TAFE NSW Construction Centre of Excellence

Construction & Operational Waste Management Plan February 2021

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1. Introduction

This report has been prepared to accompany a detailed State Significant Development Application (**SSDA**) SSD_ 8571481 for the development of an educational facility at the TAFE Nepean Kingswood Campus, located at 2-44 O'Connell Street, Kingswood (**the site**). The legal description of the site is Lot 1 in DP 866081. The site comprises a rectangular lot with an area of approximately 23 hectares.

The purpose of this report is to provide advice and guidance on the management of general waste and recyclable materials that will be generated during the development's construction and operational phases.

Specifically, the SSDA seeks development consent for the construction and operation of the TAFE NSW Construction Centre of Excellence (**TAFE CCoE**) a multi-level, integrated educational facility designed to accommodate specialised training and education for construction-related TAFE NSW courses (**the project**). The TAFE CCoE will be a new learning environment with an emphasis on flexibility and adaptability, to encourage cross-disciplinary collaboration, industry engagement and educational excellence.

On 27 February 2019, the NSW Government announced the delivery and associated funding for the CCoE.

The proposed development is classified as State Significant Development (**SSD**) on the basis that it falls within the requirements of clause 4, Schedule 19 of the State Environmental Planning Policy (State and Regional Development) 2011 (**SRD SEPP**), being 'development for the purpose of a tertiary institution…that has a capital investment value of more than $30 million'.

The Minister for Planning, or their delegate, is the consent authority for the SSDA and this application is lodged with the NSW Department of Planning, Industry and Environment (**NSW DPIE**) for assessment.

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (**SEARs**) issued for the project. Specifically, this report has been prepared to respond to the following SEARs:

25. Waste
Identify, quantify and classify the likely waste streams to be generated during construction and operation and describe the measures to be implemented to minimise, manage, reuse, recycle and safely dispose of this waste. Identify appropriate servicing arrangements (including but not limited to, waste management, loading zones, mechanical plant) for the site.

Relevant Policies and Guidelines: Waste Classification Guidelines (NSW EPA, 2014)

2. Site Details

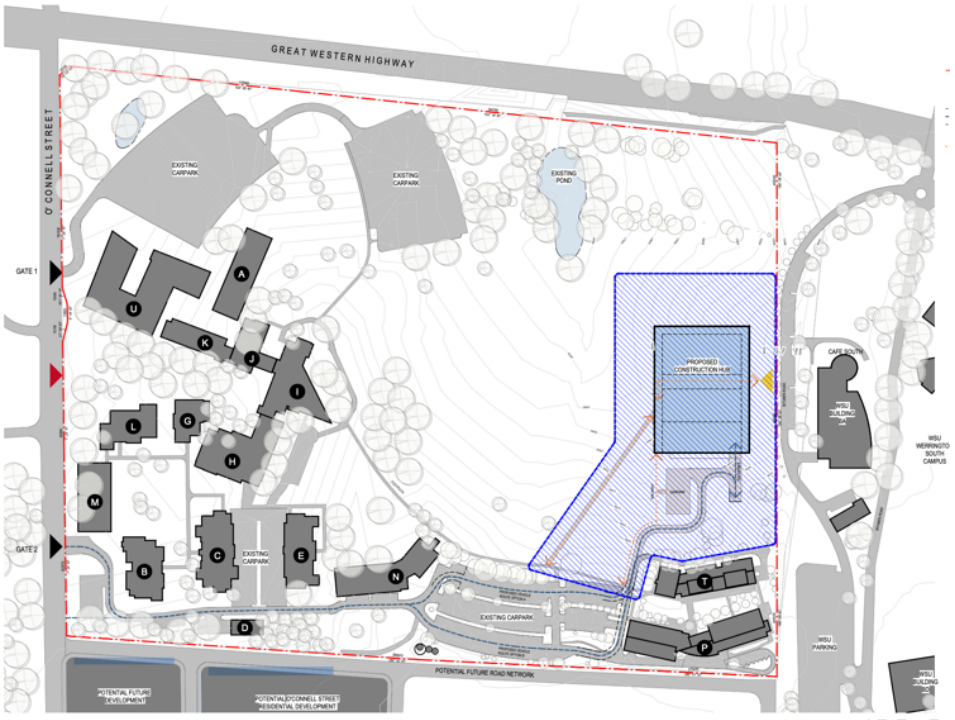
The TAFE CCoE will provide for 3,500 students and facilitate an active learning environment co-locating building, construction, engineering and manufacturing disciplines and providing flexible space for training purposes to simulate real world scenarios and environments, exhibition and function space and shared workspace.

The anticipated scope of the SSD DA works is as follows:

- Site preparation works including tree removal and excavation
- Construction of a 3-storey Construction Hub of around 9,200 m^2 of GFA, incorporating learning and workshop spaces, workspaces, and areas for industry engagement
- Provision of additional car parking
- Landscaping works

The extent of the SSD scope is shown in Figure 1 below:

Figure 1: SSD Scope



3. Demolition & Construction Waste

Prior to commencing construction, some trees will be removed from the site, as well as excavation works being undertaken for the TAFE CCoE building. Figure 2 shows trees to be removed, and the suggested sorting and storage zone for the development's demolition and construction waste.

Figure 2: Demolition & Construction Area

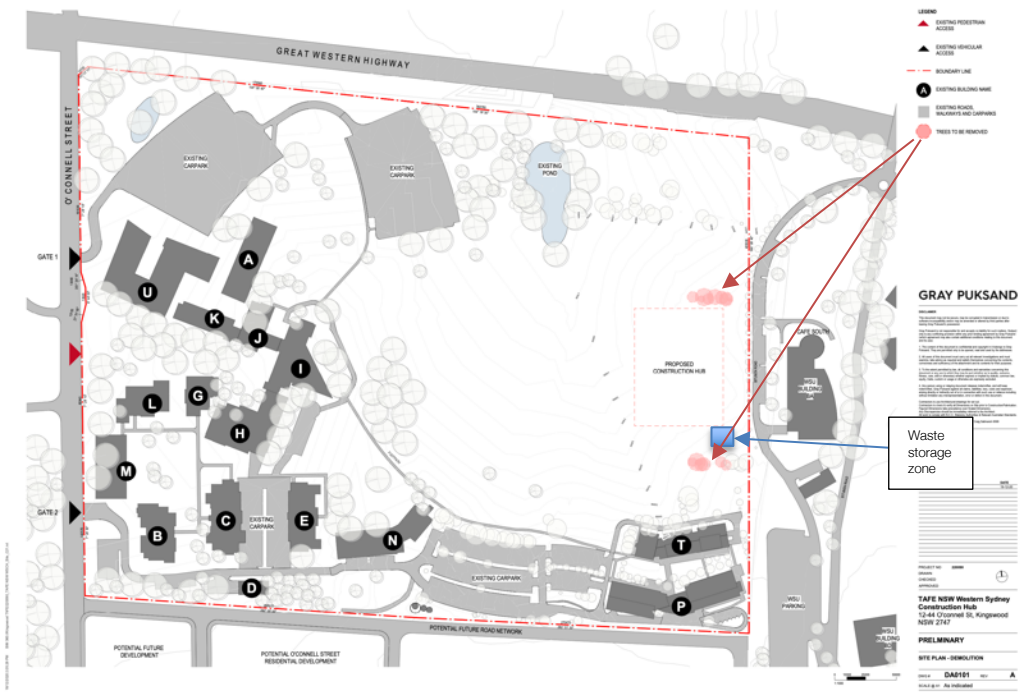


Table 1 shows estimated volumes of waste materials expected to be generated in the process of preparing the site for construction activities.

Table 1: Demolition Waste Volumes

Activity	Volume m^3	Resource Recovery Outcome
Tree Removal	500	Material to be taken to organic waste facility for processing into mulch for reuse on site in landscaping works
Soil & Rock Excavation	11,400	Subject to soil testing results, material to be reused on site in landscaping works*, or at alternative site(s)
Total	**11,900**	

** Subject to compliance with Penrith City Council's DCP*

While efforts will be made to minimise waste arising from construction activities themselves, in keeping with best practices, some waste will still be produced during the construction, including materials over-runs and waste packaging and pallets from deliveries. Table 2 shows estimated volumes of materials expected to be produced during construction.

Table 2: Construction Waste Volumes

Material	Volume m^3	Resource Recovery Outcome
Glass (Excess)	9.2	These materials will be segregated from the other materials listed below and sent to a specialised facility licensed to process this material for recycling/resource recovery. Depending on the construction waste contractor appointed, different types of materials may be able to be combined in the same bin and separated out at the designated resource recovery facility
Floor Coverings	20.2	
Plasterboard Offcuts	23.0	
Timber Offcuts	23.0	
Metal Offcuts, Sheeting, Wiring, etc.	25.3	
Used Pallets	27.6	
Soft Plastics (e.g., pallet wrapping)	27.6	
Concrete (Excess)	11.0	Crushed and re-used on site for temporary access road base, if feasible during construction phase; if not feasible, material to be sent off-site for processing
Recyclable Glass, Metal, & Plastic Containers	13.8	These materials will be generated by construction workers; therefore, they are not construction wastes and can be placed in the existing recycling bins on Campus
Paper/Cardboard Recycling	18.4	
General Waste	32.2	All waste other than the above will be sent to a landfill facility (to be specified on awarding of construction contract)
Total	**231.4**	***Potential Resource Recovery/Diversion from Landfill = 86.1%***

4. Operational Waste

To calculate total operational general waste and recycling generation, the following rates in litres/day/100 m^2 of GFA have been used for each functional area of the CCoE. These rates are based on standard waste and recycling generation rates for educational facilities and other supporting functions such as cafes and amenity areas.

Table 3: Operational Waste Generation Rates (Litres/Day per 100 m^2)

Functional Area	General Waste	Paper/Cardboard Recycling	Commingled Recycling	Misc. Other
Workshop	2	3	2	3
Industry Engagement	3	2	1	0
Workspace	5	3	2	0
Informal Learning/Breakout	5	3	2	0
Learning Spaces	3	2	1	0
Café	5	6	4	0
Amenities	5	0	0	0

Based on the TAFE CCoE's total GFA, the following volumes of general waste and recycling are predicted; weekly volumes are based on Monday-Friday operation during the academic term.

Table 4: Predicted Operational Total Waste Generation (Litres)

Material	Litres/Day	Litres/Week
General Waste	314	1,568
Paper/Cardboard Recycling	252	1,260
Commingled Recycling	164	820
Misc. Other Waste *	105	525
Total	**835**	**4,173**

** Pallets, e-waste, broken equipment, etc.*

5. Storage Facilities & Equipment

5.1 Storage Space Calculations

Table 5: Storage Space Requirements

Material Stream	Weekly Litres Generated	Bin Size Litres	No. of Bins	Collections per Week	Required Area (m^2)*
General Waste	1,568	1100	1	2	2.1
Paper/Cardboard Recycling	1,260	1100	1	2	2.1
Commingled Recycling	820	660	1	2	1.4
Misc. Other Waste	525	N/A		As required	5.0
Bin Wash Area	N/A				3.0
Total Storage Area Required					**13.6 m^2**

** Includes 20% allowance for circulation space between bins and bin movement in and out of the storage room*

The above bin numbers and weekly collection frequencies are predicated on the maximum predicted generation of each of the listed materials streams, based on the GLA totals provided and the CCoE's expected site operations and waste volumes.

5.2 Storage Room Requirements

The storage room will be adequately sized to accommodate bins for all waste and recycling generated by the development between collections.

All waste and recycling containers will be clearly differentiated through appropriate signage and colour coding to reflect the materials contained, with each different stream located in a designated area to assist in easy identification by cleaners and other building users.

The storage room will be mechanically ventilated, and exhaust points separated from outside air intakes and other devices, in accordance with AS 1668.2.

Mechanical ventilation systems will be ducted via ceiling mounted or duct mounted grilles, rigid and flexible ductwork, and acoustically treated as required. Ceiling concealed or roof mounted fans will be provided for ventilation and will operate continuously.

The storage room will also have the following features:

- Provided with artificial light, controlled by switches
- Designed to prevent the entry of vermin
- Ceilings finished with a rigid smooth non-absorbent material that can be easily cleaned
- Walls and ceilings constructed of approved solid impervious material and cement rendered internally to a smooth even surface coved at all intersections
- Floors of the main waste and recycling storage room will be constructed of concrete, at least 100 mm thick, and finished to a smooth surface coved at the intersections with walls
- Bunded bin wash facilities provided with an adequate supply of hot and cold water mixed through a centralised mixing valve with hose cock, and floor graded to a 100 mm diameter floor drain outlet

6. Waste Management & Recycling

6.1 Cardboard & Paper Recycling

Paper and cardboard materials will be generated in all areas, and will be managed as follows:

- Academic staff and students dispose of material into designated bins
- Cleaners collect materials nightly and transfer to the bins within storage room
- Recycling contractor services bins to designated schedule

6.2 Commingled Recycling

Commingled recycling consists of all mixed plastic bottles and containers, glass bottles, and steel and aluminium cans. This material stream will be generated in all areas and managed as follows:

- Academic staff, café staff, and students dispose of material into designated bins
- Cleaners collect materials nightly and transfer to the bins within storage room
- Recycling contractor services bins to designated schedule

6.3 E-Waste

Recyclable electrical and electronic waste items (computers and associated equipment, office equipment, mobile phones, etc.) will be generated from time to time and should be kept separate from other waste. TAFE Kingswood's waste contractor will be able to provide containers for collecting these materials. A single 500-litre or 660-litre bin should be sufficient for the quantities of this material expected to be generated once the development is fully operational.

6.4 Hazardous Wastes

Separate collection arrangements for materials such as glues, solvents, paint etc. should be made to keep these potentially hazardous materials from entering landfills. A 120-litre bin placed in each workshop area should be sufficient – this can be confirmed/revised once the development is operational and volumes of these materials can be accurately predicted.

6.5 General Waste & Miscellaneous Other Waste

All materials other than those discussed above will be classified as general waste, and will be disposed of and collected accordingly as follows:

- Staff and students dispose of material into designated bins
- Cleaners collect materials nightly and transfer to the bins within storage room
- Waste contractor services bins to designated schedule

Workshop areas will, from time to time, produce bulky waste items that are too large for the site's bins (e.g., pallets, broken equipment, etc.). These will be kept in a designated area in the bin storage room and collected as needed by the waste contractor.

Please note that due to the relatively small volume of organic material (food waste, coffee grounds, etc.) expected to be generated, we do not currently recommend setting up a separate collection system for this material.

6.6 Monitoring & Measurement

TAFE Kingswood already has systems in place for monitoring, measurement, and reporting of operational waste management performance. Waste contractor invoices provide weights of materials streams and numbers of bins collected.

It is anticipated that TAFE Kingswood's current waste contractor will be responsible for collection of all materials from the CCoE.

Annual performance and contract reviews will be conducted with TAFE Kingswood's facilities management team, waste contractor, and cleaning manager, to assess progress towards annual waste diversion targets and other KPIs, identify operational issues, and address any shortcomings. Waste audits will also be conducted annually to benchmark performance.

6.7 Waste Diversion Targets

Based on the expected materials the CCoE will generate, we recommend setting an initial diversion target of **55%** of overall waste diverted from landfill disposal through waste avoidance, reuse, or recycling). This target should be reviewed by TAFE Kingswood after the first year of operations, and annually thereafter, and adjusted accordingly based on actual performance.

6.8 Roles & Responsibilities

TAFE Kingswood's facilities management team will be responsible for reviewing this Operational Waste Management Plan annually, ensuring that its objectives are met, and making adjustments and additions where required to ensure continued accuracy and relevance to actual conditions.

It is anticipated that TAFE Kingswood's cleaning contractor will be responsible for internal management of general waste and recycling, including maintenance of the storage room to a high standard of cleanliness.

7. Stakeholder Education

For the proposed waste management systems to be successful an intensive initial education program will be implemented for staff and students. To support this initiative, new procedures may need to be written into contract specifications, including cleaning staff requirements for monitoring and feedback on waste management performance through visual observations of recycling stream contamination, condition of bins and equipment, contractor compliance, etc.

8. Internal Bins

It is recommended that all internal functional spaces of the CCoE are equipped with 3-stream bin hubs for:

- Paper & Cardboard Recycling
- Commingled Recycling
- General Waste

Bins should be situated in areas which effectively service a group of workstations and offices, with no bins under desks; this improves cleaning staff efficiencies by reducing the number of bins that require collection, and also reduces the number of bin liners required.

Examples of bins that are commonly used in office or educational settings are also shown below. Differently colored bin liners (general waste-black; paper-clear; commingled-blue) are recommended to assist cleaning staff to distinguish the different streams and enable them to identify contamination, prior to final disposal in the bins in the central storage room.



For areas with bins kept within housings or pull-out drawers in kitchens and central areas, care must be taken to ensure these systems are well designed and provided with clear signage to foster proper separation. An example of best practice drawer design is shown below which provides for two or three streams (paper recycling, commingled recycling, and general waste).


9. Vehicle Access & Loading

The waste contractor's collection vehicles will service the CCoE via the access road leading from the existing car park as shown in Appendix 1. Bins will be presented for collection in the outdoor open hardstand area and returned to the storage room by CCoE staff immediately following collection by the contractor.

A standard waste collection vehicle is shown in Appendix 2. Dimensions of actual vehicles used may vary from those shown; it is recommended that TAFE Kingswood consults with its waste contractor to ensure that vehicles servicing the CCoE can comply with access requirements (turning circles, roadways widths, etc.).

Contractors responsible for the removal of general waste and recycling will be required to undertake a site induction process to ensure their operational practices are conducted safely and efficiently. Additional recommended contractor standards/requirements are listed below:

- Reliable and efficient servicing, and meeting agreed schedules
- Working with the site to achieve continuous improvements in recovery rates
- Providing monthly reports on diversion and financial outcomes
- Providing tenant engagement and education programs
- Maintaining current details of processing facilities used
- Having collection vehicles fitted with weighing technology
- Maintaining evidence of compliance with relevant Green Star reporting criteria

10. Relevant Legislation, Standards & Guidelines

The following guidelines and standards have been used as references in compiling this Waste Management Plan:

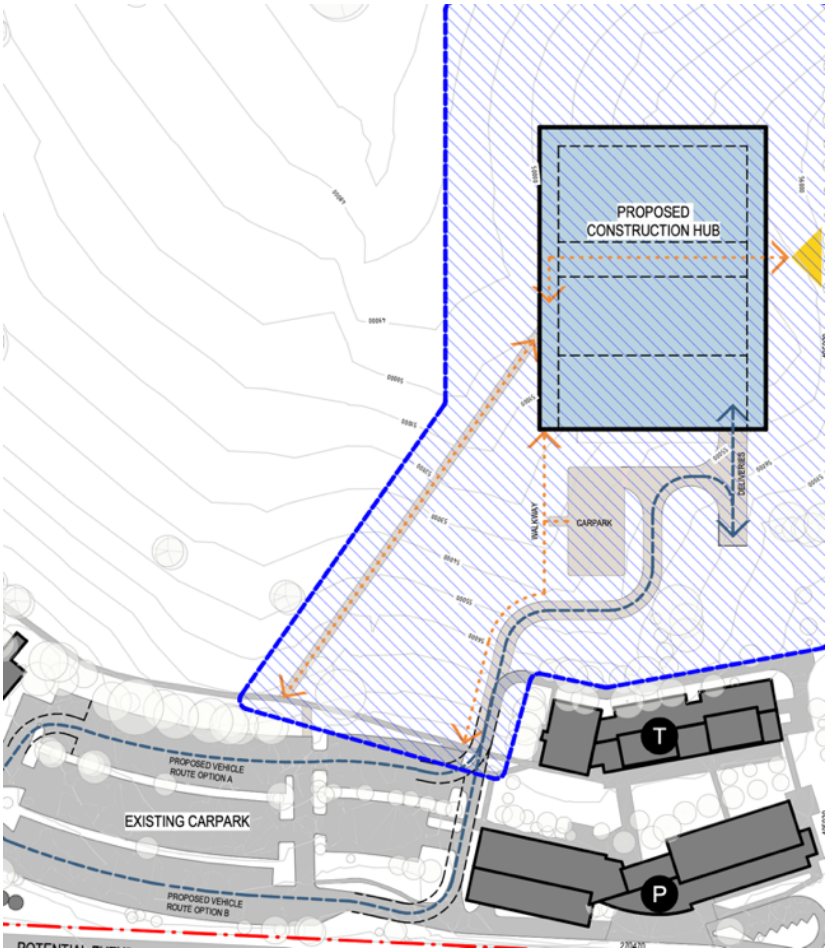
- Waste Classification Guidelines (NSW EPA 2014)
- SEARs Requirements
- Penrith Development Control Plan 2014: E12 Penrith Health and Education Precinct

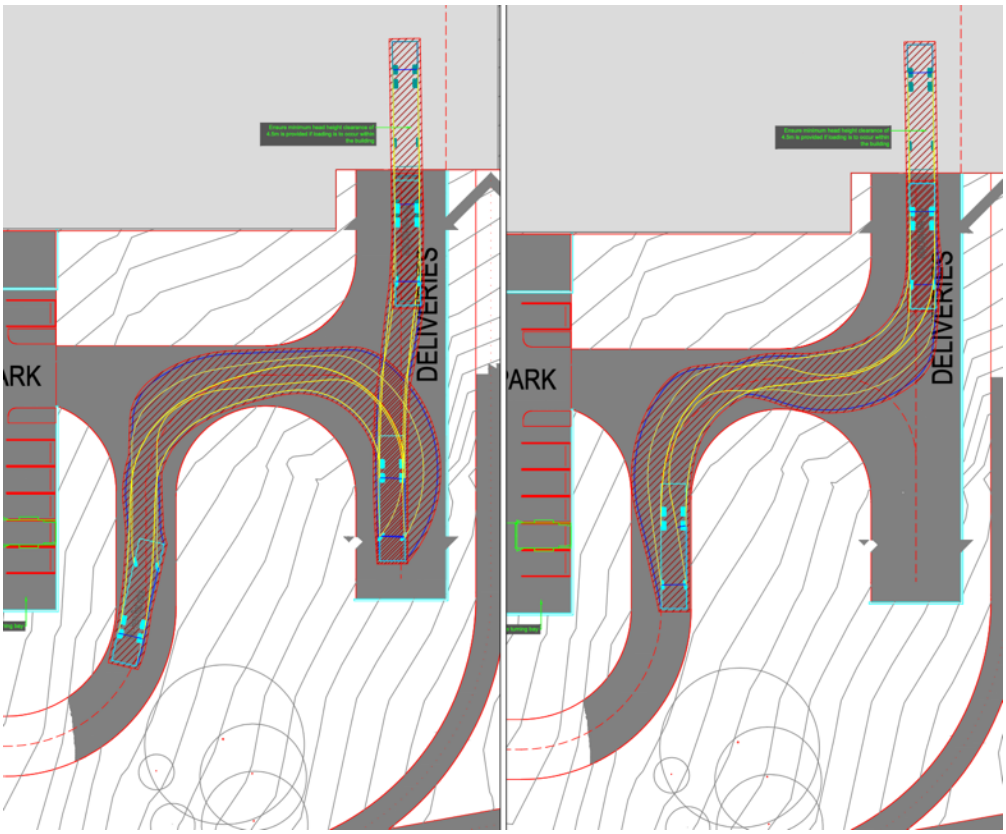
This report has been prepared by:

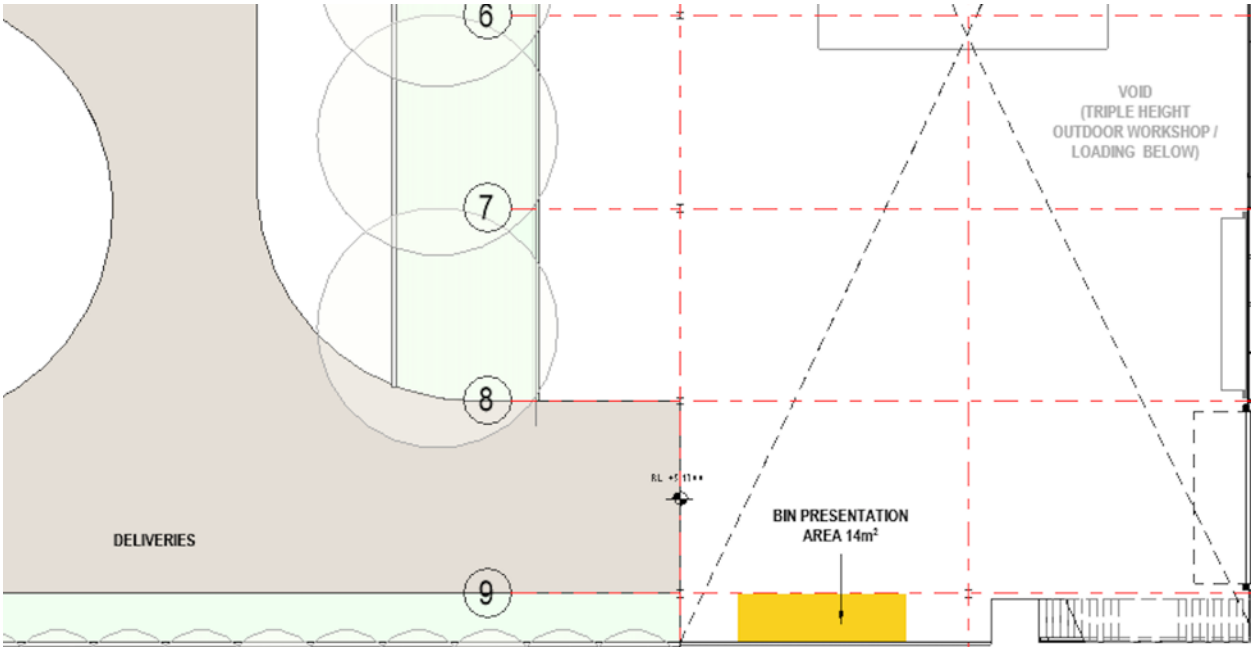
Peter Hosking

Director
Waste Audit & Consultancy Services (Aust) Pty Ltd
February 18, 2021

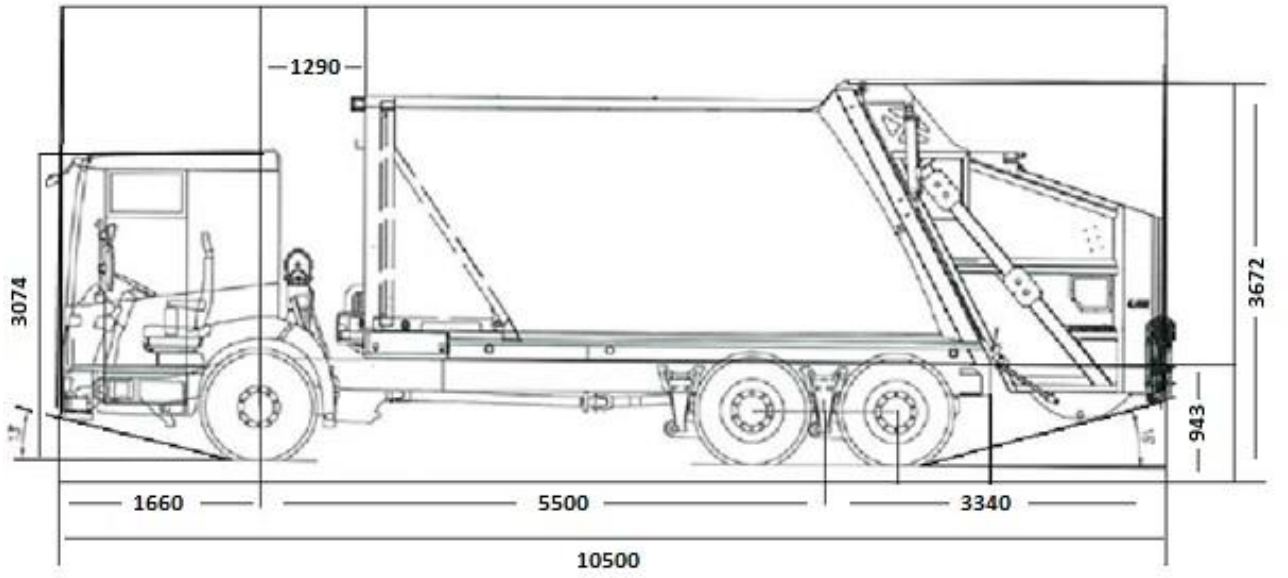
Appendix 1: Vehicle Routes & Bin Loading







Appendix 2: Waste Collection Vehicles



Appendix 3: Signage Examples

Appendix 4: Consultant Qualifications

Waste Audit & Consultancy Services (Aust) Pty Ltd specialises in providing planning, auditing, reporting, and project management services to private and government organisations across Australia. The company has been operating since 1995 and has offices in Sydney, Melbourne, and Brisbane and project delivery capacity across Australia.

The company's directors, Dale Thornton and Peter Hosking, have over 40 years of combined experience in the waste management and sustainability fields in Australia and internationally, with consistent track records of successful business management and project delivery.

Waste Audit & Consultancy Services provides a range of advisory, analytical, and project management services including the following:

- Waste Auditing
- Management of Waste and Recycling Systems
- Technology and Equipment Solutions
- Waste Management Planning
- NABERS Waste Ratings
- Carbon Footprint Analysis
- Sustainability and Compliance Reporting
- Tender Development and Management
- Financial Analysis
- Education and Training

Waste Audit & Consultancy Services has successfully completed over 500 projects over the past 25 years, ranging from audits of shopping centres and university campuses to waste management plans for small housing developments.

Please visit our website at www.wasteaudit.com.au if you would like further information on our capabilities and track record. We look forward to the opportunity to be of service.

Selected Projects 2016-2020

Client	Project	Date
Icon Project Management	Kiama Shores Seniors Living: Operational Waste Management Plan	2020
Growthbuilt	Anglicare Mount Druitt: Operational Waste Management Plan	2020
Carmichael Tompkins Property Group	Kambala School: Operational, Demolition, and Construction Waste Management Plans	2020
Coffey Projects	4-6 Bligh Street Sydney Mixed Use Development: Operational Waste Management Plan	2019
Toga	Toga Penrith Residential Development: Operational Waste Management Plan	2019
Gray Puksand	TAFE Meadowbank: Operational, Demolition, and Construction Waste Management Plans	2019
Midson	Uniting KOPWA Residential Aged Care Facility: Operational Waste Management Plan	2019
Midson	The Marion Leichhardt Residential Aged Care Facility: Operational Waste Management Plan	2019
Allen Jack & Cottier	Wee Hur Student Village: Operational & Construction Waste Management Plans	2018
Billard Leece Partnership	University of Sydney Susan Wakil Health Building: Operational Waste Management Plan	2018
Uniting Care	Hawkesbury Village Aged Care Facility: Operational Waste Management Plan	2018
Turner	Hyundai Showroom Bankstown: Operational Waste Management Plan	2018
Savills	North Shore Health Hub St Leonards: Operational Waste Management Plan	2018
University of Sydney	Chau Chak Wing Museum: Operational Waste Management Plan	2017
Geoform Architecture	1262 Canterbury Road Roselands Mixed Use Development: Operational Waste Management Plan	2017
Compass Project Management	Rouse Hill Town Centre: Commercial and Residential Operational Waste Management Plans	2017
Aurizon	Brisbane Accommodation Project: Green Star Operational Waste Management Plan	2017
University of Sydney	Health Precinct Stage 1: Operational and Construction Waste Management Plans	2017
University of Sydney	Darlington Terraces Student Accommodation: Operational Waste Management Plan	2016
Lend Lease	University of Sydney F23 Administration Building: Operational Waste Management Plan	2016