



# Operational Waste Management Plan

Smalls Road Public School

At 3B Smalls Road, Ryde

On behalf of NSW Department of Education - School Infrastructure



## About TTM

For 30 years, we've been at the centre of the Australian development and infrastructure industry. Our unique combination of acoustics, data, traffic and waste services is fundamental to the success of any architectural or development project.

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Acoustics



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## Revision Record

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## Glossary

In this waste management plan unless the subject matter otherwise indicates, a term has the following meaning:

TERM	DEFINITION
Baler	A device that compresses waste into a mould to form bales which may be self-supporting or retained in shape by wire ties and strapping.
Bin Storage Area	An enclosed area designated for storing on-site refuse bins or a refuse compactor within the property.
Bulk Bin	A galvanised or steel bin receptacle that is greater than 360L in capacity generally ranging from 1.0m <sup>3</sup> to 4.50m <sup>3</sup> used for the storage of refuse that is used for on-site refuse collection.
Bulk MGB	A plastic (polypropylene) receptacle that is greater than 360L in capacity generally ranging from 0.66m <sup>3</sup> to 1.10m <sup>3</sup> used for the storage of refuse that is used for on-site refuse collection.
Collection Point	The identified position where refuse bins are storage for collection and emptying. the collection point could be the bin storage area for bulk bins.
Composter	A container/machine used for composting specific food scraps.
Green Waste	All vegetated organic material such as small branches leaves and grass clippings, tree and shrub pruning, plants and flowers.
Hopper	A fitting into which waste is placed and from which it passes into a chute or directly into a waste container. It consists of a fixed frame and hood unit (the frame) and a hinged or pivoted combined door and receiving unit.
L	Litre(s)
Liquid Waste	Non-hazardous liquid waste generated by commercial premises that is supposed to be connected to sewer or collected for treatment and disposal by a liquid waste contractor (including grease trap waste).
Mobile Garbage Bins	Plastic (polypropylene) bin or bins used for the temporary storage of refuse that is up to 360L in capacity and may be used in kerbside refuse collection or on-site collection.
Putrescible Waste	The component of the waste stream liable to become putrid. Usually breaks down in a landfill to create landfill gases and leachate. Typically applies to food, animal and organic products.
Recycling	All material suitable re-manufacture or re-use; Glass bottles and jars – PET, HDPE and PVC plastics; aluminum aerosol and steel cans; 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 Bin	A receptacle (mobile garbage (wheelie) bin, bulk MGB or bulk bin) used for the storage of refuse.
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 mobile garbage bins or bulk bins within the property.
Regulated Waste	Waste generated from non-domestic sources.
Waste General	Refuse material with the exclusion of recycling, green waste, hazardous waste special waste, liquid waste and restricted solid waste.

# 1. Introduction

## 1.1. Background

TTM Consulting has been engaged by NSW Department of Education – Schools Infrastructure to prepare a refuse management plan to support the proposed school development at 3B Smalls Road, Ryde.

This waste management plan has been updated to include Condition D28 of the development consent executed on 11 October 2017, with the application reference SSD 8372. The following condition is outlined below:

*Prior to the commencement of operation, the Applicants must prepare a Waste Management Plan for the development and submit it to the Department/Certifier. The Waste management must:*

- *Detail the type of quantity of waste to be generated during operation of the development*

A summary of the quantities of anticipated refuse generation is shown in Section 1.4, with detailed calculations outlined in **Appendix A**.

- *Describe the handling, storage and disposal of all waste streams generated on site, consistent with the Protection of the Environment Operations Act 1997, Protection of the Environment Operations (Waste) Regulation 2014, and the Waste Classification Guideline (department of Environment, Climate Change and Water, 2009)*

Handling, storage and disposal of all waste streams generated on site are described in Section 2. A separate Demolition and Construction Waste Management Plan is provided in separate documentation which outlines the handling, storage and disposal of onsite activities, consistent with the guidelines above.

- *Detail the materials to be reused or recycled, either on or off site; and*

Reused and recycled materials have been detailed in Section 2.

- *Include the Management and Mitigation Measures included in the Waste Management plan provided by TTM dated 28 September 2017*

Mitigation measures have been described in Section 4.1 and 4.2.

## 1.2. Scope

The assessment and associated recommendations include:

- Identification of refuse streams produced within the development
- Estimated volumes generated
- Appropriate segregation methods for each refuse stream
- Internal systems and equipment requirements

- Refuse storage, collection and loading facilities design
- Refuse collection vehicle (RCV) access and manoeuvrability
- Operational and safety requirements
- Pollution prevention
- Waste minimisation

The report takes into consideration the associated workplace health and safety issues and cost implications of waste management processes and equipment to ensure safe and cost-effective solutions are in place for long term property management. Recommendations also ensure that noise and odour nuisances are mitigated and visual amenity is maintained and does not adversely affect the surrounding properties.

The recommendations for refuse collection relate to the operational phase of the development only and do not include additional requirements during or after demolition or construction phases, which requires its own separate plan.

Information contained within the report is based on local government authority requirements related to the City of Ryde Council and the associated waste services department. The recommendations provided are designed to comply with Council's Development Control Plan 2014- *Part: 7.2 Waste Minimisation and Management*.

### 1.3. Site Location

The site is located at 3B Smalls Road, Ryde, as shown in Figure 1.1. The property description is Lot 1 on DP830420 and has a single road frontage to Smalls Road. The site is currently operating as an educational facility.

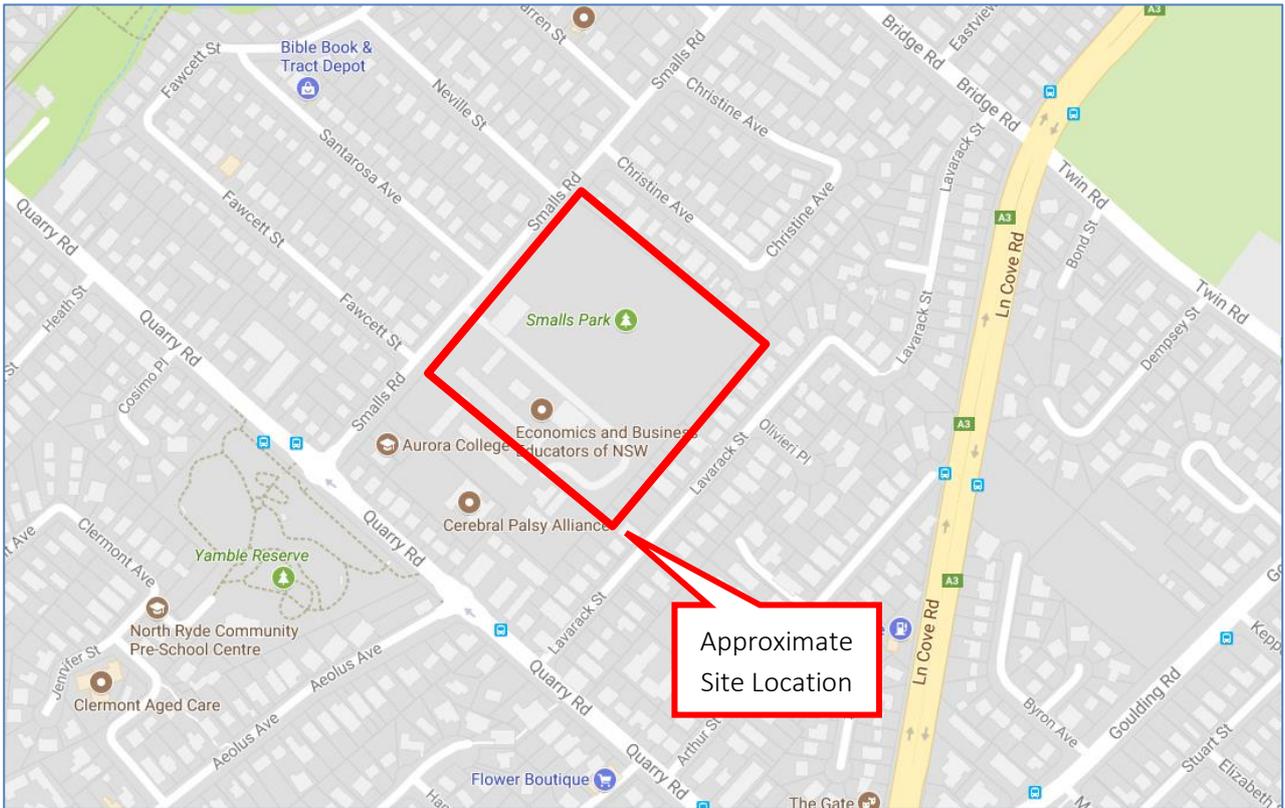


Figure 1.1: Site location

## 1.4. Development Refuse Profile

The development consists of an educational facility (school) including admin, classrooms, library and canteen area. The table below summarises the development refuse profile.

Table 1.1: Refuse Summary

Description	GFA (m <sup>2</sup> )	Generated Waste (L/week)	Generated Recycling (L/week)
Admin	240	240	240
Staff	170	85	85
Student Amenities	239	120	120
Canteen	103	773	773
Storage	61	31	31
Home Base	3,800	3,800	3,800
Sped Unit	384	384	384
Assembly Hall	438	219	219
Special Programs	152	152	152
Library	370	185	185
<b>Total</b>	<b>5,957</b>	<b>5,988</b>	<b>5,988</b>

Detailed calculations and equipment requirements are based on the unit schedules and associated waste generation rates as outlined in the detailed information in Appendix A.1. Site drawings can be found in Appendix A.2. Refer to Richard Crookes Constructions for detailed drawing package.

## 2. Refuse Management

### 2.1. Refuse Generation

The site waste streams may consist of the following:

Table 2.1: Generated Waste Streams

Frequently Generated Waste Streams	
General waste	<b>General waste</b> 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.
Recycling	<b>Recycling</b> should be collected in a dedicated receptacle to ensure separation from the waste material and must not be bagged. Recycling materials include glass, aluminium and steel cans/tins/lids, paper/cardboard and semi rigid plastics. These materials can be reused or recycled either on or off-site.
Infrequently Generated Waste Streams	
Organic waste	An alternate refuse disposal method, such as composting for <b>organic waste</b> , may be considered to reduce the total amount of general waste produced. Composting equipment is available for use where practical and space allows. Composting should be arranged with the building caretaker and further information can be found in Appendix C.
Green waste	<b>Green waste</b> is typically removed by a designated maintenance contractor.
Hard waste/bulky goods	The development has several storage spaces on the ground floor for utilisation of storage and collection of <b>hard waste/ bulky goods</b> . 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) and E-waste	The caretaker will assist in the coordination of disposal of <b>specialised / hazardous waste and e-waste</b> such as recycling of electronic, liquid waste and paint/chemicals where required, due to safety and environmental reasons. For more details for appropriate waste and disposal, refer to Council's website.

### 2.2. Refuse Disposal, Transfer and Storage Process

Each room will be supplied with adequate space for storage of one full day accumulation of refuse. Typically, schools utilise up to 60L bin receptacles. These waste and recycling bins are placed within close proximity to classroom doors, desk areas, eating and washrooms.

On completion of each day, or as required during the day, nominated staff or cleaners will transfer the waste and recycling into the appropriate bins in the refuse room (see Appendix A.2). All waste should be bagged and recycling deposited in the bins in loose form. Where applicable other materials such as cardboard and plastics should be separated.

All refuse generated onsite will be appropriately and lawfully disposed of by a licensed contractor in accordance with the relevant regulations and guidelines.

## 3. Refuse Collections

### 3.1. Refuse Vehicle Access and Loading

The site will have vehicle access to the site via Smalls Road. All refuse will be collected onsite by a **private contractor**. The vehicle will enter and exit the development in a forward gear and perform all manoeuvring onsite.

### 3.2. Collections

The collection area is contained with the ground floor refuse room located in the car park. The refuse room will be in close proximity to the vehicle parked position.

Refuse bin quantities have been based on collection cycles of two days per week for waste and two days per week for recycling. The waste caretaker/ cleaners will consult with council to finalise service days and frequency prior to the time of occupancy.

Waste caretakers/ cleaners will liaise with and directly engage a private contractor for disposal of other waste streams such as green waste, oils and organics if required.

## 4. Recommended Operational Requirements

### 4.1. On-going Management

All refuse equipment movements are to be managed by the caretaker or cleaners at all times. The caretaker/cleaner duties include, but are not limited to the following:

- organising, exchanging, maintaining and cleaning the refuse bins and associated refuse areas (frequency will depend on waste generation and will be determined based upon building operation)
- transporting and decanting (recycling) of bins as required
- organising both garbage and recycled waste pick-ups as required
- organising and coordinating bulky goods collections
- ensuring site safety for children, visitors, staff and contractors
- abiding by all relevant OH&S legislation, regulations, and guidelines
- assessing any manual handling risks and preparing a manual handling control plan for waste and bin transfers
- providing to staff/contractors' equipment manuals, training, health and safety procedures, risk assessments, and PPE to control hazards associated with all waste management activities
- continual monitoring of equipment uses and scheduling to ensure best operational outcomes.

*NOTE: 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.*

### 4.2. Waste Minimisation

#### 4.2.1. Education

On-going education and signage is important to ensure people continue to use the facilities as originally intended. Leasing arrangements should contain direction on expectations and waste management services.

#### 4.2.2. Monitoring and Review

Regular monitoring and inspections of waste and related equipment and facilities from the development should be conducted by building management/designated staff for maintenance and sustainability, including but not limited to bin volumes, refuse storage areas and stormwater management.

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

### 4.2.3. Signage

All receptacles and bins should have adequate signage and labelling, which is clear and easy to read. Standard signage should be provided in and around waste collection and storage areas (See Appendix D).

## 4.3. Safety

Note that transferring refuse bins is considered a hazardous manual task and therefore contractors must ensure 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.

## 4.4. Operational Equipment Summary

Equipment required or suitable for use as part of the operational phase of the development is outlined in Table 4.1 below. It should be noted that all collection receptacles and bins should be branded with the appropriate stickers and the use of the Mobius loop or similar identifying recycling equipment.

Table 4.1: Operations Equipment

Description	Quantity	Notes
Recycling Bins	3	1100L MGB's
Waste Bins	3	
Green Waste	Subject to final operational requirements	
Organics- Receptacles for use in centralised composting / worm farm or electronic composting bins.	Supplied as and if required	

## 4.5. Controls

### 4.5.1. Refuse Room

Waste and recycling storage rooms must be designed and constructed in accordance with the following requirements:

- The waste and recycling storage room must be of adequate dimensions to comfortably accommodate the required number of waste and recycling bins.
- The layout of the waste and recycling storage room must allow easy unobstructed access to all bins (stacked bin arrangements are not acceptable) and allow the bins to be easily removed for servicing purposes.
- Where building occupants are required to take their waste to the waste and recycling storage room, the garbage bins should be located closest to the access door to minimise the risk of the recycling bins being contaminated.

Note: The Better Practice Guide for Waste Management in Multi-Unit Dwellings, DECC 2008 provides information on suitable bin layouts for communal storage areas in larger developments.

- The floor of the waste and recycling storage room must be constructed of concrete finished to a smooth even surface and coved at the intersections with the walls.
- Where garbage or putrescible waste is to be stored, the floor must be graded to a floor waste connected to the sewerage system. The floor waste must be fitted with an in-floor dry basket arrestor approved by Sydney Water Corporation.
- Where garbage or putrescible waste is to be stored, a tap with a hose connection must be provided in or adjacent to the waste and recycling storage area to facilitate cleaning.
- The walls of the waste and recycling storage room must be constructed of brickwork, concrete block work or similar solid material with the internal wall surfaces cement rendered to a smooth even surface.
- The ceiling of the waste and recycling storage room must be constructed of a rigid smooth faced non-absorbent material. The ceiling must be of a minimum height that enables access for cleaning and enables the lids of bins to be fully opened.
- The internal walls and ceiling of the waste and recycling storage room must be painted with a light coloured washable paint.
- The waste and recycling storage room must be provided with a close fitting self-closing door that is openable from inside the room without the use of a key.
- The doors of the waste and recycling storage room must be finished with a smooth faced impervious material that is capable of being easily cleaned.
- The waste and recycling storage room must be provided with permanent natural ventilation direct to the outside air or a system of mechanical exhaust ventilation.
- The waste and recycling storage room must be provided with artificial lighting controllable by switches outside and inside the room. Sensor lights may be used in this regard.
- Clear signage must be displayed in the waste and recycling storage room describing how to use the waste facilities correctly.

#### 4.5.2. Storm Water Prevention and Litter Reduction

Designated personnel/ 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 considered:

- providing adequate signage to promote litter control
- providing sufficient refuse bins in appropriate areas
- preventing unauthorised entry to waste areas

- monitoring waste and prevent waste overflow
- promoting best practices for waste minimisation
- installing litter traps in car parks for any unwanted discharge

#### 4.5.3. Ventilation

Natural (unobstructed, permanent openings direct to external air no less than one-twentieth (1/20) of floor area) or mechanical ventilation (minimum rate of 100 L/s and 5L/m<sup>2</sup> exhausting rate) must be provided to waste storage areas unless refrigerated below four degrees Celsius.

## Appendix A Detailed Information

## A.1 – Refuse Calculations

The generation rates used for the calculation of refuse produced uses rates recommended by Council's Waste Management Guidelines.

Waste and recycling volumes indicated do not include compaction.

It should be noted that all classrooms and staff areas generally operate as an office type set up. Any refuse associated with eating areas are accounted for in the office generation rate and the canteen is based on a takeaway generation rate. All calculations are based on a five day per week operation.

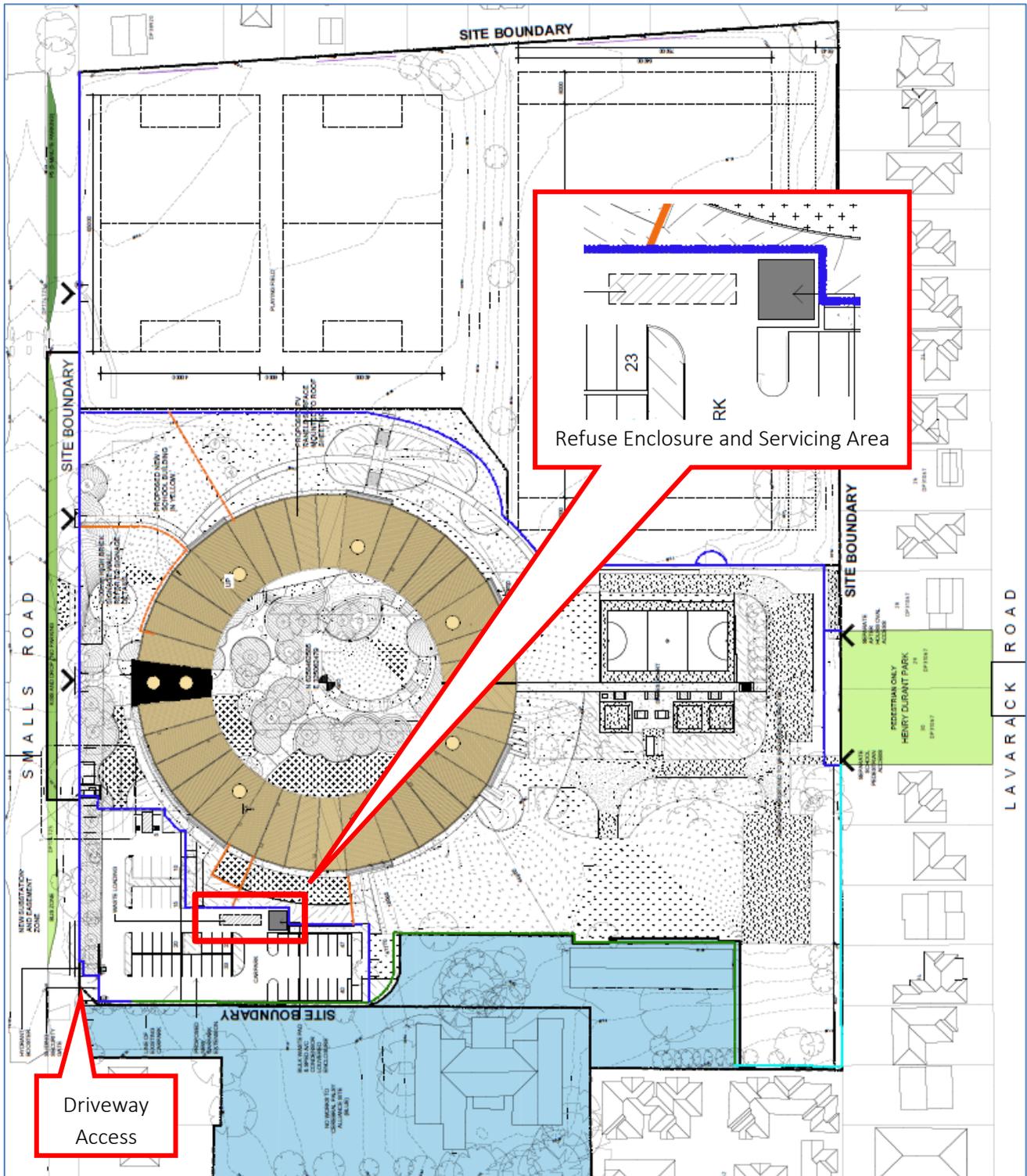
Table A.1: Generation Rates

Unit Type	Waste	Recycling
Admin/ Classrooms (home base, sped unit, special programs)	20 Litres / 100m <sup>2</sup> / day	20 Litres / 100m <sup>2</sup> / day
Staff/amenities/storage/assembly/library	10 Litres / 100m <sup>2</sup> / day	10 Litres / 100m <sup>2</sup> / day
Takeaway (Canteen)	150 Litres / 100m <sup>2</sup> / day	150 Litres / 100m <sup>2</sup> / day

Table A.2: Calculations

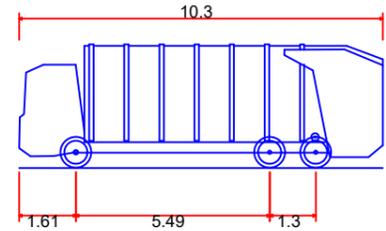
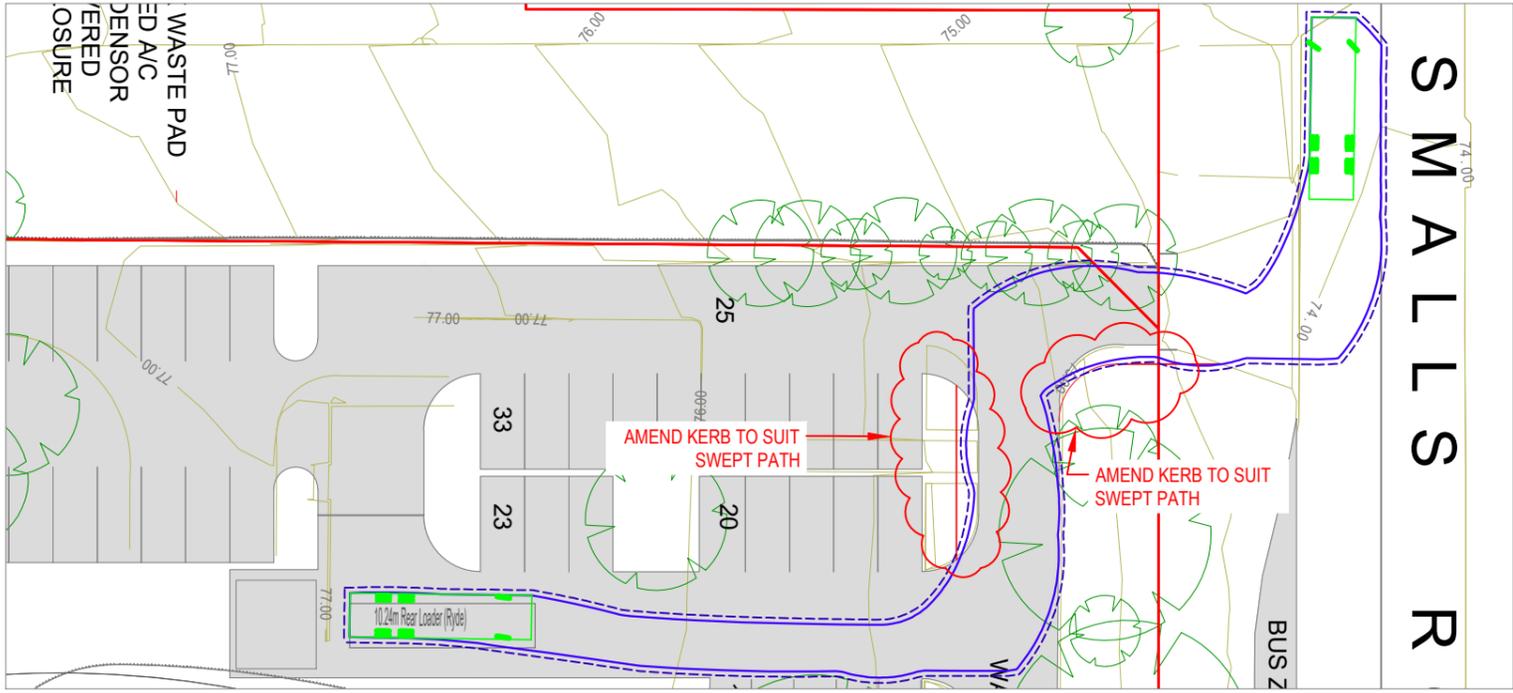
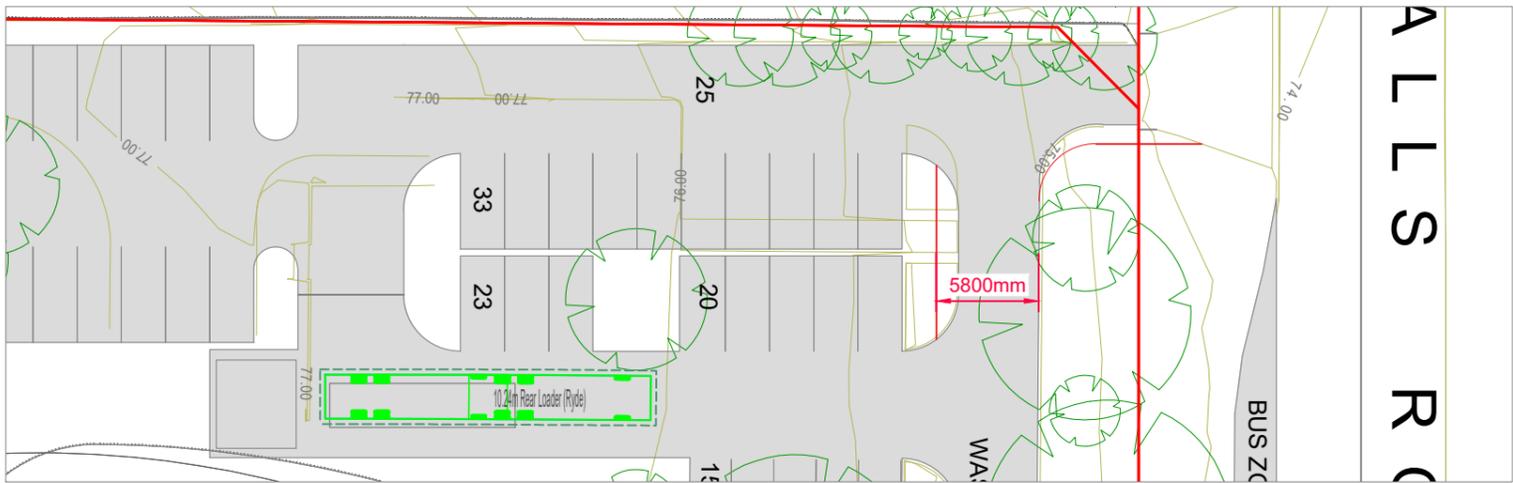
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Assembly Hall	438	219	219
Special Programs	152	152	152
Library	370	185	185
<b>TOTAL</b>	<b>5,957</b>	<b>5,988</b>	<b>5,988</b>
<b>Refuse/ day</b>		<b>856</b>	<b>856</b>
<b>Collections and Equipment</b>	<b>Bin Size (L)</b>	<b>1100</b>	<b>1100</b>
	<b>Collections per Week</b>	<b>2</b>	<b>2</b>
	<b>No Bins Required</b>	<b>3</b>	<b>3</b>
	<b>Raw Bin Area</b>	10.2 m <sup>2</sup>	
	<b>Refuse Room</b>	22.6 m <sup>2</sup>	

A.2 – Ground Floor Plan



Source: Richard and Crookes Constructions, drawing #AR1001, dated Aug 12 2019 – Proposed Site Plan

## Appendix B RCV Swept Path



**10.24m Rear Loader (Ryde)**  
 Overall Length 10.300m  
 Overall Width 2.500m  
 Overall Body Height 3.500m  
 Min Body Ground Clearance 0.304m  
 Track Width 2.500m  
 Lock-to-lock time 6.00s  
 Curb to Curb Turning Radius 9.000m

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REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	29-09-17	ORIGINAL ISSUE	AS	SK	SK

SCALE  
0 4 8 12 16 20m  
SCALE 1:400 AT ORIGINAL SIZE

NORTH

CLIENT  
**CONRAD GARRETT ANCHER  
MORTLOCK WOOLLEY**

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PROJECT <b>3A &amp; 3B SMALLS ROAD, RYDE</b>	PROJECT NUMBER 17SWY0011	ORIGINAL SIZE A3
DRAWING TITLE <b>SWEEP PATH MOVEMENTS RCV DESIGN VEHICLES</b>	DRAWING NUMBER 17SYW0011-01	REVISION A
	DATE 29 Sep 2017	SHEET 1 OF 1

## Appendix C Systems and Specifications

## C.1 – Collection Bins

BIN TYPE	HEIGHT	DEPTH	WIDTH
80 Litre Bin	870mm	530mm	450mm
120 Litre Bin	940mm	560mm	485mm
140 Litre Bin	930mm	615mm	535mm
240 Litre Bin	1080mm	735mm	580mm
660 Litre Bin	1180mm	770mm	1360mm
1100 Litre Bin	1460mm	1230mm	1370mm
3000 Litre Bin	1450mm	1842mm	1995mm

## C.2 – Example Composting

### How to manage waste at school

#### What is compostable, collecting food scraps and setting up composting and worm farming

##### Did you know?

About half of what we throw into the garbage bin is food and garden waste!

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.

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.

By turning your food and garden waste into compost you can make a difference to our environment, by –

- 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

##### What is compostable?

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.)

##### The benefits of composting

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.

##### 1. Cut back on school waste and save money

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.

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.

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.

##### 2. Help reduce greenhouse gases

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.

##### 3. Free organic fertiliser

Composting gives you a free supply of organic fertiliser for your school garden. Compost as a fertiliser

- 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

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.

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.

## Composting

Things to consider before you start composting

### Who will manage the compost?

- Student ECO/Environment team
- School caretaker/gardener
- Teachers
- Cleaner

Ensure that more than one person is responsible so there is always back up.

### How will the food for composting will be collected

A food collection bucket should be placed beside every garbage bin.

- 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).

### Clean signage on the bucket and education about what is compostable is essential

Simple ideas for signage

- school colouring competition to custom make signs
- Council can provide generic signs

### Who does the collection?

- Bin monitors (senior students)
- Bin committee
- Caretakers
- Environmental group or committee

### Setting up the composting

How many bins?

- 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.

### Where to put the bins?

Ideally the bins should be

- on the soil in a warm, well drained location
- in a sunny spot
- close to the garden where the compost will be used
- close to water

### Other considerations are

- Space near bin for collection/storage of mulch and other 'woody' materials
- Space near bin for storage of finished compost
- Hessian bags to cover the compost
- Compost turning tool for easy aeration

Follow our Easy Compost Recipe to make great compost.



## Worm farming

Another way to use your valuable food scraps.

### 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.

### 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.

### 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.

### 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.

### 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.

Sample worm farm available from Hornsby Shire Council



## 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.



**Step 2: Provide food – what and how to feed your worms**

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.

To help the worms eat more, you can mash, blend or process food before adding it to the farm.



The worm farm will take a few months to get going - worms can consume their own weight in food each day!

Remember, don't add too much food at once and only add more when most of the previous meal has disappeared.

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).

**What worms eat**

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.

**Worms like to eat...**

- 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

**Worms don't like...**

- onions – including garlic and shallots
- citrus fruit
- chillies
- raw potato peelings

**Worms are fussy about...**

- meat
- dairy foods
- fatty foods

(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.)

Do not feed worms manure from animals or fruit/vegetables scraps which have recently been sprayed with pesticides as they could kill your worms.

**Step 3: Adding water**

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.

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.

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.

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.

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.



**Step 4: Harvesting**

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.



**How to use the worm liquid and castings**

The castings harvested from your worm farm can be

- 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

Worm liquid or worm tea – liquid fertiliser drains through the worm farm and into the Collector Tray.

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.

**Help!**

**Too dry**

Worms rely on moisture within the soil to maintain their body functions. (If your worm farm is too dry you may also have ants.)

Fix it by:

- water over the top of the newspaper/hessian especially in hot weather

**Too wet**

Worms can drown if there is too much liquid in the liquid collection tray.

Fix it by:

- leaving the bottom tap open to allow the liquid to drain
- aerate the castings with a fork and add in some lime

**Too acidic**

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.

Fix it by:

- adding a sprinkle of lime every month or so (1 tablespoon per kg of food)
- add water

**Maggots**

Maggots come from meat, dairy or fatty foods in the worm farm.

Fix it by:

- 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



Source: [http://www.hornsby.nsw.gov.au/\\_data/assets/pdf\\_file/0006/85794/How-to-manage-waste-at-school.pdf](http://www.hornsby.nsw.gov.au/_data/assets/pdf_file/0006/85794/How-to-manage-waste-at-school.pdf)

## Appendix D Refuse Signage

## D.1 – Refuse Signage Resource

Signs for garbage, recycling and organics bins should comply with the standard signs promoted by the DECC.

Standard wall posters and bin lid stickers are available for download and printing from the Local Government section of the DECC website [www.environment.nsw.gov.au](http://www.environment.nsw.gov.au), in black and white and appropriate coloured versions where applicable.

Example wall posters



Example bin lid stickers



### Example Public Place Signage



## D.2 – Example Safety Signage

Safety Signs are required for refuse discharge and storage rooms / areas and must comply with Australian standards “AS 1319 Safety signs for the occupational environment”. Additional state or local government requirements may also apply. Following are examples of typical signs used around a waste storage area. It should be noted however that an assessment must be completed by a qualified fire and safety consultant, prior to occupancy, to determine the correct signage to be used.

### Fire Management



### Refuse Room Management

Do not overfill bin



Lid must be closed

