




**Sydney  
Airport**

The right future.  
Starting now.



A low-angle shot looking up at the underside of a large aircraft wing. The wing's surface is a complex network of rivets and structural panels. The upper portion of the wing is unpainted metal, while the lower portion is painted a vibrant red. A worker, seen from behind, stands on a white scissor lift platform. They are wearing a bright yellow safety vest with 'AMSA Engineering' printed on the back, a white shirt, dark trousers, and safety gear including a hard hat and gloves. Their right hand is raised, touching the red-painted section of the wing. The background is a clear, pale blue sky.

# 4.0

## ENVIRONMENTAL ACTION PLANS

# CHAPTER 4: ENVIRONMENTAL ACTION PLANS

## 4.1 Overview

This section details the strategic level Environmental Action Plans (EAPs) prepared to address the ground-based environmental aspects and impacts associated with the operation of the airport. The EAPs are the key reference tools for guiding environmental initiatives at the airport for the next five years.

Sydney Airport has developed the following 11 EAPs:

- Sustainability and Environmental Management
- Climate Change and Energy Management
- Water Management
- Air Quality
- Ground-Based Noise
- Ground Transport
- Biodiversity and Conservation Management
- Heritage
- Waste and Resource Management
- Soil and Land Management
- Spills Response and Hazardous Materials

Each EAP contains the following sections:

- Key objectives
- Background information
- Description of current management practices
- Achievements under previous environment strategies
- Five year action plan
- Key performance indicators

The content of the sections is described below.

### Key objective(s)

Key objectives have been established which follow the principles of the Sydney Airport Environment Policy and Sydney Airport Sustainable Development Policy. The objectives set the strategic direction for the environmental management of Sydney Airport for the period 2013 – 2018.

Operation of, and development at, the airport must be consistent with these objectives.

### Background

This section includes general background information and an overview of the subject as it applies to the airport, including a description of the existing sources of environmental impact. The following information is also included in this section:

### Relevant legislation and standards

Applicable Australian and NSW legislation and relevant standards are presented in each EAP.

The list is not intended to be an exhaustive register of all legislative requirements. It is also noted that, during the five year strategy period, legislation and standards will likely be amended from time to time. As such, persons or organisations should not rely on the legislative information presented in the Strategy to establish the relevant legislative requirements that may affect their operations at any given time. Updated sources and background to environmental legislation can be found at:

- [www.austlii.edu.au](http://www.austlii.edu.au) – Australian and NSW legislation
- [www.comlaw.gov.au](http://www.comlaw.gov.au) – Australian legislation
- [www.legislation.nsw.gov.au](http://www.legislation.nsw.gov.au) – NSW legislation
- [www.environment.gov.au](http://www.environment.gov.au) – Commonwealth environmental information
- [www.environment.nsw.gov.au](http://www.environment.nsw.gov.au) – NSW environmental information

### Links to other EAPs

A number of environmental aspects overlap or address similar environmental issues. For example, relevant issues concerning management of the Sydney Airport Wetlands are addressed in three EAPs, being those for Water Management, Biodiversity and Conservation Management and Heritage. Linkages between relevant EAPs are identified where they exist.

### Current management practices

This section lists and describes the management practices currently employed at the airport to address each of the identified existing sources of environmental impact. Where applicable, details of any studies, reviews or monitoring programs currently being undertaken (and their timeframes) are also included in this section.

### Achievements under previous environment strategies

This Sydney Airport Environment Strategy 2013 - 2018 is the fourth Environment Strategy prepared for Sydney Airport. This section summarises the major environmental outcomes and achievements associated with the implementation of Sydney Airport's first, second and third environment strategies. These achievements demonstrate continual environmental improvement and a high level of continuity across the strategy periods.

### Five year action plan (2013–2018)

This section describes the specific strategic level measures and actions that Sydney Airport intends

to carry out in order to achieve the key objective(s) during the five year strategy period (and their timeframes). These measures and actions aim to build on the achievements made under the first, second and third environment strategies, thereby striving towards continual improvement of Sydney Airport's environmental performance.

Actions proposed within this Strategy include:

- Those actions that have not yet been implemented from the previous strategy as the strategy was not in place for the full five year period
- New actions developed due to recent studies and plans
- New actions required to address potential environmental issues associated with implementation of the Master Plan

Each measure or action item has a defined priority, established having regard to its risk, status of current management and the availability of resources (Sydney Airport's environmental management framework is described in **Section 3.2** of this Strategy).

The categories of actions are:

- **A – Short-term actions:** These are actions to be completed within three years of approval of this Strategy;
- **B – Long-term actions:** These are actions to be completed within five years of approval of this Strategy; or
- **C – Ongoing actions:** These are actions with rolling, regular timeframes or where action is dependent on external factors such as legislative requirements.

Sydney Airport intends to carry out those actions that have not yet been implemented from the previous strategy (Sydney Airport Environment Strategy 2010–2015), within the timeframe committed to the previous strategy.

### Key performance indicators

Key performance indicators (KPIs) are listed for each EAP. The KPIs are used by Sydney Airport to track and demonstrate continual environmental improvement during the five year strategy period. There are 16 KPIs as listed below:

#### Sustainability and environmental management

- Support and contribute to the wellbeing of the local community by providing grants, sponsorships and contributions
- Maintain open communications and effective relations with the local community
- Implementation of Environment Strategy 2013–2018 Action Plan items

#### Climate change and energy management

- Reduction in the total energy consumed per passenger (MJ/PAX) and/or total energy consumed per managed area (MJ/m<sup>2</sup>)
- Reduction in greenhouse gas emissions per passenger (tonnes CO<sub>2</sub>-e/PAX) and/or greenhouse gas emissions per managed area (tonnes CO<sub>2</sub>-e/ m<sup>2</sup>)

#### Water management

- Reduction in total water consumed per passenger (kL/PAX) and/or per managed area (kL/m<sup>2</sup>)
- Water quality monitoring results show no decline or an improvement in water quality of stormwater from the airport

#### Air quality

- Minimise air emissions by increasing the use of clean energy sources including cleaner fuels for vehicle and equipment

#### Ground-based noise

- No breach of the aircraft engine operating procedures, including the ground running rules
- Receive minimal complaints from the community regarding ground-based noise

#### Ground transport

- Increased use of public transportation (train and bus) compared to the use of cars (including private cars, taxis and limousines)

#### Biodiversity and conservation management

- Biological resources/values of wetlands at the airport are preserved or enhanced

#### Heritage

- Implementation of Environment Strategy 2013 – 2018 Action Plan items

#### Waste and resource management

- Increase in the percentage of waste recycled, percentage of waste recovered, and percentage of waste diverted from landfill

#### Soil and land management

- Reduction (through management/remediation) of the number of contaminated sites

#### Spills response and hazardous materials

- Reduction in the number and volume of spills and leaks of hazardous materials



## 4.2 Sustainability and environmental management

### Key objectives

- To ensure appropriate management systems and plans are in place to satisfactorily address all environmental risks affiliated with airport operations
- To establish and maintain appropriate mechanisms for effective internal and external communication of environmental matters
- To develop and operate the airport in a sustainable manner

### Background

Sydney Airport's vision is to deliver a world class airport experience and foster the growth of Sydney Airport for the benefit of Sydney, NSW and Australia. One of Sydney Airport's core values is sustainability – responsible growth through balancing community and environmental needs with corporate objectives.

Furthermore, as stated in the Sydney Airport Environment Policy (2011), Sydney Airport 'recognises its responsibility in managing Sydney Airport in a sustainable manner' and is:

"committed to... Sustainability: by adopting measures to conserve natural resources and energy; reducing impacts on the environment; and considering the ecological, social and economic implications of our actions'.

Sydney Airport also has a sustainable development policy that establishes the principles for environmentally sustainable design of the airport. The principles ensure that all new development proposals in relation to Sydney Airport are planned and operated in accordance with current best practice technologies and guidelines for efficient resource use.

Sydney Airport believes it is possible for the airport to grow sustainably, enhancing the economic and social benefits while managing and minimising environmental and community impacts.

An important aspect of our vision and values is corporate responsibility. Sydney Airport has a corporate responsibility framework that focuses on three key areas:

- Community and stakeholder consultation – Sydney Airport is committed to effective and genuine consultation with the community, government, aviation industry, tourism, business and other stakeholders about the operation of, proposed development at and future planning for the airport
- Community support and collaboration – Sydney Airport partners with and supports local community groups, organisations, charities, sporting groups and the Arts and will continue to pursue opportunities to build these relationships

- Business and Tourism – Sydney Airport is a key driver for the economy and tourism and recognises its role in supporting major events that drive tourism growth and showcase Sydney as a global city, Australia's premier destination, as well as the great diversity of NSW. Sydney Airport has formed a partnership with Destination NSW and works closely with them to promote key tourism objectives

### Relevant legislation and standards

#### Australian

- Airports Act 1996
- Airports Regulations 1997
- Airports (Environment Protection) Regulations 1997
- Airport Development Consultation Guidelines (DIT, December 2007)
- Guidance Material for the Preparation of Airport Environment Strategies by Airport Lessee Companies (DIT, March 2009)
- AS/NZS ISO 14001:2004 Environmental management systems – Requirements with guidance for use
- Environment Protection and Biodiversity Conservation Act 1999
- Environment Protection and Biodiversity Conservation Regulations 2000

### Links to other EAPs

This EAP links to all of the EAPs in this strategy.

### Current management practices

Sydney Airport's Sustainable Development Policy, updated in 2012, has been guiding the sustainable development of the airport's buildings since 2007. The principles established by the policy ensure that all new development proposals in relation to Sydney Airport are planned and operated in accordance with current best practice technologies and guidelines for efficient resource use. The updated policy adopts the Green Star and National Australian Built Environment Rating System (NABERS) for evaluating and guiding the sustainable design and construction of the built environment.

Holistic environmental management is a vitally important function at the airport. Initiatives that have been developed to achieve this are:

- The Sydney Airport Environment Strategy 2013 – 2018
- The Sydney Airport Environmental Management Framework (refer to **Section 3.2**)
- The Environmental Audit Program (refer to **Section 3.5**)
- The Development Approval Process (refer to **Section 3.7**)

Sydney Airport has developed and maintains an environmental management system (EMS) which, as required by clause 5.02B of the Airports Regulations 1997, is intended to maintain consistency with relevant Australian and international standards. In this case, the relevant standard is AS/NZS ISO14001:2004 Environmental Management Systems – requirements with guidance for use.

The EMS provides the system by which daily environmental management can be planned, implemented and reviewed, ensuring a cycle of continuous environmental improvement.

Sydney Airport recognises that, in addition to its own activities, there are a number of other businesses and organisations which carry out a diverse range of aviation and non-aviation related activities. Effective tenant management is therefore imperative in ensuring that any risks associated with a tenant's operations are managed appropriately to prevent environmental harm. Sydney Airport has also developed a tenant management strategy to ensure effective environmental management is achieved by tenants and operators. This strategy includes the following components:

- The Environmental Audit Program (including Sydney Airport inspections)
- A requirement for tier 1 and 2 tenants to develop and provide operational environmental management plans (EMPs) to Sydney Airport
- The development approval process
- The Sydney Airport Tenant Environment Forum
- Environmental fact sheets and guidance material
- EMS procedures to address new tenants, new processes and new activities
- Statutory requirements regarding environmental responsibilities included within tenant leases and licences

Sydney Airport is also committed to effective and genuine consultation with all key stakeholders. Maintaining effective relationships with all key stakeholders is also essential to ensuring the effective environmental management of the airport. Sydney Airport liaises with a number of stakeholders, including:

- Australian Government agencies
- NSW Government agencies
- Local government authorities
- Sydney Airport tenants and operators
- Sydney Airport Community Forum and other local community groups
- Other major Australian and New Zealand airports

## **Achievements under previous environment strategies**

- Implemented a sustainable development policy in 2007 establishing the principles for sustainable development of the airport. The principles ensured that all new development proposals in relation to Sydney Airport were planned and operated in accordance with Green Star and Australian Building Greenhouse Rating (ABGR) guidelines for efficient resource use. The policy was reviewed and updated in 2012, substituting the ABGR for the NABERS
- Prepared an EMS aligned with AS/NZS ISO 14001:2004. In 2007, Sydney Airport acquired new software – Intalex MS – which is designed to help maintain compliance with the international standard, while reducing the costs and time associated with EMS information retrieval, tracking and reporting. The software features a web-based interface and functionality that can communicate to all users at all levels of the organisation. In 2011, the EMS was reviewed and updated to reflect the Sydney Airport Environment Strategy 2010-2015 commitments. In 2011, Sydney Airport implemented an EMS and Environment Strategy awareness training program for Sydney Airport staff, which included preparation and dissemination of environmental fact sheets
- Implemented an environmental audit program which classifies airport tenants into three tiers based on potential environmental risk, with tier 1 tenants having the greatest potential risk and tier 3 tenants the least potential risk. In 2010, Sydney Airport introduced a new auditing framework requiring all tier 1 and 2 tenants to carry out annual environmental audits of their activities. Tier 1 tenants are also required to engage an independent environmental auditor to undertake an audit every two years
- Reviewed and updated Sydney Airport's environment guidelines for development applications
- Established and held the first meeting of the Sydney Airport Tenant Environment Forum in 2008. The forum was established to foster communication and cooperation between Sydney Airport and airport tenants on environmental management matters affecting the airport. Tenant environment forums have been held annually since 2008. At the 2011 Tenant Environment Forum, environmental fact sheets addressing issues such as water and energy efficiency were distributed to tenants
- Provided funding and assistance through the Education Grants Scheme to a number of local schools and kindergartens to enable them to undertake local education and environmental projects. Sydney Airport provides an average of

\$50,000 annually to local schools to support their environmental and educational programs and additional funding supporting charities, sporting groups and the arts.

- Continued to be an active member of the Sydney Airport Community Forum and the Planning Coordination Forum.
- Prepared and made publicly available information on key environmental achievements. Environmental fact sheets on water, energy and wetlands are available on the Sydney Airport website.
- Reviewed and further developed the key performance indicators in the Sydney Airport Environment Strategy 2010-2015. The updated key performance indicators are presented in subsequent sections of this strategy.

## Five year action plan (2013–2018)

Actions	Status
1. Review existing EMS and update to accommodate the Environment Strategy 2013–2018 commitments	A
2. Implement EMS and Environment Strategy awareness training program for Sydney Airport staff	A
3. Update and maintain internet site to provide up-to-date environmental information to the community	A
4. Prepare and make publicly available information on key environmental achievements	A
5. Investigate the feasibility of providing real time access to environmental monitoring results at the airport	A
6. Investigate development of a sustainability policy for the airport and incorporating of the existing sustainable development policy and the environment policy into this overarching policy as appropriate	B
7. Investigate development of a sustainability plan to deliver commitments made through the Sustainability Policy	B
8. Host the Sydney Airport Environment Forum for tenants and operators	C
9. Ensure all developments, including those associated with the Master Plan 2033, are assessed against Environment Strategy commitments and applicable regulatory requirements	C
10. Conduct formal monthly meetings with the AEO to review environmental progress and implementation of the Environment Strategy 2013 – 2018	C
11. Submit Annual Environment Report to DIRD, reporting on environmental issues/incidents, regulatory compliance, monitoring and progress in implementing Environment Strategy commitments	C
12. Continue the Sydney Airport education grants scheme, including environmental projects in the program	C
13. Ensure effective consultation with external stakeholders	C
14. Implement the environmental audit program	C

### Key performance indicators

- Support and contribute to the wellbeing of the local community by providing grants, sponsorships and contributions
- Maintain open communications and effective relations with the local community
- Implementation of Environment Strategy 2013–2018 action plan items.

### 4.3 Climate change and energy management

#### Key objectives

Address the climate change implications for the airport by:

- Meeting all regulatory requirements
- Minimising risk associated with climate change
- Cost effectively reducing energy and greenhouse gas emission intensities.

#### Background

Climate change is now recognised as real and present, though some uncertainty remains around the extent of change and the magnitude of the expected impacts. In responding to climate change, there are two broad response strategies.

The first response is to reduce greenhouse gas concentrations in the atmosphere in an effort to reduce the rate and overall magnitude of future climate change.

The second response is adaptation to the impacts of climate change by all sectors of society and the economy. This helps to build the resilience of, and reduce vulnerability within, local communities and economies and involves a combination of risk management and adjustment activities.

To address these response strategies, Sydney Airport, in association with the broader aviation industry, has been working towards reducing its carbon footprint (see information below), monitoring relevant research and actions by governments, and ensuring any relevant adaptation strategies are, where appropriate, factored into future planning.

#### Global aviation industry commitment to action on climate change

The Intergovernmental Panel on Climate Change (IPCC) estimated in 2007 that aviation accounts for around 2% of global carbon dioxide emissions, with most of that relating to in-flight emissions from aircraft. Transport energy use is estimated to have accounted for 23% of global energy related greenhouse gas emissions in 2004. Aviation is responsible for around 12% of global transport energy related greenhouse gas emissions, while road transport energy use accounts for around 77%. As well as emitting carbon dioxide, aircraft contribute to climate change by the formation of condensation trails and emission of nitrogen oxides (NO<sub>x</sub>) (that form ozone, a greenhouse gas, when emitted at cruise altitudes). The best estimate of aviation's impact on climate change, given by the International Air Transport Association (IATA), is about 3% of the contribution by human activities. This contribution could possibly grow to 5% by 2050.

The aviation industry is actively working to meet the global challenge of climate change. In 2007, the international aviation industry, represented by IATA, set forth its environmental vision to mitigate greenhouse gas emissions from aviation. This vision is to be achieved through the following four pillar strategy, adopted by the global aviation industry as well as states of the International Civil Aviation Organisation (ICAO) in 2007:

- Technology advances, including new plane designs, new composite lightweight materials, new engine advances and the development of second generation biofuels
- Improved operations, including reduced auxiliary power unit (APU) usage, more efficient flight procedures and weight reduction measures
- Infrastructure improvements, including more efficient air traffic management (ATM) and airport infrastructure
- Economic measures - carbon offsets to 'plug the gap'

Additionally, in 2009, the international aviation industry, represented by IATA, adopted the following targets, which were endorsed by the aviation industry in a joint industry submission to ICAO:

- To cap aviation carbon dioxide emissions by 2020
- To achieve an average improvement in fuel efficiency of 1.5% per year from 2009 to 2020
- To achieve a reduction in carbon dioxide emissions of 50% by 2050, relative to 2005 levels

The signing in April 2008 of the Global Aviation Industry Commitment to Action on Climate Change by aviation industry leaders, including Sydney Airport, is an important demonstration of aviation's worldwide commitment to the four pillar strategy for reducing aviation's contribution to climate change.

Following on from the development of this industry agreement, the Airports Council International (ACI) Europe made a commitment to assist member airports to assess and reduce their carbon footprint through the Airport Carbon Accreditation program. The program was launched in June 2009 and enables airports to implement carbon management processes and gain public recognition of their achievements through the attainment of accreditation at different program levels.

The program has also been launched in the Asia-Pacific region and Sydney Airport is considering participation in the program. Joining the program has benefits in providing recognition for work already carried out by Sydney Airport and would assist with progressing our position to target carbon neutral growth from 2020. It



would be another demonstration of Sydney Airport's commitment and action on climate change, consistent with other major airports around the world.

Sydney Airport is committed to working with all relevant organisations across the aviation industry and is targetting carbon-neutral growth, despite growing demand for air transport. As outlined below, Sydney Airport has implemented a range of environmental initiatives aimed at improving the airport's environmental performance and reducing its carbon footprint.

#### Sydney Airport's commitment to action on climate change

In keeping with the global aviation industry's targets outlined above, Sydney Airport is targeting carbon neutral growth from 2020. Sydney Airport has already substantially improved the efficiencies of current operations through the implementation of an energy savings action plan (ESAP). The ESAP has been in place for a number of years, approved by the NSW Government in 2006. Examples of initiatives implemented under the ESAP that have saved energy and reduced greenhouse gas emissions include lighting retrofits, installation of solar hot water, optimisation of heating ventilation and air conditioning (HVAC) performance and installation of air locks to terminal doors and rail station access points.

Sydney Airport has been reporting its greenhouse gas emissions under the National Greenhouse and Energy Reporting Act 2007 since 2008/09. The most recent greenhouse gas assessment, undertaken for FY2011 includes scope 1 and scope 2 emissions and covers the aspects of the airport precinct including Terminal 1 (T1) and Terminal 2 (T2), runways and taxiways, multi-deck car parks and certain commercial buildings. Scope 1 and 2 greenhouse gas emissions are direct emissions generated by sources controlled by Sydney Airport. Control can be defined in either financial or operational

terms. Generally a company has operational control over an emission source or activity if that emission source or activity is subject to the full authority of the company's operating policies and procedures (GHG Protocol, 2004). Therefore greenhouse gas emissions related to tenants, from waste generation, airline ground operations or motor vehicles used by passengers, airport workers or for picking up and dropping off passengers are excluded from this assessment.

As shown in **Table 4.1** below, Sydney Airport's carbon footprint for 2011 was measured to be 95,593 tonnes of carbon dioxide equivalent (t CO<sub>2</sub>-e). In 2007, Sydney Airport's carbon footprint was measured to be 96,601 t CO<sub>2</sub>-e, which indicates that despite the growth in passenger numbers, emissions have remained stable during this period.

The major sources of emissions in 2011 are electricity and natural gas consumption, representing over 98% of total emissions. The terminals are the largest electricity using localities of the airport, with the electricity used predominantly for heating, lighting and cooling.

The emissions inventory and carbon footprint will be used for future monitoring comparisons and as a baseline for emissions projections for Sydney Airport's operations/activities. It forms the basis of Sydney Airport's energy savings and carbon reduction plan developed in 2012/13. Collectively, this information and the information in **Table 4.1** define the existing sources of direct environmental impact for this environmental aspect. It is noted that certain other indirect and unquantified sources of greenhouse gas emissions, also known as scope 3 emissions, are associated with airport operations. These include, for example, emissions from airline operations and from motor vehicles used by passengers, airport employees or meeter/greeters who pick up and drop off passengers.

**Table 4.1 Scope 1 and 2 emissions by source for Sydney Airport, 2010/11**

Source and activity data name	Amount	Unit	Scope	Tonnes CO <sub>2</sub> -e
Commercial air conditioning – HFC stock	0	Tonnes	1	49
Stationary – diesel oil	57	kL	1	152
Stationary – natural gas	68,905	GJ	1	3,537
Transport – diesel oil	302	kL	1	814
Transport – gasoline (other than for use as fuel in aircraft)	59	kL	1	141
Transport – liquefied petroleum gas	2	kL	1	3
Energy commodities – electricity	100,996,110	kWh	2	90,896
<b>TOTAL</b>				<b>95,593</b>

Source: SCACH NGER Report 2010/11

In accordance with the Australian Government's National Energy and Greenhouse Reporting Scheme (as established under the National Greenhouse and Energy Reporting Act 2007 and regulations), Sydney Airport monitors its energy consumption and production, as well as greenhouse gas emissions annually. This information is reported in accordance with the Act. For the purposes of the Act, Southern Cross Airports Corporation Holdings Limited is the reporting entity.

In 2012 and 2013, Sydney Airport participated in a number of programs aimed at preparing, or 'climate-proofing', Australia's major infrastructure assets from the possible future impacts of climate change. In this regard, Sydney Airport worked with the National Climate Change Adaptation Research Facility in the development of policy for infrastructure preparedness, and also contributed to the NSW Office of Environment and Heritage and the University of NSW's infrastructure review paper on climate change adaptation. Sydney Airport also participated in workshops for coastal hazard risk assessment for the Botany Bay western foreshore. Sydney Airport is now planning to undertake a climate vulnerability assessment.

#### Relevant legislation and standards

##### Australian

- Airports (Environment Protection) Regulations 1997
- Airports Act 1996
- Airports Regulations 1997

##### The clean energy legislative package:

- Clean Energy Act 2011
- Clean Energy (Consequential Amendments) Act 2011
- Clean Energy Regulator Act 2011
- Climate Change Authority Act 2011
- Clean Energy (Fuel Tax Legislation Amendment) Act 2011
- Clean Energy (Excise Tariff Legislation Amendment) Act 2012
- Clean Energy (Customs Tariff Amendment) Act 2012
- Clean Energy Legislation Amendment Act 2012

##### National Greenhouse and Energy Reporting (NGER) legislation and regulations:

- National Greenhouse and Energy Reporting Act 2007
- National Greenhouse and Energy Reporting Regulations 2008
- National Greenhouse and Energy Reporting (Measurement) Determination 2008

- National Greenhouse and Energy Reporting (Audit) Determination 2009
- National Greenhouse and Energy Reporting (Auditor Registration) Instrument 2010

##### NSW

- Energy and Utilities Administration Act 1987 – Part 6A

#### Links to other EAPs

- Water management (**Section 4.4**)
- Air quality (**Section 4.5**)
- Ground transport (**Section 4.7**)
- Waste and resource management (**Section 4.10**)

#### Current management practices

##### Energy and carbon strategy 2013+

Sydney Airport has developed a new Energy and Carbon Strategy 2013+ to reduce the airport's energy use and greenhouse gas emissions. The strategy integrates the extensive amount of work that Sydney Airport has already undertaken over many years to reduce the airport's greenhouse gas emissions with new initiatives and projects to form a targeted road map for the airport's energy and carbon management. The road map contains nine strategic elements for achieving Sydney Airport's energy use and greenhouse gas emission reduction targets by guiding energy and carbon emission related activities, reduction measures and investments. Each strategy contains short term, mid-term and long-term measures, incorporating energy and carbon reduction projects with financial payback periods from one year to five years and beyond.

##### Energy savings and carbon reduction plan

The energy savings and carbon reduction plan updates the previous ESAP and has been developed to measure and report the current energy and carbon situation. The energy savings and carbon reduction plan informs certain strategic elements of the Energy and Carbon Strategy 2013+.

Sydney Airport will continue to pursue further initiatives as part of this plan and will continue investigating the potential for the use of alternative cleaner energy such as solar energy and trigeneration for airport developments.

#### Achievements under previous environment strategies

- Completed Sydney Airport's first energy management strategy aimed at reducing Sydney Airport's energy usage in 2002. In 2003, Sydney Airport achieved a Gold Award from the NSW Government's Sustainable Energy Development Authority for energy use reduction

- Prepared and submitted an ESAP to the NSW Government in 2005, which aims to reduce the airport's energy use and greenhouse gas emissions. Implementation commenced following approval of the plan in June 2006
- During the first year of operation of the ESAP, a reduction in total energy use on the airport of 1% was achieved, despite passenger numbers increasing by 6.4%. Continued implementation of the ESAP in 2007 saw the introduction of energy savings initiatives such as a new lighting system in the T2 car park (which reduced energy usage in the car park by 30%)
- Operated hybrid vehicles as part of the vehicle fleet
- Planted over 1,600 trees in 2011 as part of Greenfleet's forest sink program
- Joined the global aviation industry – including 94 other major airports around the world – in signing an international declaration on climate change in April 2008
- Adopted a strategy to reduce carbon emissions in 2008, which seeks to reduce Sydney Airport's carbon footprint. The first step of the strategy involved developing a comprehensive emissions inventory and calculating the carbon footprint of Sydney Airport's operations. In 2011, Sydney Airport conducted broad carbon footprint investigations, focusing on scope 1 and 2 emissions
- Prepared Energy and Carbon Strategy 2013+ and an Energy Savings and Carbon Reduction plan which measure the current energy use and greenhouse gas emission profile of Sydney Airport business operations, set targets for reducing energy use and carbon emissions and present recommendations in a road map of nine strategic elements for achieving these targets through short, mid and long term measures
- Engaged in the climate change adaptation debate through contribution to the Tourism and Transport Forum and the NSW Office of Environment and Heritage (OEH's) draft Infrastructure Literature Review and Research Synthesis Paper on adaptation to climate change
- Sydney Airport's Central Terrace Building achieved a 5 star Green Star (Office Rating v2) rating, certified by the Green Building Council of Australia. A 5 star rating represents Australian excellence in environmentally sustainable design and/or construction

## Five year action plan (2013–2018)

Actions	Status
1. Explore the use of alternatively-fuelled vehicles other than hybrids	A
2. Implement cost-effective energy efficiency and saving opportunities in accordance with the Energy Saving and Carbon Reduction Plan	A
3. Implement feasible elements within the Energy and Carbon Strategy 2013+	A
4. Increase the energy and greenhouse information available for various modes of transport to, from and within the airport	A
5. Investigate calculating and reporting on a complete carbon footprint for Sydney Airport (scope 1, scope 2 and scope 3 emissions)	A
6. Prepare a Sustainable Procurement Policy for the airport that considers procuring materials primarily from the local/regional area and procuring materials with relatively lower embodied energy	B
7. Maintain compliance with existing energy and greenhouse reporting and assessment programs including NGER and NPI	C
8. Engage in the climate change adaptation debate and consider the risks of changing climatic conditions in airport planning and operational decision-making as appropriate	C

### Key performance indicators

- Reduction in the total energy consumed per passenger (MJ/PAX) and/or total energy consumed per managed area (MJ/m<sup>2</sup>).
- Reduction in greenhouse gas emissions per passenger (tonnes CO<sub>2</sub>-e/PAX) and/or greenhouse gas emissions per managed area (tonnes CO<sub>2</sub>-e/m<sup>2</sup>).

## 4.4 Water management

### Key objectives

Manage the water impacts of the airport through:

- Minimising potable water use by using alternative water sources where appropriate
- Minimising the impact of airport operations on water quality in water bodies on or adjacent to the airport
- Preventing soil and groundwater contamination occurring from airport activities
- Managing known and suspected contaminated sites in accordance with regulatory requirements

### Background

Conventional management of discrete systems for water consumption, groundwater protection and the treatment or disposal of wastewater/stormwater is no longer considered appropriate. In light of the forecast growth in aviation activity at Sydney Airport and the need to simultaneously provide adequate environmental protection, there is a need for an integrated approach to water management at Sydney Airport. This environmental action plan therefore reflects an integrated strategic approach to these three water-related environmental aspects.

#### Water consumption

With nearly 33 million passengers using the airport in 2008, around 56% of all water consumed at the airport was used to supply restroom and toilet facilities in the international and domestic terminals and other workplaces across the airport. In 2008, the airport consumed about 2,830 kilolitres per day (kL/day) of potable water from Sydney Water's supplies, which equates to 31 litres per passenger.

In 2011, just under 36 million passengers used the airport but total consumption of potable water decreased by approximately 9%. The airport consumed approximately 2,280 kL/day of potable water from Sydney Water's supplies in 2011, which equates to around 23 litres per passenger. This is a decrease in potable water use of 25% per passenger in the period between 2008 and 2011. This is primarily due to installation of the recycled water treatment plant which commenced operation in 2009. In 2012, the airport consumed approximately 600 kL/day of recycled water. Further information on the recycled water treatment plant is provided in subsequent sections.

The other major uses of potable water at the airport include construction and maintenance works, washing of aircraft, washing of cars at car rental facilities, cooling towers for air-conditioning, cleaning, landscaping and fire training activities.

#### Surface water quality

Sydney Airport is almost entirely surrounded by waterways, with Botany Bay to the south, Sydney Airport Wetlands (incorporating Engine and Mill Ponds and Mill Stream) to the east, Alexandra Canal to the north and the Cooks River to the west.

Various activities at the airport have the potential to impact on the water quality of surrounding waterways, including:

- Spills from aircraft servicing and maintenance
- Urban stormwater run-off from areas where construction and/or maintenance activities are occurring
- Bulk liquids and hazardous materials storage
- Fire training exercises

Additionally, urban stormwater run-off containing sediment, litter, oil, nutrients and sewer overflows remain a concern in relation to the water bodies surrounding the airport. This results in periodic deterioration of water quality, particularly during and after wet weather. To some extent, this problem has been addressed in recent years, with the Australian and NSW Governments instigating a number of initiatives, including the Australian Government's National Urban Water and Desalination Plan and the NSW Government's Environment Trust and Climate Change Fund. All urban councils have also been required to prepare stormwater management plans.

Rainfall at the airport is collected through an extensive stormwater system and is eventually discharged into surrounding waterways, including Alexandra Canal, Engine Ponds, Cooks River, Mill Stream and Botany Bay. The run-off flows into these waterways either directly (e.g. from runways or T1) or via containment ponds (e.g. from the Qantas Jet Base).

#### Groundwater

The area of the Botany sand aquifer is estimated to be around 5,314 hectares stretching from Centennial Park to Botany Bay. Two units of the aquifer are present beneath Sydney Airport. These are:

1. A shallow unconsolidated, granular aquifer (which is formed by the Botany Sands and overlying fill material)
2. A deeper fractured sandstone aquifer system, which is present within the Hawkesbury Sandstone

The aquifer units recharge from the following sources:

- Infiltration of rainfall into the unconsolidated sediments
- Open space areas including five local golf courses, Randwick Racecourse, Centennial Park and Sydney Airport itself

- Direct run-off from the Hawkesbury Sandstone rim
- Discharge of water from springs rising through cracks and bedding planes in the Hawkesbury Sandstone

The NSW Government – which is responsible for regulating groundwater extraction – estimates that the sustainable yield of the aquifer is 39.2 ML/day. It has allocated licences to allow 11.5 ML/day to be extracted, though this excludes pre-1972 major industrial users and extractions associated with Orica's Botany groundwater clean-up project. Actual usage is thought to be of the order of 26.7 ML/day. There were some 491 licensed bores in 1999, including 106 issued since 1995.

Sydney Airport has been issued an access licence to extract 10 ML/year from the deeper sandstone aquifer. The extracted water is used for irrigation purposes.

#### Relevant legislation and standards

##### Australian

- Airports (Environment Protection) Regulations 1997
- Airports Regulations 1997
- National Water Quality Management Strategy
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (as amended in 2005)
- Wetlands Policy of the Commonwealth Government of Australia 1997

##### NSW

- Energy and Utilities Administration Act 1987 – Part 6A
- Water Management Act 2000

#### Links to other EAPs

- Biodiversity and Conservation Management – **Section 4.8**
- Soil and Land Management – **Section 4.11**

#### Current management practices

##### Water cycle management system for Sydney Airport

Sydney Airport has developed a water cycle management system which provides an integrated process for water cycle management, monitoring and reporting. This management system – which is consistent with the Environment Strategy – includes the following components:

- Water cycle policy
- Water cycle management strategy
- Water cycle implementation plan
- Monitoring and reporting

This water cycle management strategy is to provide strategic direction and management solutions for the long term sustainable management of the airport's

water resources as it develops over the next 20 years. The objectives of this strategy are to:

- Assure supply reliability and water quality is fit for purpose
- Minimise the use of water, energy and other natural resources
- Minimise adverse on-site and off-site environmental impacts
- Be cost effective

The recommended water cycle management strategy for the airport, which forms a part of the overall system, comprises the following initiatives to be considered by Sydney Airport.

##### Water consumption

Total water demand is forecast to rise. Increase in demand is being driven by the forecast increase in passenger numbers.

Sydney Airport has carried out detailed investigations into mains water usage and possible initiatives to reduce this usage across the airport. Sydney Airport also plans to carry out extensive water reuse feasibility studies, and implement water reuse programs, over the term of the strategy.

Construction of a \$10 million water recycling plant and reticulation system for T1 was completed in 2009. The plant treats sewage effluent and uses the recycled water for toilet flushing and cooling towers. A recycled water pipeline system transports the recycled water throughout T1 and the surrounding precinct.

Although actual water savings fluctuate as they are dependent on demand, the plant was saving up to 350,000 litres per day of potable water in 2009. This increased to approximately 600,000 litres per day in 2012. Over the next 20 years, it is anticipated that potable water savings will increase to a maximum of up to one mega-litre per day. The NSW Government supported this project and provided Sydney Airport with a \$3 million grant for the installation of the recycled water pipeline system.

##### Surface water quality

Water quality at the airport is managed through a number of initiatives including:

- Gross pollutant traps on the airport boundary
- Spill kits in aircraft parking bays
- A designated spill response vehicle operated 24 hours a day
- Flame traps in apron areas associated with the terminals
- Shut-off valves at the Cooks River and Alexandra Canal discharge points
- Measures to prevent contamination of groundwater



- Identification and management of activities with the potential to impact on water quality

In 2012, Sydney Airport commenced development of a stormwater quality management plan to update the 2004 Sydney Airport stormwater management plan.

The updated plan will incorporate:

- A water quality framework, goals and guidelines
- Formal water quality monitoring schedule
- An environmental management plan for reducing pollution sources

Consultation with external parties is also an integral part of the overall water quality management at the airport. Sydney Airport is represented on a number of committees, such as the Botany Wetlands Environmental Management Steering Committee. Liaison with local and state government authorities also occurs as required.

Potential water quality impacts from construction and maintenance activities are managed via development and activity-specific environmental management plans. All bulk liquid and hazardous materials stores must be appropriately bunded to ensure that any spills or leaks can be contained on site.

Fire training exercises at Sydney Airport are conducted at a purpose-built facility in the Airport's South East Sector. The training area is fully bunded with all effluent draining to a separator system for treatment.

#### Water quality monitoring

As the water cycle management strategy for the airport indicates, monitoring of both water consumption and water quality is critical in effectively managing the airport's water cycle.

Monitoring and reporting on water quality are also important components in managing the airport's water cycle, particularly with the introduction of recycled water and alternative water sources on the site. Water quality results should be used to ensure that water sources are supplied at a quality that is fit for the intended use and is critical to managing the risks associated with water recycling processes.

The quality of water leaving the airport through stormwater channels and run-off is monitored to ensure stormwater management measures are treating stormwater as designed, and to monitor discharge to Cooks River, Alexandra Canal, Mill Stream and Botany Bay. Stormwater sampling was undertaken in 2012 and further sampling is proposed in the future as part of implementing the stormwater quality management plan.

#### Achievements under previous environment strategies

- Upgraded pollution control devices on stormwater outlet pipes at T1 terminal in 2003
- Completed a comprehensive stormwater characterisation study across the airport, and completed a stormwater monitoring program in 2003, 2006 and 2012
- Completed a detailed Sydney Airport stormwater management plan in 2004. The plan's aim is to improve the quality of stormwater run-off from the airport and so improve water quality in surrounding bodies of water. Initiatives implemented so far include:
  - Installation of three stormwater quality improvement devices (SQIDS) in the international terminal car park. These remove gross pollutants, sediment, oil and grease from stormwater run-off and improve water quality in Botany Bay, Cooks River and the Alexandra Canal
  - Installation of an additional two SQIDS in the domestic terminal precinct to improve the quality of stormwater run-off from the airport
  - Sustainable stormwater management measures are now also implemented with relevant construction projects
- In 2012, Sydney Airport commenced updating the Sydney Airport stormwater management plan
- Prepared and submitted the Sydney Airport water savings action plan to the NSW Government. Implementation commenced following submission of the plan to the government in 2006. Water savings of 10 million litres were achieved in the first year the plan was implemented. In 2012, Sydney Airport completed an update of the Sydney Airport water savings action plan. The updated plan identifies water savings that have been achieved by Sydney Airport since the implementation of the 2006 plan, identifies new areas where a reduction in potable water use can be achieved, and contains a strategy for the delivery of these new measures
- Implemented other water saving initiatives including:
  - Completion of an airport-wide leak detection project
  - Installation of water-savings devices across the airport
  - Installation of a sophisticated real-time water demand monitoring system
- Completed Stage 2 of the Sydney Airport water recycling project and moved into the commissioning phase. The new water recycling plant was operational in 2009 and will eventually save up to one million litres of drinking water every day

- Sydney Airport's water recycling project was recognised by the NSW Government with a Business Water Award
- Completed a comprehensive water cycle management system, which integrates all of Sydney Airport's previous water management strategies, policies, guidelines and plans as well as outlining a range of measures to minimise water use and improve and monitor stormwater quality

## Five year action plan (2013–2018)

Actions	Status
1. Finalise development of the Sydney Airport stormwater quality management plan	A
2. Implement the initiatives contained in the Sydney Airport stormwater quality management plan, including stormwater quality sampling	A
3. Incorporate water management in environment training for Sydney Airport staff	A
4. Undertake feasibility and options study for aircraft washing facilities	A
5. Implement cost effective water efficiency and saving opportunities in line with the water savings action plan	A
6. Review the water cycle management system	B
7. Drive adoption of the action items in the water cycle management system	C
8. Continue to ensure stormwater quality is considered in development proposals, both for the construction and operational phases of developments	C
9. Continue to implement the tenant management strategy and ensure tenants address stormwater quality in their EMPs	C

### Key performance indicators

- Reduction in total water consumed per passenger (kL/PAX) and/or per managed area (kL/m<sup>2</sup>)
- Water quality monitoring results show no decline or an improvement in water quality of stormwater from the airport

## 4.5 Air quality

### Key objectives

- Minimise air emissions from ground-based airport operations and activities as far as is practicable
- Comply with state and Commonwealth legislation and relevant standards and guidelines
- Support and encourage the progressive introduction by airlines of cleaner and more fuel efficient new generation aircraft such as the A380, B787 and A350 XWB.

### Background

The airport is one of the contributors to overall air emissions in the region. Other contributors in close proximity to the airport include the Port Botany Container Terminal (which generates container ship and heavy truck movements) as well as petrochemical and other heavy industries located in the Randwick – Botany industrial complex. Major roadways and motorways around the airport are also considered a major contributor to emissions in the region.

The types of activity which result in air pollutant emissions at airports are identified in the National Pollutant Inventory Emission Estimation Techniques for Airports (Department of Environment, Water, Heritage and the Arts, July 2008). These activities – which generate emissions through either fuel combustion or evaporation – include:

- Aircraft main engines
- Aircraft auxiliary power units (APUs)
- Aircraft ground support equipment and other airside vehicles
- Tests on aircraft engines and APUs
- Landside road traffic, including parking facilities
- Heat-generating plant
- Emergency power generators
- Fuel storage and distribution
- Solvent use during aircraft maintenance
- Fire training

Legislation governing air pollutant emissions and ambient air quality at airports has been introduced at the Commonwealth and state levels. In NSW, air quality must be assessed in relation to criteria for specific pollutants that are set contained in the Approved Methods for the Modelling and Assessment of Air Pollutants (DEC, 2005). The air pollutants that need to be assessed include carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), particulate matter with a diameter of less than 10 µm (PM<sub>10</sub>), and sulphur dioxide (SO<sub>2</sub>).

Monitoring conducted by Sydney Airport up to 2005 indicated that air quality within the boundary of the airport and in the surrounding areas is in compliance with the air quality goals established in the legislation.

In November 2005, with the approval of the AEO, Sydney Airport decommissioned the airport's air quality monitoring station (AQMS). The decommissioning followed a decade of air monitoring data demonstrating that airport operations complied with the applicable air quality standards. Sydney Airport believed that the considerable expenditure required to maintain the AQMS would be better directed toward proactive environmental projects including those which would contribute to lower air pollution and greenhouse gas emissions.

An emission inventory was developed in 2012 and detailed dispersion modelling study commenced in 2012.

In the modelling study, emissions and air pollution at the airport are calculated using the US Federal Aviation Administration (FAA) emissions and dispersion modelling system (EDMS). The FAA has mandated the use of EDMS for air quality modelling studies at airports in the United States and the model has been widely used in other countries.

The emissions inventory provides a summary of predicted emissions to air from the different types of activity at the airport (for the years 2012, 2018 and 2033) and is shown in **Table 4.2**.

**Table 4.2: Summary of predicted emissions to air from airport operations (2012, 2018 and 2033)**

Category	Emissions (tonnes per year)														
	CO			VOC			NO <sub>x</sub>			SO <sub>x</sub>			PM <sub>10</sub>		
	2012	2018	2033	2012	2018	2033	2012	2018	2033	2012	2018	2033	2012	2018	2033
Aircraft operations	1,969.9	2,383.3	3,444.4	372.5	427.9	657.2	2,395.3	3,001.3	4,547.7	197.9	247.0	367.9	13.9	15.2	20.1
Ground support equipment	1,075.9	435.3	274.5	37.6	17.0	13.0	126.7	57.2	27.7	2.7	2.6	2.9	4.8	3.1	1.8
APUs	42.1	30.2	30.6	4.1	3.1	3.4	54.4	75.8	111.2	7.1	8.6	11.6	7.6	6.5	7.6
Road traffic	188.9	177.1	237.5	17.3	14.1	15.9	24.3	15.2	13.2	0.2	0.2	0.3	0.9	0.8	1.1
Engine tests	75.5	75.5	75.5	17.6	17.6	17.6	292.7	292.7	292.7	16.7	16.7	16.7	1.5	1.5	1.5
Boilers and generators	2.8	2.8	2.8	0.4	0.4	0.4	6.1	6.1	6.1	0.3	0.3	0.3	0.4	0.4	0.4
Fuel storage and distribution	-	-	-	23.3	24.4	25.8	-	-	-	-	-	-	-	-	-
Paint and solvent use	-	-	-	35.6	35.6	35.6	-	-	-	-	-	-	-	-	-
Training fires	30.2	30.2	30.2	0.9	0.9	0.9	0.2	0.2	0.2	0.0	0.0	0.0	6.9	6.9	6.9
<b>Total</b>	<b>3,385.3</b>	<b>3,134.3</b>	<b>4,095.5</b>	<b>509.3</b>	<b>541.0</b>	<b>769.8</b>	<b>2,899.6</b>	<b>3,448.4</b>	<b>4,998.8</b>	<b>225.0</b>	<b>275.5</b>	<b>399.8</b>	<b>35.9</b>	<b>34.3</b>	<b>39.4</b>

Source: PAE Holmes (2012)

The Australian national pollutant inventory (NPI) provides information on air pollutant emissions within the Sydney-Wollongong-Newcastle airshed from industrial and mobile sources for 2010/11. As shown in **Table 4.3**, the emissions from the airport in 2012 were compared with the NPI data for the airshed in 2010/11. The emissions from the airport represent less than 1% of total emissions within the airshed.

**Table 4.3: Airport emissions compared with emissions in the greater Sydney, Newcastle and Wollongong airshed**

Pollutant	Emissions in Sydney, Wollongong and Newcastle (NPI data for 2010/11 <sup>(a)</sup> )	Emissions from Sydney Airport in 2012 <sup>(b)</sup>	Emissions from Sydney Airport in 2012 <sup>(b)</sup>
	(tonnes/year)	(tonnes/year)	% of NPI for airshed
CO	750,000	3,385	0.45%
NO <sub>x</sub>	750,000	2,900	0.39%
SO <sub>2</sub>	1,300,000	225	0.02%
PM <sub>10</sub>	640,000	36	0.01%
VOC	95,000	509	0.54%

Sources:

(a) NPI: <http://www.npi.gov.au> (accessed September 2012)

(b) PAEHolmes (2012)

## Relevant legislation and standards

### Australian

- Airports (Environment Protection) Regulations 1997
- Airports Regulations 1997
- National Environment Protection (Ambient Air Quality) Measure
- National Environment Protection (National Pollutant Inventory) Measure
- National Environment Protection (Diesel Vehicle Emissions) Measure
- Ozone Protection and Synthetic Greenhouse Gas Management Act 1989

### NSW

- Protection of the Environment Operations Act 1997
- Protection of the Environment Operations (Clean Air) Regulation 2002

## Links to other EAPs

- Climate change and energy management – **Section 4.3**
- Ground transport – **Section 4.7**

## Current management practices

### Airport infrastructure

Sydney Airport is actively supporting the introduction of the new generation of quieter, cleaner and more fuel efficient aircraft. As these aircraft are much quieter than the ones they will replace, the increasing use of these aircraft by many airlines regularly using the airport will, over time, also help to minimise the growth of aircraft noise impacts in areas around the airport.

To facilitate the introduction of these cleaner and quieter aircraft at the airport, Sydney Airport has invested \$128 million to upgrade airfield and terminal infrastructure. Sydney Airport has also installed fixed electrical ground power at all T1 and T2 gates and preconditioned air at all T1 gates. This enables airlines to minimise the use of APUs, which are powered by jet fuel, which reduces carbon emissions and minimises impacts on local air quality.

Essential infrastructure upgrades to accommodate the progressive introduction of further A380 aircraft (and the B787) over the next 20 years – such as the provision of additional stands at terminals and taxiways – are proposed to be undertaken as outlined in the Master Plan. These upgrades will keep Sydney Airport at the forefront of the introduction of the newer quieter and cleaner aircraft into the global airline fleet, making them increasingly common in the skies over Sydney.

## Encouraging the use of sustainable transport modes

As outlined in **Section 4.7** – the ground transport environmental action plan and the ground transport plan included in the Master Plan – Sydney Airport's objective is to encourage the increased use of sustainable transport modes (including public transport and cycling). This will help to minimise airport traffic-related environmental impacts such as air and noise emissions.

## Cleaner more fuel efficient aircraft

The introduction of the Air Navigation (Aircraft Engine Emissions) Regulations ensures that aircraft within Australia comply with the emission standards contained within the Convention on International Civil Aviation (Volume II, Annex 16). The standards are aimed at reducing ground level emissions and establish limits for relevant parameters including oxides of nitrogen (NO<sub>x</sub>), carbon monoxide, hydrocarbons and smoke. In March 1999, ICAO announced new limits for NO<sub>x</sub> emissions which represent a reduction of about 16%, applicable to new aircraft engine designs after 2003.

Despite the growth in aviation over recent decades, the fuel efficiency of today's modern jets is 70% better than it was with the early jets.

Improved fuel efficiency means lower air emissions and a reduced contribution to climate change. And fuel efficiency will only improve, as demonstrated by the A380 aircraft and will soon be demonstrated by the B787 and A350 XWB aircraft, where a further 20% efficiency improvement is expected.

## Achievements under previous environment strategies

- Installed an on-airport odour control unit in 2003 to reduce emissions associated with the SWSOOS
- Operated hybrid vehicles as part of the vehicle fleet
- Offset vehicle emissions through Greenfleet annually since 2006
- Invested \$128 million to facilitate the introduction of new generation of quieter, cleaner and more fuel efficient aircraft at Sydney Airport
- Invested around \$45 million for the installation of fixed electrical ground power and preconditioned air infrastructure in order that APU usage may be minimised
- Conducted a comprehensive air quality study, including an emissions inventory and a regional airshed comparison in 2012
- Commenced comprehensive dispersion modelling in 2012 and planning for air quality sampling



## Five year action plan (2013–2018)

Actions	Status
1. Complete air quality monitoring within the airport boundary	A
2. Investigate developing a best-practice guide for minimising air pollutant emissions from different sources	A
3. Investigate placing a limit on vehicle age (or a minimum requirement in terms of emissions certification)	A
4. Facilitate discussions with Airservices Australia and other key stakeholders on ways to minimise aircraft taxiing times, idling times and unnecessary aircraft engine usage	A
5. Investigate retrofitting emission-control devices (e.g. diesel particulate filters, selective catalytic reduction) to older vehicles	A
6. Eliminate vehicle idling for air transport vehicles through appropriate measures such as ensuring that non-emergency vehicles are turned off when unoccupied	A
7. Explore the use of a kerosene vapour capture and processing system as a means of reducing volatile organic compound emissions	A
8. Explore the use of vapour capture and recovery systems at service stations on the airport as a means of reducing volatile organic compound emissions	A
9. Encourage airlines and ground handlers to explore the cost-effective use of alternatively-fuelled ground support equipment such as bag tugs, belt loaders and pushback tractors	A
10. Consider revising vehicle procurement procedures to include more stringent limits on environmental performance.	B
11. Consider an 'eco-driving' course for the drivers of airport vehicles	B
12. Continue to adopt compulsory fixed electrical ground power units (FEGPUs) to minimise use of auxiliary power units (APUs). All new gates should be fitted with FEGPUs	C
13. Continue to ensure that air quality is considered in development proposals, both for the construction and operational phase of developments	C
14. Continue to implement the tenant management strategy and ensure tenants address air quality in their EMPs	C
15. Report on air quality issues to DIRD as part of annual environment report and the AEO on a monthly basis	C
16. Carry out annual NPI reporting and submit to NSW EPA	C

### Key performance indicators

- Increased use of clean energy sources including cleaner fuels for vehicles and equipment.

## 4.6 Ground-based noise

### Key objectives

- Minimise noise associated with ground-based airport operations
- Comply with relevant Commonwealth and state noise standards

### Background

As indicated elsewhere in this Strategy, the Airports (Environment Protection) Regulations 1997 do not apply to noise or other pollution generated by an aircraft in flight or when landing, taking off or taxiing at an airport, except in the case of aircraft ground running.

These important issues are addressed separately in the Master Plan 2033 (Chapter 14) and by other laws such as the Air Services Act 1995, Air Navigation Act 1920, Air Navigation (Aircraft Engine Emissions) Regulations or Air Navigation (Aircraft Noise) Regulations. These laws are administered by the Australian Government, through the DIRD or Airservices Australia. Contact details for aircraft noise and air emission enquiries are provided in the Useful Contacts section. Other types of aircraft or non-aircraft related ground-based noise are matters to be addressed in this strategy.

Ground-based noise can be generated on-site from a number of potential sources, including:

- Road traffic
- Construction and development activities
- Operation of audible alarm and warning systems
- Operation of plant and equipment
- Aircraft engine ground running
- Operation of aircraft auxiliary power units (APUs), although the need for APU usage has been reduced due to provision of fixed electrical ground power units (FEGPU) and preconditioned air (PCA) at aircraft gates

Airservices Australia and Sydney Airport's records show that over the past three years, Sydney Airport has received an average of around 14 complaints annually from the community in relation to ground-based noise. All of the complaints were investigated. The majority of the complaints relate to aircraft engine ground running and it was determined that none of the complaints occurred as a result of any breach of the ground running rules. Ground running at the airport is currently carried out at the Qantas run-up bays on the northern edge of the airport and, with permission from Sydney Airport, at other specific locations around the airport.

### Relevant legislation and standards

#### Australian

- Airports (Environment Protection) Regulations 1997
- Airports Regulations 1997

#### NSW

- Protection of the Environment Operations Act 1997
- Protection of the Environment Operations (Noise Control) Regulation 2008

### Links to other EAPs

- Nil

### Current management practices

Sydney Airport has a strategy to manage ground-based noise. As part of this strategy, engine ground running – which is essential for effective and safe aircraft operations and maintenance – is regulated by a policy that includes a comprehensive set of operational rules designed to maintain safety levels, comply with relevant standards and practices, and minimise noise impacts in areas outside the airport site boundary. Sydney Airport is committed to the ground running rules and achieving minimal complaints regarding ground-based noise.

In 2012, Sydney Airport reviewed the ground running rules in order to ensure that proposed minor operational changes to aircraft parking areas would not result in undue noise impacts. Sydney Airport is replacing the need for APU usage (a known source of ground-based aircraft noise) with FEGPU and PCA at all aerobridge gates at T1 as well as gates at T2. As of 2012, all aerobridge gates at T1 and T2 have FEGPU.

New developments at the airport such as new aircraft parking bays are assessed for noise impacts. Appropriate noise attenuation and mitigation measures are implemented where necessary to ensure relevant noise criteria are met. Similarly, noise impacts associated with construction activities are assessed during the development approval process, which is also addressed in **Section 3.7** of this strategy. Noise monitoring and modelling for individual projects is undertaken where necessary.

These management practices will be maintained and improved as appropriate for future airport operations.

### Achievements under previous environment strategies

- Conducted a comprehensive noise impact assessment for ground-based operations in 2000
- Reviewed the ground running rules in 2004 and 2012. No changes were made to the rules
- Liaised with aircraft operators and major tenants regarding potential non-compliances. For many years, including 2012, there were no non-compliances
- Continued monitoring and investigating all ground-based noise complaints. Liaised with complainants to discuss and identify any significant issues

- Reduced the use of APUs through provision of FEGPU at all aerobridge gates at T1 and T2 and PCA at T1
- Conducted baseline noise monitoring at six locations around the airport in 2012

## Five year action plan (2013–2018)

Actions	Status
1. Carry out an airline operator awareness program on the engine operating procedures which include the ground running rules	A
2. Carry out ground-based noise modelling for the airport for ground-based noise sources other than aircraft noise (inflight, taking off or taxiing), and assess against relevant noise criteria. Develop noise management programs as required based on the findings of the study	A
3. Review the engine operating procedures which include the ground running rules, and update if required	B
4. Continue to monitor ground-based noise complaints at the airport. Any observed breaches in ground running rules are to be registered, investigated and referred to the AEO for further action if required	C
5. Maintain on-going review of the need for acoustic barriers to limit off-airport noise, as part of the Master Plan development plans	C
6. Continue to ensure that noise is considered in development proposals, both for the construction and operational phase of development	C
7. Continue to install FEGPU at all new gates at the airport	C
8. Continue to encourage the increased use of FEPPU and PCA by airlines	C

### Key performance indicators

- No breach of the aircraft engine operating procedure, including the ground running rules
- Receive minimal complaints from the community regarding ground-based noise

## 4.7 Ground transport

### Key objectives

- Encourage the increased use of sustainable transport modes
- Minimise traffic-related environmental impacts (such as air and noise emissions)

### Background

The Sydney Airport Master Plan 2033 provides a 20 year strategy for the development and operation of the airport. The ground transport chapter in the Master Plan includes a ground transport and access strategy for the 20 year term and a specific five year ground transport plan. The five year plan is intended to show how Sydney Airport will maximise the efficient movement of people and freight within this term.

This ground transport action plan details Sydney Airport's commitment to sustainable transport options for airport users, with a focus on minimising traffic related environmental impacts.

Transport and traffic at the airport is classified into airside and landside components. The following sections describe the landside access components in further detail.

#### Road network

The M5 East Motorway, Eastern Distributor, Southern Cross Drive, General Holmes Drive and O'Riordan Street form the main vehicular access routes to Sydney Airport. Arterial road access to the T1 precinct is provided by Airport Drive and Marsh Street and to the T2/T3 precinct by the Qantas Drive/Joyce Drive/O'Riordan Street intersection.

Airport Drive/Qantas Drive, which forms the northern boundary of the airport and is located on airport land and maintained by Sydney Airport, forms an important element of the southern Sydney arterial road network. In addition, it provides important access and circulation for airport users.

There are three main sources of traffic on the road network in and around the airport. These are:

- Trucks travelling to or from the Port Botany Container Terminal (which carry freight)
- Trucks and cars that are directly associated with the day-to-day operation of the airport (which carry passengers, meeters/greeters, freight, and airport workers)
- Commuter and residential traffic that passes through or immediately adjacent to the airport

#### Public transport

Public transport access to the airport includes the Airport Link train line, public buses, mini buses, taxis and hire cars. The Airport Link services travel from stations at T1 and T2/T3 to City Circle stations within the Sydney CBD

and via the Airport and East Hills Line to Campbelltown and Macarthur. The Airport Link also provides an inter-terminal transfer facility for passengers transferring between the T1 and T2/T3 precincts.

Public bus routes 400 and 410 stop at the airport, although only the 400 service stops at the airport's passenger terminals. These services connect the airport to Rockdale, Burwood and Bondi Junction.

Taxis are a major transport mode for access to the airport, providing for over a quarter of all passenger trips. Mini buses link the airport to many hotels nearby and further afield.

#### Active transport

Cycle routes are provided along the Cooks River and Alexandra Canal, on the north side of Airport Drive and via the Giovanni Brunetti Bridge. Cyclists have access to all terminals and cyclist facilities are provided at various locations.

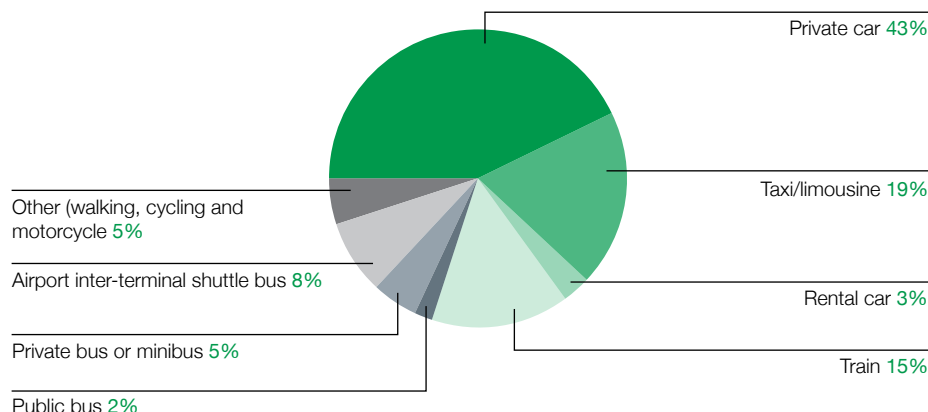
Pedestrian access to T1 is via the Giovanni Brunetti Bridge and the Alexandra Canal footbridge and then on footpaths and covered walkways. Pedestrian access to T2/T3 is on footpaths along public roads and through the pedestrian facilities at the Qantas Drive/Sir Reginald Ansett Drive intersection.

#### Airport ground travel plan

With the publication of the airport ground travel plan (AGTP) in 2006, Sydney Airport demonstrated its commitment to exploring innovative ways to improve the sustainable transport options for passengers, airport staff and visitors travelling to and from the airport. The objective of the AGTP was to "identify and target specific opportunities to promote non-car modes of access to and from the airport, and to encourage a shift to more sustainable transport modes." Pursuing and implementing the sustainable transport options identified in the AGTP in consultation with key stakeholders is a priority for Sydney Airport because, as growth in aviation activity occurs, it will help to reduce congestion on the road network surrounding the airport, assist in encouraging a modal shift in favour of public transport and improve local air quality.

The five year ground transport plan, developed as part of the Master Plan, replaces the AGTP and details the short-term initiatives that are currently in planning to encourage a shift to public transport modes.

**Figure 4.1 Mode share for all users of the airport 2012**



### Mode share

A comprehensive survey of over 14,000 passengers, visitors and staff was jointly commissioned by Sydney Airport and Transport for NSW (TfNSW) in June 2012. Mode share proportions identified from this research are shown in **Figure 4.1**. The figure shows that use of public transportation and non-private cars (including hire cars and taxis) for travel to the airport already represents more than 50% of all trips by passengers and staff. This proportion has grown since the last survey in 2006 and far exceeds the Sydney average for the same classification of modes which was recorded as 32% for all trips in the 2010/11 household travel survey.

### Relevant legislation and standards

#### Australian

- Airports (Environment Protection) Regulations 1997
- Airports Regulations 1997
- National Environment Protection (Ambient Air Quality) Measure
- National Environment Protection (National Pollutant Inventory) Measure
- National Environment Protection (Diesel Vehicle Emissions) Measure

#### NSW

- Protection of the Environment Operations Act 1997 – Part 5.8
- Protection of the Environment Operations (Clean Air) Regulation 2002 – Part 3

### Links to other EAPs

- Climate Change and Energy Management (**Section 4.3**)
- Air Quality (**Section 4.5**)

### Current management practices

#### Public transport

As indicated in the Master Plan 2033, Sydney Airport is committed to working with the NSW Government and transport operators to develop sustainable transport options for airport users, which will assist to minimise traffic related environmental impacts. In planning for the T1 and T2/T3 precincts, Sydney Airport is committed to increasing the public transport mode share by 29%, an increase of five percentage points by 2018, and by 41% or seven percentage points by 2033.

As one step to achieve this, Sydney Airport aims to improve access to and enhance public transport facilities at the airport, ensuring that each transport interchange is clean, accessible and conveniently located to improve the quality of experience for public transport users. Sydney Airport is working with NSW Government stakeholders and private infrastructure owners to further increase the attractiveness and competitiveness of public transport access modes including rail and public buses. Sydney Airport has and continues to advocate for the reduction of the station access fee to increase patronage on rail for passengers as well as staff.

The forecast increase in passengers using the airport, together with the projected increase in mode share by public transport, provides an opportunity for a substantial increase in the number of passengers using train services to the airport. In October 2013, the NSW Government delivered on its commitment to provide at least eight trains an hour between Sydney Airport and City Circle stations between 7am and 9pm as from 20 October 2013. This additional rail capacity, which represents the first expansion of public transport services to and from Sydney Airport for many years, is welcomed by Sydney Airport.

Sydney Airport supports these efforts to improve passenger rail services to the airport. Improvements to the train services identified in the Sydney's Rail Future



report include extending off-peak operating hours to encourage use by shift staff and improving connections at Wolli Creek for upgraded Cronulla line trains which provide commuter access to a significant staff catchment area.

Sydney Airport also supports the NSW Government strategy to provide strategic bus corridors and improve bus accessibility to both the T1 and T2/T3 precincts.

#### Active transport

Sydney Airport encourages cycling by providing secure cycle parking, lockers and shower facilities. At T1, bicycle racks are located at both ends of the terminal building. There are publicly accessible shower facilities located within the T1.

At T2 and T3 Terminals, undercover bicycle racks are centrally located at 5th Street adjacent to the public pick-up area.

To further support active transport, major new developments (including the T1 Rydges Hotel) are required to have shower facilities for commuting staff.

Sydney Airport will continue to work with the NSW Government and local councils to enhance / extend cycle routes and crossings in the surrounding area.

Sydney Airport is currently planning a number of major improvements to the cycleway, including inter-terminal and subregional links. A number of these links will require the cooperation of state and local government agencies and are described below:

#### T1 links

- Upgraded cycle path from T1 to Cooks River Drive and the RMS Alexandra Canal Cycleway, with traffic islands and raised and floodlit crossings as part of the T1 ground access initiatives
- Future crossing at Link Road and Airport Drive to incorporate links to the RMS Alexandra Canal Cycleway

#### T2/T3

- Improved access from Qantas Drive/Robey Street via the one-way pair configuration: new set of signals incorporating shared crossings to be installed at western and southern legs of the intersection
- Shower facilities in T2 are being investigated as part of our ongoing refurbishment of passenger facilities

#### Inter-terminal and subregional Links

- Pedestrian and/or cycle links between the Alexandra Canal, Qantas Jet Base and Robey Street to upgrade existing formal and informal paths are currently being investigated. This will require funding and input from external parties such as Transport for NSW, and local councils for access to non-airport land

- Sydney Airport is currently in discussions with local councils to link Sydney Airport land to the current and planned cycleways. This includes eventual links to the Princes Highway, as well as improved access from Marsh Street to the Alexandra Canal Cycleway

#### Road network

To help ease congestion on roads in the Port Botany – airport region, particularly congestion associated with increased container movements through Port Botany, Sydney Airport has expressed its support to the NSW Government for the construction of WestConnex.

Particularly in peak hours, the entrances to the airport can become congested and not reach operational efficiency due to oversupply of commuter, freight and airport traffic on the adjacent road network. The environmental effects of congestion include increased fuel usage, air pollution and greenhouse gas emissions. Sydney Airport proposes to upgrade its internal roads at T2/T3 to create a dedicated four lane entrance and a separate dedicated five lane exit from the precinct. These improvements will reduce congestion and associated environmental costs.

#### Achievements under previous environment strategies

- Completed the on-airport component of NSW M5 East cycleway in 2001
- Finalised and began implementing the Sydney Airport ground travel plan (AGTP) in 2006, as a way of encouraging the use of sustainable transport options. Implementation of the initiatives under the AGTP is ongoing
- Lobbied the NSW Government to reform the fare structure for users of the Airport Link train stations at T1 and T2/T3 in order to make travel by public transport to and from the airport more affordable. In 2011, the NSW Government removed the station access fee of \$11.80 for users of Mascot and Green Square stations (the two stations north of the airport). Sydney Airport continues to lobby the NSW Government for fare structure reform
- Lobbied the NSW Government to introduce additional bus services to and from the airport in order to make use of public transport more convenient
- Worked closely with RMS and local councils to develop an integrated network of shared pedestrian/cycleways to better connect the airport with the regional cycling network
- Installed additional bicycle racks at T1 and T2 and posted cycle-related information – including maps showing the location of the racks and changing/shower facilities – on the Sydney Airport website

- Developed a draft pedestrian and cycle strategy, which includes a requirement that all major new developments have bike storage and changing facilities where appropriate
- Installed new facilities including lockers and showers to support staff cycling to and from work
- Established a joint working group with Transport for NSW and NSW Roads and Maritime Services to develop ground transport solutions for the airport, including road upgrades and improved public transport services

## Five year action plan (2013–2018)

Actions	Status
1. Investigate the feasibility of developing a car pool program for airport employees	A
2. Provide improved pedestrian access infrastructure	A
3. Review existing pedestrian and cycleway linkages and facilities within and between the T1 and T2/T3 precincts	A
4. Continue to work with key stakeholders to lobby the NSW Government to reform the station access fee applying to Airport Link rail stations	C
5. Continue to explore measures to increase the number of airport staff and passengers who use public transport or other sustainable modes of transport	C
6. Continue to lobby the NSW Government and its transport agencies to provide additional public transport services (including bus and rail) to and from the airport	C
7. Ongoing review and provision of bicycle storage, showers and changing facilities as well as lockers to support alternative sustainable transport modes in line with all applicable new development proposals	C

### Key performance indicators

- Increased use of public transportation (train and bus) compared to the use of cars (including private cars, taxis, and limousines)

## 4.8 Biodiversity and conservation management

### Key objective

- Identify, preserve and, where practicable, enhance significant native biodiversity habitat on the airport and appropriately manage and control exotic species and species which present a risk to aircraft safety.

### Background

The natural environment and biodiversity of the airport and its surroundings has undergone a dramatic change due to development of the area. The majority of the land is now hardstand with few areas of native vegetation. The main areas of natural biodiversity value at the airport are the Sydney Airport Wetlands, with smaller pockets of vegetation and grassed verges of the runways also providing habitat.

The wider area of Botany Bay and its catchment are rich in biodiversity, being home to many endangered and migratory species. Although highly disturbed, the airport provides habitat for a range of fauna species. Many of the species that visit the wider area of the bay can be found at the airport at various times of the year.

Several studies have documented the biodiversity values of areas at the airport, including the Sydney Airport Wetlands (Biosis 2001, ERM 2001, Ecosure 2011, Avisure 2012, AECOM 2012). These studies were the subject of a detailed review supplemented by field surveys of key habitat areas in September 2012, in preparing this EAP.

#### Sydney Airport Wetlands

The Botany Wetlands consist of 11 interconnected ponds that stretch over 4km from Gardeners Road in Mascot to the northern shore of Botany Bay. Sydney Airport manages the downstream sections of the Botany Wetlands which includes Mill Pond (southern section), Engine Pond East and Engine Pond West and Mill Stream. Collectively, these are known as the Sydney Airport Wetlands. All but Engine Pond West constitute part of the present day Botany Wetlands.

The freshwater ponds Engine Pond East, Mill Pond and Engine Pond West were originally connected, forming part of a much larger pond system. General Holmes Drive now divides the ponds, with Engine Pond West effectively isolated from the direct flow line of Botany Wetlands (which flow through Mill Pond, Engine Pond East and Mill Stream to Botany Bay).

Mill Stream was diverted as part of the development of the airport and has little resemblance to its original form. Mill Stream presently discharges to northeast Botany Bay through a 40m wide lined channel between the parallel runway and Foreshore Road. A weir several hundred metres upstream of its mouth forms a barrier to tidal exchange, although fish passage to Engine Pond

East has been facilitated through the construction of a vertical slot fish passage by Sydney Airport in 2006.

The Botany Wetlands are listed as significant on the Directory of Important Wetlands in Australia. The Sydney Airport Wetlands are designated as an environmentally significant area (Heritage and Biodiversity) under the Airports Act 1996.

#### Flora

Of the 176 species recorded in 2009, 86 are native species, with the remaining 91 being introduced flora. Nine of the weed species recorded are listed noxious weeds under the NSW Noxious Weeds Act 1993. No individual critically endangered, endangered or vulnerable flora species is known to exist on the airport site (Biosis 2001, Ecosure 2011). However, field surveys in 2009 recorded one species of regional significance, *Hibiscus diversifolius* (swamp hibiscus) which is considered regionally rare.

Vegetation at the airport is predominantly mown grassed areas with occasional low to open shrubland and woodlands, and planted native and exotic trees. Previous assessments have identified areas of vegetation at the airport as characteristic of three endangered ecological communities (EECs) listed under the NSW Threatened Species Conservation Act 1995 (TSC Act).

These have included Eastern Suburbs banksia scrub in the Sydney Basin bioregion, coastal saltmarsh in the New South Wales North Coast, Sydney Basin and south east corner bioregions, and Sydney freshwater wetlands in the Sydney Basin bioregion.

An area containing *Banksia integrifolia* low woodland/shrubland adjacent Foreshore Road was suggested as being characteristic of Eastern Suburbs banksia scrub (Biosis 2001, ERM 2001). Later surveys conducted by Ecosure in 2009 discounted this possibility due to highly disturbed and landscaped (planted) nature of site. This area has been planted with tubestock as part of revegetation programs undertaken by Sydney Airport.

An isolated patch of coastal saltmarsh was identified in 2009 within a highly disturbed location in the middle of the airport, which is subject to an extensive mowing regime. There is no scope to enhance or assist this vegetation to regenerate into the described EEC and was therefore not considered as one (Ecosure 2011).

Ecosure (2011) proposed that vegetation in and surrounding Engine Pond West to be commensurate with the Sydney freshwater wetlands EEC. Detailed investigations completed for the draft Sydney Airport wetland management plan (AECOM 2012) discounted this possibility.

Pre-European settlement vegetation shows the area on which the current Engine Ponds are located to comprise estuarine vegetation complexes. The location of the

current day pond and existing vegetation was previously one large water body which extended considerably further to the west and south west than the current day boundaries. The pond and its surrounds do not meet definitions provided by the NSW Scientific Committee determination of this EEC as described in Benson & Howell (1994) and Adam & Stricker (1993).

In addition to the areas of relatively natural vegetation occurring on site, a number of planted tree species have been identified in the Heritage Management Plan 2009 for Sydney Airport as having heritage value – the fig trees located near Engine Pond West. These are further discussed in **Section 4.8** – heritage.

### Fauna

Due to the highly modified nature of the airport environment, significant fauna habitats are limited. Nevertheless, the Engine Ponds, vegetated pockets and grassed areas provide an opportunity for a number of species to occur on the airport site, as discussed below.

#### Birds

Within the grounds of Sydney Airport and its immediate surrounds, 166 bird species have been recorded, 74 of which are considered to be of high conservation importance (Biosis, 2001).

The Sydney Airport Wetlands represent the most significant area for fauna habitat at the airport, as reflected by the high diversity of bird species occurring in this area. Other areas of the airport also provide habitat for certain species. A number of water hens, *Cygnus atratus* (black swan), various ducks and wading birds have been recorded in the wetlands or on the edge of Botany Bay, along with other sedentary and migratory species such as the *Sterna albifrons* (little tern), *Gallinago hardwickii* (latham's snipe), *Calidris acuminata* (sharp-tailed sandpiper), *Haliaeetus leucogaster* (white-bellied sea-eagle) and *Limosa lapponica* (bar-tailed godwit).

The airside habitats contain mainly open grasslands which provide habitat for grassland birds such as *Ardea ibis* (cattle egret) and other migratory birds (such as *Charadrius bicinctus* (double-banded plover) listed under the Environment Protection and Biodiversity Conservation 1999 (EPBC Act). Areas of exposed sand at the end of Runway 34R provides potential nesting habitat for the little tern (endangered under the TSC Act and migratory under the EPBC Act).

#### Herpetofauna

Although 25 reptile and 12 amphibian species have been recorded on or in the vicinity of the airport in the past, Biosis Research (2001) concluded that it is unlikely that this number currently exist on site. Surveys conducted in 2009 (Ecosure 2011) found four reptiles namely *Ctenotus taeniolatus* (copper-tailed skink), *Tiliqua scincoides* (eastern blue-tongue lizard), *Eulamprus*

*quoyii* (eastern water skink) and *Lampropholis guichenoti* (garden skink) and two amphibians namely *Limnodynastes peronii* (striped marsh frog) and *Bufo marinus* (cane toad).

The main habitats at the airport supporting reptile and amphibian species are linked with naturally vegetated areas. However, grassed areas associated with airside activities and wetlands provide habitat for smaller, common reptile species and amphibians.

*Litoria aurea* (green and golden bell frog), which is endangered under the TSC Act and vulnerable under the EPBC Act, has historically been recorded on the airport, the surrounding region, and across Sydney prior to the 1970s. They have not, however, been recorded on airport grounds for a number of decades. This could in part be due to the existence of *Gambusia holbrooki* (mosquito fish) in the wetlands, which may result in a reduction in amphibian occupancy (Botany Wetlands Ministerial Taskforce, 1991). There are, however, two small sub-populations located nearby at Rosebery and Arncliffe. Parts of the airport may still provide potential habitat, mainly as a corridor route for the two sub-populations either side of the airport. Field surveys conducted in 2010, 2011 and 2012 (Biosphere Environmental Consultants) did not detect the species.

#### Mammals

There are few records of native mammals on the grounds of the airport or its immediate surrounding areas, likely due to the high modification of habitats. The draft environmental impact statement for the proposed third runway (Kinchill, 1990) stated that *Hydromys chrysogaster* (native water rats), *Perameles nasuta* (long-nosed bandicoots), *Trichosurus vulpecular* (brush-tail possums) and *Pseudocheirus peregrinus* (common ringtail possums) had previously been observed in the Sydney Airport area. However fauna surveys conducted in 2009 (Ecosure 2011) only detected the *Oryctolagus cuniculus* (european rabbit), *Vulpes vulpes* (red fox), *Rattus rattus* (black rat) and *Mus musculus* (house mice).

Sydney Airport has since engaged ecologists to determine the presence of the long nose bandicoot and its habitat on the airport. The assessment undertaken by consultants MWH (2013) concluded that the likelihood of the long-nosed Bandicoot occurring within the study area is considered very low given the nature of fill, lack of developed soil profiles and associated food sources, the presence of predators, and the sporadic nature of corridors to and from the site.

A number of mature fig trees are situated along Hammond Place and adjacent airside areas. These provide foraging habitat for *Pteropus poliocephalus* (grey-headed flying fox) which is listed as vulnerable under both the TSC Act and EPBC Act.

More recently a threatened population of long-nosed bandicoots in inner western Sydney have been found increasingly further south (i.e. at Alexandria) and the potential for the rail corridor through the northern lands of the airport to provide habitat for the species is being investigated in consultation with the NSW Office of Environment and Heritage (OEH).

#### Fish

A number of fish species have been recorded in both the freshwater and marine environments associated with the airport. It is probable that a number of marine species protected under the EPBC Act may inhabit the area, as determined by SEWPaC's online database.

An aquatic survey of Engine Pond West in 2009 (Ecosure 2011) recorded large numbers of *Gambusia holbrooki* (mosquito fish), whereas more recent survey (AECOM 2012) found only *Anguilla australis* (short-finned eel) and one mature *Macquaria novemaculeata* (Australian bass).

Aquatic surveys of Engine Pond East (Biosis 2001, Perrera 2009, Ecosure 2011) recorded 13 fin fish species, 10 native species: Australian bass; *Tandanus tandanus* (catfish); *Galaxias maculatus* (common jollytail); *Hypseleotris compressa* (empire gudgeon); *Hypseleotris galii* (fire-tail gudgeon); *Anguilla australis* (long-finned eel); *Mugil cephalus* (sea mullet); short-finned eel; *Retropinna semoni* (smelt); *Gobiomorphus australis* (striped gudgeon); and three introduced species, mosquito fish; *Cyprinus carpio* (european carp); and *Carassius auratus* (goldfish).

All Anguillid eels spend most of their life in freshwater. However adults migrate to sea to spawn. Juveniles make their way back to estuaries and freshwaters until they are ready to reproduce. The presence of a juvenile of this species and sea mullet suggests that the fish are using the fish ladder to move from the sea to the pond.

Perrera (2009) found that sea mullet increased from a single specimen caught two weeks following the fish ladder's operation in 2006 to 17 caught in 2009. The largest specimen caught was 220mm, with sea mullet now the third most abundant fish in Engine Pond East.

Fish surveys in the Mill Stream (Ecosure 2011) recorded juvenile *Platycephalus* sp. (flathead), *Tetractenos hamiltoni* (toadfish) and sea mullet. *Saccostrea commercialis* (Sydney rock oyster) were also in abundance on hard structures and along the concrete walls of the Mill Stream. More recent surveys of the Mill Stream (AECOM 2012) found large numbers of *Ambassis jacksoniensis* (glassfish), several juvenile *Sillago cilliata* (sand whiting) and adult specimens of toadfish and sea mullet.

#### Relevant legislation and standards

##### Australian

- Airports (Environment Protection) Regulations 1997

- Airports Regulations 1997
- Environment Protection and Biodiversity Conservation Act 1999
- Japan-Australia Migratory Bird Agreement (JAMBA)
- China-Australia Migratory Bird Agreement (CAMBA)

##### NSW

- Threatened Species Conservation Act 1995 (Part 2, Division 1)
- Fisheries Management Act 1994
- National Parks and Wildlife Act 1974 (Parts 7 and 7A)
- Noxious Weeds Act 1993

#### Links to other EAPs

- Water management – **Section 4.4**
- Heritage – **Section 4.9**

#### Current management practices

Sydney Airport has implemented and is continuing to implement a number of measures to manage biodiversity at the airport.

These include:

- A wetlands management plan that provides the framework for management of the Sydney Airport Wetlands such that a range of often competing interests and functions are met, including biodiversity conservation, minimising risk to aircraft from bird strike, heritage values, visual amenity, education and research
- The on-going implementation of the wetlands enhancement program for Engine Ponds East and West, Mill Pond and Mill Stream which aims to increase the numbers of native fish species and, more generally, improve the quality and ecological function of the wetlands themselves
- Sydney Airport actively participates as a member of the Botany Wetlands Environmental Management Steering Committee which involves a number of local councils, Sydney Water Corporation, Sydney Metropolitan Catchment Management Authority, NSW Department of Water and Energy, RailCorp and the Centennial and Moore Park Trust
- A weed eradication program for the Sydney Airport Wetlands – wetland weeds are currently managed through a regular spraying and harvesting program. Some terrestrial species are also targeted as part of this program
- The wildlife control working group was established to determine the most appropriate strategies to manage bird hazards, including development of planting guidelines to reduce attraction of birds. The working group includes representatives from Sydney Airport, NSW Government agencies, local



government authorities and key stakeholders such as the Centennial Park and Moore Park Trust

- Periodic feral animal control – management of feral animal species such as foxes and rabbits occurs periodically on-site through a number of means and in the past as part of a regional program through the Sydney south region animal management committee. Sydney Airport also carries out exotic fish (carp) removal from the Sydney Airport Wetlands
- Management of vegetation is carried out in accordance with DIRD's land clearing guidelines

#### **Achievements under previous environment strategies**

- Implemented the Wetlands Enhancement Program to better manage the wetlands  
Initiatives implemented so far include:
  - Installation of a gross pollutant trap to improve water quality
  - Removal of exotic fish (carp)
  - Construction of a fish ladder to allow the movement of native fish from Botany Bay upstream into the wetlands
  - Revegetation and rehabilitation of a section of the Engine Pond East

- Weed removal on the banks of Engine Pond West
- A native fish (Australian bass) stocking program
- Committed \$2.7 million to the Lady Robinsons Beach restoration project in 2005/06. The project includes stabilisation of the dune system with native grasses
- Planted approximately 71,000 new native plants at Sydney Airport in 2007/08 as part of the ongoing \$2 million landscaping and streetscape improvement program
- Conducted a comprehensive ecological assessment of the airport in 2009 (finalised in 2011). The assessment included terrestrial habitat, aquatic habitat and marine habitat within Botany Bay adjacent to the airport runways. Green and golden bell frog surveys of the Engine Ponds and Mill Stream were also conducted in 2010, 2011 and 2012
- Conducted a detailed review in 2012 of the ecological assessment of the airport undertaken in 2009 supplemented by field surveys of key habitat areas. Carried out targeted weed removal on Foreshore Road for bitou bush
- Prepared a draft Sydney Airport wetland management plan in 2012

## **Five year action plan (2013–2018)**

<b>Actions</b>	<b>Status</b>
1. Undertake additional field surveys to determine the presence of the green and golden bell frog	A
2. Implement all applicable recommendations from the ecological assessment of the airport	A
3. Continue investigations into the potential for the rail corridor through the Northern Lands of the airport to provide habitat for the long-nosed bandicoot in consultation with OEH	A
4. Implement the vegetation management policy	A
5. Undertake marine surveys (including sea grass) to establish baseline conditions prior to Taxiway B extension	B
6. Maintain a committee to address wildlife management at the airport	C
7. Monitor wildlife, particularly bird and bat numbers, through regular inspections	C
8. Continue to implement the wetland enhancement program, including carp control, weed control, native fish restocking and maintenance of revegetation works	C
9. Continue to implement the wetlands management plan	C
10. Ensure native species are used in landscaping of development sites	C
11. Carry out periodic feral animal control to ensure the safety of aircraft and help reduce the impact of feral animals on native wildlife	C

#### **Key performance indicators**

- Biological resources/values of wetlands at the airport are preserved or enhanced

## 4.9 Heritage

### Key objective

- Ensure that items listed in the Heritage Management Plan for the airport as having heritage value are managed in accordance with applicable legislation.

### Background

The history of the airport is described in **Chapter 1**.

#### Indigenous cultural heritage

The setting in which the airport lies would have been an ideal location for Aboriginal habitation prior to European settlement (Kinhill, 1991). With nearby water sources such as the Cooks River and Botany Wetlands and a diverse range of habitats for food on the coast and adjacent hinterland, it has been suggested that the area would have been well utilised by Aboriginal communities.

However, airport-wide heritage studies undertaken by archaeologists from Kinhill in 1991 and 1994 and Biosis Research in 2001 indicate that there are no Aboriginal archaeological sites or areas of potential archaeological sensitivity within the airport. In conjunction with the 2001 assessment, consultation was undertaken with the Metropolitan Local Aboriginal Land Council, which indicated that the airport study area did not have any potential for Aboriginal archaeological sites due to the high disturbance by post-contact land use practices.

In accordance with the Airports Regulations 1997, Sydney Airport again consulted the Metropolitan Local Aboriginal Land Council in 2009 and 2012 to confirm that, due to the highly disturbed nature of the Airport site, there are no actual or potential Aboriginal archaeological sites present at the airport.

#### Non-indigenous cultural heritage

##### *Heritage Management Plan*

There are important items of non-indigenous cultural heritage at Sydney Airport. A number of these are owned and/or operated by bodies other than Sydney Airport (such as Sydney Water). The heritage values of the airport are embodied in the location, form and function of its individual elements, including the arrangement of streets, buildings, runways and the ways in which these attributes reflect its history of change and growth.

In accordance with the Environment Strategy 2005 – 2010, a heritage management plan (HMP) for the airport has been developed. The HMP was prepared in accordance with the Commonwealth heritage management principles.

The aim of the HMP is to identify the potential Commonwealth heritage values associated with the airport as a whole and its individual elements, and to provide guidance with respect to future conservation

policies and management strategies to maintain and protect those values.

The HMP expands the previous heritage assessments of the individual elements located at the airport by identifying the key historical phases and elements remaining from those phases, the heritage values of the airport site as a whole as well as built, archaeological and landscape elements that embody the Commonwealth heritage values and the airport's State and local significance.

In preparing the HMP, all buildings within the airport were surveyed for the purpose of establishing their heritage value. The following historical phases are identified:

- Early colonial and 19th century industry
- Early 20th century suburban expansion
- Early 20th century industrial development
- Early aerodrome: 1919 – 1930
- The creation of a commercial airport: 1931 – 1938
- World War II: 1939 – 1945
- The creation of an international airport: 1947 – 1972
  - Airport redevelopment phase 1: 1947 – 1962
  - Airport redevelopment phase 2: 1963 – 1972
- Recent expansion: 1973 – present.

The HMP also identifies key themes that can be used to guide future heritage management at the airport. The first theme is that each phase of redevelopment has been rooted in a fundamental framework established in the earliest days of the airport. That is, despite the nature of expansion typical of a major airport, the origins of the airport are, in places, still visible today. The second theme is one of continual renewal. The rapidity of development of air transport over the last century has meant that all major airports – including Sydney Airport – must change to meet the demands of a growing number of passengers as well as advances in aircraft and aviation technology.

The HMP lists the built, landscape and archaeological elements at the airport that have been assessed as contributing to the overall heritage values of the airport site. A total of 49 items are identified in the HMP as having exceptional (3), high (14), moderate (19) or little (13) heritage value. The HMP includes a detailed schedule on each of these items, including a brief description, assessment of heritage values and an indicative assessment of each element's tolerance for change.

As part of development for essential aeronautical purposes, a number of items/elements with heritage value are now earmarked for removal.

## Relevant legislation and standards

### Australian

- Airports (Environment Protection) Regulations 1997
- Airports Regulations 1997
- Environment Protection and Biodiversity Conservation Act 1999
- Environment Protection and Biodiversity Conservation Regulation 2000 (Schedule 7B)
- Australian Heritage Council Act 2003
- Aboriginal and Torres Strait Islander Heritage Protection Act 1984

### NSW

- Heritage Act 1977

## Links to other EAPs

- Water Management – **Section 4.4**

### Current management practices

On 1 January 2004, a new national heritage system was established by the Australian Government under the EPBC Act.

This led to:

- The freezing of the Register of the National Estate (RNE) on 19 February 2007, with its abolition as a statutory list from February 2012
- The introduction of the National Heritage List, which is designed to recognise and protect places of outstanding heritage to the nation
- The introduction of the Commonwealth Heritage list, which includes Commonwealth owned or leased places of significant heritage value

After February 2012, the RNE will continue to be maintained by the Australian Heritage Council on a non-statutory basis as a publicly available archive. Places on the RNE that are in Commonwealth areas, or subject to actions by the Australian Government, are protected under the EPBC Act by the same provisions that protect Commonwealth heritage places.

None of the 49 items, areas or aspects identified in Sydney Airport's HMP as having heritage value – which include the three areas identified under Section 116(2)(b) of the Airports Act 1996 as being environmentally significant areas – are on the national or Commonwealth heritage lists.

Following discussions with senior representatives of the then Department of Environment and Heritage undertaken during the preparation of previous strategies, Sydney Airport understands that heritage items at the airport will be managed under the Airports Act 1996 and EPBC Act, and will not be transferred to the new Commonwealth Heritage List. The Airports Act 1996 and regulations contain a number of heritage-protection

provisions including a general duty to preserve existing aesthetic, cultural, historical, social and scientific values of the local area.

During this strategy period, the Master Plan 2033 envisages development for aeronautical purposes, other aviation related uses and facilitating the introduction of quieter, cleaner aircraft. Due to this proposed development six (out of 14) elements of high heritage value, 13 (out of 19) elements of moderate heritage value, and nine (out of 16) elements of little heritage value are proposed to be removed. Sydney Airport is also considering options for Building 60 (the former civil aviation terminal and control tower) with respect to the proposed changes envisaged for the T2/T3 precinct.

Elements of exceptional heritage value, which are considered environmentally significant areas, are retained.

A detailed heritage impact assessment has been prepared which concludes that implementation of the Master Plan, including during the period 2013-2018, would result in a substantially adverse impact on the identified heritage values of the airport. A number of mitigation measures will be implemented which significantly reduce the heritage impact of the proposed development. These mitigation measures are included as actions within this EAP.

### Achievements under previous environment strategies

- Conducted a review of the heritage elements of Sydney Airport in 2002
- Prepared a heritage management plan in 2009, identifying 49 sites having varying degrees of heritage value. These include the three sites identified in this strategy as being environmentally significant for the purposes of Section 116(2)(b) of the Airports Act 1996 and regulations
- Communicated the heritage value of Sydney Airport to staff and relevant airport tenants and operators
- Carried out emergency repair works on Hangar 13
- Assessed the ecological values of the fig trees which were identified as an item of moderate heritage value in the heritage management plan. Work also commenced on a management plan specifically for the fig trees
- Prepared a heritage impact assessment and mitigative strategy in relation to implementation of the Sydney Airport Master Plan
- Commenced development of an interpretation strategy for the airport to actively promote the history and heritage values of the airport

## Five year action plan (2013–2018)

Actions	Status
1. Finalise the heritage interpretation strategy	A
2. Commence implementation of the heritage interpretation strategy	A
3. Establish a repository for historical records and items belonging to Sydney Airport	A
4. Record existing elements of heritage value to an appropriate archival standard prior to any intervention or major works that will alter the place. These archival recordings should include oral history, video and photographic recordings and measured drawings	A
5. Develop a plan of management for the fig trees identified in the HMP as having moderate heritage value	A
6. Review and update the HMP	B
7. Implement and have regard to the HMP for the airport	C
8. Actively manage elements of exceptional, high and moderate heritage value	C
9. Consult with relevant stakeholders on proposals that have a potential to impact on items of heritage value	C

### Key performance indicators

- Implementation of Environment Strategy  
2013–2018 action plan items

## 4.10 Waste and resource management

### Key objectives

Manage the waste impacts of the airport through:

- Avoiding unnecessary resource consumption and waste generation
- Minimising waste generated through changing behaviour
- Recovering material and energy from waste including waste reuse, reprocessing and recycling
- Disposing of waste generated as a last resort

### Background

Waste generated at the airport includes a broad range of solid and liquid waste streams from various sources. Solid wastes include food waste, office paper, packaging wastes, quarantine wastes, foreign object debris (FOD), scrap metals, timber, animal wastes and litter from sources including the terminal buildings, office and commercial buildings, airfield and maintenance areas, and landside access areas. Liquid wastes include sewage, waste oils and lubricants, trade wastes (containing various contaminants including solids, metals, hydrocarbons, paints, etc.) and cooking oils/grease.

Sydney Airport manages the majority of waste disposal from T1 and apron, T2 and various other locations on the airport. Qantas is responsible for the management and disposal of waste from T3 and the Qantas Jet Base. Airlines are responsible for waste off aircraft.

### Relevant legislation and standards

#### Australian

- Airports (Environment Protection) Regulations 1997 – Clause 3.08
- National Environment Protection (Movement of Controlled Waste between States and Territories) Measure
- National Environment Protection (Used Packaging Materials) Measure
- National Waste Policy
- Product Stewardship Act 2011
- Clean Energy Act 2011

#### NSW

- Waste Avoidance and Resource Recovery Act 2001
- Protection of the Environment Operations Act 1997
- Protection of the Environment Operations (Waste) Regulation 2005
- NSW Waste Avoidance and Resource Recovery Strategy
- Waste Classification Guidelines (issued by the Office of Environment and Heritage)

### Links to other EAPs

- Climate change and energy management – **Section 4.3**
- Soil and land management – **Section 4.11**
- Spills response and hazardous materials – **Section 4.12**

### Current management practices

In 2007/08, Sydney Airport finalised and commenced implementing the Sydney Airport resource recovery plan (RRP). This plan identified and prioritised the various initiatives that Sydney Airport needs to implement in order to recover and recycle more from the airport's non-quarantine waste stream. While the main focus of the plan was on introducing changes that would reduce the quantity of waste requiring disposal to landfill, it also investigated ways for Sydney Airport to reduce the cost of processing waste that is generated. The RRP contained actions to:

- Improve the airport waste management systems
- Improve the management of construction and demolition waste
- Engage and educate stakeholders across the airport
- Manage waste sustainably through a mix of procurement strategies

Sydney Airport has also had regard to recent increases in the NSW Government's waste and environment levy, which continue to create an added incentive to reduce the quantity of waste requiring disposal.

During 2008, Sydney Airport implemented a successful recycling trial in T2, which involved setting up recycling bins at all gates in the terminal. The trial was undertaken in consultation with the packaging stewardship forum. The success of the trial means that recycling bins have now been placed throughout the T2 food courts and gate lounges and throughout T1.

In 2011, Sydney Airport entered into a new waste services contract that provides for the removal of recyclables post-collection and also composting of organics. This has made a significant reduction in the amount of waste requiring disposal at landfill.

In 2012, Sydney Airport reviewed and updated the RRP, now known as the waste and resource recovery strategy (WRRS). The WRRS builds on the initiatives of the previous plan. The WRRS aims to enhance the management of waste services at the airport in order to improve resource recovery across a broader range of waste streams. The WRRS also identifies potential opportunities to minimise waste management expenses and pursue opportunities through the waste management services provided.

### Achievements under previous environment strategies

- Developed the Sydney Airport waste strategy in 2003
- Finalised and commenced implementation of the RRP in 2007/08
- Provided recycling bins throughout the T2 food courts and gate lounges and throughout the T1 (landside) foodcourt
- Implemented a new waste contract in 2011 which targets 30% recovery of recyclable and organic material from the non-quarantine general waste stream in addition to on-site separation of recyclables
- Implemented a program to collect glass separately from other recyclables
- Installed an office recycling system in Sydney Airport offices that includes paper, cardboard, glass, plastics, aluminium cans, toners, ink cartridges and batteries
- Improved the waste data management system such that all waste generated at the airport is tracked and analysed
- Reviewed and updated the RRP, now known as the WRRS in 2012

## Five year action plan (2013–2018)

Actions	Status
1. Review the capacity of the waste system and ensure planning incorporates expansion of docks, waste collection areas and locations, to accommodate demand	A
2. Include requirements in development consents for resource recovery from construction/demolition activities	A
3. Develop and implement a stakeholder consultation and a waste education strategy	A
4. Audit Sydney Airport's waste stream to identify further opportunities for resource recovery	A
5. Prepare a sustainable procurement policy for the airport that considers procuring goods and materials with recycled and renewable content	B
6. Manage the procurement of waste management services at the airport through a planned strategic approach that allows for broader objectives to be achieved and for system improvements	B
7. Continue to ensure that waste management and resource recovery are considered through development proposals for both the construction and operational phases	C
8. Continue to implement the tenant management strategy and ensure tenants include waste management and resource recovery their EMPs	C

### Key performance indicators

- Increase in the percentage of waste recycled, percentage of waste recovered, and percentage of waste diverted from landfill



## 4.11 Soil and land management

### Key objectives

- Prevent soil pollution occurring from airport activities
- Manage known and suspected contaminated sites in accordance with regulatory requirements

### Background

Most of the airport's land has been extensively modified, including by land-filling and terrain flattening. Due to this and the long history of industrial and aviation uses, including fuel storage and distribution, soil quality varies across the airport and is considered poor quality in a number of locations.

#### Topography/soils

The airport is located within the Botany Basin which is characterised by a generally flat topography, rising only a few metres above sea level. The underlying geology of the airport comprises unconsolidated sediments overlying bedrock. The bedrock has relatively low permeability and therefore acts as a barrier to vertical groundwater flow.

#### Acid sulfate soils

The NSW Environment Protection Agency (EPA) acid sulfate soils risk maps show that there is a risk of acid sulfate soils adjacent to the airport and in the Botany Wetlands. As most of the airport's land has been subject to extensive modification, it is generally classified as disturbed terrain and has not been classified further by EPA.

#### relevant Legislation and Standards

##### Australian

- Airports (Environment Protection) Regulations 1997
- Airports Regulations 1997
- National Environment Protection (Assessment of Site Contamination) Measure

##### NSW

- Contaminated Land Management Act 1997
- Contaminated Land Management Regulation 2008
- Contaminated Sites: Guidelines for Assessing Service Station Sites (December 1994)
- Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008

#### Links to other EAPs

- Water Management – **Section 4.4**
- Spills Response and Hazardous Materials – **Section 4.12**

### Current management practices

#### Contaminated sites strategy

Sydney Airport has implemented the Sydney Airport contaminated sites strategy which involves a comprehensive risk classification and prioritisation system for contaminated sites. This system identifies contaminated sites as being either high, medium or low risk. Those sites identified as high risk have, or are suspected of having, the following characteristics:

- a) Makes the land, in its current use, unsafe or unfit for human habitation or occupation
- b) Is, in its current state, harmful to the health and welfare of human beings
- c) Is likely to be transported via groundwater, stormwater or air to some other site outside the airport, where it may have a deleterious impact
- d) In its current state, is having a damaging impact on the native flora and fauna of the site

The contaminated sites strategy further requires Sydney Airport to prioritise those high risk contaminated sites under its management according to the following ranking:

1. Sites with a potential impact on environmentally significant sites and/or an immediate risk to human health and safety
2. Sites with a potential impact on environmentally sensitive sites and/or short-term risk to human health and safety
3. Sites with a potential impact on other off-site areas and/or long-term risk to human health and safety

Under this classification system, identified high risk sites are targeted as being Sydney Airport's priority sites for further investigation and/or management action.

Sites identified as medium risk meet the following criteria:

- Type 1: Sites that were high risk but are being managed such that they no longer trigger high risk criteria although they currently do not meet the criteria of a low risk site
- Type 2: Sites that have either been identified as having significant contamination or there is evidence to suggest significant contamination although below the threshold for high risk and where generally there are no current management plans for the sites

For type 1 classified medium risk sites, site-specific EMPs are developed. The EMPs provide details of:

- The nature and extent of contamination
- Migration (including off-site) risk
- Need for monitoring and/or remediation
- Responsibilities for monitoring and/or remedial actions

The EMPs are reviewed when new information regarding the site becomes available.

For type 2 classified sites, an EMP is also developed to ensure that:

- The nature and extent of contamination is determined through conducting appropriate assessments
- The identified and likely on-site sources of contamination are addressed such that existing contamination does not increase
- A clear process is implemented to ensure risks to human habitation, health and safety, flora and fauna, airport land and groundwater environment, and potential for migration off-airport land are minimised and managed appropriately.

Groundwater monitoring of known contaminated sites is carried out on a regular basis. Results of this monitoring are provided to the AEO and DIRD.

#### Underground storage tank (UST) strategy

Sydney Airport has developed a bulk fuel management strategy, which incorporates the following principles:

- Where possible, new bulk fuel storage tanks and associated fuel lines are located aboveground and are double lined (vaulted)
- When safety, security and/or space considerations require new tanks and affiliated fuel lines to be placed underground, Sydney Airport requires that the tanks and affiliated fuel lines are double lined, corrosion resistant and include appropriate leak detection monitoring systems
- Integrity testing of tanks or ground water monitoring around tanks must be carried out

Application of the UST strategy extends to both Sydney Airport operations and airport tenants.

#### Tenant management

Tenants with sites known to be contaminated are required to undertake monitoring of the contamination and provide appropriate documentation to Sydney Airport and the AEO, including remedial action plans, where required.

Through Sydney Airport's tenant management strategy, Tier 1 and 2 tenants are required to develop and implement EMPs. The EMPs address pollution prevention measures such as procedures for hazardous materials storage, spill response and environmental training for staff. Auditing against the EMP is required on an annual basis.

Sydney Airport leases require tenants, whose operations have the potential to cause contamination, to provide baseline audits/assessments (prior to lease commencement) and exit audits/assessments (prior to lease cessation). Sydney Airport also requests tenants

that have USTs to provide results of integrity tests and/or groundwater monitoring results.

#### Acid sulfate soils

The potential impacts of acid sulfate soils are managed through the development approvals process. Where a development may impact on these soils, conditions are imposed on development approvals to ensure that these impacts are minimised.

In addition to the measures outlined above, the following measures are implemented to prevent or minimise impacts to airport soil/land:

- Contractors are required to provide construction environmental management plans (CEMPs) for construction projects where there is a risk of contamination or spills
- Sydney Airport has spill response capabilities that minimise the likelihood of contamination arising from airport operations

#### Achievements under the previous environment strategies

- Implemented remedial action plans between 1999 and 2012 for a number of contaminated sites including northern lands and the DOM3A JOSF plume
- Completed a comprehensive soil and groundwater contamination study in 2001
- Prepared and implemented the Sydney Airport contaminated sites strategy, including risk assessment of all identified sites, and development of remedial action plans for high risk sites, during 2002. The Sydney Airport contaminated sites strategy was updated in 2012
- Completed phase 1 of the Sydney Airport contaminated sites strategy, which involved a comprehensive four year program to investigate, assess and remediate, where required, all identified contaminated sites on the airport
- Continued to implement the contaminated sites strategy, and reduced the number of contaminated sites on airport through management and remediation
- Completed phase 2 of the Sydney Airport contaminated sites strategy, which included the development of a program for the ongoing monitoring and management of the airport's 11 known contaminated sites
- Continued remediation of the former joint oil storage facility site which involved extraction of hydrocarbon contaminants from groundwater at the site. The remediation infrastructure remains in place to enable remediation to recommence if necessary. Groundwater monitoring is being conducted in the area to monitor hydrocarbon levels

- Improved spill response capabilities through staff training, review and updates to the spill response procedures and through provision of additional equipment including a second dedicated spill response truck
- Implemented the tenant management strategy including the environmental auditing program to assist tenants in taking action to prevent soil pollution occurring from their activities

## Five year action plan (2013–2018)

Actions	Status
1. Broaden the former joint oil storage facility remediation program to incorporate the second contamination hot spot in the vicinity of the existing taxi parking area	A
2. Investigate the appropriateness of implementing measures consistent with the NSW Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008	A
3. Develop an environment protection plan for all USTs operated by Sydney Airport	A
4. Install groundwater monitoring wells to higher risk USTs operated by Sydney Airport	A
5. Continue implementation of the Sydney Airport contaminated sites strategy, including regular groundwater monitoring, to address high and medium risk classified sites	C
6. Maintain contaminated sites register including a detailed map illustrating known contamination	C
7. Continue to ensure the potential for acid sulphate soils is addressed as part of new developments and excavations	C
8. Continue to ensure soil quality and land related matters such as erosion are considered through development proposal, both during the construction and operational phases	C
9. Continue to implement the tenant management strategy and ensure tenants include hazardous materials storage, spill response and pollution prevention in their EMPs	C
10. Continue to ensure that all fill material is reused where appropriate or disposed of in line with applicable waste classifications under the NSW Protection of the Environment Operations Act 1997	C
11. Continue to ensure that tenants meet legislative and lease obligations relating to entry and exit site audits/assessments	C

### Key performance indicators

- Reduction (through management/remediation) of the number of contaminated sites

## 4.12 Spills response and hazardous materials

### Key objectives

- Implement best-practice environmental controls for the prevention and management of spills and release of hazardous materials
- Ensure that the storage and handling of hazardous materials and dangerous goods is managed in accordance with regulatory requirements
- Replace and/or reduce the use of hazardous materials where practicable

### Background

The operation of the airport involves the storage and regular use of a range of hazardous materials and chemicals. Sydney Airport and its airport tenants and operators each use varying types and quantities of hazardous materials and chemicals.

The major hazardous material used at the airport is aviation fuel. Aviation fuel is supplied to the airport by two underground pipelines owned by Shell and Caltex from their respective refineries. BP and Exxon/Mobil supply fuel from their bulk storage terminal using the Caltex pipeline.

Aviation fuel supplied from these underground pipelines is stored at the joint user hydrant installation (JUHI) located at the northern end of the T1 precinct (refer to **Figure 1.3**). A number of the general aviation (GA) and helicopter operators also have small refuelling storage facilities and equipment located in close proximity to their main facilities, either operated by the oil companies or by the operators themselves.

Aviation fuel is distributed across the airport from the JUHI storage facility via a number of underground pipelines to apron hydrant outlets located adjacent to aircraft gates. Into-plane dispensing is undertaken directly by the fuel companies or by other entities established by the oil companies. Specialist hydrant refuelling vehicles are used for this task and their administrative and maintenance support is accommodated as part of the JUHI facility. Bulk tanker vehicles are used for the fuelling of regional and GA aircraft and helicopters where hydrant access is not available.

Other activities involving the use of hazardous materials include maintenance facilities operated by airport tenants, fire training (which requires the storage and use of fire-fighting foam), construction and related activities and the use of liquid hydrocarbons (other than aviation fuel), solvents, paints, pesticides and herbicides.

Each of these hazardous materials and chemicals, if not used properly, can have an impact on the environment and, in some cases, their improper use could potentially cause significant harm to the environment.

### Relevant legislation and standards

#### Australian

- Airports (Environment Protection) Regulations 1997
- National Environment Protection (Movement of Controlled Waste between States and Territories) Measure
- Hazardous Waste (Regulation of Exports and Imports) Act 1989
- Australian Dangerous Goods Code (7th Edition)
- Australian Explosives Code (2nd Edition)
- AS 1940-2004: The Storage and Handling of Flammable and Combustible Liquids (Amended in 2004 and 2006)

#### NSW

- Work Health and Safety Act 2011
- Gas Supply Act 1996
- Environmentally Hazardous Chemicals Act 1985

### Links to other EAPs

- Water management – **Section 4.4**
- Air quality – **Section 4.5**
- Waste and resource management – **Section 4.10**
- Soil and land management – **Section 4.11**

### Current management practices

Effectively managing hazardous materials – and in particular ensuring an effective response to any spills of hazardous materials – is a critical component of this strategy. It ensures pollution prevention and ensures that Sydney Airport's occupational health and safety obligations are met.

Sydney Airport maintains a hazardous materials storage database. This database includes a register of all known storage facilities, including above ground storage tanks (ASTs) and underground storage tanks (USTs) for both Sydney Airport and tenants. USTs are considered to be the greatest risk to soil and groundwater at Sydney Airport. To manage the risk, Sydney Airport ensures regular integrity testing of its own tanks is carried out. Tenants are requested to include UST monitoring in their EMPs and report these results to Sydney Airport.

Records are kept of all spills and other environmental incidents reported on airport land.

The following measures are also employed by Sydney Airport to ensure minimal environmental impact should a spill or an incident occur:

- Spill response – Sydney Airport has two designated spill response trucks, which operate 24 hours a day to ensure all minor spills are addressed as soon as possible. Spill kits are also available at aircraft parking bays and other identified potential risk areas

- Sydney Airport has developed and implements spill response procedures and have also developed guidance material for tenants to ensure the correct handling and reporting of spills
- Emergency response – incidents involving hazardous materials are incorporated into the airport emergency plan to ensure procedures are in place to deal with such incidents

### **Achievements under previous environment strategies**

- Implemented a bulk fuel management strategy to improve management, removal and installation of bulk fuel tanks in 2002
- Updated the spill response procedures on a regular basis
- Implemented the tenant management strategy including the environmental audit program for tier 1 and 2 tenants, whose activities pose a higher environmental risk than other airport tenants
- Completed a comprehensive environmental audit of Sydney Airport operations in each strategy period. The results were positive, with no major non-compliance issues identified
- Conducted environmental emergency/spill response training for all relevant operational staff and contractors
- Developed a database for hazardous materials storage on airport
- Implemented the contaminated sites strategy, including an annual groundwater monitoring program
- Reviewed tenant and contractor EMPs to ensure appropriate provision for spill response, hazardous materials storage and handling, and staff training
- Conducted regular integrity tests for Sydney Airport tanks and obtained integrity test results from tenants
- Increased spill response capabilities by purchasing a second dedicated spill response truck in 2012

## Five year action plan (2013–2018)

Actions	Status
1. Develop a hazardous materials fact sheet for airport tenants	A
2. Work with Sydney Airport operations to update and maintain the airport hazardous materials storage database	A
3. Develop a hazardous materials storage map, based on the database	A
4. Review inspection and maintenance program for spill kits	A
5. Ensure all applicable airport staff (and tenants) are trained in environmental emergencies/spill response	C
6. Continue to assess high risk spill areas and ensure such areas have appropriate spill kits and response	C
7. Participate in reviews of Sydney Airport's airport emergency plan to ensure incorporation of appropriate environmental considerations (eg. provision of stormwater drainage plans, environmental contacts)	C
8. Continue to review contractor and tenant EMPs to ensure storage of hazardous materials and spill response are addressed adequately	C
9. Continue monitoring of Sydney Airport's USTs either through tank integrity tests or groundwater monitoring	C
10. Liaise with fuel suppliers to ensure appropriate measures are in place to minimise environmental impacts of activities	C

### Key performance indicators

- Reduction in hazardous materials use and hazardous waste generation
- Reduction in the number and volume of spills and leaks of hazardous materials