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Mirvac Projects Pty Ltd

60 Wallgrove Road

Eastern Creek

Waste Management Plan

Report Number 610.14984-R2

19 May 2015

Mirvac Projects Pty Ltd
Level 26, 60 Margaret Street
Sydney NSW 2000

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60 Wallgrove Road

Eastern Creek

Waste Management Plan

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Table of Contents

Table of Contents

TABLES

FIGURES

1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR Consulting) was commissioned by Mirvac Projects Pty Ltd (Mirvac) to prepare a Waste Management Plan (WMP) for the proposed industrial facilities at 60 Wallgrove Road, Eastern Creek NSW.

The WMP has been undertaken in accordance with SLR's Offer of Services dated 10th May 2015.

1.1 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 Project, including a description of how waste would be handled, processed and disposed of (or re-used/recycled), in accordance with the relevant regulatory requirements.

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; and
- to assist in ensuring that any environmental impacts during the operational life of development comply with Council's development consent conditions and other relevant regulatory authorities.

2 BETTER PRACTICE FOR WASTE MANAGEMENT AND RECYCLING

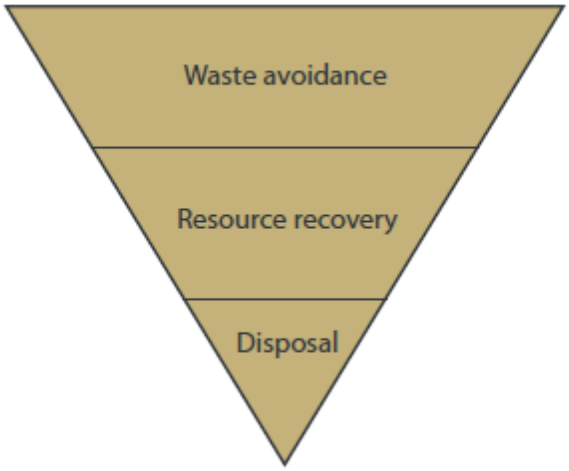
2.1 Waste Management Hierarchy

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 produce 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;
- energy recovery through thermal treatment of residual waste materials and from green waste processing; and
- waste disposal, in a manner that causes the least harm to the natural environment.

The waste hierarchy pictured below demonstrates 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 EPA Better Practice Guidelines 2012

2.2 Benefits of Implementing Better Practice for Waste Management and Recycling

The benefits of implementation better practices for waste management and recycling include:

- enhanced social and environmental reputation of an organisation;
- reduced costs associated with waste disposal;
- benefits to all stakeholders and the wider community; and
- improved environmental outcomes.

3 WASTE LEGISLATION AND GUIDANCE

The legislation and guidance outlined in **Table 1** below should be referred to during construction and operational phases of the development.

Table 1: Waste Legislation and Guidance Summary

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 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.
NSW EPA's Waste Classification Guidelines (Part 1) 2014	To assist waste generators to effectively 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 has the aim of achieving nationally consistent, minimum necessary standards of relevant health and safety, amenity and sustainability objectives efficiently.
Council's Waste Management Planning Requirements	Blacktown City Council Development Control Plan 2006 (Part O Site Waste Management and Minimisation). To facilitate responsible waste disposal/recycling by providing guidance and instructions on demolition, construction and operational waste management. Requirements include: • Provision for on-site source separation of recyclables; • Provide details of type and volumes of wastes and recyclables likely to be generated as a result of the development; • Detail how waste and recyclables will be stored and treated on-site; • Detail how wastes and recyclables will managed or disposed of; and • Detail how on-going waste management will operate once the development is complete.
NSW 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.
NSW 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 increased recycling of construction and demolition waste.
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 PROJECT DESCRIPTION

Mirvac proposes to develop 60 Wallgrove Road, Eastern Creek, into a regional distribution park of warehouses, distribution centres and freight logistics facilities on approximately 21.8 hectares of land within the Blacktown City Council local government area.

The proposal constitutes a 'major project' under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act), and consequently the Minister is the approval authority for the project.

4.1 Overview of Proposed Development

The Site known as Calibre Industrial Estate, formally the Minchinbury Employment Park, is located at 60 Wallgrove Road, Eastern Creek within the Blacktown City Council Local Government Area. It is located in the Western Sydney Employment Area (WSEA) at the intersection of the M4 and M7 Motorways.

The Site is adjacent to:

- The Pinegrove Memorial Park Lawn Cemetery to the north and west, which adjoins low density residential development on Eskdale Street approximately 270 metres from the northern boundary of the Site;
- The M4 Motorway and Minchinbury Reservoir to the south; and
- Wallgrove Road and the M7 Motorway to the east. Rural residential dwellings on Pikes Lane are located east of the M7, approximately 310 metres to the east of the site.

The Site is currently being utilised as the Sydney Quarantine Station operated by the Australian Quarantine and Inspection Service (AQIS). AQIS provides post entry quarantine services for animals and plant species entering the country from overseas. It comprises of a number of covered greenhouses and warehouses, detention basins, water tanks, on-site at grade car parking, and an internal road network (see **Figure 2** below).

Figure 2: Aerial Photo of the Site

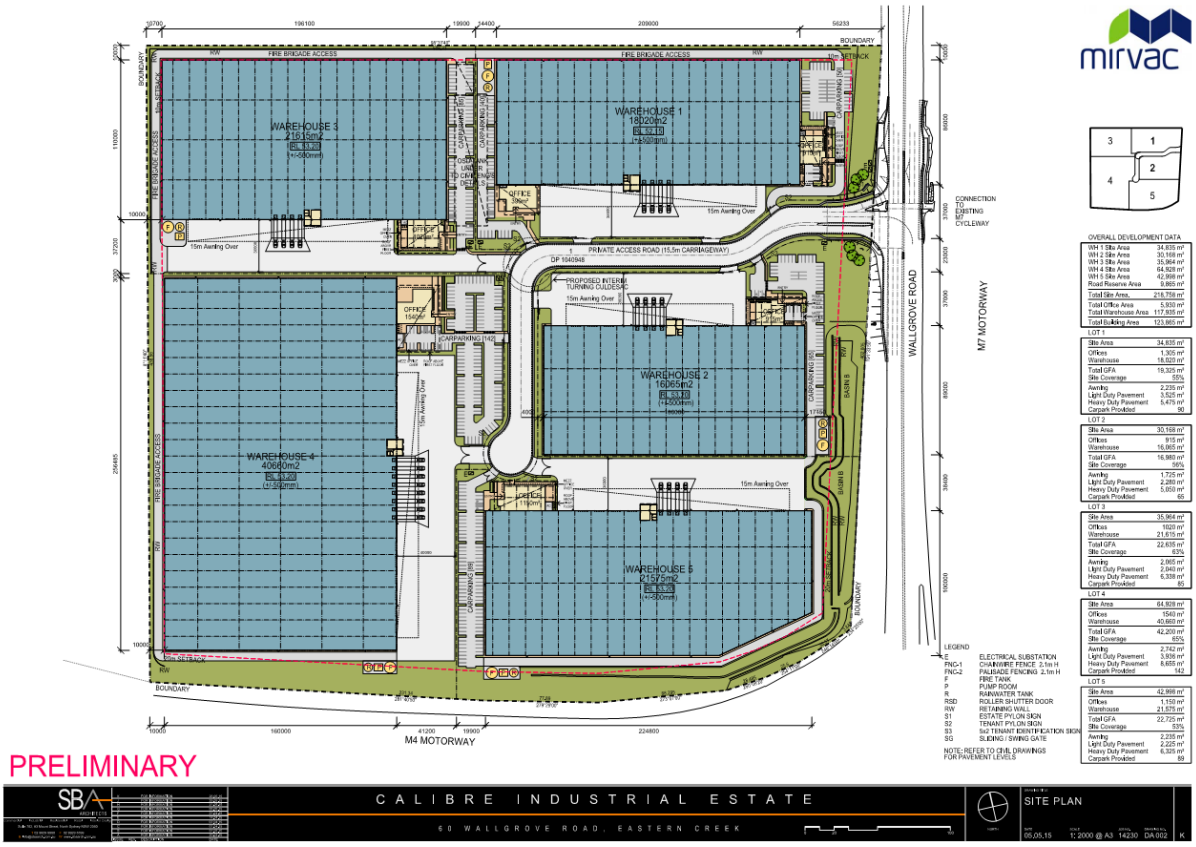
Source: JBA

Mirvac are proposing to develop the site into a regional distribution park of warehouses, distribution centres, light industry, office premises, high technology uses and freight logistics facilities. The proposed development will incorporate:

- Demolition of all existing structures on the site;
- Clearance of all vegetation on the site;
- Bulk earthworks across the site;
- Construction of multiple warehouse structures and distribution related facilities across the site;
- Construction of reticulated site services and site infrastructure, including on-site stormwater detention structures;
- Construction of the internal access road that will be capable of accommodating both heavy and light vehicles;
- Construction of lead-in services including electricity, sewer and potable water; and
- Construction of a new traffic signalised intersection at Wallgrove Road to provide entry to into the site.

The current masterplan is illustrated in **Figure 3** below.

Figure 3: Estate Masterplan for Calibre Industrial Estate



4.1.1 Development Schedule

Table 2 details the development area schedule for Lot 1.

Table 2: Lot 1 Development Area Schedule

Site Description	Unit	Number
Site Area	sqm	34,835
Warehouse	sqm	18,020
Office	sqm	1,305
Total Building Area	**sqm**	**19,325**
Site Coverage	%	55
Awning	sqm	2,235
Light Duty Pavement	sqm	3,525
Heavy Duty Pavement	sqm	5,475
Carparking	spaces	90

4.1.2 Lot 2 Development Area Schedule

Table 3 details the development area schedule for Lot 2.

Table 3: Lot 2 Development Area Schedule

Site Description	Unit	Number
Site Area	sqm	30,168
Warehouse	sqm	16,065
Office	sqm	915
Total Building Area	**sqm**	**16,980**
Site Coverage	%	56
Awning	sqm	1,725
Light Duty Pavement	sqm	2,280
Heavy Duty Pavement	sqm	5,050
Carparking	spaces	65

4.1.3 Lot 3 Development Area Schedule

Table 4 details the development area schedule for Lot 3.

Table 4: Lot 3 Development Area Schedule

Site Description	Unit	Number
Site Area	sqm	35,964
Warehouse	sqm	1,020
Office	sqm	21,615
Total Building Area	**sqm**	**22,635**
Site Coverage	%	63
Awning	sqm	2,065
Light Duty Pavement	sqm	2,040
Heavy Duty Pavement	sqm	6,338
Carparking	spaces	85

4.1.4 Lot 4 Development Area Schedule

Table 5 details the development area schedule for Lot 4.

Table 5: Lot 4 Development Area Schedule

Site Description	Unit	Number
Site Area	sqm	64,928
Warehouse	sqm	40,660
Office	sqm	1,540
Total Building Area	**sqm**	**42,200**
Site Coverage	%	65

Site Description	Unit	Number
Awning	sqm	2,742
Light Duty Pavement	sqm	3,963
Heavy Duty Pavement	sqm	8,655
Carparking	spaces	142

4.1.5 Lot 5 Development Area Schedule

Table 6 details the development area schedule for Lot 5.

Table 6: Lot 5 Development Area Schedule

Site Description	Unit	Number
Site Area	sqm	42,998
Warehouse	sqm	21,575
Office	sqm	1,150
Total Building Area	**sqm**	**22,725**
Site Coverage	%	53
Awning	sqm	2,235
Light Duty Pavement	sqm	2,225
Heavy Duty Pavement	sqm	6,325
Carparking	spaces	89

5 DEMOLITION AND CONSTRUCTION WASTE MANAGEMENT

Demolition and construction stages of developments have the greatest potential for waste minimisation.

Key construction activities will include:

- demolition of all existing structures on the site;
- clearance of all vegetation on the site;
- bulk earthworks and site preparatory works;
- construction of multiple warehouse structures and distribution related facilities across the site;
- construction of reticulated site services and site infrastructure, including onsite storm water detention structures;
- construction of the internal access road that will be capable of accommodating both heavy and light vehicles;
- construction of lead-in services including electricity, sewer and potable water; and
- construction of a new traffic signalised intersection at Wallgrove Road to provide entry into the Site (not calculated as part of this WMP).

The General Contractor will address the construction waste management principles below as part of a detailed Construction Management Plan to be prepared prior to commencement of construction.

5.1 Waste Streams and Classifications

The development is likely to generate the following broad waste streams:

- demolition wastes;
- excavation material;
- construction wastes;
- plant maintenance waste;
- packaging waste;
- work compound (on-site employee) waste; and
- waste water.

Possible waste types along with their waste classification are provided below in Table 7.

Table 7: Potential Waste Generation and EPA Classifications

Waste Types	NSW Classification	Proposed Reuse / Recycling / Disposal Method
Demolition, Site Preparation, Excavation & Construction		
Cleared vegetation	General solid (putrescible) waste	Re-use on site, reuse for similar projects and/or disposal for composting at landfill
Excavated material (VEMN, EMN)	General solid (non-putrescible) waste	Reuse 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	Reuse at other sites where possible or disposal to landfill
Concrete (solids and washouts) and asphalt	General solid (non-putrescible) waste	Reuse on-site where possible or recycled off-site
Broken aggregate and old tarmac	General solid (non-putrescible) waste	Reuse on-site where possible or recycled off-site
Steel reinforcing, other metal (eg wire mesh)	General solid (non-putrescible) waste	Off-site recycling
Conduits and pipes	General solid (non-putrescible) waste	Off-site recycling
Timber formwork	General solid (non-putrescible) waste	Reuse on-site or off-site recycling
Metals and bulk electrical cabling	General solid (non-putrescible) waste	Off-site recycling
Plasterboard	General solid (non-putrescible) waste	Off-site recycling or disposal
Bricks	General solid (non-putrescible) waste	Off-site recycling
Glass	General solid (non-putrescible) waste	Off-site recycling
Light bulbs	Hazardous waste	Off-site recycling
Plant Maintenance		
Tyres	Special waste	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.	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 local Council.)[1]

Waste Types	NSW Classification	Proposed Reuse / Recycling / Disposal Method
Air and oil filters and rags	General solid (non-putrescible) waste	General solid (non-putrescible) waste
Batteries	Hazardous waste	Off-site recycling
Packaging		
Packaging materials, including wood, plastic (including stretch wrap or LLPE), cardboard and metals	General solid (non-putrescible) waste	Off-site recycling
Wooden crates	General solid (non-putrescible) waste	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	Co-mingled recycling at off-site licensed facility
Clean paper and cardboard	General solid (non-putrescible) waste	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	Disposal at landfill
Pump-out waste and septage (sewage)	Liquid (trade) waste	Off-site disposal at licensed facility or disposal direct to sewer where arranged with Council

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

5.2 Demolition Waste

The site currently comprises of a number of covered greenhouses and warehouses, detention basins, water tanks, on-site at grade car parking, and an internal road network. A summary of the approximate composition of each building and the proposed management of the materials is presented below in **Table 8**. The proposed management assumes unless specified otherwise that the materials (where appropriate) are free from contamination and suitable for recycling. A Phase 2 Contamination Assessment was completed by JBG&G in 2013 and a hazardous materials building report will be prepared prior to demolition. At this time the demolition waste management plan will be updated.

Table 8: Proposed Site Demolition Composition and Management

Building	Typical Composition	Re-use on site	Recycling off site	Disposal off site
Plant Quarantine Station	Concrete	✓	✓	
	Glass		✓	
	Steel		✓	
	Brick		✓	
	Plastic			✓
Animal Quarantine Station Office	Brick		✓	
	Steel		✓	
	Concrete	✓	✓	
Bee House	Brick		✓	
	Asbestos containing material roof			✓
	Steel		✓	
	Wood		✓	
Dog Detector Unit	Brick		✓	
	Steel		✓	
	Wood		✓	
	Plastic			✓
Horse Complex	Laminated wood			✓
	Asbestos containing material roof			✓
	Plastic			✓
	Brick		✓	
	Concrete	✓	✓	
	Steel		✓	
Machinery Sheds	Brick		✓	
	Steel		✓	

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 9**. 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 Department of Environment, Food and Rural Affairs (DEFRA) conversion factors. Conservative estimates have been made where indicative waste compositions were not available.

Table 9: Guideline to Waste Composition and Volumes – Demolition and Construction

Material	Estimated Waste %	Conversion Factors (Density) per m3
Hard Material	32%	**1.2**
Timber	24%	**0.3**
Plastics	15%	**0.13**
Cement sheet	9%	**0.5**
Gypsum material	6%	**0.2**
Metals	6%	**0.9**
Paper/card	4%	**0.1**
Vegetation	3%	**0.15**
Soil	1%	**1.6**
Other	0.3%	**0.3**

Source: Sustainability Victoria Waste Wise Tool Kit (accessed 2013)

The UK Department for Environment, Food and Rural Affairs (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 10 below have been used for the purposes of this WMP to estimate the amounts of demolition and construction wastes that could be generated by the Project.

Table 10: Environmental Performance Indicator for Waste Volumes from New Developments

Project Type	Average Volume (m3) of Waste per 100m^2
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

5.3.1 Estimation of Waste Volumes

The estimated waste volumes for the overall development area and each individual Lot are presented in **Tables 11** to **17**. The waste arisings are based on the EPI estimates presented above in **Table 10**. 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 11: Estimated Waste Generation for the Overall Development

Proposed Land Use	Area (m2)	Estimated Construction Waste Generation (m3)
General business (office)	5,930	1,210
Storage or distribution	117,935	16,511
Roads	9,865	2,772
Car parking	14,006	3,936
Hard landscaping	31,843	8,948
Soft landscaping	39,179	0[1]
Total	**218,758**	**33,376**

1. Assumes no waste generated by soft landscaping

Table 12: Estimated Waste Volumes and Materials for Lot 1 (plus Reserve Road)

Material	Split (%)	Waste (m^3)	Conversion factor	Waste (tonnes)
Hard material	60%	4,626	1.2	5,551
Timber	16%	1,234	0.3	370
Plastics	7%	540	0.13	70
Cement sheet	6%	463	0.5	231
Gypsum material	4%	308	0.2	62
Metals	4%	308	0.9	278
Paper / card	1%	77	0.1	8
Bio-organic	2%	154	0.15	23
Soil	0%	0	1.6	0
Chemicals / paint	0.30%	23	0.3	7
Total	**100%**	**7,733**		**6,599**

Table 13: Estimated Waste Volumes and Materials for Lot 2

Material	Split (%)	Waste (m^3)	Conversion factor	Waste (tonnes)
Hard material	32%	1,362	1.2	1,634
Timber	24%	1,074	0.3	322
Plastics	15%	644	0.13	84
Cement sheet	9%	387	0.5	193
Gypsum material	6%	258	0.2	52
Metals	6%	258	0.9	232
Paper / card	4%	172	0.1	17

Material	Split (%)	Waste (m^3)	Conversion factor	Waste (tonnes)
Bio-organic	3%	129	0.15	19
Soil	1%	0	1.6	0
Chemicals / paint	0.30%	13	0.3	4
Total	**100%**	**4,296**		**2,558**

Table 14: Estimated Waste Volumes and Materials for Lot 3

Material	Split (%)	Waste (m^3)	Conversion factor	Waste (tonnes)
Hard material	32%	1,728	1.2	2,074
Timber	24%	1,363	0.3	409
Plastics	15%	818	0.13	106
Cast formless	9%	491	0.5	245
Gypsum material	6%	327	0.2	65
Metals	6%	327	0.9	294
Paper / card	4%	218	0.1	22
Bio-organic	3%	164	0.15	25
Soil	1%	0	1.6	0
Chemicals / paint	0.30%	16	0.3	5
Total	**100%**	**5,452**		**3,246**

Table 15: Estimated Waste Volumes and Materials for Lot 4

Material	Split (%)	Waste (m^3)	Conversion factor	Waste (tonnes)
Hard material	32%	3,173	1.2	3,808
Timber	24%	2,503	0.3	751
Plastics	15%	1,502	0.13	195
Cast formless	9%	901	0.5	450
Gypsum material	6%	601	0.2	120
Metals	6%	601	0.9	541
Paper / card	4%	400	0.1	40
Bio-organic	3%	300	0.15	45
Soil	1%	0	1.6	0
Chemicals / paint	0.30%	30	0.3	9
Total	**100%**	**10,011**		**5,960**

Table 16: Estimated Waste Volumes and Materials for Lot 5

Material	Split (%)	Waste (m^3)	Conversion factor	Waste (tonnes)
Hard material	32%	1,873	1.2	2,247
Timber	24%	1,477	0.3	443
Plastics	15%	886	0.13	115
Cast formless	9%	532	0.5	266
Gypsum material	6%	354	0.2	71
Metals	6%	354	0.9	319
Paper / card	4%	236	0.1	24
Bio-organic	3%	177	0.15	27
Soil	1%	0	1.6	0
Chemicals / paint	0.30%	18	0.3	5
Total	**100%**	**5,907**		**3,516**

It is estimated that more than 70% of the predicted construction waste arisings from each Lot can be re-used (on-site or at another development) or recycled off-site. The NSW target for construction and demolition waste recycling is 75% (increasing to 80% by 2021-22)[1].

5.4 Waste Avoidance Measures

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

- 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;
- 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.

The Construction Site Manager should also 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 volatile organic compounds (VOC) paints and adhesives, and the use of post-consumer reused timber or Forest Stewardship Council (FSC) certified timber. Designs enabling disassembly and reuse of materials are also desirable. Final material selection will be made with consideration for the Ecologically Sustainable Design strategy for the site.

The following measures will also be completed to improve onsite waste management and to provide more reliable figures:

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

- record waste generated and disposal methods used during the construction;
- conduct waste audits of current projects;
- compare projected waste quantities with actual waste quantities produced during the construction period;
- review at past waste disposal receipts; and
- record this information to help in waste estimations for future waste management plans.

5.5 Re-use, Recycling and Disposal

Effective management of construction materials and demolition/construction waste, including options for reuse and recycling where applicable and practicable, will be conducted.

Only project wastes that cannot be cost effectively reused or recycled are to be sent to landfill or appropriate disposal facilities.

The following procedures are to be implemented:

- all solid waste timber, brick, concrete, rock that cannot be reused or recycled will be taken to an appropriate landfill site and disposed of in an approved manner;
- all metals will be recycled where economically viable;
- waste oil will be recycled or disposed of in an appropriate manner;
- all asbestos, hazardous and/or intractable wastes are to be disposed of in accordance with Workcover Authority and EPA requirements;
- washdown equipment/plant/machinery and concrete delivery trucks within a specified, appropriately bunded, washdown bay or return to the batching plant before washing out. Liquid waste is often produced from the washing down of plant and apparatus. 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;
- completion of refuelling activities in designated areas with appropriate spill containment measures to avoid overspill to sensitive areas;
- provision of portable, self-contained toilet and washroom facilities at the site ensuring these units are regularly emptied and serviced by a suitably licensed contractor;
- where applicable, provide coloured, clearly labelled coordinated and easily accessible, co-mingled and paper/cardboard recycling bins on-site for employee use nearby common areas for large work compounds/work sites;
- dispose of general waste via a council approved system; and
- investigate any opportunities for materials exportation and reuse with other local construction operations. 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;
- Excavation material will be reused on-site where possible with all excess reused on other projects or sold;
- All other solid waste including bitumen paving, tile, timber, rock and soil will be taken to an appropriate materials recycling facility/landfill site and processed in an approved manner; and
- All garbage will be disposed of via a council approved system.

5.6 Waste Storage and Servicing

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. light bulbs, batteries, etc) will also be provided where applicable.

Where possible, employee co-mingled recycling bins will be provided nearby common areas at work compounds/work sites for plastic and glass bottles, soft drink cans, tin cans etc 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.

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.

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.

5.6.1 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.

5.6.2 Contaminated/Hazardous Waste

During the construction phases 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.

5.6.3 Liquid Waste / Stormwater / Wastewater Management

Any liquid wastes or dangerous goods wastes generated by the construction activates (e.g. due to damage or leakage of containment) will be disposed of by a suitably qualified contractor to an appropriately licensed disposal facility.

Wastewater 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.

5.6.4 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.

5.7 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.

5.8 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;
- 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.

5.9 Monitoring and Reporting

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 and presented to Council when required.

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.

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

5.10 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 17: Recommended Roles and Responsibilities

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)	• 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. • Training and awareness 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

A site specific Waste Management Plan will be prepared by each tenant prior to commencing operations for each building, based on the Operational Waste Management principles detailed below.

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 WASTE STREAMS AND CLASSIFICATIONS

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

- packaging wastes;
- office wastes;
- amenity wastes; and
- maintenance wastes

Potential waste types along with their waste classification are provided below in Table 18.

Table 18: Potential Waste Generation and EPA Classifications (Operational)

Waste Types	NSW Classification	Proposed Reuse / Recycling / Disposal Method
General Operations		
General garbage (including non-recyclable plastics)	General solid (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
Packaging materials, including wood, plastic (including stretch wrap or LLPE), cardboard and metals	General solid (non-putrescible) waste	Off-site recycling
Bulk cardboard	General solid (non-putrescible) waste	Cardboard recycling at off-site licensed facility
Wooden crates / pallets	General solid (non-putrescible) waste	Reused for similar projects, returned to suppliers, or off-site recycling
Spent Smoke Detectors[1]	General solid (putrescible) waste OR Hazardous waste (some Commercial varieties)	Disposal at landfill OR offsite disposal at licensed facility
Light bulbs	Hazardous waste	Off-site recycling
E-waste	Hazardous waste	Off-site recycling
Batteries	Hazardous waste	Off-site recycling
Maintenance waste (i.e. empty oil / paint drums etc)	Hazardous waste if the containers were previously used to store	Transport to comply with the transport of Dangerous Goods

Waste Types	NSW Classification	Proposed Reuse / Recycling / Disposal Method
	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.	Code applies in preparation for off-site recycling or disposal at licensed facility. (Note: Discharge to sewer subject to Trade Waste Agreement with local Council.)[1]
Air -conditioning parts and filters	General solid (non-putrescible) waste	Disposal to landfill
Maintenance waste (i.e. cleaning chemicals, solvents, area wash downs)	Hazardous waste if the containers store Dangerous Goods (Class 1, 3, 4, 5 or 8).	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 local Council.)[1]
Amenities		
Grey water (from bathrooms)	Liquid waste	A new sewer connection to the existing sewer submain in Pikes Lane (east of the site) will be constructed as part of the infrastructure works.
Sewage	Liquid (trade) waste	A new sewer connection to the existing sewer submain in Pikes Lane (east of the site) will be constructed as part of the infrastructure works.
Sanitary Waste	General solid waste (putrescible)	Contractor disposal 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 and the requirements of the National Health and Medical Research Council's *Code of practice for the near-surface disposal of radioactive waste in Australia (1992)* must be met. Contact ARPANSA for more information. http://www.arpansa.gov.au/radiationprotection/factsheets/is_smokedetector.cfm

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

6.1.1 Anticipated Waste Generation Rates for Operational Development

Published average waste generation rates can be used to calculate the anticipated waste amounts for the proposed development Lots at the detailed design stage. The estimated waste generation rates are based on EPA guidance for waste generation in commercial and retail premises as presented below in **Table 19**.

Table 19: Estimated Average Waste Volumes per 100m2 per day (litres)

Type of Premises	Waste Generation	Recycling Generation[1]
Showrooms	22 L/100m^2/day	100 L/100/m^2/day
Offices	8 L/100m^2/day	6 L/100/m^2/day

Source: EPA's *Better Practice Guidelines* (2012).

Notes

1. Recyclable waste generation includes paper and cardboard waste, as well as mixed recyclables (bottles, cans etc).

It is noted that all waste generation rates are approximate and will be entirely dependent on the type of business occupying the building, however, it is assumed that more than 70% of the anticipated waste arisings will be recyclable (e.g. plastic and card from packaging wastes).

It is recommended that scheduled waste audits be undertaken approximately one month into the operational phase of the development to quantify actual waste generation rates generated by the development.

The assessment of generated waste volumes will be influenced by management and employee attitude to recycling and disposal

6.2 Waste Avoidance, Reuse and Recycling Measures

A site specific Waste Management Plan will be prepared by each tenant prior to commencing operations for each building. The site specific WMP will include how the reduction, re-use and recycling of waste can be achieved by considering the examples listed below;

6.2.1 Waste Avoidance

- 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
- investigate leasing office equipment and machinery rather than purchase and disposal

6.2.2 Re-use

- establish systems with in-house and with supply chain stakeholders to ship products in reusable packaging where possible

6.2.3 Recycling

- development of ‘buy recycled’ purchasing policy;
- flatten or bale cardboard to reduce number of bin lifts required; and

  provide recycling collections within each of the offices (e.g. plastics, cans and glass).

6.3 Waste Storage and Servicing Requirements

A dedicated waste storage area will be identified within each building with enough space to contain all the bins and equipment required for the building. This includes bins of suitable sizes (100Lbins) and the installation of a cardboard baler will be reviewed within 12 months of operation. Sufficient clearance has been provided to enable collection vehicles to access the bin storage area.

6.3.1 Space Requirements

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

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.

Sufficient space will be provided for the segregation and storage of varying waste types including provision for the collection of fluorescent tubes, smoke detectors, e-wastes and other recyclable resources.

Sufficient space will also be provided for reuse items such as crates and pallets for occupational safety purposes.

6.3.2 Waste Bin Locations and Centralised Waste Storage Areas

To encourage employee recycling, general landfill waste and comingled recycling bins will be positioned in easily accessible areas for effective recycling results, including along walkways and aisles, inside any food retailer's kitchen area, and at pedestrian entry/exit points to the car park levels to deal with waste management on these levels.

Storage of cardboard and paper must be in a dry, vermin-proof area and must not be stored for more than two weeks in order to prevent infestation by pests.

Provisions must be made for the separation of hazardous materials, cardboard, paper and recyclable plastics at each holding area in addition to the centralised waste storage area.

Waste and recyclables from each holding area within the premises must be transferred to a centralised waste and recycling storage area.

Centralised storage areas should be conveniently located for servicing multiple tenants, and loading docks located close to areas requiring waste servicing and garbage chutes/ramps. The construction of additional garbage areas, rooms and equipment are to comply with BCA (Building Code of Australia) requirements and Australian Standards.

All waste sorting and storage areas are to be kept clean and odour and vermin free. It is the responsibility of the Operations Manager or equivalent personnel to check each waste sorting and storage areas for cleanliness, hygiene and OH&S issues.

6.3.3 Waste Collection Area

Waste and recyclables will be transported to a designated waste collection area (locations for each Lot to be determined at the detailed design phase) the evening or morning prior to the scheduled collection time. Where possible collection times should not coincide with peak operational delivery schedules however all areas identified will not interfere with operational truck movements.

6.4 Other Wastes

6.4.1 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.

6.4.2 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.

6.4.3 Stormwater Treatment

Carparking 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.

6.4.4 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.

6.5 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:

- garbage and recycling bins must be clearly and correctly labelled at all times (Figure 12)
- 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
- 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).

6.6 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* (2012) for example clauses.