

25 Resources and waste

Construction of the proposed airport would involve clearing and a major bulk earthworks program to achieve a level surface suitable for the construction of airport facilities, along with the use of a range of construction materials. The operational airport would employ a large workforce and service some 10 million passengers each year. As with any large infrastructure project, the construction and operation of the proposed airport would involve the consumption of natural resources and has the potential to generate substantial quantities of waste.

The peak for waste generation would be during construction, when an estimated 202,500 tonnes of waste vegetation and construction materials such as concrete and timber would be generated. During the initial airport operations, an estimated 5,251 tonnes of waste would be generated each year, and would include general waste, food, packaging waste from terminals and waste oils, paints and cleaners from maintenance activities.

Resources and waste from the airport would be sustainably managed by maximising waste avoidance, reduction, reuse and recycling (in accordance with a waste management hierarchy), while mitigating and managing impacts on human health and the environment. Waste management plans would be prepared prior to construction and operation of the airport, which would guide the management of waste during construction and operation.

Consideration would also be given to the achievement of an Infrastructure Sustainability Council of Australia 'As Built Rating' and 'Operations Rating' to promote sustainability – covering the design, construction and operation of the Stage 1 development.

The waste management market in Western Sydney is mature and handles significant volumes of waste from various domestic, commercial and industrial sources across all of Sydney. Waste facilities in Western Sydney have sufficient capacity to handle wastes of the type and volume expected to be generated at the airport site.

25.1 Introduction

This chapter provides an analysis of the resources that would be consumed and waste generated by the construction and operation of the proposed airport. Potential impacts arising from the construction and operation of the proposed airport are characterised and measures to mitigate and manage these impacts are identified.

25.2 Methodology

The following tasks were undertaken to assess resource consumption and waste generation associated with the development of the proposed airport:

- review of waste legislation and policy in order to consider which matters must be complied with and which matters may provide guidance in developing waste management strategies;
- estimation of waste generated by construction and operation of the airport; and
- determination of waste management options.

Resources consumed and waste generated during construction were estimated with reference to data on construction planning and logistics data (see Chapter 6 (Volume 1)) applied to typical waste generation rates for construction of certain types of infrastructure (e.g. roads, runways, hardstands and commercial buildings). These estimates were based on area and took into account certain assumptions such as concrete density and thickness.

Waste that would be generated during operation was estimated by referring to data from a number of existing airports. The airports were selected based on the availability and applicability of waste data. This was used to estimate the types and quantities of waste that may be generated from particular airport facilities at the proposed airport. The researched airport data are summarised in Table 25–1. The types of data typically reported were either:

- amounts for components of waste streams, such as food and cardboard;
- whole amounts for parts of airports, such as terminals and maintenance; or
- amounts of waste for the whole airport.

Outlying values were removed from the collected data, then converted to kilograms per 1,000 passengers and averaged out. The averages were then multiplied by the number of passengers to account for the 10 million annual passengers forecast each year during the Stage 1 development.

Table 25–1 Summary of waste data from researched airports

Airport	Passengers per year (million)	Waste type	Annual volume per 1,000 passengers (kg)
Aberdeen (ABZ), UK (2007)	2.7	General waste	187.0
Adelaide (ADL), Australia (2013)	7.5	General waste	95.7
Athens (ATH), Greece (2005)	14.3	General waste	819.1
		Recyclables	120.0
		Hazardous	24.9
Copenhagen (CPH), Denmark (2005)	24	General waste	144.0
Dubai (DXB), UAE (2004)	21.7	General waste	944.8
Edinburgh (EDI), UK (2007)	8.7	General waste	219.9
Fort Lauderdale (FLL), USA (2004)	10	General waste	477.4 (average)
Los Angeles (LAX), USA (2004)	29		
Portland (PDX), USA (2004)	6.5		
San Francisco (SFO), USA (2004)	36		
Baltimore-Washington (BWI), USA (2004)	21		
Glasgow (GLA), UK (2007)	8.9	General waste	305.1
Heathrow (LHR), UK (2005)	36.1	Non-hazardous	205.4
		Recyclables	24.8
		Hazardous	115.6
		Hazardous liquids	8.6
Melbourne (MEL), Australia (2004)	19	General waste	124.2
Munich (MUC), Germany (2013)	38.7	General waste	231.2
Oakland (OAK), USA (2007)	13.6	General waste	31.5
Southampton (SOU), UK (2007)	1.9	General waste	226.8
Stanstead (STN), UK (2007)	23.8	General waste	263.1
Toronto (YYZ), Canada (2005)	28.6	Non-hazardous	151.0
		Hazardous	1.4

25.3 Legislation and policy

25.3.1 Legislative framework

As a Commonwealth facility, the airport site would principally be governed by Commonwealth legislation. Although this legislation does not explicitly regulate waste, it prescribes duties for airport operators to take all reasonable and practicable measures to avoid polluting as described in Chapter 3 (Volume 1) of this EIS and Part 4 of the Airports (Environment Protection) Regulations 1997. Other relevant laws and regulations administered by the Commonwealth generally relate to national matters such as import, export and quarantine. These laws apply to particular wastes at the airport site and include the:

- *Biosecurity Act 2015*; and
- *Hazardous Waste Act 1989*.

As most waste generated at the airport site would be transported off-site, a range of state laws are also applicable. The principal NSW laws concerning waste are the:

- *Waste Avoidance and Resource Recovery Act 2001*;
- *Protection of the Environment Operations Act 1997*; and
- Protection of the Environment Operations (Waste) Regulation 2014.

Definitions and a summary of key provisions are outlined below.

25.3.2 Biosecurity Act 2015

The *Biosecurity Act 2015* allows the Australian Government to quarantine vessels, persons or goods to protect human health and the environment from pests and disease. Quarantine activities are controlled by the Australian Government Department of Agriculture and Water Resources. The Department is responsible for the clearance of all incoming international aircraft, aircraft waste, passengers and baggage. Quarantine activities at airports typically involve screening of passengers and their baggage using a range of techniques such as x-ray, detector dogs and physical inspection as well as specific waste management requirements. Screening is usually undertaken in designated examination areas after baggage reclaim but can also involve access to airside and apron areas. The Act is supported by regulations which detail provisions regarding offences under the Act and procedural matters on when and how quarantine activities are undertaken.

25.3.3 Hazardous Waste (Regulation of Imports and Exports) Act 1989

The *Hazardous Waste (Regulation of Imports and Exports) Act 1989* implements Australian Government obligations under the Basel Convention and prohibits the export and import of hazardous waste without a permit. A permit may be obtained to export hazardous waste where it can be shown that the waste would be managed in an environmentally sound manner in the country of import.

The Australian Government has banned the export of hazardous waste for disposal in all but exceptional circumstances. Export of hazardous waste for reuse, recycling or recovery is permitted providing certain conditions are met. Consideration may need to be given to the Act if waste materials originating from the airport, such as electronic waste, are exported overseas.

25.3.4 Waste Avoidance and Resource Recovery Act 2001

The *Waste Avoidance and Resource Recovery Act 2001* is the overarching waste management legislation in NSW. The objectives of the Act include encouraging the most efficient use of resources, reducing environmental harm and ensuring resource management decisions are made against a hierarchy that gives preference to waste avoidance and resource recovery. The main provisions of the Act relate to the preparation of waste strategies and extended producer responsibility schemes. The current statutory waste strategy is the NSW Waste Avoidance and Resource Recovery Strategy 2014–21 (EPA 2014a). The waste strategy is explained in Section 25.3.2.

Extended producer responsibility schemes may be made under the Act. The schemes relate to the lifecycle of a product and therefore may apply to the extraction of raw materials for a product, the manufacturing of a product and the consumption of a product, through to disposal and ongoing management requirements. The schemes may apply to producers or consumers of particular products.

Extended producer responsibility schemes in place in NSW are identified in the NSW Extended Producer Responsibility Priority Statement 2010 (DECCW 2010b) and include schemes for waste packaging, mobile phones, agricultural chemicals and containers, polyvinyl chloride, oils and lubricants, and tyres. Consumers such as an ALC would be expected to cooperate in producer responsibility schemes by isolating relevant waste streams for collection.

25.3.5 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* is the principal environmental protection legislation administered by the NSW Environment Protection Authority. The Act sets out the waste classifications, licensing requirements and other regulatory controls that would be applicable to waste transported from the airport site.

The objectives of the Act include the protection, restoration and enhancement of the quality of the environment and reduction of risks to human health. The main provisions of the Act relate to the grant and oversight of environment protection licences, the control of certain actions which may give rise to pollution and the control of waste management activities. The Act broadly defines 'waste' for the purpose of regulation as:

- a. *any substance (whether solid, liquid or gaseous) that is discharged, emitted or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment; or*
- b. *any discarded, rejected, unwanted, surplus or abandoned substance; or*
- c. *any otherwise discarded, rejected, unwanted, surplus or abandoned substance intended for sale or for recycling, processing, recovery or purification by a separate operation from that which produced the substance; or*
- d. *any processed, recycled, re-used or recovered substance produced wholly or partly from waste that is applied to land, or used as fuel ... in the circumstances prescribed by the regulations; or*
- e. *any substance prescribed by the regulations to be waste.*

Schedule 1 of the Act also sets out the waste classification which provides the basis for the NSW *Waste Classification Guidelines* (see Section 25.3.2). The classification of waste under the Act and supporting guidelines is summarised in Table 25–2. Full definitions can be found within the Act, associated Regulations and the Waste Classification Guidelines.

Part 5 of the Act prescribes a range of offences for polluting water, air, noise and land. Part 5.6 of the Act specifically deals with offences relating to land pollution and waste. Relevant offences include the unlawful transporting or depositing of waste, providing false or misleading information about waste, or operating a waste facility without lawful authority.

Table 25–2 Summary of waste classifications in NSW

Waste type	Definition
Restricted solid waste	A substance meeting the specific contaminant concentrations and/or toxicity characteristics defined in the NSW <i>Waste Classification Guidelines</i> .
Liquid waste	Under the NSW <i>Waste Classification Guidelines</i> , a substance that shows flowing characteristics at an angle of less than 5 degrees above horizontal, and becomes free flowing at or below 60 degrees Celsius or when it is transported.
Special waste	Clinical and related waste, asbestos waste and waste tyres as per the NSW <i>Waste Classification Guidelines</i> .
Hazardous waste	Substances that are Class 1 (explosives), Class 2 (gases), Class 5 (oxidising substances and organic peroxides) or Class 8 (corrosives) under the <i>Transport of Dangerous Goods Code</i> . Substances under Division 4.1 (flammable solids), Division 4.2 (substances liable to spontaneous combustion), Division 4.3 (substances which emit flammable gas on contact with water) or Division 6.1 (toxic substances) of the <i>Transport of Dangerous Goods Code</i> . Containers having previously contained Class 1, 3, 4, 5, 6.1 or 8 dangerous goods under the <i>Transport of Dangerous Goods Code</i> . Other materials generated or collected under certain circumstances including coal tar or coal tar pitch waste, lead-acid or nickel-cadmium batteries, lead paint, or otherwise classified as hazardous waste by the NSW Environment Protection Authority and a mixture of any of the above.
General solid waste (non-putrescible)	Numerous wastes other than those listed above. Examples include glass, plastic, concrete, metal, wood, asphalt and non-contaminated excavated material such as soil or gravel.
General solid waste (putrescible)	Numerous wastes other than those listed above. Examples include manure and nightsoil, food waste and domestic waste with putrescible organics.
Trackable waste	Substances listed in Schedule 1 of the Protection of the Environment Operations (Waste) Regulation 2014 (NSW). Asbestos has separate tracking requirements under Part 7 of the Regulation.

25.3.6 Protection of the Environment Operations (Waste) Regulation 2014

The NSW Protection of the Environment Operations (Waste) Regulation 2014 sets out obligations that would apply to waste managers, consigners, transporters and receivers dealing with waste coming from the airport site.

The main provisions of the Regulation relate to the payment of a waste levy by licensed waste receivers, the requirements to track the transportation and disposal of certain types of waste, and specific requirements regarding the transportation and management of asbestos waste.

Schedule 1 of the Regulation lists types of waste that must be tracked during transport and disposal. Obligations to track these wastes apply to consigners, transporters and receivers. The responsibilities of consigners generally relate to ensuring that transporters and receivers of their waste hold the relevant licences to deal with the waste. Part 7 of the Regulation contains provisions for the transportation and management of asbestos waste, including requirements for its containment during transport, reporting requirements for transporters and receivers of asbestos waste, the manner in which asbestos is disposed, and a prohibition on the reuse or recycling of asbestos waste.

25.3.7 Other laws and regulations

Other laws and regulations concerning waste include the following:

- State laws and regulations controlling hazardous substances:
 - the NSW *Explosives Act 2003*;
 - the NSW *Radiation Control Act 1990*;
 - the NSW *Environmentally Hazardous Chemicals Act 1985*; and
 - the NSW *Dangerous Goods (Road and Rail Transport) Act 2008*, which gives effect to the Australian Code for the Transport of Dangerous Goods by Road and Rail; and
- *Product Stewardship Act 2011*, which sets the framework for product stewardship in line with the National Waste Policy (see Section 25.3.2).

25.3.8 Policies, plans and guidelines

A range of policies, plans and guidelines would also apply to waste generated at or transported from the airport site. The main documents are:

- *National Waste Policy*;
- *NSW Waste Avoidance and Resource Recovery Strategy 2014–21*; and
- *NSW Waste Classification Guidelines*.

Definitions and a summary of key provisions are outlined below.

25.3.8.1 National Waste Policy

The *National Waste Policy* is an overarching policy that guides the development of legislation and policy within States and Territories. The objectives of the National Waste Policy include the avoidance and reduction of waste for disposal, management of waste as a resource, and management of waste in a safe, scientific and environmentally sound manner.

The Policy identifies a range of strategies to be implemented by the Australian Government in collaboration with the States and Territories. The strategies include:

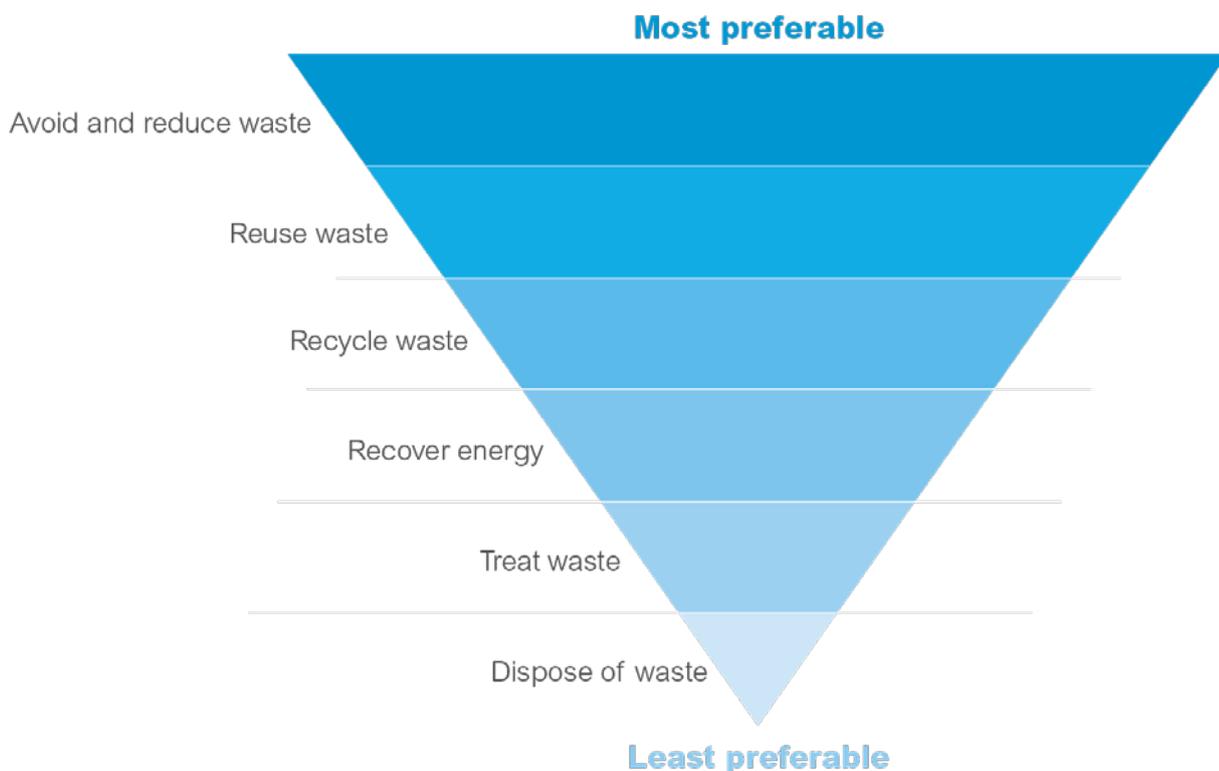
- establishment of Commonwealth product stewardship framework legislation;
- sustainable procurement principles and practices across government operations;
- improvements in waste avoidance and re-use in commercial waste streams; and
- best practice waste management and resource recovery for construction and demolition.

25.3.8.2 Waste Avoidance and Resource Recovery Strategy 2014–21

The current waste strategy under the NSW *Waste Avoidance and Resource Recovery Act 2001* is the *NSW Waste Avoidance and Resource Recovery Strategy 2014–21* (EPA 2014a). The Strategy sets objectives to avoid waste generation, increase recycling, divert waste from landfill, manage problem wastes, reduce litter and reduce illegal dumping. To achieve these objectives, the Strategy assigns the following responsibilities to industry and business:

- avoid and reduce waste through efficiency measures and industrial ecology partnerships;
- separate recycling streams at source to enable collection separate from residual waste;
- work with suppliers to reduce packaging and waste in supply chains;
- implement and maintain best practice resource recovery systems;
- actively seek other businesses that may use waste as a resource;
- ensure waste and recycling streams are taken to appropriate facilities by legitimate operators;
- specify and purchase recycled materials;
- work with other producers to take responsibility for management of problem wastes; and
- comply with regulations.

The Strategy also elaborates on a waste management hierarchy (see Figure 25–1) which supports the objectives of the *Waste Avoidance and Resource Recovery Act 2001*.



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

Figure 25–1 Waste management hierarchy

Under the waste management hierarchy, it is preferable to avoid or reduce waste by procuring only necessary materials, and consuming materials with limited production or packaging requirements. Reusable or recyclable materials should be considered where waste cannot be avoided. If waste cannot be reused or recycled, efforts should be made to recover energy to maximise its beneficial use prior to its eventual disposal. Waste with harmful characteristics should be treated prior to disposal to minimise its potential to affect human health and the environment.

25.3.8.3 Waste Classification Guidelines

The NSW *Waste Classification Guidelines* (EPA 2014b) expand on the classifications of waste in Schedule 1 of the NSW *Protection of the Environment Operations Act 1997* and Schedule 1 of the NSW *Protection of the Environment Operations (Waste) Regulation 2014*. The classification of waste is summarised in Table 25–2.

25.3.9 Other policies, standards and codes

Other policies, standards and codes include the following:

- *Australian Code for the Transport of Dangerous Goods by Road and Rail*;
- Australian standards relating to the storage and handling of hazardous substances:
 - *AS 1940-2004 The storage and handling of flammable and combustible liquids*;
 - *AS/NZS 3816:1998 Management of clinical and related wastes*;
 - *AS 2714-1993 The storage and handling of hazardous chemical materials – Class 5.2 substances (organic peroxides)*;
 - *AS/NZS 3833:2007 The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers*;
 - *AS/NZS 4452:1997 The storage and handling of toxic substances*;
 - *AS/NZS 4681:2000 The storage and handling of Class 9 (miscellaneous) dangerous goods and articles*; and
 - *AS/NZS 5026:2012 The storage and handling of Class 4 dangerous goods*.
- Australian standards and guidelines relating to the labelling and signage of waste:
 - *AS 1216-1995 Class labels for dangerous goods*;
 - *AS 1319-1994 Safety signs for the occupational environment*; and
 - *AS 4123.7-2006 Mobile waste containers – Colours, markings, and designation requirements*.

25.4 Resource consumption

Natural resources and construction materials would be used during construction and operation of the Stage 1 development.

25.4.1 Construction

Table 25–3 provides an overview of the types and estimated quantities of resources required during construction. These quantities were developed as part of preliminary construction planning. All quantities and sources would be confirmed during detailed design.

Construction and operation of the Stage 1 development would also consume resources through utilities such as potable water, electricity, gas and fuel. Daily requirements for construction would include up to 1.36 mega litres of water (including approximately 8,600 litres of potable water), 300 kilovolt amperes of electricity and 55 kilolitres of fuel (see Chapter 6 (Volume 1)).

Table 25–3 Natural resources consumed during construction

Activity	Material	Quantity (daily)	Quantity (total)	Potential sources
Earthworks ^a	Water	1.36 ML	650 ML	Existing surface water, farm dams and sediment basins Potable water supply pipes and temporary storage dams
Asphalt	Aggregate (63%)	822 tonnes	450,000 tonnes	Gunlake Marulan Quarry Holcim Lynwood Quarry Boral Peppertree Quarry
	Sand (8%)	380 tonnes	57,000 tonnes	Calga Quarry Kurnell Quarry
	Lime filler (2%)	27 tonnes	14,000 tonnes	Various
	Crusher dust (22%)	279 tonnes	157,000 tonnes	Various
	Bitumen (5%)	70 tonnes	36,000 tonnes	Camellia
Concrete	Cement (13%)	128 tonnes	60,000 tonnes	Boral Cement Australia
	Sand (38%)	373 tonnes	174,000 tonnes	Calga Quarry Kurnell Quarry
	Aggregate (44%)	434 tonnes	200,000 tonnes	Gunlake Marulan Quarry Holcim Lynwood Quarry Boral Peppertree Quarry
	Fly ash (1%)	42 tonnes	19,300 tonnes	Various
	Admixture (0.1%)	1 tonne	460 tonnes	Various
Machinery operation	Fuel/diesel	55,000 litres	–	Banksmeadow Silverwater

^a Earthworks would involve the redistribution of approximately 22 million m³ of fill material, including approximately 2 million m³ of topsoil, around the airport site

25.4.2 Operation

Operation of the proposed airport would demand significantly lower quantities of resources than construction. The Stage 1 development operating at 10 million annual passenger movements would require an estimated daily average of 1.6 mega litres of potable water; estimated maximum daily demand of 16.7 megavolt amperes of electricity; estimated daily average of 156 gigajoules of gas; and maximum daily demand of 2.7 mega litres of aviation fuel.

Use of resources would be minimised through the implementation of sustainable design principles in the design of the proposed airport, careful procurement planning to encourage the efficient operation of plant and equipment and avoid excess consumption of fuel and other utilities.

25.5 Waste generation

Construction of Stage 1 of the airport would generate approximately 202,500 tonnes of waste in total. About 5,251 tonnes of waste would be generated each year during Stage 1 operation. Waste during construction is estimated in Section 25.5.1 while waste during operation is estimated in Section 25.5.2.

A contamination assessment of the airport site has identified the potential for hazardous materials, including asbestos to be present. The removal of existing structures, and any associated management of asbestos or contamination, would be carried out on behalf of the Department of Infrastructure and Regional Development in accordance with relevant legislation and regulations (see Section 25.6). Further information on land contamination can be found Chapter 17.

25.5.1 Construction

Construction at the airport site would generate a range of waste from surplus or offcut construction materials, clearing and the demolition of existing infrastructure.

The airport site would largely be cleared of existing structures prior to construction. As such, demolition waste is expected to be limited. The main activity generating demolition waste during construction would be clearing vegetation. Removal of The Northern Road and other roads at the airport site would generate waste asphalt. Fill material from demolition would be used in bulk earthworks.

Any residual hazardous waste, including asbestos, identified at the site would be managed in accordance with the relevant legislation.

TransGrid is investigating potential options to relocate the existing above ground high voltage electricity transmission line as an underground cable, which would require a separate environmental approval. Generation of waste through this process would form part of the environmental assessment for that approval. Consultation would also occur with Airservices Australia to ensure the proposed relocation does not affect operations at the proposed airport.

Following these site preparation activities, construction waste would be generated by the construction of roads, runways, taxiways, aprons and buildings. The main waste streams generated by these activities would be general solid wastes including:

- excess and broken bricks;
- leftover concrete;

- plasterboard and fibre cement offcuts;
- carpet, tiling and insulation leftovers and offcuts;
- leftover metal from concrete reinforcements;
- metal sheet offcuts;
- plastic (pipework offcuts and packaging);
- soil (leftover bedding material); and
- timber (formwork and offcuts).

Table 25–4 quantifies the estimated volumes of waste that would be generated by demolition and construction activities for the Stage 1 development. As shown, the total volume of waste generated during construction would be of the order of 202,500 tonnes. In addition to the identified construction waste, about 24,000 litres of domestic waste water and sewage would be generated each day. Waste would be stored at the airport site for collection by suitably licensed waste contractors for offsite management.

Table 25–4 Waste generated during construction of Stage 1 development

Activity	Waste classification	Tonnes (total)
Clearing	Green waste	65,000 ^a
Removal of roads	General solid waste	3,000 ^b
Removal of transmission line	General solid waste	90
Road construction	General solid waste	78,000 ^c
Runway construction	General solid waste	6,100 ^d
Taxiway and apron construction	General solid waste	18,400 ^e
Building construction	General solid waste	32,000 ^f
Total	–	202,500

^a Assumed biomass for woodland (Ximenes et al. 2012) and grassland (Yunusa et al. 2012); 1 tonne per m³

^b Approximately 3 km of road with a width of 10 m to a depth of 0.1 m

^c Approximately 31 km of roads with a width of 10.5 m

^d Approximately 341,000 m² of runways, taxiways and aprons and associated paved areas to a depth of approximately 0.43 m, an assumed wastage rate of 5 per cent; 0.83 tonnes per m³

^e Approximately 1 million m² of runways, taxiways and aprons and associated paved areas to a depth of approximately 0.43 m, an assumed wastage rate of 5 per cent; 0.83 tonnes per m³

^f Approximately 250,000 m² of buildings

25.5.2 Operation

The majority of waste generated during operation would be from staff, retailers and passengers in the terminal complex. An estimated two-thirds of waste could be generated in these areas, while up to a third could be generated from satellite buildings and aircraft stands along with engineering and maintenance.

The main waste streams generated during operation of the airport include the following:

- general solid waste (non-putrescible) – including waste cardboard, glass, green waste, metals, paper, plastics, wood and electronic waste (including toner and printer cartridges);
- general solid waste (putrescible) – including food waste and animal waste; and
- hazardous wastes – including waste batteries, fertilisers, fuels, herbicides, oils, pesticides, paints, solvents, cleaners, clinical and pharmaceutical waste, and waste tyres.

The anticipated quantities of waste generated by the proposed airport operating at 10 million annual passenger movements during operation of the Stage 1 development are outlined in Table 25–5. An estimated 101 tonnes of waste would be generated on average each week or 5,251 tonnes each year.

In addition, approximately 2.7 mega litres of domestic waste water would be generated each day and treated at an onsite facility. Treated water in excess of recycled water demand would be irrigated to land, while an estimated 0.1 mega litres of sludge generated for daily collection by disposal trucks. Irrigation of treated water is discussed in Section 25.6.4.

Table 25–5 Waste generated during operation of Stage 1 development

Waste classification	Tonnes each week	Tonnes each year
General solid waste	79.0	4,108
General solid waste (recyclable)	13.7	710
Hazardous waste	6.7	348
Hazardous waste (liquid waste) ^a	1.6	85
Total	101	5,251

25.6 Waste management

Waste must be managed appropriately to mitigate and manage potential impacts on human health and the environment. If not managed appropriately, waste has the potential to create a range of impacts. The potential impacts of inappropriately managed waste are listed in Table 25–6.

Waste management plans would be developed as part of the environmental management framework for the proposed airport discussed in Chapter 28 (Volume 2b). The plan would collate measures to manage resource consumption and waste generation and would be developed in consultation with the relevant State authorities including the NSW Environment Protection Authority (EPA). The waste management plans are explained further in Section 25.6.1.

Consideration would also be given to the achievement of an Infrastructure Sustainability Council of Australia ‘As Built Rating’ and ‘Operations Rating’ to promote sustainability – covering the design, construction and operation of the Stage 1 development.

Table 25–6 Potential impacts of improperly managed waste

Waste type	Potential impacts
Green waste	Fire hazard, spread of weeds, visual impact, harbouring of pest species
General solid waste	Visual impact, localised increases in pH (concrete sediment), leachate (waste metal), attraction of pest species (food waste), odour (food waste)
Hazardous wastes	Land contamination, toxicity to plants and animals, degradation of water resources

25.6.1 Waste management plans

A Waste and Resources Environmental Management Plan (CEMP) and Operational Environmental Management Plan (OEMP) would be prepared prior to Main Construction Works and operation of the Stage 1 development respectively. The plans would collate measures to manage waste and thus avoid, mitigate and manage impacts to human health and the environment. The plans would define processes to track waste quantities, roles and procedures for the handling of waste at the airport site, and processes for the continual improvement of airport waste management.

The plans would collate measures to manage resource consumption and waste generation and would be developed in consultation with the relevant State authorities including the NSW EPA. The measures contained in the waste management plan would reflect the industry standard waste management hierarchy as per the NSW *Waste Avoidance and Resource Recovery Act 2001* (see Section 25.3.1) as well as relevant standards such as those for hazardous substances (see Section 25.3.2).

The plans would also align with standard sustainable procurement policies with consideration of product lifecycles, recyclable content, minimal/returnable packaging and on site recyclability. Agreements with tenants, contractors and suppliers would require compliance with the plans.

Measures to avoid and reduce waste in the waste management plans would include:

- efficient utilisation of resources to reduce consumption;
- optimisation of detailed designs to avoid unnecessary resource consumption;
- implementation of high efficiency water systems to reduce water consumption;
- procurement policies that preference recyclable, minimal and/or returnable packaging; and
- procurement of necessary materials in bulk to minimise packaging waste.

Measures to reuse and recycle waste in the waste management plans would include:

- reuse of green waste and topsoil for site landscaping;
- reuse of waste streams including metals, oils and solvents;
- recycling of waste streams including brickwork, metals, plasterboard, plastics and timber;
- contract terms with suppliers that specify recyclable content and returnable packaging; and
- co-operation in stewardship programs for compatible waste streams including pallets.

Measures to recover and treat waste would include recovery (prior to reuse) of compatible waste streams including metals, oils, solvents, brickwork, metals, plasterboard, plastics and timber. Hazardous wastes or asbestos identified during construction and operation would be managed consistently with the NSW Protection of the Environment Operations (Waste) Regulation 2014.

Residual waste that cannot be avoided, reduced, reused, recycle, recovered or treated would be collected by a licensed contractor for disposal at a licensed facility (see Section 25.6.5).

25.6.2 Waste storage area

A central waste area (or areas) would be established during construction, at which waste (including recyclables) would be stored. Some materials would be stored in stockpiles while others would be stored in bins. Stockpiles and bins would be appropriately labelled, managed and monitored.

During operation, waste generated at the airport site would be collected in bins located throughout the terminal complex and elsewhere. Purpose-designed containment equipment for sharps and other special or hazardous wastes would be situated at relevant facilities. Waste would then be collected and stored at the waste storage area.

The waste storage area would allow for the separation of waste streams based on their management requirements, and would therefore include:

- wheeled bins;
- front lift bins;
- bulk bins and skips;
- bulk material storage bays;
- hazardous waste storage areas;
- bunded bulk storage for fuels and oils;
- balers for cardboard or plastic; and
- battery storage containers.

The waste storage area may also include facilities to recycle, recover or treat waste such as:

- anaerobic digestion for recovery of energy from organic waste;
- a waste to energy facility for recovery of energy from quarantined waste; and
- a composting facility for processing of garden and food waste.

Waste would be routinely collected from the waste storage area and transferred to appropriately licensed waste management facilities described in 25.6.5.

25.6.3 Quarantine areas

The proposed airport would meet the definition of a landing place under the *Biosecurity Act 2015* and would therefore be subject to quarantine regulations. Waste to be quarantined would include food waste and other organic material, or non-washable material such as packaging that comes into contact with quarantine material. Waste generated by the proposed airport operating at 10 million annual passenger movements during the Stage 1 development includes an estimated 580 tonnes of quarantine material per year.

Quarantine waste would be managed in accordance with the requirements of the relevant quarantine authority, presently the Australian Government Department of Agriculture and Water Resources.

For example, under current biosecurity requirements, quarantine waste is stored in a secure quarantine area, within purpose built biosecurity bins. Consistent with quarantine operations at other airports, waste would be placed in cold storage if kept for more than 48 hours. Once cleared by the quarantine authority, quarantine waste would be sterilised on-site by autoclave prior to disposal at an appropriately licensed facility.

25.6.4 Effluent disposal by subsurface irrigation

An estimated 2.5 ML of wastewater per day would be generated during operation of the Stage 1 development. Wastewater would be reticulated to a treatment facility before being recycled or irrigated at the airport site. The wastewater treatment process is expected to utilise membrane biological reactor technology, which produces high quality reclaimed water suitable for a range of beneficial reuses. Recycling opportunities include the use of reclaimed water in maintenance of plant and infrastructure, industrial cooling processes or landscaping. It is expected that irrigation of excess reclaimed water would occur on land previously disturbed by the construction of the Stage 1 development, such as grassed areas between aprons and taxiways and landscaped areas. Irrigation areas would be designed and operated in accordance with the relevant guidelines and management practices discussed in Section 25.6. Further information is provided in Chapter 17.

25.6.5 Waste management facilities

The waste management market in Western Sydney has matured to manage a large volume of waste from various domestic, commercial and industrial sources. About 12 million tonnes of waste is generated in Sydney each year. Major solid waste streams in the region include:

- industrial waste from light industry such as manufacturing, warehousing and transport;
- agricultural waste including pesticides and herbicides;
- commercial waste from businesses, shopping centres and retailers;
- special waste including from hospitals; and
- general domestic waste from residential households.

There are many waste management facilities situated in the Western Sydney region. These facilities would provide a range of options for reuse, recycling, recovery and treatment of waste generated at the airport. Table 25–7 lists the identified waste management facilities.

The quantities and types of waste generated by the proposed airport are expected to be within the capacity of the various waste management facilities in the Western and Greater Sydney regions. Recyclable materials that have been separated at source (cardboard, glass and other containers, food organics) could be collected by contractors and taken to facilities specifically designed to either consolidate them for transportation to reprocessing facilities, or to sort them for transportation to such facilities. Non-recyclable wastes could be taken to transfer stations, or direct to landfills or to alternative waste processing facilities for disposal or treatment respectively.

Table 25–7 Waste management facilities

Facility	Type of waste	Operator	Address	Council
Brandown landfill	Landfill disposal of non-putrescible wastes. Hazardous, putrescible and other waste not accepted.	Brandown Pty Ltd	Lot 9 Elizabeth Dr, Kemps Creek	Penrith
Elizabeth Drive Landfill Facility	Landfill disposal of non-putrescible wastes. Some hazardous waste but no putrescible waste accepted.	Suez Environment	1725 Elizabeth Dr, Kemps Creek	Penrith
Erskine Park Landfill	Landfill disposal of non-putrescible wastes. Does not accept asbestos, putrescible waste, contaminated soils or hazardous waste.	Transpacific Cleanaway	Quarry Rd, Erskine Park	Penrith
Lucas Heights Resource Recovery Park	Landfill disposal of putrescible wastes including some hazardous waste	Suez Environment	New Illawarra Road, Lucas Heights	Sutherland
Eastern Creek Resource Recovery Park	Landfill disposal of putrescible wastes including some hazardous waste	Suez Environment	Wallgrove Road, Eastern Creek	Blacktown
Clyde Transfer Terminal	Transfer station for disposal of putrescible wastes. No other waste accepted.	Veolia Environmental Services (Australia) Pty Ltd	322 Parramatta Road, Clyde	Cumberland
Wetherill Park Resource Recovery Facility	Transfer station for disposal of putrescible wastes including some hazardous waste	Suez Environment	20 Davis Rd, Wetherill Park	Fairfield
Seven Hills Waste & Recycling Centre	Transfer station for disposal of putrescible wastes including some hazardous waste	Suez Environment	29 Powers Road, Seven Hills	Blacktown
Visy Blacktown MRF	Materials recovery facility for recyclables. No other waste accepted.	Visy Recycling	9 Bessemer St, Blacktown	Blacktown
Visy Smithfield MRF	Materials recovery facility for recyclables. No other waste accepted.	Visy Recycling	158-160 McCredie St, Smithfield	Cumberland
Camellia Resource Recovery and Treatment Facility	Food organics processing facility. No other waste accepted.	Suez Environment	Grand Ave, Camellia	Parramatta
ANL Badgerys Creek	Garden organics processing facility. No other waste accepted.	Australian Native Landscapes	210 Martin Rd, Badgerys Creek	Liverpool
Genesis Recycling Facility	Non putrescible waste processing facility. Does not accept food waste, liquid, medical and chemical wastes	Dial-A-Dump (Ec) Pty Ltd	Honeycomb Drive, Eastern Creek	Blacktown
Suez Advanced Waste Treatment Facility	Mixed waste processing facility. Accepts mixed waste containing organics and separated food and organic waste.	Suez Environment	1725 Elizabeth Drive, Kemps Creek	Penrith
UR-3R	Mixed waste processing facility. Accepts mixed waste containing organics and separated food and organic waste.	Global Renewables Limited	Wallgrove Rd, Eastern Creek	Blacktown

25.7 Mitigation and management measures

An overview of the framework for managing waste and resources during construction and operation are listed in Table 25–8.

A Waste and Resources Construction Environmental Management Plan (CEMP) will be approved prior to the commencement of Main Construction Works for the proposed airport. The Waste and Resources CEMP will collate the mitigation and management measures itemised in Table 25–8.

A Waste and Resources Operation Environmental Management Plan (OEMP) will be developed prior to commencement of Stage 1 operations and would update the Waste and Resources CEMP prepared as part of the CEMF for applicability to the operational phase of the proposed airport.

Table 25–8 Mitigation and management measures

Issue	Measure	Timing
Waste avoidance	The following measures will be implemented to avoid and reduce waste: <ul style="list-style-type: none"> • efficient utilisation of resources to reduce consumption; • optimisation of detailed designs to avoid unnecessary resource consumption; • implementation of high efficiency water systems to reduce water consumption; • procurement policies that preference recyclable, minimal and/or returnable packaging; and • procurement of materials in bulk, where practicable, to minimise packaging waste. 	Construction Operation
Reuse and recycling	The following measures will be implemented to reuse and recycle waste: <ul style="list-style-type: none"> • reuse of green waste and topsoil for site landscaping; • reuse of waste streams including metals, oils and solvents; • recycling of waste streams including brickwork, metals, plasterboard, plastics and timber; • contract terms with suppliers that specify recyclable content and returnable packaging; and • co-operation in stewardship programmes for compatible waste streams including pallets. 	Construction Operation
Waste recovery	Measures to recover and treat waste will include recovery (prior to reuse) of compatible waste including metals, oils, solvents, brickwork, metals, plasterboard, plastics and timber.	Construction Operation
Hazardous Wastes	Hazardous wastes or asbestos identified during construction and operation will be managed consistently with the Protection of the Environment Operations (Waste) Regulation 2014 (NSW).	Construction Operation
Waste Storage & Disposal	A central waste area (or areas) would be established during construction, at which waste (including recyclables) would be stored. Some materials would be stored in stockpiles while others would be stored in bins. Stockpiles and bins would be appropriately labelled, managed and monitored. Residual waste that cannot be avoided, reduced, reused, recycle, recovered or treated will be collected by a licensed contractor for disposal at a licensed facility.	Construction Operation
Illegal dumping	An illegal dumping prevention strategy will be developed as part of the Waste and Resources CEMP. The strategy will outlined measures to be undertaken to minimise the risk of illegal dumping on the airport site and will be developed in consultation with the NSW Environment Protection Authority and relevant local councils.	Construction Operation
Resource use	The Sustainability Plan and the associated sustainability measures will help to ensure that resources are used efficiently and waste is minimised as detailed in Chapter 28 (Volume 2b).	Construction

25.8 Conclusion

The total volume of waste generated during construction of the Stage 1 development would be in the order of 202,500 tonnes, while an estimated 5,251 tonnes of waste would be generated each year during Stage 1 operations.

A combination of on-site and off-site management measures would provide a range of options to reuse, recycle, recover and treat waste generated at the proposed airport. A waste management plan would be prepared prior to construction and operation of the proposed airport, which would collate measures to manage waste and thus avoid and mitigate impacts to human health and the environment.

The quantities and types of waste generated by the airport would be readily manageable through the implementation of the waste management plan, and within the capacity of the various waste management facilities in the Western and Greater Sydney regions.