

APPENDIX 12

WASTE MANAGEMENT PLAN





global environmental solutions

Mainfreight Facility Expansion
Prestons Distribution Centre
Goodman Property Services

Report Number 630.10523.0000

8 February 2013



Version: Final

Mainfreight Facility Expansion

Prestons Distribution Centre

Goodman Property Services

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DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
630.10523.0000	Final	20 February 2013	Gemma Dawson	Jason Watson	Jason Watson

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1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR Consulting) was commissioned by McKenzie Group Consulting on behalf of Goodman Property Services to undertake a Waste Management Plan (WMP) for the proposed development located at 26 Yarrowa Street, Prestons, NSW.

The WMP has been undertaken in accordance with SLR's Offer of Services, Provision of a Waste Management Plan dated 6th February 2013.

1.1 Objective

The principal objective of this WMP is to identify all potential wastes likely to be generated on site during the construction phase of the Project, including a description of how waste would be handled, processed and disposed of (or reused/recycled).

The specific objectives of this WMP are as follows:

- To encourage the minimisation of waste production and maximisation of resource recovery.
- To encourage improved environmental outcomes through waste management.
- To ensure the appropriate management of contaminated or hazardous waste.
- To identify procedures and chain of custody for waste management.
- To ensure the long term sustainability of resource use through more efficient, cost effective use of materials.

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

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

As an example, Penrith City Council state 'unsorted construction and demolition waste accounts for up to 1.5 million tonnes of waste going to landfills within Sydney each year'. These volumes together with the limited capacity of available landfill have resulted in the need for new developments to consider waste management as part of the development process. Waste Management Plans are just one means of ensuring that appropriate actions are taken to manage the generation and treatment of wastes for new developments'.

1.2 Stages of the Waste Management Plan

In accordance with current local policy requirements, which outline the approach to managing waste arisings during the construction and operational phase of commercial developments, this report addresses these requirements in the following stages:

- **Waste Legislation** - to identify legislation relevant to construction site waste management;

- **Quantification of Waste Arisings** - to identify quantities of waste that will be produced during the construction phase(s) of the project as outlined in Section 4;
- **Waste Management Options** - to ensure waste is managed in the most appropriate manner to maximise the amount of waste that is re-used, recycled and recovered (waste hierarchy); and to identify methods of reducing waste through waste minimisation and sustainable procurement options as outlined in Section 4;and
- **Monitoring** - to establish a monitoring schedule for the WMP to ensure ongoing compliance and regular updating of the WMP to take account of any relevant changes, issues or amendments to waste management practices as outlined in Section 5.

2 WASTE LEGISLATION

2.1 Introduction

Set out in this Section are details of Legislation relevant to the management of waste from the construction phase of the Development. 'Waste' is used as a term to describe "any substance or object which a holder discards or intends to discard". In reality waste is not a single substance; a development such as the Mainfreight Facility will give rise to a whole range of different waste types the method of collection and disposal for which will vary according to the nature and source of the waste. The Development is anticipated to give rise to the following broad categories of waste:

Construction Waste	
Construction and demolition waste	C&D waste is that generated from construction and demolition activities, including the reclamation of contaminated land. It constitutes material such as soil, rubble, concrete and bricks, but also hazardous materials such as asbestos and contaminated soils (which is unlikely for this site as much of the development will be on undeveloped Greenfield).
Hazardous Wastes	Hazardous waste has historically been considered material that poses the greatest risk to human health or the environment, including materials such as asbestos, oils, solvents and chemical wastes. Hazardous wastes may be generated during construction activities but may also be generated in small quantities by building occupants (see operational waste below).
Operational Waste	
Commercial and industrial Waste	C&I waste is that produced by commercial premises including shops, warehouses, offices, entertainment and catering businesses (commercial waste), plus factories and industrial plants (industrial wastes). C&I waste generally includes a proportion of special or hazardous wastes and some inert or semi-inert material.
Hazardous Waste	The most likely source of hazardous waste will be generated during use of the facility for the storage and handling of approximately half a million kilograms of materials classified as dangerous goods, including aerosol cans, acidic soils and liquids and alkali liquids.

2.2 Protection of the Environment Operations Act 1997

The POEO Act establishes the State's environmental regulatory framework and includes licensing requirements for certain activities (including waste).

The objectives of this Act are as follows:

- a) to protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development,
- b) to provide increased opportunities for public involvement and participation in environment protection,
- c) to ensure that the community has access to relevant and meaningful information about pollution,
- d) to reduce risks to human health and prevent the degradation of the environment by the use of mechanisms that promote the following:
 - i. pollution prevention and cleaner production,
 - ii. the reduction to harmless levels of the discharge of substances likely to cause harm to the environment,
 - iii. the elimination of harmful wastes,
 - iv. the reduction in the use of materials and the re-use, recovery or recycling of materials,
 - v. the making of progressive environmental improvements, including the reduction of pollution at source,
 - vi. the monitoring and reporting of environmental quality on a regular basis,
- e) to rationalise, simplify and strengthen the regulatory framework for environment protection,
- f) to improve the efficiency of administration of the environment protection legislation,
- g) to assist in the achievement of the objectives of the *Waste Avoidance and Resource Recovery Act 2001*.

2.3 Waste Avoidance and Resource Recovery Act 2001

A key policy standard for waste management is the *Waste Avoidance and Resource Recovery Act 2001* which has established a scheme to promote extended producer responsibility in place of industry waste reduction plans.

The objects of this Act are as follows:

- (a) *to encourage efficient use of resources and to reduce environmental harm in accordance with the principles of ecological sustainable development;*
- (b) *to ensure that resource management options are considered against a hierarchy of the following order:*
 - i. *avoidance of unnecessary resource consumption,*
 - ii. *resource recovery (including reuse, reprocessing, recycling and energy recovery),*
 - iii. *disposal,*
- (c) *to provide for the continual reduction in waste generation,*
- (d) *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,*
- (e) *to ensure that industry shares with the community the responsibility for reducing and dealing with waste,*

- (f) *to ensure the efficient funding of waste and resource management planning, programs and service delivery,*
- (g) *to achieve integrated waste and resource management planning, programs and service delivery on a State-wide basis,*
- (h) *to assist in the achievement of the objectives of the Protection of the Environment Operations Act 1997.*

2.4 Policy for Waste Minimisation in New Developments 2005

The Council of the City of Sydney's "*Policy for Waste Minimisation in New Developments 2005*" (Waste Minimisation Policy (2005)) was developed to encourage efficient waste minimisation and resource recovery for demolition, construction and ongoing facility management.

The Waste Minimisation Policy (2005) details a range of waste management provisions (including those specific to commercial developments) and includes design specifications for waste storage and collection access areas, procedures for recycling and disposal, and procedures to ensure an acceptable level of general amenity is maintained.

2.5 Australian Packaging Covenant

Goodman is 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 and safety.
- **Recycling:** Efficiently collect and recycle packaging.
- **Product Stewardship:** Demonstrate commitment of all signatories.

3 PROJECT DESCRIPTION

The Mainfreight Distribution Centre is located at Yarrawa Street in Prestons, NSW. The existing facility consists of two separate buildings connected by a breezeway, providing a 14,000m² warehouse and a 13,000m² cross dock operation with 1,000m² of office and amenities across the two buildings.

The proposed new development will comprise construction of a warehouse/distribution centre extension to the existing Mainfreight Centre including the use of the facility for the storage and handling of approximately half a million kilograms of materials classified as dangerous goods, including aerosol cans, acidic soils and liquids and alkali liquids.

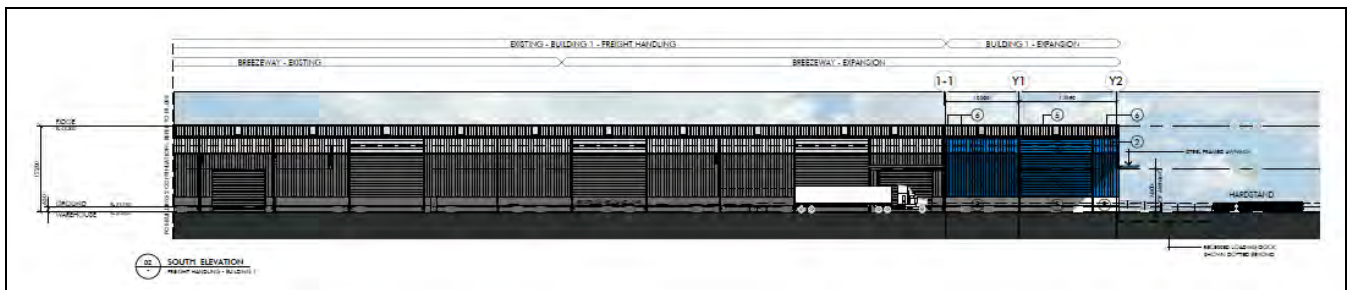
The proposed development will include the construction of around 13,260m² of new warehouse space, sheds and hardstand. An aerial photo of the proposed extension is shown below in Figure 1.

Figure 1 Plan to show extension at Yarrawa Street



Figure 2 below shows the elevations of the existing facility and proposed extension.

Figure 2 View of South Elevation (courtesy of Nettleton Tribe Architects)



4 QUANTIFICATION OF CONSTRUCTION WASTE ARISING

4.1 Assumptions

To aid management of construction waste it is first necessary to identify the types and quantities of waste that will be produced during the construction phase of the site. However, with only minimal baseline data available for construction waste the targets and action plans are informed estimates and will therefore need to be reviewed and amended throughout the life of the project.

Existing data for construction waste arisings in Australia only covers domestic brick housing so for the construction of an industrial building a UK tool has been used for approximate waste generation calculations. The SMARTWASTE tool developed by the UK Building Research Establishment (BRE) provides Environmental Performance Indicators (EPI's) for the construction waste industry across a number of developments, including housing, offices, hospitals and schools as outlined below in Table 1.

Table 1 Environmental Performance Indicators for the Construction Waste Industry

Project Type	Average waste volumes (m3) per 100m2
Residential	17.7
Public Buildings	23.8
Leisure	15.6
Industrial Buildings	14
Healthcare	18.1
Education	19.8
Commercial Other	16.9
Commercial Offices	20.4
Commercial Retail	22.1
Civil Engineering	28.1

The BRE have also produced figures for the estimated construction waste tonnages by waste stream and these are shown, along with percentage split and conversion factors for determining volumes of waste in Table 2.

Table 2 Estimated Construction Waste by Material Waste Stream

Material Type	% Split	Conversion Factor (m3 to tonnes)
Hard material (excavation)	32%	1.24
Timber	24%	0.34
Plastics	15%	0.22
Cast formless	9%	0.4
Gypsum material	6%	0.33
Metals	6%	0.42
Paper / card	4%	0.21
Bio-organic	3%	0.51
Soil	1%	1.25
Chemicals / paint	0.30%	0.57

Using the EPI benchmarks, the BRE tonnage data and the site plan details it is possible to provide approximate waste volumes totalling 2,241m³ from the construction of the building for the Mainfreight Extension. It has been assumed that the soft landscaping will not require any off site waste management.

Table 3 shows the material breakdown and tonnage data for the development, which is largely comprised of hard material from excavation, timber, building materials and plastics (from packaging).

Of the estimated 1,404 tonnes of waste generated over the life of the construction, over half of this waste (881 tonnes) is anticipated to be hard material which will be readily recyclable as aggregate either on or off site.

Table 3 Material Breakdown and Tonnage Data

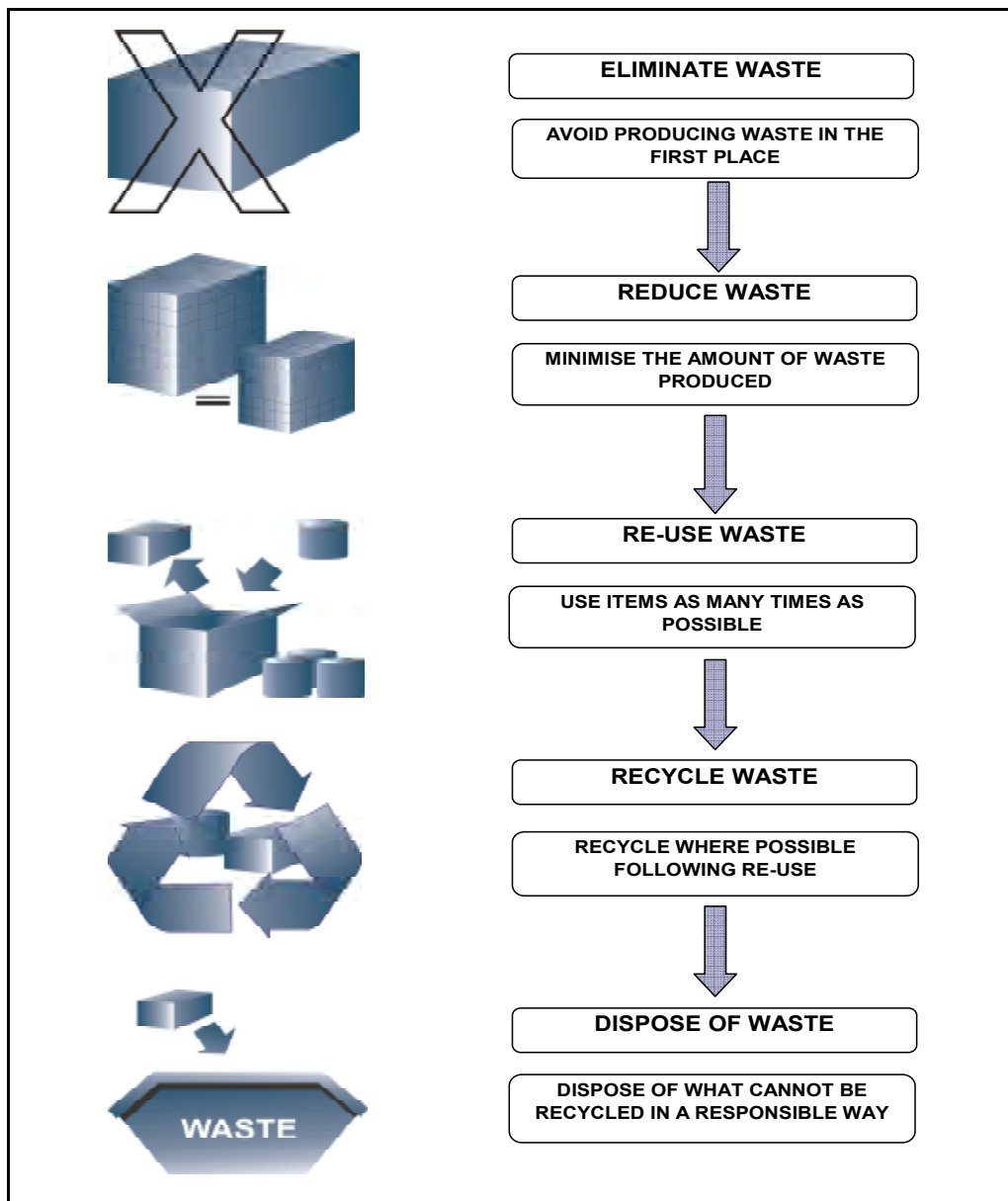
Material	Split %	Waste (m3)	Conversion factor	Waste (tonnes)
Hard material (excavation)	32%	710	1.24	881
Timber	24%	538	0.34	183
Plastics	15%	336	0.22	74
Cast formless	9%	202	0.4	81
Gypsum material	6%	134	0.33	44
Metals	6%	134	0.42	56
Paper / card	4%	90	0.21	19
Bio-organic	3%	67	0.51	34
Soil	1%	22	1.25	28
Chemicals / paint	0.30%	7	0.57	4
Total	100%	2,241		1,404

4.2 Waste Hierarchy

It is necessary to have a structured methodology for minimising the quantity of construction waste disposed of to landfill. The methodology, outlined herein is not prescriptive; rather it sets out the guiding principles that will be adopted and as such is sufficiently flexible to accommodate site-specific issues that may not have been anticipated at present.

The waste management hierarchy as outlined below in Figure 3 sets out the order in which options for waste management should be considered based on environmental impact. This section will deal with how the hierarchy can be applied to this construction development site.

Figure 3 Waste Management Hierarchy



4.2.1 Waste Minimisation

Waste minimisation is at the pinnacle of the waste hierarchy and is essentially concerned with avoiding the production of waste in the first place. Whilst complete avoidance of waste is impossible, adopting certain waste minimisation practices will ensure that the overall quantity of materials not beneficially used on site is kept to a minimum.

The following factors will be adopted to help to minimise waste on site:

- Improved precautions in handling of materials on site can have a major impact on the reduction of waste on site. Wherever possible materials will be kept in locked and covered storage, until time of use, to avoid damage from vandalism, theft, vehicle movements, weather, etc;
- On time delivery of materials when they are required;

- Maintaining a record of materials delivered on-site and dispatched – recording the number of skips used so that the amount of material consumed, sent for landfill or recycling can be determined.;
- Packaging is designed to protect raw materials and wherever feasible will be kept on until the last moment. Material suppliers will be asked to collect packaging for reuse;
- Avoidance of over-ordering materials according to the stage of construction need;
- Responsibility for overseeing waste minimisation activities will be assigned to specific site personnel (eg site manager), who will monitor the progress and smooth running of waste minimisation activities.

It is estimated¹ that on average, up to 10% reductions in waste quantities can be achieved through waste minimisation and re-use, which also has significant carbon benefits through avoidance of surplus raw materials used. The procurement of recycled or recovered materials reprocessed locally can also further enhance carbon savings.

4.2.2 Re-Use

Where avoidance of excess materials on site is not feasible all available materials will be recorded and considered for possible re-use on site before recycling. Materials such as timber, bricks, tiles, paving blocks and top soil will be stored separately on site within the existing footprint and will all be considered for re-use elsewhere in this development. The purpose of storing re-use materials in separate skips is to reduce the potential for contamination and to encourage the re-use of materials by offering clean material streams from which to choose.

Options for re-use include:

- use of reclaimed materials (where appropriate);
- on-site reprocessing of materials; and
- re-use of packaging materials in limited circumstances.

The use of a Waste Management Plan data sheet as illustrated in Section 5 will allow site managers to keep a record of all available materials on site, hopefully reducing the need to over order and increase opportunities for re-use where possible.

Surplus materials will be considered for on-site storage and may be used in subsequent construction projects by the developer. Such opportunities will be limited to inert materials such as soil, rubble and to a lesser extent timber.

4.2.3 Recycling of Waste

The management of all off site waste and recycling will be undertaken by a suitably qualified contractor who specialise in reprocessing and recovery of construction and demolition waste. Where possible the contractor will manage the reprocessing and recovery of construction and demolition waste produced on site using their own equipment or that of their on-site sub-contractors.

One option for recycling is for separate skips to be allocated for separating the waste streams on-site, they would be easily accessible and placed near to the point of waste generation (but away from traffic routes). Skips would be designated by type of waste or recyclable material.

An alternative on-site management solution is to co-collect the waste on-site and separate the recyclables at one of the waste management contractors many recycling sites close to Prestons. The recycling rate for this option is estimated to be approximately 80% although higher performance can be anticipated as new outlets for recyclables become available. The appointed waste management contractor will be able to provide full details of materials and tonnages recycled off-site.

¹ BRE Sustainable Construction (2000)

4.2.4 Disposal

Disposal of waste is at the bottom of the waste hierarchy (see Figure 3) as this is the least sustainable method of waste management and one of the overarching aims of this WMP is to reduce the disposal of waste.

Where it is not possible to re-use or recycle materials the residual fraction of waste will be taken to an appropriate residual treatment facility or landfill site. The same procedure will also apply to hazardous wastes on site.

5 WASTE MANAGEMENT ON SITE

5.1 Waste Storage Requirements (Construction)

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

The Contractor 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.

Waste generated on site, when it is not able to be directly deposited into the skip bins, will be placed in designated stockpile areas within the site for transfer to the skip bins by bobcat or other means. All waste placed in stockpile areas and 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 (i.e. appropriate siting of waste stockpile locations should take into account slope and drainage factors).

Hazardous and contaminated wastes will be removed from site by waste contractors for disposal to appropriately licensed facilities.

No liquid wastes or wash down waters should be disposed of via the stormwater drainage system. Wastewater storage tanks should be carefully monitored to ensure overflow does not occur.

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

Table 4 provides indicative waste storage requirements based on the estimated anticipated waste volumes and collection frequency. These storage requirements will need to be considered prior to commencement of construction.

Table 4 Estimates On Site Storage Requirements for Waste and Recycling

Material	Total Skip requirements (14cy/10.6m3)¹	Skip on site (14cy/10.6m3)¹	Collection frequency
general waste	114	3	daily
Rubble	70	2	daily
Metals	12	2	weekly
timber and products	30	4	weekly
packaging (plastic and card)	27	3	weekly
plasterboard & plaster	5	1	weekly
Total	258	15	

Based on 80% efficiency and over the life of the build

5.2 Waste Management Responsibility (Operational)

Responsibility for waste management will fall to the nominated waste management coordinator who will be appointed prior to commencement of site works. The responsibilities of the coordinator will include, but not be limited to:

- ensuring that all staff and contractors are aware of site requirements for management of waste. All contractors will be required to attend a short introductory session on waste management principles;
- monitoring of material and waste tonnages;
- liaison with waste contractors regarding removal of waste from site;
- dealing with any hazardous wastes that may be generated; and
- liaison with all project managers to ensure that materials are managed in the most sustainable manner possible.

5.2.1 Signage and Education

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

Employed staff and contractors should be made aware of all recycling initiatives and waste storage/handling requirements.

5.2.2 Dangerous Goods and Liquid Wastes Storage

Dangerous goods stores and associated waste areas will comply with relevant Australian Standards as listed in WorkCover's "*Code of Practice for Storage and Handling of Dangerous Goods (2005)*" document and competent advice will be sought when making design, process and storage decisions about handling dangerous goods. In addition, WorkCover notification may need to be provided where manifest levels are exceeded (refer to Workcover's "*Notification of Dangerous Goods on Premises Guide*" for further information, including the appropriate thresholds).

All maintenance chemicals, oils and fuels including associated wastes should be stored separately in an appropriately bunded, well-ventilated area with a drain grease trap and allow sufficient space for handling and storage in accordance with Australian Standard *AS 1940: 2004 The Storage and Handling of Flammable and Combustible Liquids* and relevant development consent conditions.

Liquid waste from drain grease traps must be removed by a licensed waste contractor.

5.2.3 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.

5.2.4 General Waste Storage Requirements

Waste/recycling storage areas must be constructed in accordance with the requirements of the Building Code of Australia (BCA).

The following additional general recommendations are provided for the waste storage areas:

- The floor of the waste area should be bunded, graded and drained, and finished to a smooth even surface.
- Adequate ventilation should be provided to prevent nuisance odour.

- The area should be conveniently located to enable easy access for on-site movement as well as collection and servicing.
- The waste area should be secure and lockable.
- The waste area should be clearly signposted to ensure correct use and waste separation.
- The waste storage areas are to be kept clean and odour free. It is the responsibility of the Operations Manager to routinely check waste sorting and storage areas for cleanliness, hygiene and OH&S issues.

Waste/recycling storage areas must be of adequate size to comfortably accommodate all waste and recycling bins associated with the development.

Waste/recycling storage areas must be able to accommodate separate general waste bins and recycling bins which are of sufficient volume to contain the quantity of waste generated between collections.

5.2.5 Contractor Waste Collection

Typically a national waste and recycling contractor will be employed to collect and appropriately dispose of the majority of wastes generated by the development. Written evidence of a valid and current contract with a licensed waste collector will be held at the premises.

Liquid wastes must only be collected by licensed waste contractors as approved by Sydney Water and the NSW Office of Environment and Heritage.

Hazardous wastes will be collected by appropriately licensed waste contractors. Research should be undertaken to engage hazardous waste contractors that can ensure the waste is recycled or disposed of by the best means available to Australia. The contractor will be required to provide details of the methods of recycling and disposal.


5.2.6 WMP Data Sheet

In order to monitor minimisation and recycling targets; and to update information on waste arisings from the construction phase the nominated waste coordinator will complete the WMP Data Sheet (as shown in Figure 4). As the initial waste forecasts are based upon average benchmarks it will be important to record all waste arising and composition throughout the construction phase; and to reassess minimisation and recycling targets as required.

The following example has been provided by Department of Environment and Climate Change NSW² as part of its guidance on Site Waste Minimisation and Management Chapter for Consolidated Development Control Plans.

² <http://www.environment.nsw.gov.au/resources/warr/08353SiteWasteMin2.pdf>

Figure 4 Construction Waste Management Template



	Reuse	Recycling	Disposal	
Type of waste generated	Estimate Volume (m³) or Weight (t)	Estimate Volume (m³) or Weight (t)	Estimate Volume (m³) or Weight (t)	Specify method of on site reuse, contractor and recycling outlet and/or waste depot to be used
Excavation material				
Timber (specify)				
Concrete				
Bricks				
Tiles				
Metal (specify)				
Glass				
Plasterboard (offcuts)				
Fixtures and fittings				
Floor coverings				
Packaging (used pallets, pallet wrap)				
Garden organics				
Containers (cans, plastic, glass)				
Paper/cardboard				
Residual waste				
Hazardous/special waste (specify)				

5.3 Summary of Waste Management Approach

The following approach, which summarises data from elsewhere within this document, will be adopted for managing waste:

- a waste management coordinator will be appointed to oversee all waste management practices on site;
- a range of practices will be adopted to minimise the production of waste in the first place (waste minimisation);
- wastes that are generated, will be reused, wherever applicable, which may include storing materials onsite for subsequent development projects;
- a local contractor will be appointed to manage all waste from site with an inherent responsibility to recycle as much as practically possible;

- the quantity and types of waste destined to landfill will be minimised through a combination of minimisation, reuse and recycling;
- dedicated skips or bins and a waste management area will be provided for the management of all wastes. Skips or bins to allow segregation of materials will be provided;
- all contractors and staff will be required to complete a short introductory session to understand requirements for managing waste whilst they are working on site; and
- a monitoring programme will be adopted to track and record all waste movements.

The above approach provides a framework for managing waste but has been designed to be sufficiently flexible to accommodate site-specific issues that may not have been anticipated at present. In adopting the principles set out in this Waste Management Plan, Goodman can demonstrate and ensure that the requirements which were set out in the NSW DECC Guidance will be fully met.

6 CLOSURE

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