Oakdale South Development - Toyota

Waste & Recycling Management Plan

Report Number 610.16362-R2D1

27 July 2016

Goodman Property Services

GPO Box 4703

Sydney NSW 2001

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Waste & Recycling Management Plan

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1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Goodman Property Service (Aust) Pty Ltd (Goodman) to prepare a Waste & Recycling Management Plan (WMP) for the proposed construction and operation of the Toyota Parts & Accessories Facility to be located at Lot 3B of the Oakdale South Estate (OSE) on Estate Road, Eastern Creek (the Development site).

Further details of the development have been provided in **Section 4** of this document. The following report has been prepared based upon DA architectural drawings issued on 9 May 2016.

This report has been prepared to inform a State Significant Development Application (SSDA) for the staged development of the Toyota Facility. The aim of the report is to assess the potential impacts of the proposed development with regard to the management of waste and recycling, and has been prepared in accordance with the relevant waste legislation and guidance as per Section 3 of this report. The report responds to the Secretary's Environmental Assessment Requirements (SEARs) as they relate to waste generated both during the construction and ongoing operation of the development. This report supports an Environmental Impact Statement (EIS) prepared in respect of the proposal and should be read in conjunction with the EIS and development plans submitted with the SSDA.

It is noted that excavation works associated with the project site will be addressed under a separate approval.

1.1 Secretary's Environmental Assessment Requirements

The NSW Department of Planning and Environment (DPE) issued Secretary's Environmental Assessment Requirements (SEARs) for the Project on 29 June 2016. **Table 1** below identifies the SEARs relevant to this WMP and the relevant sections of the report in which they have been addressed.

Table 1 Secretary's Environmental Assessment Requirements (SSD 7663)

Key Issue	Assessment Requirement	Addressed in Section
Waste	Details of the quantities and classification of all waste streams to be generated on site.	Section 5.2, 5.4 and Section 6.2, 6.3.
	Details of waste storage, handling and disposal.	Section 5.6 – 5.8, and Section 6.5 – 6.11
	Details of the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the *NSW Waste Avoidance and resource Recovery Strategy 2014-2021.*	Section 5.5, 5.6, 5.9 – 5.13, and Section 6.4, 6.12 – 6.16

Issued: 29/06/16

Guidance to be referred to in this WMP include:

- Waste Avoidance and Resource Recovery Strategy 2012-21 (EPA);
- Waste Avoidance and Resource Recovery Performance Report 2006 (DEC);
- EPA's Waste Classification Guidelines;
- Protection of the Environment Operations (Waste) Regulations 2005; and
- Resource Recovery Exemption.

1.2 Scope

This WMP applies to the construction and on-going operation of the proposed Toyota Parts & Accessories Facility development.

The provisions contained in the WMP must be implemented at all stages of the development, and may be subject to review upon expansion or changes in operational procedures.

- See **Section 5** for the Construction WMP.
- See **Section 6** for the Operational WMP.

1.3 Objectives

The principal objective of this WMP is to identify all potential wastes likely to be generated at the site during development and operational phases of the development, including a description of how waste would be handled, processed and disposed of (or re-used/recycled), in accordance with the SEARs.

The specific objectives of this WMP are as follows:

- To encourage the minimisation of waste production and maximisation of resource recovery.
- To ensure the appropriate management of contaminated/hazardous waste.
- To identify procedures and chain of custody records for waste management.
- To assist in ensuring that any environmental impacts during the operational life of development comply with the SEARs and other relevant regulatory authority conditions.

2 BETTER PRACTICE FOR WASTE MANAGEMENT AND RECYCLING

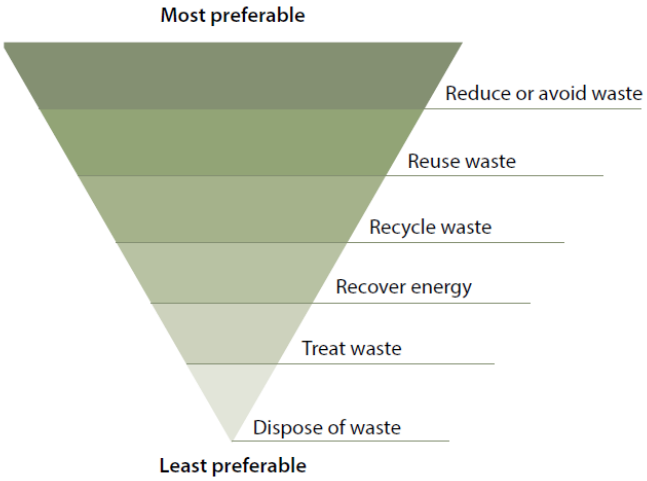
2.1 Waste Management Hierarchy

Where appropriate, this WMP aims to meet the principles of the waste management hierarchy, by promoting waste as a resource through the following in order of preference:

- Waste avoidance through prevention or reduction of waste generation. Waste avoidance is best achieved through better design and purchasing choices.
- Waste reuse, without substantially changing the form of waste.
- Waste recycling through the treatment of waste that is no longer usable in its current form to generate new products.
- Energy recovery through thermal treatment of residual waste materials and from green waste processing.
- Waste disposal, in a manner that causes the least harm to the natural environment.

The waste hierarchy (**Figure 1**) shows a classification of waste management options in order of their environmental impacts, as established under the Waste Avoidance and Resource Recovery Act 2001.

Figure 1 Waste Hierarchy



Source: NSW Waste Avoidance and Resource Recovery Strategy 2014-21 (EPA 2014)

2.2 Benefits of Implementing Better Practice

- Enhanced social and environmental reputation of an organisation.
- Reduced costs associated with waste disposal.
- Benefits to all stakeholders and the wider community.
- Improved environmental outcomes.

3 WASTE LEGISLATION AND GUIDANCE

The legislation and guidance outlined in **Table 2** below should be referred to during the demolition, construction and operational phases of the development.

Table 2 Waste Legislation and Guidance

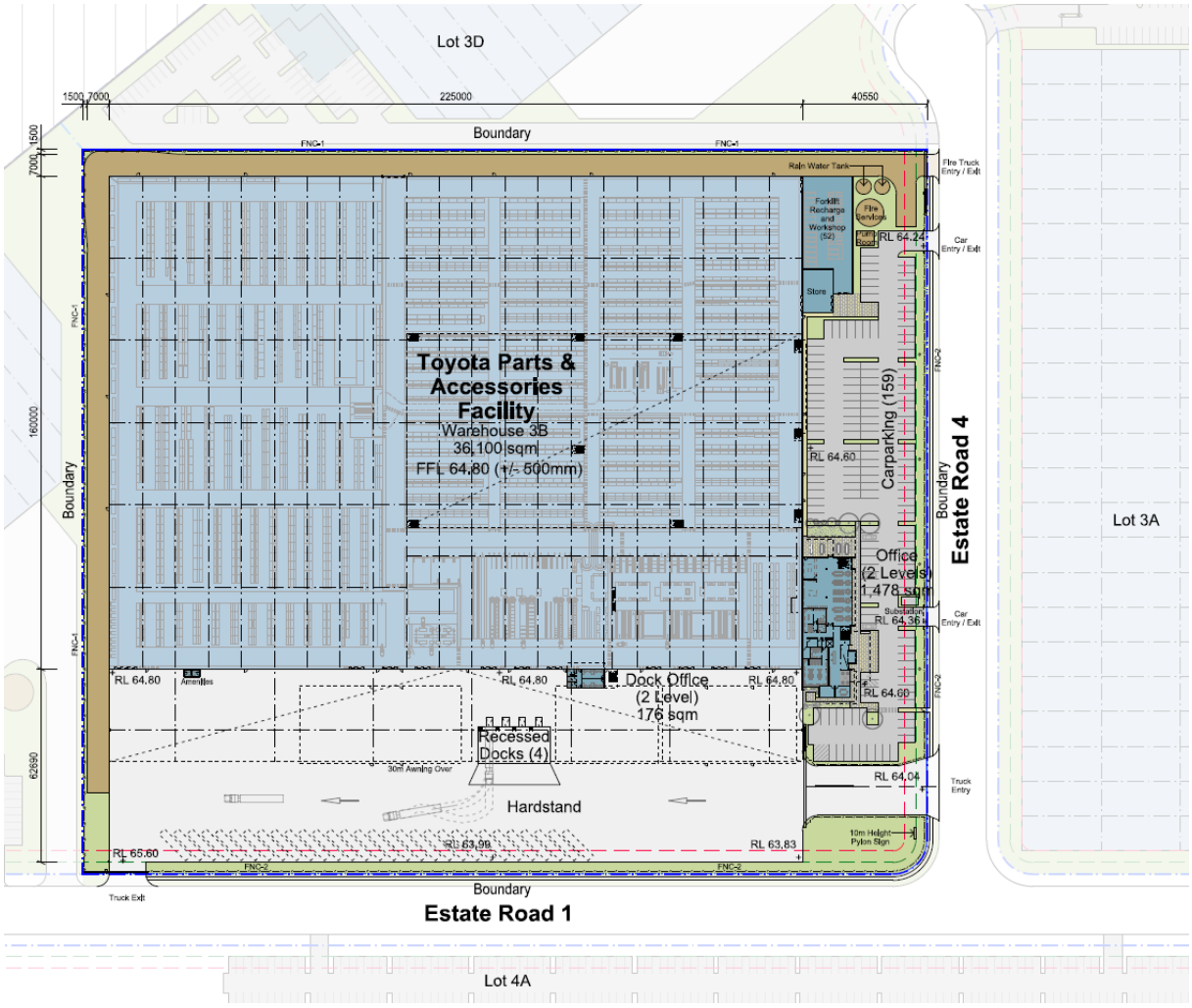
Legislation	Objectives
Waste Avoidance and Resource Recovery Act 2001	To promote extended producer responsibility in place of industry waste reduction plans. Specific objectives include: • To encourage efficient use of resources. • To minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste. • To ensure that industry shares with the community the responsibility for reducing and dealing with waste. • To ensure the efficient funding of waste and resource management planning, programs and service delivery.
Protection of the Environment Operations Act (POEO) 1997 & Amendment Act 2011	Administered by the NSW Environmental Protection Authority (EPA) to enable the Government to establish instruments for setting environmental standards, goals, protocols and guidelines. *Important Note: The owner of a premises, the employer or any person carrying on the activity which causes a pollution incident is to immediately notify the relevant authorities when material harm to the environment is caused or threatened.* A list of each relevant authority is provided in the POEO Amendment Act and will be noted in the site's incident register.
POEO (Waste) Regulation 2014	Contains provisions relating to the waste levy, waste tracking, management requirements for certain waste types, payment schemes for councils, consumer packaging recycling and other miscellaneous provisions.
EPA's Waste Classification Guidelines (Part 1) 2014	To assist waste generators to effectively classify, manage, treat and dispose of waste to ensure the environmental and human health risks associated with waste are managed appropriately and in accordance with the POEO Act and is associated regulations.
Building Code of Australia (BCA) and relevant Australian Standards (AS)	The BCA (and AS) have the aim of achieving nationally consistent, minimum necessary standards of relevant health and safety, amenity and sustainability objectives efficiently.
EPA's Waste Avoidance and Resource Recovery (WARR) Strategy 2014-21	A key component of the State Government's vision for the environmental and economic future of the state that will be supported financially by the *Waste Less, Recycle More* funding initiative providing long-term targets for 6 key result areas including reduced illegal dumping.
EPA's (DEC) Waste Avoidance and Resource Recovery (WARR) Performance Report 2006	Outlines the performance outcomes of recycling efforts contributed by the municipal, commercial and industrial, and construction and demolition sectors compared to baseline data as a result of the Waste Strategy 2003.
EPA's Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities 2012	The EPA's Better Practice Guidelines (2012) encourage efficient waste minimisation and resource recovery for commercial and industrial facilities and is used as a benchmark document when assessing waste production rates within Australia and details a range of waste management provisions.
Australian Packaging Covenant	Each building should be encouraged to establish an Action Plan to demonstrate their contribution to the achievement of the Australian Packaging Covenant's (APC) goals. The three main performance goals of the APC are: • Design: Optimise packaging to use resources efficiently and reduce environmental impact without compromising product quality/safety. • Recycling: Efficiently collect and recycle packaging. • Product Stewardship: Demonstrate commitment of all signatories.

4 SITE DESCRIPTION

The development site is located on Lot 3B of Estate Road, Eastern Creek, approximately 3.5 km west of the M7 Motorway. The primary access route to the site is via Old Wallgrove Road. The site covers a total area of approximately 6.43 hectares (ha).

The development site is illustrated in **Figure 2**.

Figure 2 Toyota Development Site



Source: SBA Architects, 9 May 2016

4.1 Development Schedule

The development schedule for Lot 3B is presented below in **Table 3**.

Table 3 Lot 3B Development Schedule

Site Area	64,290 sqm
Warehouse	36,100 sqm
Office (2 levels)	1,478 sqm
Dock Office (2 levels)	176 sqm
Forklift Charge	550 sqm
Store	140 sqm
Warehouse Amenity	12 sqm
Total Building Area	38,456 sqm
Mezzanine	8,000 sqm
Awning	6,750 sqm
Site Cover (exc. awning)	60%
Floor Space Ratio	0.60 : 1
Hardstand Area	14,820 sqm
Light Duty Area	4,120 sqm
Carparking	159
Provisional Parking	60

Source: SBA Architects, 9 May 2016

5 CONSTRUCTION WASTE MANAGEMENT PLAN

Demolition and construction stages of developments have the greatest potential for waste minimisation. Waste avoidance, appropriate segregation and reuse / recycling of wastes can help realise significant cost savings.

Key construction activities at the site include:

- earthworks to allow installation of building slabs, services and ground level features (e.g. car park, loading docks, internal roads);
- site infrastructure development;
- construction of new buildings, structures and roofing; and
- landscaping and refurbishment works.

5.1 Targets for Resource Recovery

The performance of each development contributes to overall NSW State recycling targets, which for the construction and demolition (C&D) sector, is 75% (increasing to 80% by the year 2021) of total C&D waste recycled (see NSW WARR Strategy 2014-21).

Waste minimisation measures that can be implemented to assist in achieving this resource recovery target are provided in the following sections. Waste audits will determine the actual percentage of wastes that were recycled and disposed of at landfill during the development.

5.2 Waste Streams and Classifications

The site preparation and construction phase of the development will generate the following broad waste streams:

- green waste from site clearing activities;
- construction wastes;
- plant maintenance waste;
- packaging waste;
- work compound (on-site employee) waste, and
- wastewater. (Construction related wastewater is not quantified in this WMP.)

Potential waste types along with their waste classification are provided **Table 4**.

For further information on how to determine a waste's classification refer to the EPA (2014) *Waste Classification Guidelines*.

Table 4 Potential Waste Generation with Classifications

Waste Types	NSW Classification	Waste Avoidance	Reuse and Recycling Potential / Disposal Method
Site Preparation and Construction			
Green waste / vegetation and significant trees	General solid (non-putrescible) waste	Re-locate trees and shrubs on-site were practical and feasible or sell for use off-site	Mulch for reuse on-site or compost off-site for recycling and use as fertiliser
Excavated material (soil, VEMN, EMN) (from minor top soil removal and filling works only)	General solid (non-putrescible) waste	Avoid excessive excavations	Reuse topsoil on-site where possible or reuse for similar projects. Sandstone may be incorporated in design or sold.
Sediment fencing, geotextile materials	General solid (non-putrescible) waste	Implement to required standards	Reuse at other sites where possible or disposal to landfill
Concrete (solids and washouts) and asphalt	General solid (non-putrescible) waste	Retain existing pavement were possible in design, planned work staging to avoid excessive waste	Reuse on-site where possible or recycle off-site as filling, levelling materials or as road base
Plasterboard / gyprock	General solid (non-putrescible) waste	Minimise oversupply	Off-site recycling or disposal
Plant Maintenance			
Tyres	Special waste	Check tyres air pressure is suitable for works	Off-site recycling or disposal
Empty oil and other drums / tins (e.g. fuel, chemicals, paints, spill clean ups)	Hazardous waste if the containers were previously used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and from which residues have not been removed by washing or vacuuming. General solid (non-putrescible) waste if the containers have been cleaned by washing or vacuuming.	Staged work planning to avoid wastage, minimise oversupply	Transport to comply with the transport of Dangerous Goods Code applies in preparation for off-site recycling or disposal at licensed facility. (Note: Discharge to sewer subject to Trade Waste Agreement with Sydney Water)[1]
Batteries	Hazardous waste	Use of rechargeable alternatives where practical	Off-site recycling
Packaging			
Packaging materials, including wood, plastic (including stretch wrap or LLPE), cardboard and metals	General solid (non-putrescible) waste	Ordering materials in bulk and ordering from suppliers using minimal or recyclable packaging	Return to suppliers for reuse or off-site recycling
Wooden crates	General solid (non-putrescible) waste	Careful storage for reuse	Reused for similar projects, returned to suppliers, or off-site recycling
Work Compound and Associated Offices			
Recyclable beverage containers (glass and plastic bottles, aluminium cans), tin cans	General solid (non-putrescible) waste	Ordering supplies in bulk packaging where practical, careful segregation for recycling	Co-mingled recycling at off-site licensed facility
Clean paper and cardboard	General solid (non-putrescible) waste	Careful segregation and storage for recycling	Paper and cardboard recycling at off-site licensed facility
General domestic waste generated by workers (soiled paper and cardboard, food stuffs, polystyrene)	General solid (non-putrescible) waste mixed with putrescible waste	Ordering supplies using minimal packaging, ordering materials as required to avoid excessive waste	Post-collection treatment of residual waste and/or disposal at landfill

Waste Types	NSW Classification	Waste Avoidance	Reuse and Recycling Potential / Disposal Method
Pump-out waste and septage (sewage)	Liquid (trade) waste	-	Off-site disposal at licensed facility or disposal direct to sewer where arranged with Sydney Water.

Note 1: Source: http://www.environment.nsw.gov.au/waste/envguidlns/index.htm

5.3 Construction Waste Generation Rates

The Construction Site Manager will need to specify the types and quantities of wastes produced during construction and on this basis, the numbers and capacity of skip bins can be determined.

A guide/estimate of the potential waste percentages is provided based on published waste generation rates for construction and demolition projects, as indicated in **Table 5**. These figures have been referenced from a number of sources including the Inner Sydney Waste Board's Waste Planning Guide for Development Applications (1998), Victoria's Ecorecycle Waste Wise Events toolkit, the UK's WRAP composition and conversion factors and the UK Department of Environment, Food and Rural Affairs (DEFRA) conversion factors. Conservative estimates have been made where indicative waste compositions were not available.

Table 5 Guideline to Waste Composition and Volumes - Construction

Material	Estimated Waste %	Conversion Factor (tonne per m^3)
Hard Material	32%	1.20
Timber	24%	0.34
Plastics	15%	0.25
Cement sheet	9%	0.50
Gypsum material	6%	0.20
Metals	6%	0.42
Paper/card	4%	0.40
Vegetation	3%	0.15
Soil	1%	1.20
Other (chemicals / paint)	0.3%	0.30

Source: UK WRAP 2014

The UK DEFRA and the UK Building Research Establishment (BRE) have developed a number of benchmark indicators to help determine approximate tonnages of waste produced during various construction projects including civil engineering and commercial retail works. The benchmarks include Environmental Performance Indicators (EPI) which measure the volume (cubic metres, m^3) of waste produced per 100 square metres (m^2).

The EPI indicators provided in **Table 6** have been used for the purposes of this WMP to estimate the amounts of construction wastes that could be generated by the Project.

Table 6 Environmental Performance Indicator for Waste Volumes from New Developments

Project Type	Average Volume (m3) of waste per 100 m^2
Industrial Buildings	14.0
Commercial Offices	20.4
Civil Engineering	28.1

5.4 Estimation of Waste Volumes

5.4.1 Construction of New Buildings

The estimated waste volumes and tonnes for the overall development area are presented in **Table 7** and **Table 8**. The waste arisings are based on the EPI estimates presented above in **Table 6**. Actual waste tonnage and composition will vary however this estimate is provided to inform potential on-site or off-site re-use and recycling opportunities.

Table 7 Estimated Waste Generation for the Development

Proposed Land Use	Area (m^2)	Estimated Waste (m^3)
Storage or distribution	36,100	5,054
General business (office)	1,654	337
General industrial	702	197
Car parking	3,154	886
Hardstand and light duty areas	18,940	2,652
Total	**60,550**	**9,126**

Note 1: Soft landscaping excluded.

Table 8 Estimated Waste Volumes and Materials for the Development

Material	Split (%)	Waste (m^3)	Conversion factor	Waste (tonnes)
Hard material	40%	3,651	1.20	4,381
Timber	16%	1,460	0.34	496
Plastics	7%	639	0.25	160
Cement sheet	10%	913	0.50	456
Gypsum material	14%	1,278	0.20	256
Metals	8%	730	0.42	307
Paper / card	2%	183	0.40	73
Bio-organic	2%	183	0.15	27
Soil	0%	-	1.20	-
Other (chemicals / paint)	1%	91	0.30	27
Total	**100%**	**9,126[1]**	**-**	**6,183[1]**

Note: Totals may not add up due to rounding.

It is estimated that more than 70% of the predicted construction waste arisings from Lot 3B could be re-used (on-site or at another development) or recycled off-site. As previously outlined, the NSW target for C&D waste recycling is 75% (increasing to 80% by 2021-22)[1].

It is noted that all waste generation rates are approximate only.

5.5 Waste Avoidance Measures

The Construction Site Manager will identify opportunities for waste avoidance by:

- applying practical building designs and construction techniques;
- appropriate sorting and segregation of demolition and construction wastes to ensure efficient recycling of wastes;
- selecting construction materials taking into consideration to their long lifespan and potential for reuse;
- ordering materials to size and ordering pre-cut and prefabricated materials;
- reuse of formwork (where possible);
- planned work staging;
- use of naturally ventilating buildings to reduce ductwork;
- use of prefabricated components for internal fit outs;
- reducing packaging waste on-site by returning packaging to suppliers where possible, purchasing in bulk, requesting cardboard or metal drums rather than plastics, requesting metal straps rather than shrink wrap and using returnable packaging such as pallets and reels;
- careful on-site storage and source separation;
- subcontractors informed of site waste management procedures; and
- coordination and sequencing of various trades.

[1] NSW Waste and Avoidance Resource Recovery Strategy 2014-21

The Construction Site Manager, in consultation with Goodman, will advise on material selection for the reduction of embodied energy and resource depletion. This includes:

- the use of recycled concrete and steel;
- the reduction of PVC use;
- the use of low VOC (volatile organic compounds) paints, floor coverings and adhesives;
- the use of low formaldehyde wood products and post-consumer reused timber or Forest Stewardship Council (FSC) certified timber where possible;
- the use of fittings and furnishings that have been recycled, are made from or incorporate recycled materials, and have been certified as sustainable or environmentally friendly by a recognised third party certification scheme; and
- the use of building materials, fittings and furnishings including structural framing, roofing and façade cladding chosen with consideration to their longevity, adaptation, disassembly, reuse and recycling potential.

Effective management of construction materials and C&D waste, including options for reuse and recycling where applicable and practicable, will be conducted. Only wastes that cannot be cost effectively reused or recycled are to be sent to landfill or appropriate disposal facilities.

Refer to **Table 2** for an outline of the potential reuse, recycling and disposal methods for potential waste streams generated by the development.

The following procedures are to be implemented:

- concrete, tiles and bricks will be reused on-site or re-used / recycled off-site;
- waste oil will be recycled or disposed of in an appropriate manner;
- all solid waste timber, brick, concrete, tiles and rock that cannot be reused or recycled will be taken to an appropriate facility for treatment to recover further resources or for disposal to landfill in an approved manner;
- all asbestos, hazardous and/or intractable wastes are to be disposed of in accordance with Workcover Authority and EPA requirements;
- portable, self-contained toilet and washroom facilities will be provided at the site and will be regularly emptied and serviced by a suitably licensed contractor;
- provision for the collection of batteries, fluorescent tubes and other recyclable resources will be provided on site to enable off-site recycling;
- beverage container recycling should be provided on-site or these items sorted for recycling at an appropriately licensed facility;
- all garbage will be disposed of via a council approved system; and
- opportunities for materials exportation and reuse with other local construction operations will be investigated. This will have two benefits: minimising energy through reduction of material reprocessing, encouraging material reuse.

5.5.1 Site Specific Procedures

The Construction Site Manager will also consider implementation of the following procedures:

- all used crates will be stored for reuse unless damaged;
- all cardboard waste is to be recycled via on-site recycling compactors which shall be collected by an appropriate recycling contractor;
- all glass and metals that can be economically recycled will be;
- all re-enforcing mesh to be utilised within the construction stages of the construction;
- colour bond roof material off cuts to be stockpiled on site for reuse or recycling;
- waste concrete will be disposed of at a crushing/recycling plant where practicable;
- waste bricks will be crushed and utilised on site. All half/damaged bricks and blacks will be stored on site to be removed for offsite crushing and recycling;
- minor excavation material will be reused on-site where possible with all excess reused on other projects or sold; and
- all other solid waste including bitumen paving, tile, timber, rock and soil will be taken to an appropriately licensed materials recycling facility / landfill site and processed in an approved manner.

5.6 Waste Segregation

For construction stages, consider minimum dedicated skips for:

- timber;
- plasterboard/gyprock;
- concrete;
- bricks;
- steel/scrap metal;
- general waste; and
- other waste (i.e. for the collection of materials that may be re-used on future projects).

Separate receptacles for the safe disposal of hazardous waste types (i.e. batteries) will also be provided where applicable.

Where possible, employee beverage container recycling bins will be provided nearby common areas at work compounds/work sites for plastic and glass bottles, soft drink cans, aluminium and tin cans to ensure these items do not end up at landfill. Specialised bins for cigarette butts should also be provided outside lunchrooms and nearby common areas at work compounds/work sites.

5.7 Space and Amenity

Waste storage areas will be accessible and allow sufficient space for storage and servicing requirements. The storage areas will also be flexible in order to cater for change of use throughout the Project.

Where space is restricted, dedicated stockpile areas are to be delineated on the site, with regular transfers to dedicated skip bins for sorting. The positions of the designated waste holding areas on site will change according to building works and the progression of the development, but must consider visual amenity, OH&S and accessibility in their selection.

All waste placed in stockpile areas/skips for disposal or recycling shall be adequately contained to ensure that the waste does not fall, blow, wash or otherwise escape from the site. Appropriate siting of waste stockpile locations will take into account slope and drainage factors to avoid contamination of stormwater drains during rain events.

Waste containers are to be kept clean and in a good state of repair.

5.8 Servicing and Transport

The frequency of the waste removal will, in most cases, be dictated by the volume of material being deposited into each of the dedicated skips.

Skips are to be checked on a daily basis by the Construction Site Manager to ensure that they are not overflowing. If skips are reaching capacity, removal and replacement must be organised with the next 24 hours. All skips leaving the project site will be covered with a suitable tarpaulin to ensure that the spillage of wastes from the skips whilst in transit is eliminated.

All waste collection activities for demolition and construction are to be conducted between 7am and 6pm daily.

All site generated building waste collected in the skip bins will leave the site and be deposited in the approved recycling centre, transfer station or landfill site.

5.8.1 Contaminated / Hazardous Waste

During the construction phase of the development, there must be a commitment to engage qualified and certified contractors to remove all contaminated/hazardous materials (e.g. asbestos) and dispose of all contaminated/hazardous waste at an appropriately licenced facility, where applicable.

In the event that any contaminated or hazardous materials are unexpectedly uncovered during demolition or excavation works, the Construction Site Manager is to stop work immediately and contact the relevant hazardous waste contractor prior to further works being undertaken in the area.

Contaminated material stockpiled on site will be minimised as far as possible and should be stored on HD polythene liner, in a bunded location which is protected from inclement weather. Sediment fences should also be installed around the base of stockpiles and the stockpiles should be covered. Where excavated material requires validations, samples should be taken for NATA laboratory testing as per the requirements of the contamination assessment prior to restoration works, backfilling exercises and disposal.

Any trucks carrying contaminated materials should be securely and completely covered immediately after loading the materials, to prevent windblown emissions and spillage.

Decontamination of all equipment prior to demobilisation from the site is important in order that contaminated materials are not spread off-site. This should be achieved using dry cleaning methods as far as practicable and collection of material for disposal. The following additional measures should be employed on site:

- as far as possible, all tracked surfaces to be kept free of contaminated material; and
- all equipment should be cleaned in an area contained contaminated soils so that they remain within the area, or on a lined surface and collected spoil should be treated as contaminated material.

5.8.2 Liquid Waste / Stormwater / Wastewater Management

Liquid waste is often produced from the washing down of plant and apparatus. Any liquid wastes or dangerous goods wastes generated by the development (e.g. due to damage or leakage of containment) will be disposed of by a suitably qualified contractor to an appropriately licensed disposal facility. Washdown of equipment, plant and machinery and concrete delivery trucks will take place off-site or on-site within a specified and appropriately bunded washdown bay. There may be a local sewer that this waste water can be connected to; alternatively, this could be transferred into a localised waste water treatment facility or plant.

Waste water storage tanks (where applicable) will be carefully monitored to ensure overflow does not occur and no liquid wastes or wash down waters will be disposed of via the stormwater drainage system. Any refuelling activities will be undertaken off-site or at on-site designated areas with appropriate spill containment measures to avoid overspill to sensitive areas.

5.8.3 Spills Management

Spills on the worksite are most likely to involve fuel, hydraulic oil or engine oil spilled from plant items, and paints and solvents.

If a spillage occurs, site staff will immediately identify the spilled materials and notify the Construction Site Manager. Then contain the spill as soon as possible so it doesn't spread.

Containment measures for spillages will be provided at appropriate locations and in close proximity to staff car park areas, dangerous goods stores areas and main Project work areas (e.g. a spill kit containing non-combustible absorbent material).

Material Safety Data Sheets (MSDS) will also be located nearby spill kit areas for advice on spillage clean-up and disposal.

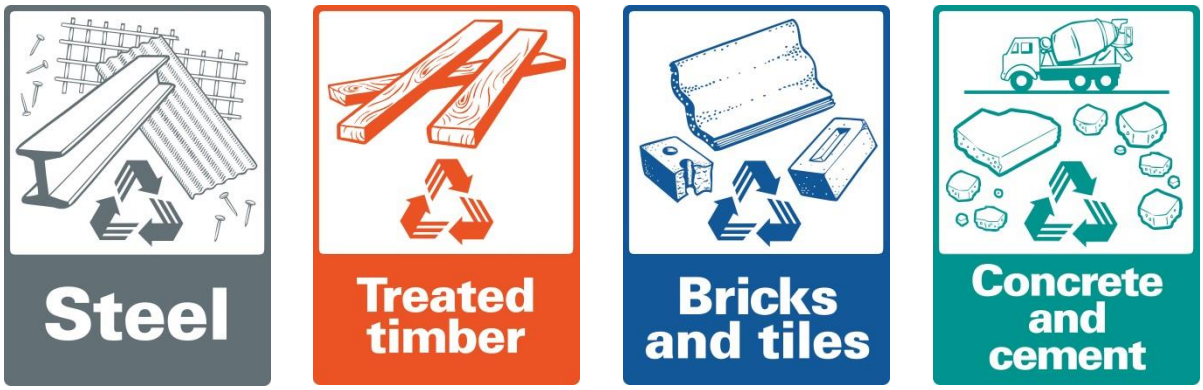
5.9 Signage

Standard signage will be posted in all storage/waste collection areas and all skips/drums/bins are required to be labelled correctly and clearly to identify materials stored within.

Where applicable, general and co-mingled recycling bins placed nearby staff tearoom/break areas will be colour coded with clear labels.

Refer to the EPA's website under 'waste tools' for construction and demolition waste and recycling signs (see also **Figure 3**).

Figure 3 Australian Standard Signs



Source: http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm

5.10 Training and Awareness

All staff (including sub-contractors and site staff) employed during the construction phases of the development must undergo induction training regarding waste management for the development site.

Induction training is to cover, as a minimum, an outline of the WMP including:

- legal obligations;
- emergency response procedures on site;
- waste storage locations and separation of waste;
- the implications of poor waste management practices;
- correct use of General Purpose Spill Kit; and
- details of responsibility and reporting (including identification of personnel responsible for waste management and individual responsibilities).

It is the responsibility of the Construction Site Manager or Environmental Management Representative (EMR) to notify Council of the appointment of waste removal, transport or disposal contractors.

5.11 Monitoring and Reporting

The following measures will be undertaken to improve demolition and construction waste management and to provide more reliable waste generation figures:

1. Compare projected waste quantities with actual waste quantities produced.
2. Conduct waste audits of current projects (where feasible).
3. Note waste generated and disposal methods.
4. Look at past waste disposal receipts.
5. Record this information to track waste avoidance, reuse and recycling performance and to help in waste estimations for future waste management plans.

Records of waste volumes recycled, reused or contractor removed are to be maintained and reported to the Principal Contractor on a quarterly basis. Additionally, dockets/receipts verifying recycling/disposal in accordance with the WMP must be kept.

Daily visual inspections of waste storage areas will be undertaken by site personnel and inspection checklists/logs recorded for reporting to the Construction Site Manager or EMR on a weekly basis or as required. These inspections will be used to identify and rectify any resource and waste management issues.

Waste audits are to be carried out by the EMR to gauge the effectiveness and efficiency of waste segregation procedures and recycling/reuse initiatives. Where audits show that the above procedures are not carried out effectively, additional staff training will be undertaken and signage re-examined.

5.12 Incident Response

Incidents occurring during the construction phase of the Project may involve fuel or chemical spills, seepage or mishandling of hazardous waste, or unlicensed discharge of pollutants to the environment.

All environmental incidents are to be dealt with promptly to minimise potential impacts. An incident register must be maintained on-site at all times and include the contact details of the 24 hour EPA Pollution line.

5.13 Roles and Responsibilities

All personnel have a responsibility for their own environmental performance and compliance with all legislation. It will be the responsibility of the Contractor to implement the WMP, and an employee responsibility to ensure that they comply with the guideline at all times.

Where possible, an Environmental Management Representative (EMR) should be appointed for the Project. Suggested roles and responsibilities are provided below.

Table 9 Recommended Roles and Responsibilities

Role	Responsibility
Construction Site Manager	• Ensuring plant and equipment are well maintained. • Ordering only the required amount of materials. • Keeping materials segregated to maximise reuse and recycling. • Ultimately responsible for routinely check waste sorting and storage areas for cleanliness, hygiene and OH&S issues, contaminated waste materials, and also ensuring that all monitoring and audit results are well documented and carried out as specified in the WMP.
Environmental Management Representative (EMR) or equivalent role	• Approaching and establishing the local commercial reuse of materials where reuse on-site is not practical. • Establishing separate skips and recycling bins for effective waste segregation and recycling purposes. • Ensuring staff and contractors are aware of site requirements. • Provision of training of the requirements of the WMP and specific waste management strategies adopted for the Project. • Contaminated waste management and approval of off-site waste transport, disposal locations and checking licensing requirements. • Approval of off-site waste disposal locations and checking licensing requirements. • Assessment of suspicious potentially contaminated materials, hazardous materials and liquid wastes. • Monitoring, inspection and reporting requirements.

Daily visual inspections of waste storage areas may be delegated to other on site staff. All subcontractors will be responsible for ensuring that their work complies with the WMP through the site induction and contract engagement process.

6 OPERATIONAL WASTE MANAGEMENT

Ineffective waste management for commercial premises can lead to environmental pollution, offensive odours, litter, attraction of vermin and occupational safety and hygiene problems.

Effective waste management reduces costs through the reuse of resources and minimisation of fees associated with removal, transportation and disposal of waste, and improves environmental outcomes locally, regionally and globally. Effective waste management is achieved through the implementation of a WMP for the operational life of the development.

6.1 Targets for Resource Recovery

The performance of each development contributes to overall NSW State recycling targets, which for the commercial and industrial (C&I) sector, represents 57% (increasing to 70% by the year 2021) of total residential waste recycled (see NSW WARR Strategy 2014-21).

6.2 Waste Streams and Classifications

The operation of the Project will generate the following broad waste streams:

- general waste;
- packaging wastes (cardboard, paper, plastic, timber / pallets);
- steel;
- office wastes;
- garden organics;
- amenity wastes; and
- maintenance wastes.

Potential waste types along with their waste classification are provided in **Table 10**.

For further information on how to determine a waste's classification, refer to the EPA (2014) *Waste Classification Guidelines.*

Table 10 Potential Waste Generation with Classifications

Waste Types	NSW Classification	Proposed Reuse / Recycling / Disposal Method
General Operations		
General garbage (including non-recyclable plastics)	General solid (putrescible and non-putrescible) waste	Disposal at landfill
Recyclable beverage containers (glass and plastic bottles, aluminium cans), tin cans	General solid (non-putrescible) waste	Co-mingled recycling at off-site licensed facility
Clean office paper	General solid (non-putrescible) waste	Paper recycling at off-site licensed facility
Cardboard / Bulk Cardboard	General solid (non-putrescible) waste	Cardboard recycling at off-site licensed facility
Plastic packaging materials (including stretch wrap, polystyrene)	General solid (non-putrescible) waste	Baled and sent for off-site recycling
Wooden crates / pallets / timber	General solid (non-putrescible) waste	Reused for similar projects, returned to suppliers, or off-site recycling
Steel	General solid (non-putrescible) waste	Off-site recycling
E-waste, batteries, printer toners and ink cartridges	Hazardous waste	Off-site recycling (free disposal box / bags and pickup service exists for printer toners and ink cartridges)
Wastewater from amenities and kitchens	--	Disposal to sewerage
Sanitary waste	General solid (putrescible) waste	Contractor disposal at licensed facility
Maintenance		
Spent smoke detectors[1]	General solid (non-putrescible) waste OR Hazardous waste (some commercial varieties)	Disposal to landfill OR off-site disposal at licensed facility
Light bulbs / fluorescent tubes	Hazardous waste	Off-site recycling
Cleaning chemicals, laundry chemicals (bleach etc.), solvents, area wash downs, empty oil / paint drums / chemical containers	Hazardous waste if containers used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and residues have not been removed by washing or vacuuming. General solid (non-putrescible) waste if containers cleaned by washing or vacuuming.	Transport to comply with the transport of Dangerous Goods Code applies in preparation for off-site recycling or disposal at licensed facility. (Note: Discharge to sewer subject to Trade Waste Agreement with Sydney Water)[1]
Air-conditioning parts and filters	General solid (non-putrescible) waste	Disposal to landfill
Garden organics / green waste (lawn mowing, tree branches, hedge cuttings, leaves etc.)	General solid (non-putrescible) waste	Option to reuse on site as mulch or to organise collection. Alternatively, contractor/gardener removal for recycling at licensed facility.

Source: http://www.environment.nsw.gov.au/waste/envguidlns/index.htm

Note 1: The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) require that when more than 10 smoke alarms (particularly americium-241 sources) are collected for bulk disposal they must be treated as radioactive waste. Contact ARPANSA for more information.

6.3 Estimated Waste Generation

The waste volumes generated will be influenced by the employee's attitude to segregation, recycling and disposal, and the adequacy of signage and education provided for the employees and residents.

6.3.1 Solid Waste

Approximate waste generation rates provided by EPA data are used to calculate the anticipated waste amounts for the proposed development and are presented in **Table 11**.

Table 11 Guideline Waste Generation Rates

Type of Premises	Facility Area	General Waste Generation	Recycling Generation[1]
Warehouse	Warehouse & Storage	30 L/100 m^2/day	30 L/100 m^2/day
Offices	Offices	10 L/100 m^2/day	10 L/100 m^2/day
Kitchen Areas	Restaurant	2.0 L per meal	0.9 L per meal

Source: EPA's Better Practice Guidelines for Waste Management and Recycling in C&I Facilities (2012).

Note 1. Recyclable waste generation includes paper and cardboard waste, as well as mixed container recyclables.

The approximate volumes have been converted into tonnes by applying conversation rates taken from Victoria's Ecorecycle Waste Wise Events toolkit for 'garbage' (0.15 tonnes per 1000 L) and 'co-mingled containers' (0.063 tonnes per 1000 L).

Table 12 Estimated Operational Waste Generation Rates (L/day)[1]

Facility Area	Approx. Area (m^2)	Garbage Average L/day	Recycling Average L/day	Garbage Average L/wk	Recycling Average L/wk
Warehouse	36,100	10,830	10,830	75,810	75,810
Offices	1,654	165	165	1,158	1,158
	No. of People				
Kitchen Areas	150	600	270	4,200	1,890
Total Volume	**-**	**11,595**	**11,265**	**76,968**	**76,968**
Total Tonnes	**-**	**1.7**	**0.7**	**11.5**	**4.8**

Note 1. All waste generation rates are approximate and maximum occupancy rates assumed.

Waste generation rates in **Table 13** above do not provide estimates for the generation of steel, timber and cardboard. Toyota has provided waste generation rates for a representative Toyota Warehouse Facility and these are outlined below:

Table 13 Waste Generation Rates for a Representative Toyota Warehouse Facility

Waste Type	Cardboard	Steel	Timber	General Waste	TOTAL
Tonnages Per Annum	104.64	11.4	267.12	21	**404.16**

Source: Toyota 2016

According to the above information, all cardboard, steel and timber is recycled (i.e. a total of 383.16 tonnes recycling per annum) and recycling tonnages represent approximately 95% of all waste generated.

6.3.2 Wastewater

Estimated operational wastewater generation for the facility is 10.5 ML per year and 202 kL per week.

The wastewater generation estimate is based on:

- a wastewater generation rate of 70,000 L per person per year[2]. This rate, which is for domestic wastewater, is considered commensurate with the proposed use of the facility, which is understood to be primarily for storage of parts and accessories, and
- the Toyoto Facility is expected to employ 150 people (based on assumed maximum occupancy of seats).

6.4 Waste Avoidance, Re-use and Recycling Measures

6.4.1 Waste Avoidance

Waste avoidance measures may include:

- provision of take back services to clients to reduce waste further along the supply chain;
- re-work/re-packaging of products prior to local distribution to reduce waste arisings;
- review of packaging design to reduce waste but maintain 'fit for purpose'; and
- investigating leased office equipment and machinery rather than purchase and disposal.

6.4.2 Re-use

Establish systems in-house and with supply chain stakeholders to transport products in re-useable packaging where possible.

6.4.3 Recycling

Recycling opportunities include:

- development of 'buy recycled' purchasing policy;
- flatten or bale cardboard to reduce number of bin lifts required; and
- providing recycling collections within each of the offices and tearooms (e.g. plastics, cans and glass).

[2] Source: ANZECC/ARMCANZ (1997) *Australian Guidelines for Sewerage Systems – Effluent Management*

6.5 General Waste and Recycling Storage

6.5.1 Bins Types and Number

Typical capacities for lidded, front-lift bins range from 1,500 L, 3,000 L and 4,000 L (corresponding to bin sizes of 1.5 m^3, 3 m^3 and 4 m^3.

Based on a frequency of waste collection from the facility of once a week and the waste volumes estimated in **Section 6**, **Table 14** provides an estimate of the number of bins that would be needed to service the general and recyclable waste generated by the facility over a 7-day working week.

Table 14 Estimated Number of Bins

	Compaction Ratio			
Bin Capacity	**1:1 (no compaction)**	**2:1**	**4:1**	**6:1**
1,500 L (1.5 m^3)	103	52	26	18
3,000 L (3 m^3)	52	26	13	9
4,000 L (4 m^3)	39	20	10	7

Note: The actual number of bins required for compacted waste will depend on the size and shape of compacted waste produced by the compactor, as well as the extent of packing achieved within bins.

A twice-weekly collection frequency will allow the number of bins shown in **Table 14** to be halved.

Depending on contractual arrangements organised with the site manager employed, management of garden organics waste arising from the maintenance of the landscaped areas will either be the responsibility of the landscaping contractor or of Management.

6.5.2 Waste and Recycling Storage Area

A dedicated waste and recycling storage area has been provided nearby the loading dock area where the recycling bins, garbage skips, and cardboard and plastic bales will be stored prior to collection.

Sufficient space is required to encourage appropriate segregation and storage of varying waste and recyclable material types, including space provision for the collection of fluorescent tubes, smoke detectors, e-wastes and other recyclable resources.

The construction of garbage areas, rooms and equipment are to comply with BCA (Building Code of Australia) requirements and Australian Standards.

The waste and recycling storage area will incorporate a number of measures to ensure best practice waste management:

- The storage area shall be located on a smooth, impervious ground surface.
- The storage area should be under cover (e.g. awning).
- Surface water should not collect at the storage area.
- Vermin management measures should be implemented at and around the storage area.
- Doors/gates to the storage area will be able to be opened from both the inside and outside and wide enough to allow for easy passage of waste/recycling containers.
- Transfer paths for garbage bins between the warehouse and the storage area, and also between the storage area and the collection point will be free of steps.
- The storage area should allow ready access by waste collection vehicles;
- Bins requiring emptying by private contractor will be stored on a level surface.
- Sufficient clearance is necessary to enable collection vehicles to access the bin storage area.

- The location of the storage area should not impede movements of vehicles using/servicing the facility, nor create blind-spots for vehicular traffic.
- Where possible, collection times should not coincide with peak operational delivery schedules however all areas identified will not interfere with operational truck movements.
- Clear and easy to read signs and warning signs should be displayed as appropriate to identify the area as a waste and recycling storage area.

6.6 General Waste and Recycling Transfer and Servicing

Cleaners/employees will transfer general and recyclable waste from warehouse and office areas to the compaction room or lidded front-lift bins via mobile garbage bins (MGBs).

General waste should be transferred from warehouse and office areas to the waste storage or compaction room for compaction. Dedicated and trained compaction room operators shall be responsible for compaction of waste.

Recyclable waste should be transferred from warehouse and office areas to lidded front-lift bins, which are clearly marked for storing recyclable waste, in the waste storage area.

Separate, clearly labelled MGBs should be used for general waste and recyclable waste.

6.7 Bulky / Hazardous Waste Management

Sufficient space will be provided within the development for the storage of large and/or bulky items (eg. broken pallets, broken storage units and e-waste such as batteries, fluorescent tubes and smoke detectors) that cannot be disposed of in the general or recyclable waste stream. Space will also be allocated to store reusable items such as crates so that storage in a public place is avoided.

Management may consider organising a skip on a monthly basis or as required to remove bulky waste items, or engage a contractor to collect and transport these items for reuse, recycling or disposal at an EPA licensed facility.

6.8 Contaminated / Hazardous Wastes

- All contaminated and hazardous wastes (i.e. fluorescent tubing, batteries, e-wastes and smoke detectors) should be recycled at an appropriately licensed facility.
- E-waste (electronic waste such as computers, mobile phones, printer toners and ink cartridges) and batteries contain heavy metal contaminants and should be recycled at an appropriately licensed recycling facility.
- Commercial-use smoke detectors should be returned to the supplier for disposal (it is a condition of the supplier's licence to sell smoke detectors) and not disposed of with general landfill waste as they contain small amounts of radioactive material. Contact the supplier and/or the EPA for information on how to return used smoke detectors.

6.9 Liquid Waste

- Liquid, semi-liquids or moist substances will not be placed in waste containers, unless securely wrapped or contained to prevent the substance from leaking.
- Any liquid wastes or dangerous goods wastes generated by the development (e.g. due to damage or leakage of containment) should be disposed of by a suitably qualified contractor to an appropriately licensed disposal facility.
- No liquid wastes or wash down waters should be disposed of via the stormwater drainage system. Wastewater storage tanks (including stormwater collection tanks) should be carefully monitored to ensure overflow does not occur.

6.10 Stormwater Treatment

Car parking areas must drain to a stormwater treatment device capable of removing litter, oil, grease and sediment prior to discharge to the stormwater system.

All wastewater and stormwater treatment devices are required to be regularly maintained and cleaned to ensure these devices remain effective, with all solid and liquid wastes collected from these devices disposed of in accordance with this WMP and the POEO Act.

6.11 Spills Management

Containment measures for spillages should be provided at appropriate locations and in close proximity to staff car park areas, dangerous goods stores areas and main warehouse operation areas (e.g. a spill kit containing non-combustible absorbent material). Material Safety Data Sheets (MSDS) should also be located nearby spill kit areas for advice on spillage clean up and disposal.

6.12 Signage

Education and communication must be regular and ongoing to overcome the transient nature of contractors and visiting staff members. The main signage aspects to consider are:

- general waste (garbage) and recycling bins and storage areas must be clearly and correctly labelled / indicated at all times;
- waste storage areas must have clear signage instructing cleaners and tenants how to correctly separate (if required);
- the location of, and directions to, waste storage areas must be well signposted;
- all hazards or potential dangers associated with the waste facilities should be clearly identified, especially those linked to compaction or other waste handling equipment; and
- emergency contact information should be displayed in case there are any issues with the waste and recycling systems/services in the building.

All signage should conform to the relevant Australian Standard and the NSW EPA's standard recycling signs. The design and use of safety signs for waste rooms and enclosures should comply with AS 1319 Safety signs for the occupational environment. Australian Standards are available from the SAI Global Limited website (www.saiglobal.com).

6.13 Communication Strategies

Waste management initiatives and management measures should be clearly communicated to building managers, owners, tenants and cleaners. Benefits of providing this communication include:

- improved satisfaction with services;
- increased ability and willingness to participate in recycling;
- improved amenity and safety;
- improved knowledge and awareness through standardisation of services;
- increased awareness or achievement of environmental goals and targets;
- reduced contamination of recyclables stream; and
- increased recovery of recyclables and organics (where implemented) material.

To realise the above benefits, the following communication strategies should be considered:

- use consistent signage and colour coding throughout the development;
- ensure all staff are trained in correct waste separation and management procedures;
- provide directional signage to show location of and routes to waste storage areas;
- co-mingled and general waste bins should be clearly labelled to ensure no cross contamination;
- any employees / contractors should adhere to the WMP for compliance, in consultation with Management; and
- repair signs and labels promptly to avoid breakdown of communications.

The full set of signage can be found on the EPA's website.[3]

6.14 Contract Clauses

Waste collection contracts and cleaning contracts should include clauses relating to waste servicing requirements. Lease agreements should also outline and enforce proper use of waste facilities.

Refer to Appendix H of the EPA's *Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities* (2012) for example clauses.

6.15 Monitoring and Reporting

Visual assessment of bins prior to collection should be undertaken by Management within the first few months of the facility becoming operational and reaching peak operations to ensure the waste management system is sufficient for the developments' needs, as well as on a half-yearly basis to ensure employees are continuing to segregate waste and recycling correctly.

Where visual audits show that recycling is not carried out effectively, signage should be re-examined.

[3] http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm

6.16 Roles and Responsibilities

It should be the responsibility of Management to implement the WMP and a responsibility of the employees and building caretakers/cleaners to ensure that they comply with the guideline at all times.

Management should routinely check waste sorting and storage areas for cleanliness, hygiene and OH&S issues, and also ensure all monitoring and audit results are well documented and carried out as specified in the WMP.

An outline of waste management responsibilities are presented in **Table 15**.

Table 15 Waste Management Responsibility Allocation

Responsible Person	General Tasks
Building Management	Ensure the WMP is implemented throughout the operational life of the facility.
	Review and update the WMP on a regular basis (e.g. annually) to ensure the WMP remains applicable.
	Undertake liaison and management of contractor collections.
	Perform a visual waste inspection of bin fullness once Warehouse 3B is fully operational.
	Manage any complaints and non-compliances reported through waste audits etc.
	Perform inspections of all waste storage areas on a regular basis for cleanliness.
	Organise cleaning and maintenance requirements for waste storage areas and bins as required.
	Ensure effective signage, communication and education is provided to alert new tenants/cleaners about the provisions of this WMP.
	Monitor and maintain signage to ensure it remains clean, clear and applicable.
	Ultimately responsible for the management of all waste management equipment, cleaning requirements, waste transfer and collection arrangements.
Cleaners / Caretaker / Employees	Monitor bins to ensure no overfilling occurs.
	Ensure waste and recycling storage areas are kept tidy.
	Ensure segregation between general waste and recycling.
	Transfer of waste to the waste storage area as required.
	Cleaning of all bins and waste and recycling area as required.
Gardening Contractor	Placing all garden organics into an appropriately labelled bin for recycling or reuse as organic mulch on landscaped gardens.
	Removal of any large garden organics waste materials which are too large to be recycled via contractor collections (if applicable).