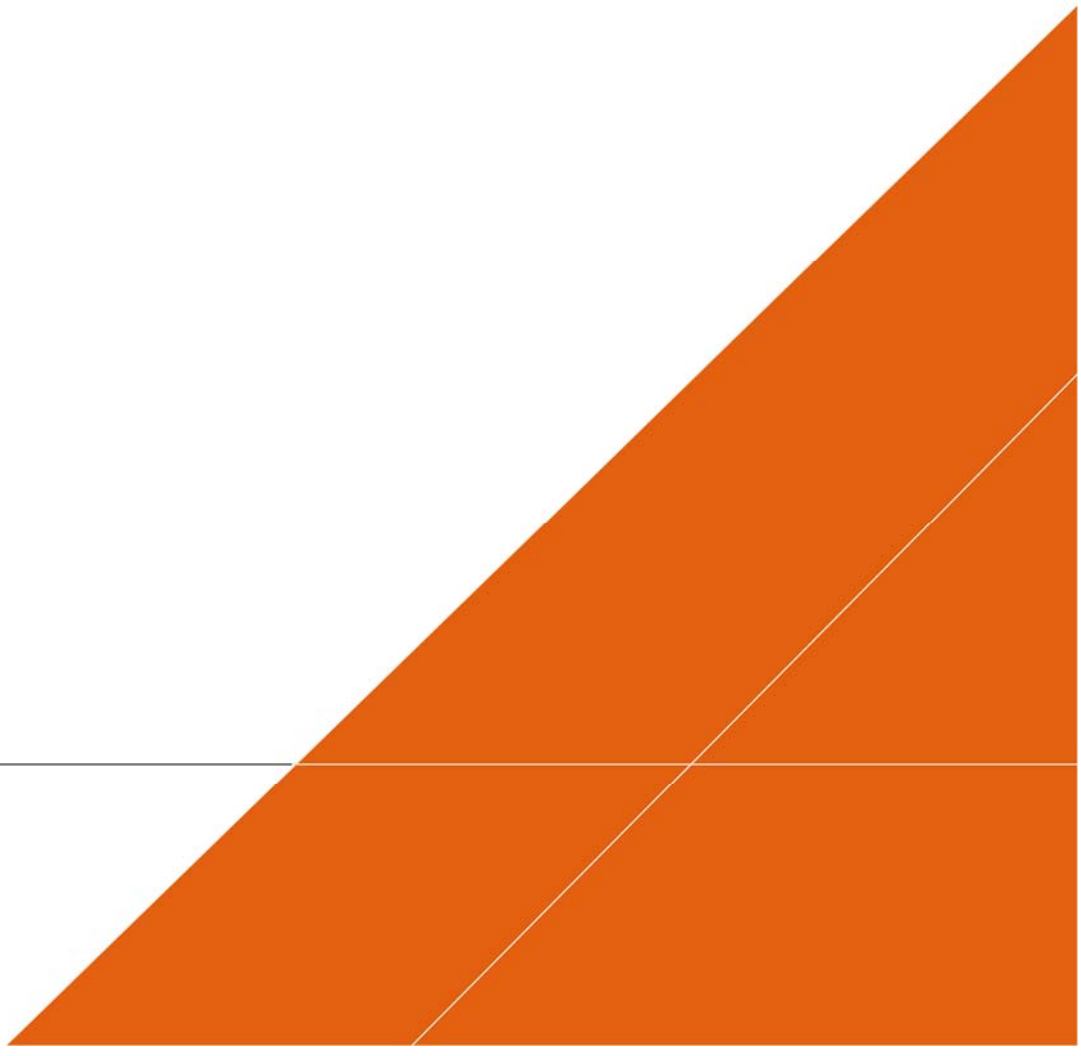
ARCADIS Design & Consultancy for natural and built assets

201 ELIZABETH ST SYDNEY

Waste Management Report

12 DECEMBER 2016



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DEXUS PROPERTY GROUP

201 Elizabeth St, Sydney

Waste Management Report

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01	09/12/2016	Draft Report	CW	SP
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APPENDICES

1 EXECUTIVE SUMMARY

The redevelopment of 201 Elizabeth St, Sydney, will comprise a new high-rise building with retail space, a hotel in the Podium and residential apartments in the Tower.

This waste management report outlines how waste will be managed for the operational phase of the Project, in alignment with City of Sydney's *Waste Minimisation Policy for New Developments* (City of Sydney, October 2005) and other best practice waste management guidance. It includes the following scope:

- Estimation of waste types and quantities for residential and retail areas
- Description of waste storage requirements for the waste streams and estimated quantities, including bin sizes, storage room sizes and other infrastructure
- Collection frequencies and specifications of collection vehicles
- 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.

Waste Storage

Waste storage required for the residential areas is outlined in Table 1.

Table 1 Description of residential waste storage requirements

Waste storage area	Infrastructure required	Space required
Storage within each residence	Bins to be provided by residents	<1m^2
Waste Service Room – each residential level	1x 240L bin for recycling Residual waste chute charging device (access point for the chute)	Approximately 2.5m^2 per Waster Service Room
Central Waste Storage Room - Residential	4x 1,100L residual waste bins (+ one spare) 9x 1,100L recyclable bins (+ one spare) 1x bin-lifter for recycling bins[1] Residual waste chute hopper and linear carousel (with compactor)[2] Hard waste and e-waste storage space	See Appendix C for indicative layout

Waste storage required for the hotel is outlined in Table 2.

Table 2 Description of hotel waste storage requirements

Waste storage area	Infrastructure required	Space required
Storage within each hotel area	Waste and recycling bins for hotel lobby, hotel meeting and conference / executive lounge,	<1m^2 for each group of bins

[1] See Appendix B for diagram
[2] As above

Waste storage area	Infrastructure required	Space required
	hotel office, recreational areas and food and beverage areas. Waste, recycling and organics bins for the hotel kitchen.	
Waste Service Rooms – Lower Ground Floor, Ground Floor, Level 01	1x 240L bin for residual waste 1x 240L bin for recycling 1x cardboard cage	Approximately 3.5m^2 per room
Waste Service Room – Level 02	2x 240L bins for residual waste 1x 240L bin for meat and fish waste 2x 240L bins for recycling 1x cardboard cage 60L bottle bins, as required	Approximately 10m^2
Central Waste Storage Room – Hotel (for peak times during ballroom events)	6x 1,100L residual waste bins (+ one spare) 7x 1,100L recyclable bins (+ one spare) 2x bin-lifters (one for recycling and one for residual waste)[3] 1x cardboard baler Refrigerated storage space for meat waste E-waste storage shelving Reusable waste storage space Liquid waste storage space (bunded and drained to a grease trap)	Refer to Appendix C for indicative layout

Waste storage required for the retail areas is outlined in Table 3.

Table 3 Description of retail waste storage requirements

Waste storage area	Infrastructure required	Space required
Storage within each shop	Bins to be provided by retail operators	<1m^2
Waste Service Room – Retail levels	1x 240L bin for residual waste 1x 240L bin for recycling 1x cardboard cage	Approximately 3.5m^2 per room

[3] See Appendix B for diagram

Waste storage area	Infrastructure required	Space required
Central Waste Storage Room - Retail	4x 1,100L residual waste bins (+ one spare) 4x 1,100L recyclable bins (+ one spare) 2x bin-lifters (one for recycling and one for residual waste)[4] 1x cardboard baler E-waste storage shelving Reusable waste storage space	Refer to Appendix C for indicative layout.

Residential Internal Waste Management

Residential tenants will arrange the disposal of their own waste to the nearest Waste Storage Room as required. Residual waste shall be transferred to the Central Storage Room - Residential via a waste chute, with a charging device to be located in each Waste Service Room. Recycling bins shall be transferred to the Central Storage Room - Residential for emptying as required, by building management. Recycling bins will be transported to the Central Storage Room – Residential via the internal lifts.

Cleaning and maintenance of bins, Waste Service Rooms and the Central Storage Room – Residential will be the responsibility of building management. A bin wash area will be provided adjacent to the Central Waste Storage Areas to enable cleaning of bins.

Hotel Internal Waste Management

Housekeeping staff will arrange the disposal of hotel waste to the nearest Waste Storage Room and then transfer the waste from the Waste Storage Rooms to the Central Storage Room – Hotel on a daily basis, or as required, via the internal lifts.

Cleaning and maintenance of bins, Waste Service Rooms and the Central Storage Room – Hotel will be the responsibility of hotel management. A bin wash area will be provided adjacent to the Central Waste Storage Areas to enable cleaning of bins.

Retail Internal Waste Management

Retail tenants will arrange the disposal of their own waste to the nearest Waste Storage Room, on a daily basis (or as required). Building management will transfer the waste from the Waste Storage Rooms to the Central Storage Room - Retail on a daily basis, or as required, via the internal lifts.

Cleaning and maintenance of bins, Waste Service Rooms and the Central Storage Room - Retail will be the responsibility of building management, with details and responsibilities clearly outlined in the relevant contract(s). A bin wash area will be provided adjacent to the Central Waste Storage Areas to enable cleaning of bins

[4] See Appendix B for diagram

Waste Collection Frequencies

Assumed collection frequencies and collection vehicles for each residential waste stream are outlined in Table 4.

Table 4 Residential waste collection frequencies

Waste Stream	Collection Frequency
Residual waste	Two times per week
Recyclables	Three times per week
E-waste	As required.
Bulky waste	Weekly

Assumed collection frequencies and collection vehicles for each hotel waste stream are outlined in Table 5.

Table 5 Hotel waste collection frequencies

Waste Stream	Collection Frequency
Residual waste (for peak times)	Daily
Recyclables (for peak times)	Daily
E-waste	As required
Reusable items	N/A – to be reused within the building
Liquid waste	As required

Assumed collection frequencies and collection vehicles for each retail waste stream are outlined in Table 6.

Table 6 Retail waste collection frequencies

Waste Stream	Collection Frequency
Residual waste	Four times per week
Recyclables	Four times per week
E-waste	As required
Reusable items	N/A – to be reused within the building

2 INTRODUCTION

DEXUS Property Group is preparing to submit a State Significant Development Application (SSDA) to for the redevelopment of 201 Elizabeth St, Sydney ("the Project"). Consequently, Arcadis was commissioned to prepare a waste management report to support this application.

The redevelopment of 201 Elizabeth St, Sydney, will comprise a new high-rise building with retail space, a hotel in the Podium and residential apartments in the Tower.

This waste management report outlines how waste will be managed for the operational phase of the Project, in alignment with City of Sydney's *Waste Minimisation Policy for New Developments* (City of Sydney, October 2005) and other best practice waste management guidance. It includes the following scope:

- Estimation of waste types and quantities for residential and retail areas
- Description of waste storage requirements for the waste streams and estimated quantities, including bin sizes, storage room sizes and other infrastructure
- Collection frequencies and specifications of collection vehicles
- 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.

Principles followed during development of this waste management report were:

- Provision of waste management systems which will enable achievement of NSW resource recovery targets
- Provision of waste management systems which will encourage waste minimisation
- Mitigation of safety and hygiene risks for users of waste management systems
- Ease of use of waste management systems
- Noise minimisation
- Ease of access for collection vehicles.

3 RESIDENTIAL WASTE

3.1 Waste Generation

Sufficient storage is to be provided to manage residual waste, recycling, bulky waste and e-waste arising from the residential premises within the Project. Estimations of waste streams generated by the Project are outlined in Table 7. Assumptions used for these calculations are contained in Appendix A.

Table 7 Estimated residential waste volumes

Waste Stream	Estimated Volume (m^3/week)
Residual waste	26.5 (uncompacted)
Recyclables	29.4
E-waste[5]	1
Bulky waste	15.5

3.2 Waste Storage

Storage for residential waste will be provided within three areas of the Project, being:

- Space within each residence to store one days' worth of residual waste, recyclables and organics
- Space/s allocated on each level for a Waste Service Room, for interim waste storage
- A Central Waste Storage Room in Basement 1.

Descriptions of the above waste storage areas are outlined in Table 8 and the location and an indicative layout of the Central Waste Storage Room – Residential is included in Appendix C. The Central Waste Storage Room – Residential will be a completely separate and self-contained area to the Central Waste Storage Rooms for the Hotel and Retail (see Sections 4 and 5), with separate keys and locking systems.

Table 8 Description of residential waste storage requirements

Waste storage area	Infrastructure required	Space required
Storage within each residence	Bins to be provided by residents	<1m^2
Waste Service Room – each residential level	1x 240L bin for recycling Residual waste chute charging device (access point for the chute)	Approximately 2.5m^2 per Waster Service Room
Central Waste Storage Room - Residential	4x 1,100L residual waste bins (+ one spare) 9x 1,100L recyclable bins (+ one spare) 1x bin-lifter for recycling bins[6]	See Appendix C for indicative layout

[5] 'E-waste' refers to the following waste streams - batteries, equipment containing printed circuit boards, computers, televisions, fluorescent tubes and smoke detectors
[6] See Appendix B for diagram

Waste storage area	Infrastructure required	Space required
	Residual waste chute hopper and linear carousel (with compactor)[7] Hard waste and e-waste storage space	

3.3 Management of Internal Waste Removal

Residential tenants will arrange the disposal of their own waste to the nearest Waste Storage Room as required. Residual waste shall be transferred to the Central Storage Room - Residential via a waste chute, with a charging device to be located in each Waste Service Room. Recycling bins shall be transferred to the Central Storage Room - Residential for emptying as required, by building management. Recycling bins will be transported to the Central Storage Room – Residential via the internal lifts.

Cleaning and maintenance of bins, Waste Service Rooms and the Central Storage Room – Residential will be the responsibility of building management. A bin wash area will be provided adjacent to the Central Waste Storage Areas to enable cleaning of bins. Additionally, building management will be responsible for ensuring that the following management principles are followed:

- Clear and easy to read “NO STANDING” signs and “DANGER” warning signs for children must be fixed to the external face of each waste and recycling room, where appropriate
- Standard signage on how to use the waste management system and what materials are acceptable in the recycling must be posted in all communal waste collection and storage areas
- Adequate signage identifying the Central Waste Storage Area – Residential and Waste Service Rooms must be prominently displayed
- All waste and recycling receptacles must be clearly and correctly labelled to identify which materials are to be placed in which bin
- Any compactors or mechanical devices for the storage of waste must be child proofed
- Equipment must be protected from theft and vandalism.

Building management will also designate an area to be used for composting and/or worm-farming.

3.3.1 Chute Design Specifications

Detailed design of the chute will incorporate the following design requirements:

- Chutes, service openings and charging devices must be constructed of metal or other smooth faced, durable, fire resistant and impervious material of non-corrosive nature
- Chutes must be cylindrical in section and the internal diameter must be adequate
- Chutes must be vertical without bends or “off-sets” and not be reduced in diameter
- Chute branches to charging devices must be capable of delivering the waste to the chute without using force
- Chutes must terminate in the waste room and discharge the waste directly into a receptacle or waste compactor
- A cut-off must be provided at or near the base of the chute to effectively close off the chute whilst the receptacle or compacting device is withdrawn

[7] As above

- Charging devices must:
  - 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
- The chute, charging device and service opening must be capable of being easily cleaned
- Chutes must be ventilated to ensure that air does not flow from the chute through any service opening.

3.4 Waste Collection

Assumed collection frequencies for each residential waste stream are outlined in Table 9.

Table 9 Residential waste collection frequencies

Waste Stream	Collection Frequency
Residual waste	Two times per week
Recyclables	Three times per week
E-waste	As required.
Bulky waste	Weekly

Building management will be responsible for moving the bins from the Central Waste Storage Area - Residential to the Waste Collection Point. It is anticipated that a manual handling device will be required in order to move the compacted bins.[8]

Collection vehicles required to service each waste stream are outlined in Table 10, with associated dimensions and clearance requirements. Turning circles demonstrating that the largest of these vehicles is able to access the Waste Collection Point are included in the Proposed Basement 1 Plan.

Table 10 Collection vehicle specifications

Waste Stream	Bin Types	Collection Vehicle	Dimensions and Clearance
Residual waste	1,100L bins	Rear-loading compactor[9]	Length – 9.54m Width – 2.6m Operational height – 4m Travel height – 3.8m Weight (payload) – 26t Steering error allowance – at least 0.6m (absolute minimum)

[8] For example, see http://www.electrodrive.com.au/products/waste-bin-mover.aspx
[9] Dimensions sourced from Policy for Waste Minimisation in New Developments (City of Sydney, October 2005, http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0018/120384/WasteCodeForNewDevelopments.pdf)

Waste Stream	Bin Types	Collection Vehicle	Dimensions and Clearance
			on both sides of the theoretical wheel path, or 1m as a desirable minimum
Recyclables	1,100L bins	Rear-loading compactor	Length – 8.54m Width – 2.6m Operational height – 4m Travel height – 3.8m Weight (payload) – 26t Steering error allowance – at least 0.6m (absolute minimum) on both sides of the theoretical wheel path, or 1m as a desirable minimum
E-waste	50-90L crates	May either be a small rigid vehicle or a medium rigid vehicle (MRV)	**MRV**[10] Length – 8.8m Width – 2.5m Operational height – 4.5m Design turning radius – 10m
Bulky waste	N/A	Dependent upon waste type, may either be a rear-loading compactor or an (MRV)	**Rear-loading compactor** Length – 8.54m Width – 2.6m Operational height – 4m Travel height – 3.8m Steering error allowance – at least 0.6m (absolute minimum) on both sides of the theoretical wheel path, or 1m as a desirable minimum **MRV** Length – 8.8m Width – 2.5m Operational height – 4.5m Design turning radius – 10m

[10] Dimensions sourced from Austroads Design Vehicles and Turning Path Templates Guide (Austroads, 2013, http://austroads.com.au.tmp.anchor.net.au/images/stories/ap-g34-13.pdf) and Classes of Vehicle Design (Moreton Bay Regional Council https://www.moretonbay.qld.gov.au/uploadedFiles/common/forms/transport/Classes-of-Vehicle-Design.pdf)

4 HOTEL WASTE

4.1 Waste Generation

Sufficient space is to be provided to manage residual waste, recyclables, e-waste[11], re-usable items[12] and liquid wastes (such as oils) arising from the hotel premises within the Project. Estimations of these waste streams generated by the Project are outlined in Table 15.

Table 11 Estimated hotel waste volumes

Waste Stream	Estimated Volume (m^3/week)
Residual waste (when no events held in the ballroom) - uncompacted	32.4
Recyclables (when no events held in the ballroom)	39
Residual waste (when an event is held in ballroom every night) - uncompacted	136.2
Recyclables (when an event is held in ballroom every night)	50.8

4.2 Waste Storage

Storage for hotel waste will be provided within three areas of the Project, being:

- Space in each hotel area to collect waste from the immediate vicinity (e.g. bins in the lobby and kitchen)
- Space allocated on each hotel level for a Waste Service Room, for interim waste storage
- A Central Waste Storage Room in Basement 1.

Descriptions of the above waste storage areas are outlined in Table 16 and the location and an indicative layout of the Central Waste Storage Room – Hotel is included in Appendix C. The Central Waste Storage Room – Hotel will be a completely separate and self-contained area to the Central Waste Storage Rooms for Residential and Retail, with separate keys and locking systems.

Table 12 Description of hotel waste storage requirements

Waste storage area	Infrastructure required	Space required
Storage within each hotel area	Waste and recycling bins for hotel lobby, hotel meeting and conference / executive lounge, hotel office, recreational areas and food and beverage areas. Waste, recycling and organics bins for the hotel kitchen.	<1m^2 for each group of bins

[11] 'E-waste' refers to the following waste streams - batteries, equipment containing printed circuit boards, computers, televisions, fluorescent tubes and smoke detectors
[12] Such as crates, pallets, kegs and other reusable items

Waste storage area	Infrastructure required	Space required
Waste Service Rooms – Lower Ground Floor, Ground Floor, Level 01	1x 240L bin for residual waste 1x 240L bin for recycling 1x cardboard cage	Approximately 3.5m^2 per room
Waste Service Room – Level 02	2x 240L bins for residual waste 1x 240L bin for meat and fish waste 2x 240L bins for recycling 1x cardboard cage 60L bottle bins, as required	Approximately 10m^2
Central Waste Storage Room – Hotel (for peak times during ballroom events)	6x 1,100L residual waste bins (+ one spare) 7x 1,100L recyclable bins (+ one spare) 2x bin-lifters (one for recycling and one for residual waste)[13] 1x cardboard baler Refrigerated storage space for meat waste E-waste storage shelving Reusable waste storage space Liquid waste storage space (bunded and drained to a grease trap)	Refer to Appendix C for indicative layout

4.3 Management of Internal Waste Removal

Housekeeping staff will arrange the disposal of hotel waste to the nearest Waste Storage Room and then transfer the waste from the Waste Storage Rooms to the Central Storage Room – Hotel on a daily basis, or as required, via the internal lifts.

Cleaning and maintenance of bins, Waste Service Rooms and the Central Storage Room – Hotel will be the responsibility of hotel management. A bin wash area will be provided adjacent to the Central Waste Storage Areas to enable cleaning of bins. Additionally, hotel management will be responsible for ensuring that the following management principles are followed:

- Clear and easy to read “NO STANDING” signs and “DANGER” warning signs for children must be fixed to the external face of each waste and recycling room, where appropriate
- Standard signage on how to use the waste management system and what materials are acceptable in the recycling must be posted in all communal waste collection and storage areas
- Adequate signage identifying the Central Waste Storage Area – Hotel and Waste Service Rooms must be prominently displayed
- All waste and recycling receptacles must be clearly and correctly labelled to identify which materials are to be placed in which bin
- Any compactors or mechanical devices for the storage of waste must be child proofed

[13] See Appendix B for diagram

- Equipment must be protected from theft and vandalism
- A valid and current contract with a licensed collector for waste and recycling collection and disposal / processing must be held on site.

4.4 Waste Collection

Assumed collection frequencies for each hotel waste stream are outlined in Table 17.

Table 13 Hotel waste collection frequencies

Waste Stream	Collection Frequency
Residual waste (for peak times)	Daily
Recyclables (for peak times)	Daily
E-waste	As required
Reusable items	N/A – to be reused within the building
Liquid waste	As required

Building management will be responsible for moving the bins from the Central Waste Storage Area - Hotel to the Waste Collection Point.

Collection vehicles required to service each waste stream are outlined in Table 18, with associated dimensions and clearance requirements. Turning circles demonstrating that the largest of these vehicles is able to access the Waste Collection Point are included in the Proposed Basement 1 Plan.

The collection vehicle type is dependent on the contract made by management. Loading dock to allow for sufficient space for clearance of the largest waste collection vehicles.

Liquid waste from grease traps will only be removed by licensed waste contractors approved by Sydney Water and the NSW Environment Protection Authority.

Table 14 Collection vehicle specifications

Waste Stream	Bin Types	Collection Vehicle	Dimensions and Clearance
Residual waste	1,100L bins	Rear-loading compactor[14]	Length – 9.54m Width – 2.6m Operational height – 4m Travel height – 3.8m Steering error allowance – at least 0.6m (absolute minimum) on both sides of the theoretical wheel path, or 1m as a desirable minimum

[14] Dimensions sourced from Policy for Waste Minimisation in New Developments (City of Sydney, October 2005, http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0018/120384/WasteCodeForNewDevelopments.pdf)

Waste Stream	Bin Types	Collection Vehicle	Dimensions and Clearance
		Front lift compactor [15]	Length – 11.0m Width – 2.5m Operational height – 8.5 m Travel height – 4.2 m
Recyclables	1,100L bins	Rear-loading compactor	Length – 8.54m Width – 2.6m Operational height – 4m Travel height – 3.8m Steering error allowance – at least 0.6m (absolute minimum) on both sides of the theoretical wheel path, or 1m as a desirable minimum
		Front lift compactor[16]	Length – 11.0m Width – 2.5m Operational height – 8.5m Travel height – 4.2m
E-waste	50-90L crates	May either be a small rigid vehicle or a medium rigid vehicle (MRV)	**MRV**[17] Length – 8.8m Width – 2.5m Operational height – 4.5m Design turning radius – 10m
Liquid waste	Likely 10-20L drums	May either be a small rigid vehicle or an MRV	**MRV**[18] Length – 8.8m Width – 2.5m Operational height – 4.5m Design turning radius – 10m

[15] Dimensions sourced from Suez Front Lift Collection System, http://www.sita.com.au/resources/publications/brochures/
[16] Dimensions sourced from Suez Front Lift Collection System, http://www.sita.com.au/resources/publications/brochures/
[17] Dimensions sourced from Austroads Design Vehicles and Turning Path Templates Guide (Austroads, 2013, http://austroads.com.au.tmp.anchor.net.au/images/stories/ap-g34-13.pdf) and Classes of Vehicle Design (Moreton Bay Regional Council https://www.moretonbay.qld.gov.au/uploadedFiles/common/forms/transport/Classes-of-Vehicle-Design.pdf)
[18] Dimensions sourced from Austroads Design Vehicles and Turning Path Templates Guide (Austroads, 2013, http://austroads.com.au.tmp.anchor.net.au/images/stories/ap-g34-13.pdf) and Classes of Vehicle Design (Moreton Bay Regional Council https://www.moretonbay.qld.gov.au/uploadedFiles/common/forms/transport/Classes-of-Vehicle-Design.pdf)

5 RETAIL WASTE

5.1 Waste Generation

Sufficient space is to be provided to manage residual waste, recyclables, e-waste[19], re-usable items[20] and liquid wastes (such as oils) arising from the retail premises within the Project. Estimations of these waste streams generated by the Project are outlined in Table 15.

Table 15 Estimated retail waste volumes

Waste Stream	Estimated Volume (m^3/week)
Residual waste	17.2
Recyclables	17.2

5.2 Waste Storage

Storage for retail waste will be provided within three areas of the Project, being:

- Space within each shop to store up to one days' worth of residual waste and recyclables
- Space allocated on each retail level for a Waste Service Room, for interim waste storage
- A Central Waste Storage Room in Basement 1.

Descriptions of the above waste storage areas are outlined in Table 16 and the location and indicative layout of the Central Waste Storage Room – Retail is included in Appendix C. The Central Waste Storage Room – Retail will be a completely separate and self-contained area to the Central Waste Storage Rooms for Residential and Hotel, with separate keys and locking systems.

Table 16 Description of retail waste storage requirements

Waste storage area	Infrastructure required	Space required
Storage within each shop	Bins to be provided by retail operators	<1m^2
Waste Service Room – Retail levels	1x 240L bin for residual waste 1x 240L bin for recycling 1x cardboard cage	Approximately 3.5m^2 per room

[19] 'E-waste' used to refer to the following waste streams - batteries, equipment containing printed circuit boards, computers, televisions, fluorescent tubes and smoke detectors
[20] Such as crates, pallets, kegs and other reusable items

Waste storage area	Infrastructure required	Space required
Central Waste Storage Room - Retail	4x 1,100L residual waste bins (+ one spare) 4x 1,100L recyclable bins (+ one spare) 2x bin-lifters (one for recycling and one for residual waste)[21] 1x cardboard baler E-waste storage shelving Reusable waste storage space	Refer to Appendix C for indicative layout.

5.3 Management of Internal Waste Removal

Retail tenants will arrange the disposal of their own waste to the nearest Waste Storage Room, on a daily basis (or as required). Building management will transfer the waste from the Waste Storage Rooms to the Central Storage Room - Retail on a daily basis, or as required, via the internal lifts.

Cleaning and maintenance of bins, Waste Service Rooms and the Central Storage Room - Retail will be the responsibility of building management, with details and responsibilities clearly outlined in the relevant contract(s). A bin wash area will be provided adjacent to the Central Waste Storage Areas to enable cleaning of bins.

Additionally, building management will be responsible for ensuring that the following management principles are followed:

- Clear and easy to read “NO STANDING” signs and “DANGER” warning signs for children must be fixed to the external face of each waste and recycling room, where appropriate
- Standard signage on how to use the waste management system and what materials are acceptable in the recycling must be posted in all communal waste collection and storage areas
- Adequate signage identifying the Central Waste Storage Area – Retail and Waste Service Rooms must be prominently displayed
- All waste and recycling receptacles must be clearly and correctly labelled to identify which materials are to be placed in which bin
- Any compactors or mechanical devices for the storage of waste must be child proofed
- Equipment must be protected from theft and vandalism
- A valid and current contract with a licensed collector for waste and recycling collection and disposal / processing must be held on site.

5.4 Waste Collection

Assumed collection frequencies for each retail waste stream are outlined in Table 17.

Table 17 Retail waste collection frequencies

Waste Stream	Collection Frequency
Residual waste	Four times per week
Recyclables	Four times per week

[21] See Appendix B for diagram

Waste Stream	Collection Frequency
E-waste	As required
Reusable items	N/A – to be reused within the building

Building management will be responsible for moving the bins from the Central Waste Storage Area - Retail to the Waste Collection Point.

Collection vehicles required to service each waste stream are outlined in Table 18, with associated dimensions and clearance requirements. Turning circles demonstrating that the largest of these vehicles is able to access the Waste Collection Point are included in the Proposed Basement 1 Plan.

The collection vehicle type is dependent on the contract made by management. Loading dock to allow for sufficient space for clearance of the largest waste collection vehicles.

Liquid waste from grease traps will only be removed by licensed waste contractors approved by Sydney Water and the NSW Environment Protection Authority.

Table 18 Collection vehicle specifications

Waste Stream	Bin Types	Collection Vehicle	Dimensions and Clearance
Residual waste	1,100L bins	Rear-loading compactor[22]	Length – 9.54m Width – 2.6m Operational height – 4m Travel height – 3.8m Steering error allowance – at least 0.6m (absolute minimum) on both sides of the theoretical wheel path, or 1m as a desirable minimum
		Front lift compactor[23]	Length – 11.0m Width – 2.5m Operational height – 8.5m Travel height – 4.2m
Recyclables	1,100L bins	Rear-loading compactor	Length – 8.54m Width – 2.6m Operational height – 4m Travel height – 3.8m Steering error allowance – at least 0.6m (absolute minimum) on both sides of the theoretical

[22] Dimensions sourced from Policy for Waste Minimisation in New Developments (City of Sydney, October 2005, http://www.cityofsydney.nsw.gov.au/__data/assets/pdf_file/0018/120384/WasteCodeForNewDevelopments.pdf)
[23] Dimensions sourced from Suez Front Lift Collection System, http://www.sita.com.au/resources/publications/brochures/

Waste Stream	Bin Types	Collection Vehicle	Dimensions and Clearance
			wheel path, or 1m as a desirable minimum
		Front lift compactor[24]	Length – 11.0m Width – 2.5m Operational height – 8.5m Travel height – 4.2m
E-waste	50-90L crates	May either be a small rigid vehicle or a medium rigid vehicle (MRV)	**MRV[25]** Length – 8.8m Width – 2.5m Operational height – 4.5m Design turning radius – 10m
Liquid waste	Likely 10-20L drums	May either be a small rigid vehicle or an MRV	**MRV[26]** Length – 8.8m Width – 2.5m Operational height – 4.5m Design turning radius – 10m

[24] Dimensions sourced from Suez Front Lift Collection System, http://www.sita.com.au/resources/publications/brochures/
[25] Dimensions sourced from Austroads Design Vehicles and Turning Path Templates Guide (Austroads, 2013, http://austroads.com.au.tmp.anchor.net.au/images/stories/ap-g34-13.pdf) and Classes of Vehicle Design (Moreton Bay Regional Council https://www.moretonbay.qld.gov.au/uploadedFiles/common/forms/transport/Classes-of-Vehicle-Design.pdf)
[26] Dimensions sourced from Austroads Design Vehicles and Turning Path Templates Guide (Austroads, 2013, http://austroads.com.au.tmp.anchor.net.au/images/stories/ap-g34-13.pdf) and Classes of Vehicle Design (Moreton Bay Regional Council https://www.moretonbay.qld.gov.au/uploadedFiles/common/forms/transport/Classes-of-Vehicle-Design.pdf)

6 DESIGN SPECIFICATIONS

6.1 Design of Waste Service Rooms and Central Waste Storage Rooms

The detailed design of the Waste Service Rooms and the Central Waste Storage Areas will incorporate the following design requirements:

- The floors must be constructed of concrete at least 75mm thick or other approved material graded and drained to a Sydney Water Corporation approved drainage fitting located in the room.
- The floor must be finished to a smooth even surface coved at the intersection with walls and plinths and provided with a ramp to the doorway where necessary.
- The walls must be constructed of approved solid impervious material and shall be cement rendered internally to a smooth even surface coved at all intersections.
- The ceilings must be finished with a rigid smooth faced non-absorbent material capable of being easily cleaned.
- The walls, floors and ceilings must be finished with a light colour.
- A close fitting and self-closing door openable from within the room must be fitted.[27]
- Rooms must be constructed in such a manner as to prevent the entry of vermin.
- Rooms must be ventilated by either:
  - Permanent, unobstructed natural ventilation openings direct to the external air, not less than 5% of the floor area; or
  - A mechanical exhaust ventilation system exhausting at a rate of 5L/s.m^2 floor area, with a minimum rate of 100L/s minimum
- Rooms must be provided with artificial light controlled by switches located both outside and inside the room.
- Any compactors or mechanical devices for the storage of waste must be child proofed.
- Equipment must be protected from theft and vandalism.
- Any facet of the waste management system that is visible from outside the building must blend in with the development.

The Central Storage Rooms must also be provided with an adequate supply of hot and cold water mixed through a centralised mixing valve with hose cock.

6.2 Access Design Specifications

The detailed design of the access to the Central Waste Storage Areas will include the following design requirements:

- An industrial-type strength pavement designed for a maximum wheel loading of 7 tonnes per axle
- The gradient of the ramp access to basement must not exceed 1:8
- The height to the structural members and ceiling must allow for the largest collection vehicle travel height / operational height
- The provision of space clear of structural members or vehicle parking spaces adequate to allow sufficient clearance for collection vehicles to turn.

---

[27] Note - An approved roller shutter door may be permitted under special circumstances. When permitted a sign must be erected in a conspicuous position drawing attention to the fact the door must be kept closed at all times when not in use.

APPENDIX A

Assumptions for Calculations

Table 19 Waste generating areas

Level	Waste Generating Area and size
Basement 04	Non-waste generating area
Basement 03	Non-waste generating area
Basement 02	Non-waste generating area
Basement 01	Hotel back of house 310m^2
Lower Ground Floor	Retail 975m^2 (gross floor area (GFA)) Hotel back of house 610m^2 (GFA) – Back of house was not considered a waste generating area as materials transferred from this area become waste at other parts of the hotel.
Ground Floor	Retail 2,060m^2 (GFA) Hotel lobby 970m^2 (GFA) – Non-waste generating area
Mezzanine	Retail 1,455m^2 (GFA) Hotel office 160m^2 (GFA)
Podium – Level 01	Retail 410m^2 (GFA) Hotel meeting and conference / executive lounge 1,357m^2 (GFA) Ballroom 843m^2 (GFA)
Podium – Level 02	Food and Beverage and Main Kitchen 1,810m^2 (GFA)
Typical Lower Podium (Levels 03 – 09)	43 hotel rooms per floor (301 hotel rooms in total for these levels)
Upper Podium – Level 10	27 hotel rooms
Upper Podium – Level 11	25 hotel rooms
Podium Roof – Level 12	Recreational amenities 280m^2 (GFA) 2x 1-bed apartments 6x 2-bed apartments
Typical Low and Mid-Rise Tower (Levels 12 to 39)	2x 1-bed apartments per level 6x 2-bed apartments per level
Typical High-Rise Tower (Levels 40 to 49)	5x 3-bed apartments per level
Plant Rooms and Roof (Levels 50 to 52)	Non-waste generating area

Table 20 Waste generation rates

Waste Stream	Generation Rate	Source
Residential		
Residual waste 1 bedroom apartment	80L / unit / week	Guidelines for Preparing a Waste Management Plan (City of Melbourne, 2015)
Residual waste 2 bedroom apartment	100L / unit / week	Guidelines for Preparing a Waste Management Plan (City of Melbourne, 2015)
Residual waste 3 bedroom apartment	120L / unit / week	Guidelines for Preparing a Waste Management Plan (City of Melbourne, 2015)
Recyclables 1 bedroom apartment	80L / unit / week	Guidelines for Preparing a Waste Management Plan (City of Melbourne, 2015)
Recyclables 2 bedroom apartment	120L / unit / week	Guidelines for Preparing a Waste Management Plan (City of Melbourne, 2015)
Recyclables 3 bedroom apartment	120L / unit / week	Guidelines for Preparing a Waste Management Plan (City of Melbourne, 2015)
E-waste	16.9kg / person / day	Arcadis' industry knowledge. Assumed 2.6 people per apartment.
Bulky waste	3.2m^3 / household / year	NSW Local Government Waste and Resource Recovery Data Report, as reported by councils 2012-13 (NSW EPA, 2014, http://www.epa.nsw.gov.au/resources/warrlocal/140432-lg-data-1213.pdf) Divided City of Sydney clean-up waste tonnes by number of City of Sydney households. Density of average clean-up pile taken from SSROC Regional Report – Audit of Bulky Clean-Up Waste (A. Prince Consulting, 2014, http://ssroc.nsw.gov.au/wp-content/uploads/2015/04/SSROC-2014-REGIONAL-cleanup-report_Final_ANON.pdf)
Retail		
Residual waste	50L / 100m^2 floor area / week	Policy for Waste Minimisation in New Developments (City of Sydney, October 2005)
Recyclables	50L / 100m^2 floor area / week	Policy for Waste Minimisation in New Developments (City of Sydney, October 2005)
E-waste	1m^3 of storage per 1,000m^2 of retail space to be provided.	Further space can be allocated by building management once operational, if required.

Waste Stream	Generation Rate	Source
Reusable items	1m^2 of storage per 1,000m^2 of retail space to be provided.	Further space can be allocated by building management once operational, if required.
Liquid waste	20L / week	Conservative assumption. As areas are retail, it is unlikely that any liquid waste will be generated.
Hotel		
Residual Hotel Room	5L/bed/day	Guidelines for Preparing a Waste Management Plan (City of Melbourne, 2015)
Residual Recreational Amenities (Gym)	10L / 100m^2 floor area / week	Guidelines for Preparing a Waste Management Plan (City of Melbourne, 2015)
Residual Food and Beverage and Main (Restaurant)	660L / 100m^2 floor area / week	Guidelines for Preparing a Waste Management Plan (City of Melbourne, 2015)
Residual Meeting and Conference/Executive Lounge (Office)	10L / 100m^2 floor area / week	Policy for Waste Minimisation in New Developments (City of Sydney, October 2005)
Residual Ball Room (Restaurant)	660L / 100m^2 floor area / week	Guidelines for Preparing a Waste Management Plan (City of Melbourne, 2015)
Residual Office	10L / 100m^2 floor area / week	Policy for Waste Minimisation in New Developments (City of Sydney, October 2005)
Recycling Hotel Room	5L/bed/day	Guidelines for Preparing a Waste Management Plan (City of Melbourne, 2015)
Recycling Recreational Amenities (Gym)	10L / 100m^2 floor area / week	Guidelines for Preparing a Waste Management Plan (City of Melbourne, 2015)
Recycling Food and Beverage and Main (Restaurant)	200L / 100m^2 floor area / week	Guidelines for Preparing a Waste Management Plan (City of Melbourne, 2015)
Recycling Meeting and Conference/Executive Lounge (Office)	10L / 100m^2 floor area / week	Policy for Waste Minimisation in New Developments (City of Sydney, October 2005)

Waste Stream	Generation Rate	Source
Recycling Ball Room (Restaurant)	200L / 100m^2 floor area / week	Guidelines for Preparing a Waste Management Plan (City of Melbourne, 2015)
Recycling Office	10L / 100m^2 floor area / week	Policy for Waste Minimisation in New Developments (City of Sydney, October 2005)

APPENDIX B

Waste Equipment Specifications

240 LITRE CONTAINER

Material

- **Polymer components:**
  - Injection moulded from specially designed HDPE
  - Resistant to decay, frost, heat and chemicals
  - Special UV-stabilisation provides excellent ageing characteristics
- **Corrosion resistant steel axle**
- **Noise reduction:**
  - Quiet-running solid rubber tyres
  - Tight-fitting axle
- **Long service life:**
  - High quality materials
  - Most advanced manufacturing processes
  - Withstands exposure to high mechanical stress levels
- **Recycling:**
  - All container parts are recyclable

Advantages

- Easy to manoeuvre
- Versatile, with a comprehensive accessories range
- Complies with EN840 and AS4123 quality requirements
- Particularly stable due to external position of wheels
- Safe and easy to handle
- Suitable for all DIN lifting equipment
- Double angle rail for greater safety when emptying
- Compatible with identification and weighing systems
- Special ribs prevent containers from becoming jammed when stacked

Imprints and markings

- Manufacturer, year of manufacture, material
- Nominal volume, max permitted total weight
- EN 840 and AS4123 markings
- Individual markings with imprints, hot-foil printing or adhesive labels*
- Customer specific serial numbers if required*

Accessories

- For accessories and special design variations such as lid apertures and locks please refer to the separate accessories sheet for 2-wheeled containers

Quality

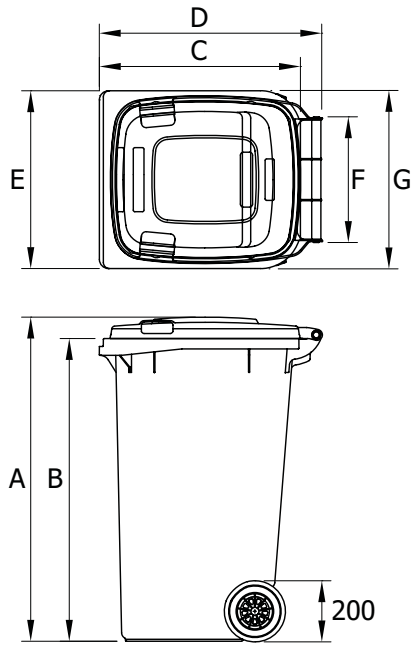
- Certified according to EN840
- Manufactured in accordance with AS4123

Dimensions - Weights - Standards

Nominal volume:	240 litres
Net weight:	approx 13 kg
Max load:	96 kg
Permitted total weight:	110 kg

A	1060 mm	D	730 mm	G	550 mm
B	990 mm	E	585 mm		
C	660 mm	F	400 mm		

Measurements to be used as a guide only – variations will occur



Colours

- Standard colours: black, nature green, dark green, grey
- Special colours are available on request* – common colours include blue, yellow, red, brown, orange, purple

DIN

SULO®

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SULO - New Zealand
PO Box 58 962
Greenmount, Manukau City 2141
New Zealand
Tel: +64 9 - 968 2180
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1100 Litre Flat Lid Container

Material

- Polymer components:
  - Injection moulded from specially designed HDPE
  - Resistant to decay, frost, heat and chemicals
  - Special UV-stabilisers provide excellent ageing characteristics
- Corrosion resistant steel components
- Noise reduction:
  - Wheel assemblies with solid rubber tyres
- Long service life:
  - High quality materials
  - Excellent manufacturing processes
  - Withstands exposure to high mechanical stress levels
- Recycling:
  - All container parts are recyclable

Design

- Easy handling through the use of ergonomic handles
- Versatile, with a comprehensive accessories range
- In accordance with the safety requirements of EN-840
- Easy grip handles on all sides
- Safe, easy handling, even with heavy loads
- Various wheel assembly configurations for different applications
- Improved water drainage as a result of rounded lids
- Water drainage plug as standard†
- Compatible with identification and weighing systems
- Reinforced base, front and rear panels for greater stability
- Fitted as standard with chip nest in accordance with RAL GZ 951/1
- Easy to clean due to smooth surfaces and rounded internal corners

Accessories

- For accessories and special design variations such as lid apertures, locks and towing brackets, please refer to the separate accessories sheet for 4-wheeled containers

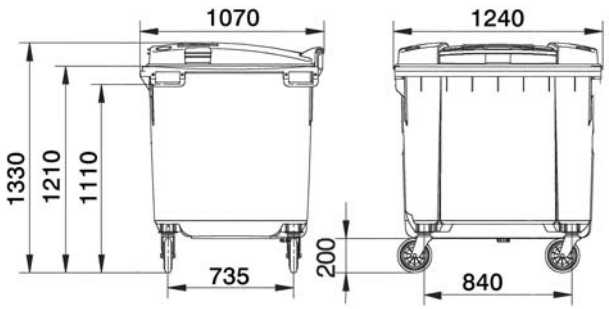
Quality

- Certified according to DIN EN 840 and RAL GZ 951/1
- Constant quality control through manufacturers laboratory as well as independent institutes

Dimensions - Weights - Standards

Nominal volume:	1100 litres
Net weight:	approx. 65 kg
Max. load:	440 kg
Permitted total weight:	510 kg

Measurements to be used as a guide only -variations will occur



Note: Certification and Quality Marks depicted in this brochure are registered to SULO Umwelttechnik GmbH & Co. KG

Colours

- Standard colours: green, blue, yellow
- Special colours are available on request*
- All additives are cadmium free and environmentally friendly

Imprints and markings

- Manufacturer, year of manufacture, material
- Nominal volume, max. permitted total weight
- EN 840, RAL markings
- Individual markings with imprints, hot-foil printing or adhesive labels available on request *

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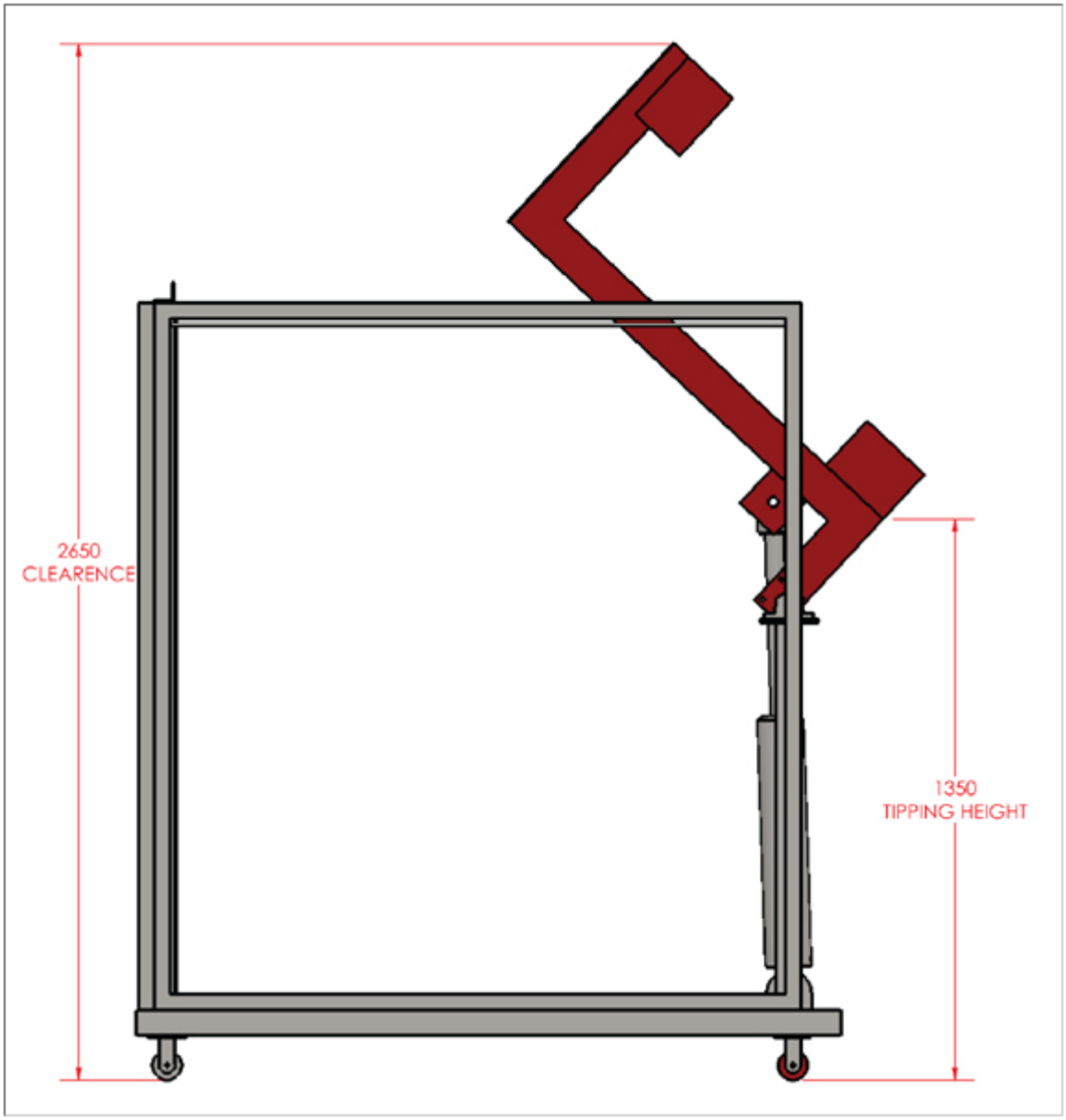
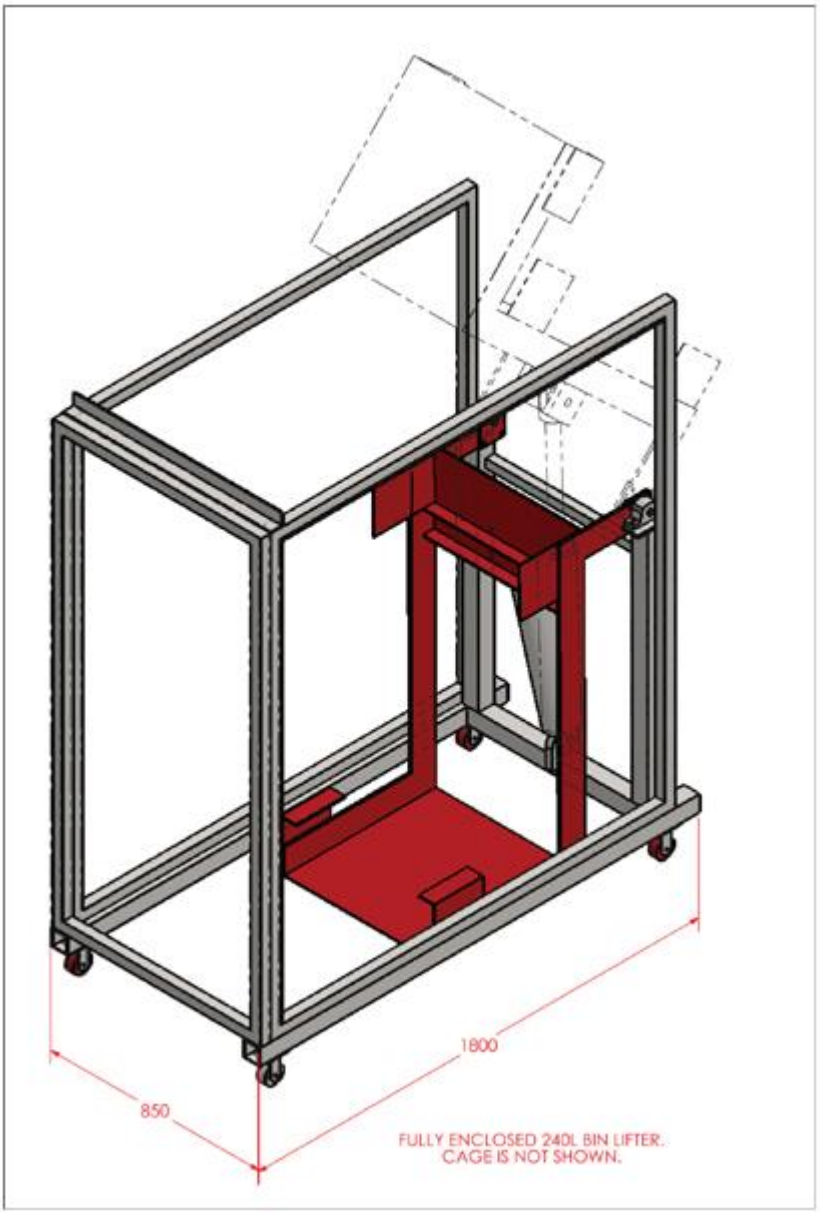
Elephants Foot 120-240 Litre Binlifter

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850
FULLY ENCLOSED 240L BIN LIFTER.
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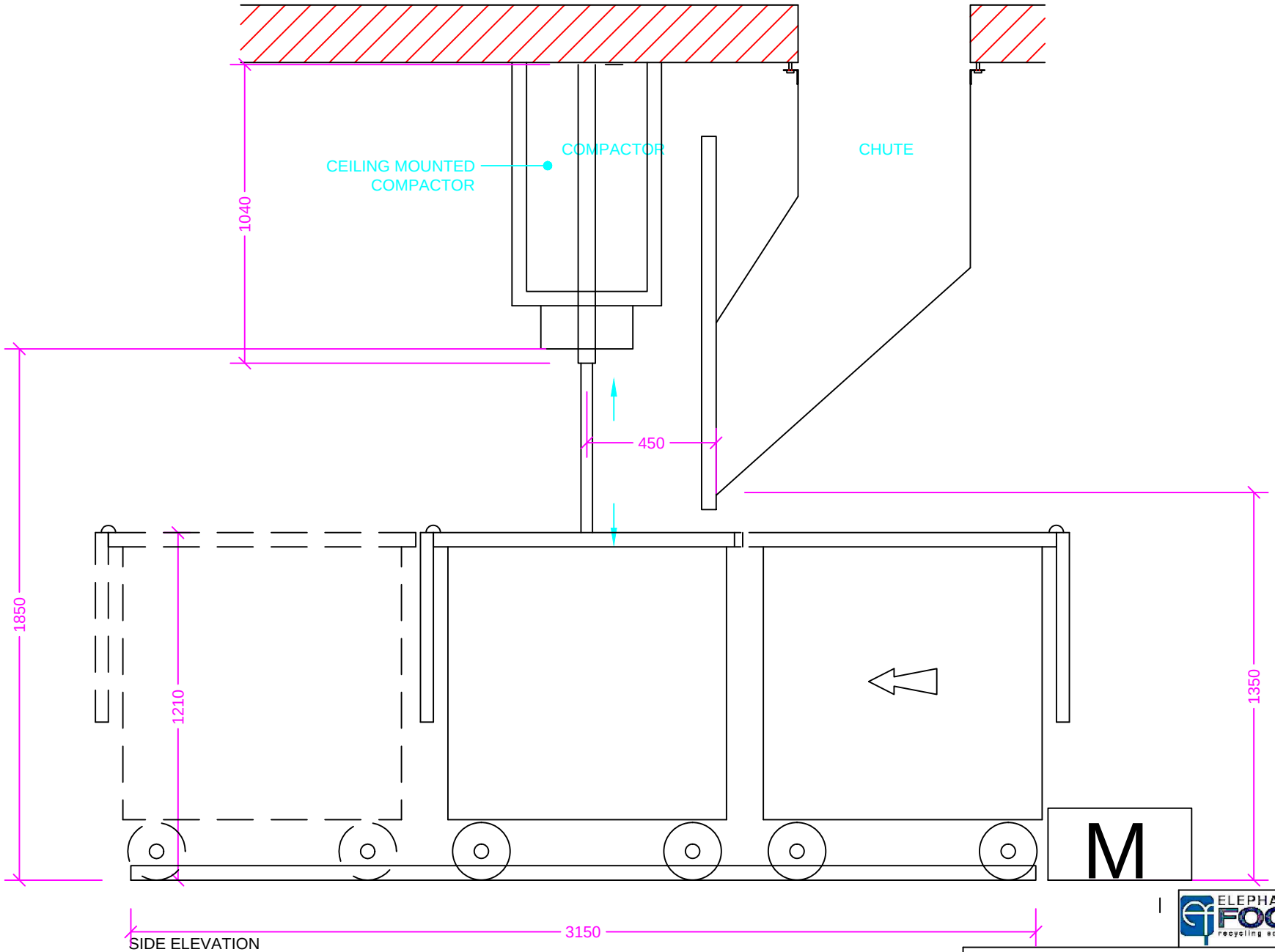

SIDE ELEVATION
scale 1:20

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44-46 Gibson Ave Padstow NSW 2211
Ph 02 9780 3500 Fax 02 9707 2588
Free Call 1800 025 073

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PROJECT: -

DATE: 21.10.13

SCALE AS SHOWN

DRAWN: CK

A4

TITLE: 2 BIN LINEAR TRACK & COMPACTOR w/- 1100L BINS

DRAWING No: DM009-2BIN1100LINCOM

REV -

REV	DATE	REVISION DESCRIPTION	BY
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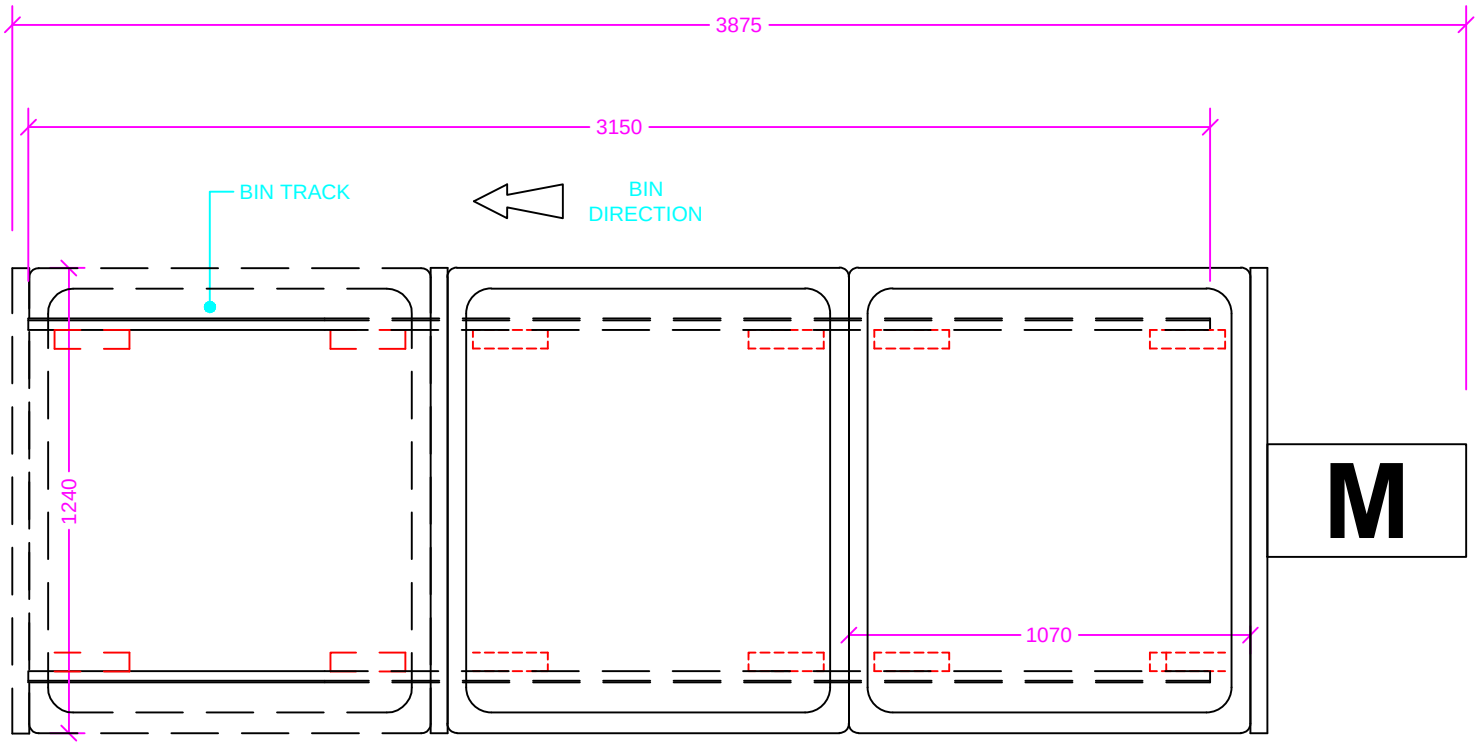

LAYOUT PLAN
scale 1:20

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TITLE: 2 BIN LINEAR TRACK w/- 1100L BINS

DRAWING No: DM009-2BIN1100LIN

REV -

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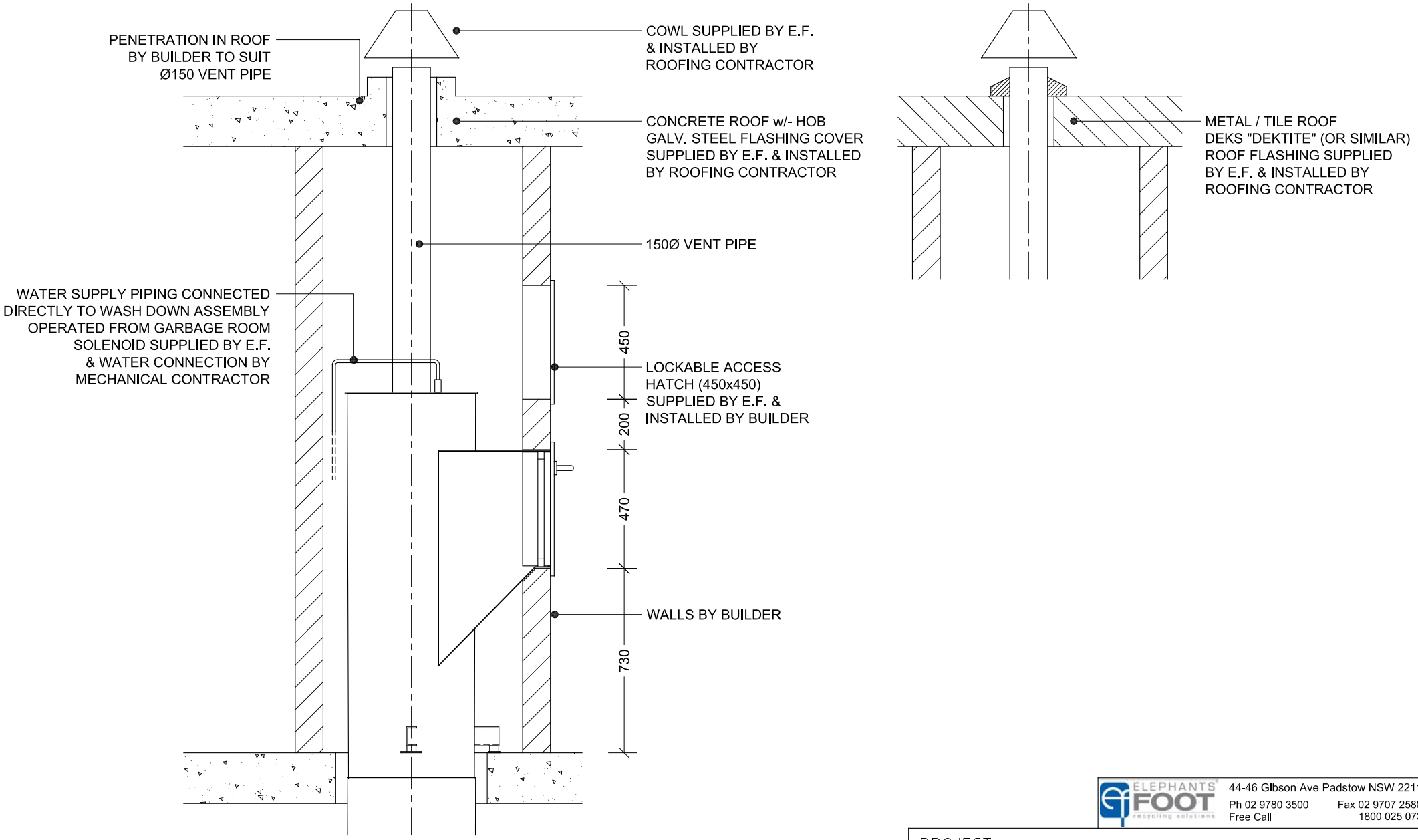

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REV	DATE	REVISION DESCRIPTION	BY
—	— — —	ISSUED FOR COMMENT	—

PROJECT: -

DATE: 06.11.13

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DRAWN: CK

A4

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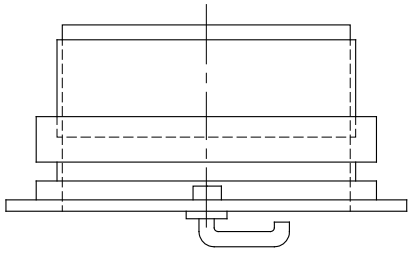
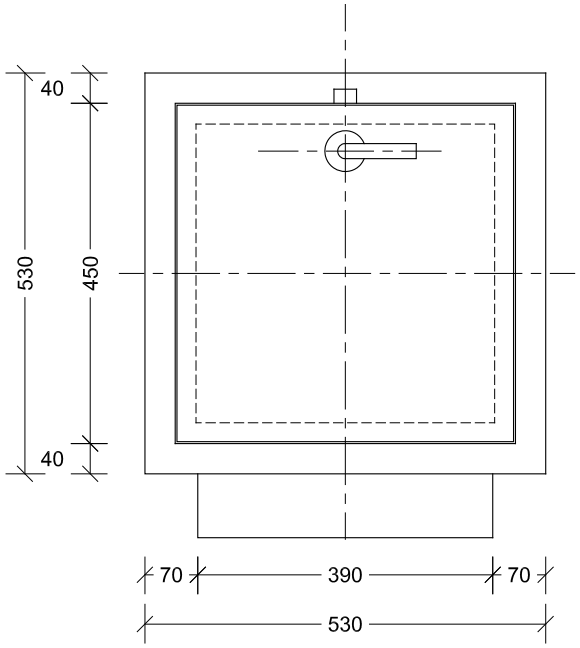
DRAWING No: DM009-CHUTEVCL NSW

REV -



PLAN
SCALE 1:10



FRONT VIEW
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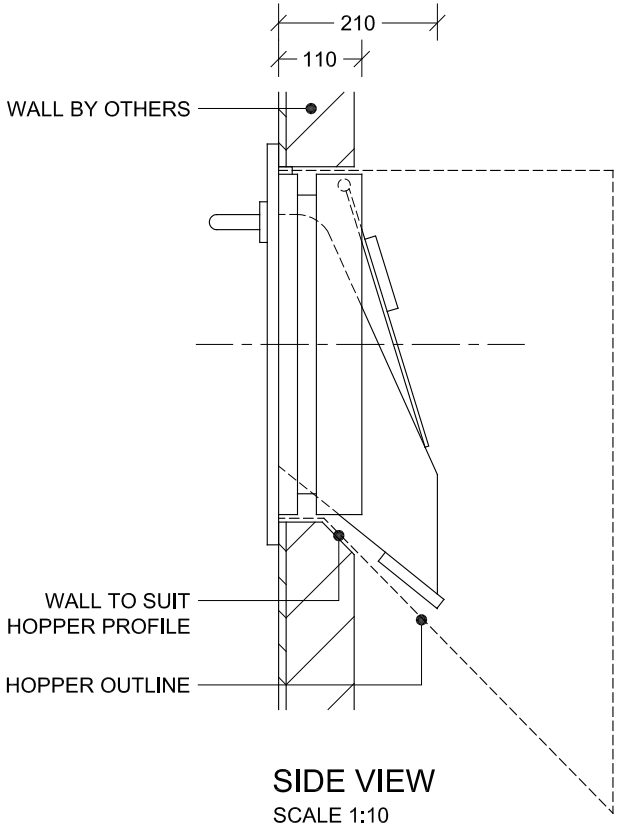
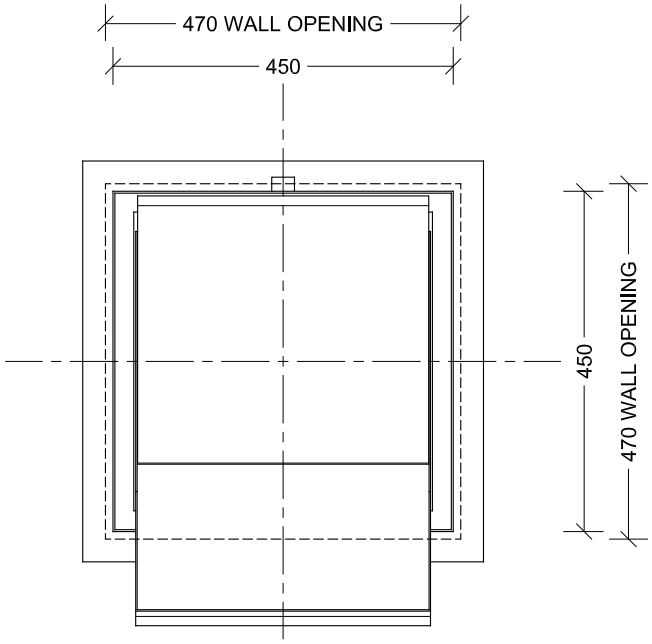


SIDE VIEW
SCALE 1:10



REAR VIEW
SCALE 1:10

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PROJECT: -
DATE: 04.11.13
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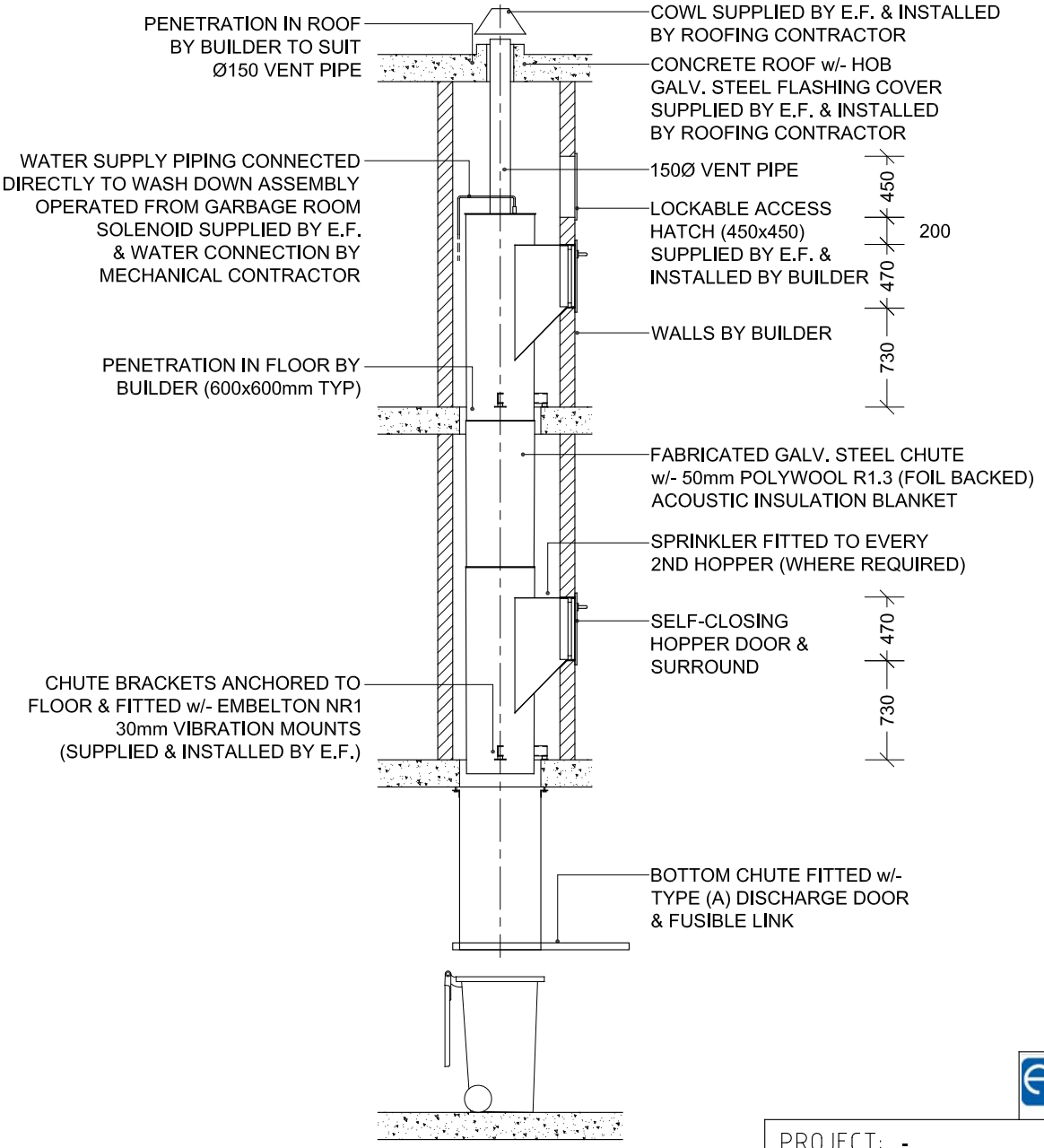
DRAWING No: DM009-HDOOR
SHEET 1 of 1
REV -



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PROJECT: -		
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SCALE 1:50		
DRAWN: CK	DRAWING No: DM009-SECTION NSW	REV -
A4		

REV	DATE	REVISION DESCRIPTION	BY
–	— — —	ISSUED FOR COMMENT	–

EF51

This small footprint baler offers maximum volume reduction for minimum cost and floor space. It produces an excellent bale of cardboard up to 70kg. It can bale a range of materials including loose paper, cardboard and plastic film.

Benefits:

- Low height baler – easy to transport and install
- Produces up to 70kg bale of cardboard
- Automatic cycle saves labour time
- Door mounted tape cutter & easy tie system saves time
- User friendly push button controls
- Robustly constructed for long life
- CE Marked
- IP55 rated so machine can be situated outside

Product information

- HxWxD (mm): 2180x810x810
- Feed opening (mm): 540x720
- Weight (kg): 375
- Cycle Time (sec): 45
- Compaction force(T): 4
- Power Supply (V): 240
- Motor (kW): 1.1
- Noise Level (dBA) 65

Bale Dimensions:

- HxWxD (mm): 600x715x500
- Bale Weight (kg): Up to 70 (cardboard)

.

Standard EF51 is supplied with:

- Trolley for bale discharge
- 2 rolls of baling cord

Optional extras:

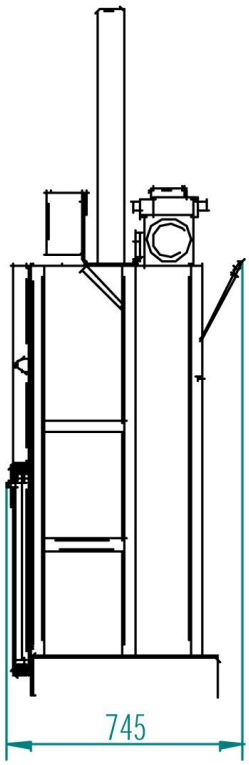
- Vandal proof control cover
- Extra trolley

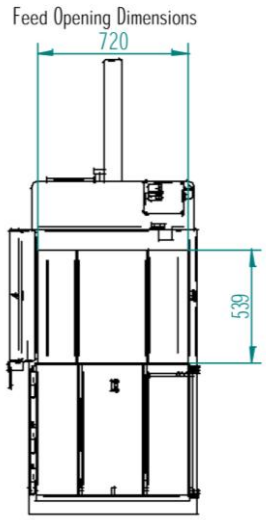
ELEPHANTS FOOT WASTE COMPACTORS PTY LTD **ABN** 70 001 378 294
Sydney Head Office 44-46 Gibson Ave Padstow NSW 2211 Ph: +612 9780 3500 Fax: +612 9707 2588
Website: www.elephantsfoot.com.au - Email: info@elephantsfoot.com.au
Offices in Victoria & Queensland - Toll Free 1800 025 073

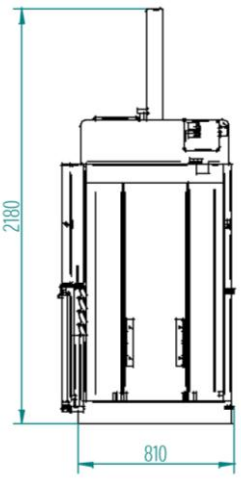
ELEPHANTS FOOT recycling solutions

Description	Specification
Machine Dimensions H x W x D (mm)	2180 x 810 x 810
Transport Height (ram dropped) (mm)	1940
Machine Weight (kg)	375
Feed Opening H x W (mm)	540 x 720
Bale Size H x W x D (mm)	600 x 715 x 500
Bale Weight (cardboard)	Up to 70 kg
Compaction Force	4 Tonnes
Motor	1.1kW
Electric Supply	240V, 13A plug
Cycle Time (sec)	45
Type of Tie/No. of ties	9mm Tape/ 2 off
Type/No. of Retaining Claws Front	Serrated edge / 2 off
Type/No. of Retaining Claws Rear	Removable / 2 off
Method of Removing Bales	Remove with Trolley
Depth of Chamber Below Feed Opening	600mm
Access for Forklift/Pallet Truck	Yes, Side
Electric Rating Standard	IP55
Electric Rating Optional	IP65
Sound Level	65 dBA

View From RHS







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Offices in Victoria & Queensland - Toll Free 1800 025 073

APPENDIX C

Waste Storage Area Diagrams

LEGEND

- Residual waste 1100L bin
- Recyclables 1100L bin
- Bin lifter
- Chute and compactor
- 240L bin storage
- Reusable waste and e-waste storage area
- Refrigerated waste storage
- Bulky waste and e-waste storage area
- Bunded oil storage area
- Cardboard compactor