Australian Government

Department of Infrastructure and Transport

Modelling of alternative airport sites

BOOZ & COMPANY

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FINAL REPORT

Modelling of Alternative Airport Sites

Canberra

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Important Note

Booz & Company has devoted its best professional efforts to this assignment and our findings represent our best judgment based on the information available.

In preparing our traffic forecasts for the Sydney region, we have relied upon the information provided by all entities. While we have checked our sources of information, data and assumptions, we will not assume responsibility for the accuracy of such data, information and assumptions received from any entity.

Any airport traffic forecast is subject to uncertainties. Inevitably, some assumptions used to develop the forecasts will not be realised and unanticipated events and circumstances may occur. Therefore Booz & Company cannot provide any form of assurance that the forecasts documented in this report will be achieved. The actual traffic outcome will vary from that forecast and the variations may be material.

Specifically, the following factors could result in an actual outcome outside the forecast range:

- Lower than assumed economic growth rates in Australia and/or those countries expected to provide a significant source of inbound international air passengers
- Shifts in Government policy which directly, or indirectly, impact on Sydney region aviation activity
- Adverse impacts for Sydney region aviation activity associated with aviation industry developments
- A significant shift in the distribution of aviation traffic between Sydney region airports and competing international and domestic airports
- Significant changes in airline costs (e.g. a fuel price shock or carbon tax) which are passed on by way of significantly higher air fares
- External factors, including, but not limited to, natural disasters, political unrest, acts of terrorism and associated security concerns and labour disputes

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Glossary of Terms

Expression	Definition
Air Services Australia data	Provides aircraft movements at specified airports
CBD	Central Business District
CCD	Census Collection District; typically multiple CCD's fit into an SLA
Connecting Passenger	Passenger movements that stopover at an intermediary airport en route to their intended destination
FSC	Full Service Carrier (e.g. Qantas)
Generalised (Journey) Cost	Generalised cost is the end-to-end cost of a journey. It includes the fare paid, together with the estimated monetary value of the time spent completing the journey including airport access and egress
Greenfields Sites	A site that is currently undeveloped and is usually being considered for urban development.
Hub Airport	An airport that offers multiple onward flight connections and is often a larger/capital city airport
LCC	Low Cost Carrier (e.g. Tiger Airways)
LGA	Local Government Area
MIDT	Market Information Data Tapes provides passenger ticketing data captured by the Global Distribution Systems (GDS), i.e. indirect passenger bookings
O-D Direct Passengers	Passengers that travel directly to their intended destination and do not stop on route (Direct Services)
O-D Market	Origin and Destination market is the country or city pairs where a passenger starts and ends their journey; any intermediary stops are not considered
Passenger movements	The arrival or departure of a passenger at an airport
Primary Airport	In this study the primary airport is Sydney (Kingsford-Smith) Airport
RPT Airport	Regular Public Transport Airport
SLA	Statistical Local Area; typically multiple SLAs fit into an LGA
SRS	SRS Analyser is an online tool allowing access to IATA's Schedule Reference Service (SRS). SRS is a neutral source of schedule data that collects, validates, consolidates and distributes airline flight schedules and related data for over 900 airlines worldwide
Sydney GMA	Sydney Greater Metropolitan Area as defined by the 38 Local Government Areas which constitute Sydney

Expression	Definition
The Joint Study	Refers to the “Joint Study on Aviation Capacity for the Sydney Region”, commissioned by the Australian and NSW Governments

Executive Summary

This report investigates potential solutions to accommodate long-term air passenger demand in the Sydney Region and follows on from the Joint Study on Aviation Capacity for the Sydney Region ("The Joint Study") commissioned by the Australian and NSW Governments.

The Joint Study concluded that by around 2035 there will be no scope for further Regular Passenger Transport (RPT) aircraft movement growth at Sydney (Kingsford-Smith) Airport due to:

- The physical constraints affecting the airport (i.e. runway length, constraints on taxiway, gate and apron development);
- The commercial mix of services and the operational issues which limit the scope for continued upgauging of aircraft; and
- The legislated movement cap.

Therefore, in accordance with the findings of the Joint Study, it is anticipated that from around 2030, additional major airport capacity will be needed to supplement Sydney (Kingsford-Smith) Airport (i.e. Sydney KSA). Accordingly, the capacity of Wilton to support long-term passenger demand in conjunction with Sydney (Kingsford-Smith) was investigated. The potential passenger demand at Badgerys Creek was also considered to provide an objective scale against which to interpret the Wilton findings. It is noted the Australian Government has ruled out Badgerys Creek for an airport site. The possibility of upgrading existing infrastructure at RAAF Base Richmond to support future Sydney Region air traffic demand as an interim step was also considered.

The analysis comprised two key work steps.

Firstly, an assessment of the identified sites was conducted through a qualitative framework which focused on factors such as location, population catchment, accessibility and scalability. The assessment revealed the relative advantages of Badgerys Creek which, in comparison to Wilton and RAAF Base Richmond, has a larger and denser resident catchment area, is in closer proximity to the Sydney CBD, has a higher potential for expansion and offers greater accessibility.

Secondly, a quantitative demand assessment of the sites was conducted to establish their potential as an additional RPT facility in the Sydney Region. Four scenarios were developed based on varying facility capacities and service offerings (see Table 1). It is important to note that it was assumed that each of the three sites could be developed to accommodate the stated capacity limits. It is acknowledged that the larger capacity options are unlikely to be practical in the case of the RAAF Base Richmond site.

Table 1: Patronage Modelling Scenarios for an Additional RPT Facility in the Sydney Region

Scenario	Capacity	Markets
1	2M Passengers	▪ Short haul domestic routes (up to 2.5 hours)
2	5M Passengers	▪ Short haul domestic routes (up to 2.5 hours) ▪ Medium haul domestic routes (2.5 to 4 hours) ▪ Short haul international routes (up to 5 hours)
3	20M Passengers	▪ All domestic routes ▪ Regional (unmet KSA demand) ▪ Short haul international routes (up to 5 hours) ▪ Medium haul international routes (5 to 9 hours)
4	Unlimited Capacity Scenario	▪ All domestic routes ▪ Regional (unmet KSA demand) ▪ All international routes

Source: Booz & Company.

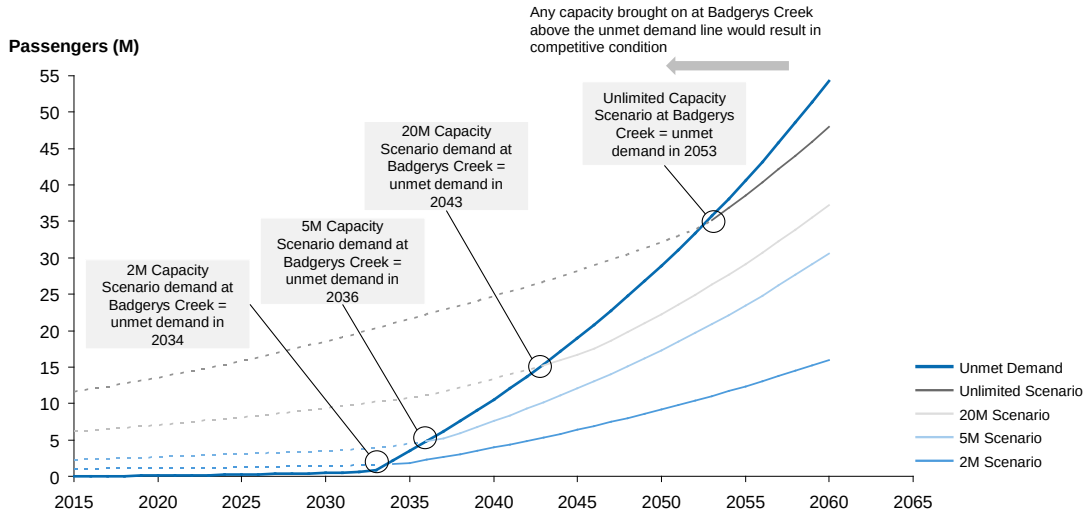
As identified in the Joint Study, the level of unmet demand at Sydney (Kingsford-Smith) Airport is forecast to increase significantly after 2035. The level of competition between Sydney (Kingsford-Smith) Airport and an additional RPT facility in the Sydney Region is dependent on the timing of the introduction of additional capacity and the role that the new airport assumes. Based on advice from the Department of Infrastructure and Transport, potential start-up dates for RPT operations are as follows:

- Richmond is available for RPT operations from 2017;
- Badgerys Creek accepts RPT services from 2025; and
- Wilton is commissioned for RPT operations from 2030.

To illustrate the full inter-relationship between air passenger demand and the supply of airport capacity over the long-term, the estimated demand for new airport capacity is shown from 2015 throughout this report on a fully ramped up basis.

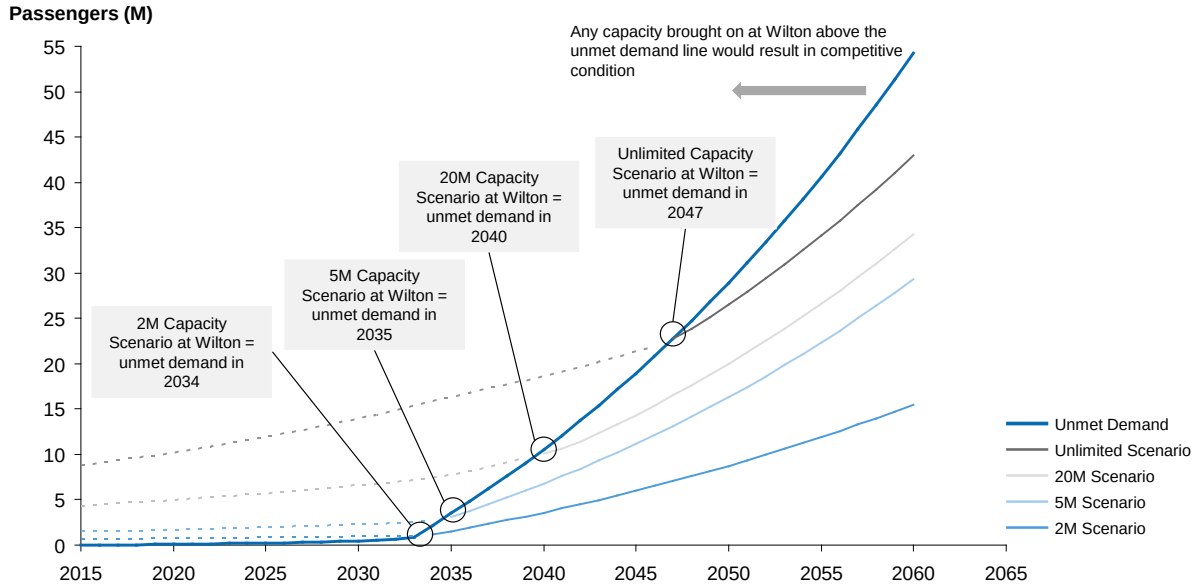
As shown in Figure 1, it is forecast that an airport at Badgerys Creek, operating in full competition to Sydney (Kingsford-Smith) Airport, could be handling an estimated 21.7 million diverted passengers from Sydney (Kingsford-Smith) Airport by 2035. This compares to approximately 16.4 million passengers that could be diverted from Sydney (Kingsford-Smith) Airport to Wilton in the same year (see Figure 2).

Figure 1: Badgerys Creek Multiple Scenarios (2015 to 2060)



Note: The demand curve for each scenario does not include "generated demand".
Source: Booz & Company analysis (2011; 2012).

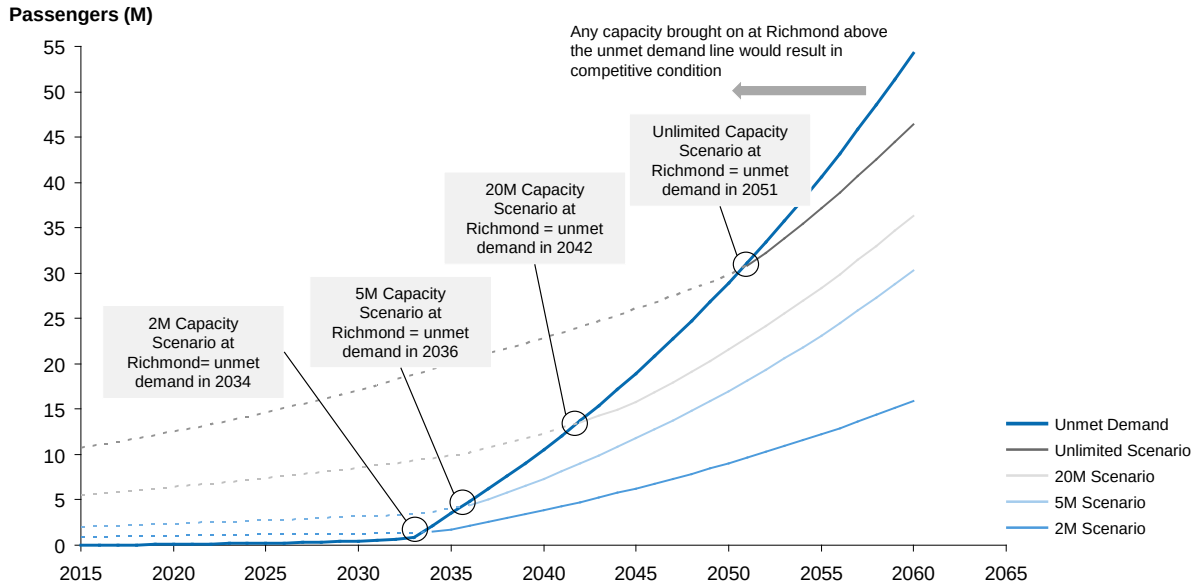
Figure 2: Wilton Multiple Scenarios (2015 to 2060)



Note: The demand curve for each scenario does not include "generated demand".
Source: Booz & Company analysis (2011; 2012).

RAAF Base Richmond could be serving approximately 20 million passengers diverted from Sydney (Kingsford-Smith) Airport by the year 2035 on an unconstrained basis, as shown in Figure 3.

Figure 3: Richmond Multiple Scenarios (2015 to 2060)

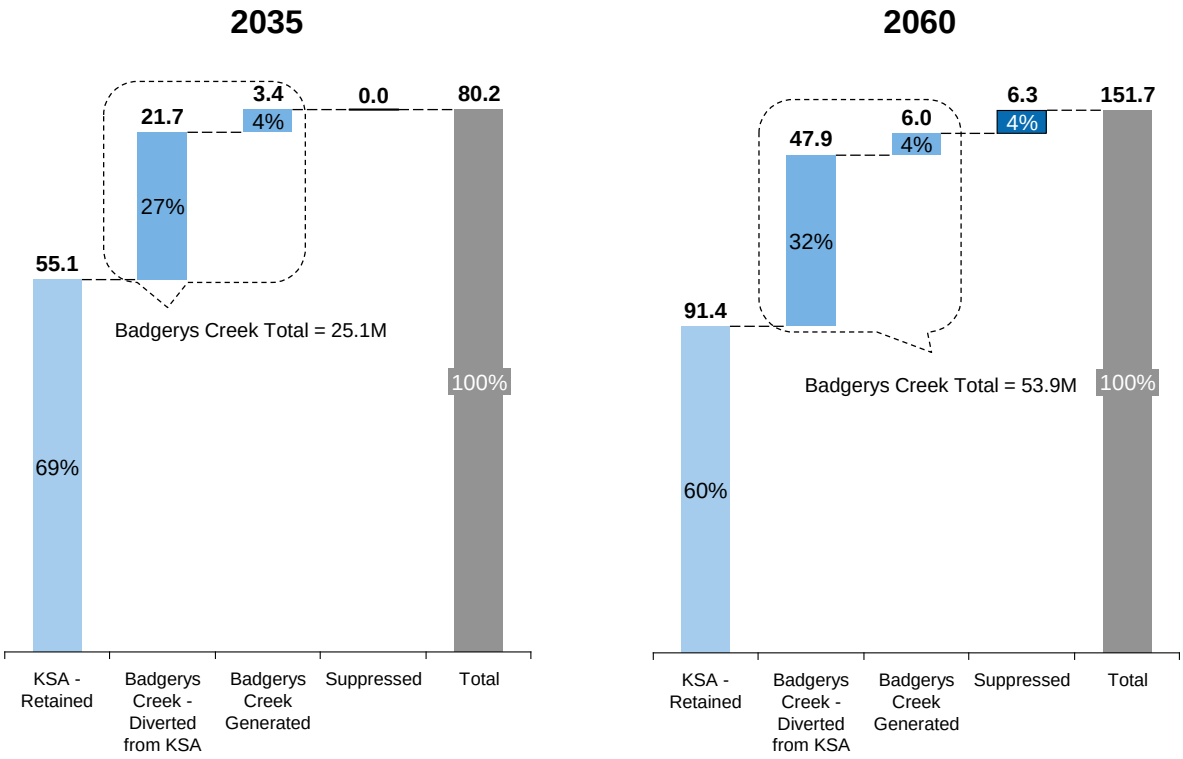


Note: The demand curve for each scenario does not include "generated demand".
Source: Booz & Company analysis (2011; 2012).

International experience shows that secondary airports usually support between 1% and 20% of the total passenger traffic in a multi-airport system. It is estimated that a new RPT site in the Sydney Region may need to accommodate between 30% and 35% of total Sydney demand by 2060.

Specifically, under Scenario 4, Figure 4 shows that approximately 36% of all Sydney Region air traffic demand is forecast to be accommodated by an additional RPT facility at Badgerys Creek in 2060.

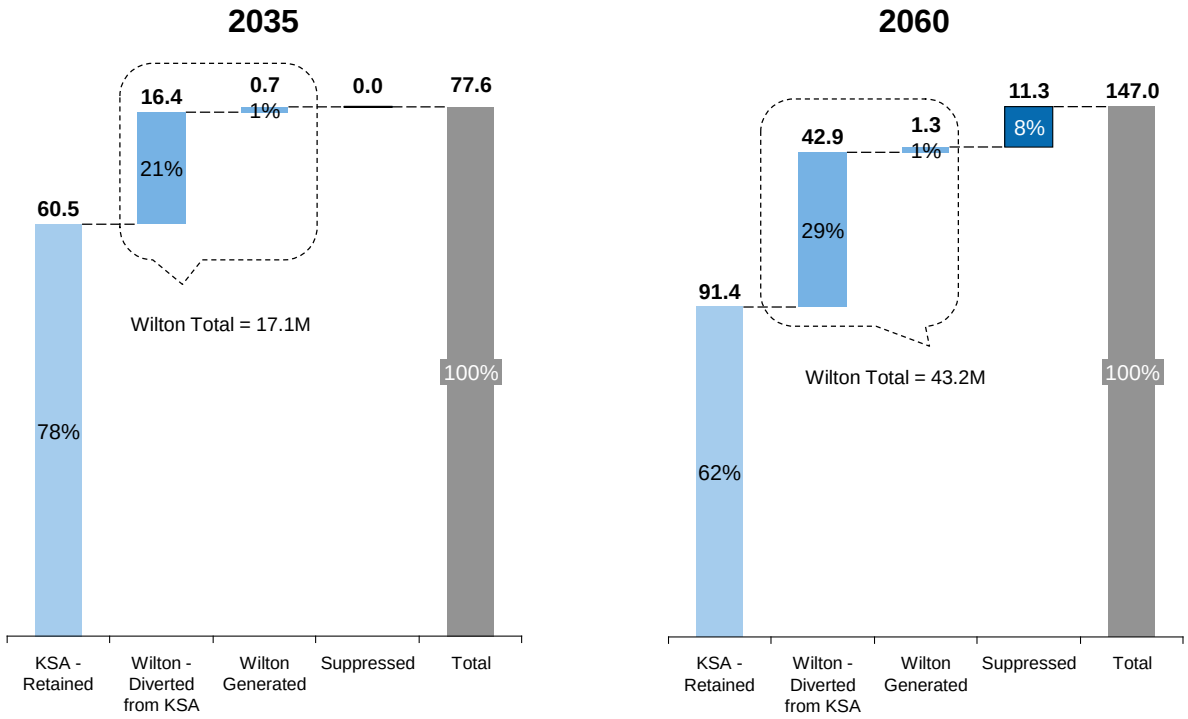
Figure 4: Badgerys Creek & Sydney (Kingsford-Smith) Airport Demand Breakdown, Scenario 4



Source: Booz & Company analysis (2011; 2012).

By way of comparison, an additional RPT site at Wilton is estimated to cater for approximately 30% of the total Sydney air traffic demand by 2060 under Scenario 4 (as shown in Figure 5). Factors such as distance to the CBD, poor accessibility and lower catchment density contribute to the site attracting a smaller proportion of passengers than a potential facility at Badgerys Creek.

Figure 5: Wilton & Sydney (Kingsford-Smith) Airport Demand Breakdown, Scenario 4



Source: Booz & Company analysis (2011; 2012).

The analysis suggests that demand for capacity at a major new "greenfield" airport in the Sydney region will grow strongly once Sydney (Kingsford-Smith) Airport reaches capacity (i.e. beyond 2035). While demand prior to this period may not justify the provision of a (large capacity) secondary airport, it is possible that an interim facility (i.e. RAAF Base Richmond) could accommodate spillover demand in the interim and also generate new (i.e. generated) demand in the local catchment.

1. Introduction

1.1 Background

This report investigates potential solutions to accommodate the long-term growth in air passenger demand in the Sydney region. This includes the investigation of two additional "greenfield" sites as a potential second major Regular Public Transport (RPT). The report also examines the possibility of upgrading the existing infrastructure at RAAF Base Richmond to accommodate unmet air passenger demand in the Sydney Region. Scenarios were developed to show the impact of different passenger capacity capabilities at these sites. This study follows on from the Joint Study on Aviation Capacity for the Sydney Region ("The Joint Study") commissioned by the Australian and NSW Governments. This study identified when Sydney (Kingsford-Smith) Airport would reach capacity and the potential impacts of insufficient capacity to meet the growth in the demand for air passenger services.

The Joint Study identified Badgerys Creek and Wilton as the two most potentially suitable "greenfield" locations for the development of an additional major RPT facility in the Sydney Region.

Badgerys Creek was viewed as the best site, for a number of reasons, including:

- The location is close to the growing western region of Sydney and road and rail transport links; and

- The site has been protected, as it was acquired by the Commonwealth for a future airport between 1986 and 1991, therefore significantly reducing the cost of the new facility and providing less disruption to the community than other potential sites.

However, it was recommended that if Badgerys Creek was ruled out, Wilton would represent the next best site given the long term population growth which is expected to spread to the southwest of the Sydney Region, The Joint Study also noted that RAAF Base Richmond should be investigated as an interim solution for a level of RPT operations.

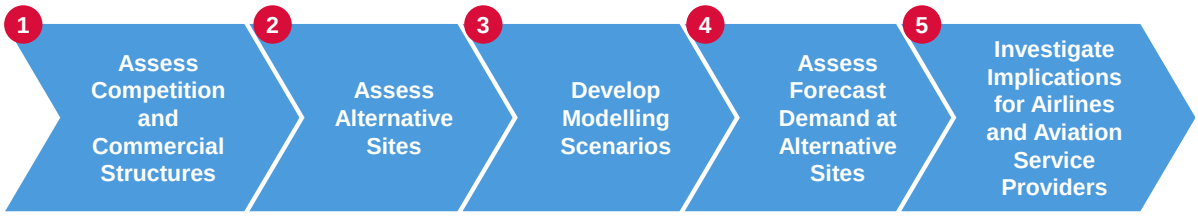
As part of this study, patronage modelling was conducted for the "greenfield" sites of Wilton and for the existing infrastructure at RAAF Base Richmond, as additional RPT facility options for the Sydney Region. Patronage modelling of an airport at Badgerys Creek was considered, to provide an objective scale against which to interpret the Wilton findings. The derived air passenger demand includes diverted demand from Sydney (Kingsford-Smith) Airport as a result of capacity constraints as well as demand induced (i.e. generated) by the new site. Passenger demand which cannot be readily diverted to an additional major RPT facility is either suppressed (i.e. outbound international travel by Australian residents and domestic travel), redistributed to other airports within Australia or lost to foreign ports (i.e. inbound international travel by foreign residents).

2. Approach

2.1 Overview

This report considered the potential market implications of establishing an additional major RPT facility in the Sydney region. Figure 6 outlines the approach adopted to forecast demand for multiple airports in the Sydney Basin and estimate the potential diversion of unmet demand from Sydney (Kingsford-Smith) Airport to an additional RPT facility.

Figure 6: Overview of Approach



Source: Booz & Company (2012).

2.2 Assess Competition and Commercial Structures

An assessment of a range of complementary and competitive arrangements was undertaken to identify the potential outcomes for passenger diversion from Sydney (Kingsford-Smith) Airport. The assessment included:

- The degree of duplication/overlap of airline networks and schedules, and the target market segments (e.g. LCC, FSC, international, domestic, regional);
- The make-up of air service providers across the individual airports;
- The scale of the airport and the target catchment (i.e. local area or the broader Sydney region); and
- Ownership models.

Existing examples of the different models for multiple airports serving overlapping catchments were identified and reviewed to gain insight into potential outcomes.

2.3 Assessment of Alternative Sites

An assessment of the identified alternative sites was undertaken with regard to the competitive and commercial structure framework. This assessment included both demand and supply side considerations:

- Demand side
  - the population density of the catchment area;
  - the proximity of the site to Sydney CBD; and
  - the accessibility of the site.

- Supply Side
  - scalability of the site for future growth.

2.4 Development of Patronage Modelling Scenarios

As shown in Table 2 below, four scenarios were developed to explore the potential for the diversion of demand at Sydney (Kingsford-Smith) Airport to an additional major RPT facility, and the generation of additional demand around the new airport due to the greater accessibility of air services.

Table 2: Patronage Modelling Scenarios

Scenario	Airport Size (Passengers)	Complementary Facility to KSA	Competitive Facility to KSA
Scenario 1	2 million	✓	
Scenario 2	5 million	✓	
Scenario 3	20 million		✓
Scenario 4	Unlimited		✓

Source: Booz & Company (2012).

Complementary facilities would accommodate any unmet demand from the primary airport, as well as stimulate the market by offering an alternate gateway. On the other hand, competitive facilities would capture demand from the primary airport as well as generate their own demand and accommodate unmet demand from the primary airport.

2.5 Assessment of the Forecast Demand at the Alternative Sites

The forecast patronage demand at the alternate sites was assessed using the following five categories:

1. Passenger movements which would naturally redistribute to the additional RPT facility due to it being more attractive on a generalised cost basis;

2. Passenger movements redistributed to the additional RPT facility due to capacity not being available at Sydney (Kingsford-Smith) Airport;

3. Passenger movements which remain at Sydney (Kingsford-Smith) Airport;

4. Suppressed passenger movements due to insufficient capacity at both the additional facility and Sydney (Kingsford-Smith) Airport and/or due to the facility representing a poor alternative to Sydney (Kingsford-Smith) Airport for passengers; and

5. Generated passenger trips at alternative sites due to an overall reduction in the generalised cost of travelling by air.

The breakdown of demand into these five categories gives insights into the suitability of each of the alternate sites as a secondary major RPT facility for the Sydney Region.

The patronage forecasts for each of the four scenarios included a Central Case and two sensitivities which consist of an estimated upper bound ("High Case") and an estimated lower bound ("Low Case").

2.6 Investigate Implications for Airlines and Aviation Service Providers

The scale and level of competition which an additional major RPT airport presents to Sydney (Kingsford-Smith) Airport will serve to determine the potential implications for airlines and supporting aviation service providers. The implications of the scenarios developed are discussed in five key areas:

- Level of direct competition in the market and the resulting impact on passenger volumes and yields;
- Segmentation of the air passenger market between airlines;
- Opportunities to grow new markets and improve operations within the Sydney region;
- Duplication of assets and supporting services; and
- Risks to the commercial sustainability of operations from an additional major RPT facility.

3. Competition and Commercial Structures

3.1 Competitive Dynamics

Airport co-existence models range from highly "competitive" to purely "complementary". A brief description of this spectrum is provided below:

- **Competing:** a competing airport model would see two airports in direct commercial competition with each other.
- **Hybrid:** a hybrid airport model would see two airports in "semi" competition with each other for certain markets segments, while also complementing each other's service offerings across a cross-section of market segments.
- **Complementary:** a complementary airport model would see two major RPT airports in the Sydney region with complementary service offerings. The market would be divided up between the two airports in a mutually exclusive manner.

The characteristics and impacts of each airport co-existence model are presented in Figure 7 below. Characteristics and impacts are explored in further detail within the following subsections.

Figure 7: Competitive Dynamics Framework

AIRPORT CO-EXISTENCE MODEL	COMPETING	HYBRID	COMPLEMENTARY
CHARACTERISTICS			
AIRLINE NETWORK SCHEDULE	**Full duplication** of services across both airports	Targeted **duplication of some** specific services	**Mutually exclusive** service offerings
MARKET SEGMENTS SERVED	**All** market segments serviced at both competing airports	**Some crossover** in market segments serviced at both airports	**Mutually exclusive** market segments serviced by each airport (e.g. domestic vs. international)
AIRLINE BASES	**Multiple airlines** based out of both airport sites	**Multiple airlines** *potentially* based out of both airport sites – **very limited** degree of airline **exclusivity** *likely*	**Multiple airlines** *potentially* based out of both airport sites – **some** degree of airline **exclusivity** *likely*
OWNERSHIP STRUCTURE	**Mutually exclusive** competing airport owners	**Mutually exclusive** competing airport owners (potential exists for individual ownership)	**One individual owner** of both complementary airports
IMPACTS			
SECONDARY IMPACT ON SURROUNDING AIRPORTS	**High impact –** competitive environment not necessarily geographically constrained, diversion from non-KSA possible	**Limited to medium impact –** impact dependent upon what segments competition exists within	**Limited** impact due to non competitive market dynamics
STIMULATION OF MARKET OR SECTOR GROWTH	**High degree** of stimulation of market growth – particularly for second airport "localities" where generalised costs fall markedly	**Some degree** of stimulation of market growth, impact dependent upon what segments competition exists within	**Limited degree** of stimulation of market growth
IMPACT ON AIRLINES & AIRFARES	**High impact** – strong competition drives down airport fees and subsequently airfares	**Some impact** – impact dependent upon what segments competition exists within	**Some impact** – alleviation of supply constrains should see some level of airfare decrease even with no competition existing

Note: The impact on surrounding airports refers to Newcastle (NTL) and Canberra (CBR).

Source: Booz & Company (2011).

It is important to recognise that hybrid and complementary models may only be achievable with some level of policy intervention. In this respect, it is important to recognise that policy intervention has not always achieved the desired outcome. Arguably, the most well-known example is Mirabel Airport in Montreal, Canada, which was established as a new "greenfield" airport to handle all international traffic. The established airport at Dorval was retained to handle domestic traffic. The market did not embrace this model, resulting in the ultimate de-commissioning of Mirabel and the consolidation of all operations at Dorval (see Section 3.6).

Accordingly, the scenarios developed and calibrated in subsequent sections of this report are somewhat hypothetical but nonetheless representative of the range of potential outcomes that might be observed in practice following the establishment of additional RPT capacity in the Sydney Region.

3.2 Characteristics of Airport Co-Existence Models

Airport co-existence model can be best explained and contrasted against the following characteristics:

- Market segments served;
- Airline bases; and
- Airline network schedules.

Each of these characteristics is discussed in further detail below.

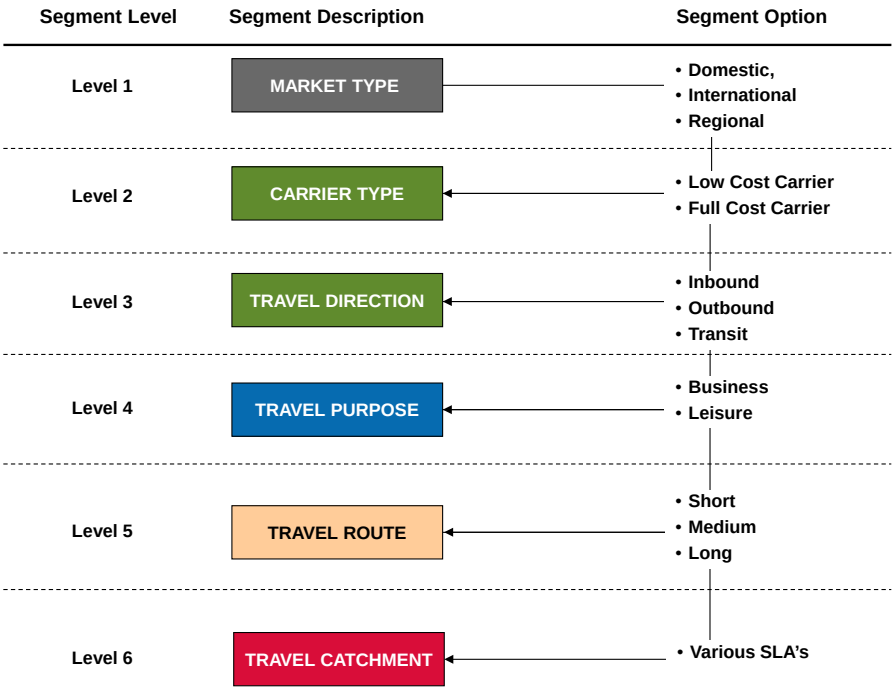
3.2.1 Market Segments Served

The first category of differentiation between airport co-existence models centres around an airport's overarching strategy and operating model. Depending on geographical location, segmented market characteristics and underlying commercial arrangements, airport operators will make a decision to target certain market segments over others. Different market segments may be appealing to different operators for a variety of reasons, but will ultimately be aligned to the operator's overarching corporate strategy.

Of additional importance is the emergence and proliferation of Low Cost Carriers (LCCs) in more recent decades. The potential competition between primary and secondary airports has become an increasingly important issue for domestic LCC operators all around the world, with LCC business models having drastically changed the market conditions experienced over the past decade or so. LCCs essentially increase the efficiency and affordability of air travel but potentially place a strain on existing airport capacity.

A high level view of the air passenger market segments that an airport could potentially target are presented in Figure 8 below.

Figure 8: Micro segmentation Framework



Source: Booz & Company (2011).

Under a purely competitive co-existence model, airports will compete for airline and passenger traffic across all market segments. Under a hybrid model, airports will be operating under a "differentiated" corporate strategy, whereby selected market segments will be chosen for "competition". Under a complementary airport model market segments will be divided up between airports in a mutually exclusive and ordered manner. To some extent, the market segments targeted under each scenario will not only be driven by the profit margins at stake, but also the alignment of certain higher order market segments to the characteristics of travellers within an airport's surrounding local catchment area.

3.2.2 Airline Bases

Airports, such as Sydney (Kingsford-Smith) Airport, drive much of their market positioning as hosts to one or more principal carriers in Australia. This symbiotic relationship between host carrier and airport is a central feature of the traditional 'hub-spoke' business model. This is reinforced by Sydney (Kingsford-Smith) Airport's strong international presence and close geographical proximity to NSW's state capital of Sydney.

Metropolitan airports facilitate a significant part of economic activity generated for its respective city. Airports seeking re-deployment of operators from Sydney (Kingsford-Smith) Airport to an additional major RPT facility will be mindful that any new airport must be capable of serving larger aircraft sufficient to deliver scale economies for the carrier. Additionally, in order to attract LCCs, the LCC business model must be complemented with adherence to low operational costs. Another aspect that may require attention encompasses the quick turnaround of aircraft. This means airport design considerations will be critical and need to be tailored to attract a target market (e.g. open apron configuration and taxiway).

Under a two airport model, airlines will have the choice of basing themselves exclusively out of one airport or a combination of the two airports. Ultimately, commercial factors and underlying infrastructure availability will dictate the decision around where to base an airline.

However, it is highly unlikely that under the current capacity constrained operating environment, that all major airlines will restrict themselves to a singular port.

3.2.3 Airline Network and Schedule

The third category of differentiation between airport co-existence models centres on airline network schedule variability. The type and frequency of scheduled services at airports will correlate directly with an airport's target market.

In a competing airport environment, it is expected that there will be significant duplication of services across competing airports. Under a hybrid model, duplication will not be as widespread, but rather targeted based on the competing airports' chosen business operating models (and hence target market segments). Under a truly complementary airport model, services at complementary airports will by definition be mutually exclusive. Different airports will have mutually exclusive target markets, and hence services will be scheduled accordingly.

3.3 Impacts of Airport Co-Existence Models

Primary and secondary impacts of airport co-existence models centre around three main impact areas:

- Impact on surrounding airports;
- Stimulation of market or sector growth; and
- Impact on airlines and air fares.

Each of these impacts is discussed in further detail below.

3.3.1 Impact on Surrounding Airports

Different airport models will pose significantly different risks to surrounding airport market shares.

Under a model of two competing RPT airports, it is likely that Sydney (Kingsford-Smith) Airport would lose market share across a wide cross section of market segments. However, market share losses may not necessarily be isolated to Sydney (Kingsford-Smith) Airport alone. Depending on the location of any airport, market share losses may also be experienced at other airports such as Newcastle and Canberra. This is due to the fact that the geographical location of any new airport will significantly impact upon the relative generalised costs of air travel for a broad catchment across NSW and the ACT. The magnitude of impacts on secondary airports will be heavily influenced by the ground "accessibility" of any new airport, including availability of transport infrastructure and public transport services.

Market share losses under a complementary airport setup, however, are likely to be less geographically concentrated and less pronounced. Under the complementary setup, shifts in entire market segments will result as services are simply transferred from one location to another. It should be noted that such a scenario could not be achieved through market forces alone. Government policy intervention would be required to realise this model for the Sydney region. This scenario would therefore require the development of policies that

mandate the respective roles of each airport. This would influence the services that would operate to and from each airport and could therefore strongly influence the level of passenger demand for each. Geographical location and generalised cost considerations play less of a part in a traveller's decision making process, with the supply side availability dictating airport choice. Increased generalised costs are likely to result in an overall reduction in passenger movements as demand is suppressed.

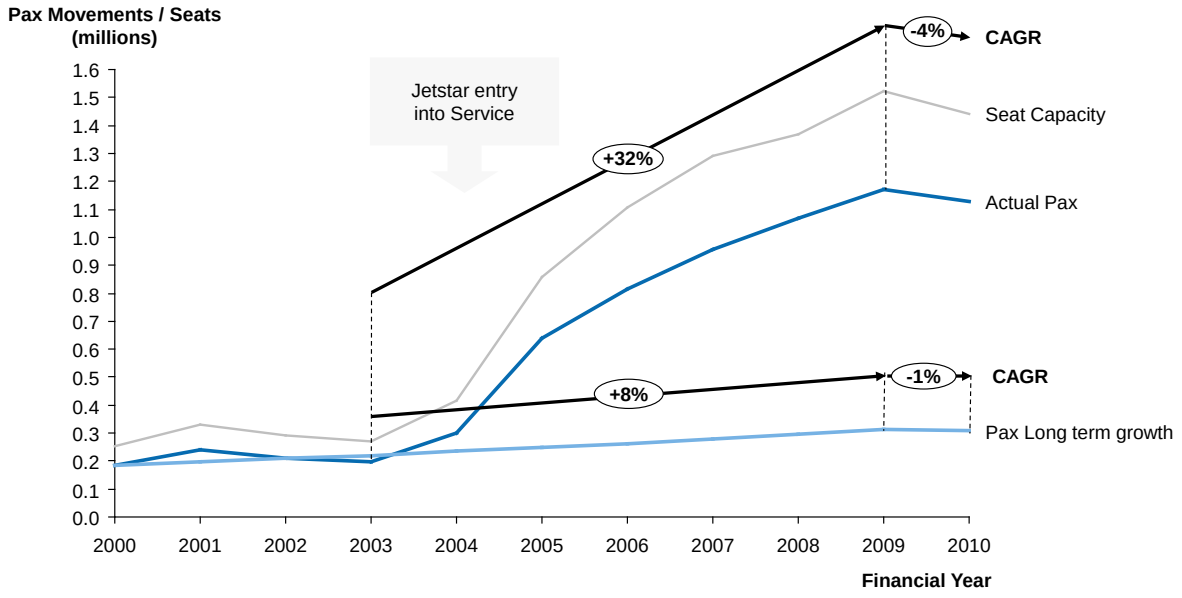
3.3.2 Stimulation of Market or Sector Growth

Development of an additional major RPT airport will not only result in market share implications for the current air traveller market, but also has the potential to increase the size of the base market itself. Secondary airports may generate additional trips by facilitating access to air services for customers within the new airport catchment area who may not have otherwise undertaken these trips.

As previously discussed, the geographical location of any new airport will significantly impact upon the relative generalised costs of air travel to and from the broader NSW and ACT catchment area. As generalised costs drop significantly for passengers living within closer proximity to a new airport, latent passenger markets are likely to emerge as a direct consequence. This will be particularly pronounced for leisure and shorter haul domestic market sub segments.

Historical growth at Newcastle Airport provides a clear illustration of the potential, for the generation of demand through introduction of new services. Exogenous growth at Newcastle would have seen passenger demand grow at 7 per cent per annum based on the level of service provided up until 2004. However the entrance of Jetstar and the response from Virgin Blue in the Newcastle market resulted in rapid growth in seat capacity. The market was subsequently stimulated by discount air fares and promotions resulting in an increase by 32 per cent per annum in passenger demand and seat capacity between 2003 and 2009, followed by a decrease of 4 per cent per annum due to the exit of Tiger Airways in 2010 which reduced capacity and slowed growth. A total Compound Average Growth Rate (CAGR) of 27 per cent was registered from 2003 to 2010. Figure 9 shows the growth in passenger demand led by seat capacity at Newcastle Airport.

Figure 9: Stimulation of Passenger Demand (Newcastle Airport)



Source: BITRE reported passenger volumes and IATA published schedule data.

3.3.3 Impact on Airlines and Air Fares

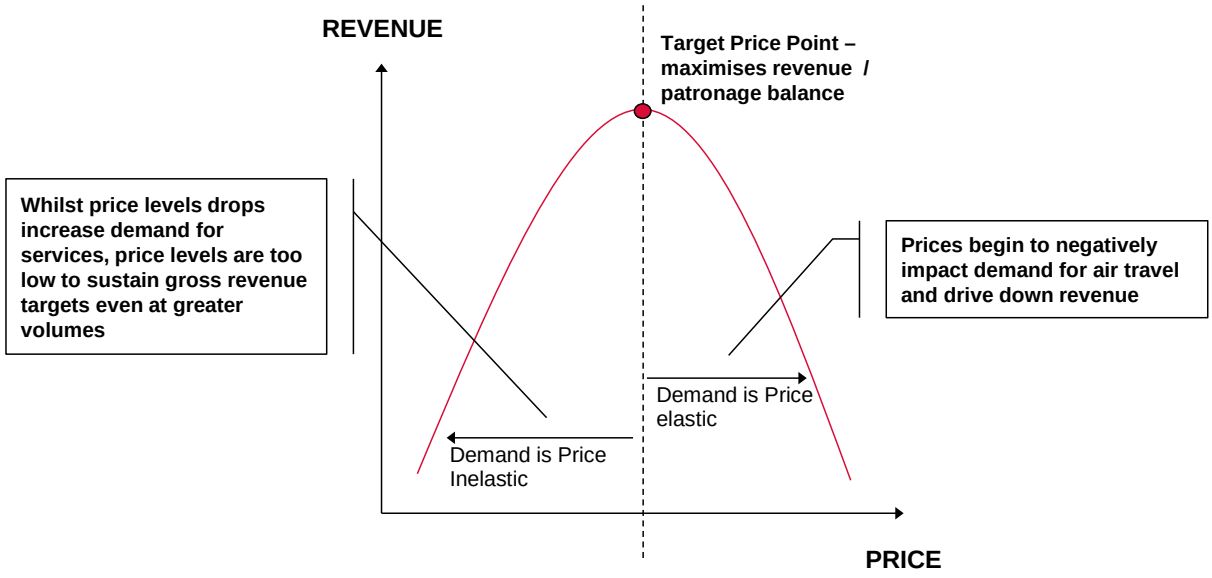
The development of an additional major RPT airport in the Sydney region could have the following benefits:

- Firstly, alleviation of capacity constraints will mean airlines are able to offer greater breadth and depth of routes and services. This benefit will hold true irrespective of the airport co-existence model in place, and also ensures that an additional RPT airport is likely to be able to leverage some competitive advantage irrespective of whether it is a complementary or competing airport in nature.

- Secondly, introduction of competition into the Sydney market is likely to result in lower airport access charges and hence lower air fares for customers. This would be most pronounced within the domestic travel sub-market, where airport fees and charges make up a more significant portion of an airlines cost to serve. By definition, the benefits of competition can only be reaped under an airport co-existence model which is based more around a competing rather than complementary airport setup.

As previously discussed, the development of a competing RPT airport has the potential to generate new demand and increase the size of the captive market. This is likely to be even more pronounced in the face of reduced air fares. However, airlines and airport operators will still face the challenge of ensuring any price benefits have the desired effect of maximising not only patronage, but also sector revenues. A trade-off, as illustrated within Figure 10 below, exists in this regard.

Figure 10: Price vs. Patronage vs. Revenue Trade-Off (Illustrative)



Source: Booz & Company (2011).

As described above, it is anticipated that there would be reductions in air fares resulting from competition between the two airports. For the purpose of this analysis, however, the demand forecasts do not take into account market stimulation resulting from these air fare reductions. This is consistent with the assumption that there is no demand suppression resulting from potential increases in air fares resulting from Sydney (Kingsford-Smith) Airport's capacity constraints in The Joint Study.

3.4 Assessment Framework of Proposed Airport Site and Co-existence Models

The merits of a particular airport co-existence model will vary by airport site. This variance is in accordance with the characteristics by which an additional RPT facility is constrained.

The key constraint governing the appropriateness of a particular co-existence model for a specific scenario is an airport's physical location. More specifically, the "level of isolation" which exists as a direct result of an airport's geography and surrounding environment plays a central role within this determination. "Level of isolation" is defined across three sub-categories:

1. **Population / Density of Catchment:** this sub-category refers to an airport's "level of isolation" from its base market;

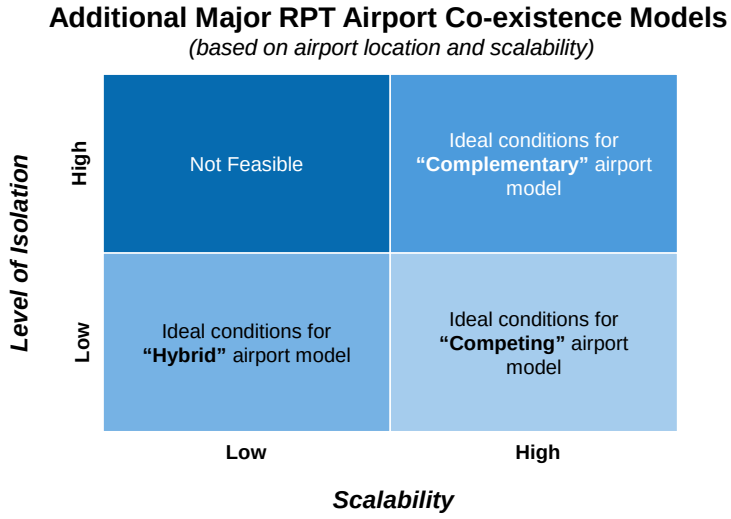
2. **Proximity to Central Business District (CBD):** this sub-category refers to an airports "level of isolation" from key activity and tourism centres; and

3. **Accessibility:** this sub-category refers to an airport's "level of isolation" from key enabling infrastructure, such as roads and public transport.

Also governing the appropriateness of a particular co-existence model for a specific scenario is the additional RPT facility's scalability. "Scalability" refers to the level to which an airport can fluidly accommodate growth in air passenger markets, and respond to changes in base market characteristics. When assessing scalability, the availability of growth enabling resources (i.e. land) is critical.

A future RPT airport operator needs to be mindful of the applicability of specific co-existence business models against the backdrop of prevalent contextual limitations. Figure 11 presents a co-existence model applicability framework to assess the best co-existence models by balancing off "scalability" and "level of isolation" considerations.

Figure 11: Additional Major RPT Airport Co-existence Models (based on location and scalability)

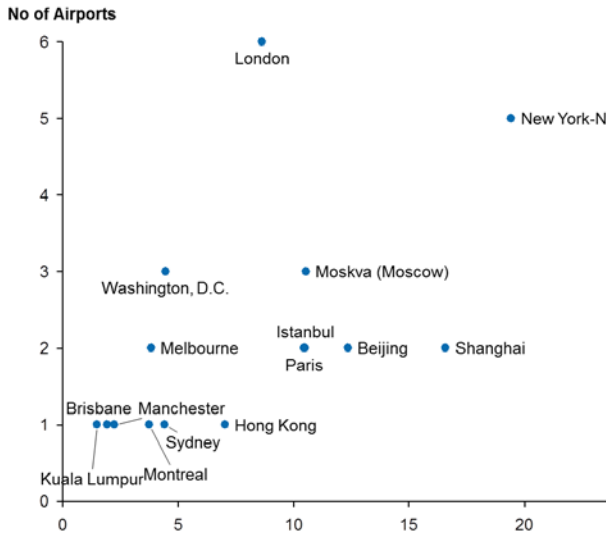


Source: Booz & Company (2011).

3.5 Examples of Multiple Airports

International evidence shows that the number of airports serving a city is not closely related to the catchment population. A number of metropolitan cities around the world were analysed to determine how each city caters for air travel demand and the consequent relationship between the number of airports available and the population size. Figure 12 shows that a clear relationship between the population size of a city and the number of airports serving the city is not apparent.

Figure 12: Number of Airports versus Population



Source: Booz & Company analysis of UN and ATI data.

The number of airports serving a city will be influenced by a number of factors other than population, including:

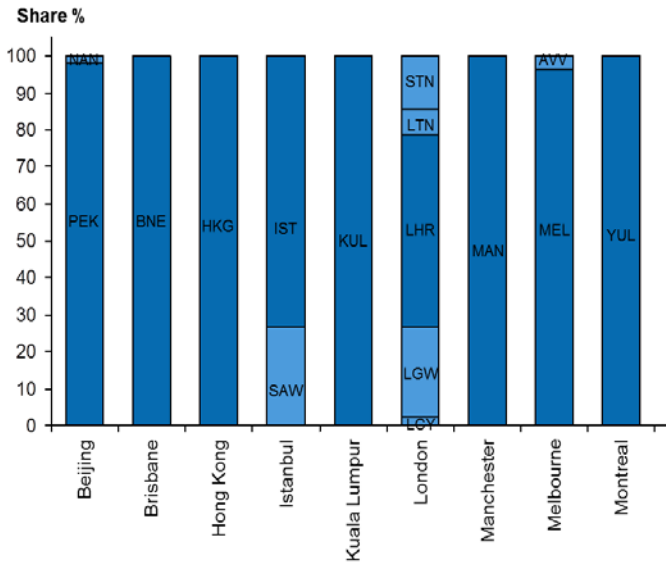
- Geographic concentration of population;
- Balance of resident and non-resident travel;
- Surface access;
- Ownership structures;
- Competitive landscape;
- Government policy; and
- Capacity constraints at individual airports.

Three of the cities with the largest population, among those analysed, are located in East Asia (i.e. Tokyo, Beijing, Shanghai). Tokyo, which has a population of 37 million people, is served by two main airports, namely Narita International Airport for international markets and Haneda Airport (until recently) for domestic markets. Shanghai is similar in its division between international and domestic airports and Beijing has the majority of passenger traffic concentrated on a single airport.

The range of population sizes served by two airports ranges from Melbourne with a population of 4 million to Tokyo with a population of 37 million. As of 2010, the cities served by the most airports was; London with 6 airports serving over 7 million inhabitants and New York City, with 5 airports serving over 19 million inhabitants.

Where a city is serviced by multiple airports, there is typically one dominant or primary airport within the catchment. Airports categorised as primary airports have a larger traffic base than secondary airports, as shown in Figure 13.

Figure 13: Primary and Secondary Airports Share of Air Traffic Demand



Source: Booz & Company analysis of ATI data.

Notes: Due to the absence of more recent data, 2008 air traffic data was used for Beijing Nanyuan Airport (source: CAA).
A list of the IATA codes used in the analysis is included in Appendix 2

3.6 Observations of Multiple Airports

The need for secondary airports is driven by one or more of a number of factors:

- Capacity constraints at the primary airport;
- LCCs seeking lower cost access to destinations; and
- Catchments becoming large enough to warrant two airports based on the generalised cost of ground access and/or pressure from surrounding development.

In many cases the key driver for an additional facility is the emergence of capacity constraints at the primary airport. As an airport reaches capacity, enormous strain is posed not only on the airport itself but mostly on the airlines which become incapable of operating efficiently and expanding their network to cater for additional demand. As demand grows, the number of available 'sought after' slots will decrease and operators will be looking for an alternative to develop their network and meet demand.

The growth in LCCs drove the conversion of many existing airfields into secondary RPT facilities. LCCs operations focus on providing point-to-point services satisfying the basic requirements of passenger journeys. Flexible time slots and quick turnaround of aircraft

which can be facilitated by an open apron configuration and taxiway are required. Therefore, given the capacity constraints which often affect the primary airports, secondary airports are seen as a viable option to make front to this issue.

Secondary airports may generate additional trips by facilitating access to air services for customers within the new airport catchment area who may not have otherwise undertaken these trips. Good surface access is another determining factor for the success of secondary airports.

Network carriers or Full Service Carriers (FSC) are more likely to continue operating out of primary airports. Primary airports support the hub-and-spoke network model which allows for high frequency and interconnectivity between flights to provide a comprehensive network of origins and destinations, FSCs invest more into terminal facilities (e.g. gate lounges and airline clubs) to provide passengers with a higher standard of service and comfort.

Urban growth will drive the development of alternative aviation facilities. When urban areas expand geographically, ground access to existing airports will be degraded, creating an opportunity for an additional facility to serve part of the catchment. Residential development around existing airports often places pressure on governments to relocate all or some of the aviation activity to reduce the impacts of aircraft noise on residential areas.

For multiple airports to co-exist in the same catchment, the market needs to be large enough to sustain more than one airport. The primary airport needs to have sufficient capacity constraints to allow the secondary airport to grow or clear segmentation between markets served from each airport is required. An artificial or ambiguous split of services or market segments is likely to lead to the failure of one of the airports. Less successful cities often make the mistake of creating two primary airports and mandating a split of traffic between the two airports (i.e. typically an international-domestic disaggregation). Ineffective "multi-hub cities" have in effect focused on local traffic and failed to attract a proportionate share of connecting passengers.

The location and accessibility of the secondary airports are also key factors to their success. A passenger's choice of an airport is influenced by several factors such as travel distance and convenience in accessing the airport, available airlines, schedule frequency and connectivity (for transfer passengers). Airlines' choice of which airport to use are driven by considerations of safety, security, yields, airport charges, interline connectivity and alliance partnership preferences.

The first challenge for secondary airports in openly competitive markets is to attract airline services. The second challenge is that of retaining airline services or, at a minimum, to avoid major losses if the airlines withdraw for any reason.

A number of lessons can be learnt from prior attempts by other cities to create split hubs. Today, there are multi-airport cities such as Chicago, Dallas and Houston which were able to create effective hubs and cities such as Washington, Montreal, London and Paris which run ineffective hub structures[1]:

- Paris has failed to become one of Western Europe's leading international gateways due to the decision to split hub traffic between Charles de Gaulle and Paris Orly. International services were moved to Charles de Gaulle Airport (58 million passengers) in 1966. Paris Orly (25 million passengers) remained with a focus on domestic and continental Europe markets;

[1] *Neufville, R. de (nd), "The Future of Secondary Airports: Nodes of a Parallel Air Transport Network?", English version of article prepared for the journal Cahiers Scientifiques du Transport*

- Splitting the aviation market in Montreal failed to sustain a new airport at Mirabel. The Canadian national government forced intercontinental carriers to use Mirabel airport, while leaving Dorval airport to cater for domestic carriers only. International flights were banned from Dorval between 1975 and 1997. This policy deprived the intercontinental carriers of the possibility of easy onward domestic connections and gave them the incentive to relocate flights to Toronto. International operations quickly fell away after the ban was lifted in 1997 and by 2000; the underutilisation of Mirabel airport drove the decision to relocate all services back to Dorval airport.

- In Washington, D.C., Dulles did not develop into the international connecting hub it was planned to be. It was built with the intent to supplant Washington Reagan, but it catered to only about 3 million annual passengers (as compared to approx. 14 million passengers annually at Baltimore and Reagan) for its first two decades.

- London Stansted airport was built with the intent to be a major traffic reliever to the traffic pressures on London Heathrow. Traffic averaged to approximately 5 million annual passengers for most of its first decade. Its traffic has however grown to 18.6 million passengers in 2010 driven by the growth of low cost airlines, especially Ryanair. It is still largely underutilised. Traffic at Heathrow has grown to 66 million over the same period and is over three times greater than London Stansted.

4. Assessment of Alternative Sites

This section reviews the alternative site recommendations outlined in The Joint Study and analyses their potential against a number of factors, including location, population catchment and scalability.

Figure 14 below shows the alternatives site locations of:

- Badgerys Creek, approximately 56 kilometres by road from the Sydney CBD;
- Wilton, approximately 80 kilometres by road from the Sydney CBD; and
- RAAF Base Richmond, located approximately 65 kilometres from the Sydney CBD.

Figure 14: Alternative Site Locations

Source: Google Earth (2012).

4.1 Level of Isolation

Population Density of Catchment

Positioning an airport close to areas with higher population density will be attractive from a demand perspective for three main reasons:

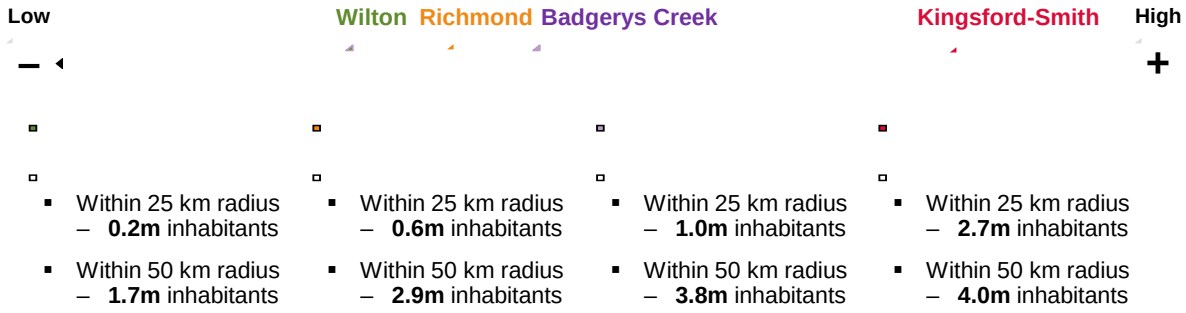
- **Reducing generalised costs for a greater volume of travellers**: the physical location of any new airport will significantly impact the relative generalised costs of air travel across Local Government Area's (LGA's) within its geographical proximity;

- **Greater potential for generation of latent demand**: new airports can generate additional trips though facilitating access to air services for customers within neighbouring LGA's who may not have otherwise undertaken these trips, and

- **The service differentiation of a secondary airport**: the characteristics of the surrounding market can help shape an airport's overarching strategy, allowing it to improve its competitive positioning through targeted offerings.

A comparison of population densities in locations surrounding the "greenfield" sites at Badgerys Creek, Wilton, as well as at RAAF Base Richmond and Sydney (Kingsford-Smith) Airport is presented in Figure 15 below.

Figure 15: Population Density of Catchment Comparison, 2011



Note: Population estimates are based on BTS population data at an SLA level as CCD data for the period was unavailable
Source: Booz & Company analysis (2012), BTS Population Data (2011).

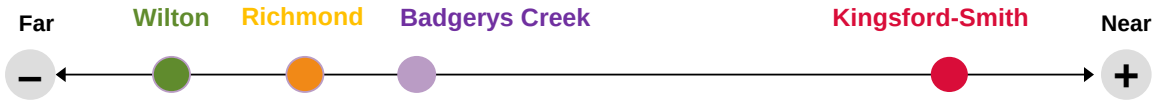
Proximity to CBD

The proximity of an airport to Sydney's Central Business District (CBD) influences its attractiveness to the air traveller market. This effect will be pronounced across both business and leisure sub-markets, with Sydney's CBD serving as a hub for both tourism and business activity. By way of importance, Sydney's CBD as a destination point currently accounts for approximately two-thirds of overnight and inbound passenger trips annually through Sydney (Kingsford-Smith) Airport[2]. Sydney's CBD also ranks as a key travel origination point, with over one-third of outbound trips originating from within a 10km radius of the CBD.

A comparison of the proximity of Badgerys Creek, Wilton, RAAF Base Richmond and Sydney (Kingsford-Smith) Airport) to the Sydney CBD are presented in Figure 16 below.

[2] *TRA, NVS (2009) & IVS (2008)*

Figure 16: Proximity to CBD Comparison, 2012



WILTON	RICHMOND	BADGERYS CREEK	KINGSFORD-SMITH
▪ Distance of **80 km** to Sydney CBD, via the partially tolled M5 and Hume Highway ▪ Approximately **70 min** to Sydney CBD by road	▪ Distance of **65km** to Sydney CBD ▪ Approximately **65 min** to Sydney CBD by road	▪ Distance of **56 km** to Sydney CBD, via the partially tolled M4 ▪ Approximately **52 min** to Sydney CBD by road	▪ Domestic Terminal **11.7 km** and International Terminal **14.3 km** south of Sydney CBD ▪ Approximately **20 min** by road to Sydney CBD

Source: Worley Parsons (2010), Google Maps (2012).

Accessibility

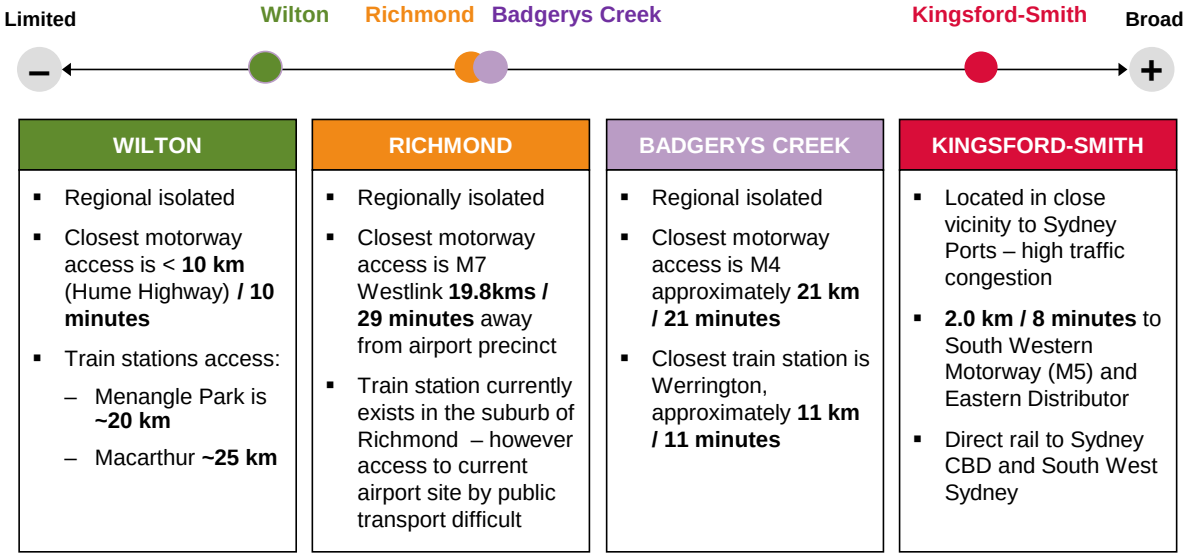
Airport accessibility (through road, public transport and active transport means) is a significant contributor to an airport's attractiveness to the air traveller market. This is particularly the case in a "competing" airport environment, where accessibility may serve as a choice differentiator on a segment-by-segment basis. The importance placed on accessibility is due to two key reasons:

1. **Cost:** the more easily accessible an airport is, the less costly it is to access. This will reflect both monetary and non-monetary (i.e. travel time) considerations. The importance of generalised cost in passenger decision making varies by customer segment (e.g. business vs. leisure and long vs. short haul); and

2. **Breadth of Choice:** wider breadth of accessibility options (e.g. public transport, motorways, and bus lanes) broadens the appeal of an airport to a greater cross section of market segments, which may inherently prefer a certain ground access mode over another having regard to price and service considerations.

A comparison of the accessibility assessment for Badgerys Creek, Wilton, RAAF Base Richmond and Sydney (Kingsford-Smith) Airport are presented in Figure 17 below.

Figure 17: Accessibility Comparison, 2012



Source: Worley Parsons (2010), Booz & Company (2012), and Google Maps (2012).

4.2 Scalability Potential

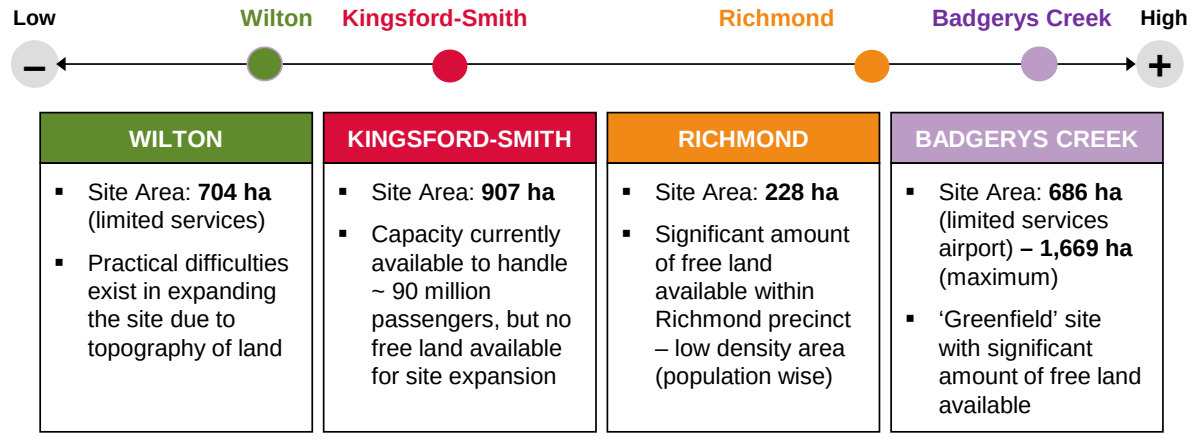
The availability of abundant undeveloped land in close proximity to an airport's site (i.e. that can be secured for aviation use) helps mitigate scalability risk. Latent scalability potential enables an airport to respond to two periodically recurring phenomena:

- **Changes in technology:** as aircraft technology evolves, changes to airport configurations and base infrastructure (e.g. wider runways to handle A380s) are likely to be required. Enough free land in close proximity to the airport site needs to exist to facilitate any future changes that may be required to accommodate airlines' continually evolving technological innovations; and

- **Growth in passenger volumes:** as passenger volumes grow into the future, land needs to be available to allow for any necessary airport or infrastructure expansions (e.g. reconfiguration or construction of new runways and terminals) to mitigate against the risk of capacity constraints re-emerging.

A comparison of the scalability potential of Badgerys Creek, Wilton, RAAF Base Richmond and Sydney (Kingsford-Smith) Airport is presented in Figure 18. As illustrated below, Badgerys Creek ranks highest in terms of scalability potential, due to the amount of available land. The site at Badgerys Creek is closely followed by RAAF Base Richmond where air traffic could potentially grow fourfold. Sydney (Kingsford-Smith) Airport and Wilton's scalability is on the other hand limited. The Sydney Airport site is close to being fully developed, while Wilton is significantly constrained by the topography of the site.

Figure 18: Scalability Comparison

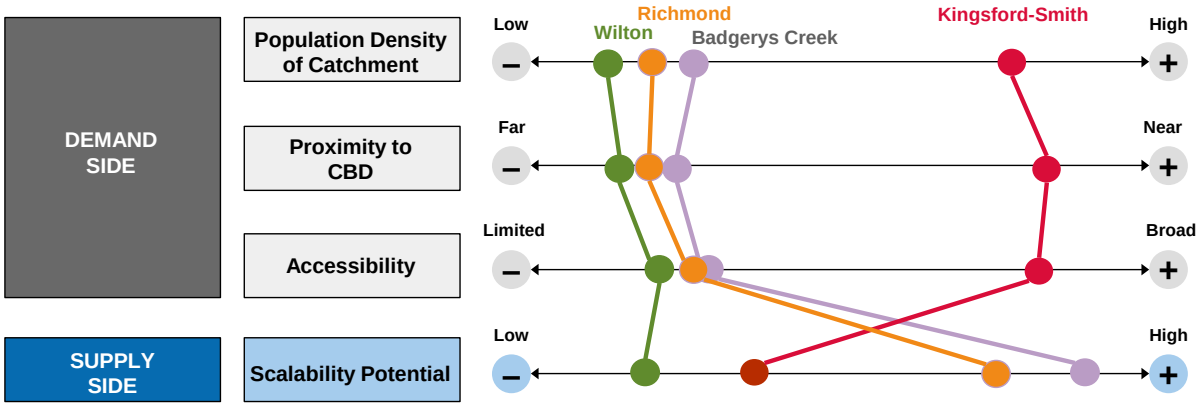


Source: Worley Parsons (2010), Booz & Company (2012).

4.3 Airport Assessment Framework Findings

Figure 19 below summarises the findings of the qualitative assessment undertaken for Badgerys Creek, Wilton, RAAF Base Richmond and Sydney (Kingsford-Smith) Airport.

Figure 19: Airport Assessment Framework Summary



Source: Booz & Company (2012).

Sydney (Kingsford-Smith) Airport rates well on level of isolation but poorly on scalability. The latter is attributable to its inability to expand capacity through the development of additional runways and associated infrastructure. The capacity constraints at Sydney are the primary driver of the need for an additional RPT airport.

The assessment also revealed the relative advantages of a potential site at Badgerys Creek in comparison to Wilton and RAAF Base Richmond. Badgerys Creek has a larger and denser resident catchment area, is in closer proximity to the Sydney CBD, has a higher potential for expansion and offers greater accessibility than the alternative sites.

5. Patronage Modelling Scenarios

This section presents an overview of the scenarios developed to explore the adequacy of an additional RPT facility to meet long-term air passenger demand in the Sydney Region. Each scenario is explored in detail, in terms of the likely markets served and the passenger profiles expected to use the facilities in each case. The assumptions underpinning these scenarios were informed by existing examples of different scales of operations at Australian airports.

5.1 Scenario Overview

Four capacity scenarios for an additional RPT facility at Badgerys Creek, Wilton or RAAF Base Richmond were developed for evaluation. Each of the scenarios assumes a different level of capacity and that infrastructure upgrades are made to provide sufficient capacity to meet demand. The scenarios also assume that ground access is enhanced to provide sufficient levels of service to each of the airports.

A summary of the four alternative scenarios is presented in Table 3 below.

Table 3: Capacity Scenarios for the Alternative Sites

Scenario		Airport Capacity (passengers p.a.)
Number	Description	
Scenario 1	Low Capacity	2 million
Scenario 2	Medium Capacity	5 million
Scenario 3	High Capacity Tier 1	20 million
Scenario 4	High Capacity Tier 2	Unlimited

Source: Booz & Company (2012).

The level of duplication of airline networks across the two airports is incremental between the four cases and is influenced by the defined capacity at the alternative facility. Under Scenario 1, there will be complementary services, whilst in Scenario 4 there will be competition over a broad range of market segments. In general, however, it is expected that the smaller markets would go to one airport or the other but not to both. The four scenarios model the additional demand which would be generated by the local catchment of a new facility as a result of the reduction in the generalised cost of the end-to-end air trip.

The capacity constraints defined in each of the four scenarios influence the service offering that is sustainable in each particular case. That is, the depth and breadth of the airline networks in each scenario is influenced by the airport capacity. With increasing airport capacity, the depth and breadth of the network is similarly increased. Scenario 1 would have limited domestic services whereas Scenario 4 would serve all markets. The depth and breadth of airline service offering will influence the attractiveness of the airport to passengers in the Sydney region. The level of capacity for each scenario provides an indication of airport size. It is assumed that upgrades would be made at the respective airports to provide capacity for additional growth in demand.

5.1.1 Scenario 1 – Low Capacity

This scenario would provide a total annual capacity for two million passengers[3], in a complementary situation with Sydney (Kingsford-Smith) Airport. In this scenario, it was assumed that the additional site would service only the domestic short-haul market. Short-haul flights would include locations on the east coast such as the Gold Coast (OOL), Brisbane (BNE), Melbourne (MEL), Canberra (CBR), and Adelaide (ADL).

5.1.2 Scenario 2 – Medium Capacity

The second scenario represents the situation where the new site provides capacity for five million passengers per annum. The markets served would focus on domestic Australia, predominately with narrow body aircraft:

- Short haul domestic (up to 2.5 hours);
- Medium haul domestic (2.5 to 4 hours) including North Queensland and Central Australia, but excluding Western Australia (which is over 5 hours flying time); and
- Short haul international, primarily trans-Tasman services.

5.1.3 Scenario 3 – High Capacity Tier 1

Scenario 3 involves the provision of a fully developed airport alternative. In this situation, the site was assumed to cater for 20 million passengers annually. The markets served would include:

- All domestic markets;
- Regional (unmet KSA demand);
- Short haul international; and
- Medium-haul international secondary markets.

5.1.4 Scenario 4 – High Capacity Tier 2

Scenario 4 similarly involves the provision of a fully developed airport alternative with capacity for up to 70 million passengers annually. The markets served would include:

- All domestic markets;
- Regional (unmet KSA demand);
- Short haul international;
- Medium-haul international; and
- Long-haul international.

[3] *Booz & Company estimates, 2012*

5.2 Estimated Airport Market Shares

The process for determining airport market shares for each market segment (domestic and international) was based on the relative generalised cost to access the two competing airports from the CBD, that is, the ratio of generalised access costs for Badgerys Creek, Wilton or RAAF Base Richmond and Sydney (Kingsford-Smith) Airports. Analyses of similar relationships between competing pairs of airports globally informed the development of the model to predict relative airport market share. For example, relative market share between airport pairs such as Kuala Lumpur International Airport (KUL) and Sultan Abdul Aziz Shah Airport (formerly Subang airport, SZB); and Haneda Airport (HND) and Narita (NRT) were examined. The benchmarking analysis was used to determine the influence of generalised costs of secondary airports to their subsequent market share.

A range of additional relationships between the referenced airport pairs were examined to determine the relative impact of airport service offering on market share. These include the relative range of destinations served and service frequencies at the competing airports. Accordingly, these factors represent the differences between the four airport scenarios evaluated in this paper.

Table 4 presents a summary of comparisons between competing airport pairs across all markets. As described above, a range of factors were examined to determine the influence of generalised costs and service offering on the relative market share of competing airport pairs.

Table 4: Market Share Comparison (All Markets)

Competing Airport Pair		Market Share of A1	Access to CBD (A1/A2)*	Destinations Served (A1/A2)	Number of Services (A1/A2)	Service Frequencies (A1/A2)
Airport 1 Primary (A1)	Airport 2 Secondary (A2)					
Kuala Lumpur	Sultan Abdul Aziz Shah	92%	2.3	1.7	4.5	2.7
Melbourne	Avalon	97%	0.4	15.0	40.3	2.7
Haneda	Narita	96%	0.4	5.3	15.4	2.9
Istanbul	Istanbul Sabiha	68%	0.4	1.6	2.1	1.4

**Access to CBD = the generalised cost of ground access to Airport 1 (A1) / generalised cost of ground access to Airport 2 (A2).*
Source: Air Transport Intelligence, IATA published schedule data Booz & Company analysis (2011).

A similar comparison was undertaken, which considered common markets only between the two airports. The results of this comparison are presented in Table 5 below.

Table 5: Market Share Comparison (Common Markets)

Competing Airport Pair		Market Share of A1	Access to CBD (A1/A2)	Number of Services (A1/A2)	Service Frequencies (A1/A2)
Airport 1 Primary (A1)	Airport 2 Secondary (A2)				
Kuala Lumpur	Sultan Abdul Aziz Shah	84%	2.3	17.3	17.3
Melbourne	Avalon	94%	0.4	2.2	2.2
Haneda	Narita	95%	0.4	8.2	8.2
Istanbul	Istanbul Sabiha	66%	0.4	1.9	2.0

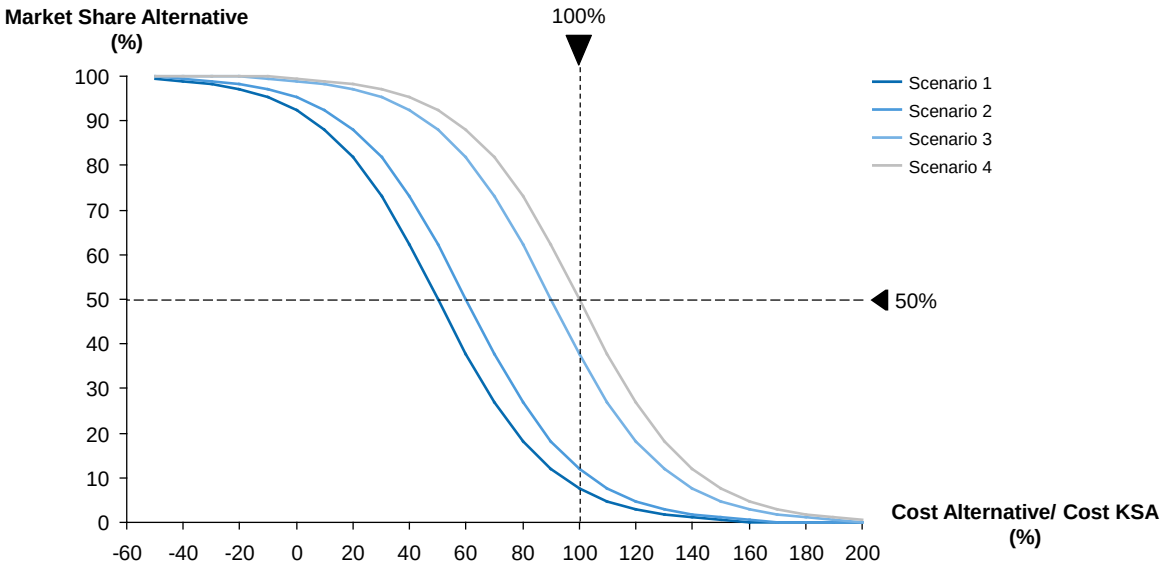
Source: Air Transport Intelligence, IATA published schedule data, Booz & Company analysis (2011).

The results of these analyses indicate that there is a negative relationship between secondary airport access costs and market share. As the ground access costs of the secondary airport increase, its relative market share decreases. A trend was also observed relating to the relative service offering between the primary and secondary airports. The greater the proportion of markets served by the secondary airport and the greater the service frequencies, the higher the market share of that airport (as would be expected).

The functions developed to assess the relationship between generalised costs of the alternative, and its subsequent market share in each of the scenarios, reflect the analysis above. The function was calibrated based on the empirical evidence found for airports operating at the “tail end” of the curve (i.e. the secondary airport has a low market share in the markets where the two airports compete).

Figure 20 presents the function describing relative domestic market share for each of the scenarios. When the relative generalised costs for the end-to-end journey are equal between two competing airports and service offering is comparable between the two airports, as in Scenario 4, the model predicts that the alternative airport will capture 50 per cent of the primary airport’s domestic market share. Whereas for Scenario 1 the same generalised cost for both airports results in only a 7 per cent market share for the additional RPT facility due to the restricted airline service offering within the broader domestic market.

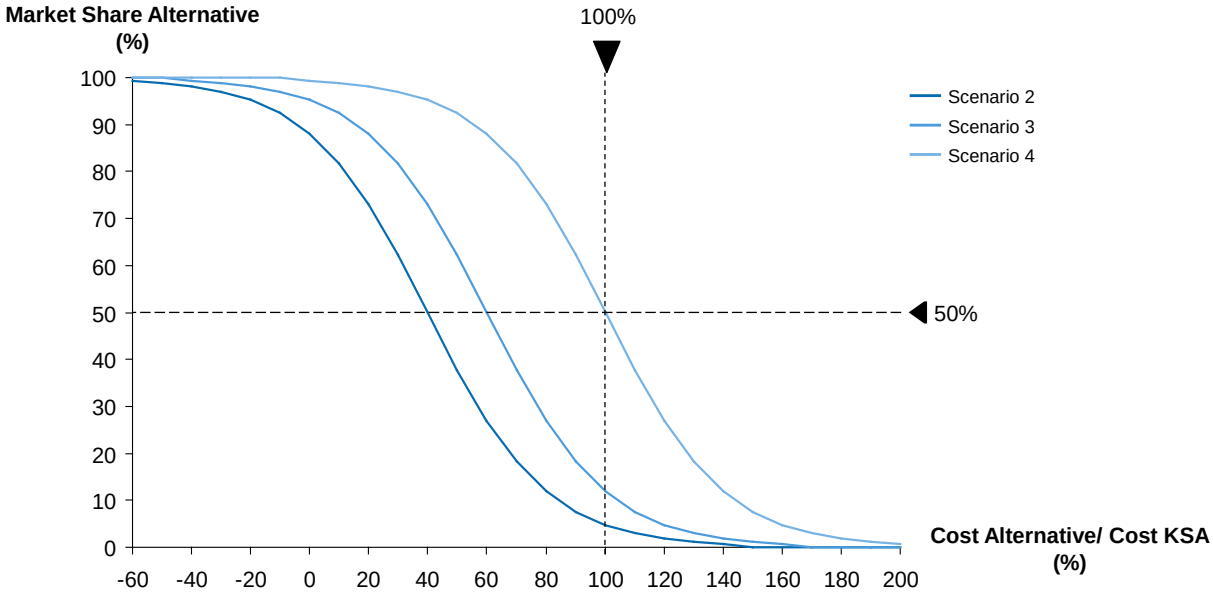
Figure 20: Demand Function for Forecasting Domestic Market Share



Source: Booz & Company (2012).

In the international case, the model illustrates that ground access costs to the alternative airport must be more competitive to attract the same market share as the domestic case. That is, the ground access costs of the alternative must represent 70 per cent of the primary's to attract half of the market share. This reflects the fact that the breadth and depth of the international service offering of the additional RPT facility that is described in Scenario 3 is significantly lower than that for Sydney (Kingsford- Smith) Airport. Similarly, in Scenario 2, the lower breadth and depth of the international network requires even greater generalised access cost savings to attract 50 per cent of the market share. This is illustrated in Figure 21 below. Scenario 1 is not represented in the below figure as in that scenario the additional RPT facility would service domestic routes only.

Figure 21: Demand Function for Forecasting International Market Share



Source: Booz & Company (2012).

5.3 Estimation of Generated Demand

An additional RPT facility in the Sydney Region would likely result in a reduction of the average generalised cost for air travel, which would in turn stimulate additional demand for air services. The level of new (i.e. generated) demand generated by the natural catchment of each site was modelled through a market stimulation equation and calibrated through the benchmarking of other low and medium capacity Australian airports. It is expected that the majority of generated demand under all scenarios will be generated by the short to medium-haul domestic market, particularly in the initial years of operations at the secondary airport.

6. Forecast Demand at Alternative Sites

Scenarios 1 and 2 were run under complementary conditions, as the assumed capacity of any new airport under these scenarios was 2 million and 5 million passengers annually respectively. Airports up to 5 million passengers annually would not be able to sustain a competitive position against an airport the size of Sydney (Kingsford-Smith). However, market forces alone would not be enough to achieve a complementary scenario, which would therefore require a level of policy intervention. Under complementary conditions, capacity would be brought online as unmet demand from Sydney (Kingsford-Smith) Airport warrants it and new (i.e. generated demand) would be generated from the "natural" catchment.

Scenarios 3 and 4 were run under competitive conditions, where capacity was assumed to be in the range of 20 million passengers for the former case and unconstrained for the latter. Under competitive conditions, capacity is brought online before unmet demand from Sydney (Kingsford-Smith) Airport warrants it. Scenarios 3 and 4 are assumed to result in competitive models due to the capability to exploit significant capacity at the new "greenfield" airport sites.

The initial capacity of the additional RPT facility provides an indication of the scale of the facility and has not been assumed to be a discrete ultimate capacity (i.e. the analysis assumes that incremental capacity at an additional RPT facility would be provided to accommodate growth but no step changes in capacity would be made).

The patronage demand forecasts for each of the four scenarios include a Central Case and two sensitivities; an estimated upper bound ("High Case") and an estimated lower bound ("Low Case"). These were determined as follows:

- The High Case assumes that all of Sydney (Kingsford-Smith) Airport unmet demand will be pushed to the new site when capacity is reached (at Sydney Airport), irrespective of the travellers' preference for Sydney (Kingsford-Smith) Airport or the additional facility. A higher level of generated demand was also assumed under this scenario;

- The Low Case assumes that only individuals who have a preference for travel from the new site (as determined by generalised cost of travel) will be using the new facility. A lower level of generated demand was also assumed under this scenario; and

- The Central Case assumes that the number of individuals who decide to travel from the new site lies between the High and Low forecasts (i.e. it has been defined as the average of the High and Low forecasts).

The demand breakdown presented in the analysis below consists of the following categories:

- "Sydney (Kingsford-Smith) Airport Retained" demand, which consists of demand that remains at Sydney (Kingsford-Smith) Airport;

- "New Site Diverted from Sydney (Kingsford-Smith) Airport" demand, which consists of passenger movements which would naturally redistribute to the additional RPT facility due to it being more attractive on a generalised cost basis; as well as passenger movements which would redistribute to the new facility due to capacity not being available at Sydney (Kingsford-Smith) Airport;

- "New Site Generated" demand, which consists of additional passenger trips generated by a reduction in the generalised cost of the end-to-end air trip. It should be noted that the majority of generated demand under all scenarios is anticipated to be generated particularly by leisure and short to medium haul domestic market sub segments; and

- "Suppressed" demand, which consists of demand suppressed because of insufficient capacity at both the additional facility and Sydney (Kingsford-Smith) Airport and/or due to the facility representing a poor alternative to Sydney (Kingsford-Smith) Airport for passengers.

It is important to recognise that it is not possible to provide a definitive profile of either diverted or generated demand (i.e. type of service, trip purpose, trip length). The service type (i.e. as defined in each of the scenarios) and trip origin (i.e. Sydney residents) or trip destination (i.e. non-Sydney residents) were the only segmentation dimensions captured in the modelling.

Finally, the demand forecasts presented in this study are not reflective of actual start up dates for each of the sites identified, but rather focus on fully ramped up demand for the period between 2015 and 2060. In practice, based on advice from the Department, potential start up dates for RPT operations are as follows:

- Richmond (2017);

- Badgerys Creek (2025); and

- Wilton (2030).

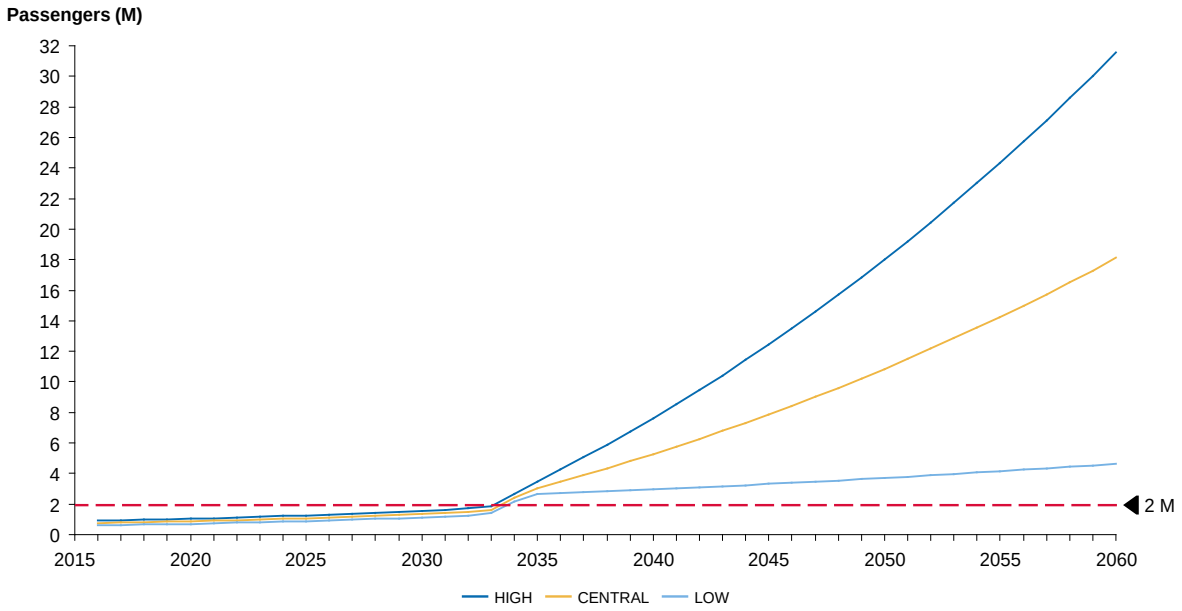
6.1 Badgerys Creek

6.1.1 Scenario 1 – Low Capacity

Scenario 1 assumes that all international and regional passengers would remain at Sydney (Kingsford-Smith) Airport and that airlines would target larger domestic markets for potential start-up operations at Badgerys Creek where the airline could sustainably capture part of the market as opposed to moving individual regional (intrastate) markets away from Sydney (Kingsford-Smith) Airport.

Based on the assumptions described above, it is forecast that an additional RPT facility of 2 million passengers per annum at Badgerys Creek would be able to cater for demand until 2034 for the High, Central and Low Case. This is illustrated in Figure 22 below.

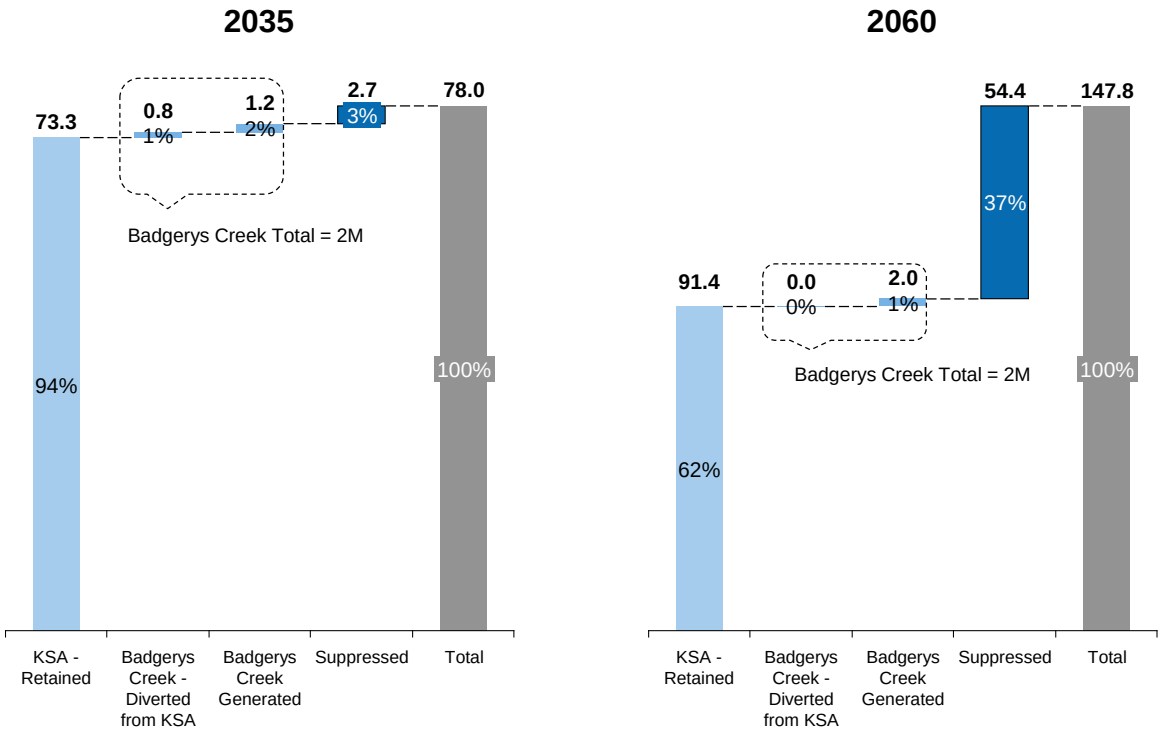
Figure 22: Scenario 1 – Passenger Demand for Badgerys Creek (2015 to 2060)



Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 23 shows the breakdown of unconstrained demand under Scenario 1 for the Central forecast in 2035 and 2060 respectively. Badgerys Creek, which will operate in complementary conditions to Sydney (Kingsford-Smith) Airport, is estimated to capture approximately 3 per cent of the total Sydney Region air travel demand in 2035 and 1 per cent in 2060, with Sydney (Kingsford-Smith) Airport continuing to act as the primary airport in the region serving approximately 94 per cent of the market in 2035 and 62 per cent in 2060. The level of unmet or suppressed demand in the Sydney Region is estimated to increase from approximately 2.7 million in 2035 to 54.4 million by 2060 with the new facility being able to capture only a small amount of the unmet demand.

Figure 23: Scenario 1 - Breakdown of Passenger Demand, Badgerys Creek, Central Forecast (2035 and 2060)

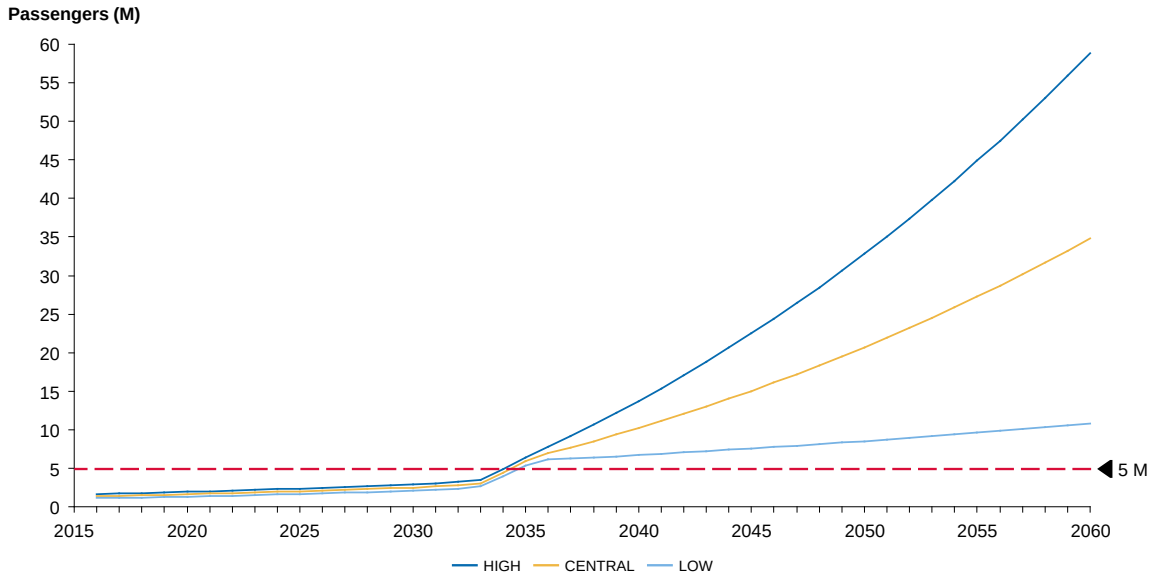


Note: Passenger diversion from Sydney (Kingsford-Smith) Airport falls over time because of the assumption that as the new facility approaches capacity, new passenger generated demand would be accommodated first.
Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

6.1.2 Scenario 2 – Medium Capacity

The results for Scenario 2 indicate that the assumed 5 million annual passenger movement capacity would be reached in 2035 for the High, Central and Low Cases. This is shown in Figure 24 below.

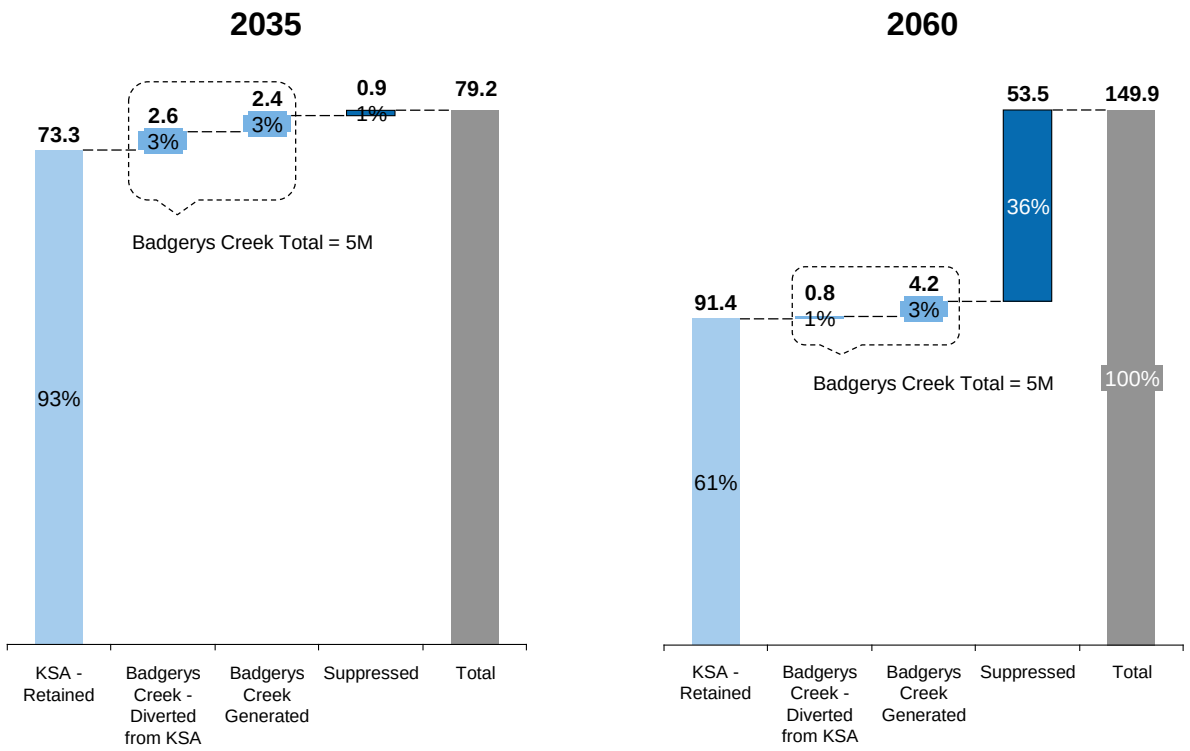
Figure 24: Scenario 2 – Passenger Demand for Badgerys Creek (2015 to 2060)



Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 25 shows the breakdown of unconstrained demand under Scenario 2 for the Central forecast in 2035 and 2060 respectively. Badgerys Creek, which will operate in complementary conditions to Sydney (Kingsford-Smith) Airport, is estimated to capture approximately 6 per cent of the total Sydney Region air travel demand in 2035 and 4 per cent in 2060, with Sydney (Kingsford-Smith) Airport continuing to act as the primary airport in the region serving approximately 93 per cent of the market in 2035 and 61 per cent in 2060. The level of unmet or suppressed demand in the Sydney Region is estimated to be approximately 53.5 million by 2060 with the new facility being able to capture only a small amount of the unmet demand.

Figure 25: Scenario 2 – Breakdown of Passenger Demand, Badgerys Creek, Central Forecast (2035 and 2060)



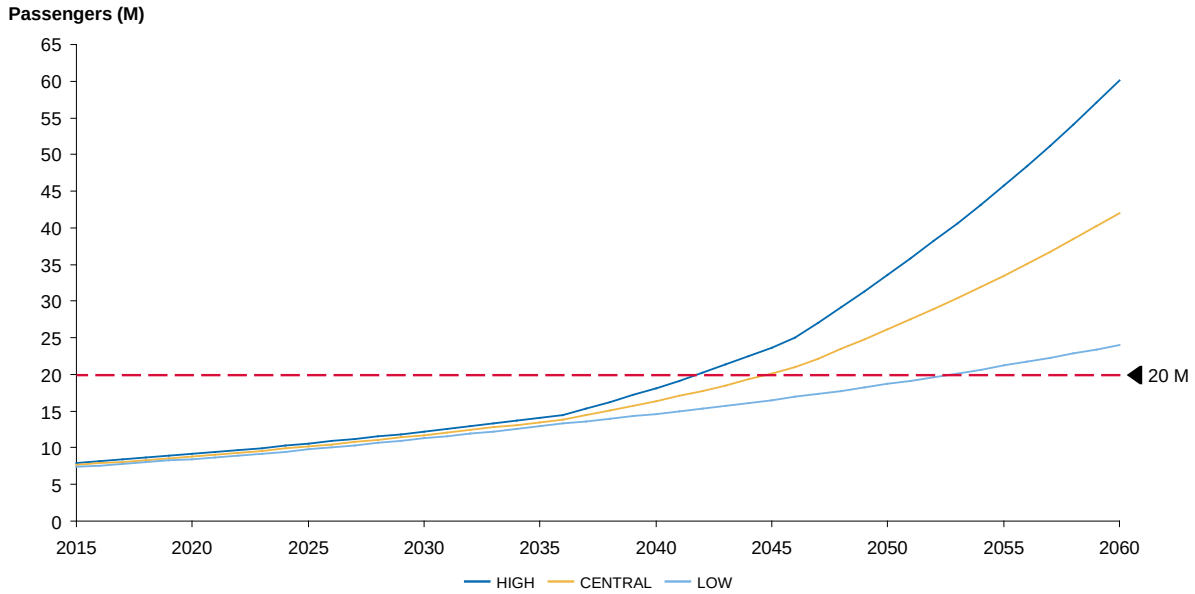
Note: Passenger diversion from Sydney (Kingsford-Smith) Airport falls over time because of the assumption that as the new facility approaches capacity, new passenger generated demand would be accommodated first.

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

6.1.3 Scenario 3 – High Capacity Tier 1

Under Scenario 3, a maximum capacity of 20 million annual passenger movements was assumed. An airport of this capacity would be in direct competition with Sydney (Kingsford-Smith) Airport. The results indicate that the assumed 20 million annual passenger movements would be reached by 2042 for the High Case, 2045 for the Central Case and after 2053 for the Low Case. This is shown in Figure 26 below.

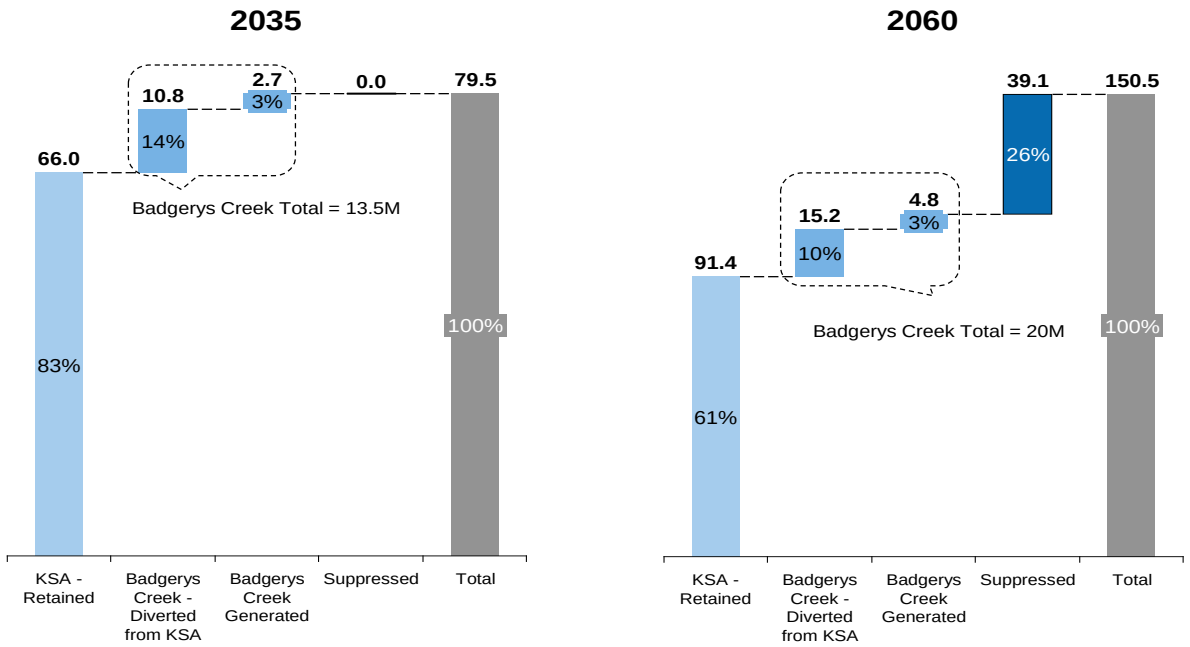
Figure 26: Scenario 3 – Passengers Demand for Badgerys Creek (2015 to 2060)



Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 27 shows the breakdown of unconstrained demand under Scenario 3 for the Central forecast in 2035 and 2060 respectively. Badgerys Creek is estimated to capture approximately 17 per cent of the total Sydney Region air travel demand in 2035 and 13 per cent in 2060, with Sydney (Kingsford-Smith) Airport continuing to act as the primary airport in the region serving approximately 83 per cent of the market in 2035 and 61 per cent in 2060. The level of unmet or suppressed demand in the Sydney Region is estimated to be approximately 39.1 million by 2060.

Figure 27: Scenario 3 – Breakdown of Passenger Demand, Badgerys Creek, Central Case (2035 and 2060)

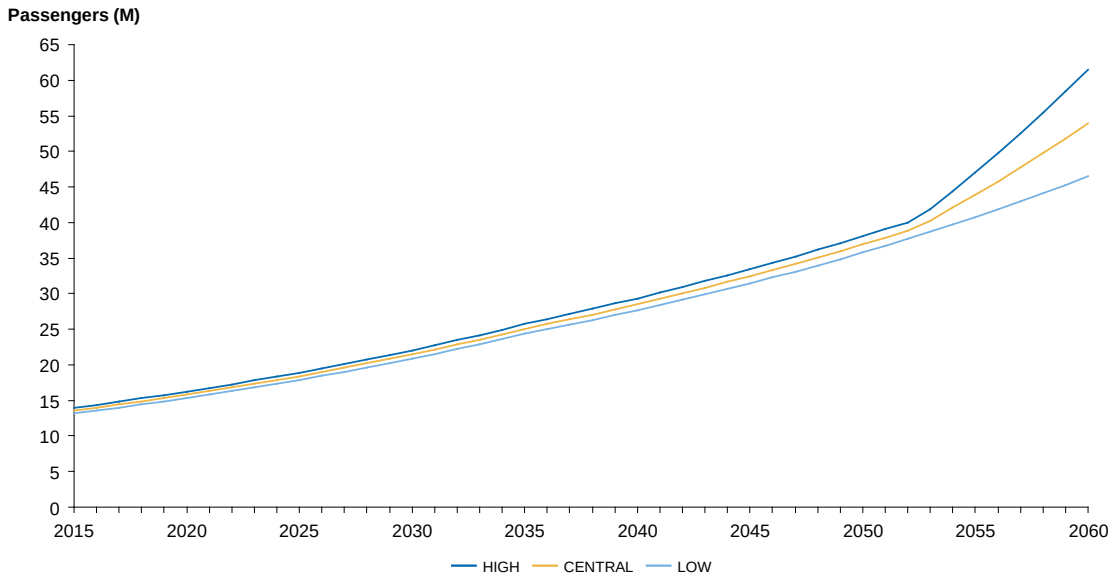


Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

6.1.4 Scenario 4 – High Capacity Tier 2

Scenario 4 assumed no capacity constraints on annual passenger movements at Badgerys Creek. The results indicate by 2060; the High Case would cater for over 61.5 million passenger movements annually, the Central Case would cater for approximately 54 million passenger movements annually, and the Low Case would cater for 46.5 million passenger movements annually. This is shown in Figure 28 below.

Figure 28: Scenario 4 – Passenger Demand for Badgerys Creek (2015 to 2060)

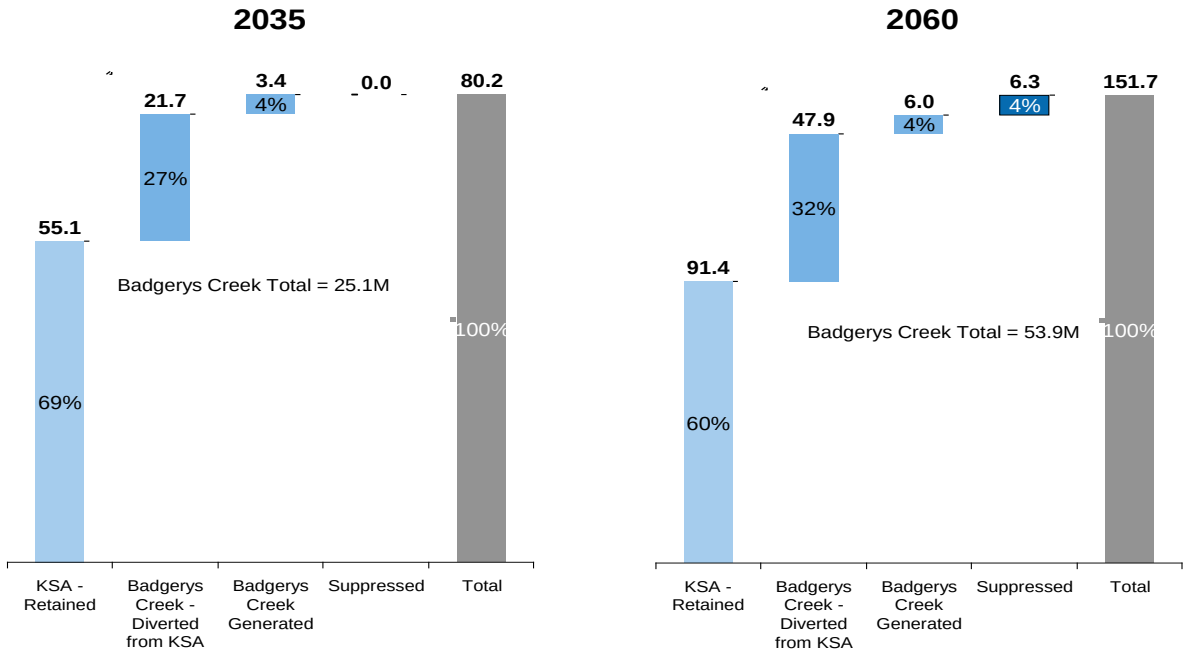


Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 29 shows the breakdown of unconstrained demand under Scenario 4 for the Central forecast in 2035 and 2060 respectively. Badgerys Creek is estimated to capture

approximately 31 per cent of the total Sydney Region air travel demand in 2035 and 36 per cent in 2060, with Sydney (Kingsford-Smith) Airport continuing to act as the primary airport in the region serving approximately 69 per cent of the market in 2035 and 60 per cent in 2060. The level of unmet or suppressed demand in the Sydney Region is estimated to be approximately 6.3 million by 2060 with the new facility being able to capture a significant portion of unmet demand from Sydney (Kingsford-Smith) Airport.

Figure 29: Scenario 4 – Breakdown of Passenger Demand, Badgerys Creek, Central Case (2035 and 2060)



Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

The forecast distribution of domestic and international trips by SLA for 2035 and 2060 is shown below in Table 6 and Table 7 respectively. As would be expected, Badgerys Creek captures a relatively higher share of trips from the areas closest to the Badgerys Creek site.

Table 6: Scenario 4 - Domestic Trip Distribution by Area, Central Case (2035 and 2060)

Sydney Area Regions	2035		2060	
	KSA	Badgerys Creek	KSA	Badgerys Creek
Sydney City	31.0%	5.9%	28.3%	7.2%
Inner North	6.9%	1.7%	6.3%	2.0%
South	6.7%	2.1%	6.1%	2.6%
East	6.1%	1.0%	5.6%	1.2%
North East	4.9%	1.4%	4.4%	1.8%
Inner West	3.4%	1.1%	3.1%	1.4%
North West	3.3%	7.1%	3.0%	8.7%
West Central	2.8%	2.7%	2.6%	3.2%
North	2.7%	2.3%	2.5%	2.8%
South West	1.5%	2.8%	1.3%	3.4%
Central Coast	1.4%	1.0%	1.3%	1.2%
TOTAL	**70.8%**	**29.2%**	**64.5%**	**35.5%**

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

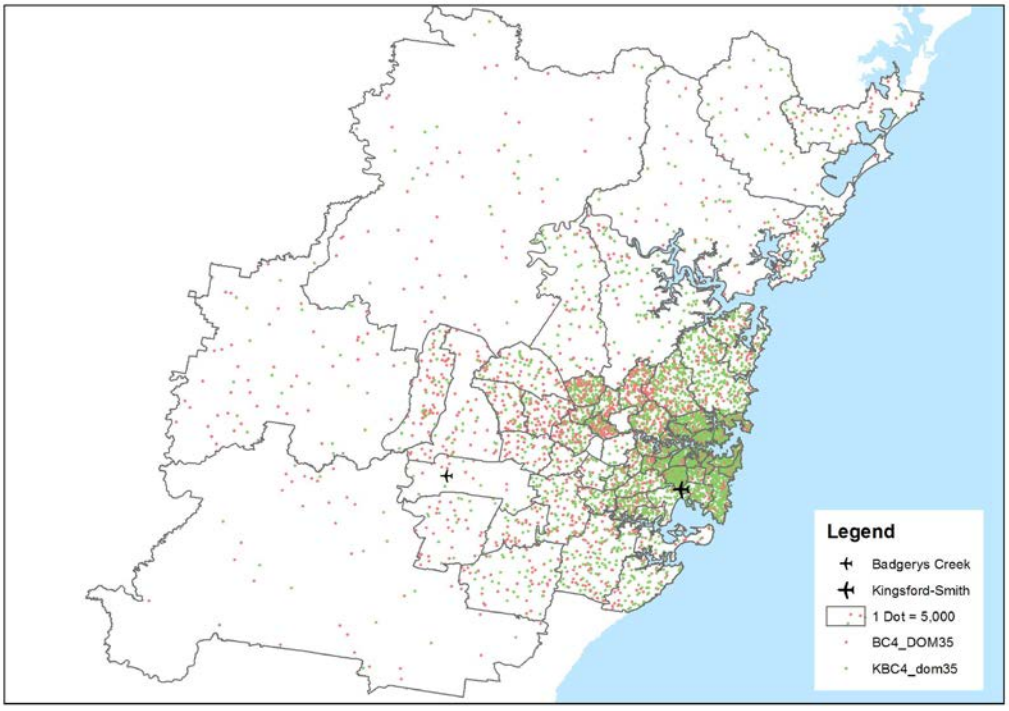
Table 7: Scenario 4 – International Trip Distribution by Area, Central Case (2035 and 2060)

Sydney Area Regions	2035		2060	
	KSA	Badgerys Creek	KSA	Badgerys Creek
Sydney City	27.1%	7.4%	27.1%	9.5%
East	6.5%	1.6%	5.9%	1.8%
South	6.4%	2.7%	5.6%	3.0%
Inner North	6.1%	2.1%	5.4%	2.4%
North East	4.0%	1.5%	3.5%	1.7%
North West	3.5%	7.7%	3.0%	8.3%
West Central	3.4%	3.4%	2.9%	3.8%
North	3.0%	3.0%	2.6%	3.3%
Inner West	2.7%	1.3%	2.4%	1.5%
Central Coast	1.4%	1.1%	1.1%	1.2%
South West	1.4%	2.7%	1.2%	2.9%
TOTAL	**65.5%**	**34.5%**	**60.7%**	**39.3%**

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

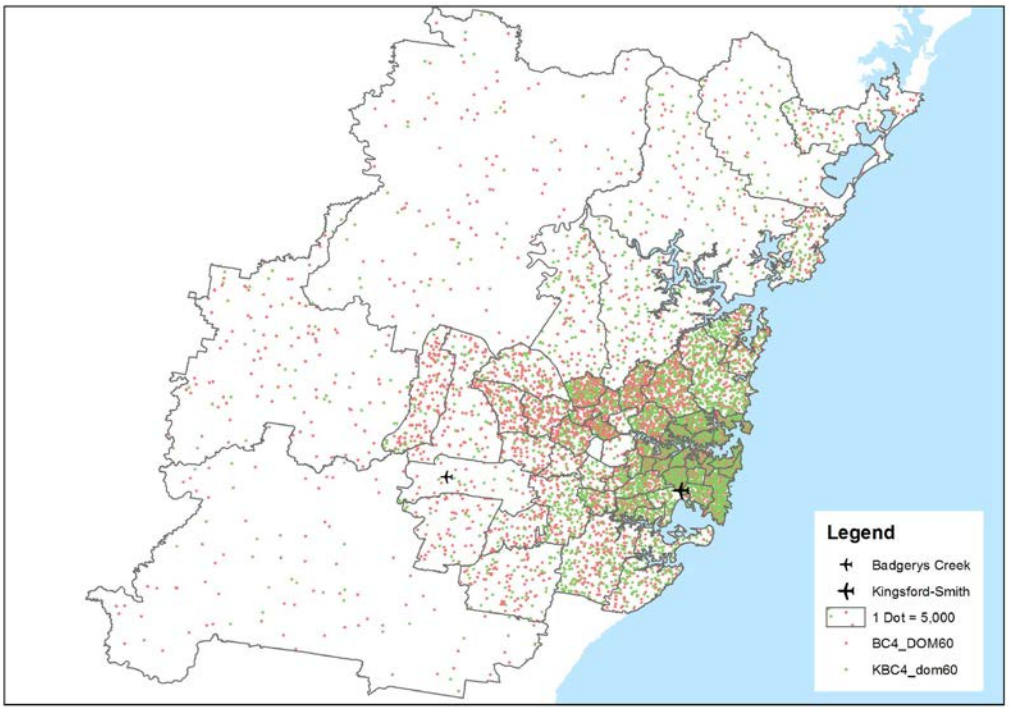
This domestic air trip distribution is shown graphically in Figure 30 and Figure 31 below for 2035 and 2060 respectively.

Figure 30: Scenario 4 – Domestic Trips by SLA in 2035



*Note: **BC4_DOM35** in the legend refers to domestic air trips forecast to be undertaken from a facility in Badgerys Creek in 2035; **KBC4_dom35** in the legend refers to domestic air trips forecast to be undertaken from Sydney (Kingsford-Smith) Airport in 2035. Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).*

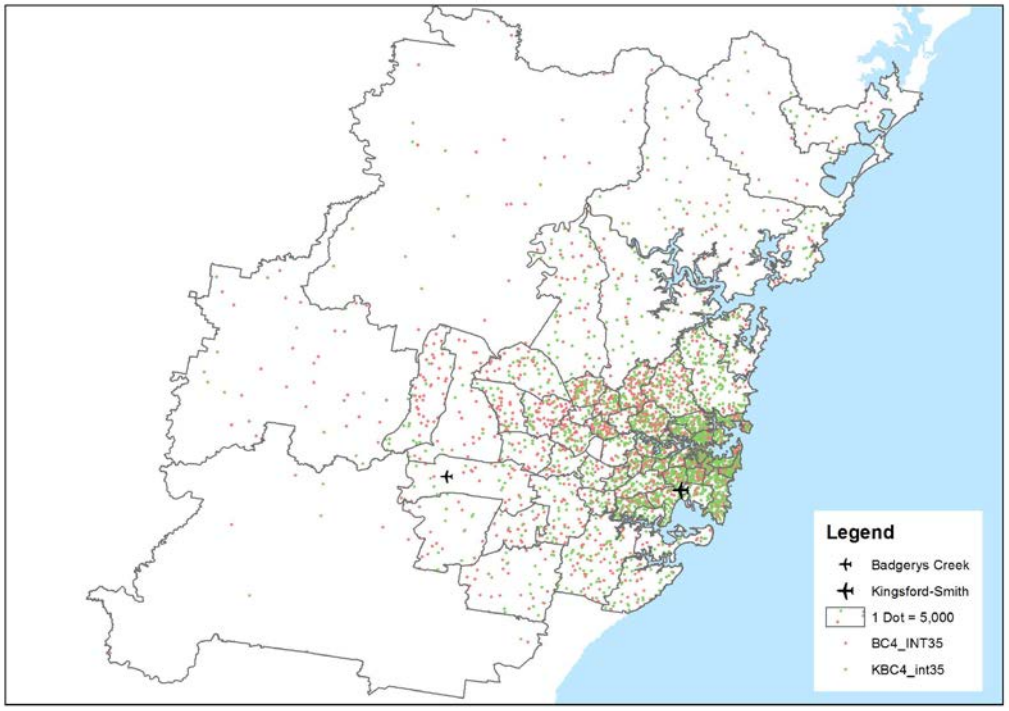
Figure 31: Scenario 4 – Domestic Trips by SLA in 2060



*Note: **BC4_DOM60** in the legend refers to domestic air trips forecast to be undertaken from a facility in Badgerys Creek in 2060; **KBC4_dom60** in the legend refers to domestic air trips forecast to be undertaken from Sydney (Kingsford-Smith) Airport in 2060. Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).*

The distribution of international trips by area is shown in Figure 32 and Figure 33 below for 2035 and 2060 respectively.

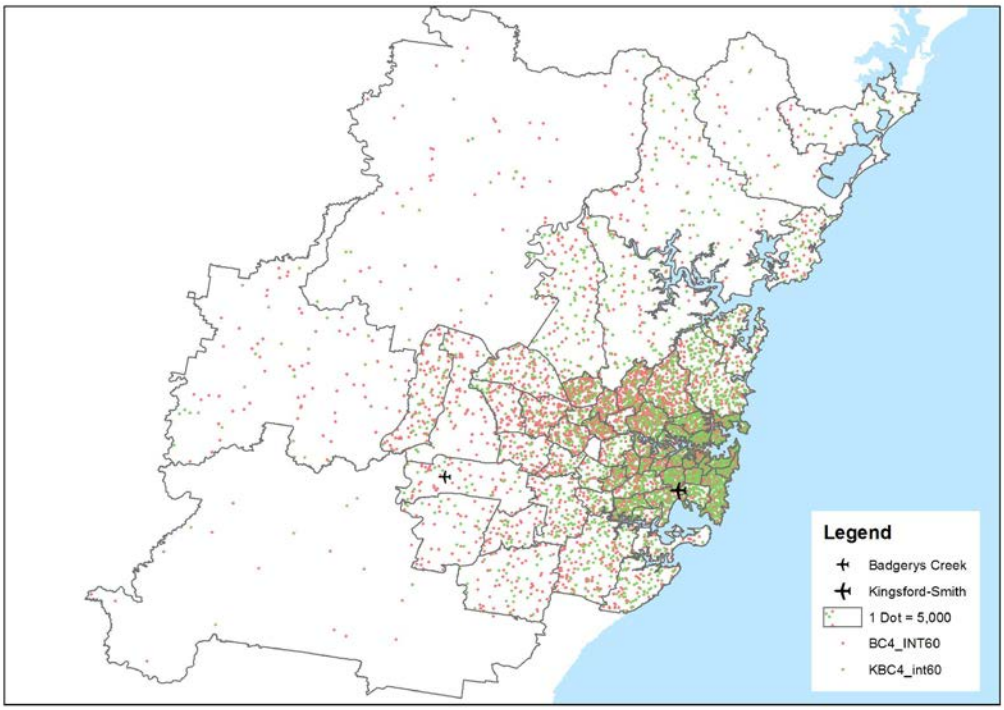
Figure 32: Scenario 4 – International Trips by SLA in 2035



*Note: **BC4_INT35** in the legend refers to international air trips undertaken from a facility in Badgerys Creek in 2035; **KBC4_int35** in the legend refers to domestic air trips forecast to be undertaken from Sydney (Kingsford-Smith) Airport in 2035.*

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 33: Scenario 4 – International Trips by SLA in 2060



*Note: **BC4_INT60** in the legend refers to international air trips undertaken from a facility in Badgerys Creek in 2060; **KBC4_int60** in the legend refers to domestic air trips forecast to be undertaken from Sydney (Kingsford-Smith) Airport in 2060.*
Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

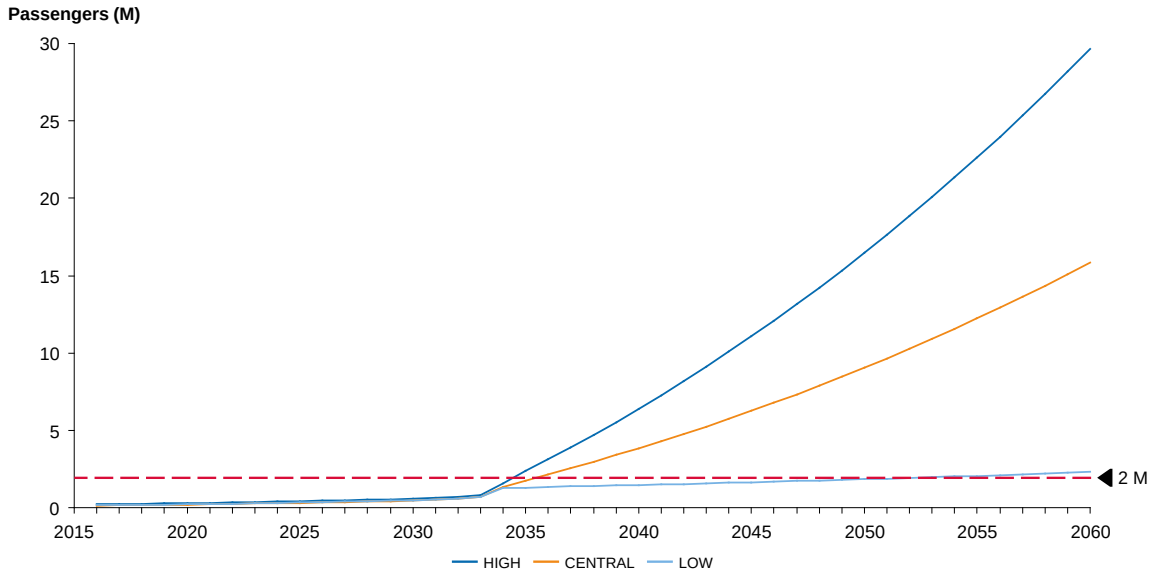
6.2 Wilton

6.2.1 Scenario 1 – Low Capacity

Scenario 1 assumes that all international and regional passengers would remain at Sydney (Kingsford-Smith) Airport and that airlines would target larger domestic markets for potential start-up operations at Wilton where the airline could sustainably capture part of the market as opposed to moving individual regional (intrastate) markets away from Sydney (Kingsford-Smith) Airport.

Based on the assumptions described above, it is forecast that an additional RPT facility of 2 million passengers per annum at Wilton would be able to cater for demand until 2035 for the High Case, 2036 for the Central Case and 2054 for the Low Case (see Figure 34).

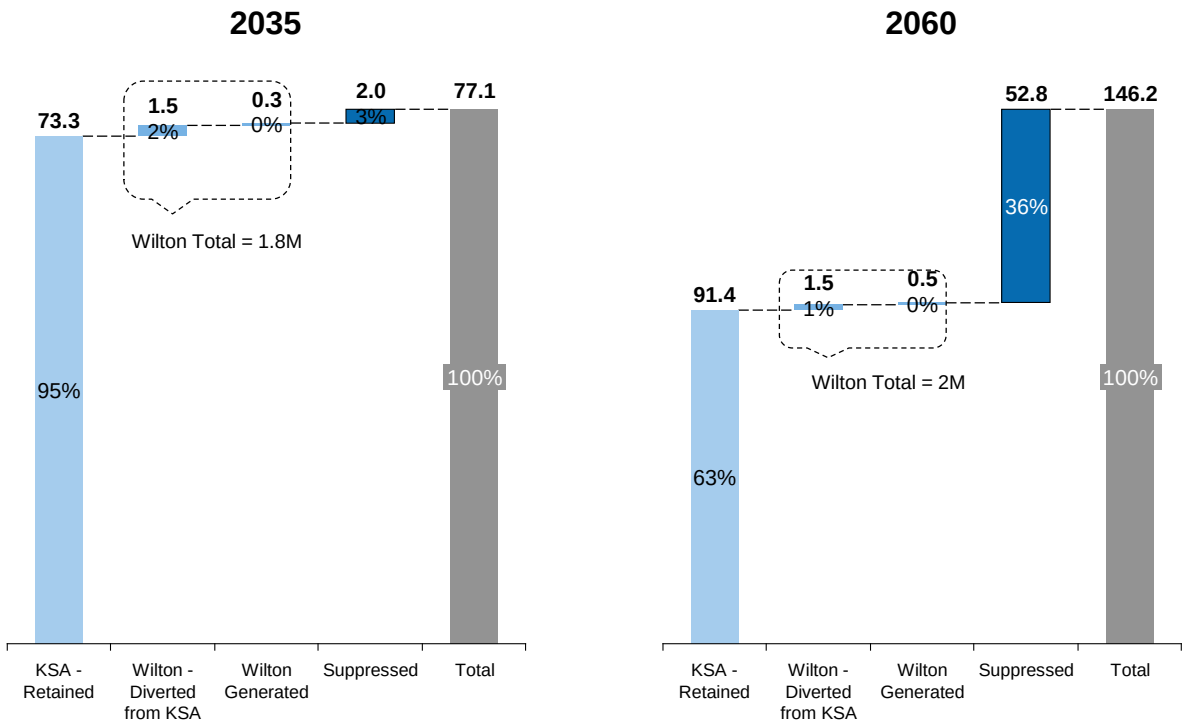
Figure 34: Scenario 1 – Passenger Demand for Wilton (2015 to 2060)



Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 35 shows the breakdown of unconstrained demand under Scenario 1 for the Central forecast in 2035 and 2060 respectively. Wilton, which will operate in complementary conditions to Sydney (Kingsford-Smith) Airport, is estimated to capture approximately 2 per cent of the total Sydney Region air travel demand in 2035 and 1.0 per cent in 2060. Sydney (Kingsford-Smith) Airport would continue to act as the primary airport in the region serving approximately 95 per cent of the market in 2035 and 63 per cent in 2060. The level of unmet or suppressed demand in the Sydney Region is estimated to increase from approximately 2 million in 2035 to 52.8 million by 2060 with the new facility being able to capture only a small amount of the unmet demand.

Figure 35: Scenario 1 - Breakdown of Passenger Demand, Wilton, Central Case (2035 and 2060)



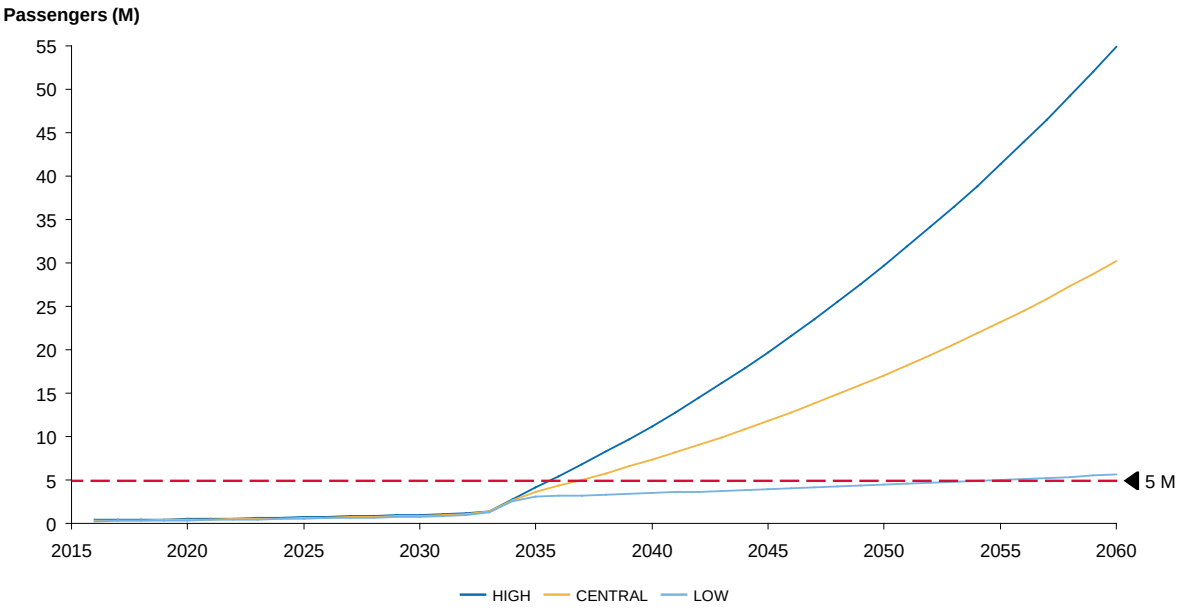
Note: Passenger diversion from Sydney (Kingsford-Smith) Airport falls over time because of the assumption that as the new facility approaches capacity, new passenger generated demand would be accommodated first.

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

6.2.2 Scenario 2 – Medium Capacity

The results for Scenario 2 indicate that the assumed 5 million annual passenger movement capacity would be reached in 2036 for the High Case, 2037 for the Central Case and 2056 for the Low Case. This is shown in Figure 36 below.

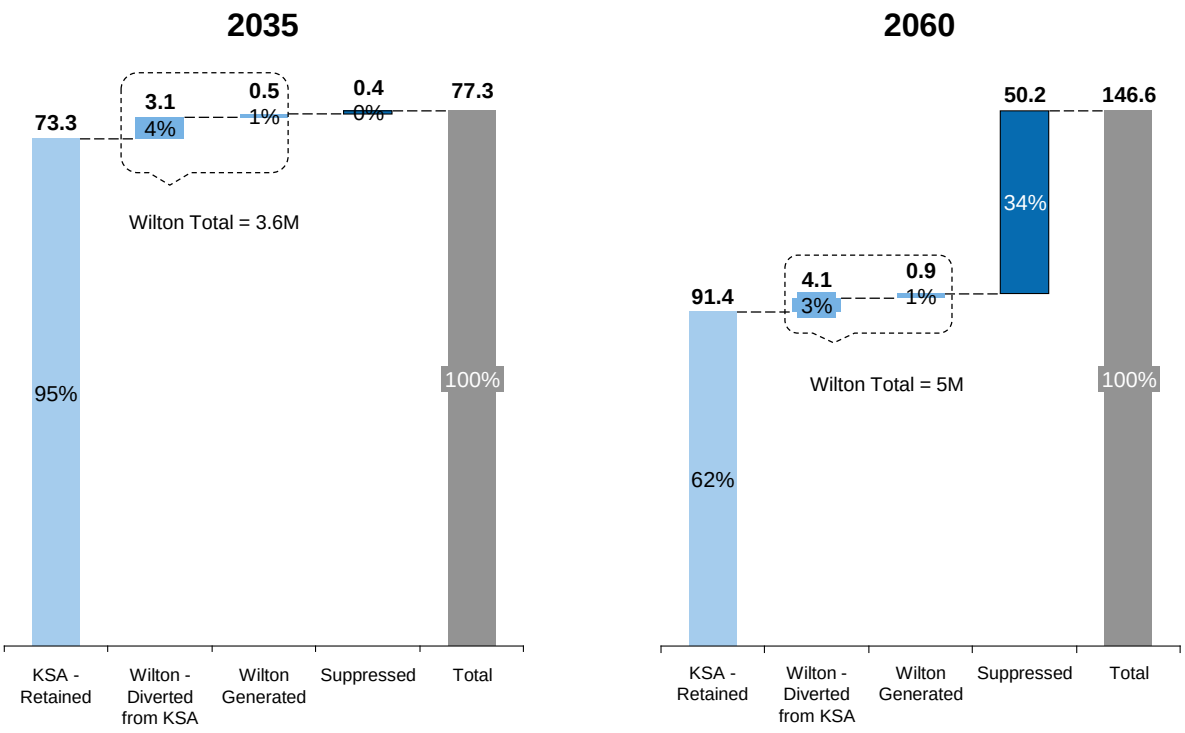
Figure 36: Scenario 2 – Passenger Demand for Wilton (2015 to 2060)



Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 37 shows the breakdown of unconstrained demand under Scenario 2 for the Central forecast in 2035 and 2060 respectively. Wilton, which will operate in complementary conditions to Sydney (Kingsford-Smith) Airport, is estimated to capture approximately 5 per cent of the total Sydney Region air travel demand in 2035 and 4.0 per cent in 2060. Sydney (Kingsford-Smith) Airport would continue to act as the primary airport in the region serving approximately 95 per cent of the market in 2035 and 62 per cent in 2060. The level of unmet or suppressed demand in the Sydney Region is estimated to be approximately 50.2 million by 2060 with the new facility being able to capture only a small amount of the unmet demand.

Figure 37: Scenario 2 – Breakdown of Passenger Demand, Wilton, Central Case (2035 and 2060)



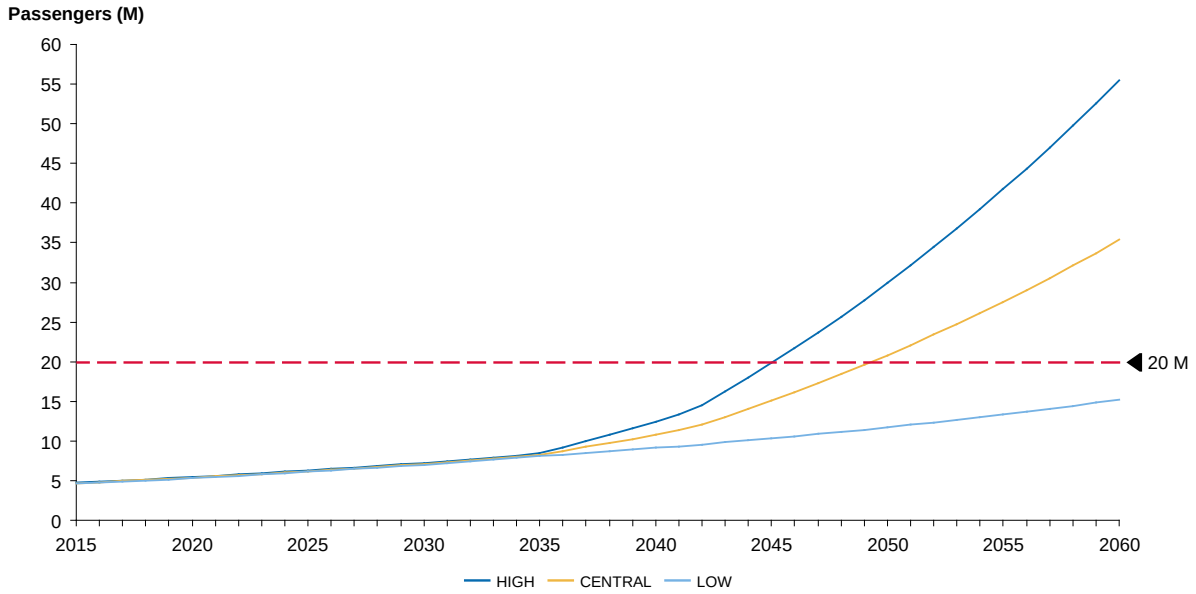
Note: Passenger diversion from Sydney (Kingsford-Smith) Airport falls over time because of the assumption that as the new facility approaches capacity, new passenger generated demand would be accommodated first.

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

6.2.3 Scenario 3 – High Capacity Tier 1

Under Scenario 3, a maximum capacity of 20 million annual passenger movements was assumed. An airport of this capacity would be in direct competition with Sydney (Kingsford-Smith) Airport. The results indicate that the assumed 20 million annual passenger movements would be reached by 2046 for the High Case, 2050 for the Central Case and after 2060 for the Low Case. This is shown in Figure 38.

Figure 38: Scenario 3 – Passengers Demand for Wilton (2015 to 2060)



Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 39 shows the breakdown of unconstrained demand under Scenario 3 for the Central forecast in 2035 and 2060 respectively. Wilton is estimated to capture approximately 11 per cent of the total Sydney Region air travel demand in 2035 and 14 per cent in 2060, with Sydney (Kingsford-Smith) Airport continuing to act as the primary airport in the region serving approximately 69 per cent of the market in 2035 and 62 per cent in 2060. The level of unmet or suppressed demand in the Sydney Region is estimated to be approximately 35.3 million by 2060.

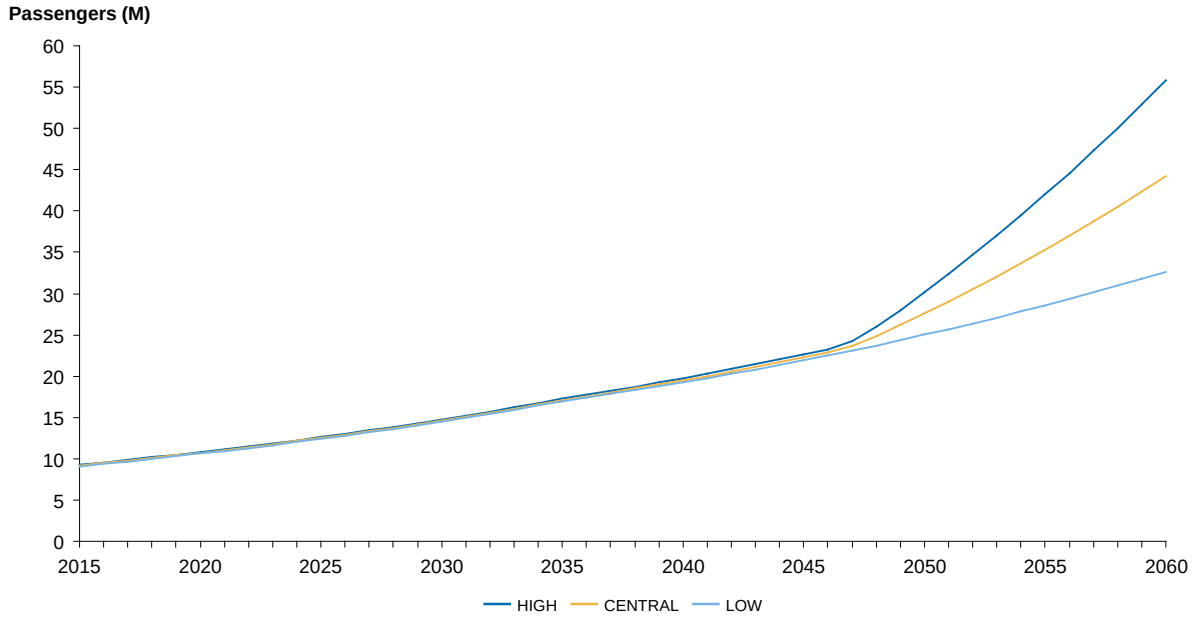
Figure 39: Scenario 3 – Breakdown of Passenger Demand, Wilton, Central Case (2035 and 2060)

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

6.2.4 Scenario 4 – High Capacity Tier 2

Scenario 4 assumed no capacity constraints on annual passenger movements. The results indicate by 2060; the High Case would cater for over 55.8 million passenger movements annually, the Central Case would cater for approximately 44.2 million passenger movements annually, and the Low Case would cater for 32.7 million passenger movements annually. This is shown in Figure 40 below.

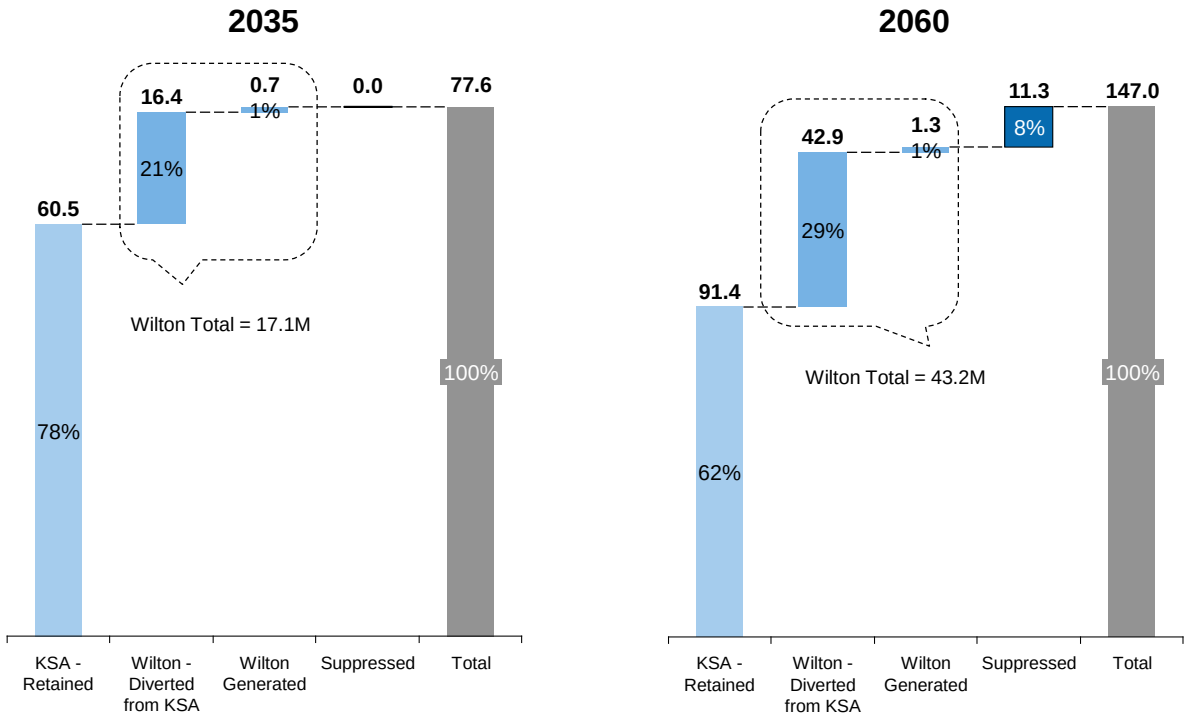
Figure 40: Scenario 4 – Passenger Demand for Wilton (2015 to 2060)



Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 41 shows the breakdown of unconstrained demand under Scenario 4 for the Central forecast in 2035 and 2060 respectively. Wilton is estimated to capture approximately 22 per cent of the total Sydney Region air travel demand in 2035 and 30 per cent in 2060, with Sydney (Kingsford-Smith) Airport continuing to act as the primary airport in the region serving approximately 78 per cent of the market in 2035 and 62 per cent in 2060. The level of unmet or suppressed demand in the Sydney Region is estimated to be approximately 11.3 million by 2060 (i.e. 8 per cent of total demand), with Wilton forecast to capture about 29 per cent of the unmet demand from Sydney (Kingsford-Smith) Airport.

Figure 41: Scenario 4 – Breakdown of Passenger Demand, Wilton, Central Case (2035 and 2060)



Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

The forecast distribution of domestic and international trips by SLA for 2035 and 2060 are shown in Table 8 and Table 9 respectively. As would be expected, the figures for Wilton show that a relatively higher share of trips is captured from the areas closest to the Wilton's site.

Table 8: Scenario 4 - Domestic Trip Distribution by Sydney Area, Central Case (2035 and 2060)

Sydney Area Regions	2035		2060	
	KSA	Wilton	KSA	Wilton
Sydney City	33.5%	4.5%	29.0%	6.9%
Inner North	7.5%	1.3%	6.5%	2.0%
South	7.4%	1.8%	6.4%	2.7%
East	6.5%	0.8%	5.6%	1.3%
North East	5.5%	1.0%	4.8%	1.6%
North West	4.9%	3.2%	4.2%	4.9%
Inner West	3.9%	0.8%	3.3%	1.3%
West Central	3.7%	1.6%	3.2%	2.4%
North	3.6%	1.4%	3.2%	2.1%
Central Coast	1.8%	0.8%	1.5%	1.2%
South West	1.5%	2.9%	1.3%	4.5%
TOTAL	**79.8%**	**20.2%**	**69.1%**	**30.9%**

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

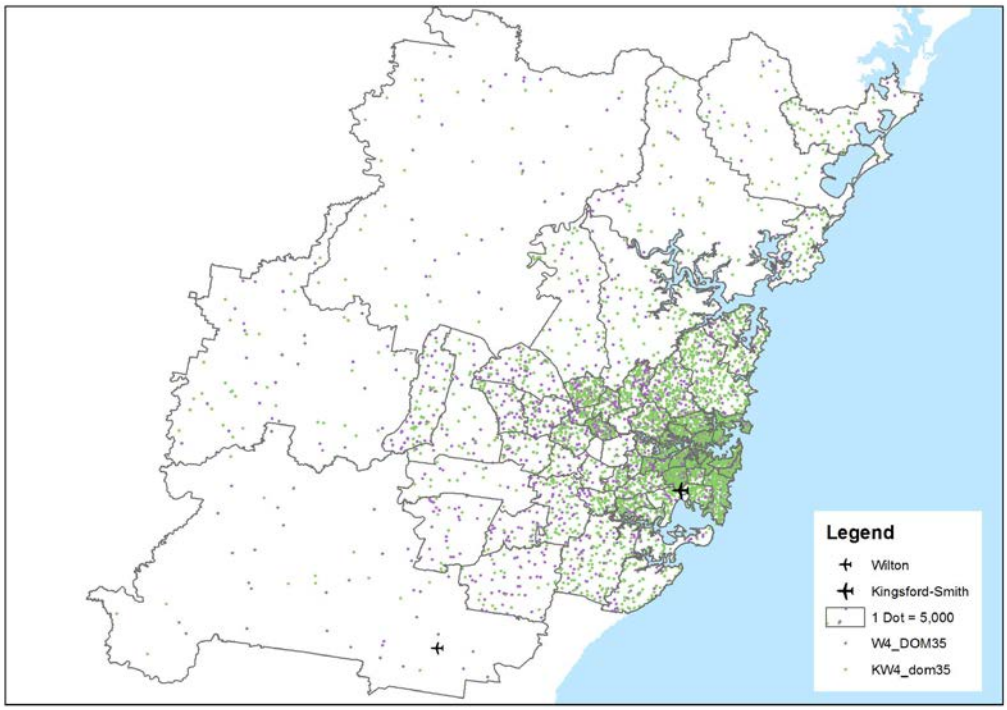
Table 9: Scenario 4 – International Trip Distribution by Sydney Area, Central Case (2035 and 2060)

Sydney Area Regions	2035		2060	
	KSA	Wilton	KSA	Wilton
Sydney City	29.8%	6.0%	28.1%	9.3%
South	7.1%	2.4%	5.8%	3.2%
East	7.0%	1.4%	6.0%	1.9%
Inner North	6.8%	1.7%	5.7%	2.4%
North West	5.0%	3.8%	4.0%	5.0%
North East	4.6%	1.1%	3.7%	1.5%
West Central	4.3%	2.2%	3.5%	3.0%
North	4.0%	1.9%	3.2%	2.5%
Inner West	3.2%	1.0%	2.6%	1.4%
Central Coast	1.7%	0.9%	1.3%	1.2%
South West	1.5%	2.6%	1.2%	3.5%
TOTAL	**75.0%**	**25.0%**	**65.1%**	**34.9%**

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

The distribution of domestic air trips is illustrated in Figure 42 and Figure 43 below for 2035 and 2060 respectively.

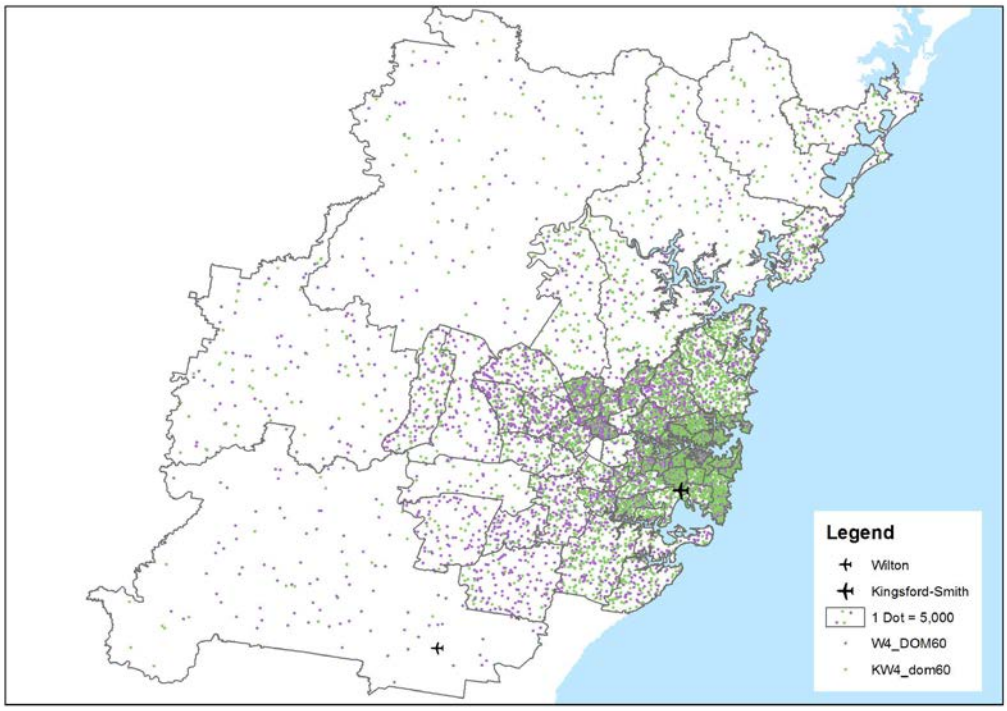
Figure 42: Scenario 4 – Domestic Trips by SLA in 2035



*Note: **W4_DOM35** in the legend refers to domestic air trips forecast to be undertaken from a facility in Wilton in 2035;*
***KW4_dom35** in the legend refers to domestic air trips forecast to be undertaken from Sydney (Kingsford-Smith) Airport in 2035.*

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

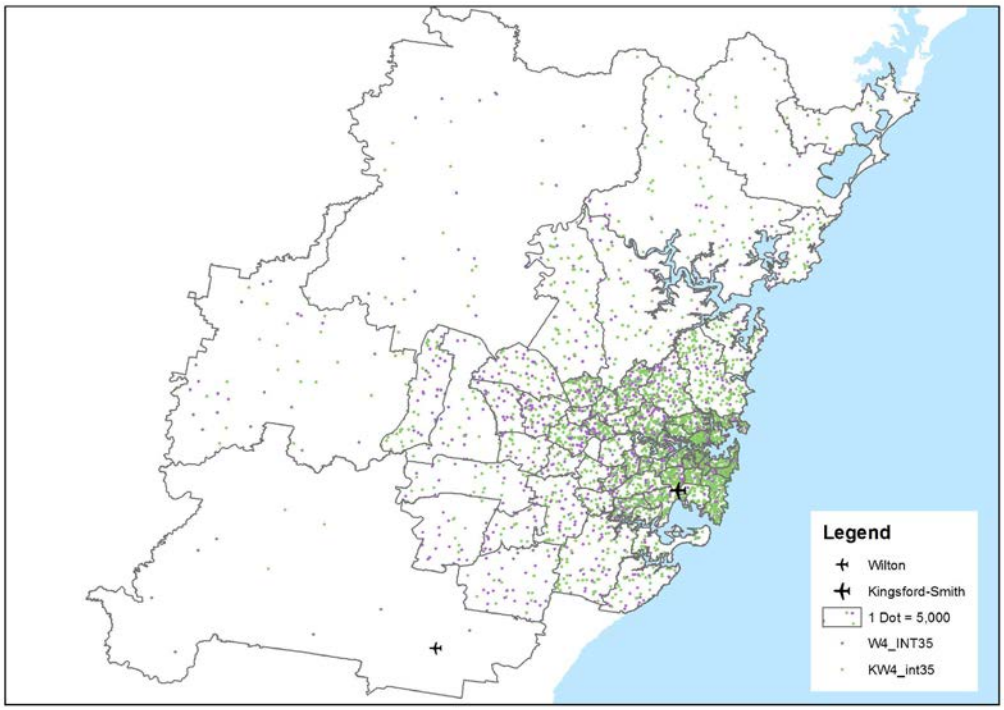
Figure 43: Scenario 4 – Domestic Trips by SLA in 2060



*Note: **W4_DOM60** in the legend refers to domestic air trips forecast to be undertaken from a facility in Wilton in 2060; **KW4_dom60** in the legend refers to domestic air trips forecast to be undertaken from Sydney (Kingsford-Smith) Airport in 2060.*
Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

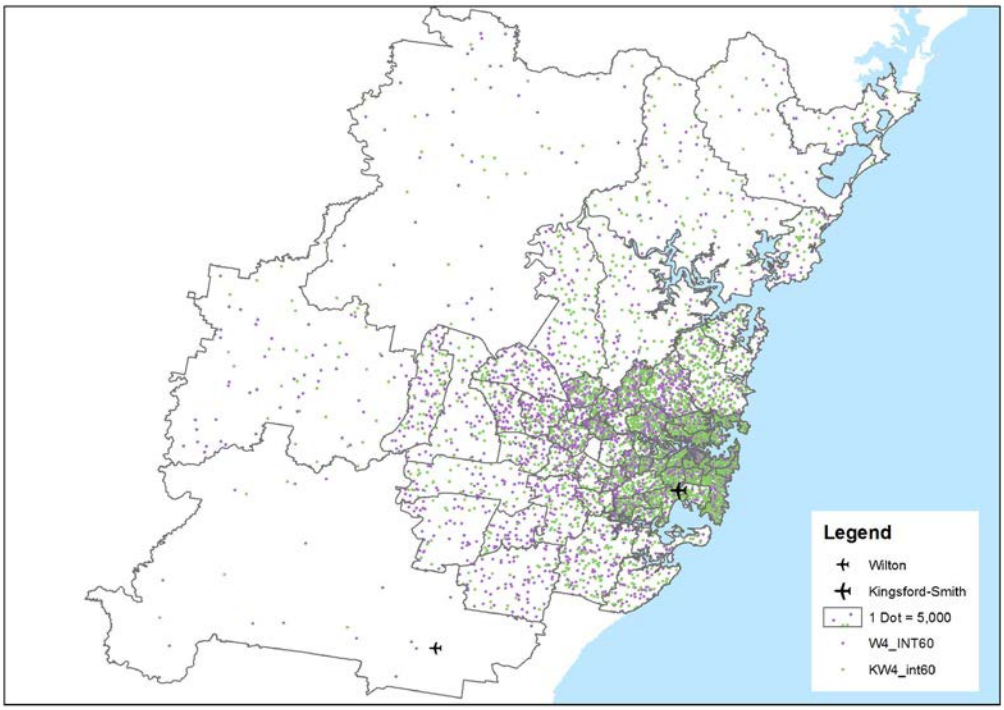
The distribution of international air trips is shown in Figure 44 and Figure 45 below for 2035 and 2060 respectively.

Figure 44: Scenario 4 – International Trips by SLA in 2035



*Note: **W4_INT35** in the legend refers to international air trips forecast to be undertaken from a facility in Wilton in 2035; **KW4_int35** in the legend refers to international air trips forecast to be undertaken from Sydney (Kingsford-Smith) Airport in 2035. Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).*

Figure 45: Scenario 4 – International Trips by SLA in 2060



*Note: **W4_INT60** in the legend refers to international air trips forecast to be undertaken from a facility in Wilton in 2060; **KW4_int60** in the legend refers to international air trips forecast to be undertaken from Sydney (Kingsford-Smith) Airport in 2060.* Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

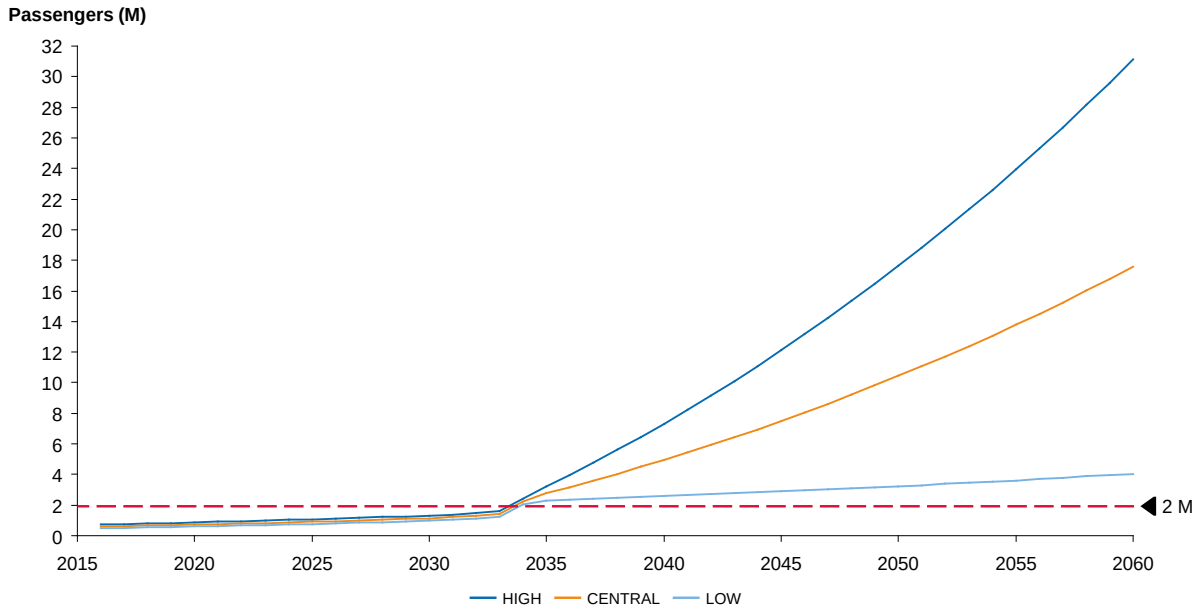
6.3 RAAF Base Richmond

6.3.1 Scenario 1 – Low Capacity

Scenario 1 assumes that all international and regional passengers would remain at Sydney (Kingsford-Smith) Airport and that airlines would target larger domestic markets for potential start-up operations at RAAF Base Richmond where the airline could sustainably capture part of the market as opposed to moving individual regional (intrastate) markets away from Sydney (Kingsford-Smith) Airport.

Based on the assumptions described above, it is forecast that an additional RPT facility of 2 million passengers per annum at RAAF Base Richmond would be able to cater for demand until 2034 for the High, Central and the Low Case. This is shown in Figure 46.

Figure 46: Scenario 1 – Passenger Demand for RAAF Base Richmond (2015 to 2060)



Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 47 shows the breakdown of unconstrained demand under Scenario 1 for the Central forecast in 2035 and 2060 respectively. Richmond, which will operate in complementary conditions to Sydney (Kingsford-Smith) Airport, is estimated to capture approximately 2 per cent of the total Sydney Region air travel demand in 2035 and 1.0 per cent in 2060, with Sydney (Kingsford-Smith) Airport continuing to act as the primary airport in the region serving approximately 95 per cent of the market in 2035 and 62 per cent in 2060. The level of unmet or suppressed demand in the Sydney Region is estimated to increase from approximately 2.5 million in 2035 to 54 million by 2060 with the new facility being able to capture only a small amount of the unmet demand.

Figure 47: Scenario 1 - Breakdown of Passenger Demand, RAAF Base Richmond, Central Case (2035 and 2060)

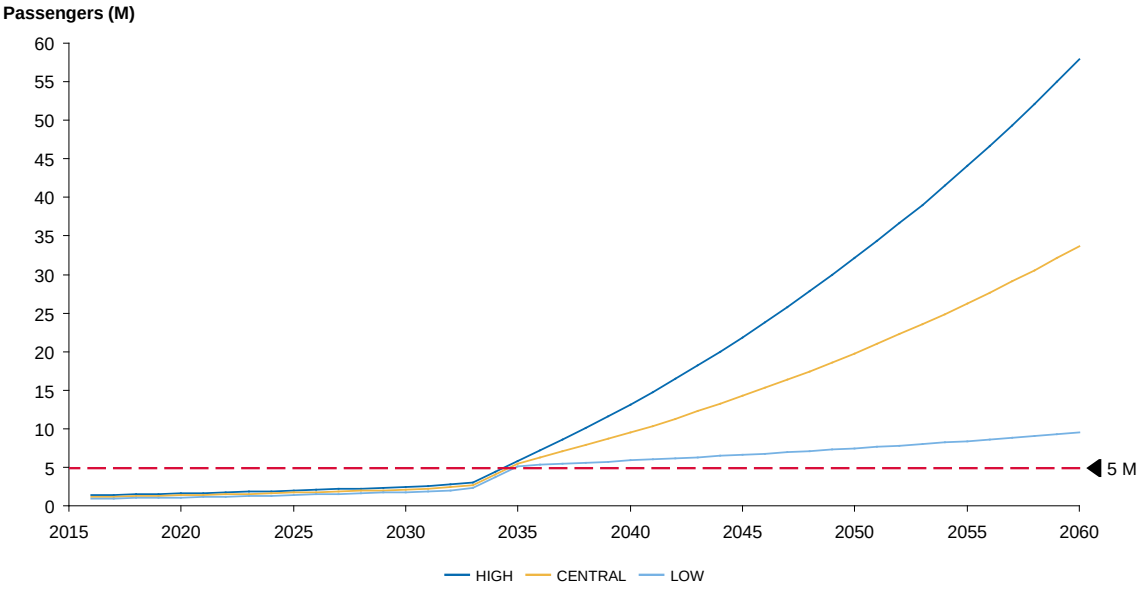
Note: Passenger diversion from Sydney (Kingsford-Smith) Airport falls over time because of the assumption that as the new facility approaches capacity, new passenger generated demand would be accommodated first.

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

6.3.2 Scenario 2 – Medium Capacity

The results for Scenario 2 indicate that the assumed 5 million annual passenger movement capacity would be reached in 2035 for the High, Central and Low Cases. This is shown in Figure 48 below.

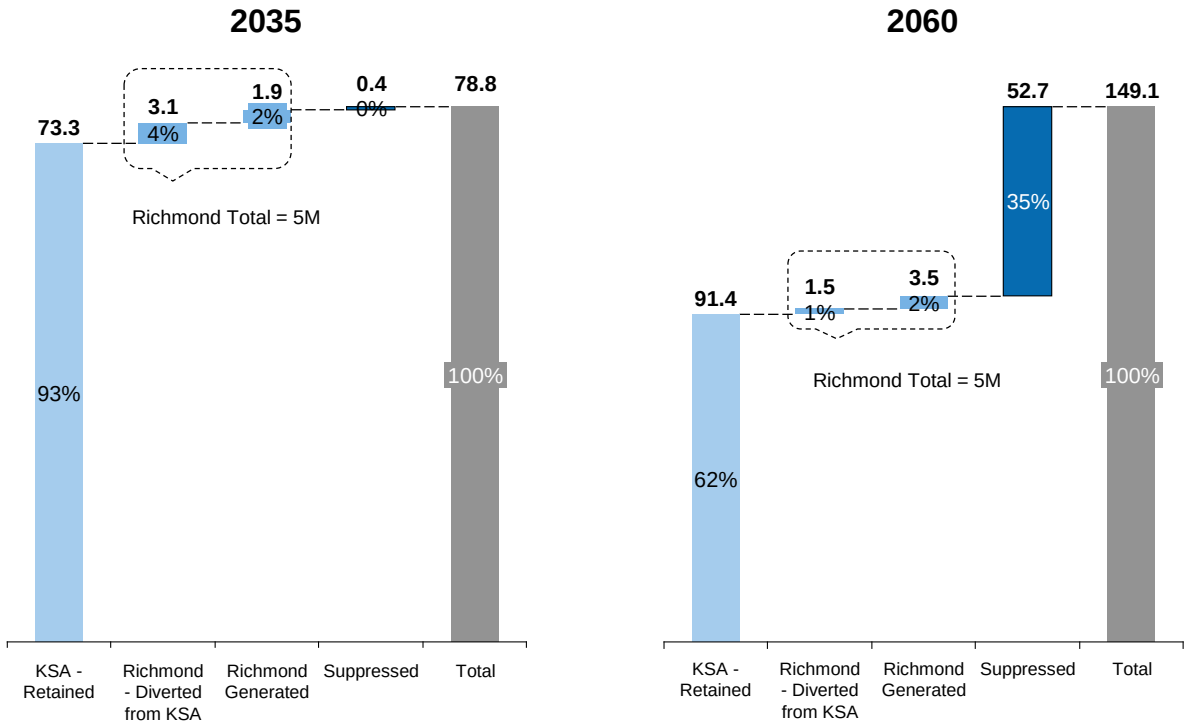
Figure 48: Scenario 2 – Passenger Demand for RAAF Base Richmond (2015 to 2060)



Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 49 shows the breakdown of unconstrained demand under Scenario 2 for the Central forecast in 2035 and 2060 respectively. Richmond, which will operate in complementary conditions to Sydney (Kingsford-Smith) Airport, is estimated to capture approximately 6 per cent of the total Sydney Region air travel demand in 2035 and 3.0 per cent in 2060, with Sydney (Kingsford-Smith) Airport continuing to act as the primary airport in the region serving approximately 93 per cent of the market in 2035 and 62 per cent in 2060. The level of unmet or suppressed demand in the Sydney Region is estimated to be approximately 52.7 million by 2060 with the new facility being able to capture only a small amount of the unmet demand.

Figure 49: Scenario 2 – Breakdown of Passenger Demand, RAAF Base Richmond, Central Case (2035 and 2060)



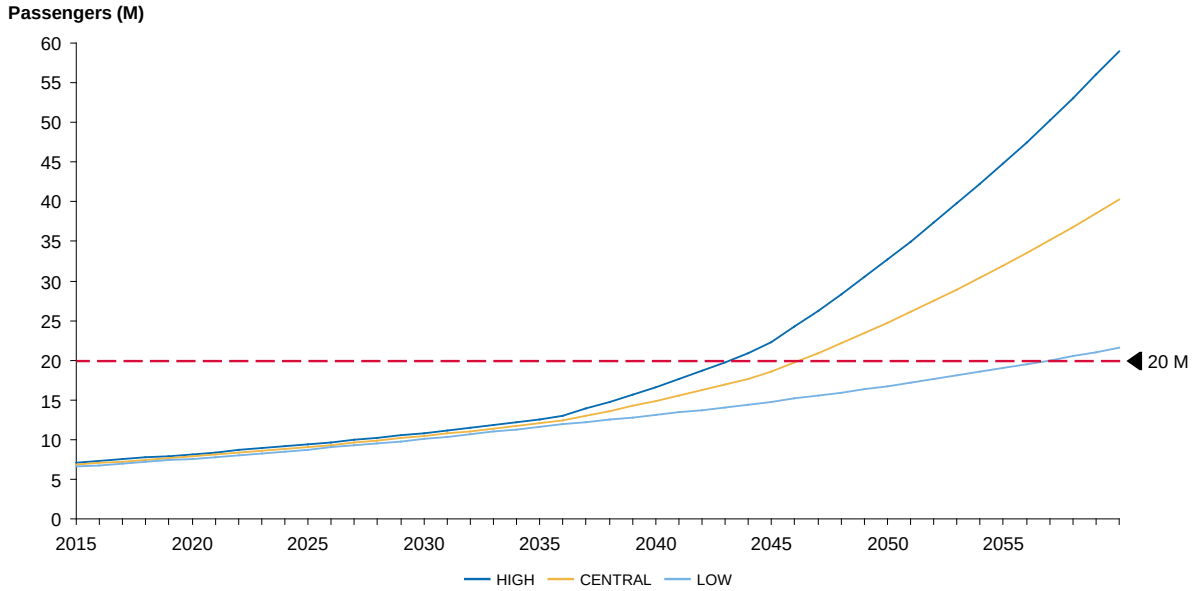
Note: Passenger diversion from Sydney (Kingsford-Smith) Airport falls over time because of the assumption that as the new facility approaches capacity, new passenger generated demand would be accommodated first.

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

6.3.3 Scenario 3 – High Capacity Tier 1

Under Scenario 3, a maximum capacity of 20 million annual passenger movements was assumed for Richmond. An airport of this capacity would be in direct competition with Sydney (Kingsford-Smith) Airport. The results indicate that the assumed 20 million annual passenger movements would be reached by 2044 for the High Case, 2047 for the Central Case and after 2057 for the Low Case. This is shown in Figure 50.

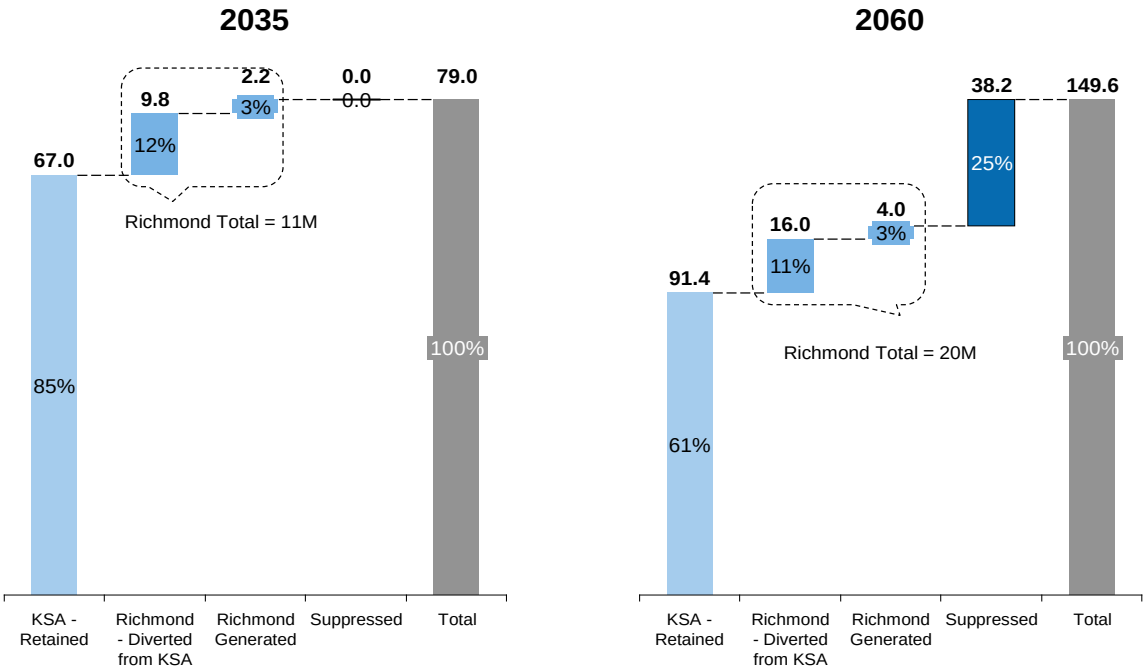
Figure 50: Scenario 3 – Passengers Demand for RAAF Base Richmond (2015 to 2060)



Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 51 shows the breakdown of unconstrained demand under Scenario 3 for the Central forecast in 2035 and 2060 respectively. Richmond is estimated to capture approximately 15 per cent of the total Sydney Region air travel demand in 2035 and 14 per cent in 2060, with Sydney (Kingsford-Smith) Airport continuing to act as the primary airport in the region serving approximately 85 per cent of the market in 2035 and 61 per cent in 2060. The level of unmet or suppressed demand in the Sydney Region is estimated to be approximately 38.2 million by 2060.

Figure 51: Scenario 3 – Breakdown of Passenger Demand at RAAF Base Richmond, Central Case (2035 and 2060)

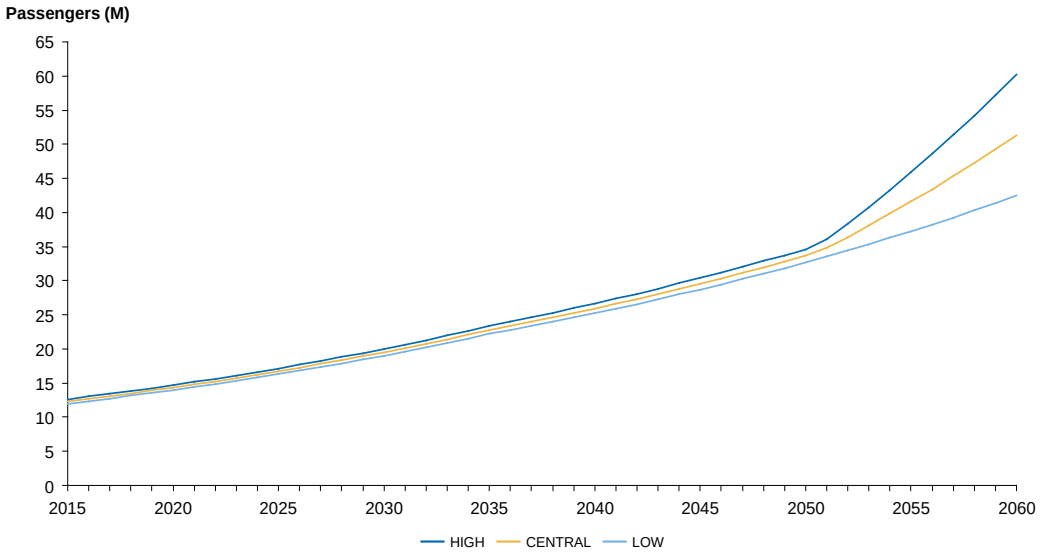


Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

6.3.4 Scenario 4 – High Capacity Tier 2

Scenario 4 assumed no capacity constraints on annual passenger movements. The results indicate by 2060; the High Case would cater for 60.2 million passenger movements annually, the Central Case would cater for approximately 51.4 million passenger movements annually, and the Low Case would cater for 42.5 million passenger movements annually. This is shown in Figure 52 below.

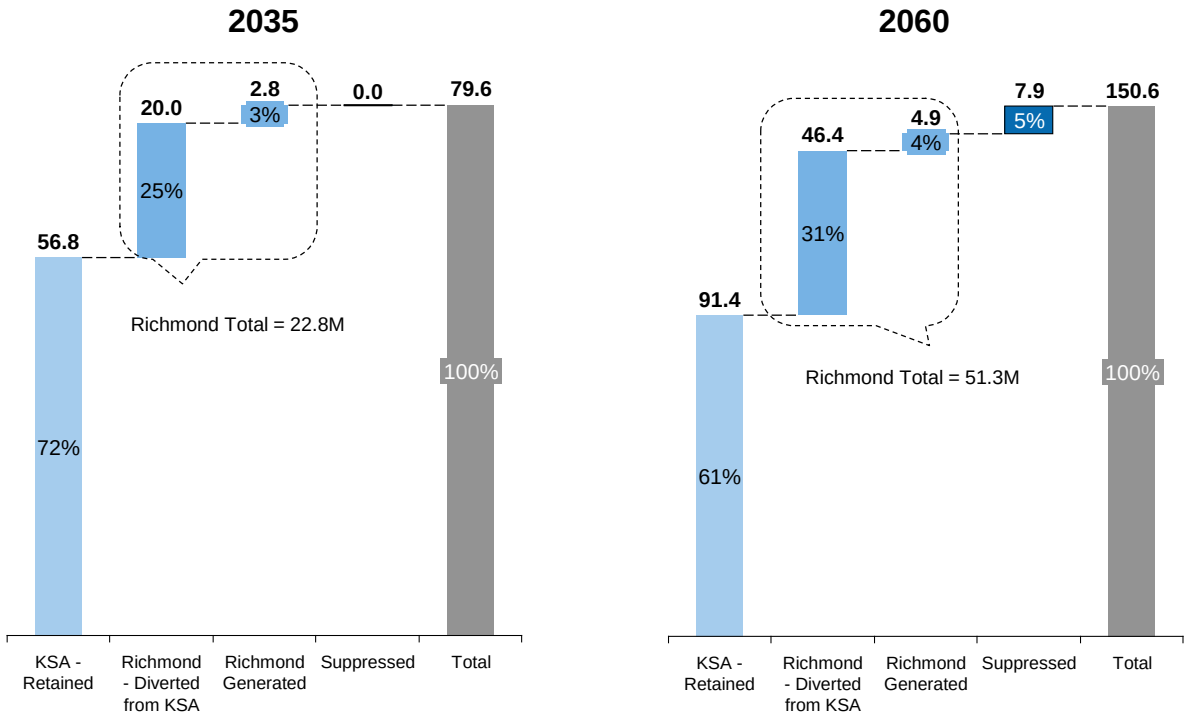
Figure 52: Scenario 4 – Passenger Demand for RAAF Base Richmond (2015 to 2060)



Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 53 shows the breakdown of unconstrained demand under Scenario 4 for the Central forecast in 2035 and 2060 respectively. Richmond is estimated to capture approximately 28 per cent of the total Sydney Region air travel demand in 2035 and 35 per cent in 2060, with Sydney (Kingsford-Smith) Airport continuing to act as the primary airport in the region serving approximately 72 per cent of the market in 2035 and 61 per cent in 2060. The level of unmet or suppressed demand in the Sydney Region is estimated to be approximately 7.9 million by 2060 (i.e. 5 per cent of total demand) with the new facility estimated to capture about 31 per cent of the unmet demand from Sydney (Kingsford-Smith) Airport.

Figure 53: Scenario 4 – Breakdown of Passenger Demand, RAAF Base Richmond, Central Case (2035 and 2060)



Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

The forecast distribution of domestic trips by SLA for 2035 and 2060 is shown in Table 10 below and international in Table 11. As would be expected, the figures for RAAF Base Richmond show that a relatively higher share of trips is captured from the areas closest to the RAAF Base Richmond's site.

Table 10: Scenario 4 - Domestic Trip Distribution by Area, Central Case (2035 and 2060)

Sydney Area Regions	2035		2060	
	KSA	Richmond	KSA	Richmond
Sydney City	30.8%	6.3%	27.6%	8.1%
South	8.0%	1.0%	7.2%	1.3%
Inner North	6.7%	1.8%	6.0%	2.4%
East	6.4%	0.8%	5.7%	1.1%
North East	4.7%	1.6%	4.2%	2.1%
Inner West	3.7%	0.9%	3.3%	1.2%
West Central	3.4%	1.7%	3.1%	2.2%
North West	3.0%	8.4%	2.7%	10.8%
North	2.9%	1.9%	2.6%	2.5%
South West	2.2%	1.1%	2.0%	1.4%
Central Coast	1.3%	1.1%	1.2%	1.4%
TOTAL	**73.3%**	**26.7%**	**65.7%**	**34.3%**

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Table 11: Scenario 4 – International Trip Distribution by Area, Central Case (2035 and 2060)

Sydney Area Regions	2035		2060	
	KSA	Richmond	KSA	Richmond
Sydney City	27.1%	7.7%	26.5%	10.4%
South	7.7%	1.5%	6.6%	1.7%
East	6.8%	1.3%	6.0%	1.6%
Inner North	6.0%	2.3%	5.2%	2.7%
West Central	4.0%	2.3%	3.4%	2.7%
North East	3.9%	1.6%	3.3%	1.9%
North	3.3%	2.5%	2.7%	2.9%
North West	3.3%	9.0%	2.7%	10.2%
Inner West	3.0%	1.1%	2.6%	1.3%
South West	2.0%	1.1%	1.7%	1.3%
Central Coast	1.3%	1.2%	1.1%	1.3%
TOTAL	**68.3%**	**31.7%**	**61.8%**	**38.2%**

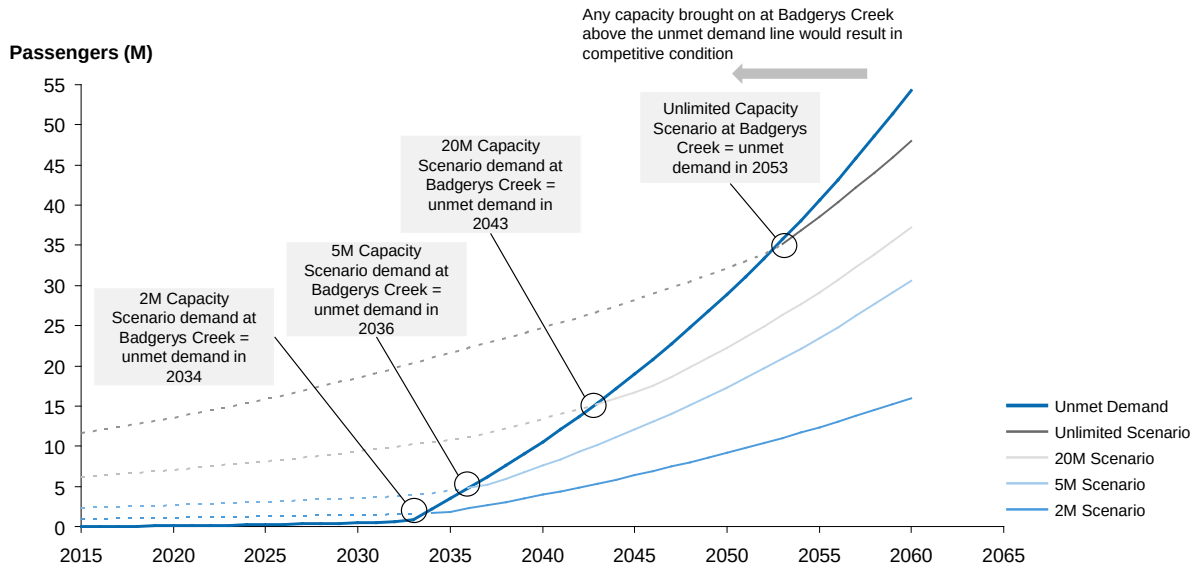
Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

6.4 Competitive versus Complementary Airports

The level of competition between Sydney (Kingsford-Smith) Airport and an additional major RPT facility depends on the timing of the introduction of additional capacity. Whenever additional capacity is introduced to the market, competition will increase, hence introducing more capacity than what is needed to accommodate unmet demand at Sydney (Kingsford-Smith) Airport and will result in some level of competition.

Figure 54 shows the year at which an additional RPT facility at Badgerys Creek becomes purely complementary to Sydney (Kingsford-Smith) Airport under each of the four development scenarios.

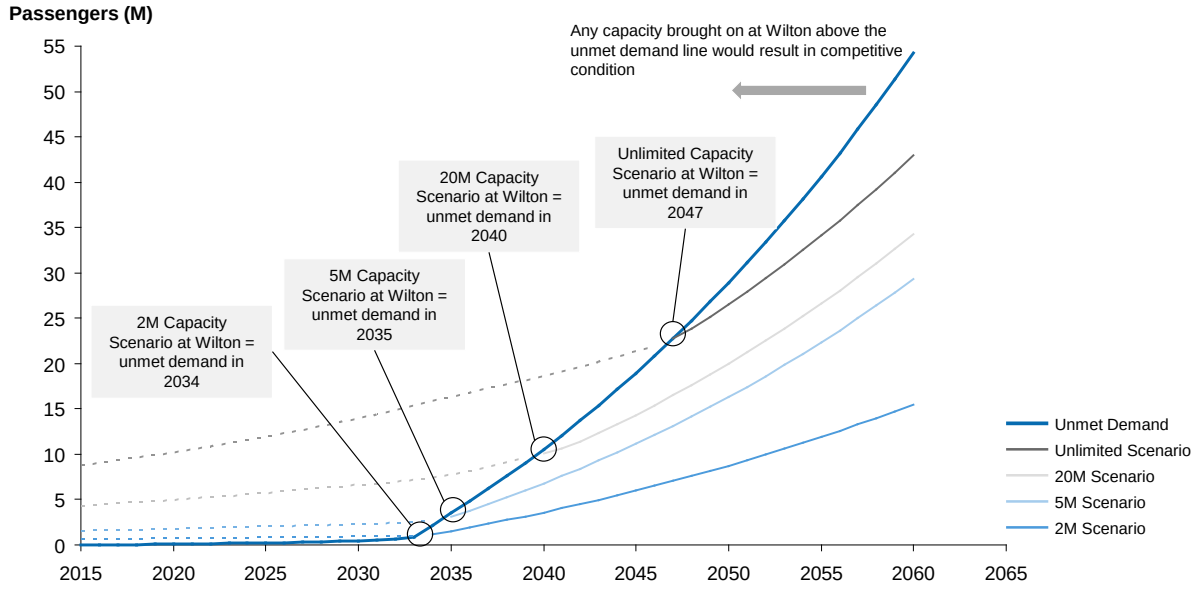
Figure 54: Badgerys Creek Multiple Scenarios (2015 to 2060)



Note: The demand curve for each scenario does not include "generated demand".
Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 55 shows the year at which an additional RPT facility at Wilton becomes purely complementary to Sydney (Kingsford-Smith) Airport under each of the four development scenarios.

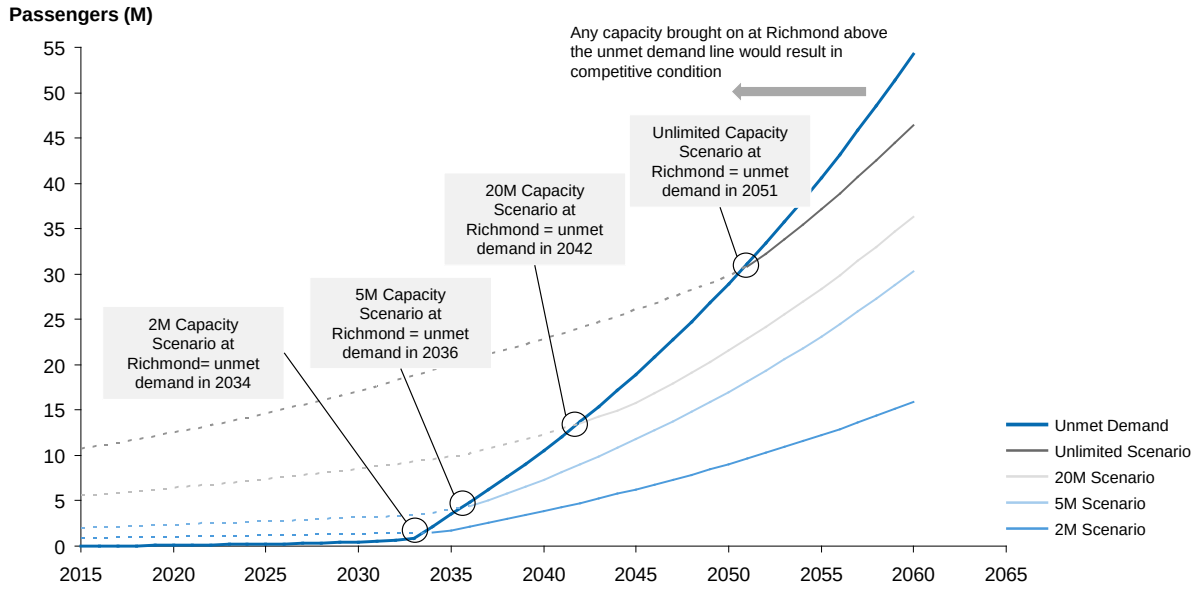
Figure 55: Wilton Multiple Scenarios (2015 to 2060)



Note: The demand curve for each scenario does not include "generated demand".
Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Figure 56 shows the year at which an additional RPT facility at RAAF Base Richmond becomes purely complementary to Sydney (Kingsford-Smith) Airport under each of the four development scenarios.

Figure 56: Richmond Multiple Scenarios (2015 to 2060)



Note: The demand curve for each scenario does not include "generated demand".
Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

6.5 Freight Forecast

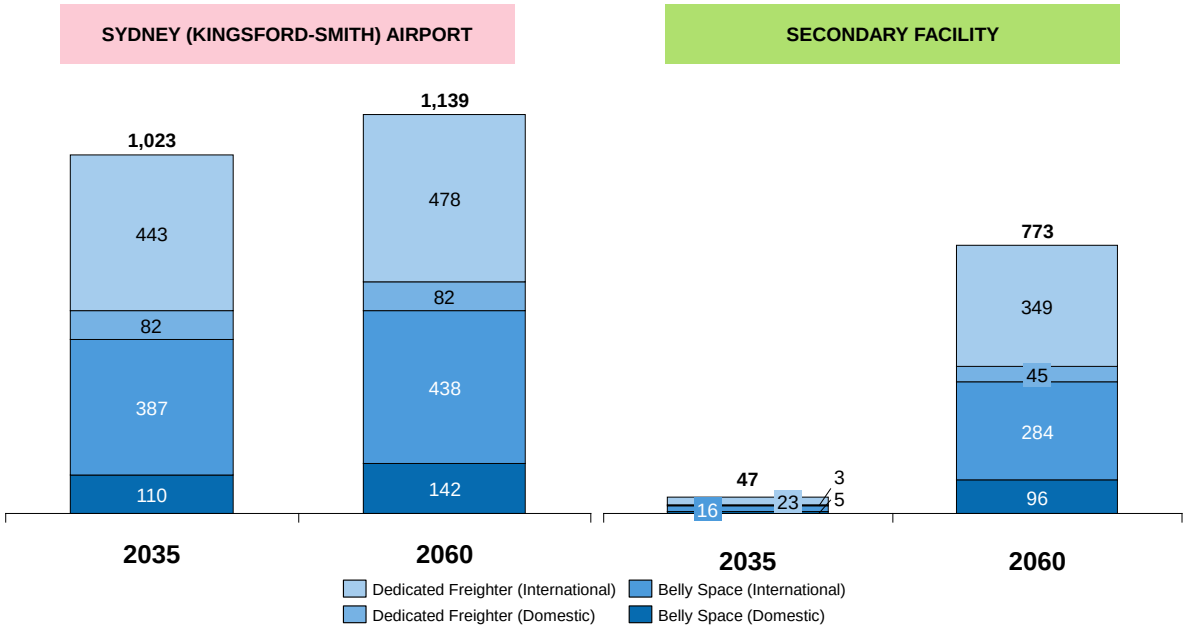
Freight is also expected to play an important role at the new facility. However, a number of limitations constrain the modelling of freight demand. For this reason, freight demand was modelled on a capacity basis, given it is more dependent on the supply chain than individual movement choices. The freight demand data modelled in this analysis is reflective of unmet freight demand at Sydney (Kingsford-Smith) Airport as estimated by The Joint Study[4]. It should be noted that suppressed freight demand was assumed to divert to the new RPT facility under Scenarios 3 and 4 only given the breadth of markets and routes served.

Freight movements at airports consist of carriage by dedicated freighters and in the belly space of RPT services. The number of international dedicated freighter movements which could be accommodated at Sydney (Kingsford-Smith) Airport is forecast to be 6,000 movements in 2060, with domestic freight growing to 8,000 movements. This compares to a total freighter demand of approximately 14,000 international movements and 17,000 domestic movements by 2060 under an unconstrained setting. The freight tonnage which could be accommodated by Sydney (Kingsford-Smith) Airport and the alternate site for the years of 2035 and 2060 is shown in Figure 57.

Freight tonnage for the alternate RPT facility was estimated to be 47,000 tonnes in 2035, with dedicated freighters carrying 26,000 tonnes and the belly space in RPT services carrying 21,000 tonnes. By 2060, estimated freight tonnage handled by the alternate RPT facility grows to 773,000 tonnes; with dedicated freighters carrying 394,000 tonnes and RPT belly space carrying 379,000 tonnes. This is equivalent to approximately 40% of the freight that Sydney (Kingsford-Smith) Airport is forecast to be able to handle in 2060 (i.e. 1.1 million tonnes) under the current policy settings[5].

[4] *It should be noted that part of the spilled freight demand from Sydney (Kingsford-Smith) Airport is assumed to be captured by Canberra Airport, as per assumptions made in the Joint Study*
[5] *Policy settings include curfew and aircraft movement cap regulations currently in place at Sydney (Kingsford-Smith) Airport*

Figure 57: Freight Tonnage Estimates for Sydney (Kingsford-Smith) Airport (constrained) & Alternate Site ('000s), 2035 and 2060



Source: Booz & Company Demand Forecasts (2011)

7. Limitations

This report presented four development scenarios for Badgerys Creek, Wilton and RAAF Base Richmond, based on annual passenger movement caps specified by the Department of Infrastructure and Transport. The analysis was based on a set of hypothetical conditions for competitive and complementary scenarios based on professional judgment and do not reflect the position of the owners and managers of Sydney (Kingsford-Smith) Airport.

The catchment analysis assumes an even distribution of socioeconomic characteristics across the Sydney region. Therefore the demand responses to the defined scenarios do not take demographic factors into account. For example, the current and future difference in income levels between inner Sydney suburbs and those in the outer west are not explicitly captured in the analysis. These factors should be considered in reviewing the forecast demand responses to the alternative scenarios as they are likely to influence the market catchment of each airport.

The catchment analysis and the passenger demand forecasts assume uniform population density growth across the Sydney Region. The Bureau of Transport Statistics population forecasts show that Western Sydney is expected to grow faster than the rest of Sydney, which would increase the catchment population for the “greenfield” RPT facilities at Badgerys Creek and Wilton, thereby increasing the generated demand for these airports.

The base input data used for the catchment analysis considered the Sydney Greater Metropolitan Area. This data was not available for the Illawarra subregion, which would naturally form part of the catchment area for a “greenfield” RPT facility at Wilton, given the main population centre in this subregion (i.e. Wollongong) distances approximately 35 kilometres by road from Wilton.

It was assumed that ground access infrastructure would grow to accommodate forecast passenger demand at the alternate sites; however, the potential stimulation of demand generated by upgraded and/or new ground access infrastructure was not taken into account.

The demand functions, which drive the market share of the two airports under each of the scenarios, were modeled on the basis of theoretical analysis which was informed by a limited number of examples of co-existence of airports in the same catchment. The curves for Scenario 1 were calibrated based on real examples of multiple competing airports within the same catchment where the additional RPT facility has a much more limited service offering than the primary airport. Scenario 4 assumed that both airports are equally attractive in markets where they compete. The other two scenarios are graduations between the two extremes.

This analysis adopted the same peak spreading of aircraft movements at Sydney (Kingsford-Smith) Airport as The Joint Study. This is likely to apply to business passengers who are travelling to the Sydney CBD (i.e. who are not going to want to travel 65-80 kilometres by road to the CBD). However, time sensitive passengers beginning or ending their journey in the West would prefer peak time flights to the alternate sites. Therefore, it is likely that some peak services would be redistributed to the new facility. It should be noted that the distribution of services to the secondary airport will be sensitive to the timing of the establishment of capacity.

The modelling focuses on a two airport system and does not take into account the role that RAAF Base Richmond could play in the medium to long term as part of a three airport system or simply as an interim facility being de-commissioned when a new major secondary

airport is established. RAAF Base Richmond would be accommodating spill over demand in the interim whilst also generating new (i.e. generated) demand in the local catchment.

It should also be noted that the freight analysis included in this paper has not been modelled with reference to available capacity. The analysis is only reflective of spill over demand for freight from Sydney (Kingsford-Smith) Airport, as estimated by the Joint Study. Even though this analysis could be applied to Scenarios 3 and 4, it should be considered that demand for freight will be dependent on the breadth of routes served, the number of passenger aircraft movements to the new site ("freight follows passengers") as well as the potential for freight distribution centres to locate in the West of the Sydney Region close to a new RPT site. Based on these factors the estimated level of freight demand could vary significantly over the forecast period.

Appendix 1. Breakdown of Forecast Passenger Demand

Badgerys Creek

Table 12: Scenario 1 – Breakdown of Passenger Demand (2015, 2035 and 2060)

Scenario 1 - Complementary Forecast (Numbers in '000s)		2015	2035	2060
1 2	Diverted Demand (to Badgerys Creek)	-	0.8	-
3	KSA Retained Demand	43.0	73.3	91.4
4	Suppressed Demand (Both Airports)	-	2.7	54.4
5	Badgerys Creek Generated Demand	-	1.2	2.0

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Table 13: Scenario 2 – Breakdown of Passenger Demand (2015, 2035 and 2060)

Scenario 2 - Complementary Forecast (Numbers in '000s)		2015	2035	2060
1 2	Diverted Demand (to Badgerys Creek)	-	2.6	0.8
3	KSA Retained Demand	43.0	73.3	91.4
4	Suppressed Demand (Both Airports)	-	0.9	53.5
5	Badgerys Creek Generated Demand	-	2.4	4.2

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Table 14: Scenario 3 – Breakdown of Passenger Demand (2015, 2035 and 2060)

Scenario 3 - Competitive Forecast (Numbers in '000s)		2015	2035	2060
1 2	Diverted Demand (to Badgerys Creek)	6.1	10.8	15.2
3	KSA Retained Demand	36.8	66.0	91.4
4	Suppressed Demand (Both Airports)	-	-	39.1
5	Badgerys Creek Generated Demand	1.5	2.7	4.8

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Table 15: Scenario 4 – Breakdown of Passenger Demand (2015, 2035 and 2060)

Scenario 4 - Competitive Forecast (Numbers in '000s)		2015	2035	2060
1 2	Diverted Demand (to Badgerys Creek)	11.6	21.7	47.9
3	KSA Retained Demand	31.3	55.1	91.4
4	Suppressed Demand (Both Airports)	-	-	6.3
5	Badgerys Creek Generated Demand	1.9	3.4	6.0

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Wilton

Table 16: Scenario 1 – Breakdown of Passenger Demand (2015, 2035 and 2060)

	Scenario 1 - Complementary Forecast (Numbers in '000s)	2015	2035	2060
1	Diverted Demand (to Wilton)	-	1.5	1.5
2				
3	KSA Retained Demand	43.0	73.3	91.4
4	Suppressed Demand (Both Airports)	-	2.0	52.8
5	Wilton Generated Demand	-	0.3	0.5

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Table 17: Scenario 2 – Breakdown of Passenger Demand (2015, 2035 and 2060)

	Scenario 2 - Complementary Forecast (Numbers in '000s)	2015	2035	2060
1	Diverted Demand (to Wilton)	-	3.1	4.1
2				
3	KSA Retained Demand	43.0	73.3	91.4
4	Suppressed Demand (Both Airports)	-	0.4	50.2
5	Wilton Generated Demand	-	0.5	0.9

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Table 18: Scenario 3 – Breakdown of Passenger Demand (2015, 2035 and 2060)

	Scenario 3 - Competitive Forecast (Numbers in '000s)	2015	2035	2060
1	Diverted Demand (to Wilton)	4.3	7.7	18.9
2				
3	KSA Retained Demand	38.6	69.1	91.4
4	Suppressed Demand (Both Airports)	-	0.1	35.3
5	Wilton Generated Demand	0.3	0.6	1.1

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Table 19: Scenario 4 – Breakdown of Passenger Demand (2015, 2035 and 2060)

	Scenario 4 - Competitive Forecast (Numbers in '000s)	2015	2035	2060
1	Diverted Demand (to Wilton)	8.8	16.4	42.9
2				
3	KSA Retained Demand	34.2	60.5	91.4
4	Suppressed Demand (Both Airports)	-	-	11.3
5	Wilton Generated Demand	0.4	0.7	1.3

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Richmond

Table 20: Scenario 1 – Breakdown of Passenger Demand (2015, 2035 and 2060)

	Scenario 1 - Complementary Forecast (Numbers in '000s)	2015	2035	2060
1 2	Diverted Demand (to Richmond)	-	1.0	0.3
3	KSA Retained Demand	43.0	73.3	91.4
4	Suppressed Demand (Both Airports)	-	2.5	54.0
5	Richmond Generated Demand	-	1.0	1.7

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Table 21: Scenario 2 – Breakdown of Passenger Demand (2015, 2035 and 2060)

	Scenario 2 - Complementary Forecast (Numbers in '000s)	2015	2035	2060
1 2	Diverted Demand (to Richmond)	-	3.1	1.5
3	KSA Retained Demand	43.0	73.3	91.4
4	Suppressed Demand (Both Airports)	-	0.4	52.7
5	Richmond Generated Demand	-	1.9	3.5

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Table 22: Scenario 3 – Breakdown of Passenger Demand (2015, 2035 and 2060)

	Scenario 3 - Competitive Forecast (Numbers in '000s)	2015	2035	2060
1 2	Diverted Demand (to Richmond)	5.6	9.8	16.0
3	KSA Retained Demand	37.4	67.0	91.4
4	Suppressed Demand (Both Airports)	-	-	38.2
5	Richmond Generated Demand	1.3	2.2	4.0

Source: Booz & Company Demand Forecasts (2012), and Patronage Model (2011).

Table 23: Scenario 4 – Breakdown of Passenger Demand (2015, 2035 and 2060)

	Scenario 4 - Competitive Forecast (Numbers in '000s)	2015	2035	2060
1 2	Diverted Demand (to Richmond)	10.7	20.0	46.4
3	KSA Retained Demand	32.2	56.8	91.4
4	Suppressed Demand (Both Airports)	-	-	7.9
5	Richmond Generated Demand	1.6	2.8	4.9

Source: Booz & Company Demand Forecasts (2011), and Patronage Model (2012).

Appendix 2. List of IATA Airport Codes

Table 24: World Airport Codes

IATA Code	Airport Name
AVV	Avalon Airport
BNE	Brisbane Airport
BWI	Baltimore/Washington International Thurgood Marshall Airport
CDG	Charles De Gaulle Airport
DCA	Ronald Reagan National Airport
DME	Moscow Domodedovo Airport
EWR	Newark Liberty International Airport
HKG	Hong Kong International Airport
HND	Haneda Airport, Tokyo
HPN	Westchester County Airport
IAD	Dulles International Airport
IST	Ataturk Airport, Istanbul
JFK	John F. Kennedy International Airport
KUL	Kuala Lumpur International Airport
LCY	London City Airport
LGA	LaGuardia Airport
LGW	London Gatwick Airport
LHR	London Heathrow Airport
LTN	Luton Airport
MAN	Manchester Airport
MEL	Tullamarine Airport
NAY	Nanyuan Airport, Beijing
NRT	Narita Airport, Tokyo
ORY	Orly Airport, Paris
PEK	Peking Capital Airport
PVG	Pu Dong Airport
SAW	Airport Istanbul Sabiha
SHA	Shanghai Hongqiao International Airport
STN	London Stansted Airport
SVO	Sheremetyevo Airport
SYD	Sydney (Kingsford-Smith) Airport

IATA Code	Airport Name
VKO	Vnukovo Airport
YUL	Airport Montreal International

Source: IATA