to the sewer, enabling all waste to be contained and safely disposed of.
- Partitioned and enclosed with a minimum 2.7m unobstructed internal room height in accordance with the Building Code of Australia.
- The room is to be provided with an adequate supply of water through a centralised mixing valve and hose cock.
- The room to incorporate adequate lighting and natural/mechanical ventilation in accordance with the Building Code of Australia.

**NOTE:** The room will need to allow for the permanent storage of **2 service bins** per dual chute system, allowing residents access to all waste streams during Council's waste collection periods.

### 3.5.2 Waste Collection Room

All developments are required to provide a waste collection room located close proximity to the proposed loading bay. The room is to be designed for the storage of the entire fleet of bins for collection by Council's collection contractors.

The room will need to incorporate the following requirements into the design:

- The room is to be large enough to accommodate the entire fleet of bins plus 0.2m between bins to allow adequate manoeuvrability (refer to section 3.4 for bin allocation).
- 1.8m unobstructed clearance zone between the stored bins and the entrance to permit access and manoeuvrability.
- The room to provide suitable dual door access for the service of bins with a minimum width of 1.8m and accessed by a 1.8m unobstructed access corridor.
- The room is to be located within close proximity to the on-site loading bay.
- The room is to be fully enclosed, walled and not permit through access to other on-site waste infrastructure. Separate unobstructed access is required.
- The floor is to be waterproofed, non-slip and sealed in accordance with the Building Code of Australia to permit the use of wash facilities.
- The floor is to be graded to a central drainage point connected to the sewer, enabling all waste to be contained and safely disposed of.
- The room is to be partitioned and enclosed with a minimum 2.7m unobstructed internal room height in accordance with the Building Code of Australia.
- The room is to be provided with an adequate supply of water through a centralised mixing valve and hose cock.
- The room to incorporate of adequate lighting and natural/mechanical ventilation in accordance with the Building Code of Australia.

### 3.5.3 Bulky Goods Collection Room

Residential Flat Buildings are required to provide a bulky goods collection room. The room allows for the placement of various household items including mattresses, furniture and other goods to be collected by Council's waste collection service. Council provides a bulky goods collection service for each development. The size of the bulky goods room is based on the following calculation:

$$\text{Bulky Goods Room Area (m}^2\text{)} = \left[ \text{Number of Units} \times 8 \right] \div 52$$

**NOTE:** All calculations are rounded up to next whole number (ie. 4.1m<sup>2</sup> = 5m<sup>2</sup>)

The room will need to incorporate the following requirements into the design:

- The room is to be **Xm<sup>2</sup>** (refer to bulky goods equation above) to permit the safe storage of bulky good items.
- The room to provide a minimum unobstructed width of 1.8m.
- The room to provide suitable dual door access for the service of bins with a minimum width of 1.8m and accessed by a 1.8m unobstructed access corridor.
- A room is to be located within close proximity to the on-site loading bay.
- The room is to be fully enclosed, walled and not permit through access to other on-site waste infrastructure. Separate unobstructed access is required.
- The floor is to be waterproofed, non-slip and sealed in accordance with the Building Code of Australia to permit the use of wash facilities.
- The floor is to be graded to a central drainage point connected to the sewer, enabling all waste to be contained and safely disposed of.
- The room is to be partitioned and enclosed with a minimum 2.7m unobstructed internal room height in accordance with the Building Code of Australia.
- The room is to be provided with an adequate supply of water through a centralised mixing valve and hose cock.
- The room to incorporate of adequate lighting and natural/mechanical ventilation in accordance with the Building Code of Australia.

### 3.5.4 Bin Lifts

Council does not permit the movement of bins up basement ramps assisted by ride on or portable tug devices. This is outlined in Clause 5.2.2.4, subsection 6e, dot points 5 & 6 of the DCP:

*“the bin carting route for larger bins (660L & 1100L), the maximum length of the route of travel is 10m”*

#### 3.5.4.1 Infrastructure Solutions

For the movement of bins from the chute room to the waste collection room one of the following is required to be implemented within residential flat buildings:

##### Option A: Dock Leveller

- A dock leveller can be proposed for the transportation of bins from the chute room to the waste collection room.
- Specifications of the dock leveller is to be provided with scaled architectural plans indicating its position. It is recommended the leveller be located adjacent to the chute room and waste collection room
- The dock leveller is to have an unobstructed doorway opening of 1.8m wide to provide manoeuvrability and access for 1100L bins
- The dock leveller is to be of sufficient size to transport a minimum of two 1100L bins in one trip

##### Option B: Bin Service Lift

- A designated elevator can be proposed for the transportation of bins from the chute room to the waste collection room.
- Specifications of the bin service lift is to be provided with scaled architectural plans indicating its position. It is recommended the service lift be located adjacent to the chute room and waste collection room
- The service lift is to have an unobstructed doorway opening of 1.8m wide to provide manoeuvrability and access for 1100L bins
- The service lift is to be of sufficient size to transport a minimum of two 1100L bins in one trip

### 3.5.5 Abloy Key System

All on-site waste collection infrastructure outlined in section 3.5 is to be locked through Council's Abloy Key System. The lock system number is **50L092** and can be arranged through Olympic Lock Smiths:

- Address: Unit 28/56 Buffalo Road, Gladesville NSW 2111
- Phone: 1300 303 045

### 3.6 BIN TRANSPORTATION

For the internal movement of 660L and 1,100L bins the following design specifications apply:

- The bin carting route from the waste chute room to the waste collection room is to be as direct/short as possible, free from obstructions, and not require bins to be carried over any stairs.
- The bin carting route for 240L bins is to be a maximum of 75m in length, a maximum grade of 1:24 and via a 1.8m unobstructed access corridor
- For larger bins (660L & 1100L), the maximum unassisted route of travel is 10m, maximum grade of 1:24 and via a 1.8m unobstructed access corridor
- The movement of bins from the basement to the waste collection room is not permitted via the basement ramp.

Bin tug devices can be broken into two categories; Electric Ride On Tug Devices and Electric Portable Bin Tug Devices. Unit specifications and operations clearances for each system are provided below:

#### 3.6.1 Electric Ride On Tug Device



**Figure 11: Typical Electric Ride On Tug Device used by the caretaker for the movement of 660L & 1100L bins within the development**

**Note:** All Electric Ride On Tug Devices must utilise a Gel Battery operating system. Council does not support the use of Lead Acid Battery's due to fire and maintenance hazards.

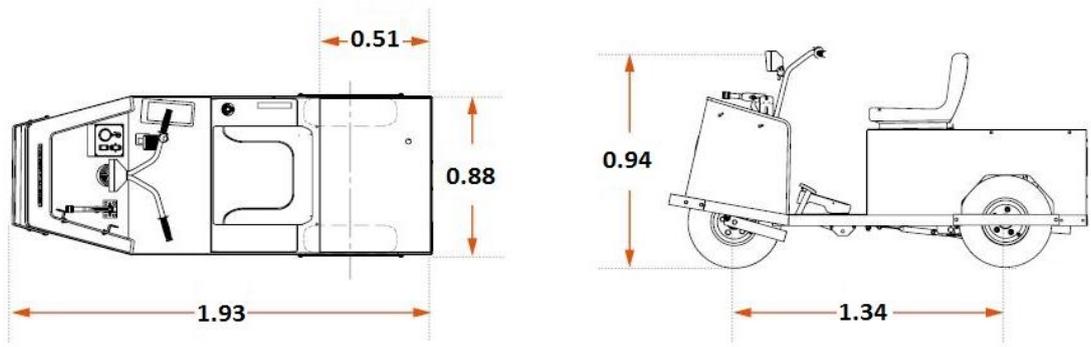


Figure 12: Schematic of a Typical Electric Ride On Tug Device

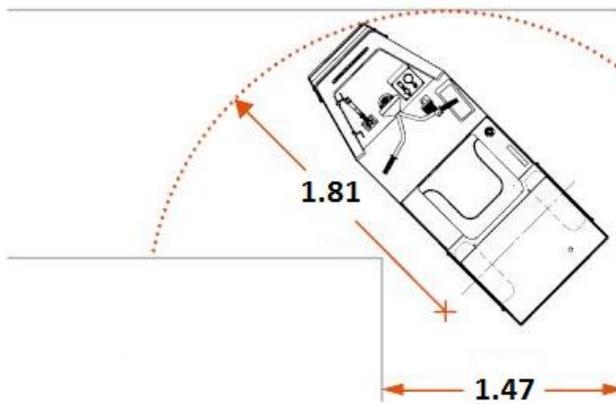


Figure 13: Swept path model for a Typical Electric Ride On Tug Device

Vehicle Classification	Dimensions
Length (m)	1.93
Width (m)	0.88
Height (m)	0.94
Wheelbase (m)	1.34
Powertrain	36-Volt
Seating Capacity (kg)	1 Person
Unit Weight (kg)	426
Aisle Clearance (m)	1.80
Towing Capacity (kg)	3,629
Speed (km/h)	9.6

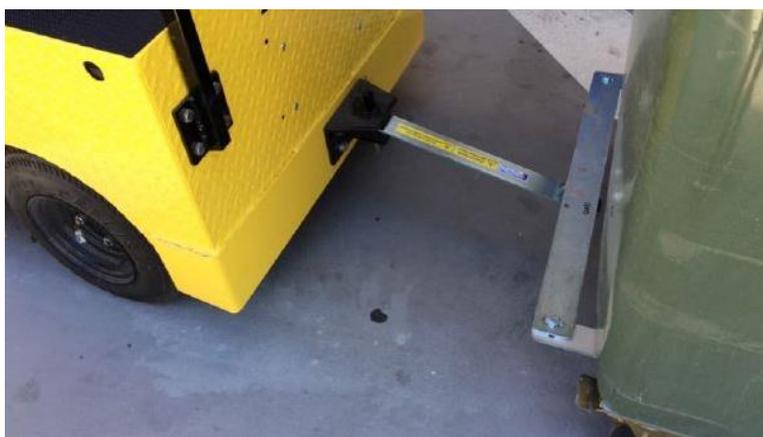
Table 7: Typical Electric Tug Device unit specifications

To facilitate bin movements (660L & 1100L bins) via an Electric Ride On Tug Device two configurations can be utilised. These include a Universal Towing Device (section 3.6.1.1) and an Aluminium Trailer (section 3.6.1.2).

### 3.6.1.1 Universal Towing Device

The universal towing device is a bracket that can be fitted to 660L and 1100L bins within a development. The device allows the bins to be attached in a 'train' configuration permitting multiple bin movements. The device has key features including:

- Attachment without the need to drill or alter bin infrastructure. The bracket is fixed to the base of the bin through the use of castor mounting bolts
- Passivated zinc finish for corrosion protection
- Spring loaded draw bar folds up to allow safe bin servicing/collection
- Directional lock castors to permit bin movements when towing in train



**Figure 14: Universal Rowing Device attachment to the Electric Tug Device**



**Figure 15: Universal Rowing Device attachment between 660L and 1100L bins**



**Figure 16: Universal Towing Device pulling 1100L bins behind an Electric Tug Device**

### 3.6.1.2 Aluminium Trailer

The aluminium trailer is used for the transportation of 660L and 1100L bins within a development. The trailer is attached to the Electric Tug Device and operates like a standard vehicle trailer. The trailer has key features including:

- Heavy Gauge Aluminium construction
- Engineered to be light weight, robust and easily cleaned
- Fixed draw bar for easy attachment
- Rear ramp for the loading of 660L and 1100L bins



**Figure 17: Aluminium Trailer attached to the Electric Tug Device for 660L and 1100L bin movements**



**Figure 18: Aluminium Trailer attached to an Electric Tug Device**

### 3.6.2 Portable Bin Tug Device



Figure 19: Typical Portable Bin Tug Device

**Note:** All Electric Portable Bin Tug Devices must utilise a Gel Battery operating system. Council does not support the use of Lead Acid Batterys due fire and maintenance hazards.

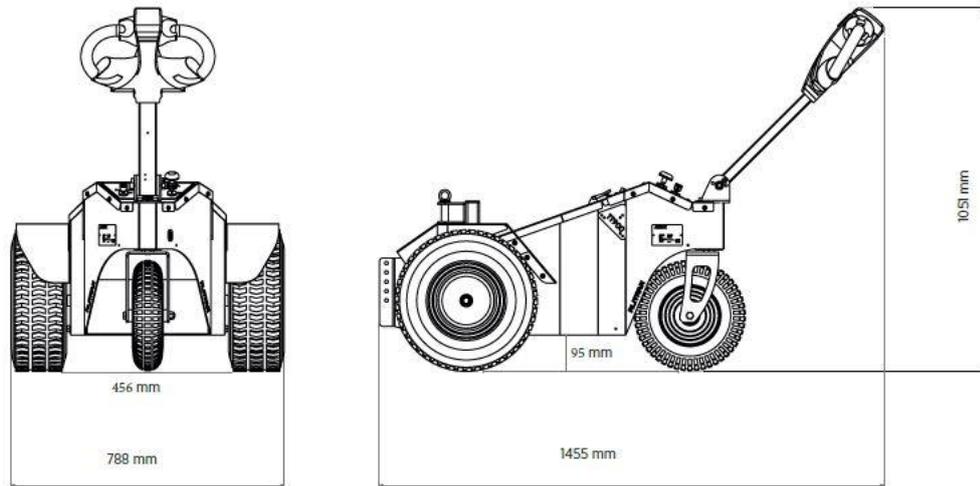


Figure 20: Schematic of a typical Portable Bin Tug Device

Vehicle Classification	Dimensions
Length (m)	1.45
Width (m)	0.79
Height (m)	1.05
Wheelbase (m)	0.46
Powertrain	24-Volt
Seating Capacity (kg)	1 Person
Unit Weight (kg)	300
Aisle Clearance (m)	1.80
Towing Capacity (kg)	3,000
Speed (km/h)	5.0

Table 8: Typical Portable Bin Tug Device unit specifications

To facilitate bin movements (660L & 1100L bins) via a Portable Bin Tug Device two configurations can be utilised. These include a Universal Towing Device (section 3.6.2.1) and an Aluminium Trailer (section 3.6.2.2).

### 3.6.2.1 Universal Towing Device

This configuration is consistent with the specifications outlined in section 3.6.1.1.



**Figure 21: Portable Bin Tug Device moving 1100L bins in a train configuration**

### 3.6.2.2 Aluminium Trailer

This configuration is in accordance with the specifications outlined in section 3.6.1.2.



**Figure 22: Portable Bin Tug Device moving bins using an aluminium trailer**

### 3.7 CONCEPT ON-SITE WASTE INFRASTRUCTURE CONFIGURATION

This section applies to Residential Flat Buildings waste collection infrastructure outlined in section 3.5. The following concept configurations are a guide and are not viewed as the only waste infrastructure solution for residential flat buildings.

#### 3.7.1 Concept Basement Configuration

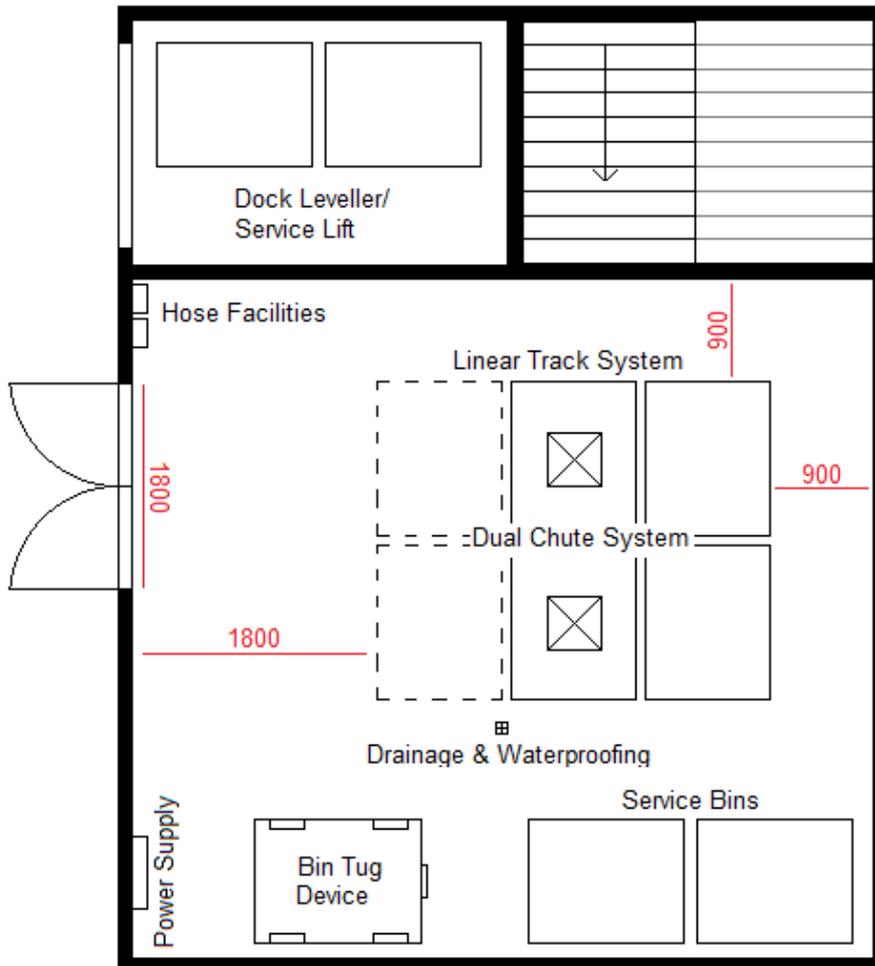


Figure 23: Concept basement waste collection infrastructure

### 3.7.2 Concept Ground Floor Configuration

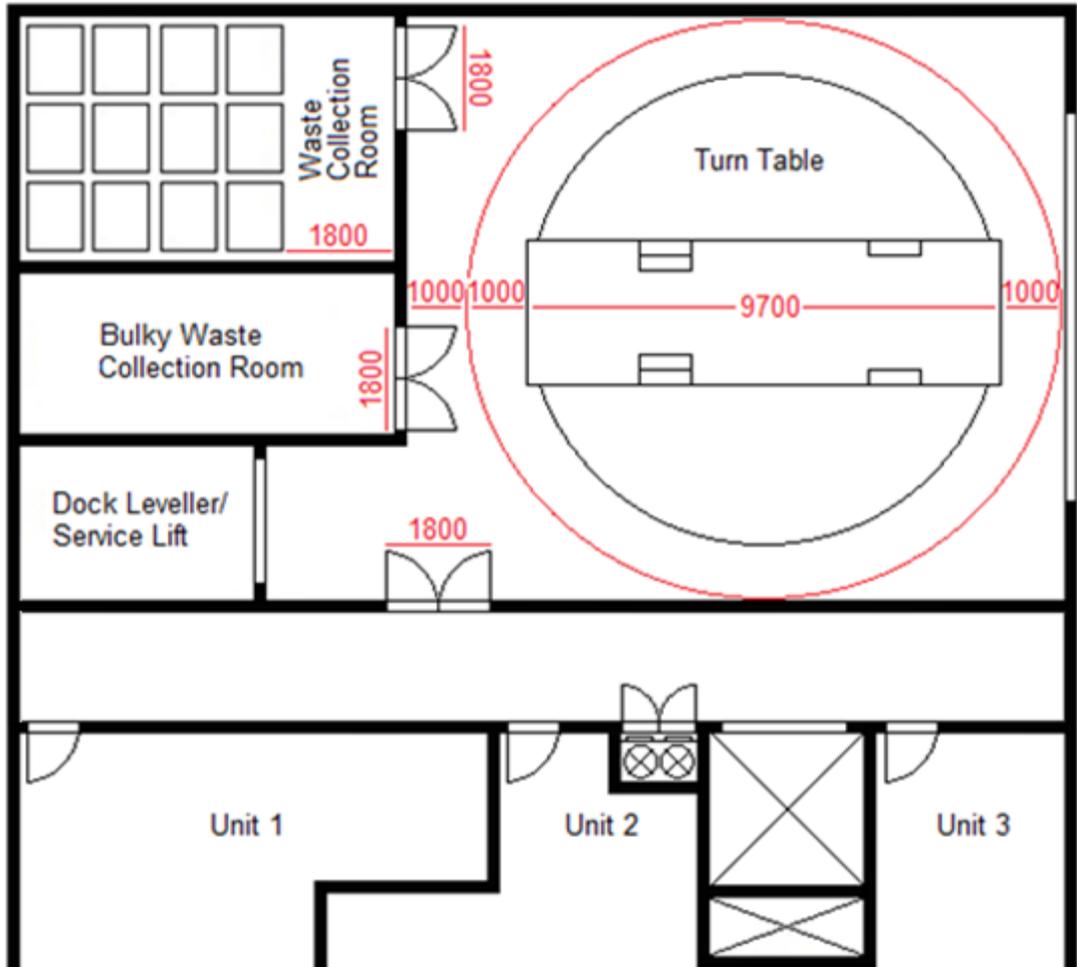


Figure 24: Concept ground floor waste collection infrastructure

### 3.8 CHUTE ROOM MODEL INFRASTRUCTURE

**Note:** The diagrams provided below are used as information tools. Unit specifications vary based upon the supplier and implementation within a building.

#### 3.8.1 Linear Track System

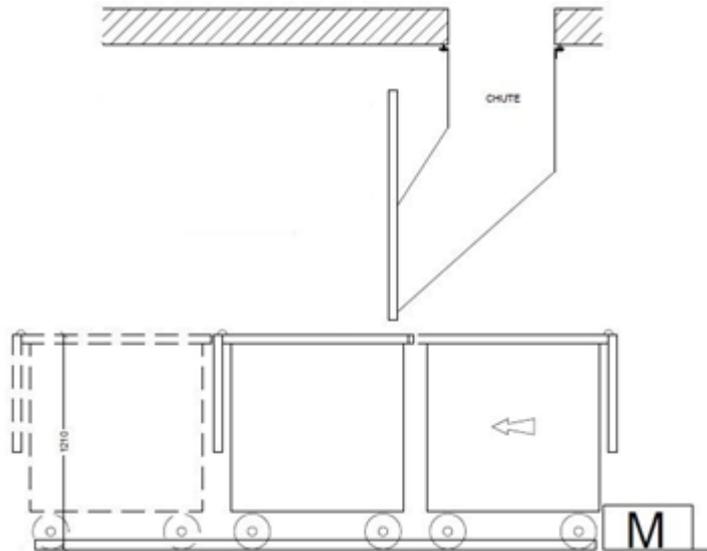


Figure 25: Design configurations of a linear track system accommodating 1,100L bins

#### 3.8.2 Circular Carousel System

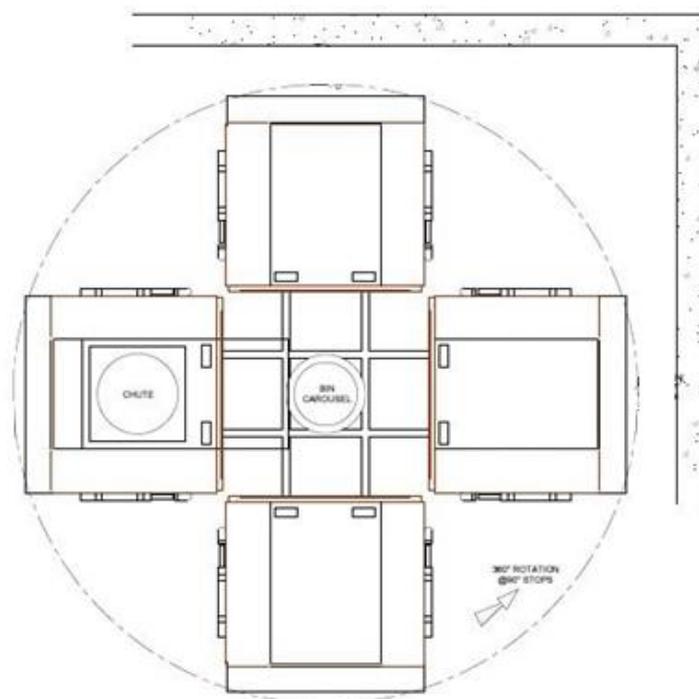


Figure 26: Design configuration of a circular carousel accommodating 1,100L bins

### 3.8.3 Chute System Cross-section

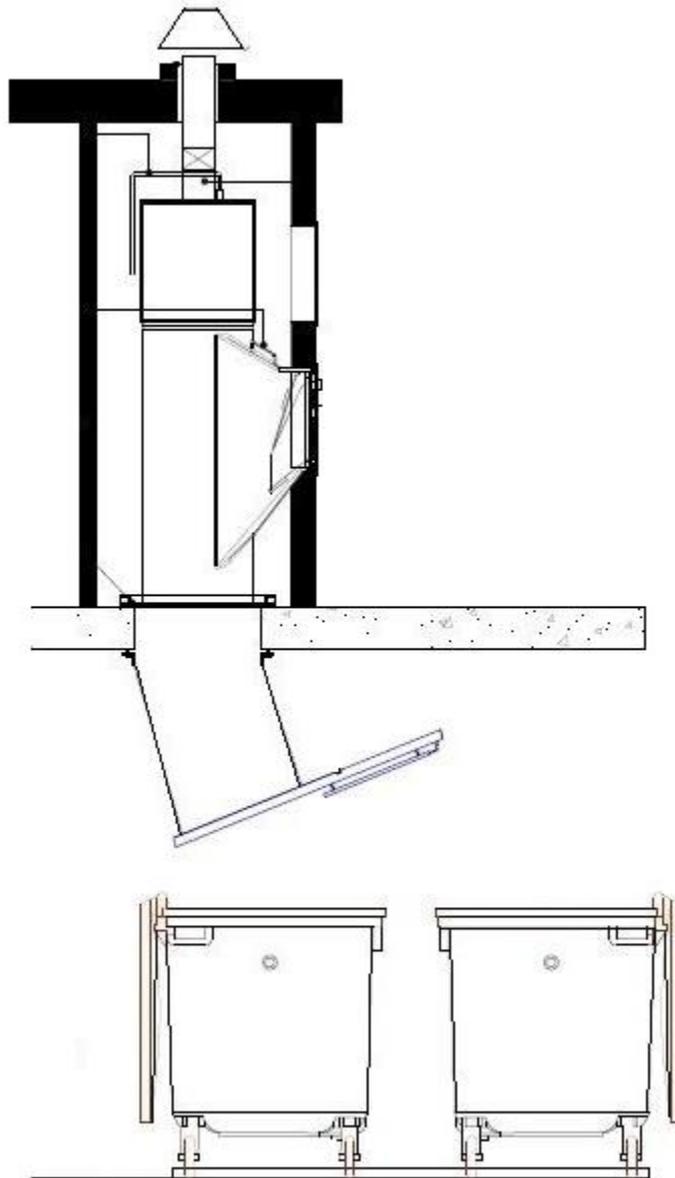


Figure 27: Cross section of a chute inlet throughout various level of the building

### 3.9 COMPACTION UNITS

To facilitate on-site waste collection within residential flat buildings with 80 or more dwellings, compaction units are designed to facilitate an efficient on-site waste collection solution. Each RFB is required to provide a separate compaction unit for residual and recyclable waste streams. A brief summary of how waste collection occurs through the use of compaction units is outlined below:

- Dual waste chute systems (as outlined in section 3.5.1) collect residual and recyclable waste in 1,100L bins
- Once the bins on the carousel system are full the caretaker will remove the bins and replace them with service bins
- The full 1,100L bins are transported from the chute room to the respective compaction unit using a bin tug device (as outlined in section 3.6)
- The 1,100L bin is emptied into the compaction unit using the bin lifter attached (as illustrated in figure 30). The bin lift is locked through a protective cage and abloy key. This restricts access to the site's caretaker and Council's waste collection contractors
- The compaction unit compacts the respective waste stream (residual or recycling) using a maximum compaction ratio of 2:1
- The emptied 1,100L bins are washed and placed back onto the linear track or circular carousel device
- Council's hook lift vehicle on the designated collection day drives into the loading bay, lifts the compaction unit onto the truck and takes the unit to be emptied at the respective disposal site (as illustrated in figures 28-29).
- The time to conduct on-site loading of compaction units is approximately 5-10mins with a unit turnaround time of 2hrs.

#### 3.9.1 Waste Generation Rates

For developments incorporating compaction units, a cubic metre calculation is used to determine the size of the required compaction units. The following calculations are used to determine the cubic metre waste generation rates for residential flat buildings:

$$\text{Recycling Waste Generation} = \left[ \frac{\text{Number of Units}}{18} \times 1.1 \right] \div 2$$
$$\text{Residual Waste Generation} = \left[ \frac{\text{Number of Units}}{9} \times 1.1 \right] \div 2$$

**Note:** All rates are rounded up to the next whole number (ie. 4.1m<sup>3</sup> = 5m<sup>3</sup>)

### 3.9.2 Compaction Unit Specifications

The implementation of compaction units within a residential flat building comprised of 80 or more dwellings are to accommodate the following:

- The compaction units for each waste stream must be large enough to accommodate the developments waste allocation (refer to section 3.9.1)
- The hook lift vehicle proposed to service the compaction units (9.1m, 8.3m or 7.0m) must be capable of servicing the allocated compaction units outlined in sections 3.10, 3.11 & 3.12.
- A minimum 2m separation must be provided between the compaction units to accommodate the bin lifters door opening and manoeuvrability when emptying 1,100L bins
  - The separation between compaction units can be reduced to 1m if a rear loading bin lifter is used

### 3.9.3 Integrated Auger Compactors

The Integrated Auger Compaction unit will be provided by Councils contractor. Each development must accommodate one of the following sizes:

- 10m<sup>3</sup> Integrated Auger Compactor (4.3m long)
- 17m<sup>3</sup> Integrated Auger Compactor (5.9m long)
- 23m<sup>3</sup> Integrated Auger Compactor (7.0m long)

The proposed compactor for each development requires a specific vehicle to be accommodated on-site. Vehicle specifications for each Integrated compaction unit is outlined in sections 3.10, 3.11 & 3.12.

### 3.9.4 Waste Collection Vehicles

To support a safe and efficient waste collection service the following is required to be addressed:

- Council standard waste collection vehicle movements on-site to be provided in accordance with section 2.2
- Unobstructed operational height clearances of 4.5m must be provided in accordance with AS2890.2

### 3.9.5 Bulky Goods Collection Room

The use of compaction units within residential flat buildings requires the implementation of Bulky Goods Collection Infrastructure within the development in accordance with section 3.5.3. Council's standard waste collection vehicles required to service bulky waste is outlined in section 2.3.

### 3.9.6 Hook Lift Vehicle Loading Options

#### 3.9.6.1 Ground Floor Loading

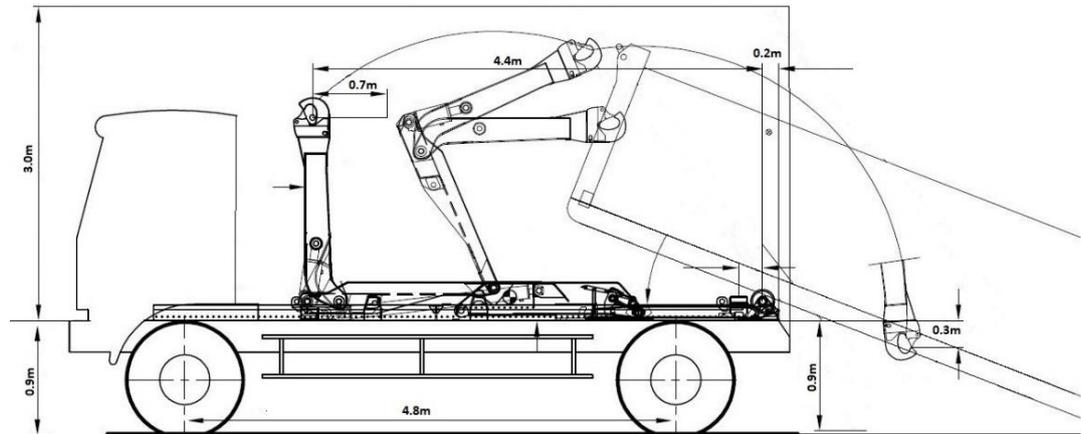


Figure 28: Hook Lift Vehicle ground loading configuration

#### 3.9.6.2 Elevated Dock Loading

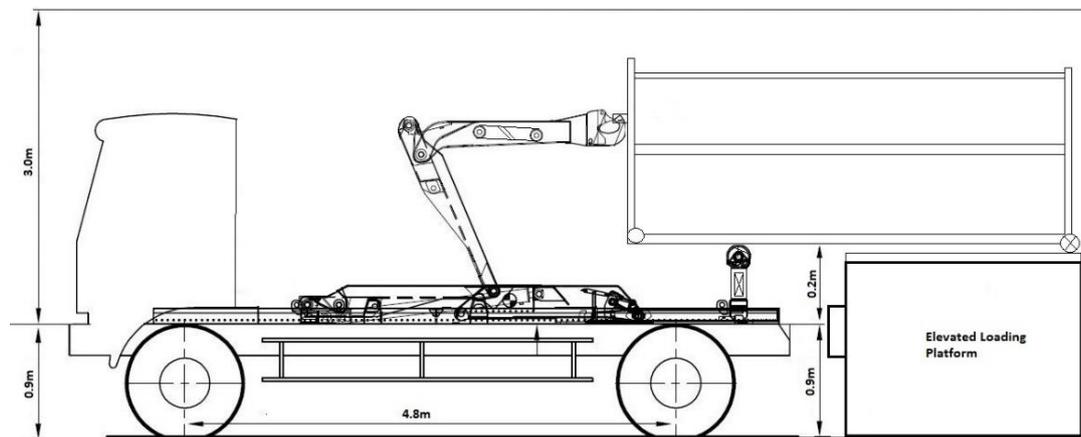


Figure 29: Hook Lift Vehicle ground loading configuration

### 3.9.7 Compaction Unit Schematics



Figure 30: Integrated Auger Compactor and Bin Lifter



Figure 31: Integrated Auger used to compact objects within the compaction unit



Figure 32: 1100L bin lifter used to empty bin into the Auger Compactor

### 3.10 HOOK LIFT 7.0M COLLECTION VEHICLE

#### 3.10.1 Hook Lift Collection Vehicle Specifications

Vehicle Class	Heavy Rigid Vehicle Dimensions
Overall Length (m)	7.0
Operational Length- Loaded (m)	8.4
Design Width (m)	2.8
Design Height (m)	3.7
Swept Circle (m)	21.6
Clearance (travel height) (m)	4.5
Roadway/ramp grade (max)	1:6.5 (15.4%)
Rate of change of grade (max)	1:16 (6.25%) in 7.0m of travel
Gross Weight (max tonnes)	28.0
Front Chassis Clearance	13°
Rear Chassis Clearance	16°

Table 9: Standard dimensions sourced from manufacture specifications

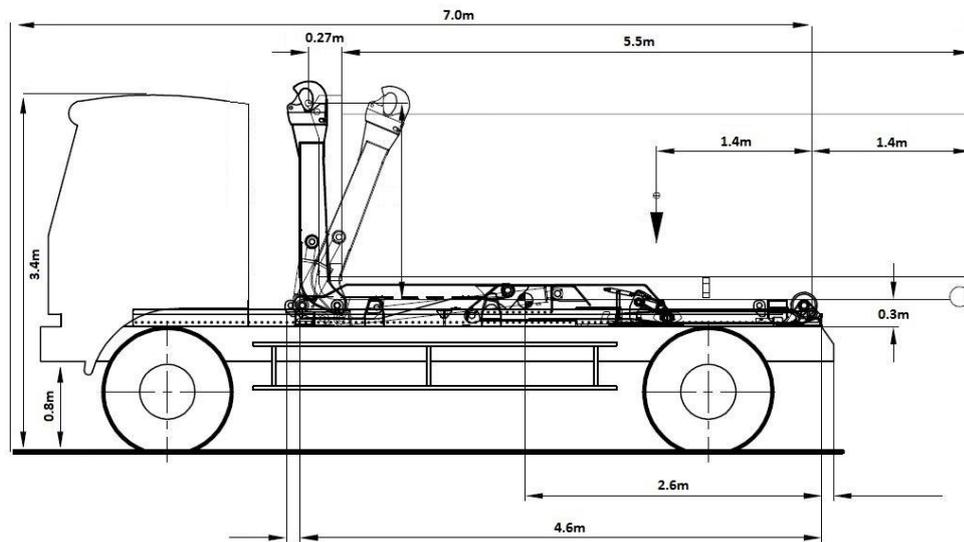


Figure 33: 7m Heavy Rigid Waste Collection Vehicle specifications

**NOTE:** Consideration of vehicle dimensions including rear operational requirements and overhead clearances are required when assessing collection points and route of travel for waste collection vehicles.

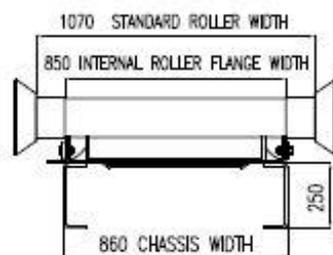


Figure 34: 9.5m Hook Lift Waste Collection Vehicle tray specifications

### 3.10.2 Integrated Auger Compactor Electrical Specifications

Electrical Requirements	Description
Electrical Outlet	5 Pin, 415 Volt, 32 Amp Outlet
Phase	3 Phase, 1 Neutral and 1 Earth
Location	Electrical located within 1m of the unit
Circuit Breaker	D Curve Circuit Breaker <ul style="list-style-type: none"> <li>- Large enough to start and run 10kw electric motor</li> <li>- Breaker size to be confirmed with breaker supplier</li> </ul>

Table 10: Electrical requirements for the operation of integrated auger compactors

### 3.10.3 Integrated Auger Compactor Schematics (4.3m)

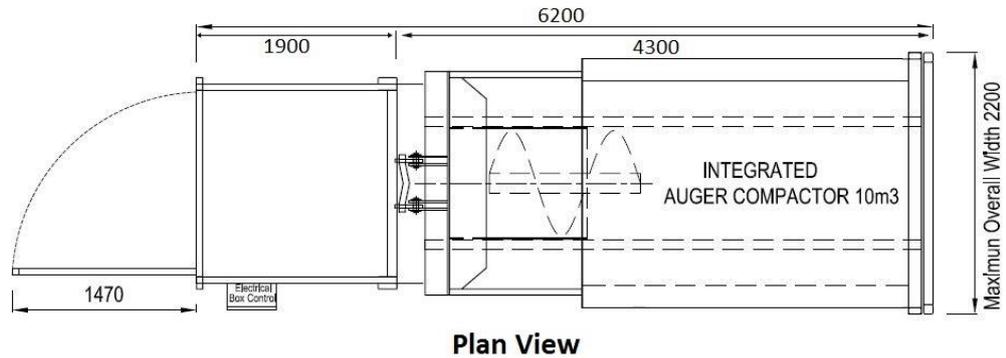


Figure 35: 4.3m Integrated Auger schematic with rear loading bin lifter

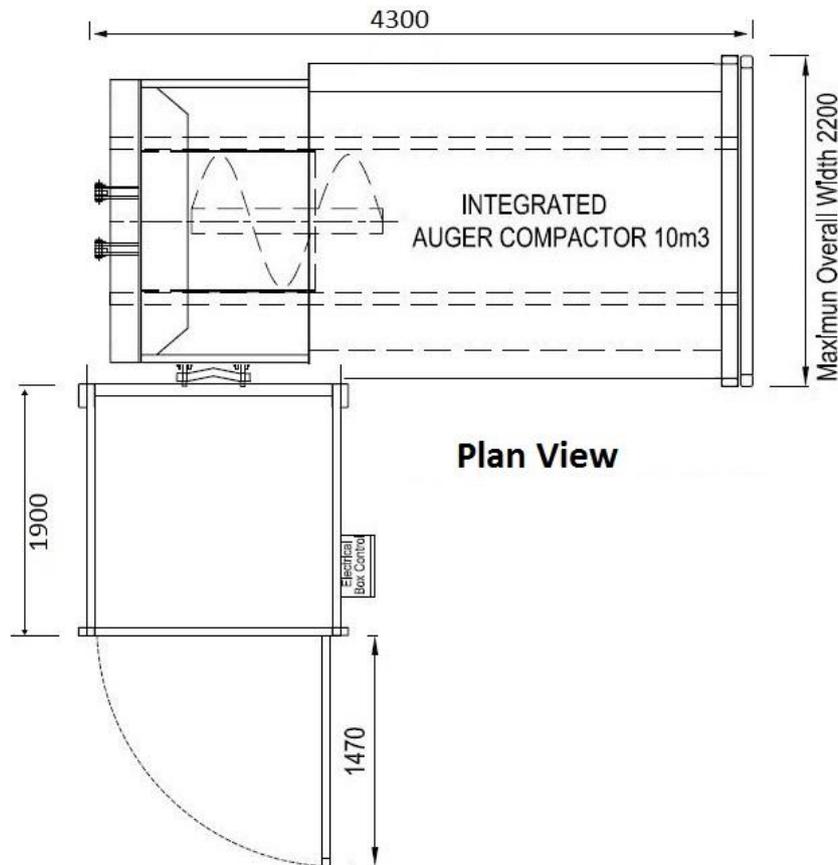


Figure 36: 4.3m Integrated Auger schematic with rear loading bin lifter

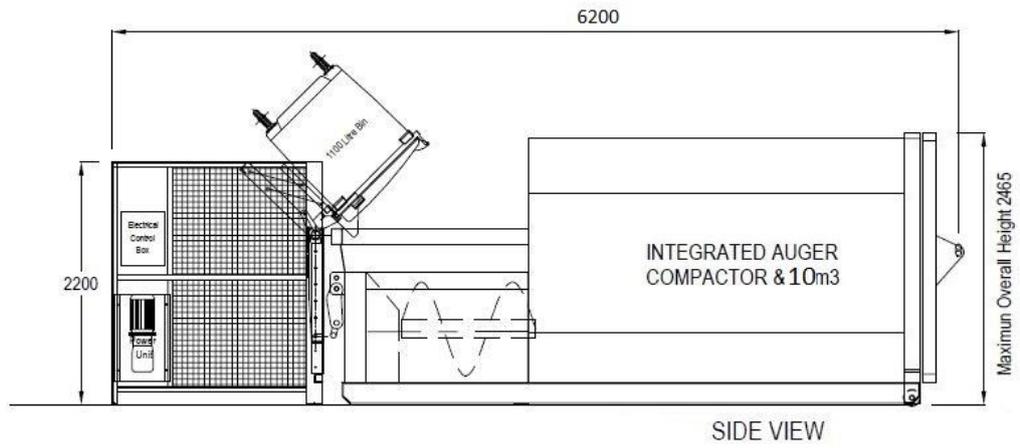


Figure 37: 6.0m Integrated Auger schematic side view

### 3.10.4 Guide Rail Specifications

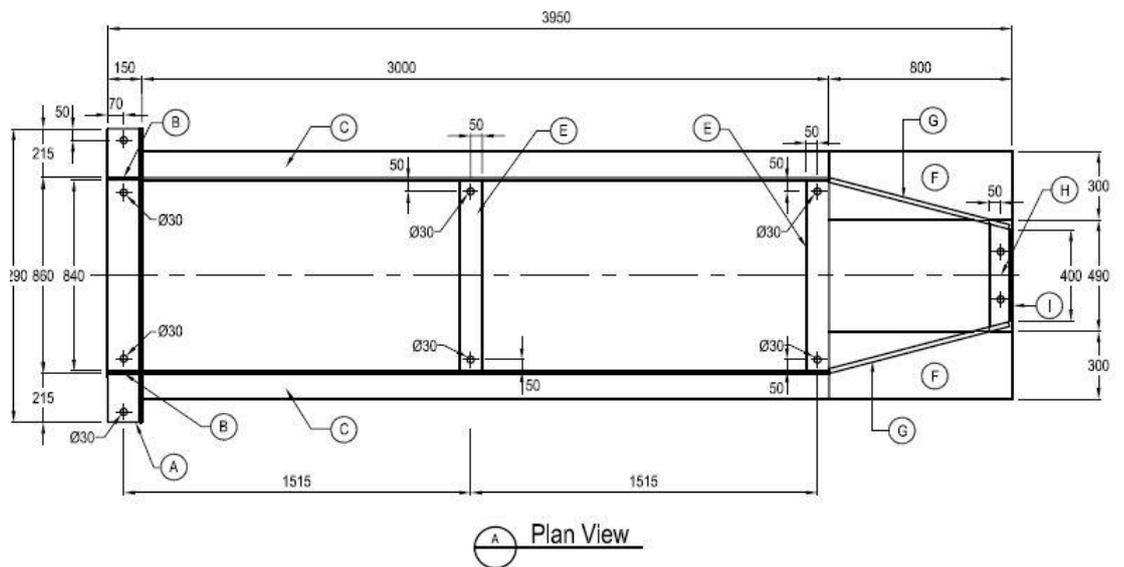


Figure 38: Integrated Auger Guide rails plan view

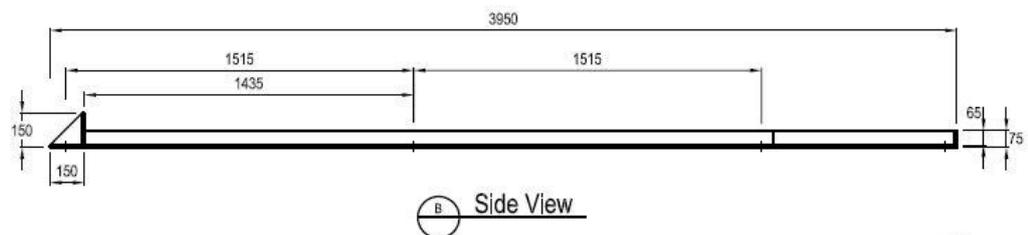
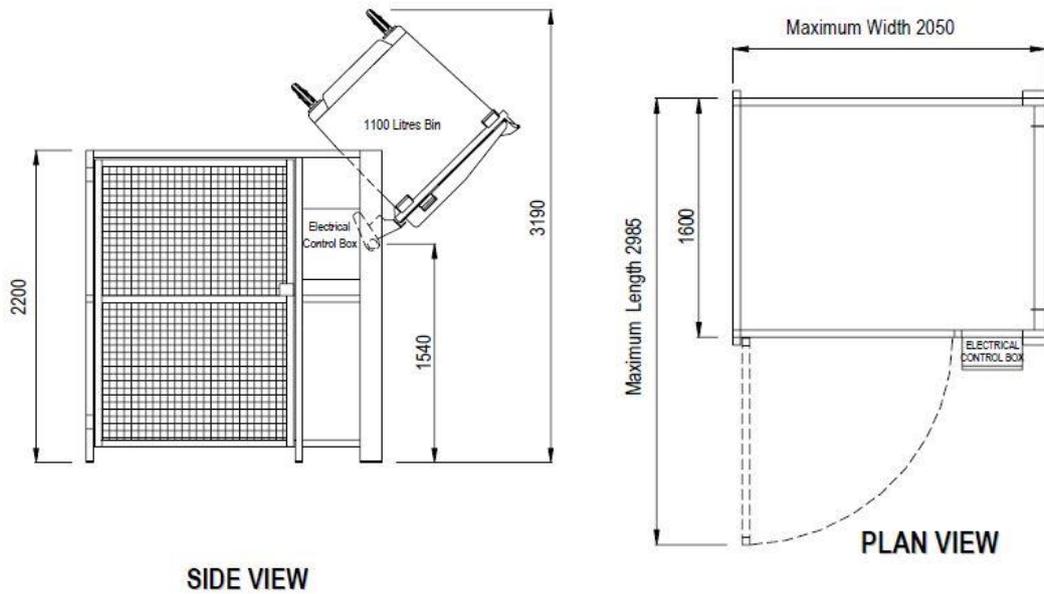


Figure 39: Integrated Auger Guide rails side view

### 3.10.5 Bin Lifter Specifications

Description	Specifications
Bin Capacity	1100L Bin
Lifter Capacity	350kg
Electric Motor	3kw
Power Supply	412V, 3 phase, 10amp, 5 pin

**Table 11: Operational specifications for the operation of 1100L bin lifters**



**Figure 40: 1100L bin lifter schematic side and plan view**

### 3.11 HOOK LIFT 8.3M COLLECTION VEHICLE

#### 3.11.1 Hook Lift Collection Vehicle Specifications

Vehicle Class	Heavy Rigid Vehicle Dimensions
Overall Length (m)	8.3
Operational Length- Loaded (m)	9.5
Design Width (m)	2.8
Design Height (m)	3.7
Swept Circle (m)	21.6
Clearance (travel height) (m)	4.5
Roadway/ramp grade (max)	1:6.5 (15.4%)
Rate of change of grade (max)	1:16 (6.25%) in 7.0m of travel
Gross Weight (max tonnes)	28.0
Front Chassis Clearance	13 <sup>0</sup>
Rear Chassis Clearance	16 <sup>0</sup>

Table 12: Standard dimensions sourced from manufacture specifications

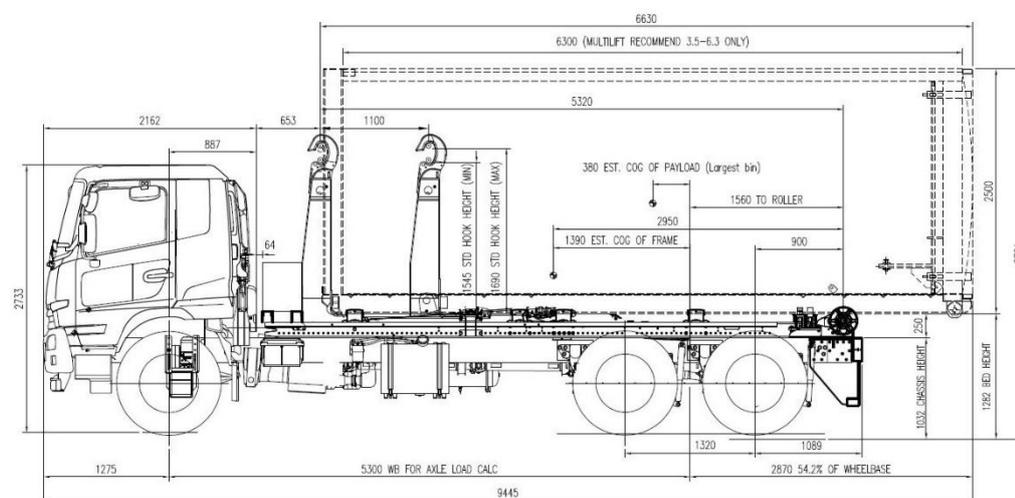


Figure 41: 8.3m Hook Lift Waste Collection Vehicle specifications

**NOTE:** Consideration of vehicle dimensions including rear operational requirements and overhead clearances are required when assessing collection points and route of travel for waste collection vehicles.

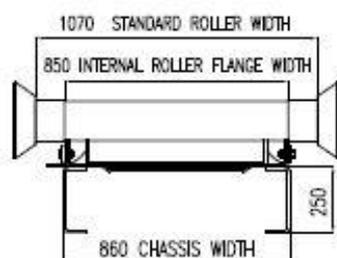


Figure 42: 9.5m Hook Lift Waste Collection Vehicle tray specifications

### 3.11.2 Integrated Auger Compactor Electrical Specifications

Electrical Requirements	Description
Electrical Outlet	5 Pin, 415 Volt, 32 Amp Outlet
Phase	3 Phase, 1 Neutral and 1 Earth
Location	Electrical located within 1m of the unit
Circuit Breaker	D Curve Circuit Breaker <ul style="list-style-type: none"> <li>- Large enough to start and run 10kw electric motor</li> <li>- Breaker size to be confirmed with breaker supplier</li> </ul>

Table 13: Electrical requirements for the operation of integrated auger compactors

### 3.11.3 Integrated Auger Compactor Schematics (6m)

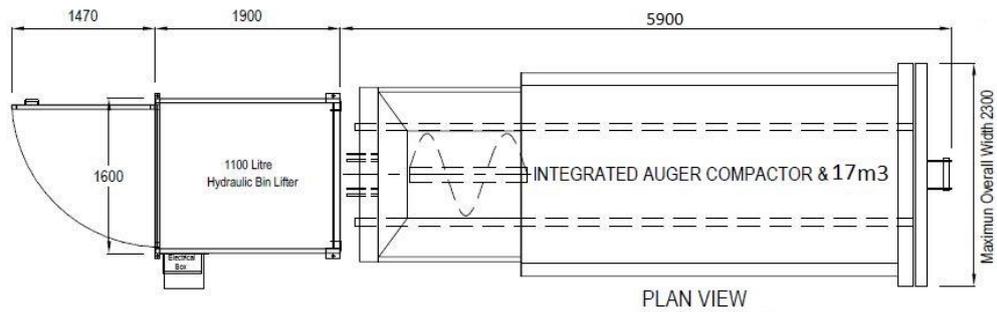


Figure 43: 6.0m Integrated Auger schematic with rear loading bin lifter

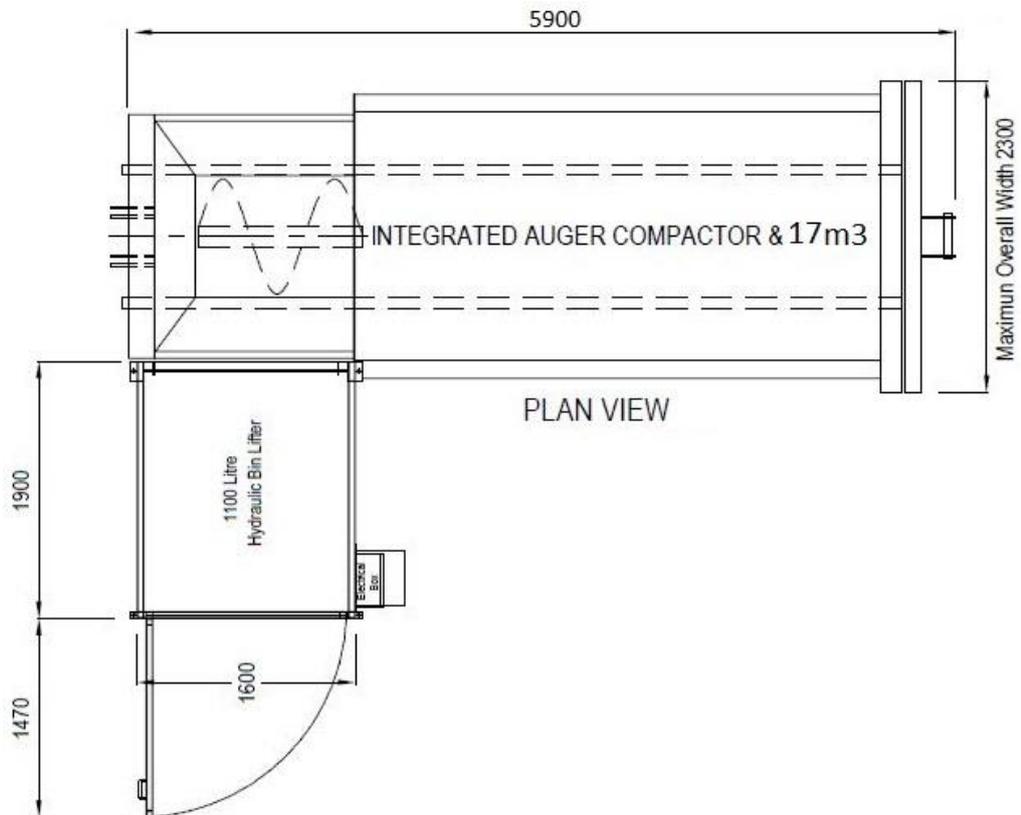


Figure 44: 6.0m Integrated Auger schematic with side loading bin lifter



### 3.11.5 Bin Lifter Specifications

Description	Specifications
Bin Capacity	1100L Bin
Lifter Capacity	350kg
Electric Motor	3kw
Power Supply	412V, 3 phase, 10amp, 5 pin

Table 14: Operational specifications for the operation of 1100L bin lifters

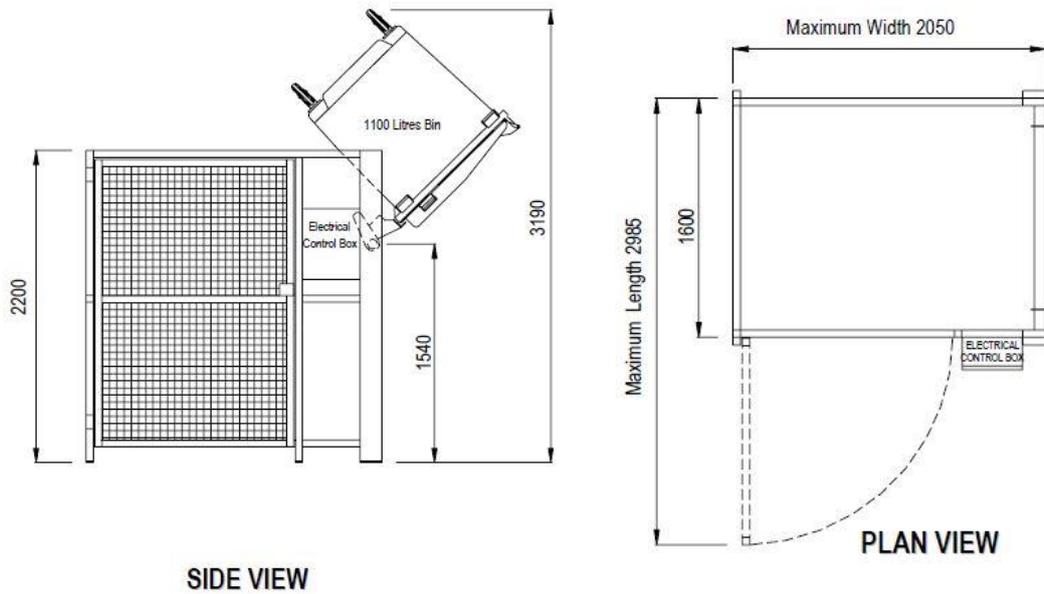


Figure 47: 1100L bin lifter schematic side and plan view

### 3.12 HOOK LIFT 9.1M COLLECTION VEHICLE

#### 3.12.1 Hook Lift Collection Vehicle Specifications

Vehicle Class	Heavy Rigid Vehicle Dimensions
Overall Length (m)	9.1
Operational Length- Loaded (m)	10.2
Design Width (m)	2.8
Design Height (m)	3.7
Swept Circle (m)	22.5
Clearance (travel height) (m)	4.5
Roadway/ramp grade (max)	1:6.5 (15.4%)
Rate of change of grade (max)	1:16 (6.25%) in 7.0m of travel
Gross Weight (max tonnes)	28.0
Front Chassis Clearance	13 <sup>0</sup>
Rear Chassis Clearance	16 <sup>0</sup>

Table 15: Standard dimensions sourced from manufacture specifications

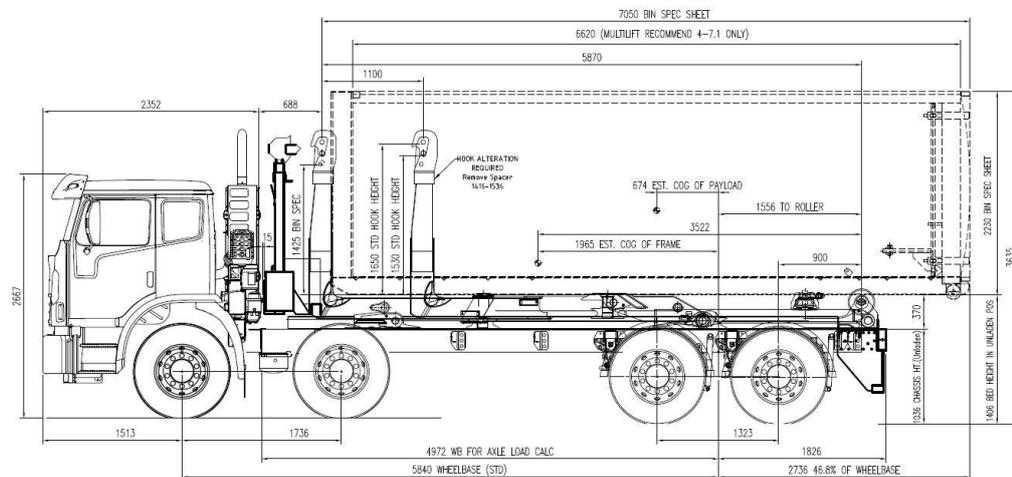


Figure 48: 9.1m Hook Lift Waste Collection Vehicle specifications

**NOTE:** Consideration of vehicle dimensions including rear operational requirements and overhead clearances are required when assessing collection points and route of travel for waste collection vehicles.

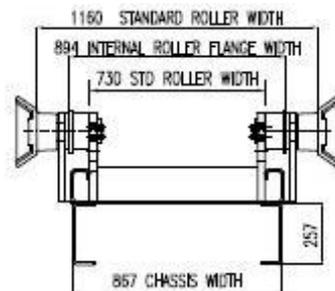


Figure 49: 9.1m Hook Lift Waste Collection Vehicle tray specifications

### 3.12.2 Integrated Auger Compactor Electrical Specifications

Electrical Requirements	Description
Electrical Outlet	5 Pin, 415 Volt, 32 Amp Outlet
Phase	3 Phase, 1 Neutral and 1 Earth
Location	Electrical located within 1m of the unit
Circuit Breaker	D Curve Circuit Breaker <ul style="list-style-type: none"> <li>- Large enough to start and run 10kw electric motor</li> <li>- Breaker size to be confirmed with breaker supplier</li> </ul>

Table 16: Electrical requirements for the operation of integrated auger compactors

### 3.12.3 Integrated Auger Compactor Schematics (7m)

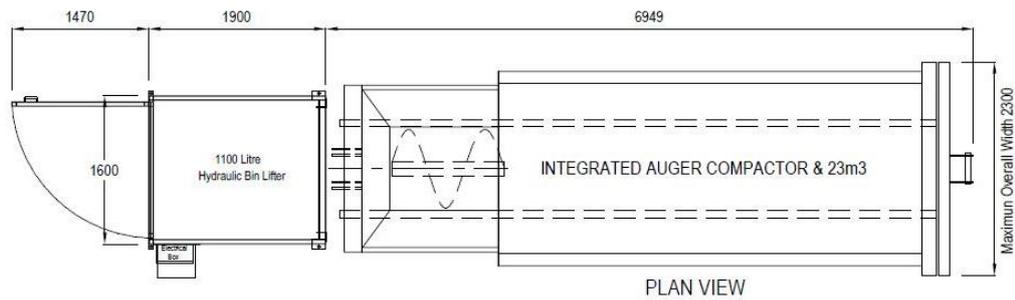


Figure 50: 7.0m Integrated Auger schematic with rear loading bin lifter

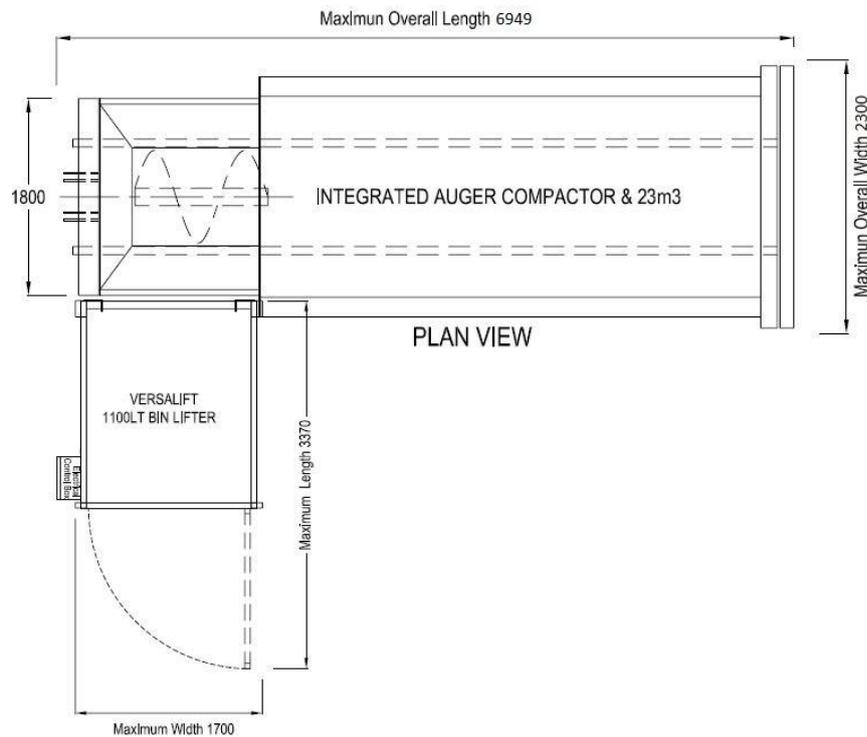


Figure 51: 7.0m Integrated Auger schematic with side loading bin lifter

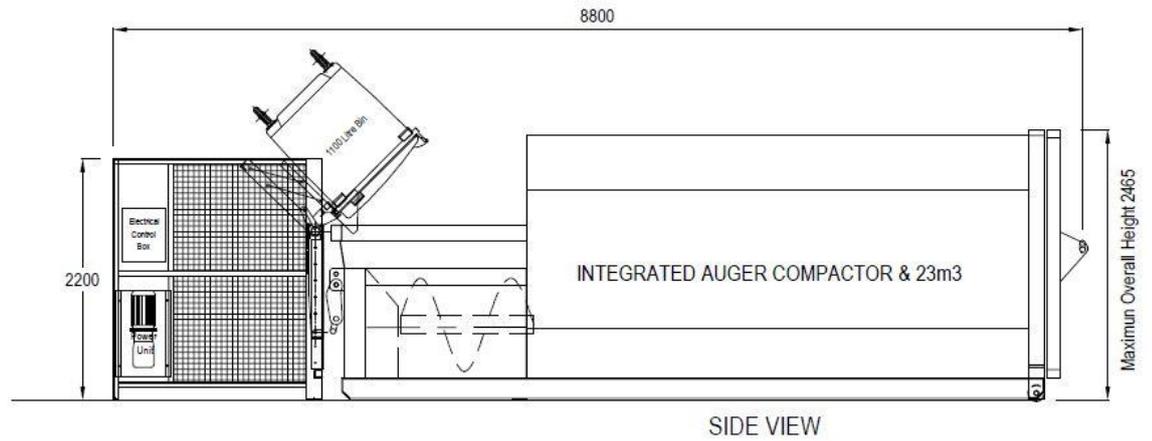


Figure 52: 7.0m Integrated Auger schematic side view

### 3.12.4 Guide Rail Specifications

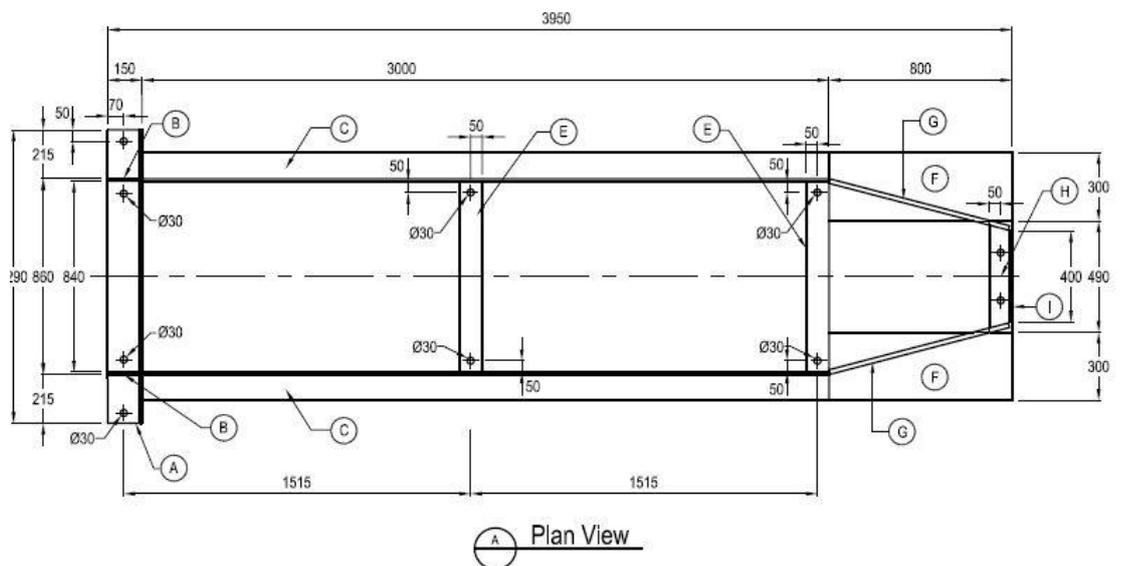


Figure 53: Integrated Auger Guide rails plan view

### 3.12.5 Bin Lifter Specifications

Description	Specifications
Bin Capacity	1100L Bin
Lifter Capacity	350kg
Electric Motor	3kw
Power Supply	412V, 3 phase, 10amp, 5 pin

Table 17: Operational specifications for the operation of 1100L bin lifters

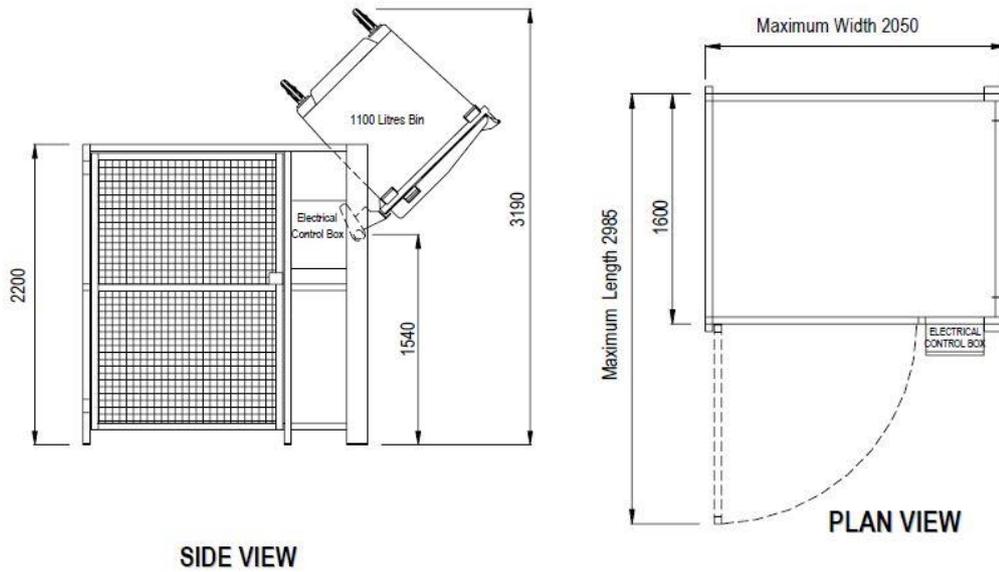


Figure 54: 1100L bin lifter schematic side and plan view

## 4. HOOK LIFT ON-SITE WASTE INFRASTRUCTURE CONFIGURATIONS

### 4.1 CONCEPT GROUND FLOOR CONFIGURATION

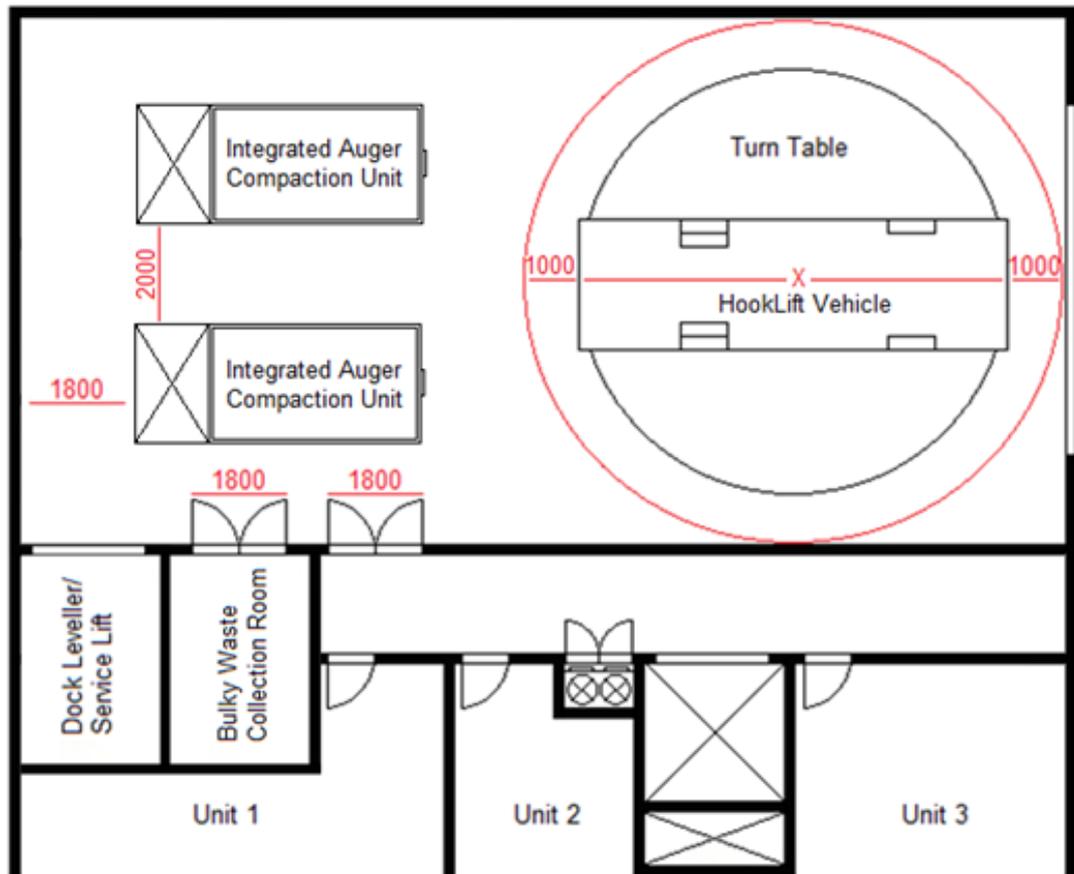


Figure 55: Concept configuration of ground floor waste infrastructure required to service compaction units within Residential Flat Buildings

**Note:** The following configuration is a guide and is not viewed as the only solution for residential dwellings.

## 5. AUTOMATED WASTE COLLECTION SYSTEMS

### 5.1 STAGED DEVELOPMENT PRECINCTS

Developments that are a part of key precincts or staged developments may consider the implementation of Automated Waste Collection Systems. AWCS is a network of underground pipes that transport municipal and/or industrial/commercial waste at high speeds (60-70 km/hour) to a designated waste collection point. Typically, developments that wish to incorporate these technologies require a minimum of 1,000 units.

Detailed information, design specifications, and schematics are available in the '**Automated Waste Collection Systems Waste Management Guideline Document**' available on Council's Website.

To explore the viability of AWCS on individual sites Council advises a pre-lodgment meeting is booked with Council's Waste and Resource Recovery Department.

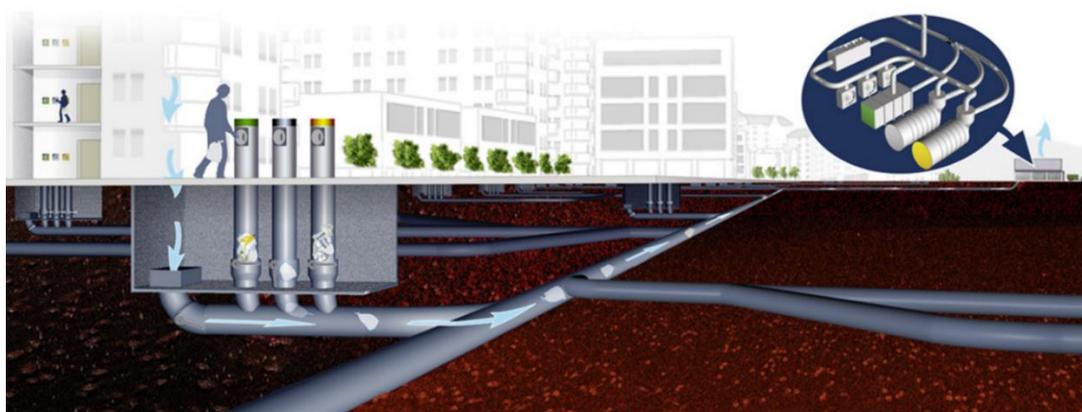


Figure 56: Schematic of the Automated Waste Collection System

## 6. INDEMNITY AGREEMENT

### 6.1 ON-SITE INDEMNIFICATION

Prior to the issue of any Occupation Certificate, all RFBs are required to enter a formal agreement with Penrith City Council for the use of Council's Waste Collection Service. This is to include Council being indemnified against claims for loss or damage.

**Note:** By entering into an agreement with Penrith City Council for waste collection, the development will be required to operate in full compliance with Council's Waste collection and Processing Contracts for Standard Waste Collection. The provision of Council's waste collection service will not commence until formalisation of the agreement.

Download the [On-site Waste Collection Application](#) from Council's website.

**Note:** The original form will need to be signed by an authorised representative of the Residential Flat Building and submitted to Council.

## 7. GLOSSARY

The following are standard terms used within this document:

<b>Term</b>	<b>Definition</b>
<b>Bulk Bins</b>	Large bins which have four swivel wheels so can be moved in any direction.
<b>Collection Point</b>	The nominated point from which waste and recycling is collected by Council's waste service.
<b>Service Cupboard</b>	Room provided on each residential level that contains the required waste and recycling bins for residents on that level. Where a waste chute system is provided, the room will also include access to the waste chute (waste hopper).
<b>Loading Area</b>	The area provided adjacent to or within proximity of the waste bin holding area that enables the waste collection vehicle to park and service the development.
<b>Heavy Rigid Vehicle</b>	Heavy Rigid Vehicle is defined as per Australian Standard 2890.2
<b>Mobile Garbage Bins</b>	Small bins that have two wheels so can only be moved forwards and backwards (not sideways).
<b>Residential Flat Building</b>	A building containing 3 or more dwellings, but does not include an attached dwelling or multi dwelling housing.
<b>Waste Collection Area</b>	The nominated area within the development site where the bins will be carted to (from storage area) and temporally stored for collection.
<b>Waste Chute System</b>	Ventilated, vertical pipes passing through each floor of a multi-storey building with access on each residential level. Resident access to the chute is through a chute hopper contained within an interim storage room. Chutes discharge into bulk bins located within a waste chute room.
<b>Waste Chute Room</b>	The room in which the chute terminates and garbage drops from the chute into a bulk bin. The area can store and contain any required volume handling equipment. The waste chute compartment is to be located within or immediately adjacent to the communal waste storage room. No resident access to this area for safety reasons.
<b>Integrated Auger Compactor</b>	A compactor specifically designed for compacting large volumes of waste material. Due to the integrated nature of the system it is well suited for wet material such as residual waste that can be compacted to a predetermined ratio.