

An architectural rendering of a modern school building with two main wings. The left wing is a multi-story brick structure with white balconies and large windows. The right wing is a taller, more modern building with a dark brick facade and large glass windows. In the foreground, there is a paved area with a red brick path, a green lawn, and several trees. A group of children are playing on the path, and a few adults are standing nearby. The sky is blue with some clouds.

Upgrades to Chatswood Public School and Chatswood High School

Appendix 30 - Operational Waste Management Plan

SSD 9483

Prepared by Foresight Environmental

For School Infrastructure NSW, Department of Education



Upgrades to Chatswood Public School and Chatswood High School

Operational Waste Management Plan

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This report is based on information provided by Johnstaff coupled with Foresight Environmental's knowledge of waste generated within the retail property sector. 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 Johnstaff.

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Table of Contents

1. OVERVIEW OF DEVELOPMENT	5
1.1 INTRODUCTION	5
1.2 PROJECT DESCRIPTION	5
1.3 SITE DESCRIPTION	6
2. WASTE GENERATION ESTIMATE	7
2.1 ESTIMATED WASTE GENERATION	8
2.1.1. CHATSWOOD PUBLIC SCHOOL	8
2.1.2. CHATSWOOD HIGH SCHOOL	8
3. WASTE MANAGEMENT SYSTEMS	9
3.1 CHATSWOOD PUBLIC SCHOOL	9
3.2 CHATSWOOD HIGH SCHOOL	9
3.3 OTHER WASTE/RECYCLING	10
4. WASTE AND RECYCLING STORAGE AREA	11
4.1 WASTE STORAGE AREAS	11
4.1.1. CHATSWOOD PUBLIC SCHOOL – DURING CONSTRUCTION	11
4.1.2. CHATSWOOD PUBLIC SCHOOL – POST CONSTRUCTION	12
4.1.3. CHATSWOOD HIGH SCHOOL – DURING CONSTRUCTION	13
4.1.4. CHATSWOOD HIGH SCHOOL – POST CONSTRUCTION	14
4.2 AMENITY	15
4.3 SIGNAGE	16
4.4 COLOUR-CODING	16
5. COLLECTION	17
5.1 WASTE COLLECTION VEHICLE	17
5.2 COLLECTION ACCESS	18
5.2.1. PUBLIC SCHOOL	18
5.2.2. HIGH SCHOOL	18
6. ONSITE MANAGEMENT PROTOCOLS	19

6.1	WASTE SYSTEMS	19
6.2	OUTDOOR AREAS	20
6.3	BULKY DESIGN & TECH MATERIALS	21
6.4	LIQUID/HAZARDOUS WASTE	21
6.5	WASTE STREAM COLLECTION PRACTICES	22
7.	ADDITIONAL OPPORTUNITIES	23
7.1	WASTE DIVERSION OPPORTUNITIES	23
7.2	ORGANICS RECOVERY/RECYCLING	23
8.	COMPLIANCE	25
9.	CONCLUSION	25

1. Overview of Development

1.1 Introduction

This operational waste management plan (WMP) has been prepared by Foresight Environmental on behalf of School Infrastructure NSW (SINSW), for inclusion in the Plans and Documents noted in the NSW Department of Planning and Environment (DPE Secretary's Environmental Assessment Requirements (SEARS) for Application Number State Significant Development (SSD) 9483.

1.2 Project Description

Investing in our schools - The NSW Government is investing \$6.7 billion over four years to deliver 190 new and upgraded schools to support communities across NSW. In addition, a record \$1.3 billion is being spent on school maintenance over five years. This is the largest investment in public education infrastructure in the history of NSW.

Upgrades to Chatswood Public School and Chatswood High School will deliver:

- more than 150 new and refurbished innovative learning and teaching spaces
 - increased quality active play space currently allocated to primary school and high school students
 - specialist teaching facilities such as science, art, and music rooms
 - dedicated performing arts spaces
 - new sports facilities and recreational areas
 - new libraries and administration facilities.
- Upgrades to Chatswood Public School, including the provision of:
 - 53 x homebases (comprising 25 existing and 28 new spaces);
 - 4 x special program classrooms (music, language etc);
 - 3 x special support unit classrooms;
 - Increased quality active play spaces;
 - Retaining Heritage buildings A and B
 - New hall;
 - New car parking facilities; and
 - Associated site works and landscaping.
- Upgrades to Chatswood High School, including the provision of:
 - 123 Classrooms (comprising 21 existing and 102 new spaces)
 - New administration and staff facilities;
 - New hall; and
 - Associated site works and landscaping.

1.3 Site Description

The subject sites are located within the City of Willoughby LGA in the suburb of Chatswood.

The sites are connected via Centennial Avenue. Chatswood Public School is bounded by residences on Jenkins Street to the west and the Pacific Highway to the east. Chatswood High School is bounded by residences and Eddy Road to the south, Dardanelles Road to the West and Centennial Avenue to the north. Both sites combined cover an area of approximately 7.45 hectares. A site locality plan is presented in Figure 1 below.

Figure 1: Chatswood High School and Chatswood Public School



2. Waste Generation Estimate

The following waste estimates have been generated for the purpose of demonstrating the capacity of the waste systems to manage standard usage based on industry averages and historical audit data. These profiles have been produced for both the Chatswood Public School and Chatswood High School. For the purpose of this assessment, we have assumed approximately 25 students per classroom.

It should be noted that all procedures and practices recommended within the Waste Management Plan will remain the same throughout construction and post construction phases of the development. There may be times where various teaching spaces, and other components, of the site may be activated, or deactivated, during the development; however, the student population and operational waste generation will not change.

While these profiles do not reflect the current composition of waste and recycling streams generated, it provides an overview of best practice targets based on similar developments and current volumes generated at the school.

The following estimates are based on the information received, and benchmark¹ data from similar developments while providing best practice targets. The primary waste streams expected to be generated in the ongoing operation of the development would be:

- Cardboard/paper recycling
- Co-mingled recycling
- General waste

Additional smaller waste streams may include secure paper, toner cartridge recycling, fluoro tube/globe recycling and battery recycling – see section 3.3.

¹ Foresight Environmental have referred to the council DCP and believe that through use of our data model, rather than the suggested waste generation rates, a better outcome for the asset could be achieved. The data model is based on tenant specific inputs to extrapolate waste generation figure with greater accuracy and specifies a broader level of material segregation.

Foresight Environmental's data model draws on benchmark data from our extensive database of waste audits, onsite weighing systems and waste collection data from commercial and retail assets throughout Australia. Foresight Environmental provide waste data reporting services to over 6 million square meters of real estate for the commercial, retail, accommodation, health and entertainment sectors. Foresight Environmental work towards bettering the industry in cooperation with the Better Building Partnership and NABERS waste technical working groups.

2.1 Estimated Waste Generation

2.1.1. Chatswood Public School

Based on industry averages and historical audit data, it is estimated that the Chatswood Public School will generate a total of **2,126 kilograms and 18,771 litres** of waste and recyclables per week. It should be noted that the following waste generation profile is an estimation only, based on average teaching use with approximately 25 students per classroom – assuming full use during weekdays within the 53 home bases, 4 special program classrooms, and 3 special support unit classrooms.

Table 1: Waste generation estimate for Chatswood Public School

Stream	KG/day	L/day	KG/Wk	L/Wk
Cardboard/Paper	87	1,310	436	6,570
Mixed Recycling	22	374	113	1,877
General Waste	314	2,059	1,577	10,324
Total	424	3,744	2,126	18,771

2.1.2. Chatswood High School

Based on industry averages and historical audit data, it is estimated that the Chatswood High School will generate a total of **2,280 kilograms and 23,934 litres** of waste and recyclables per week. It should be noted that the following waste generation profile is an estimation only, based on average teaching use with approximately 25 students per classroom – assuming full use during weekdays within the 123 classrooms.

Table 2: Waste generation estimate for Chatswood Public School

Stream	KG/day	L/day	KG/Wk	L/Wk
Cardboard/Paper	111	1,671	556	8,377
Mixed Recycling	29	477	144	2,393
General Waste	315	2,625	1,580	13,163
Total	455	4,774	2,280	23,934

3. Waste Management Systems

The following tables demonstrate how the required onsite systems for each component will provide ample capacity for the estimated waste profiles describe in Section 2.

3.1 Chatswood Public School

The following table details the systems and collection frequencies required to manage the estimated waste volumes for the Public School. The waste room will be accessible via Jenkins Street:

Table 3: Recommended Public School equipment and collection frequency

Stream	Bin Type	No. of Bins	Weekly Clearance Frequency	Weekly Capacity (L)	Estimated volume / week (L)	Footprint per bin (m ²)	Total Footprint (m ²)
Paper/Cardboard	MGB - 1100L	2	3	6,600	6,570	1.69	3.37
Mixed Recycling	MGB - 1100L	2	1	2,200	1,877	1.69	3.37
General Waste	MGB - 1100L	4	3	13,200	10,324	1.69	6.74
Total bin footprint							13.48
Recommended Room Size – including circulation space							20.22

3.2 Chatswood High School

The following table details the systems and collection frequencies required to manage the estimated waste volumes for the High School. The waste room will be accessible via De Villiers Ave:

Table 4: Recommended High School equipment and collection frequency – Oliver Rd

Stream	Bin Type	No. of Bins	Weekly Clearance Frequency	Weekly Capacity (L)	Estimated volume / week (L)	Footprint per bin (m ²)	Total Footprint (m ²)
Paper/Cardboard	MGB - 1100L	3	3	9,900	8,377	1.69	5.06
Mixed Recycling	MGB - 1100L	1	3	3,300	2,393	1.69	1.69
General Waste	MGB - 1100L	4	3	13,200	13,163	1.69	6.74
Total bin footprint							13.48
Recommended Room Size – including circulation space							20.22

3.3 Other Waste/Recycling

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

- Green Waste/vegetation – vegetation generated from onsite maintenance activities will be managed by grounds staff. A bulk 3m³ front lift bin is recommended for the management of this stream which should be collected on request as required.
- 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).
- Secure Paper – Sensitive documentation will be disposed of by administration staff into the secure paper 240L bins located in the appropriate areas throughout the development. These bins will be collected by the waste contractor when full.

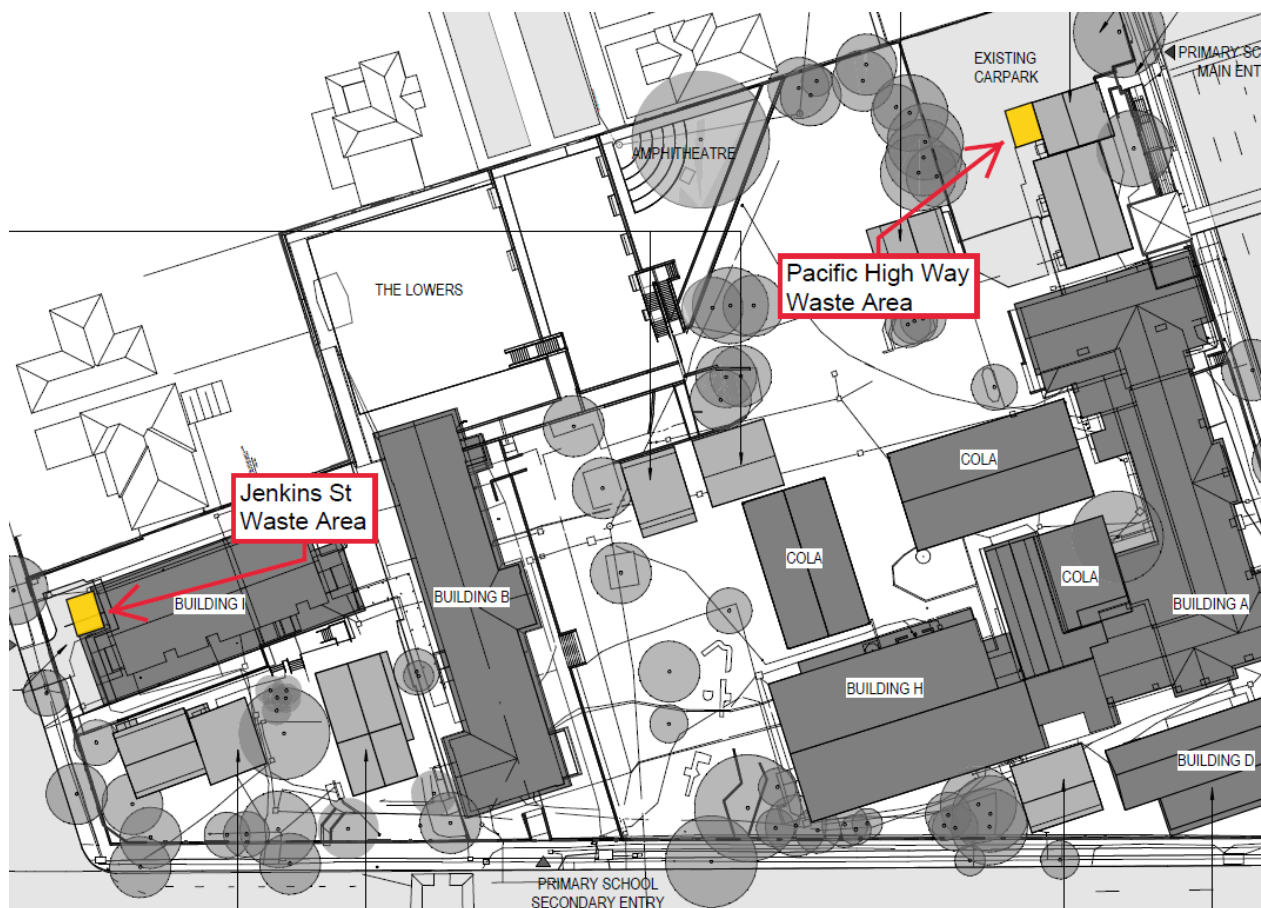
4. Waste and Recycling Storage Area

4.1 Waste Storage Areas

4.1.1. Chatswood Public School – During Construction

The waste and recycling areas to be utilised by the Public School during construction works will not change from the locations currently in place within the Public School. The figure below illustrates the location of the waste areas, which adequately service the school's current waste and recycling generation.

Figure 2: Public School Waste storage area locations – During Construction



4.1.2. Chatswood Public School – Post Construction

After the completion of works, the waste and recycling areas are to be consolidated into one room within the new carpark's lower ground level off Jenkins St. The figure below illustrates the location of the waste areas, which will adequately service the school's waste and recycling generation.

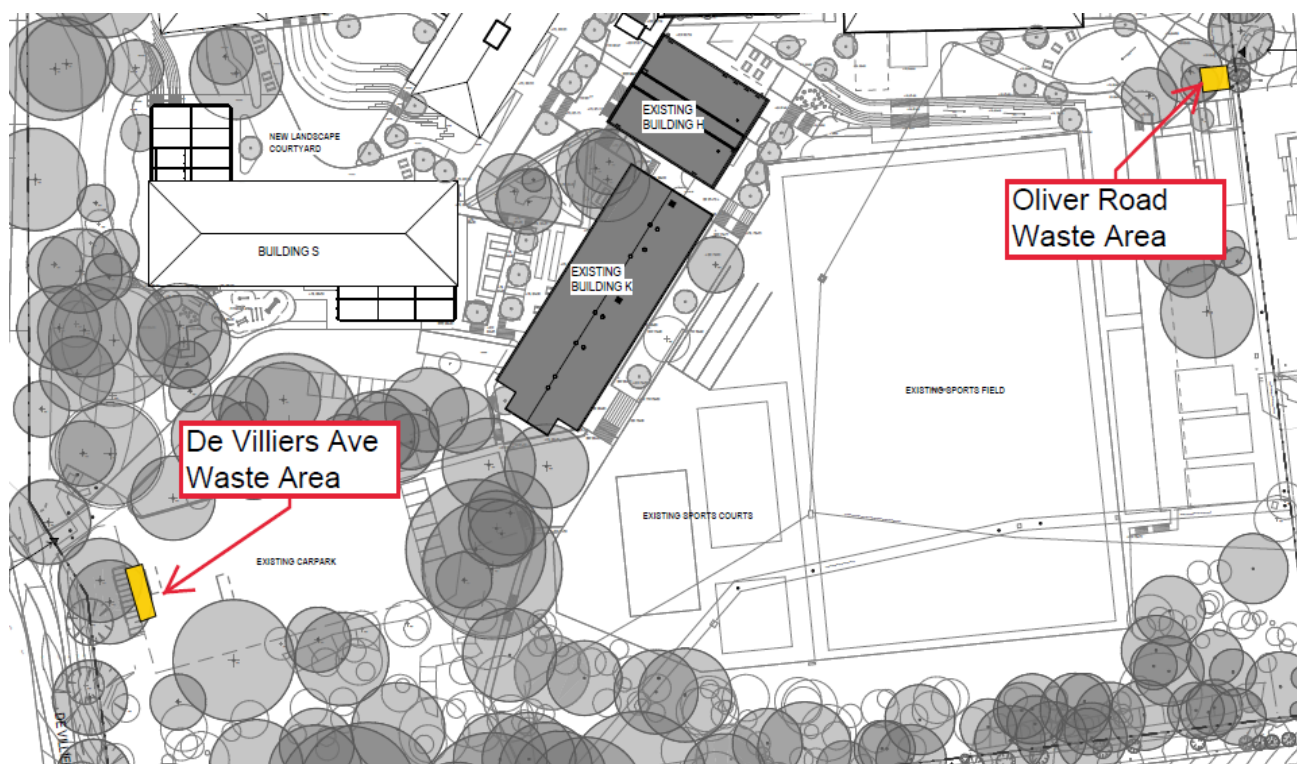
Figure 3: Public School Waste storage area location – Post Construction



4.1.3. Chatswood High School – During Construction

The waste and recycling areas to be utilised by the High School during construction works will not change from the locations currently in place within the High School. The figure below illustrates the locations of the waste areas, which adequately service's the school's current waste and recycling generation.

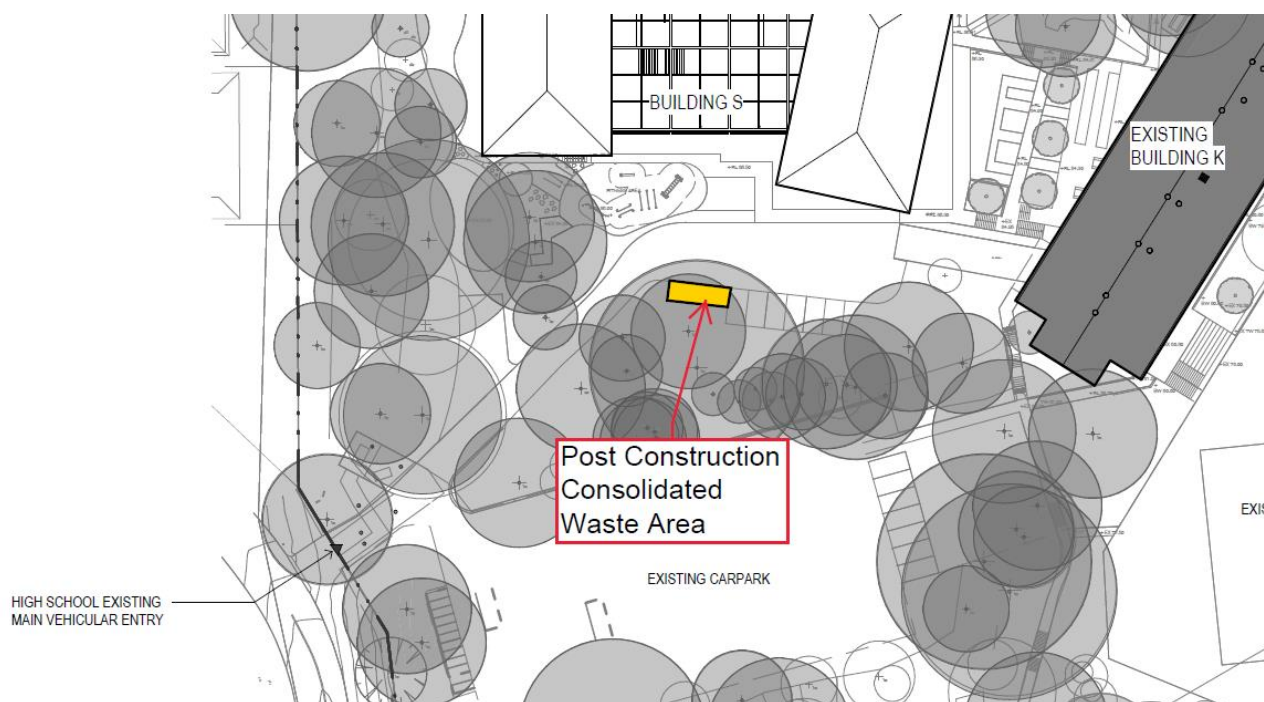
Figure 4: High School Waste storage area location



4.1.4. Chatswood High School – Post Construction

After the completion of works, the waste and recycling areas are to be consolidated into one room situated just south of Building S, which will be accessible from De Villiers Avenue via the main vehicular entry for the High School. The figure below illustrates the location of the waste areas, which will adequately service the school's waste and recycling generation.

Figure 5: High School Waste storage area location – Post Construction



4.2 Amenity

The main waste and recycling storage room will have the following features:

- Ventilation: The bin storage rooms will be ventilated to external air or mechanically exhausted in accordance with AS 1668.2-2002
- Vermin Prevention:
 - The bin storage rooms will feature tightly fitted doors
 - Opening will be vermin proof
 - Cleaners are to ensure that bin lids are closed when unattended
- Doors: The room will be fitted with a close fitting self-closing door that is openable from inside the room without the use of a key. The doors will be finished with a smooth faced impervious material that is capable of being easily cleaned
- Floor: Structural concrete slab, 75mm thick, with smooth epoxy topping finish with coved wall and floor junctions. Graded drains to approved sewer connections – fitted with an in-floor dry basket arrestor approved by Sydney Water Corporation
- Walls: Brick work/concrete block or similar finished in a light coloured, washable paint. A protective galvanized metal railing must be placed around the inside wall of all waste and recycling rooms and communal bin areas at 1 metre above the floor and at least 50 mm clear of the wall to protect the walls from damage caused by moving bins.
- Fire: All walls, floors and ceilings of waste and recycling rooms and waste service compartments must be of a fire resistance level (FRL) in accordance with the requirements of the BCA
- Lighting: Base building lighting with switches inside and outside waste room (sensors may also be used)
- Water Supply: cold tap and hose connection
- Signage: clear signage identifying the various streams and appropriate use will be prominently displayed (see section on signage below)
- Noise: Due to location of waste area, noise will not impact neighbouring residents
- Odour: An automatic deodoriser will be installed
- Hygiene: The School will ensure all bins are cleaned internally and externally on a regular basis (at least once every 3 months)

The ongoing maintenance and up-keep of the waste storage room will be the responsibility of cleaning/school management staff. They will be tasked with ensuring bins are stored neatly and are cleaned as required.

4.3 Signage

All waste and recycling streams will be differentiated with clear signage 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.

Figure 6: Stream appropriate signage



4.4 Colour-coding

To further reinforce the differentiation between waste and recycling streams, it is highly recommended that the bin storage room be colour-coded to ensure bins are stored in the correct area and to enable easy identification of the streams provided. This can be done by painting borders on the floor indicating where bins should be stored. The colour of the paint should be consistent with the waste stream e.g. yellow paint for mixed recycling, red paint for general waste. The waste room walls can also be painted.

Photographs 1 & 2 – Examples of appropriate colour-coding

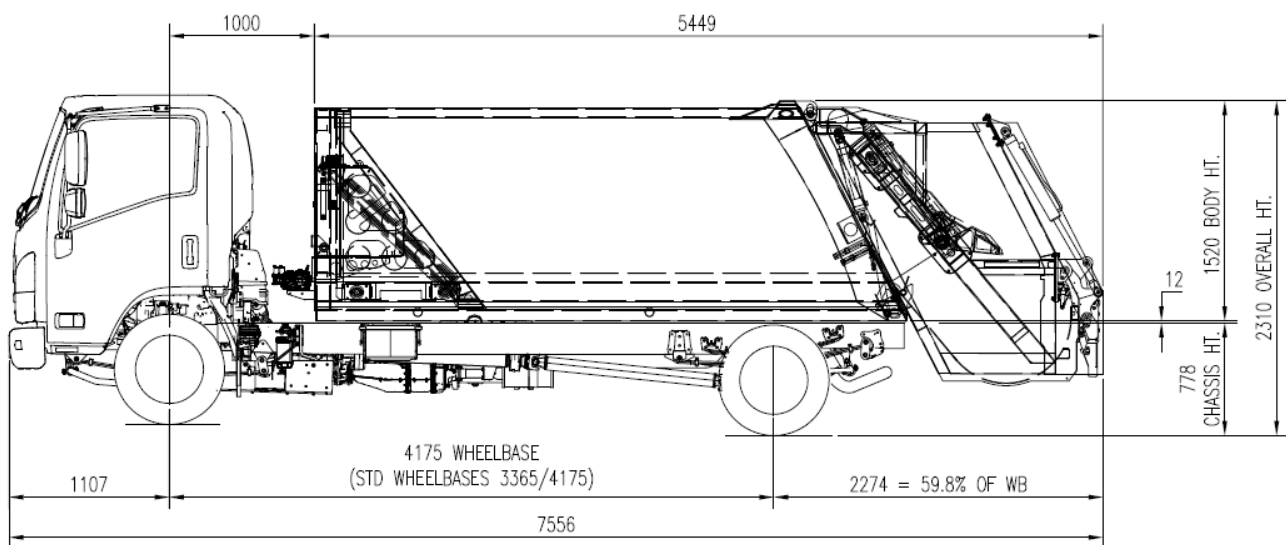


5. Collection

5.1 Waste Collection Vehicle

Waste truck specifications will vary slightly between contractors however as a guide, all streams and bins recommended in this report would typically be collected by a MRV rear lift waste truck – figure 7 details the indicative dimensions of a typical MRV rear-lift truck used by most commercial waste contractors.

Figure 7 - Indicative waste contractor specs - assume 8m MRV



6. Onsite Management Protocols

6.1 Waste systems

Throughout the various teaching and meeting rooms in the school, it would be impractical and unnecessary to offer bins in every single room. Instead, it is recommended that smaller “Multi-sort” bin hubs be established throughout the floors in hallways and common spaces to service the smaller rooms as necessary. 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.

Cleaners/facilities management will empty waste and recycling into trolley and then transfer to main waste storage area to be disposed into the larger bins for collection.

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

Photograph 1 – Best practice bin hub

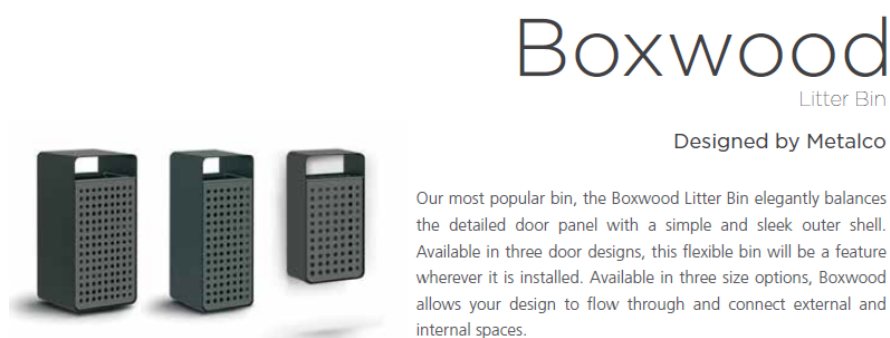


6.2 Outdoor Areas

Bin hubs should be implemented in appropriate outdoor areas. The following photographs provide examples of waste and recycling bin hubs. It is important to note that should recycling be implemented in these areas, both general waste and recycling bins be located next to each other. When separated, the likelihood of the recycling stream being contaminated by non-recyclables increases substantially.

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 one. Full bins can then be transferred to the waste storage/collection area for collection by the waste contractor.

Photographs 3 & 4 – Outdoor bin hubs



6.3 Bulky Design & Tech Materials

Bulky waste such as timber and metals from design technology labs will be managed by teaching staff within teaching areas. It is proposed for consideration that manoeuvrable crates/cages be located within design/technology workshops for the storage of scrap materials (timber, metal etc). These crates will have a dual function – scraps and offcuts can be placed in the crates and made available to other users for re-use. It is anticipated that most materials will be reused with only limited quantities of materials needing disposal periodically. When crates become full and the materials are deemed unfit for reuse, they can be wheeled to the waste storage area to be collected by the appointed waste contractor upon request.

Figure 9 - Bulky waste cage



6.4 Liquid/Hazardous waste

Liquid/hazardous waste generated from visual art studios and science labs should be managed in dedicated bunded hazardous waste storage cabinets – they should be implemented in visual arts store rooms and in science prep/chemical store rooms for the safe storage of any paints, solvents or liquid chemicals associated with class/science lab activities. These wastes should then be collected by a specialist contractor directly for appropriate disposal i.e. Chemsal.

Figure 10 - Hazardous waste storage cabinet



6.5 Waste Stream Collection Practices

Table 3 outlines the cleaners and campus operational staff collection practices for each waste stream.

Table 5: Collection Practices

Waste Stream	Collection Practices
Paper/cardboard recycling	1. Cleaners empty bin hubs into cleaner trolleys. Material is then taken to the appropriate waste storage area and transferred into the paper/cardboard bins. 2. Where possible, bulky cardboard should be taken directly to the waste storage 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 MGB(s) 4. Bins collected from the waste storage areas directly by waste contractor
Comingled Recycling	1. Cleaners empty bin hubs into cleaner trolleys. Material is then taken to the appropriate waste storage area and transferred into the MGB co-mingled bin(s) in waste storage area. 2. Bins collected from the waste storage areas directly by waste contractor
General Waste	1. Cleaners to collect general waste from bin hubs using a trolley and transport the waste to the appropriate waste storage area to be transferred into the MGB(s). 2. Bins collected from the waste storage areas directly by waste contractor

Figure 11 - Example of segregated cleaner trolley to transfer waste from bin hubs to waste storage area.



7. Additional Opportunities

7.1 Waste Diversion Opportunities

The following initiatives represent opportunities for Chatswood Public School and Chatswood High School to explore in an effort to reduce total waste production. These options are not a requirement, however, should be considered in order to move towards best practice waste management.

7.2 Organics Recovery/Recycling

Although offering food/organic recycling throughout all areas is not recommended due to the challenges of contamination, options for the kitchen where there is more control over the type of materials being disposed should be investigated.

Alternatively, other onsite options that would reduce the quantity of waste being taken offsite by waste contractors should be investigated. An effective solution could incorporate one or both of the following:

- Onsite compost bins
- Onsite worm farms

Figure 12: Example of a compost setup



Figure 13: Example of a basic worm farm



8. Compliance

The details below provide reference to requirements as detailed by Willoughby Council DCP Section C.8 Waste Management.

Table 6: C.8.3 Waste Management – Controls for all developments

Control	COMPLIANCE
C.8.3.1 - Submissions	Compliant – Section 4
C.8.3.2 - General	Compliant – Section 3 and Section 4
C.8.3.4 - Access to garbage and recycling rooms and communal bin areas	Compliant – Section 5
C.8.3.5 - Amenity	Compliant – Section 4
C.8.3.6 - Location	Compliant – Section 5
C.8.3.7 - Construction	Compliant – Section 4
C.8.3.8 - Water supply	Compliant – Section 4
C.8.3.9 - Hygiene	Compliant – Section 4
C.8.3.10 - Management	Compliant - Section 6
C.8.3.11 - Signage	Compliant – Section 4
C.8.3.12 - Ventilation	Compliant – Section 4
C.8.3.13 - Lighting	Compliant – Section 4
C.8.3.14 - Safety	N/A
C.8.3.15 - Servicing of bins	Compliant – Section 5
C.8.3.16 - Bin storage at the kerb	N/A
C.8.3.17 - Refrigerated waste rooms	N/A

9. Conclusion

The details of this waste management plan confirm that the waste facilities provided in the proposed design adequately cater for the projected waste generation rates at the completion of development.