

Infrastructure Australia

Project Business Case Evaluation

Project name	Western Sydney Airport
Rating	High Priority Project
Date of IA Board rating	21 October 2016

Location	Western Sydney, New South Wales
Proponent	Department of Infrastructure and Regional Development
Project timeframe	<p>The Reference Design and costings are estimated based on a model that delivers the Airport over a number of stages to 2064, with the three most critical stages being:</p> <ul style="list-style-type: none"> • Stage 1 (complete 2026): A single 3,700m runway with a parallel taxiway, associated aviation terminal infrastructure and support precincts • Second runway (complete 2052): A second parallel runway • Long term capacity (complete 2064): Additional aviation infrastructure and support precincts to add further capacity to meet long-term forecast demand.

Evaluation Summary

Sydney is Australia's primary aviation gateway, accounting for around 40% of international services, 43% of domestic services, and 45% of international air freight.¹ Demand for airport services in the Sydney basin is forecast to grow beyond the capacity of Sydney's Kingsford Smith Airport. Airports are critical economic assets, and constraints on Sydney's airport capacity would increase the cost of accessing Sydney, with a significant negative impact on Australia's economy, and national productivity. Addressing these constraints would improve productivity and facilitate broader economic impacts such as increased trade, tourism and foreign direct investment, and wider economic benefits such as agglomeration benefits derived from improved connectivity between businesses (including the clustering of airport businesses).

The need for and location of a second Sydney airport have been investigated since the 1940s, with a number of studies commissioned by successive Australian and New South Wales Governments. Most recently, the 2012 *Joint Study on aviation capacity in the Sydney Region* found that Kingsford Smith Airport would be unable to meet demand for new services by 2033, and a second airport in the Sydney basin would be required. The Joint Study stated that "the option of doing nothing is no longer available and the costs of deferring action are unacceptable".² The Joint Study identified Badgerys Creek as the preferred site option.

Updated demand modelling undertaken as part of the Western Sydney Airport business case estimated that maximum aircraft movements at Kingsford Smith Airport would be reached by 2037 in a single airport system.

¹ Department of Infrastructure and Regional Development (2016), *Final Business Case for Western Sydney Airport*, p 3; based on Bureau of Infrastructure, Transport and Regional Economics, <http://bitre.gov.au/statistics/aviation/domestic.aspx#summary>

² Australian Government and NSW Government (2012), *Joint Study on aviation capacity in the Sydney Region*, p 5.

The Australian Infrastructure Audit (2015) also identified the need for additional airport capacity in the Sydney basin, and the February 2016 Infrastructure Priority List included development of a western Sydney airport as an Initiative.

The proof of concept design developed for Western Sydney Airport (referred to in the business case as the Reference Design) includes initial construction of a 3,700m runway with a parallel taxiway, and associated aviation terminal infrastructure and support precincts. The Reference Design assumes a number of additional stages of development to ensure the Airport can meet longer-term passenger demand in the Sydney basin. The final design of Stage 1 and the nature and timing of subsequent developments would be at the discretion of the airport operator subject to contractual and regulatory requirements.

The proponent has undertaken an economic appraisal for all stages of the airport development to 2075, with a stated benefit-cost ratio (BCR) of 1.9 (7% discount rate and P50 costs). The onsite infrastructure works to deliver Stage 1 of the Reference Design are expected to cost around \$5 billion (P50 costs, nominal). Further works required to expand the airport in the longer term are expected to cost more than \$38 billion in comparable terms.

Infrastructure Australia's evaluation shows a strong strategic case for the project. However, Infrastructure Australia has identified a number of limitations in the economic analysis underpinning the business case, including risks around demand forecasting, and risks in implementation of the economic appraisal methodology. To understand the impact of these risks, sensitivity testing was undertaken on a number of key assumptions and parameters in the business case, and on reductions in demand. This analysis indicated that the BCR could be expected to remain above 1 even when all key risks identified were realised concurrently. As such, Infrastructure Australia is confident that the benefits of the project would exceed its costs, and that it would provide net benefit to the Australian economy.

1. Strategic Context

Airports are critical economic assets. They are drivers of economic growth, facilitating the movement of people and goods, and shaping patterns of economic activity in surrounding areas. The need for and location of a second Sydney airport have been investigated since as early as 1946, with a number of studies commissioned by successive Australian and New South Wales Governments. Most recently, this has included:

- *Joint Study on aviation capacity in the Sydney Region (2012)*: This joint Australian Government / NSW Government study found that Kingsford Smith Airport would be unable to meet demand for new services by 2033 and recommended Badgerys Creek as the preferred site for a second Sydney Airport.
- *A Study of Wilton and RAAF Base Richmond for Civil Aviation Operations (2013)*: This study confirmed technical limitations with both Wilton and Richmond, and noted industry's clear preference for development of the site at Badgerys Creek.

As part of the privatisation of Kingsford Smith Airport in 2002, Southern Cross Airports Corporation Pty Ltd (a related company of the Kingsford Smith operator) acquired a right of first refusal to develop and operate any second major airport within 100km of Sydney's General Post Office.

In April 2014, the Australian Government confirmed that the Badgerys Creek site would be the location of Western Sydney Airport, and in April 2014 it announced a 10-year program of road upgrades in the western Sydney region, which would assist in providing access to the Western Sydney Airport site. A joint scoping study on Western Sydney rail needs, commissioned by the Australian and NSW Governments in November 2015, is separately considering rail service options for the proposed airport and Western Sydney region.

The Western Sydney Airport business case is based on a proof-of-concept airport design to meet demand forecasts for the Sydney basin to 2075. The business case proposes 24-hour operations. This is consistent with the Australian Infrastructure Plan, which recommends that "caps, curfews and other restrictions on how our infrastructure is operated and used should be avoided where possible", and "new assets – including ... airports – should be planned to ensure curfews and other restrictions are avoided".

The business case does not include the road upgrades in the western Sydney region, nor possible future rail services to the airport site, as these are being progressed through separate business cases.

The Environmental Impact Statement (EIS) and revised draft Airport Plan for Western Sydney Airport were finalised in September 2016. These took account of comments received during the public exhibition period held from October to December 2015.

Infrastructure Australia's February 2016 Infrastructure Priority List included development of a western Sydney airport as an Initiative, and included further initiatives for the preservation of corridors for future rail and fuel pipeline connections to the site.

2. Problem Description

Sydney is Australia's primary aviation gateway, accounting for around 40% of international services, 43% of domestic services, and 45% of international air freight.³ Demand is forecast to grow significantly, to the extent that capacity at Kingsford Smith Airport alone would not be able to service this growth. Capacity constraints at Kingsford Smith Airport would have a significant impact on Australia's economy and national productivity.

In 2013, Kingsford Smith Airport served around 36 million passengers. The Joint Study (2012) forecast that annual unconstrained demand would more than double to around 76 million passengers per year by 2030, and increase to around 165 million by 2060 as a result of population growth, economic growth and growing international tourism.

The Kingsford Smith Airport site is highly constrained, with limited opportunities for expanding terminal capacity, and no practical option for additional runway capacity. The Joint Study found that "under current constraints, Sydney (Kingsford-Smith) Airport will become unable to meet demand for new services... By around 2035, there will be practically no scope for further growth of [Regular Public Transport] services at the airport."⁴ As such, a proportion of demand for aviation services unable to be met by Kingsford Smith Airport would be suppressed. The analysis concluded that, if no additional capacity were made available over and above that planned for Kingsford Smith Airport, unmet demand would rise to approximately 54 million passengers per year, and more than 760,000 tonnes of air freight per year, by 2060.

Constraints in aviation capacity can have significant negative impacts on the broader community and economy. These include reduced productivity, increased costs of business, adverse international trade impacts and adverse regional impacts. The Joint Study (2012) found that "the option of doing nothing is no longer available and the costs of deferring action are unacceptable."⁵ The study estimated these costs as follows:

- Forgone Gross Domestic Product (GDP) of \$59.5 billion to 2060, including \$17.5 billion of NSW GSP.
- 17,300 fewer jobs created each year in Australia on average to 2060, of which 12,700 would be in NSW.

Demand forecasts from the Joint Study were updated and adjusted as part of the Western Sydney Airport business case. The business case estimates that the Joint Study would likely have forecast 61 million passengers per year in 2030, rising to 102 million in 2050. This is broadly consistent with the updated demand forecasts in the business case, which estimate capacity at Kingsford Smith Airport would be reached by 2037 (i.e. 4 years later than estimated in the Joint Study).

3. Project Overview

The Reference Design is a proof-of-concept airport design for Western Sydney Airport to meet forecast longer-term passenger demand in the Sydney basin. The Reference Design and costings are estimated based on a model that delivers the Airport over a number of stages to 2064, with the three most critical stages being:

- Stage 1: Single runway airport with capacity for 10 million passengers per year. This would involve works to develop and construct the airport, including site clearing and bulk earthworks to support the Stage 1 development, the construction of a 3,700m runway with a parallel taxiway, and associated aviation terminal infrastructure and support precincts. Construction is planned for the period 2018 to 2025, with operations to commence in 2026. The airport has been designed to accommodate the largest aircraft in operation today (e.g. the A380). An Airport Business Park is expected to be developed in stages as the Airport grows.
- Second runway – As demand increases from Stage 1, new taxiways, aprons, terminals and support facilities would add capacity. The first runway is estimated to reach capacity around 2052 (around 37 million passengers per year). A second parallel 3,700m runway is expected to be required at this point.

³ Department of Infrastructure and Regional Development (2016), *Final Business Case: Western Sydney Airport*, p 3; based on Bureau of Infrastructure, Transport and Regional Economics, <http://bitre.gov.au/statistics/aviation/domestic.aspx#summary>

⁴ Australian Government and NSW Government (2012), *Joint Study on aviation capacity in the Sydney Region*, p 2.

⁵ Australian Government and NSW Government (2012), *Joint Study on aviation capacity in the Sydney Region*, p 5.

- Longer-term demand – Additional aviation infrastructure and support precincts would be developed over the period to around 2064 to add further capacity to meet long-term forecast demand.

The Airport Plan provides a level of commercial flexibility in how the operator chooses to meet the requirements for Western Sydney Airport. The final design and precise nature of subsequent developments would be at the discretion of the airport operator consistent with the demand for airport services and subject to contractual and regulatory requirements.

The business case expects that all off-site supporting infrastructure, including road and public transport infrastructure to link Western Sydney Airport with Sydney's ground transport system, would be provided by the NSW Government in consultation with the Australian Government.

4. Options Identification and Assessment

The Joint Study (2012) considered options to optimise the use of existing airports for growing civil aviation operations. This included consideration of Bankstown and Camden Airports, RAAF Base Richmond, Canberra Airport, Newcastle Airport (at RAAF Base Williamtown) and Illawarra Regional Airport. The Joint Study found that, while Bankstown Airport could support a limited number of smaller (turboprop) aircraft and RAAF Base Richmond could be used for interim operations, a new airport would be needed by the mid-2030s to meet aviation demand.

The Joint Study identified Badgerys Creek as the best location for this airport, given its proximity to growing markets in the western part of Sydney and Sydney's transport network, and the availability of the site as a result of acquisition and reservation of land for the airport in the 1980s. Wilton was identified as the 'next best' option, but with considerably more challenges. The 2013 Wilton-Richmond technical study considered Wilton's suitability as a second airport and explored the use of RAAF Base Richmond for limited civil operations. This study also considered in more detail the Australian Government-owned site at Badgerys Creek to provide an objective basis for assessing and comparing the benefits of a site at Wilton. Key findings of the study included:⁶

- RAAF Base Richmond could only provide ancillary capacity for Sydney.
- An airport at Wilton appeared feasible. However, the environmental impact of a facility of the size needed to accommodate long-term demand, and the extent of earthworks needed to prepare the site raised questions about the degree of risk, and therefore cost, involved.
- The aviation industry had a clear preference for the development of the Badgerys Creek site, given its relative proximity to the market.

In April 2014, the Australian Government announced that Badgerys Creek would be the site for Sydney's second airport.

5. Economic Evaluation

The proponent undertook a full cost-benefit analysis incorporating all stages of the preferred option (i.e. including a second runway), with the long term development anticipated to be complete by around 2064. Stage 1 of the Reference Design is expected to cost around \$5 billion (P50 costs, nominal). Further works required to expand the airport are expected to cost more than \$38 billion in comparable terms. The appraisal period extends to 2075, consistent with forecasts of passenger demand in the Sydney basin. Future costs and benefits are discounted to their present value using a 7% real discount rate. The proponent's business case states that the proposed project has a BCR of 1.9 (7% discount rate and P50 costs).

Infrastructure Australia has identified a number of potential limitations in the analysis which could present risks to achieving the estimated economic benefits. These include inconsistencies in the economic appraisal methodology, and in the application of standard economic appraisal assumptions and parameters. Key issues include:

- **Long-term passenger demand forecasts** – The demand modelling for domestic and international passengers is based on projections for Gross State Product and Gross Domestic Product respectively. However, standard testing for models of this type estimates that Gross State Product can only be expected to accurately forecast domestic passenger demand around 80% of the time. Infrastructure Australia is aware that

⁶ Australian Government (2013), *A Study of Wilton and RAAF Base Richmond for Civil Aviation Operations*, pp 99-100.

the demand forecasts in the business case are broadly consistent with alternative industry forecasts. This gives some confidence that the demand forecasts in the business case are a reasonable basis on which to estimate future demand. However, the methodology underpinning these alternative forecasts has not been assessed by Infrastructure Australia.

- **Exclusion of the change in air fares from the economic appraisal methodology** – Passenger benefits account for 75% of total benefits in the project case. These are estimated based on travel time and vehicle operating cost savings, rather than the expected reduction in air fares as a result of airport capacity constraints being addressed. The vast majority of these benefits accrue to new passengers. Conventional economic appraisal would estimate these new passenger benefits as half of the reduction in costs to existing passengers at Kingsford Smith Airport, taking account of the change in air fares. The business case estimates these benefits based on half the costs of travelling to the next available airport, Canberra Airport. However, the change in fares could be estimated directly based on the Bureau of Infrastructure, Transport and Regional Economics estimates on the responsiveness of passenger demand to changes in fares.

A number of other issues relate to the treatment of assumptions and estimation methods. The most notable are:

- Inconsistent treatment of real escalation in costs and benefits: real escalation has been applied to capital costs for 10 years, and to travel time savings for 50 years.
- Fuel taxes (i.e. a financial transfer) have been included in vehicle operating cost estimates. These should be excluded from an economic appraisal.
- Urban congestion cost estimates for Sydney have been applied to the Sydney-Canberra motorway, where congestion costs would be expected to be lower, and some congestion cost savings related to airport trips have been duplicated.

To understand the impact of these issues and others, sensitivity testing was undertaken. This analysis indicated that adjustments to address the issues identified, when taken together, would have a material impact on the project BCR, but that the BCR would remain above 1. As such, Infrastructure Australia is confident that the benefits of the project would exceed its costs, and that it would provide net benefit to the Australian economy.

Broader economic impacts such as increased trade, tourism and foreign direct investment, and wider economic benefits such as agglomeration benefits derived from improved connectivity between businesses (including the clustering of airport businesses) were identified in the business case but not quantified in the CBA.

Major cost items

The major capital cost element is Airport Works (around 97% of the total), including all site preparation and airport infrastructure works required to develop Stage 1 and support the ongoing expansion and commercial interests of the Airport.

The total capital cost estimate of around \$5 billion (P50 costs, nominal) has been peer reviewed, and Infrastructure Australia understands that all recommendations from that review were subsequently incorporated into the cost estimates.

The development of off-site supporting infrastructure, including road and public transport infrastructure to connect the airport to Sydney’s transport network, is expected to be provided by the NSW Government in consultation with the Australian Government.

Total capital cost (nominal, undiscounted)	The Reference Design for Stage 1 is expected to cost around \$5 billion (P50 costs, nominal). Further works required to expand the airport are expected to cost more than \$38 billion in comparable terms.
Proponent’s proposed Australian Government funding contribution	This will be a matter for the Australian Government.
Other funding (source / amount / cash flow) (nominal, undiscounted)	This will be a matter for the airport operator, subject to terms specified by the Australian Government.

Major sources of benefit

The major sources of benefit identified by the proponent include:

- **Consumer surplus benefits** (i.e. willingness to pay for air travel, less costs of air fares and airport access) for new passengers in the Sydney basin, who would otherwise be displaced as capacity constraints emerge at Kingsford Smith Airport, and existing users (including residual values) (PV \$9.3 billion, 82% of total benefits).
- **Producer surplus benefits** (i.e. incremental profit) to airport operators from the net increase in passengers accommodated in the Sydney basin as a result of Western Sydney Airport, and avoided/deferred investment in additional capacity at Kingsford Smith Airport (PV \$2.5 billion, 22% of total benefits).
- **Reduced externality impacts of road use** (e.g. air pollution, noise and congestion), as a result of shorter trips to Western Sydney Airport and avoided trips to Canberra for 50 per cent of displaced trips (PV \$980 million, 9% of total benefits). This benefit is offset by noise and externality impacts of additional airport operations and the net increase in aircraft in the Sydney basin as a result of Western Sydney Airport (PV \$1.4 billion, -12% of total benefits).

6. Deliverability

Consistent with Southern Cross Airports Corporation Pty Ltd's right of first refusal, delivery options include Southern Cross Airports Corporation, or in the event it declines, another private sector airport operator, or the Australian Government. The final design of the airport or its surrounding infrastructure would be determined at the time of procuring design and construction.

In the final financial analysis, the estimated cost differences between government and any privately delivered options, including Southern Cross Airports Corporation, would be expected to reflect the final proposed contractual and risk allocation positions, and the potential residual cost exposures that remain for the Australian Government under each option. These cost items have the potential to be material, and are therefore likely to be important evaluation considerations.

The business case also considered packaging options, the airport works procurement model, the commercial model and funding and financing options. It identified three broad packages: Australian Government preparation activities, airport construction works, and operating phase activities. An airport lease model was the preferred commercial model, reflecting the difficulty associated with structuring a suitable availability model. Shortlisted financing options considered included equity investment and a concessional loan.

Infrastructure Australia recommends the operator undertake a post-completion review after each stage of the project has commenced operation. In particular, each of these reviews should update the stated BCR for the entire project in the light of the stages already completed, potential changes to the Reference Design, and any revisions to the timing of remaining stages.