



Operational Waste Management Plan

Proposed Cronulla High School Redevelopment

At 31 Bate Bay Road Greenhills Beach

On behalf of NSW Department of Education



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Revision Record

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Executive Summary

This document is an Operational Waste Management Plan (OWMP) developed for a proposed high school redevelopment to be located at the Cronulla High School.

A summary of the proposed waste management processes and equipment is outlined below.

- Equipment:
 - 1 x 3000L general waste bulk bin.
 - 1 x 1500L commingled recycling bulk bin.
 - 1 x 1500L paper recycling bulk bin.
 - A minimum of one receptacle for printer toner recycling will be located in the main administration office in Building L, additional receptacles to be considered based on operational requirement for each printer or printing room.
 - Smaller receptables / bins ranging from 60L-120L located throughout classrooms, staff areas and common / eating areas. Receptacles will be placed in a way that ensures the same amount of effort is required to separate recyclable material as it is to dispose of general waste.
 - E-waste will be stored in a suitable storage room until a quantifiable amount has been generated to enable recycling collection by appointed contractor.
 - Optional equipment: composting bins, battery recycling bins and refuse trolleys.
- Refuse collection:
 - All refuse will be collected by private contractors using front-loading RCV's.
 - Refuse collections will occur on-site via Bate Bay Road, within the loading area.
 - Servicing frequency is based on the existing collection arrangement of 3 services per week for general waste and one service per week for recycling.
- Refuse storage:
 - Bulk bins will be stored within the refuse area and will be adequately screened.
 - Bin washing facilities will be provided in close proximity to the storage area.
- Refuse transfer:
 - Minimal transfer will be required for bulk bins as the RCV will be positioned to service bins from the loading area.

- Refuse disposal:
 - Receptacles for storage of at least one day worth of waste and recycling will be provided within classrooms, staff areas and common areas.
 - Once a day, or as required, cleaners/waste caretaker will transfer refuse materials to the refuse area for disposal into the appropriate bulk bins.
 - An area with a power supply and data point for the purpose of installing bin weighing scales will be installed in a sheltered position close to the refuse storage area and on the likely travel path cleaners will take.
- Recycling Rate Tracking
 - A designated staff member or cleaner will be appointed to track refuse stream generation rate and subsequent recycling rate achieved.
 - Recycling rate results will be published, circulated and easily accessible such as via an e-newsletter, with the purpose of highlighting current rate and performance against benchmarked recycling rate target.
 - An achievable initial recycling rate target based on current performance shall be set at no greater than 40% by volume to encourage participation and buy-in and promote a sense of accomplishment on achievement. Recycling rate target will be reviewed at regular intervals; 6 monthly intervals recommended however, no greater than 12 months.
 - A baseline waste composition audit (contracted service or internal) is recommended at beginning of program to establish potential recoverable material percentage based on existing waste practices.

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1 Introduction

1.1. Background

TTM Consulting has been engaged by NSW Department of Education to prepare an OWMP to support the proposed Cronulla High School Redevelopment at 31 Bate Bay Road Greenhills Beach. The redevelopment is being pursued as development without consent under Part 5 of the Environmental Planning & Assessment Act 1979.

This OWMP has been prepared with the aim to achieve the prescriptive pathway 8B of the Operational Waste Credit 8, in accordance with Cardno documentation. These requirements are outlined in the OWMP and have been based on:

- 8B.1 Separation of waste streams
- 8B.2 Dedicated waste storage area
- 8B.3 Access to waste storage area

1.2. Scope

The content of this plan is intended to provide information in reverse order to the typical movement of waste streams from disposal to collection. The reverse order provides context for refuse collection, storage and transfer. Information about refuse disposal and disposal points is given for each use area within the development.

The items covered within the report are explained in Table 1.1. The key information for Council approval can be found in Section 2.

Table 1.1: Scope Items

Item	Explanation
Refuse streams	Identification of refuse streams and anticipated development refuse volumes to be produced
Refuse separation	Recommendations for appropriate segregation methods for each refuse stream
Refuse collections	Assessment of refuse collection vehicle (RCV) access and manoeuvring
Refuse storage	Detailed analysis of refuse storage facilities and design
Refuse transfer	Assessment of refuse transfer between refuse storage and collections areas
Refuse disposal	Recommendations for refuse disposal within the development
Refuse management equipment	Identification of recommended and optional refuse management systems and equipment
Refuse management operations	Recommendations for operational efficiency and ongoing management, including refuse minimisation, tenant education and safety
Building design	Recommendations for design of refuse management facilities

Detailed information including refuse calculations, site plans and drawings, recommended refuse management equipment and system specifications, common refuse signage as well as a list of terms and abbreviations are provided in the appendix.

The recommendations in this report relate to the operational phase of the development. Additional requirements for refuse management during or after demolition or construction phases are not included and require a dedicated plan.

1.3. Regulatory Considerations

1.3.1. Council’s Refuse Planning Scheme

Per advice from Sutherland Shire Council, the council currently does not have specific requirements for a school within the Sutherland Shire DCP 2015. TTM has referred to council requirements outlined in the Sutherland Shire DCP 2015 Chapter 25 – B5 Business Development – Waste from Industrial, Commercial and Educational Establishments. Table 1.2 demonstrates the refuse management items addressed to align with these requirements.

This plan satisfies the Sutherland Shire DCP 2015 requirements by providing the following information:

- Type and quantity of refuse materials that would be generated during the occupancy of the proposed development.
- Refuse collection, storage, transfer and disposal arrangements during occupancy of the completed development.
- Recommended operational requirements for the operational phase of the development, and design requirements for the building and refuse management facilities.

Table 1.2: Waste Management Plan Compliance Checklist

Item	Controls	Comments / Compliance
1.	A waste storage area is to be provided for all developments to store bins for general waste and recyclables.	Complies – See section 4 for detail
2.	Waste storage areas must not be within: a. the front setback; or b. the parking area; or c. the landscaping area; or d. within 3 metres of the waterway; and must not interfere with maneuverability, efficiency and safety of site access.	Complies – See section 4 for detail
3.	Developments must be designed so that bins do not need to be wheeled more than 75 metres.	Complies – Bins to be serviced from storage area.

4.	The location and design of the waste storage area must not detract from the amenity and character of the streetscape.	Complies – See section 4 for detail.
5.	Waste and recycling facilities must be designed to prevent litter and contamination of the stormwater drainage system.	Complies – See section 4 for detail.
6.	Bin storage and access requirements should take into consideration the future servicing requirements of the building.	Complies – Anticipated changes include introduction of further stream separation.
7.	Signage in waste storage areas must be encouraged and explain Council requirements for the separation of recyclable material and waste. Standard bin bay signage is available at cost through Council’s Waste Services.	Complies – Details throughout this OWMP.
8.	A tap must be provided in close proximity to the bin room/area	Complies – See section 4 for details.
9.	A floor waste trap connected to the sewer shall be provided within the bin room area. Stormwater shall not be permitted to enter this floor waste trap.	Complies – See section 4 for details.
10.	Commercial and industrial premises require waste storage areas for 240L and/or 750L garbage bins and 240L recycling bins, having regard to the size of development and intensity of use.	N/A Educational establishment only.
11.	The site and driveway must accommodate waste collection vehicles used by the garbage service provider.	Complies – Dimensions of driveway unchanged.
12.	Containment measures must be applied to all developments to prevent water pollution in the event of a spill of any liquid (other than rainwater).	Complies – See section 4 for detail.
13.	The floors of all new industrial and commercial premises developments must either be sunken or fall to the rear and away from exit points such as doorways. The joint between the floor and wall must be sealed such that in effect a container is created to function as a secondary containment measure within the building/unit.	N/A Educational establishment only.

14.	In the case of existing structures/buildings where an industrial or commercial change of use is proposed, alternative measures must be employed to achieve the objective to have in place secondary containment of liquids. These developments will need to employ measures such as containment drains and blind pits or containment humps (consider OH&S), to ensure the risk of pollution of stormwater is eliminated.	N/A
15.	50% of units in multi-unit industrial/commercial premises must be fitted out with drains and appropriately sized blind pits to accommodate wet processing operations to facilitate connection to the Sydney Water Sewer System under a Trade Waste Agreement. The fall of the floor of these units must be made to accommodate such an installation while still ensuring secondary containment.	N/A Educational establishment only.
16.	Any development that handles hazardous, industrial or group A liquid waste must dispose of these wastes in accordance with the NSW Tracking Requirements prepared by the EPA.	N/A No dangerous goods present on site.
17.	Any development must store and handle dangerous goods in compliance with the requirements of the Occupational Health and Safety Act 2000, the Occupational Health and Safety Regulation 2001, the Explosives Act 2003, the Explosives Regulation 2005, the Radiation Control Act 1990 and the Radiation Control Regulation 2003.	N/A No dangerous goods present on site.
18.	The NSW Workcover Authority Code of Practice 2005 – ‘Storage and Handling of Dangerous Goods’ outlines control measures focused on physically containing the hazard and risks posed by dangerous goods and provides practical guidance to occupiers of premises on the safe storing and handling of dangerous goods.	N/A No dangerous goods present on site.

1.4. Site Location

The site is located at 31 Bate Bay Road Greenhills Beach, as shown in Figure 1.1. The site has road frontages to Captain Cook Drive, Elouera Road and Bate Bay Road, with the latter utilised for the service vehicle access. The site description is Lot 1 on DP815804 and is currently operating as an existing educational facility.

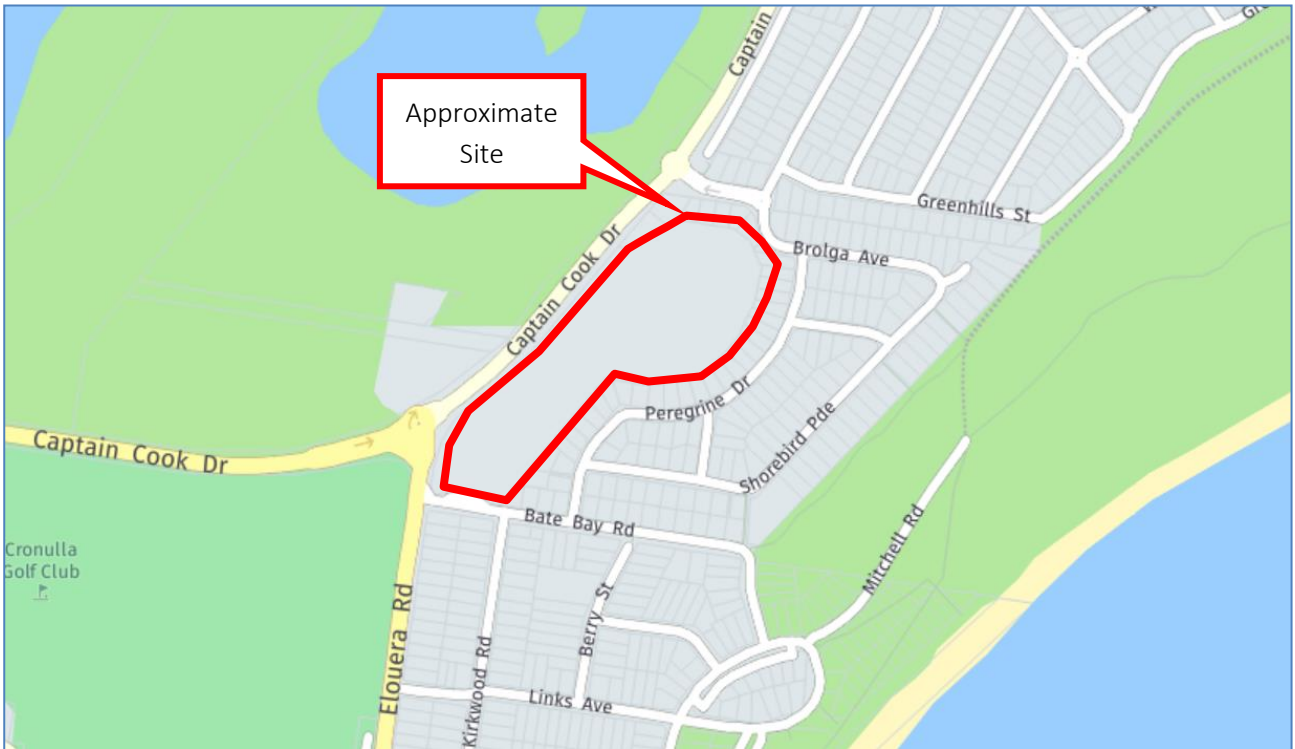


Figure 1.1: Site location



Figure 1.2: Site location

1.5. Existing Waste Arrangements

TTM has obtained the existing waste collection arrangements for site from the school / project team and are as follows:

Table 1.3: Existing Arrangements

Item	Arrangement
Existing Student numbers	<ul style="list-style-type: none"> • 1,309 students
Proposed Student numbers	<ul style="list-style-type: none"> • 1,002 students
Existing Waste Collection Area	Refer to Figure 1.2 above
Existing Waste Generation (Bin Numbers and Collections)	<ul style="list-style-type: none"> • 1x 3,000L bulk bin – general waste –3x weekly collection • 1x 3,000L bulk bin – commingled recycling – weekly collection
RCV type	Front-lift

1.6. Development Summary and Refuse Profile

The development consists of an existing educational facility (school) with 10 buildings (A to K) and demountables. The buildings include administration offices, classrooms, library, communal halls, canteen areas and outdoor areas. Two new buildings are proposed as part of the redevelopment (L & M). The school currently has 1309 enrolled students (at July 2022) and the redevelopment is expected to provide education for 1,002 students by 2036. School hours of operation are 8:45am to 3:10pm.

Table 1.4 demonstrate the anticipated volumes for general waste and recycling. All calculations / equipment requirements are based on the development schedules and generation rates as outlined in in Appendix A.

Table 1.4: Refuse Summary

Description	Measure	Quantity	General Waste (L / Week)	Commingled Recycling (L / Week)	Paper Recycling (L / Week)
Buildings	m ² GFA	10,768	8,076	1,346	1,346

2 Refuse Management

This section describes the arrangements for the collection, storage, transfer and disposal of refuse within the development. This includes associated bin quantities, storage capacities, equipment details, collection frequencies and site access details.

2.1. Refuse Collection

All refuse from site is deemed commercial and will be collected by private refuse collection contractors.

2.1.1. Bin Quantities

Table 2.1 outlines the number of bins per collection. Noting that the equipment shown is considered a maximum volume, as waste volumes may vary according to the development occupants' attitudes to waste disposal and recycling, bin numbers and sizes may need to be altered to suit the building operation.

Table 2.1: Bin Arrangements

Refuse Stream	Bin / Equipment - Type or Size	Numbers of Bins / Items per Collection
General Waste	3000L	1
Commingled Recycling	1500L	1
Paper Recycling	1500L	1

2.1.2. Collection Cycle

Table 2.2 outline the vehicles and estimated collection frequencies or site entries required to service the site refuse. The type of vehicles allocated, and demand will be subject to final design and potential selection of volume reduction equipment. The figures demonstrated apply as a maximum demand.

Table 2.2: Estimated RCV Demands

Commercial Refuse Collections		Day 1	Day2	Day 3	Day 4	Day 5	Day 6	Day 7	Collections per Week
General Waste	Collection Days	☑		☑		☑			3
	Vehicle Type	FEL RCV		FEL RCV		FEL RCV			
Commingled Recycling	Collection Days		☑						1
	Vehicle Type		FEL RCV						
Paper Recycling	Collection Days				☑				
	Vehicle Type				FEL RCV				
Printer Toner Recycling	Collection Days	Ad-hoc basis							-
	Vehicle Type	Ad-hoc basis							
Hazardous Waste	Collection Days	Ad-hoc basis							-
	Vehicle Type	Ad-hoc basis							
Green Waste	Collection Days	Ad-hoc basis							-
	Vehicle Type	Ad-hoc basis							
Total Collections per Week		1		2		1			4

2.1.3. RCV Arrangements

No changes are proposed for service vehicle access and servicing frequency arrangements. Vehicular access for waste vehicles will all be facilitated via Bate Bay Road as per existing arrangements. All refuse will be collected onsite by a private contractor.

Due to the loading area arrangements, additional collection measures are required for servicing. This includes out of hours servicing when minimal pedestrians and cars, potential traffic controls and additional personnel to act as a spotter when a driver is reversing, in accordance with TTW traffic engineers recommendations. It is noted that contractors will have their own risk management controls and procedures prior to collections.

Further detail on servicing arrangements and service vehicle manoeuvring can be found in the TTW traffic report.

2.2. Refuse Storage

A dedicated area for general waste and recycling will be stored in bulk bins in the refuse area located between buildings C and M, as demonstrated on the development plans in Appendix B. The refuse area is suitably sized to accommodate the waste generated and number of bins proposed based on standard storage and collection methods.

The caretaker will be responsible for cleaning the bins after collections. Bin washing facilities such as a hosecock and tap should be provided in close proximity to the refuse area, along with appropriate drainage. Staff and cleaners are able to access all bins without the need for rotation.

Storage of infrequently generated waste such as bulky items and electronic waste should be arranged with the caretaker.

2.3. Refuse Transfer

Each classroom and staff /common / eating areas will be supplied with adequate space for storage of at least one full day accumulation of refuse. At a minimum, receptacles for general waste, comingled recycling and separate paper recycling will be provided. Printer toner recycling receptacles will be placed in the main administration office but also in other printing rooms as operationally required. Typically, schools utilise up to 60L bin receptacles within the classrooms. These waste and recycling bins are placed within close proximity to classroom doors, desk areas, eating and washrooms. Several larger 240L / public place bins should be placed around the common areas such as playground and eating areas.

An area with a power supply and data point for the purpose of installing bin weighing scales such as the Foresight OSAT Waste Metering System will be installed in a sheltered position close to the refuse storage area and on the likely travel path cleaners / caretaker will take. Similar systems may be installed with barcodes placed on bins that are scanned before weighing, this data is then used to identify high waste generating area. Cleaners or caretakers will weigh each refuse stream before disposal, results will be automatically recorded to maintain system integrity.

On completion of each day, or as required during the day, the caretaker / cleaners will transfer the waste and recycling from each room and the common areas and decant into the appropriate bulk bins, after weighing, in the refuse area (see Appendix B).

Refuse trolleys or bin lifters to reduce manual handling. Caretakers / cleaners should avoid transferring over long distances, steps/bumps, steep grades, blind corners and through car parking circulation aisles.

2.4. Refuse Disposal and Separation

A minimum level of separation from the general waste stream of comingled recycle, paper, printer toner and e-waste will be undertaken. Ongoing waste minimisation and management review may identify the requirement for further stream separation such as food organics which may be composted and reused on site in educational activities.

The tables in this section summarise general recommended disposal arrangements for frequently generated and infrequently generated refuse for the development. Frequently generated refuse considers material streams that are generated in high volumes for any given period and require significant capacity for storage prior to collections. Infrequently generated refuse includes material streams that that are generated in relatively low volumes, and where minimal provision for storage can be easily managed by collection frequency.

2.4.1. Frequent Waste Streams

Table 2.3: Disposal of Frequently Generated Streams

Refuse Stream	Disposal Details
WASTE	
General Waste	<p>General waste should be collected in a dedicated receptacle within the allotted space and bagged or wrapped prior to disposal. Operationally, general waste should be bagged and weigh approximately 3kg or less and not exceed the dimensions of the waste receptacles.</p> <p>Disposal At a minimum a waste bin up to 60 L capacity should located in staff rooms and classrooms. Waste bins should be accompanied by a recycling bin in order to facilitate separation of general waste and recycling. Wastes from workshops, craft rooms etc. may include larger amounts of waste. All waste bins should be lined with plastic bags. Bags should be tied before removal. An equivalently sized recycling bin should also be provided.</p> <p>Transfer Waste is collected by staff / cleaners and placed in movable bins or trolleys within a waste compartment. The material is then transferred to the refuse rooms for final disposal into (bulk) bins</p>
RECYCLING	
Commercial Comingled, (including glass, aluminum, steel cans, tins, paper, small cardboard, semi rigid plastics)	<p>Recycling should be collected in a dedicated receptacle to ensure separation from the waste material and must not be bagged.</p> <p>Disposal Recycling largely consists of clean paper (and cardboard) which can be collected separately from comingled recycling if large quantities are produced. In addition, comingled recycling may originate from classroom and eating areas where food is consumed.</p> <p>Transfer Recycling is collected by staff / cleaners and placed in movable bins or trolleys. The material is then transferred to the refuse rooms for final disposal into (bulk) bins. Items for recycling must not be bagged and disposed in loose form.</p>
Paper Recycling	<p>Disposal Large quantities of clean paper may be produced by offices and classrooms. This material can be collected separately from comingled recycling. There should be allowance for a bin within the immediate areas and preferably within proximity to photocopiers or printers. Subject to the occupant's operations, smaller bins may also be placed in multiple locations or at desks to be collected by cleaners during their normal cleaning duties. The paper material should be decanted into dedicated bins on the cleaners' trolleys or in the larger (80 L to 240 L bins) placed on each level.</p> <p>Transfer Staff / cleaners transfer material to the (bulk) bins in the refuse room in movable bins or trolleys. Larger (80 L to 240 L) bins placed on each level are exchanged as required empty bin from the refuse room.</p>

2.4.2. Infrequent Waste Streams

Table 2.4: Disposal of Infrequently Generated Waste Streams

Refuse Stream	Disposal Details
Organics / Food Waste	An alternate general waste disposal method, such as composting for organic waste, should be considered to reduce the total amount of general waste produced to avoid going to landfill. Composting can be arranged with staff as part of education programs with assistance of the waste caretaker / cleaner. It is recommended that organic / food waste disposal is considered and separated at the source. Separate bins or designated composting areas should be provided. Further information can be found in Appendix C.
Green Waste	Green waste is common for schools surrounded by gardens or landscaping areas. A green waste bin may be considered if larger quantities are produced. The grounds caretaker is typically responsible for removal and disposal of green waste, however and if the caretaker is not able to transport the green waste to a composting facility where required, private contractors should be engaged.
Secure Destruction Paper	Staff rooms / administration offices often produce secure destruction paper / confidential paper documents which need to be disposed separately from general recyclable cardboard / paper. Special 240L bins are typically placed within the offices for disposal of secure destruction paper. The bins can be collected directly from the individual rooms by the respective contractor and replaced by empty bins. Alternatively, staff / cleaners may take the bins to the refuse area prior to collection.
Hard Waste / Bulky Goods	Hard waste may be stored in the designated storage rooms. Collections can be coordinated, and hard waste / bulky goods moved to the loading area for removal prior to collection. When storing bulky goods in a loading area, it is recommended that items are placed on a pallet for easy loading via pallet a jack or forklift onto the collecting vehicle. Unless otherwise instructed by council, charitable organisations may be contacted by the waste caretaker / cleaner as a mode for collections.
Hazardous Waste (paints, batteries and cartridges) Electronic Waste	Separate receptacles / areas should be provided for storage of hazardous and e-waste. Staff / waste caretaker will make arrangements for the disposal of specialised or hazardous waste and electronic waste such as recycling of toner cartridges and batteries. Please refer to local council and state government websites for disposal options. It is an expectation that staff / waste caretaker assists with disposal of hazardous, electronic or liquid waste and any paint or chemicals as required. Hazardous waste must be handled with due care, separated and securely stored for collection by a specialist waste contractor. Please refer to local council and state government websites for further information.

3 Recommended Operational Requirements

3.1. Operational Equipment Summary

Equipment required or suitable for use as part of the operational phase of the development is outlined in Table 3.1. Lists of equipment, equipment suppliers and refuse management service providers for use during the operational phase of the development can be found in Appendix C.

Table 3.1: Equipment Schedule

Description	Quantity	Notes
Bin Weighing Scales / Waste metering system	1	See Appendix C.2
General Waste Bins	1	3000L bulk bin
Comingle Recycling Bins	1	1500L bulk bin
Paper Recycling Bins	1	1500L bulk bin
Printer Toner Recycling Bin	1	Receptacle supplied from recycling contractor typically a large cardboard box
Small receptacles	TBD	Supplied as and if required TBD prior to, or, during operation – see Appendix C.1
Public space bins	TBD	
Secure Paper bins	TBD	
Hazardous waste	TBD	
Refuse Trolleys	TBD	
Organic / composting bins	TBD	
Green Waste	Subject to operational requirements	

3.2. On-going Management

Responsibilities must be assigned for all on-going refuse management operations. A designated staff member will be appointed to track refuse stream generation rate (via recorded stream weights) and subsequent recycling rate achieved, this person will be responsible for delegating all waste management, improvement activities and maintaining system integrity. The following lists (Table 3.2 to Table 3.8) are designed to help managing responsibilities and monitor the refuse operations in order to maintain efficient services and a safe environment.

Table 3.2: General Refuse Management Checklist

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

3.2.1. Safety

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

Table 3.3: Safety Checklist

Objectives	Checked	Remarks
Abiding by all relevant occupational health and safety legislation, regulations and guidelines to ensure site safety for visitors, staff and contractors.		
Assessment of any manual handling risks and preparation of a manual handling control plan for waste and bin transfers.		
Provision of equipment manuals, training, health and safety procedures, risk assessments and personal protective equipment to staff / contractors in order to control hazards associated with all waste management activities.		

3.2.2. Signage

All receptacles, bins and other refuse management equipment will have adequate signage. Standard signage will be provided in and around waste collection and storage areas and will be colour coded in accordance with AS 4123.7–2006 Mobile waste containers (see Appendix D).

Table 3.4: Signage Checklist

Objectives	Checked	Remarks
Ensuring compliance of signage with government local council regulations.		Use signage provided by Council if available
Ensuring that labelling on bins, refuse room etc. is appropriate and clear and easy to read and updated if required.		

3.2.3. Cleaning and Maintenance

Regular cleaning and maintenance of all refuse management facilities is important to maintain a safe and hygienic environment for visitors, staff and contractors.

Table 3.5: Cleaning and Maintenance Checklist

Objectives	Checked	Remarks
General cleaning of all refuse holding and transfer areas including <ul style="list-style-type: none"> • Refuse bins, rooms and storage areas • Refuse transfer areas • Any other refuse management equipment 		Frequency depends on refuse generation and building operation.
Coordination of specialised cleaning contractors as required.		
Maintenance and servicing of refuse management equipment as per schedule.		Frequency depends on equipment and building operation.
Coordination of specialised equipment contractors as required.		

3.2.4. Refuse Minimisation

Refuse minimisation is an important part of any site operation. At a minimum, the following should be implemented. Additional refuse minimisation options can be found in Appendix C.

A baseline waste composition audit should be undertaken by an external contractor, this will highlight the contents and make-up of each refuse stream and help shape future waste strategies and opportunities for improvement. The specific operational activities to improve waste minimisation will be governed by the result of the waste composition audit however, the appointed waste caretaker or appropriate personnel will develop an action plan to improve performance outcomes based on audit recommendations.

Refuse minimisation requires regular reviewing to ensure operational sustainability of refuse volumes, equipment and economic feasibility. It is recommended that refuse weights and movements are noted and reviewed. An external review is usually conducted 12 to 18 months after the implementation of the plan.

Table 3.6: Refuse Minimisation Checklist

Objectives	Checked	Remarks
Conduct baseline waste composition audit		
Develop action plan based on audit results		
Regular review of material quantities to avoid over-ordering.		
Consideration of secondary and recycled materials where possible.		
Encouraging refuse minimisation through education and signage (see below).		
Reduce refuse through continuous monitoring and review (see below).		

3.2.5. Education and Communication

On-going education is important to ensure people continue to use the facilities as originally intended and optimise participation or buy-in to recycling improvement strategies.

The designated staff member for tracking refuse stream generation rate will ensure adequate communication of benchmark recycling rate and audit results.

The designated staff member will ensure ongoing recycling rate results will be published, circulated and easily accessible such as via an e-newsletter, with the purpose of highlighting current rate and performance against benchmarked recycling rate target.

Table 3.7: Education and Communication Checklist

Objectives	Checked	Remarks
Communication of refuse management arrangements to staff and contractors as required.		
Communication of benchmarked recycling rate		
Communication of recycling rate performance		

3.2.6. Monitoring and Review

Regular monitoring and inspections of waste and related equipment and facilities from the development should be conducted by building management or designated staff for maintenance and sustainability.

Waste composition audits are recommended on a routine (12 monthly) basis to identify potential improvements in the recycling processes taking place. Audits may be undertaken by external contractor or internally by visual inspection during on-site waste management handling activities. For example, cleaners may observe contents of waste receptacles when decanting caddies in larger bins and recording results, this method is less accurate than a comprehensive audit however, gives immediate indicative results and may be undertaken on an ongoing basis.

Table 3.8: Monitoring and Review Checklist

Objectives	Checked	Remarks
Continual monitoring of equipment uses and scheduling to ensure best operational outcomes.		
Regular review of refuse management equipment and facilities such as bin volumes, refuse storage capacities and stormwater management arrangements.		
Coordinate routine auditing of waste streams		
Develop and update action plan based on audit outcome		

4 Recommended Design Requirements

This section lists general recommended design requirements for the building and refuse management facilities. They should be considered for optimal refuse management within the development, and to comply with relevant regulations and Council requirements.

4.1. Bin Storage and Bin Servicing Point

The RCV's will access the servicing point as described in Section 2. The bin service point will have the following features:

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

4.2. Refuse Area

The refuse area will have the following features in order to minimise odours, deter vermin, protect surrounding areas, and make it a user-friendly and safe area:

- The area must be of adequate dimensions to accommodate all waste containers, and any compaction equipment installed, and allow easy access to the containers and equipment for users and servicing purposes.
- The floor must be constructed of concrete finished to a smooth even surface, coved to a 25mm radius at the intersections with the walls and any exposed plinths, and graded to a floor waste connected to the sewerage system.

- The floor waste must be provided with a fixed screen in accordance with the requirements of Sydney Water Corporation.
- Any doors must be of adequate dimensions to allow easy access for servicing purposes and must be finished on the internal face with a smooth-faced impervious material.
- Any fixed equipment must be located clear of the walls and supported on a concrete plinth at least 75mm high or non-corrosive metal legs at least 150mm high.
- The area must be provided with adequate natural ventilation direct to the outside air or an approved system of mechanical ventilation.
- A hose cock must be provided in or adjacent to the room to facilitate cleaning (see Section 4.3 below).

Additional refuse room considerations:

- Be insect and vermin proof.
- Be fire rated and ventilated in accordance with the National Construction Code – Building Code of Australia.
- The floors must be graded to fall to a drainage point.
- Drainage points must be connected to sewer in accordance with trade waste requirements.
- Not located adjacent to or within any habitable portion of a building or place used in connection with food preparation (including food storage).
- Permit unobstructed access for removal of the containers to the servicing point.
- Will be attractively designed to minimise their visual impact on the surrounding areas.
- Does not have any steps or lips.
- Is enclosed on all sides except for the gated entrance to ensure bins are not visible from a public place, neighbouring properties, passing vehicles or pedestrian traffic external to the site.
- Is of sufficient size to accommodate the bins with sufficient clearance around the combined bin area.
- Is positioned away from entrances to shops or residential premises.
- The height of the bin storage area allows for waste bins to be opened and closed.

4.3. Bin Wash

A bin wash-down facility should be provided within or adjacent to the bin storage area. It will have the following features:

- Constructed hardstand with a solid concrete base.
- Roofed and designed to prevent entry to rainwater.

- Graded to fall to a drainage point that is connected to sewer in accordance with trade waste requirements.
- Provided with a hosecock for cleaning.
- Is in a purpose-built storage area which is air locked, fly and vermin proofed, and used solely for the storage of waste.
- Is in a well-ventilated portion of the basement and not within 10m of an opening to a food premises or food handling area.

4.4. Bin Carting

The bin carting route will the following features:

- Is via the hard stand pathways.
- Allows bins to be easily manoeuvred.
- Is clear of speed control devices or similar provisions.
- Does not impede traffic flow.
- Does not extend through any habitable parts of a building or food premises.
- Does not have any lips, stairs or steps for bins to be manoeuvred easily.

4.5. Storm Water Prevention and Litter Reduction

Designated staff / cleaners are responsible for on-site storm water pollution and litter reduction. To limit the impact on the environment and site, the following measures should be taken into account:

- Provide adequate signage to promote litter control.
- Provide sufficient refuse bins in appropriate areas.
- Prevent unauthorised entry to waste areas.
- Monitor waste and prevent waste overflow.
- Promote best practices for waste minimisation.
- Install litter traps in car parks for any unwanted discharge.

4.6. Ventilation

Natural or mechanical ventilation must be provided to waste storage areas unless refrigerated below 4°C. Natural ventilation means unobstructed, permanent openings direct to external air no less than one-twentieth (1/20) of floor area. Mechanical ventilation requires a minimum rate of 100L/sec and 5L/m² exhaust rate.

Appendix A Detailed Refuse Calculations

Due to limited waste generation information located within Council’s planning documents, TTM have conducted a first principles assessment based on the existing waste currently generated on-site. This is also generally in accordance with the City of Sydney’s Guidelines for Waste Management in New Developments and the NSW Better Practice Guide. The generation rates are outlined in Table A.1.

Table A.1: Generation Rates

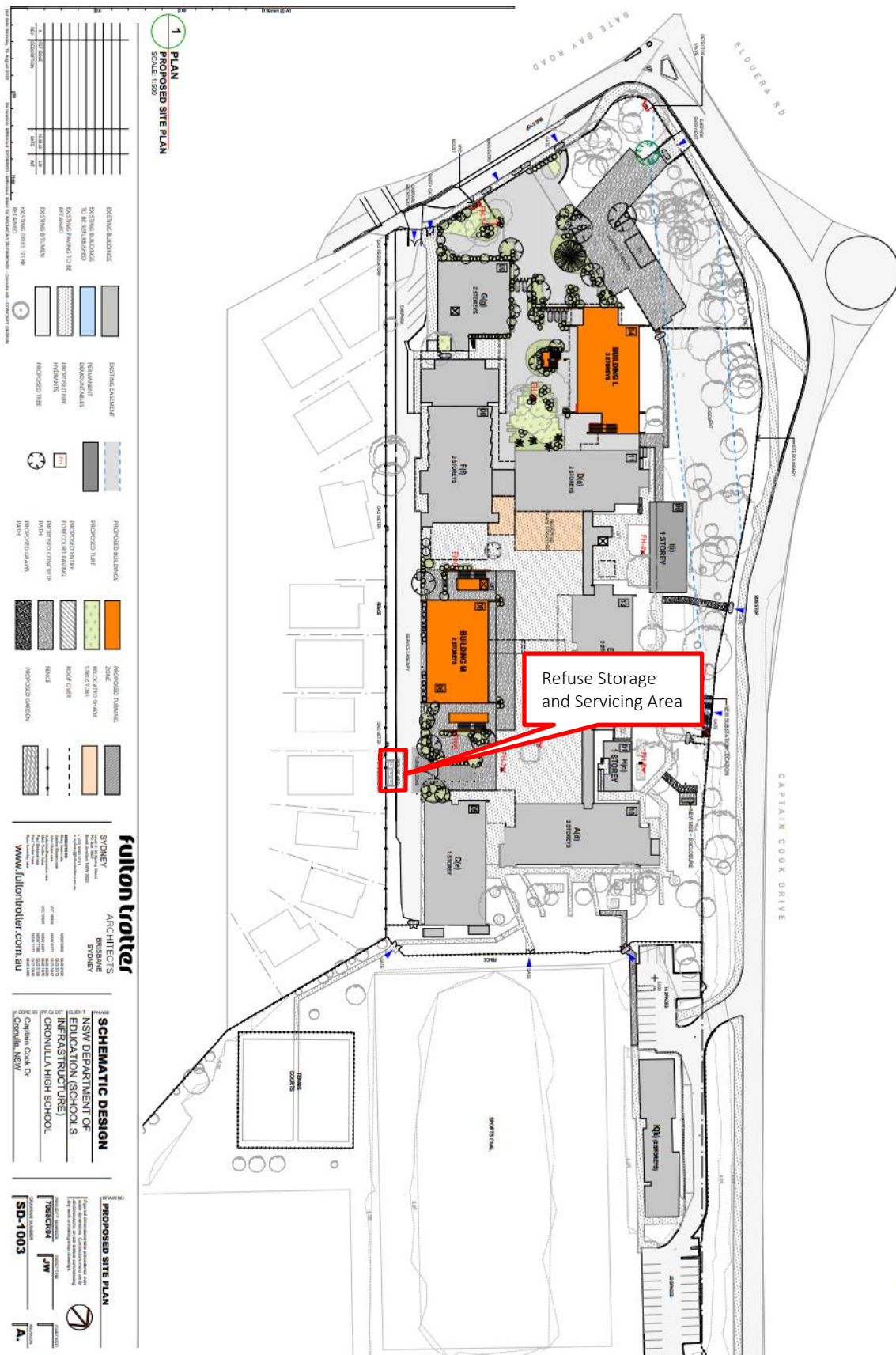
Type	Measure	General Waste	Commingled Recycling
Cronulla High School	L / 100m ² GFA / day	15	5

Waste and recycling volumes indicated do not include compaction and can be further reduced if streams are separated (ie food waste, cardboard and paper etc). Green waste and hazardous waste volumes have not been considered in any calculations as these can vary based on school’s attitude to waste disposal. All volumes are calculated based on a 5 day per week operation. The refuse calculations are shown in Table A.2.

Table A.2: Refuse Calculations

Type	Description	Measure	Quantity	General Waste (L/Week)	Commingled Recycling (L/Week)	Paper Recycling (L/Week)	
Existing Buildings	Building A	GFA(m ²)	1463	1097	183	183	
	Building B	GFA (m ²)	534	401	67	67	
	Building C	GFA (m ²)	643	482	80	80	
	Building D	GFA(m ²)	1382	1037	173	173	
	Building E	GFA (m ²)	1352	1014	169	169	
	Building F	GFA (m ²)	776	582	97	97	
	Building G	GFA(m ²)	799	599	100	100	
	Building H	GFA (m ²)	110	83	14	14	
	Building I	GFA (m ²)	232	174	29	29	
	Building K	GFA(m ²)		0	0	0	
	Demountables	GFA(m ²)	1234	926	154	154	
New Buildings	Building L	GFA (m ²)	1011	758	126	126	
	Building M	GFA (m ²)	1232	924	154	154	
Total (L / Week)			10768	8076	1346	1346	
Volumes per Day (L / Day)				1141	192	192	
Volumes per Collection (L / Collection)				2307	1346	1346	
Collection and Equipment Details		Collections Per Week		3	1	1	
		Storage Capacity		2 Days	5 Days	5 Days	
		Equipment Size		3000L	1500L	1500L	
		Equipment Quantity		1	1		
		Total Raw Area	7.75m ²				
		Refuse Storage Area	Approx. 8m ²				

Appendix B Site Plans and Drawings



Appendix C Systems and Specifications

The information in this section is included to demonstrate options for equipment, waste minimisation and potential suppliers and should not form part of assessment outside of providing details for the equipment specified throughout the waste management plan.



C.1 Typical Refuse Bins

Bin Types	Waste Streams	Examples	Information
60L-80L bins	General waste, recycling, food waste, paper / cardboard		<p>Various options and sizes available. Tenant to supply depending on preference and space available.</p> <p>Example: 60L metro bins Dimensions approx. 559 x 279 x 635mm (L x W x H)</p> <p>Examples: https://www.spacepac.com.au</p>
240L bins	General waste, paper, recycling, green waste		<p>Dimensions approx. 740 x 580 x 1080mm (L x W x H) (dimensions may depend on contractor)</p> <p>Examples: http://www.justwheeliebins.com.au, http://wheeliebinsonline.com.au</p>
3000L bins	General waste, recycling, paper / cardboard		<p>General Dimensions: 140mm 1500mm 2100mm (H x W x D) (dimensions depend on contractor)</p> <p>Examples: https://www.suez.com.au/en-au/our-offering/businesses/how-can-we-help-you/waste-management/equipment/bins-and-containers</p>
Common area / public place bins	General waste, recycling (paper / cardboard, glass), food waste		<p>Various types and sizes available</p> <p>Examples: Public Litter Bins https://draffin.com.au Solar litter bin with compactor https://www.solarbins.com.au/features/big-belly-solar-bin</p>

C.2 Typical Refuse Management Equipment


Systems	Waste Streams	Examples	Information
Bin Weighing Scales	All streams		<p>Scales are used to capture all outgoing refuse weights for ongoing analysis of recycling rates.</p> <p>Examples https://www.osat.info/</p>
Organics Household Composting, Worm Farm, Digesters	Food waste / organics		<p>Organics / food waste separation, composting and digesting, household-type and commercial grade equipment available</p> <p>Examples Urban Composter https://www.urbancomposter.com.au Closed Loop https://closedloop.com.au/upcycling-products ORCA https://www.feedtheorca.com</p>
Trolleys	General waste, recycling, food waste, paper / cardboard		<p>Assisted manual transfer of refuse</p> <p>Examples: https://rubbermaidcommercial.com.au/products/waste-management/mega-brute https://www.materialshandling.com.au/products/deluxe-compact-cleaning-carts</p>

C.3 Refuse Transfer and Disposal Methods

Method	Examples	Description
Manual transfer / disposal		<p>Manual transfer is simply the process of physically carrying waste bags, food waste receptacles or recycling boxes and crates without assistance.</p> <p>From a safety perspective, this is acceptable for small quantities and initial disposal into refuse chutes, refuse compartments or, in the case of ground level activities, directly into the refuse storage room.</p> <ul style="list-style-type: none"> • Waste material should be bagged prior to any transfer from apartments, suites, offices, back-of-house areas etc. to waste storage compartments or rooms. • Food waste should be placed in receptacles such as a caddy style bin or bucket which will not allow leakage during transfer. • Recycling material should be placed in boxes or crates prior to transfer. • Cardboard and paper items can be placed within another cardboard box for transfer. <p>Examples: https://www.alamy.com</p>
Assisted manual transfer		<p>Assisted manual transfer includes the use of any wheeled container, wheelie bin or trolley with a capacity to carry refuse items with a combined weight of 20kg and above. The equipment bears the weight of the material, but it still requires physical force and or balance to move the bin or trolley.</p> <p>From a safety perspective, this type of equipment should be a minimum requirement for transfer of material greater than 20kg and when transferring between individual levels to the refuse storage room or loading areas. Use of enclosed or caged equipment will also eliminate 'litter or leakage trails' which can occur when using open or unsealed equipment.</p> <p>Examples: http://www.justwheeliebins.com.au, https://rubbermaidcommercial.com.au, https://www.materialshandling.com.au</p>

C.4 Refuse Minimisation Options

Refuse Minimisation Options – Waste



Systems	Description
Composting	<p>Food waste composting is an option of reducing the amount of general waste going to landfill where organic waste can create methane gas due to anaerobic digestion, which contributes to global warming. Systems of different scales exist. Small benchtop composters for individual tenancies or offices are shown below.</p> <p>The process usually involves breaking down organic food scraps through natural processes. This includes systems such as worm farms or composters where microbes break down the food waste, with or without the aid of compost additives. The composted products are rich in nutrients and good bacteria, and they can be added to flower bed or gardens.</p> <p>Most food wastes and other organic (garden) material can be composted including meat, fish, vegetables, fruit, dairy, coffee or wilted flowers. However, large bones, excessive liquids such as cooking oil or seafood shells should not be placed in the composters.</p>  <p>Sources: https://www.urbancomposter.com.au, https://closedloop.com.au/upcycling-products,</p>

Systems	Description
	<div style="background-color: #f4a460; height: 20px; width: 100%;"></div> <h2 style="text-align: center;">How to manage waste at school</h2> <h3 style="text-align: center;">What is compostable, collecting food scraps and setting up composting and worm farming</h3> <p>Did you know?</p> <p>About half of what we throw into the garbage bin is food and garden waste!</p> <p>Mixed with the rest of our garbage, the potential of these organic materials is lost – they are usually wasted in landfills where they contribute to environmental problems like the greenhouse effect and water pollution.</p> <p>Food and garden scraps are too valuable to waste. Recycling your school's food and garden scraps on site not only saves energy (less trucks to have to pick up the material), but also provides a natural soil conditioner for your gardens.</p> <p>By turning your food and garden waste into compost you can make a difference to our environment, by –</p> <ul style="list-style-type: none"> • reducing the amount of waste you dispose • reducing the use of artificial fertilisers • improving your local soil quality • creating a more natural, healthier (and happier) place for your students <p>What is compostable?</p> <p>All food can be collected as well as paper food wrappings and paper bags. (The small amounts of meat in left over sandwiches shouldn't affect your composting system.)</p> <p>The benefits of composting</p> <p>Composting food and garden scraps helps to complete a natural cycle of life. Composting occurs naturally everywhere. As plants grow and eventually die, their nutrients are made available again by returning to the soil.</p> <p>1. Cut back on school waste and save money</p> <p>One major benefit of composting is that you will greatly reduce the amount of garbage your school throws away. Sending less waste to landfills is an effective way to reduce your environmental impact.</p> <p>Compostable food and garden waste can make up a significant percentage of landfill waste. Experts say that between 25 percent and 50 percent of the food we buy ends up being thrown away.</p> <p>Composting is one of many environmentally friendly ideas that can also save your school money. By composting your schools organic waste you can cut back on garbage disposal bills while helping the earth.</p> <p>2. Help reduce greenhouse gases</p> <p>Your school can have a direct effect on reducing greenhouse gases just by composting. Organic waste that is sent to landfills ends up buried, where sunshine and air cannot reach it. The result is decomposition that occurs in an anaerobic environment, which creates methane gas. Cutting back methane emissions, which are many times more effective at trapping heat than carbon dioxide, is a top priority in reducing greenhouse gas.</p> <p>3. Free organic fertiliser</p> <p>Composting gives you a free supply of organic fertiliser for your school garden. Compost as a fertiliser</p> <ul style="list-style-type: none"> • contains nutrients and microorganisms that your plants, shrubs, and trees will love • retains water in your soil, thereby reducing erosion • encourages nature to work for you • earthworms and many other beneficial creatures flourish in enriched soils. Their activities help release essential nutrients, which strengthen plants and increase their resistance to diseases <p>Mix your compost with your soil as you prepare your garden beds for planting. You can also use compost to top-dress the soil around the bases of perennial plants, trees, and shrubs.</p> <p>Put the benefits of composting to work for you by starting your school composting system. Composting is an easy and rewarding way to reduce your schools garbage and feed the soil.</p>

Systems	Description
	<p>Composting</p> <p>Things to consider before you start composting</p> <p>Who will manage the compost?</p> <ul style="list-style-type: none"> • Student ECO/Environment team • School caretaker/gardener • Teachers • Cleaner <p>Ensure that more than one person is responsible so there is always back up.</p> <p>How will the food for composting will be collected</p> <p>A food collection bucket should be placed beside every garbage bin.</p> <ul style="list-style-type: none"> • Collection buckets should be • 10 litre size (maximum) • should have a lid • should have a handle (a second hand tradesmen's bucket with a small hole cut into the lid is ideal save money by asking for donations within the school). <p>Clean signage on the bucket and education about what is compostable is essential</p> <p>Simple ideas for signage</p> <ul style="list-style-type: none"> • school colouring competition to custom make signs • Council can provide generic signs <p>Who does the collection?</p> <ul style="list-style-type: none"> • Bin monitors (senior students) • Bin committee • Caretakers • Environmental group or committee <p>Setting up the composting</p> <p>How many bins?</p> <ul style="list-style-type: none"> • A waste audit can be done to determine the number of bins required. (Council can assist with your audit. The audit can become part of your SEMP). • Alternatively start with a minimum of two bins and add extras as required. <div data-bbox="858 1234 1417 1787" style="text-align: right;"> </div>

Systems	Description
	<p>Worm farming Another way to use your valuable food scraps.</p> <p>What is worm farming? Worm farming is another great way to compost your food scraps. Worms will eat most of your kitchen waste and turn it into a high-quality fertiliser. Worm farming is great for people who live in units, high rises or have limited space or garden material. Worm farms don't smell, they don't take up much room and can be kept indoors.</p> <p>What type of worms will be in the worm farm? Composting worms, such as Tigers, Reds and Blues, are the only species that live, work and breed well in the rich, moist, organic environment of a worm farm.</p> <p>How many worms are needed to start a farm? You start a worm farm with about ½ kg or 2000 worms. The population doubles approximately every three months until the population reaches the capacity of the container. Worms are self regulating and will stop breeding once they reach the capacity of their container, as the older worms die off they will start breeding again.</p> <p>What worms like to eat? Worms like to eat most vegetables (except tomatoes, raw potatoes and peelings, carrot tops), they love fruit especially melon, pineapple and apple (they don't like citrus), they enjoy herbs (but don't like strong flavours like chilli, onion and garlic). Worms will also eat soaked and ripped cardboard, hair, tea bags and crushed egg shells.</p> <p>The worm farm In establishing and maintaining a worm farm you are looking after a living creature, as living creatures worms require three basics: 1) shelter, 2) food and 3) water. Worms are easy going so you can choose the style of worm farm best for you. Basically a worm farm is a series of stackable boxes made up of plastic, wood or any other lightweight, waterproof material (polystyrene boxes from the fruit shop are ideal). You can easily make your own worm farm or if you prefer you can purchase a worm farm from Hornsby Shire Council. If you are making your own worm farm, the base should have a solid floor to catch the run off or worm tea from the upper layers or trays. Layers stacked above the base layer need to have holes in them to allow run off to drip into the bottom tray and for the worms to move between layers.</p> <p>Sample worm farm available from Hornsby Shire Council</p>  <p>Easy steps to worm farming Step 1: Provide shelter - set up your worm farm. Place the worm farm in a shady place in your backyard or in a low light area on your balcony, worm farms can be kept inside if you like. Before adding your worms to the worm farm, you will need to provide them with bedding material to the second working tray. A combination of finished compost, leaves and paper works best as bedding. However a coir fibre brick for the bedding is provided in the worm farm kit - make sure there is enough to come up to the line. The bedding material should be moist before it is added to the first working tray of your worm farm. Make the bedding layer 10 to 15 cm deep. Spread worms out on the surface of the bedding and allow them to burrow. Leave the worms for a week to allow them to settle in. The worms will live in the bedding, wriggling from lower trays to the upper trays to eat the food.</p> 

Systems	Description
	<p>Step 2: Provide food – what and how to feed your worms</p> <p>When starting out, add a small amount of food to the first working tray. You may not be able to feed your worms all your food scraps in the first few weeks. Do not overfeed – about ½ kg per 2,000 worms per week is enough to keep them going. Once your worms start multiplying, you will be able to give them more food.</p> <p>To help the worms eat more, you can mash, blend or process food before adding it to the farm.</p> <div data-bbox="316 698 454 772" style="display: flex; flex-direction: column; gap: 5px;"> Second working tray First working tray </div>  <p>The worm farm will take a few months to get going - worms can consume their own weight in food each day!</p> <p>Remember, don't add too much food at once and only add more when most of the previous meal has disappeared.</p> <p>After you have fed your worms, keep their environment moist and dark by covering them with moist newspaper, a piece of underfelt/carpet or a hessian bag. You will only need to use your second working tray if/when the first working tray becomes full (keep in your garage or shed until this time).</p> <p>What worms eat</p> <p>Just like us, worms have their likes and dislikes. Worms will eat most of the scraps from your kitchen, with only a couple of exceptions.</p> <p>Worms like to eat...</p> <ul style="list-style-type: none"> • most vegetable and food scraps (they really like variety) • soaked and ripped pizza boxes /egg cartons • shredded and soaked cardboard • paper – ripped into small bits • hair • crushed egg shells <p>Worms don't like...</p> <ul style="list-style-type: none"> • onions – including garlic and shallots • citrus fruit • chillies • raw potato peelings <p>Worms are fussy about...</p> <ul style="list-style-type: none"> • meat • dairy foods • fatty foods <p>(Worms will eat these foods, but they can sometimes make the worm farm smelly and attractive to maggots, it's therefore best to avoid, or not add these foods at all.)</p> <p>Do not feed worms manure from animals or fruit/vegetables scraps which have recently been sprayed with pesticides as they could kill your worms.</p> <p>Step 3: Adding water</p> <p>Worms rely on moisture within the soil to maintain their body functions. It is essential to keep the worm farm moist – the consistency of a wet sponge, but not too moist or too dry, as the worms will die.</p> <p>Add water to the farm as required, this can simply be done by gently pouring a bucket full of water over the top (leave the hessian or newspaper cover in place). During periods of high temperatures you may need to "water" your worm farm every day.</p> <p>Remember to remove the liquid or "worm tea" in the bottom tray regularly. Leaving the tap open with a bucket or container under the tap to collect the worm tea is the easiest most convenient way to collect the worm tea.</p> <p>It is also a good idea if your worm farm is outside and there is a lot of rain as leaving the tap open will allow the farm to drain freely.</p> <p>The worm tea makes a great natural liquid fertilizer, full of nutrients. Mix the worm tea with water (1:10) to the colour of weak tea before feeding your plants.</p> <div data-bbox="906 1688 938 1711" style="display: flex; align-items: center;"> Tap  </div>

Systems	Description
	<p>Step 4: Harvesting</p> <p>Harvest the castings from the first working tray when the castings have reached 2cm above the moulded line. Stop feeding the worms for one week, remove the newspaper/hessian and remove the first working tray and empty. Rotate with the second (so this becomes the first working tray), put some food scraps in the top tray and cover. The worms will move up towards the food in the second working tray.</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <p>Second working tray</p> <p>First working tray</p> <p>Liquid collection tray</p> <p>Tap</p> </div>  </div> <p>How to use the worm liquid and castings</p> <p>The castings harvested from your worm farm can be</p> <ul style="list-style-type: none"> • mixed into compost and used in your “no dig” veggie garden • added to potting mix when potting plants (caution - if harvesting in spring and autumn you could get baby worms appearing in pot plants!) • applied around the drip line of plants (especially vegetables and herbs) when planting into your “no dig” veggie garden • applied around the dripline of native trees <p>Worm liquid or worm tea – liquid fertiliser drains through the worm farm and into the Collector Tray.</p> <p>To use; mix 1 part worm tea to 10 parts water and use as a liquid fertilizer for your plants. If too strong it will burn plant roots. The diluted worm tea can also be sprayed on to foliage as a natural insecticide.</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%;"> <p>Help!</p> <p>Too dry</p> <p>Worms rely on moisture within the soil to maintain their body functions. (If your worm farm is too dry you may also have ants.)</p> <p>Fix it by:</p> <ul style="list-style-type: none"> • water over the top of the newspaper/hessian especially in hot weather <p>Too wet</p> <p>Worms can drown if there is too much liquid in the liquid collection tray.</p> <p>Fix it by:</p> <ul style="list-style-type: none"> • leaving the bottom tap open to allow the liquid to drain • aerate the castings with a fork and add in some lime <p>Too acidic</p> <p>If worms aren't laying eggs, the farm will probably be too acidic (from fruit and sugary foods). An indication is the presence of small white worms and ants.</p> <p>Fix it by:</p> <ul style="list-style-type: none"> • adding a sprinkle of lime every month or so (1 tablespoon per kg of food) • add water <p>Maggots</p> <p>Maggots come from meat, dairy or fatty foods in the worm farm.</p> <p>Fix it by:</p> <ul style="list-style-type: none"> • soak some bread in milk and leave in the feeding tray, the bread acts as a magnet for the maggots, after about two days dispose of the bread and maggots </div> <div style="width: 45%; text-align: center;">  </div> </div> <p>Source: http://www.hornsby.nsw.gov.au/data/assets/pdf_file/0006/85794/How-to-manage-waste-at-school.pdf</p>

Refuse Minimisation Options – Recycling

Systems	Description
Container deposit schemes	<p>Container deposit / refund schemes are currently in place in several states in Australia. Various models exist including bottle return facilities and (automated) reverse vending machines.</p> <p>Tenants, staff and cleaners should be encouraged to separate containers that qualify for the schemes from the waste or recycling streams and return them to one of the return points. Storage space or dedicated bins within tenancies, apartments or communal areas should be provided.</p> <p>For larger developments or precincts where large amounts of empty containers are expected, consideration may be given to an on-site return point. The return points should be located near recycling bins so that cardboard boxes or plastic bags that have been used to transfer the empty containers to the return point can be disposed appropriately. This can prevent cluttering of the area around the return point.</p> <p>The images below show a typical return point and containers that commonly qualify for a deposit refund.</p> <div data-bbox="354 728 1356 958"> <p>The composite image consists of three parts: on the left, a person in a dark blue and white uniform stands at a return point with a sign that reads 'HOW TO CLAIM YOUR 10c REFUND' and 'ELIGIBLE DRINK CONTAINERS'; in the middle, a blue and white 'envirobank' machine with a 'drisipogo' logo; on the right, a collection of various eligible containers including a white milk carton, a silver can, a brown beer bottle, a clear plastic bottle, and a small clear bottle.</p> </div> <p>Sources: https://returnandearn.org.au, https://envirobank.com.au/bottle-and-can-recycling-queensland, https://www.containersforchange.com.au/how-it-works</p>

C.5 Refuse Management Equipment Suppliers

	Shredders	Bin Tugs / Trailers	Trolleys / Manual Handling Equipment	Bin Lifters / Tipplers	Weighing Systems	Spill Containment, Spill Response, Absorbents, Drain Protection	Food Waste Management / Vacuum Systems, Pulping, Digestors	Composting	Waste Cooking Oil Systems	Medical Waste Equipment	Smoking Management	Bins (General), Bin Stands	Bin Cleaning Equipment	Sorting Equipment
Waste Management Equipment														
Elephants Foot Recycling Solutions http://www.elephantsfoot.com.au				☑	☑									
Waste Initiatives https://wasteinitiatives.com.au	☑													☑
Wastech http://wastech.com.au	☑													
Pakmor http://pakmor.com.au	☑			☑	☑									
Materials Handling https://www.materialshandling.com.au		☑	☑	☑		☑						☑	☑	
Spacepac http://ev.spacepac.com.au		☑	☑											
Spacepac Solutions http://www.spacepac.com.au		☑	☑								☑	☑		
Draffin https://draffin.com.au				☑							☑	☑		
Electrodrive / Lift Master http://www.electrodrive.com.au		☑		☑										
Absorbenviro http://www.absorbenviro.com.au						☑								
Trade Environmental http://www.tradeenviro.com.au						☑								
Spillstationaustralia www.spillstation.com.au						☑								
Meiko https://www.meiko.com.au							☑							

Waste Management Equipment	Shredders	Bin Tugs / Trailers	Trolleys / Manual Handling Equipment	Bin Lifters / Tipplers	Weighing Systems	Spill Containment, Spill Response, Absorbents, Drain Protection	Food Waste Management / Vacuum Systems, Pulping, Digestors	Composting	Waste Cooking Oil Systems	Medical Waste Equipment	Smoking Management	Bins (General), Bin Stands	Bin Cleaning Equipment	Sorting Equipment
Closed Loop Organics https://closedloop.com.au/upcycling-products								☑						
Urban Composter https://www.urbancomposter.com.au								☑						
Cookers https://www.cookers.com.au									☑					
Rubbermaid https://rubbermaidcommercial.com.au/products/waste-management			☑			☑				☑	☑	☑		
Sulo http://www.sulo.com.au			☑					☑		☑		☑		
Australian Waste Management https://www.australianwastemanagement.com.au/products				☑								☑		

C.6 Refuse Management Service Providers

Specialist Waste Services	Food Waste	Waste Cooking Oil	Hazardous Waste	Liquid Waste	Electronic Waste	Industrial Waste	Construction & Demolition Waste	Wastewater	Secure Document Destruction
Cleanaway https://www.cleanaway.com.au		✓	✓				✓	✓	
JJ Richards https://www.jjrichards.com.au		✓	✓	✓		✓	✓	✓	
Veolia https://www.veolia.com/anz			✓	✓	✓		✓	✓	✓
Suez https://www.suez.com.au				✓	✓		✓	✓	
SecondBite https://www.secondbite.org	✓								
OZ Harvest https://www.ozharvest.org	✓								
Cookers https://www.cookers.com.au		✓							
ToxFree https://www.toxfree.com.au			✓		✓	✓			
AceWaste https://www.acewaste.com.au			✓			✓			

Appendix D Refuse Signage

D.1 Refuse Signage

Waste signage guidelines are provided by the New South Wales Environmental Protection Authority:
<https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/business-government-recycling/standard-recycling-signs>

General Refuse Signage



Other Refuse Signage



Colour coding as per AS 4123.7-2006

Mixed (Commingled) Recycling	PMS 108
General waste (landfill)	PMS 032C
Organics	PMS 15-0343
Paper and cardboard recycling	PMS Process Blue C
Soft Plastics	PMS 1655
Used Cooking Oil	Grey

D.2 Other Refuse, Facility and Safety Signage

Various signage including refuse area, safety and facility signage should be arranged through certified signage providers. Example signs can be found at <http://www.signblitz.com.au>, <https://www.wayout.com.au> or <https://www.smartsign.com>.

Example Refuse Enclosure Signage



Example Facility Signage



Example Safety Signage



Appendix E Terms and Abbreviations

In this OWMP, a term or abbreviation has the following meaning unless indicated otherwise:

TERM	DEFINITION
Equipment	
Bin (Refuse Bin)	A plastic or steel container for disposal and temporary storage of waste or recycling items. Various types and sizes exist for different items and purposes. Examples include residential unit bins, bulk bins, MGB, steely bins and specialised for medical waste or cigarette butts.
Bin Storage Area	An enclosed area designated for storing on-site refuse bins or a refuse compactor within the property.
Bulk Bin	A galvanized or steel bin that is greater than 360L capacity generally ranging from 1.00m ³ to 4.50m ³ used for the storage of refuse for on-site refuse collection.
Bulk Mobile Garbage Bin (MGB)	A plastic (polypropylene) receptacle that is greater than 360L in capacity generally ranging from 660L to 1100L used for the storage of refuse.
Collection Point	An identified position where refuse bins are stored for collection and emptying. The collection point can also be the bin storage area.
Composter	A container or machine used for composting food scraps and/or organic materials.
Green Waste	All vegetated organic material such as small branches, leaves and grass clippings, tree and shrub pruning, plants and flowers.
Liquid Waste	Non-hazardous liquid waste generated by commercial premises should be connected to sewer or collected for treatment and disposal by a liquid waste contractor (including grease trap waste).
Mobile Garbage Bin (MGB)	A plastic (polypropylene) bin or bins used for the temporary storage of refuse that is up to 360L capacity and may be used in kerbside refuse collection or on-site collection.
Putrescible Waste	Putrescible waste is the component of the waste stream liable to become putrid and usually breaks down in a landfill to create landfill gases and leachate. Typically applies to food, animal and organic products.
Recycling	Recycling contains all material suitable for re-manufacture or re-use, e.g. glass bottles and jars, plastics such as PET, HDPE and PVC, aluminum aerosol and steel cans and lids, milk and juice cartons, soft drink, milk and shampoo containers, paper, cardboard, junk mail, newspapers and magazines.
Refuse	Material generated and discarded from residential and commercial buildings including general waste, recyclables, green waste and bulky items.
Refuse Collection Vehicle (RCV)	A vehicle that is specifically designed for collecting and emptying refuse bins and refuse compactors.
Refuse Storage Room	An area identified for storing on-site MGBs or bulk bins within the property.
Refuse Trolley	A cart on wheels used to collect smaller quantities of refuse from different areas or rooms of a building or site and wheel the collected refuse to a (bulk) bin storage area where it is disposed. Refuse trolleys are commonly used in hotels or offices.
Regulated Waste	Regulated waste is waste prescribed under legislation as regulated waste.
Transfer (Assisted Transfer)	Assisted transfer of refuse material and associated bulk bins or trolleys by tractor, ATV, UTV or bin tug.
Transfer (Manual Transfer)	Physical transfer of refuse material and associated bulk bins or trolleys without assistance.
Waste	Waste is referred to as refuse material with the exclusion of recycling, green waste, hazardous waste, special waste, liquid waste and restricted solid waste.

TERM	DEFINITION
Waste (General Waste)	Generally referred to as material free of any actual or apparent contamination such as pathological / infectious, radioactive materials and / or hazardous chemical. Reporting use is for material considered to be free of food waste.
Wheelie Bin	Referred to as a MGB of up to 360L, usually with 2 wheels for easy transfer. A common type is a 240L wheelie bin used for kerbside collection in many residential areas.
Measures	
Cubic Metre (m ³)	Volume in cubic metre(s) related to refuse management equipment.
Ground Floor Area (GFA)	The GFA of all storeys of a building is measured from the outside of the external walls or the centre of a common wall. It is commonly measured in square metres.
Kilogram (kg)	Kilogram(s) related to refuse weight.
Litre (L)	Litre(s) related to refuse volumes.
Square Metre (m ²)	Square metre(s) related to refuse areas.
Collection Vehicles	
Body Truck	A conventional heavy vehicle with a covered loading area. It is generally designed for emptying the content of bins into the truck during refuse collections but can be used to carry entire (full) bins for servicing by bin swap-over.
Front-End-Loading RCV (FEL RCV)	A FEL RCV is a truck specially designed to collect municipal solid waste and recycling, typically 1500L to 4000L bulk bins, from a front-loading mechanism and haul the collected waste to a solid waste treatment facility.