Lindfield Learning Village

100 Eton Road, Lindfield

Operational Waste Management Plan

Prepared by Foresight Environmental

e. info@foresightenvironmental.com

w. www.foresightenvironmental.com

This report is based on information provided by The NSW Department of Education c/o Designinc Sydney Pty Ltd coupled with Foresight Environmental's knowledge of waste generated within the education and commercial sectors. To that extent this report relies on the accuracy of the information provided to the consultant. It has been compiled by Foresight Environmental on behalf of Designinc Sydney.

This report is not a substitute for legal advice on the relevant environmental related legislation, which applies to businesses, contractors or other bodies. Accordingly, Foresight Environmental will not be liable for any loss or damage that may arise out of this project, other than loss or damage caused as a direct result of Foresight Environmental negligence.

Revision No.	Issue date	Author	Reviewed by	Reason/comments
1	6 March 2017	Scott Ebsary	Sandy Casaroli	Draft issue for review
2	13 March 2017	Scott Ebsary	Patrick Arnold	Updated incorporating Designinc feedback 9/3/17
3	15 March 2017	Scott Ebsary	Patrick Arnold	Updated images for waste areas
4	27 March 2017	Scott Ebsary	Patrick Arnold	Updated location of east waste room
5	12 October 2017	Scott Ebsary	Patrick Arnold	Updated to incorporate EPA feedback
6	31 May 2019	Kyle Renwick	Scott Ebsary	Update student numbers
7	25 June 2019	Scott Ebsary	Kyle Renwick	Update staging details and current plans
8	4 July 2019	Scott Ebsary		Update minor Designinc feedback
9	22 July 2019	Patrick Arnold		Update minor Designinc feedback

Table of Contents

1. INTRODUCTION 4

2. SPATIAL USE 5

3. WASTE GENERATION ESTIMATE 6

3.1 LEARNING VILLAGE ESTIMATED WASTE GENERATION 6

4. WASTE MANAGEMENT SYSTEMS 8

4.1 LEARNING VILLAGE SYSTEMS 8

4.2 OTHER WASTE/RECYCLING 9

5. WASTE AND RECYCLING STORAGE AREA 9

5.1 SIGNAGE AND COLOUR-CODING 11

6. ONSITE MANAGEMENT PROTOCOLS 12

6.1 WASTE SYSTEMS ON EACH LEVEL 12

6.2 OUTDOOR AREAS 13

6.3 WASTE STREAM COLLECTION PRACTICES 14

6.4 WASTE STREAM ACCEPTANCE CRITERIA 15

7. ADDITIONAL OPPORTUNITIES 16

7.1 WASTE DIVERSION OPPORTUNITIES 16

7.1.1. ORGANICS RECOVERY/RECYCLING 16

8. OPERATIONAL MONITORING AND PERFORMANCE 18

8.1 ONGOING MONITORING AND REVIEW 18

8.2 RECYCLING PERFORMANCE AND TARGETS 18

9. APPENDIX 20

1. Introduction

Overview

This operational waste management plan has been prepared by Foresight Environmental on behalf of the NSW Department of Education and School Infrastructure NSW (the Applicant). It accompanies a Response to Submissions Report in support of State Significant Development Application (SSD 16_8114) for Lindfield Learning Village (the site).

On 24 October 2018 the Minister for Planning granted partial development consent to SSD 8114 for Phase 1 construction and operation of a new school for 350 students. The remainder of SSD 8114 (as originally proposed) has not yet been granted consent and has been subject to further investigation, assessment and engagement with the relevant agencies (DPE, RFS, OEH, RMS, TfNSW) and Council.

The Response to Submissions and supporting documents seek approval for the remainder of SSD 8114, being:

Phase 2(a) of construciton:

- Minor internal works within the approved Phase 1 area to accommodate an additional 35 students.
- The additional 35 students (a total of 385 enrolled students) is needed for Day 1 Term 1 2020, prior to Phase 2(b) being completed.
- Phase 2(a) will occur immediately on approval to allow the additional students for Day 1 Term 1 2020.

Phase 2(b) of construction:

- Works to accommodate 1,050 students (including the approved 350).
- Repurposing of the Phase 1 area.
- A loop road around the southern portion of the site for emergency vehicles, buses and drop off and pick up vehicles.

Phase 3 of construction:

- Works to accommodate an additional 950 students in the western wing of the building.

Vegetation management will be required to achieve the necessary APZ. The SSD does not seek approval for vegetation management outside the site boundary.

The purpose of this operational waste management plan is to outline the systems and practices involved in managing waste and recycling during the ongoing operation of the School as detailed within the EIS.

Response to Submissions

To date there have been no issues raised by agencies during exhibition of SSD 8114 and subsequent Response to Submissions for Phase 1 for this operational waste management plan.

2. Spatial Use

Table 2 below details the **waste generating areas** of the new development – these areas will form the basis of the waste generation estimates to be incorporated with the whole-of-campus estimate, allowing for projected student numbers (2,000) and equivalent full time (EFT) staff numbers (312). These figures do not represent the total GFA of the new development – only the areas that will actually contribute to the waste estimate. Stages 1, 2 and 3 have been considered in the waste generation estimate in order to ensure the proposed waste facilities provide sufficient capacity for the completed development.

Table 1 – Waste generating areas by location and type

	Teaching Areas	Office / Admin / Aurora	Common Areas (incl. circulation)	Amphitheatre/ Hall/Gym	Common Amenities	Canteen	Total
Stage 1 350 students Shared facilities M^2		682	2,250	3,228	163	608	6,931
Stage 2 1,050 students Shared facilities M^2 (includes stage 1 repurposing works)	7,222	2,189	5,417	2,126	824	478	18,256
Stage 3 Additional 950 students Shared facilities M^2	2103	-	572	-	67	-	2,742

3. Waste Generation Estimate

Based on the information provided and benchmark data from similar developments, the primary waste streams expected to be generated in the ongoing operation of the development would be:

- Cardboard/paper recycling
- Comingled recycling
- Food organics recycling
- General waste

Additional smaller waste streams may include toner cartridge recycling, fluoro tube/globe recycling and battery recycling.

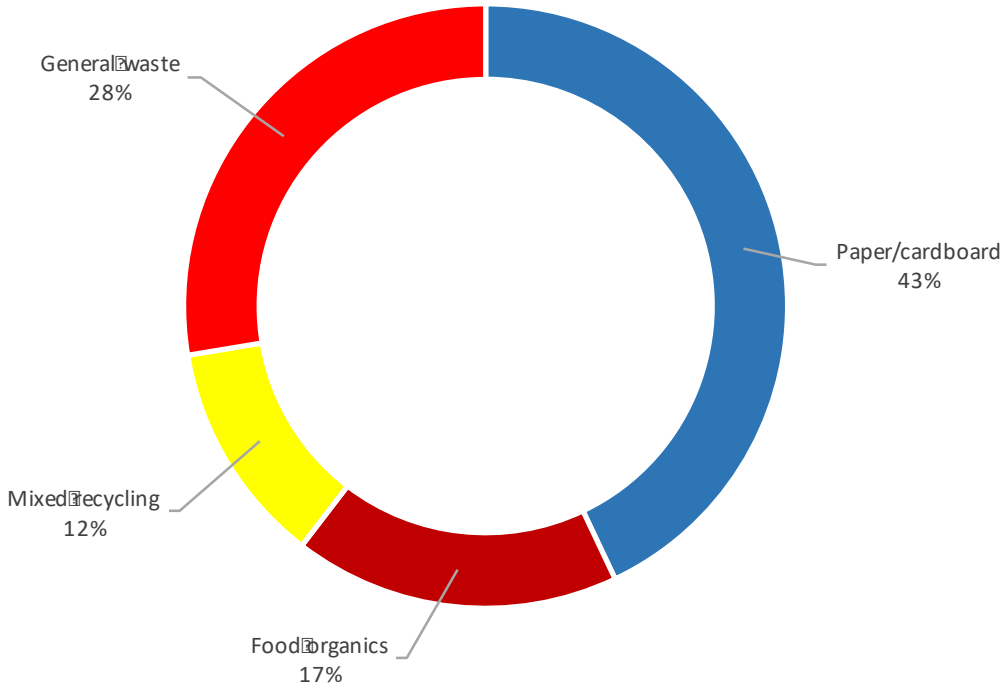
3.1 Learning Village Estimated Waste Generation

Based on industry averages and historical audit data, it is estimated that the proposed facilities will generate a total of **457 kilograms and 5,969 litres** of waste and recyclables per day. It should be noted that the following waste generation profile is an estimation only, based on average teaching and office use – assuming full use during weekdays with the projected total student number of 2,000 and staff of 312.

Table 2 – Learning Village waste generation estimate

	kg/day	L/day	kg/wk	L/wk
Paper/cardboard	114	2,660	568	13,301
Food organics	219	949	1,093	4,743
Comingled recycling	22	684	109	3,420
General waste	103	1,677	515	8,384
Total	**457**	**5,969**	**2,286**	**29,847**

Chart 1 – Waste profile (volume)



4. Waste Management Systems

4.1 Learning Village Systems

Table 4 below demonstrates how the current onsite systems provide ample capacity for the estimated waste volumes detailed in table 2 above.

Table 3: Recommended equipment and collection frequency

Waste Stream	Bin Type	No. of Bins	Weekly Clearance Frequency	Capacity (weekly)	Estimated volume / week	Footprint per bin (m^2)	Total Footprint (m^2)
Paper/Cardboard Recycling	1100L MGB	4	1	4,400	13,301	1.37	5.5
	240L MGB	25	2	12,000		0.43	10.7
Comingled Recycling	660L MGB	2	3	3,960	3,420	1.05	2.1
General Waste*	1100L MGB	5	3	16,500	13,127	1.37	6.9
TOTAL				36,860	29,847		25.1
Recommended Storage Area (including circulation space)							**38m^2**

*note: includes organics

**note: these bins will be stored throughout the school for use at the point of generation – they will only be brought to the waste storage/collection area as required for collection. It is unlikely that they will all be located at the collection area at any one time.

4.2 Other waste/recycling

The following waste stream will be collected on call as needed:

- Battery Recycling – Battery recycling boxes will be present where deemed necessary e.g. copy rooms, office/study common areas. These boxes will be collected when full by a dedicated contractor.
- Toner Cartridge Recycling – Used toners will be collected by administration staff and consolidated for collection by specialty cartridge recycler (usually provided by office supplier).

5. Waste and Recycling Storage Area

The current waste storage areas – one to the east and one to the west of the main building shown in figure 1 below - provide sufficient capacity for the bins proposed in table 3 above. Both waste areas were previously used in the former UTS campus operations and provide ample space for the storage of the required bins. Table 4 details the total bins and collection frequency required for whole Learning Village operation – bin systems for all streams will be stored at both storage areas, with the number of bins being split between the areas appropriately as required by the actual operational practices.

Figure 1 – Waste storage area location

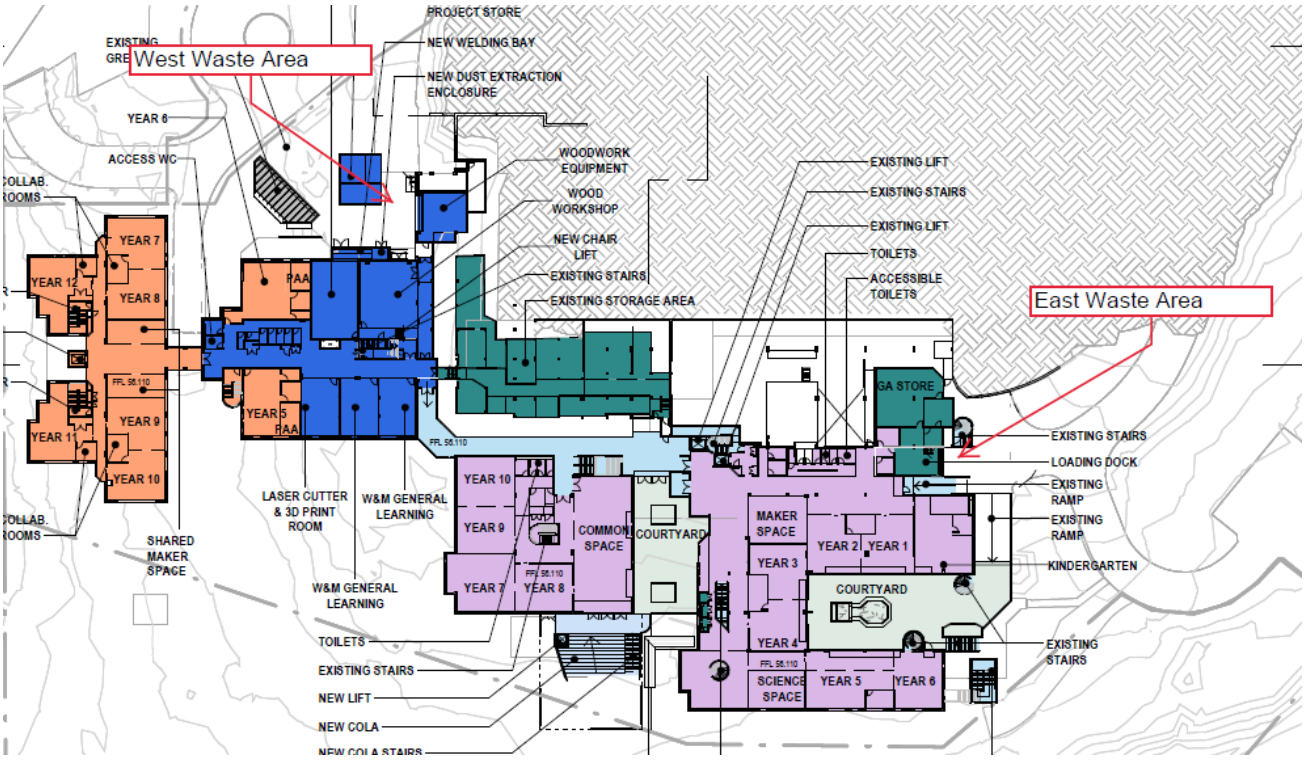


Figure 2 – Eastern waste storage area – indicative layout

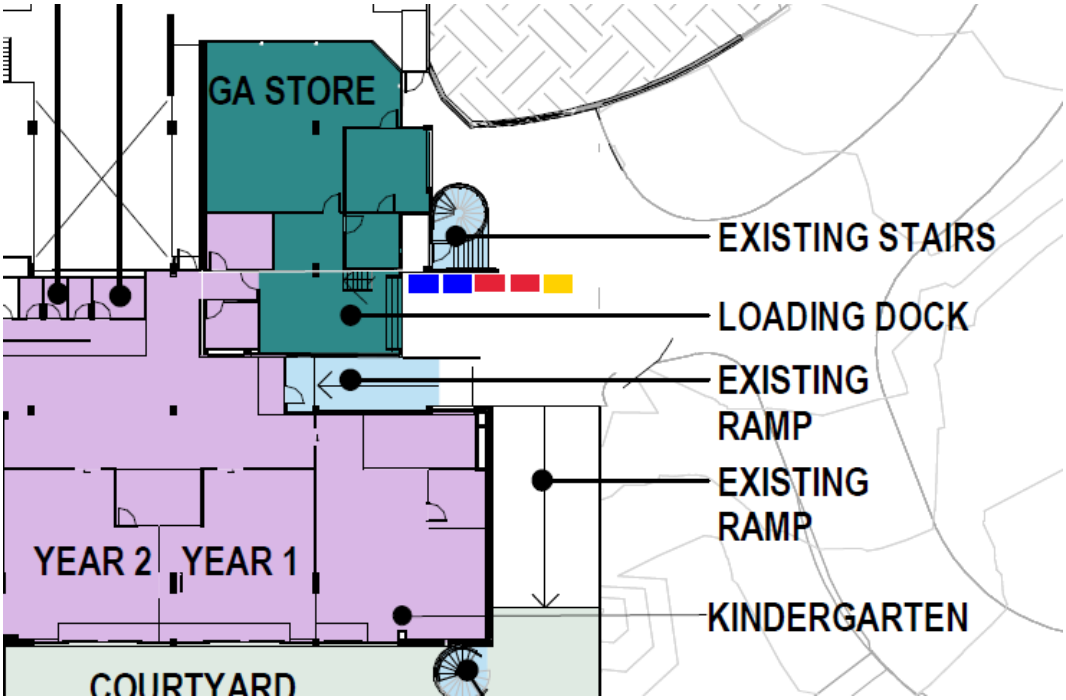
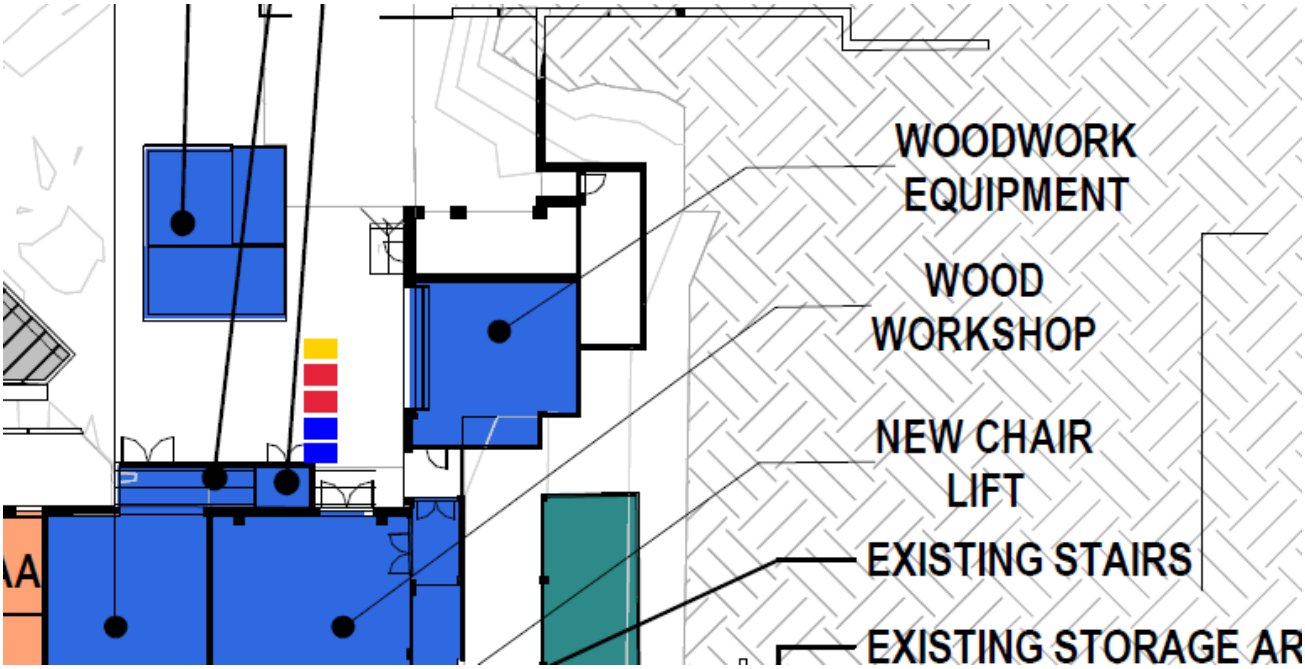


Figure 3 – Western waste storage area – indicative layout



5.1 Signage and Colour-coding

All waste and recycling streams should be differentiated with clear signage and colour-coding on all bins and on walls within the waste storage area. Below are examples of appropriate signage incorporating textual information, pictures and colour-coding to communicate the message.

6. Onsite Management Protocols

6.1 Waste systems on each level

Throughout each level are various areas with different functions – including teaching/study areas, office/admin areas, tutorial rooms etc.

Due to the amount of different rooms and areas it would be impractical and unnecessary to offer bins in every single room. Instead, it is recommended that bin hubs be established throughout the floors in hallways and common spaces to service the different areas. This encourages students/staff using the spaces to remove any waste they have and place it in the appropriate bin at the nearest hub – such a practice should promote recycling by giving users the choice of stream to dispose material into, and also reduce the time taken for cleaners to empty the bins. See photograph below for an example of a waste/recycling hub.

Signage will need to be displayed on all bins and ideally on walls above bins advising of acceptance criteria within each system.

Figure 4 – Best practice bin hub

6.2 Outdoor Areas

Appropriate public place bin hubs should be implemented throughout high traffic outdoor areas i.e. sporting fields, break-out/lunch areas, walkways etc.

The following photographs provide examples of waste and recycling bin hubs. It is important to note that if recycling is implemented in these areas that both general waste and recycling bins must be located next to each other – when these streams are isolated from each other the likelihood of the recycling stream being contaminated by non-recyclables significantly increases.

For ease of use, bin hubs should be large enough to house a 240L MGB for each stream so that maintenance staff can simply remove the full bin and replace it with an empty bin. Full bins can then be transferred to the waste storage/collection area for collection by the waste contractor.

Figure 5 – Outdoor bin hubs

6.3 Waste Stream Collection Practices

Table 4 outlines the cleaners and campus operational staff collection practices for each waste stream

Table 4: Onsite collection practices

Waste Stream	Collection Practices
Paper/cardboard recycling	1. Cleaners empty bin hubs into cleaner trolleys. Material is then taken to waste storage area via the lift core and transferred into the paper/cardboard bins. 2. Where possible, bulky cardboard should be taken directly to the waste storage area or left in a designated area on each level (e.g. store rooms) to be collected by cleaning staff. 3. Cleaners collect flattened cardboard as required and transfer it to the waste storage area where it is deposited into the paper/cardboard recycling 660L MGBs 4. Bins collected from the waste storage areas directly by waste contractor via Eton Road.
Comingled Recycling	1. Cleaners empty bin hubs into cleaner trolleys. Material is then taken to waste storage area via the lift core and transferred into the 240L MGBs comingled bins in waste storage area. 2. Bins collected from the waste storage areas directly by waste contractor via Eton Road.
General Waste	1. Cleaners to collect general waste from bin hubs using a trolley and transport the waste to the waste storage area to be transferred into the 1100L general waste bins. 2. Bins collected from the waste storage areas directly by waste contractor via Eton Road.
Organic Recycling	1. Please refer to section 7 below
Toner Cartridge Recycling	2. Used toner cartridges will be collected by campus operations and placed into the designated toner cartridge recycling bin located in office areas 3. This will be collected on call by a dedicated contractor (i.e. Planet Ark)
Battery Recycling	1. Batteries will be collected in boxes at collection point decided upon by campus management (ideally office common areas, reception areas) 2. This waste stream will be collected on call.

Figure 6 – example of segregated cleaner trolley to transfer waste from bin hubs to waste storage area

6.4 Waste Stream Acceptance Criteria

Paper/cardboard Recycling:

The paper/cardboard recycling stream offered by the Department of Education (DoE) waste contractor accepts all paper and cardboard materials including newsprint, glossy paper and mixed office paper.

Comingled Recycling:

The comingled recycling stream offered by the DoE waste contractor accepts all recyclable plastic containers, aluminium containers, glass bottles and steel cans.

General Waste:

The general waste stream accepts all other non-recyclable materials including food waste/scraps.

7. Additional Opportunities

7.1 Waste Diversion Opportunities

The following initiatives represent opportunities for Lindfield Learning Village to explore in an effort to reduce total waste generation. These options should be considered to move towards best practice waste management.

7.1.1. Organics Recovery/recycling

It should be noted that offering food/organic recycling throughout all areas of the school is not recommended due to the challenges of contamination, however options should be investigated for the canteen where there is more control over the type of materials being disposed ensuring that organics bins would remain free of contaminants.

A practical approach to implementing an organics stream would be to locate organics bins (120L MGBs) in the canteen back of house area and in any other food preparation areas (i.e. food technology classrooms). Canteen staff and students/teachers where relevant would be responsible for separating any food preparation waste into the dedicated organics bins. If the appointed waste contractor provides an organics recycling service then these bins would be transferred to the waste storage area on a set schedule of no longer than every two days to be collected by the waste contractor.

It is recommended that the proposed waste contractor confirm their ability to provide an organics recycling service prior to being engaged to ensure the school has the support required to implement an organics recycling stream.

Alternatively, in lieu of a commercial organics recycling service, other onsite options should be investigated which would actually reduce the quantity of waste being taken offsite by waste contractors. An effective solution could incorporate one or all of the following:

- Onsite compost bins
- Onsite worm farms

These systems would be managed by onsite maintenance staff or a collabrative approach could be devised which engages students and staff to take some ownership over the management of these systems and possibly incorporated into the delivery of the curiculum i.e. a school sustainability initiative

Figure 7 – example of compost set up

8. Operational Monitoring and Performance

8.1 Ongoing monitoring and review

Ongoing monitoring of the waste and recycling program is recommended to be conducted by school operations staff. The appointed waste contractor and cleaning contractor should be required to meet regularly (quarterly) with school operations staff to ensure all stakeholders are continuously working towards best practice. The review process incorporates the following elements:

- Cleaners/managers/drivers regularly make note of any contamination in recycling streams and provide feedback to school operations staff for them to address throughout the school as appropriate.
- Waste contractor reports and invoices are reviewed and analysed on an ongoing basis to ensure the reported data and invoiced costs are reflective of onsite practices and performance.

8.2 Recycling performance and targets

Based on the estimated waste composition for the schools, approximately 61% of the total waste profile by volume could be recycled – it should be noted that this profile assumes 100% separation of common recyclables which in reality is unlikely.

With the implementation of the additional recycling streams proposed in this plan, the school will be better equipped to capture the available recyclables generated from onsite operations. It is strongly recommended that all future recycling initiatives should be focused on the continued effective capture of the basic recyclables of paper/cardboard and mixed recycling. Then, once those streams are well established, initiatives to capture organics can be implemented – though it is recommended only in areas where contamination can be monitored and controlled i.e. kitchens, canteens etc.

In an effort to drive performance improvements, a 3-year recycling target has been proposed based on achievable outcomes which allows for progressive improvements to be made to the waste program each year.

The table below outlines an achievable target progression.

Table 5 - Year-on-year target progression

	Year 1	Year 2	Year 3
School Recovery Target	30%	40%	50%
Primary focus	Paper/cardboard and mixed recycling capture	Staged roll-out of organics to limited, managed areas	Potential complete rollout of organics and maximum separation of other common recyclables

These targets are provided as a conservative guide which should be reviewed and adjusted in light of actual onsite practices once operational as greater diversion opportunities may be available to facility management.

Figure 8 – example of basic worm farm

9. Appendix

The following figures provide the approximate dimensions of the proposed bin systems.

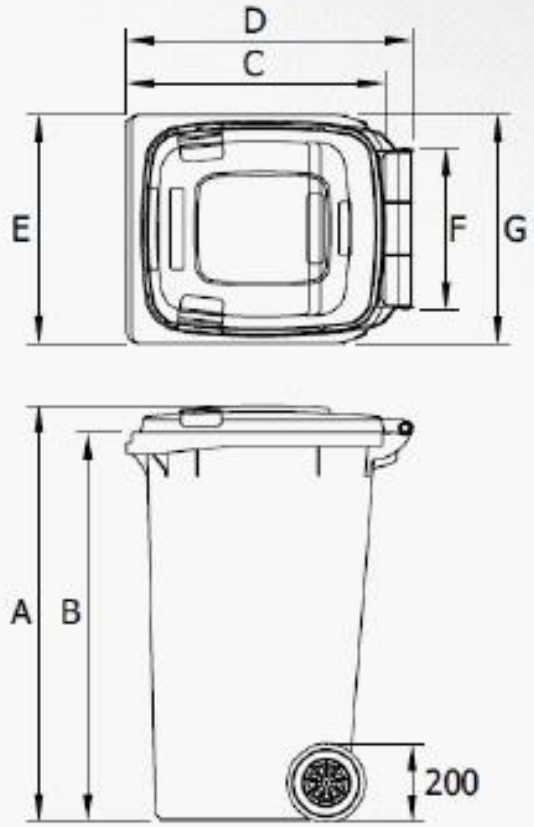
240L MGB

Dimensions - Weights - Standards

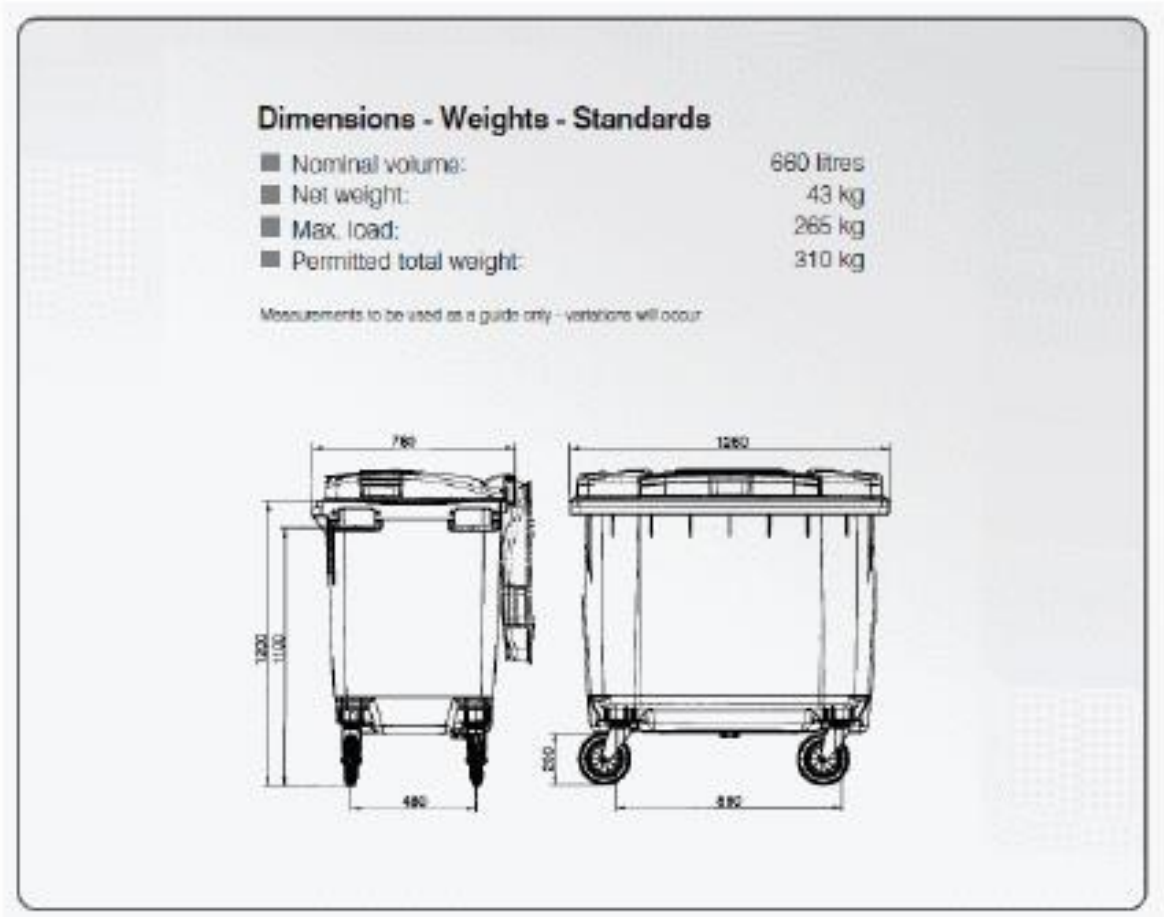
Nominal volume:	240 litres
Net weight:	approx 13 kg
Max load:	96 kg
Permitted total weight:	110 kg

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

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



660L MGB


Dimensions - Weights - Standards
Nominal volume: 660 litres
Net weight: 43 kg
Max. load: 265 kg
Permitted total weight: 310 kg
Measurements to be used as a guide only - variations will occur

1100L MGB

Dimensions - Weights - Standards

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

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