

Waste Management Strategy



SIMTA

SYDNEY INTERMODAL TERMINAL ALLIANCE

Transitional Part 3A Concept Plan Application

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SIMTA

Moorebank Intermodal Terminal Facility

Waste Management Strategy

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Construction and Demolition Waste Management Forms

Executive summary

The Sydney Intermodal Terminal Alliance (SIMTA) is a consortium of Qube Logistics and Aurizon. The SIMTA Moorebank Intermodal Terminal Facility (SIMTA proposal) is proposed to be located on the land parcel currently occupied by the Defence National Storage and Distribution Centre (DNSDC) on Moorebank Avenue, Moorebank, south west of Sydney. SIMTA proposes to develop the DNSDC occupied site into an intermodal terminal facility and warehouse/distribution facility, which will offer container storage and warehousing solutions with direct rail access to Port Botany. Construction of the rail connection from the SIMTA site to the Southern Sydney Freight Line (SSFL) will be undertaken as part of the first stage of works for the SIMTA proposal.

The SIMTA site is located in the Liverpool Local Government Area. It is 27 kilometres west of the Sydney CBD, 17 kilometres south of the Parramatta CBD, 5 kilometres east of the M5/M7 Interchange, 2 kilometres from the main north-south rail line and future Southern Sydney Freight Line, and 0.6 kilometres from the M5 motorway.

The SIMTA site, approximately 83 hectares in area, is currently operating as a Defence storage and distribution centre. The SIMTA site is legally identified as Lot 1 in DP1048263 and zoned as General Industrial under Liverpool City Council LEP 2008. The parcels of land to the south and south west that would be utilised for the proposed rail link are referred to as the rail corridor. The proposed rail corridor covers approximately 75 hectares and adjoins the Main Southern Railway to the north. The rail line is approximately 3.5 kilometres in length, 20 metres in width (variable width) and includes two connections to the SSFL, one south and one north.

Hyder has reviewed and identified relevant legislative requirements for waste management and identified the waste materials associated with the SIMTA site based on indicative development plans and anticipated use of the site.

Numerous waste streams are expected to be generated from the SIMTA site during the construction and operational phases.

A waste management strategy has been developed comprising:

- An outline of the relevant legislative context and waste policy requirements is provided and consists of relevant NSW environmental and waste acts as well as Liverpool Council's Development Control Plan, 2008.
- A summary of the anticipated waste materials generated by the SIMTA site including those typical of demolition, construction and operation, as detailed in the report.
- A waste management and minimisation strategy for the waste streams in accordance with a staged development and a hierarchy of objectives being:
 - Reduce: Discarding less material through the use of robust management practices and encouraging members of the supply chain to adopt the same principle.
 - Reuse: Making use of existing materials wherever practically possible.
 - Recycle: Identifying and segregating materials for recycling.
 - Recovery: Identifying and recovering materials suitable for recovery.
 - Responsible disposal: Complying with current waste management legislation and company policy and procedure, for the disposal of waste.

The report further details the requirements, potential waste material and the respective management and minimisation strategies.

Glossary of terms

DA	Development Application
DCP	Development Control Plan
DNSDC	Defence National Storage and Distribution Centre
EPA	Environmental Protection Authority
OEH	Office of Environment and Heritage
OHS	Occupational Health and Safety
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
SIMTA	Sydney Intermodal Terminal Alliance
UST	Underground Storage Tank
WARR Act	Waste Avoidance and Resource Recovery Act 2001
WMM Act	<i>Waste Minimisation and Management Act 1995</i>
WMP	Waste Management Plan
WRAP	Waste and Resources Action Programme

1 Introduction

The Sydney Intermodal Terminal Alliance (SIMTA) is a consortium of Qube Logistics and Aurizon. The SIMTA Moorebank Intermodal Terminal Facility (SIMTA proposal) is proposed to be located on the land parcel currently occupied by the Defence National Storage and Distribution Centre (DNSDC) on Moorebank Avenue, Moorebank, south west of Sydney. SIMTA proposes to develop the DNSDC occupied site into an intermodal terminal facility and warehouse/distribution facility, which will offer container storage and warehousing solutions with direct rail access to Port Botany. Construction of the rail connection from the SIMTA site to the Southern Sydney Freight Line (**SSFL**) will be undertaken as part of the first stage of works for the SIMTA proposal.

The SIMTA proposal is a **transitional Part 3A project** under Schedule 6A of the *Environmental Planning and Assessment Act 1979 (EP&A Act)*

This report has been prepared by Hyder Consulting (Hyder) for SIMTA in order to address required waste management planning to support the environmental assessment for Concept Plan approval as a transitional Part 3A project for the SIMTA proposal.

This waste management strategy comprises the following:

- The relevant legislative context and requirements for waste management.
- A summary of the anticipated waste materials generated during demolition, construction and operation of the SIMTA site.
- A strategy for the management of construction, demolition and operational waste.

This waste management strategy only considers waste management planning for the SIMTA site and does not include waste management planning works associated with the construction and operation of the rail corridor. Waste management considerations for the rail corridor works will be addressed once the rail link design details are known and will be included within project application documentation and any required waste management plan.

1.1 Background

1.1.1 The site

The SIMTA site is located in the Liverpool Local Government Area. It is 27 kilometres west of the Sydney CBD, 17 kilometres south of the Parramatta CBD, 5 kilometres east of the M5/M7 Interchange, 2 kilometres from the main north-south rail line and future Southern Sydney Freight Line, and 0.6 kilometres from the M5 motorway.

The SIMTA site (refer to Figure 1), is currently operating as a Defence Storage and Distribution centre. The SIMTA site is legally identified as Lot 1 in DP1048263 and zoned as General Industrial under Liverpool City Council LEP 2008. The site is currently tenanted by the Department of Defence and operates as a Defence National Storage and Distribution Centre (DNDSC). The DNDSC site comprises low rise buildings including warehouses, administrative offices, car parks and associated infrastructure which occupy around 42 hectares or 50 per cent of the sites spatial extent (around 80 hectares).

The parcels of land to the south and south west that would be utilised for the proposed rail link are referred to as the **rail corridor**. The proposed rail corridor covers approximately 75 hectares and adjoins the Main Southern Railway to the north. The rail line is approximately 3.5 kilometres in length, 20 metres in width (variable width) and includes two connections to the SSFL, one south and one north.

Table 1 shows the lot and deposited plan number of the land parcels that will be impacted by the SIMTA proposal.

Table 1 Land parcels of the SIMTA proposal

Lot	Deposited Plan	Property Address/Description
1	1048263	Moorebank Avenue, Moorebank (SIMTA Site)
3001	1125930	Moorebank Avenue, Moorebank (land immediately south and south-west of SIMTA Site, including School of Military Engineering)
1	825352	Railway land and to the north of East Hills Railway Line
2	825348	
1	1061150	
2	1061150	
1	712701	
5	833516	Privately owned land north of East Hills Railway Line, east of Cumberland & South Passenger Line and Southern Sydney Freight line and west of Georges River
7	833516	
51	515696	
52	517310	
104	1143827	
103	1143827	
91	1155962	

Lot	Deposited Plan	Property Address/Description
4	1130937	Land west of the Georges River, north of the above privately owned land
5	833516	Railway land along shared railway line – Cumberland & South Passenger Line and Southern Sydney Freight Line
101	1143827	
102	1143827	
Conveyance Book 76	Number 361	Main Southern Rail Corridor
NA	NA	Georges River (Crown Land)

Numerous waste streams are expected to be generated from the SIMTA site during the construction and operational phases. The waste management strategy considers waste management planning for the SIMTA site but does not include waste management planning for the rail corridor and associated rail link. Pending confirmation of the rail link design, there are likely to be minor short term waste streams associated with packaging, vegetation clearing, spoil and surplus materials and spill control and maintenance requirements during operation. These streams are not able to be meaningfully quantified in the absence of design information. Waste management plans prepared as part of any construction or operation environmental management plan will incorporate management of waste streams generated from both the SIMTA site and rail corridor.

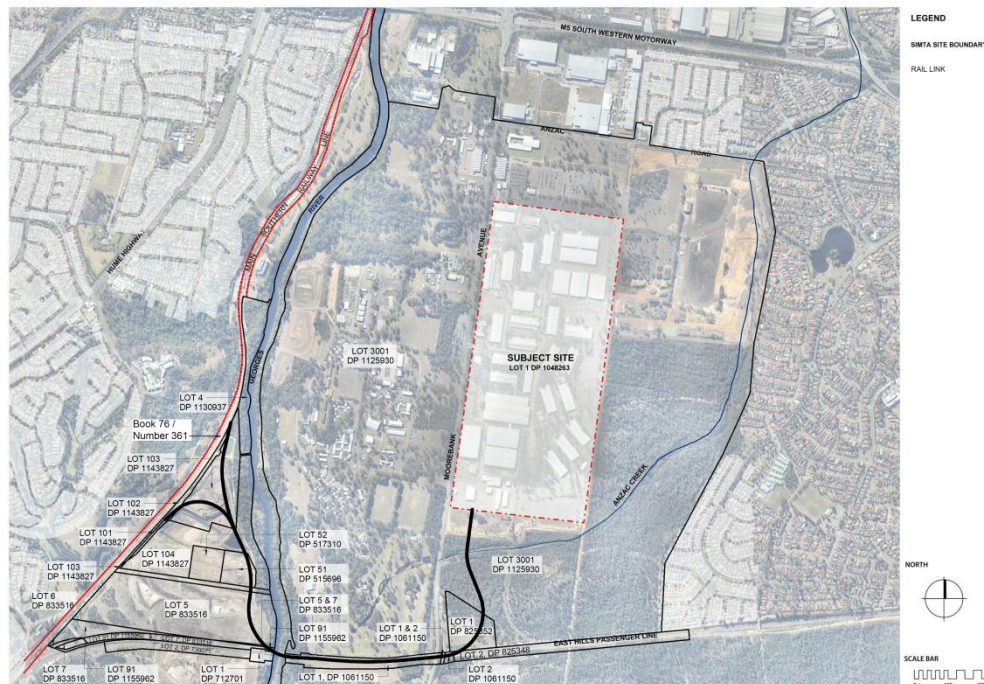


Figure 1: SIMTA site with rail corridor lands and indicative rail link

1.1.2 Waste management

Proposed works for the SIMTA site involve demolition of the existing buildings on the site and the construction and operation of warehouse space and freight village facilities including a four storey hotel, retail, cafe, offices and business service centres.

Hyder has reviewed and identified relevant legislative requirements for waste management and identified the waste materials associated with the SIMTA site based on indicative development plans and anticipated use of the facility. In addition Hyder visited the site at Moorebank on Thursday 26 August 2010. During this visit, Hyder:

- Visually observed existing building materials.
- Noted key site features in relation to waste management issues.

Management of wastes during the construction and operational phases of the SIMTA site is an important part of minimising the environmental impacts of the SIMTA proposal.

Separate contamination studies have been commissioned and, as such, contamination management is not included in this report.

1.1.3 Site specific considerations

The site is generally flat, with several open drainage channels. Of the 66 buildings on site, the majority can be described as fully enclosed metal sheds. There are several open and partially-open metal sheds towards the southern end of the site, and several brick buildings are located around the administration centre.

The buildings range from extremely large sheds through to small toilet amenities. The buildings are connected by a network of asphalt and some dirt roads, and there are also several open hardstand areas on the site.

There is a significant amount of undeveloped land, especially towards the southern end of the site, which would generally be described as open grassland. Other vegetation on site ranges from large mature native Eucalypt species, dotted throughout the site and along roadways, through to small decorative shrubs.

1.2 Purpose

The development of the SIMTA site has the potential to generate solid and liquid wastes. The key waste streams identified include:

- Excavated material such as dirt, clayey quartzose sand, clay and soil.
- Construction and demolition waste such as asphalt, masonry, concrete, timber, vegetation, packaging material and scrap metal.
- General waste from operation of the intermodal terminal facility and warehouse/distribution facility such as trade waste, waste water, packaging materials and freight village facilities wastes.

The purpose of this report is to:

- Review compliance with waste policy and legislative requirements.
- Provide a preliminary forecast of the construction/demolition and operational waste materials, based on the information available at this stage. The waste forecast provides an estimate of the waste types that may arise during the construction and operation of the SIMTA site.
- Demonstrate what actions shall be considered to support the delivery of waste reduction, waste minimisation and waste management during demolition, construction and operation of the SIMTA site.
- Compose information to assist in the development of detailed waste management plans addressing the waste streams in accordance with a staged development.

2 Legislative context and requirements

This section describes the legislation impacting on waste management at a state and local level. The main legislation and guidelines that govern the management of waste for the SIMTA proposal are:

- *Protection of the Environment Operations Act 1997.*
- *Waste Avoidance and Resource Recovery Act 2001.*
- *Protection of the Environment (Waste) Operations Regulation 2005.*
- *NSW Waste Avoidance and Resource Recovery Strategy (DECCW 2007).*
- Liverpool Council Development Control Plan 2008.

The following legislation, policies and strategies provide the framework and guidelines for waste avoidance, waste reduction, waste re-use, waste recycling and waste disposal activities which will be adopted during the construction and operational phases of the SIMTA proposal. It is important to note that new legislation and amendments to existing legislation may be introduced at the time of lodgement.

2.1 *Protection of the Environment Operations Act 1997*

The *Protection of the Environment Operations Act 1997 (POEO Act)* defines 'waste' for regulatory purposes and establishes management and licensing requirements along with offence provisions to deliver environmentally appropriate outcomes. This *Act* also establishes the ability to set various waste management requirements via the regulation.

The *POEO Act* incorporates the major regulatory and enforcement provisions of the former *Waste Minimisation and Management Act 1995 (WMM Act)*.

All material to be excavated and removed from the site (including associated activities) should be undertaken in strict accordance with the *POEO Act*. Requirements include:

- Ensuring waste is classified appropriately and in accordance with relevant guidelines.
- Waste materials are disposed of to appropriately licensed facilities.
- Other materials are removed to facilities lawfully able to accept such materials.

2.2 *Waste Avoidance and Resource Recovery Act 2001*

The *Waste Avoidance and Resource Recovery Act 2001 (WARR Act)* repeals and replaces the *WMM Act* and promotes waste avoidance and resource recovery by developing strategies and programs such as the extended producer responsibility scheme for industry.

The *WARR Act* establishes the waste hierarchy to make certain that resource management options are considered against the following principles, in order of priority:

- Avoidance – actions to reduce the amount of waste generated.
- Resource Recovery – which includes re-use, reprocessing, recycling and energy recovery, consistent with the most efficient use of the recovered resources.
- Disposal – an 'end-of pipe' option that shall be undertaken to minimise any negative environmental outcomes.

2.3 *Protection of the Environment (Waste) Operations Regulation 2005*

The *Protection of the Environment Operations (Waste) Regulation 2005* introduced a mechanism in April 2008 for recognising genuine resource recovery in NSW.

This Regulation also sets out provisions around the way waste is managed in terms of storage and transportation as well as reporting and record keeping requirements for waste facilities. It also provides for the contributions to be paid by the occupiers of licensed waste facilities for each tonne of waste received at the facility or generated in a particular area; exempts certain occupiers or types of waste from these contributions; and allows deductions to be claimed in relation to certain types of waste. The Regulation also makes special requirements relating to asbestos and clinical waste.

2.4 *NSW Waste Avoidance and Resource Recovery Strategy (DECCW 2007)*

The Waste Strategy 2007 provides a framework for reducing waste generation and improving the efficient use of resources, and retains targets identified in Waste Strategy 2003. The strategy proposes priority areas and actions to guide the work of all key groups in NSW in contributing to the minimisation of environmental harm from waste disposal and through the conservation and efficient use of resources.

The Waste Strategy 2003 identified waste avoidance and resource recovery goals and targets in four key result areas. These are retained in the 2007 Strategy and are:

- Preventing and avoiding waste.
- Increasing recovery and use of secondary materials.
- Reducing toxicity in products and materials.
- Reducing litter and illegal dumping.

The 2014 resource recovery targets are also retained in Waste Strategy 2007. These include an increase in recycling of commercial and industrial waste from baseline 28 per cent to 63 per cent in 2014 and increased recycling of construction and demolition waste from baseline 65 per cent to 76 per cent in 2014.

2.4.1 *Reducing Waste: Implementation Strategy 2011-2015*

In 2010, the NSW government commissioned a review of the Waste Strategy with a view to ensuring the policies and programmes applied to waste management and resource recovery were optimised and sufficient to achieve the 2014 resource recovery targets. The review highlighted five new focus areas, including:

- Making it easier for households to separate and recover their waste.
- Making it easier for businesses to separate and recover their waste.
- Reducing or removing problem wastes to improve resource recovery and produce environmentally safe recyclable materials.
- Facilitating investment in waste infrastructure.
- Reducing litter and combating illegal dumping.

2.5 Liverpool Council *Development Control Plan 2008*

The objectives of the Demolition of Existing Developments section of the Liverpool *Development Control Plan (DCP) 2008* – General Controls for all Developments are:

- To minimise waste generation and disposal to landfill.
- To guarantee efficient storage and collection of wastes and recyclables during demolition and construction stages.
- To minimise adverse impact on adjoining premises.
- To minimise release of contaminated materials.

The Liverpool DCP requires the following from the applicant of new developments:

- A Waste Management Plan (WMP) is to be submitted with the Development Application (DA). The WMP must include volume or area estimates and information about re-use, recycling and disposal options for all types of waste produced on site, including excavation materials.
- The waste management plan together with proof of lawful disposal for all waste that is disposed of, or otherwise recycled from the site must be retained on site. Proof is to include a log book with associated receipt/invoices, waste classification, and site validation certificate. All entries must include:
 - Time and date.
 - Description and size of waste.
 - Waste facility used.
 - Vehicle registration and company name.

The required waste management forms for demolition and construction waste are included in Appendix A.

3 Potential waste materials

The expected waste materials generated from the construction and demolition, and operational phases, are outlined in the sections below. The waste materials presented in Table 2 can be expected to be generated during the demolition, construction and operational phases of the SIMTA site.

Table 2: Potential waste materials

Demolition waste	Construction waste	Operational waste
<ul style="list-style-type: none"> • Concrete – removal of pavement and structures. • Asphalt – removal of pavement and roads. • Corrugated galvanised steel from roofs, walls and frames. • Other metals from pipes and wiring. • Concrete building slabs. • Reinforced concrete panels – removal of structures. • Masonry – removal of structures. • Wood – removal of structures. • Tiles – from roofs and interior fittings. • Vegetation. • Earthworks. • Contaminated soils. • Glass – from office buildings. • Carpeting – from existing offices. • Insulation. • Domestic waste. • Sewage. • Fixtures – from existing offices and business centres. 	<p>Excess materials such as:</p> <ul style="list-style-type: none"> • Masonry • Steel • Packaging materials • Glass • Plastics • Concrete • Asphalt • Miscellaneous waste such as carpeting, fixtures and insulation, domestic waste and sewage. 	<ul style="list-style-type: none"> • Trade wastes, sewage and other waste water. • Packaging and containers, including pallets, polythene, paper and cardboard and glass. • Metals. • Used oils, tyres, rags, packaging and oil drums. • Clean up materials used in accordance with emergency response procedures for accidental spillages. • Food waste. • Domestic waste. • Green waste from landscaping.

3.1 Construction and demolition waste

Table 3 outlines typical components of construction and demolition materials.

Table 3: Typical components of construction and demolition materials

Waste category	Content examples
Wood	Forming and framing, trees, engineered wood
Metals	Pipes, rebar, wiring, framing
Plastics	Doors, windows, flooring, pipes, packaging
Tiles	Roofs
Masonry	Bricks
Glass	Windows, lights
Cardboard	Packaging
Concrete	Foundations, driveways, building slabs,
Asphalt	Road structure
Miscellaneous	Carpeting, fixtures, insulation, ceramic tile

Details of the type, quantity, source, destination and re-use, recycling and disposal strategies for demolition and construction waste materials of SIMTA site will be identified in subsequent staged project applications. The waste details will be outlined in waste management plans exemplified in Appendix A.

3.1.1 Demolition

The following waste materials can be expected to be generated during the demolition phase:

- Concrete – removal of pavement and structures.
- Asphalt – removal of pavement and roads.
- Corrugated galvanised steel from roofs, walls and frames.
- Other metals from pipes and wiring.
- Concrete building slabs.
- Reinforced concrete panels – removal of structures.
- Masonry – removal of structures.
- Wood – removal of structures.
- Tiles – from roofs and interior fittings.
- Vegetation.
- Earthworks.
- Contaminated soils.
- Glass – from office buildings.
- Carpeting – from existing offices.
- Insulation.
- Domestic waste.
- Sewage.
- Fixtures – from existing offices and business centres.

Figure 2 to Figure 5 show examples of existing buildings at the site.



Figure 2: Example of steel roof and wall building



Figure 3: Example of masonry building with steel roof



Figure 4: Example of steel roof and wall building



Figure 5: Example of building with reinforced concrete panels and steel roof

Underground Storage Tanks

One underground storage tank (UST), sanitary drainage at building 55, has been identified from drawing 250149-OF-H-7552. It is believed that additional USTs such as oil separators are present at the SIMTA site and readers are referred to HIBBS & Associates, Hazardous Materials Survey DNSDC, Moorebank (2002) report for further details. It is understood that any UST management will be incorporated in the Phase One Land Contamination report.

3.1.2 Construction

The SIMTA proposal will incorporate 290,000 square metres of warehouse space. Each warehouse would be a standard steel frame with either metal or concrete walls. The warehouses would be up to around 20 metres high. Each warehouse would have its own offices.

It is anticipated that the SIMTA proposal will also incorporate freight village facilities including a four-storey hotel, retail, cafe, offices and business services. These would be simple constructions of masonry and steel roofs.

Construction waste would include excess materials such as masonry, steel, packaging materials, glass, plastics, concrete, asphalt, miscellaneous waste such as carpeting, fixtures and insulation, domestic waste and sewage.

The volume of construction waste generated can be estimated based on project value or floor area and waste generation performance indicators produced by for example the Waste & Resources Action Programme (WRAP) which works in England, Scotland, Wales and Northern Ireland to help businesses and individuals reap the benefits of reducing waste, develop sustainable products and use resources in an efficient way. The anticipated volume of construction waste that would be generated throughout the construction stages will be estimated in a detailed waste management plan, produced for subsequent development stages.

3.2 Operational waste

Waste generated from the operation of the facilities would be associated with the container operations, warehouse activities, vehicle servicing and repairs, and the freight village facilities (hotel, offices, café and retail). It is anticipated that these facilities are likely to generate the following wastes:

- Trade wastes from container washing, oil/grit separator, sewage and other waste water.
- Packaging waste, including pallets, polythene, paper and cardboard associated with the container unloading and warehousing.
- Metals associated with container repair activities.
- Used oils, tyres, rags, packaging, oil drums and discarded components associated with on-site vehicle and rail track maintenance.
- Clean up materials used in accordance with emergency response procedures for accidental spillages.
- Paper and cardboard from warehouse, offices, cafe, retail and business centres.
- Plastic, metal and glass containers associated with warehouse, offices, cafe, hotel, retail and business centre operations.
- Food waste associated with hotel restaurant, cafe and offices.
- Domestic waste from hotel housekeeping, cafe, offices and business centres.

- Sewage.
- Green waste from landscaping.

4 Waste management and minimisation strategy

This strategy seeks to make sure that waste reduction will be considered during the various stages of the SIMTA proposal.

It aims to achieve waste diversion from landfill in accordance with the WARR targets for the construction and demolition waste stream. Waste minimisation will be considered during the design phase through:

- Building form – design size and space to eliminate unnecessary elements and to reduce off-cuts resulting from the construction process.
- Design flexibility – incorporate flexibility in design for future building expansion, adaption and dismantling.
- Design complexity – reduce the complexity of the design to standardise the construction process and reduce the quantity of materials required.
- Specifications – avoid over specification and minimise the variety and number of different components; evaluate the reuse and recycling opportunities for the specified materials before specification involving the whole supply chain.

Different waste minimisation and management aspects for different development stages and activities are presented in the sections below.

Demolition

The following measures to improve the minimisation of demolition waste will be implemented:

- Re-use of material will have priority over recycling.
- Recycling will have priority over disposal.
- Selection of reputable waste removal contractors who will guarantee that recyclable material will be recycled and will provide any relevant certificates.
- Vegetation removed as a result of demolition activities shall be either preserved for use in the new development, or mulched for inclusion in landscaping activities. The remainder (if applicable) will be sent to a composting facility.
- Earth excavated from the demolition site will be used for infill and landscaping where feasible, the remainder (if applicable) will be sent to a recycling facility.
- Asphalt will be re-used by transferring it to a batching plant or using it as a base layer for access roads.
- Concrete components from the existing structures will where possible be crushed and re-used on-site, the remainder (if applicable) will be sent to a recycling facility.
- Fuel and oil storage from demolition machinery will be secured and managed responsibly within compound sites during works, and removed upon completion of works.
- Before the removal of any demolition materials from the construction site, a 'recycling coordinator' shall inspect containers for compliance with waste management requirements.
- Make certain sewage waste is disposed of by a licensed waste contractor in accordance with Sydney Water and Environment Protection Agency (EPA) requirements.

The above measures will be supported by:

- Educational programmes to encourage recycling shall be adopted and recycling bins provided on site for paper and cardboard, metals, glass and plastic, which will then be sent to approved recyclers.
- Domestic waste will be collected regularly and disposed of at licensed facilities.

All waste that cannot be re-used or recycled will be disposed of in accordance with the NSW EPA's *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes (1997)*.

Construction

The best opportunities for improving materials resource efficiency in construction projects occur during the design stage. Implementing these opportunities can provide significant reductions in cost, waste and carbon emissions. There are five key principles that design teams can adopt during the design process to reduce waste:

- Design for re-use and recovery.
- Design for off-site construction.
- Design for materials optimisation.
- Design for waste efficient procurement.
- Design for deconstruction and flexibility.

In keeping with the waste management 'reduce, re-use, recycle' hierarchy, presented in Figure 6, the following measures will be undertaken to minimise construction waste at site:

- Reduce potential waste by ordering the correct quantities of materials.
- Coordinate and sequence trades people to minimise waste.
- Prefabricate materials where possible.
- Use modular construction and basic designs to reduce the need for off-cuts.
- Re-use formwork.
- Reuse or recycle materials from the demolition phase where possible, eg use timber from demolition as formwork.
- Separate off-cuts to facilitate re-use, resale or efficient recycling.
- Minimise site disturbance and limit unnecessary excavation.
- Select landscaping which reduces green waste.
- Select waste removal contractors to guarantee that recyclable waste are recycled.
- Engage with the supply chain to supply products and materials that use minimal packaging and segregate packaging for re-use.
- 'Take-back' schemes – set up schemes with suppliers to take back packaging materials.
- Before the removal of any construction materials from the site, a 'recycling coordinator' shall inspect containers for compliance with waste management requirements.
- Make certain sewage waste is disposed of by a licensed waste contractor in accordance with Sydney Water and EPA requirements.



Figure 6: Waste Management Hierarchy (Zero Waste South Australia, 2010)

These measures are supported by the following:

- Educational programs and the provision recycling bins onsite (for paper and cardboard, metals, glass and plastic) will encourage the adaption of recycling. Collected material will be sent to approved recyclers.
- Domestic waste will be collected regularly and disposed of at licensed facilities.

All waste that cannot be re-used or recycled shall be disposed of in accordance with the NSW EPA's *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes (1997)*.

Logistics

A logistics plan shall be developed at the early stages of the SIMTA proposal to guarantee that due consideration is given to material requirements through the construction phase, enabling efficient management of the delivery and storage of materials. This will include:

- 'Just-in-time' delivery – to alleviate space constraints for storage and site congestion.
- 'Construction consolidation centres' – these provide effective supply chain management solutions enabling the safe and efficient flow of construction materials.

Access to the site for waste removal vehicles will be determined for all construction and demolition vehicles including details of vehicle accessing the site and related noise issues.

Waste storage

To the extent feasible, waste shall be sorted and stored according to material type in a designated waste storage area on site. Clearly labelled bulk bins will be available for the placement of different materials.

Figure 7 depicts an example of how the waste storage area could be established at the demolition site. The exact configuration and number of bins will be determined by the materials being generated at the time and included in subsequent stages of development.

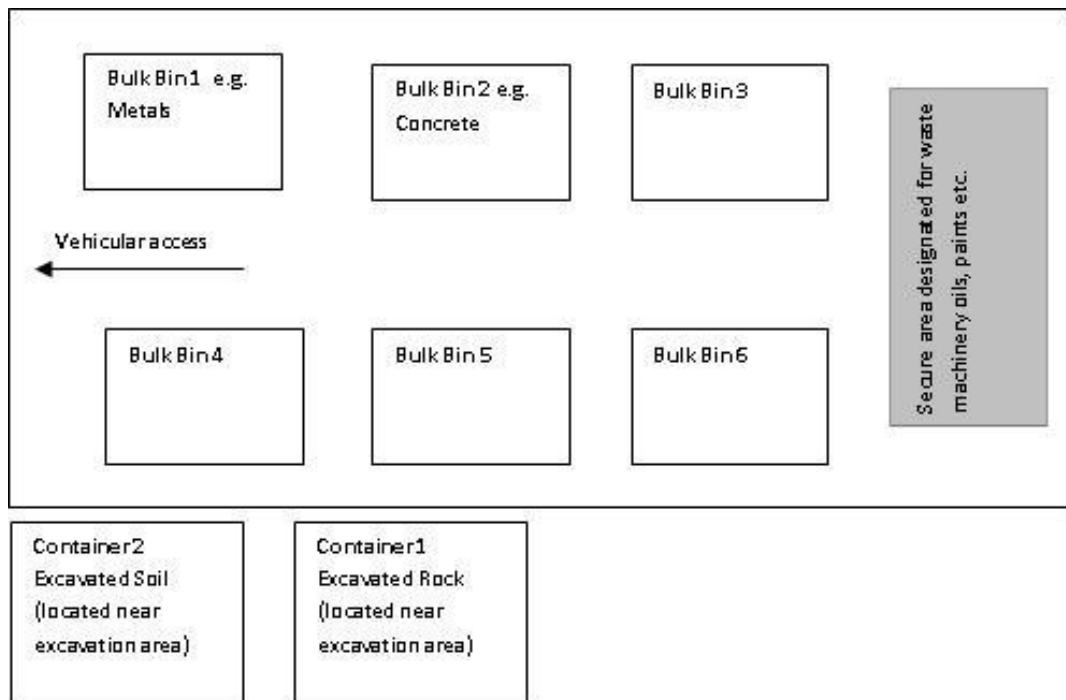


Figure 7: Example waste storage area

In addition to the above, the following waste management methods shall be implemented during construction and demolition to make sure the highest practicable percentage of waste is diverted from landfill for re-use or recycling:

- Waste management during the SIMTA proposal construction phase is to be centrally administered in order to maintain one consistent system from the start to completion.
- Between collection periods, all waste/recyclable materials generated on-site shall be kept in appropriately labelled containers.
- The waste storage area shall be appropriately sized to accommodate bins of sufficient volume to contain the quantity of waste generated between collections.
- The positioning, type and size of containers used to hold waste shall be compatible with the collection practices of the nominated waste contractor.
- Waste management facilities shall be suitably enclosed, covered and maintained to prevent potentially contaminated waste/rain water runoff from entering the stormwater system.
- Consideration shall be given to the time of day at which containers are collected to minimise the adverse impacts on residential amenity, pedestrian movement and local traffic.
- Arrangements shall be in place regarding the regular maintenance and cleaning of waste management facilities.
- The waste storage areas shall be appropriately lit to maintain security of staff and be equipped with fire extinguishing equipment and smoke alarms.
- The waste storage areas shall be secure.
- The waste storage areas shall meet all relevant occupational health and safety (OHS) requirements.

Communication and education

To make sure waste management requirements are realised by those on-site during construction and demolition, the following shall be adopted:

- The general contractor shall conduct an on-site pre-construction meeting with subcontractors. Attendance will be required for the subcontractors' key field personnel. The purpose of the meeting will be to reinforce to the subcontractors' key field employees the commitments made with regard to construction waste management goals and requirements.
- There shall be a nominated waste management site 'champion' to guarantee the appropriate waste management is adhered to throughout works.
- Waste prevention and recycling activities shall be discussed at the beginning of each subcontractor 'toolbox' meeting to reinforce plans are on track and to communicate re-use and recycling progress to date.
- As each new subcontractor comes on site, the recycling coordinators shall present him/her with a summary of the waste management requirements and provide a tour of the waste and recycling areas.
- All recycling skips/containers will be clearly labelled. Containers shall be located in close proximity to the buildings under construction in which recyclables/salvageable materials will be placed.
- Lists of acceptable/unacceptable materials will be posted throughout the site in order to enhance appropriate recycling.
- All subcontractors shall be informed in writing of the importance of non-contamination with other materials or general waste.
- Recycling coordinators shall inspect the containers frequently to insure that no contamination is occurring.

Operational waste

- Appropriate areas shall be provided within each premise for the storage of garbage and recycling bins and all waste and recyclable material generated by this facility.
- Waste and recycling stations throughout the SIMTA proposal will encourage appropriate disposal of waste and recyclables.
- Each business centre, office, the hotel and cafe shall have a clearly defined storage space sized to sufficiently store all the garbage, recyclables and other wastes generated by that unit for at least one day.
- Standard signage on how to use the waste management system and what materials are acceptable in the recycling will be posted in all waste collection and storage areas. Also, all waste and recycling receptacles will be clearly and correctly labelled to identify which materials are to be placed in which bin.
- All domestic waste shall be collected regularly and disposed of at licensed facilities.
- Waste collection vehicles will be able to service the SIMTA proposal progress efficiently and effectively.
- In order to maximise recycling opportunities, an education programme and on-going monitoring will to be implemented for training personnel to properly sort and transport waste into the right components and destinations.
- Sewage waste will be disposed of by a licensed waste contractor in accordance with Sydney Water and OEH requirements.

- Trade waste will be discharged to the sewer through a trade waste agreement with Sydney Water.

Summary of waste management and minimisation strategies

Table 4 outlines the recommended waste management and minimisation strategies to be adopted throughout the demolition, construction and operational phases of the SIMTA site.

Table 4: Waste management and minimisation strategies

Demolition waste	Construction waste	Operational waste
<ul style="list-style-type: none"> • Re-use of material will have priority over recycling. • Recycling will have priority over disposal. • Selection of reputable waste removal contractors who will guarantee that recyclable material will be recycled and will provide any relevant certificates. • Vegetation removed shall be either preserved for use in the new development, or mulched for inclusion in landscaping activities. The remainder will be sent to a composting facility. • Excavated earth will be used for infill and landscaping where feasible, the remainder will be sent to a recycling facility. • Asphalt will be re-used by transferring it to a batching plant or using it as a base layer for access roads. • Concrete components will where possible be crushed and re-used on site, the remainder will be sent to a recycling facility. • Fuel and oil storage from demolition machinery will be secured and managed responsibly within compound sites during works, and removed upon completion of works. • Sewage waste shall be disposed of by a licensed waste contractor in accordance with Sydney Water and OEH requirements. 	<ul style="list-style-type: none"> • Reduce potential waste by ordering the correct quantities of materials. • Coordinate and sequence trades people to minimise waste. • Prefabricate materials where possible. • Use modular construction and basic designs to reduce the need for off-cuts. • Re-use formwork. • Re-use or recycle materials from the demolition phase. • Separate off-cuts to facilitate re-use, resale or efficient recycling. • Minimise site disturbance and limit unnecessary excavation. • Select landscaping which reduces green waste. • Select waste removal contractors to guarantee that recyclable waste are recycled. • Engage with the supply chain to supply products and materials that use minimal packaging. • Set up schemes with suppliers to take back packaging materials. • Sewage waste shall be disposed of by a licensed waste contractor in accordance with Sydney Water and OEH requirements. 	<ul style="list-style-type: none"> • Appropriate areas shall be provided for the storage of waste and recyclable material. • Standard signage on how to use the waste management system and what materials are acceptable in the recycling will be posted in all waste collection and storage areas. • All domestic waste shall be collected regularly and disposed of at licensed facilities. • Waste collection vehicles will be able to service the SIMTA site efficiently and effectively. • An education programme and on-going monitoring will to be implemented for training personnel to properly sort and transport waste into the right components and destinations. • Sewage waste will be disposed of by a licensed waste contractor in accordance with Sydney Water and OEH requirements. • Trade waste will be discharged to the sewer through a trade waste agreement with Sydney Water.

5 Conclusions and recommendations

This site specific waste management strategy provides a summary of SIMTA's approaches to achieve best practice waste reduction, waste minimisation and waste management for the SIMTA site. This guidance will help reduce the amount of construction, demolition and operational waste sent to landfill in keeping with NSW resource recovery target.

It is recommended that:

- Detailed waste management arrangements will be provided for each subsequent staged development in a waste management plan, which will address the construction and demolition phase as well as the operational phase of each stage. The detailed waste management plan will outline waste quantities, storage requirements for materials and bins, recycling and disposal options and communication and education arrangements. The plans will be developed in accordance with relevant waste management legislation and policies.
- The staged waste management plan be directed to reducing, minimising and managing waste in support of the following waste management hierarchy objectives:
 - Reduce: Discarding less material through the use of robust management practices and encouraging members of the supply chain to adopt the same principle.
 - Re-use: Making use of existing materials wherever practically possible.
 - Recycle: Identifying and segregating materials for recycling.
 - Recovery: Identifying and recovering materials suitable for recovery.
 - Responsible disposal: Complying with current waste management legislation and company policy and procedure, for the disposal of waste.

6 References

Office of Environment and Heritage (2011). Waste legislation.

<http://www.environment.nsw.gov.au/waste/Waste_regulation.htm>.

Government of South Australia – Zero Waste (2011). Waste Management Hierarchy. <

<http://www.zerowaste.sa.gov.au/about-us/waste-management-hierarchy>>.

WRAP (2011). Construction - Tools and Guidance.

<http://www.wrap.org.uk/construction/tools_and_guidance/>

US EPA (2003). Estimating 2003 - Building-related Construction and Demolition Materials

Amounts. <<http://www.epa.gov/osw/conservation/rrr/imr/cdm/pubs/cd-meas.pdf>>

Appendix A

Construction and Demolition Waste Management Forms

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WASTE MANAGEMENT PLAN

Site Address	DA Number
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Demolition Containing Asbestos

Please fill in if Applicable

Tick if under 10m²

Tick if over 10m²

Work Cover Licence No.	
Demolition Contractor Details	_____ _____
Licensed Landfill	_____ _____

General Demolition Waste

Type of Material	Less than 10m ³	More than 10m ³	How will you manage this waste?		
			Onsite	Recycle	Landfill
Bricks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Concrete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tiles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timber (clean)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timber (treated)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plasterboard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Metals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Green Waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Principal Off-Site Recycler	Principal Licensed Landfill Site
_____ _____ _____	_____ _____ _____

Declaration

Name of applicant (Please Print) _____

Signature of applicant _____ Date _____

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WASTE MANAGEMENT PLAN

Construction



Site Address _____	DA Number _____
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Will you use Site Cleaners?	<input type="checkbox"/> Yes, for some work or <input type="checkbox"/> Yes, for all work or <input type="checkbox"/> No	Estimated total volume or weight _____	_____
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Please supply details of site cleaners used	ABN Number _____ Name _____ Phone _____ Mobile _____
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If using site cleaners for all work, please STOP here. DO NOT continue to complete form.

All Excavation Material including Swimming Pools	<input type="checkbox"/> Less than 10m ³ <input type="checkbox"/> More than 10m ³	<input type="checkbox"/> Reuse onsite <input type="checkbox"/> Reuse offsite <input type="checkbox"/> Landfill Disposal
--	--	---

Address if reused off site _____

Name and Address of licensed landfill _____

Type of Material	Less than 10m ³	More than 10m ³	How will you manage this waste?		
			Onsite	Recycle	Landfill
Bricks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Concrete	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tiles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Timber (clean or treated)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plasterboard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Green Waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Principal Off-Site Recycler	Principal Licensed Landfill Site
_____ _____ _____	_____ _____ _____

Declaration

Name of applicant (Please Print) _____

Signature of applicant _____ Date _____