

Technical Report 3

InterVISTAs – Route Forecasts

FINAL REPORT

Wellington International Airport Air Traffic Forecasts

Forecast Update – March 2016



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Executive Summary

Wellington International Airport Limited (**WIAL**) commissioned InterVISTAS Consulting Inc. (**InterVISTAS**) to produce airport activity forecasts for Wellington International Airport (**WLG**) over the years 2015-2060. This work consists of two parts:

- **Part A: Business As Usual Airport Traffic Forecast** consisting of both passenger and aircraft movement forecasts under a scenario where WLG's runway infrastructure is unchanged (i.e., no lengthening of the runway).
- **Part B: Forecast of a Runway Extension Scenario** consisting of both passenger and aircraft movement forecast under a scenario where WLG's runway length is extended allowing the operation of larger aircraft types. Services are assumed to start on the extended runway in FY2021. Additional services were introduced into the Runway Extension scenario based on findings from InterVISTAS' 2014 report *Viability Assessment of Long Haul Service at Wellington Airport*.

Risk analysis was conducted to examine the impact of multiple risk factors on the air traffic outlook and to determine the criteria for the high and low forecast outcomes. The risk analysis is documented in the body of the report.

The initial air traffic forecasts were delivered to WLG in October of 2015. This report contains updated forecasts developed in March of 2016. The same forecast horizon is retained (FY2015-FY2060) while updates have been made to the forecast inputs and forecast models. These changes are described in the section below.

2016 Forecast Update

InterVISTAS has conducted a review and update of the WLG air traffic forecasts at the request of Wellington International Airport Ltd. Our review focused on updating the traffic forecasts in light of recent traffic data and service announcements and addressing consultation feedback received by WIAL regarding InterVISTAS' forecast. Only one response which addressed InterVISTAS' forecast was received. This response from the Board of Airline Representatives of New Zealand (**BARNZ**) and the New Zealand Institute of Economic Research (**NZIER**) (*Review of Demand Forecasts: Assessment of InterVISTAS Wellington International Airport Air Traffic Forecasts* published in February of 2016). BARNZ and NZIER's criticisms of InterVISTAS' technical forecast were centred on three key points:

1. InterVISTAS' forecasts overestimated the level of origin-destination (**O/D**) traffic growth from China and Other Asia regions.
2. Technical criticisms of the econometric modelling of forecast models used to derive baseline O/D demand in the future.
3. Criticisms over the viability of example routes introduced in the Runway Extension scenario forecast.

InterVISTAS has updated the economic growth projections underpinning the traffic forecasts including those for China and Other Asia. NZIER cites forecasts for Chinese GDP growth and Asian GDP growth produced by OECD which would result in a lower level of inbound Chinese visitors to Wellington over the forecast period. While we agree with NZIER that the OECD forecasts point to a lower long term growth in these regions, we note that the OECD forecasts are considerably lower than those produced by other organisations. Selecting the lowest GDP forecasts available will inevitably

lead to lower traffic forecasts. To make use of all available sources, InterVISTAS has employed a forecast of Chinese GDP averaged across all sources.¹ While the OECD does not produce a long-term forecast of all the countries matching InterVISTAS definition of Other Asia², we have made similar adjustments to the GDP growth outlook for that and other geographic regions. The forecast team has also reviewed the assumptions regarding economic outlook for all of the forecast sectors and made updates to reflect current economic conditions and the current economic outlook.

The revisions to the forecast assumptions have resulted in a decrease in inbound O/D passengers from China and Other Asia in the constrained Business as Usual (BAU) forecast. The result in the Most Likely BAU forecast is a 23% decrease in inbound Chinese and Other Asia O/D passengers by FY2060. However, when considered against total inbound international O/D passengers in FY2060, the revisions to the economic outlook assumptions produce a reduction of less than 7%, and a reduction in total O/D passenger demand of less than 2% (domestic and international combined). While the appropriate revisions to the economic outlook assumptions have had a noticeable impact on the level of inbound Chinese and Other Asian travellers to Wellington, the overall impact on O/D demand was small.

Additionally, WIAL has provided InterVISTAS with forecast estimates of FY2016 and FY2017. As this forecast update was produced with two months remaining in FY2016, we have rebased our forecast on WIAL's estimate of full-year FY2016 traffic. Our forecasts for FY2017 have been adjusted to reflect the current expectations of passenger traffic at WLG in that year, in particular with respect to the introduction of a Singapore Airlines widebody service to Singapore via Canberra, Australia. This rebasing has been conducted to ensure that the updated forecast employs the most current and accurate information available regarding WLG's short-term situation.

In response to the technical comments by NZIER on the modelling approach, InterVISTAS maintains that the GDP elasticity estimates generated by the econometric analysis are in line with established elasticities for air travel demand. The univariate econometric modelling techniques employed in this forecast are typical of studies estimating air travel demand.³ InterVISTAS has conducted multiple studies of estimating air travel demand elasticise and is familiar with established estimates for elasticities in various types of markets, as well as the current literature on econometric modelling techniques.

As part of the forecast modelling procedure, the InterVISTAS forecast team assumes that GDP elasticity estimates decline significantly over time, reflecting the maturing of air travel markets, thus resulting in lower traffic growth relative to GDP growth in the long term. This attenuation is part of the industry outlook and professional judgement used when developing air traffic forecasts. Finally, given the long forecast horizon, there is uncertainty regarding the potential future demand for both air travel in general and air travel in specific markets. This is addressed through the use of Monte Carlo risk analysis techniques. Our general modelling methodology is in line with industry standards and employs proven techniques to forecast future demand over a very long time horizon.

Lastly, NZIER levied criticisms regarding the choice of specific routes introduced as part of the Runway Extension forecast. InterVISTAS' 2014 long-haul viability assessment report provided an empirical basis to identify world regions that would be most likely to see long-haul non-stop services

¹ Consisting of a consensus of forecasts by the OECD, World Bank, the IMF, IHI Global Insights, and Oxford Economics.

² All countries in Asia other than China and Japan.

³ Further, even if the OLS estimator is inefficient due to autocorrelation or presence of a unit root (which is not necessarily the case), they will remain unbiased (if possibly inefficient) and appropriate estimates of the economic relationship as modelled.

at WLG should a runway extension be completed. This previous analysis was used as an analytical guide to determining not only priority world regions for service, but practical metrics for modelling potential new services such as appropriate aircraft gauge, market stimulation factors, beyond and behind market stimulation, and insight on prioritization and timing of service introduction. InterVISTAS is a consultancy specializing in aviation economics, airport forecasting, and airline network analysis with decades of experience in these areas within the project team.

Air Passenger Forecasts

Summary of Passenger Forecasts

Tables ES-1 and **ES-2** below summarize the forecast growth rates of the Business as Usual (BAU) and Runway Extension scenarios over the low, Most Likely, and high forecasts. The final set of air passenger forecasts were generated using a risk analysis process, involving simulating 10,000 iterations of the baseline BAU forecast of O/D traffic using different randomly generated set of input factors. The median value generated by the 10,000 iterations was selected as the Most Likely forecast. Low and high scenario forecasts were derived from the 5th and 95th percentile outcomes of the risk analysis.⁴

As the tables display, WLG is forecast to see generally higher rates of growth in the coming 5-10 years relative to the average of the past two decades. This reflects recent trends of additional capacity being added at WLG as well as the global air travel market's continued recovery out of the 2008-2009 economic downturn. Over the long run, enplaned-deplaned (E/D) passenger growth will decline as WLG's travel markets mature with average annual traffic growth over the full forecast horizon (FY2015-FY2060) projected to be at levels below historical.

Table ES-1: Annual Average Growth Rates, E/D Passenger Traffic – BAU Scenario

Fiscal Years	Domestic			International			Total E/D		
	Low	Most Likely	High	Low	Most Likely	High	Low	Most Likely	High
1997-2015 (Historical)		2.6%			4.6%			2.8%	
2015-2016 ⁵	3.3%	3.8%	4.6%	14.6%	15.7%	16.6%	4.9%	5.5%	6.3%
2016-2020	1.1%	2.9%	4.1%	2.0%	3.9%	5.2%	1.2%	3.1%	4.2%
2020-2025	1.0%	2.5%	3.4%	2.1%	3.5%	4.5%	1.2%	2.6%	3.6%
2025-2030	1.7%	2.3%	3.0%	2.6%	3.2%	3.9%	1.9%	2.5%	3.2%
2030-2035	1.8%	2.2%	2.6%	2.6%	3.0%	3.6%	1.9%	2.3%	2.8%
2035-2040	1.6%	2.0%	2.5%	2.5%	2.9%	3.3%	1.8%	2.2%	2.7%
2040-2045	1.4%	1.8%	2.2%	2.2%	2.6%	3.0%	1.5%	2.0%	2.3%
2045-2050	1.3%	1.7%	1.9%	2.1%	2.5%	2.7%	1.4%	1.8%	2.0%
2050-2055	1.3%	1.7%	1.8%	2.0%	2.3%	2.5%	1.4%	1.8%	1.9%
2055-2060	1.2%	1.6%	1.8%	2.0%	2.2%	2.3%	1.4%	1.7%	1.9%
2015-2060	1.4%	2.1%	2.6%	2.5%	3.2%	3.7%	1.6%	2.3%	2.8%

⁴ The low scenario implies that there is less than a 5% chance that traffic at WLG will drop below the low forecast, and the high scenario implies that there is less than a 5% chance that traffic at WLG will exceed the high forecast.

⁵ FY2016 forecast based on projected traffic levels using actual April 2015-January 2016 traffic data.

The Runway Extension scenarios were constructed by adding new long-haul international services operationally enabled by the construction of a lengthened runway. Additional services stimulate new O/D traveller demand beyond serving the existing travel demand between WLG and the local market (e.g. the United States for a new non-stop service to that country) and beyond connecting markets.

Table ES-2: Annual Average Growth Rates, E/D Passenger Traffic – Runway Extension Scenario

Fiscal Years	Domestic			International			Total E/D		
	Low	Most Likely	High	Low	Most Likely	High	Low	Most Likely	High
1997-2015 (Historical)		2.6%			4.6%			2.8%	
2015-2016 ⁶	3.3%	3.8%	4.6%	14.6%	15.7%	16.6%	4.9%	5.5%	6.3%
2016-2020	1.1%	2.9%	4.1%	2.0%	3.9%	5.2%	1.2%	3.1%	4.2%
2020-2025	0.8%	2.2%	3.0%	4.9%	7.6%	11.0%	1.5%	3.1%	4.4%
2025-2030	1.5%	2.1%	2.9%	4.2%	4.7%	4.7%	2.0%	2.7%	3.3%
2030-2035	1.7%	2.0%	2.5%	3.0%	4.1%	4.1%	2.0%	2.5%	2.9%
2035-2040	1.6%	2.0%	2.5%	2.6%	3.1%	3.2%	1.8%	2.2%	2.7%
2040-2045	1.2%	1.7%	2.2%	2.9%	2.8%	2.9%	1.6%	2.0%	2.4%
2045-2050	1.3%	1.7%	1.8%	2.0%	2.4%	2.9%	1.4%	1.8%	2.1%
2050-2055	1.3%	1.7%	1.8%	1.8%	2.1%	2.2%	1.4%	1.8%	1.9%
2055-2060	1.2%	1.6%	1.8%	1.7%	2.0%	2.0%	1.4%	1.7%	1.9%
2015-2060	1.3%	2.0%	2.5%	3.0%	3.9%	4.5%	1.7%	2.4%	2.9%

The Runway Extension scenario features higher levels of international E/D traffic growth as a result of new non-stop long-haul services coming online throughout the forecast period. However, as new long-haul services are introduced, domestic traffic growth becomes less than in the BAU scenario, as non-stop services enabled travellers to conduct overseas travel directly without requiring connecting at a domestic gateway (e.g. Auckland (AKL) or (CHC)).⁷ The stimulating effect of new non-stop international services outweighs the loss to domestic E/D traffic resulting in higher total E/D traffic growth for WLG in this scenario.

Constrained Business as Usual Forecast

Domestic traffic in the **Most Likely forecast** is forecast to grow by an average of 2.1% per annum over the forecast period (up to FY2060) and reach 11.9 million passengers by FY2060. Domestic passenger growth in the BAU scenario is projected to accelerate over the period FY2015-2020 as new domestic trunk and regional capacity is added and Air New Zealand adds additional ATR72 services on trunk and regional routes. Along with the introduction of Jetstar regional service to Dunedin and Nelson in FY2016. This additional capacity is expected to stimulate demand, either by meeting underserved demand for domestic air travel or indirectly through pricing. In the longer term,

⁶ FY2016 forecast based on projected traffic levels using actual April 2015-January 2016 traffic data.

⁷ The same effect is also observed at Australian gateway airports, but does not impact aggregate International E/D passenger volumes as those passengers would have been International E/D's prior to the runway extension *ceteris paribus*.

domestic traffic is expected to grow as the New Zealand economy grows, although the rate of growth is projected to attenuate as the market matures.⁸

International traffic in the **Most Likely forecast** at WLG is forecast to grow at a faster rate than domestic traffic in the constrained BAU scenario despite continuation of the operational limitations placed on carriers by the runway's current length with service only available to Australia and the Pacific Islands. Growth is forecast to be 3.2% per annum overall from FY2015-FY2060, and to reach 3.1 million passengers in 45 years' time. International seat capacity is projected to grow strongly in FY2016 with Jetstar significantly increasing capacity to Australia from WLG, Qantas continuing seasonal service to Brisbane, and Singapore Airlines' announced service to Singapore via Canberra beginning in FY2017. Fiji Airways is introducing year-round service to Nadi beginning in FY2016, which is projected to treble seat capacity to the Pacific Islands.

The previous BAU forecasts contained a 5th freedom service to China over Australia, based on WIAL's then best information on when such a service may be introduced. However, this service was only assumed to occur should a runway extension not be developed.⁹ The introduction of this 5th freedom service in the previous forecast led to a stimulation of Chinese O/D traffic, but only in the BAU forecast. As Singapore Airlines' has officially announced a 5th freedom flight to Singapore via Canberra, the assumed Chinese 5th freedom has been dropped from the current BAU forecast. As the SQ 5th freedom service is introduced, Other Asia O/D traffic demand is appropriately stimulated, leading to a relative increase in O/D demand for Other Asia relative to the previous BAU forecast. However, as the SQ service is included in both the BAU and Runway Extension forecast, the underlying O/D demand forecast in both scenarios is identical.

Total traffic in the **Most Likely forecast** at WLG is forecast to grow at an average annual rate of 2.3% per annum over the forecast period (to FY2060), reaching 15.1 million passengers in FY2060. The long term forecast growth of total air passenger traffic at WLG is forecast to be slightly less than the 2.5% per annum average growth rate observed from FY1997-2015, owing to the eventual maturing of WLG's air passenger market, combined with the runway length constraints.

The results of the risk analysis, producing high and low scenarios of the Business as Usual forecast are presented in **Section 5.1**.

Runway Extension Scenario

Under this forecast scenario, it is assumed that WLG constructs an extended runway that is capable of handling long-haul widebody aircraft and opening up the potential for the introduction of new long haul service.¹⁰ To develop this forecast scenario, the forecast team has used the results and recommendations for potential services from InterVISTAS' December 2014 report, *Viability Assessment of Long Haul Service at Wellington Airport*. This report identifies viable long-haul routes for WLG to be served by foreign carriers and provides data-driven metrics to establish the proper parameters for modelling new international services. The forecast team has maintained as much commonality as possible between the findings of the long-haul viability report to ensure that this

⁸ The reason for the attenuation is twofold: firstly, as the potential of the airport is realized, the easier opportunities for service expansions are exploited reducing opportunities for further growth; the second reasons is arithmetical – higher traffic increases are required to achieve the same growth rate, e.g., a 5% increase on a base of 10 million passengers requires twice as much traffic growth on a base of 5 million passengers.

⁹ The assumption being that if the extended runway were to be developed for a FY2021 operational date, the 5th freedom to China would not be introduced as it was assumed airlines would hold back on service introductions until the new runway was available for non-stop long-haul routes.

¹⁰ Astral Limited, *Review of Proposed Runway Extension Lengths*, 13 November 2015. Provided to InterVISTAS by WIAL.

forecast represents results that are consistent with the previous work. Common elements include market stimulation factors, allocation of beyond market stimulation levels, stimulation rates for domestic passenger, and suggested aircraft type indicative of the gauge of aircraft appropriate for the market being served. The official announcement of Singapore Airlines 5th freedom service to Singapore via Canberra has demonstrated that there is a viable market at WLG for direct international service beyond Australia, in part confirming the validity of InterVISTAS' route analysis.

As new international services are added, two effects are observed. First, international E/D traffic is increased as the establishment of non-stop overseas service will stimulate new travel demand as travellers no longer need to connect over a gateway airport in New Zealand or Australia to reach WLG. The second effect is that some portions of those travellers on the long-haul international flights represent existing O/D passengers which had previously connected via a domestic or Australian gateway. The reallocation of those passengers to non-stop international flights causes a reduction in E/D domestic and Australian traffic, slightly lowering those forecast outcomes. The runway extension scenario forecast also models a slight stimulation of domestic connecting passengers, as the introduction of new international services makes WLG a more attractive gateway for connecting itineraries, most likely driven from regional airports in the southern half of the North Island and from airports in the northern portion of the South Island.

Table ES-3 below describes in brief the additional services deployed at WLG as part of the Most Likely forecast runway extension scenario.¹¹ It should be noted that the aircraft type specified for services beginning beyond FY2030 are intended to be indicative of the general size and seat capacity appropriate for that market. As next generation aircraft enter carrier fleets we expect that similarly gauged aircraft are employed versus the strict assumptions indicated below. A more detailed description of the additional services is provided in the main body of the report.

Table ES-3: Additional Long-Haul Services – Most Likely Scenario

Year of Service Introduction	E/D Forecast Region	Aircraft Type	Initial Service Frequency	Assumptions Regarding New Service
FY2021	Other Asia	B777	7x Weekly	Conversion of SQ Canberra (CBR) – Singapore (SIN) service to non-stop.
FY2021	USA	B777	3x Weekly	Based on IVC analysis ¹² of United Airlines (UA) service to Los Angeles (LAX).
FY2022	Australia	B777	4x Weekly	Based on IVC analysis of Emirates (EK) 5 th freedom service via Australia. Future developments cover additional 5 th freedom services via Australia.
FY2026	China	A330	4x Weekly	Based on IVC analysis of Cathay Pacific (CX) service to Hong Kong (HKG). Future development of service to China captures new destinations in Mainland China, e.g. Guangzhou (CAN), Shanghai (PVG), Beijing (PEK).
FY2032	Other Asia	B777	4x Weekly	Based on IVC analysis of Malaysia Airlines (MH) service to Kuala Lumpur (KUL).

¹¹ The announced Singapore Airlines direct Wellington to Singapore service, via Canberra, is included in the Runway Extension scenario until FY2021 whereupon it converts to a daily non-stop service when the extended runway is assumed to become operational.

¹² InterVISTAS' *Viability Assessment of Long Haul Service at Wellington Airport*, 2014.

FY2034	Other Asia	B787	3x Weekly	Based on IVC analysis of Thai Airways (TG) service to Bangkok (BKK).
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In addition to these new long-haul services, extra seat capacity was allowed for existing services to Australia and the Pacific Islands to reflect the lifting of operational capacity (or weight penalty) restrictions due to WLG's current limited runway length.

Adjustments to Long-Haul Services in the 2016 Forecast Update

The update to the forecast adjusts some of the assumptions regarding the introduction of new services. They are:

- Singapore Airlines converting their WLG-CBR-Singapore (**SIN**) service, introduced in FY2017, into a daily non-stop service in FY2021 once the extended runway is operational. Both the runway extension scenario and BAU scenario include the SQ 5th freedom flight beginning in FY2017.
- As a result of Singapore Airlines converting their 5th freedom service to a non-stop, we assume that a narrowbody service by a New Zealand or Australian carriers backfills WLG-CBR route at the same frequency (4 times weekly).
- Additional long-haul services to China and Other Asia have had their year of introduction pushed back to reflect the downgraded outlook for economic growth in those markets.¹³
 - The first China service is not introduced until 2026 (versus 2024 in the October 2015 forecast)
 - The two additional Other Asia services have the introductions delayed until FY2032 and FY2034, respectively (versus FY2027 and FY2029).
- The removal of a WLG-Adelaide (**ADL**) trans-Tasman service. WIAL has provided InterVISTAS with a technical report by Astral Aviation Consultants indicating that new generation narrowbody aircraft, such as the A320neo, will be able to serve more distant trans-Tasman routes (e.g. Adelaide or Cairns) from WLG's existing runway. This information was not available during the previous forecasting work and it was our understanding that ADL would require the runway extension to be operationally feasible. In light of this recent information, the forecast team has removed the previous WLG-ADL service. It is assumed that more distant trans-Tasman locations will be served as Australian O/D demand grows into the future in both the BAU and Runway Extension scenarios without requiring any additions to the forecasting model. Furthermore, the current forecast retains additional services for 5th freedom flights to WLG via Australia. The modelling of these 5th freedom services does not specify any specific gateway in Australia (as the O/D forecasting approach is aggregated at a country/regional level, not an airport level), retaining the possibility of a 5th freedom service to WLG via ADL in the future.

Beyond the initial introduction of new services, it is assumed that frequencies and load factors will grow throughout the forecast period. The future development and expansion of long-haul service capacity is captured by the following:

- Additional capacity on the originally planned route;
- New carriers entering the market on the same route;
- New or existing carriers expanding service within the forecast region (e.g. services to Mainland China).

¹³ It should be noted that the stimulation rates for services to these regions have not been adjusted as market stimulation is not a function of GDP growth. The economies of China and countries in Other Asia will continue to grow and mature – albeit at lower levels than previously forecast – and will still present an opportunity for market stimulation when new long-haul services are introduced.

Tables ES-4 and **ES-5** display the assumptions regarding the additional long-haul services in the Low and High forecast scenarios. Adjustments based on InterVISTAS' expert judgement were made to the new long-haul services in these forecasts. In general, the following adjustments were made:

- Timing of service introduction.
- Removal of new services (Low forecast only).
- Initial service frequency and future increases to frequencies.
- Initial load factors and future development of load factor increases.
- Market stimulation levels.

To develop the Low forecast, service introduction was delayed or entirely absent, featured lower load factors, reduced frequencies, and diminished market stimulation. In contrast, new services in the High scenario feature an accelerated build-up of service frequencies, higher load factors, earlier service introduction dates, and enhanced market stimulation.

Table ES-4: Additional Long-Haul Services – Low Scenario

Year of Service Introduction	E/D Forecast Region	Aircraft Type ¹⁴	Initial Service Frequency	Assumptions Regarding New Service
FY2021	Other Asia	B777	4x Weekly	Conversion of SQ CBR service to non-stop.
FY2021	USA	B777	3x Weekly	Based on IVC analysis of UA service to LAX.
FY2030	China	A330	4x Weekly	Based on IVC analysis of CX service to HKG. Future development of service to China captures new destinations in Mainland China, e.g. CAN, PVG, PEK.
FY2034	Other Asia	B777	4x Weekly	Based on IVC analysis of MH service to KUL.

Table ES-5: Additional Long-Haul Services – High Scenario

Year of Service Introduction	E/D Forecast Region	Aircraft Type ¹³	Initial Service Frequency	Assumptions Regarding New Service
FY2021	Other Asia	B777	7x Weekly	Conversion of SQ CBR service to non-stop.
FY2021	USA	B777	4x Weekly	Based on IVC analysis of UA service to LAX.
FY2022	Australia	B777	7x Weekly	Based on IVC analysis of EK 5 th freedom service via Australia. Future developments cover additional 5 th freedom services via Australia.
FY2024	China	A330	4x Weekly	Based on IVC analysis of CX service to HKG. Future development of service to China captures new destinations in Mainland China, e.g. CAN, PVG, PEK.
FY2030	Other Asia	B777	4x Weekly	Based on IVC analysis of MH service to KUL.
FY2032	Other Asia	B787	3x Weekly	Based on IVC analysis of TG service to BKK.

¹⁴ Note that the aircraft type specified for services beginning beyond FY2030 are intended to be indicative of the general size and seat capacity appropriate for that market. As next generation aircraft enter carrier fleets we expect that similarly gauged aircraft are employed versus the strict assumptions indicated in the tables.

Table ES-6 below shows the number of additional weekly widebody flights introduced as a result of the extra services enabled by the extended runway. The table shows additional flights added in the Most Likely, Low, and High forecasts based on the extra services introduced in each forecast scenario and InterVISTAS' judgement of how flight frequencies to the forecast regions will build throughout the forecast period.

Table ES-6: Progression of Incremental Long-Haul Service Frequencies by Forecast Sector, Average Weekly Departure Frequencies

Year	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other	Total
Most Likely Forecast									
FY 2021	-	-	-	7	-	3	-	-	10
FY2025	4	-	-	7	-	4	-	-	15
FY2035	8	5	-	14	-	7	-	-	34
FY2045	11	9	-	20	-	9	-	-	49
FY2060	15	9	-	25	-	10	-	-	59
Low Forecast									
FY 2021	-	-	-	4	-	3	-	-	7
FY2025	-	-	-	4	-	3	-	-	7
FY2035	-	4	-	9	-	5	-	-	18
FY2045	-	7	-	13	-	7	-	-	27
FY2060	-	8	-	15	-	8	-	-	30
High Forecast									
FY 2021	-	-	-	7	-	4	-	-	11
FY2025	7	4	-	10	-	7	-	-	28
FY2035	9	7	-	19	-	7	-	-	42
FY2045	11	9	-	25	-	10	-	-	55
FY2060	15	10	-	33	-	12	-	-	70

To place this in context, WLG in 30 years' time (FY2045) is forecast to have approximately one quarter the number of average weekly departures of long-haul widebody services as AKL has scheduled for FY2016.¹⁵ By FY2060, WLG is projected to have just 30% of AKL's current long-haul widebody services. Christchurch has, on average, 18 long-haul widebody departures per week, including 5th freedom services via Australia.¹⁶ This includes the partial introduction of China Southern three times weekly service which will bring their FY2017 total up to 20-21 average weekly services. In their respective fiscal years for 2015, CHC handled approximately 5.9 million passengers to WLG's 5.5 million.

¹⁵ OAG schedule data via Diio Mi. For the 12-month period ending 31 March 2016 AKL had approximately 196 weekly long-haul international departures including 5th freedom services via Australia. (Local trans-Tasman widebody services by NZ, JQ, and QF are not included.)

¹⁶ Including China Airlines 3x weekly year-round service via SYD and 3x weekly seasonal service (initiated in October FY2016) via MEL.

By further comparison, for the 12-month period ending 31 March 2016, ADL had on average 24 weekly long-haul international departures, plus an additional 4 weekly departures in FY2017 once Qatar Airways begins service to Doha (**DOH**). WLG is forecast to have a similar amount by FY2035, in 30 years' time. In FY2015, ADL processed approximately 7.8 million E/D passengers compared to WLG's 5.5 million.

Runway Extension Scenario – Most Likely Forecast

Domestic traffic in the **Most Likely forecast** is forecast to grow at an average annual rate of 2.0% per annum reaching 11.5 million by the end of the forecast period (FY2060). The long-term growth and forecast traffic levels under the runway extension scenario is less than the constrained BAU scenario as some international O/D passengers divert from domestic trunk itineraries as not all passengers need to connect via AKL and CHC (domestic trunk routes) to reach international destinations.

International traffic in the **Most Likely forecast** is forecast to grow at 3.8% per annum over the forecast period, and have 4.3 million passengers in FY2060. International E/D traffic is forecast to see its highest growth in the ten years following the assumed construction of the extended runway in FY2021, growing at 7.6% p.a. from FY2020-25 and 4.7% p.a. from FY2025-2030. As WLG's new international markets begin to mature, and the base level of international traffic increases, growth rates of international E/D traffic will gradually attenuate towards the long-term average. In the updated forecast, there is less growth in non-Australia and non-Pacific Islands E/D traffic due to reduced O/D demand growth from China and Other Asia, compared to the forecast of October 2015. However, the reduction in the level of additional services forecast has pushed additional overseas international passengers over Australian gateways, as well as domestic gateways like AKL and CHC.

By comparison, the Most Likely Runway Extension forecast of 4.3 million international passengers in FY2060 is less than half of the international E/D passengers at AKL for the 12-month period ending 31 December 2015. Based on total passenger traffic projections for AKL in FY2045 and inferring for future international passengers in that year,¹⁷ WLG is forecast to only have one-eighth of AKL's international E/D passenger traffic in 30 years under the runway extension scenario.

Total traffic in the **Most Likely forecast** in the runway extension scenario is forecast to grow to 15.8 million passengers by FY2060, at an average annual rate of 2.4% - nearly matching the 2.8% average historical growth rate observed from FY2017-2015.

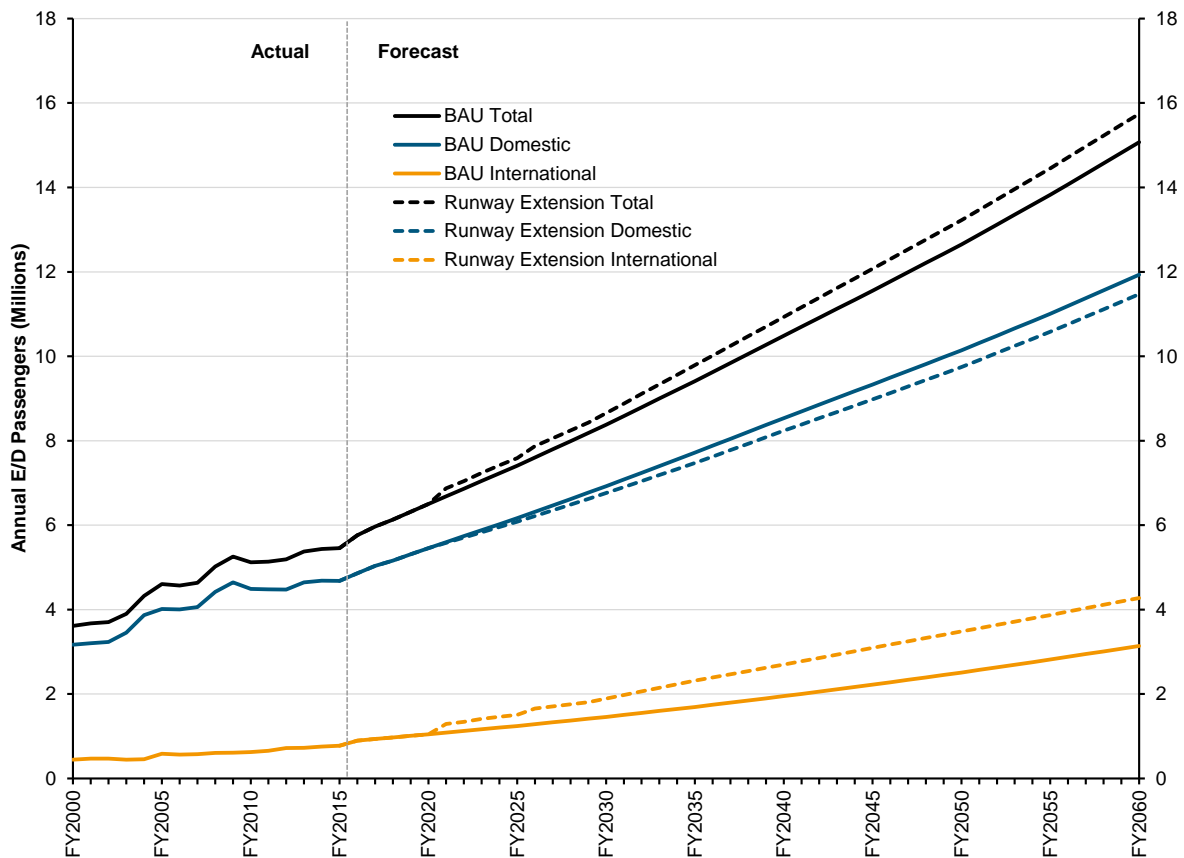
The results of the risk analysis, producing high and low forecasts of the Runway Extension scenario are presented in **Section 5.2**.

¹⁷ Auckland International Airport Ltd, *Airport of the future: Our vision for the next 30 years*, 2014. This document projects 40 million E/D passengers in FY2045. Assuming an equal share of international to total passengers in FY2045 as in FY2015 produces the estimate of approximately 25 million international passengers. This is likely a conservative estimate, given that international traffic at New Zealand airports typically grows faster than domestic traffic.

Comparison of BAU and Runway Extension Most Likely Forecast Results

Figure ES-1 shows the comparison of Most Likely forecasts of total E/D passengers at WLG between the Business As Usual scenario and Runway Extension scenario. Compared to the BAU forecast the runway extension scenario forecasts higher international and total air passenger volumes. Domestic air passenger traffic in the runway extension scenario forecast is below that forecast in the BAU scenario, as the introduction of new long-haul international services will reduce the number of passengers travelling domestically connecting at AKL or CHC for overseas travel.

Figure ES-1: Most Likely Forecasts of Total E/D Passengers at WLG



By FY2060, the Most Likely forecast of the Runway Extension scenario projects the following air passenger volumes:

- Total air passengers: 15,774,000 E/D passengers (+672,500 vs BAU)
- Domestic air passengers: 11,470,000 domestic E/D passengers (-461,500 vs BAU)
- International air passengers: 4,274,000 international E/D passengers (+1,134,000 vs BAU)

These differences in passenger traffic by sector in the runway scenario are largely similar to those projected in the forecast of October 2015. However, the adjustment of long-term economic projections has lowered the BAU forecast of E/D passengers slightly, leading to a somewhat lower level of airport passenger traffic in both the BAU and Runway Extension scenarios.

Comparison of International E/D Traffic Forecasts

In the Most Likely runway extension scenario, WLG is forecast to reach nearly 4.3 million International E/D passengers by FY2060, and 5.5 million in the high forecast scenario. These airport passenger traffic figures may be compared to the international traffic data from AKL to provide perspective on the potential growth of international traffic at WLG. For the 12-month period ending December 2015, AKL handled 8.9 million International E/D passengers, roughly 150% more international passengers than the current high forecast projects in forty-five years' time.

Incremental Inbound International Visitors – Risk Analysis

Table ES-7 below shows the additional incremental international visitors (i.e. inbound O/D) to Wellington as part of the Runway Extension forecast. These incremental passengers are forecast through the introduction of new long-haul services, stimulating O/D travel demand in the local market (e.g. new services to China stimulating demand for Chinese travellers) as well as in beyond markets as new levels of connectivity are achieved through non-stop international services at WLG (e.g. stimulation of O/D demand for Europe as travellers may connect over a Chinese gateway with non-stop service to WLG). The table below compares the incremental international visitors added in the Most Likely, low, and high forecasts of the Runway Extension scenario.

Table ES-7: Incremental Inbound Visitors ('000s), Runway Extension Scenarios

Year	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other	Total
Most Likely Forecast									
FY2025	39	9	0	31	2	13	1	4	98
FY2035	60	27	1	76	5	32	1	7	209
FY2045	79	43	1	110	8	41	1	10	292
FY2060	112	58	1	144	10	49	1	12	387
Low Forecast									
FY2025	26	3	0	5	1	3	0	1	40
FY2035	29	13	1	19	2	7	1	3	74
FY2045	36	24	1	32	4	9	1	4	111
FY2060	48	34	1	42	5	10	1	5	144
High Forecast									
FY2025	54	21	1	27	5	16	1	7	132
FY2035	73	45	2	80	9	23	1	12	244
FY2045	98	63	2	123	12	31	1	16	345
FY2060	140	96	3	182	17	39	1	21	500

In the Most Likely Runway Extension scenario, an additional 387,000 annual incremental inbound international visitors are forecast to travel through WLG in FY2060 as a result of new long-haul services made available by the extension of WLG's runway. All markets and sectors receive some level of stimulation due to the availability of non-stop long-haul services at WLG or, in the case of O/D demand for Australia and the Pacific Islands, by lifting of operational restrictions on narrowbody operations providing some small stimulation to O/D demand as more capacity is available compared to the constrained BAU scenario. Regions which are not forecast to receive non-stop services (e.g. Japan or the UK) still receive inbound visitor stimulation as a function of the improvements to beyond connecting itineraries brought about by new overseas non-stop services.

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1 Introduction

1.1 Objective

Wellington International Airport Limited commissioned InterVISTAS Consulting Inc. (InterVISTAS) to produce airport activity forecasts for Wellington International Airport (WLG) over the years 2015-2060. This work consists of two parts:

- **Part A: Business As Usual Airport Traffic Forecast** consisting of both passenger and aircraft movement forecasts under a scenario where WLG's runway infrastructure is unchanged (i.e., no lengthening of the runway).
- **Part B: Forecast of a Runway Extension Scenario** consisting of both passenger and aircraft movement forecast under a scenario where WLG's runway length is extended allowing the operation of larger aircraft types to further destinations. Additional services were introduced into the Runway Extension scenario based on findings from InterVISTAS' 2014 report *Viability Assessment of Long Haul Service at Wellington Airport*.

Both forecast parts employed InterVISTAS risk-based forecasting methodology to provide a range of possible forecast outcomes with associated probabilities.

For the purposes of this report, annual summaries of passenger traffic and aircraft activity at WLG are measured by fiscal year, running from 1 April to 31 March.

InterVISTAS was originally commissioned to develop a long-term forecast of WLG's air traffic in 2015, delivering a forecast during October of that year. This document, and associated supplementary materials, contains the updated forecast of March 2016, commissioned by WIAL.

1.2 Forecast Output

Forecasts are provided for both origin/destination (**O/D**) and enplaned/deplaned (**E/D**) passenger traffic. **O/D traffic** captures the final origin and destination of the passenger, regardless of their routing. For example, O/D traffic between Wellington and China would count all the passenger traffic between Wellington and China regardless of the routing they take. For example, Wellington-China can travel via Auckland, Christchurch or an Australian airport.

E/D traffic measures the number of aircraft enplanements and deplanements at the airport based on the passenger's immediate origin or endpoint airport. It can differ from the O/D traffic in the geographic categorization of the passenger. For example, a passenger travelling China-Auckland-Wellington is categorised as an international passenger on an O/D basis whereas they are a domestic passenger on an E/D basis (their next immediate airport is Auckland). In addition, E/D traffic includes passengers connecting at WLG whereas O/D traffic does not.

In addition, the traffic forecasts are broken down as follows:

- Domestic trunk vs. regional passengers,
- International traffic broken down into the following sectors:
 - Australia, China, Japan, Other Asia, United Kingdom, United States of America, Pacific Islands, and Other (rest of the world)

- Additionally, O/D traffic forecasts are divided into inbound international visitors and outbound New Zealand residents
- Aircraft movements, by segment and aircraft type.

1.3 Report Structure

This report presents the air traffic forecasts prepared by InterVISTAS, as well as documentation of the methodology and assumptions underlying the forecasts. It also details the risk analysis

The report is structured as follows:

- Chapter 2 describes the current and historical aviation activity at the airport.
- Chapter 3 describes the background on the local population and economy, as well as the economies of major trading and tourism partners.
- Chapter 4 describes the air traffic forecasting methodology and assumptions, including details of the risk analysis.
- Chapter 5 provides the passenger forecasts, including the risk analysis.
- Chapter 6 provides the forecasts of aircraft movements.
- The appendices provide additional information on the forecasting methodology and assumptions.

1.4 About InterVISTAS

InterVISTAS Consulting Inc. is a global consulting firm specializing in aviation, transportation, and tourism. In our aviation practice we provide support to airports, airlines, governments, and regulators on a wide variety of projects including forecasts, air service development, airline network planning, economic analysis, regulatory review and expert witness support.

InterVISTAS has extensive experience in air traffic forecasting. We have prepared air traffic forecasts for airports in Australasia, Asia, Europe, Australia, North and South America and Africa. Although each traffic forecast has its unique characteristics and dynamics, we have extensive experience in New Zealand and other air transport markets featuring similar trends.

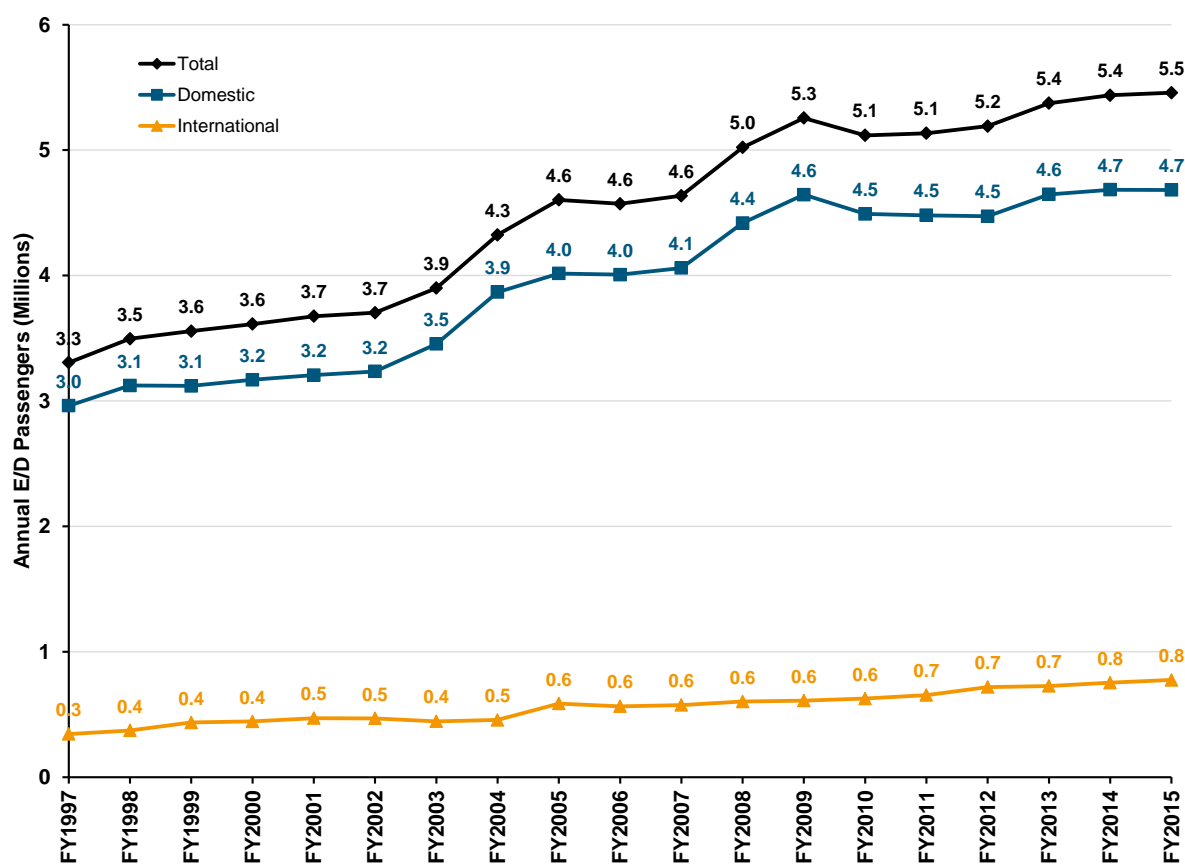
2 Overview of the Aviation Market

2.1 Current and Historical Aviation Activity

2.1.1 Air Passenger Traffic

Figure 2-1 summarizes the historical domestic and international passenger traffic at WLG for fiscal years 1997 to 2015. The fiscal year runs from April 1st to March 31st (e.g. FY2015 captures passenger traffic from 1 April 2014 to 31 March 2015).

Figure 2-1:
Historical Domestic and International Passengers at WLG
FY1997 – FY2015



Source: Wellington Airport Traffic Statistics.

Total Traffic

In FY2015, passenger traffic totalled 5,457,279 enplaned/deplaned (E/D) passengers, increasing by 0.4% over FY2014 passenger volumes. Since FY1997, total passenger traffic at WLG has grown at an average rate of 2.8% per annum. Between FY1997 and FY2009 growth in total traffic was nearly continuous (with only FY2006 showing a small contraction on passengers).

The onset of the global economic downturn in FY2010 led to a 2.6% drop in passenger traffic levels compared to FY2009. Over the past five years, WLG has maintained continuous growth out of the global recession, averaging growth rates of 1.3% per annum between FY2011 and FY2015.

Domestic Traffic

In FY2015, domestic traffic reached 4,682,086 E/D passengers, making up 85% of WLG total passenger volume in that year. Domestic passenger growth was essentially flat between FY2014 and FY2015, but has averaged 0.8% per annum growth between FY2011 and FY2015. Between FY1997 and FY2002 domestic traffic averaged 1.8% per annum, and then underwent a period of accelerated growth between FY2003 and FY2005, averaging 7.5% per annum (annual domestic traffic growth peaked in FY2004, gaining 12% over the previous year). The strong growth in the early 2000s was largely due to the restructuring and expansion of Air New Zealand's domestic product.

Domestic traffic experienced another high growth period between FY2008 and FY2009, which was associated with Virgin Blue's entry into the domestic market, with domestic traffic at WLG growing by 8.3% and 4.7% in FY2008 and FY2009, respectively.¹⁸ Domestic traffic declined by 3.3% in FY2009 due to the global economic recession, and continued to decline (though only a 0.2% per annum) through FY2010 and FY2011 (though some of the decline in FY2011 was due to the earthquake in Christchurch in February 2011). In more recent years, domestic traffic grew by 3.8%, 0.8%, and 0% in FY2013, FY2014, and FY2015, respectively. Between FY1997 and FY2015, domestic traffic averaged growth of 2.5% per annum.

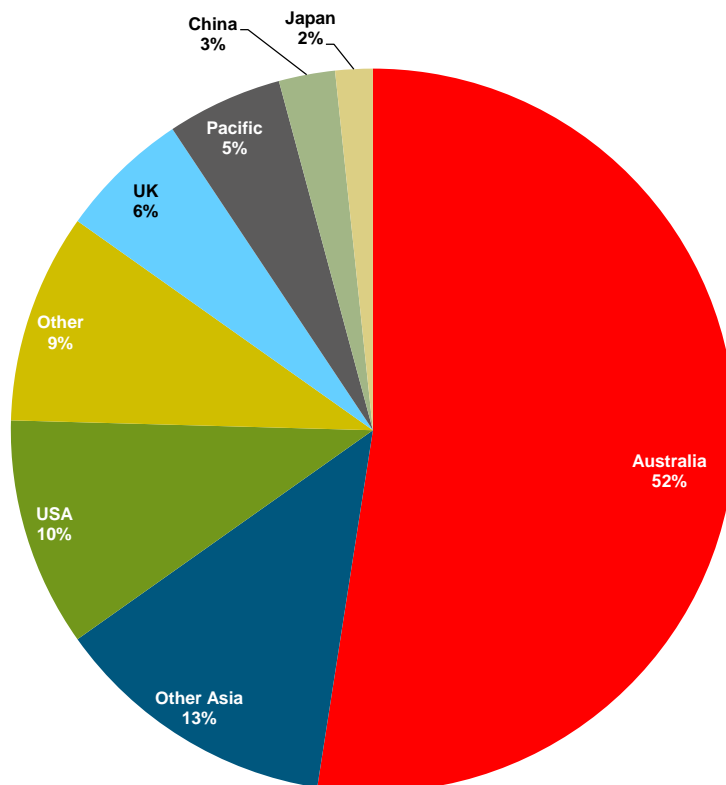
International Traffic

In FY2015, international passenger traffic at WLG totalled 775,193 E/D passengers, an increase of 2.9% compared to international traffic levels in FY2014. International passenger traffic has more than doubled since FY1997, growing on average at 4.5% per annum. Of those international E/D passengers, 768,438 were Australia E/D passengers while 6,759 were Pacific Islands passengers. As of the writing of this report, International passenger traffic at WLG has grown 17% YTD (March-August FY2016) as a result of additional capacity provided by Jetstar to MEL and OOL, as well as the introduction of year-round service by Fiji Airways.

Due to the restricted runway length, traffic to/from other international markets has to travel via an Australian or domestic airport. However, international traffic can be examined on an O/D basis reflecting their ultimate origin or destination region. **Figure 2-2** shows the distribution of WLG international origin/destination (O/D) passengers in FY2015 by international market. Australia is the largest O/D market for WLG, making up more than half of the total O/D demand in FY2015. The three largest international O/D markets other than Australia are Other Asia (all Asia other than China and Japan) at 13%, the USA at 10%, and Other (all other world regions including non-UK Europe) at 9%. The total number of international O/D passengers to/from WLG in FY2015 was approximately 996,000.

¹⁸ Virgin Blue subsequently left the New Zealand domestic market in October 2010.

Figure 2-2
Market Share of International Origin/Destination Passengers by International Market
FY2015



Source: Diio FMg.

Table 2-1 shows the share of inbound and outbound O/D travellers by international market. WLG's international O/D market is primarily dominated by outbound NZ residents, with only Australia and Japan having more inbound travellers than outbound NZ residents. In total, 54% of WLG's international O/D passengers in FY2015 were outbound NZ residents. The remaining 46% were inbound visitors, primarily from Australia. Note that these are inbound Australian residents destined ultimately for WLG, highlighting the importance of the Australian market to WLG and the Wellington Region.

Table 2-1
Inbound/Outbound Origin/Destination Passenger Shares
FY2015

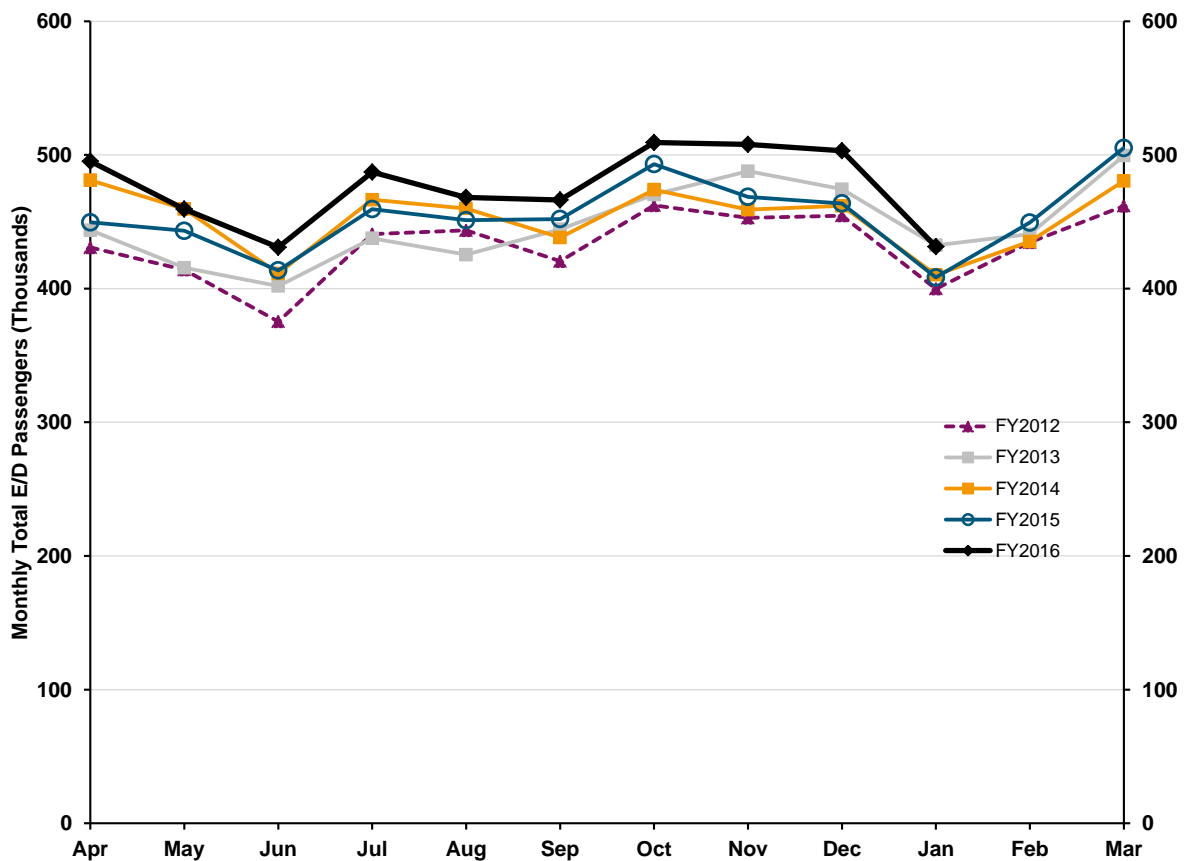
O/D Market	Australia	Other Asia	USA	Other	UK	Pacific	China	Japan
International Travellers Inbound	60%	24%	36%	33%	37%	11%	45%	56%
NZ Residents Outbound	40%	76%	64%	67%	63%	89%	55%	44%

Source: Diio FMg Point of Sale data.

Monthly Traffic

Figure 2-3 presents the monthly traffic levels for the past four fiscal years (2012-2015) and fiscal year 2016 from April to January. Historically, WLG experiences its highest traffic levels in the early autumn (March) and its lowest traffic levels in early summer (January). Traffic volumes exhibit a relatively low degree of seasonality, with the peak and trough months being within +/- 10% of the average month (based on FY2015 data). Low seasonal markets are typically attractive to airlines as they are able to more easily maintain year-round operations which reduces complexity and cost relative to seasonal only service.

Figure 2-3
Total Monthly E/D Passengers
April FY2012 – January FY2016



Source: Wellington Airport Traffic Statistics.

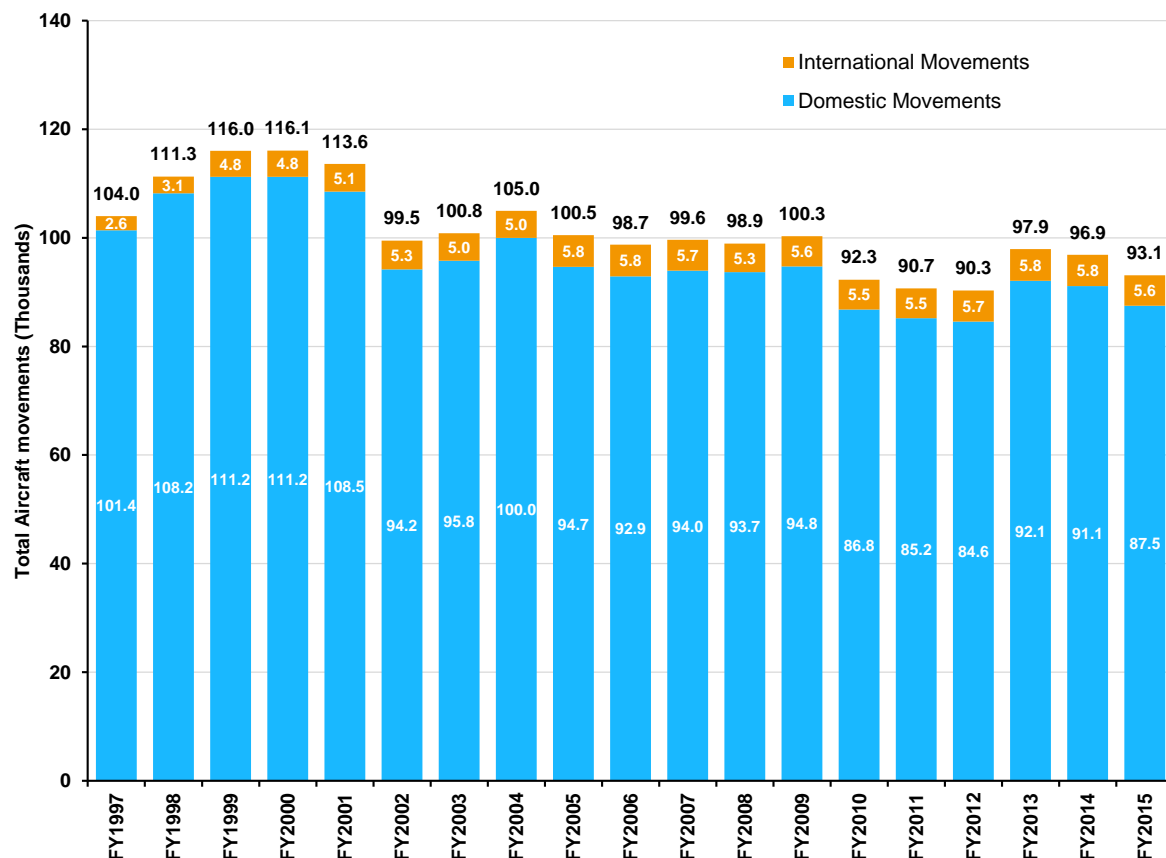
2.1.2 Aircraft Movements

Figure 2-4 shows historical aircraft movements, both domestic and international, at WLG from FY1997 to FY2015. In 2015, WLG handled 93,032 aircraft movements, of which 87,512 (94%) were domestic and 5,520 were from international destinations. Total movements have decreased by nearly 20% since their peak in FY2000, despite the growth in passenger traffic over the past fifteen years. Since FY1997, aircraft movements at WLG have experienced two major shifts. First, in FY2002 with

the collapse of Ansett New Zealand (a subsidiary of Ansett Australia which liquidated in 2001) and subsequent difficulties in the New Zealand domestic market, where landings dropped by nearly 13% in a single year. The next structural shift occurred between FY2010-2012, owing to a combination of factors including the onset of the global financial crisis, the earthquakes in Christchurch, and the impact of a volcanic ash cloud in early 2011 affecting aircraft operations.

Overall, aircraft landings have been declining despite growth in passenger traffic. For domestic operations, this is attributed to upgauging of aircraft operating on domestic routes and rationalization in the domestic fleets. International aircraft landings have more than doubled between 1997 and 2015 at an average rate of 4.1% per annum over those years. More recently, the growth in international aircraft landings has slowed, growing at an average rate of just 0.3% per annum from 2010 to 2015. By comparison, international E/D passenger traffic has grown at an average rate of 4.3% per annum over the same period, suggesting growing aircraft seating capacity and/or increasing load factors for international service at WLG. However, international aircraft movements have increased in FY2016, growing by nearly 17% YTD (March-August FY2016) versus one year prior, due to additional service frequencies by Jetstar and Fiji Airways.

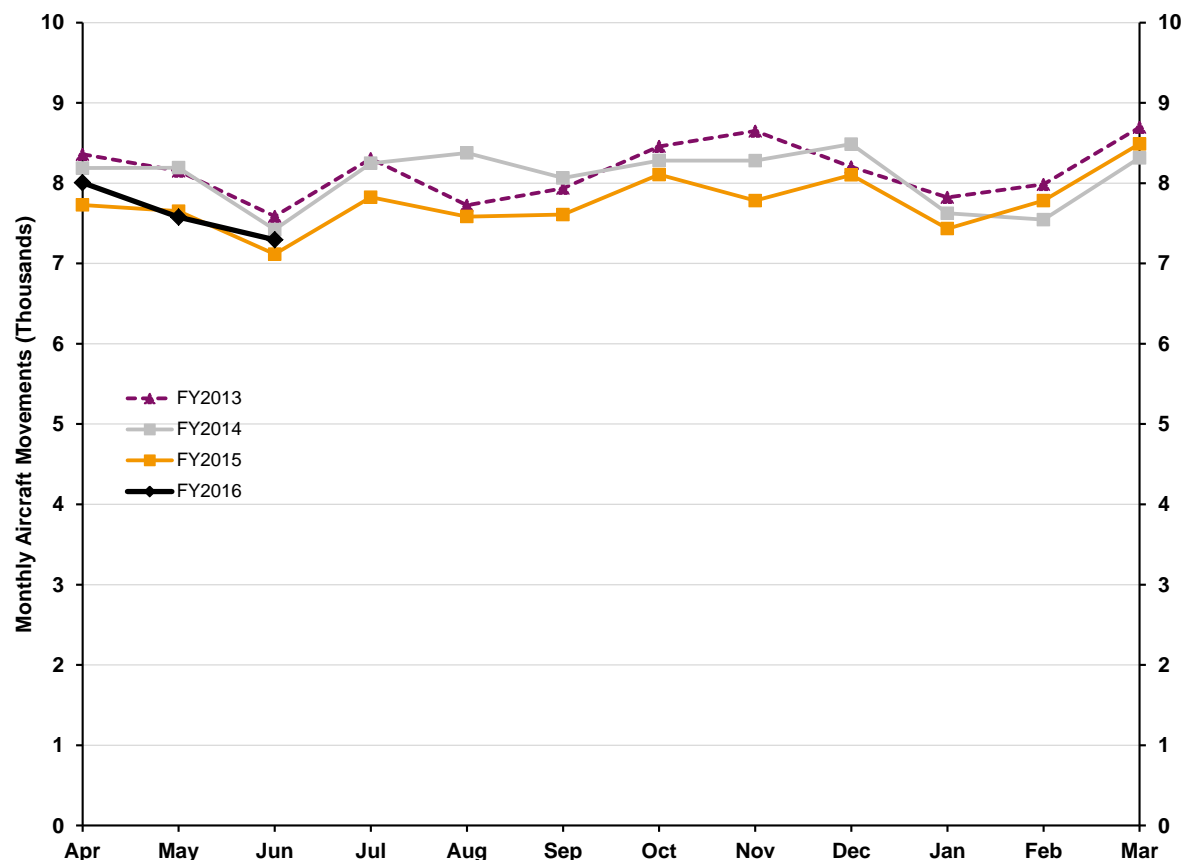
Figure 2-4
Annual Total Aircraft Movements at WLG
FY1997-FY2015



Source: Wellington Airport Traffic Statistics.

Figure 2-5 shows monthly aircraft movements at WLG for the past three fiscal years as (2013-2015) and the first three months of FY2016. The busiest month of the year is typically March due to high domestic aircraft operations, while the busiest month for international operations is typically December or January.

Figure 2-5
Monthly Aircraft Movements at WLG
FY2013 – June FY2016



Source: Wellington Airport Traffic Statistics.

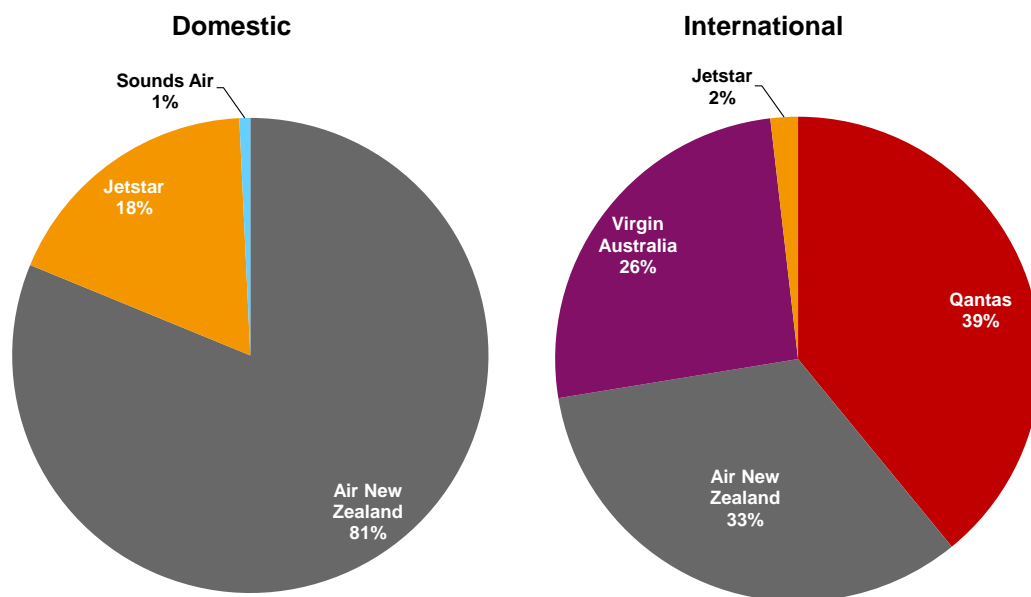
2.1.3 Airline Operations

Figure 2-6 shows the air carrier share of seat capacity in the domestic and international markets at WLG for FY2015. Air New Zealand accounted for 81% of the domestic seat capacity in 2015 (including Air New Zealand's regional subsidiaries). The carrier operates jet service on major trunk routes in New Zealand (Auckland and Christchurch, as well as Dunedin and Queenstown), as well as turboprop service to regional markets on the South and North Islands. Following the departure of Virgin Blue/Virgin Australia, Jetstar (a Qantas subsidiary) is the only other airline offering trunk route service to Auckland and Christchurch. Beginning in FY2016, Jetstar will offer WLG-Nelson (**NSN**) regional service operated by Eastern Australia Airlines using Dash-8 Q300 aircraft, as well as WLG-

Dunedin (**DUD**) service operating on an A320 commencing in October of FY2016.¹⁹ Regional carriers operating at WLG in FY2015 include Air New Zealand's regional subsidiaries Air Nelson, Eagle Airways, and Mount Cook Airline, as well as ancillary regional operators Air Chathams, Origin Air, and Sounds Air.²⁰

Qantas is the largest international carrier operating at WLG, accounting for 39% of the total international seat capacity in FY2015. Qantas is closely followed by Air New Zealand with 33% of seat capacity, and Virgin Australia at 26%. Due to runway length preventing long-haul wide-body aircraft from operating at WLG, international air service is limited to Trans-Tasman flights, as well as seasonal service to Nadi (**NAN**), Fiji. Beginning in FY2016 Fiji Airways commenced year-round WLG-NAN service which is projected to nearly treble seat capacity to the Pacific islands from Wellington.²¹ Additionally, new capacity is being introduced by Jetstar on Trans-Tasman routes to Gold Coast (**OOL**) and Melbourne (**MEL**) in FY2016, further boosting international seat capacity in the coming year. Singapore Airlines has announced the introduction of a direct 5th-freedom service to Singapore via Canberra, to begin in FY2017. This service will initially operate 4x weekly using a Boeing 777-200 aircraft, providing Wellington with its first direct (but not non-stop) international service, and first non-stop service to Canberra.

Figure 2-6
Domestic and International Market Share by Carrier Seat Capacity
FY2015



Source: OAG Schedule Data via Diio Mi.

¹⁹ Jetstar New Zealand, "Jetstar launches low fares to Nelson, Napier, New Plymouth and Palmerston North", 30 August 2015.

²⁰ As of the writing of this report, Air New Zealand is in the process of shutting down operations by Eagle Airways. They are not expected to be operating past the end of FY2016.

²¹ OAG Schedule Data via Diio Mi, Scheduled Seat Capacity from WLG, FY2016.

Table 2-2 shows the international seat capacity by destination. In FY2015 carriers offered services to five international locations, four of which are in Australia. Sydney is the largest international E/D market for WLG at 47% of last year's outbound international seat capacity. Brisbane (26%) and Melbourne (25%) make up most of the remaining international seat capacity.

Table 2-2
International Outbound Seats by Destination
FY2015

Destination	Outbound Seats	Market Share
Sydney (SYD)	221,424	47%
Brisbane (BNE)	121,616	26%
Melbourne (MEL)	117,124	25%
Coolangatta/Gold Coast (OOL)	8,460 ²²	2%
Nadi, Fiji (NAD)	4,032	1%
Total International	472,656	100%

Source: OAG Schedule Data via Diio Mi.

Table 2-3 shows forward schedules for FY2016 (April 2015-March 2016), showing the significant capacity increases to WLG's scheduled international seat capacity. Total international seat capacity is projected to increase 18%, while capacity to Fiji will nearly triple and seat capacity to OOL is scheduled to nearly quadruple.

Table 2-3
International Outbound Seats by Destination
FY2016

Destination	Outbound Seats	Market Share
Sydney (SYD)	222,264	40%
Melbourne (MEL)	161,208	29%
Brisbane (BNE)	129,256	23%
Coolangatta/Gold Coast (OOL)	29,520	5%
Nadi, Fiji (NAD)	14,420	3%
Total International	556,668	100%

Source: OAG Schedule Data via Diio Mi.

²² Seat capacity is only reflective of a partial year's service, as JQ commenced service in December of FY2015.

3 Economic Conditions

Economic conditions are expected to have meaningful impacts on traffic levels at WLG. New Zealand's economy is highly dependent on international trade. Its main trading partners are Australia, China, the U.S., and Japan. As part of the 2016 forecast update, InterVISTAS has reviewed both short- and long-term projections for economic outlook and adjusted its forecast assumptions accordingly. The following provides an overview of the economic conditions in and around Wellington, New Zealand and its major international trade and tourism markets.

3.1 Population

In 2014, the population of the Wellington Region²³ was approximately 490,000 persons, while the population of Wellington city proper is just under 200,000 persons, or 40% of the regional population. The population of New Zealand is approximately 4.5 million persons, meaning that the Wellington Region accounts for approximately 11% of the national population, and Wellington city accounts for approximately 4% of the national population.

WLG's catchment area also includes much of Manawatu-Wanganui (directly north of the Wellington Region), which in 2014 had a population of approximately 233,000 persons. Combining the Wellington Region and Manawatu-Wanganui gives a combined direct catchment area population of approximately 723,000 persons in 2014, or 16% of the national population. While not all residents in Manawatu-Wanganui would travel to WLG as their primary airport, the size of this catchment area is an important metric in understanding WLG's local market.²⁴

Over the next 40 years, the total population of New Zealand is projected to grow at an annual rate of 0.7% per annum on average.²⁵ Over the same time period, the Wellington Region is projected to grow at 0.4% per annum, Manawatu-Wanganui at 0.05% per annum, and the combined catchment area of those administrative regions at 0.3% per annum, on average.²⁶ Population growth in WLG's primary catchment area is projected to be centred on the Wellington Region and Wellington city proper, while the outlying regions in its catchment area are not projected to grow their population as fast.

3.2 New Zealand's Gross Domestic Product

Figure 3-1 shows New Zealand's real Gross Domestic Product (GDP) growth over the past ten years and a short-term forecast to FY2020. New Zealand's economy was impacted by the global economic recession in FY2009, with GDP contracting by more than 2% in that year. The economy quickly rebounded, posting positive growth from FY2010 to FY2015. Growth in FY2011 was impacted by the Christchurch earthquake in February 2011, in particular.

Over the past five years, New Zealand's economy has grown, in real terms, at an average of 2.3% per annum. This is slightly below the 25-year average annual growth rate of 2.7%. The short-term outlook for New Zealand's real GDP growth is a return to levels similar to recent historical rates, averaging 2.6% from FY2016-2020.

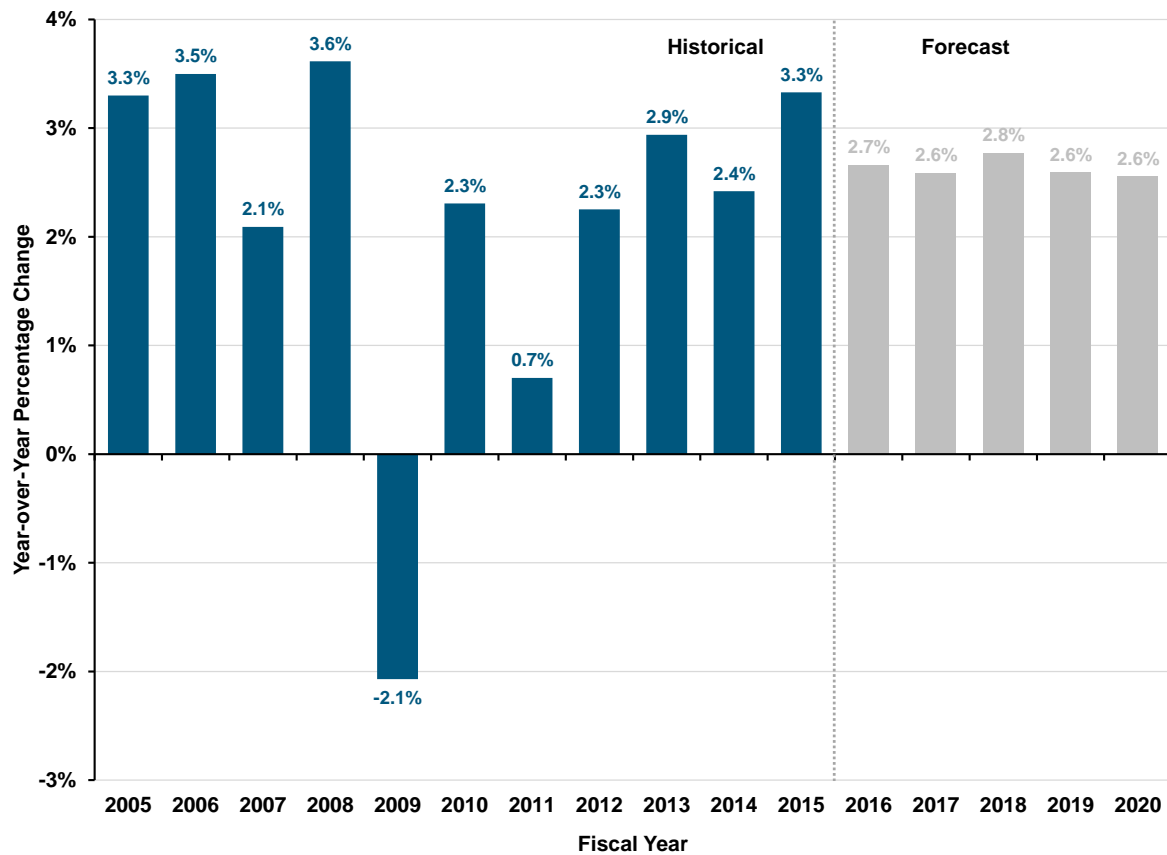
²³ Including the local authorities of Wellington, Lower Hutt, Upper Hutt, Porirua, Kapiti Coast, and the Wairarapa – within approximately 1 hours' drive of the airport

²⁴ Based on InterVISTAS' 2014 analysis of WLG's catchment area, WLG draws travellers from the following regions in addition to those listed above: Marlborough, Hawke's Bay, Taranaki, Nelson and Tasman. InterVISTAS, *Viability Assessment of Long Haul Service at Wellington Airport*, December 2014.

²⁵ Statistics New Zealand, Population Projections (Median Case), 2014-2068.

²⁶ Statistics New Zealand, Subnational Population Projections (Medium Scenario), 2013-2043.

Figure 3-1
New Zealand Real GDP (FY2010)
Year-over-Year Percentage Change
FY2005 – FY2015



Source: Statistics New Zealand.

Forecast: Average of forecast Real GDP growth from: New Zealand Treasury, International Monetary Fund, ANZ Bank, ASB, Westpac, World Bank Development Indicators, IHS Global Insight, Oxford Economics, and OECD.

Table 3-1 below provides a table of the various public and private sector forecasts of real economic growth for New Zealand. Over the long term, New Zealand's economy is projected to grow in real terms at approximately 2.3% per annum through to FY2045.²⁷

Table 3-1
New Zealand Real GDP Growth Projections

Fiscal Year	The Treasury ²⁸	ANZ Bank ²⁹	ASB ³⁰	Westpac ³¹	IMF ³²	USDA ³³	OECD ³⁴
2016	3.3%	2.4%	2.2%	2.4%	2.2%	3.0%	3.3%
2017	2.8%	2.5%	2.7%	2.6%	2.4%	2.9%	2.4%
2018	2.8%	2.8%	3.5%	2.9%	2.4%	2.8%	2.3%
2019	2.4%	2.5%	3.1%	-	2.5%	2.7%	2.4%
2020	-	-	-	-	2.5%	2.6%	2.5%

3.3 Economy in Major Markets

This section analyses the performance of the major source markets for international travel at WLG over the last ten years and an outlook for the short-term.

Australia

As described in Section 2.1, the largest component of international traffic at WLG is made up of travel to/from Australia. Australia's GDP averaged 2.9% per annum growth over the past ten years, as illustrated in **Figure 3-2**. Australia's economy weathered the global recession in strong fashion, not entering a recession during FY2009-2010. However, economic growth in Australia did slow during that period, averaging only 2% per annum from FY2010-2012 compared to the growth in surrounding years typically exceeding 3% per annum. Real GDP growth is expected to slow slightly in the coming five years to between 2.5-3.0% through to FY2020, as shown in **Table 3-2**. Over the long term, Australia's economy is expected to grow in real terms at an average rate of 2.6% per annum from 2015-2045, with GDP growth slowly declining throughout the forecast period.³⁵

²⁷ Based on long-term consensus forecasts from the OECD World Bank Development Indicators, International Financial Statistics of the IMF, HIS Global Insight, and Oxford Economic Forecasting, and projections from the USDA ERS.

²⁸ The Treasury of New Zealand, 2015 Budget and Fiscal Update, May 2015.

²⁹ ANZ Bank, New Zealand Economics, ANZ Economic Outlook, February 2016.

³⁰ ASB, Quarterly Economic Forecast, February 2016.

³¹ Westpac, Economic Overview, February 2016.

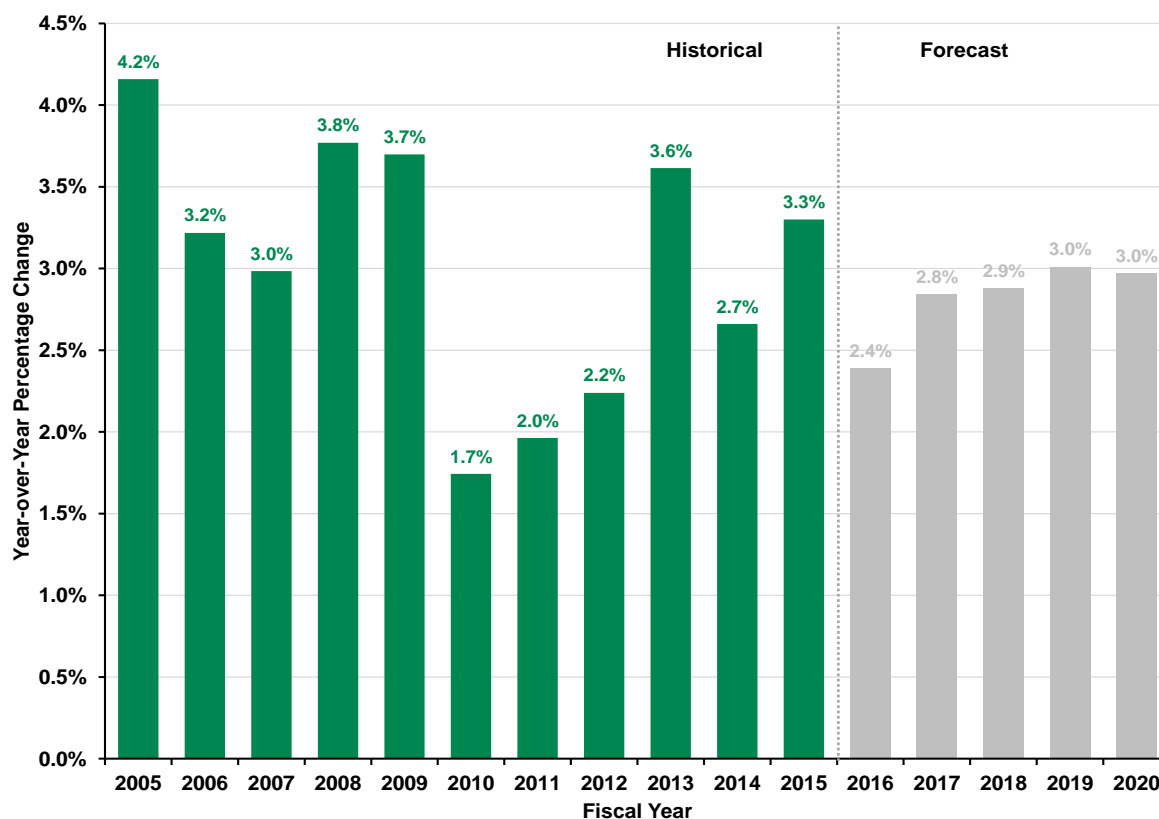
³² International Monetary Fund, World Economic Outlook, January 2016.

³³ The US Department of Agriculture's Economic Research Service (ERS) provides a consensus forecast of economic indicators based on forecasts from, the World Bank Development Indicators, International Financial Statistics of the IMF, HIS Global Insight, and Oxford Economic Forecasting, and projections from the ERS.

³⁴ OECD, GDP long-term forecast (indicator), 2016.

³⁵ Based on long-term consensus forecasts from World Bank Development Indicators, International Financial Statistics of the IMF, HIS Global Insight, and Oxford Economic Forecasting, and projections from the USDA ERS.

Figure 3-2
Australia Real GDP
Year-over-Year Percentage Change
FY2005 – FY2020



Source: USDA ERS (historical), average of the Reserve Bank of Australia, OECD, World Bank Development Indicators, HIS Global Insight, and Oxford Economics, and short-term outlook from the Australian Big Four banks (forecast).

Table 3-2
Australia Real GDP Growth Projections

Fiscal Year	Reserve Bank of Australia ³⁶	Commonwealth Bank of Australia ³⁷	Westpac ³⁸	National Australia Bank ³⁹	ANZ Bank	USDA ⁴⁰	OECD ⁴¹
2016	2.5%	2.4%	2.3%	2.9%	2.3%	2.4%	2.9%
2017	2.8%	3.0%	2.8%	2.9%	2.7%	2.6%	3.8%
2018	2.8%	3.1%	2.8%	2.7%	3.1%	2.9%	3.9%
2019	-	-	-	-	3.1%	2.9%	3.8%
2020	-	-	-	-	-	3.0%	3.7%

³⁶ Reserve Bank of Australia, *Statement on Monetary Policy*, "Table 6.1 – Output Growth and Inflation Forecasts", February 2016.

³⁷ Commonwealth Bank of Australia, *Forecasts – Economic and Financial*, March 2016.

³⁸ Westpac, *Economic Overview*, February 2016.

³⁹ National Australia Bank, *Economic Forecast*, March 2016.

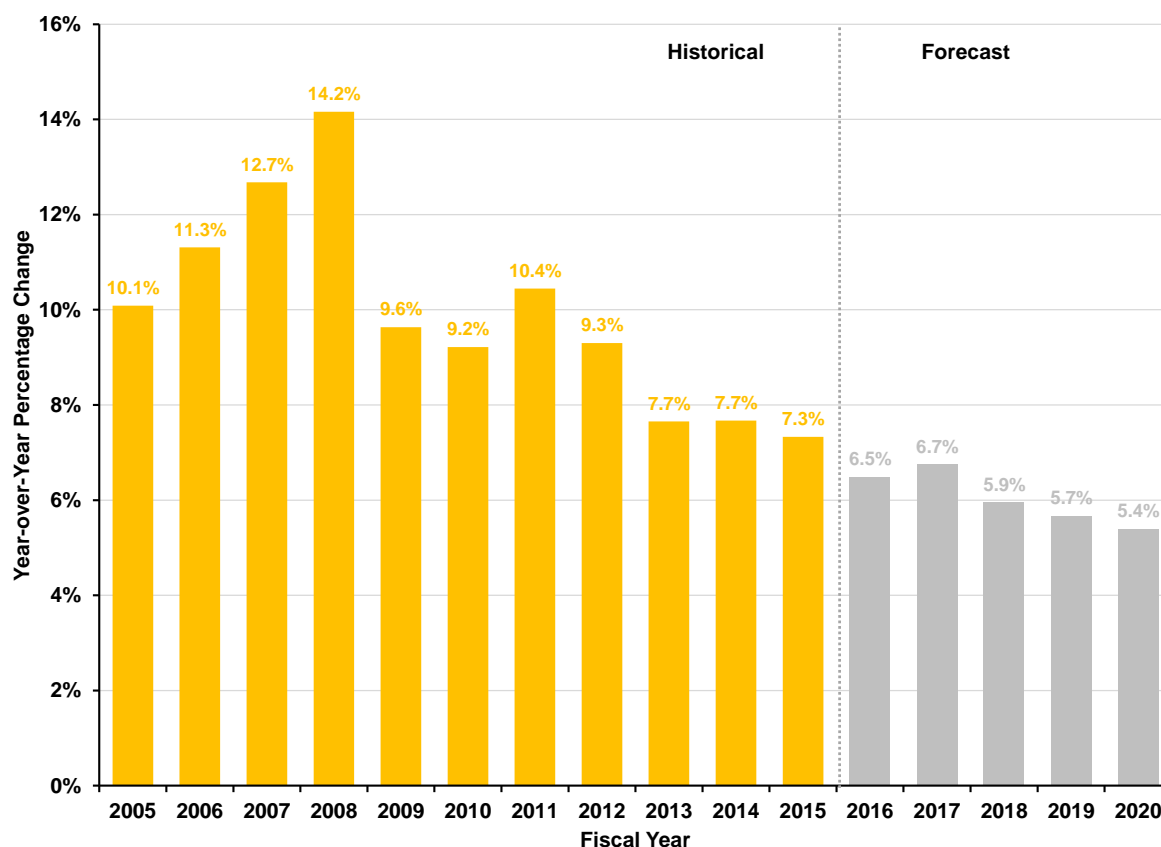
⁴⁰ The US Department of Agriculture's Economic Research Service (ERS) provides a consensus forecast of economic indicators based on forecasts from, the World Bank Development Indicators, International Financial Statistics of the IMF, HIS Global Insight, and Oxford Economic Forecasting, and projections from the ERS.

⁴¹ OECD, *GDP long-term forecast (indicator)*, 2016.

China

Figure 3-3 shows the recent historical annual growth in real Chinese GDP with a short-term outlook for China's economy to FY2020. Historically, China's economy has grown at rates well above global averages, ranging from 14% (in 2008) to 7% (in 2015). While China's GDP growth has been very strong, it is projected that current trends in a moderating of their growth will continue as the economy matures. The InterVISTAS forecast team has revised its assumptions regarding China's economic outlook and downgraded its GDP growth forecast. Over the short term, China's economic growth is expected to slow relative to past growth, and expand at an average of 6% per annum from FY2016-2020. Over the long term, China is still expected to outpace the global average real GDP growth, at an annual average of 4.4% per annum from FY2015-2045.⁴² However, the very long term growth (in the second half of the forecast period) of the Chinese economy remains somewhat speculative, but it is likely that its GDP growth will trend down towards averages seen by advanced post-industrial economies in the past twenty years.

Figure 3-3
China Real GDP
Year-over-Year Percentage Change
FY2005 – FY2020



Source: USDA ERS (historical), average, OECD, World Bank Development Indicators, IHS Global Insight, and Oxford Economics (forecast).

⁴² Based on long-term consensus forecasts from the OECD, World Bank Development Indicators, International Financial Statistics of the IMF, HIS Global Insight, and Oxford Economic Forecasting, and projections from the USDA ERS.

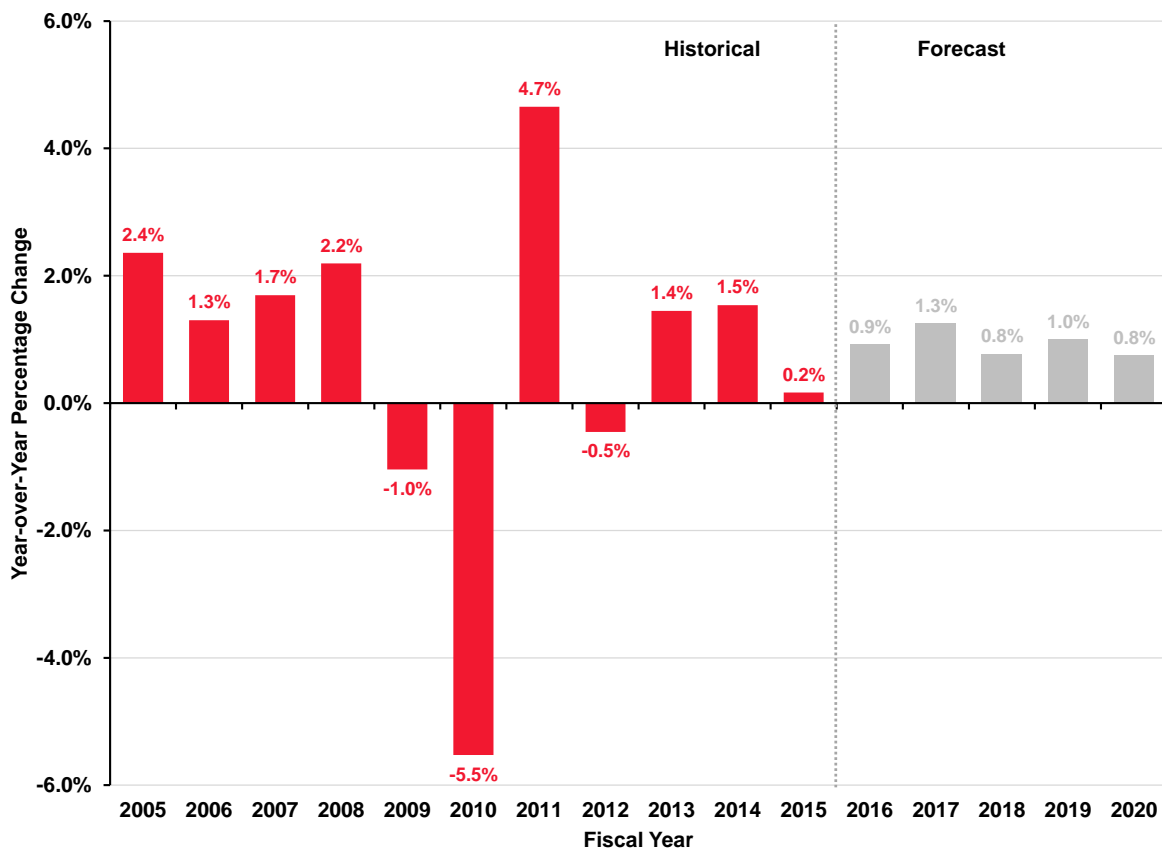
China is the fastest growing visitor and tourist market to New Zealand and at WLG. Since 1995, visitors to New Zealand residing in China have grown by nearly 4,000%, from under 10,000 visitors in FY1995 to nearly 300,000 in FY2015.⁴³ This growth in travellers clearing customs at all New Zealand ports has been nearly continuous, with only FY2008 showing a drop in visitors by air from China.

⁴³ Statistics New Zealand, Visitor Departures by Country of Residence and New Zealand Port.

Japan

Figure 3-4 shows the recent historical annual growth in Japan's real GDP over the past ten years, with a short-term outlook from FY2016-2020. The Japanese economy continues to perform relatively poorly compared to its East Asian neighbours and below global averages and averages for advanced industrialized nations. Japan has experienced three years of negative real GDP growth in the past ten (FY2009, 2010, and 2012), due in large parts to global financial crisis in FY2008/09 and the Tohoku earthquake at the end of FY2011. The short term outlook for Japan's real GDP growth averages only 0.9% per annum from FY2016-2020. Over the long term, Japan's economy is only projected to grow in real terms at an annual average of 0.8% per annum from FY2015-2045.⁴⁴ An ageing population and one of the world's lowest birth rates will put continued stress on the Japanese economy and social support system.⁴⁵ With the Japanese population expected to already be in decline, a stagnant population base poses risks to WLG for future tourist visits by air.

Figure 3-4
Japan Real GDP
Year-over-Year Percentage Change
FY2005 – FY2020



Source: USDA ERS (historical), average of World Bank Development Indicators, IHS Global Insight, OECD, and Oxford Economics (forecast).

⁴⁴ Based on long-term consensus forecasts from World Bank Development Indicators, International Financial Statistics of the IMF, HIS Global Insight, OECD, and Oxford Economic Forecasting.

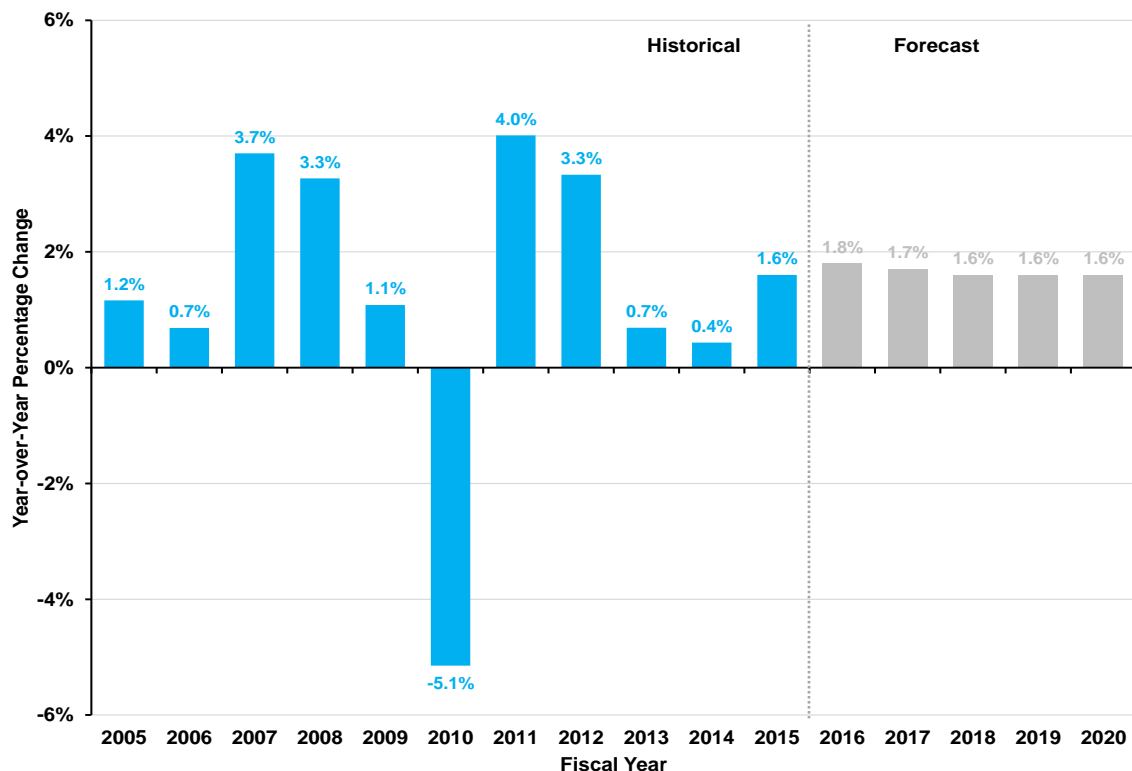
⁴⁵ United Nations, World Population Prospects: 2012 Revision.

Germany

Figure 3-5 shows the recent historical trends in real GDP growth for Germany from FY2005-2015, along with a short term outlook for real GDP from FY2016-2020. Germany is the European Union's largest economy, and over the past ten years their real GDP has grown at rates from 4% (in FY2011) to -5% (in FY2010). On average, from FY2005-2015 the German economy grew by 1.6% per annum. Germany experienced a significant contraction in its real GDP growth in FY2010 as a result of the global financial crisis, but recovered strongly in FY2011/12 at annual growth rates 4.0% and 3.3%, respectively. More recently, the German economy has slowed again due to the influence of the Eurozone debt crisis, with growth only averaging approximately 1% p.a. over the past three years. The short-term outlook for Germany's real GDP is for moderate growth, averaging 1.7% per annum from FY2016-2020. Over the long term, the German economy is expected to grow at an average annual rate of 1.3%.⁴⁶

Based on exit customs data at WLG, visitors from Germany have been the fastest growing visitor market other than China. The number of German travellers leaving New Zealand from WLG has increased nearly continuously since FY1995, with only minor slowing in following the global recession and during the Eurozone crisis.

Figure 3-5
Germany Real GDP
Year-over-Year Percentage Change
FY2005 – FY2020



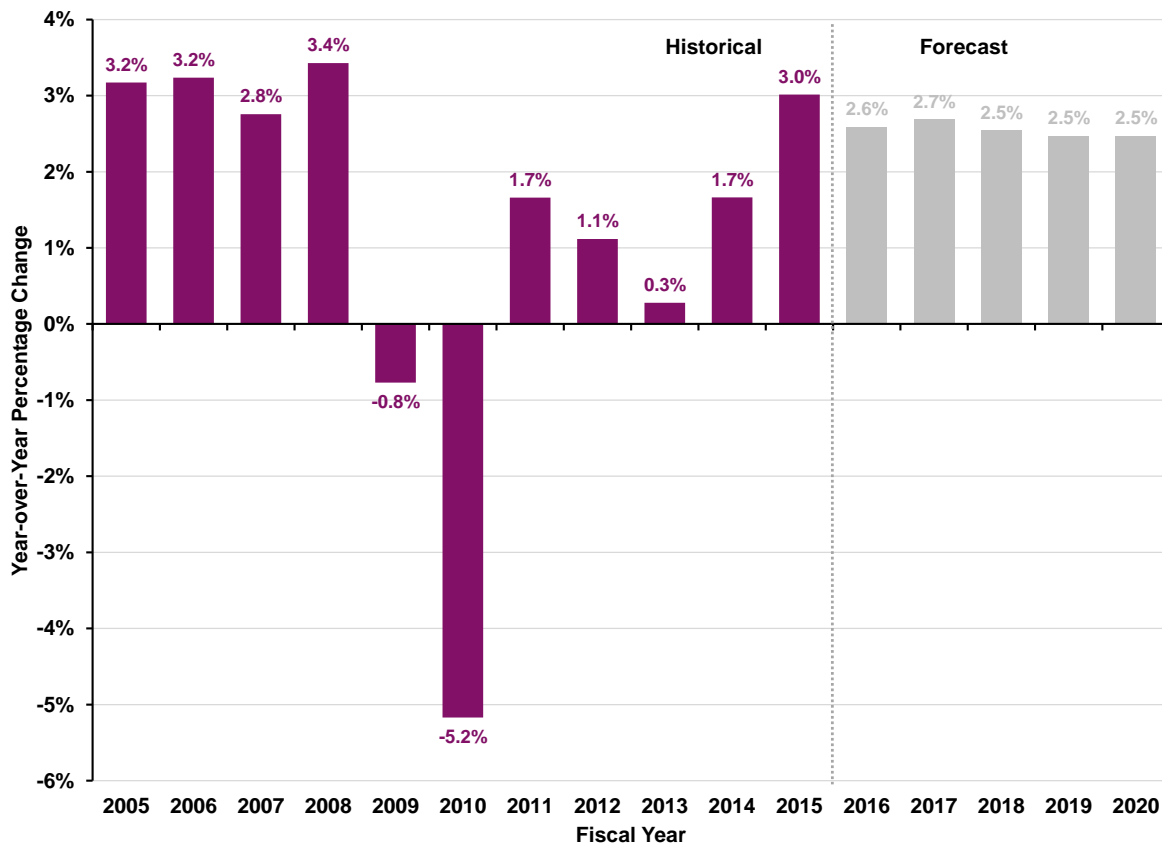
Source: USDA ERS (historical), average of, World Bank Development Indicators, IHS Global Insight, OECD, and Oxford Economics (forecast).

⁴⁶ Based on long-term consensus forecasts from World Bank Development Indicators, International Financial Statistics of the IMF, HIS Global Insight, OECD, and Oxford Economic Forecasting..

United Kingdom

As discussed in Section 2.1, the UK is the second-largest tourist market for WLG and is also the second-largest inbound tourist/visitor market for New Zealand as a whole. While the number of visitors arriving in New Zealand through WLG from the UK is relatively small compared to the Australian market, the economic impact of the UK economy on international visitors to WLG is important. **Figure 3-6** shows the recent historical growth in the United Kingdom's real GDP over the years FY2005 to 2015, as well as a short-term outlook on real GDP growth. In the past 10 years, the UK economy has grown at rates ranging from 3.4% (in FY2008) to -5.2% (in FY2010). The UK suffered two years of recession during the global financial crisis, posting negative GDP growth in FY2009/10. The UK economy has experienced positive growth following the recession, but generally at rates below pre-recession levels. The short-term outlook for the UK economy is positive but moderate, with real GDP projected to grow at an average of 2.6% per annum from FY2016-2020. Over the long term, real GDP growth is projected to remain at around 2.5% per annum from FY2015-2045.⁴⁷

Figure 3-6
UK Real GDP
Year-over-Year Percentage Change
FY2005 – FY2020



Source: USDA ERS (historical), average of World Bank Development Indicators, IHS Global Insight, OECD, and Oxford Economics (forecast).

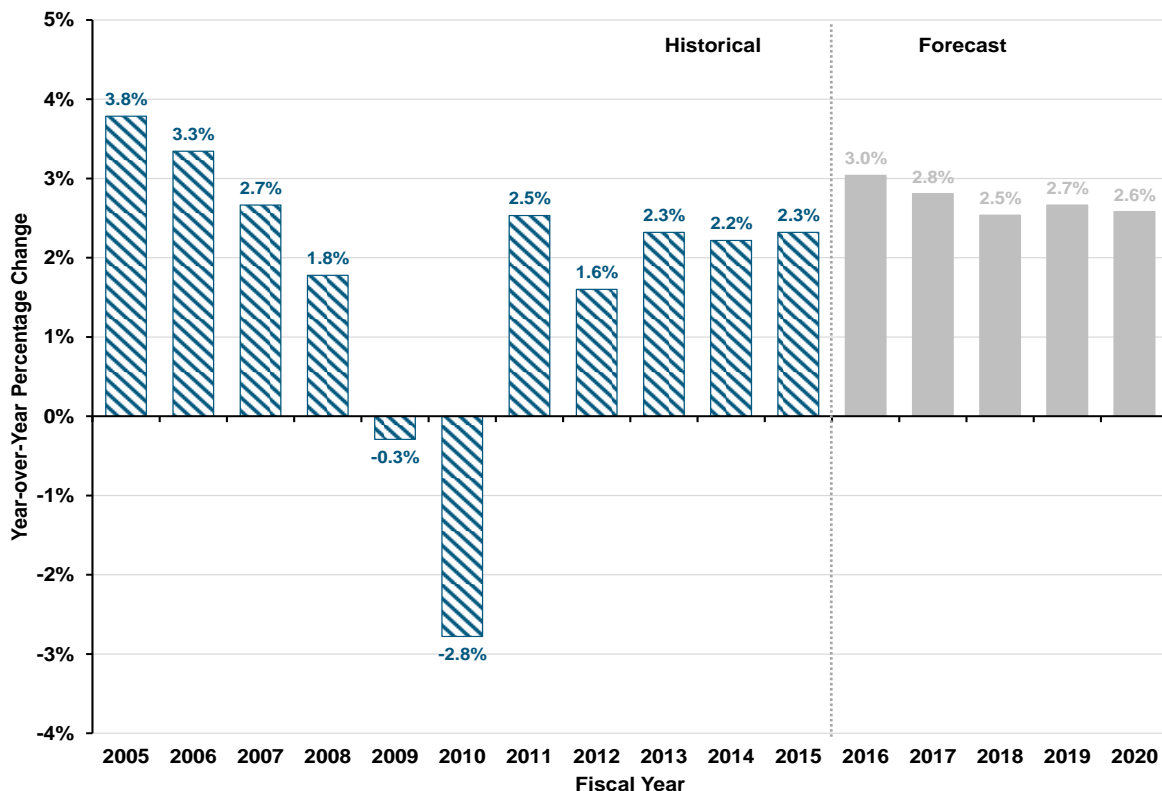
⁴⁷ Based on long-term consensus forecasts from World Bank Development Indicators, International Financial Statistics of the IMF, IHS Global Insight, OECD, and Oxford Economic Forecasting.

United States

Figure 3-7 shows real GDP growth rates for the United States from FY2005 to 2015 with a short-term outlook to FY2020. The U.S. economy suffered its largest recession since the end of WWII during FY2009/10, contracting by -0.3% and -2.8%, respectively. In the years following the recession, growth in the U.S. economy has been below long-term historical levels of around 3% per annum. From FY2011-2015, the U.S. economy grew at an annual average rate of 2% per annum. The current short term outlook for the American economy is a return to slightly higher growth in FY2016/17 at 3.0% and 2.8%, respectively, then moderating slightly to growth rates averaging 2.6% for FY2018-2020. Over the long term, the U.S. economy is projected to grow at an annual rate of 2.6% over FY2015-2045.⁴⁸

Since FY2009, visitors to New Zealand clearing exit customs at WLG have grown dramatically, nearly trebling over just six years. The United States is currently the third largest international market for travellers clearing customs at WLG, and the third largest market for visitors to New Zealand after Australia and China.

Figure 3-7
United States Real GDP
Year-over-Year Percentage Change
FY2005 – FY2020



Source: USDA ERS (historical), average of, World Bank Development Indicators, IHS Global Insight, OECD, and Oxford Economics (forecast).

⁴⁸ Based on long-term consensus forecasts from World Bank Development Indicators, OECD, International Financial Statistics of the IMF, HIS Global Insight, and Oxford Economic Forecasting.

4 Forecasting Methodology

The objective of the study is to forecast future traffic levels at WLG and to quantify the impact of extending the runway at Wellington International Airport on air traffic activity levels. As such, constrained (no runway extension) and unconstrained (with the runway extension) forecasts were produced:

- A forecast of a Business As Usual (BAU) traffic at the airport over 45 years
- A forecast of a Runway Extension scenario over the same forecast horizon.

InterVISTAS has taken a forecasting approach combining traditional econometric modelling and a stochastic, scenario-based assessment of future demand and airport traffic levels. This approach allowed for the forecast team to utilize data-driven econometric analysis and risk-based scenario modelling while integrating internal and external expert judgement to most accurately account for current market trends and future developments.

This study produced the following traffic forecasts:

- Origin/destination and enplaned-deplaned traffic broken down into:
 - Domestic trunk vs. regional passengers,
 - International traffic broken down into the following sectors:
 - Australia, China, Japan, Other Asia, United Kingdom, United States of America, Pacific Islands, and Other (rest of the world)
 - Additionally, O/D traffic forecasts are divided into inbound international visitors and outbound New Zealand residents
- Aircraft movements, by segment and aircraft type.

This chapter describes the forecasting methodologies used to produce the above traffic forecasts. Additional discussion on the assumptions and results are described in **Chapter 5** and **Chapter 6**.

4.1 Air Passenger Forecast Methodology

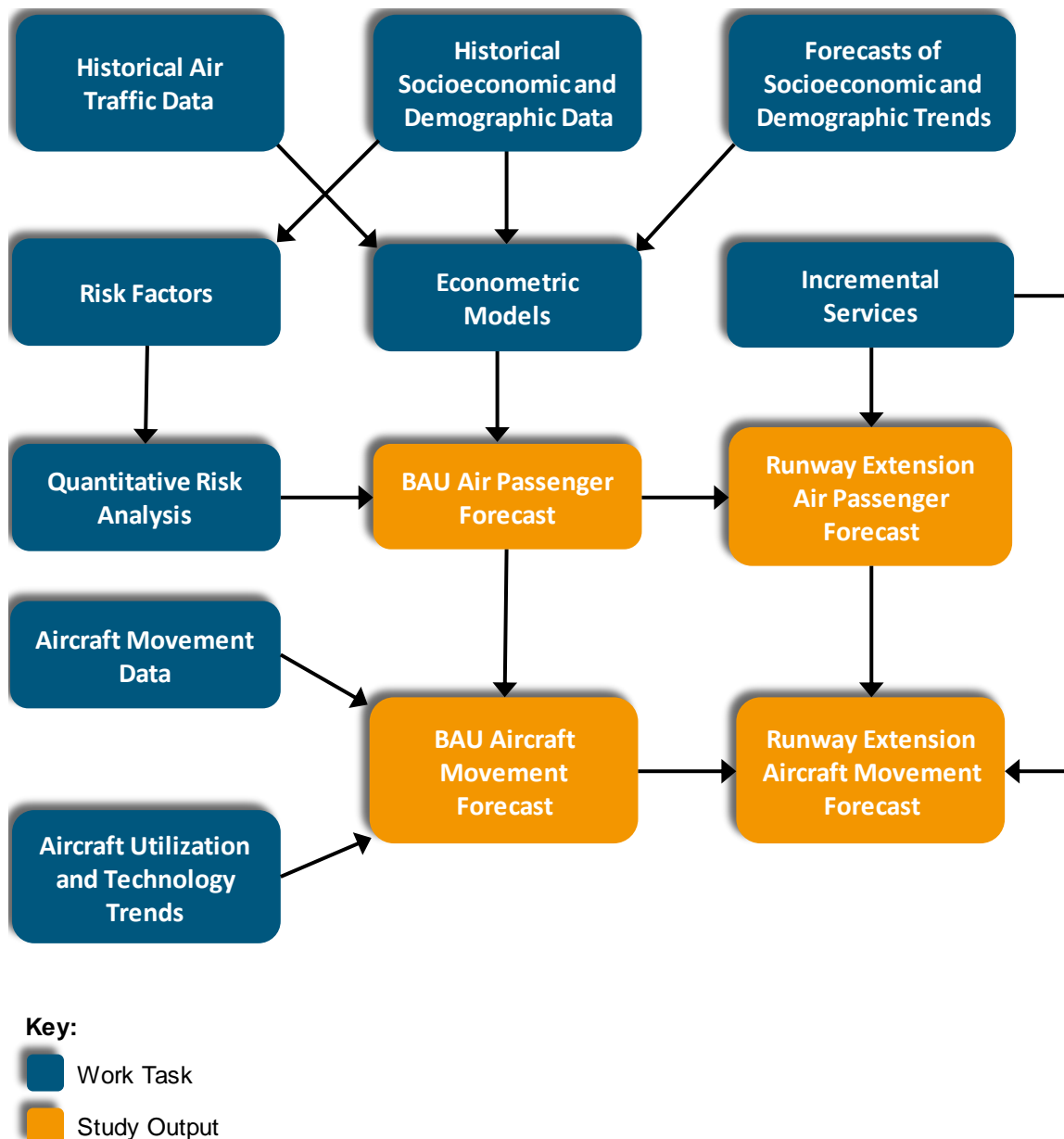
Air travel is a derived demand. Demand for air transportation between origin and destination markets is derived from the socio-economic interactions between these markets, shaped by carriers' networks and available airlift capacity. Generally, business/trade activity, tourism/visitor activity as well as visiting friends and relatives (VFR) constitute the primary components of air travel at an airport.

Dependable forecasting practice requires awareness of the uncertainties surrounding the forecasts. Considerable effort by the project team went into analysing the factors affecting traffic activity at Wellington International Airport. A combination of statistical analysis, market and industry outlook plus professional judgement was used to produce the air passenger forecasts.

Figure 4-1 provides an overview of the forecasting model components and sequence, highlighting key components which are discussed in more detail below. In essence, air passenger forecasts were generated using a combination of econometric analysis, risk analysis and scenario development.

In addition to the constrained BAU forecast, forecasts of passenger traffic and aircraft movements were developed for a runway extension scenario, based off of the BAU forecasts. The benefit of this approach is that it allows the forecast team to utilize data-driven econometric analysis while integrating internal and external expert judgment.

Figure 4-1: Air Traffic Forecasting Methodology



The following sections describe in more detail the specific forecasting methodologies employed to arrive at the air passenger forecasts and aircraft movement forecasts.

4.1.1 Econometric Forecasts

The econometric modelling approach used regression analysis relating historical passenger traffic at WLG to various socio-economic and industry factors, such as economic growth, incomes, population growth, etc. Using projections of these factors, it was possible to produce forecasts of air traffic at WLG through the econometric models. Separate models were estimated for the following:

- Domestic traffic;
- New Zealand outbound international traffic to: Australia, Pacific Islands, Asia including China, UK, USA and other world regions;
- Inbound international traffic from Australia, China, Japan, South Korea, Germany, UK, USA, Canada, and all other world regions.

The dependent variables describing the various traffic markets were obtained from two sources:

1. Wellington International Airport Authority: providing historical domestic enplaned/deplaned traffic.
2. Statistics New Zealand data providing New Zealand resident traveller departure data (NZ outbound international traffic) and international visitor arrivals by country of residence (inbound international traffic) in combination with data from Diio FMg (a well-established third party provider of aviation data) capturing ticketed itineraries.

The forecast team examined the statistical significance of a wide range of variables to produce the final models, including real Gross Domestic Product (GDP) of the source countries, population, GDP per capita, and dummy variables to capture specific factors or events (e.g. the Ansett collapse and subsequent difficulties in Air New Zealand, the introduction of new carriers on Trans-Tasman routes in the mid-2000s, etc.). Numerous model estimations were conducted using a variety of reasonable combinations of the above variables. The final models were selected on the basis of statistical fit, coefficient estimate robustness, and the plausibility of the coefficient estimates produced.⁴⁹ For most markets, it was found that national GDP was the most effective variable to explain the determinants of air traffic.⁵⁰ The final selected models were found to have parameter estimates that are in line with established elasticities for air travel demand. The univariate econometric modelling techniques employed in this forecast are typical of studies estimating air travel demand. InterVISTAS has conducted multiple studies of estimating air travel demand elasticities and is familiar with established estimates for elasticities in various types of markets, as well as the current literature on econometric modelling techniques. Details of the final model specifications and parameter estimates can be found in **Appendix A**.

⁴⁹ Different model specifications were chosen for models of each traffic segment to allow for more accurate and segment-specific forecasting based on the segment's historical data and trends.

⁵⁰ In the final forecasts, some international markets were aggregated to best reflect the underlying data available for both inbound and outbound international travellers.

4.1.2 Estimation of O/D Markets at WLG

The econometric forecasts produced parameter estimates of the elasticity of GDP to the demand for air travel. InterVISTAS thus estimated the size of WLG's domestic O/D market, and international O/D markets (by direction) to base the forecast from.

InterVISTAS, using its experience and expertise with air travel data, estimated FY2015 inbound and outbound international O/D traffic in the following markets:

- Australia
- China
- Japan
- Other Asia
- UK
- USA
- Pacific Islands
- Other (rest of world)

In addition, domestic O/D traffic volumes were estimated including estimates of domestic O/D and E/D traffic on trunk routes (to AKL and CHC) and to regional domestic destinations.

Estimates of O/D traffic were developed using data from Diio FMg (a well-established third party provider of aviation data) capturing ticketed itineraries as well as ticket point of sale to determine inbound vs outbound shares of traffic. These estimates were then calibrated to match WLG's reported international and domestic E/D traffic volumes in FY2015.⁵¹ **Table 4-1** below shows the breakdown of WLG's FY2015 estimated O/D traffic:

⁵¹ Wellington International Airport Authority, *Wellington International Airport – Traffic Statistics*, April 2015.

Table 4-1: Estimated WLG FY2015 O/D Traffic

Market	Inbound	Outbound	Total
Australia	313,929	208,798	522,727
China	11,155	13,877	25,032
Japan	9,264	7,388	16,652
Other Asia	30,020	96,819	126,838
UK	21,759	36,478	58,237
USA	37,158	64,918	102,076
Pacific	5,725	45,643	51,368
Other	31,012	62,481	93,493
Total International O/D	460,022	536,402	996,424
Domestic Trunk	2,697,087		
Domestic Non-Trunk	1,258,611		
Total Domestic O/D	3,955,698		
Connections	505,157		
Total WLG E/D	5,457,278		

The estimates of O/D market sizes and traffic volumes were also employed to allocated O/D traffic into E/D segments, based on traveller itineraries, as described below in **Section 4.1.3**.

Connecting Passengers

In FY2015 there were approximately 505,000 connecting passengers at WLG, representing approximately 9% of the E/D passenger traffic at the airport.⁵² Connecting traffic at WLG is dominated by domestic connections. Domestic connecting traffic at WLG serves to connect the North and South Islands by transferring regional passengers on turboprop aircraft to jets on trunk and other regional routes. Domestic connections on trunk routes also direct traffic to AKL and CHC where passengers may be making onward connections to overseas locations. Domestic to international traffic captures both regional traffic destined to and originating from Australia and the Pacific, as well as traffic accessing Australian gateways for onward long-haul overseas journeys. The estimated mix of connections in FY2015 is as follows:

- Domestic-Domestic: 93%
- Domestic-International: 7%

The proportion of connecting traffic in the constrained BAU forecast is expected to increase broadly in line with overall traffic, albeit at a slightly higher rate reflecting increased opportunities for connections

⁵² Derived from estimates of O/D and connecting passenger volumes from Diio FMg and airport statistics of E/D passenger traffic for FY2015.

as air services develop. The mix of domestic-domestic and domestic-international traffic is expected grow in line with the volumes of domestic and international traffic. In the runway extension forecast, domestic-international connecting traffic is anticipated to increase, as the introduction of new services will stimulate additional demand from regional communities linked to WLG which could in turn access new international destinations through only a single connection.⁵³ Further discussion of the methodology used to estimate and model the stimulation of domestic connections in the runway extension forecast is described in **Section 4.4**.

4.1.3 Allocating Traffic to Routes

The analysis described above is based on the source market of the passengers using WLG. However, there are a number of route choices that travellers can select from travelling to/from WLG, many of which are constrained by the lack of long-haul international service. For example, a visitor from the UK can travel to Wellington via Asia (e.g. Hong Kong via AKL), the U.S./Canada (e.g. Los Angeles via AKL), or Australia (direct to WLG from SYD or MEL or via CHC). Similarly, a traveller from China could travel via a point in Asia or via Australia. For airport planning purposes, the passenger routing is important as it dictates the type of aircraft serving WLG and if Wellington is their point of customs clearance to New Zealand.

Therefore, the origin/destination passenger forecasts were converted into enplaned/deplaned passengers, by splitting the source markets (both inbound and outbound traffic) into “gateway” regions: domestic, Australia, China, Japan, Other Asia, UK, USA, Pacific Islands, and Other (rest of world). A current FY2015 split was determined based on O/D and E/D traffic data from Diio FMg. For example, O/D passengers from the UK were split 39% via a domestic E/D segment (over AKL or CHC) and 61% over Australia. The current forecast updated the O/D-E/D traffic splits based on estimates of annualized FY2016 O/D passenger data. The updated splits, driven by the updated O/D traffic demand data for FY2016, have subtly changed the splits matrix (in addition to adjustments made to reflect the FY2017 SQ WLG-CBR-SIN service) but do not substantially impact the outcomes of the E/D passenger forecast.

The split is projected to change over the forecast period as new services emerge at WLG. For example, for traffic to/from Other Asia and China, a greater proportion is expected to arrive via Australia in the future rather than through a domestic gateway. This reflects the expected growth in capacity from Asian carriers to Australia and Singapore Airlines’ announced Singapore to Wellington service via Canberra beginning in FY2017. Nevertheless, the strong competition dynamics and connection potential via New Zealand gateways will mean that domestic gateways will retain the majority of international air traffic routings. The assumed splits are provided in **Appendix B**.

4.2 Risk Analysis

As with any projection of future activity, the air traffic forecasts for WLG are subject to a degree of risk and uncertainty. The forecasts are based on underlying assumptions regarding economic growth, traffic development, fuel prices, aviation technology, etc. which are developed from the best available intelligence and analysis. However, it is not possible to determine how these factors might vary over time and when certain events may occur; e.g., the timing of recessions, fuel price spikes, etc. Furthermore, one-off events may have an impact on traffic but are impossible to predict, such as terrorist attacks and major natural disasters.

⁵³ As opposed to an existing itinerary which would require a minimum double connection, e.g., connecting through WLG then on to AKL, CHC, SYD, or MEL for long-haul international services.

The traditional approach to this issue in air traffic forecasting is to supplement the base case forecasts with high and low case forecasts. This conveys that there is uncertainty in the forecast, and provides a rough range for likely outcomes. However, the low case should not be interpreted as a “worst” case, but rather a conceivable though low probability outcome. The low scenario typically embodies slower growth in airport traffic over the medium to long term due to the combined effect of a slower economy, high air fares, high fuel prices, etc.

An approach to better understanding the range of possible future scenarios is to apply quantitative risk analysis to the forecast. Quantitative risk analysis recognises that there are a number of key drivers of the forecast (economy, fares, fuel prices, etc.) and that each of these drivers has its own level of uncertainty or its own probability distribution. This type of risk analysis utilises the probabilities of these drivers to create a large number of potential scenarios. One scenario might be normal economic performance but with high fuel costs and a terrorism event. Another might be weak economic performance and high fuel costs but with no terrorism event. Typically, the quantitative forecasts will create thousands of such scenarios, each time randomly generating values for each of the forecast drivers. This is often referred to as Monte Carlo simulation.

Monte Carlo simulation (or the Monte Carlo method) is a computerized simulation technique which makes use of randomization and probability statistics to investigate problems involving uncertainty. Typically, it involves a computer model of a system or project (e.g., air traffic at an airport). The inputs to the model, instead of being fixed numbers or variables, are specified as probability distributions. For example, rather than traffic growth being set at X% per annum, it might be defined as having Normal (bell-curve) distribution with a mean of X% and a standard deviation of Y%. Using computer software, the model is run multiple times, each time randomly sampling from the input distributions, resulting in different outcomes each time. Often, the model will be run (known as iterations) thousands or tens of thousands of times and the results are collected from each run.

With enough iterations of the model, the output can demonstrate the range of possible outcomes and provide statistical estimates of the probabilities of various outcomes. Depending on the complexity of the model and input distributions assumed, the range of outcomes can be large and are not always linear. Expected or “most likely” values can also be generated.

Monte Carlo can be seen as a powerful “what-if” or scenario-generating exercise where every possible what-if or scenario is generated (within the confines of the model specification), including interactions between the various input factors. Another way of looking at it is that each iteration of the model represents one possible future for the system being modelled. By running the model thousands of times, the user can view whole sets of possible futures and assess which are most likely to occur; and identify areas of greatest downside or upside.

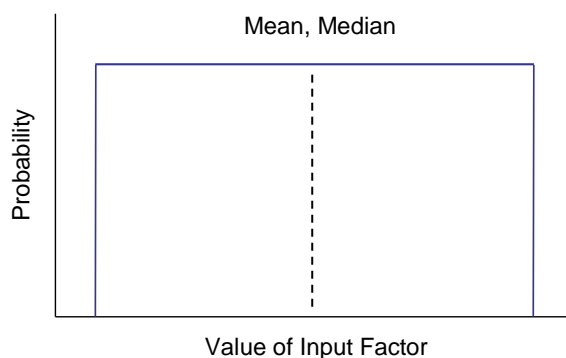
Monte Carlo is used extensively in a wide range of fields. One of its first applications was in designing the shielding for nuclear reactors at the Los Alamos National Laboratory in the 1940s (The name “Monte Carlo” was coined as a codename by scientists at the laboratory in reference the Monte Carlo casino resort). Monte Carlo simulation has since been used in finance, project planning, engineering studies, traffic modelling, cancer radiation therapy, and telecommunications network design, among many other applications.

The real power of the Monte Carlo simulation lies in its ability to provide more meaningful statements regarding this range of possible forecast outcomes. Rather than produce just a single static outcome, the process can also provide a probability-weighted range of traffic outcomes and allow questions to be addressed, such as:

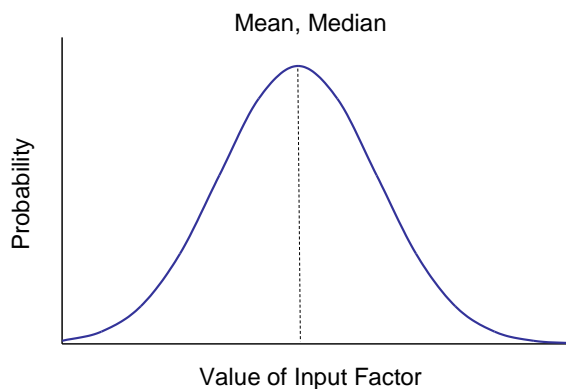
- What is the probability that passenger traffic growth will exceed 3% per annum over the next five years?
- What is the probability that passenger traffic will be greater than 10 million in FY2035?
- What is the probability that passenger traffic in FY2045 will be less than 15 million?

4.2.1 Probability Distributions

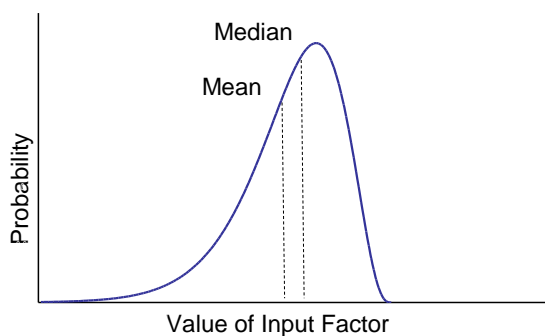
As indicated above, in stochastic risk analysis probability distributions are defined for each input factor of interest (economic growth, fuel prices, etc.). The distribution applied to each factor will affect the range of values generated and the probability of different values occurring. Commonly used distributions include:



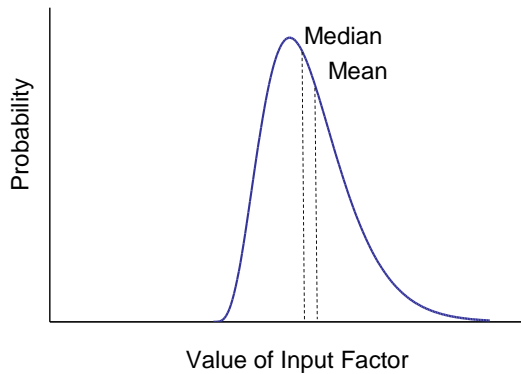
Uniform Distribution: A range of values between a specified maximum and minimum, all equally likely to occur.



Normal Distribution: A symmetrical distribution centred around the mean (expected) value. Values further away from the mean are less likely to occur than values near to the mean. Values below the mean are just as likely to occur as values above the mean.



Left-tailed (Gamma) Distribution: A non-symmetrical distribution skewed to the right with a long left-hand tail. Values below the median are just as likely to occur as values above the median. Larger relative impacts (in absolute value terms) on the left side cause the median to be larger than the mean.



Right-tailed Distribution: A non-symmetrical distribution skewed to the left with a long right-hand tail. Values below the median are just as likely to occur as values above the median. Larger relative impacts (in absolute value terms) on the right side cause the median to be smaller than the mean.

4.2.2 Risk Analysis of the WLG Passenger Air Traffic Forecasts

Table 4–2 outlines the factors selected affecting traffic development at WLG and the probability distributions applied. The identification of these factors was a result of previous analysis and the expert judgement of the study team. The 2016 forecast updated has reviewed these factors, in particular the potential economic growth of countries and world regions, and made adjustments to the short- and long-term outlooks for economic activity.⁵⁴ These have affected the risk factor distributions for the quantitative risk analysis used to develop the risk-based estimates of O/D traffic at WLG.

Table 4-2: Forecast Risk Factors

Factor	Comments	Distribution Details
Economic Growth in New Zealand	Forecast GDP growth over the forecast period. Based on average of forecasts received from various banks and other sources. Variance based on historical variance of New Zealand GDP from past 20 years and potential future GDP growth.	<ul style="list-style-type: none"> Right-tailed (gamma) distribution Mean value of 2.2% p.a. Min value: -1.7% Max value: 4.5%
Economic Growth in Australia	Forecast GDP growth over the forecast period. Based on average of forecasts received from various banks and other sources. Variance based on historical variance of Australian GDP from past 20 years and potential future GDP growth.	<ul style="list-style-type: none"> Right-tailed (gamma) distribution Mean value of 2.4% p.a. Min value: -1.8% Max value: 3.9%
Economic Growth in China	Forecast GDP growth over the forecast period. Based on average of forecasts received from various banks and other sources. Variance based on historical variance of Chinese GDP from past 20 years and potential future GDP growth.	<ul style="list-style-type: none"> Right-tailed (gamma) distribution Mean value of 3.8% p.a. Min value: -1.5% Max value: 13.5%

⁵⁴ It should be noted that, while the maximum and minimum ranges for economic variables are based on historical data, the distributions employed are typically concentrated about the mean reflecting the likely range of future economic growth variation.

Factor	Comments	Distribution Details
Economic Growth in Japan	<p>Forecast GDP growth over the forecast period. Based on average of forecasts received from various banks and other sources.</p> <p>Variance based on historical variance of Japan GDP from past 20 years and potential future GDP growth.</p>	<ul style="list-style-type: none"> Left-tailed (gamma) distribution Mean value of 1.4% p.a. Min value: -6.3% Max value: 5.6%
Economic Growth in Other Asia Region	<p>Forecast GDP growth over the forecast period. Based on average of forecasts received from various banks and other sources.</p> <p>Variance based on historical variance of Other Asia regional GDP from past 20 years and potential future GDP growth.</p>	<ul style="list-style-type: none"> Right-tailed (gamma) distribution Mean value of 4.4% p.a. Min value: -3.4% Max value: 11.0%
Economic Growth in UK	<p>Forecast GDP growth over the forecast period. Based on average of forecasts received from various banks and other sources.</p> <p>Variance based on historical variance of UK GDP from past 20 years and potential future GDP growth.</p>	<ul style="list-style-type: none"> Right-tailed (gamma) distribution Mean value of 2.4% p.a. Min value: -4.9% Max value: 4.1%
Economic Growth in USA	<p>Forecast GDP growth over the forecast period. Based on average of forecasts received from various banks and other sources.</p> <p>Variance based on historical variance of USA GDP from past 20 years and potential future GDP growth.</p>	<ul style="list-style-type: none"> Right-tailed (gamma) distribution Mean value of 2.6% p.a. Min value: -2.5% Max value: 4.8%
Economic Growth in Pacific Islands Region	<p>Forecast GDP growth over the forecast period. Based on average of forecasts received from various banks and other sources.</p> <p>Variance based on historical variance of Pacific Islands regional GDP from past 20 years and potential future GDP growth.</p>	<ul style="list-style-type: none"> Right-tailed (gamma) distribution Mean value of 2.7% p.a. Min value: -1.0% Max value: 4.0%
Economic Growth in Other Regions (World GDP)	<p>Forecast GDP growth over the forecast period. Based on average of forecasts received from various banks and other sources.</p> <p>Variance based on historical variance of World GDP from past 20 years and potential future GDP growth.</p>	<ul style="list-style-type: none"> Right-tailed (gamma) distribution Mean value of 3.5% p.a. Min value: -1.7% Max value: 4.7%
Terrorism	Major terrorism event in Australasia affecting air traffic at the airport	<ul style="list-style-type: none"> Probability of event: 5% (once every 20 years) Impact (percentage reduction in traffic) is Normally distributed with a mean value of -15% and variance where: 5th percentile is -10% 95th percentile is -20% Recovery time (time taken to recover all the traffic lost as a result of the

Factor	Comments	Distribution Details
		terrorism event): 2 years
Pandemic	SARS-type outbreak with direct impact on the airport (e.g., outbreak in Australasia) which reduces traffic by 25% for 6 months (effectively 12.5% in the year of occurrence). Estimated impact of the event based on analysis of the impact of SARS on Toronto (YYZ) and expert judgement)	<ul style="list-style-type: none"> Probability of event: 5% (once every 20 years) Impact (percentage reduction in traffic) is Normally distributed with a mean value of -12.5% and variance where: 5th percentile is -10% 95th percentile is -15% Recovery time: traffic recovered within one year
Fuel Price Spike	An abrupt spike in the price of crude oil and jet fuel. The increase in fuel prices increases airline operating costs and reducing capacity and/or rising fares reducing the demand for travel. The risk factor also captures 'knock on' effects such as a reduction in discretionary spending due to rising energy costs.	<ul style="list-style-type: none"> Probability of event: 5% (once every 20 years) Impact (percentage reduction in traffic) is Normally distributed with a mean value of -5% and variance where: 5th percentile is -2.0% 95th percentile is -5.0% Recovery time: traffic recovered within one year
Fuel Price Dip	An abrupt dip in the price of crude oil and jet fuel. The decrease in fuel prices decreases airline operating costs and increases capacity and/or lowering fares increasing the demand for travel. The risk factor also captures 'knock on' effects such as an effective increase in discretionary spending due to lowered energy costs.	<ul style="list-style-type: none"> Probability of event: 5% (once every 20 years) Impact (percentage increase in traffic) is Normally distributed with a mean value of +5% and variance where: 5th percentile is +2.0% 95th percentile is +5.0% Recovery time: traffic returns to normal within one year.

4.3 Aircraft Movement Forecast Methodology

Passenger carrier aircraft movements are generally a function of passenger traffic demand and air service development, shaped by carriers' networks and average aircraft size. Forecasts of future aircraft operations are derived forecasts, taking into consideration passenger traffic demand, potential service improvements/expansion, changes to airline fleets, and load factors.

Forecasts of annual aircraft movements were based on forecast passenger traffic demand. Passenger aircraft movements depend on the average aircraft size and average load factor (i.e., average passengers per flights), as represented by the formula below:

$$\text{Aircraft Movements} = \frac{\text{E/D Passenger Forecasts}}{\text{Average Aircraft Size} \cdot \text{Average Load Factor}}$$

Where: Average Aircraft Size · Average Load Factor = Average Passengers per Aircraft Movement

To provide an additional level of detail to aircraft movement forecasts, InterVISTAS developed a bottom-up approach to produce aircraft movement forecasts by aircraft type. Projections of average load factor by forecast region (e.g. domestic trunk, domestic regional, Australia, etc.) were applied to a projected mix of aircraft types operating at WLG in the future on an annual basis. The projections of average load factor and forecast sector aircraft mix average aircraft size determined the number of

annual movements required to serve the E/D passenger demand. Forecast movements by aircraft type were then established using the projected mix of aircraft and the forecast sector's total annual required movements.

Projections of load factors, type aircraft in operation, mix of operating aircraft, and average aircraft size reflect:

- Current airline and fleet mix;
- Market development and new air services;
- Carrier fleet replacement plans and improved aircraft utilization.

Details of the assumptions underlying the forecasts regarding projected aircraft mix and load factors are provided with the resulting forecasts in **Chapter 6**.

4.4 Additional Services for Runway Extension Scenarios

To develop the Part B runway extension scenario, InterVISTAS modified the constrained Part A forecast by introducing new long-haul services. These services, only available under the scenarios in which WLG constructs an extended runway, affect O/D and E/D passenger forecasts as well as aircraft movement forecasts.

The selection of potential long-haul services added in the runway extension scenario forecasts was derived from InterVISTAS' previous analysis contained in the report *Viability Assessment of Long-Haul Service at Wellington Airport* submitted in December 2014. In this report, InterVISTAS assessed the potential demand from the airline's perspective for new long-haul services should WLG's runway be extended to allow for long-haul widebody operations. This analysis demonstrated the viability of long haul services given underlying demand conditions.

Given the operational limitations imposed by WLG's current runway length, long-haul widebody services are not available.⁵⁵ Thus passengers wishing to travel beyond New Zealand and eastern Australia must connect through an airport in either New Zealand (AKL or CHC) or Australia (e.g., SYD or MEL) which features long-haul or overseas service. Under the runway extension scenarios, new direct services to WLG will emerge. A portion of the traffic on that new service will be passengers who previously flowed over a connecting airport in New Zealand or Australia to reach their destination. The development of new long-haul services will then remove some E/D traffic from the domestic and Australia sectors as some of those passengers will transfer to the direct international service. However, not all passengers on a new service will come from existing E/D passengers. The introduction of a new route generates new demand, an effect called market stimulation.

The addition of new long-haul services will also stimulate the O/D passenger demand to and from WLG. This market stimulation arising from new services is widely accepted in the airline industry based on the analysis of new route launches in various markets and the impact these have had on traffic levels. When a new service is added it provides more convenient options for travellers which, in turn, can stimulate additional demand. Specifically, new services provide direct services with significantly shorten journey times without the inconvenience and the missed connection risk (or missed baggage risk) of connecting options. Even passengers making onward travel beyond the new destination will find the service more convenient as it reduces the number of connections (e.g.,

⁵⁵ Short-haul widebody services have materialised at WLG, with Singapore Airlines debuting a Wellington to Singapore service, via Canberra, using a Boeing 777-200 beginning in FY2017.

passengers will be able to travel Wellington-Singapore-London rather than Wellington-Auckland-Singapore-London). In summary, the new services can provide additional travel options, greater competition and increased market visibility, which in turn results in demand from O/D passengers that would not have travelled but for the improvement in air access.

Stimulation occurs both in the local market but also in connecting markets where travel times and/or airfares are improved. The forecast accounts for this beyond market stimulation by allocating a portion of the stimulated O/D demand to the local market and to other markets in which connections can be made. The distribution of stimulated O/D demand is based on the analysis conducted as part of the *Viability Assessment of Long-Haul Service at Wellington Airport* report.

Additionally, new services by foreign carriers generally result in a higher level of inbound stimulation from new visitors, as foreign carriers usually have stronger market presence in their home country. In this forecast we have adopted the findings of previous analyses for the distribution of stimulated international traffic between inbound (i.e. international visitors) and outbound O/D traffic.

Finally, the introduction of new long-haul international service at WLG will also stimulate connecting domestic passengers at WLG (behind market stimulation). Travellers originating or destined to secondary airports in New Zealand without international air access may be induced to connect via WLG to new international routes, instead of connecting through AKL or CHC. The quantification of the domestic connecting stimulation is also derived from InterVISTAS' long-haul viability assessment report.

For each new service added, the following metrics were used as inputs to determine the impact on O/D and E/D traffic, as well as on aircraft movements:

- Forecast region for new service (e.g., China, Other Asia, USA, etc.).
- Aircraft type and number of seats.
- Average weekly frequency.
- Load factors.
- International O/D stimulation factor.
- Domestic connecting stimulation factor.
- Attraction of existing E/D travellers on the potential new service previously connecting via domestic and Australian airports.

The aircraft seat count, average weekly frequency, and load factor determine the total number of annual E/D passengers to be added each year for each service. Over time, frequencies and load factors were gradually increased to reflect additional capacity on that service. Increases to average weekly frequencies are also used to represent an additional airline or new destination within a forecast region coming online. For example, a new service is added operated by a foreign carrier beginning service between Singapore and Wellington, allocated to the Other Asia region.

The timing of service introductions were established in consultation with the author of InterVISTAS' long-haul viability assessment report. Consideration was given to the priority in which routes should be introduced based on the findings of that report, namely market viability and connectivity. The timing of service introductions also considered overlapping market connectivity. For example, introducing both a non-stop Other Asia service (e.g. Singapore) and service to the United States in the same year will have some overlapping connecting markets in Europe, but otherwise provide

onward connectivity in different world regions. Further long-haul services, particularly those in China and Other Asia, are spaced in such a way as not to imply that regional and connecting markets would be saturated with service. The current forecast has also reconsidered the timing of additional services to China and Other Asia, beyond the conversion of SQ's announced tag-end service to a non-stop, based on revised GDP forecasts. With a downgraded economic outlook, those additional services to Asia have been delayed to account for the slightly slower medium-term growth in passenger demand driven by economic growth.

Market stimulation percentages are then employed. For example, if a new service were forecast to handle 100,000 passenger per annum (based on aircraft size, frequency and load factor), then a specified percentage (say, 40%) of passengers would be newly stimulated travellers, and the rest (60%) would be diverted from existing E/D travellers flowing over international gateways in New Zealand and Australia. The allocation of diverted existing E/D passengers is based on an analysis of FY2015 O/D travel itineraries.⁵⁶ For example, in FY 2015, 78% of travellers to/from Other Asia connected via a domestic E/D segment (e.g., over AKL) while 22% connected via an Australia E/D segment (e.g. over SYD or MEL). In the case of Singapore service, these diverted passengers are removed from the relevant domestic or Australia E/D traffic and reallocated to Other Asia.

The stimulation of new O/D passengers was then allocated to international markets based on InterVISTAS' long-haul route viability analysis, allocating stimulated O/D passengers both to the local market (Singapore in the SIN-WLG example) as well as potential connecting markets such as the UK and China. The amount of stimulation depends on traffic conditions and the other travel options available to travellers. For example, the first direct service to Asia will have a higher level of stimulation as this the first direct service made available to this market. Later services to additional destinations in Asia were modelled to have a smaller stimulation factor, since there is already direct capacity serving this market. The reduction in market stimulation factors is also representative of overlapping connecting service to beyond/behind markets, which will be stimulated less when an existing long-haul service is already in place providing direct or connecting service to a given market.

Finally, the domestic connecting stimulation percentage is employed to add additional stimulated connecting passengers. Based on InterVISTAS' long-haul viability assessment, this effect is quite small – typically less than 5% of the total E/D traffic of a new route. This metric then captures the stimulated increase in domestic connecting traffic as WLG becomes a more desirable location for travellers to connect through when travelling international to/from regional locations in New Zealand.

Details of the new long-haul services introduced in the runway extension forecast can be found in **Section 5.2.1**.

⁵⁶ Diio FMg, Origin Destination travel itineraries from New Zealand to the world.

4.5 Comment on Very Long Term Traffic Forecasts

Forecasts are required for a relatively long period – up to 2060 (45 years). The forecasts up to 2045 are based on a fully developed model using a combination of econometric analysis and Monte Carlo simulation. As reliable forecasts of economic growth and air market trends are not available beyond 2045, a basic extrapolation approach was used for the forecast period after 2045. The approach assumed that air traffic growth rates beyond 2045 would gradually attenuate from pre-2045 levels due to market maturity.

While every effort was made to produce accurate and robust forecasts, forecasts beyond 30 years in the future should be treated with caution. Beyond 30 years, it is much more difficult to capture effects of long term changes in:

- Consumer attitudes (e.g., climate change concerns impacting behaviour);
- General rate of economic growth (i.e., no meaningful economic forecasts past 2040);
- Changes in population birth rates (in a 10-20 year period, population forecasts are reasonably accurate. Beyond 20 years, the effects of potential changes in attitudes toward birth rates, immigration, etc. begin to affect the population level); and
- Aircraft technology and fleet acquisition.

In particular, the forecasts of aircraft movements by specific aircraft type must be considered as general guidelines. While we have good information that the type of aircraft operating in 20 years will be similar to those operating today, the type of aircraft operating 30, 40, and 45 years in the future remain more uncertain. It is highly unlikely that an Airbus A320 in service today will be operating in FY2060, but more likely that an aircraft of a similar size will be in operation. Thus aircraft specific movement forecasts beyond FY2035 should be interpreted as indicative of the general size of aircraft expecting to be operating, not necessarily that exact aircraft model.

5 Air Passenger Forecasts

The following sections summarize the air passenger traffic forecasts for Wellington International Airport under the two forecast scenarios:

- **Part A: Business As Usual Air Passenger** under a scenario where WLG's runway infrastructure is unchanged (i.e., no lengthening of the runway).
- **Part B: Runway Extension Air Passenger Forecast Scenario** under a scenario where WLG's runway length is extended allowing the operation of larger aircraft types. Services are assumed to start on the extended runway in FY2021. Additional services were introduced into the Runway Extension scenario based on findings from InterVISTAS' 2014 report *Viability Assessment of Long Haul Service at Wellington Airport*.

These forecasts have been developed using the methodology described in **Chapter 4** and the appendices. Total E/D forecasts are provided, along with breakdowns into domestic and international markets by low, Most Likely, and high scenarios produced by the risk analysis. Additional forecast breakdowns are provided in the accompanying spreadsheets.

5.1 BAU Constrained Forecast

This section presents the results of the Business as Usual constrained forecast scenarios where WLG's runway infrastructure is unchanged. No additional non-stop, long-haul services are added and the results are reflective of a continuation of historical trends in air passenger traffic with constrained operations.

The BAU forecasts do include the announced Singapore Airlines 5th freedom service to Singapore via Canberra. This new service has led to a simulation of Other Asia O/D traveller demand beginning in FY2017, stimulation not present in the previous forecast. Additionally, the updated forecast removes a previously anticipated 5th freedom service to China, over Australia that was to begin in FY2019. The latter service was removed as it was only assumed to have begun should the runway not be built and the Singapore 5th freedom service has been officially announced between the time of the previous forecast and this update. The previous forecast, including the 5th freedom China service included stimulation of Chinese O/D demand, but only in the BAU scenario. This stimulation has been removed, thus lessening the current O/D demand for China in the BAU forecast relative to the previous forecast.

5.1.1 Most Likely Forecasts

The **Most Likely** forecast of passenger traffic at WLG is provided in **Figure 5-1** and **Table 5-1**. Domestic traffic is forecast to grow by an average of 2.1% per annum over the forecast period (up to FY2060). Domestic passenger growth is expected to accelerate over the period FY2016-FY2020 as Air New Zealand retires its 737-300s and replaces them with additional A320 and ATR services, as well as Jetstar entering the regional market – both factors increasing domestic capacity. The additional capacity is expected to stimulate demand, either by directly stimulating underserved demand or indirectly through pricing and increased quality of service. Longer term, domestic traffic is expected to grow as the economy grows, but taper through the latter half of the forecast period as the domestic market matures. By 2035 domestic passenger traffic is forecast to reach 7.7 million E/D passengers and by 2060 reach just below 12 million passengers.

International traffic to Australia and the Pacific Islands is forecast to grow by an average of 3.1% per annum from FY2015 to FY2060. Increases in scheduled capacity are forecast to produce above-historical growth in WLG's international markets in FY2016/17. The introduction of Singapore Airlines WLG-CBR-SIN service in FY2017 will further increase the near-term and longer-term international E/D traffic to Australia. As with domestic service, growth in the New Zealand and international economies will drive continued growth in international traffic at WLG. That growth is expected to taper into the future as international markets mature and, in general, global economies mature and their growth rates slow. By 2035 international passenger traffic is forecast to reach 1.7 million passengers and 3.1 million by 2060.

Figure 5-1: Most Likely Forecast of E/D Passengers at WLG – BAU Constrained Forecast

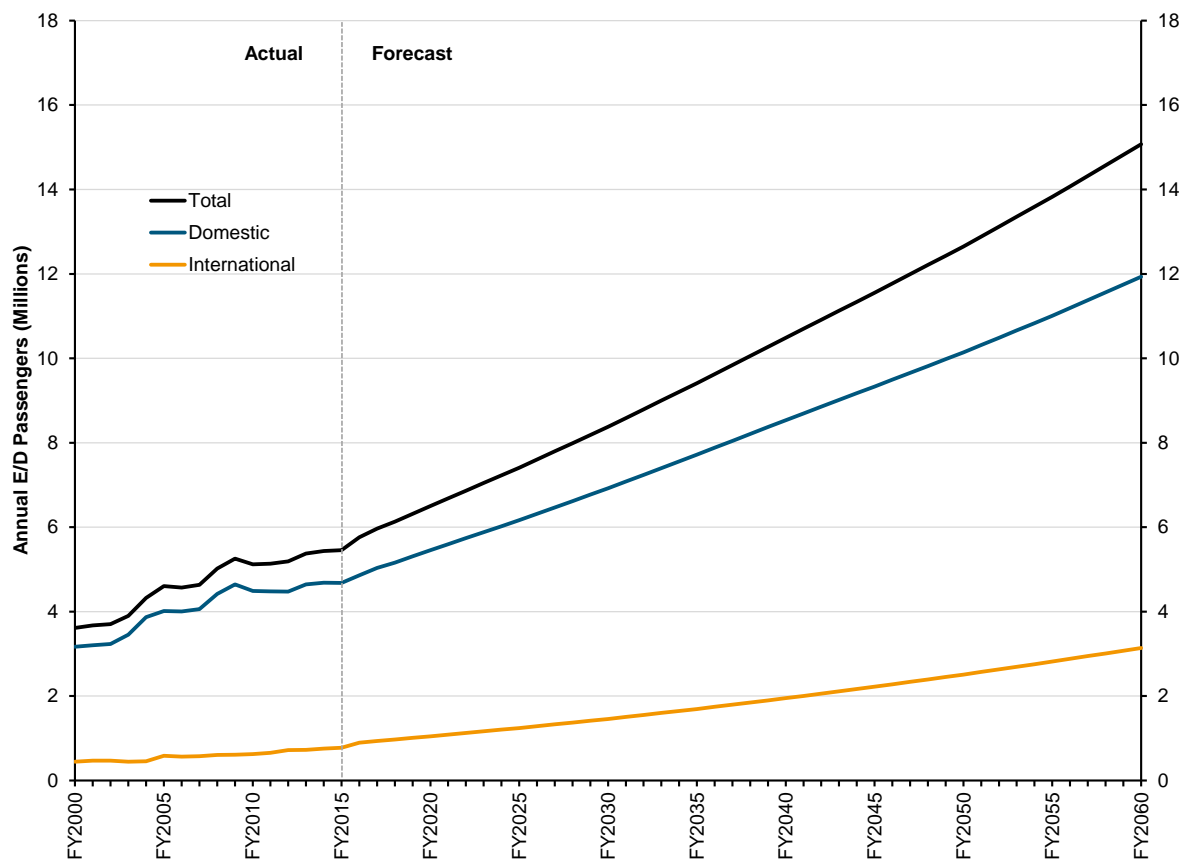


Table 5-1: Most Likely Forecast of E/D Passengers at WLG (Thousands) – BAU Constrained Forecast

Year	Domestic			International									Total Passengers
	Total	Trunk	Regional	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other	Total	
FY2015 (Actual)	4,682	3,248	1,435	768	0	0	0	0	0	7	0	775	5,457
FY2016	4,862	3,368	1,494	876	0	0	0	0	0	21	0	897	5,759
FY2017	5,034	3,411	1,623	909	0	0	0	0	0	26	0	935	5,969
FY2018	5,162	3,498	1,664	944	0	0	0	0	0	27	0	970	6,132
FY2019	5,310	3,602	1,709	981	0	0	0	0	0	28	0	1,009	6,319
FY2020	5,455	3,704	1,751	1,018	0	0	0	0	0	29	0	1,047	6,502
FY2025	6,165	4,208	1,957	1,208	0	0	0	0	0	35	0	1,243	7,408
FY2030	6,467	4,424	2,044	1,292	0	0	0	0	0	37	0	1,329	7,796
FY2035	7,717	5,321	2,396	1,647	0	0	0	0	0	46	0	1,693	9,410
FY2040	8,045	5,559	2,486	1,747	0	0	0	0	0	49	0	1,796	9,840
FY2045	9,331	6,499	2,832	2,161	0	0	0	0	0	60	0	2,221	11,553
FY2050	10,141	7,099	3,042	2,442	0	0	0	0	0	67	0	2,509	12,650
FY2055	11,007	7,744	3,264	2,741	0	0	0	0	0	75	0	2,816	13,823
FY2060	11,931	8,436	3,496	3,057	0	0	0	0	0	83	0	3,140	15,072
Long-Term Growth Rates													
FY2015-20	3.1%	2.7%	4.1%	5.8%	N/A	N/A	N/A	N/A	N/A	33.4%	N/A	6.2%	3.6%
FY2015-25	2.8%	2.6%	3.2%	4.6%	N/A	N/A	N/A	N/A	N/A	17.7%	N/A	4.8%	3.1%
FY2015-35	2.5%	2.5%	2.6%	3.9%	N/A	N/A	N/A	N/A	N/A	10.1%	N/A	4.0%	2.8%
FY2015-45	2.3%	2.3%	2.3%	3.5%	N/A	N/A	N/A	N/A	N/A	7.5%	N/A	3.6%	2.5%
FY2015-60	2.1%	2.1%	2.0%	3.1%	N/A	N/A	N/A	N/A	N/A	5.7%	N/A	3.2%	2.2%

Note: The split of forecast international passengers is based on immediate origin/destination (or E/D segment) rather than final origin/destination. For example, UK passengers are allocated to domestic and Australia based on their connecting point into WLG.

5.1.2 Risk Analysis

As described in **Chapter 4**, the final set of air passenger forecasts were generated using a risk analysis process. The risk analysis involved simulating 10,000 iterations of the BAU forecasts of O/D passenger traffic using different randomly generated set of input factors. The median value generated by the 10,000 iterations was selected as the Most Likely forecast.

To generate low and high scenario forecasts, the 5th percentile and 95th percentile outcomes were selected as the criteria for each of those traffic scenarios. As determined by the risk analysis, the low scenario implies that there is less than a 5% chance that traffic at WLG will drop below the low scenario forecast (or a 95% chance that realized traffic will be above the low scenario forecast). Similarly, there is less than a 5% chance that actual future traffic will exceed the high scenario forecast (or a 95% chance that realized traffic will be less than the high scenario forecast).

Total Air Passengers

The Low, Most Likely, and High scenario results for WLG's total E/D traffic are shown below in **Table 5-2** and **Figure 5-2**.

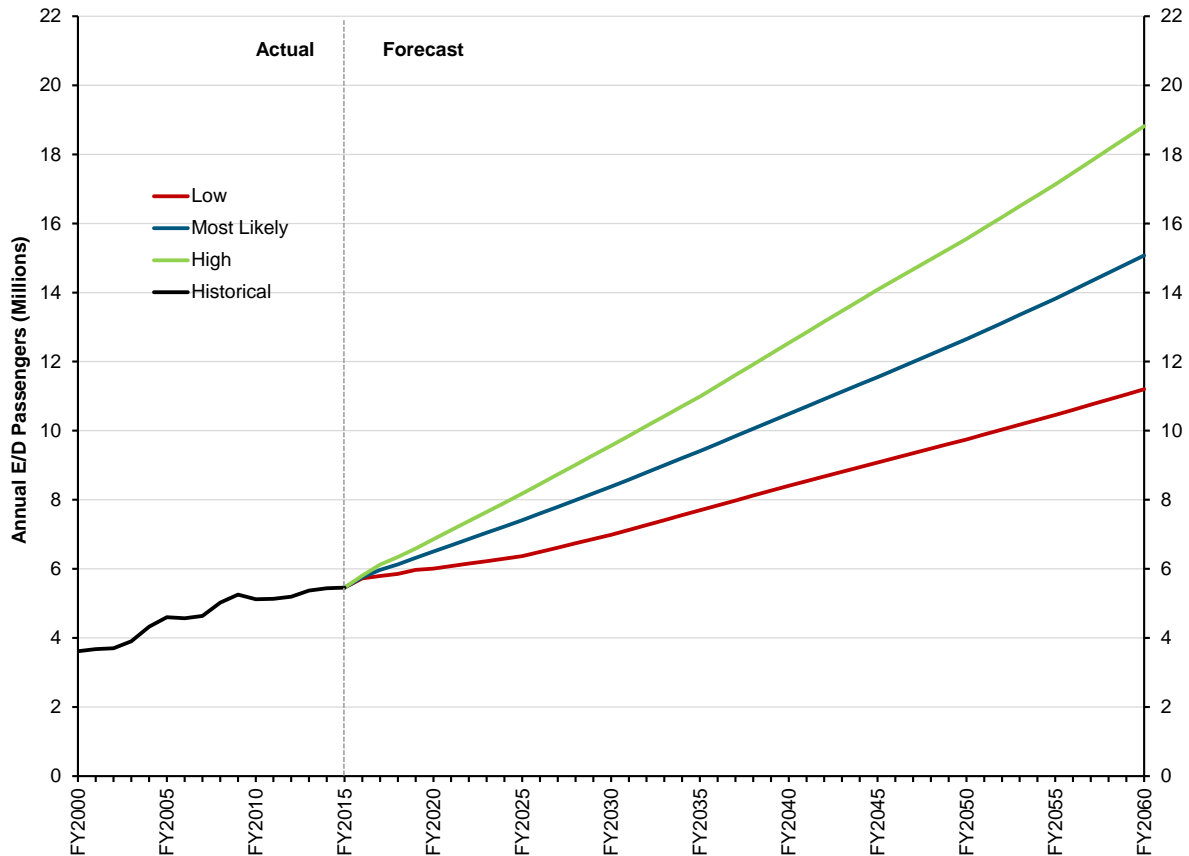
Table 5-2: Total Passengers – BAU Constrained Scenarios

Year	Total WLG E/D Traffic (Thousands)		
	Low Scenario (5 th Percentile)	Most Likely (Median Outcome)	High Scenario (95 th Percentile)
FY2015 (Actual)		5,457	
FY2016	5,726	5,759	5,804
FY2017	5,793	5,969	6,123
FY2018	5,857	6,132	6,344
FY2019	5,969	6,319	6,587
FY2020	6,009	6,502	6,855
FY2025	6,368	7,408	8,176
FY2030	6,987	8,380	9,568
FY2035	7,694	9,410	10,988
FY2040	8,408	10,486	12,540
FY2045	9,078	11,553	14,080
FY2050	9,748	12,650	15,554
FY2055	10,456	13,823	17,129
FY2060	11,199	15,072	18,821
Long-Term Growth Rates			
FY2015-2020	1.9%	3.5%	4.6%
FY2015-2025	1.5%	3.1%	4.0%
FY2015-2035	1.7%	2.7%	3.5%
FY2015-2045	1.7%	2.5%	3.2%
FY2015-2060	1.6%	2.3%	2.8%

As can be seen, the risk analysis shows a considerable range of traffic outcomes from the low, Most Likely, and high scenarios. For example, in FY2035 the low and high scenarios for total E/D traffic are 7.7 million and 11.0 million, respectively, versus a Most Likely of 9.4 million. In the short term, the

range of outcomes is skewed more to the downside. In the low scenario the forecasts do not project a total loss of traffic at WLG in the short term, although they do project the potential for well below historical growth levels. In the longer term, the range between low and high forecasts is fairly balanced compared to the Most Likely forecast.

Figure 5-2: Forecast Total E/D Passengers at WLG – BAU Constrained Scenarios



Total air passenger traffic, including both domestic and international is projected to grow at an average of 2.3% per annum in the Most Likely scenario from FY2015 to 2060. Average annual growth in the low scenario is forecast to be 1.6% p.a. and 2.8% p.a. in the high scenario. International traffic is projected to make up an ever increasing share of WLG's passenger traffic, growing from 14% share in FY2015 to 21% in FY2060 in the Most Likely scenario.⁵⁷ Wellington's Most Likely passenger traffic growth is forecast to be slightly below the historical average of 2.8% p.a. from FY1997-2015. This is due in part to expectations that as WLG's passenger markets grow, growth will gradually slow, and because of the constraints placed on future international operations due to the limited runway length.

Total passenger growth in the low scenario is projected to be positive throughout the forecast period, indicating that there is less than a 5% chance that WLG's traffic will not grow over the period FY2015 to 2060. High scenario passenger traffic growth is forecast to exceed historical averages, especially in the short term, where WLG's passenger volumes may near 19 million passengers per annum by the end of the forecast horizon in FY2060.

⁵⁷ Relative share of international traffic to total traffic is forecast to be similar across all three scenarios.

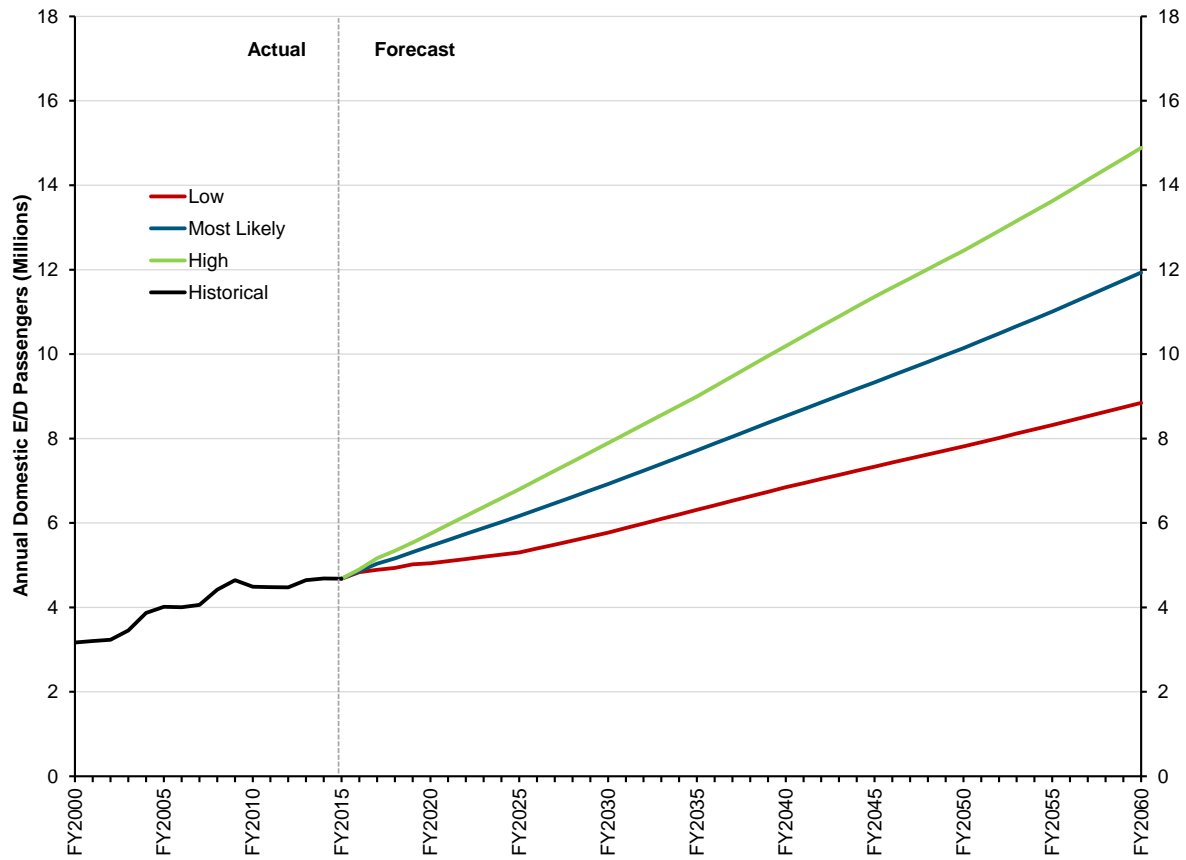
Domestic Air Passengers

The Low, Most Likely, and High forecast of WLG's domestic air passenger traffic are shown below in **Table 5-3** and **Figure 5-3** for the BAU constrained forecast.

Table 5-3: Domestic Passengers – BAU Constrained Scenarios

Year	Domestic WLG E/D Traffic (Thousands)		
	Low Scenario (5 th Percentile)	Most Likely (Median Outcome)	High Scenario (95 th Percentile)
FY2015 (Actual)		4,682	
FY2016	4,837	4,862	4,899
FY2017	4,890	5,034	5,164
FY2018	4,936	5,162	5,339
FY2019	5,022	5,310	5,534
FY2020	5,046	5,455	5,748
FY2025	5,299	6,165	6,795
FY2030	5,771	6,921	7,895
FY2035	6,312	7,717	8,993
FY2040	6,846	8,537	10,193
FY2045	7,335	9,331	11,358
FY2050	7,815	10,141	12,450
FY2055	8,318	11,007	13,623
FY2060	8,843	11,931	14,886
Long-Term Growth Rates			
FY2015-2020	1.5%	3.1%	4.1%
FY2015-2025	1.2%	2.8%	3.7%
FY2015-2035	1.5%	2.5%	3.3%
FY2015-2045	1.5%	2.3%	3.0%
FY2015-2060	1.4%	2.1%	2.6%

Figure 5-3: Forecast Domestic E/D Passengers at WLG – BAU Constrained Scenarios



Domestic traffic is projected to grow at an average of 2.1% per annum in the Most Likely scenario from FY2015 to 2060. Average annual growth in the low scenario is forecast to be 1.4% p.a. and 2.6% p.a. in the high scenario. Growth rates in the Most Likely scenario are projected to be highest in the coming 15 years, reflecting potential new capacity increases and demand growth closer to historical averages. The Most Likely growth is slightly below the recent historical average of 2.5% p.a. from FY1997-2015, reflecting the future tempering of domestic traffic growth as markets mature.

In the low scenario, short-term growth is projected to be modest, but positive, from FY2015-2020 but slowly accelerating after that. Even in the low, 5th percentile, scenario, domestic traffic is forecast to nearly double by the end of the forecast period. In the high scenario, annual growth rates are forecast to exceed 3.5% through to FY20205 after which growth will slowly taper. By FY2060, high scenario domestic traffic is forecast to reach 14.9 million passengers.

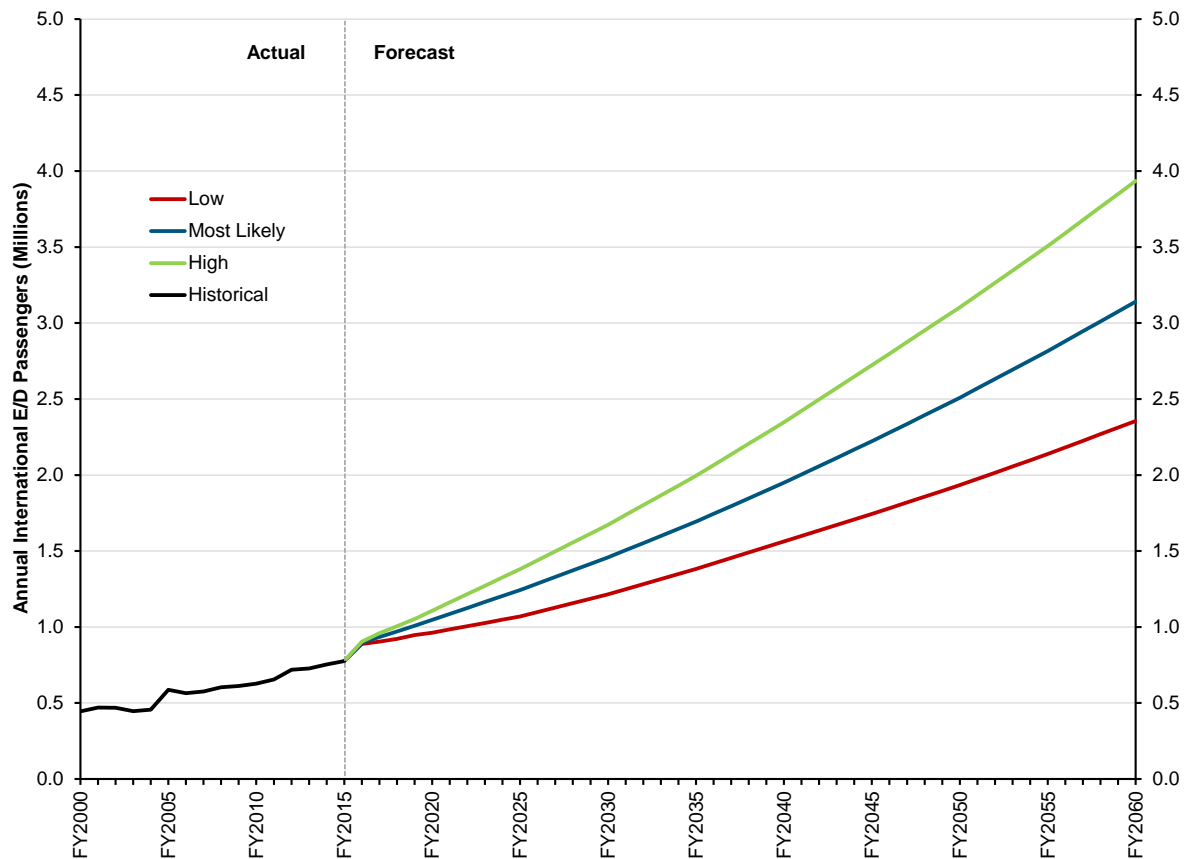
International Air Passengers

The Low, Most Likely, and High forecast of WLG's international air passenger traffic are shown below in **Table 5-4** and **Figure 5-4** for the BAU constrained forecast.

Table 5-4: International Passengers – BAU Constrained Scenarios

Year	International WLG E/D Traffic (Thousands)		
	Low Scenario (5 th Percentile)	Most Likely (Median Outcome)	High Scenario (95 th Percentile)
FY2015 (Actual)		775	
FY2016	889	897	904
FY2017	903	935	960
FY2018	921	970	1,005
FY2019	947	1,009	1,053
FY2020	962	1,047	1,107
FY2025	1,069	1,243	1,381
FY2030	1,216	1,458	1,673
FY2035	1,382	1,693	1,995
FY2040	1,563	1,949	2,347
FY2045	1,743	2,221	2,722
FY2050	1,934	2,509	3,104
FY2055	2,138	2,816	3,506
FY2060	2,356	3,140	3,935
Long-Term Growth Rates			
FY2015-2020	4.3%	6.0%	7.1%
FY2015-2025	3.2%	4.7%	5.8%
FY2015-2035	2.9%	3.9%	4.7%
FY2015-2045	2.7%	3.5%	4.2%
FY2015-2060	2.5%	3.1%	3.6%

Figure 5-4: Forecast International E/D Passengers at WLG – BAU Constrained Scenarios



International traffic, consisting in the constrained scenario of traffic to Australia and the Pacific Islands, is projected to grow at an average of 3.1% per annum in the Most Likely scenario from FY2015 to 2060. Average annual growth in the low scenario is forecast to be 2.5% p.a. and 3.6% p.a. in the high scenario. Like domestic traffic, growth rates in the Most Likely scenario are projected to be highest in the coming 15 years, reflecting potential new services to Australia and capacity increases to the Pacific. The Most Likely growth is slightly below the recent historical average of 4.5% p.a. from FY1997-2015, reflecting the future tempering of international traffic growth as markets mature.

Low scenario international traffic growth in the short term is forecast to be similar to long-term domestic traffic growth, and will be positive throughout the forecast period. High scenario growth is forecast to be above historical averages in the short term, and by FY2060 high scenario international traffic is forecast to be near 4 million passengers per annum.

5.2 Runway Extension Scenario

This section presents the results of the runway extension forecast scenarios where WLG's runway infrastructure upgraded to allow for long-haul widebody aircraft operations. It is assumed that an extended runway would be open for long-haul operations starting on 1 April 2020 (start of FY 2021) and that during the construction period there is no reduction in the volume or growth of air passenger traffic.

The runway extension scenario forecasts are based on the same underlying O/D passenger forecasts as the BAU forecast.⁵⁸ Additional stimulated demand arising from the introduction of new long-haul services is handled through the forecast mechanisms described in **Chapter 4**. The introduction of new services stimulates demand in both international regions as well as stimulating the demand for domestic connections.

5.2.1 Additional Services

The introduction of new long-haul international services at WLG in the runway extension scenario forecasts are based on InterVISTAS' previous work for WIAL. The December 2014 report *Viability Assessment of Long-Haul Service at Wellington Airport* and its associated analytical results were used as a basis for selecting and forecasting the new routes added to this forecast. This section discusses the key assumptions for the introduction of new long-haul services and increases in load factors and passenger capacities made possible by the potential extension of WLG's runway.

Table 5-5 below describes in brief the additional services deployed at WLG as part of the Most Likely forecast runway extension scenario. A more detailed description of the additional services, including stimulation factors, is provided in the supplementary spreadsheets.

Table 5-5: Additional Long-Haul Services – Most Likely Scenario

Year of Service Introduction	E/D Forecast Region	Aircraft Type	Initial Service Frequency	Assumptions Regarding New Service
FY2021	Other Asia	B777	7x Weekly	Conversion of SQ CBR service to non-stop.
FY2021	USA	B777	3x Weekly	Based on IVC analysis of UA service to LAX.
FY2022	Australia	B777	4x Weekly	Based on IVC analysis of EK 5 th freedom service via Australia.
FY2026	China	A330	4x Weekly	Based on IVC analysis of CX service to HKG. Future development of service to China captures new destinations in Mainland China, e.g. CAN, PVG, PEK.
FY2032	Other Asia	B777	4x Weekly	Based on IVC analysis of MH service to KUL.
FY2034	Other Asia	B787	3x Weekly	Based on IVC analysis of TG service to BKK.

⁵⁸ The underlying O/D forecasts are identical in the BAU and Runway Extension scenarios. Both include the SQ WLG-CBR-SIN service and the attendant O/D market stimulation in the Other Asia sector anticipated by the introduction of this 5th freedom service.

Adjustments to Long-Haul Services in the 2016 Forecast Update

The update to the forecast adjusts some of the assumptions regarding the introduction of new services. They are:

- Introduction of Singapore Airlines announced 5th freedom service to Singapore via Canberra beginning in FY2017. This service is assumed to occur in both the BAU and Runway Extension forecast.
- In the Runway Extension scenario, the SQ WLG-CBR-SIN service is converted to a daily non-stop service once the new runway becomes operational in FY2021.
- As a result of Singapore Airlines converting their 5th freedom service to a non-stop, we assume that a narrowbody service by a New Zealand or Australian carriers backfills WLG-CBR route at the same frequency (4x weekly).
- Additional long-haul services to China and Other Asia have had their year of introduction pushed back to reflect the downgraded outlook for economic growth in those markets.⁵⁹
 - The first China service is not introduced until 2026 (versus 2024 in the October 2015 forecast)
 - The two additional Other Asia services have their introductions delayed until FY2032 and FY2034, respectively (versus FY2027 and FY2029).
- The removal of a WLG-ADL trans-Tasman service. InterVISTAS has been provided with a technical report by Astral Aviation Consultants indicating that new generation narrowbody aircraft, such as the A320neo, will be able to serve more distant Trans-Tasman routes (e.g. Adelaide or Cairns) from WLG's existing runway. This information was not available during the previous forecasting work and it was our understanding that ADL would require the runway extension to be operationally feasible. In light of this recent information, the forecast team has removed the previous WLG-ADL service. It is assumed that more distant Trans-Tasman locations will be served as Australian O/D demand grows into the future in both the BAU and Runway Extension scenarios without requiring any additions to the forecasting model. Furthermore, the current forecast retains additional services for 5th freedom flights to WLG via Australia. The modelling of these 5th freedom services does not specify any specific gateway in Australia (as the O/D forecasting approach is aggregated at a country/regional level, not an airport level), retaining the possibility of a 5th freedom service to WLG via ADL in the future.

In addition to these new long-haul services, extra seat capacity was allowed for existing services to Australia and the Pacific Islands to reflect the lifting of operational capacity (or weight penalty) restrictions due to WLG's current limited runway length.

While the forecast team did consider other additional services which may have potential for introduction at WLG, the decision was made to limit the new services largely to those which had been studied in depth. The analysis of potential routes conducted by InterVISTAS' long-haul viability study included a technical analysis allowing for the detailed estimation of market stimulation factors and O/D travel demand in beyond connecting markets.

Beyond the initial introduction of new services, it is assumed that frequencies and load factors will grow throughout the forecast period. The future development and expansion of long-haul service capacity is captured by the following:

⁵⁹ It should be noted that the stimulation rates for services to these regions have not been adjusted as market stimulation is not a function of GDP growth. The economies of China and countries in Other Asia will continue to grow and mature – albeit at lower levels than previously forecast – and will still present an opportunity for market stimulation when new long-haul services are introduced.

- Additional capacity on the originally planned route;
- New carriers entering the market on the same route;
- New or existing carriers expanding service within the forecast region (e.g. services to Mainland China).

Table 5-6 below shows the average weekly frequency of incremental non-stop long-haul international services to the forecast regions in the years FY2021, FY2025, FY2035, FY2045, and FY2060. Further details of the number of movements by forecast region and by aircraft type are provided in the supplementary spreadsheets.

**Table 5-6: Progression of Incremental Long-Haul Service Frequencies by Forecast Sector
Average Weekly Departure Frequencies**

Year	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other	Total
Most Likely Forecast									
FY 2021	-	-	-	7	-	3	-	-	10
FY2025	4	-	-	7	-	4	-	-	15
FY2035	8	5	-	14	-	7	-	-	34
FY2045	11	9	-	20	-	9	-	-	49
FY2060	15	9	-	25	-	10	-	-	59
Low Forecast									
FY 2021	-	-	-	4	-	3	-	-	7
FY2025	-	-	-	4	-	3	-	-	7
FY2035	-	4	-	9	-	5	-	-	18
FY2045	-	7	-	13	-	7	-	-	27
FY2060	-	8	-	15	-	8	-	-	30
High Forecast									
FY 2021	-	-	-	7	-	4	-	-	11
FY2025	7	4	-	10	-	7	-	-	28
FY2035	9	7	-	19	-	7	-	-	42
FY2045	11	9	-	25	-	10	-	-	55
FY2060	15	10	-	33	-	12	-	-	70

To place this in context, WLG in 30 years' time (FY2045) is forecast to have approximately one quarter the number of average weekly departures of long-haul widebody services as AKL has scheduled for FY2016.⁶⁰ By FY2060, WLG is projected to have just 30% of AKL's current long-haul widebody services.

By further comparison, Christchurch has, on average, 18 long-haul widebody departures per week, including 5th freedom services via Australia.⁶¹ This includes the partial introduction of China Southern three times weekly service which will bring their FY2017 total up to 20-21 average weekly services. In

⁶⁰ OAG schedule data via Diio Mi. For the 12-month period ending 31 March 2016 AKL had approximately 196 weekly long-haul international departures including 5th freedom services via Australia. (Local trans-Tasman services by NZ, JQ, and QF are not included.)

⁶¹ Including China Airlines 3x weekly year-round service via SYD and 3x weekly seasonal service (initiated in October FY2016) via MEL.

their respective fiscal years for 2015, CHC handled approximately 5.9 million passengers to WLG's 5.5 million. For the 12-month period ending 31 March 2016, Adelaide Airport (ADL) had on average 24 weekly long-haul international departures, plus an additional 4 weekly departures in FY2017 once Qatar Airways begins service to DOH. WLG is forecast to have a similar amount by FY2035, in 30 years' time. In FY2015, ADL processed approximately 7.8 million E/D passengers compared to WLG's 5.5 million.

Additional Services in the Low and High Scenarios

To develop the Low and High scenarios for the runway extension forecast, the same Low and High scenario O/D forecasts from the risk modelling were used. Furthermore, adjustments based on InterVISTAS' expert judgement were made to the new long-haul services. In general, the following adjustments were made:

- Timing of service introduction.
- Removal of new services (low forecast only).
- Initial service frequency and future increases to frequencies.
- Initial load factors and future development of load factor increases.
- Market stimulation levels.

To develop the Low forecast, service introduction was delayed or entirely absent, featured lower load factors, reduced frequencies, and diminished market stimulation. In contrast, new services in the High scenario feature an accelerated build-up of service frequencies, higher load factors, earlier service introduction dates, and enhanced market stimulation. In conjunction with the underlying high/low O/D forecasts, these adjustments resulted in high and lower E/D forecast results, respectively.

Table 5-7 and **Table 5-8** below show the additional long-haul services added in the Low and High Runway Extension scenario forecasts.

Table 5-7: Additional Long-Haul Services – Low Scenario

Year of Service Introduction	E/D Forecast Region	Aircraft Type	Initial Service Frequency	Assumptions Regarding New Service
FY2021	Other Asia	B777	4x Weekly	Conversion of SQ CBR service to non-stop.
FY2021	USA	B777	3x Weekly	Based on IVC analysis of UA service to LAX.
FY2030	China	A330	4x Weekly	Based on IVC analysis of CX service to HKG. Future development of service to China captures new destinations in Mainland China, e.g. CAN, PVG, PEK.
FY2034	Other Asia	B777	4x Weekly	Based on IVC analysis of MH service to KUL.

Table 5-8: Additional Long-Haul Services – High Scenario

Year of Service Introduction	E/D Forecast Region	Aircraft Type	Initial Service Frequency	Assumptions Regarding New Service
FY2021	Other Asia	B777	7x Weekly	Conversion of SQ CBR service to non-stop.
FY2021	USA	B777	4x Weekly	Based on IVC analysis of UA service to LAX.
FY2022	Australia	B777	7x Weekly	Based on IVC analysis of EK 5 th freedom service via Australia. Future developments cover additional 5 th freedom services via Australia.
FY2024	China	A330	4x Weekly	Based on IVC analysis of CX service to HKG. Future development of service to China captures new destinations in Mainland China, e.g. CAN, PVG, PEK.
FY2030	Other Asia	B777	4x Weekly	Based on IVC analysis of MH service to KUL.
FY2032	Other Asia	B787	3x Weekly	Based on IVC analysis of TG service to BKK.

5.2.2 Most Likely Forecast Results

The **Most Likely** forecast of passenger traffic at WLG is provided in **Figure 5-5** and **Table 5-9**. In the Most Likely runway extension scenario, WLG's total air passenger traffic is forecast to grow at 2.4% per annum and be just below 16 million passengers by FY2060. Domestic traffic is forecast to grow by an average of 2.0% per annum over the forecast period (up to FY2060). The runway extension scenario forecasts slightly lower growth for domestic traffic due to the introduction of new long-haul services at WLG which do not require travellers to make domestic connections to AKL or CHC. However, this loss of traffic from new services only affects domestic trunk traffic; regional traffic is left unchanged. New long-haul services will stimulate demand for domestic connections at WLG, but this effect is projected to be relatively minor.

With the runway extension assumed to be built, international traffic is forecast to make up a much larger share of WLG's total passenger traffic. From a share of 14% in FY2015 to 27% of total traffic in FY2060, the addition of new long-haul services at WLG will significantly accelerate the growth of international traffic. Beginning in FY2021 (when the runway construction is assumed to have been completed),⁶² international traffic is projected to grow at an average of 7.6% per annum from FY2020-2025 and then grow at rates approaching 5% p.a. through to FY2030. As in the constrained BAU forecast, international O/D demand growth is expected to taper as WLG's international travel markets mature. In the Most Likely forecast, international air passenger traffic at WLG is forecast to reach approximately 4.3 million passengers in FY2060, adding an extra 1.1 million incremental international E/D passengers compared to the constrained BAU Most Likely international forecast.

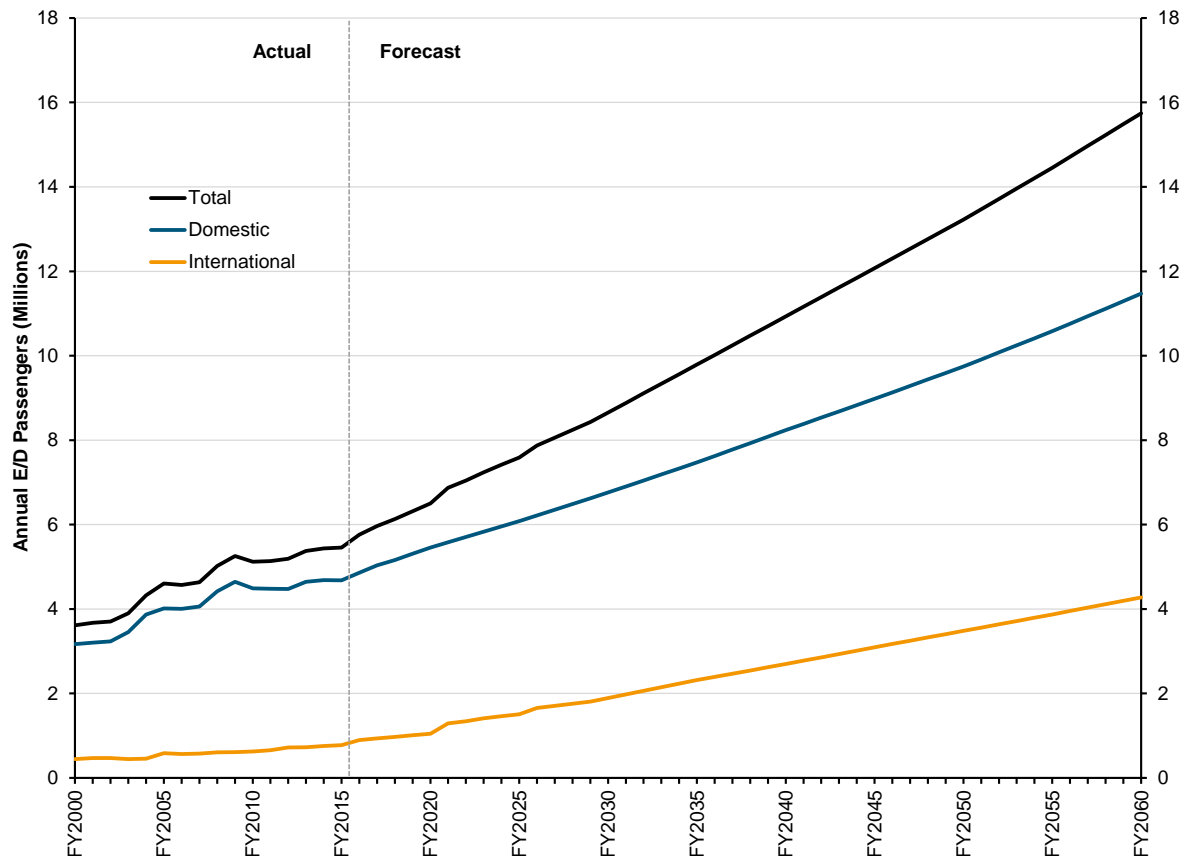
To put this in context, the 3.1 million international passengers forecast by 2045 is approximately one third of international E/D traffic at Auckland airport (AKL) in 2015, and the 4.3 million forecast by 2060

⁶² While the runway extension is assumed to be available for operations on 1 January 2020, additional long-haul services do not begin until 1 April 2020 (the first day of FY2021) as that coincides with the start of the airline scheduling season.

is half of AKL's current international traffic.⁶³ Auckland International Airport's most recent Master Plan projects 40 million E/D passengers in the year FY2045.⁶⁴ Assuming the relative share of international passengers to total passengers remains constant, this implies a projected international E/D traffic volume of approximately 25 million passengers.⁶⁵ The current Most Likely forecast for WLG under the runway scenario forecasts 3.1 million international passengers with the runway extension, just one-eighth of AKL's inferred international passenger traffic in 30 years.

Forecasts including the additional long-haul services project that Australia will remain WLG's top international destination by E/D passenger volumes, reflecting continued growth in demand for travel across the Tasman Sea, as well as to utilize 5th freedom and connecting services via Australia. Other Asia, the USA, and China are forecast to be the next three largest regions for international E/D passengers by FY2060. Most Likely passenger volumes to the Pacific Islands are also forecast to grow relative to the constrained BAU forecast, due primarily to the lifting of current payload restrictions (i.e., available seat) as a result of the lengthened runway allowing unrestricted operations for narrowbody and smaller widebody aircraft.

Figure 5-5: Most Likely Forecast of E/D Passengers at WLG – Runway Extension Forecast



⁶³ Based on 12-month period ending 31 December 2016. Source: Auckland Airport, December 2015 Monthly Traffic Update.

⁶⁴ Auckland International Airport Ltd, *Airport of the future: Our vision for the next 30 years*, 2014.

⁶⁵ AIAL's 30-year passenger projection does not indicate breakdowns for international versus domestic passenger traffic. It is likely that, like WLG, AKL will see higher growth in international passenger traffic relative to domestic, increasing the share of international passengers to total passengers.

Table 5-9: Most Likely Forecast of E/D Passengers at WLG (Thousands) – Runway Extension Forecast

Year	Domestic			International									Total Passengers
	Trunk	Regional	Total	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other	Total	
FY2015 (Actual)	4,682	3,248	1,435	768	0	0	0	0	0	7	0	775	5,457
FY2016	4,862	3,368	1,494	876	0	0	0	0	0	21	0	897	5,759
FY2017	5,034	3,411	1,623	909	0	0	0	0	0	26	0	935	5,969
FY2018	5,162	3,498	1,664	944	0	0	0	0	0	27	0	970	6,132
FY2019	5,310	3,602	1,709	981	0	0	0	0	0	28	0	1,009	6,319
FY2020	5,455	3,704	1,751	1,018	0	0	0	0	0	29	0	1,047	6,502
FY2025	6,080	4,117	1,964	1,247	0	0	145	0	76	40	0	1,508	7,588
FY2030	6,760	4,575	2,185	1,455	86	0	165	0	142	46	0	1,894	8,654
FY2035	7,471	5,059	2,412	1,640	106	0	325	0	195	53	0	2,319	9,790
FY2040	8,236	5,598	2,639	1,874	156	0	405	0	201	61	0	2,696	10,932
FY2045	8,978	6,126	2,853	2,136	181	0	461	0	247	68	0	3,094	12,072
FY2050	9,745	6,680	3,065	2,414	219	0	496	0	276	77	0	3,481	13,226
FY2055	10,580	7,293	3,288	2,722	234	0	545	0	285	85	0	3,871	14,452
FY2060	11,470	7,949	3,521	3,046	249	0	591	0	293	95	0	4,274	15,744
Long-Term Growth Rates													
FY2015-20	3.1%	2.7%	4.1%	5.8%	N/A	N/A	N/A	N/A	N/A	33.4%	N/A	6.2%	3.6%
FY2015-25	2.6%	2.4%	3.2%	5.0%	N/A	N/A	N/A	N/A	N/A	19.3%	N/A	6.9%	3.4%
FY2015-35	2.4%	2.2%	2.6%	3.9%	N/A	N/A	N/A	N/A	N/A	10.8%	N/A	5.6%	3.0%
FY2015-45	2.2%	2.1%	2.3%	3.5%	N/A	N/A	N/A	N/A	N/A	8.0%	N/A	4.7%	2.7%
FY2015-60	2.0%	2.0%	2.0%	3.1%	N/A	N/A	N/A	N/A	N/A	6.0%	N/A	3.9%	2.4%

Note: The split of forecast international passengers is based on immediate origin/destination (or E/D segment) rather than final origin/destination. For example, UK passengers are allocated to domestic and other international markets based on their connecting point to WLG.

5.2.3 Risk Analysis

To construct the High and Low scenarios for the runway extension forecast, the same underlying high/low forecast of O/D passengers developed for the BAU forecast was used. Low and High scenario runway extension forecasts then had their projections of new long-haul services adjusted, as described in **Section 5.2.1**.

Total Air Passengers

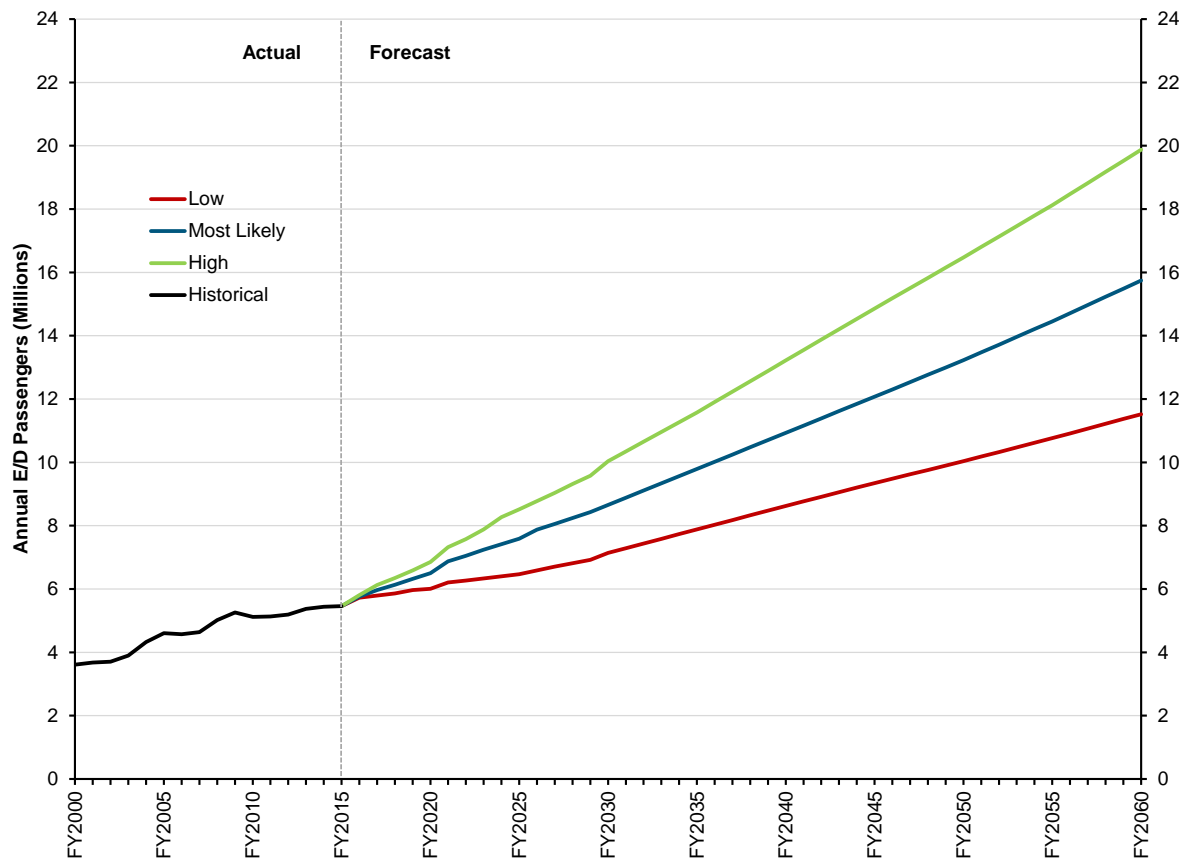
The Low, Most Likely, and High scenario results of total air passengers of the runway extension forecasts are presented in **Table 5-10** and **Figure 5-7**.

Table 5-10: Total Air Passengers – Runway Extension Scenarios

Year	Total WLG E/D Traffic (Thousands)		
	Low Scenario (5 th Percentile)	Most Likely (Median Outcome)	High Scenario (95 th Percentile)
FY2015 (Actual)		5,457	
FY2016	5,726	5,759	5,804
FY2017	5,793	5,969	6,123
FY2018	5,857	6,132	6,344
FY2019	5,969	6,319	6,587
FY2020	6,009	6,502	6,855
FY2025	6,465	7,588	8,515
FY2030	7,139	8,654	10,034
FY2035	7,880	9,790	11,574
FY2040	8,622	10,932	13,218
FY2045	9,346	12,072	14,858
FY2050	10,036	13,226	16,472
FY2055	10,763	14,452	18,122
FY2060	11,521	15,744	19,875
Long-Term Growth Rates			
FY2015-2020	1.9%	3.5%	4.6%
FY2015-2025	1.7%	3.3%	4.4%
FY2015-2035	1.8%	2.9%	3.8%
FY2015-2045	1.8%	2.6%	3.3%
FY2015-2060	1.7%	2.4%	2.9%

As in the constrained BAU forecast, there is a considerable range out traffic outcomes between the low and high scenarios relative to the Most Likely. The relative difference between the Low and High forecasts in relation to the Most Likely forecast under the runway extension is similar to the results of the BAU constrained forecast.

Figure 5-6: Forecast Total E/D Passengers at WLG – Runway Extension Scenarios



Domestic Air Passengers

The Low, Most Likely, and High forecast results of domestic air passenger traffic from the runway extension scenario are presented in **Table 5-11** and **Figure 5-8**.

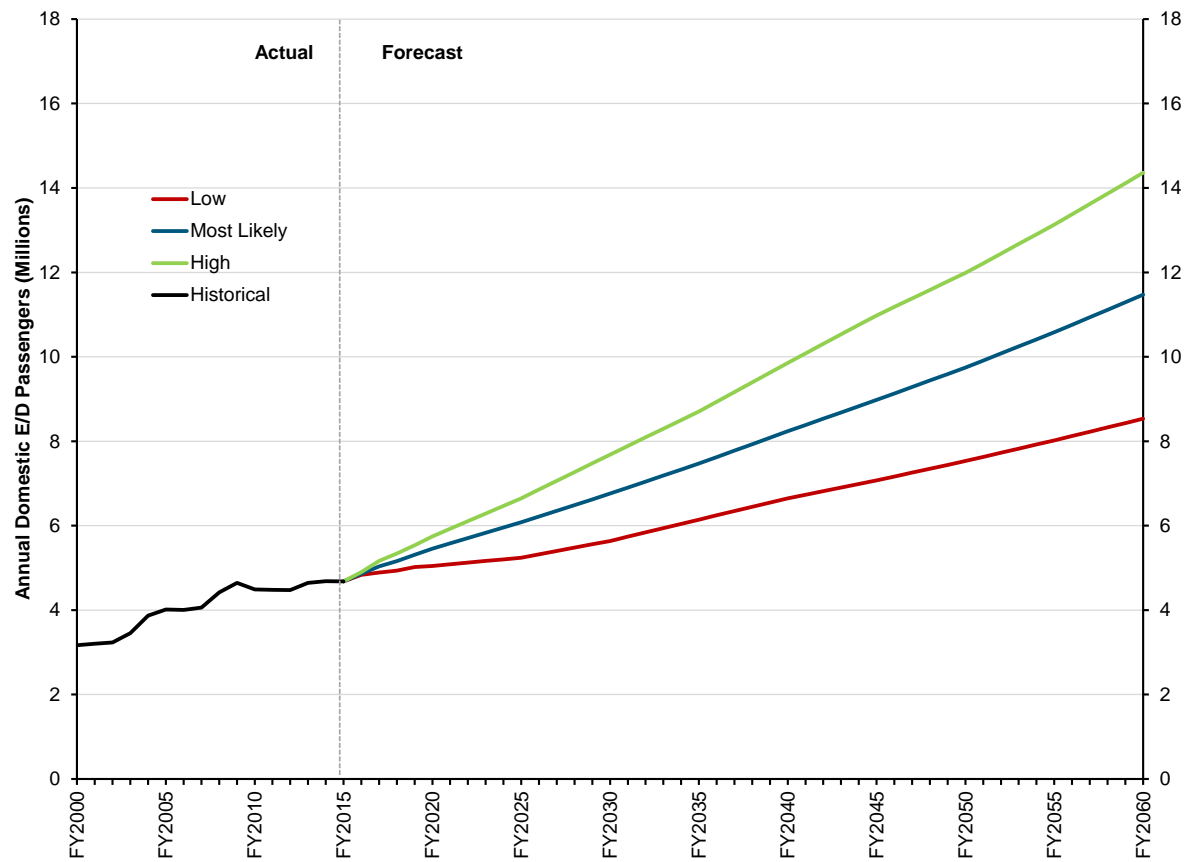
Table 5-11: Domestic Passengers – Runway Extension Scenarios

Year	Domestic WLG E/D Traffic (Thousands)		
	Low Scenario (5 th Percentile)	Most Likely (Median Outcome)	High Scenario (95 th Percentile)
FY2015 (Actual)		4,682	
FY2016	4,837	4,862	4,899
FY2017	4,890	5,034	5,164
FY2018	4,936	5,162	5,339
FY2019	5,022	5,310	5,534
FY2020	5,046	5,455	5,748
FY2025	5,241	6,080	6,648
FY2030	5,638	6,760	7,684
FY2035	6,144	7,471	8,704
FY2040	6,649	8,236	9,858
FY2045	7,073	8,978	10,978
FY2050	7,532	9,745	11,988
FY2055	8,021	10,580	13,127
FY2060	8,533	11,470	14,359
Long-Term Growth Rates			
FY2015-2020	1.5%	3.1%	4.1%
FY2015-2025	1.1%	2.6%	3.5%
FY2015-2035	1.4%	2.3%	3.1%
FY2015-2045	1.4%	2.2%	2.8%
FY2015-2060	1.3%	2.0%	2.5%

The forecasts of domestic air passenger traffic in the runway extension scenario are lower than the constrained BAU forecasts. This difference is due to the reduction in domestic E/D traffic as new long-haul international services are introduced as some passengers no longer need to make connections over AKL or CHC to reach their overseas destinations. This loss of traffic is only slightly offset by the stimulation of new domestic connecting passengers travelling via WLG to access the new long-haul international routes. In the Most Likely forecast of the runway extension scenario, domestic air passenger traffic is approximately 461,000 passengers lower than the Most Likely forecast of the constrained BAU scenario. However, this reduction in domestic passenger traffic is only applied to trunk routes (AKL and CHC). Regional domestic traffic is relatively unaffected, though it is expected that stimulation to connecting traffic would be from regional or airports in the southern half of the North Island and northern portion of the South Island.

In the Most Likely scenario, domestic traffic is forecast to grow at an average of 2.0% per annum, below the historical average of 2.5% p.a. from FY1997-2014. The Low and High forecasts, respectively, are projected to grow at average annual rates of 1.3% and 2.5%, slightly below the low and high forecasts of the constrained BAU forecast.

Figure 5-7: Forecast Domestic E/D Passengers at WLG – Runway Extension Scenarios



International Air Passengers

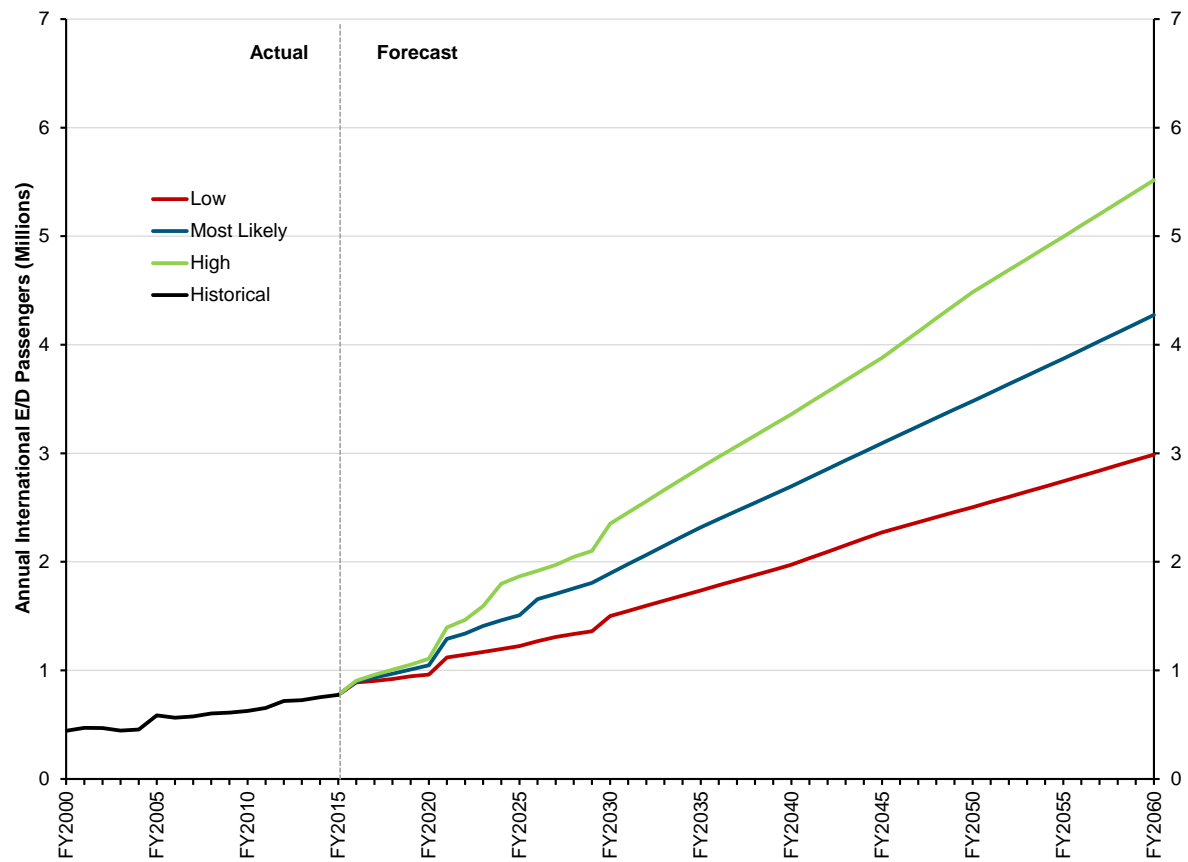
The Low, Most Likely, and High forecast results of international air passenger traffic from the runway extension scenario are presented in **Table 5-12** and **Figure 5-9**.

Table 5-12: International Passengers – Runway Extension Scenarios

Year	International WLG E/D Traffic (Thousands)		
	Low Scenario (5 th Percentile)	Most Likely (Median Outcome)	High Scenario (95 th Percentile)
FY2015 (Actual)		775	
FY2016	889	897	904
FY2017	903	935	960
FY2018	921	970	1,005
FY2019	947	1,009	1,053
FY2020	962	1,047	1,107
FY2025	1,224	1,508	1,867
FY2030	1,501	1,894	2,351
FY2035	1,737	2,319	2,870
FY2040	1,973	2,696	3,360
FY2045	2,272	3,094	3,880
FY2050	2,504	3,481	4,484
FY2055	2,742	3,871	4,995
FY2060	2,989	4,274	5,516
Long-Term Growth Rates			
FY2015-2020	4.3%	6.0%	7.1%
FY2015-2025	4.6%	6.7%	8.8%
FY2015-2035	4.0%	5.5%	6.5%
FY2015-2045	3.6%	4.6%	5.4%
FY2015-2060	3.0%	3.8%	4.4%

Under the runway extension scenario, WLG's international E/D air passenger traffic is forecast to increase dramatically compared to the constrained BAU forecast. Beginning in FY2021, the year in which it is assumed that an extended runway will enable new non-stop long-haul scheduled service, international E/D traffic grows with the addition of new long-haul services. Comparing the Most Likely forecasts of the runway extension and constrained BAU scenarios, the runway extension forecast projects that an additional 1.1 million international E/D passengers will be travelling through WLG than in the constrained Most Likely forecast. It is expected that WLG will experience the fastest growth in its international air passenger traffic between FY2020 and FY2030 as new services are introduced. From FY2030 to FY2060, international traffic will continue to grow, albeit at a lower rate reflecting the maturing of WLG's international markets.

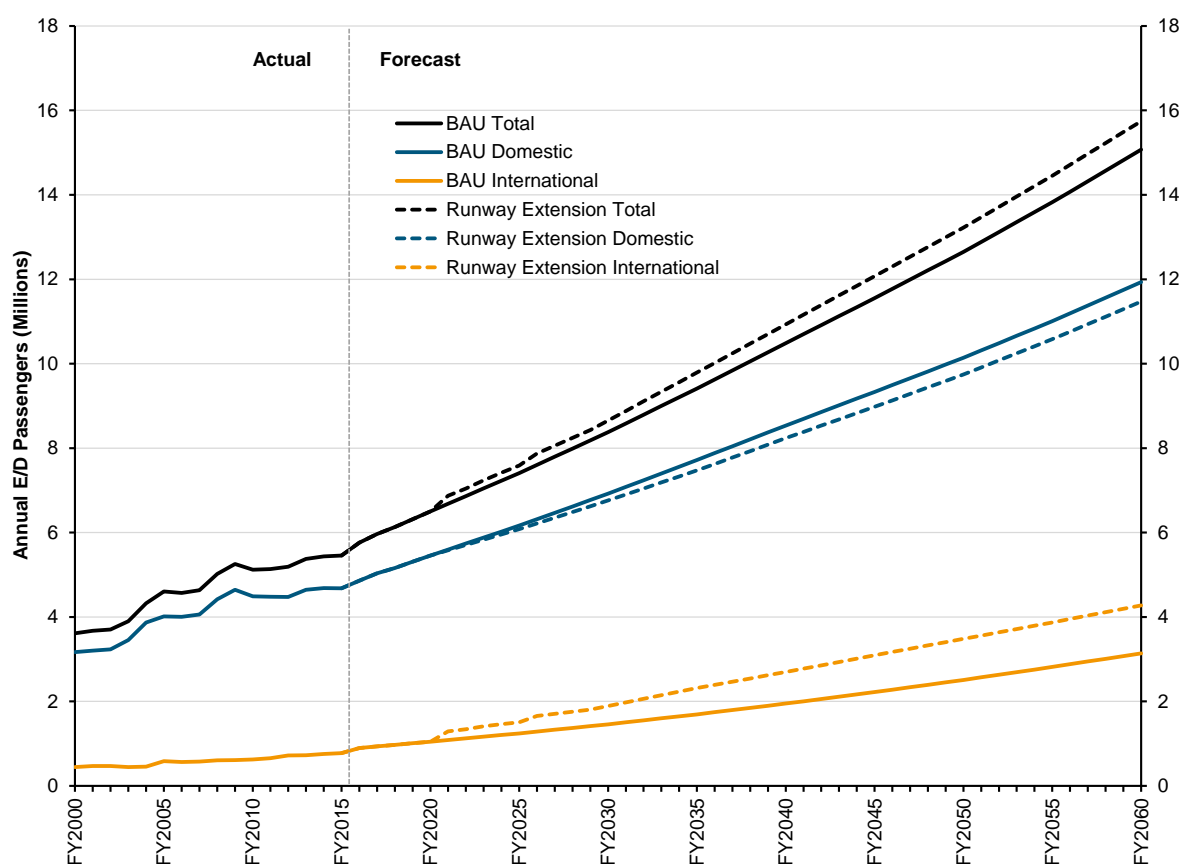
Figure 5-8: Forecast International E/D Passengers at WLG – Runway Extension Scenarios



5.3 Comparison of Forecast Scenarios

Figure 5-9 shows the comparison of Most Likely forecasts of total E/D passengers at WLG between the Business As Usual (BAU) scenario and Runway Extension scenario. Compared to the BAU forecast the runway extension scenario forecasts higher international and total air passenger volumes. Domestic air passenger traffic in the runway extension scenario forecast is below that forecast in the BAU scenario, as the introduction of new long-haul international services will reduce the number of passengers travelling domestically which under the BAU forecast must connect at AKL or CHC for overseas travel.

Figure 5-9: Comparison of Most Likely Forecasts of Total E/D Passengers at WLG



By FY2060, the Most Likely forecast of the Runway Extension scenario projects the following air passenger volumes:

- Total air passengers: 15,774,000 E/D passengers (+672,500 vs BAU)
- Domestic air passengers: 11,470,000 domestic E/D passengers (-461,500 vs BAU)
- International air passengers: 4,274,000 international E/D passengers (+1,134,000 vs BAU)

Comparison of International E/D Traffic Forecasts

In the Most Likely runway extension scenario, WLG is forecast to reach 4.3 million International E/D passengers by FY2060, and 5.5 million in the high forecast scenario. These airport passenger traffic figures may be compared to the international traffic data from AKL to provide perspective on the

potential growth of international traffic at WLG. For the 12-month period ending December 2015, AKL handled 8.9 million International E/D passengers, roughly 150% more international passengers than the current high forecast projects in forty-five years' time.

5.4 Comparison of O/D Forecasts

The driving force behind the differences in the constrained BAU forecast and runway extension forecast is the stimulation of O/D demand. Additional long-haul international services stimulate O/D travel demand to and from WLG. The new services stimulate the local O/D demand (to and from the market which the new route serves, e.g., China or Australia), as well as beyond connecting markets. As new long-haul services are added at WLG, passengers – both in New Zealand and abroad – have an increased ability to reach WLG via connections at major hubs in the forecast regions. Thus a new service to Singapore or the United States provides the opportunity for a traveller destined to or originating from the UK to get from/to WLG with one less connection. The improvement in service quality thus stimulates O/D travel demand to and from WLG to various regions in the world.⁶⁶ Compared to the forecast of October 2015, inbound O/D markets in China and Other Asia have been reduced, owing to the downgraded economic outlook in those regions.

Tables 5-13 and 5-14 below compares the inbound and outbound O/D demand in the Most Likely BAU and runway extension scenarios. Details of O/D demand in the low and high forecasts may be found in the supplementary materials.

Table 5-13: Inbound O/D Market Comparison, Most Likely Forecasts (Thousand Passengers)

Year	Inbound O/D Demand								Total
	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other	
Constrained BAU Forecast									
FY2015	314	11	9	30	22	37	6	31	460
FY2025	460	27	11	73	34	50	8	44	707
FY2035	632	55	12	140	48	62	10	58	1,016
FY2045	832	101	12	228	65	77	13	75	1,403
FY2060	1,191	196	13	368	98	106	18	108	2,097
Runway Extension Scenario									
FY2015	314	11	9	30	22	37	6	31	460
FY2025	500	36	11	104	36	62	8	48	804
FY2035	692	83	13	216	53	94	10	65	1,226
FY2045	911	144	13	338	73	118	13	85	1,695
FY2060	1,303	254	15	512	108	155	19	120	2,484
Incremental Inbound International Visitors (Runway Extension vs. BAU)									
FY2015	-	-	-	-	-	-	-	-	-
FY2025	39	9	0	31	2	13	1	4	98
FY2035	60	27	1	76	5	32	1	7	209
FY2045	79	43	1	110	8	41	1	10	292
FY2060	112	58	1	144	10	49	1	12	387

⁶⁶ A more detailed description of this phenomenon and how it is modelled in this forecast is provided in Section 4.4.

Table 5-14: Outbound O/D Market Comparison, Most Likely Forecasts (Thousand Passengers)

Year	Outbound O/D Demand								Total
	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other	
Constrained BAU Forecast									
FY2015	209	14	7	97	36	65	46	62	536
FY2025	296	21	12	149	57	102	68	96	800
FY2035	373	29	16	201	79	137	95	130	1,060
FY2045	463	37	21	258	103	172	126	167	1,346
FY2060	622	49	28	358	140	231	176	225	1,829
Runway Extension Scenario									
FY2015	209	14	7	97	36	65	46	62	536
FY2025	321	25	12	159	61	109	72	104	862
FY2035	409	38	17	226	88	155	101	145	1,179
FY2045	507	50	23	294	115	195	134	188	1,504
FY2060	680	62	31	406	154	258	187	250	2,028
Incremental Outbound Resident Travellers (Runway Extension vs. BAU)									
FY2015	-	-	-	-	-	-	-	-	-
FY2025	25	4	0	10	3	7	4	8	62
FY2035	36	9	1	25	9	18	6	15	119
FY2045	44	13	2	37	12	23	8	21	158
FY2060	59	13	3	48	14	27	10	25	199

As can be seen, inbound O/D markets are stimulated to a greater extent than outbound markets. This result of the forecast is based on the assumption that new long-haul services would predominantly be served by foreign carriers. In InterVISTAS' 2014 report, *Viability Assessment of Long Haul Service at Wellington Airport*, it is observed from recent examples of new services by foreign carriers into New Zealand that the majority of the market stimulation (and incremental traffic) was from international visitors. New Zealand resident travellers will certainly also be stimulated by new long-haul services, be they by a foreign carrier or domestic incumbent, as residents within WLG's catchment area will now have better access to non-stop long haul services.

Comparisons to the Previous Forecast

It should be noted that in the underlying O/D demand forecasts, driven by the econometric models and regional economic outlooks, are identical across the BAU and Runway Extension scenarios. Thus the difference in O/D demand between the BAU and Runway models represents the incremental passenger demand stimulated as a result of the development of new long-haul services enabled by the runway extension.

If comparing the results of the current O/D forecasts and those of the previous forecast of October 2015, the gap between current and previous forecasts' BAU and Runway scenarios are not identical. The reason for this result is that the O/D forecast in the previous BAU model featured a 5th freedom service to China, over Australia which was not present in the Runway model. This 5th freedom service was included based on WIAL's then-current best information. It was assumed to only occur if the

runway was not extended.⁶⁷ Therefore, the previous BAU forecast for Chinese Inbound O/D was stimulated over that of the baseline O/D forecast in the Runway Extension scenario. As the current forecast features identical baseline O/D forecasts,⁶⁸ the difference between the current forecast's O/D projections and those of the previous forecasts are not exact one-to-one comparisons. This update has been developed with a number of new pieces of information regarding upcoming air services at WLG which, along with updated economic outlooks, affect the O/D forecasts.

A similar effect can be observed in the difference in O/D demand for the Other Asia sector. Both current BAU and Runway Extension scenarios feature the inclusion of Singapore Airlines' WLG-CBR-SIN 5th freedom service, beginning part way through FY2017. The O/D forecasts of both the BAU and Runway Extension scenarios feature stimulation to the Other Asia sector beginning in FY2017. This lifts up the underlying Other Asia O/D demand in the current forecasts relative to the previous forecasts of October 2015, but only in the near term. Over the long term, the downgraded economic outlook for Asian economies, relative to our previous outlook, forecasts a lower number of Other Asian O/D travellers by FY2060. The number of incremental passengers added in the runway extension scenario are slightly reduced, owing to the delayed introduction of new long-haul services brought about by a downgraded outlook of economic growth in that world region.

⁶⁷ As the previous forecast modelled the Chinese 5th freedom beginning in FY2019, it was assumed that should the runway be developed, and thus announced prior to FY2019, carriers and WIAL would seek out non-stop long-haul services to China instead of 5th freedom services over Australia.

⁶⁸ Which equally model the impact of SQ's WLG-CBR-SIN service.

5.4.1 Incremental Travellers in Runway Extension Scenario

Table 5-15 below summarises the incremental inbound visitors to WLG (i.e. inbound O/D travellers) induced by the extension of WLG's runway and the enabling of long-haul non-stop overseas services. The table below depicts the number of incremental international visitors added compared to the BAU scenario beginning in FY2025, four years after the assumed date in which the runway becomes operational. Incremental visitors are displayed for the Most Likely, Low, and High forecasts.

Across all forecast regions, the high forecast projects increased levels of incremental international visitors at WLG compared to the Most Likely forecast. This is a function of the increased levels of non-stop long-haul services included in the high forecast. Conversely, the Low forecast has fewer incremental inbound travellers at WLG resulting from reduced assumptions for new long-haul services. In all cases, the underlying pre-stimulation O/D travel demand is identical across BAU and Runway scenarios, varying only by the Low, Most Likely, and High forecasts.

Table 5-15: Incremental Inbound Visitors ('000s), Runway Extension Scenarios

Year	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other	Total
Most Likely Forecast									
FY2025	39	9	0	31	2	13	1	4	98
FY2035	60	27	1	76	5	32	1	7	209
FY2045	79	43	1	110	8	41	1	10	292
FY2060	112	58	1	144	10	49	1	12	387
Low Forecast									
FY2025	26	3	0	5	1	3	0	1	40
FY2035	29	13	1	19	2	7	1	3	74
FY2045	36	24	1	32	4	9	1	4	111
FY2060	48	34	1	42	5	10	1	5	144
High Forecast									
FY2025	54	21	1	27	5	16	1	7	132
FY2035	73	45	2	80	9	23	1	12	244
FY2045	98	63	2	123	12	31	1	16	345
FY2060	140	96	3	182	17	39	1	21	500

Table 5-16 below shows the number of incremental outbound New Zealand resident travellers added through in the Runway Scenarios versus the BAU scenarios. While the stimulation of new travellers in the local market for long-haul services is predominantly inbound (due to the assumption of services being offered primarily by foreign carriers), the stimulatory effects of beyond services to markets like the UK are based on the historical patterns of inbound and outbound travel. Thus the UK receives higher number of incremental outbound passengers versus incremental inbound as New Zealand residents made up the majority of the historical O/D travel demand on that market.

Table 5-16: Incremental Outbound Resident Travellers ('000s), Runway Extension Scenarios

Year	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other	Total
Most Likely Forecast									
FY2025	25	4	0	10	3	7	4	8	62
FY2035	36	9	1	25	9	18	6	15	119
FY2045	44	13	2	37	12	23	8	21	158
FY2060	59	13	3	48	14	27	10	25	199
Low Forecast									
FY2025	17	2	0	11	1	6	4	3	44
FY2035	17	7	1	27	4	14	5	6	81
FY2045	20	9	1	36	6	21	6	9	108
FY2060	25	8	2	41	7	22	8	10	122
High Forecast									
FY2025	35	17	1	54	8	33	5	16	169
FY2035	43	23	3	116	15	50	7	26	282
FY2045	55	23	4	139	19	69	9	35	352
FY2060	73	24	5	178	24	86	13	44	447

6 Aircraft Movement Forecasts

As discussed in **Section 4.3**, aircraft movements are generally a function of passenger traffic demand and air service development, shaped by carriers' network and the average aircraft size. Forecasts of future aircraft movements are derived forecast, taking into consideration passenger traffic demand, potential service improvement/expansion, change in carrier fleets and aircraft sizes, and load factors.

The forecasts of aircraft movements were constructed using a bottom-up approach, identifying and projecting the proportion of aircraft movements by aircraft type in a given forecast sector, the average seat capacity of aircraft operating in that sector, and a sector average load factor. From these inputs, sector total aircraft movements were calculated based on the formula below (reproduced from Section 4.3):

$$\text{Aircraft Movements} = \frac{\text{E/D Passenger Forecasts}}{\text{Average Aircraft Size} \cdot \text{Average Load Factor}}$$

Where: Average Aircraft Size · Average Load Factor = Average Passengers per Aircraft Movement

The total number of aircraft movements required for a given sector was then allocated to aircraft movements by specific aircraft type based on the projected mix of aircraft operating in a given forecast year. The results presented in this chapter of the report describe the total aircraft movements at WLG and by forecast sector. Details of the aircraft movement forecasts by aircraft type are presented in the accompanying spreadsheets.

6.1 Assumptions Underlying Aircraft Movement Forecasts

To generate the derived aircraft movement forecasts, the forecast team analysed historical data on aircraft movements by sector at WLG and complimented that data with airline schedule data to identify the number of scheduled movements by aircraft type.⁶⁹ An analysis of historical average load factors by sector was also conducted to determine the current and projected future load factors for aircraft operations at WLG.

In the short- and medium-term, market intelligence and research on known fleet plans was used to identify changes in the mix of aircraft operating at WLG. In the long- and very long-term, expert judgement was used to project the type and mix of aircraft operating at WLG under the BAU and runway extension forecast scenarios. Overall it is assumed that the average number of passengers per aircraft movement will continue to increase at WLG into the future. This is due a combination of increasing average aircraft size (e.g. retirement of sub-50 seat turboprop aircraft to be replaced with 70+ seat aircraft) and increasing load factors.

Determination of future average passengers per aircraft was based on the known fleet plans of carriers serving WLG as well as sector specific average load factors. The average number of passengers per aircraft in domestic trunk operations is projected to grow from an average of 119 in FY2015 to 166 in FY2045. In the short term this is due to Air New Zealand's retirement of 737-300 from its fleet early in FY2016, which is to be replaced by additional A320 services, and an increase in operations from ATR72-600 turboprops. Further into the future it is projected that Dash-8 services will be slowly phased out from domestic trunk operations as the youngest aircraft in the fleets are transferred to regional routes and operators. Those turboprop services are assumed to be taken up

⁶⁹ OAG schedule data via Diio Mi.

by ATR72 operations or longer term, some other regional aircraft in the 60-80 seat range. Larger jet aircraft will also enter the domestic trunk fleet, such as the A321, further increasing average aircraft size.

The average number of passengers per aircraft movement for domestic regional operations is forecast to increase from 24 in FY2015 to 35 passengers per movement in FY2045. While in the short-term load factors are projected to decrease as additional capacity is introduced at WLG (i.e., Jetstar beginning regional service to NSN with Dash-8 operations in FY2016/17), overall average aircraft sizes are projected to increase throughout the forecast. In FY2016 Eagle Airways is ceasing Beech 1900D service at WLG (operating for Air New Zealand Link), to be replaced by additional Dash-8 and ATR72 services. By FY2025, older Dash-8 aircraft will begin to be retired from the fleets of regional operators, as additional ATR72 services are introduced. While the more detailed forecasts provided in the supplementary spreadsheets to indicate that Dash-8 aircraft will be in operation throughout the forecast period, it is more likely that these will be some form of 50-seat regional aircraft. Bombardier ceased production of the Dash-8 100 and 300 in 2009 but is now offering an extended service program for these aircraft, which will increase the number of life cycles of the aircraft by 50%.⁷⁰ In addition, ATR is currently offering the ATR42-600 for sale, further indicating the possibility that 50-seat turboprops will remain in operations in 2045.

Aircraft operating on Trans-Tasman and Pacific Islands routes are also expected to increase in average size over the forecast period. The average number of passengers per aircraft operating to Australia is expected to increase from 145 in FY2015 to 179 in FY2045. This is reflective of current orders by Virgin Australia for higher capacity 737MAX aircraft, the eventual retirement of 737-800 aircraft and introduction of A321 aircraft (potentially by NZ or QF), as well as operation of a Boeing 777-200 between Wellington and Canberra as part of Singapore Airlines' SIN-CBR-WLG service beginning in FY2017. For operations to/from the Pacific Islands, the average passengers per aircraft is forecast to increase from 142 to 156 from FY2015 to FY2045. Growth in average passengers per aircraft is largely dominated by future increases in load factors, as well as a potential upgauging of aircraft to higher capacity A321 versus existing A320 operations. Fiji Airways' introduction of year-round non-stop service at WLG is projected to nearly treble Pacific seat capacity by FY2017, likely leading to lower load factors in the short term (which is supported by year to date traffic data). Over time, load factors are projected to increase throughout the forecast period.

Forecast Update Adjustments

As part of the forecast update process, new information was brought to the forecast team's attention affecting the short-term results of the aircraft movement forecast. The previous forecast projected a significant increase in aircraft movements in FY2016 versus FY2015. New information has revealed that this projection was due to Sounds Air (S8), an ancillary carrier serving regional destinations on the North and South Islands, only recently uploading their flight schedules to the Global Distribution System. These flight schedules, which are used to develop short-term aircraft movement forecasts, thus showed a significant increase in apparent flights – even though Sounds Air has been operating at WLG for some time and is represented in the airport's own historical aircraft movement statistics. Adjustments have been made to correct for the previous overestimation of movements in FY2016, as well as incorporating the movements associated with Singapore Airlines' direct Boeing 777-200 service to Singapore via Canberra beginning in September FY2017.

⁷⁰ <http://chorusaviation.ca/2015-02-02-Bombardier-and-Chorus-Sign-Purchase-Agreement-for-up-to-23-Q400-NextGen-Aircraft-and-Launch-New-Extended-Service-Program-for-Dash-8-300-Aircraft>.

6.2 BAU Constrained Forecast

The resulting constrained BAU forecasts of aircraft movements are provided in **Figure 6-1** and **Table 6-1**. The average passengers per aircraft, based on projected mix of aircraft types by sector, were applied to each sector's E/D passenger traffic to arrive at the Most Likely forecast portrayed below.

Total aircraft movements at WLG are, in the Most Likely forecast, projected to grow from 93,032 movements in FY2015 to 149,800 in FY2060, growing at an average annual rate of 1.1% per annum. Compared to the constrained BAU Most Likely average annual forecast growth of total E/D traffic at WLG of 2.3% over the same period, the aircraft movement forecast projects the continuation of current trends for aircraft movements to grow at a fraction of the rate of passenger traffic. This is due largely to upgauging of aircraft, forecasts of higher load factors, and reduction in the relatively frequency of operations of small sub-50 seat aircraft.

Domestic regional and international aircraft movements are expected to have additional short-term growth to accommodate additional scheduled capacity in those sectors in FY2016. In particular, on regional routes, movements are projected to increase by 2% in FY2016 due in large part to the entry of Jetstar using a small fleet of Dash-8 300s. Internationally, boosted seat capacity and frequencies are expected in FY2016 for Australia, and the Pacific Islands are projected to increase aircraft movements to those regions by nearly 20% versus FY2015 as Fiji Airways introduced year-round service to NAN.

Under the constrained BAU Most Likely forecast, international aircraft movements are projected to grow the fastest over the 45-year forecast period, at an average of 2.6% per annum (versus Most Likely growth of 3.1% per annum for international passengers). On the domestic side, trunk aircraft movements are forecast to grow at 1.2% p.a. (vs. 2.1% for trunk passengers) and regional movements at 0.8% p.a. (vs. 2.0% for regional passengers). Regional aircraft movements are forecast to grow the slowest as that is the sector in which the greatest upgauging of aircraft is expected. By FY2060 it is forecast that regional aircraft movements will still make up the majority of WLG's aircraft activity albeit with a lower share (57% in FY2060 vs. 65% in FY2015), as domestic trunk and international movements make up an increasingly large proportion of aircraft activity owing to the greater growth in those sectors passenger traffic and more limited upgauging opportunities due to the constrained runway length.

Figure 6-1: Most Likely Forecast of WLG Aircraft Movements – Constrained BAU Scenario

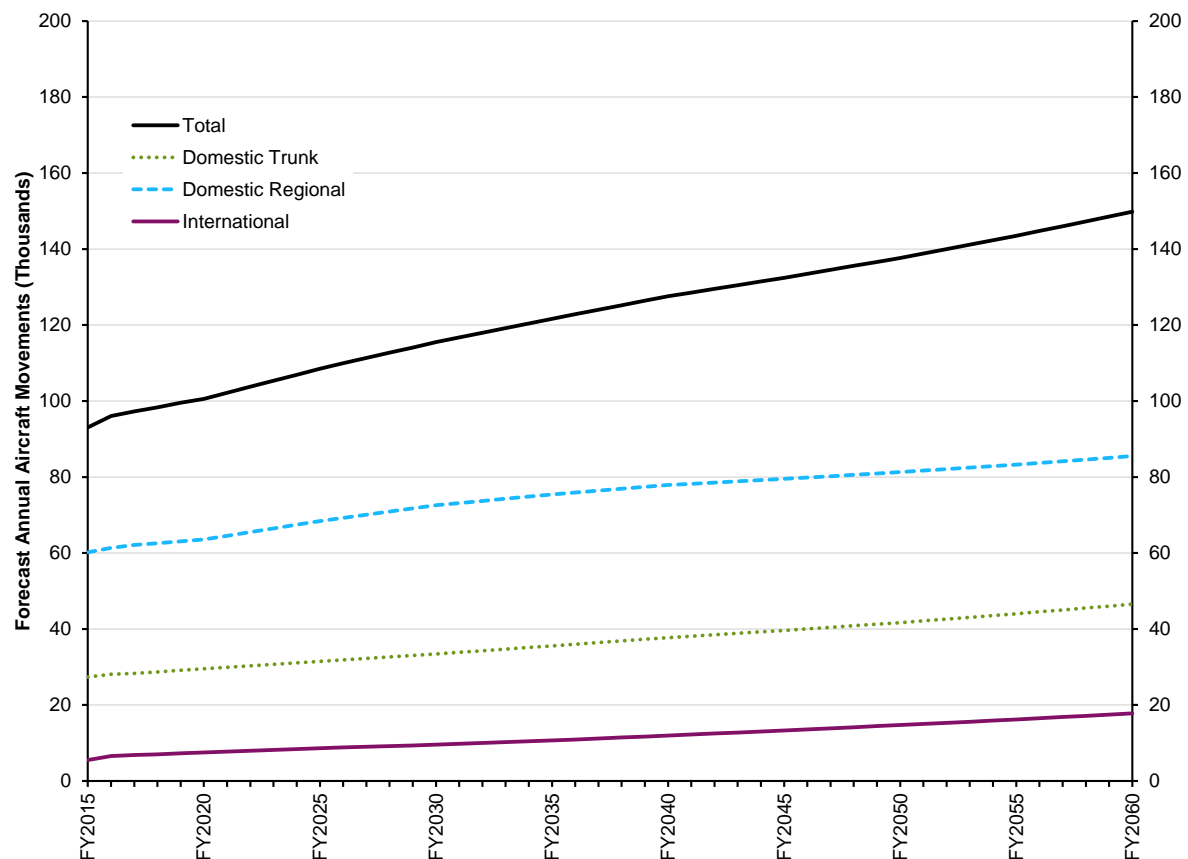


Table 6-1 shows the constrained BAU Most Likely forecast of aircraft movements broken down into domestic by trunk routes and regional, as well as by international market. Detailed forecasts of aircraft movements by specific aircraft type can be found in the supplemental forecast summary spreadsheets.

Table 6-1: Most Likely Forecast of Aircraft Movements at WLG – BAU Constrained Forecast

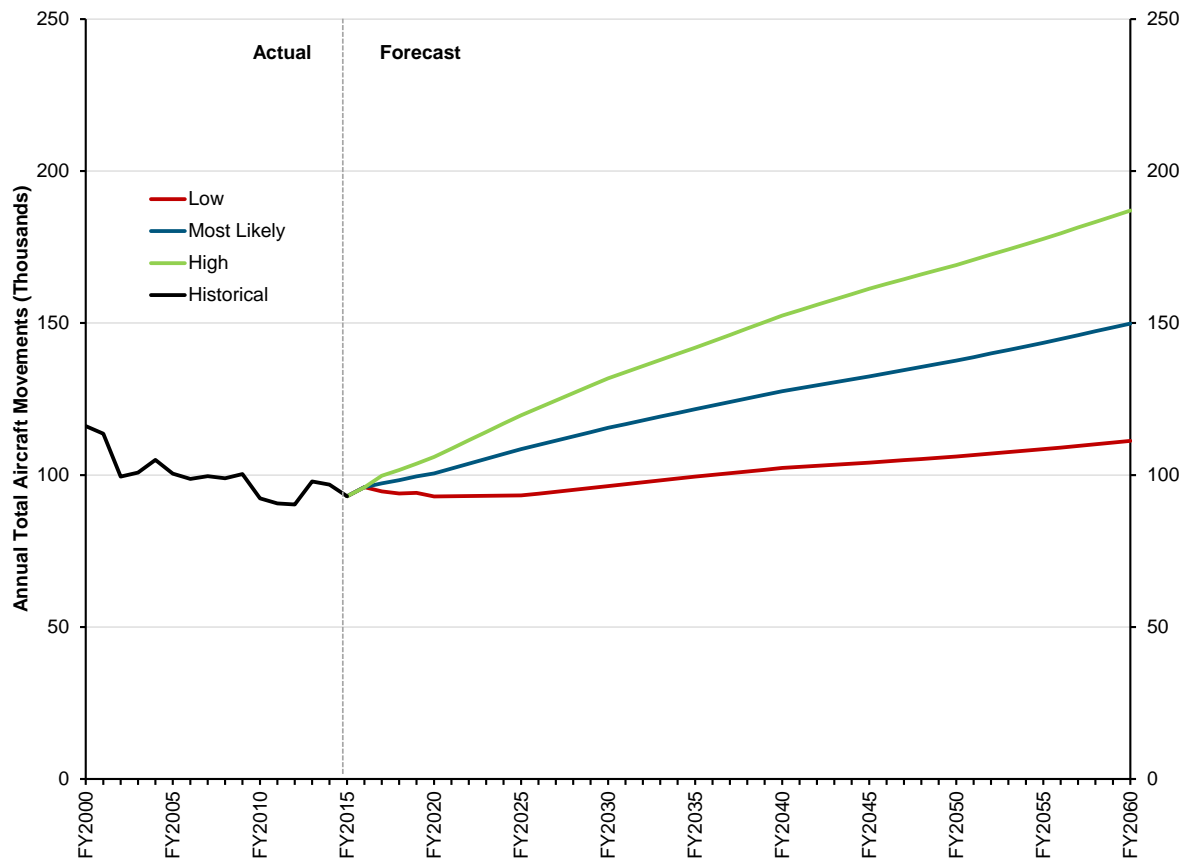
Year	Domestic			International									Total Movements
	Total	Trunk	Regional	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other	Total	
FY2015 (Actual)	87,512	27,337	60,175	5,469	0	0	0	0	0	51	0	5,520	93,032
FY2016	89,440	28,090	61,350	6,400	0	0	0	0	0	180	0	6,580	96,020
FY2017	90,440	28,320	62,120	6,590	0	0	0	0	0	220	0	6,810	97,250
FY2018	91,290	28,720	62,570	6,790	0	0	0	0	0	220	0	7,010	98,300
FY2019	92,230	29,140	63,090	7,070	0	0	0	0	0	230	0	7,300	99,530
FY2020	93,050	29,510	63,540	7,250	0	0	0	0	0	230	0	7,480	100,530
FY2025	99,900	31,480	68,420	8,360	0	0	0	0	0	270	0	8,630	108,530
FY2030	105,960	33,410	72,550	9,250	0	0	0	0	0	310	0	9,560	115,520
FY2035	110,990	35,550	75,440	10,320	0	0	0	0	0	340	0	10,660	121,650
FY2040	115,620	37,730	77,890	11,580	0	0	0	0	0	370	0	11,950	127,570
FY2045	119,140	39,620	79,520	12,880	0	0	0	0	0	410	0	13,290	132,430
FY2050	122,940	41,660	81,280	14,260	0	0	0	0	0	450	0	14,710	137,650
FY2055	127,270	44,010	83,260	15,710	0	0	0	0	0	480	0	16,190	143,460
FY2060	132,030	46,520	85,510	17,270	0	0	0	0	0	510	0	17,780	149,810
Long-Term Growth Rates													
FY2015-20	1.2%	1.5%	1.1%	5.8%	N/A	N/A	N/A	N/A	N/A	35.2%	N/A	6.3%	1.6%
FY2015-25	1.3%	1.4%	1.3%	4.3%	N/A	N/A	N/A	N/A	N/A	18.1%	N/A	4.6%	1.6%
FY2015-35	1.2%	1.3%	1.1%	3.2%	N/A	N/A	N/A	N/A	N/A	10.0%	N/A	3.3%	1.4%
FY2015-45	1.0%	1.2%	0.9%	2.9%	N/A	N/A	N/A	N/A	N/A	7.2%	N/A	3.0%	1.2%
FY2015-60	0.9%	1.2%	0.8%	2.6%	N/A	N/A	N/A	N/A	N/A	5.3%	N/A	2.6%	1.1%

Table 6-2 and **Figure 6-2** present the results of the risk analysis constrained BAU forecast into Low (5th percentile) and High (95th percentile) outcomes. The Low and High scenarios were generated using the low and high scenario E/D passenger forecasts and applying the forecasts of average passengers per aircraft presented in Section 6.1.

Table 6-2: Quantitative Risk Analysis, Total Aircraft Movements – Constrained BAU Scenario

Year	Total Aircraft Movements Traffic (Thousands)		
	Low Scenario (5 th Percentile)	Most Likely (Median Outcome)	High Scenario (95 th Percentile)
FY2015 (Actual)		93.0	
FY2016	96.0	96.0	95.9
FY2017	94.6	97.3	99.8
FY2018	93.9	98.3	101.7
FY2019	94.1	99.5	103.7
FY2020	93.0	100.5	105.9
FY2025	93.3	108.5	119.7
FY2030	96.3	115.5	131.8
FY2035	99.5	121.7	141.9
FY2040	102.3	127.6	152.4
FY2045	104.1	132.4	161.3
FY2050	106.1	137.7	169.1
FY2055	108.5	143.5	177.7
FY2060	111.2	149.8	187.0
Long-Term Growth Rates			
FY2015-2020	0.0%	1.6%	2.6%
FY2015-2025	0.0%	1.5%	2.5%
FY2015-2035	0.3%	1.3%	2.1%
FY2015-2045	0.4%	1.2%	1.8%
FY2015-2060	0.4%	1.1%	1.6%

Figure 6-2: Forecast Total Aircraft Movements at WLG – Constrained BAU Scenario



6.3 Runway Extension Scenario

Under the runway extension scenario, aircraft movements associated with new long-haul international services were determined by the design parameters of the specific service. If, for example, a new route was introduced at an average of 4x weekly service, that additional service would contribute 416 aircraft movements the services' respective sector movements in a given year. The underlying O/D forecast, translated into E/D traffic, still drives the core aircraft movement forecasts by sector and by aircraft type. Additional services merely add movements on top of that underlying demand.

Further modifying the aircraft movement forecasts are the stimulation factors for each service. If the addition of a new service causes 40,000 domestic trunk E/D passengers and 20,000 Australian E/D passengers to be reallocated to the new long-haul service (as they no longer need to flow over a domestic or Australia gateway to reach their destination), then subsequently the number of domestic trunk and Australian movements will be adjusted reflecting lower E/D demand in those sectors. The existing assumptions regarding average passengers per aircraft, load factors, and mix of aircraft types are retained between the constrained BAU model and runway extensions model, excepting movements introduced as part of new long-haul widebody services.

Figure 6-3 presents the Most Likely forecast of domestic trunk, domestic regional, international and total aircraft movements at WLG under the runway extension scenario. **Table 6-3** presents detailed movement statistics by international E/D sector. In FY2060 WLG's total aircraft activity is forecast to grow to 149,800 movements, at an average annual rate of 1.1% per annum. This growth in total

aircraft movements may be compared to the growth in total E/D air passenger traffic of 2.4% per annum, retaining the BAU forecasts assumptions regarding the upgauging of aircraft and general increases in load factors expected in the future, leading to aircraft movements growing at a lower rate than that of passenger traffic.

By FY2060 in the runway extension scenario Most Likely forecast, domestic trunk movements are forecast to reach 44,800 movements, growing at an average annual rate of 0.9%, versus the constrained BAU FY2060 movements of 46,500. The difference in Most Likely movements of -2,700 domestic trunk movements is due to the forecast reduction in trunk capacity and flights as new long-haul services reduce the demand for domestic trunk flights as passengers do not need to connect over domestic gateways to reach their international destinations.

International aircraft activity is forecast to reach 23,500 movements in FY2060 in the Most Likely scenario, versus 17,800 in the constrained BAU scenario, growing at an average of 3.2% per annum. Much of the additional 5,700 movements are associated with new long-haul services. Like domestic trunk movements, new services will reduce some of the demand for Australian E/D traffic as new long-haul international services will remove the requirement for passengers to flow over an Australian gateway (e.g., SYD or MEL) to reach their overseas destination. Most Likely international movements under the runway extension scenario are forecast to grow by an average of 6.6% p.a. in the five years following the completion of the runway extension (FY2020-2025) versus an E/D passenger growth of 7.6% in the Most Likely runway extension scenario forecast.

Figure 6-3: Most Likely Forecast of WLG Aircraft Movements – Runway Extension Scenario

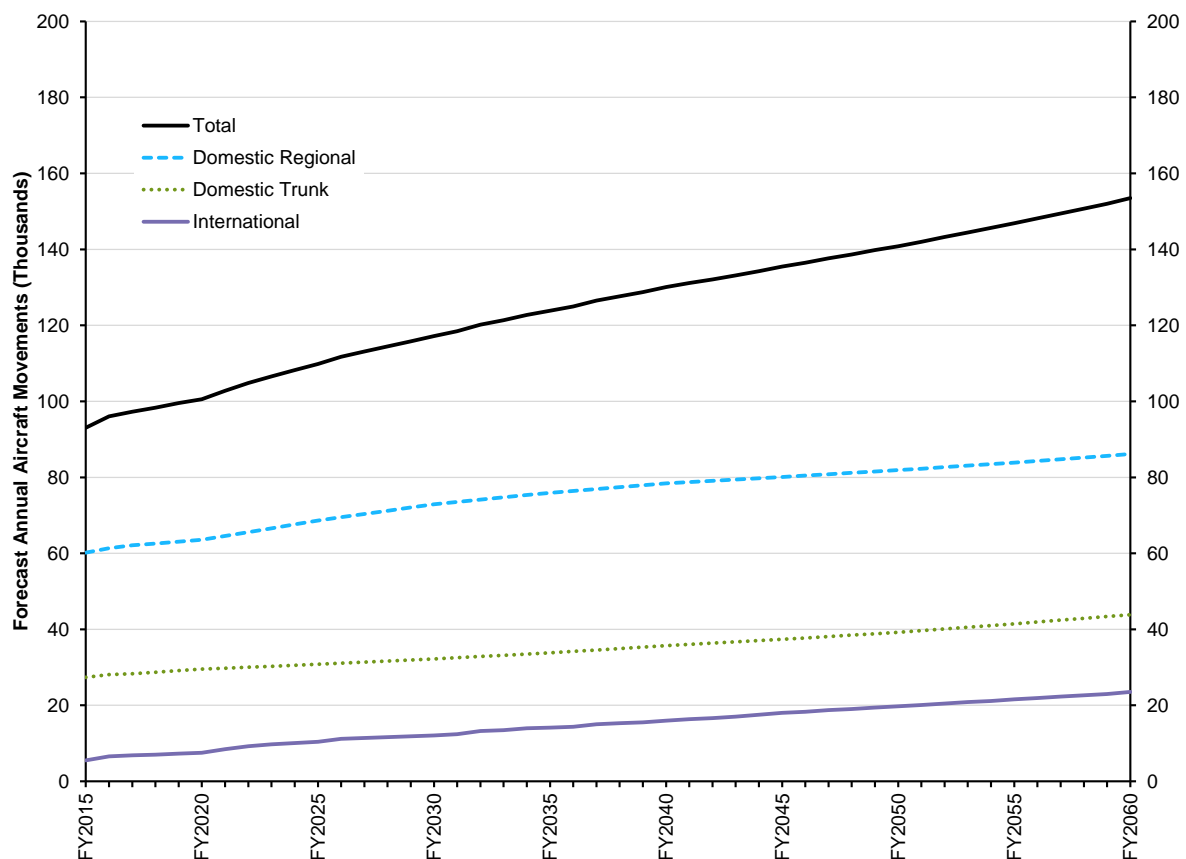


Table 6-3: Most Likely Forecast of Aircraft Movements at WLG – Runway Extension Scenario

Year	Domestic			International									Total Movements
	Trunk	Regional	Total	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other	Total	
FY2015 (Actual)	87,512	27,337	60,175	5,469	0	0	0	0	0	51	0	5,520	93,032
FY2016	89,440	28,090	61,350	6,400	0	0	0	0	0	180	0	6,580	96,020
FY2017	90,440	28,320	62,120	6,590	0	0	0	0	0	220	0	6,810	97,250
FY2018	91,290	28,720	62,570	6,790	0	0	0	0	0	220	0	7,010	98,300
FY2019	92,230	29,140	63,090	7,070	0	0	0	0	0	230	0	7,300	99,530
FY2020	93,050	29,510	63,540	7,250	0	0	0	0	0	230	0	7,480	100,530
FY2025	99,430	30,790	68,640	9,000	0	0	730	0	420	270	0	10,420	109,850
FY2030	105,130	32,200	72,930	10,090	420	0	730	0	520	310	0	12,070	117,200
FY2035	109,740	33,810	75,930	11,090	520	0	1,460	0	730	340	0	14,140	123,880
FY2040	114,110	35,690	78,420	12,260	730	0	1,870	0	730	370	0	15,960	130,070
FY2045	117,440	37,350	80,090	13,650	940	0	2,080	0	940	410	0	18,020	135,460
FY2050	121,100	39,200	81,900	15,110	940	0	2,190	0	1,040	450	0	19,730	140,830
FY2055	125,320	41,450	83,870	16,730	940	0	2,390	0	1,040	480	0	21,580	146,900
FY2060	129,960	43,840	86,120	18,420	940	0	2,600	0	1,040	510	0	23,510	153,470
Long-Term Growth Rates													
FY2015-20	1.2%	1.5%	1.1%	5.8%	N/A	N/A	N/A	N/A	N/A	35.2%	N/A	6.3%	1.6%
FY2015-25	1.3%	1.2%	1.3%	5.1%	N/A	N/A	N/A	N/A	N/A	18.1%	N/A	6.6%	1.7%
FY2015-35	1.1%	1.1%	1.2%	3.6%	N/A	N/A	N/A	N/A	N/A	10.0%	N/A	4.8%	1.4%
FY2015-45	1.0%	1.0%	1.0%	3.1%	N/A	N/A	N/A	N/A	N/A	7.2%	N/A	4.0%	1.3%
FY2015-60	0.9%	1.1%	0.8%	2.7%	N/A	N/A	N/A	N/A	N/A	5.3%	N/A	3.3%	1.1%

Table 6-4 and **Figure 6-4** present the results of the risk analysis for the runway extension scenario, comparing the Low (5th percentile) and High (95th percentile) traffic outcomes along with the Most Likely. The low and high scenarios were generated using the low and high scenario E/D passenger forecasts and applying the forecasts of average passengers per aircraft presented in Section 6.1. In addition, adjustments were made in the low and high scenario to the additional services, through a combination of delaying or removing service introduction in the low forecast, moving up service introduction in the high forecast, and adjusting service frequencies, stimulation rates, and the expansion or growth of services up or down in the high and low scenarios, respectively. These adjustments impact the number of new international aircraft movements added, as well as the number of flights (via E/D passenger demand) removed based on passengers no longer connecting over domestic or Australian gateways to reach international destinations.⁷¹

Table 6-4: Quantitative Risk Analysis, Total Aircraft Movements – Runway Extension Scenario

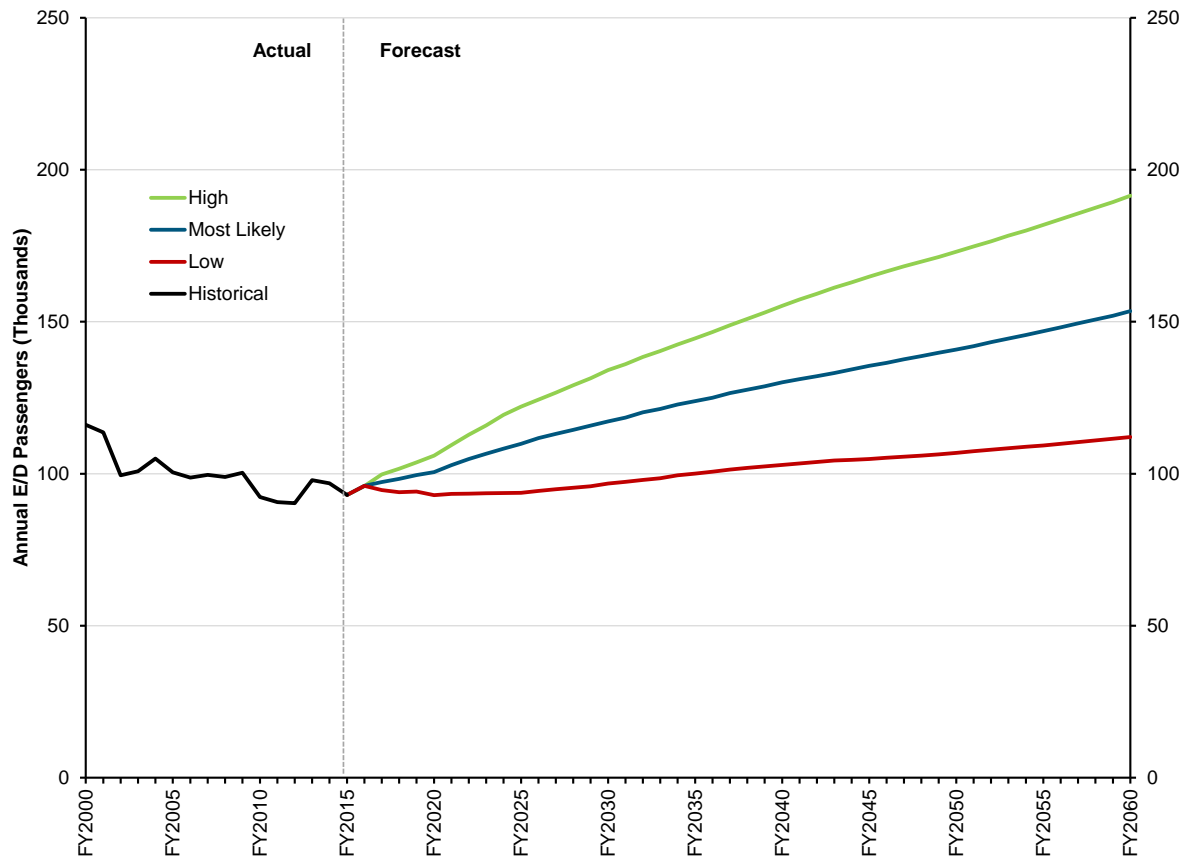
Year	Total Aircraft Movements Traffic (Thousands)		
	Low Scenario (5 th Percentile)	Most Likely (Median Outcome)	High Scenario (95 th Percentile)
FY2015 (Actual)		93.0	
FY2016	96.0	96.0	95.9
FY2017	94.6	97.3	99.8
FY2018	93.9	98.3	101.7
FY2019	94.1	99.5	103.7
FY2020	93.0	100.5	105.9
FY2025	93.7	109.9	122.1
FY2030	96.8	117.2	134.1
FY2035	100.0	123.9	144.6
FY2040	102.9	130.1	155.3
FY2045	104.9	135.5	164.8
FY2050	106.9	140.8	173.0
FY2055	109.3	146.9	181.8
FY2060	112.0	153.5	191.5
Long-Term Growth Rates			
FY2015-2020	0.0%	1.6%	2.6%
FY2015-2025	0.1%	1.7%	2.7%
FY2015-2035	0.4%	1.4%	2.2%
FY2015-2045	0.4%	1.3%	1.9%
FY2015-2060	0.4%	1.1%	1.6%

Compared to the constrained BAU scenario, the runway extension scenario low forecast is 800 movements higher than the BAU forecast (112,400 vs 111,200 in the BAU forecast). This small difference is largely dependent on the reduced deployment of new long-haul services in the runway

⁷¹ Under the low scenario there would be fewer losses to domestic trunk and Australian traffic as fewer new services are introduced and there is less capacity available (albeit under a situation of reduced O/D demand). Under the high scenario, the converse is true: increased capacity on long-haul services leads to more passengers shifting away from connecting itineraries using domestic trunk and Australian E/D gateway segments.

scenario Low forecast, leading to less diversion of existing domestic trunk and Australian E/D passengers onto new long-haul routes. Comparing the two High forecasts, the runway extension scenario is 4,500 movements above the constrained BAU forecast. The increased market stimulation featured in the international services in the high scenario (resulting in less cannibalization of domestic trunk and Australia E/D traffic) offsets the additional long-haul traffic leading to only small differences in the two high and low forecast results across scenarios.

Figure 6-4: Forecast Total Aircraft Movements at WLG – Runway Extension Scenario



Appendix A: Econometric Analysis

As described in Chapter 4, regression analysis was conducted on the major source markets, relating the traffic growth to economic growth. The result of this analysis fed into the forecasts of traffic. For most markets, it was found that national real GDP was the most effective explanatory variable for traffic. The final model specifications are summarized below:

$$\ln(PaxTraffic)_{tj} = \beta_0 + \beta_j \cdot \ln(RealGDP)_{tj}$$

Where:

ln is the natural logarithm of the variable;

PaxTraffic is the total traffic in market segment *j* at fiscal year *t* at WLG or in the Wellington catchment region

RealGDP is the Gross Domestic Product of the source market *j* in fiscal year *t*, adjusted for inflation;

β_0 and β_j are the estimated model parameters capturing the impacts of the various factors on traffic growth at WLG. The parameters are interpreted as the constant (or intercept) and GDP elasticity, respectively.

The results from the regression analysis for the source markets are summarized below. They show the parameter estimate and associated T-Statistic, the latter of which is a measure of the statistical significance of the variable: absolute values over 2 generally indicate statistical significance. Also provided is the adjusted R^2 , which measures the 'goodness of fit' of the regression, i.e. how well the model explains variation in the dependent variable. The R^2 can take a value between 0 and 1, where 1 indicates that the model perfectly explains variation. In all cases, the key variables were highly statistically significant and the R^2 is fairly close to 1.

In all cases, it was found that the air travel demand elasticities in relation to GDP were in line with established estimates published by industry and academic papers. The univariate modelling approach taken is also common of both airport traffic forecasting and empirical research on air travel demand elasticities. The InterVISTAS forecast team considered many other specifications including other socioeconomic and macroeconomic variables such as GDP per capita, population, and fuel prices, but the models displayed here produced the most reasonable, and appropriate, estimates of GDP elasticities for air traffic forecasting.

Domestic Traffic

WLG Domestic Traffic

Dependent variable: total domestic passenger traffic, logged, 1997-2015

Explanatory variable: Real New Zealand GDP, logged, 1997-2015

Parameter estimates:

Variable	Parameter Estimate	T-Statistic
Constant	2.204	3.2
ln(GDP)	1.075	18.8
Adjusted- R^2	0.91	

Inbound International Visitors

Inbound International Visitor Traffic from Australia

Dependent variable: inbound Australian visitors arriving at WLG, logged, 1995-2015

Explanatory variable: Real Australian GDP, logged, 1995-2015

Parameter estimates:

Variable	Parameter Estimate	T-Statistic
Constant	-2.120	-4.3
ln(GDP)	1.958	24.4
Adjusted-R ²	0.97	

Inbound International Visitor Traffic from China

Dependent variable: inbound Chinese visitors to all ports in New Zealand, logged, 1995-2015

Explanatory variable: Real Chinese GDP, logged, 1995-2015

Parameter estimates:

Variable	Parameter Estimate	T-Statistic
Constant	-3.121	-3.1
ln(GDP)	1.750	14.0
Adjusted-R ²	0.91	

Inbound International Visitor Traffic from the UK

Dependent variable: inbound UK visitors to all ports in New Zealand, logged, 1995-2015

Explanatory variable: Real UK GDP, logged, 1995-2015

Parameter estimates:

Variable	Parameter Estimate	T-Statistic
Constant	-0.154	-0.1
ln(GDP)	1.624	5.5
Adjusted-R ²	0.61	

Inbound International Visitor Traffic from USA

Dependent variable: inbound USA visitors to all ports in New Zealand, logged, 1995-2015

Explanatory variable: Real USA GDP, logged, 1995-2015

Parameter estimates:

Variable	Parameter Estimate	T-Statistic
Constant	3.269	5.3
ln(GDP)	0.906	16.0
Adjusted-R ²	0.93	

Inbound International Visitor Traffic from All Other World Regions

Dependent variable: inbound Other World visitors to all ports in New Zealand, logged, 1995-2015

Explanatory variable: Real World GDP, logged, 1995-2015

Parameter estimates:

Variable	Parameter Estimate	T-Statistic
Constant	3.269	5.3
ln(GDP)	0.906	16.0
Adjusted-R ²	0.93	

Japan, Other Asia, and Pacific

In the case of Japan, Other Asia, and the Pacific Islands regions it was not possible to estimate robust models of traffic growth. In those cases a model was used based on established income elasticities for air travel. In the case of Japan and Other Asia, elasticities were taken from *Estimating Air Travel Demand Elasticity*, an IATA report produced by InterVISTAS in 2007, and adjusted for local market factors.⁷² The elasticities were assumed to be the following:

- Japan: 1.00
- Other Asia: 1.500

In the case of the Pacific Islands region, the GDP elasticity for Other world traffic was applied (0.906).

⁷² https://www.iata.org/whatwedo/Documents/economics/Intervistas_Elasticity_Study_2007.pdf

New Zealand Residents Outbound International Traffic

Outbound NZ Resident Traffic to Australia

Dependent variable: International departures by NZ residents from WLG catchment area to Australia, logged, 1997-2015

Explanatory variable: Real New Zealand GDP, logged, 1997-2015

Parameter estimates:

Variable	Parameter Estimate	T-Statistic
Constant	-3.548	-3.9
ln(GDP)	1.273	17.0
Adjusted-R ²	0.93	

Outbound NZ Resident Traffic to all World Regions Other Than Australia⁷³

Dependent variable: International departures by NZ residents from WLG catchment area to all markets other than Australia, logged, 1997-2015

Explanatory variable: Real New Zealand GDP, logged, 1997-2015

Parameter estimates:

Variable	Parameter Estimate	T-Statistic
Constant	-7.928	-6.3
ln(GDP)	1.628	15.7
Adjusted-R ²	0.93	

As with the GDP parameters for international visitors to New Zealand, the GDP elasticities for NZ residents international journeys were gradually tapered to simulate the maturity of markets and declining impact of increases in GDP on air travel demand. Each forecast market segment was allowed to have its GDP parameter tapered in a unique way, reflecting Inter VISTAS' expert judgement about the future evolution of each outbound international market.

Attenuation of Air Travel Demand Elasticities

In all cases, the application of the GDP elasticity parameters to the forecast GDP variables assumed some tapering of the elasticities as the market matures. In other words, the GDP elasticity is assumed to decline further into the future – GDP growth produces a relatively smaller amount of additional air service. For example, the GDP elasticity for inbound UK visitors is assumed to decline from 1.624 in FY2015 to 1.023 in FY2060.

⁷³ For outbound international trips by NZ residents from the Wellington catchment area, all forecast market segments except Australia were aggregated to provide more robust parameter estimates.

Appendix B: Passenger Splits

The origin/destination international passenger forecasts in **Appendix A** were converted into enplaned/deplaned passengers by splitting the source markets (and the inbound/outbound New Zealand traffic) into “gateway” regions: Australia, China, Japan, Other Asia, UK, USA, Pacific, Other (rest of world). The split is projected to change over the forecast period as new services emerge at WLG and elsewhere in New Zealand and Australia. Note that the assumed splits do not affect the overall total traffic, just the allocation to geographic regions.

These splits were determined using O/D passenger data and itineraries sourced from Diio FMg and Sabre. Each itinerary includes the ultimate origin and destination of the passenger, as all intermediate points (e.g., WLG-AKL-HKG-LHR). The complete itinerary allows for the identification of the true O/D sector as well as the sector of the E/D segment taken to/from WLG. For example, 38.8% of WLG-UK O/D passengers departed from/arrived at WLG via a domestic flight connecting (a domestic E/D passenger likely to AKL or CHC) while 61.2% connected via an Australian gateway and hence were classified as Australian E/D passengers.

FY2015	O/D Sector								
E/D Sector	Domestic	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other
Domestic	100.0%	1.0%	85.4%	78.4%	40.4%	38.8%	62.6%	76.0%	42.3%
Australia	0.0%	99.0%	14.6%	21.6%	59.6%	61.2%	32.8%	21.2%	57.7%
China	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Japan	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other Asia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
UK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
USA	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pacific	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.6%	2.8%	0.0%
Other	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

FY2016[†]	O/D Sector								
E/D Sector	Domestic	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other
Domestic	100%	1%	85%	77%	39%	38%	61%	56%	41%
Australia	0%	99%	15%	23%	61%	62%	34%	21%	59%
China	0%	0%	0%	0%	0%	0%	0%	0%	0%
Japan	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other Asia	0%	0%	0%	0%	0%	0%	0%	0%	0%
UK	0%	0%	0%	0%	0%	0%	0%	0%	0%
USA	0%	0%	0%	0%	0%	0%	0%	0%	0%
Pacific	0%	0%	0%	0%	0%	0%	6%	23%	0%
Other	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

FY2020	O/D Sector								
E/D Sector	Domestic	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other
Domestic	100%	0.8%	80%	77%	27%	44%	61%	48%	41%
Australia	0%	99%	20%	23%	73%	56%	34%	20%	59%
China	0%	0%	0%	0%	0%	0%	0%	0%	0%
Japan	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other Asia	0%	0%	0%	0%	0%	0%	0%	0%	0%
UK	0%	0%	0%	0%	0%	0%	0%	0%	0%
USA	0%	0%	0%	0%	0%	0%	0%	0%	0%
Pacific	0%	0%	0%	0%	0%	0%	5%	32%	0%
Other	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

FY2045	O/D Sector								
E/D Sector	Domestic	Australia	China	Japan	Other Asia	UK	USA	Pacific	Other
Domestic	100%	0.6%	80%	77%	27%	44%	61%	49%	41%
Australia	0%	99%	20%	23%	73%	56%	34%	20%	59%
China	0%	0%	0%	0%	0%	0%	0%	0%	0%
Japan	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other Asia	0%	0%	0%	0%	0%	0%	0%	0%	0%
UK	0%	0%	0%	0%	0%	0%	0%	0%	0%
USA	0%	0%	0%	0%	0%	0%	0%	0%	0%
Pacific	0%	0%	0%	0%	0%	0%	5%	31%	0%
Other	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

Note

†:

For the forecast update of February 2016, the FY2016 E/D to O/D passenger splits were updated to reflect the most recently available O/D and connecting passenger data, as well as WIAL's projection of full year FY2016 E/D traffic (based on April 2015 to January 2016 data).



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