MARTIN JENKINS

SOCIO-ECONOMIC IMPACTS OF AIRPORT INFRASTRUCTURE IN THE QUEENSTOWN-LAKES DISTRICT

Final Report

15 June 2020

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PREFACE

This report has been prepared for Queenstown-Lakes District Council by MartinJenkins (Martin, Jenkins & Associates Limited).

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EXECUTIVE SUMMARY

Purpose

This report provides an independent assessment of the range of social and economic impacts associated with the current airport infrastructure and how these impacts would change under four hypothetical airport infrastructure scenarios out to 2050.

The issue

The Queenstown-Lakes district is a great place to live and work and is New Zealand's premier visitor destination. The district's population and economy has grown rapidly over the last 20+ years. This growth has accelerated over the last 5 to 10 years, driven by people moving to the district to live and work; and by the growth in visitors, international and domestic.

Airports play an important role in regional economies connecting businesses and residents to the rest of the country and the world. Airport infrastructure is especially important to the Queenstown-Lakes district because of its

- geography and isolated location
- importance to the visitor industry, which is the mainstay of the district's economy.

Airport infrastructure in the district needs to expand to meet the growing demand from residents and from visitors to the district and wider region. Scheduled air services operate from Queenstown Airport, which is located in a built-up and rapidly expanding area close to the Queenstown Town Centre. This means that recent growth and current operations affect many people in a variety of ways, and further expansion would affect even more.

Incorporating COVID-19

When we began this project, it was forecast that Queenstown Airport was about three years away from reaching capacity and was exploring options to address the forecast increase in demand, including increasing noise boundaries and developing Wānaka Airport to enable scheduled services. Community response to the consultation process around noise boundary expansion and a Wānaka Airport Masterplan confirmed the need to pause and get a clearer understanding of the social and economic impacts associated with the Airport and airport expansion.

As we write this report, COVID-19 has brought tourism to a stand-still, and it will be some time before economic activity returns to where it was at the end of 2019. It has become clear that the prospects for international tourism have fundamentally changed over a few short-months and will take years to recover.

With about 60 percent of its economy focused on visitors[1] and about 64 percent of visitor expenditure being from international visitors[2], Queenstown-Lakes is very likely the most impacted district in the country as a result of COVID-19. The current focus within the district has been on dealing with the fallout of having no visitors and addressing business closures and job losses. From here the focus of the community will be on retention and recovery.

[1] (Infometrics, 2019)

[2] (Ministry of Business, Innovation and Employment, 2020)

It is still too early to understand the full implications of COVID-19 and how it might play out over the medium- to long-term. An option was to ignore COVID-19 in our modelling. However, we concluded that the impact of the COVID-19 response on the Queenstown-Lakes district was too significant to do so, especially given our analysis is considering expansion options and suggesting constraints on the ability to meet passenger demand in a few years under the Status Quo Scenario.

Our revised modelling of forecast passenger demand assumes it will take five years to return to pre-COVID-19 levels (year to December 2019) and a further three years before growth returns to forecast levels. This has the effect of pushing the passenger demand forecasts out by five or more years.

Data for this report was collected before the magnitude of the impacts of COVID-19 on tourism were widely understood. As a consequence, some of the community perspectives canvassed in this report may have changed, or some of the issues raised may no longer be as material in the current environment.

However, we are confident that the findings of this report will remain relevant in the medium-term. The Queenstown-Lakes district's offering is too compelling for people to not want to visit or make a life here. If the recovery from COVID-19 is faster or takes longer, it is easy enough to move the impact analysis forwards or backwards.

Understanding the positive and negative impacts of airports

By enabling connectivity, airports make an important positive contribution to regional economies. In the Queenstown-Lakes district this is even more so, considering its geography, a growing population, and an economy where close to two-thirds of jobs are reliant on the tourism sector. These positive impacts, captured through business activity and productivity, jobs and incomes, and local travel, are key factors in achieving positive social impacts such as material well-being and way of life.

There are direct negative impacts associated with airport activity at Queenstown Airport, namely noise and impacts on the environment. These are generally localised around the airport and local communities are concerned about the impacts of airport expansion in their areas. However, it is clear that the issues and concerns of the local community go beyond impacts from airport operations to also include the indirect impacts that are resulting from ongoing visitor and population growth.

In most cases, growth is good in that it provides investment in amenities and in services and jobs that support and sustain households. However, rapid growth over a sustained period, particularly visitor growth, has created social and economic impacts, affecting ways of life, sense of community and material well-being. This is reflected in areas such as traffic, congestion, and house prices. The impacts from rapid growth have been exacerbated by the difficulty in funding and building the infrastructure needed to support it.

Climate change and the need for sustainable tourism are two other issues that are very topical in the community. While these issues are bigger than, and largely beyond the direct control of, the airport, the airport is seen as the mechanism through which to address them. We are mindful of the contribution the airport makes, and the influence the airport actually has on these issues, in our analysis.

An impact can be anything that affects an individual or a community and can be very subjective. In preparing this report, we have rated how impacts change under the different hypothetical scenarios. Where possible, we have quantified the impacts. In many cases, quantifying the impacts is not practical. Where this is the case, we have completed a qualitative assessment. Because of the subjective nature of these impacts, we have reserved judgement on the significance of the impact. However, we would note that, in many cases, the impacts identified are minor, are being or can be addressed through other fora, or are very localised.

In preparing this report, we held workshops to hear views on airport impacts from representatives from over 50 groups. We also ran an open survey to provide the opportunity for anyone who would be impacted by the airport infrastructure and airport infrastructure scenarios to have their say. The survey had more than 4,400 responses.[3]

We are confident we have identified the range of issues and concerns of the broader community and that these are reflected in this report.

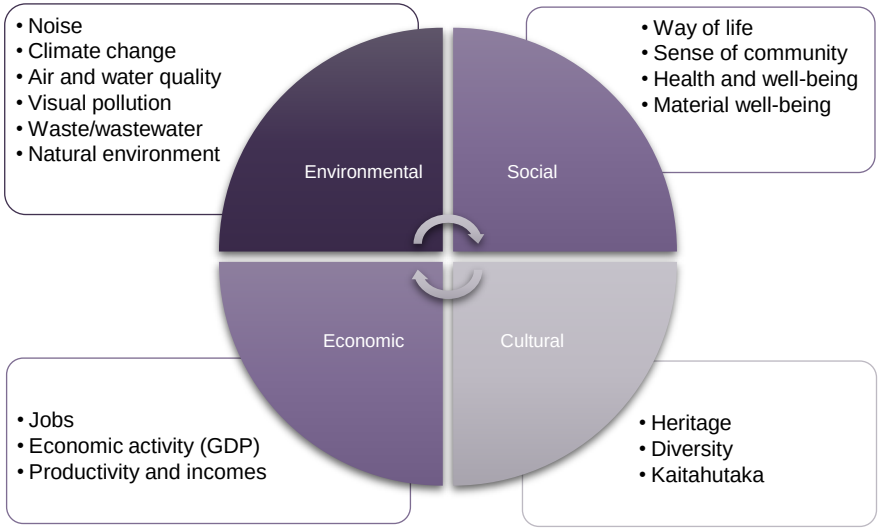
All of these have been considered against the available evidence and literature and assessed with reference to a well-being framework that is consistent with section 10 of the Local Government Act 2002. Further, issues and concerns have been considered in light of the community outcomes identified through community processes such as the Long Term Plan, Whai Ora, and Vision Beyond 2050. Fundamentally, the outcomes for each of those centres on sustainability, resilience, and well-being.

Impacts associated with airports

Based on our review and stakeholder engagement we have identified the following impacts associated with airport infrastructure in the Queenstown-Lakes district.

While all of these impacts can be associated with airports, some are more significant than others.

Figure 1: Impacts associated with airports



Source: MartinJenkins

Each of these impacts has been considered for four hypothetical airport infrastructure scenarios:

- Scenario 1 – Status quo
- Scenario 2 – Expansion
- Scenario 3 – Scheduled services at Wānaka Airport
- Scenario 4 – New international airport

These are described in the following table.

[3] 1,500 of these were partial responses although most of these only skipped a few questions.

Table 1: Hypothetical airport infrastructure scenarios

Scenario	Description
Scenario 1: Status Quo	The current noise boundaries at Queenstown Airport are kept at their current levels. There are no scheduled services out of Wānaka Airport
Scenario 2: Expanded noise boundaries at Queenstown Airport	The current noise boundaries at Queenstown Airport are expanded from 2024. There are no scheduled services out of Wānaka Airport.
Scenario 3: Scheduled services at Wānaka Airport	The current noise boundaries at Queenstown Airport are expanded from 2024. Wānaka Airport is developed to allow narrow-body jets and is open for scheduled services from 2028.
Scenario 4: New International Airport	The current noise boundaries at Queenstown Airport are kept at their current levels. There are no scheduled services out of Wānaka Airport. The New International Airport is commissioned in a location that is within two hours of Queenstown and opens for scheduled services in 2035.

Source: MartinJenkins

These hypothetical scenarios provide constrained and unconstrained airport infrastructure to facilitate passenger demand. Scenario 1 is the most constrained, and Scenario 3 is the least constrained. Scenario 4 has the greatest capacity but is a constrained scenario until the New International Airport is operational.

The constraint does not mean no additional visitors beyond what comes in through the airport. About two-thirds of visitors come into the district by road. A constraint on air capacity will result in a portion of those who would have flown in, coming into the district by road. For this analysis we have assumed that portion to be 20% of visitors.

It is important to note that Scenario 4 is significantly different from Scenario's 1 through 3 in that it is a greenfield development that will most likely occur in a currently un-developed area. This makes it difficult to compare changes in impacts, especially environmental impacts. We would argue that the negative impacts will be greater in that they are new impacts affecting an environment, compared to the other scenarios, where there is an increase in existing activity. Further, new supporting infrastructure, such as roads and water/wastewater, will most likely be needed to support an "airport precinct" and to transport passengers to and from the airport. This is taken into consideration when estimating the non-quantifiable impacts.

The analysis compares annual average activity from 2030[4] through to 2050. This allows us to compare the impacts of the scenarios over a period of time, which provides a truer reflection of the net impacts. Assessing different time periods would provide different impact outcomes. For example, a longer time period would result in a higher annual average employment and GDP impacts for Scenario 4 as well as higher CO_2 and congestion costs.

The report also provides information for different levels of activity at two points in time, 2030 and 2050, which shows a different perspective again. For example, the number of passengers and emissions in 2050 is highest under Scenario 4. This is different than using the annual average between 2030 and 2050, where the number of passengers and emissions is highest under Scenario 3.

The key findings for impacts under each scenario are outlined below.

[4] There is limited difference in activity across the four scenarios between 2020 and 2030 due to COVID-19, which means constrained activity under Scenario 1 and 4 doesn't occur until 2028.

Social impacts

Social impacts, in the broadest sense, are anything that affects or concerns a group of stakeholders. This means that almost anything can potentially be a social impact.

Ultimately social impacts can be categorised into four areas as shown in Table 2. Each of these social impacts can be and are influenced by a range of economic, environmental, and cultural impacts such as employment, incomes, noise, waste, pollution, and diversity. Social impacts can be both positive and negative.

Table 2: Summary of social impacts for each scenario

	Scenario 1: Status Quo	Scenario 2: Expanded noise boundaries at Queenstown Airport	Scenario 3: Scheduled services at Wānaka Airport	Scenario 4: New International Airport
Social Impacts				
Way of life	- Minor	+/- Moderate	+/- Moderate	+/- Moderate
Sense of Community	- Moderate	+ Moderate	+ Moderate	+/- Moderate
Health and Well-being	- Minor	- Minor/Moderate	+/- Minor, - Moderate	+ Minor/Moderate
Material Well-being	- Major	+ Moderate, - Minor	+ Moderate, - Minor	+/- Moderate

Way of life

Airport development affects people's way of life through its influence on the way people live and interact. Aspects of the way of life most influenced by airport development are living standards and the character of the town/region.

Living standards are strongly linked to income and employment, which is a function of the increased activity enabled directly and indirectly by the airport. The character of the town/region is also affected directly and indirectly by increased airport activity. Increased growth in visitor numbers can be associated with larger communities, made up of a more diverse and transient population.

Scenario 1 results in the least change from the current state. The smallest increase in passenger arrivals translates into the lowest level of tourism activity, and the least travel demand in comparison to the other scenarios.

Scenarios 2, 3 and 4 all have varying degrees of impact on living standards and the changing character of the town/region. These scenarios all result in higher growth, income, and employment than Scenario 1.

Scenario 3 facilitates slightly higher growth than Scenario 2, as growth in Scenario 2 is constrained from 2045. As a result, Scenario 3 has a slightly more positive impact on living standards, and a greater change on the character of the town/region than Scenario 2.

Scenario 3's impact on the character of the town/region is also greater than Scenario 2 because it has more of an effect on the Wānaka area. However, road network congestion costs are lower than for Scenario 2 because residents and visitors in the Wānaka area have less distance to travel to and from their local airport.

The impact of Scenario 4 on living standards and the character of the town/region changes over time. Before construction of the New International Airport, the impacts are the same as Scenario 1, and result in little change from the current state. Once the New International Airport opens in 2035, it would lead to the greatest level of growth and the greatest increase in income and employment. However, because growth is constrained until the New International Airport opens, the overall impact on income and employment over the period to 2050 (and flow on impact to living standards) is less than the positive impact of Scenarios 2 and 3.

Once construction starts on the New International Airport, the character of the area where the New International Airport is located will change. It is likely that the New International Airport will be built in a sparsely populated, rural area. The character of this area will change significantly. However, the number of people directly impacted by the change will be small.

As is the case for Scenarios 2 and 3, growth occurring once the New International Airport is open would have a flow-on impact to the character of the region from the growing population and visitor numbers.

Scenario 4 has the highest road network congestion cost in 2050. This is because it is expected to be located further away from more highly populated residential and commercial areas, meaning travellers have further to commute to and from the airport.

Sense of community

A sense of community can broadly be thought of as the feeling of belonging. Airport development has the biggest effect on sense of community through its impact on connectivity. Stakeholder feedback shows that both business and leisure travellers value ease of travel very highly. This was rated most frequently by survey respondents as one of the top three positive impacts of airports (53%).

Constraining aircraft movements has flow on effects on connectivity. If the demand for seats exceeds supply, airlines are likely to increase ticket prices. The amount of travel undertaken will be lower, reducing both business and personal connections.

Scenario 1 has the greatest negative impact on connectivity because it constrains growth the most. Scenario 2 is unconstrained until 2045 and therefore facilitates affordable travel for both business and personal purposes up until this time. Scenario 3 enables affordable travel for the entire period. Scenario 3 also offers Wānaka residents the best connectivity of all the options, allowing businesses to more easily connect with their networks, and residents to connect with friends and family.

Scenario 4 has the same negative impact on connectivity as Scenario 1 until aircraft movements are unconstrained when the New International Airport opens. From this point, Scenario 4 is likely to offer the greatest choice of affordable options for both business and leisure travellers.

As discussed in the way of life section above, Scenarios 2, 3 and 4 may be associated with larger, more diverse communities and a more transient population. This may have some impacts on social cohesion and inclusion. However, the role of airport development in social cohesion and inclusion is minor, and other socio-economic factors are likely to have a much greater impact.

Health and well-being

Airport development impacts people's mental, physical, and spiritual well-being largely through the impact of noise generated by aircraft. Aircraft noise impacts people's health mainly through annoyance and stress. Airport

development, and people's perception of the impacts of airport development, can also cause fear and anxiety for some people.

Our survey found that 31% of respondents perceived the mental and physical health impacts of current airport operations negatively. For some stakeholders, negative sentiment is driven by concern about the direct impacts of noise and pollution.

Scenario 1 had the least impact on noise and emissions. As it is associated with the smallest change from the current state, it also causes the least degree of fear and anxiety for many in the community. Many see noise as a proxy for growth, and therefore some community concern about noise represents a general concern about their perceptions of the impacts of growth.

Scenario 3 has slightly higher emissions and slightly more people are impacted by noise than in Scenario 2. Many respondents from the Wānaka region are concerned about the impact of airport development on their community. Many are anxious that growth will change the character of their community and that opening up Wānaka Airport to commercial flights will be the first step to further airport expansion in the future.

Scenario 4 has the same amount of emissions as Scenario 1 until the New International Airport opens. By 2050, it has the greatest level of emissions. Once the New International Airport opens, Scenario 4 will result in the least amount of people being impacted by aircraft noise. Scenario 4 should therefore result in the fewest people being highly annoyed and stressed by aircraft noise.

Material well-being

Like living standards, material well-being is closely related to income and employment.

Scenario 1 results in the least change from the current state and the smallest increase in income and employment. Scenario 3 has slightly higher income and employment and, therefore, a more positive impact on material well-being than Scenario 2. In Scenario 4, the impact on material well-being is initially the same as Scenario 1. When the New International Airport opens in 2035, the New International Airport enables the greatest increase in income and employment from this point in time. The overall impact on material well-being is less than Scenarios 2 and 3 over the period to 2050 because of the constraint on income and employment prior to the opening of the New International Airport.

Scenarios 2 to 4 may have some impact on property prices and the property rights of houses located in the noise boundaries. In Scenario 2, more properties are in the expanded noise boundaries at Queenstown Airport. The property values of those most affected by noise may by negatively impacted. Properties located within the noise boundaries are likely to be subject to more restrictive planning conditions. These conditions can restrict what the property is used for and increase costs through, for example, enhanced insulation requirements.

Scenario 3 may have a slightly greater impact than Scenario 2, as in addition to the properties in the expanded noise boundaries at Queenstown Airport, a small number of properties located in the Wānaka Airport noise boundaries will also be impacted.[5] We expect that the number of people impacted will be substantially less than those impacted by the expanded noise boundaries at Queenstown Airport. It should also be noted that those

[5] The number of properties will depend on where the noise boundary extends to. This would be developed as part of more detailed design when QAC develops its masterplan for Wānaka Airport.

owning properties around Wānaka Airport may benefit from changes in zoning to allow for the development of supporting infrastructure.

In Scenario 4, the property values and property rights of those living close to the New International Airport may be impacted when the location of the New International Airport is confirmed. As we expect the location to be in a rural area, the number of properties benefiting from Queenstown Airport reverting to general aviation is likely to be greater than the number negatively impacted in Scenario 4. Like Scenario 3, property owners near the New International Airport may benefit from land use zoning changes.

Economic impacts

Table 3: Summary of economic impacts for each scenario

	Scenario 1: Status Quo	Scenario 2: Expanded noise boundaries at Queenstown Airport	Scenario 3: Scheduled services at Wānaka Airport	Scenario 4: New International Airport
FTE Employment (2050)	11,990	20,350	21,230	22,360
FTE Employment (Annual average from 2030 to 2050)	10,850	16,580	16,670	16,020
FTE Employment (Annual average relative to Scenario 1: Status Quo)	-	*5,730*	*5,830*	*5,170*
GDP, $m, 2050	838	1,409	1,468	1,545
GDP, $m (Annual average from 2030 to 2050)	757	1,150	1,155	1,110
GDP, $m (Annual average relative to Scenario 1: Status Quo)	-	*393*	*398*	*353*
Annualised network operating costs, average (2030-2050), $m	-941.50	-1,065.2	-1,046.3	-1,054.9
Annualised network operating costs, $m (2030-2050) (relative to Scenario 1: Status Quo)	-	*-123.7*	*-104.8*	*-113.3*
Productivity	- minor	+ minor	+ moderate	- minor

Source: MartinJenkins, Abley Consulting

Economic impacts occur due to the increased activity enabled directly and indirectly by the airport.

Over the period from 2030 to 2050, Scenario 3 is expected to generate the greatest economic benefit to the Queenstown-Lakes district (jobs, employment, network operating costs and productivity). This is because flight capacity is constrained under Scenario 4 from 2030 until 2035 when the new airport is built. Similarly, under Scenario 2, flight capacity limits are reached in 2045.

Scenario 1 sets the benchmark for network operating costs as it has the lowest impact on total operating costs. Compared to Scenario 1, Scenario 2 generated additional network operating costs of $123.7 million, with Scenario 3 again having the lowest negative impact between 2030 and 2050.

Employment

In 2019, there were 30,000 filled jobs in the Queenstown-Lakes district. Of these, we estimate about 7,500 were directly or indirectly related to airport operations (Queenstown and Wānaka) and visitor activity (400 jobs related to airport operations activity and 7,100 related to visitor activity).

In 2050, under Scenario 1, the district is estimated to generate about 10,400 less jobs than Scenario 4. Scenarios 2 and 3 have a similar impact on employment in 2050.

Constraining airport capacity at current boundaries, ie under Scenario 1, the district would forego between 5,200 (Scenario 4) and 5,800 (Scenario 3) jobs on average annually between 2030 and 2050.

GDP

Queenstown and Wānaka Airports were estimated to contribute about $526 million to the Queenstown-Lakes district GDP in 2019. About $40 million of this was related to airport operations, and a further $486 million to visitor expenditure attributable to the Airport. GDP in the Queenstown-Lakes district was $3.06 billion in 2019.

By constraining airport capacity at current limits, when compared with Scenario 3, the district will forego $400 million in annual GDP on average between 2030 and 2050, which represents about 13% of the district's current annual GDP.

Scenario 1 makes the lowest contribution to GDP between 2030 and 2050. By 2050, Scenario 4 makes the biggest contribution.

However, since Scenario 4 is constrained between 2030 and 2035 when the New International Airport is completed and operating fully, Scenario 3 provides the greatest total contribution over the 30-year period.

Transport network operating costs

Scenario 1 has the lowest overall transport network operating costs and impact on congestion. A key influence on this is the lower level of tourism activity due to constrained visitor numbers. The flow-on effect is less commercial activity in the retail and hospitality sectors and lower overall employment and residents across the Queenstown-Lakes district, resulting in a net reduction in travel demand across the network.

There is not a big difference in network operating costs in 2033, due to suppressed passenger demand resulting from COVID-19. As Scenario 4 has not been completed yet, activity and therefore costs are the same as for Scenario 1.

By 2050, Scenario 3 typically has the second lowest road network costs. A driver for this is because the addition of a second airport better services the needs of Wānaka residents and visitors, resulting in less reliance on, and travel to, Queenstown Airport.

Scenario 4 ranks lowest amongst the four scenarios, which is linked to the remoteness of the location. It is further away from built up residential and commercial areas that provide accommodation and hospitality for visitors as well as nearby housing for workers at the airport. It is also distant from other employment activity, which can further support an airport zone. This all increases the time and distance of trips to the Airport compared to the other scenarios with locations that are closer to the key urban areas within the Queenstown-Lakes district.

Productivity

According to the literature, increased airport activity results in increased productivity. Increased productivity results in increased incomes. As shown in the economy section, different industries have different levels of labour productivity. Tourism-related industries tend to have lower levels of labour productivity than, say, capital-intensive industries such as mining, or financial and insurance services.

The impact on productivity and income resulting from the airport and scenarios cannot be directly measured. However, we can make some observations based on the locations and constraints.

Scenario 1 and Scenario 4 are likely to negatively affect productivity over the assessment period. Under Scenario 1, the key factor is likely higher air travel costs due to constrained supply. Under Scenario 4, constrained

supply will occur in the early stages. Once the New International Airport is built there will likely be costs associated with the increased travel times to get to and from the Airport. This could be offset to a degree by having better connectivity in terms of direct international destinations and lower prices due to larger aircraft operating.

Scenario 3 is the least constrained scenario and also has the benefit of providing increased choice around which airport to use. This suggests that it will have the greatest positive impact on productivity and, by association, incomes.

Scenario 2 involves the least change of the growth scenarios and so there will be least disruption resulting from structural changes. This would be a business as usual scenario for businesses.

Environmental impacts

Table 4: Summary of environmental impacts for each scenario

		Scenario 1: Status Quo	Scenario 2: Expanded noise boundaries at Queenstown Airport	Scenario 3: Scheduled services at Wānaka Airport	Scenario 4: New International Airport
Environmental impacts	**CO_2, other emissions, and climate change**	- Minor	- Moderate	- Moderate	- Moderate
	CO_2 equivalent emissions produced by aircraft in 2050* - (000 tonnes)	526	1,209	1,315	1,976
	Estimated average annual cost to New Zealand 2030-2050* ($m)	8.99 – 99.9	13.5 – 150.2	14.3 – 158.6	12.5 – 139.0
	Noise	- Minor	- Moderate	- Moderate	+/- Moderate
	Number of residential properties and residents likely within noise boundaries^	796 properties 1,988 people	3,975 properties 9,935 people	3,990 properties 9,965 people	Location dependent but likely to be < Scenario 1
	Number of people likely highly annoyed total^	236	1,150	1,153	Location dependent but likely to be < Scenario 1
	Number of schools/early learning centres in likely noise boundaries^	2 schools (624 students) 2 early learning centres (<132 children)	4 schools (1,778 students) 3 early learning centres (<205 children)	4 schools (1,778 students) 3 early learning centres (<205 children)	0
	Natural environment	- Minor	- Minor	- Minor	- Minor
	Water quality	- Minor	- Minor	- Minor	- Minor
	Air quality	- Minor	- Minor	- Minor	- Minor
	Visual pollution	- Minor	- Minor	- Minor	+/- Minor
	Waste and wastewater	- Minor	- Minor	- Minor	- Minor

* See Appendix 5 for details on how these figures were calculated.

^ See Appendix 4 for details on how these figures were calculated.

The two main environmental impacts of airport activity are emissions and noise. The level of emissions in 2050 is 3.75 times higher in Scenario 4 compared to Scenario 1. In relation to noise, Scenario 3 has the greatest negative impact, very slightly ahead of Scenario 2. This is due to a slightly greater number of residential properties and people within or near the noise boundaries.

CO_2, other emissions, and climate change

Climate change was identified through the analysis as the most important environmental impact associated with airport development in the district.

Climate change is a global issue that affects everybody. The direct impact of climate change on the Queenstown-Lakes district is difficult to determine. However, climate change is expected to cause temperatures to rise, snow and frost days to decrease and extreme rainfall events to become more frequent over the next 80 years[6].

A recent study calculated that aviation was responsible for 11% of the district's gross CO_2 emissions.[7] In relation to the aviation sector, CO_2 and other emissions that affect climate change are largely caused by aircraft burning fuel.

There is a correlation between the number of aircraft movements and how far they fly, and CO_2 emissions. In 2019, we estimated about 459,000 tonnes of CO_2 were emitted by aircraft. Scenario 1, which has the fewest flights in 2050 also has the lowest level of CO_2 emissions, at 526,000 tonnes in 2050. Conversely, Scenario 4 has the highest level of CO_2 emissions, at 1.98 million tonnes in the year 2050.

When considering domestic emissions over the period from 2030 to 2050, the greatest annual average cost of somewhere between $14.3 and $158.6 million is under Scenario 3, which would be about 59% higher than Scenario 1.

Noise

Noise from an airport is mostly due to airplanes taking off and landing. Focus groups and the survey both identified noise as one of the main negative impacts of Queenstown Airport. Noise affects individuals in a number of ways – generally in the social impacts area through health and well-being, and way of life.

The effects of noise tend to be localised near the airport. However, it was identified as a major negative impact by a much wider group of people. Noise is considered by many respondents as a lever to constrain further expansion, and therefore limit the negative impacts associated with tourism and/or emissions.

There are identified impacts of noise, which tend to occur at higher noise levels over a period of time. Airport noise boundaries set out those areas where higher noise levels occur. People affected are generally those living, working, or socialising within those noise boundaries.

There are about 800 properties and 2,000 people living within the current airport noise boundaries. Further resident growth within the inner noise boundary is unlikely. Two schools with a collective student roll of 624 (in 2019), and two early learning centres licensed for up to 132 children, are located within the noise boundaries. Wakatipu High School, which has a school roll of just under a thousand, is very close to, but not within, the outer boundary.

Applying noise annoyance curves to residents living within the current noise boundaries (Scenario 1) suggests that about 236 people would likely be highly annoyed and therefore impacted by noise. Noise would have the

[6] (Bodeker Scientific, 2019)

[7] (Tonkin and Taylor Limited, 2018)

greatest impact in Scenario 2 and 3, where about 1,150 people would be highly annoyed and impacted by noise. Noise is expected to have the least negative impact under Scenario 4. The amount of people affected would depend upon where the airport was located, but we assume it would be in an area where very few residents live within the noise boundaries.

Other environmental impacts

While noise and emissions are the two environmental areas of greatest concern to the community, the scenarios also affect other environmental impacts. These impacts include air quality, visual pollution, waste and wastewater, water quality and the natural environment.

The effect of each scenario on these impacts is relatively consistent between scenarios. Scenario 1 results in the least change and therefore has the least impact on the environment in general.

Scenario 2 and 3 enable increased activity. Direct airport activity requires more water and produces more waste. As Scenario 3 operates across two airports, the impact on the environment will be slightly greater. However, we are not aware of any water quality issues or at-risk flora and fauna populations in the immediate vicinity of either Queenstown or Wānaka Airports.

The environmental impacts of Scenario 4 are dependent on where the New International Airport is located. We would expect that any environmentally sensitive areas would be considered during both the selection of the location for the New International Airport and in design. Because of the importance of environmental sustainability to the Queenstown-Lakes district, we would expect that minimising waste and water use and the New International Airport's environmental footprint would feature prominently in the design of the New International Airport. Although the New International Airport would enable higher visitor numbers than the other scenarios, it may use less water and produce less waste than operating airports in two locations as in Scenario 3.

Cultural impacts

Table 5: Summary of cultural impacts for each scenario

	Scenario 1: Status Quo	Scenario 2: Expanded noise boundaries at Queenstown Airport	Scenario 3: Scheduled services at Wānaka Airport	Scenario 4: New International Airport
Cultural Impacts				
Cultural diversity	- Minor	- Minor	- Minor	- Minor
Cultural heritage	- Minor	- Minor	- Minor	- Minor

Cultural diversity

Cultural diversity refers to the variety of different cultures and ethnic groups in a community. While airports can play a small direct role in diversity through the people they hire, the greater impact is through airports' facilitation of tourism and support of growth in general.

Scenario 1 has the least impact on cultural diversity as it is associated with the least growth. Both Scenario 2 and 3 enable increasing visitor numbers and a growing resident population but are still expected to have minor impacts on diversity. Scenario 3 may lead to a slightly greater degree of change in Wānaka, as Wānaka Airport provides easier access to the region. While some residents embrace increasing diversity, others view this change negatively.

Scenario 4 has little impact on diversity prior to the opening of the New International Airport. Once the New International Airport is open, this Scenario facilitates the greatest increase in diversity, as it results in the greatest number of international visitors and has the potential to link to the greatest number of international ports.

Cultural heritage

Cultural heritage embodies the ways of living and things of value that have been passed on from generation to generation. Cultural heritage includes both physical places and intangible elements such as community values, customs, and practices.

Airport operations can have a direct impact on sites of significance located near to the airport. It also has an indirect impact on heritage through its role in enabling increased visitor numbers and a larger resident population.

Scenario 1 has the least physical change from airport operations and the lowest growth. Scenario 1 therefore has the least impact on how people experience places important to them and on community values and customs.

Increased visitor numbers and larger communities enabled by Scenarios 2 and 3 may change how people experience places of cultural significance as they become more crowded. Larger, more diverse communities may also change community values and customs.

Scenario 3 may have a slightly greater impact on cultural heritage than Scenario 2 as it is likely to increase the number of visitors to the Wānaka area. There are some sites close to the Wānaka Airport that may be impacted, including the Clutha River, which is Wāhi Tūpuna.

The impact of Scenario 4 on sites of significance depends in part on its location. We would expect that sites of significance will be considered when selecting the location of the New International Airport and treated sensitively in the design process. Once the New International Airport opens, it will facilitate the greatest number of visitors, which will have flow on impacts on cultural heritage.

What we heard: A matter of perspective

Many people who live and work in the Queenstown-Lakes district have strong views about airport expansion and the impacts that current activity and future expansion will have on their community and the wider district and region. Many of these perspectives were put forward during earlier consultations on airport expansion. We used an online survey and a series of focus groups to understand the broad sentiments in the community and the drivers of optimism and concern around airport activity and expansion.

The stakeholders who responded to our survey are fairly evenly divided in their overarching sentiment about the impacts of current airport infrastructure in the Queenstown-Lakes district, with almost equal proportions feeling positive (31%), negative (34%) and neutral (34%).

The engagement illustrated that individuals' views about airport expansion and impacts are informed by a complicated mix of factors, including:

- **Agreement (or not) with the 'need' for airport expansion.** Many stakeholders see views on airport expansion as expressions of values – for example, prioritising economic growth over environmental protection – rather than objective assessments of 'need'.
- **Personal experience of the advantages and disadvantages** of the current airport arrangements, and associated flow-on effects.
- **Expectations of being personally impacted by airport expansion**, and its associated flow-on effects. This includes individuals' expectations that they will benefit from positive impacts and/or be disadvantaged by negative impacts.
- **Expectations for fairness**. Individuals make a personal assessment of the extent that benefits and disadvantages are 'fairly' distributed across communities in the region (and beyond). A common theme in the consultation was a concern for people living in other neighbourhoods.
- **Sentiment about wider contextual matters.** Specifically, we heard: a lack of trust in Council processes related to airport management; concerns about growth and its relationship to airport activity; a desire for airport planning to be done in a different way (that is, at the regional level for the lower South Island, or the whole of the South Island; or at a system level alongside other forms of transport infrastructure); and concern that decisions on airport expansion need to be aligned with other Council objectives and plans, in particular on climate change.

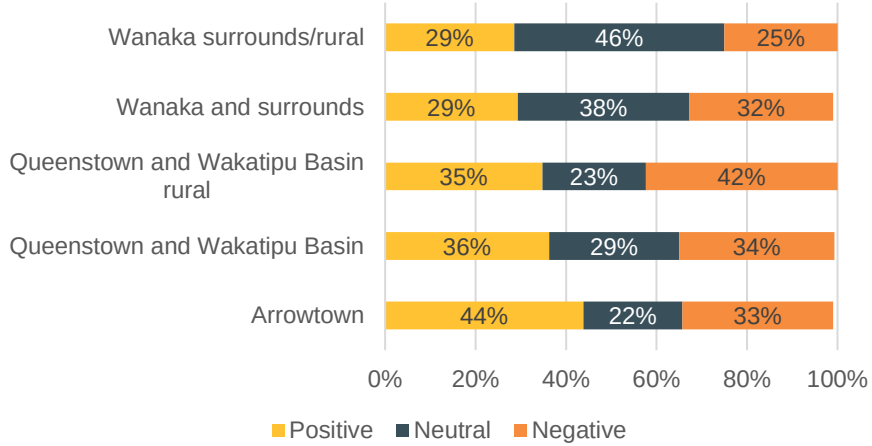
Our survey found that overarching sentiment towards current airport infrastructure is fairly similar across stakeholder subgroups, with some key exceptions.

Those living closer to the current airport infrastructure are more likely to have a stronger perspective, whether positive or negative

Respondents from Wānaka and Surrounds, and Wānaka and Surrounds Rural, are more likely to be neutral (38% and 46% respectively). Arrowtown respondents are more likely to be positive (44%). Respondents from Queenstown and Wakatipu Basin Rural are least likely to be neutral (23%) and most likely to be negative (42%).

This variation in sentiment by community is likely to be influenced by individuals' current experiences of positive and negative impacts (for example, noise, and airport convenience) as well as their preferences for or against change in the current arrangements.

Figure 2: Overarching sentiment towards current airport infrastructure, by community



Source: MartinJenkins Airport Impacts Survey

Respondents who are newer to the district are more likely to be positive about current airport infrastructure

Respondents who have lived in the District for less than 10 years are more likely to be positive than those who have lived in the area for longer (33% compared to 30%).

Insights from focus groups suggests that respondents who have moved to the district more recently value connectivity more highly, as it enables them to stay connected with friends and families in New Zealand and overseas and/or to work remotely for businesses outside the region. For some people, the current airport infrastructure was a deciding factor in their move to the district.

In contrast, respondents who are longer-term residents will naturally have seen more change in the area, both generally and in relation to the airport infrastructure and its impacts.

Youth and older respondents tended to view the impacts negatively

Youth under 15 years of age have the highest proportion of respondents that view the impacts negatively (62%; note this relates to 22 respondents).

Older respondents (50 and over) are also more likely to be negative than positive about current airport infrastructure, although to a lesser extent than for the youngest age group (36–37% negative compared to 29-30% positive).

Environmental impacts associated with airports are a key concern raised by school-age stakeholders. At the local level, they are concerned about degradation of their local environment, and at the global level they are concerned about climate change and greenhouse gas emissions. There are also a number of schools, community and sports facilities that are affected by noise from the current Queenstown Airport flight paths.

We heard a mix of positive and negative views from young people of working age. On the positive side, they see travel, education and job opportunities linked to airport development. On the negative side they are concerned about the cost of living and housing shortages that they experience as a result of rapid population growth.

Social impacts associated with growth in general, and the changing character of their town specifically, were highlighted as concerns for older stakeholders. They are concerned for their own quality of life (tranquillity and access to services) as well as the experience of other people in their community (health, housing and poverty of children and grandchildren, for example).

Respondents in households with higher incomes saw the impacts of current airport infrastructure in a more positive light

40% of respondents with household income of $40,000 or less view the impacts negatively (9% of respondents fall into this earning bracket).

41% of respondents with household income of more than $200,000 view the impacts positively (17% of respondents fall into this earning bracket).

Many of the potentially negative impacts of growth are likely to disproportionately affect lower-income households (such as rising costs of living, and accommodation shortages). Although these problems do not necessarily result directly from airports, airports are seen to be enablers of growth and therefore may be viewed negatively by people from lower-income households. People from lower-income households are also likely to have fewer choices about where they live and may be less able to make use of the benefits of airports (for personal travel for example).

Many stakeholders believe that the potentially positive economic benefits of airports will not flow through to households, for example through the sort of higher-quality jobs that increase household income.

Our engagement with higher-income stakeholders and the business community found that they identified positively with the benefits of airports for business connectivity, for attracting talent, and for tourism. While we found this group to be one of the most positive, their positivity is qualified: they caution that growth must be managed and accompanied by investment in infrastructure for the district to thrive.

Respondents who live in the district full-time are slightly more positive and less negative about current infrastructure than those who only live there part-time

Full-time residents are slightly more positive and less negative about the impacts of the current airport infrastructure than part-time residents (32% of full-time residents are positive and 32% are negative, compared to 28% of part-time residents being positive and 38% negative).

There was no noticeable difference in overall sentiment between Māori and non-Māori respondents

Māori and other non-European respondents are less likely to be positive about impacts of current airport infrastructure overall (only 28% of Māori and other non-European respondents indicated they feel positive or very positive compared to 32% of European/Pākehā respondents).

Many of the concerns voiced by mana whenua and other Māori stakeholders are similar to those of other stakeholders. Additional concerns that relate to impacts on Kaitahutaka are discussed in detail later in this report.

Pākehā and non-Pākehā stakeholders voiced concerns about population growth leading to demographic changes and a lack of social cohesion leading to social tensions. By contrast, some stakeholders are positive about the vibrancy that can result from diversity at a population level.

Business owners showed a more positive sentiment towards effective airport infrastructure

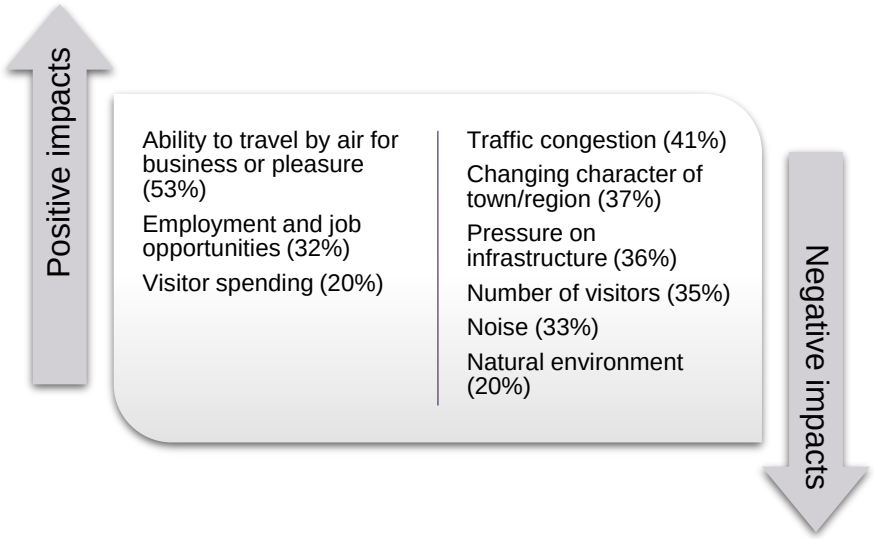
Qualitative feedback from business owners showed a more positive sentiment towards the impacts of airports overall. Although they did identify negative impacts, particularly strain on infrastructure, they were more optimistic that negative impacts could be managed or mitigated so that benefits could be realised.

Business owners voiced similar concerns to other stakeholders about the potentially negative impacts of unmanaged growth and over-tourism. They were particularly keen for the district to take a strategic approach to economic development, to diversify the economy and to “increase the quality of tourists it attracts”.

Impacts that stakeholders are most optimistic and most concerned about

Despite survey respondents being fairly evenly split in their overall sentiment about current airport infrastructure, they identified more negative impacts than positive impacts. This finding is illustrated in Figure 3, which shows the impacts that 20% or more of survey respondents identified in their 'Top 3' important positive impacts and 'Top 3' negative impacts they are most concerned about. There was a similar trend in focus groups, where most participants identified more negative than positive impacts.

Figure 3: Impacts that survey respondents feel most positive and most negative about



* Areas of greatest concern and optimism were consistent across subgroups with one exception: 'changing character of town' was of particular concern to Wānaka and Surrounds respondents.

Impacts of greatest concern or importance, and the drivers of stakeholder concerns or optimism, are discussed in the following sections. In many cases we found that individuals had very different reasons for being concerned or optimistic, reflecting their different values and social situations.

Positive feedback was mostly related to economic impacts, but not all economic impacts were viewed positively

For all of the economic impacts we asked about, more survey respondents feel positively than negatively. Economic impacts are inter-related, and to a large extent sentiment about airport impact is informed by sentiment towards growth and tourism in general. The large proportion of 'mixed' sentiment is likely to reflect this.

Responses are mostly consistent across subgroups. Two variations are worth noting: first, Arrowtown respondents view the economic impacts as especially positive; second, the more respondents earn, the more positively they view the economic impacts. Those earning $40,000 or less have more mixed feelings about the economic impacts.

Environmental impacts were mostly viewed negatively

There are many drivers of negative sentiment about environmental impacts. Stakeholders presented strong views about the direct impact of Queenstown Airport infrastructure at the global level through CO_2 emissions and other greenhouse gases. We heard repeated concern about incongruity between airport expansion and the district's climate commitments. Young people are particularly concerned about environmental impacts.

Many impacts provoke a mixed response, depending on the perspective of the stakeholder

As an example, while many respondents expected airport development to increase employment and job opportunities, some people raised concerns that the quality of employment and job opportunities would decline.

There is variation in the drivers of concern and/or optimism

Focus group feedback revealed variation in the drivers of concern and/or optimism. For example, concern about 'noise' resulting from airport development is driven by a range of factors including concern about the direct effects of aeroplane sound, and also recognition that noise boundaries are the mechanism through which airport use is controlled.

People do not distinguish between direct and indirect impacts or between airport development and growth in general

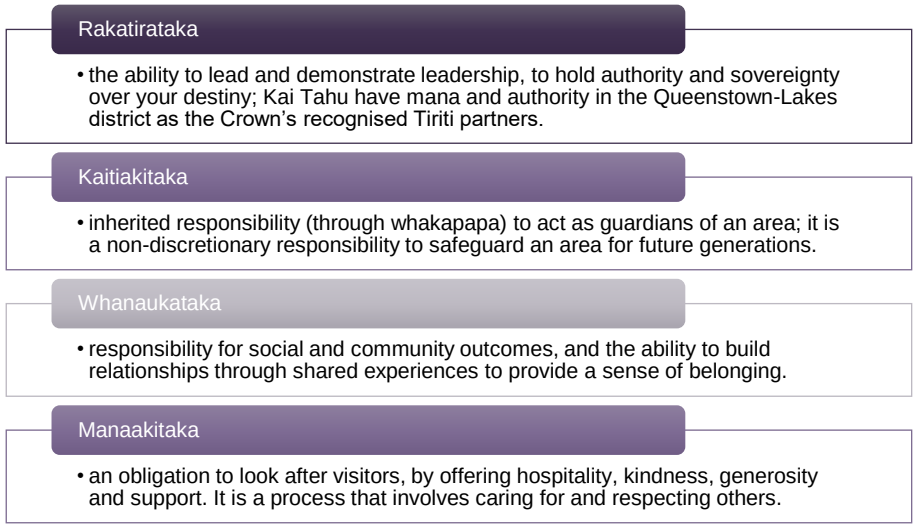
Many stakeholders do not distinguish between the direct and indirect impacts of airport development, or between airport development and growth in general (both domestic and tourism). Their lived experience of these impacts is intertwined and informs their overall sentiment as well as their concern about specific issues.

Stakeholder feedback about Kaitahutaka impacts

We asked Māori respondents how they felt airport development may impact on these values and their ability to live by them. Survey respondents who identified as being of Māori descent with whakapapa to mana whenua were asked about the impacts of airport activity on Kaitahutaka in four domains. Māori respondents that do not whakapapa to mana whenua were asked about the impact on Te Ao Māori values in the same domains.

There was a higher level of concern about negative impacts among mana whenua than other Māori survey respondents. Other Māori respondents (those who don't whakapapa to the area) were more likely to select 'No strong feelings' – this makes sense, as the four values all spring from whakapapa.

Kaitahutaka, Māori values



All of the Māori interviewees expressed concern about airport development leading to greater numbers of visitors, and the negative impacts increased visitor numbers would have on the quality of experiences and on locals' everyday lives (including overcrowding in areas of natural beauty, increased costs of living, and traffic congestion). They also expect negative impacts on the environment if there are increased numbers of aircraft movements – in particular, on the area's natural beauty and tranquillity.

The protection of Wāhi Tūpuna is particularly important to Kāi Tahu. These are officially recognised in the Crown's Tiriti Settlement with Kāi Tahu and are included in the District Plan. Their inclusion will enable the QLDC to ensure that airport development options do not impact on these areas of high cultural importance.

It was also noted that Kāi Tahu are not against development, and that they have commercial interests including in tourism. They expect to be able to benefit from development so long as it is done well and within sensible limits, and so long as spiritual and physical interests are balanced. Survey comments from mana whenua and other Māori showed a mix of sentiment: some actively support growth and development (if it is done well); others are happy with the current state; and others are unhappy with the current state and oppose any further growth and development.

Table 6 summarises stakeholder sentiment towards each of the scenarios by area.

Table 6: Stakeholder sentiment for the four scenarios, by area

	Scenario 1: Status Quo	Scenario 2: Expanded noise boundaries at Queenstown Airport	Scenario 3: Scheduled services at Wānaka Airport	Scenario 4: New International Airport
Arrowtown	0.08	-0.93	-0.22	-0.75
Queenstown and Wakatipu Basin	0.26	-1.09	-0.58	-0.25
Queenstown and Wakatipu Basin rural	0.47	-1.00	-0.76	-0.74
Wānaka and surrounds	0.68	-0.74	-0.98	-0.35
Wānaka surrounds/rural	1.13	-0.73	-1.39	-0.41

Source: MartinJenkins

Positive numbers show that overall sentiment is positive, negative numbers show that overall sentiment is negative. The distance from zero shows the strength of positivity/negativity (minimum possible value is -2 and maximum possible value is +2).

Across all areas, survey respondents are positive overall about Scenario 1 and negative overall about the remaining three scenarios. However, there is considerable variation in levels of positivity/negativity by neighbourhood, and for each scenario.

Scenario 1 would result in the least change, which is one of the reasons that we see higher levels of positivity about it. The key reason that some stakeholders feel positively about the Status Quo Scenario is it effectively puts a ‘pause’ on airport expansion and, by association, a pause on growth.

Stakeholders have different reasons for thinking that a pause is a good idea. For some people that pause is important because it would allow time for infrastructure to be improved; for others it would allow the district to have a managed conversation about its ambitions (or not) for growth; and for others it would allow time to focus on diversifying the economy away from dependence on tourism.

The apparent pause of the Status Quo Scenario is also a key reason for some stakeholders feeling negatively about this Scenario. They see this Scenario as failing to respond to inevitable tourism growth, and therefore as a short-term solution that simply delays the discussion to a later date. Some stakeholders feel that by not increasing airport capacity in the region, road traffic will increase and/or economic growth will be curtailed.

The strongly negative feedback about Scenario 2 is in line with previous consultations. There are many reasons why stakeholders feel negatively, including a view that affected residents have already made their position clear about expanding noise boundaries at Queenstown Airport, and both affected and unaffected stakeholders are keen to show solidarity with them. This is particularly the case for respondents from Queenstown and Wakatipu Basin and Queenstown and Wakatipu Basin Rural.

The variation in sentiment about Scenario 3 by neighbourhood is not surprising given it would result in greater change for residents of Wānaka in particular. Depending on the perspective of the stakeholder, positivity and negativity stem from the fact that this Scenario would share the benefit and burden of airports across the district. Some stakeholders are enthusiastic about the personal, business, and economic opportunities that they think would flow from opening up Wānaka Airport to scheduled flights. Others are concerned about this Scenario leading to unmanaged growth in Wānaka, which could both overwhelm local infrastructure and change the character of the town. Specifically, these stakeholders talk about existing problems relating to housing affordability, tourist accommodation and congestion being further exacerbated by the increased visitor numbers that would result from scheduled flights.

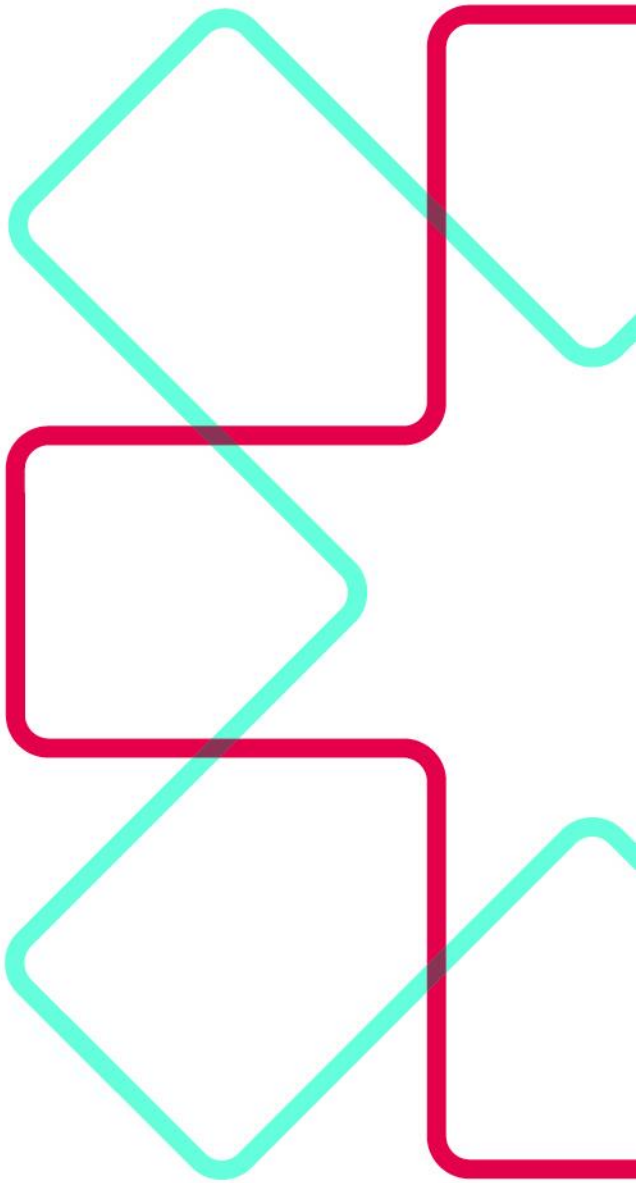
Scenario 4, New International Airport, also draws less intense opposition, but survey respondents from all areas are still negative about it overall. For a lot of stakeholders, negative sentiment was driven by a lack of detail about where a new international airport would be situated and/or the fact that it is seen to further enable tourism growth. Costs, environmental impacts, duplication, and the time it would take to complete the airport and supporting infrastructure drive negative sentiment about this Scenario for many stakeholders.

Stakeholders have mixed views about the economic impact of a New International Airport. On one hand, there is a view that this Scenario could better distribute economic benefits across the district and diversify the economy by enabling new types of industry (such as food exports). On the other hand, many stakeholders are concerned that the local economy of Queenstown will be negatively affected by a significant reduction in tourism if the district and activities there are harder to access. Further, reduced connectivity for businesses would also have a negative impact.

On the positive side, stakeholders believe that Scenario 4 could reduce road traffic and stress on other infrastructure in Queenstown if it is situated closer to attractive visitor destinations. The flip side of this would be an increase in the use of roads for visitors who still want to access Queenstown.

Some stakeholders were doubtful that consent would be granted to develop a new international airport. Others thought that a stop-gap solution would be required to meet demand until a new international airport became operational, and that this would likely result in expanded noise boundaries at Queenstown Airport and the associated negative impacts.

INTRODUCTION



1 INTRODUCTION

This report provides independent advice on the social and economic impacts of airports on the Queenstown-Lakes district.

1.1 COVID-19

While this project was underway, New Zealand and the world were affected by the global and national responses to the COVID-19 pandemic. Given its relatively high reliance on visitors, the Queenstown-Lakes district has been one of the worst affected in New Zealand.

Initially, visitors traveling from or through China were stopped. Then, international borders were closed, and the New Zealand population went into lockdown under Alert Level 4. New Zealand, like many other countries, closed shop. Most people were confined to their homes or temporary accommodation for more than a month, with only essential services being allowed to operate. Movement into and throughout the country was severely restricted, and scheduled air services in or out of Queenstown Airport ceased. Under Alert Level 3, international borders remained closed and internal travel was severely restricted. Queenstown Airport remained closed to scheduled services. Domestic travel restrictions eased as we entered level 2. However, international visitors remain severely restricted. Some scheduled domestic services to and from Queenstown Airport have resumed. There are some signs of hope for the tourism sector, with initial discussions underway between the New Zealand and Australian governments regarding a potential re-opening of the Trans-Tasman border, subject to both countries continuing to maintain control over the spread of coronavirus.

The Queenstown-Lakes district has been hit especially hard by the current crisis. About two-thirds of jobs across the district are related to tourism, which came to a complete halt on 25 March. The public health response to COVID-19 has had immediate impacts on people and businesses, drastically limiting their ability to earn incomes and revenue. There are also some issues specific to Queenstown-Lakes, such as the high number of migrant workers, who no longer have incomes or access to government support programmes. The immediate response has focused on relief to businesses in the form of wage subsidies, tax relief and emergency social assistance, to try to limit the direct fallout from loss of incomes. With the government fast-tracking infrastructure projects to stimulate the economy there are opportunities for the Queenstown-Lakes district and the lower South Island going forward. The airport will play a role in supporting these projects as a key gateway to the region.

The impacts of COVID-19 are expected to be broad and long-lasting. Despite government support, a large number of visitor-related businesses, and also some of those businesses supporting them, will close. Many others will significantly reduce staff, effectively going into hibernation due to much lower levels of demand and revenue. A significant number of people will lose their jobs and economic livelihoods and will need to reconsider how they will earn a living. In the short-term, many business owners and their employees will choose to leave the visitor sector; and some people will likely need to leave the district to find work. The return of flight services will be critical to the district's economic recovery through the connectivity it can and needs to offer for businesses and workers.

COVID-19 is expected to have sustained impacts on visitor markets and how they operate over the medium-term. With continuing travel restrictions, international tourism will take a long time to recover. The early recovery will

therefore need to be domestic-led. This will be a very different market from that which has sustained Queenstown-Lakes businesses in recent times.

Even when international markets recover, there is significant debate within the sector and amongst policymakers about the future of the sector, with some calling for a reset and a greater focus on sustainability.

Incorporating COVID-19 into the impact analysis

When this project began, the issue for the Queenstown-Lakes was how to deal with unprecedented growth in tourism and population, which was forecast to continue. As we write this report, there is no tourism in the district at all – international or domestic – and the local economy is in turmoil, with business failures and job losses. Few could have predicted the scale of the economic transformation over the last few months.

When we carried out the survey and focus groups for this project, people were becoming aware of COVID-19, but as the scale of the threat became more apparent, the scale of the response by governments around the world escalated dramatically. Given this, it is likely that the survey responses and focus group conversations would be different if they were repeated today.

Passenger demand forecasts were developed by Aviado in 2018 before COVID-19. These are long-term forecasts, so peaks and troughs in activity are incorporated into the analysis and so events such as COVID-19 are included and should not matter. However, as our scenarios implied supply constraints in the near future, and the impact of COVID-19 has been so immediate and large, we have had to recalibrate airport user activity for 2020 to reflect current activity. We have then incorporated a recovery from COVID-19 into the Aviado forecasts. We estimate it will take at least five years to recover to the pre-COVID-19 levels of airport activity (2019 levels), and then slowed growth after that for the next three years before returning to the passenger demand levels forecast by Aviado.[8] We have not attempted to hypothesise how tourism behaviour may change as a result of COVID-19 beyond that given the high levels of uncertainty that currently prevail.

It is too early to predict with any level of certainty how long the economy will take to recover from COVID-19 and what future activity might look like. Our five-year recovery timeframe is just as likely to be too short as it is to be too long. In fact, Queenstown Airport Corporation (QAC) will not be including forecasts of activity into their Statement of Intent until at least October 2020, when there is a bit more clarity on how COVID-19 has affected domestic and international travel patterns in the short and long term. In any event, if the recovery takes longer then we could move the years out by the relevant amount and vice versa.

What we do know is that COVID-19 has removed the immediate pressures on airport infrastructure and will affect the district's future growth in the medium-term. We are also confident the Queenstown-Lakes district will continue to be a desirable place to live and visit in the future and will continue to be an attractive destination for domestic tourists and international tourism once international travel restrictions begin to free up. Although the issues and impacts identified in this report do not exist in the immediate future, they remain valid and are likely to become relevant again at some point.

Separately, COVID-19 has meant that we have not been able to engage with airports in the southern region or airlines affected by different scenarios. We have engaged an airport consultancy to sense-check the air transport-related assumptions used in our scenarios.

[8] This is relatively consistent with several forecast of the likely recovery from COVID-19 including both the Treasury and Reserve Bank forecasts (both of which are slightly different, with the Reserve Bank being more optimistic on the impacts of alert levels on activity. A recent report by Jarden on the effects of COVID-19 on Auckland Airport passenger numbers, suggested a best case where activity would return to pre-COVID trend level by FY24, underpinned by stronger domestic travel assumptions and minimal long haul leakage. Key catalysts for this scenario to prove up would be faster containment of COVID-19 and a vaccine introduced.

1.2 Background

Queenstown-Lakes district has seen rapid population and visitor growth

The Queenstown-Lakes district's recent history is one of growth – from a sleepy alpine village of about 3,000 in the early 1980s, to a bustling group of communities supporting about 42,000 residents. The majority of residents, 28,000 people, live in the Wakatipu Basin. Wānaka and surrounds has also grown rapidly to about 14,000 residents.[9]

In the 20 years to 2019, the district's population grew by an average of 4.9% per year. Population growth has accelerated in recent years, with the average for the last five years being 6.1%.[10]

Growth in population has been matched by growth in visitors. Over the last 18 years, visitor numbers have increased by an estimated 3.2% each year. Over the last 10 years, total visitors increased by 3.8% per year, and over the last five years by 5.9%.[11]

Rapid, sustained growth has inevitably changed the district. Population growth, combined with the large number of visitors, has put significant strain on the district's infrastructure. Living costs are a problem for residents, especially housing costs, which are the highest in the country.

It is estimated that, on average, there are about 67,000 people in the district, but that on a busy (peak) day, there are about 123,000.[12]

Unprecedented growth for Queenstown Airport

Population and visitor growth have also meant unprecedented growth for Queenstown Airport. Passenger movements through the airport have increased by 13% a year on average over the last 10 years. Over the same period, passenger movements on international flights have increased by 23% per year, and on domestic flights by 10% per year.

In the year to December 2019, there were a total of 2.4 million passenger movements on about 18,200 scheduled flights[13] It is currently the fourth busiest airport in New Zealand, despite the district making up less than 1% of the country's population.[14]

Planning for growth

When Queenstown Airport's current noise boundaries[15] in the District Plan were first notified in 2009, it was expected that these boundaries would accommodate growth in aircraft movements up to the year 2037. However, the most recent forecasts from Queenstown Airport Corporation (QAC) indicated that these boundaries may only accommodate growth for a further three to four years.[16]

To plan for this growth, in August 2018, QAC initiated informal consultation on expanding air noise boundaries at Queenstown Airport. Later in 2018 they also began engaging with the Upper Clutha community about developing Wānaka Airport to reintroduce commercial flights.

Through the QAC consultations, communities raised strong concerns about, and opposition to, further expansion of noise boundaries at Queenstown

9 (Infometrics, 2019)

10 (Infometrics, 2019)

11 (Queenstown-Lakes District Council, 2019)

12 (Queenstown-Lakes District Council, 2019)

13 Passenger movements count both arrivals and departures. One passenger is therefore counted as two movements – their arrival and then their departure.

14 (Statistics New Zealand, 2020).

15 For a description of noise and Queenstown Airport's current and proposed noise boundaries are in Appendix 4.

16 This was before the COVID-19 crisis. The immediate impact of the crisis has been significant, and it is not clear how long it will take for airport activity to recover, and what growth will look like post-recovery.

Airport and development of Wānaka Airport. As well as the direct impacts of airport operations, there was a deeper set of concerns about the impacts of unsustainable visitor growth on residents' well-being, the environment, and the economy. Some individual residents and community groups were also concerned that the unconstrained and unmanaged growth would degrade the tourist experience, damaging the longer-term appeal of the Queenstown-Lakes district as a premium destination.

People argued that the airport enabled these broader impacts, and that these would get worse with any further expansion of airport operations. Concerns were expressed about the capacity of current infrastructure to accommodate and sustain growth, and that a systems-view of all infrastructure needed to be considered, including at a regional level, to guide future airport development. Some advocated for air-travel restrictions as a tool for managing growth in visitor numbers.

Concerned about the strong community opposition to airport developments shown through the initial consultation, in 2019, QLDC deferred agreement to the QAC's Statement of Intent (SOI), which set out QAC's key objectives and the nature and scope of its activities. Following this, QAC stopped all consultation on expanded airport activity while QLDC sought further information on the social and economic impacts of airports in the district to allow them to make more informed decisions on their direction to QAC.

In December 2019, MartinJenkins was commissioned to carry out a socio-economic impact analysis of airports in the Queenstown-Lakes district.

1.3 Our brief

QLDC wants to ensure that decision-making about the future of airport infrastructure is objective and considers all perspectives. It wants to understand the social and economic impacts of airport development. It also wants to understand how future airport infrastructure can help achieve desirable community outcomes, while meeting the needs of the district's residents and business for effective air services.

This report identifies and explores the social, environmental, and economic impacts of airports in the Queenstown-Lakes district.

This project is one of multiple inputs to QLDC's wider engagement and long-term planning processes. Planning large-scale infrastructure development is iterative and ongoing, and high-quality consultation is a vital input to robust decision making.

The Queenstown-Lakes district's Spatial Plan and QAC's Statement of Intent will draw on several inputs, including the social and economic impact assessments contained in this report. This report will also help to inform QAC in its development of the Queenstown and Wānaka Airport Masterplans.

QLDC has also committed to wide-reaching engagement with the district's communities and key stakeholders, to ensure that decision-making is well-informed. QLDC will, in conjunction with QAC, continue to engage with iwi, community and business stakeholders on airport development options.

The scope of our assessment is set out in Table 7.

Table 7: Socio-economic impact analysis

Social Impacts	Environmental Impacts	Economic Impacts
The social consequences of airport operations on the district's communities, with particular regard to well-being, quality of life and social licence	The environmental impact of airport operations, including consideration of climate change and reputation	The role of the airport operations and activity on economic growth
Identification, presentation, and commentary on the social, environmental, and economic impacts that are relevant to the scenario analysis		

In this report we identify and discuss the social, environmental, and economic impacts. We then consider how they would change under four airport scenarios that represent constrained (Status Quo) through to less constrained (Expanded noise boundaries, Expansion at Wanaka Airport) and enhanced (New International Airport) growth.

These scenarios are hypothetical and have been developed to support an understanding of the impacts under different locations and development paths, where there are constraints on the ability to meet forecast passenger demand. The scenarios are described further in Table 8.

Table 8: Scenario analysis – impacts of constrained and unconstrained growth

Scenario 1. Status Quo	Scenario 2. Expanded noise boundaries	Scenario 3. Scheduled services at Wānaka Airport	Scenario 4. New International Airport
The current noise boundaries at Queenstown Airport are kept at their current levels. There are no scheduled services out of Wānaka Airport.	The current noise boundaries at Queenstown Airport are expanded from 2024. There are no scheduled services out of Wānaka Airport.	The current noise boundaries at Queenstown Airport are expanded from 2024. Wānaka Airport is developed to allow narrow-body jets and is open for scheduled services from 2028.	Current noise boundaries at Queenstown Airport are kept at their current levels. There are no scheduled services out of Wānaka Airport. The New International Airport is commissioned in a location that is within two hours of Queenstown and opens for scheduled services in 2035.
Constraint on scheduled flights			
Up to 21,600 flights.	Up to 41,600 scheduled flights.	No constraints on scheduled flights. Growth is managed through dual airports. Narrow-Body jet capable at both airports.	Scheduled flights are constrained until the New International Airport opens and is fully operational. Scheduled services cease from Queenstown Airport, which reverts to general aviation. Potential to increase demand through allowing larger aircraft, which can open up new international routes.

1.4 Methods applied

Much of the information in this report is gathered from existing sources. However, we have collected new information through focus groups and a survey. We have also built a model to estimate airport activity under four hypothetical scenarios and applied regional economic impact analysis to determine employment and GDP impacts. Methods applied in this report are outlined below and are explained in more detail in the appendices.

A well-being framework for presenting airport impacts

An economic framework does not fully consider or reflect the range of outcomes that contribute to individual and community well-being. While these economic impacts are valid and important, the analysis needs to go beyond GDP, incomes, and employment to reflect all the impacts, positive and negative, that airports can have on a community.

Our analytical framework draws on well-being frameworks such as the New Zealand Treasury's Living Standards Framework, and Local Government's four-well-beings' framework. We have also incorporated the range of outcomes important to the Queenstown-Lakes district as captured in the Whai Ora, Vision Beyond 2050 and the QLDC Long Term Plan.

Literature review

The literature review focused on:

- understanding the current context and issues in relation to airport development in the Queenstown-Lakes district.
- Identifying and measuring the range of impacts associated with airports.
- We also received a number of submissions from stakeholder groups, which we also reviewed.

A full list of references used in this report is on page 148.

Stakeholder engagement

Stakeholder engagement was undertaken to obtain a diverse range of views and perspectives on the social, economic, and environmental impacts associated with the current airport infrastructure, and how these views change across the four hypothetical scenarios considered. The engagement provided insight into the factors that influence the perspectives of individuals and communities towards the airport and potential future development scenarios.

A further objective of the stakeholder engagement was to provide an opportunity individuals and community groups who felt impacted by the airport and future developments to voice their concerns.

Stakeholder feedback was gathered through:

- an initial meeting and follow-up discussions with QLDC and discussions with a select number of key stakeholders.
- seven focus groups involving representatives from more than 50 community groups.
- an online survey, that was open for anybody to complete, and which received more than 4,400 responses.
- targeted interviews with stakeholders who are mana whenua.

A key purpose of the survey was to encourage all voices in the district to be heard. As such the survey was open to everyone. Running an open survey means that survey respondents self-select and so the response is biased. This requires caution in interpreting the findings. A more detailed explanation of the stakeholder engagement and survey design is included in Appendix 1.

Modelling and impact analysis

We developed a scenario growth model to estimate airport activity under four different scenarios. This activity was used to calculate CO_2 emissions and economic impacts. Assumptions used in the scenario growth model were sense-checked by an aviation consultancy.

We used a regional input-output model to calculate the employment and GDP impacts over thirty years from 2020-2050. The study area for the impacts was Queenstown-Lakes district and Cromwell.

A more detailed explanation of the modelling and economic impact analysis is included in Appendix 2.

We worked with Abley Consulting to model the impacts of the four scenarios on the road transport network. This analysis used the QLDC Transport Model.

Emissions, the costs of these emissions to New Zealand and the number of properties, schools, early learning centres and people within the likely noise boundaries under each scenario were also estimated. Discussion of noise and emissions are in Appendix 4 and Appendix 5.

1.5 Caveats

The report should be read in light of the brief. We also emphasise several caveats.

The scenarios are hypothetical

This report identifies and presents impacts associated with airport infrastructure in Queenstown-Lakes and the likely social, environmental, and economic impacts across four hypothetical scenarios. The Scenarios, while plausible, are not fully-developed options. Fully developed-options would require more specific scenarios, technical analysis, and costings.

The report does not present a preferred option, as this would require a detailed business case to be developed, including the strategic, economic, commercial, financial and management cases, and a comprehensive cost-benefit analysis.

A range of assumptions have been applied in modelling the four scenarios. Assumptions around air transport-related activity have been sense-checked by aviation experts. However, with the modelling going out to 2050, and uncertainty around the impacts of COVID-19, there is a high level of uncertainty regarding the scenarios. As most assumptions are held constant across the four scenarios, the focus should be on considering the relativities across the Scenarios rather than the quantum of each scenario.

This is a socio-economic impact analysis

This report assesses social, economic and environmental impacts associated with airports in the Queenstown-Lakes district. More detailed assessments should be undertaken at the detailed planning stage, to ensure that the potential size of these impacts is captured accurately, based on specific development options. We expect that this would occur once QAC has identified a preferred option and is seeking consents.

This report can inform the further development of options for inclusion in a detailed business case, and the associated economic, environmental, and social impact assessments.

The survey results are not representative of the district's population

There were over 4,400 responses to the survey on the impacts of Queenstown-Lakes airports. About 95% of respondents lived or worked in the Queenstown-Lakes district. Given there are about 35,000 residents over

the age of 15[17], over 10% of the resident population responded to the survey.

While this represents good coverage for a survey of this kind, it is important to note that the survey results provide an indication of respondents' views and concerns but are not representative of the district's population.

We made a deliberate choice to run an open survey as opposed to a sample-based survey so that everyone who wanted to have a say could do so. Although all residents were encouraged to participate in the survey, respondents ultimately self-selected. The survey therefore has a bias towards people who are directly impacted by, or are very concerned about, issues related to airport expansion.[18] Given these selection biases, it is not appropriate to suggest that the survey results can be aggregated to reflect the views of the entire district.

Assessment of impacts

The report provides an independent assessment of a range of impacts associated with airport activity in the Queenstown-Lakes district, and then considers how these impacts change under the four scenarios.

Not all impacts can be quantified or measured, and not all quantified impacts are comparable for a range of measurement reasons. For example, several activities, such as noise and jobs, have both social and economic impacts. Some impacts may be considered to be both positive and negative, such as jobs in the visitor sector. Certain activities, such as noise, waste, and visual pollution, affect certain individuals and communities more than others.

Our assessment of impacts required us to draw on and balance a range of different information sources. Where possible we have attempted to quantify the impacts. Where the impact could not be quantified, or the level of impact associated with the scenario determined, we applied a qualitative assessment rubric considering the airport's contribution, the distribution, and the quantum of the impact. A full explanation of the approach is outlined on page 59.

Risks and costs of scenarios

We have steered clear of making a judgement call on the risks associated with each hypothetical scenario. There have been a number of costs associated with these scenarios from various quarters that are in the public domain. We do not think it is helpful at this stage to try to estimate what these costs will be, especially for hypothetical scenarios. These should be developed as part of a business case when options have been identified and technical cases have been developed from which to estimate costs.

17 (Statistics New Zealand, 2020)

18 Over 70 percent of respondents were from the Wānaka and Surrounds area.

1.6 Report format

This report is split into three sections and appendices.

Setting the scene

The first section sets the scene, describing the context and issues that led to the commissioning of this report. We provide a quick overview of airports in the Queenstown Lakes district including location and operations, current, historical, and forecast growth, and the need to expand. We then summarise the issues associated with current airport activity and expansion options.

Identifying impacts

The second section explores the impacts associated with airports, and specifically in the Queenstown-Lakes district context. This involved an approach to identifying, classifying, and measuring impacts, and then an assessment of each of the impacts within that framework.

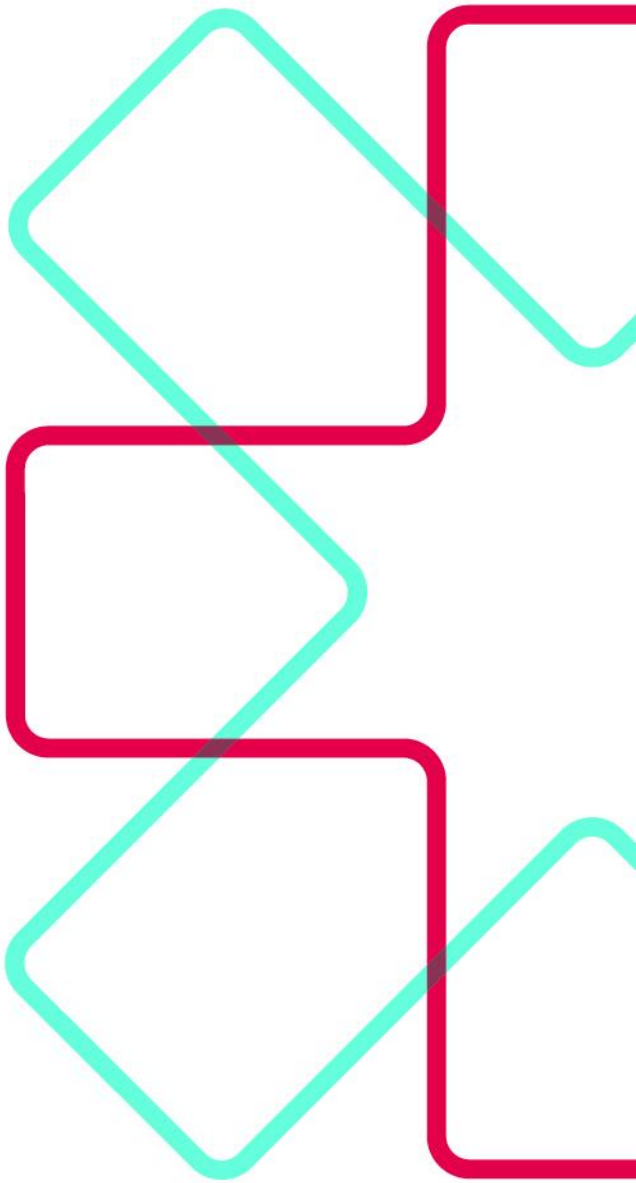
Impacts analysis across hypothetical scenarios

The third section compares the impacts across four scenarios to provide an idea of how impacts differ under different development models. This includes a brief description of the four scenarios and forecast activity out to 2050. The impacts identified in the previous section are then assessed under each scenario to show the absolute or relative effect each scenario would have on the impacts.

Appendices

To deliver on the brief we interpreted a lot of information and undertook several separate pieces of analysis. To keep this report succinct and user-focused without losing the depth of information and analysis gathered, we have presented broader discussions and more technical information and analysis as appendices. There are seven appendices attached to this report covering: stakeholder engagement; economic impact modelling; the role of airports; airports and noise; aircraft, emissions, and the climate; mitigating airport impacts; and frameworks for assessing impacts.

SETTING THE SCENE



2 QUEENSTOWN-LAKES AIRPORTS

2.1 Queenstown Airports

There are three airports in the Queenstown-Lakes district. Queenstown Airport Corporation (QAC) operates Queenstown and Wānaka Airports. QAC also provides property maintenance services at Glenorchy Airstrip on QLDC's behalf. This section considers Queenstown and Wānaka Airports only.

At Queenstown Airport, QAC provides scheduled commercial air services and commercial general aviation operations. QAC is also required to ensure the airport is operationally resilient as a life-line utility under the Civil Defence Emergency Management Act 2002.

At Wānaka Airport, QAC provides commercial and non-commercial general aviation.

QAC is a council-controlled trading organisation, majority-owned by QLDC (75.01%), with Auckland Airport a minority shareholder (24.99%). QAC operates Queenstown and Wānaka airports, facilitating air connectivity for the residents of, and visitors to, the Southern Lakes region.

As majority shareholder, QLDC engages with QAC through the Statement of Intent (SOI), which is a requirement under the Local Government Act.

This section provides information on airports and airport activity in the Queenstown-Lakes district. A discussion on the role of airports in an economy is in Appendix 3.

2.2 Airport locations

Queenstown Airport

Source: By Ruazn2 at English Wikipedia, CC BY 2.5, https://commons.wikimedia.org/w/index.php?curid=7384129

Queenstown Airport is located in Frankton, 8 kilometres from Queenstown Town Centre on SH6. It is the fourth busiest airport in New Zealand, with over 18,000 scheduled flights moving over 2.4 million passengers (in 2019). There is also general aviation activity, fixed wing, helicopters, and private jets, which cater to visitors and residents.

Frankton has grown rapidly and has developed as a town centre in its own right. Many businesses, services and activities that used to be located in Queenstown Town Centre have moved to Frankton, which has grown

significantly to become a major business and service centre for the Wakatipu Basin's resident population.

There are four schools[19] in Frankton, with a total roll of over 1,600 in 2019; and seven early childhood learning centres that can cater for up to 460 children[20]. There are also a number of other community facilities, for example the Events Centre and Frankton Golf Course. Tourism and population infrastructure continue to develop in the area, including major accommodation, health services and entertainment projects, especially in the Remarkables Park zone.

About 6,600 people live in Frankton and Frankton East, and there are affected communities in Kelvin Heights.[21] The wider area's population has grown significantly, particularly in surrounding areas such as Jacks Point and Lake Hayes. The population in these areas is expected to continue to grow.

At the same time, the airport has also grown its services. This increase in airport operations has had an impact on local residents, as evidenced by the response to consultation on increasing the noise boundaries. This is exacerbated by the large and growing resident population in the area.

Projected growth in passenger activity would put increasing pressure on infrastructure in the Frankton area and surrounds, including on the road network into Queenstown Town Centre.

Wānaka Airport

Source: Wānakaairport.com

Wānaka Airport is located about 9 kilometres south-east of Wānaka, which is a town in the Upper Clutha of about 9,000 residents[22] . Located in a rural setting, surrounded by farmland, the airport is used for general aviation with fixed-wing aircraft and helicopters. A number of aerospace related businesses also operate there.

As well as Wānaka and Albert Town to the North-west, there are smaller communities nearby, including Luggate to the south and Lake Hawea and Hawea Flats to the north.

19 Remarkables (570) and Kingsview (54) Primary Schools and Wakatipu High School (974)

20 (Ministry of Education, 2020)

21 Frankton has about 2,600 residents, Frankton East has about 2,300 residents, and Kelvin Heights has about 1,700 residents. (Queenstown-Lakes District Council, 2019)

22 Including Albert Town

Resident population in the Wānaka area has been growing at a faster rate than in the Wakatipu over the last 18 years. Luggate and Hawea Flats have also seen relatively high population growth recently.

2.3 Airport operations

Airport operating expenditure

QAC earned income of $49.6 million in the year to June 2019 and had total costs of $33 million. Of this $15.3 million was operating expenditure and $5.6 million was invested in infrastructure and land over the year.[23] Expenditure by QAC contributes to economic activity directly attributable to the airports in the economic impact analysis. For our analysis we have assumed that operating expenditure grows in line with passenger numbers.[24]

In 2019, QAC declared a dividend of $8.2 million, of which $6.2 million went to QLDC.[25]

Other businesses operating in the airport

A number of other businesses also operate within the airport boundaries. Including direct employment by QAC, close to 1,000 people work at Queenstown and Wānaka Airports (700 at Queenstown and 300 at Wānaka) across more than 80 businesses (about 60 at Queenstown and 20 at Wānaka).[26]

Expenditure from these businesses has been estimated and included in the economic impact analysis.

2.4 Passenger and aircraft movements

Scheduled services

Queenstown Airport has scheduled air services to the main centres in New Zealand (Auckland, Wellington, Christchurch) and internationally to five destinations in Australia. It also provides general aviation services. [27]

In the year to December 2019, there were 2.4 million passenger movements (about 1.2 million passengers) on about 18,200 scheduled aircraft movements. [28]

Of these, about 30 percent, or 360,000 passengers and 5,500 aircraft movements, were on international flights (ie landing from overseas). The remaining 540,000 passengers (70 percent) were on 12,700 domestic flights (from Auckland, Wellington, Christchurch).

Domestic scheduled services operate between Queenstown and Auckland, Wellington, and Christchurch. International scheduled services are all to Australia, and include Sydney, Melbourne, Brisbane, and the Gold Coast.

Just under 90% of scheduled aircraft movements were narrow body jets, with the remaining 10% being ATRs servicing mainly Christchurch but also Wellington.

23 (Queenstown Airport Corporation, 2019)

24 Regression analysis of passenger numbers and operational expenditure between 2013 and 2019 suggests that passenger numbers explain 98 percent of operational expenditure.

25 (Queenstown Airport Corporation, 2019)

26 (Queenstown Airport Corporation, 2019)

27 General aviation is made up of non-scheduled air services – fixed wing aircraft, helicopters, and private jets.

28 Passenger movements count both arrivals and departures – ie, 1 passenger is counted as 2 movements – their arrival and then their departure.

Scheduled services have operated out of Wānaka in the past. From 1994 to January 2013, Air New Zealand subsidiary, Eagle Air, flew domestic commercial flights into Wānaka.

General aviation

Private jets and recreational flights (flightseeing etc), both fixed-wing and helicopters, also operate out of Queenstown Airport. In 2019, there were close to 500 private jet movements, 27,000 helicopter movements and 14,000 fixed-wing movements.

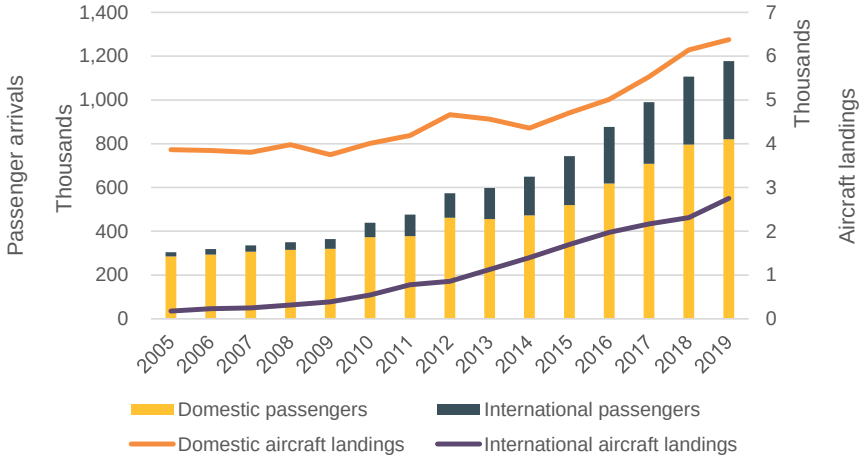
Wānaka Airport is a general aviation airport used for flightseeing, flight training, helicopter maintenance, skydiving, private recreational aviation, and attractions.

In 2019, there were just over 50,000 helicopter and fixed-wing movements from Wānaka Airport.

2.5 Forecast growth in activity

Queenstown Airport is the fastest growing airport in New Zealand. Between 2009 and 2019, airport activity has increased at an annual rate of 13%. International passenger growth has increased at 23% each year compared to 10% annual growth for domestic passengers.

Figure 4: Queenstown Airport passenger arrivals and aircraft landings, 2005-2019



Source: QAC

Scheduled passenger services growth

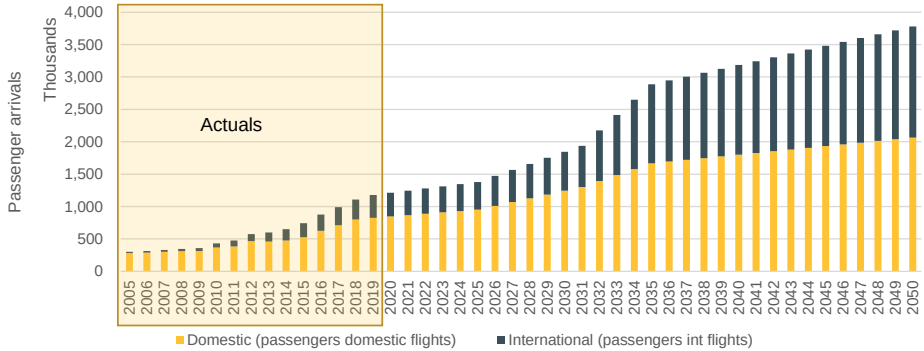
In 2018, QAC commissioned Aviado to undertake passenger demand forecasts for Queenstown Airport. The Aviado analysis found that passenger demand was expected to increase from 2.24 million movements in 2018, to 7.1 million movements in 2045, growth of 4.4% each year. International demand was expected to increase by 6.2% each year, while domestic demand was expected to increase by 3.3% each year.[29]

QAC, as part of its master planning, consulted on expanding the air noise boundaries to allow for up to 41,600 aircraft movements, which would support 5.1 million passenger movements by 2045. This was lower than

[29] Note that the domestic passenger demand also includes international visitors on domestic flights.

the 7.1 million passenger movements forecast by Aviado but was considered more sustainable from a community perspective.

Figure 5: Queenstown Airport passenger arrivals, 2005-2050



Source: QAC passenger arrivals (2005-2019), Aviado Passenger Demand Forecasts (2020-2045), MartinJenkins (2045-2050)

The Aviado forecasts are used for the passenger demand in our scenario modelling. As discussed earlier, these forecasts have been modified to reflect the impact and possible recovery under COVID-19.

General aviation growth

General aviation is not expected to grow at the same rate as passengers.

QAC, in their Queenstown Airport Masterplan Options document, set out general aviation trends at Queenstown airport. Namely,

- fixed wing aircraft are tending to scale up to larger, modern, more efficient aircraft to accommodate more passengers
- helicopters fleets are likely to expand in number rather than in size
- larger aircraft with the ability to fly longer distances are opening up the private jet market to more areas.

In our analysis, general aviation is captured through expenditure rather than the change in aircraft activity. We assume that business growth continues to grow at a constant rate consistent with population and tourism growth across all four scenarios.

3 ISSUES AROUND AIRPORT EXPANSION

It is clear that the airport needs to increase its capacity for scheduled aircraft services if it is to meet forecast demand.

QAC initiated informal consultation on expanding air noise boundaries at Queenstown Airport. Later in 2018 they also began engaging with the Upper Clutha community about developing Wānaka Airport to reintroduce commercial flights. A further option that was discussed, but discounted was a new international airport to service the district and possibly the lower South Island.

Air services are critical to the Queenstown-Lakes people and businesses…

Airports are important pieces of infrastructure for New Zealand's regions, allowing people and cargo to move more effectively between towns and cities. This "connectivity" is fundamental to the ability of a region to attract and retain people and support business activity.

This is especially true for the Queenstown-Lakes district, which is relatively distant and isolated.[30] The district is an internationally recognised destination, and its economy is largely sustained by tourism. It is also a desirable place to live, with a natural alpine setting and good amenities, services, and connections. Many new businesses are also attracted by the ability to operate nationally and globally from the district. All of this is enabled through having good air services.

A third of all visitors, and half of all international visitors are thought to fly into the district.

Compared with other provincial New Zealand centres, a higher proportion of travel into and out of Queenstown is by air. Almost 1.2 million people arrived through Queenstown Airport in 2019. Of these, we estimate about 75,000 were business trips from outside the district. An estimated 120,000 trips were taken by locals travelling for either business or pleasure.

Because of the level of air-services it provides, the airport is also a transport hub for visitors to, and residents of, the lower South Island. The airport acts as a gateway to a number of visitor attractions in the lower South Island. Despite having their own airport with scheduled services just 10 minutes from the Invercargill town centre, a number of Southlanders travel to Queenstown to take advantage of cheaper or more convenient flights.

This high level of connectivity provided by the airport flows through into positive economic and social impacts, affecting the ability of businesses to operate, the ability of tourists to visit, and the willingness of people to move into the region.

Yet there is strong community resistance to plans to extend airport capacity at Queenstown and Wānaka airports…

Communities generally value having good air connections, because they enable personal and business travel, and support businesses to operate nationally and globally.

Like most infrastructure, airports and their operations also have negative impacts. These include noise, waste, and sometimes traffic-related issues.

[30] Dunedin, the largest city in the lower South Island, is 3.5 hours' drive away. Invercargill, the next largest city, is over 2 hours' drive away.

These impacts are generally local, and so most opposition to expansion is from the local community and those most directly affected.

A set of specific factors have combined to make proposed expansion of airport infrastructure in the Queenstown-Lakes district a particularly contentious topic.

Consistent with our impacts framework, we have grouped concerns into the direct impacts of airport location and operations, and wider (indirect) issues associated with airport expansion – namely aircraft and passengers. In some cases, the distinction between direct and indirect issues is blurry.

There are negative impacts from direct airport operations

Most of the direct impacts from airport operations and aircrafts such as waste and wastewater, and noise, tend to relate to location, activity, and intensity of airport operations.

The strongest opposition to airport developments or expansion were from residents and community groups in close proximity to airport locations.

Several community groups within the Wakatipu/Frankton area expressed concerns about the proposed expansion in the current location of the Queenstown Airport. In particular, the Kelvin Peninsula residents' group and We Love Wakatipu are strongly opposed to continued airport growth and expansion of noise boundaries.

In relation to future options, there is strong opposition to development of Wānaka Airport to enable jet capable scheduled services by the Wānaka Stakeholders Group, which claims over 3,000 members. The over-riding concern of affected Wānaka residents about introducing scheduled air services directly into Wānaka is the noise and visual impact of jet planes and the flow on effects of increased tourism on the local community.

There were also several respondents to the MartinJenkins survey who expressed concern that they may live near to a new international airport location.

The bulk of noise impacts in the airport vicinity are created by aircraft, mostly during take-off and landing, which is within the vicinity of the airport.

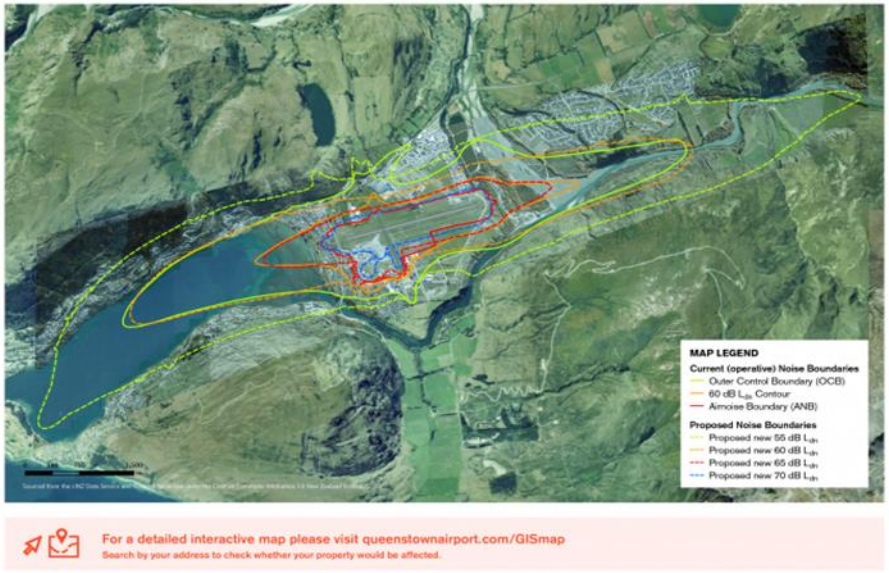
Noise negatively affects people and communities in a range of ways, including generating social and health and sometimes economic impacts. However, the impacts of noise are local, and generally contained within noise boundaries.

Queenstown Airport is situated within a built-up area, with a significant number of residences, community facilities and activities close to the airport. Expanding the noise boundaries will increase the number of people exposed to noise. As a result, opposition to expanding noise boundaries can therefore be expected.

Stakeholders' perceptions of direct airport impacts, such as noise, are often informed by their views on a wider range of contextual issues.[31] These issues are likely to explain the community's reaction to QAC's consultation on noise boundaries and master-planning.

[31] (World Health Organization, 2018)

Figure 6: Current and proposed noise boundaries at Queenstown Airport



Source: QAC

But it appears that the greatest concern is in relation to issues beyond direct airport operations

There are a number of broader issues beyond the direct airport operations that are concerning communities within the Queenstown-Lakes district. Airport infrastructure and its future development are relevant for each of these issues, even if the airport itself is not directly the cause and cannot effectively be the solution.

Concerns from the wider community tend to relate to:

- climate change and the environment
- rapid visitor and population growth enabled by airport expansion and the effects of this growth on congestion and house prices
- capacity of supporting infrastructure, and the need for a systems approach in deciding how and where airport expansion occurs.

…Climate change, caused by aircraft and tourists

Many in the Queenstown-Lakes community are very concerned about climate change. This is clearly reflected in the community outcomes for the district in the Long-Term Plan, Whai Ora, and Vision Beyond 2050. Over three-quarters of respondents in the 2019 Quality of Life Survey were concerned or very concerned about climate change.

QLDC declared a climate change emergency and has developed a Climate Action Plan for the district.

Air travel, and airport operations, is viewed by residents as a significant contributor to climate change. Concerns about the climate are also tied to the increase in visitors to the district, whose consumption also affects climate change.

A significant proportion of survey respondents believe that increasing population and visitor growth poses risks to environmental goals and aspirations.

…and the impacts associated with continued rapid growth

The rapid growth in people across the district – both in residents[32] and visitors – is considered a major issue. The focus groups and the survey

[32] According to the Quality of Life Survey, about 46% of respondents were uncomfortable with the growth in resident numbers.

made clear that there needs to be a discussion around how to manage growth to improve community outcomes.

Many feel that growth has happened too fast, and/or for too long, and is negatively affecting the well-being of communities and individuals. There is a growing sentiment that more growth is not delivering the desired community outcomes.

The negative impacts of growth manifest in a number of areas, including:

- infrastructure
- cost of living
- congestion
- way of life.

Infrastructure…

56% of survey respondents were negative about the impact of current airport infrastructure on other infrastructure. Infrastructure in the district has struggled to meet the needs of the growing population and visitors.

A view commonly raised in the focus groups suggests concern that infrastructure has not kept pace with growth in many parts of the district and is already not coping with existing requirements.

72% of survey respondents are negative about the impact of current airport infrastructure on other infrastructure; and 36% of respondents had infrastructure pressures as one of the top 3 negative impacts of greatest concern to them.

A recent report identified a range of key infrastructure challenges across a number of areas, including the transport network (road and airport), Queenstown Town Centre, water and wastewater, accommodation, and the environment.[33]

The report estimated that it would cost about $635 million to bring 'eroded' infrastructure to an acceptable standard, about $835 million to enable 'sustainable' activity, and over $1 billion to develop infrastructure that 'enhanced' existing experiences.[34]

Cost of living…

According to the Quality of Life Survey 2019, the cost of living is a key factor for 60% of respondents intending to leave the district.

The cost of living in Queenstown is higher than many other parts of New Zealand. The key component driving costs is accommodation. House prices are the highest in the country and rents are comparable to large cities such as Wellington and Auckland. However, average incomes are lower in the district, and so affordability is a concern.

At $1.1 million, median house prices in Queenstown-Lakes are the highest of any district and are 1.75 times higher than the national median of $665,000. However, the median household income is only $74,000.[35] The district has a house price-to-income multiple of 14.5, which is twice the New Zealand multiple of 7.2.[36]

33 (MartinJenkins, 2018)

34 (MartinJenkins, 2018)

35 The household income for a standard household is made from one full time male median income, 50% of one female median income, both in the 30-34 age range, plus the Working For Families income support they are entitled to receive under that program. This standardised household is assumed to have one 5 year old child.

36 (Interest.co.nz, 2020)

Similarly, rents are higher in the district than nationally ($635 compared to $470).[37] Rental affordability,[38] as calculated by Infometrics, is 0.236 for the Queenstown-Lakes district, compared to 0.195 nationally.[39]

Congestion…

Traffic congestion is an increasing issue for many in the Queenstown-Lakes district. Congestion and/or growth were cited as a factor influencing the decision of 15% of respondents who were considering leaving the district.[40]

The geography of the Wakatipu Basin makes for a challenging transport system. Local topography limits the ability to extend or expand current road transport corridors, and this constrains access to the town centres and spreads growth over a wide area.

Because of the topography and the spread of communities, the district relies heavily on cars as the main mode of transport. This is also true for visitors arriving at the airport and wanting to travel around the district. Traffic issues are further exacerbated by ongoing road works.

For the main route between Queenstown and Frankton (Frankton Road – SH6A Queenstown to Frankton), annual average daily traffic grew by 7% each year from 2013-2018, a 41% increase over five years. In 2018, annual average daily traffic volume was approximately 27,000 vehicles per day, which is nearing the road's capacity of 28,500 vehicle movements per day.[41]

Annual average traffic through Wānaka on SH6 increased by 10% each year from 2013 to 2018, or 58% over the five years. In 2018, the average daily traffic volume recorded through Wānaka on SH6 was approximately 5,000 vehicles.[42]

In addition to the main arterial route through the Queenstown and Wānaka town centres, local roads are also busy, and it is difficult to find parking.

It is estimated that road congestion cost the district $35 million in 2016. This could be expected to increase by 50% by 2025, and to more than double by 2046.[43]

…and way of life.

There are concerns that the rapid population growth and large number of visitors has changed the communities and their way of life. Over time, patterns of activity have changed, with infrastructure and activity in the Queenstown Town Centre increasingly geared for the visitor market, and local services pushed out to Frankton. This has left many locals, especially those who have lived in the district for some time, feeling disenfranchised.

> *"Don't forget the locals that call this place home and have for a long time, well before it was overcrowded with tourists."*[44]

There were also impacts specifically related to visitor numbers and growth…

The underlying issues around proposed airport expansions often related to growth, particularly tourism growth, and to the Airport's role in enabling this growth. Communities frequently express a range of concerns about growth,

37 (Ministry of Business, Innovation and Employment, 2019)

38 The rental affordability index is the ratio of the average weekly rent to average household income. A higher ratio, therefore, suggests that average rents cost a greater multiple of typical incomes, which indicates lower rental affordability.

39 (Infometrics, 2019)

40 (Versus Research, 2020)

41 (New Zealand Transport Agency, 2018)

42 (New Zealand Transport Agency, 2018)

43 (Abley Transportation Consultants, 2017, p. 40)

44 (Versus Research, 2020)

including the drivers of it, the ability to manage and direct it, and its unintended consequences.

Central to concerns about growth in the Queenstown-Lakes district, are the area's reliance on visitors, and the impacts these visitors are having on the environment and on local communities. Common issues raised related to resilience and sustainability, and the effects on culture and way of life.

…too many visitors

Queenstown faces a disproportionately high tourist load relative to its population. On a peak day, there were over 123,000 visitors in the district. This is forecast to increase to over 200,000 by 2048.[45] The ratio of visitors to residents is very high.

Visitor numbers in Wānaka are lower, and the market is geared more to the domestic visitor. We note that visitor numbers for Wānaka have been growing faster than those for Queenstown in recent years.[46]

Wānaka and Surrounds Rural respondents had especially negative concerns for visitor numbers (88% negative). Many of these are concerned that their town centre will become 'overrun by tourists', affecting their way of life and ability to enjoy their own environments.

> *"The town centre of Wānaka risks becoming like Queenstown; inaccessible and overrun by tourists"*[47]

Stakeholders' sentiment about the number of visitors reflects a wider sentiment about tourism and growth. For many stakeholders, airports are a key enabler of visitors and visitors perpetuate existing problems, such as pressure on infrastructure, and traffic congestion.

Of those respondents in the 2019 Quality of Life Survey who were considering leaving the district, almost 10% cited the level of tourism as a key reason.

…the negative impact of visitors on the environment

As visitor numbers grow, the negative impacts of tourism on the environment are becoming clearer. The recent report by the Parliamentary Commissioner for the Environment set out the range of impacts associated with tourism.[48] There is a strong push from many communities and business organisations within the district for more 'sustainable' tourism, both in terms of the number of, and the type of, tourists.

…the district is too reliant on the visitor economy

The economy in the Queenstown-Lakes district is heavily weighted towards the visitor sector, which accounts for about 55% of the district's GDP and 64% of employment.[49] Food and accommodation is the largest industry in the district, accounting for 22% of employment and 17% of GDP.

The community acknowledges the positive contributions that tourism makes to the district, such as jobs, quality and choice of shops and services, and understanding and appreciation of different cultures. In the 2019 Quality of Life Survey, only 22% of residents did not agree that the community benefits from tourism.[50] . However, 57% of respondents were not comfortable with the growth in visitor numbers, compared with only 24% who were comfortable with visitor growth.

Other respondents express concern about the 'type' of visitors that are attracted to the district and would prefer a 'higher quality' of visitor. There was strong reference to sustainable and 'high-value' tourism. There were

45 (Queenstown-Lakes District Council, 2019)
46 (Queenstown-Lakes District Council, 2019)
47 (Versus Research, 2020)
48 (Parliamentary Commissioner for the Environment, 2019)
49 (Infometrics, 2019) – note that the visitor sector is made up of a number of industries.
50 (Versus Research, 2020)

particular references to not wanting visitors coming over for a 'boozy' weekend.

…the infrastructure burden is not shared appropriately

The large number of visitors requires greater investment in supporting infrastructure. The difficulty in making visitors pay for locally funded infrastructure puts the burden onto the relatively small rating base. As a result, investment in infrastructure has not kept pace with growth.

As noted earlier, the cost of effective infrastructure to support sustainable tourism in the Queenstown-Lakes district was estimated at between $800 million and $1.02 billion.[51]

A number of respondents opposed airport expansion in general until effective planning was completed, and appropriate infrastructure was in place

A common theme expressed through our stakeholder engagement is that more thought is needed on development planning across the district, to ensure sustainable growth and tourism. This includes the view that infrastructure development must meet the needs of the community, not just visitors.

There were concerns that inadequate infrastructure and negative attitudes towards visitors could compromise the international visitor experience, constrain future growth, and damage the tourism industry in the district and nationally.

Stakeholders are concerned about direct impacts in and around airport sites, for example related to sewerage and water; as well as indirect impacts related to wider infrastructure across the district, ranging from roads to hospitals.

A submission on the expansion of Queenstown Airport air noise and outer control boundaries from the Queenstown Stakeholders Group in 2018 tied together these threads of infrastructure, sustainable tourism, and location issues.[52]

The submission opposed the proposed expansion of the airport's noise boundaries, stating:

> *"The key issue is, however, the complete lack of community infrastructure planning accompanying the expansion proposal, and the subsequent potential and very high risk of the loss of amenity values which firstly bring people to Queenstown as visitors and secondly which are enjoyed by residents in the Wakatipu."*

The submission added that:

> *"The future of Queenstown depends on how we manage growth of our greatest economic and social asset, the tourism industry."*

The Kelvin Peninsula Community Association questioned Queenstown Airport's focus on meeting demand and promoting its role as a regional hub for visitors to the rest of the lower South Island. The association promoted the opportunity to spread demand to other airports in the lower South Island, as a means of addressing infrastructure constraints and limiting impacts on the environment and communities.[53]

The key issue of supporting community infrastructure, and the need to manage tourism sustainably, is something that all communities of interest – businesses, residents, and social services – can agree on.

51 (MartinJenkins, 2018)

52 The submission was lodged on 2 October 2018 and was signed by 36 local businesses, business and tourism organisations, residents' groups, education providers, local iwi and interested members of the public who came together as the Queenstown Stakeholders Group.

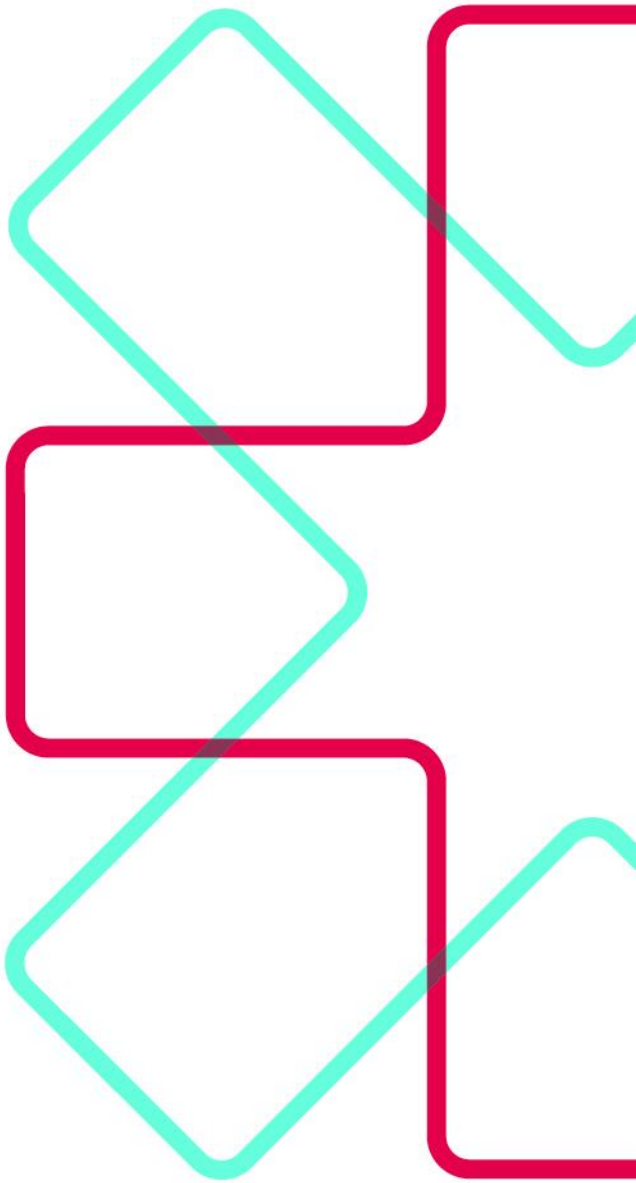
53 (Kelvin Peninsula Community Association, 2020)

Efforts to address issues and mitigate impacts

QAC, local and government stakeholders, and businesses are aware of these issues and many steps have been taken to try to address and mitigate them. An overview of what is being done is discussed in Appendix 6.

In general, our modelling does not consider the effect that future efforts might have on reducing impacts. Arguably, those efforts will, if successful, reduce or mitigate the issues and impacts associated with airports.

IMPACTS ANALYSIS



4 IMPACTS ANALYSIS

Airports have a number of impacts on communities, both positive and negative. Positive impacts tend to accrue through their role in connecting communities, businesses, and residents, and supporting visitor activity. Negative impacts tend to result from the infrastructure and operations of the airport.

The benefits of airports are generally assessed using economic frameworks. As a driver of economic growth, the focus of airport impacts has been on employment and productivity generated by the airport activity itself, and the impact from users – visitors, businesses, and residential travel.

The negative impacts of airports have generally been considered separately, usually as part of the consenting process.

The climate change impact of air travel has increased in importance, as have the environmental impacts of tourism, which is facilitated by air travel. These have generally been assessed separately to airports and assigned to airlines and or the tourism sector.

This report is relatively unique in that it brings together the social, environmental, and cultural alongside the economic impacts within a single report to explore how airports contribute to each of these areas and then assesses these impacts against activity from Queenstown's current airport infrastructure and from possible future infrastructure scenarios.

4.1 Identifying the impacts associated with Queenstown airports

4.1.1 Impact areas

To enable discussion and analysis, impacts are grouped into four impact areas:

- **Environmental –** are those impacts that cause a change to the environment – the surroundings, be they 'natural' or otherwise, that we, plants and/or animals, live and operate in.
- **Economic –** are the effects on economic activity, predominantly GDP and employment, in a specified region.
- **Social –** are, in the broadest sense, anything that affects or concerns a group of stakeholders. The Queenstown-Lakes district community is the stakeholder in focus for this analysis.
- **Cultural –** are those impacts that affect the values, customs, and interests of people, as well as impacts on sites of cultural and historical significance in an area.

These impact areas are consistent with the four well-beings set out in the Local Government Act 2002. The impacts are consistent with the domains in the Treasury's Living Standards Framework as well as the community outcomes in the Queenstown-Lakes district as noted in the Long Term Plan, Whai Ora and Vision Beyond 2050.[54]

[54] These frameworks are outlined in Appendix 7.

An initial set of impacts were identified through the literature and stakeholder discussions.

The range of identified impacts were then put to the focus groups and survey respondents, who were asked to identify those that positively or negatively affected them and their communities, and also to identify other impacts if they were not listed.

This confirmed the range of impacts associated with airports that were most relevant to the Queenstown-Lakes district communities and airport users.

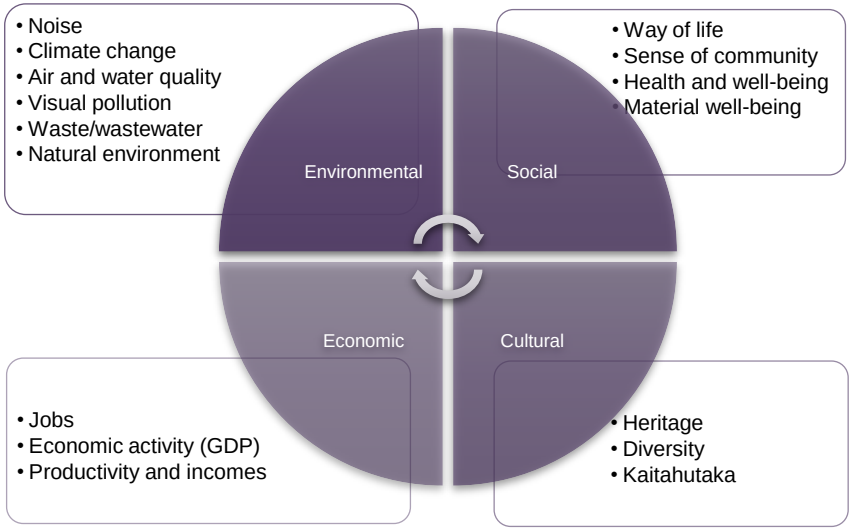
Other issues and concerns raised

A number of airport-related issues or concerns raised through the stakeholder engagement are not explicitly listed in the impact areas. These include congestion, cost of living, house prices, infrastructure, and over-tourism.

These issues and concerns are valid. However, they are not impacts in their own right, but rather feed into, and are a symptom of one or more of the impacts identified. For example, over-tourism manifests itself in a range of social and environmental impacts including way of life, sense of community, heritage, and waste. Congestion has economic, social, and environmental impacts.

These issues and concerns are still covered off in the analysis but are used to inform one or more of the impacts in Figure 7.

Figure 7: Impacts associated with airports



Source: MartinJenkins

Interconnectedness of impacts

While each impact has been noted under its most ‘obvious’ impact area, we note the interconnectedness between them. In many cases impacts are closely interlinked (for example health is often related to material well-being; jobs are connected to way of life and material well-being).

Direct versus indirect impacts

Airport impacts can be direct or indirectly related. It is important to understand the distinction between direct and indirect impacts.

Direct impacts include those that relate purely to activity at the airport such as those that result from airport operations such as energy use in the terminal building, or noise resulting from aircraft taking off or landing. Airport

activity includes the airport company but also businesses that provide services through the airport.

Indirect activities include those activities that relate to the airport but are not “at the airport” activity. They are often not under the full control of the airport itself. These include aircraft operations and people that fly in and out of the airport.

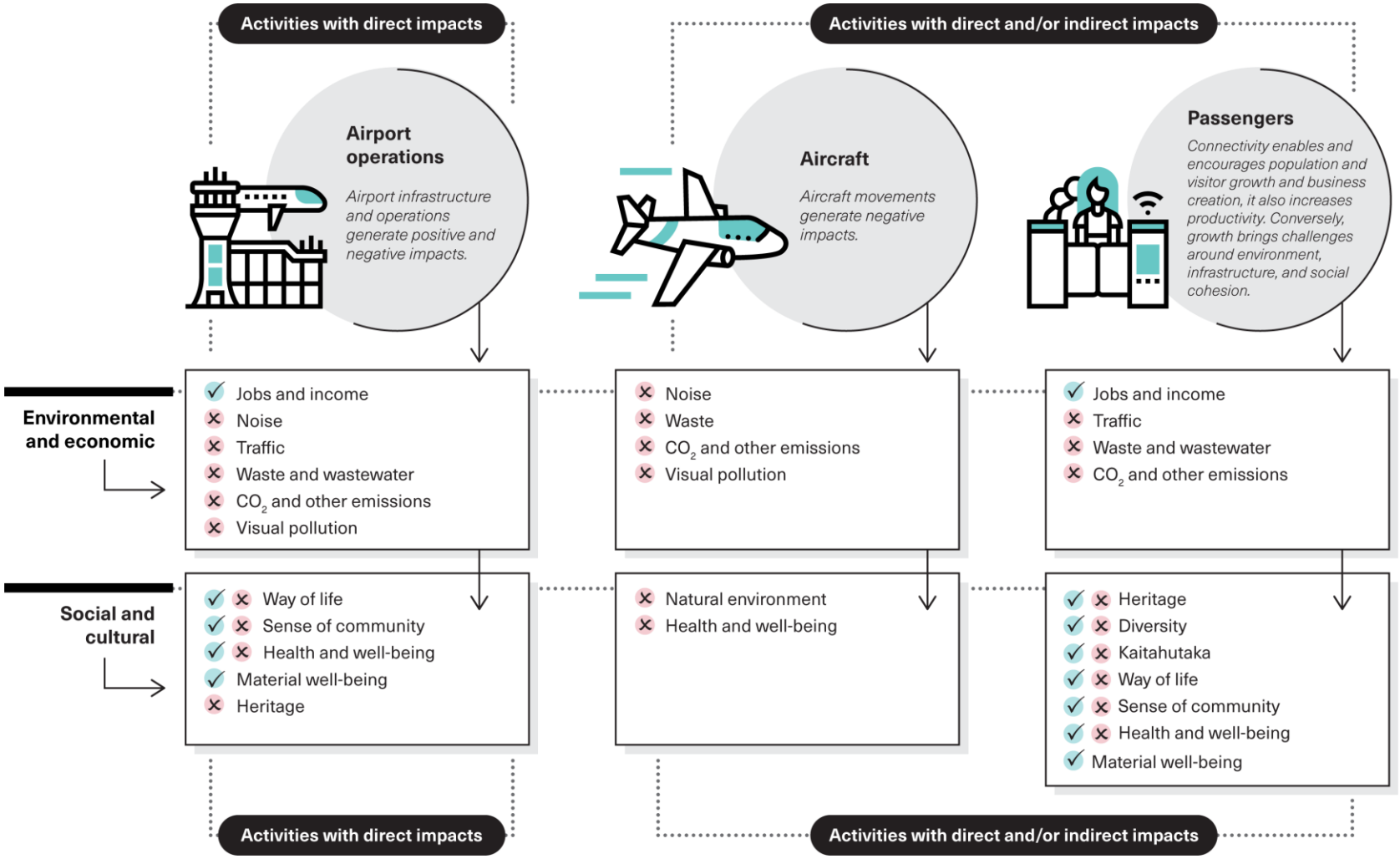
Tourism is a good example of indirect activity. The impacts of tourism are often tagged to the airport, but there is ambiguity around how much effect the airport really has on the ability to regulate the volume and type of visitors. About a third of all visitors to the district arrive through the airport. Only 30% of airport arrivals are on international flights. About half of all international visitors enter the district by road. Once in the district, the airport’s ability to influence the visitor’s activities is limited. Taking this further, the negative impacts associated with tourism can be caused by a range of other factors the visitor cannot influence, such as under-investment in infrastructure or poorly designed or enforced environmental regulations.

Activity impacts vs outcome impacts

There is also a causal effect where an impact in one area contributes to one or more impacts in other areas. Generally, environmental, and economic impacts contribute to the social and cultural impacts.

For example, jobs and incomes (economic impact) contribute to material well-being (social impact). Noise (environmental impact) affects health and well-being (social impact). Tourists have an economic impact on jobs from their spending (positive), but they also bring social (positive and negative), cultural (positive and negative) and environmental impacts (negative).

Table 9: How direct and related airport activity relates to impacts



Source: MartinJenkins

4.2 Measuring impacts

Measuring impacts is important to provide perspective. Where possible we have used available data to analyse the effects of the impact.

Some impacts can be directly measured. Where measures are available, we have identified the source. Where we have measured impacts, we explain the method in the analysis. For some of the impacts we have measured activity that affects that impact to provide an idea of the relevance or size of that impact.

4.2.1 Qualitative assessment framework

In many cases, the impact cannot be measured due to lack of data, the subjective nature of the impact, or uncertainty around the airport's contribution to that impact.

Description

To evaluate the social, cultural, and environmental impacts of each option, we have developed a qualitative assessment framework. This framework allows us to use standard criteria to categorise the impacts into groups, reflecting our judgement of the magnitude of the impact on the community.

Our framework assesses each of the impacts across three dimensions:

- Airport's contribution to the impact
- Distribution of the impact
- Size of the impact.

Airport's contribution to impact

The first dimension we considered was whether the impact was a direct or an indirect impact. As we are assessing the impacts of airport development, the Airport's contribution to the impact is the relevant measure, not the size of the impact in general. As an example, housing affordability is a significant issue in the Queenstown-Lakes district. However, the Airport has only a small impact in comparison to other factors.

Distribution of impact

The second dimension was the distribution of the impact. Here, we assessed the number of communities and the amount of people that are likely to be affected. As an example, noise impacts are largely limited to people within the noise boundaries. Climate change affects everyone.

Size of impact

The third dimension was the size of the impact. We considered the size of the impact to be the amount of change from the current state.

Assessment of the dimensions

All dimensions were informed by the following:

- What the literature says about the contribution of airport operations to the impact and experiences elsewhere
- Any aspects of the impact that we have been able to quantify
- Stakeholder's perceptions.

Some impacts are made up of multiple sub-impacts. Where this is the case, we have balanced our assessment of all of the sub-impacts to make an overall judgement.

Categories of impact

After considering the three dimensions above, we have made a judgement as to whether the impact is minor, moderate, or major.

The table below gives an indication of how our assessment of the dimensions fits into each category of impact.

Types of impacts in each category

Minor	• Mostly indirect impacts or direct impacts of small size • Large impacts affecting a small number of people
Moderate	• Mix of direct and indirect impacts • Mix of impacts affecting a small or large amount of people • Mix of big change and small change
Major	• Impacts are direct • Many people are impacted • Mostly big changes from current state

Direction of impact

Impacts can be positive or negative or both. Impacts are mixed because they affect groups in different ways, or the sub-impacts within the impact move in different directions, or the impact is initially one direction and then moves in the other direction over time.

To give an indication of the direction of the impact, we have also added one of three symbols to our assessment:

- **+** (positive)
- **-** (negative)
- **+/-** (mixed)

4.3 Social impacts

Table 10: Social impacts summary table

Impact area	Impact	Short description	Interconnected impacts and activities
Social	**Way of life** • Living standards • Work/life balance • Changing character of town/region • Community amenity • Growth in traffic	This set of impacts considers how the way people live and interact changes as a result of airport development. It includes consideration of how people's quality of life may be impacted.	GDP, employment, incomes, congestion
	Sense of Community • Social inclusion • Social cohesiveness • Connectivity	A sense of community can broadly be thought of as the feeling of belonging. Members of a community feel that members matter to each other and to the group and that members' needs will be met by the community group.	Congestion, visitor growth
	Health and Well-being • Mental, physical, and spiritual health • Fear and perceptions • Safety and security of air travel • Lifeline utility	This impact considers the effects of airport operations and airport development on people's mental, physical, and spiritual safety and well-being.	Noise, emissions, visual pollution
	Material Well-being • Housing affordability • Cost of living • Income and employment • Property rights	This impact considers the effects of airport operations and airport development on people's ability to afford to live in the area and pursue their interests that support their quality of life.	GDP, employment, incomes, living standards

Social impacts, in the broadest sense, are anything that affects or concerns a group of stakeholders. This means that almost anything can potentially be a social impact, and social impacts can be both positive and negative.

A review of the literature and feedback from the community focus groups and the survey has identified the following groups of social impacts:

- way of life
- sense of community
- health and well-being and
- material well-being.

4.3.1 Way of Life

Way of life considers how the way people live and interact changes as a result of airport development. It includes consideration of how people's quality of life may be impacted. Factors that affect people's way of life include:

- living standards
- work/life balance
- changing character of town/region
- community amenities
- growth in traffic.

These factors are discussed below.

Living standards

Living standards refer to the level of comfort, wealth, and material goods that an individual or group experience.[55] Living standards are closely tied to the positive economic impacts of growth - employment and income levels. Employment opportunities and higher incomes improve purchasing power and enables access to other factors that impact living standards such as quality housing, education, and health.

Airport development contributes to better living standards both directly, through employment opportunities provided by the airport and airport-related businesses, and indirectly, by facilitating growth that supports jobs and incomes. Factors influencing living standards are discussed in more detail in the material well-being section on page 69.

Work/life balance

Work /life balance refers to people's ability to effectively manage paid work in such a way that it does not crowd out other activities that matter to people, such as time with the family, participation in community activities, personal development and recreational activities.[56]

Airports can improve people's work/life balance to the extent that they create employment opportunities near to where people live. This reduces travel time between home and work.

Including QAC, about 700 people work in about 60 businesses located at Queenstown Airport. These workers are likely to live in the Queenstown-Lakes district. However, given the high cost of housing in Queenstown, there is some evidence that lower wage workers are needing to move further out from central Queenstown.[57] As airports typically provide a high proportion of lower paid jobs, it may be that some workers are having to commute further

[55] (Ernst and Young, 2012)

[56] (Employment New Zealand, 2020)

[57] (Brettkelly, 2017)

to find accommodation, reducing their leisure time. Housing affordability is discussed further on page 69.

Changing character of town/region

Development can impact the character of a community by changing the physical and/or social characteristics of a community. Airports can affect the character of a community both directly and indirectly.

Airport and airport-related development can directly impact the physical landscape by replacing natural landscapes with buildings and other airport-related infrastructure, making the area appear more urban. The visual impact of airport development is greatest for those living closest to the airport.

Airport development can also indirectly affect the character of an area by supporting economic and population growth. Growth is likely to have a greater impact on the character of an area than the direct impacts of airport development. Growth requires increased investment in building and infrastructure to support increased activity as well as increasing population and visitor numbers. This alters the physical environment in which people live.

Increased population and visitor numbers also alter the social characteristics of a community. This can occur, for example, through losing the 'connectedness' of a smaller community, increasing cultural diversity, and a more transient population.

Development impacts are more likely to be larger if the existing physical environment is perceived to be attractive and/or tranquil. Tranquillity can also be thought of as natural quiet and is a defining characteristic of many New Zealand landscapes. In an increasingly urbanised world, both domestic and international visitors are attracted to parts of New Zealand with high natural character. Increasing visitor numbers can detract from the quality of the visitor experience.[58] Many sites in New Zealand that are popular with visitors have high cultural and historic value.

The spiritual experience associated with visiting these sites can be lessened if these sites become congested. Congestion may also discourage locals from visiting areas spiritually important to them.

Visual impacts on the landscape are closely related to other impacts, particularly noise. People tend to perceive that the noise from a development is louder if they can also see the development. Areas considered tranquil may be characterised as having a lack of both noise and visual impacts.[59]

Our survey found that the impact airports have on the character of their town/region is important to the community. The changing character of your town/region was one of the top three negative impacts for 37% of respondents. 49% of respondents are negative about the impact of current airport infrastructure on changing character of their town/region compared to 15% who are positive.

Focus group feedback suggests that stakeholders are variously concerned about both the direct and indirect impact of airports on the character of their town/region. Direct impacts relate to the Airport's purchase of properties in Frankton (community becoming a ghost town), changes in land use around an airport site, increased noise, and the impacts of noise on well-being and environmental degradation. Indirect impacts relate to population growth, numbers of visitors and an economy that is focused on tourism.

Social impacts associated with growth in general and the changing character of their town specifically were highlighted as concerns for older stakeholders and residents from Wānaka and Surrounds.

[58] (Parliamentary Commissioner for the Environment, 2019; Airbus, 2020)

[59] (Parliamentary Commissioner for the Environment, 2019)

Community amenity

Amenity is a term given to the attributes of a place that make it an appealing place for people to live. Amenities can be publicly or privately owned and encompass workplaces, community facilities and open spaces. Amenity can be affected by changes to the physical landscape including loss of views, reduced privacy, or by the effects of noise or pollution.[60]

Airport development can directly impact the amenity of the surrounding community. As discussed in the changing character section above, airports can change the physical landscape of a community. They can also encourage investment in the area directly surrounding the airport. To make these areas more appealing places for people to visit and socialise, they often include entertainment and leisure facilities. For example, the development around Auckland Airport includes walks to visit historic sites, mountain biking tracks and sports fields.

More remote communities do not have access to the same standard of infrastructure as urban communities, such as in areas like education, transport, and communications. Should this be combined with insufficient economic opportunities, strong economic incentives to relocate will exist (particularly for young adults). This phenomenon impacts on the diversity of the demographics in the community and the utility of being near family.

Growth in traffic

Airport development impacts the growth in traffic directly, through traffic travelling to and from the airport and the surrounding airport precinct and indirectly, through traffic generated by an increase in population and visitor numbers. Improved transport infrastructure can contribute significantly to the quality of people's lives. Better transport infrastructure improves connectivity, increases recreational opportunities, aids regional economic development, and improves safety through, for example, higher quality roads.

Increased traffic growth can also negatively impact people's quality of life. Increased traffic is associated with problems such as increased congestion on transport networks, increased pollution and increased investment in building and maintaining infrastructure.

The cost of congestion in Queenstown is significant and is forecast to grow considerably. Projections show that total costs of congestion were $35 million – this is expected to more than double in the next 30 years.[61]

Traffic congestion was the impact most commonly identified as being of concern to survey respondents. Traffic congestion was identified by 41% of survey respondents as being in the top three negative impacts. While 73% of respondents are negative about the impact of current airport infrastructure on traffic congestion; only 5% are positive.

Stakeholders are concerned about traffic that results directly (in and around the Airport site) and indirectly (resulting from population growth and increased numbers of visitors). Traffic congestion has a daily impact on individuals – affecting their ability to access services and to enjoy life. Concern about traffic congestion also reflects a wider concern about pressure on infrastructure.

Because issues associated with increased traffic are such a significant issue to the community, we have worked with Abley Consulting to identify the Transport Network Costs for each scenario.

[60] (Ernst and Young, 2012)

[61] (Rationale, 2017, pp. 34-35). The analysis was completed using the Queenstown-Lakes District Transportation Model. Analysis of two key model outputs has been undertaken using vehicle operating costs and the value of time using the NZ Transport Agency Economic Evaluation Manual procedures. Costs have been calculated by estimating the travel time and vehicle operating costs when there is no congestion present and comparing this to the base model congestion considering the traffic demand by time of day and network operating conditions.

4.3.2 Sense of community

A sense of community can broadly be thought of as the feeling of belonging. Members of a community feel that members matter to each other and to the group and that members' needs will be met by the community group.[62] Factors that affect a sense of community include:

- social inclusion and cohesion
- connectivity.

Social inclusion and cohesion

While not the same, the concepts of social inclusion and cohesion are closely related. Social inclusion facilitates participation in society for all groups in a community, particularly those who may be disadvantaged because of age, sex, disability, race, ethnicity, origin, religion, or economic status. Social cohesion refers to the ability of a community of people to live together in harmony. Social inclusion should contribute to making communities more cohesive. An inclusive and cohesive community welcomes diversity and embraces greater equality and tolerance.[63]

The social impacts of economic growth contribute to social inclusion and cohesion by positively impacting employment opportunities and income levels. As discussed further on page 71, airports contribute both directly and indirectly to employment opportunities for the surrounding communities. Greater employment opportunities and career choices are likely to contribute to greater social inclusion and cohesion and a greater sense of community. Employment opportunities enable people to earn income to pursue their interests and life goals and to connect with friends, family, and other members of their community.

Feedback from our survey suggests that some respondents perceive a link between cultural diversity and social inclusion and cohesion. Some respondents are concerned about a lack of social cohesion that may result from population growth and increased diversity. Other stakeholders perceive positive social benefits from cultural diversity. Some stakeholders are positive about the impact of the Airport on cultural diversity because they see Queenstown as "New Zealand's smallest big city" and celebrate the vibrancy of a diverse population. Some stakeholders see International students as adding to this diversity. These stakeholders perceive that the Airport is a key aspect of the district infrastructure that enables the Queenstown-Lakes district to attract international students.

Our engagement process surfaced significant division among community members, particularly in Wānaka. This division was focused on Airport expansion but appears to be more generally related to tourism and growth. Divergent community opinions on airport development may in itself lead to reduced community cohesion. Social inclusion and cohesion are complex, multidimensional constructs. The Airport's contribution to social inclusion and cohesion, through its direct and indirect role in generating employment, is likely to be relatively small. Other factors designed to target social inclusion and cohesion more specifically, such as policies to improve access to resources, giving marginalised members of society a voice and improving tolerance for diversity, are likely to have a bigger impact.

Connectivity

Airports enable people and businesses to connect more easily. This connectivity supports both the social and economic well-being of communities. The economic benefits of connectivity include improved productivity, reduced business costs, enhanced business relationships and

[62] (McMillan & Chavis, 1986)

[63] (United Nations, 2016)

investment opportunities, support for tourism and the facilitation of goods, services, and events. These are discussed in more detail in Appendix 4.

The opportunities air travel provides enhances people's quality of life and mental and physical well-being. Affordable air travel allows people to visit family and friends, facilitates recreational and leisure activities, facilitates educational opportunities, broadens perspectives, and increases national cohesion.

Our engagement found that the ability to easily travel by air for business or pleasure is by far the direct benefit of airports that receives the most positive sentiment from stakeholders. This impact was identified by 53% of respondents as one to the top 3 positive impacts of importance of them. In addition, 51% of respondents are positive about the impact of current airport infrastructure on their ability to easily travel by air and 12% are negative.

Stakeholders had many personal and professional reasons for valuing ease of travel highly, for example for holidays and work trips; to stay connected with family that have moved away; and to attract family that have moved away to come back to the district.

Insights from focus groups suggests that residents who have moved to the district more recently value connectivity more highly, as it enables them to remain connected with friends and families throughout New Zealand/overseas and/or work remotely for businesses outside of the region, for example. For some people, the current Airport infrastructure was a deciding factor in their move to the district.

In contrast, longer-term residents will naturally have seen a greater degree of change in the area generally, and in relation to the Airport infrastructure and its impacts.

For those who viewed easy air travel negatively, this was driven by a number of factors including environmental impacts, an economy overly dependent on tourism, and biosecurity risks.

Visiting family and friends

Air transport allows people to visit friends and family in other parts of the country and other parts of the world relatively easily, quickly, and affordably. Without air transport it would be more difficult to maintain these close social connections which are important for people's well-being.

About 10 percent of passenger trips through Queenstown Airport are by locals. Many of these will be visiting friends and family. Similarly, of the 40 percent of domestic visitors flying into Queenstown Airport, a number of them will be coming to visit friends and family.

Leisure and recreation

Air transport allows people to travel to many different destinations for holidays and recreational activities. There are many noted benefits of travel such as broader perspectives, ability to rest and recover away from the day to day home and work environment, and new experiences stimulating fresh ideas and innovation.[64]

Recent research[65] found that local people benefit through the leisure impacts of increased connectivity. The increased availability of flights to different places, reduced cost of travel and improved passenger experience all contribute to the benefit. The analysis showed statistically significant positive effects of leisure abroad improving mental and physical health, as well as boosting productivity.

Without an easily accessible airport, travelling on holiday would be both more time consuming and more costly.

64 (Ernst and Young, 2012)

65 (Airports Commission, 2015)

Events

Access to the airport is likely to increase the number of events that occur in the Queenstown-Lakes district. Events encompass both leisure and business activities. These events have economic benefits through income generation and employment and social benefits such as increasing access to recreational and cultural experiences. The Queenstown-Lakes district is popular destination for corporate conferences, sporting events and festivals. Ease of access because of the existence of the airport is likely to be a significant reason that many of these events are held in the area.

In the year to June 2019, 75,000 delegates spent about 120,000 visitor days across 1,130 single-day and 491 multi-day events. The Queenstown-Lakes district has about 3% market share of business events in New Zealand.[66]

Access to education

Air transport makes it much easier for local people to attend higher education institutions such as universities (in New Zealand and abroad) while maintaining their connection with home. The individual benefits from higher education and the community also benefits if they return to the region to apply their knowledge and skills.

Regular and affordable flights to Auckland, Wellington and Christchurch allow tertiary students quick and easy access between tertiary institutions and their families.

National connectivity

Accessible and affordable flights for both business and leisure supports greater national connectivity. Greater national connectivity supports increased national cohesion and a stronger national identity.[67]

The Airport provides affordable and regular flights to the three main centres of Auckland, Christchurch, and Wellington. These three centres provide connections to all other provinces that have scheduled air services.

4.3.3 Health and well-being

Airport development can have direct and indirect impacts on people's health and well-being. This impact considers the aspects of health and well-being that may be impacted by airports, both directly and indirectly. It includes consideration of:

- mental, physical, and spiritual health
- fear and perceptions
- safety and security of air travel
- lifeline utility.

Mental, physical, and spiritual health

Airport development impacts people's mental, physical, and spiritual well-being largely through the impact of noise generated by aircraft. Aircraft noise impacts people's health mostly through annoyance and stress.

Our survey found that 31% of respondents perceived the mental and physical health impacts of current airport operations negatively. For some stakeholders, negative sentiment is driven by concern about the direct impacts of noise and pollution, particularly as they affect residents living and going to school near airports. These concerns are not limited to local residents but are voiced by other stakeholders as well. Some respondents experience their own quality of life through the natural environment. Their

[66] (Ministry of Business, Innovation & Employment, 2019)

[67] (Ernst and Young, 2012)

perception of airport impacts on the natural environment impact how they experience recreational activities and their general health and well-being.

The health and well-being impacts of noise are discussed further in Appendix 4, and airport impacts on the natural environment are discussed further in Appendix 5.

Fear and perceptions

People's fears and anxieties and their perceptions of impacts should be regarded as real social impacts and therefore should be considered appropriately. The degree of fear and anxiety that people experience in relation to future development projects is largely dependent on contextual factors relating to engagement. Engagement that the community considers to be genuine, considers the views of all stakeholders and incorporates appropriate mitigation actions is much more likely to reduce social impacts related to perception, fear, and anxiety.[68]

The extent and effectiveness of the project's community engagement has a considerable bearing on the amount of fear and anxiety generated. The extent of social impacts experienced is largely contingent on contextual factors such as the genuineness of the engagement mechanisms used, and the extent to which the views of all stakeholders are considered and reflected in the various reports and mitigation actions.

Stakeholders' perceptions of airport impacts are informed by their views on wider contextual matters. Specific to the Queenstown-Lakes district, feedback signalled that stakeholder sentiment may be influenced by issues including lack of trust in Council processes related to airport management, views about growth and its relationship to airport activity, desire for airport planning to be undertaken in a different way (i.e. at the regional level for the lower South Island, or the whole of the South Island; or at a system level alongside other forms of transport infrastructure), and concern for alignment to other Council objectives and plans, in particular Climate Change.

While many of these contextual matters may not be directly related to airport activity, they influence stakeholders' perceptions and should be considered by Council in forming their decision about airport expansion.

Safety and security of air travel

Safety and security of air travel should be considered from both the perspective of the traveller and those living near an airport. Terrorist activities such as the 2001 airplane hijackings have had lasting impacts on safety and security measures implemented in aviation world-wide.

While the New Zealand aviation sector is generally considered to be a relatively low risk target for terrorist activities, this risk does increase slightly as aircraft movements grow.[69]

Increased traffic movements may also increase the likelihood of an aircraft incident as an aircraft takes off or lands at an airport. While an incident is a possibility, the likelihood is very low. The International Civil Aviation Organisation's global accident rate provides an indication of safety performance of scheduled commercial fixed wing operations. In 2018, there were 2.6 accidents per million departures. To date, there have been no fatal accidents at Queenstown Airport.

Peoples' perception of the current impacts of airport operations on the safety and security of air travel were somewhat unexpected. Our survey found that 33% rated the impact of the safety and security of air travel positively, and 15% negatively. Of the negative responses, some stakeholders commented that they are very concerned about the flight safety risks posed by the

[68] (Ernst and Young, 2012)

[69] Low risk should not be considered as no risk, as the Christchurch mosque shootings in March 2018 illustrates.

surrounding terrain, runway and/or weather conditions experienced at Queenstown Airport. These concerns are particularly strong for some local residents and business owners, who identified concern about whether the local health system could cope and the flow on negative economic impacts if a serious incident were to occur. Road safety is also an area of particular concern for many stakeholders both in terms of the quantity of traffic on the road from the current Airport to Wānaka and the driving experience of international visitors using roads from the Airport to other parts of the district.

We are unsure why 33% of respondents rated the impact of airports positively. It may be that the safety and security standards in place at the airport make people feel safe and secure. It may also be that people feel that the Airport's role as a lifeline utility makes them feel safe and secure. This is discussed further in the following section.

Lifeline utility

Airports play a critical role in supporting community well-being in the event of a national disaster, civil emergency, or medical event. In the event of a natural disaster or civil emergency, such as a weather event that closes road access, airports provide a lifeline by which aid can be delivered, or people can be evacuated.

Airports also play a role in facilitating emergency healthcare. Individuals requiring care can be transported to appropriate medical facilities much faster than alternative forms of transport. This also applies to the time critical transport of organs for transplantation and their supporting medical teams. Faster access to medical facilities is likely to contribute to better health outcomes.

Every flight into Queenstown Airport would have freight capacity to provide essential supplies (such as food, medical supplies, and personal protective gear) in the event of an emergency.

Feedback during our engagement found that people really value the role that existing Airport infrastructure plays in providing a 'lifeline' for the district, both in terms of medivac and a link to the outside world if a serious event were to impact roads.

4.3.4 Material well-being

People's material well-being is impacted by a number of factors associated with airport development. This includes:

- house prices and affordability
- cost of living
- jobs and incomes
- property rights.

House prices and affordability

House prices are impacted both directly and indirectly by airport development. Property values for houses located close to the airport and that are severely impacted by aircraft noise are likely to be negatively impacted. However, airport development may also positively impact house prices by facilitating growth. This is more likely to be the case for houses not significantly impacted by noise.

Airport development can have a positive impact on houses located near the airport that are not significantly impacted by noise. Some research suggests that lower priced areas may be more likely to experience an uplift in value

than moderate and more highly priced areas if the Airport and surrounding businesses create a higher proportion of lower-skilled jobs.[70]

Housing affordability may also be impacted indirectly by airport development facilitating growth. If the supply of housing is unable to keep pace with demand from population growth, then housing costs may increase by more than income, making housing more unaffordable.

Housing affordability is a well-known concern for both buyers and renters in the Queenstown-Lakes district. The Queenstown-Lakes Community Housing Trust has found that,

> *"while there is a steady stream of people willing to move into the District, an unusually high percentage of these people leave the district after 12-18 months. The reasons cited are usually due to the high living costs, with the largest of those being the cost of living."*[71]

Housing affording measures, such as the cost of housing for first home buyers, highlight the financial stress new home-owners face.

The house price to income multiple for the Queenstown-Lakes district in March 2020 was 14.5. This is more than two times less affordable than the national multiple of 7.2.[72]

Untangling the causes of housing affordability is a complex area. Increasing demand for housing driven by growth is just one of many factors. Other factors include:

- land use and planning regulations
- the cost of building materials
- the number and scale of land and building developers
- availability of skilled labour
- holiday homes.

Historically, the Wakatipu land development market has been characterised by relatively few players of any scale. This has limited both price competition and supply. Construction costs have been above national averages, in part driven by a shortage of labour. The supply of land was also restricted by zoning regulations.[73] The Queenstown-Lakes district housing stock is also characterised by a relatively high proportion of holiday homes and homes listed for rent on sites such as airbnb, which are not available to residents.

Housing affordability was one of the top 3 negative concerns for 9.6% of survey respondents. In addition, 45% of respondents viewed the impact of current Airport operations as being negative, while 9% viewed this impact positively. Both housing affordability and access to secure housing are concerns for many stakeholders. They experience high rents and housing shortages due to high demand for housing, housing being made available for airbnb holiday let rather than longer-term rental and seasonal peaks in demand. The Airport is seen to impact housing affordability indirectly by contributing to growth and tourism.

While respondents are concerned about housing affordability, the drivers of housing affordability in the district are many and complex. It is likely that the Airport, through its facilitation of growth, has only a minor impact on housing affordability.

Cost of living

The biggest impact on people's cost of living is housing costs. As discussed in the section above, housing affordability is a significant concern for the Queenstown-Lakes district.

70 (Ernst and Young, 2012)

71 (Community Housing Trust Queenstown Lakes, 2020)

72 (Interest.co.nz, 2020)

73 (Highlander Trusts Limited, February 2019)

Cost of living was one of the top 3 negative concerns of current Airport operations for 6.7% of survey respondents. When the responses from those that viewed housing affordability as one of their top 3 negative concerns are added, 16.3% of respondents rated cost of living as one of their top 3 concerns.

Similar to responses for housing affordability, airport impacts on cost of living was rated negatively by 43% of respondents, and positively by 10%. Stakeholder sentiment about airport impact on cost of living is tied to the tourism-based economy that airports are seen to enable. The direct and indirect financial burden of airport development and maintenance on rate payers was identified by some stakeholders as negatively impacting cost of living. Wānaka residents had especially negative concerns about the cost of living (88% responded negatively).

Young people of working age were also concerned about cost of living in the district. Feedback from this group was that they are concerned about the cost of living and housing shortages that they experience as a result of rapid population growth.

Like housing affordability, the Airport has only a minor impact on cost of living through its facilitation of growth.

Jobs and incomes

Employment provides people with the income needed to fund the cost of living, to pursue their interests and to participate in society. The earlier section on social inclusion and cohesion provides more discussion on how employment and income contribute to people's way of life.

42% of survey respondents are positive about the impact of current Airport infrastructure on employment and job opportunities; 13% are negative. 32% of respondents identified this impact as one of the top 3 positive impacts of importance to them.

In 2019, we estimate that the airport directly and indirectly contributes about 7,500 FTE jobs in the Queenstown-Lakes district. The mean income in the district is $55,000, which is 88 percent of the mean income nationally.

Jobs and incomes are explained in more detail in the economic impacts section of our report on page 95.

Property rights

The goal of land use planning is to ensure the optimum use of land spaces. Planning provisions provide rules on the type of uses permitted for different classifications of land. Land uses around airports are typically restricted to activities suitable for the level of noise. Those located within noise contours are subject to planning controls. Land use and planning controls around the airport are discussed further in Appendix 4.

Currently, 791 residential properties sit within the noise boundaries of Queenstown Airport. Based on per household population estimates (Census 2018) for the Queenstown-Lakes district, this is approximately 2,350 people. There are an estimated 5 houses within the current Wānaka noise boundary, which equates to approximately 15 people.

Previous feedback to QAC's noise boundary consultation in 2018 highlighted the concerns that both businesses and residents have about additional restrictions required under the district plan for those within expanded noise boundaries. Property developers noted concerns that their development options would be impacted in the future and with increased costs from meeting higher acoustic treatment standards. Local schools and the Southern District Health Board also commented on the additional cost of future development and expansion.

4.4 Cultural impacts

Table 11: Cultural impacts summary table

	Impact	Description	Interconnected impacts and activities	Ability to measure
Cultural	Cultural diversity	This impact considers the effects airports can have on the variety of different cultures and ethnic groups in a community.	Way of life, health and well-being, sense of community	Ethnicity groups and nationality statistics can be gathered.
	Cultural heritage	Refers to impacts on the valued and inherited ways of living (values, customs, and practices), objects, and places of significance, from past generations.	Natural environment, way of life, health and well-being, sense of community	Able to measure impacts of physical/tangible heritage. Intangible is perceptive and complex.
	Kaitahutaka, Māori values	The core principles and ideals on which Māori live. These may include Rakatirataka, Kaitiakitaka, Whanaukataka, Manaakitaka.	Natural environment, way of life, health and well-being, sense of community, material well-being	Requires ongoing dialogue with Māori and an awareness of what these values are to determine likely impacts.

Cultural impacts refer to impacts on people's customs, values, traditions, and ways of living within the Queenstown-Lakes district. It encompasses the culture embedded in the community in both a tangible and intangible form. Tangible 'culture' refers to artefacts, objects, and sites of significance.

Cultural impacts from airport development are highly location and community specific. They are often felt by different community groups and demographics differently, as culture is very much linked to one's own way of life, identities, and values.

During our stakeholder engagement, Te Ao Māori was often referenced in relation to cultural impacts. However, most of the discussion and sentiments around cultural impacts more generally related to the visitor and population growth that airports can facilitate. Most people saw increased visitor numbers as having an impact on cultural diversity, and most viewed this positivity (although some did not), yet there was a strong desire for communities in the Queenstown-Lakes district to protect their past and current way of life. The following discussion provides more depth on specific cultural impact areas which touch on this.

> *"This is our place, our turangawaewae, not even taking into account Te Ao Māori.... our community, our culture, let the maunga speak, and the lakes and rivers. They are crying no more!"*

4.4.1 Cultural diversity

Cultural diversity refers to the variety of different cultures and ethnic groups in a community. Airports can have a direct impact on cultural diversity in a community through their own hiring and operational practices in which different people can be employed across the Airport precinct.

Airports can also facilitate cultural diversity through the visitors and residents they support, the connectivity they provide and the new jobs and businesses that are able to flow from this. This often ads vibrancy to an area and leads to diversity of thought and differing ways of life, which is generally seen as valuable. However, it can also lead to divides within a community if different people fail to respect, understand, and learn from each other.

Within the Queenstown-Lakes district there are many nationalities, and people generally welcome cultural diversity. However, there is some concern that welcoming more visitors and people into the Queenstown-Lakes district will negatively impact the culture of Queenstown-Lakes district communities. 21% of survey respondents felt positively about the impacts an airport development may have on cultural diversity. Some of these stakeholders are positive because they see Queenstown as “New Zealand’s smallest big city” and celebrate the vibrancy of a diverse population. Others noted how great this diversity is for the entire region.

“I would love to see more travel options in the region. I see it as a positive to have more people and cultures in the region.”

However, an almost equal percentage of survey respondents (18%) felt negatively about these impacts, and most stakeholders had mixed (25%), or no strong feelings (36%) about cultural diversity impacts. Mixed views have implications for residents and for visitors, in terms of how welcome they feel and their sense of safety, belonging and well-being. Most of the negative sentiment towards cultural diversity impacts was linked to growth and tourism in the Queenstown-Lakes district rather than directly attributable to airports. There was a concern that a lack of social cohesion may result from population growth and increased diversity in the Queenstown-Lakes district.

4.4.2 Cultural heritage

Cultural heritage refers to the ways of living and things of value that have been passed on from generation to generation. It is made up of tangible elements such as artefacts, buildings, and places of significance, and intangible elements like a community’s values, customs, and practices.

Airports themselves have a history and a story, and as a gateway to an area they often symbolise the changing times of a place. They can often become synonymous with a place too. Heathrow Airport is a good example of this. Airports are also reflected in the memories people hold of their connections to a place and their experiences of the way of life within these communities.

How an airport operates and positions itself in the community can also set a precedent for community values and impact the way of life that gets passed on to future generations. Within stakeholder engagement this sentiment was often reflected, noting that airports in the Queenstown-Lakes district could implement new technologies, and operate as a low carbon, eco-friendly precinct, therefore spurring the creation of a low carbon culture in the district.

More tangibly airports can immediately impact the cultural heritage of a place through their location and construction. Construction of an airport may intrude on an area of historical and cultural significance. While this is unlikely to happen in the Queenstown-Lakes district due to planning requirements and adequate consultation which seeks to protect these areas, there are some heritage sites surrounding Queenstown-Lakes district Airports which development could impact.

There are a number of heritage sites within close proximity to Queenstown Airport. At least 6 are within 0.5 km of the Airport land area. The hills and rivers surrounding Frankton are also wāhī tūpuna, culturally significant places for Māori and their ancestors, as is Lake Wakatipu, which is also very close to the Airport. While there no sites of significant within 2 km of the Wānaka Airport land area, the Upper Clutha River is adjacent to the airport and this is also regarded at wāhī tūpuna.

Māori are concerned about the desecration of wāhī tūpuna, where development, operations and visitors can cause significant cultural and spiritual harm as people interact with these areas. As kaitiaki of those sites, Māori see them themselves as having the responsibility to protect and, at

times, restrict visitors and developments in those areas[74]. Ongoing discussions are needed with the councils tiriti partner on how wāhī tūpuna sites may be affected by airport development.

In our stakeholder engagement, 31% of survey respondents are negative about the impacts airport development generally have on cultural heritage. 21% have mixed feelings, 37% have no strong feelings and 11% are positive about the impacts. Most concerns about airport development impacting cultural heritage are linked to the Airport's role in facilitating population growth and tourism. It was clear through stakeholder engagement that the Queenstown-Lakes district community has a high desire to protect and preserve the unique culture and ways of living that past and current generations have been able to experience.

In Wānaka this culture was described as a "laid back family, friendly culture" and "a pleasant Kiwi town", whereas Queenstown was referred to as a 'tourist hub' with a more international and mixed culture.

Comments were made on how tourism left towns with "no soul or culture to experience" and that through airport development the "extra flow of visitors will change our lifestyle and unique culture forever."

The desire to protect cultural heritage and diversity was much more noticeable in the Wānaka community areas, particularly the Wānaka Surrounds and Rural areas. These residents within the survey see the impacts of airport development as having a negative impact on cultural heritage at rates of 10 percentage points higher than most other communities in the Queenstown-Lakes district.

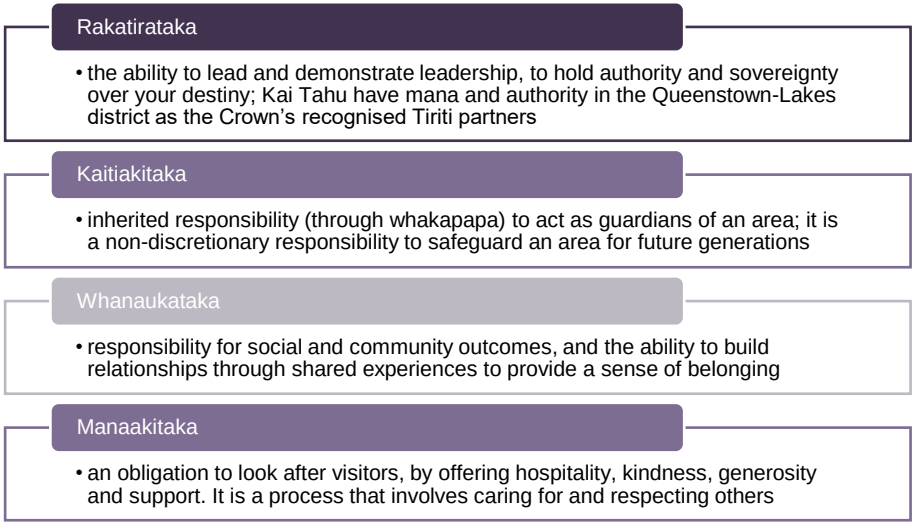
[74] (Parliamentary Commissioner for the Environment, 2019)

4.4.3 Māori values

Māori values were mentioned by stakeholders throughout focus groups and surveys as being important to the community in the context of airport operations and development.

Four Māori values[75] were identified through discussion with Aukaha. These values spring from whakapapa and the rights and obligations that this brings, as well as mana and mauri.

Figure 8: Kaitahutaka, Māori values



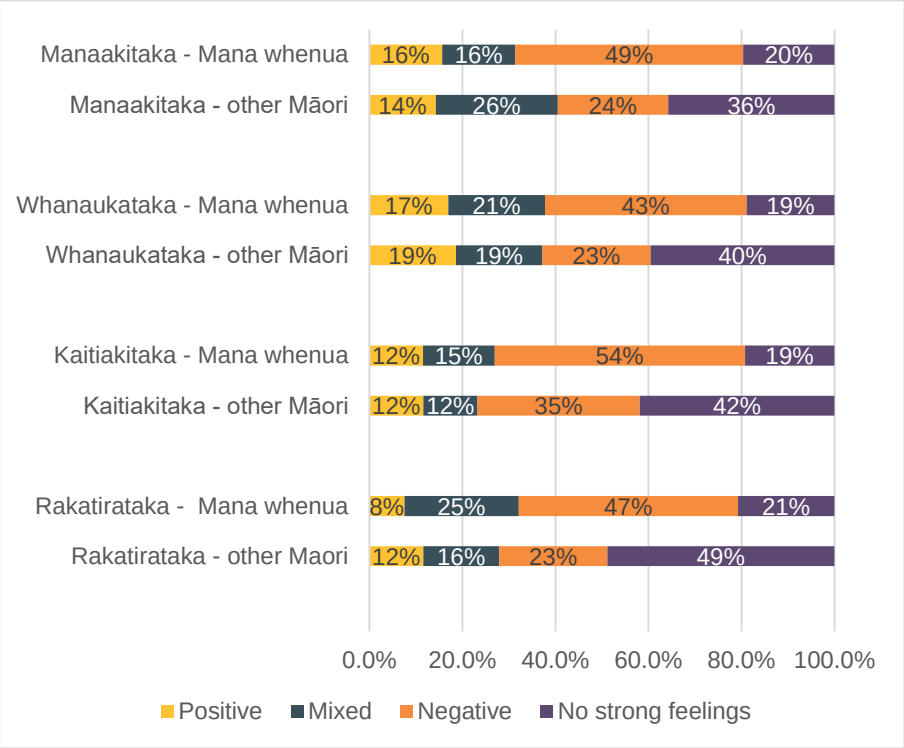
Within our engagement we asked Māori respondents how they felt airport development may impact on these values and their ability to live by them. Survey respondents who identified as being of Māori descent with whakapapa to mana whenua were asked about the impacts of airport activity on Kaitahutaka in four domains. Māori respondents that do not whakapapa to mana whenua were asked about impact on Te Ao Māori values in the same domains.

Sentiment from both of these groups is presented in Figure 9, and shows a higher level of concern about negative impacts among mana whenua than other Māori survey respondents.

- Other Māori respondents (those who don't whakapapa to the area) were more likely to select 'no strong feelings' – this makes sense, as the four values all spring from whakapapa.
- Across all the values, small numbers expected positive impacts (ranging from 6 to 12 mana whenua respondents out of 71; and ranging from 8 to 12 other Māori respondents out of 64).

[75] The values were presented in Kāi Tahu dialect and not translated into English, following the advice of Aukaha. They were presented as Kaitahutaka values to mana whenua, and as Te Ao Māori values to Māori.

Figure 9: Mana whenua and other Māori respondents' – potential impacts of airport development on values



Source: MartinJenkins Airport Impacts Survey

Kaitiakitaka

Over half (38 out of 71, or 54%) of mana whenua respondents think kaitakitaka would be negatively impacted by future airport development; (11) thought the impacts would be 'mixed'. This compares to 35 percent for other Māori. A similar proportion (12%) felt airport development would have a positive impact.

Interviewees talked of their vision for their mokopuna and the need to look after the area far into the future – for seven generations. The area needs to be safeguarded both socially and culturally to ensure mokopuna can gather kai, visit wāhi tūpuna and nohoanga.

The ability to maintain cultural practices is dependent on being able to access and use land. This allows connections to be maintained, spiritually and physically. Rivers were identified as particularly important, as they are a part of whakapapa.

Kaitiakitaka is important for both traditional and modern practices, such as tourism. Kaitiakitaka in the context of tourism implies sustainable tourism that does not restrict mana whenua access to an area. There was concern that 'quantity' of tourists is being prioritised over 'quality' tourism experiences – having too many tourists makes it difficult to act as guardians and risks the loss of wairua. There is also concern that if development continues in the area, this could lead to conflict between mana whenua in the role as guardians, and developers who do not understand this.

Manaakitaka

Just under half (35 out of 71, or 49%) of mana whenua respondents think manaakitaka would be negatively impacted by future airport development; and 16 percent thought the impacts would be 'mixed'. For other Māori, just under a quarter felt manaakitaka would be negatively impacted while 26 percent had 'mixed' feelings.

Interviewees talked of being obligated to act as good hosts and to respect visitors and other residents in the area. This was seen as a two-way process that mana whenua need to continue to engage in, understanding how to look after the wishes of others, with the expectation that visitors and other residents will also respect mana whenua.

There was concern that the area is moving into a ‘fast food’ model of tourism, which erodes the quality of experiences, making it difficult for mana whenua to authentically engage and host visitors.

Rakatirataka

Just under half (33 out of 71, or 47%) of mana whenua respondents think this would be negatively impacted by future airport development; and a quarter (18) thought the impacts would be ‘mixed’. Almost half of other Māori had no strong feelings about rakatirataka.

Interviewees talked about the fundamental importance of rakatirataka, and the rights that come from settlement and being a tiriti partner. This underpins all other values and stems from both spiritual and physical power.

Rūnaka being fully involved by the QLDC in decision making is a positive reflection of Kāi Tahu rakatirataka in the area, and interviewees had a very strong expectation that this would continue and that the QLDC will continue to treat them as partners (rather than as another stakeholder group). There was concern that decision making should not be led or unduly influenced by the Queenstown Airport Corporation, as they are not required to work in partnership with Kāi Tahu.

Whanaukataka

A lower number thought this value would be negatively impacted (31 out of 71, 43%), but the proportion is still high. One-fifth (15) thought the impacts would be ‘mixed’. Whanaukataka also had the largest proportion of positive respondents across the four values.

Interviewees talked about the importance of maintaining social connections and keeping whakapapa alive. There was concern that the cost of living in the area is having a negative impact on social connections amongst mana whenua, as younger generations are not able to afford to live where their tūpuna traditionally lived. Currently there are around 400 Kāi Tahu in the area, but they are a ‘hidden’ group as many feel they do not look Māori.

The high number of transient and temporary workers also has a negative impact on the community’s ability to build a sense of belonging and to support each other.

General feedback from mana whenua stakeholders

All of the interviewees expressed concern about airport development leading to greater numbers of visitors, and the negative impacts increased visitor numbers would have on the quality of experiences, and locals’ day to day lives (including overcrowding in areas of natural beauty, increased costs of living, and traffic congestion). They also expect negative impacts on the environment if there are increased numbers of aircraft movements – in particular, on the area’s natural beauty and tranquillity.

The protection of Wāhi Tūpuna is of particular importance to Kāi Tahu. These are officially recognised in the Crown’s Tiriti Settlement with Kāi Tahu and are included in the District Plan. Their inclusion ensures airport development options do not impact on these areas of high cultural importance.

One interviewee also noted that Kāi Tahu are not against development, and that Kāi Tahu have commercial interests including in tourism. They expect to be able to benefit from development so long as it is done well and within sensible limits, and that both spiritual and physical interests are balanced. Survey comments from mana whenua and other Māori showed a mix of sentiment, including those who actively support growth and development (if it is done well), others who were happy with the current state, and others who are unhappy with the current state and who oppose any further growth and development.

4.5 Environmental impacts

Table 12: Environmental impacts summary table

	Impact	Description	Interconnected impacts and activities
Environmental	Noise	Noise is an unwanted sound. In relation to airports this is predominantly due to aircrafts taking off and landing. This impact considers the number of people effected by noise due to airports.	Health and well-being, natural environment, material well-being (property values)
	CO_2, other emissions, climate change	Refers to the greenhouse gases and particles emitted by airport activity, with aircrafts being the largest emitter. Climate change is a flow on impact of these emissions.	Natural environment, air quality
	Air quality	Air quality refers to the extent to which the air is pollutant free. This impact considers how air quality changes due to airport construction and activities, like fuel combustion from aircraft which release pollutants, gases, and particles into the air.	Natural environment, health, visual pollution, CO_2, and other emissions
	Visual pollution	This impact considers how someone's view of their natural/and or man-made environment may be impaired by aircraft movements, and airport related construction and operations.	Natural environment, cultural heritage, Māori values
	Waste and waste-water	Refers to the consumer and business rubbish, food waste, wastewater, and bio-security waste produced and disposed of.	Natural environment, cultural heritage
	Water quality	Refers to the clarity and general ecological conditions of the water body such as lakes, rivers, and ground water. Sediment and polluted run-off from airports can impact water quality.	Natural environment, cultural heritage, Māori values, way of life
	Natural environment	Refers impacts on the natural landscapes and flora and fauna that inhabit those landscapes.	All environmental impacts, way of life, health and well-being, cultural heritage, Māori values

Environmental impacts associated with airports tend to be negative or at the very least negatively perceived. For the most part, the level and extent of the direct impacts are highly dependent on the management of airport activities, the location of the airport, supporting infrastructure and planning requirements. Other impacts are inherent in an airport's operations and the scale of these impacts is highly dependent on the level of activity itself, and are difficult to mitigate. Noise and emissions from aircraft are examples of this.

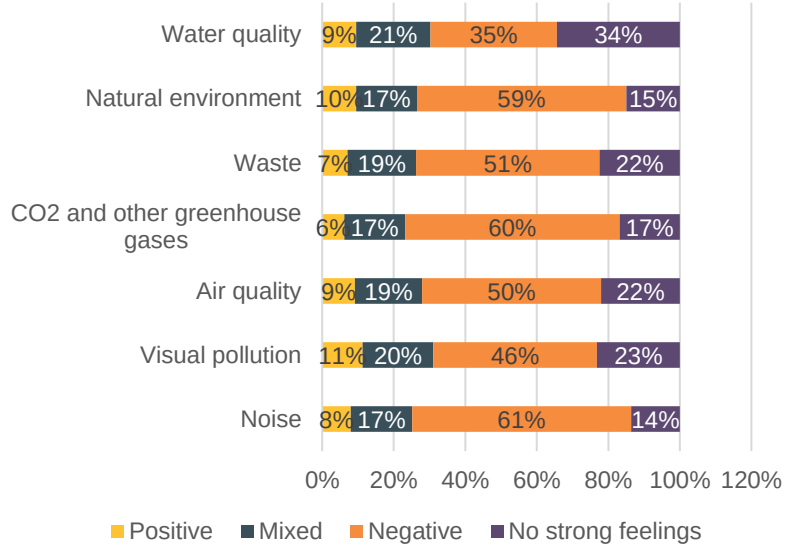
There is also a difficulty in distinguishing one environmental impact from the other as environmental impacts are highly interconnected and are often compounding in nature. Most stakeholders noted this and took a holistic approach to viewing environment impacts.

Overall, views on the environmental impacts of airport development are negative. For all of the environmental impacts we asked about, more survey respondents feel negatively than positively. This is as expected. All demographic cuts reflected the same or similar proportions as the overall cut, with one exception. The small number of survey respondents aged under 15 (n=22) viewed all dimensions especially negatively (71% - 100% negative).

Figure 10 shows survey respondents' sentiment towards current Queenstown-Lakes Airport infrastructure as it relates to a range of environmental impacts.

The following discussion provides more details on each of the environmental impacts in turn and highlights how the impact applies to airport development in the Queenstown-Lakes district. It does not provide a full environmental impact assessment.

Figure 10: Survey respondents' feelings about the potential environmental impacts of current airport activity



Source: MartinJenkins Airport Impacts Survey

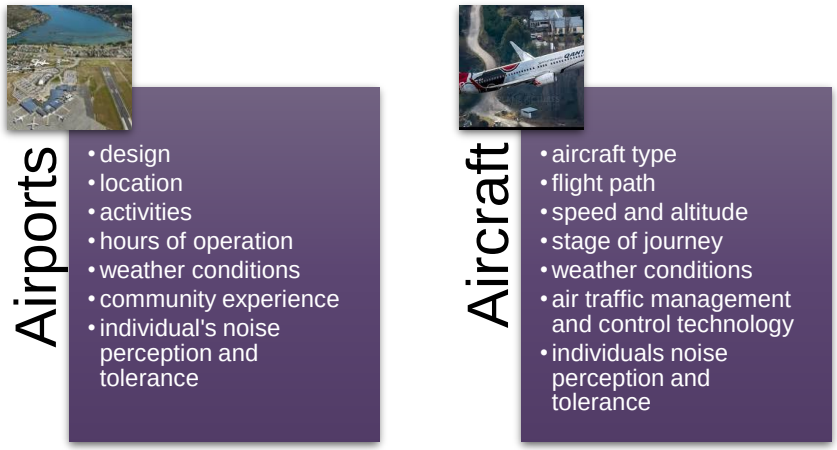
In order, the most negative sentiment from survey respondents were related to noise, CO_2 and other greenhouse gases, and natural environment. Fewer than half of respondents felt negatively about water quality and visual pollution.

4.5.1 Noise

Noise and airports

Noise from an airport precinct is similar in level to other commercial and industrial areas, as people and vehicle activities are carried out. Aircraft are typically the loudest source of airport noise, and its effects are felt the most widely. How noisy an airport's activity is, and is perceived to be, is dependent on a variety of factors. These have been summarised below.

Figure 11: Factors that affect 'loudness' from airports and aircrafts



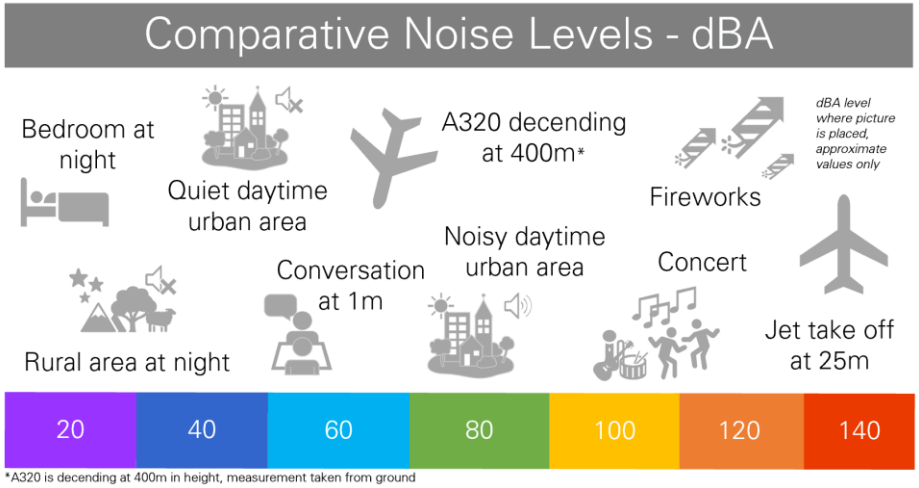
Measurement of airport noise in New Zealand

Aircraft noise levels are measured in decibels (dB) and single noise events are averaged over a 24-hour period to generate a day/night measurement (dB Ldn).

There is a noise penalty of 10dB between 10pm and 7am, which means one flight at night roughly equates to ten flights during the day.

An increase in dB's does not equate to incremental increases in 'loudness'. Changes under 5dB are marginally noticeable to the human ear while changes of 10dB tend to sound twice as loud.

Figure 12: How noise compares



Source: MartinJenkins, based on information from NZTA Fundamentals of Sound; Federal Aviation Administration, Fundamentals of Noise and Sound; and National Air Traffic Services (UK), Noise.

Technology and aircrafts

Jets tend to generate more noise than turboprop aircraft, and turboprops tend to generate more noise than general aviation aircraft.

Aircraft have become significantly quieter over the past three decades, but most of these gains were achieved by the early 2000s.

Prototypes for electric aircraft are already being tested but are unlikely to replace large, long-haul passenger aircraft within the next twenty to thirty years.

Appendix 4 provides more information on the science of noise, aircraft technology, and how noise is created and managed by airports.

Impacts of airport noise

While noise from an airport and aircraft is purely environmental, its effects can also be felt socially, culturally, and economically. The main flow on impacts include:

Environment – tranquillity and wildlife

Noise from an airport has direct impacts on people's ability to experience the tranquilities in an environment. The level of disturbance is relative to surrounding noise levels, with airport noise in urban areas much less noticeable than in rural areas. For Queenstown-Lakes district this would suggest that developing an airport in Wānaka would cause more noticeable noise disturbance than scaling the existing airport at Queenstown.

For wildlife, airport-related noise can be far reaching. Noise-related disturbances can evoke similar physiological responses in animals as in humans, such as increased heart rate and stress. Some animal habitats and feeding and breeding patterns are also impacted by noise levels, but it is difficult to isolate noise as the primary cause of these changes over the long term. Many animals are adaptive when it comes to noise disturbances, but this may mean displacement of them in the environment[76]. This suggests that noise from an airport is likely to disturb wildlife, but the level of impact is dependent on the specific wildlife surrounding the airport location.

Socio-cultural- health and well-being

> *There tends to be an exponential relationship between noise impacts on people and their distance from an airport[77].*

Health impacts from airport noise are mostly psycho-social in nature and are linked to annoyance and stress. Studies suggest that people's level of annoyance with noise is linked to their relationship and attitude to the source and authority over the noise, rather than simply the noise itself[78]. This appears to hold true for the Queenstown-Lakes district community, with tensions and concerns over airport noise linked to who has 'control' of this noise.

Noise annoyance levels are also linked to concerns about negative health effects, property values and quality of life impacts, with middle age adults and homeowners experiencing higher levels of aircraft noise annoyance, presumably due to attitudinal and fear factors[79]. This was apparent in focus group sessions in which people raised concern over aircraft noise impacting children and their ability to learn, and people's ability to hold conversations and enjoy their outdoor space at their home.

Even moderate levels of aircraft noise can have high annoyance impacts. Roughly 30% of people, across 15 international studies indicated a high level of annoyance at day-night decibel levels of 65 or below[80]. Living in a daytime aircraft contour of over 55dB's is also negatively associated with subjective well-being measures such as happiness and life satisfaction. Interestingly this aggregate well-being effect was not found to be significant for those living in night-time aircraft noise contours[81]. For Queenstown Airport it is estimated that 280 of the 2,350 people living between the airport and outer noise boundary are highly annoyed by aircraft noise.

76 (Department of Conservation, 2011)
77 (Wolfe, et al., 2014)
78 (World Health Organization, 2018)
79 (Schreckenberg, Meis, Kahl, Peschel, & Eikann, 2010)
80 (Schreckenberg, Meis, Kahl, Peschel, & Eikann, 2010)
81 (Airports Commission, 2015)

Airport-related noise impacts on people's quality of life, as people living close to the airport are unable to experience a peaceful outdoor environment, may be disrupted while sleeping, need to keep their windows closed in summer and have their conversations interrupted by low-flying aircraft. A few people noted that indoor conversations had to be stopped when big jets take off and land at Queenstown Airport. People's ability to connect with their environment on a spiritual level can also be disturbed by noise. These lifestyle impacts, noise annoyances and sleep disturbances have health effects such as hypertension, cardiovascular effects, and rising blood pressure[82].

These effects can have flow on consequences, such as increased stress, increased workplace accidents, reduced performance in school and work, and anti-social behaviour[83]. Aircraft noise exposure has been found to be associated with poorer long-term memory and reading comprehension in children[84]. However, there is limited evidence that aircraft noise has an impact on children's attention or working memory[85].

Noting these potentially adverse health impacts, the WHO recommends that average aircraft noise exposure should not exceed 45dB Lden (day-evening-night levels). For night-time, this recommendation is below 40dB Lnight due to affects associated with sleep disruption. When converted to dB Ln this 45dB Lden recommendation means a dB Ln of 45.5, which is a lower maximum than the maximum noise exposure allowed within the noise boundaries in the Queenstown-Lakes district (of 55 dB's Ldn and 65Ldn dB)[86]. This recommendation is met by the mitigation measures QAC uses to reduce the noise exposure for people living in the inner and mid noise boundaries[87].

Economic – residential property values

Noise generally decreases house prices, with properties severely impacted by noise likely to fall significantly in value[88]. However, airport noise is only one factor driving a particular property market. Studies show that socio-economic value factors are more closely linked to property values than aircraft noise impacts. This appears to be the case in the Queenstown-Lakes district with average house values in the district rising by 6.5% per

82 (World Health Organization, 2018)

83 (Ernst and Young, 2012)

84 (Basner, et al., 2017)

85 (World Health Organization, 2018)

86 Conversions are made using table 4b, $Lden^{b}$ to Ldn^{a} in (Brink, Schäffer, Pieren, & Wunderli, 2017)

87 Which is to reduce interior noise to 40dB over a 24 hour period, (Queenstown Airport Corporation, 2020)

88 (Ernst and Young, 2012)

year on average since 2009[89], despite increasing activity at Queenstown Airport.

If not significantly impacted by noise, proximity to an airport can even increase property values[90]. This depends on the perceived value of being close to transport links and people's sensitivity to noise. Houses in lower priced areas are more likely to see these increased values than higher or moderately priced areas[91].

Studies conducted in Brisbane showed that from 1988 to 2017, airport noise did not negatively impact the residential property values in that area. In most cases, properties in these areas had higher average annual capital returns than non-effected properties. There was also no difference in the ability to rent, or the rental rates, between effected and non-effected properties[92].

An independent review of the potential impact of Wellington Airport on property values found that property prices within the Air Noise Boundaries increased with elevation and views as opposed to distance from the airport. The results suggested there was not a strong link between property value and proximity to the airport.[93]

However, there are still minor concerns over airport noise impacting property values in the Queenstown-Lakes district.

Noise in the Queenstown-Lakes district

Current noise boundaries for Queenstown Airport are an Outer Control Boundary area beyond which Ldn should not exceed 55 dB's, and an inner Air Noise Boundary beyond which noise should not exceed more than 65Ldn dB. Approximately 790 residential properties are within the current noise boundaries of Queenstown Airport, which equates to about 1,980 people living in these areas. There are also two schools within the boundaries with a current school roll of 624 students.[94] About five residential properties are currently within the Wānaka Airport noise boundary (roughly equated to 10 people).

While measures have been put in place to mitigate the impact of aircraft noise, population and tourism growth has increased the number of aircraft flying into Queenstown. As aircraft volumes increase, the concerns about noise tends to increase in areas beyond high noise impact areas.

Although the Queenstown Airport Liaison Committee only appears to receive a few complaints at each meeting with most of these related to General Aviation[95], concern over noise has been previously voiced during Airport consultations. Schools[96] who submitted on QAC's noise consultation process were concerned that students learning environments may be disrupted by increased noise. There were also concerns about the increased development costs complying with higher acoustic insulation requirements could cause.

Many community members express concern over noise impacting their ability to enjoy the outdoors and hold conversations. One submission captured this sentiment in a simple line stating:

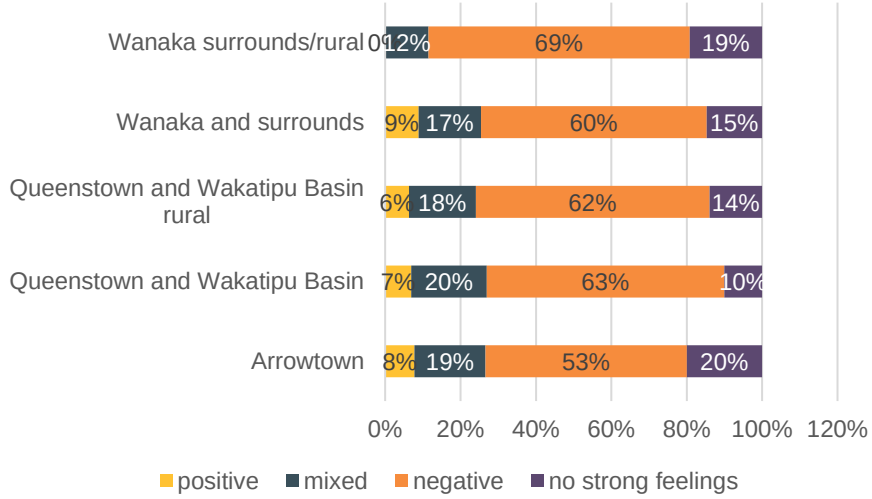
> *"None of us came to Queenstown to live inside*[97]

This sentiment was also reflected in feedback from our community engagement. Noise was one of the biggest concerns for the Queenstown-Lakes district community members and other stakeholders, with 33% of

89 (Infometrics, 2019), see average house values
90 (Eves & Blake, 2018)
91 (Ernst and Young, 2012)
92 (Eves & Blake, 2018)
93 (Wellington Airport, 2011)
94 (Ministry of Business, Innovation & Employment, 2019)
95 Based on a review of the QALC meeting minutes from 2019
96 Wakatipu High School, Remarkables Primary School, Kingsview School and Wakatipu Playcentre.
97 (Kelvin Peninsula Community Association, 2020)

survey respondents identifying this impact as one of the top three negative impacts of greatest concern to them. Different communities expressed varying level of concerns.

Figure 13: Survey respondents' feelings about the noise impacts of current airport activity, by area



Source: MartinJenkins Airport Impacts Survey

Focus group feedback illustrates that concern about noise is driven by a variety of issues. For some people, concern relates to the sound they or others experience from aeroplanes (volume, time of day, location) and its interference with aspects of social and economic well-being:

- on a day to day basis because of where they live, work, or go to school
- in their leisure time and when they are experiencing nature.

Stakeholders are not only concerned about the impact of noise on their own experience. Focus group participants expressed concern also about impact on other residents (in solidarity) and on the visitor experience, and the impact this could have for tourism.

For other people, concern about noise is less to do with their immediate experience and signals instead an understanding that 'noise boundaries' is the lever through which air traffic is controlled, and/or a belief that air traffic is the lever through which tourism / growth is controlled.

This observation aligns with how noise is viewed more generally in other study areas. Noise complaints from airports are often linked to the number of aircraft flying and the cumulative noise events experienced, rather than the noise from single noise events[98]. It is clear that aircraft noise is often seen as a lever for constraining airport activity and growth more generally.

Measuring noise impacts

In this analysis, the number of residential properties and schools that are likely to be in the noise boundaries of each hypothetical scenario have been estimated. The total number of people potentially effected has been calculated based on average household figures, and annoyance curves[99] have been used to determine the number of people likely to be highly annoyed by aircraft noise within the Airport's noise boundaries. More information is provided in Appendix 4.

[98] (Ernst and Young, 2012)

[99] (Miedema, 2001)

4.5.2 CO_2, other GHGs and climate change

Greenhouse gases are linked to the changing temperature of the earth's climate over time. Common greenhouse gases from airport activities include carbon dioxide (CO_2), nitrous oxide (N_2O) and methane (CH_4). Emissions occur:

- during the construction of the airport itself
- through its' ground operations
- via the aircraft and passengers they accommodate.

Aircraft

Aircraft are the largest emitters of GHGs linked to an airport. While it is difficult to attribute aircraft emissions to a specific airport, some estimates indicate that these could make up to 90% percent of an airport's gross emissions[100]. The quantity of GHGs emitted is measured through fuel consumption and flight path variations. Aircraft may also create contrail-cirrus clouds – clouds of tiny ice crystals – when at cruising altitudes, emitting particles such as soot and sulphate, water vapour and other non-CO_2 emissions, which all have in impact on the climate[101][102]. To account for the impacts these have on the earth's climate, scientists apply a 'Radiative Forcing' (RF) multiplier to the quantity of emissions calculated.

Airports

Airports produce emissions during ground operation activities such as using, cleaning, and maintaining vehicles, equipment, and aircraft. Emissions are also released when storing chemicals and other pollutants and through de-icing and anti-icing activities. Other sources of emissions include energy consumption (electricity and gas) and waste and wastewater management across the airport precinct[103].

There is also evidence that the carbon footprint of the materials used in constructing an airport is significant in the whole-life carbon impact of an airport[104] . This embodied carbon can account for as much as 50 percent of the total whole-life carbon impact of an airport[105]. Despite emissions being linked to airport operations, airport operators often only have direct control of around 10% of total emissions[106] with other operators at the airport responsible for the large majority.

QAC is currently completing its own carbon mapping to assess its emissions footprint. This analysis focuses on aircraft movements to calculate the amount of carbon dioxide equivalent that would be produced under each hypothetical scenario.

Passengers

The emissions a visitor creates can be quantified. Overnight visitors can create approximately 12.3 kg of $CO_{2\text{-e}}$ per room per night[107], generate 1.2 – 2.3 kg of $CO_{2\text{-e}}$[108] per day from solid waste they create[109], and produce emissions via road transport. These flow on impacts should be considered

100 (Clouston, 2018)
101 (European Union Aviation Safety Authority)
102 (Gossling & Upham, 2008)
103 (Airport Carbon Accreditation, 2020)and (CRS Report, 2008)
104 (Radio New Zealand, 2019)
105 (Clouston, 2018)
106 (Clouston, 2018)
107 See page 59 of (Ministry for the Environment, 2019)
108 This is waste of unknown composition and without gas recovery emission factors as the landfills Queenstown-Lakes district do not recover gas. See section 9.3 of (Ministry for the Environment, 2019)
109 This is estimated to be 1-2kgs. See (Mateu-Sbert, Ricci-Cabello, Villalonga-Olives, & Cabeza-Irigoyen, 2013). Also see (Jamieson, Kelovkar, Sunalai, & Mandke, 2003)

by decision-makers in relation to airport development. A recent illustration of this is the UK's appeal court decision to rule a third runway at Heathrow Airport illegal, as decision-makers failed to consider the flow on impacts of the development and the UK's climate commitments under the Paris Agreement[110].

Emissions and climate change in the Queenstown-Lakes district

Climate change is expected to have impacts on the Queenstown-Lakes district over the next 80 years, with temperatures estimated to warm by several degrees, snow cover and frost days likely to decrease, and extreme rainfall events likely to become more frequent[111]. This is in part due to emissions.

In 2017, the Queenstown-Lakes district produced about 685,000 tonnes of CO_2 equivalent through the stationary energy, transport, waste, and livestock sectors.[112] This equated to 18.5 tCO_2e per capita in 2017 or 10.8 tCO_2e/capita/year with visitors included (almost double that of the average New Zealand city). Transport made up 50% of these emissions, with 11% of total gross emissions (or 77,750 tonnes of CO_2e) attributable to aircraft in the air, grounded aircraft, and airport vehicles. As previously mentioned, a wider range of emissions will be shown through carbon mapping of the airport, which QAC is currently undertaking.

Throughout community engagement, stakeholders presented strong views about the direct impact of Queenstown-Airport infrastructure on global warming through CO_2 emissions and other greenhouse gases. 60 percent of survey respondents feel that the Airport's potential impact on climate change is negative. We heard repeated concern about incongruity between airport expansion and the districts' climate commitments.

Climate change in relation to airport development was the second highest environmental impact concerning survey respondents. Younger people reported higher rates of concern than older demographics. This finding is consistent with findings from QLDC's Quality of Life Survey 2019, in which 75% of respondents were concerned or very concerned about the impacts of climate change in the district.

Identifying and measuring emissions

In New Zealand, the Ministry for the Environment (MfE) provides organisational guidance for measuring emissions based on a range of international standards and guidelines[113]. This analysis follows the MfE guidance in calculating airport emissions for the key GHGs – CO_2, N_2O and CH_4 – across the four hypothetical scenarios.

There are a range of calculations for the social and economic costs of climate change. Many studies put a financial figure on a tonne of carbon by calculating the social cost of carbon. These social carbon costs are the welfare costs to society that result when one extra tonne of $CO_{2\text{-}e}$ is emitted and impacts on the climate. Calculations however are highly subjective because the models used (Integrated Assessment Models) rely heavily on the modeller's assumptions[114].

Our analysis is based on the emissions price a carbon dioxide equivalent would need to be in order for New Zealand to achieve our emission reduction targets under the Zero Carbon Bill. This price is not the individual price to businesses or individuals but captures the full cost of transitional

110 (Carrington, 2020)

111 (Bodeker Scientific, 2019)

112 That is before forestry and any other offsets are accounted for. For the full report see (Tonkin and Taylor Limited, 2018)

113 (Ministry for the Environment, 2019)

114 Specifically they are the most impacted by assumptions made on the climate damage anticipated and the discount rate applied (Environmental Protection Agency, 2016)

policies. A recent report commissioned by the MfE to inform the Zero Carbon Bill identified a range of prices for $CO_{2\text{-e/t}}$ under two different methods.

A bottom up industry method estimated that the annual average price of $CO_{2\text{-e/t}}$, would in effect be between $76 and $100 between 2018-2050[115], and that this would need to rise to $157 to $250 per tonne by 2050 depending on the pace of technology change[116].

A top-down model estimated that the average annual price of $CO_{2\text{-e/t}}$ would be between $272 – $845 $CO_{2\text{-e/t}}$ by 2050. This range is large due to the varying innovation scenarios in the energy, agriculture and transport sectors which were selected[117].

These prices are used in this analysis to provide a cost range of airport emissions across the scenarios, but they should be read with caution, as indicative, due to underlying assumptions in the original modelling.

More details on how emissions were calculated and costed in this analysis are provided in Appendix 5.

4.5.3 Natural environment

The natural environment in the Queenstown-Lakes district encompasses the lakes (Lake Hayes, Wānaka and Wakatipu), the rivers (such as the Shotover and Kawarau Rivers), the surrounding mountains, the wet and flat lands, and the flora and fauna that inhabit these places. The development of an airport and general airport activities in the Queenstown-Lakes district may change this natural environment. It is likely that this change will be perceivably negative, compounding in nature and linked to a combination of both direct and indirect activities and impacts.

Direct airport activities and resulting impacts on the natural environment include:

- *Visual changes* – an airport precinct and flying aircraft may visually impair peoples' ability to view and enjoy their natural environment. Developing an airport may result in 'greenery' being removed. Visual impacts of an airport do not tend to be as noticeable by communities in urbanised areas, but this does not diminish their impacts on the environment. Questions about preserving more naturally kept environments may be needed[118].
- *Waste creation* – like any large commercial precinct, airports produce large volumes of waste. If this is not managed properly waste may degrade an environment by blowing across land and spilling into waterways. Large waste generation may also lead to higher landfill utilisation and infrastructure pressures (especially for wastewater).
- *Water impacts* – if pollutants, sediment, and surface or rainwater from an airport precinct is not feed into appropriate drainage systems and treated, it may result in run-off into nearby water bodies which changes the mineral content of the water and effects aquatic life. Airport development may require water sources to be diverted or tunnelled.
- *Biodiversity impacts* – construction of an airport may reduce the plants and animals in the area if habitats are fragmented, degraded, or destroyed. This change in habitat makes it difficult for animals to forage for food, breed and migrate. This particularly affects animals who have large land requirements, and/or consistent foraging and/or breeding

115 (Ministry for the Environment, 2018).

116 (New Zealand Productivity Commission, 2018, p. 144))

117 For full technical details of the Computable General Equilibrium (CGE) modelling undertaken by NZIER the reader is referred to (NZIER, 2018)

118 (Aviation Environment Federation, 2008)

patterns[119]. Airport related activities may result in bird strike and roadkill.[120]

- *Emissions, air quality and climate change* – as discussed in the previous section, airports emit gases and pollutants which may cause changes in the natural environment at local and globalised levels.
- *Noise* – noise has an environmental impact mainly caused by aircraft movements. This noise may disrupt the tranquillity of a natural environment and cause animals to change their habitats and feeding and breeding patterns which has flow on changes to natural environments.

Indirect airport activities and resulting impacts on the natural environment

Airports facilitate the movement of people. Many of the more widespread impacts on the natural environment are a function of the passengers arriving through the airport. As with residents, human activity by visitors such as driving vehicles, utilising community infrastructure and spending time outdoors puts pressure on the natural environment.

Distinct to airport passengers are the biosecurity risks that they carry, especially if the Queenstown-Lakes is the first destination passengers arrive at within New Zealand. New Zealand's flora and fauna is both vulnerable and unique and our economy is highly reliant on supporting and protecting these species, while remaining highly connected to international markets[121]. Passengers travelling through the airport, like any airport, may introduce and accelerate the spread of foreign organisms[122], which could have devasting impacts on New Zealand's environment and economy.

How impacts on the natural environment are felt and measured

The true impact of an airport's construction and operations on the natural environment is highly dependent on how its activities are managed and the supporting community infrastructure to enable it to do so. For example, the design of the airport could be made to blend into the landscape to reduce visual impacts. Clear requirements and new technology for managing and disposing of waste, wastewater and run-off and pollutants, can be implemented, and enforced by regulatory bodies and airport policies. Planning guidelines and environmental expert advice can be taken account of to ensure flora and fauna around the airport are protected.

More generally the impacts on the natural environment due to an airport can be felt and measured under the 'four well-being's':

Environmental – environmental based impacts typically compound and result in the degradation of the natural environment. A small body of research exists to support the notion that airports can improve the natural environment through an increased recognition of the need to protect the environment as more people visit and value an area[123].

Social – as the natural environment changes it affects how people utilise and enjoy the outdoors. Negative impacts typically mean people cannot enjoy a tranquil, pure, and pristine environment. This has flow on effects to people's way and quality of life, which may impact their health. It may also change the character of the area.

119 (Aviation Environment Federation, 2008)

120 (Aviation Environment Federation, 2008)

121 (Parliamentary Commissioner for the Environment, 2019)

122 See examples of the incursions of brown marmorated stink bugs between 2018-2019, the spread of didymo across the South Island, the transportation of Phytophthora agathidicida between Kauri forests and the discovery of Undaria pinnatifida in Fiordland, as mentioned in (Parliamentary Commissioner for the Environment, 2019)

123 (Air Transport Action Group, 2005)

Cultural – the natural environment is part of the Queenstown-Lakes district's shared cultural heritage and is inextricably connected to people's sense of identity and place. For Māori there is an inherited connection and a responsibility to act as guardians of the environment and the taonga species that inhabit these areas. Changes to the natural environment impact people's cultural connections with the environment.

Economic – New Zealand's economy is highly dependent on our ability to protect our natural environment. If airports cannot mitigate biosecurity breaches, then our biodiversity dependent industries such as agriculture, horticulture, forestry, and fishing will suffer. Negative impacts on the natural environmental may also result in reduced tourism revenue and local GDP if the ability to attract people to the area is affected.

Natural environment impacts in the Queenstown-Lakes district

The natural environment of the Queenstown-Lakes district is clearly very unique. It is a main factor in what draws people to the area, and it was clear through the focus groups and surveys that people were concerned about the impacts an airport development has on the surrounding landscapes.

- 20% of survey respondents identified impacts on the natural environment as one of the top 3 negative impacts of greatest concern to them.
- 59% of survey respondents are negative about the impact of current airport infrastructure on natural environment; 10% are positive.

At a local level, many stakeholders see the quality of the natural environment as a key asset for the Queenstown-Lakes district. They value protection of the environment and are negative about the direct impacts of airports on the natural environment at the local level: eg visual pollution, air quality, water quality, production of waste. Stakeholders value protection of the local environment for a range of reasons, including because:

- they believe the natural environment has innate value and is worthy of protection
- they experience their own quality of life through the natural environment (e.g. for recreation, health, and well-being)
- it is of value to tourism, and therefore the local economy.

Some stakeholders report positive sentiment about environmental impacts from airport infrastructure. In particular, these are driven by a belief that the existing alternatives for inter-regional travel are more damaging (e.g. road transport) and that emerging technologies will reduce environmental impacts, especially if incentivised.

Observations from the focus groups and surveys about the environment are consistent with the views the Queenstown-Lakes district community expressed in the Quality of Life Survey 2019. The survey finds that people in the community are generally very environmentally conscious. 71% of survey participants made lifestyle changes in the last 12 months to become more environmentally conscious. The most common actions were reducing the use of plastics and improving recycling efforts.

Others in the Quality of Life Survey expressed thoughts that more should be done to protect the environment in the Queenstown-Lakes district, especially within decision making. Comments that the environment should be more of a priority than development and tourism, were also raised. This was consistent with themes noted in our stakeholder engagement.

The environment is clearly important to community members sense of connection and identity with the Queenstown-Lakes district. When asked to name their favourite place in the district and provide a reason as to why this was their favourite, 82% of Quality of Life Survey participants said it was the

environment/physical features that made the place special. Again, this was strongly noted in our stakeholder engagement.

Measuring natural environment impacts

The impacts on the natural environment have not been quantified, but their significance is considered and rated in each of the hypothetical scenarios. Generally, natural environment impacts are a result of people or infrastructure. The impacts are therefore greater as activity increases or where activity occurs in more pristine or less touched areas.

4.5.4 Air quality

Inter-linked with emissions and climate change is the issue of air quality. Airport operations that result in emissions linked to climate change are often the same activities that can cause air quality issues. The combustion of aviation fuel and de-icing of the airfield and aircrafts are two examples[124]. Emissions and climate change also contribute to worsening air quality. However, air quality is a more localised issue than climate change and is linked to pollutants, gases, and particles other than the key GHGs that factor heavily in climate change.

Typical pollutants that affect air quality include airborne chemicals, particle matter, and gases such as carbon monoxide (CO), nitrogen oxides and sulphur oxides[125]. These pollutants settle in the atmosphere and through long term exposure can impact on human health[126]. Poor air quality can also damage natural ecosystems, deteriorates buildings, impact people's enjoyment of outdoor activities, and degrade the mauri of air as a Māori taonga[127].

In New Zealand, air quality is assessed against 14 air quality standards. Air monitoring responsibilities rest with local councils. For the Queenstown-Lakes district this is explicitly outlined in the District Plan which notes that "*The Regional Council has the principal role in the control and management of emissions of contaminants to air*."

At a national level New Zealand's air quality is generally very good[128]. Airports and aircrafts do not factor in reasons for poor air quality, instead burning fires in residential homes and road transport emissions are the most common causes of air quality issues.

While there are no council air testing sites currently in Queenstown or Wānaka, air quality in the Otago region generally meets recommended guidelines.[129] Burning solid fuels to heat homes during winter is the most cause for concern.

The geography of Queenstown-Lakes district means that air pollutants during winter months tend to linger. This could be more of an issue if aviation activity were to be increased substantially. A few stakeholders in the focus groups noted this as a concern. However, air quality did not stand out on its own as a major concern across survey respondents.

Residents in Wānaka and Queenstown, where current airports are based, noted more concern over air quality impact linked to airports than those in other communities such as Arrowtown. It appears that this concern is a cumulation of other impacts, notably CO_2 emissions and general environmental impacts.

Changes in air quality have not been specifically estimated in our analysis but the impacts likely significance is considered and rated in each of the

124 (Aviation Environment Federation, 2008)

125 (Ministry for the Environment, 2018)

126 This includes premature death, cardiac disease, and respiratory issues. For more information see (Environmental Health Indicators New Zealand, 2020)

127 (Ministry for the Environment, 2018)

128 (Ministry for the Environment, 2018)

129 (Land Air Water Aotearoa, 2020)

hypothetical scenarios. Current air quality, aircraft emissions, activity levels, health implications and the topography of an area are factors we considered when determining air quality impacts.

4.5.5 Visual pollution

Visual pollution is the impairment of someone's view of their natural/and or man-made environment. All developments have a 'zone of visual intrusion' from which they can be seen. The more people can see the development, the closer they live and work to the development, and the clearer their lines of sight are, the bigger the visual impact will be.[130] For an airport development, the removal of existing landscape features such as trees and hedges and replacing them with buildings, tarmac and supporting infrastructure (e.g. roads, windmills for additional energy generation) has visual impacts. Planes are the most widely sighted visual impacts for residents and visitor. At night, the lights of the runways, aircraft and terminals increase light pollution. Air pollutants caused by airport activities may also impair the visual enjoyment of the outdoors.

The district's relatively untouched, natural beauty may mean the impacts of visual pollution are greater than many other areas. There is a need to consider whether areas should be preserved because of their attractive landscapes.

Visual pollution impacts in relation to airport development was not sighted as a 'stand out' concern by members of the Queenstown-Lakes district community during stakeholder engagement. However, stakeholders did note the ability for airport construction to cause visual changes. They also expressed annoyance at the visibility of aircraft, although this was often linked to noise.

Pollution more generally was often referred to; and a concern about development making the area more urban and city-like was clearly voiced. This was linked to the story about growth generally, which is viewed both negatively and positively. Some who thought about development positively saw that new infrastructure would make the area more attractive to a younger, international demographic, and that visual impacts could be managed through careful design and planning. Many visual impacts can be managed through well-designed and well-managed airport precincts.[131]

In survey responses, Wānaka residents expressed a higher level of concern of visual pollution impacts. This is likely because airport expansion at Wānaka Airport would be more noticeable than expansion at Queenstown Airport, given Wānaka Airport is in a rural location.

4.5.6 Water quality

Water quality and ecological conditions can be measured by the number of plants growing in the water body[132] and water clarity, chlorophyll content, total phosphorus, and total nitrogen[133].

Airports can affect water quality through construction activity when sediment and polluted run-off may flow into nearby water bodies, changing the mineral content of the water and affecting aquatic life. Runoff from terminal buildings, chemicals, fuel, and fire and de-icing agents can also pollute water, and run off either into drains or (if good drains are not in place) into nearby water bodies or ground water.

Water bodies often have cultural significance as well as ecological and social significance.

130 (Aviation Environment Federation, 2008)

131 (Aviation Environment Federation, 2008)

132 Called Lake Submerged Plant Indicators

133 Called Tropic Level Indicators, which indicate the life supporting factors in the waterbody

Stakeholders cited water quality as a concern when referring to construction of an airport, but most water quality concerns were raised in the context of increasing growth and tourism. Overall, survey respondents were the least concerned about water quality of all the environmental impacts. However, at an ethnic level Māori were more concerned than non-Māori respondents (40% versus 35% of respondents felt negative towards this impact). This speaks to the cultural and spiritual significance of water bodies for Tangata Whenua.

4.5.7 Waste and wastewater

Waste and wastewater include consumer and business rubbish, food waste and wastewater, and bio-security waste. Waste can have negative environmental (and economic) impacts if it is not managed properly. Flow on impacts of waste generation include higher landfill utilisation, infrastructure pressures (wastewater especially) and environment degradation.

Waste from an airport is generated by:

- *Airport construction* which produces industrial and physical waste and wastewater.
- *Airport operations* such as through aircraft and ground equipment maintenance, which can produce chemical and hazardous waste and wastewater.
- *Aircrafts* who may also dispose of their 'deplaned' waste at the airport[134].
- *Visitors* who are estimated to generate 1-2 kgs of waste per day[135].

Queenstown-Lakes district community concerns about waste and wastewater were mostly linked to tourism and growth. It was referred to in relation to environmental impacts more generally outside the airport precinct, with management of waste and support infrastructure being noted as levers for the level of impact from waste due to airports. 51% of survey respondents felt negatively about the impacts of waste in relation to current airport activity, while 41% felt mixed or no strong feelings.

[134] See here for some more information (International Civil Aviation Organization, Unknown)

[135] (Parliamentary Commissioner for the Environment, 2019)

4.6 Economic impacts

Table 13: Economic impacts summary table

	Impact	Description	Interconnected impacts and activities	Ability to measure	Current impact on the Queenstown-Lakes district
Economic	GDP	Wages and profits generated from expenditure related to airport operations and visitor activity	Material well-being, living standards, work/life balance	Using regional input-output tables we can estimate GDP related to airport operations and enabled activity	2019 – $526 million* 2020 – $236 million
	Employment	Jobs generated from expenditure related to airport operations and airport facilitated visitor activity	Material well-being, living standards, work/life balance	Using regional input-output tables we can estimate GDP related to airport operations and enabled activity	2019 – 7,518 FTEs* 2020 – 3,313 FTEs
	Road network operating costs	Costs associated with travelling on the road network	Material well-being, way of life, emissions	Using the transport network model, we can estimate the costs associated with the increased passenger numbers on the network	$665 million*
	Productivity	Increase in output per worker	Material well-being, living standards, work/life balance	Labour productivity can be measured (GDP per FTE). However, it is more difficult to attribute the Airport's contribution to that labour productivity.	$102,000 (87% of national)
	Incomes	For individuals it is money that is earned from doing work or received from investments. For companies it is profits from selling goods or services.	Material well-being, living standards, work/life balance	Earnings, Household income. While incomes can be measured, apart from airport staff, they cannot be directly attributed to the airport activity	Mean earnings – $55,082 (88% of national) Mean Household income – $125,208 (112% national)

*These estimates are pre COVID-19)

Airports play an important role in a well-functioning economy by providing infrastructure that enables physical connections to the rest of the country and the world.

Air transport facilitates business relationships and investment, improves the productivity of firms, supports tourism, and facilitates trade, and makes an area more accessible and liveable for residents.

As noted by Richard Florida[136],

> *Airports play a substantial role on the economic growth and development of cities and regions. In today's knowledge economy, far and away, the most precious cargo they move is people.*

Queenstown-Lakes district is remote from the main centres across New Zealand. Reliable scheduled services are essential to provide the connectivity that allows national and global businesses to operate in the Queenstown-Lakes district and to make it accessible to more visitors.

Many stakeholders recognise that the current Airport infrastructure creates jobs and employment opportunities directly (at airports) and indirectly (through tourism) and business.

There are two distinctions when measuring economic activity associated with airports – activity related to airport operations, and activity enabled by airport operations.

Activity related to airport operations

Economic impacts that are directly related to the airport and its operations includes the airport company itself and businesses it contracts to provide services; and independent businesses within the airport that provide services to passengers and other people who visit the airport.

QAC directly spent about $33 million in 2019, of which, $15 million was on operating costs.

Businesses operating at Queenstown and Wānaka Airports (including the Airports) employ about 1,000 people.

Activity enabled by airports

Indirectly, airports impact the economy through the improved connectivity of the area to the world. The two key areas of activity are tourism and businesses. A full discussion of the role of airports is included in Appendix 3.

Tourism

The district's economy is underpinned by tourism. The airport is critical for bringing visitors in and out, especially international visitors. There is a strong correlation between airport growth and visitor growth. Tourists account for a large proportion of air travellers through Queenstown Airport. Visitors spend money in the district, which filters through a number of tourism-related businesses and, in turn, those businesses that service them.

We estimate that about 50% of international visitors and 22% of domestic visitors to the Queenstown-Lakes district arrive via Queenstown Airport. A large proportion of these visitors would not come to the district if there were no direct air services.

While visitor spending is not directly attributable to airports, airports enable visitor access and are therefore seen to enable visitor spending.

Visitor spending is the main driver of positive sentiment, where 42% of respondents are positive about the impact of current airport infrastructure on visitor spending; 11% are negative. 20% of respondents identified this impact as one of the top 3 positive impacts of importance to them.

Stakeholders have mixed views about whether airports attract the 'right' kind of visitor spending – those who feel negatively would prefer to see Queenstown attract 'higher quality' visitors rather than greater volume; other stakeholders observe that many visitors that enter through Queenstown

[136] (Florida, 2012)

Airport disperse to other parts of the region rather than spending within their neighbourhood or the district.

MJ observation: One could argue that Queenstown does attract a greater proportion of "high-value" visitors. International visitors spend more than domestic visitors. With a sophisticated "experience" offering, daily expenditure in the Queenstown-Lakes district is much higher than in other districts. Labour productivity in visitor-related sectors is higher in Queenstown than in most other districts.

Business activity

Many businesses and self-employed people in the district rely and depend on effective air services to connect with clients and suppliers and to move goods and services. Effective airports improve business productivity.[137] Improved productivity leads to increased incomes and resilience.

We estimate that about 5% of passengers using Queenstown Airport are travelling for business purposes. Further, there were about 500 private jet movements in the district in 2019. Many of these trips may have been business-related.

4.6.1 Jobs and incomes

Economic impacts are calculated by identifying the activity attributable to airports, converting them into output (expenditure) and then reflecting that in two measures – full-time equivalent jobs and value-added (incomes and profits).

The two measures of economic impact – jobs and incomes – are of course fundamental to supporting material well-being and are factors in improving living standards and the affordability of living costs, which are discussed earlier in the social impacts section.

Full-time equivalent jobs and Value Added (GDP)

Full-time equivalents (FTEs) are the number of full-time jobs supported by a given level of expenditure in a certain area. It is not the same measure as employment. In the tourism sector, for example, many employees only work part-time. Each of these can be considered an employee. However, the FTEs measure calculates the number of full-time jobs based on the ratio of full-time and part-time workers in an industry.

Value added (GDP) measures the portion of the value of expenditure from an activity that is added in an area (hence references to national GDP, regional GDP). In essence, it is a measure of the incomes (salaries and wages) and profits captured within the study area (in this case the Queenstown-Lakes district).

Measuring jobs and incomes

The generally applied approach to measure jobs and incomes for airports is economic impact analysis.

Activity associated with airports is identified and converted to outputs (expenditure) by industry. As noted above, activity relates to airport operations, and visitors attracted through the airport.

Regional industry input-output tables are then used to calculate the value added and number of jobs that result from that expenditure. These are the direct economic impacts.

There are also indirect and induced impacts that can be captured within the district. Indirect impacts are generated from businesses that receive that

[137] (Oxford Economics, 2018) argues that the largest economic benefit of increased connectivity comes through its impact on the long-term performance of the wider economy by enhancing the overall level of productivity. They estimate that a 10 percent improvement in global connectivity results in a 0.5 percent increase in long run GDP per capita.

initial expenditure purchasing goods and services from suppliers who also pay wages and salaries and make profits.

Induced impacts occur when wage and salary earners spend their incomes and businesses invest or distribute their profits.

Combining the direct, indirect, and induced impacts provides a measure of the total impacts of airport activity. Regional input output tables ensure that only the activity captured within the region is measured.

Application to the scenarios

For each of the scenarios we estimate the likely expenditure attributable to airport activity, operations, and visitors, over the period 2020 to 2050. We then apply economic impact analysis to calculate the GDP and FTE employment over the entire period.

4.6.2 Network travel costs

Congestion and traffic safety have been raised as significant impacts of airport activity and expansion. There are a number of costs associated with travel to and from the airports including:

- road user costs across the fleet inclusive of vehicle operating costs and travel time costs
- emissions in the form of carbon dioxide costs
- accident costs
- congestion across the network in the form of the length of network or number of intersections operating near, at, or over-capacity in peak periods.

These costs cut across social, environmental, and economic impacts. All are negative impacts.

Measuring network travel costs

Using the Queenstown-Lakes Tracks Transportation Model, the annualised network travel costs for each of the four scenarios have been calculated for 2033 and for 2050.[138] Total costs are calculated as the sum of:

- vehicle operations
- CO_2 emissions
- travel times
- congestion
- crashes
- travel time reliability.

To put the analysis into context, the estimated network travel costs for the region for 2019 (pre-COVID) are shown in Table 14.

[138] (Abley, 2020)

Table 14: Network travel costs (pre-COVID-19)

Year	2019, $m
Vehicle operating	220.8
CO_2 emissions	8.8
In-vehicle time	365.7
Additional congestion	6.6
Crashes	45.1
Travel time reliability	18.3
Total network operating costs	**665.3**

Source: (Abley, 2020)

Total network operating costs associated with 2019 activity were estimated to be about $665 million. The greatest costs were in-vehicle time ($366 million) and vehicle operations ($221 million), which make up close to 90% of total costs. Note that these costs are for the entire network including Cromwell and Lake Dunstan, which are in the Central Otago district.

4.6.3 Productivity

Productivity is a way of describing the efficiency of production. Overall productivity is influenced by a number of factors such as labour and other production inputs (such as machinery, technology, and land).

Increases in productivity means the same amount of output can be delivered with fewer inputs. With growth in productivity, an economy is able to produce—and consume—increasingly more goods and services for the same amount of work. This means higher incomes and greater profits.

The level of productivity is a key factor in determining the standard of living. More productive industries or sectors tend to pay higher wages.

Airports and productivity

There is strong evidence that suggests effective airports can improve productivity and growth in an area. Good quality air transport links improve the productivity of firms in a region, which increases incomes.

Airports enable access to domestic and international markets which can drive down costs and prices for firms through economies of scale and improved efficiency in the supply chain.

Airports also enable competition in local markets which improves choice and decreases prices for consumers. By opening up markets, air services expose companies to stiffer competition, encouraging them to be more efficient.

An extensive body of research evidence demonstrates the critical importance of transport (and good transport infrastructure) for productivity and economic growth.[139] A 2018 report by Oxford Economics[140] states that:

> *"Arguably, the largest economic benefit of increased connectivity comes through its impact on the long-term performance of the wider economy by enhancing the overall level of productivity."*

The same report suggests a 10% improvement in global connectivity results in a 0.5% increase in long run GDP per capita. Earlier research[141] shows the expansion of trade by air services in the previous decade contributed an additional 0.6% to Europe's GDP.

Effective air transport services also drive productivity growth by making it easier for companies to attract high quality employees from around New

[139] (Crafts, 2009)

[140] (Oxford Economics, 2018).

[141] (Oxford Economics Forecasts, 2005)

Zealand and globally. An earlier study by Oxford Economics Forecasting[142] found that for many senior staff and professionals, access to international links influences their decision on where to live and work. Improved access to a wider pool of appropriately skilled labour will improve productivity ultimately leading to increased incomes and higher employment in the local economy.

Tourism and productivity

Negative sentiment for some stakeholders relates to the quality of jobs and associated levels of income. We also see this concern reflected in the lower rate of positivity and higher rate of negativity about the impacts on Household incomes (26% positive, 20% negative).

Tourism is generally considered a relatively low-value sector because it pays low wages. This is corroborated by the average labour productivity in the district being 87% of the national rate.

However, the tourism sector in the Queenstown-Lakes district is more productive than nationally. Labour productivity for the Queenstown-Lakes district is $89,330 compared to $70,350 for New Zealand, which is 1.3 times higher.[143]

Looking more closely at the industries that contribute to tourism, labour productivity in the food and accommodation sector in the Queenstown-Lakes district is $81,600. Across the rest of New Zealand, labour productivity in the food and accommodation sector is only $37,900, suggesting that the Queenstown-Lakes district's labour is 2.15 times more productive than New Zealand in that sector. The only other two sectors where Queenstown-Lakes district has higher labour productivity than New Zealand is Arts and Recreation and Education and Training, both of which are visitor-related.

This finding is consistent with the higher average daily spend of international visitors and the higher average daily spend in the Queenstown-Lakes district relative to other districts.

While the tourism sector does have a number of lower-paying jobs, it also has higher-paying jobs and spends a lot on goods and services, which flows through to many other sectors of the economy such as in construction and business services. This is particularly the case where the tourism businesses are larger and have more significant investments.

Measuring productivity

One partial measure is labour productivity, which measures GDP per employee. This measure does not consider the range of other factors that contribute to delivering goods and services.

Each employee in the Queenstown-Lakes district contributes an average of $102,000 to the district's GDP. This is 87% of national labour productivity of $117,000 per employee.

As noted earlier, in the tourism sector, labour productivity in the district is $89,330, which is 130% of national labour productivity ($70,350).[144]

Theory shows that there is a positive relationship between labour productivity and incomes although this is heavily dependent upon capital utilisation and intensity and the supply of labour. Further, In the tourism industry, and especially in Queenstown, there is a strong reliance on migrant workers, who make up a large part of the sector's workforce.

Incomes are therefore not a good measure of productivity in the district. However, they are useful when considering social impacts, in particular Material well-being. The mean income in the Queenstown-Lakes district is

142 (Oxford Economics Forecasts, 2005)

143 (Infometrics, 2019)

144 (Infometrics, 2019)

estimated at $55,100, which is 88% of the mean income nationally of $62,800.

Application to the scenarios

It is very difficult to quantify productivity improvements resulting from changes in airport activity. Accordingly, the economic impact model does not determine changes in productivity over time or across scenarios.

However, based on the evidence, we could assume that improved access to the airport and increased levels or air services would result in increased productivity. This needs to be tempered by the effect that the changing scenarios will have on the way businesses operate, for example travel-times.

HOW IMPACTS CHANGE UNDER THE FOUR SCENARIOS

5 IMPACTS ANALYSIS – FOR FOUR SCENARIOS

Looking at how the range of impacts (positive and negative) are affected under four different scenarios provides better context to make informed decisions. Where impacts can be quantified, the scenarios will allow us to explore the magnitude of change. Where impacts cannot be quantified, we can discuss them and consider their change relative to the other scenarios.

5.1 Modelling the four scenarios

A model was created to calculate the economic activity associated with each scenario.

For each scenario, a forecast of air passenger arrivals on domestic and international flights was developed based on an unconstrained demand forecast[145] and the airport capacity constraints arising from noise boundary limits[146]. Based on available data, the forecast passenger arrivals were categorised by passenger type (local, domestic visitor, or international visitor) and purpose of visit (holiday, visiting friends and family or business). Total annual visitor expenditure by air passengers was then calculated considering the spend and length of stay characteristics of each visitor type.

In scenarios where constrained airport capacity results in unmet demand (ie more people want to fly direct to Queenstown-Lakes than there are available flights), the proportion of the unmet demand that will visit the district by other modes has been estimated (for example, fly into Dunedin or Invercargill airports and enter Queenstown-Lakes district by road). The spend by these visitors has also been accounted for in calculating the economic impacts.

In addition to visitor spending, air passenger volumes also drive economic activity associated with airport operations (such as terminal operations, air traffic control, runway maintenance etc) as well as activity of businesses in the airport precinct (such as food and beverage, retail, rental cars, commercial general aviation).

The operational expenditure associated with growing airport operations was estimated based on historic airport expenditure for a range of comparable New Zealand airports. The data shows a relatively linear relationship between expenditure and incremental passenger movements.

Growth in activity of airport precinct businesses was forecast based on current expenditure levels and number of people employed[147] and the forecast growth in passenger volumes for each scenario. In order to avoid double counting, activity arising from visitor spending was excluded (as this has already been captured in the visitor expenditure impacts). For example, activity of retail businesses and rental cars were excluded as purchases are made almost exclusively by visitors. Similarly, 90 percent of activity by food and beverage businesses was excluded – the remaining 10 percent representing purchases by locals using the airport.

Expenditure was then allocated to industries and input into the regional input-output multiplier model to calculate direct, indirect, and induced economic impacts in terms of GDP (value added) and employment.

The structure of the model is shown in appendix 2.

[145] Aviado (2018)

[146] Provided by Queenstown Airport Corporation (QAC)

[147] In 2019, approximately 700 people were employed at Queenstown Airport and 300 at Wānaka Airport.

5.1.1 Air passenger unconstrained demand forecast

The base unconstrained passenger demand forecast for the Queenstown-Lakes district used in the analysis was developed in 2018 by Aviado Partners for QAC.[148] Adjustments to the base forecast have been made for COVID-19.

Careful consideration was given to the basis of the unconstrained demand forecast as it is the primary input to the economic impact model. The Aviado passenger demand forecasts are much higher than the QLDC visitor growth forecast (shown in Table 46). The low growth of the QLDC forecast relative to historical growth suggests that it is a constrained growth forecast. Given the passenger growth at Queenstown Airport over the past ten years, it is considered that the Aviado forecast provides a reasonable basis for estimating the future unconstrained demand for flights to the Queenstown-Lakes district.

Table 15: Growth forecast comparison

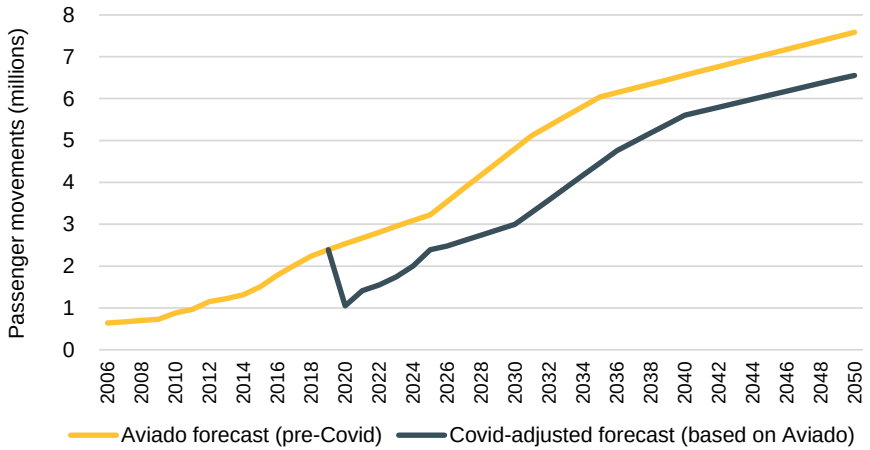
	Compound average growth rate (CAGR), % p.a.
Historic air passenger growth, Queenstown Airport (2009 – 2019)	12.6%
Original Aviado air passenger demand forecast (2019 – 2045)	4.3%
COVID–adjusted Aviado passenger demand forecast (2019 – 2050)	3.7%
QLDC visitor growth forecast (2019 – 2048) *	1.4%

* note that the QLDC visitor growth forecast was from Dec 2019 and is being revised to consider COVID-19.

[148] The Aviado forecast was developed for 2019-2045. This has been extrapolated to 2050 for the economic impact analysis.

The COVID-19-adjusted unconstrained demand forecast is used as the base case in the analysis is shown in Figure 14.

Figure 14: Unconstrained passenger demand forecast – Aviado forecast adjusted for COVID-19



Source: MartinJenkins

Impact of COVID-19 on passenger volumes

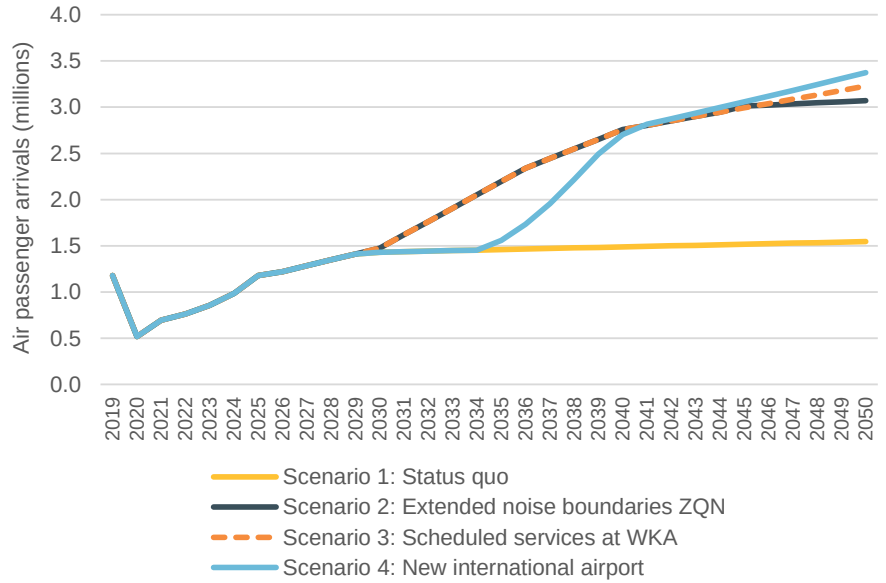
There is of course a lot of uncertainty about the short and medium-term impacts of COVID-19, and how quickly domestic and international air passenger volumes to Queenstown will recover to 2019 levels. The relative difference in economic impacts between the four scenarios is somewhat dependent on the recovery time period assumed because a faster recovery

will mean the current capacity limits at Queenstown Airport are reached earlier. However, the exact profile of the drop and recovery is not material to the **relative impacts** as this will be common in each scenario. The scenarios assessed only diverge when the capacity constraints are reached.

5.1.2 Air passenger arrivals and unmet demand summary

The volume of air passenger arrivals into the district underpins the calculation of economic impacts. Figure 15 shows the number of passenger arrivals under each of the four scenarios.

Figure 15: Air passenger arrivals – Queenstown-Lakes district



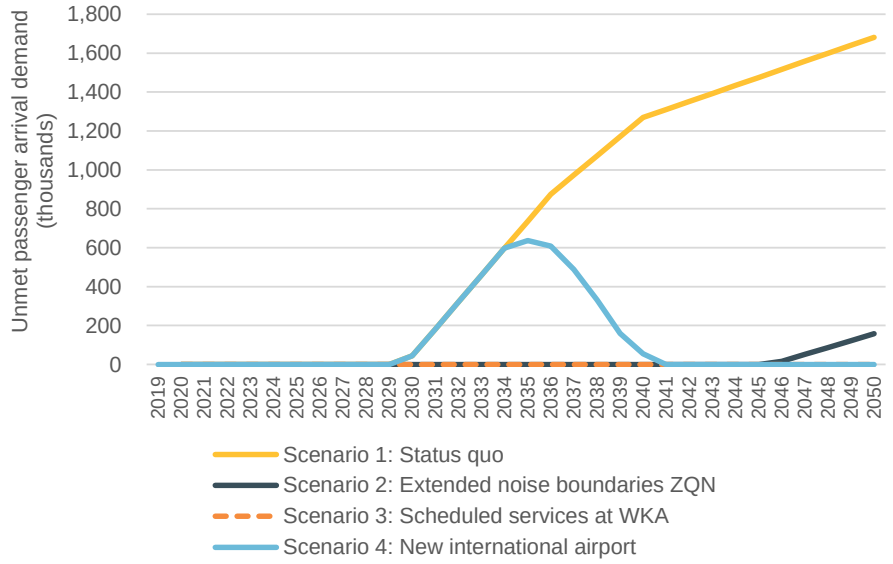
Source: MartinJenkins

Under the base case demand forecast, the scenarios do not diverge in terms of the number of air passenger arrivals to Queenstown-Lakes district until about 2030 when Queenstown Airport reaches its flight capacity limit of 21,000 movements.

Under the Status Quo Scenario passenger arrivals then only increase slightly as A321 aircraft are introduced which have greater seat capacity per flight.

Figure 16 shows the unmet passenger demand under the four scenarios.

Figure 16: Unmet air passenger arrival demand, Queenstown-Lakes district



Source: MartinJenkins

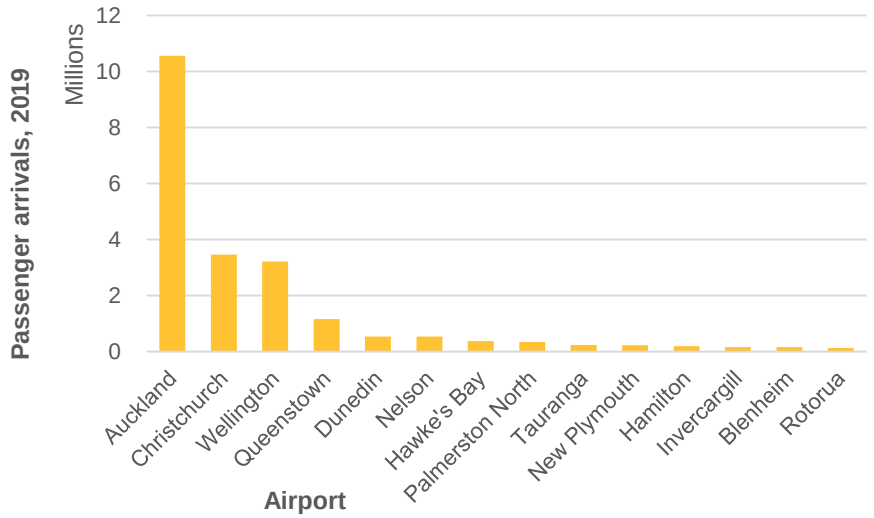
It is the lost activity resulting from the unmet passenger demand, which is represented by the area under the curves, that drive the economic impacts for each scenario.

To put the number of arrivals under the four scenarios into context, Queenstown currently has about a third of the passenger arrivals of Christchurch and Wellington Airports, which had 3.5 million and 3.2 million passenger arrivals in 2019 respectively. Nelson and Dunedin Airport had about 540,000 passenger arrivals. Invercargill had about 160,000 passenger arrivals.

Passenger arrivals in New Zealand airports with scheduled services is shown in Figure 17.[149]

Arrivals range from 10.6 million at Auckland Airport, to 133,000 at Rotorua Airport.

Figure 17: Passenger arrivals at New Zealand airports, 2019



Source: MartinJenkins

In 2050, Scenario 1 has about 1.55 million visitor arrivals, about half the number of Wellington Airport. Scenario 2 has about 3.1 million visitor arrivals, about the same activity as Wellington Airport. Scenario 3 has about 2.75 million arrivals out of Queenstown Airport and about 480,000 arrivals out of Wānaka, which is about 10% fewer than Dunedin Airport. Scenario 4 has about 3.4 million visitors, which is similar in activity to Christchurch Airport.

[149] Excluding Chatham Islands Airport and Paraparaumu Airport.

5.2 Summary of the four scenarios

Table 16: Summary of activity under the four scenarios

Activity	Scenario 1: Status Quo Queenstown Airport	Scenario 2: Expanded noise boundaries at Queenstown Airport	Scenario 3: Scheduled services at Wānaka Airport	Scenario 4: New International Airport
Short Description	Current noise boundaries at Queenstown Airport are kept at their current levels. There are no scheduled services out of Wanaka Airport.	The number of scheduled flights can increase to 41,600 from 2024. There are no scheduled services out of Wanaka Airport.	The current noise boundaries at Queenstown Airport are expanded from 2024. Wanaka Airport is developed to allow narrow body jets and is open for scheduled services from 2028.	Current noise boundaries at Queenstown Airport do not change and there are no scheduled services out of Wanaka Airport. The NIA is commissioned in a location within two hours of Queenstown. NIA opens for scheduled services in 2035.
Constraint				
Noise Boundaries (scheduled commercial flights)	21,000	41,600	Queenstown Airport - 41,600 Wanaka Airport (unknown)	70,000+
Scheduled Flights				
Current	18,174	18,174	18,174	18,174
2030	21,000	21,792	22,610	21,000
2050	21,000	41,600	44,978	47,701
Passenger arrivals				
Current (2019)	1,178,059	1,178,059	1,178,059	1,178,059
2030	1,431,023	1,475,178	1,530,272	1,431,023
2050	1,546,190	3,069,773	3,227,653	3,373,567

Source: MartinJenkins

As discussed earlier, these scenarios are hypothetical and do not represent agreed options for future airports development. They provide a range of possible options from no change “status quo”, which will suppress passenger demand, through to building a new international airport at a greenfield site that can increase demand. We also look at two intermediate scenarios – expanding noise boundaries at Queenstown Airport and developing Wānaka Airport to enable scheduled commercial services.

This can be seen by the increase in passenger arrivals enabled by the increase in scheduled flights as we move from Scenario 1 through to Scenario 4.

5.3 Scenario 1: Status Quo

5.3.1 Description

The Status Quo is the most constrained scenario. Under the Status Quo Scenario, the current noise boundaries at Queenstown Airport are kept at their current levels and operating hours are not changed. There are no scheduled services out of Wānaka Airport, which continues to operate in its current capacity.

The number of scheduled services to Queenstown Airport increases to meet passenger demand. The existing noise boundaries are reached in 2030, when there are 21,000 scheduled flight movements moving about 2.9 million passengers. From this point, the number of scheduled flights is constrained.

5.3.2 Projected change in activity

The Status Quo Scenario is the most constrained scenario. The physical limits on the number of scheduled flight movements will cap the number of people flying in and out of the district.

Airlines will likely respond by increasing prices to address demand or explore options to increase the number of flights. Applying these assumptions results in the following changes in activity under the Status Quo Scenario.

Table 17: Change in activity under the Status Quo Scenario

Status Quo Arrivals and aircraft movements	ZQN		
	Current	**2030**	**2050**
Passenger arrivals			
Domestic flights	819,863	994,020	1,073,587
International flights	358,196	437,003	472,603
Total	**1,178,059**	**1,431,023**	**1,546,190**
Passenger movements			
Domestic flights	1,676,068	2,019,140	2,180,763
International flights	716,908	887,678	959,993
Total	**2,392,976**	**2,906,818**	**3,140,757**
Scheduled aircraft movements			
Domestic flights:			
ATRs	1,969	2,349	2,349
Narrow-body jets	10,732	12,434	12,434
International flights:			
Narrow-body jets	5,473	6,218	6,218
Wide-body jets	0	0	0
Total aircraft movements	18,174	21,000	21,000
Unmet passenger arrival demand			
Total unmet arrival demand	0	44,155	1,681,463
People entering district via other modes	0	8,831	336,293

Source: MartinJenkins

By 2050, the Airport has 3.14 million passenger movements. The constraint means that in 2050 there will be unmet arrival demand of 1.68 million. Around 336,000 visitors that would have flown into the district now enter by road.

5.3.3 Impacts

The effect of Scenario 1 on the range of impacts are discussed below.

Social

Way of Life

The impact on people's way of life in this Scenario is mixed. Some aspects, such as work/life balance and the character of the town/region will not change much from how people are impacted now. This is reflected in the community's response, discussed on page 62. More people viewed Scenario 1 positively in comparison to other scenarios, largely because this Scenario involves the least change.

There will be some impact on traffic volumes in and around the airport precinct as movements increase up to the level capped by the noise boundaries. The 17% increase in projected passenger arrivals is likely to have a moderate impact on congestion around the airport precinct and local roads (in the absence of infrastructure improvements).

Scenario 1 has the lowest congestion costs as it has the lowest level of tourism activity. This has a flow on effect to commercial activity in other sectors, resulting in less travel across the network in comparison to the other scenarios.

As the size of congestion costs are relatively low in comparison to the other scenarios and the impact of the congestion is localised, we have rated impacts related to way of life as having a minor negative effect.

Sense of Community

Constraining airport growth in this Scenario means that the status quo will have the largest negative impact on connectivity. In this Scenario ticket prices are likely to increase as airlines respond to demand for seats being greater than supply.

The increased price and decreased availability of seats will impact both business and leisure travellers. Business travellers may not make trips they would otherwise have made because the cost of travel becomes prohibitive. Business travellers are less likely to be able to book far enough in advance to secure the most cost-effective fares. This may result in decreased productivity, increased business costs and reduced investment opportunities.[150]

Leisure travellers are likely to make fewer trips as the cost of travel increases. This will impact on people's well-being by reducing their ability to connect with friends and family, go on holiday and participate in leisure and recreation activities.

The increased cost of travel is likely to impact low income earners to a greater extent than those on higher incomes. This may have an impact on social inclusion and cohesion as lower income earners are less able to participate in activities experienced by others in society.

Increased travel costs may also reduce the attractiveness of the region for both business, recreation, and sporting events.

Our stakeholder feedback was that people valued ease of travel highly for both business and leisure. Some moved themselves and their businesses to the area because of the ease of travel. Increased travel costs and reduced flight availability may reduce the attractiveness of the area to those

[150] The degree of lost productivity will depend on how quickly businesses can adapt by finding new ways of working. The impacts of COVID 19 may mean that businesses are better positioned to interact with clients remotely than may otherwise have been the case.

considering a move to the district. This may have an impact on the region's ability to diversity its economy by attracting non-tourism related businesses to the area.

We have assessed the overall impact of a loss of connectivity to be moderate negative, as it impacts both business and leisure travellers in the wider Queenstown-Lakes district.

Health and Well-being

Stakeholder feedback indicates that the health and well-being impacts of most concern to the community relate to noise and pollution. In the Environmental Impacts section, we assess the effects of noise and emissions.

Those most likely to experience stress related health impacts of noise are likely to be those most highly annoyed by noise. Scenario 1 results in the least change to noise boundaries and therefore is expected to have the least amount of highly annoyed people.

Some groups in the community have expressed a high degree of concern about the perceived negative impacts of growth associated with other scenarios. Scenario 1 may therefore cause the least anxiety for these people.

We have assessed the impact of Scenario 1 as having a minor negative impact on health and well-being.

Material Well-being

Constraining aircraft movements has a flow on impact on employment and income. As our discussion of economic impacts shows, constraining airport growth will mean that the average annualised level of GDP is between $353-$398 million less than for the other scenarios. There are between 5,170 and 5,830 fewer FTEs. This is a significant impact for the region.

Constraining growth may reduce pressure on the demand for housing. However, it also limits income growth. If incomes grow at a faster rate than house prices, houses become more affordable.

Because of the size of the impact on district wide employment and GDP, we have assessed the negative impact on material well-being for the status quo to be major.

Environmental

Noise

There is still some capacity within the current noise boundaries to increase the number of flights into Queenstown Airport. Utilising this capacity will cause a minor increase in noise impacts on those currently within the noise boundaries.

Almost 800 residential properties are currently in the air noise boundaries at Wānaka and Queenstown Airports. This equates to an estimated 1,990 people. Of these people, 236 are expected to be highly annoyed by noise. This figure is unlikely to grow significantly by 2050 due to restrictions that prohibit new builds unless the District Plan already permits it.

Because the noise boundaries do not expand in this Scenario, we have rated the change in noise impacts in comparison to the current state to be minor.

CO_2 Emissions, GHGs and Climate Change

The quantity of CO_2 equivalent directly produced by scheduled aircrafts will increase to 526,000 tonnes per year by 2050, from a level of 486,000 tonnes in 2019. This same amount (526,000 tonnes) is estimated to be emitted into the global atmosphere each year from 2030 to 2050. It is important to note that not all these emissions are emitted in the Queenstown-Lakes district.

Applying estimates of the cost for New Zealand to transition to meet zero carbon targets, the cost of domestic aircraft emissions from this total could be in the range of $257 million – $2.8 billion.

The actual local impact due to climate change is highly variable and dependent on a cumulation of other factors including offsetting initiatives. This is the case for all scenarios.

CO_2 emissions costs generated by the road network in this Scenario are the lowest emissions costs of all scenarios.

Our assessment of Scenario 1 is that these aircraft movements will have a minor impact on total emissions produced in the Queenstown-Lakes district.

Air quality

Assuming technology remains constant, air quality is likely to worsen as activity increases. Though the district does not have any current air quality issues, over the long term the increased activity and aircraft emissions in Scenario 1 is likely to have a small negative impact on air quality. However, the airport contributes only indirectly to growth in general, and the increase in air movements is capped by the noise boundaries. Therefore, we have assessed the impact of Scenario 1 on air quality to be minor.

Visual pollution

Visual impacts will mainly be related to increased aircraft movements in this Scenario. This Scenario is unlikely to involve any major change to existing infrastructure. We have therefore assessed the impact of Scenario 1 on visual pollution to be minor.

Waste and wastewater

The amount of waste produced will grow as activity increases within existing noise boundary constraints. The impact of this waste on the community is highly dependent on how waste and wastewater is managed and the supporting infrastructure to do so.

There will also be some impact from the growth in visitors allowed within the noise boundary constraints. As growth in this Scenario is the smallest, it has the least impact on waste and wastewater of all the scenarios.

We have assumed that the current systems and management are sufficient to manage increased waste volumes in this Scenario and have therefore assessed the impact to be minor.

Water quality

As airport operational activity increases up to the level allowed by the current noise boundaries, there may be a small reduction in water quality in waterways surrounding the airport. However, this is highly dependent on supporting infrastructure and management and mitigation systems and processes.

There will also be some impact from the growth in activity allowed within the noise boundary constraints. As growth in this Scenario is the smallest, it has the least impact on water quality of all the scenarios.

We have assessed this impact to be minor as we understand that there are no current water quality issues caused by airport operations.

Natural environment

There is likely to be some impact on the natural environment as activity increases to the level permitted within the current noise boundaries. The severity and nature of the impact will depend on the management and cumulation of the other environmental impacts.

Currently there is no evidence of flora and fauna around the airport requiring careful protection. We have therefore assessed this impact as minor.

Cultural

Cultural diversity

While staffing increases at the Airport could increase the cultural diversity across the Airport, this impact is likely to be small for the Queenstown-Lakes district as a whole. The greatest impact on cultural diversity in this Scenario will come from the increased number of visitors and residents in the Queenstown-Lakes district, although this is also likely to be minor. Stakeholder feedback also suggested that people do not feel strongly about the impact of the status quo on cultural diversity.

Our assessment is that the impact of the status quo on cultural diversity is minor.

Cultural heritage

Given that Queenstown Airport will only expand to the level permitted by the noise contours, there is unlikely to be a significant impact on cultural heritage. As the population grows, there may be some minor impacts on how people experience places that are important to them. Population growth may also slowly start to change elements such as community values, customs, and practices. However, the majority of stakeholders did not have concerns over the impacts on cultural heritage under this Scenario.

We have assessed the impact of Scenario 1 on cultural heritage to be minor.

Economic

Scenario 1 has the lowest impact in terms of jobs and GDP of the four scenarios. However, it also has the lowest impacts on road network costs. As the most constrained scenario, these impacts set the baseline against which to measure the other three scenarios.

Employment and GDP

Employment and GDP increase quickly from 2020 to 2030 before hitting the scheduled flight constraints. From 2030, the growth in GDP slows, with increases due mainly to airline efficiencies and improvements in technology.

Under Scenario 1, employment increases to 11,993 and GDP increases to $838 million by 2050. On average between 2030 and 2050, Scenario 1 generates annual employment of 10,856 and GDP of $757 million. This is shown in Table 18 below.

Table 18: Employment and GDP impacts – Scenario 1

Scenario 1.	2030	2040	2050	Ave annual (2030-2050)
FTE employment	9,181	11,074	11,993	10,846
GDP ($m)	641	772	838	757

Source: MartinJenkins

Total road network costs associated with Scenario 1 are $795 million in 2030, increasing to $1.08 billion in 2050. The breakdown of total costs by type of cost is shown in Table 19.

Table 19: Road network costs, 2030 and 2050 – Scenario 1

Scenario 1.	2030 ($m)	2050 ($m)
Vehicle operating costs	257.8	354.5
In Vehicle time cost	433.5	588.1
Additional Congestion Costs	7.5	11.0
Travel Time Reliability Costs	21.7	29.4
CO_2 Emissions Costs	10.3	14.2
Crash costs	64.5	78.9
Total Network Operating Costs	**795.2**	**1,076.0**

Source: (Abley, 2020)

Note that, for Scenario 1, these costs include all activity in the district rather than just airport activity. With the least activity across all areas, costs are lowest under Scenario 1. Scenario 1 is used as the benchmark against which other scenarios can be compared to determine their additional impact on road network costs.

Productivity

Scenario 1 is a constrained Scenario, where the potential increase in economic activity from forecast passenger demand does not occur.

With limited growth in activity, there will be less visitor money flowing into the economy and therefore less investment into tourism-related businesses, and new visitor products.

Capacity on flights will be constrained and seat prices will increase, impacting costs for businesses that rely on air travel.

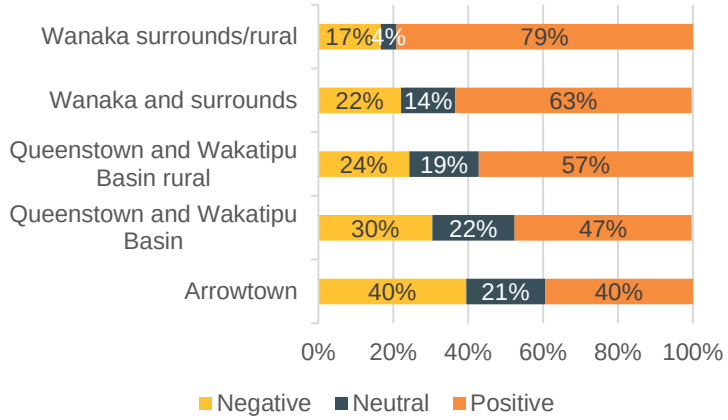
Relative to the other scenarios, lower levels of investment will lead to lower increases in productivity. Lower increases in productivity will flow through into lower increase in incomes. There will be cases where businesses need to become more innovative and productive to address the slowing of visitor activity but, on balance the impact on productivity will be negative.

Our assessment is that Scenario 1 is likely to have a moderate negative impact on productivity relative to current activity.

5.3.4 Community response to Status Quo Scenario

Figure 18 shows that in all neighbourhoods most survey respondents feel neutral or positive overall about the impacts of the Status Quo Scenario. However, there is considerable variation in levels of positivity by neighbourhood, with residents of Wānaka and Surrounds and Wānaka Surrounds rural areas most positive about the Status Quo overall.

Figure 18: Survey respondents' overall sentiment towards the impacts of Scenario 1, by neighbourhood



Source: MartinJenkins Airport Impacts Survey

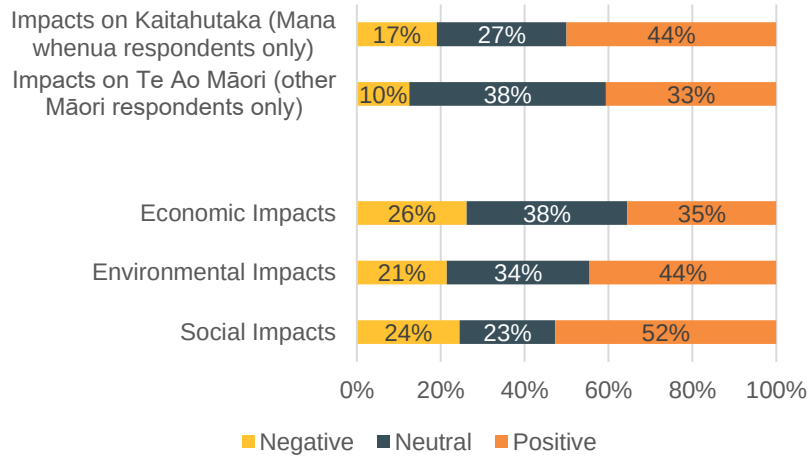
This Scenario would result in the least change, which is one of the reasons that we see higher levels of positivity among respondents from Wānaka.

These results are mostly consistent across subgroups, with two exceptions:

- Younger respondents (15 years and under, and 15-29 years old) are more likely to be positive about the Status Quo Scenario
- Those with the highest household incomes (more than $200,000) are less likely to be positive about the Status Quo Scenario

Figure 19 shows respondents' assessments of the impacts of Status Quo Scenario in 5 domains: Social impacts, Environmental impacts, Economic impacts and impacts on Te Ao Māori and Kaitahutaka.

Figure 19: Survey respondents' assessment of high-level impacts on Scenario 1



Source: MartinJenkins Airport Impacts Survey

N=2891-2904 for Economic, Environmental and Social impacts. N=40-48 for other Māori and mana whenua only impacts.

The results are mostly consistent across subgroups, except for Arrowtown, where respondents had a stronger negative view of the economic impacts (41% negative).

The fact that respondents are less positive about impacts in all domains than they are about the Scenario overall suggests their overall positivity is indication of a preference for the Status Quo as the 'least-worst' option rather than optimism per se.

Reasons for positive and negative stakeholder sentiment

Puts a pause on growth

The key reason that some stakeholders feel positively about the Status Quo Scenario is because in their view it effectively puts a 'pause' on airport expansion and by association a pause on growth. Stakeholders have different reasons for thinking that a 'pause' is a good idea. For some people that pause is important because it would allow time for infrastructure to be improved; for others it would allow the district to have a managed conversation about its ambitions (or not) for growth; and for others it would allow time to focus on diversifying the economy away from a dependency on tourism.

Another group of stakeholders hope that the Status Quo Scenario would be an 'end' to the airport expansion debate. These stakeholders do not see a problem with the current arrangements, would like to protect the character of their neighbourhood, and/or would prefer for rates to be invested in other things.

The apparent 'pause' of the Status Quo Scenario is also a key reason for some stakeholders to feel negatively about this Scenario. It is perceived to not respond to inevitable tourism growth, and therefore is perceived to be a short-term solution that is not sustainable but rather puts off the discussion to a later date. Some stakeholders feel that by not increasing airport capacity, road traffic will increase and / or economic growth will be curtailed.

Limits negative impacts associated with airports

A second reason that stakeholders feel positively about the Status Quo Scenario is because, compared to other scenarios, it limits direct and indirect negative impacts that they associate with airports to those that are already committed.

By contrast, some stakeholders who feel negatively about the Status Quo Scenario would prefer to limit negative impacts to the *current* state, or even reduce negative impacts below the current state. They recognise that the Status Quo Scenario represents an increase from what they currently experience (visitors, noise, congestion etc) because in the current state the 'noise bucket' is not full.

Location of the airport

Other stakeholders are concerned about noise and congestion continuing to be focused in the 'wrong' place (close to residents and tourism centres) under this Scenario, and that the 'burden' of Airport impacts would continue to be carried by residents who are currently affected.

Some stakeholders think noise will be positively affected in the Status Quo Scenario as capacity limits will 'force' airlines to use quieter planes to meet demand and increase revenue within existing limits.

Impact on the cost of travel

Still others are concerned about costs of travel increasing as demand continues to increase and capacity is reached. Other stakeholders see rising travel costs as a potential positive. These stakeholders believe that when capacity is reached, the Queenstown-Lakes district will attract a more boutique, higher value visitor which will benefit both the visitor experience and the economy.

Flight safety risk

A less common but nonetheless important concern for some stakeholders is a perception that Status Quo Scenario poses risks for flight safety that could be reduced at other sites/under other scenarios.

5.4 Scenario 2: Expanded noise boundaries at Queenstown Airport

5.4.1 Description

Under the Expanded Noise Boundaries Scenario, the community agrees to expand the noise boundaries at Queenstown Airport. The expanded noise boundary is assumed to come into effect in 2024 increasing the maximum allowable number of flights (aircraft movements) from 21,000 to 41,600. Operating hours do not change at Queenstown Airport and there are no scheduled services out of Wānaka Airport.

5.4.2 Projected change in activity

Under this Scenario, airport capacity meets passenger demand up until 2045, when the number of scheduled flights reach the expanded noise boundary at 41,600.

From this point, the number of scheduled flights will be constrained. There are a number of behaviour changes from suppliers and users that will occur. With excess demand and an inability to increase the number of seats, airlines will likely increase prices. With most flights fully booked, users will have to book well in advance to ensure a seat or pay a premium for impulse or unplanned air travel.

The changes in passenger and aircraft movements in 2030 and 2050 are shown in Table 20 below.

Table 20: Change in activity under the Expanded Noise Boundaries at Queenstown Airport Scenario

Extended noise boundaries at ZQN Arrivals and aircraft movements	ZQN		
	Current	**2030**	**2050**
Passenger arrivals			
Domestic flights	819,863	1,022,750	1,752,965
International flights	358,196	452,428	1,316,808
Total	**1,178,059**	**1,475,178**	**3,069,773**
Passenger movements			
Domestic flights	1,676,068	2,077,499	3,560,775
International flights	716,908	919,012	2,674,815
Total	**2,392,976**	**2,996,511**	**6,235,590**
Scheduled aircraft movements			
Domestic flights:			
ATRs	1,969	2,441	4,042
Narrow-body jets	10,732	12,874	20,234
International flights:			
Narrow-body jets	5,473	6,477	17,324
Wide-body jets	0	0	0
Total aircraft movements	**18,174**	**21,792**	**41,600**
Unmet passenger arrival demand			
Total unmet arrival demand	0	0	157,880
People entering district via other modes	0	0	31,576

Source: MartinJenkins

5.4.3 Impacts

The effect of Scenario 2 on the range of impacts are discussed further below.

Social

Way of Life

This Scenario has mixed impacts on the way of life of the community. Living standards are likely to improve in comparison to the status quo as the benefits of airport growth flow through to employment and income. Once airport growth is constrained in 2045, the flow on impacts to improved living standards will also be constrained.

Increased airport growth up to 2034 will have a flow impact on the character of the town/region. A busier airport is likely to require an increased investment in infrastructure in the area surrounding the airport. Increased infrastructure investment is also likely to be required in the wider region as visitor numbers increase and the resident population grows. Population growth may result in the community becoming more diverse. It is also possible that the population becomes more transient in nature.

Another consequence of growth is the subsequent increase in traffic. The increased number of travellers and workers in the airport precinct will increase congestion in the roads leading to and from the airport. Traffic between Queenstown and other areas in the district is also likely to increase.

Table 21 gives an indication of the size of the impact of traffic congestion relative to Scenario 1. Congestion costs for Scenario 2 are higher than the congestion costs associated the Scenario 1 because it enables more tourism activity. Congestion costs are relatively higher than the costs associated with Scenario 3. This is because people living or visiting the Wānaka area must travel further in Scenario 2.

Table 21: Road network costs – Scenario 2 additional congestion compared to Scenario 1

Scenario 2	2030	2050
Additional Congestion Costs ($m)	2.1	4.7

Source: (Abley, 2020)

After assessing the various sub-effects on the way of life, we have assessed the overall impact of Scenario 2 to be moderate. The direction of this is mixed, as the improvement in living standards is positive, while the change to the character of the town/region is negative.

Sense of Community

Expanding the noise boundaries at Queenstown Airport will allow airlines to increase supply to cater for the increasing demand for air travel to and from the region. This will ensure that the community continues to benefit from being easily able to travel for business or pleasure, which stakeholder feedback suggests is particularly important. However, post 2034 the noise boundaries will constrain any further growth in aircraft movements. At this point, airlines are likely to increase prices, impacting both business and leisure travellers.

As noted by some stakeholders, growth may provide improved employment opportunities for young people, encouraging them to stay in the region. This is likely to positively impact social inclusion and cohesion, as family members can live closer to each other, and people live in the area for longer.

However, the overall impact on social inclusion and cohesion is uncertain. There is some concern from stakeholders that increasing visitor numbers and growth in the tourism industry may lead to a more transient population and locals feeling disgruntled about the impacts of this growth. This would reduce social inclusion and cohesion.

We have assessed the overall impact of Scenario 2 on sense of community to be moderately positive. This is driven by the importance of connectivity for both businesses and leisure travellers and the fact that the airport only has a small, indirect effect on social inclusion and cohesion.

Health and Well-being

Feedback from the community suggests that many in the community feel concerned and anxious about increasing noise boundaries. Some are concerned about the impacts of increasing noise and emissions. As discussed further in the following environmental impacts section, the number of people living in the noise boundaries is greater in Scenario 2 than Scenario 1. This is likely to result in an increase in the number of people highly annoyed in comparison to Scenario 1.

Stakeholder feedback also suggests that much of the anxiety people feel is related to concern about the ability of the Queenstown-Lakes district to cope with growth.

The increased aircraft movements will slightly increase the risk of a fatal accident at the airport. However, the risk would remain low.

We have assessed the effect on health and well-being to be a minor to moderate negative impact. While more people are living in the noise boundaries, not all of those people will be highly annoyed by noise or adversely affected by emissions.

Material Well-being

Increased noise boundaries will directly increase income and employment in the district, both directly, from increased airport activity, and indirectly, through the flow on impacts to other sectors. These benefits will be curtailed once growth is constrained in 2034.

The impact on property prices and affordability is mixed. Expanded noise boundaries may result in a small negative impact on property prices for those living closest to the airport. We do note that QAC would offer to buy the small number of houses falling inside the inner noise boundary that would be most affected. Incomes in the community increase more than in Scenario 1, which may make housing more affordable. However, increased population numbers are also likely to increase the demand for housing, which would drive house prices higher. The size of the impact on property prices across the district is likely to be small, as other socio-economic, planning and policy factors are likely to effect greater change.

The property rights of those located in the expanded noise contours are likely to be impacted Under current noise regulations, new properties cannot be built within the noise boundaries or existing properties altered unless this is already approved in the District Plan, or approved via a resource consent. Properties seeking alterations must comply with greater noise insultation requirements. No new activities sensitive to aircraft noise (including schools, houses, and hospitals) are permitted within the 70dB and the 65dB noise boundaries.

During our engagement, stakeholders expressed concerns on the increased costs associated with these restrictions.

The overall direction of the impact of increased noise boundaries at Queenstown Airport on material well-being is mixed. While the whole district will benefit from an increase in income and employment, property owners located within the expanded noise boundaries will be negatively impacted. Taking these factors into account, we have assessed the overall impact to be moderate, and the direction mixed.

Environmental

Noise

Assuming technology remains constant, approximately 9,930 people in at least 3,975 residential properties could live within the expanded noise boundaries. We have estimated that approximately 1,150 of these people

may become highly annoyed by airport noise. Those who are highly annoyed may suffer stress and disturbance related health impacts.

The number of people and properties affected could be greater than this by 2050 if the District Plan allows for the growth that is projected in these areas. According to current spatial plan projections, the number of properties in the immediate Frankton area is projected to be 1.6 times the number of current properties by 2048.

It is likely that QAC would offer to buy the small number of houses (30-40) that would fall within the inner most noise boundary, reducing the number of people impacted by noise within this area. However, it is unclear what value these properties would be sold for. There may be a negative impact on property values for other surrounding properties, but the overall impact on property values is more dependent on other socio-economic factors, policy, and planning regulations.

Considering the strong concerns voiced by stakeholders over noise annoyance and exposure under this Scenario, and the number of houses located within the expanded boundaries, we have assessed the impacts of noise to be moderate.

CO_2 emissions, GHGs and climate change

Scheduled aircraft movements are estimated to produce 1.21 million tonnes of CO_2 equivalent tonnes for the year in 2050 under this Scenario (assuming that technology remains constant). From 2030 to 2050, an average of 1.0 million CO_2 equivalent tonnes from aircraft movements will be emitted. Note that this is the amount emitted into the atmosphere in general, not just over the Queenstown-Lakes district.

At a transitional cost per tonne to meet zero carbon emissions targets, the domestic share of these emissions would cost New Zealand in the magnitude of $352 million to $3.9 billion. Generally, emissions will contribute to climate change, especially if they are not offset. However, the localised impacts of this are highly dependent on a cumulation of other factors, (see Appendix 5 for more information).

Table 22 below shows the costs of the additional road network emissions under this Scenario compared to Scenario 1. Consistent with the traffic congestion costs, additional emissions costs are higher than Scenario 1 and Scenario 3. This is due to the higher level of tourist activity than in Scenario 1, and the greater distance that residents and visitors in the Wānaka area travel in comparison to Scenario 3.

Table 22: Road network costs – Scenario 2, additional emissions compared to Scenario 1

Scenario 2	2030	2050
CO_2 Emissions Costs	1.0	1.1

Source: (Abley, 2020)

Due to the additional amount of emissions produced, and the estimated cost of mitigating these emissions, we have assessed the negative impact of emissions generated under Scenario 2 to be moderate.

Air quality

There is no indication that there are air quality impacts at the current level of activity. However, air quality impacts are often compounding, and this is likely to be the case in Queenstown due to the topography of the area. The increase in activity will therefore likely result in a small reduction in air quality in the Queenstown-Lakes district. We expect that this impact will be minor, but further modelling would be required to confirm this.

Visual pollution

The increase in the noise boundaries will likely result in an increase in the number of aircraft, increasing visual pollution. Other visual impacts may result from the need to adapt land use and infrastructure around the airport

as activity increases. However, visual impacts because of these changes are likely to be only incremental to what exists today, as the area around the airport is already a mix of commercial and industrial areas and people are used to seeing aircraft.

We have therefore assessed the impact of Scenario 2 on visual pollution as minor.

Waste and wastewater

As activity increases, larger volumes of waste will be produced. The airport contributes directly to increased waste and wastewater through increased airport operational activities, and indirectly, through its role in supporting growth. It is likely that growth from increased tourist activity and population growth will have a larger impact on waste and wastewater than airport operations. To ensure that the community does not experience environmental degradation, it is important that the appropriate investment in supporting infrastructure is made to support growth.

We have assessed the impact of waste and wastewater to be minor under this Scenario. This assessment assumes that supporting infrastructure will be in place.

Water quality

There are no significant concerns about water quality near the airport currently, but sediment and polluted run-off could cause water quality issues if activities are not appropriately regulated and managed. There may also be some impacts on water quality from increasing tourist activity and population growth.

Generally, water quality was not a major concern for respondents under this Scenario.

Because the airport's role in impacting water quality is likely to be limited if its activities are responsibly managed, we have assessed this impact to be minor.

Natural environment

There is currently no evidence of at risk, plant, insect, or animal populations surrounding Queenstown Airport. Other environmental impacts are likely to compound due to increased activity and cause some negative impacts on the natural environment. Our assessment is that these impacts will be minor.

Cultural

Cultural diversity

The additional passenger growth that airport development contributes to in this Scenario is likely to increase the cultural diversity in the Queenstown-Lakes district. The impact is likely to be small, as marketing bodies, businesses, airlines and the QLDC have a much greater say than the airport on the diversity of people moving to, and visiting, the region. Staffing increases and flow on hiring decisions for businesses at the Airport and in the wider region could also increase the diversity of the community, although the effect will be small at a district level.

Our assessment is that the impact on cultural diversity is minor.

Cultural heritage

Airport expansion under this Scenario will likely have some impacts on the heritage sites close to Queenstown Airport, although consultation and planning regulations are designed to protect these areas. The changing face of the Airport is however a reflection of the changing face of the community. Increased population growth and visitor numbers, in part facilitated by the Airport, lead to changing community values, customs and practices over time. Increased visitors to areas of cultural significance may change people's experiences of these places and crowd out local people. Stakeholder feedback has indicated that they were somewhat concerned over this impact.

Because the airport has only an indirect impact on growth and other factors are likely to play a greater role in the development of community values and custom, we have assessed this impact to be minor.

Economic

Scenario 2 has the second-best economic outcomes of the four scenarios over the 20 years from 2030 to 2050, generating average annual employment of 16,579 and average annual GDP of $1.15 billion.

Compared to Scenario 1, Scenario 2 results in an additional 5,733 FTEs and $393 million in GDP each year between 2030 and 2050. Employment and GDP impacts for Scenario 2 are shown in Table 23.

Table 23: Employment and GDP impacts – Scenario 2

Scenario 2.	2030	2040	2050	Ave annual (2030-2050)
FTE employment (total)	9,406	18,033	20,354	16,579
FTE employment (relative to Scenario 1)	225	6,959	8,361	5,733
GDP (total)	657	1,248	1,409	1,150
GDP (relative to Scenario 1) ($m)	16	476	572	393

Source: MartinJenkins

Scenario 2 has the second highest network operating costs of the four scenarios. By 2050, the total network operating costs are expected to be about $107 million higher than under Scenario 1. Additional road network costs for Scenario 2, relative to Scenario 1 by type of cost is shown in Table 24.

Table 24: Road network costs – Scenario 2, additional costs compared to Scenario 1

Scenario 2.	2030 ($m)	2050 ($m)
Vehicle operating cost	24.2	28.3
CO2 emissions	1.0	1.1
In vehicle time cost	43.6	63.4
Additional congestion cost	2.1	4.7
Crash cost	0.8	5.9
Travel time reliability	2.2	3.2
Total Network Operating Costs	**73.9**	**106.6**

Source: (Abley, 2020)

Productivity

Scenario 2 is an unconstrained growth scenario until 2045, when capacity constraints will affect passenger growth demand. It is a continuation of the status quo, where growth is allowed to continue in the same area with similar drivers. Investments into visitor infrastructure will continue, largely in the same areas.

Relative to other scenarios, Scenario 2 enables the second highest level of activity between 2030 and 2050, which will have a positive impact on productivity. The location of the airport is positive for businesses in Frankton and Queenstown. Scenario 2 has the least disruption to the operations and investment decisions of existing businesses.

There will be increased congestion as a result of the levels of activity within the Wakatipu / Frankton areas. Business costs for those operating in the Frankton area will be higher due to growth and demand.

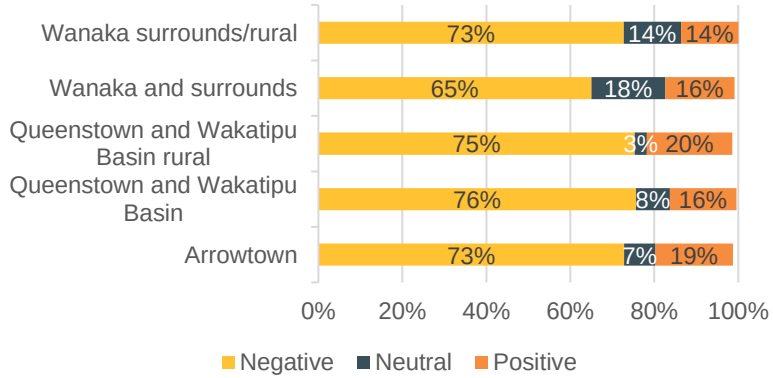
However, on balance the impact on productivity will be positive.

Our assessment is that Scenario 2 is likely to have a minor positive impact on productivity relative to Scenario 1.

5.4.4 Community response to Scenario 2: Extended Noise Boundaries at Queenstown Airport

Figure 20 shows that in all neighbourhoods a large majority of survey respondents feel negatively overall about the impacts of the impacts of the Extended Noise Boundaries at Queenstown Airport Scenario.

Figure 20: Survey respondent's overall sentiment towards Scenario 2, by neighbourhood



Source: MartinJenkins Airport Impacts Survey

These results are consistent across subgroups apart for 15-29 year-old respondents, who feel less negatively overall (although more than half still feel negatively).

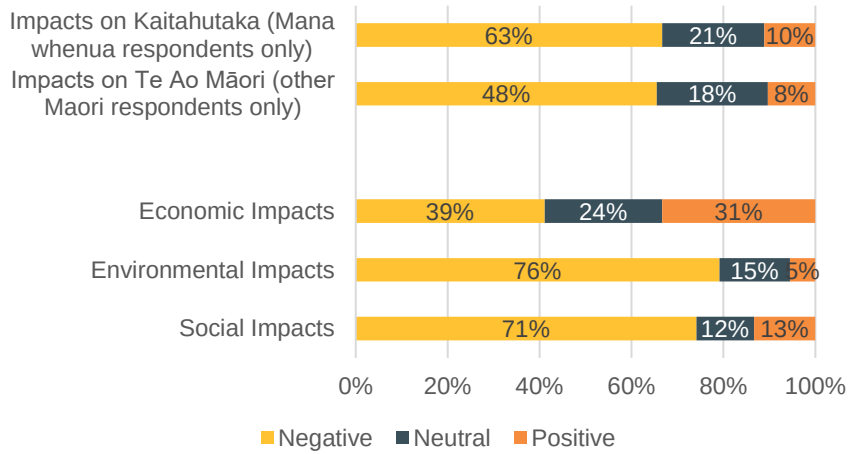
The strongly negative feedback about this Scenario is in line with previous consultations. There are many reasons that stakeholders feel negatively about this Scenario, including a view that:

- affected residents have already made their views clear about this Scenario, and other stakeholders are keen to show solidarity with them
- this Scenario places a disproportionate burden on an already affected community, and also does not distribute airport impacts
- Queenstown Airport is not suitable for expansion, due to other land use nearby and concerns about flight safety

Very few stakeholders provided positive perspectives about this Scenario in focus group discussions. The few positive views that were expressed are driven by support for growth in general, a desire to limit negative impacts elsewhere and the possibility of concentrating investment in local infrastructure to achieve the greatest results.

Figure 21 shows respondents' assessments of the impacts of the Extended Noise Boundaries at Queenstown Airport Scenario in five domains: Social impacts, Environmental impacts, Economic impacts and impacts on Te Ao Māori and Kaitahutaka.

Figure 21: Survey respondent's assessment of high-level impacts of Scenario 2



Source: MartinJenkins Airport Impacts Survey

N=2808-2815 for Economic, Environmental and Social impacts. N=38-48 for mana whenua only impacts.

The results are mostly consistent across subgroups, although respondents from Queenstown and Wakatipu Basin, and Wānaka and Surrounds, viewed the impacts especially negatively.

Reasons for positive and negative sentiment

Throughout focus groups and the engagement survey many stakeholders expressed concern and frustration about any scenarios that proposed an expansion of the noise boundaries at Queenstown Airport. Frustration stems from a view that local residents have already expressed in previous consultations that they do not support expansion of noise boundaries at Queenstown Airport, and some people feel that view is not being listened to. While this view was certainly not universally held, we heard it expressed by residents of neighbourhoods close to the Queenstown Airport, and stakeholders living in unaffected areas.

The key reason that most stakeholders feel negatively about the Extended Noise Boundaries at Queenstown Airport Scenario is because in their view it would further exacerbate existing direct and indirect negative impacts – particularly those related to impacts of **noise**, **visitor numbers** and **stress on infrastructure.** These concerns were not limited to residents that live nearby the current Queenstown Airport, but were shared by many others in the district including stakeholders who are otherwise supportive of Airport expansion to enable growth.

As well as being concerned about the indirect **stress on infrastructure** resulting from increased tourism, some stakeholders are concerned about the direct impact of expansion on infrastructure such as waste-water capacity, for example.

Many stakeholders expressed specific concerns about the suitability of Queenstown Airport for growth. The relative proximity of the Airport to highly populated residential zones, schools and other community facilities is seen by some stakeholders to intensify the negative impact of **noise** and **traffic congestion** (for example by impacting mental and physical health for a greater number of people and creating limitations on school and social activities).

Another key reason for negativity about this Scenario is a perception that it is a 'quick-fix', rather than a long-term solution. Stakeholders with this view believe that demand will continue to outstretch the capacity that is enabled by extended noise boundaries, and then further Airport expansion will be required. Stakeholders similarly believe that there is a physical limit to the expansion possible at Queenstown Airport, and for this reason extending noise boundaries is not a long-term solution.

A somewhat different reason for some stakeholders to be negative about this Scenario is because they feel that it would miss an opportunity to 'share' the **economic** benefits of growth across the district and/or across the region.

A reason that many stakeholders feel positively about this Scenario is because it contains many of the negative impacts to already affected areas and will not directly affect their neighbourhoods. This sentiment was particularly common among respondents that reside in Wānaka who are keen to maintain the **character of their town**.

Positivity also stems from a view that this option would be less expensive and quicker to implement than other scenarios. As such, it would optimise the existing Airport site (and Airport infrastructure). In so doing, this Scenario is seen by some stakeholders to be more positive for the environment because the physical works required would be less. However, like other scenarios that enable growth, there is a perception that this Scenario will have negative **environmental** impacts at local and global levels.

Another driver of positivity is a view that this Scenario represents a managed approach to growth and will enable **economic** benefits of growth to be realised. Economic and social benefits are perceived to flow from travel opportunities and connectivity, affordable travel, and diversification of the local economy.

Not all stakeholders are positive about the potential for economic benefits, and some feel they would not eventuate from increased tourism because

- airport expansion would make Queenstown less attractive for visitors
- there are constraints to land use around the airport, and
- they believe expansion of noise boundaries would lead to increased economic reliance on tourism.

There is also a view that continuing to concentrate visitor travel through the existing Airport will undermine the attractiveness of Queenstown as a destination.

5.5 Scenario 3: Scheduled services at Wānaka Airport

5.5.1 Description

Under the Scheduled Services at Wānaka Airport Scenario, the current noise boundaries at Queenstown Airport are expanded from 2024 and Wānaka Airport is developed to allow narrow body jets and is open for domestic scheduled services from 2028.

Under this Scenario, passenger demand is fully met across the two airports. Flights operating at Wānaka Airport ramp up over 3 years so that in 2031 the airport has 400,000 passenger movements (2,900 aircraft movements). For context, this is similar to the size of Invercargill or New Plymouth airports currently.

5.5.2 Projected change in activity

Under this Scenario, all demand can be met through increased scheduled commercial flights.

Activity at Queenstown Airport is lower than in Scenario 2. Growth in domestic demand is met somewhat through Wānaka Airport. Passenger volumes at Wānaka Airport are assumed to grow at 5% per year from 2031. The changes in passenger and aircraft movements in 2030 and 2050 are shown in Table 25.

Table 25: Change in activity under the Scheduled services at Wānaka Airport Scenario

Scheduled services at WKA Arrivals and aircraft movements	ZQN			WKA	
	Current	2030	2050	2031	2050
Passenger arrivals					
Domestic flights	819,863	880,925	1,324,189	196,919	477,846
International flights	358,196	452,428	1,425,618	0	0
Total	**1,178,059**	**1,333,353**	**2,749,807**	**196,919**	**477,846**
Passenger movements					
Domestic flights	1,676,068	1,789,411	2,689,808	400,000	970,643
International flights	716,908	919,012	2,895,839	0	0
Total	**2,392,976**	**2,708,423**	**5,585,647**	**400,000**	**970,643**
Scheduled aircraft movements					
Domestic flights:					
ATRs	1,969	2,102	3,160	470	1,187
Narrow-body jets	10,732	11,089	15,452	2,453	6,198
International flights:					
Narrow-body jets	5,473	6,477	18,980	0	0
Wide-body jets	0	0	0	0	0
Total aircraft movements	**18,174**	**19,668**	**37,593**	**2,922**	**7,385**
Unmet passenger arrival demand					
Total unmet arrival demand	0	0	0		
People entering district via other modes	0	0	0		

Note: 2031 shown for Wānaka as this is when it has ramped up to full operations, having opened in 2028.
Source: MartinJenkins

5.5.3 Impacts

The effect of Scenario 3 on the range of impacts are discussed further below.

Social

Way of Life

Because growth is unconstrained in this Scenario, living standards are likely to improve more than in Scenario 1 and 2, as the community benefits from greater employment and income. While the overall number of jobs will grow, some respondents to this Scenario commented that the quality of jobs would not necessarily improve. While this may be true of airport-related jobs, the flow on impact into other areas of the economy should create many different types of jobs. Increased access to the region may also attract businesses in a wide variety of industries, helping to diversify the economy away from tourism.

This Scenario may have a small impact on the work life balance for some in the community. Improved employment opportunities in the Wānaka area may mean that some residents who have been commuting further for work are now able to find work closer to home. Those living in the Wānaka area will also benefit from reduced travel time to get to and from the airport.

As in Scenario 2, increased growth will impact on the changing character of the town/region as a growing population and greater visitor numbers will require an increased investment in infrastructure. The change in this Scenario will be slightly greater than in Scenario 2 as the Wānaka area is likely to see greater population and visitor growth than in Scenario 2. Like in Scenario 2, growth will result in larger communities, increased diversity, and the possibility of a more transient population.

Also, the area around Wānaka Airport will experience change as airport operations expand and supporting businesses develop. As there are few people living in the immediate vicinity of Wānaka Airport, we expect this impact to be relatively minor.

Some stakeholders commented that the Wānaka area was more pristine than other areas and therefore development will have a greater impact. Others are worried about the problems that may arise without sufficient infrastructure investment to support growth.

Growth will drive increased traffic volumes on roads in the region. Table 26 shows the additional congestion costs of this Scenario compared to Scenario 1.

Table 26: Road network costs – Scenario 3 additional congestion compared to Scenario 1

Scenario 3	2030	2050
Additional Congestion Costs ($m)	2.2	3.6

Source: (Abley, 2020)

Congestion costs in Scenario 3 are greater than in Scenario 1, but are less than Scenarios 2 and 4. As discussed in Scenario 2, the congestion impacts of Scenario 3 are less than for Scenario 2 as people living and visiting the Wānaka area have less distance to travel. This may also improve safety, particularly by reducing the amount of people driving on unfamiliar roads and in dangerous winter conditions. Our assessment of this Scenario is that the overall impact is likely to be moderate. The direction of impact is mixed, as the impact on living standards is positive, while the overall change to the character of the town/region is negative.

Sense of Community

In this Scenario, ease of travel is likely to be greater than under Scenario 1 and slightly better than Scenario 2. Flight movements are not constrained, which should lead to greater choice of affordable travel options for both

business and leisure travellers. Wānaka residents in particular will benefit more from increased connectivity with other areas and the reduced travel time to their local airport.

Lower income earners are more likely to be able to afford travel and therefore share in the benefits associated with travel, including being able to visit friends and family. This contributes to enhanced social inclusion and cohesion.

As in Scenario 2, growth may provide improved employment opportunities for young people in the region. The impact is likely to be slightly greater than in Scenario 2, as more employment opportunities will be created. A bigger proportion of these opportunities are likely to be in the Wānaka area.

Also, as in Scenario 2, the overall impact on social inclusion and cohesion is uncertain. Growth in tourism and an influx of new residents may lead to a more transient population and locals feeling unsettled by changes to the community. Others in the community will welcome the increased diversity.

We have assessed the overall impact on sense of community in this Scenario to be moderately positive.

Health and Well-being

The health and well-being impacts discussed in Scenario 2 remain relevant in Scenario 3. There are slightly more people impacted by noise and emissions than in Scenario 2, as there are a few properties likely to be located in noise boundaries around Wānaka Airport.

In addition to people's fears and concerns about the management of growth, noise and pollution, some stakeholders felt that allowing some commercial operations in Wānaka was just the first step and further development would follow. There is a lack of trust in the process by some.

It should also be noted that the health and well-being benefits were valued highly by a number of recreational users of Wānaka Airport and these users are concerned about the impact on them once commercial services are introduced.

As in Scenario 2, while increased air movements slightly increase the risk of an incident at Queenstown Airport, the overall risk remains low. The impact on Wānaka Airport is less clear. General aviation flights are associated with more accidents per hour flown than commercial flights.[151] The use of Wānaka Airport by general aviation services is likely to change with the introduction of commercial services. In addition, air traffic management may be enhanced with the introduction of commercial services. At present, there is no air traffic control at Wānaka Airport. Instead, special procedures are in place to manage traffic and avoid aircraft colliding.

Commercial flights at Wānaka Airport will improve access to Wānaka area in the event of a natural disaster or for emergency healthcare services.

In our view, people's perceptions of the impact of noise, emissions and air quality are likely to have the biggest impact on health and well-being. Therefore, we have assessed this impact to be minor to moderate.

Material Well-being

Like Scenario 2, the Queenstown-Lakes district will benefit from increased income and employment in this Scenario. The impact in Scenario 3 is slightly greater than in Scenario 2 from 2045, as commercial flights at Wānaka Airport means that air traffic growth in the region is not constrained.

The impact on property prices is likely to be mixed. As in Scenario 2, houses located in the expanded noise boundaries surrounding Queenstown Airport may experience a small negative impact on prices. Similarly, properties significantly impacted by noise from Wānaka Airport may also experience a

[151] (Morris, 2019)

small negative price impact. The increased economic activity at Wānaka Airport may cause property prices in the area that are not significantly impacted by noise to rise.

As in Scenario 2, the impact on housing affordability is unclear. Increased incomes may improve the affordability of house prices for buyers, but increased population growth may increase house prices, reducing affordability.

The property rights of those located in the expanded noise contours will be impacted by increased restrictions under the District Plan and the increased costs associated with these restrictions. The impact will be greater than in Scenario 2 because properties in both the Queenstown Airport and Wānaka Airport noise boundaries will be impacted.

The overall direction of the impact of this Scenario on material well-being is mixed. While the whole district will benefit from an increase in income and employment, property owners located within the expanded noise boundaries will be negatively impacted. Taking these factors into account, we have assessed the overall impact to be moderate.

Environmental

Noise

The same number of people are impacted by expanded noise boundaries at Queenstown Airport in Scenario 3 as are in Scenario 2. Upwards of 9,935 people across 3,980 residential properties are likely to reside in the noise boundaries at Queenstown Airport.

The increased aircraft activity at Wānaka Airport may also expand the noise boundaries around this airport. People living and working close to the Airport will likely experience greater noise levels than they currently experience. Some of these people will experience increased annoyance because of the increase in noise. We estimate that there are at least 10-20 residential properties near the airport. Luggate township, which is approximately 2 kilometres from the airport itself, the rural areas of Wānaka (to the north west of the airport) and Albert Town residents may also experience some noise disturbance. Because the area near Wānaka Airport is relatively rural, the noise impacts of increased airport activity at Wānaka Airport is less than the impact of increased activity at Queenstown Airport.

Feedback suggests that stakeholders have major concerns about the impacts of noise under this Scenario.

Overall, we do not expect the noise impacts to affect many more people than Scenario 2. We have therefore rated the noise impacts from this Scenario to be moderate.

CO_2 Emissions, GHGs and Climate Change

This Scenario leads to more emissions being produced than Scenario 1 or Scenario 2. In this Scenario, scheduled aircraft flying to and from Queenstown and Wānaka Airports will emit 1.32 million tonnes of CO_2 equivalent into the global atmosphere in the year 2050. From 2030 to 2050 emissions will average 1.02 million tonnes of CO_2 equivalent each year. As for the previous scenarios, it is important to note that this is the amount emitted into the atmosphere in general, not just over the Queenstown-Lakes district.

At current estimates of the cost for New Zealand to transition to meet zero carbon targets, the share of domestic emissions from this total could cost New Zealand roughly $370 million – $4.1 billion. The localised impacts of these gases as they affect climate change are dependent on the combination of climate change initiatives in the district, impacts generally, technology and other mitigation practices.

Table 27 below shows the costs of road network emissions under this Scenario relative to Scenario 1. Consistent with the traffic congestion costs, emissions costs are higher than for Scenario 1, but lower than Scenarios 2 and 4.

Table 27: Road network costs – Scenario 3 additional CO_2 emissions compared to Scenario 1

Scenario 3.	2030	2050
CO_2 Emissions Costs ($m)	0.9	0.9

Source: (Abley, 2020)

Due to the amount of emissions produced, and the estimated cost of mitigating these emissions, we have assessed the negative impact of emissions generated under Scenario 3 to be moderate.

Air quality

As for Scenario 2, we would expect the increase in emissions, gases, and particles in this Scenario from increased aircraft movements to have a minor negative impact on air quality in the district. We would expect the impact on the Queenstown area to be slightly higher than in the Wānaka area, in part because of the flatter topography of the Wānaka area compared to Queenstown. While total emissions produced increase in this Scenario, these emissions are released into the atmosphere in general, not just over the Queenstown-Lakes district.

We have therefore assessed the overall air quality impacts as being minor under this Scenario.

Visual pollution

In comparison to Scenario 1 and 2, there will be an increase in the visibility of aircrafts in this Scenario. However, we expect this to be a small impact as people living near both airports are used to seeing aircraft. The impact will be slightly greater for those living around Wānaka Airport, as this is currently used for general aviation only.

In addition to the changes to infrastructure in and around Queenstown Airport that occur in Scenario 2, additional infrastructure investment will also be made to support increased activity at Wānaka Airport. As the area surrounding Wānaka Airport is relatively untouched landscape, this will have a greater visual impact than changes to Queenstown Airport.

Our overall assessment is that visual impacts are likely to be minor in this Scenario.

Waste and wastewater

As in Scenario 2, greater airport activity will result in larger volumes of waste and wastewater being produced. Appropriate infrastructure investment will need to be made to protect against environmental degradation. Infrastructure at Wānaka is currently less equipped to support increased activity, however we would expect that this would be addressed during the expansion.

We have assessed the impact of waste and wastewater in this Scenario to be minor. This assessment assumes that supporting infrastructure will be in made as both airports expand.

Water quality

Wānaka Airport is approximately 1.3 km from the Clutha River/Mata-Au, which feeds into Lake Wānaka, Hawea and Wakatipu. Queenstown Airport is also surrounded by Lake Wakatipu and the Shotover and Kawarau Rivers.

There are no significant concerns about water quality near either of the airports currently. However, infrastructure and management processes must ensure that increased airport operations do not adversely impact water quality. We would expect that this is being considered as part of QAC's sustainability work.

As in Scenario 2, there may also be some impacts on water quality from increasing tourist activity and population growth.

Because we expect that appropriate management and environmental protection regulations are in place, we have assessed this Scenario has having a minor impact on water quality.

Natural environment

As noted in Scenario 2, there is currently no evidence of at risk, plant, insect, or animal populations in the areas surrounding Queenstown Airport. This is also the case for the area surrounding Wānaka Airport. There are likely to be small negative impacts associated with growth, however our assessment is that these impacts will be minor.

Cultural

Cultural diversity

The unconstrained growth in this Scenario leads to more visitors and greater population growth than Scenario 1 and slightly greater growth than in Scenario 2. This is likely to result in a more diverse population mix over time. This impact may be greater in the Wānaka area, as Wānaka Airport will provide a gateway to visitors and new residents.

Some stakeholders, particularly in Wānaka, expressed their concern that increased growth and cultural diversity will change the character of their town/region. It should be noted that growth and change would occur without airport development. As is the case for all scenarios, airports are only one factor attracting people to the region and growth and change would occur without airport development. We have therefore assessed this impact as minor.

Cultural heritage

Airport expansion will likely have some impacts on the heritage sites and wāhī tūpuna close to Queenstown Airport, and the wāhī tūpuna of the Clutha River close to Wānaka Airport. As is the case in Scenario 2, planning regulations are designed to protect these areas. Liaison with the community and the Council's tiriti partners will strengthen protections for these important sites.

Other impacts on cultural heritage are like those in Scenario 2, where growth impacts the character of the town/region and people's experiences of cultural areas important to them. The impacts on cultural heritage in this Scenario are likely to be slightly higher than in Scenario 2 as growth is unconstrained. Our overall assessment is that the impact on cultural heritage of this Scenario is minor.

Economic

Scenario 3 had the highest employment and GDP impacts of the four scenarios over the 2030 to 2050 period with average employment of 16,673 jobs and contributing an average of $1.16 billion to the regional economy.

Relative to Scenario 1, Scenario 3 generates an extra $398 billion in GDP and an additional 5,828 jobs.

Table 28: Employment and GDP impacts – Scenario 3

Scenario 3.	2030	2040	2050	Ave annual (2030-2050)
FTE employment (total)	9,398	18,013	21,228	16,673
FTE employment (relative to Scenario 1)	217	6,939	9,234	5,828
GDP (total)	656	1,246	1,468	1,155
GDP (relative to Scenario 1) ($m)	15	474	630	398

Source: MartinJenkins

Scenario 3 had the lowest additional costs compared to Scenario 1, at $89.6 million in 2050. The main reason Scenario 3 costs are lower is because the addition of a second airport better services the needs of the Wānaka Ward, resulting in less reliance on and travel to the Queenstown Airport for locals

and tourists alike. Road network costs for Scenario 3 relative to Scenario 1, broken down by type of cost, is shown in Table 29.

Table 29: Road network costs – Scenario 3 additional road network costs compared to Scenario 1

Scenario 3.	2030 ($m)	2050 ($m)
Vehicle operating cost	21.8	23.5
CO_2 emissions	0.9	0.9
In vehicle time cost	39.7	53.1
Additional congestion cost	2.2	3.6
Crash cost	0.7	5.8
Travel time reliability	2.0	2.7
Total Network Operating Costs	**67.3**	**89.6**

Source: (Abley, 2020)

Productivity

Scenario 3 is also an unconstrained growth scenario, but with activity spread to Wānaka Airport. This Scenario would allow for more efficiencies for users in terms of where they enter and exit the district. The two locations will give businesses more choices around how they structure and operate their businesses to maximise efficiencies.

However, there are also likely to be costs in terms of servicing two airports, both for businesses operating within the airports, but also tourism businesses having to deal with customers in a further location. We would note that there are already general aviation services operating out of Wānaka Airport.

Relative to other scenarios, Scenario 3 enables the highest level of activity between 2030 and 2050, which will have a positive impact on productivity. Scenario 2 has the least disruption to the operations and investment decisions of existing businesses.

There will be increased congestion as a result of the levels of activity within the Wakatipu / Frankton areas. Business costs for those operating in the Frankton area will be higher due to growth and demand.

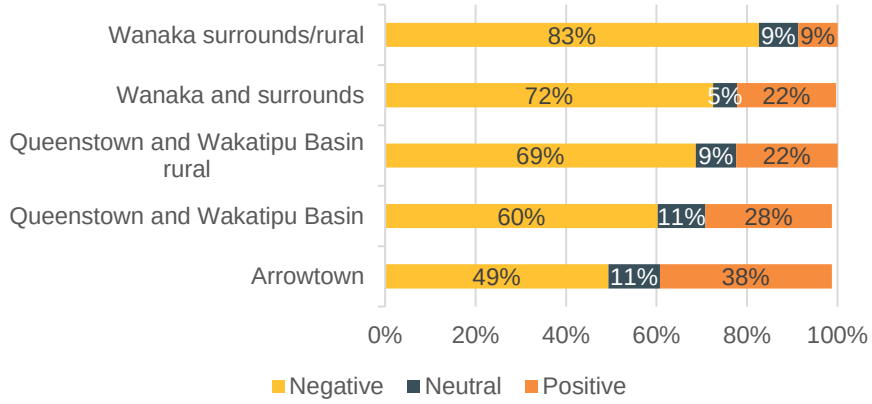
However, on balance the impact on productivity will be positive.

Our assessment is that Scenario 3 is likely to have a moderate positive impact on productivity relative to the other scenarios.

5.5.4 Community response to Scenario 3 – Scheduled Services at Wānaka Airport Scenario

Figure 22 shows that in most neighbourhoods a majority of survey respondents feel negatively overall about the impacts of Scenario 3.

Figure 22: Survey respondent's overall sentiment towards the impacts of Scenario 3, by neighbourhood



Source: MartinJenkins Airport Impacts Survey

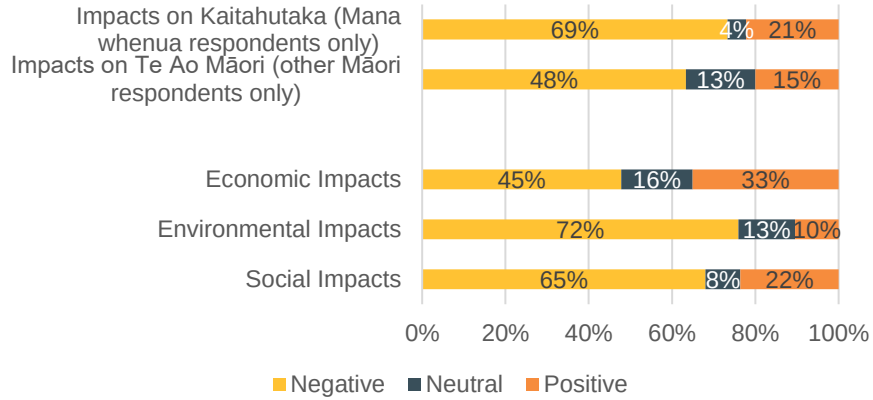
These results are consistent across most subgroups, with two exceptions:

- By age, those aged under 15 feel entirely negatively about this Scenario (100% of respondents aged under 15 feel negatively compared to 48-51% of other age ranges).
- By household income, respondents with the highest household income (more than $200,000) feel least negative and most positive about this Scenario.

The variation in sentiment by neighbourhood is not surprising given this Scenario would result in a greater amount of change for residents of Wānaka in particular.

Figure 23 shows respondents' assessments of the impacts of the Extended Noise Boundaries at Queenstown Airport Scenario in 5 domains: Social impacts, Environmental impacts, Economic impacts and impacts on Te Ao Māori and Kaitahutaka.

Figure 23: Survey respondent's assessment of the high-level impacts of Scenario 3



Source: MartinJenkins Airport Impacts Survey

The results are mostly consistent across subgroups, except for respondents from Arrowtown who were less negative about this Scenario:

- 53% viewed social impacts as negative
- 63% of viewed environmental impacts as negative
- 26% viewed economic impacts as negative

Reasons for positive and negative sentiment

Many stakeholders feel positively or negatively about this Scenario for the same reasons they feel positively or negatively about Expanded Noise Boundaries at Queenstown Airport. Rather than repeating those reasons here, we discuss reasons that are unique to this Scenario.

Depending on the perspective of the stakeholder, positivity *and* negativity stem from the fact that this Scenario would share the benefit and burden of Airports across the region.

Some stakeholders are enthusiastic about the personal, business and economic opportunities that they think would flow from opening up Wānaka Airport to scheduled flights, such as:

- easier access to flights for Wānaka residents and easier access to Wānaka for visitors
  - making Wānaka more attractive for living and visiting
  - reducing traffic on the roads from Queenstown to Wānaka (lowering car emissions and lessening road safety risks)
- better connectivity for residents and business
- increased opportunities for young people (stemming from growth and connectivity)
- improved local infrastructure stemming from growth
- more, and diverse, employment opportunities at Wānaka Airport and in the local economy.

Other stakeholders are concerned about this Scenario leading to unmanaged growth in Wānaka, which could both overwhelm local infrastructure and change the character of the town. Specifically, stakeholders talk about existing problems relating to housing affordability, tourist accommodation and congestion being further exacerbated by increased visitor numbers that would result from scheduled flights.

Stakeholders have mixed views about the suitability of Wānaka Airport for expansion. On one hand, some stakeholders are of the view that it is a safer site than Queenstown Airport with better weather conditions. While other stakeholders are concerned that the current site of Wānaka Airport would be a short-term solution as it is constrained by residential and water-related infrastructure.

Stakeholders also have mixed views about whether it is positive or negative to have two commercial Airports within a 1 hour drive of each other. Some stakeholders do not believe there is sufficient demand to justify the investment, while others see it as adding to the resilience of the region.

Similarly, the costs of developing Wānaka Airport are thought to be high by some stakeholders, who are concerned about these costs being met by rate payers.

Another driver of negativity is concern about the impact of this Scenario for existing users of Wānaka Airport and a perception that the *quality* of Airport jobs would decrease, impacting household incomes and the opportunity for Wānaka Airport to enable higher-end airport activity by providing unique services (such as research). The counter view is that Wānaka Airport is currently under-utilised, and development is justified.

Noise is also an issue that drives negativity. Many local stakeholders are concerned about where flight paths would be located and how noise from

flights would affect their quality of life, property value and the character of the area.

While many stakeholders are concerned about negative environmental impacts associated with any Airport expansion, some are concerned about how these relate specifically to this Scenario: because the Wānaka area is seen to be more ‘pristine’ and more vulnerable than other locations.

A lack of trust was particularly noted in relation to this Scenario. Stakeholders are concerned that any development of Wānaka Airport will be a first step towards much more significant growth at the Airport over time.

5.6 Scenario 4: New International Airport

5.6.1 Description

Under the new international airport Scenario, the current noise boundaries at Queenstown Airport are kept at their current levels and operating hours are not changed. There are no scheduled services out of Wānaka Airport. A new international airport is commissioned in a yet to be determined location that is within two hours of Queenstown, opening in 2035.

Once the New International Airport is completed, this Scenario can meet and possibly encourage increased activity, including beyond the Queenstown-Lakes district. Queenstown Airport reverts to a general aviation airport supporting a range of airfield services such as flight-seeing, operating in a similar role as Wānaka Airport does currently. There is limited general aviation activity at the New International Airport.

5.6.2 Projected change in activity

The number of scheduled services to Queenstown Airport increases to meet passenger demand. The noise limit is reached in 2030, when there are 21,000 scheduled flights moving about 2.9 million passengers.

At this point, passenger numbers are constrained. There may be some ongoing increase in passenger numbers as flight schedules, loading capacity and aircraft type change to fit within the noise boundaries. With the number of seats limited and demand high, prices increase accordingly.

The constraints on seats continues until the New International Airport opens for scheduled services in 2035. Scheduled flights into Queenstown Airport transition to the New International Airport upon its opening, when it becomes the sole airport providing scheduled services for the Queenstown-Lakes district.

The changes in passenger and aircraft movements in 2030 and 2050 are shown in Table 30 below.

Table 30: Change in activity under the New International Airport Scenario

New international airport	ZQN		NIA
Arrivals and aircraft movements			
	Current	**2030**	**2050**
Passenger arrivals			
Domestic flights	819,863	994,020	1,802,035
International flights	358,196	437,003	1,571,531
Total	**1,178,059**	**1,431,023**	**3,373,567**
Passenger movements			
Domestic flights	1,676,068	2,019,140	3,660,451
International flights	716,908	887,678	3,192,231
Total	**2,392,976**	**2,906,818**	**6,852,682**
Scheduled aircraft movements			
Domestic flights:			
ATRs	1,969	2,349	4,300
Narrow-body jets	10,732	12,434	21,019
International flights:			
Narrow-body jets	5,473	6,218	21,059
Wide-body jets	0	0	1,323
Total aircraft movements	**18,174**	**21,000**	**47,701**
Unmet passenger arrival demand			
Total unmet arrival demand	0	44,155	0
People entering district via other modes	0	8,831	0

Source: MartinJenkins

5.6.3 Impacts

It is important to note that Scenario 4 is significantly different from Scenario's 1 through 3 in that it is a greenfield development that will most likely occur in a currently un-developed area. This makes it difficult to compare changes in impacts, especially environmental impacts.

We would argue that the negative impacts will be greater in that they are new impacts affecting an environment, compared to the other scenarios, where there is an increase in existing activity. Further, new supporting infrastructure, such as roads and water/wastewater, will most likely be needed to support an "airport precinct" and to transport passengers to and from the airport. This is taken into consideration when estimating the non-quantifiable impacts.

Until the New International Airport is operating in 2035, the impacts are the same as for Scenario 1.

The effect of Scenario 4 on the range of impacts are discussed further below.

Social

Way of Life

Initially, the impact on people's way of life will be similar to that of Scenario 1. Prior to the New International Airport being built there is likely to be an increase in traffic on the roads around the airport precinct until air traffic movements become constrained by the noise contours.

Once construction begins on the New International Airport, the character of the town/region will be affected. Feedback from stakeholders suggested it was difficult for them to comment on the degree of impact without knowing the location. It is likely that the New International Airport will have a large impact on the character of the area in which it is built – both during and after construction. The area chosen is likely to be in a relatively quiet, rural setting. The New International Airport will change the visual landscape of the area, through both the development of the airport itself, and the surrounding infrastructure. The surrounding area will develop to support the economic activity at the airport. Although the area will be larger, busier, and less rural, the community will benefit from increased investment in infrastructure and community amenities. The likely rural location also means that the number of people impacted will be relatively low.

Table 31 below shows the road network congestion costs associated with this Scenario. This Scenario has the second highest additional congestion costs after Scenario 2. This is due to the likelihood that the location is further away from built up residential and commercial areas. This has the flow on impact of increasing the time and distance of trips to and from the Airport in comparison to the other scenarios. It is likely that roading infrastructure linking the New International Airport to the rest of the region will need to be improved.

Table 31: Road network costs – Scenario 4 congestion costs compared to Scenario 1

Scenario 4	2030	2050
Additional Congestion Costs ($m)	0.0	3.8

Source: (Ableу, 2020)

In the short term, people's living standards will not be impacted much as growth is constrained. However, we expect that the New International Airport will facilitate the greatest annual growth in passenger numbers once it is opened in 2035. The employment and income benefits are likely to be shared throughout the region.

The opening of the New International Airport may have an impact on people's work/life balance. Those that continue to live in Queenstown are likely to face longer commute times to the New International Airport.

However, the long-term impact is less clear. As the communities in the areas surrounding the New International Airport develop, people are more likely to live in these areas.

Balancing the sub-impacts on the way of life in this Scenario, we have assessed the overall impact to be moderate. The direction is mixed, as the impact on congestion and the character of the town/region is negative and the impact on living standards is positive.

Sense of Community

Prior to the opening of the New International Airport, the impact of constrained airport growth will have the same negative impacts on connectivity as for Scenario 1. The higher cost of travel will affect both business and leisure travellers. This will have flow on impacts on business productivity and people's well-being.

Once the New International Airport is opened, the Queenstown-Lakes district is likely to benefit from improved connectivity. This Scenario is likely to lead to the greatest choice of affordable travel options for both business and leisure travellers. The New International Airport may open connections to other international destinations that are unable to fly directly to the Queenstown-Lakes district at present due to runway constraints. Airlines will be able to pick aircraft mix to suit demand, rather than what can be accommodated at Queenstown Airport. As with Scenario 3, unconstrained growth is more likely to result in affordable prices.

The district may attract a greater number of events because of the affordability and ease of travel. Affordable prices will also make travel more accessible to low income earners, enabling a greater proportion of the community to connect with family and friends and participate in leisure and recreation activities. This contributes to social cohesion and inclusion.

The overall impact on social inclusion and cohesion once the New International Airport is opened is uncertain. The growth in tourism and the increasing residential population may lead to a more transient population and some locals feeling disgruntled by changes to the community. The community around the New International Airport is also likely to change as it grows to support the New International Airport.

Given the importance of ease of travel to stakeholders, and the number of people in the community who are affected, we have assessed the impact on sense of community to be moderate. The direction of the impact is mixed. This is largely because the time between Queenstown Airport becoming constrained and the New International Airport being built means there is a negative impact on ease of travel initially, but a positive impact once the New International Airport opens.

Health and Well-being

Some stakeholders expressed concern about the perceived negative impacts of the New International Airport being located in their community. They fear that this will forever change the character of the area in which they live. It is important that these voices are heard during future planning process, as change of this degree can cause a high degree of anxiety for some.

The design of the New International Airport will be informed by modern safety and security requirements and the size of aircraft likely to use the airport. Safety and security are also likely to be key criteria used when assessing the suitability of a location for the New International Airport. While higher traffic volumes may slightly increase the risk of an incident occurring, the enhanced safety and security parameters of the New International Airport will mitigate this risk.

An increased number of flights to a wider network will offer the region support in the event of a natural disaster or medical emergency. However, the increased distance from Queenstown will have an impact on time critical support for residents living close to Queenstown Airport.

As discussed in the noise section on page 80, residents currently living within the noise boundaries of Queenstown Airport will likely be exposed to

less noise when Queenstown Airport reverts to general aviation. The health and well-being of those residents that are highly annoyed by noise may improve. The number of residents who benefit from reduced noise near Queenstown Airport is likely to be greater than the number of residents impacted by new noise near the New International Airport.

The amount of people who will benefit from reduced noise at Queenstown Airport is a large driver in our assessment of the overall impact of Scenario 4 on people's health and well-being. In the longer term, we expect the impact to be positive. However, prior to the New International Airport opening, we expect there will be a small negative impact on residents living near Queenstown Airport.

Material Well-being

As in Scenario 1, constraining aircraft movements while a New International Airport is being planned and constructed has a negative impact on income and employment across the community.

Constraining growth may reduce pressure on the demand for housing. However, it may also limit income growth. If incomes grow at a slower rate than property prices, houses become less affordable.

The location of the New International Airport may affect property prices for properties located near the Airport. Properties located in the noise contours may be negatively impacted. The value of properties located near the New International Airport, but which are not significantly impacted by noise may increase as more people move into the area. The New International Airport is also likely to attract increased housing development in the surrounding areas. This increased supply may help housing affordability.

The location of the New International Airport may affect growth in other major centres in the district, such as Queenstown and Wānaka. Some people that may have previously based themselves in these areas may move closer to the New International Airport. Spreading growth throughout the region may reduce the pressure on housing demand in Queenstown and Wānaka.

The growth in income and employment associated with the New International Airport during and post construction will positively impact people's material well-being. Increased incomes may improve people's ability to afford housing. The income and employment benefits may be spread more widely in the region than the other scenarios.

Those located in the noise contour of the New International Airport are likely to experience a change in their property rights. Planning parameters are likely to restrict the type of activities and development that can be undertaken within the noise contour. These are likely to be similar to the types of restrictions in place in the noise contours at Queenstown Airport.

The overall impact on material well-being is mixed. The economic impacts of the New International Airport opening will have a positive impact on people's material well-being. However, growth will be constrained for a period before the New International Airport opens, negatively impacting people's well-being. We have assessed the impact to be moderate.

Environmental

Noise

Up until the point that the New International Airport begins operating, the impact on noise will be the same as that experienced in Scenario 1. There will be a small increase in noise as the number of flights increase to reach the capacity allowed by the current noise boundaries.

Once the New International Airport is opened, this Scenario will produce the most noise because it has the most aircraft movements of all the scenarios. However, the impacts on people, noise sensitive activities and wildlife are highly location-dependent. It is likely that the New International Airport will be built in a location that is sparsely populated.

Once the New International Airport is open, those living near Queenstown Airport will experience less aircraft noise when Queenstown Airport reverts to general aviation. We expect that the number of people impacted by noise from the New International Airport will be far less than those who benefit from less noise at Queenstown Airport. However, those exposed to noise from the New International Airport will likely experience large changes in noise exposure compared to their previous environment. So, for the relatively few, the impact may be significant.

We have assessed the overall impact to be moderate. The direction of the impact is mixed. Before the New International Airport opens, those residents living near Queenstown Airport will have a small negative impact from noise. Once the New International Airport opens, the overall impact from reduced noise at Queenstown Airport will be positive and benefit many residents living near Queenstown Airport.

CO_2 emissions, GHGs and climate change

In Scenario 4, scheduled aircraft movements result in 1.98 million tonnes of CO_2 equivalent being emitted into the atmosphere in 2050 (assuming that technology remains constant). This is the highest amount of all of the scenarios because once the New International Airport is open, it results in the greatest level of airport activity. Between 2030 and 2050, about 1.11 million tonnes of CO_2 equivalent are emitted each year. Note that this is the amount emitted into the atmosphere in general, not just over the Queenstown-Lakes district.

As is the case with the other scenarios, it is important to consider that only a portion of the total amount emitted into the global atmosphere is emitted over Queenstown-Lakes district. At current estimates of the cost for New Zealand to transition to meet zero carbon targets, the domestic share of these emissions could cost New Zealand roughly $331 million – $3.7 billion.

Generally, emissions will contribute to climate change, especially if they are not offset. However, the localised impacts of this are highly dependent on a cumulation of other factors, (see Appendix 5 for more information).

Table 32 below shows the costs of road network emissions under this Scenario. Emissions costs are the highest in this Scenario because of the greater level of airport activity and the further distance that residents and visitors need to travel between the airport and residential and commercial areas.

Table 32: Road network costs – Scenario 4 CO_2 emissions relative to Scenario 1

Scenario 4	2030	2050
CO_2 Emissions Costs	0.0	2.3

Source: (Abley, 2020)

Air quality

The impact on air quality in this Scenario is initially the same as the impact in Scenario 1. Once the New International Airport opens, this Scenario has the potential to negatively impact air quality because of increased airport activity. The actual impact is dependent on the location and surrounding topography of the new airport, the number of people located nearby, and the types of flora and fauna in the area. It is likely that the chosen location will `be in a thinly populated area so relatively few people will be impacted.

Once Queenstown Airport reverts to general aviation, there may be a positive impact to air quality in the Queenstown area. As there are no current air quality issues in Queenstown, we expect this impact to be relatively minor.

We have assessed the negative impact on air quality under this Scenario to be minor. The is largely driven by the expected small number of people located in the area near the New International Airport.

Visual pollution

The building and operation of the New International Airport will impact the visual landscape in the area where the New International Airport is located. The likely rural location of the New International Airport means that the construction and operation of the New International Airport and supporting infrastructure will have a greater impact on the visual landscape than an airport in a less rural location. However, as the airport is likely to be in a relatively unpopulated area, the number of people impacted will be low.

The New International Airport has the highest number of aircraft movements of all the scenarios. This means that there will be more aircraft visually impacting the environment than in other scenarios. However, there will be less people living near the airport to be impacted by these flights.

When Queenstown Airport reverts to general aviation, we expect that residents living near the airport will be positively impacted by less commercial aircraft in the sky and less activity around the airport. Those that benefit from this reduced activity are likely to be greater than those affected by increased activity at the New International Airport.

Prior to the construction and opening of the New International Airport, the visual impacts of this Scenario will be the same as those discussed in Scenario 1.

Our overall assessment is that the impact on visual impacts will be mixed. We expect the impact of both the increase in activity at the New International Airport and the decreased activity at Queenstown Airport to be minor.

Waste and wastewater

As the New International Airport has the greatest amount of forecast activity, the New International Airport will produce more waste and wastewater than Scenarios 1 and 2. The comparison against Scenario 3 is less clear, as one airport is likely to produce less waste and wastewater per passenger or aircraft than two.

Prior to the construction and opening of the New International Airport, this Scenario will have the same impact on waste and wastewater as Scenario 1.

We would expect that the new Airport will have appropriate infrastructure to protect against environmental degradation. We would also expect sustainability to be a key design criterion for the New International Airport. For this reason, we have assessed the impact on waste and wastewater to be minor.

Water quality

The impact on water quality of the New International Airport is highly dependent on the location of the airport. If it is located near sensitive waterways and ecosystems, then the impact could be substantial. We would expect that the environmental sensitivity would be considered when selecting the location and when designing the New International Airport.

The greater activity associated with the New International Airport means that this Scenario has the potential to create the greatest water quality issues. However, we would expect that the new build will implement improved infrastructure and systems to manage the activities that impact water quality, such as pollutant and sediment run-off. We have therefore assessed the impact on water quality from the New International Airport to be minor.

Prior to the construction and opening of the New International Airport, Scenario 4 will have the same impact on water quality as Scenario 1.

Natural environment

The impact on the natural environment of the construction and operation of the New International Airport is highly location dependent. The size of the impact will depend on the environmental sensitivity of the location and the ability to integrate environmentally sustainable practices throughout the

construction and operation of the New International Airport. We would expect environmental sensitivity and sustainability will be important considerations in the selection of the location and in the design of the airport.

Because the location of the New International Airport is likely to be in a relatively untouched area, the character of the natural environment will change. However, those impacted by the change are likely to be relatively few, as the area chosen is likely to have few people living nearby. If the area is in a place where people travel to experience the natural environment, then the change may impact a greater amount of people.

Our overall assessment is that Scenario 4 will have a minor impact on the natural environment. This is based on our expectation that relatively few people will be impacted, that the area chosen is not environmentally sensitive and the design and operation of the New International Airport will promote sustainability.

Cultural

Cultural diversity

This Scenario results in the highest level of growth in population and visitors to the Queenstown-Lakes district. It is therefore likely to have the greatest impact on cultural diversity. The impact is likely to be the greatest in the area near the New International Airport, as the New International Airport and supporting businesses attract many new people to the area. Conversely, the area around Queenstown Airport may become less diverse as the airport reverts to general aviation.

As in the other scenarios, the impact related directly to the airport is relatively minor for the district, as several factors contribute to the types of people attracted to the area. In comparison to Scenarios 2 and 3, the impact is delayed until the New International Airport is under construction.

Cultural heritage

The direct impact of the Airport on heritage sites in this Scenario are largely dependent on where the Airport is located. We would expect that sites of cultural significance would be considered when choosing an appropriate location for the New International Airport.

The effects from the Airport's contribution to growth on cultural heritage are the same as those described in Scenarios 2 and 3. As this Scenario has the greatest impact on growth, the size of these impacts is slightly larger. However, the impacts occur later than in Scenarios 2 and 3, as growth is constrained until the New International Airport opens.

Changing the use of Queenstown Airport to general aviation is a significant event in the history of the Queenstown-Lakes district, as the airport reflects the story of the area's evolution. The reduction on aircraft movements and road traffic volumes around the airport may be beneficial for the nearby sites of significance.

We have assessed the overall impact of Scenario 4 on cultural heritage to be minor, as we expect the choice of location and airport design to consider sites of cultural significance.

Economic

Although the New International Airport is projected to have the highest employment and GDP contributions in 2050, it has the second-lowest total economic impacts of the four scenarios over the 2030-2050 period. This is because passenger demand is constrained under Scenario 4 from 2030 to 2040. From 2030 to 2035 capacity is constrained by the current noise boundaries at Queenstown Airport, and while the New International Airport opens in 2035, it takes five years for passenger movements to ramp up from the constrained level to fully unconstrained volumes.

Over a longer timeframe, we would expect the New International Airport to have the largest contribution to economic impacts. Employment and GDP impacts of Scenario 4 are presented in Table 33.

Table 33: Employment and GDP impacts – Scenario 4

Scenario 4.	2030	2040	2050	Ave annual (2030-2050)
FTE employment (total)	9,181	17,740	22,360	16,017
FTE employment (relative to Scenario 1)	0	6,666	10,366	5,171
GDP (total)	641	1,228	1,545	1,110
GDP (relative to Scenario 1) ($m)	0	456	707	353

Source: MartinJenkins

Conversely, the New International Airport had the highest additional road network costs relative to Scenario 1 at $179 million in 2050. The main reason for the higher costs was the remoteness of the location. It is further away from built up residential and commercial areas, which provide accommodation and hospitality for visitors as well as nearby housing for workers at the airport. It is also distant from other employment activity which can further support an airport zone. This all increases the time and distance of trips to the Airport compared to the other scenarios which are all located closer to the key urban areas within the District. A breakdown of network costs for Scenario 4 relative to Scenario 1 is presented in Table 34.

Table 34: Road network costs – Scenario 4 relative to Scenario 1

Scenario 4.	2030 ($m)	2050 ($m)
Vehicle operating cost	0.0	56.9
CO_2 emissions	0.0	2.3
In vehicle time cost	0.0	98.0
Additional congestion cost	0.0	3.8
Crash cost	0.0	13.3
Travel time reliability	0.0	4.9
Total Network Operating Costs	**0.0**	**179.2**

Source: (Abley, 2020)

Productivity

Scenario 4 is a growth Scenario, where the capacity for larger aircraft that can travel further will encourage further demand. The New International Airport will also attract further domestic demand from the wider region. However, the Scenario is constrained until the New International Airport can be built in 2035.

Scenario 4 would have the largest fundamental change on productivity. While a new international airport in an optimal location could improve productivity and incomes, there are a number of risks associated with identifying that “optimal” location and how that would affect passenger and business activity. Further, the disruptions to existing activity would be broader than just the Queenstown-Lakes district. Some of these will be positive and others will be negative.

A new international airport would affect activity through the other airports and associated activity in the lower South Island (assuming that the new

international airport would be located to service the entire lower South Island).

For the Queenstown-Lakes district there would be significant change. There would be initial productivity losses as it will take longer to get to and from the airport. There will be structural change as businesses operating within the airport precinct, or with visitors travelling by air, make decisions on where they locate. Overall, we expect that the disruption on business activity and the increase in travel-times will have a negative impact on productivity over the assessment period.

Relative to the other scenarios, we consider that Scenario 4 will have a lesser impact on productivity than Scenario 2 and Scenario 3 but will have a more positive impact on productivity than Scenario 1.

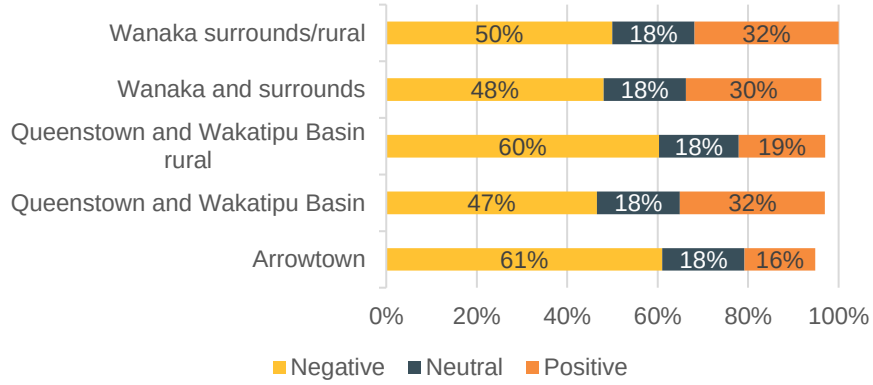
Our assessment is that Scenario 4 is likely to have a minor positive impact on productivity relative to Scenario 1 over the assessment period.

If the assessment period were longer then the productivity impacts of Scenario 4 would most likely be more positive.

5.6.4 Community response to New International Airport Scenario

Figure 24 shows that in all neighbourhoods more respondents feel negatively than positively about the impacts of the New International Airport Scenario.

Figure 24: Survey respondent's overall sentiment towards the impacts of Scenario 4, by neighbourhood

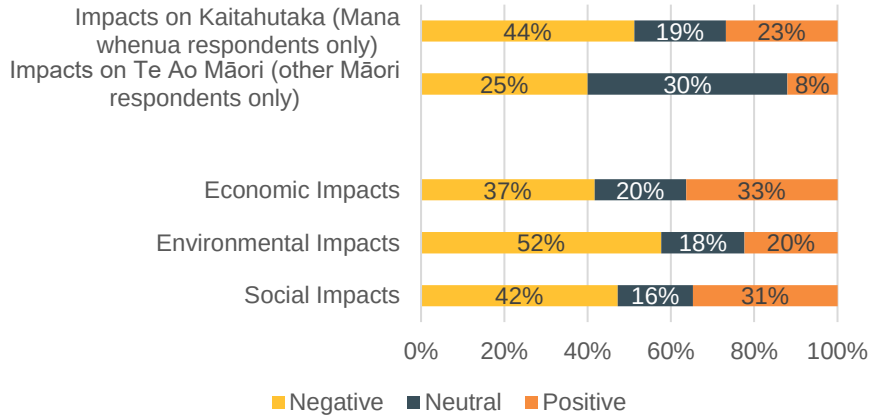


Source: MartinJenkins Airport Impacts Survey

These results are consistent across age, ethnicity, residence status, tenure, and income subgroups.

Figure 25 shows respondents' assessments of the impacts of the New International Airport Scenario in 5 domains: Social impacts, Environmental impacts, Economic impacts and impacts on Te Ao Māori and Kaitahutaka.

Figure 25: Survey respondent's assessment of the high-level impacts of Scenario 4



Source: MartinJenkins Airport Impacts Survey

The results are mostly consistent across subgroups, with some variation by neighbourhood.

Arrowtown residents were more negative overall (54% viewed the social impacts as negative, 59% viewed the environmental impacts as negative and 50% viewed the economic impacts as negative).

Wānaka Surrounds Rural viewed the environmental impacts especially negatively (70%).

Reasons for positive and negative sentiment

For a lot of stakeholders, negative sentiment was driven by a lack of detail about where a new international airport would be situated and/or the fact that it is seen to further enable tourism growth.

Costs, environmental impacts, duplication, and the time it would take to complete are driving negative sentiment for many stakeholders.

There is major concern about the likely costs to build a new airport and also the associated infrastructure needed to support the airport precinct and link it into, and make necessary upgrades to, the transport network.

Many stakeholders see this Scenario as being particularly negative for the environment because it will not only result in increased emissions (in the same way as other growth scenarios) but will also involve building a new international airport and developing associated infrastructure.

Stakeholders have mixed views about the economic impact of a New International Airport. On one hand, there is a view that this Scenario could better distribute economic benefits across the district and diversify the economy by enabling new types of industry (such as food export). On the other hand, many stakeholders are concerned that the local economy of Queenstown will be negatively affected by a significant reduction in tourism activity if the district and activities are harder to access. Further, reduced connectivity for businesses would also have a negative impact.

Stakeholders also have concerns that reducing access to Queenstown would reduce the vibrancy of the district, as it would be less attractive to migrants.

On the positive side, stakeholders believe that a new international airport could reduce road traffic and stress on other infrastructure in Queenstown if it is situated closer to attractive visitor destinations. The flip side of this would be an increase in the use of roads for visitors that still wish to access Queenstown.

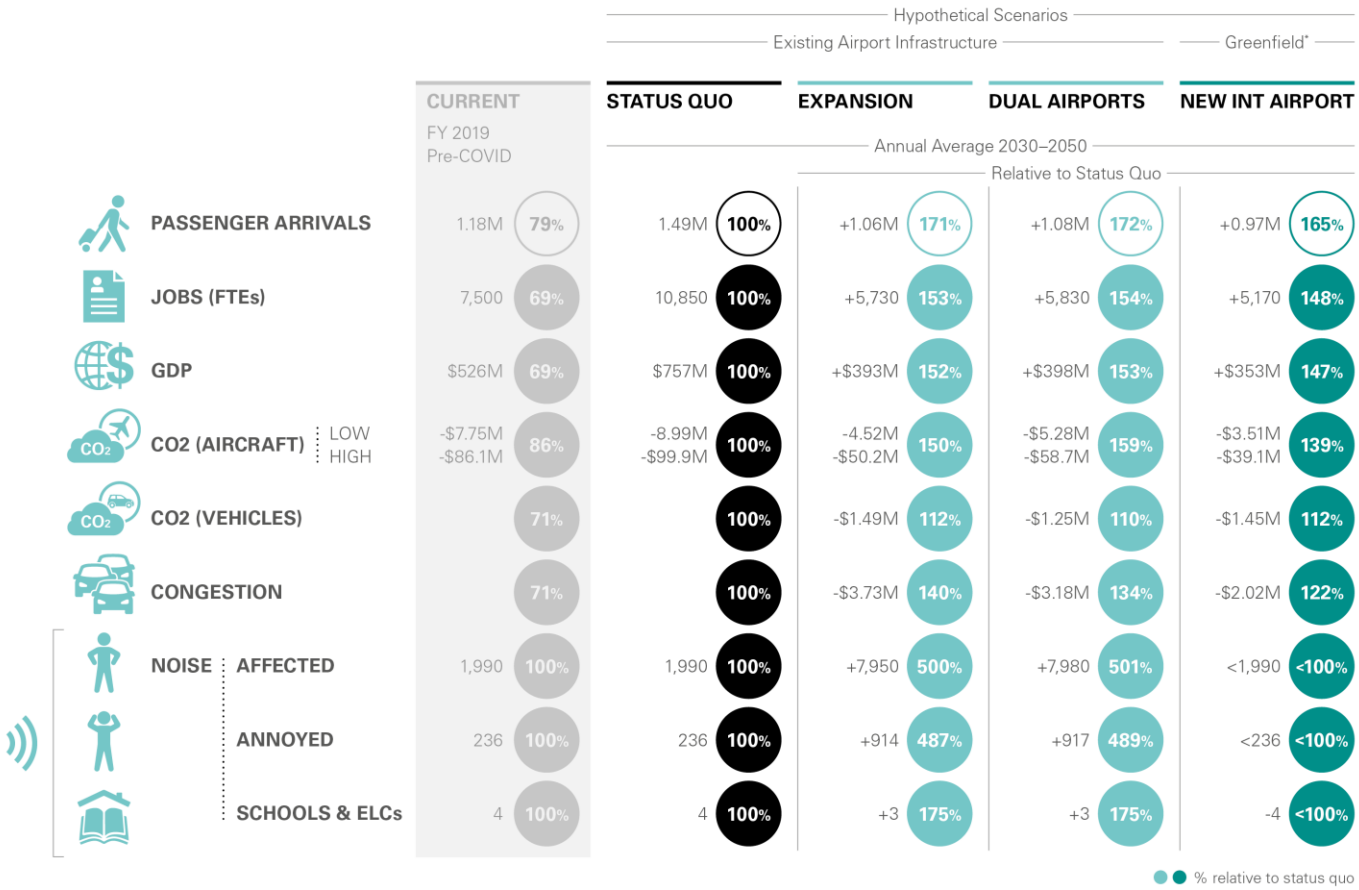
Some stakeholders were doubtful that consent would be granted to develop a new international airport. Others thought that a stop-gap solution would be required to meet demand until a new international airport became operational, which would likely result in expanded noise boundaries at Queenstown Airport anyway, and the associated negative impacts.

Many stakeholders who are positive about this Scenario, indicate that their support depends on where a new international airport would be situated. For example, situating the airport in a location that better serves the *region* rather than the district was viewed positively. Positioned well and planned well, they see a new international airport as providing a 'future-proof' solution that could avoid some of the negative impacts such as noise affecting residential areas and accommodate future growth needs of the region in ways that other options could not.

Some stakeholders are positive about this Scenario because of the opportunities that could be realised through the repurposing of the current Queenstown Airport site for housing and urban living.

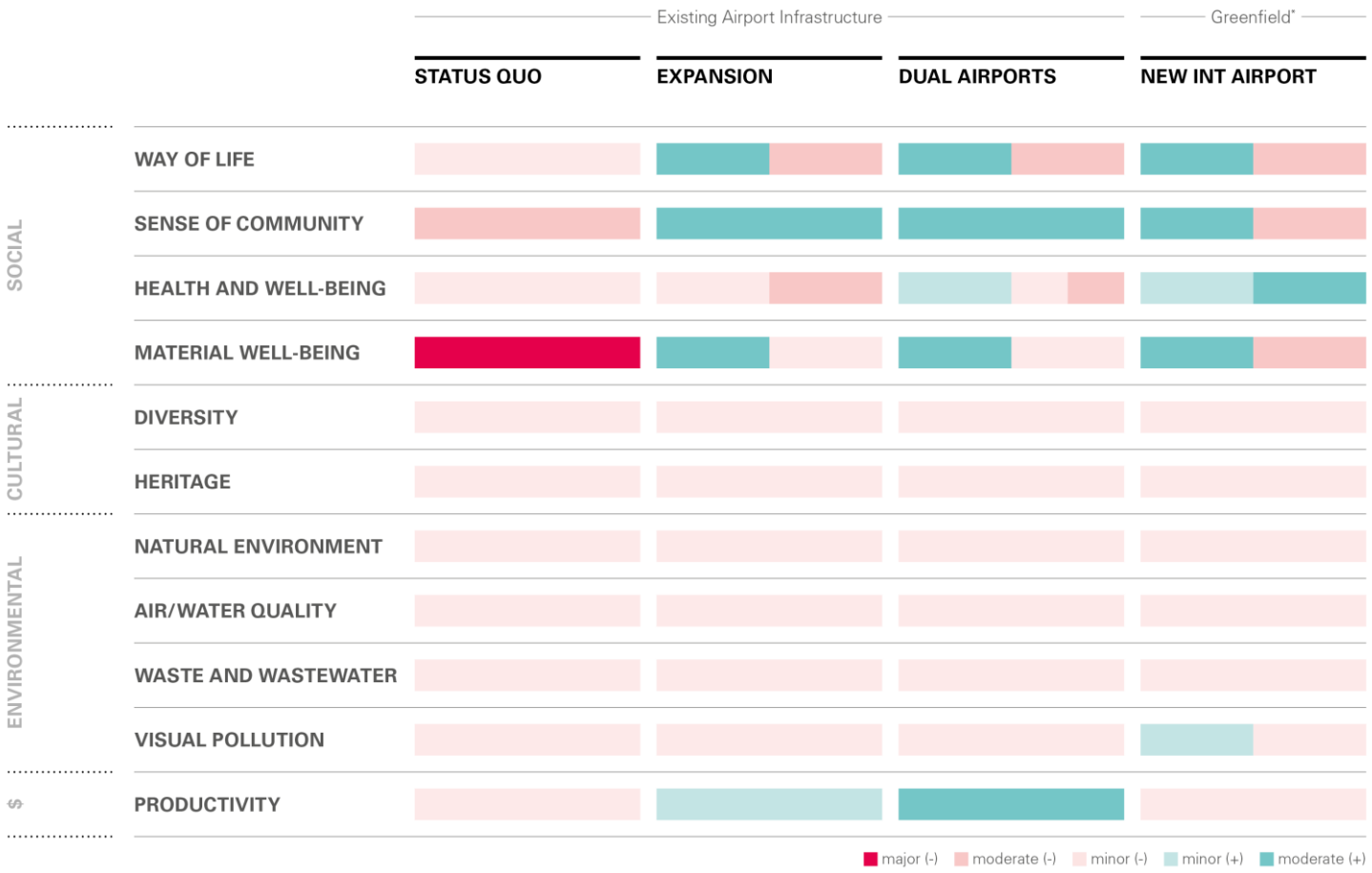
SOCIO ECONOMIC IMPACTS OF AIRPORT INFRASTRUCTURE (QUANTIFIABLE)

COMPARISON OF HYPOTHETICAL SCENARIOS



SOCIO ECONOMIC IMPACTS OF AIRPORT INFRASTRUCTURE (NON-QUANTIFIABLE)

COMPARISON OF HYPOTHETICAL SCENARIOS



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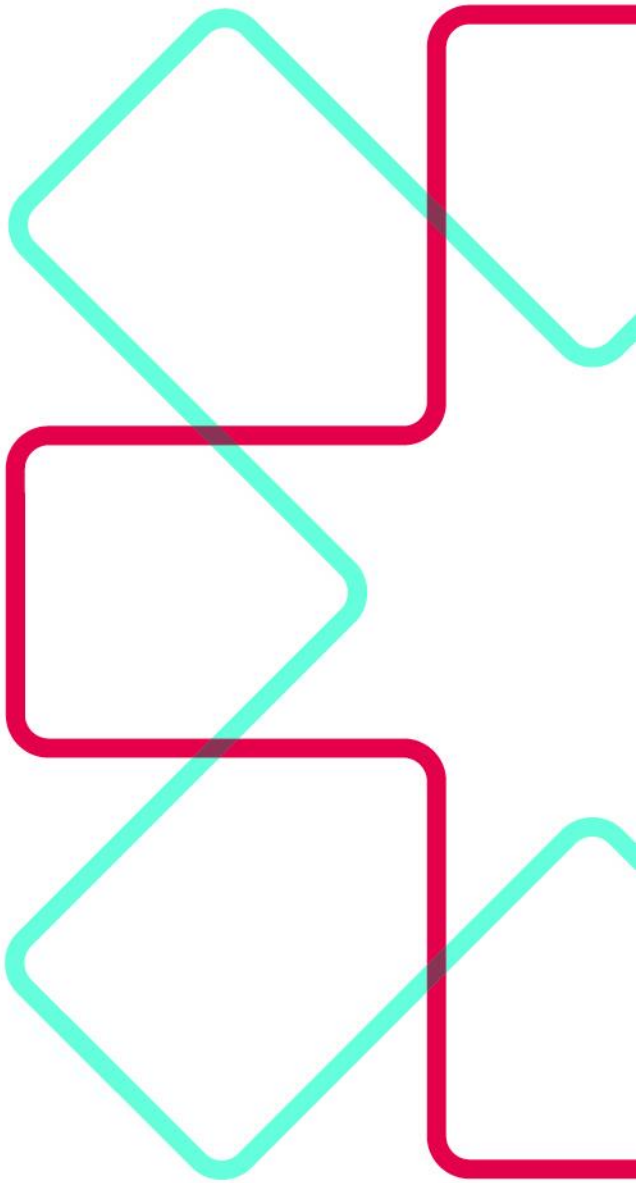
APPENDICES



APPENDIX 1: STAKEHOLDER ENGAGEMENT

Purpose of stakeholder engagement

The primary purpose of the stakeholder engagement carried out for this study was to gather a wide range of perspectives about the social and economic impacts (positive and negative) of different development options to accommodate forecast growth, to inform our analysis and QLDC's planning processes.

Specifically, we sought to identify the types of social and economic impacts, who they could/will affect and the scale and significance of those impacts for people/groups.

To achieve this purpose, we sought to:

- involve a wide range of people/groups, including those who have not previously been heard
- provide sufficient, accessible information about the status quo and possible options – so that stakeholders could give us informed feedback about impacts
- ensure that everybody that wanted to have a say had an opportunity to do so.

A secondary purpose of the engagement was to increase awareness among stakeholders that QLDC is considering options for accommodating future airport development, and to enable interested parties (including those who have not previously participated) to provide their views.

It was not the purpose of the stakeholder engagement to build support for any particular option, or to build consensus about the value of any of the options.

Stakeholder engagement context

Stakeholder engagement for this project is one of multiple inputs to QLDC's wider planning framework. Planning large scale infrastructure development is iterative and on-going, and quality consultation is a vital input to robust decision making. The Queenstown-Lakes district Spatial Plan and QAC's Statement of Intent[152] will draw on a number of inputs, including the social and economic impact assessments contained in this report. This assessment will also support QAC in its development of the Queenstown and Wānaka Airport Masterplans.

Following the current project QLDC, in conjunction with QAC, will continue to engage with iwi, community and business stakeholders on airport development options.

Stakeholder engagement methods

In accordance with good practice, and with QLDC Significance and Engagement policy, the engagement used a mix of methods to enable wide and targeted participation. Our engagement design was also informed by a review of past consultations by QAC/QLDC and initial scoping interviews

152 As a Council- Controlled Trading Organisation, QAC is required to prepare an annual Statement of Intent which publicly states its strategic priorities for the next three years, in accordance with Section 64(1) of the Local Government Act 2002

with a subset of stakeholders. Scoping interviews were designed to provide insight into expectations for the engagement process and perceptions on our draft design for engagement.

Specifically, we gathered stakeholder feedback through:

- Initial engagement, with select stakeholders
- an **online survey**, that was open for anybody to complete
- seven **focus groups** with a subset of stakeholders who were selected to provide a broad range of views
- **targeted interviews** with stakeholders who are mana whenua.

Table 35 provides a summary of the numbers of stakeholders who provided feedback through each mechanism.

Table 35: Number of stakeholders that provided feedback for this study

Method	Notes	Number of participants / respondents
Initial engagement	Discussions with six organisations to gain a better understanding of the context and scope of the project.	6 organisations
Focus groups	**Participants include representatives of** community associations, advocacy groups, business and commercial groups, airport user groups, tourism operators, schools, ethnic and religious groups, youth representatives, property developers, health care providers.	n=51
Survey	The profile of respondents does not match the profile of the population in the district. In particular, younger residents are underrepresented among survey respondents (18-29 year olds make up 26% of the district population and only 7% of survey respondents are aged 15-29) and residents of Wānaka are overrepresented (residents of Wānaka ward make up 31% of the district population and more than half of survey respondents).	n=4,441 responses (including n=1,468 partial responses)
Targeted interviews with mana whenua	We partnered with Aukaha to identify interviewees that could speak as representatives of mana whenua or who had lived experience of being mana whenua impacted by Airport activity in the district.	n=4

Initial engagement – scoping

A brief initial engagement was conducted to help frame our approach for the project. Informal interviews explored:

- the context and drivers and for the project
- key areas of focus and possible airport development scenarios
- the type and dept of information needed
- previous engagements – results and participants
- ideas for who to involve in the next phases, and the pros and cons of potential engagement methods.

Table 36: Initial engagement – interviewees

Organisation	Interviewees
Queenstown Airport Corporation	Board Chair Prue Flacks, Chief Executive Colin Keel, General Manager Corporate and Community affairs Sara Irvine
Ignite Wānaka	Executive Officer Naomi Lindsay
Queenstown Chamber of Commerce	Chief Executive Anna Mickell, Deputy Chair Angela Spackman
Destination Queenstown	Chief Executive Graham Budd and Marketing and Communication Director Sarah O'Donnell
Ngāi Tahu Tourism	General Manager Jolanda Cave
QLDC	In addition to key client contacts: Anita Vanstone (Spatial Plan) and Gabrielle Tabron (Frankton Master Plan)

Main engagement – feedback on social and economic impacts

Our main engagement was designed to allow a wide range of stakeholders to provide feedback on the social and economic impacts of future airport development. It included deep, rich feedback from focus groups, and broad feedback from an online survey.

Focus groups – 7 groups, 52 attendees

Purpose: The purposes of the focus groups were to identify impacts that had been missed from our literature review and review of previous QLDC/QAC consultations; and to understand the *drivers* of sentiment (about impacts in general and in relation to specified scenarios) and how drivers differ for different stakeholder groups.

The focus groups were designed to:

- allow rich discussion of topics, to ensure we understood the reasons and sentiments driving feedback
- ensure we identified the full range of impacts important to stakeholders.

Focus group numbers were kept small to ensure everyone could participate and be heard – a total of 52 individuals attended. Invited groups were asked to limit attendance to one member. In cases where more than one group member attended, this was communicated with other focus group attendees and agreement to continue obtained. Anybody who was not able to attend a focus group was encouraged to provide feedback using the online survey.

Seven focus groups were held in community venues in Wānaka and Queenstown. Each focus group lasted two hours. Notes were taken of the discussion, but feedback was kept anonymous (who said what was not recorded).

Information about the project scope was presented, followed by structured group discussion and exercises covering:

- future airport development in general – potential positive and negative impacts
- four hypothetical development scenarios – potential impacts and overall reaction.

We worked with the client to identify the range of perspectives to be represented. Attendees were evenly split between Wānaka and surrounds, and Queenstown and Wakatipu.

Target Audience: We invited a limited number of stakeholders to participate in focus groups. Our aim was to have 6-8 participants per focus group (to enable meaningful contribution and rich discussion by each person present). Invitees were selected to gather a wide range of views. Some stakeholders arrived at focus groups without invitation or brought two representatives. This was managed by asking the wider group to give permission for additional participants to stay and where more than one participant represented the same group they were asked to work together so as to not dominate discussion. In total, 51 individuals took part in a focus group. Table 37 provides a breakdown of the perspectives that they represented.

Format: Seven focus groups were conducted in locations in Wānaka (3) and Queenstown (4). Each focus group lasted for 2 hours and followed a standardised format, focusing first on airport impacts in general and then perceived impacts of specified scenarios. Two facilitators and a note taker attended each focus group and the sessions used a mix of activities and expert facilitation to prompt rich discussion and meaningful participation by those present. Participants agreed to follow Chatham House rules to create a safe space for individuals to voice their views.

Timing: The focus groups were held over four days: 17, 18, 19 and 28 February 2020.

Focus group analysis: Closed questions were analysed by neighbourhood and by other demographic identifiers (for example, residency status, ethnicity, age, income) to identify common and divergent responses. Open ended questions were grouped by neighbourhood and other demographic identifiers and analysed for outliers and common themes. As well as looking for common drivers of sentiment, we were keen to identify perspectives that had not yet been raised and that may differ from the majority view.

Table 37: Summary of stakeholder groups represented in focus groups

Stakeholder groups represented by focus group participants	Number of focus group participants bringing this point of view
Community associations	12
Advocacy groups	10
Business and commercial groups	6
Airport user groups	5
Tourism operators	5
Schools	4
Ethnic and religious groups	3
Youth representatives	3
Property developers	2
Heath care providers	1
Total number of individuals that participated in a focus group 50/50 split between Wānaka and surrounds and Queenstown/Wakatipu	51

There was a 50/50 split in focus group attendees between Wānaka and surrounds and Queenstown/Wakatipu.

Online Survey – 4,400 responses

Purpose: The purposes of the online survey were to understand the prevalence of concerns and optimism about particular Airport impacts in general and in relation to specified scenarios; and to provide a mechanism for all stakeholders that wanted to provide feedback to do so.

Target Audience: all interested parties were able to complete the survey, including people living within and outside Queenstown-Lakes district who have an interest in the district's airport infrastructure.

Format: the survey was distributed online, with paper survey provided on request. It included a mix of closed and open questions that covered airport impacts in general and in relation to specified scenarios. The survey also collected demographic information about respondents, however responses are otherwise anonymous.

Timing: the survey was open for 3 weeks, from 18 February until 11 March 2020.

Response: the survey attracted 4,441 responses, including 1,468 partial responses.

Survey analysis:

Closed questions were analysed by neighbourhood and by other demographic identifiers (for example, residency status, ethnicity, age, income) to identify common and divergent responses.

Open ended questions were grouped by neighbourhood and other demographic identifiers and analysed for outliers and common themes. As well as looking for common drivers of sentiment, we were keen to identify perspectives that had not yet been raised and that may differ from the majority view.

The online survey was designed to:

- give everyone who wanted to provide input a chance to provide feedback – it was not limited to those living in the district
- understand respondents' preferences and viewpoints (through the capture of respondent demographics).

The survey included closed and open-ended questions and covered the same broad topics as the focus groups:

- part one asked for respondents' demographics and relationship to the district
- part two asked about airport impacts in the current environment, including the three most concerning negative impacts and the three most important positive impacts
  - for those who identified as mana whenua or Māori, there were four additional questions asking about Kāitahutaka / Te Ao Māori values
- part three asked for views on how impacts will change under different airport development scenarios
- part four provided space for additional comments.

Table 38: Online survey – respondents

Demographic	Responses
Total number of responses	4.441
(x of these were partial responses – partial responses were included unless they were mostly empty, for most partial responses only a couple of questions were unanswered)	1,468 partial
Age	
Under 29 years	8%
30-49 years	38%
50-65 years	35%
Over 65	18%
Gender	
Male	50%
Female	50%
Gender diverse	0%

Ethnicity	
European	85%
Māori	3%
Pacific Peoples	0%
Asian	1%
Prefer not to say / did not answer	11%
Resident	
Currently living full time in the district	76%
Currently living part time in the district	9%
I don't live there but I own property / business	7%
I used to live in the district	2%
I am a visitor to the district	3%
other	2%
Area	
Wānaka and surrounds	53%
Queenstown and Wakatipu basin	18%
Arrowtown	2%
Queenstown and Wakatipu basin rural	2%
Wānaka surrounds/rural	1%
Blank	24%
Number of years in the district	
Less than 1 year	3%
1 year to just under 2 years	6%
2 years to just under 5 years	18%
5 years to just under 10 years	21%
More than 10 years	52%
Not applicable	1%

Mana whenua hui

We met with Aukaha, a Rūnaka based consultancy service,[153] to identify issues of importance for mana whenua. Their feedback was used to add specific questions to the online survey. They also helped us to engage with Kāi Tahu, facilitating interviews with four people who identified as mana whenua. The four mana whenua interviews were conducted using video conferencing. Each interview lasted between 30 minutes and one hour. Notes were recorded, but feedback has been kept anonymous.

The additional online survey questions and interviews explored key Kāitahukaka values:

- rakatirataka
- kaitiakitaka
- whanaukataka
- manaakitaka.

Notes for interpreting survey feedback in this report

There are two important things to remember when interpreting the survey feedback presented in this section and throughout the report.

1 survey participants are not representative of the full population

2 stakeholder sentiment is influenced by other contextual matters that do not directly result from Airport activity.

Survey participants are not representative of the District population

It is important to remember that the survey statistics provide an indication of *respondents'* sentiment and concerns. Survey respondents do not match the

[153] Aukaha is governed by their five Rūnaka owners: Te Rūnanga o Waihao, Te Rūnanga o Moeraki, Kāti Huirapa Rūnaka ki Puketeraki, Te Rūnanga o Ōtākou, and Hokonui Rūnanga.

wider district in terms of their demographic profile, and they are likely to be people who are more engaged with issues related to airport expansion than non-respondents. Our survey was also only available in English and is likely to underrepresent the views of residents with English as a second language.

Sentiment is influenced by contextual matters

Stakeholders' perceptions of airport impacts are informed by their views on wider contextual matters. Specific to Queenstown-Lakes district, feedback signalled that stakeholder sentiment may be influenced by issues including, lack of trust in council processes related to Airport management, views about growth and its relationship to airport activity, desire for Airport planning to be undertaken in a different way (i.e. at the regional level for the lower South Island, or the whole of the South Island; or at a system level alongside other forms of transport infrastructure), and concern for alignment to other Council objectives and plans, particular regarding Climate Change.

While many of these contextual matters may not be directly related to Airport activity, they influence stakeholders' perceptions and should be considered by Council in forming their decision about Airport expansion.

APPENDIX 2: ECONOMIC IMPACT ANALYSIS

Scope of the analysis

The purpose of this analysis is to assess the economic impacts of the four hypothetical airport development scenarios. The analysis seeks to quantify the potential economic impacts in terms of GDP and jobs of constraining airport capacity at current limits compared with three scenarios in which the district's airport capacity is expanded to meet demand.

Quantifying the potential economic benefits that may be foregone by constraining airport capacity will help inform discussions and decision making about the best way forward for the district and the region.

Four airport development scenarios

The four scenarios assessed are:

- Scenario 1: Status Quo
- Scenario 2: Extended noise boundaries at Queenstown Airport
- Scenario 3: Scheduled services at Wānaka Airport
- Scenario 4: New International Airport

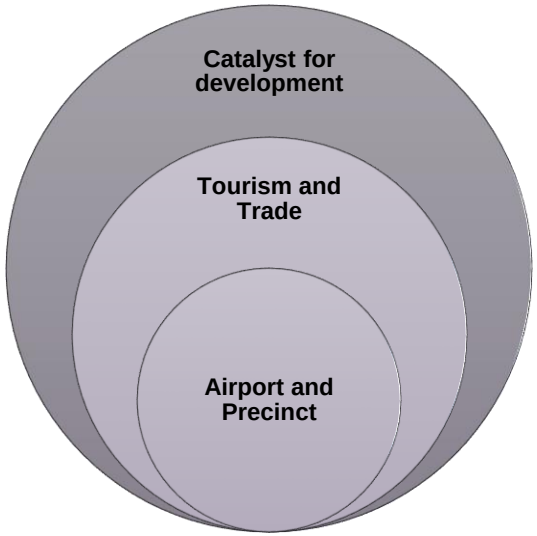
Table 39: Four scenarios

	Scenario 1: Status Quo	Scenario 2: Expanded noise boundaries at Queenstown Airport	Scenario 3: Scheduled services in Wānaka Airport	Scenario 4: New International Airport (NIA)
Short Description	Current noise boundaries at Queenstown Airport are kept at their current levels. There are no scheduled services out of Wanaka Airport	The number of scheduled flights can increase to 41,600 from 2024. There are no scheduled services out of Wanaka Airport	The current noise boundaries at Queenstown Airport are expanded from 2024. Wanaka Airport is developed to allow narrow body jets and is open for scheduled services from 2028.	Current noise boundaries at Queenstown Airport do not change and there are no scheduled services out of Wanaka Airport. The NIA is commissioned in a location that is within two hours of Queenstown. NIA opens for scheduled services in 2035.
Constraint:				
Maximum allowable aircraft movements (due to noise boundary limits)	21,000	41,600	41,600 at Queenstown Airport from 2024 onwards. ~10,000 at Wanaka Airport from 2028 onwards.	21,000 at Queenstown Airport until 2034 70,000+ at NIA from 2035.

Methodology

The overarching framework for assessing the economic impacts of airports in the district is shown in Figure 26.

Figure 26: Economic activity associated with the district's airports



The analysis considers the economic contribution of the airport at three levels:

1 The economic impact of the airport and the wider airport precinct, including air services, retail and rental, engineering, and cargo operations

2 The airport's impact on tourism and trade

3 The airport's broader contribution to the region and its growth including productivity benefits, business and investment attraction, and talent attraction and retention.

This economic impact analysis quantifies the impact on airport operations, airport precinct business activity and on tourism in the district for each scenario.

Air freight in the district is very limited so potential freight impacts have not been quantified.

In addition to these impacts, there are a range of wider impacts that are difficult to monetise. The impacts of each scenario in terms of the district's connectivity, productivity, industry development and talent attraction and retention are discussed qualitatively in the main body of the report, drawing on international literature.

The temporary GDP and employment impacts directly created from the construction projects (ie the physical buildings and other infrastructure) in the development scenarios have not been quantified. This is because the temporary jobs generated by the large-scale capital expenditure required in Scenario 3 and Scenario 4 would skew the impact analysis somewhat and would not make for a fair comparison between scenarios. By excluding the direct impacts of construction projects, the results of the analysis provide a more meaningful understanding of the differences between the scenarios for the Queenstown-Lakes district economy over the 30-year time period assessed.

The analysis was undertaken in five key steps for each scenario:

- Step 1: Identification of economic impacts and those that can be quantified and monetised
- Step 2: Calculation of direct impacts in terms of expenditure
- Expenditure was calculated for in each of the following areas:

  - Visitor expenditure
  - Airport operations
  - Airport precinct businesses (excluding impacts already counted in visitor expenditure)
- Step 3: Calculation of indirect and induced impacts
- Step 4: Sensitivity analysis of key assumptions
- Step 5: Comparison of the impacts against the Status Quo.

Input-Output multiplier analysis

Regional input-output multiplier analysis has been used to calculate the direct, indirect, and induced economic impacts associated with each scenario. It is a widely used and accepted method for assessing the economic impacts of projects.

For each scenario, the forecast visitor expenditure, airport operations expenditure, and expenditure at businesses within the airport precinct (excluding spend by visitors already counted) is calculated.

This direct expenditure (or "output") is then allocated to the industries the expenditure occurs in, which is converted to direct impacts in terms of GDP and employment using a regional input-output (I-O) multiplier model.

Indirect and induced impacts resulting from the direct expenditure flowing through the district economy is then calculated using the multiplier model.

The total economic impact in the district for each scenario is the sum of the direct, indirect, and induced impacts, modelled over the time period from 2020 to 2050.

Underlying logic of multiplier analysis

The underlying logic of Regional I-O Multiplier Analysis is that enterprises create flows of expenditure (direct impacts) that are magnified or 'multiplied' as they flow on to the wider economy. This happens in two ways:

1 indirect impacts – the enterprise purchases materials and services from supplier firms, who in turn make further purchases from their suppliers and so forth

2 induced impacts – employees in the enterprises and in firms supplying services are paid a wage and the enterprises generate profits, which is then spent on consumption.

The total impact is the sum of the direct, indirect, and induced impacts.

Multipliers

Regional multipliers are used to capture the indirect and induced impacts at a regional or national level. They are also used to calculate GDP. Multipliers are derived from the national I-O tables published by Statistics New Zealand and the regional (Queenstown-Lakes district) I-O tables supplied by Butcher Partners Limited.

The size of the multiplier depends upon the degree of economic self-sufficiency of the area's economy. The more self-sufficient a region or nation is, the higher the multiplier is likely to be. Initial expenditure is assigned to the industry where it occurs. Each industry has a different multiplier based on the average pattern of purchases of goods and services, capital formation, profits, wages, and salaries.

Measures of economic activity

I-O multiplier analysis provides calculation of three measures of economic activity – Gross Output, Value Added and Employment.

Gross Output is the value of production, which is built up through the national accounts as a measure of gross sales or turnover. It is essentially the initial expenditure incurred by the activity.

Value Added is the increase in output generated along the production process, which when aggregated totals GDP. Value Added is the sum of:

- compensation of employees (salaries and wages)
- income from self-employment
- depreciation
- profits and
- indirect taxes less subsidies.

Employment, expressed as full-time equivalents (FTEs), is a measure of the total labour demand associated with the given gross output for one year.

Limitations of regional I-O multiplier analysis

There are acknowledged limitations of regional I-O multiplier analysis.

However, we consider that the nature of study (airport) and where the activity is located means that the impact of the limitations as shown in the following table.

Table 40: Addressing the limitations of regional I-O multiplier analysis

Limitation	Application in this analysis
Additionality and displacement – the I-O multiplier analysis assumes that the activity or event being analysed is new activity and does not displace existing activity.	Additionality and displacement have been considered carefully and is considered in the calculation of the activity expenditure used in the model. This is particularly relevant when looking at visitor activity, where visitors have alternative options for getting into and out of the Queenstown-Lakes district. You would expect that visitors would still visit the district if the airport were not there, just not as many.
Static model – It is assumed that an activity will not have an impact on relative prices.	Due to the size of the local economy, and the types of inputs purchased, it is unlikely that the airport activities will influence prices for either products or services.
Aggregation and accuracy of multipliers – Each industry has its own unique inputs and outputs and thus multipliers. The more aggregated the level of analysis, the less accurate these inputs and outputs become. It is therefore important to apportion the initial expenditure to the industry where it occurs.	With regards to aggregation limitations impacting on accuracy, expenditure has been broken down into individual expense areas and then allocated to the most relevant industry. The current analysis allocates activity across separate industries, which provides a higher level of accuracy. Visitor expenditure is assigned to industries based on the breakdown of spend identified through the Regional Tourism Estimates and the assignment of activity in the Tourism Satellite Accounts.
Regions and boundaries – The smaller or less defined a region and its boundaries, the less accurate the multiplier analysis will be. Similarly, the easier it is to move across boundaries, the less accurate the analysis will be.	Geographically, the Queenstown-Lakes district is relatively isolated so there is likely less (or clearer) movement of activity across geographic boundaries. This suggests that the level of accuracy of the regional multipliers are higher.

Model for calculating impacts

A model was created to calculate the economic activity associated with each scenario. The structure of the model is shown in Figure 27.

For each scenario, a forecast of air passenger arrivals on domestic and international flights was developed based on an unconstrained demand forecast[154] and the airport capacity constraints arising from noise boundary limits[155]. Based on available data, the forecast passenger arrivals were categorised by passenger type (local, domestic visitor, or international visitor) and purpose of visit (holiday, visiting friends and family or business). Total annual visitor expenditure by air passengers was then calculated considering the spend and length of stay characteristics of each visitor type.

In scenarios where constrained airport capacity results in unmet demand (ie more people want to fly direct to Queenstown-Lakes than there are available flights), the proportion of the unmet demand that will visit the district by other modes has been estimated (eg fly into Dunedin or Invercargill airports and enter Queenstown-Lakes district by road). The spend by these visitors has also been accounted for in calculating the economic impacts.

In addition to visitor spending, air passenger volumes also drive economic activity associated with airport operations (eg terminal operations, air traffic control, runway maintenance etc) as well as activity of businesses in the airport precinct (eg food and beverage, retail, rental cars, commercial general aviation).

The operational expenditure associated with growing airport operations was estimated based on historic airport expenditure for a range of comparable New Zealand airports. The data shows a relatively linear relationship between expenditure and incremental passenger movements.

Growth in activity of airport precinct businesses was forecast based on current expenditure levels and number of people employed[156] and the forecast growth in passenger volumes for each scenario. In order to avoid double counting, activity arising from visitor spending was excluded (as this has already been captured in the visitor expenditure impacts). For example, activity of retail businesses and rental cars were excluded as purchases are made almost exclusively by visitors. Similarly, 90 percent of activity by food and beverage businesses was excluded – the remaining 10 percent representing purchases by locals using the airport.

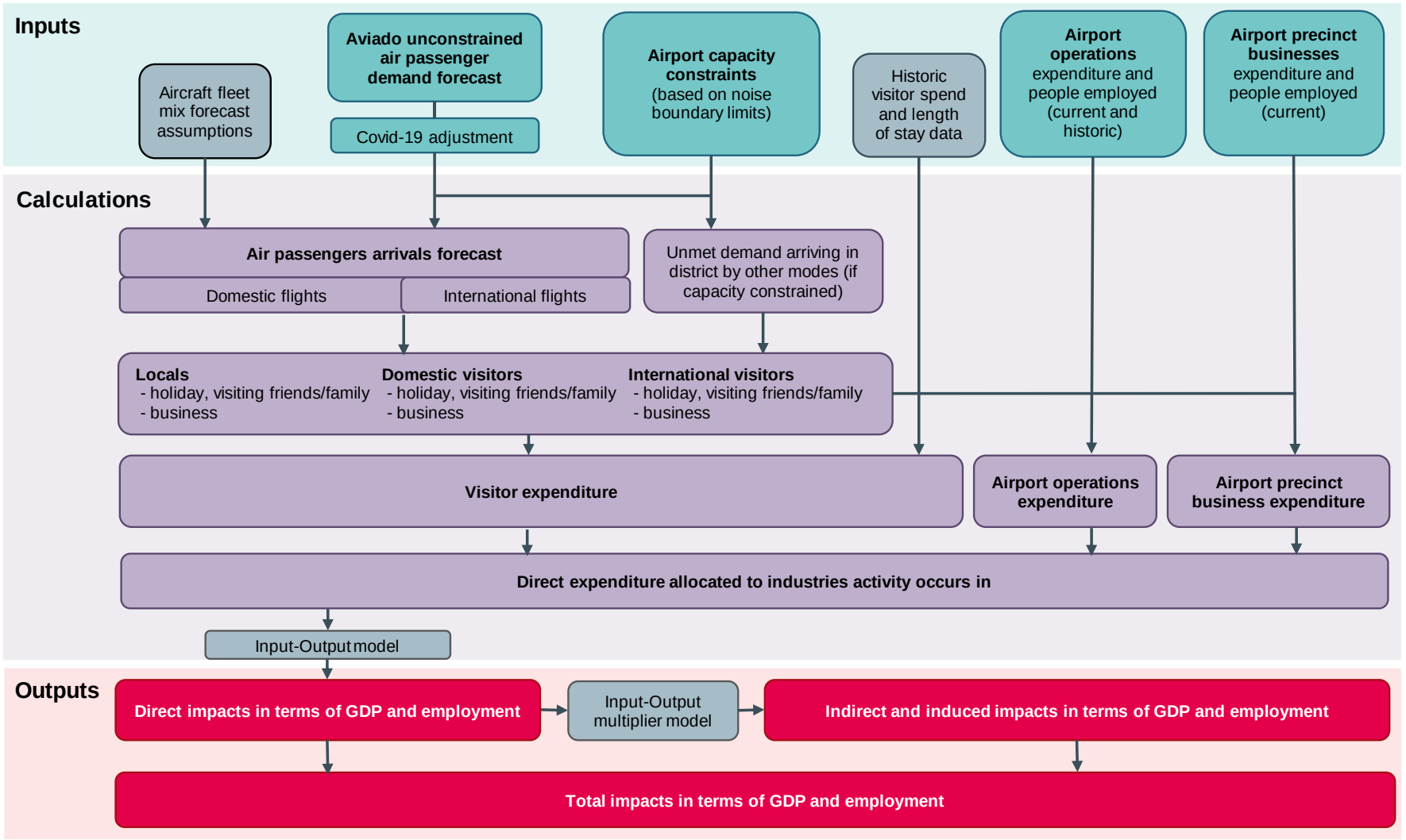
Expenditure was then allocated to industries and input into the regional input-output multiplier model to calculate direct, indirect, and induced economic impacts in terms of GDP (value added) and employment.

[154] Aviado (2018)

[155] Provided by Queenstown Airport Corporation (QAC)

[156] In 2019, approximately 700 people were employed at Queenstown Airport and 300 at Wanaka Airport.

Figure 27: Model structure



Time period of analysis

The economic impacts are assessed over a 30-year time period, from 2020 to 2050. This time period aligns with the forecast period of the Queenstown-Lakes district Council's Spatial Plan.

Common currency

The quantified economic impacts are calculated in 2020 currency terms. All expenditure inputs are in 2020 dollars.

Double counting

Care has been taken to identify all instances where airport precinct business activity is a result of visitor expenditure and this is excluded from the economic impacts to avoid double counting. This ensures that economic activity due to visitor expenditure is not double counted in both tourism impacts and airport precinct activity impacts.

Peer review process

The key assumptions underpinning the scenario definitions and the economic impact model have been independently reviewed by Airbiz. Airbiz is a global aviation consultancy recognised for its specialist aviation industry advice.

The approach, methodology, model, and the results generated from this analysis have been subject to an internal peer review process to confirm the validity of the approach and to provide quality assurance of the model.

Limitations

Not all economic impacts are able to be quantified. Therefore, in reality, the quantum of the relative economic impacts of the scenarios will be larger than what has been calculated in the model.

The analysis relies on the base unconstrained air passenger demand forecast for Queenstown developed by Aviado Partners (2018). While the demand forecast has been adjusted to consider the effects of COVID-19, we have not sought to, nor been required to, independently verify the base forecast. Aviado Partners are a recognised international specialist aviation consulting firm and the analysis relies on their expertise in this area.

Disclaimer

The model and this technical report have been prepared solely for the purposes stated herein and should not be relied upon for any other purpose. To the fullest extent permitted by law, we accept no duty of care to any third party in connection with the provision of this report. We accept no liability of any kind to any third party and disclaim all responsibility for the consequences of any third party acting or refraining to act in reliance on this technical report.

We have not been required, or sought, to independently verify the accuracy of information provided to us. Accordingly, we express no opinion on the reliability, accuracy, or completeness of the information provided to us and upon which we have relied.

The statements and results expressed herein have been made in good faith, and on the basis that all information relied upon is true and accurate in all material respects, and not misleading by reason of omission or otherwise. We reserve the right, but will be under no obligation, to review or amend this technical report if any additional information, which was in existence on the date of this technical report, was not brought to our attention, or subsequently comes to light.

Data inputs

A variety of data sources were used to capture the economic impacts of each scenario including:

- Queenstown Airport Corporation (QAC) publicly available data.
- QLDC Spatial Plan population forecast data.
- Ministry of Business, Innovation and Employment's International Visitor Survey and Monthly Regional Tourism Expenditure estimates.
- Statistics New Zealand Accommodation Survey.
- Destination Queenstown publicly available data.
- Publicly available information from other New Zealand airports.

The analysis also draws on confidential aggregated data regarding the aggregate revenue of businesses currently operating in the Queenstown airport precinct. This data was used to estimate future economic activity of precinct businesses under each scenario.

Current activity

Aircraft and passenger movements at Queenstown Airport

Current airport activity is covered in the section on Queenstown Airports starting on page 39.

In 2019, Queenstown Airport had 2.39 million passenger movements and 18,174 scheduled aircraft movements. Of these passengers, approximately half were New Zealand residents and half were international residents.

Table 41: Queenstown Airport passenger movements, 2019

Flight origin	Passenger movements	%
Domestic flights	1.68 million	70%
International flights	717,000	30%
Total	**2.39 million**	**100%**

Source: QAC

Table 42: Queenstown Airport aircraft movements, by route, 2019

Route	Aircraft movements
Auckland	8,185
Wellington	1,833
Christchurch	2,676
Sydney	2,719
Melbourne	1,520
Brisbane	877
Gold Coast	357
Other	7
Total	**18,174**

Source: QAC

Table 43: Queenstown Airport aircraft movements, by type, 2019

Aircraft	Aircraft movements
A320	13,602
B737-800	2,603
ATR	1,969
Total	**18,174**

Source: QAC

Airport operational expenditure and employment

In 2019, QAC operating expenditure was $15.3 million[157]. Data was not publicly available on the number of people QAC employs directly.

Airport precinct businesses activity and employment

Queenstown Airport and airport precinct businesses employed approximately 700 people in 2019. While the turnover of businesses operating at Queenstown Airport was estimated for the analysis, this is commercially sensitive information so is not presented.

Wānaka Airport and Wānaka airport precinct businesses employed about 300 people in 2019[158]. The turnover of these businesses was estimated for the analysis based on the type of businesses operating and the number of employees.

Visitor spend and length of stay data

In 2019, the average length of stay for visitors to the Queenstown-Lakes district was 2.37 nights (Table 44) and visitors spent between $180 and $295 per night depending on visitor type (Table 45).

Table 44: Visitor length of stay, 2019

Area	Average length of stay, 2019 (nights)
Queenstown RTO	2.46
Wānaka RTO	2.07
Queenstown-Lakes district	**2.37**

RTO: Regional tourism organisation.

Source: Statistics New Zealand Accommodation Survey

Table 45: Visitor spend, 2019

Visitor type	Average spend per night
Domestic visitor (estimate)*	236.63
International visitor	295.79
Domestic business visitor (estimate)*	180.79
International business visitor	225.99

Source: MBIE, International Visitor Survey

*Note: domestic visitor spend is assumed to be 80% of international visitor spend.

Air passenger unconstrained demand forecast

The base unconstrained demand forecast for the Queenstown-Lakes district used in the analysis was developed in 2018 by Aviado Partners, a recognised international specialist aviation consulting firm. Adjustments to the base forecast have been made for COVID-19. This forecast and the adjustments to it that have been made for the effects of COVID-19 are described in the main body of this report on page 103. The COVID-adjusted unconstrained demand forecast used as the base case in the analysis is shown in Figure 28.

Careful consideration was given to the basis of the unconstrained demand forecast as it is the primary input to the economic impact model. While the Aviado forecast growth is greater than the visitor growth forecast in QLDC's Spatial Plan (shown in Table 46), the Spatial Plan forecast is not an unconstrained forecast. Given the passenger growth at Queenstown Airport over the past ten years, it is considered that the Aviado forecast provides a reasonable basis for estimating the future unconstrained demand for flights to the Queenstown-Lakes district.

[157] Excluding depreciation, amortisation, finance costs and income tax expense. Source: QAC Annual report June 2019.

[158] QAC

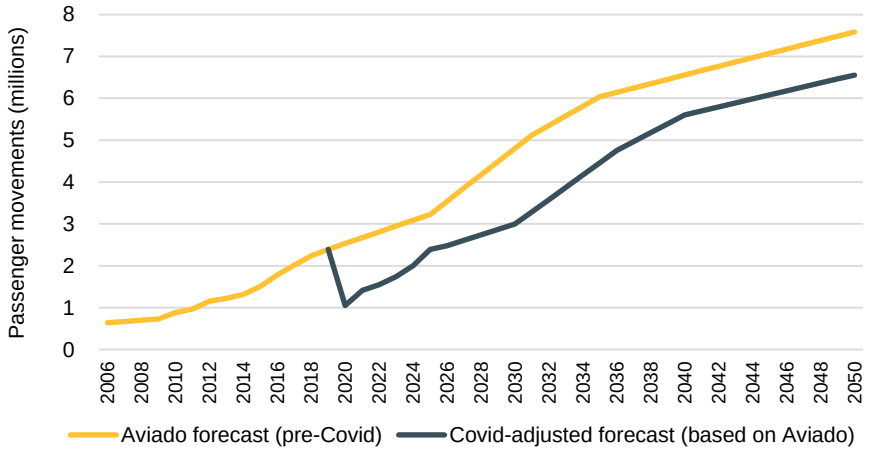
Table 46: Growth forecast comparison

	Compound average growth rate (CAGR), % p.a.
Historic air passenger growth, Queenstown Airport (2009 – 2019)	12.6%
Original Aviado air passenger demand forecast (2019 – 2045)	4.3%
COVID–adjusted Aviado passenger demand forecast (2019 – 2045)	3.7%
QLDC Spatial Plan visitor growth forecast (2019 – 2048)	1.4%

The Aviado forecast was developed for 2019-2045. This has been extrapolated to 2050 for the economic impact analysis.

As the unconstrained passenger demand forecast is a key input in the analysis, variations of the demand forecast are tested in the sensitivity analysis.

Figure 28: Unconstrained passenger demand forecast – Original Aviado forecast compared with COVID-adjusted forecast



Impact of COVID-19 on passenger volumes

There is of course a lot of uncertainty about the short and medium-term impacts of COVID-19, and how quickly domestic and international air passenger volumes to Queenstown will recover to 2019 levels. The relative difference in economic impacts between the four scenarios is somewhat dependent on the recovery time period assumed because a faster recovery will mean the current capacity limits at Queenstown Airport are reached earlier. However, the exact profile of the drop and recovery is not material to the relative impacts as this will be common in each scenario. The scenarios assessed only diverge when the capacity constraints are reached.

For this reason, three recovery scenarios are tested in sensitivity analysis:

1 **3-year recovery**. Recovery to 2019 air passenger volumes takes 3 years following the drop in 2020 – total passenger volumes return to 2019 levels in 2023.

2 **5-year recovery**. Recovery to 2019 volumes takes 5 years following the drop in 2020 – so passenger volumes return to 2019 levels in 2025.

3 **7-year recovery**. Recovery to 2019 volumes takes 7 years following the drop in 2020 – total passenger volumes return to 2019 levels in 2027.

No position has been taken on the relative likelihood of each of these recovery scenarios. The scenarios have been used to show the effect the speed of the recovery will have on the relative economic impacts of the airport development scenarios.

In simple terms, the faster the recovery, the greater the economic impacts will be of constraining airport capacity over the 30 year time period modelled, because the constraint will be reached earlier meaning potential economic benefits will be foregone over a longer period of time.

Aircraft capacity and loading factors

Aircraft seat capacity used in the model are shown in Table 47. Where relevant, the load factor (% of maximum capacity) is shown for domestic and international flights into and out of Queenstown Airport in 2019.

Table 47: Aircraft capacity and loading factor for Queenstown Airport flights

Aircraft	Seat capacity	Average load factor, 2019	
		Domestic flights	International flights
ATR 72	68	80%	n/a
A320	170	86%	76%
B737-800	174	n/a	
A321	214	n/a	n/a

Source: MartinJenkins calculation based on QAC data.

Note: A321 aircraft did not operate the Queenstown Airport route in 2019 but are shown here as the model assumes A321s are introduced in the future.

Capacity can increase in periods of high demand, although this is difficult for airlines to manage. Generally, airlines aim for 85 percent loading over the long run, which is the sweet spot for aircraft operations.

Assumptions

A summary of inputs and assumptions underpinning the economic impact analysis is presented in Table 48. Key assumptions requiring more detailed explanation are discussed following the table.

Table 48: Inputs and assumptions in the economic impact model

Input / assumption		Source
Airport and passenger inputs		
Nationality of passenger movements through Queenstown Airport, current (2019).	Approximately 50% of annual passenger movements at Queenstown Airport relate to New Zealand-resident travellers and 50% to international travellers. (Note, these proportions include both domestic and international flights).	QAC (FAQ on QAC website)
Arrivals as % of all passenger movements.	49.2%	QAC, 2019 data
Proportion of visitors to Queenstown-Lakes district that arrive via the airport.	33.3%	https://www.stuff.co.nz/business/industries/105768339/its-crunch-time-for-queenstown--let-tourist-numbers-double-or-shut-the-gate
Airport capacity constraints, due to noise boundary limits (aircraft movements).	**Scenario 1 (Status Quo):** Queenstown Airport: 21,000 **Scenario 2 (Extended noise boundaries):** Queenstown Airport: 21,000 (2020 – 2023) increasing to 41,600 from 2024 onwards. **Scenario 3 (Dual airports):** Queenstown Airport: 21,000 (2020 – 2023) increasing to 41,600 from 2024. Wanaka Airport: ~10,000 beginning in 2028. **Scenario 4 (New International Airport):** Queenstown Airport: 21,000 New airport: 70,000 from 2035 onwards.	MartinJenkins in consultation with QAC and Airbiz
Proportion of local Q-L residents on international flights in/out of the region.	10%	Statistics New Zealand, Traveller arrivals by NZ port – Queenstown Airport
Proportion of international residents on domestic flights into/out of Q-L.	33%	MartinJenkins calculation based on QAC 2019 data

Passenger types. (Aggregated for both domestic and international flights)	**NZ resident passengers:** Local (and regional) residents – Business: 5% – Holiday and VFR: 15% Domestic – Business: 10% – Holiday and VFR: 70% **International passengers:** – Business: 2.6% – Holiday and VFR: 97.5%	NZ resident passengers: MartinJenkins estimate in consultation with QAC and Airbiz International passengers: MBIE, International Visitor Survey
Future load factor assumed, by aircraft type. (% of maximum capacity)	**Domestic flights:** – A320 (86%) – A321 (86%) – ATR72 (80% – estimated) **International flights:** – A320 / B737-800 (80%) – A321s (80%)	Calculated based on QAC 2019 data (ATR72 load factor estimated)
Aircraft maximum seat capacity.	A320: 170 B737-800: 174 ATR 72: 68 A321: 214	Air NZ Aircraft manufacturers websites Airbiz
Aircraft fleet mix assumptions.	A321s are introduced on domestic and Australian routes in 2024 – carrying 5% of narrow-body jet passengers. By 2050, it is assumed A321's carry 50% of passengers flying on narrow-body jets. It is assumed the proportion of domestic passengers flying in ATRs remains consistent in the future (currently 6% of domestic passengers).	Assumption based on discussions with Airbiz
Visitor spend inputs		
Spend by visitors arriving by air (average spend per night).	**NZ resident:** – Holiday: $237 – Business: $181 **International:** – Holiday: $296 – Business: $226	Domestic: MartinJenkins estimate (80% of international visitor spend) International: MBIE, International Visitor Survey

Average length of stay in Q-L (nights).	**NZ resident:** – Holiday: 2.37 – Business: 1.5 **International:** – Holiday: 2.37 – Business: 1.5	Statistics New Zealand Accommodation Survey
Visitor dispersal if airport capacity is constrained		
Potential visitors who have not been able to secure a flight to Q-L because demand exceeds capacity that will still decide to travel to the district/region via other airports or mode. (% of people who wanted to travel to the district/region but could not book a flight to Queenstown-Lakes).	Domestic visitor: 20% International visitor: 20%	MartinJenkins estimate This estimate is sensitivity tested at 10% and 50%
Scenario 1: Status Quo		
Growth of businesses at Wānaka airport.	Under status quo, businesses operating at Wānaka airport are assumed to grow at the same rate as Wānaka population growth.	QLDC Spatial plan
Scenario 2: Expanded noise boundaries at Queenstown Airport		
No specific assumptions for Scenario 2 were required.		
Scenario 3: Scheduled services at Wanaka Airport		
Volume of passenger movements at Wānaka under the Dual Airports Scenario (Scenario 3).	400,000 passenger movements in 2031, three years after opening in 2028.	MartinJenkins calculation based on forecast number of residents in the Wānaka Ward and the potential pool of visitors that may fly to Wānaka – being those that both fly into the district on a domestic flight and visit Wānaka. We calculate that if 40% of these visitors choose to fly to Wanaka Airport, total passenger movements at Wanaka Airport
Scenario 4: New International Airport		
Ramp-up from new international airport opening in 2035 to 2040.	It is assumed air passenger movements at the new airport grow smoothly from the constrained volume in 2034 (at Queenstown Airport) to the unconstrained demand volume by 2040. Growth from 1.5 million air passenger arrivals in 2034 to 2.8 million air passenger arrivals in 2040.	MartinJenkins estimate based on consultation with Airbiz
Up-tick in international passenger demand from 2040 (due to wide-body aircraft routes opening).	Additional 1% added to the annual growth rate for international passenger demand from 2040-2050 to reflect capacity of the new airport to have wide-body jets operate.	MartinJenkins estimate

Unmet passenger demand visiting the district via other modes when airport constraints are reached

In Scenarios 1, 2 and 4 where constrained airport capacity results in unmet demand for a period of time (ie more people want to fly direct to Queenstown-Lakes than there are available flights), the proportion of the unmet demand that will visit the district by other modes has been estimated (eg those that may fly into Dunedin or Invercargill airports and enter Queenstown-Lakes district by road). The spend by these visitors has also been accounted for in calculating the economic impacts of each scenario.

When flight availability is limited, some potential visitors will simply decide to travel elsewhere, while some will tolerate the extra time (and possibly extra cost) required to fly to another airport and enter the Queenstown-Lakes district by road. Consumers' choices will depend on the preferences and type of visitor.

For the base case analysis, it has been assumed 20% of prospective passengers who cannot get a direct flight will still travel to the region. Most of these will be either domestic tourists, people visiting friends and family or international visitors who are touring the country. A potential visitor from Australia intending to visit Queenstown for a few days is unlikely to visit if there are no direct flights available. This assumption is tested in the sensitivity analysis. The estimate predominantly impacts Scenario 1 – which is the most constrained scenario.

If this proportion expected to still visit the district is lower than that assumed, the economic activity foregone by constraining airport growth will be greater. Conversely, if the proportion that still visit is larger, the economic activity foregone by constraining airport growth will be smaller.

Wānaka airport volume assumptions (Scenario 3)

Under Scenario 3, Wānaka airport is opened for scheduled domestic flights.

Demand for domestic flights to or from Wānaka airport will be from residents in the area and from visitors flying in or out. We have sought to estimate the potential passenger volumes at Wānaka airport in 2031 (allowing 3 years after opening in 2028 to ramp up to full operations) based on the number of residents and the pool of potential visitors that both visit Wānaka and enter the district via air on a domestic route. It is assumed passenger volumes at Wānaka Airport then grow at 5% per year from 2031.

Estimating passenger volumes in 2031

The average resident in a regional area in New Zealand makes 3 flights into or out of their regional airport per year[159] (ie an average of 1.5 return flights per year). In 2031, the Wānaka Ward population is forecast to be 19,300, so is expected to generate 57,900 passenger movements.

39% of international visitors to Queenstown-Lakes district in 2019 visited Wānaka[160], equating to approximately 452,000 international visitors. Assuming the same percentage of domestic visitors to the district visit Wānaka, it is estimated 1.27 million people visited Wānaka last year (452,000 international and 820,000 domestic). Of those, it is estimated about 340,000 entered the district by air on a domestic route – approximately 27% of all visitors to Wānaka. We estimate that by 2031, when Wānaka Airport has ramped up to full operations (having opened in 2028), approximately 429,000 visitors to Wānaka will enter the Queenstown-Lakes district by air on a domestic route. It is from this pool of people that demand for flying into or out of Wānaka Airport will arise.

159 Airbiz advice

160 MBIE, International Visitor Survey

If 40% of those 429,000 visitors in 2031 decide to fly into or out of Wānaka Airport, this will generate approximately 343,000 passenger movements.

When resident demand of 57,900 movements is added, this gives total passenger demand for Wānaka Airport of approximately 400,000 passenger movements in 2031. This is equivalent to the size of Invercargill or New Plymouth airports currently (see Table 49 for comparable regional airports in New Zealand).

The economic impact model therefore assumes 400,000 passenger movements at Wānaka Airport in 2031, growing over 20 years to 970,000 in 2050 (5% p.a. growth). This rate of growth at Wānaka Airport is required in order for the volume of aircraft movements at Queenstown Airport to remain below its capacity constraint in 2050 (Queenstown Airport capacity constraint of 41,600 based on the extended noise boundaries).

Table 49: Comparable regional New Zealand airports

Airport	Passenger movements, 2019
Nelson	1.05 million
Hawkes Bay	750,000
Palmerston North	687,000
New Plymouth	457,000
Invercargill	321,000
Rotorua	265,000

Source: Airport Annual reports

Airport users

As we move along the scenarios, the profile of airport users (international and domestic visitors, and locals) will skew further toward international visitors and those with higher incomes. There will also be a higher proportion of business users as they are not as price sensitive. There will be a drop-off in local users.

There will also be an increase in visitors and locals driving in to and out of the district.

Over the longer term, this will have a flow-on effect to businesses (tourism related, population related and export-focused). Visitor growth will ease. While a number of visitors will come in by road, there will be fewer overall visitors than if they could have flown in. There may be a shift to higher-value visitors as higher travel costs will deter budget visitors. However, budget visitors would likely still come, but by road.

User behaviour

Where there are limited seats and changes in price, different types of users will behave differently.

Similarly, the time taken to get to and from the airport will also encourage different behaviour from users.

Visitors

Higher price and constrained supply

Higher price and supply constraints will apply to Scenario 1 “status quo” and Scenario 2 “extended noise boundaries in Frankton”. International and domestic visitors who want to visit the Queenstown-Lakes district can take several actions:

- pay the higher price and fly into the Queenstown-Lakes district
- fly somewhere else in New Zealand and drive to the Queenstown-Lakes district
- drive to the Queenstown-Lakes district
- not visit the Queenstown-Lakes district.

Visitors are the most price sensitive group, and so visitor growth through into the district will decline. Those who are price sensitive will go elsewhere for their holiday (either in New Zealand or another country). Others, that are not time constrained will choose to travel to the district via other airports (Dunedin and Invercargill) and then by road.

We expect the behaviour change to be greater for domestic visitors, who will have more options around how, when and where they visit.

Distance of airport from amenities

The distance from the airport to amenities applies largely to Scenario 4 “a new international airport”, which will be much further from Queenstown-Lakes district than Frankton.

We expect this to have limited impact on international visitors, who will likely not consider the additional distance as a barrier (assuming the price to get to Queenstown or Wānaka does not change significantly).

For domestic visitors, those who live closer to the district that may decide to travel by car. It is almost a six-hour drive from Christchurch to Queenstown. It currently takes over an hour to fly from Christchurch to Queenstown. If it takes about 3.5 to 4.0 hours to get from the new international airport to Queenstown (flight time plus check-in plus travel to Queenstown) this could encourage some people who would normally fly to drive instead, especially for those who are driving to Christchurch airport to fly to Queenstown.

Residents

Residents in the Queenstown-Lakes district are thought to travel more by air than most other regions in New Zealand (Chatham and Stewart Islanders excluded).

Higher prices and constrained supply

Locals who travel will also likely cut back on the amount of air travel from Queenstown-Lakes airport due to the higher cost of flights, especially for non-essential travel. Some may drive to Invercargill airport and possibly Dunedin Airport to take advantage of lower prices or because they cannot secure a flight that suits.

Higher prices and constrained availability will have negative impacts on local businesses and the population. Businesses and population that are dependent upon air travel and are mobile may look at moving away from the district. Those looking to move into the district who include air connectivity as a key decision criteria may reconsider.

Distance from the airport

This would affect residents in Scenario 4 and could result in a drop in residential travel. Businesses and individuals who include air connectivity as a key decision criterion may reconsider. Depending upon where the new airport is located will determine the impact on Wānaka and Queenstown residents. Wānaka residents already have to travel about an hour to get to Queenstown Airport.

Business travellers

Business travellers are less sensitive to price and so their activity continue as per usual. However, there are a number of residents in Queenstown who travel regularly for work both nationally and globally. Some of these residents may decide to relocate to where prices are more affordable.

Airlines/aircraft

A number of assumptions have been made on how airlines will respond to increasing demand and constraints on the ability to land scheduled services.

Prices and loading capacity

As demand increases and load factor reaches 80 percent, airlines put on further flights until they are constrained by the noise boundaries. Airlines then manage demand through pricing mechanisms.

The loading factor for ATRs and international narrow-body jets (A320 and B737) is assumed to remain consistent at 80% into the future, which is the industry average. Domestic A320 flights are assumed to have a load factor of 86%, which is the load factor of these flights in 2019.

Capacity can increase in periods of high demand, although this is difficult for airlines to manage. Generally, airlines aim for 80 percent loading over the long run, which is the sweet spot for aircraft operations.

Aircraft activity

The type of aircraft used, and ratio of aircraft type does not change. Narrow body jets account for 90 percent of aircraft movements.

Narrow-body jets (A320 and B737) fly to all destinations. Turbo-props (ATR-72) fly between Queenstown and Christchurch and Wellington.

Seats and loading capacity

The number of seats stays constant for the different aircraft. This is 70 seats for the ATR-72s and 150 for the A320.

Airport activity

Operations

Operating activity (revenues and expenditure) of the airport and employment in the airport and businesses operating in the airport precinct increases in line with passenger growth.

We have applied the same ratio of operating expenditure to passenger numbers under each of the scenarios.

General aviation

General aviation and other airport users are not affected and continue to grow at the historical rate.

Infrastructure supply

Growth in visitor numbers is not constrained by visitor infrastructure. Roading infrastructure is developed in line with the Infrastructure Asset Management Strategy.

Results – quantifiable economic impacts

A comparison of the economic impacts of the four scenarios on Queenstown-Lakes district is presented in this section.

Air passenger arrivals and unmet demand summary

The volume of air passenger arrivals into the district underpins the calculation of economic impacts.

Under the base case demand forecast, the scenarios do not diverge in terms of the number of air passenger arrivals to Queenstown-Lakes district until about 2030 when Queenstown Airport reaches its flight capacity limit of 21,000 movements (Figure 29).

Under the Status Quo Scenario, passenger arrivals then only increase slightly as A321s are introduced which have greater seat capacity per flight.

Figure 30 shows the unmet air passenger demand under each scenario. This is the expected number of people who would have flown directly to Queenstown-Lakes but would not be able to book a flight due to the constrained airport capacity.

Under the most constrained scenario (Status quo), unmet air passenger demand is expected to be around 1.7 million by 2050. Under the New international airport scenario, air passenger demand exceeds available flights between 2030 and 2035 when the new airport is opened. With expanded noise boundaries at Queenstown Airport (Scenario 2), the limit on the allowable number of flights is expected to be reached around 2045.

Figure 29: Air passenger arrivals – Queenstown-Lakes district

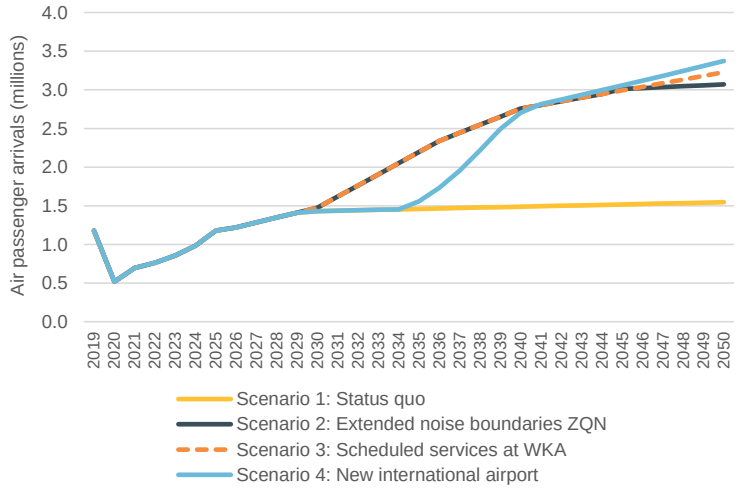
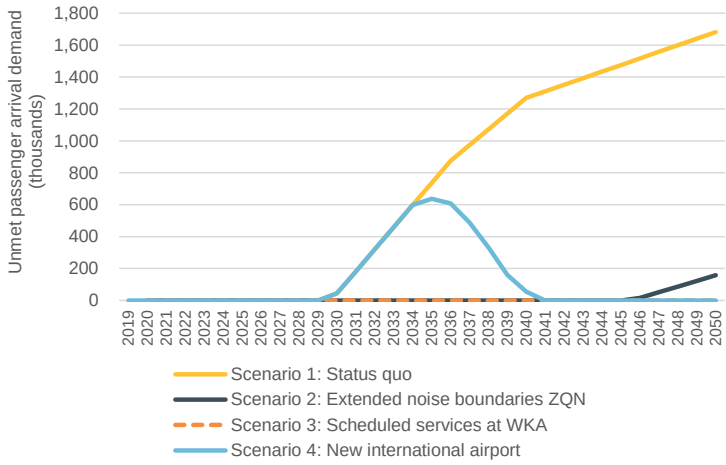


Figure 30: Unmet air passenger arrival demand, Queenstown-Lakes district



Forecast passenger and aircraft movement summary

The below tables summarise the forecast passenger arrivals, movements, and aircraft movements for each scenario.

Table 50: Scenario 1: Status Quo

Status Quo Arrivals and aircraft movements	ZQN		
	Current	**2030**	**2050**
Passenger arrivals			
Domestic flights	819,863	994,020	1,073,587
International flights	358,196	437,003	472,603
Total	**1,178,059**	**1,431,023**	**1,546,190**
Passenger movements			
Domestic flights	1,676,068	2,019,140	2,180,763
International flights	716,908	887,678	959,993
Total	**2,392,976**	**2,906,818**	**3,140,757**
Scheduled aircraft movements			
Domestic flights:			
ATRs	1,969	2,349	2,349
Narrow-body jets	10,732	12,434	12,434
International flights:			
Narrow-body jets	5,473	6,218	6,218
Wide-body jets	0	0	0
Total aircraft movements	18,174	21,000	21,000
Unmet passenger arrival demand			
Total unmet arrival demand	0	44,155	1,681,463
People entering district via other modes	0	8,831	336,293

Table 51: Scenario 2: Expanded noise boundaries at Queenstown Airport

Extended noise boundaries at ZQN Arrivals and aircraft movements	ZQN		
	Current	**2030**	**2050**
Passenger arrivals			
Domestic flights	819,863	1,022,750	1,752,965
International flights	358,196	452,428	1,316,808
Total	**1,178,059**	**1,475,178**	**3,069,773**
Passenger movements			
Domestic flights	1,676,068	2,077,499	3,560,775
International flights	716,908	919,012	2,674,815
Total	**2,392,976**	**2,996,511**	**6,235,590**
Scheduled aircraft movements			
Domestic flights:			
ATRs	1,969	2,441	4,042
Narrow-body jets	10,732	12,874	20,234
International flights:			
Narrow-body jets	5,473	6,477	17,324
Wide-body jets	0	0	0
Total aircraft movements	**18,174**	**21,792**	**41,600**
Unmet passenger arrival demand			
Total unmet arrival demand	0	0	157,880
People entering district via other modes	0	0	31,576

Table 52: Scenario 3: Scheduled services at Wānaka airport

Scheduled services at WKA Arrivals and aircraft movements	ZQN			WKA	
	Current	**2030**	**2050**	**2031**	**2050**
Passenger arrivals					
Domestic flights	819,863	880,925	1,324,189	196,919	477,846
International flights	358,196	452,428	1,425,618	0	0
Total	**1,178,059**	**1,333,353**	**2,749,807**	**196,919**	**477,846**
Passenger movements					
Domestic flights	1,676,068	1,789,411	2,689,808	400,000	970,643
International flights	716,908	919,012	2,895,839	0	0
Total	**2,392,976**	**2,708,423**	**5,585,647**	**400,000**	**970,643**
Scheduled aircraft movements					
Domestic flights:					
ATRs	1,969	2,102	3,160	470	1,187
Narrow-body jets	10,732	11,089	15,452	2,453	6,198
International flights:					
Narrow-body jets	5,473	6,477	18,980	0	0
Wide-body jets	0	0	0	0	0
Total aircraft movements	**18,174**	**19,668**	**37,593**	**2,922**	**7,385**
Unmet passenger arrival demand					
Total unmet arrival demand	0	0	0		
People entering district via other modes	0	0	0		

Note: 2031 shown for Wānaka as this is when it has ramped up to full operations, having opened in 2028.

Table 53: Scenario 4: New International Airport

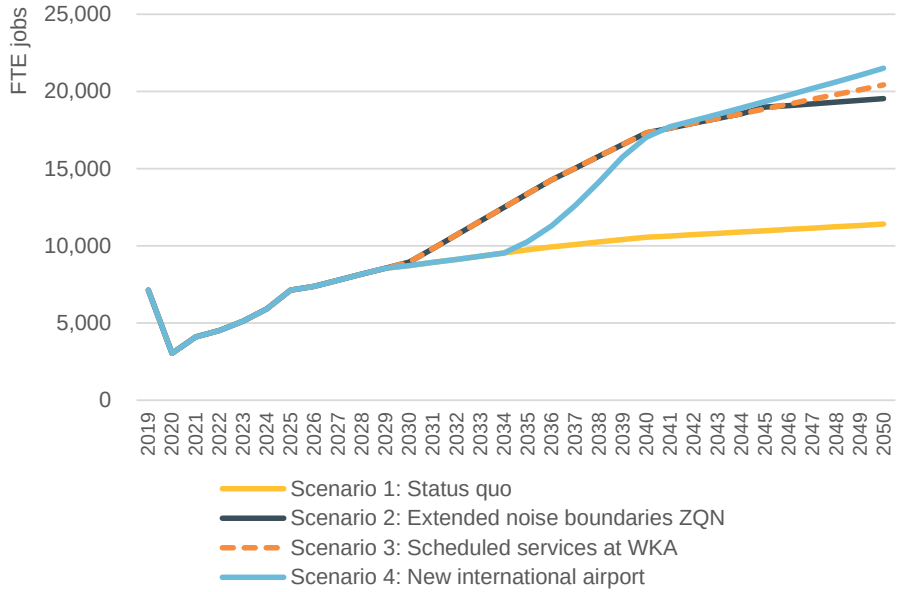
New international airport Arrivals and aircraft movements	ZQN		NIA
	Current	**2030**	**2050**
Passenger arrivals			
Domestic flights	819,863	994,020	1,802,035
International flights	358,196	437,003	1,571,531
Total	**1,178,059**	**1,431,023**	**3,373,567**
Passenger movements			
Domestic flights	1,676,068	2,019,140	3,660,451
International flights	716,908	887,678	3,192,231
Total	**2,392,976**	**2,906,818**	**6,852,682**
Scheduled aircraft movements			
Domestic flights:			
ATRs	1,969	2,349	4,300
Narrow-body jets	10,732	12,434	21,019
International flights:			
Narrow-body jets	5,473	6,218	21,059
Wide-body jets	0	0	1,323
Total aircraft movements	**18,174**	**21,000**	**47,701**
Unmet passenger arrival demand			
Total unmet arrival demand	0	44,155	0
People entering district via other modes	0	8,831	0

Employment impacts

There were around 30,000 filled jobs in Queenstown-Lakes district in 2019. This analysis estimates about 7,000 of these were directly or indirectly a result of airport operations and the expenditure of visitors in the district arriving by air. Under an unconstrained scenario, it is estimated that by 2050, the airport(s) and visitors arriving by air would generate around 20,000 jobs directly and indirectly (Figure 31).

However, if the district's airport capacity is constrained at current limits, it is estimated the district will give up between 5,200 and 5,800 jobs on average annually between 2030 and 2050 (Table 55). In 2050, under the Status quo scenario, the district is estimated to forego around 10,400 jobs compared with the new international airport scenario.

Figure 31: Total employment impact of airports in Queenstown-Lakes district



On average over the period from 2030 to 2050, the dual airports scenario (Scenario 3) is expected to generate the largest economic benefits to the district (Table 54). This is because flight capacity is constrained under Scenario 4 from 2030 until 2035 when the new airport is built. Similarly, under Scenario 2, flight capacity limits are reached in 2045.

Table 54: Total employment impact of airports in Queenstown-Lakes district

Total employment impacts (FTEs)		2019	2020	2030	2040	2050	Average annual (2030-2050)
Scenario 1: Status quo	Visitor spend	7,137	3,040	8,726	10,560	11,409	10,330
	Airport and precinct business activity	381	273	454	514	584	516
	Total employment impact	**7,518**	**3,313**	**9,181**	**11,074**	**11,993**	**10,846**
Scenario 2: Expanded noise boundaries ZQN	Visitor spend	7,137	3,040	8,944	17,324	19,535	15,899
	Airport and precinct business activity	381	273	461	709	819	679
	Total employment impact	**7,518**	**3,313**	**9,406**	**18,033**	**20,354**	**16,579**
Scenario 3: Scheduled services at WKA	Visitor spend	7,137	3,040	8,944	17,324	20,419	16,012
	Airport and precinct business activity	381	273	453	689	809	661
	Total employment impact	**7,518**	**3,313**	**9,398**	**18,013**	**21,228**	**16,673**
Scenario 4: New international airport	Visitor spend	7,137	3,040	8,726	17,044	21,501	15,362
	Airport and precinct business activity	381	273	454	696	859	655
	Total employment impact	**7,518**	**3,313**	**9,181**	**17,740**	**22,360**	**16,017**

Note 1: Total employment impact includes direct, indirect, and induced impacts.

Note 2: The reduced employment in 2020 is due to the potential impact of COVID-19.

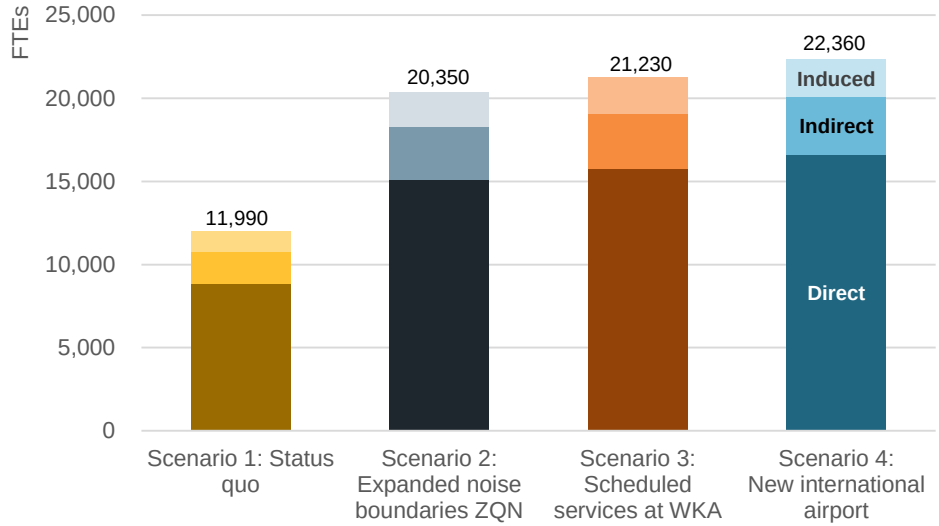
Table 55: Total employment impact in Queenstown-Lakes district, relative to the Status Quo Scenario

Total employment impacts (FTEs)		2030	2040	2050	Average annual (2030-2050)
Scenario 2: Expanded noise boundaries ZQN	Visitor spend	218	6,764	8,126	5,570
	Airport and precinct business	7	195	235	163
	Total employment impact	**225**	**6,959**	**8,361**	**5,733**
Scenario 3: Scheduled services at WKA	Visitor spend	218	6,764	9,010	5,682
	Airport and precinct business	0	176	225	146
	Total employment impact	**217**	**6,939**	**9,234**	**5,828**
Scenario 4: New international airport	Visitor spend	0	6,484	10,092	5,032
	Airport and precinct business	0	182	275	139
	Total employment impact	**0**	**6,666**	**10,366**	**5,171**

Note: Total employment impact includes direct, indirect, and induced impacts.

Figure 32 illustrates the breakdown of employment impacts in terms of direct, indirect, and induced impacts for each scenario in 2050.

Figure 32: Employment generated by Queenstown-Lakes district airports, 2050

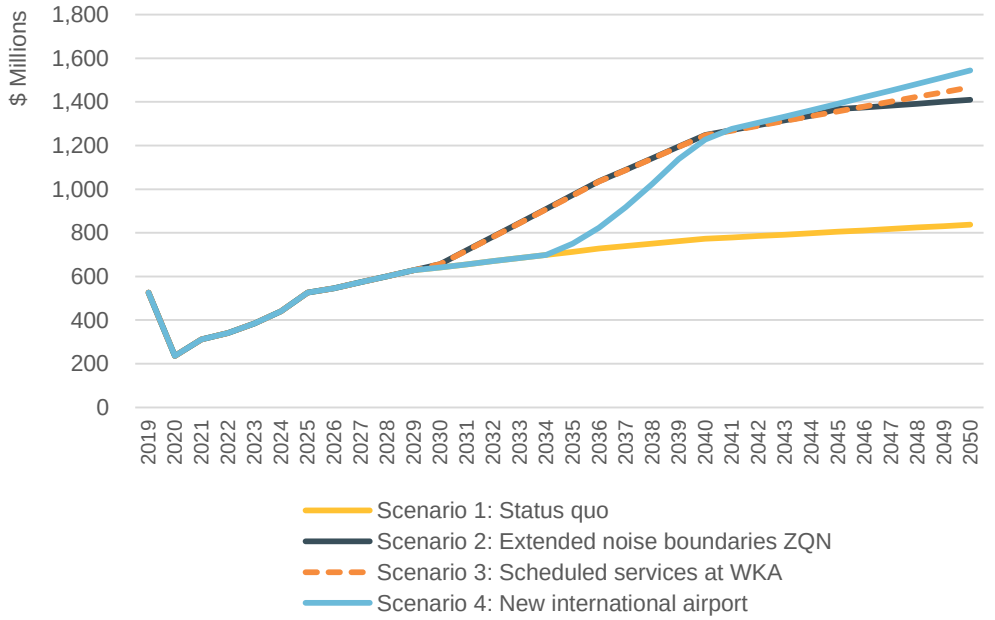


GDP impacts

Queenstown-Lakes district GDP was $3.06 billion in 2019. We estimate about $530 million of this (18%) was a result of the airport and expenditure by visitors arriving in the district by air. Under unconstrained scenarios, we estimate GDP generated (directly and indirectly) by airports in the district will grow to around $1.5 billion (Figure 33).

If the district's airport capacity is constrained at current limits, when compared with Scenario 3, it is estimated the district will forego $400 million in annual GDP on average between 2030 and 2050, which represents about 13% of the district's current annual GDP (Table 57). This corresponds to foregoing about $8.3 billion in total GDP over the 20 years between 2030 and 2050.

Figure 33: Total GDP impacts generated by airports in Queenstown-Lakes district



Note: Total GDP impact includes direct, indirect, and induced impacts.

Table 56: Total GDP impact of airports in Queenstown-Lakes district

Total GDP impacts ($m)		2019	2020	2030	2040	2050	Total ($m)	Average annual (2030-2050)
Scenario 1: Status quo	Visitor spend	486	208	595	719	777	18,988	704
	Airport and precinct business activity	39	28	47	53	60	1,497	53
	Total GDP impact	**526**	**236**	**641**	**772**	**838**	**20,486**	**757**
Scenario 2: Expanded noise boundaries ZQN	Visitor spend	486	208	609	1,175	1,325	26,883	1,080
	Airport and precinct business activity	39	28	48	73	84	1,851	70
	Total GDP impact	**526**	**236**	**657**	**1,248**	**1,409**	**28,734**	**1,150**
Scenario 3: Scheduled services at WKA	Visitor spend	486	208	609	1,175	1,384	27,041	1,087
	Airport and precinct business activity	39	28	47	71	83	1,812	68
	Total GDP impact	**526**	**236**	**656**	**1,246**	**1,468**	**28,853**	**1,155**
Scenario 4: New international airport	Visitor spend	486	208	595	1,156	1,456	26,105	1,043
	Airport and precinct business activity	39	28	47	72	89	1,799	68
	Total GDP impact	**526**	**236**	**641**	**1,228**	**1,545**	**27,904**	**1,110**

Note 1: Total GDP impact includes direct, indirect, and induced impacts.

Note 2: The reduced GDP in 2020 is due to the potential impact of COVID-19.

Table 57: Total GDP impact in Queenstown-Lakes district, relative to the Status Quo Scenario

Total GDP impacts ($m)		2030	2040	2050	Total (2030-2050)	Average annual (2030-2050)
Scenario 2: Expanded noise boundaries ZQN	Visitor spend	15	456	548	7,894	376
	Airport and precinct business	1	20	24	354	17
	Total GDP impact	**16**	**476**	**572**	**8,248**	**393**
Scenario 3: Scheduled services at WKA	Visitor spend	15	456	607	8,052	383
	Airport and precinct business	0	18	23	315	15
	Total GDP impact	**15**	**474**	**630**	**8,368**	**398**
Scenario 4: New international airport	Visitor spend	0	437	679	7,117	339
	Airport and precinct business	0	19	28	302	14
	Total GDP impact	**0**	**456**	**707**	**7,418**	**353**

Note: Total GDP impact includes direct, indirect, and induced impacts.

Visitor expenditure summary

The visitor expenditure by air passengers drives the large majority of the employment and GDP impacts presented above. This section summarises visitor expenditure for each of the four scenarios.

Results are presented first as absolute visitor expenditure for each scenario (Table 58), then relative to the Status quo scenario (Table 59).

Table 58: Visitor expenditure comparison

Visitor expenditure ($m)		2020	2030	2040	2050	Total (2020-2050)	Average annual (2020-2050)
Scenario 1: Status quo	Domestic visitors	121	302	366	395	9,724	314
	International visitors	159	500	605	653	15,882	512
	Total visitor expenditure	**280**	**802**	**970**	**1,048**	**25,606**	**826**
Scenario 2: Expanded noise boundaries ZQN	Domestic visitors	121	309	503	559	12,332	398
	International visitors	159	513	1,082	1,227	23,915	771
	Total visitor expenditure	**280**	**822**	**1,585**	**1,786**	**36,247**	**1,169**
Scenario 3: Scheduled services at WKA	Domestic visitors	121	309	503	571	12,354	399
	International visitors	159	513	1,082	1,295	24,107	778
	Total visitor expenditure	**280**	**822**	**1,585**	**1,866**	**36,460**	**1,176**
Scenario 4: New international airport	Domestic visitors	121	302	495	577	11,776	380
	International visitors	159	500	1,064	1,386	23,423	756
	Total visitor expenditure	**280**	**802**	**1,559**	**1,963**	**35,198**	**1,135**

Table 59: Visitor expenditure comparison – relative to Status quo scenario

Visitor expenditure ($m), relative to Status quo		2030	2040	2050	Total (2030-2050)	Average annual (2030-2050)
Scenario 2: Expanded noise boundaries ZQN	Domestic visitors	7	137	164	2,609	124
	International visitors	13	477	574	8,033	383
	Total visitor expenditure	**20**	**614**	**738**	**10,642**	**507**
Scenario 3: Scheduled services at WKA	Domestic visitors	7	137	176	2,630	125
	International visitors	13	477	642	8,224	392
	Total visitor expenditure	**20**	**614**	**818**	**10,854**	**517**
Scenario 4: New international airport	Domestic visitors	0	130	182	2,052	98
	International visitors	0	459	733	7,541	359
	Total visitor expenditure	**0**	**589**	**915**	**9,593**	**457**

Sensitivity analysis

The key assumptions or inputs tested in the sensitivity analysis are:

1 COVID-19 recovery time period

2 Unmet demand proportion that visit the district via other modes.

Time period for passenger volumes to recover following COVID-19

The base case assumes air passenger volumes to Queenstown-Lakes take five years to recover to 2019 levels following the shock in 2020 (ie volumes recover to 2019 levels in 2025). Due to the uncertainty around the impact of COVID-19 and the potential ongoing impacts of a global recession, we have also assessed economic impacts under a three-year and a seven-year recovery scenario (Table 60 and Table 61). A quicker recovery time period increases the quantum of the impact of constraining airport capacity because capacity constraints are reached earlier.

For example, under Scenario 3, assuming a 3-year recovery period increases the average annual employment impacts relative to the Status quo (2030-2050) by 16% compared with the base case.

Table 60: Employment impacts relative to the Status quo scenario

Employment impact (FTEs)	Recovery period	2030	2040	2050	Ave annual (2030-2050)	% difference from base case
Scenario 2: Expanded noise boundaries ZQN	3 years	1,696	7,478	8,367	6,491	13%
	5 years (base case)	225	6,959	8,361	5,733	
	7 years	0	5,660	8,369	4,902	-14%
Scenario 3: Scheduled services at WKA	3 years	1,688	7,456	9,745	6,742	16%
	5 years (base case)	217	6,939	9,234	5,828	
	7 years	0	5,638	8,711	4,905	-16%
Scenario 4: New international airport	3 years	0	7,174	10,927	5,608	8%
	5 years (base case)	0	6,666	10,366	5,171	
	7 years	0	5,262	9,793	4,606	-11%

Table 61: GDP impacts relative to the Status quo scenario

GDP impact ($m)	Recovery period	2030	2040	2050	Total ($m)	Ave annual (2030-2050)	% difference from base case
Scenario 2: Expanded noise boundaries ZQN	3 years	117	511	572	9,336	445	13%
	5 years (base case)	16	476	572	8,248	393	
	7 years	0	388	572	7,053	336	-14%
Scenario 3: Scheduled services at WKA	3 years	116	509	665	9,678	461	16%
	5 years (base case)	15	474	630	8,368	398	
	7 years	0	386	594	7,041	335	-16%
Scenario 4: New international airport	3 years	0	490	745	8,040	383	8%
	5 years (base case)	0	456	707	7,418	353	
	7 years	0	361	668	6,612	315	-11%

Proportion of unmet air passenger demand that visit the district via other modes

The base case assumes that when demand exceeds flight capacity, 20% of potential passengers who cannot book a flight would still travel to Queenstown via other modes (for example, by flying to Dunedin or Invercargill and driving, or an international visitor touring the country may decide to drive from Christchurch rather than fly directly). This was estimated based on an assessment of the propensity of the various passenger types to incur the additional time cost to visit Queenstown-Lakes district.

To test the sensitivity of modelled impacts to changes in this assumption, we have tested this input at 10% and at 50%, though we consider 50% is unrealistically high.

Table 62 and Table 63 show that the greater the proportion of people assumed to still visit the region via other modes when flights are constrained, the smaller the relative economic impacts of the development scenarios compared to the constrained Status quo scenario.

For example, under Scenario 3, the economic impacts relative to the Status quo are 34% lower than the base case if we use the input assumption of 50%.

Table 62: Employment impacts relative to the Status quo scenario

Employment impact (FTEs)	Proportion	2030	2040	2050	Ave annual (2030-2050)	% difference from base case
Scenario 2: Expanded noise boundaries ZQN	10%	251	7,728	9,284	6,374	11%
	20% (base case)	225	6,959	8,361	5,733	
	50%	144	4,653	5,592	3,810	-34%
Scenario 3: Scheduled services at WKA	10%	243	7,708	10,253	6,481	11%
	20% (base case)	217	6,939	9,234	5,828	
	50%	136	4,633	6,178	3,867	-34%
Scenario 4: New international airport	10%	0	7,401	11,385	5,713	10%
	20% (base case)	0	6,666	10,366	5,171	
	50%	0	4,460	7,310	3,547	-31%

Table 63: GDP impacts relative to the Status quo scenario

GDP impact ($m)	Proportion	2030	2040	2050	Total ($m)	Ave annual (2030-2050)	% difference from base case
Scenario 2: Expanded noise boundaries ZQN	10%	17	528	635	9,165	436	11%
	20% (base case)	16	476	572	8,248	393	
	50%	10	319	383	5,496	262	-33%
Scenario 3: Scheduled services at WKA	10%	17	526	699	9,303	443	11%
	20% (base case)	15	474	630	8,368	398	
	50%	9	317	422	5,562	265	-34%
Scenario 4: New international airport	10%	0	506	777	8,193	390	10%
	20% (base case)	0	456	707	7,418	353	
	50%	0	305	499	5,094	243	-31%

APPENDIX 3: THE ROLE OF AIRPORTS

Airports are a critical piece of transport infrastructure that play important roles both socially and economically in regions.

This section summarises the key roles airports play and the significance of each in the Queenstown-Lakes context.

The social role of airports

Airport infrastructure plays a number of roles that contribute to the social well-being of communities. These include facilitating travel to visit friends and family and to go on holiday, access higher education as well as providing critical relief in the event of a natural disaster or civil emergency.

Airports allow people to visit friends and family

Air transport allows people to visit friends and family in other parts of the country and other parts of the world relatively easily, quickly, and affordably. Without air transport it would be more difficult to maintain these close social connections which are important for people's well-being.

Airports facilitate locals going on holiday

Air transport allows people to travel to many different destinations for holidays, which are beneficial to their well-being by offering rest and recreation as well as the intellectual stimulation of visiting and learning about a new place.

Recent research undertaken by the UK Airports Commission (2015) found that local people benefit through the leisure impacts of increased connectivity. The increased availability of flights to different places, reduced cost of travel and improved passenger experience all contributing to the benefit. The Commission's analysis showed statistically significant positive effects of leisure abroad improving mental and physical health, as well as boosting productivity. The results of their statistical analysis across all datasets showed taking holidays involving flights is associated with improvements in health and well-being.

Airports provide people with relatively easy access to higher education

Air transport makes it much easier for local people to attend higher education institutions such as universities (in New Zealand and abroad) while maintaining their connection with home. The ease of access to this education and the ability to visit family and friends at home improves both the well-being of the individual and of the community if they return to the region and apply their knowledge and skills.

Airports facilitate economic activity, improving incomes which improves well-being

The ways in which airports facilitate economic activity, which improves incomes and creates jobs, are outlined in the next section on the economic role of airports.

Airports are critical for disaster relief aid, emergency, and healthcare services

In the event of a natural disaster or civil emergency, such as a weather event that closes road access, airports provide a lifeline by which aid can be delivered, or people can be evacuated.

The economic role of airports

Airports play an important role in a well-functioning economy. Air transport facilitates business relationships and investment, improves the productivity of firms, supports tourism, and facilitates trade.

Airports facilitate business relationships and investment

Effective and efficient passenger air services are essential for conducting business. They allow companies to maintain and foster business relationships domestically and globally. Although videoconferencing technology is becoming more sophisticated, many companies still consider face-to-face meetings to be essential for developing client relationships and generating new business.

As noted by Richard Florida[161],

> *Airports play a substantial role on the economic growth and development of cities and regions. In today's knowledge economy, far and away, the most precious cargo they move is people.*

A 2009 survey[162] of over 2,200 businesspeople by Harvard Business Review Analytic Services found that 87 percent consider face-to-face meetings as essential for securing new business, and 95 percent agreed that such meetings are critical to building long-term relationships. More than half of those surveyed said that constraints on the number of flights they take for work would hurt their business.

Effective air transport is also an important enabler of investment into and out of regions. Companies are more likely to invest in places with good air transport links.

A 2003 European survey[163] found 56 percent of companies consider international transport links to be an essential factor for locating businesses in Europe, while 28 percent of companies surveyed believe that innovation and investment in research and development would be very badly or fairly badly affected if air transport services were constrained.

Investment often entails some movement of staff, either in the decision-making phase, or post-investment for technical capability, management oversight, or servicing and meeting customers.

As the main centres in the Queenstown-Lakes district are about 3-4 hours' drive from the nearest large airport (Dunedin), constraining air services in the district may have a significant impact on investment in the region.

From: https://blueswandaily.com/regional-airports-continue-to-play-a-vital-role-in-keeping-europe-connected/

While regional airports have "a positive impact" for companies already established locally, they are "essential to attracting" new companies and diversifying economic activity, says Airports Council International (ACI) Europe, with all business surveys indicating that the vicinity of an airport is one of the key company location factors – there are successful examples across Europe of regional airports having developed business parks or hosting research centres.

It is therefore no surprise that regional airports are now considered prime assets by regional and local authorities. As such, they are not only "an essential part of the national and European transport network," they are "a

[161] Sourced from www.citylab.com/transportation/2012/05/airports-and-wealth-cities/855/ on 29 January 2019

[162] *Managing Across Distance in Today's Economic Climate: The Value of Face-to-Face Communication*, Harvard Business Review Analytic Services for British Airways, 2009: http://tinyurl.com/7h8nrqg

[163] Healey and Baker (2003) as cited in (Air Transport Action Group, 2005, p. 12)

vital part of any region's strategy to attract and retain investment and growth," says ACI Europe.

- A survey of companies in the US, France, China, Chile, and Czech Republic found that more than 65% of businesses consider passenger air services vital or very important for servicing or meeting customers. A survey of businesses in Hamburg found 80% of the manufacturing companies reported air service connections as important in getting customers to look at their products.
- Fully participating in a worldwide economy encourages higher productivity, investment, and innovation.

Airports improve productivity

Good quality air transport links improve the productivity of firms in a region which increases incomes.

A 2018 report[164] by Oxford Economics states that:

> *"Arguably, the largest economic benefit of increased connectivity comes through its impact on the long-term performance of the wider economy by enhancing the overall level of productivity."*

An extensive body of research evidence demonstrates the critical importance of transport (and good transport infrastructure) for productivity and economic growth. (See Crafts (2009) for an overview of this research).

In particular, the research evidence shows investment in transport links to central business districts and major cities may show significant additional productivity benefits due to:

- agglomeration
- more effective market competition
- improved labour supply.

Productivity improvements occur via two main mechanisms:

1 the effect on local firms of increased access to domestic and foreign markets, and the effect of increased competition in the local market from domestic and overseas firms.

2 freer movement of investment capital and labour.

Airports enable access to domestic and international markets which can drive down costs and prices for firms through economies of scale and improved efficiency in the supply chain.

Airports also enable competition in local markets which improves choice and decreases prices for consumers. By opening up markets, air services expose companies to stiffer competition, encouraging them to be more efficient.

Effective air transport services also drive productivity growth by making it easier for companies to attract high quality employees from around New Zealand and globally. A 2005 study by Oxford Economics Forecasting[165] found that for many senior staff and professionals, access to international links influences their decision on where to live and work. Improved access to a wider pool of appropriately skilled labour will improve productivity ultimately leading to increased incomes and higher employment in the local economy.

Air transport also facilitates innovation, by allowing the diffusion of new technology more quickly and easily.

[164] *Aviation Benefits Beyond Borders*, 2018, Oxford Economics report for the Aviation Transport Action Group.

[165] Survey conducted on behalf of IATA: Measuring Airline Network Benefits, OEF, 2005

Recent research[166] suggests a 10% improvement in global connectivity results in a 0.5% increase in long run GDP per capita. Another study shows the expansion of trade by air services in the previous decade contributed an additional 0.6% to Europe's GDP.[167]

Airports support tourism

Tourism is fundamental to the Queenstown-Lakes economy. The broad sector contributes 32 percent of the district's GDP compared to 6 percent of New Zealand's GDP. As one of New Zealand's largest export industries, tourism is a key source of income for the country.

Effective air services support tourism by providing visitors with a convenient, affordable, and quick means of travelling to a destination.

Airport infrastructure plays an important role in supporting the significant tourism-related economic activity in the Queenstown-Lakes district. Without sufficient air service capacity in the district to meet demand, flight prices are likely to increase, some visitors will still travel to the district by other modes (ie fly to Dunedin airport and drive or bus), while some prospective visitors will decide to travel elsewhere.

Airports facilitate the movement of goods and services

By facilitating the movement of goods and services, air transport encourages regions to specialise in activities where they have a comparative advantage.

While there is minimal registered freight movement through Queenstown Airport, a number of users are travelling for business. Another area of activity is around conferences and events.

A district remote from the main centres across New Zealand, reliable scheduled services are essential to provide the connectivity that allows businesses that operate nationally and globally, to set up in the Queenstown-Lakes district. A relatively large portion of the district's residents also work remotely, and the ability meet with their clients is an important part of their offering.

166 (Oxford Economics, 2018)

167 (Oxford Economics Forecasts, 2005)

APPENDIX 4: AIRPORTS AND NOISE

What is noise?

Noise is referred to as an unwanted sound. Sound is a change in air pressure and is heard as our ears detect this change. These pressure levels are known as decibels. Because sound is made up of constantly changing high and low frequencies (pitch) and levels (loudness), which our ears find difficult to distinguish, a decibel energy average (dBA) is often reported to capture and roughly compare specific noise levels and sources over a period of time[168].

Mitigating airport related noise

Aircraft

Aircraft provide the single loudest source of noise, and the most widely disbursed. This noise is created by the plane's engine, and air resistance as air hits the plane. In terms of aircraft type, jet aircrafts tend to generate more noise than turboprop aircraft, which both tend to generate more noise than general aviation aircraft. As general aviation activity typically makes up a smaller portion of an airport's activity and it generates less noise, noise from general aviation aircraft is typically negligible in its contribution to total airport-related noise.[169]

Over time individual aircrafts have become quieter. Improvements in technology mean that modern planes are significantly quieter than planes that flew in previous decades. As an example, the A320neo, used by Air New Zealand on several its domestic routes, is 50% quieter than previous generation aircraft.[170] Generally, aircraft are quieter due to 2013 standards by the ICAO requiring aircraft models to be at least 7dB quieter than older models.[171] However, further improvements in reducing noise from aircraft tend to have diminishing benefits.

Electric planes are being explored by numerous aircraft producers with existing prototypes already being tested[172] but they are very unlikely to become technologically and commercially viable for large long-haul passenger planes within the next 2-3 decades.[173] Air New Zealand has indicated that hybrid and electric aircraft could be a viable option for their regional network.[174] However, generally airlines will likely wear out their existing aircraft, which have a lifespan of 20-30 years, even if small short-haul technology becomes feasible, which is possible within the next decade.

Air traffic control

Air traffic control practices and new technologies can reduce the impact of aircraft noise, specific to this is flight path design. Aircraft routes affect the number of people impacted by noise from overhead planes. Where and when an aircraft can travel is managed by Airways New Zealand in accordance with the rules and regulations of the Civil Aviation Act 1990.[175]

168 (New Zealand Transport Agency, 2020)
169 (Christchurch International Airport, 2014)
170 (Airbus, 2020)
171 (International Civil Aviation Organization, 2020)
172 For example see (Airbus, 2020), and (Hawkins, 2019)
173 (Bowler T. , 2019)
174 (Air New Zealand, 2019)
175 For more on Airways New Zealand see (Airways, n.d.)

Over the past decade Performance Based Navigation (PBN) technology has enabled aircraft routes in New Zealand to become safer, more efficient, and quieter. The technology uses satellite-based rather than convention ground based-technologies to direct planes as they fly.[176]

Auckland Airport has using PBN technology since 2012. One completed trial of their 'SMART Approaches' flight path in 2017 had limited success on reducing aircraft noise but experienced significant emissions reductions.[177] Generally, though improved flight paths are expected to have reduced noise impacts on communities, especially during take-off and landing.[178] Queenstown Airport has been using PBN technology since 2003.

Airports

Airports themselves may have specifically designed buildings and grounds to mitigate the noise effects on passenger and vehicle activity around the terminal. They can also complete regular noise monitoring and implement restrictions on night-time activity and on activities such as engine testing.

Airports also work with effected properties to mitigate the noise effects of aircraft movements. Often this is through installing insulation and ventilation systems. QAC's noise mitigation programme is an example of this[179]. Unfortunately, these measures are often only able to mitigate the noise effects of noise indoors, not people's outdoor environment.

Noise standards, boundaries, and planning regulations

In New Zealand

In New Zealand airport and aircraft noise is regulated through controls by Councils outlined in their District Plans. NZ Standard 6805 sets guidance for councils in planning land use and controlling airport noise.[180] The standard was developed based on international practice. It sets the maximum acceptable noise levels (within contours) for the protection of community health and amenity values, while balancing planning needs to ensure an airport can operate efficiently.[181]

NZ6805 recommends that Councils include requirements in their District Plan to establish noise boundaries around airports, which airports must comply with. An Outer Control Boundary (OCB) area should be established and noise should not exceed 55Ldn dB outside this boundary. New residential builds should be avoided and insultation and ventilation should be installed on existing properties within this boundary. An Air Noise Boundary should also surround an airport (within the OCB) and noise beyond this boundary should not exceed 65Ldn dB. It is recommended that new residential builds are prohibited in Air Noise Boundaries.

In the Queenstown-Lakes district

In practice Airports in the Queenstown-Lakes district must comply with NZS6805 through restrictions outlined in the Queenstown-Lakes District Plan (June 2018). The District Plan imposes conditions on the level of aircraft noise that can be generated at Queenstown Airport and imposes obligations on QAC to monitor and mitigate that noise. These obligations

176 (New Zealand Transport Agency, n.d.)
177 (Auckland Airport, 2019)
178 (Auckland Airport, 2018)
179 (Queenstown Airport Corporation, 2019) also see (Queenstown Airport Corporation, 2020)
180 (Standards New Zealand, n.d.)
181 (Hannah, Page, & McLaren, 2014)

include convening the Queenstown Airport Liaison Committee, implementing a Noise Management Plan, prohibiting aircraft activity between the hours of 10pm and 6am (except for emergency aircraft), and restricting engine testing.

Specifically, the District Plan states that "*The Airport shall be managed so that the noise from aircraft operations does not exceed 65 dB Ldn outside the Air Noise Boundary (ANB) or 55 dB Ldn outside the Outer Control Boundary (OCB).*[182]. Within the ANB new noise sensitive activities, such as residential buildings, schools and hospitals are prohibited. Alterations or additions to these buildings are also prohibited. In order to use existing buildings for noise sensitive activities they must be fitted with acoustic insulation so that night-weighted sound exposure from within the building does not exceed 40 dB Ldn.

Further outlined in the District Plan, is the definition of Annual Aircraft Noise Contours (AANC) as Ldn contours of 55 dB, 60 dB, and 65 dB. Queenstown Airport must produce yearly AANC contour maps at these levels using aircraft noise prediction software and complete a monitoring programme at least every three years to compare aircraft levels with the AANC. In addition, Queenstown Airport must provide funding for noise mitigation measures on properties inside 60 and 65 dB Ldn AANC's.

There are also requirements on the designations for Wānaka Airport in the District Plan. Like Queenstown Airport, the plan outlines restrictions and requirements on managing land use, aircraft approaching the airport, measuring and monitoring noise, and constructing infrastructure at and around the airport. It also restricts airport operations between the hours of 10pm and 7am (other than emergency aircraft operations) and provides guidelines on the convening of the Wānaka Airport Liaison Committee.

Wānaka Airport currently only has an Outer Noise Boundary beyond which noise must not exceed 55 dB Ln. Compliance with this noise boundary must be determined every two years.

Noise metrics

There are a few key points to understanding the basics of noise metrics. The first is that noise is changes in air pressure which are measured in a metric called decibels 'dB's' (rather than pressure changes which are more complex). The second is that our hearing is unable to distinguish between different noise frequencies and levels. Due to this an 'A' weighting metric is often used to weight sound frequencies so a noise can be measured to align with how the human ear responds to loudness[183]. This metric is noted as dB(A) or dBA.

Another important point to understand is that when measuring noise, an increase in dB's does not equate to incremental increases in 'loudness'. Our hearing response is logarithmic not linear. For example, the perception in the loudness in sound from 60dBA to 80 dBA is not 1/3 louder but 4 times as loud.[184] Any incremental change of 10dBA or more generally sounds twice as loud[185] while an incremental change of 3-4 dBA is barely audible to the human ear.[186]

Aircraft noise is a series of single noise events. In New Zealand aircraft noise levels are measured in decibels (dB) and single noise events are averaged over a 24-hour period to generate a day/night measurement (dB Ldn). This dB Ldn accounts for the number of single noise events and their loudness. There is a noise penalty of 10dB between 10pm and 7am, which means 1 flight at night roughly equates to 10 flights during the day.[187] In

182 (Queenstown-Lakes District Council, 2018) see Appendix 1 Designations June 2018. A1 – 78. Point 7.

183 (Cirrcus Research plc, 2016)

184 (Arnot, 2018)

185 (Marshall Day Acoustics, 2016)

186 Marshall Day Acoustics 2019 private presentation

187 (Queenstown Airport, 2017)

determining noise boundaries the dB Ldn is not factored off one single 24 hour period but considers the busiest three-month period of aircraft movements for the year.

Other noise metrics include Leq, SEL and LAfmax.[188] Leq is the equivalent continuous sound level. It can be thought of as the 'average' noise level over a defined time period. Sound Exposure Level (SEL) or sometimes noted as LEA is a Leq normalised to one second. It is often used to measure single noise events such as an aircraft taking off and can be used to compare the energy of noise events which have different time durations.

LAfmax is the maximum noise level with 'A' weighting to align with how the human ear responds to loudness, and a 'fast time' weighting, over the measured time period. This fast time weighting is essentially the "speed" at which the instrument used to measure the noise responds to changing noise levels.

Measuring noise

Typically monitoring noise at an airport involves measuring single aircraft events, making considerations for other environmental noise such as animals, weather and road noise and combining this with information on aircraft movements. Calculations can be made to determine whether an airport is meeting noise boundary requirements.

Noise experts typically use Integrated Noise Management (INM), a computer-based software to evaluate and model aircraft noise around an airport.[189] It is used internationally to measure aircraft noise in Ldn. Using information on flight tracks, stage of journey, aircraft types and operations, runway configuration, and surrounding terrain, INM can calculate airport noise boundaries by modelling noise energy averages at different measuring points around an airport and joining the same noise levels to create noise contours.

The impacts of airport noise on communities can be measured in many ways. Common measures include[190]:

- Using Geographic Information System software and INM to calculate the number of houses in a noise contour and using statistics on household data to determine the number of people in these areas.
- Estimating the number of people likely to be highly annoyed by aircraft noise by applying annoyance curves (which give the relationship between certain noise levels (Ldn) and the number of people likely to be annoyed), to the total number of people living in the specific noise boundaries.
- Calculating the number of 'loud' (e.g. over 70 dB LAmax) aircraft noise events people are exposed to around an airport – referred to as 'Number Above' assessments[191].

Technical details of this analysis

Residential properties in noise boundaries

For Queenstown in Scenario's 1, 2 and 3 these figures have been estimated based on information taken from QAC's proposed noise changes summary document, 2018. Growth in housing is prohibited within the inner noise boundaries so we do not expect residential housing to increase in these areas. There may be some growth in the outer noise boundaries (both current and proposed) however we have assumed this is growth will likely be restricted due to planning regulations.

188 (Cirrcus Research plc, 2016)

189 (Federal Aviation Administration, 2019)

190 (Marshall Day Acoustics, 2017)

191 (Department of Transport and Regional Services, 2000)

For Wānaka, residential property numbers have been estimated using satellite imaging. Although we note that specialised noise modelling and software is needed to determine whether Wānaka's noise boundaries would need to be expanded (and if so, what this looks like), the approximate area of Queenstown's noise boundaries was used a reference point in our basic assessment of Wānaka's potential noise boundaries. Again, we assume planning regulations will be in place in Wānaka to restrict growth in potential noise boundaries.

People/residents in noise boundaries

The number of people within the noise boundaries was calculated using average household figures for Frankton and Wānaka based on current spatial plan population projections.

Specifically, the average number of people per household was calculated by adding resident figures and the number of visitors staying in residential properties on an average day together, then dividing this number by the number of residential houses for each area. This gives an average number of people per household of 2.5 for Frankton/Queenstown and 2.0 for Wānaka. These ratios are consistent from 2020 to 2048 and are in line with past census estimates of average household estimates for these areas.

Average household numbers were multiplied by the number of residential properties in the relevant noise boundary to give an estimate of the total number of people living/staying overnight in the noise boundaries.

Schools and early learning centres in the noise boundaries

The number of schools and early learning centres (ELC's) within the noise boundaries (actual and likely) have been estimated by using GIS mapping to determine whether the current schools and ELC's in the Queenstown Lakes District fall within current, proposed or likely (in the case of Wānaka) noise boundaries.

GIS and noise boundary data available at https://queenstownairport/GISmap was used to do this for Queenstown. For Wānaka we assume no current schools are likely to fall into noise boundaries under Scenario 3, as they are many kilometres from the current noise boundaries.

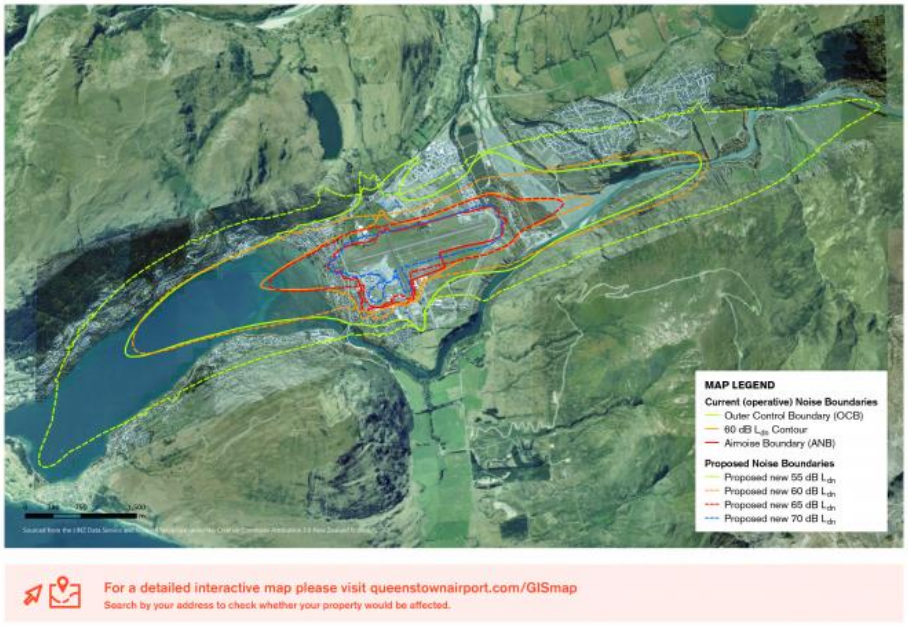
The list of schools, their student rolls (as of July 2019) and the list of ELC's and the number of children they are licensed to care for has been sourced from Ministry of Education data (available at educationcounts.govt.nz).

People highly annoyed

To estimate the number of people highly annoyed by aircraft noise within the noise boundaries, the annoyance curve produced by Miedema (2001) was used. This is a commonly used annoyance curve for aviation noise. The curve provides the percentage of people that are likely to be highly annoyed for a corresponding noise level.

In our estimates we multiply the number of those within the inner noise boundary (max 65dB Ldn level) by the percentage of people highly annoyed at this level (28%). This is then added to the number of people who live between the inner noise boundary and the outer noise boundary (ie between 65dB Ldn and 55dB Ldn) and are likely to be annoyed at this level (11%).

Figure 34: Current and proposed noise boundaries at Queenstown Airport



Source: QAC

APPENDIX 5: AIRCRAFT, EMISSIONS AND THE CLIMATE

The context

Globally

Climate change is evident with increasing global temperatures (of approximately 0.9 degrees Celsius since the late 19th century), rapidly melting ice sheets and rising sea levels[192]. Carbon dioxide emissions and other greenhouse gases exacerbate the warming of the planet by reacting with other gases and trapping energy from the sun in the atmosphere. At a global level aviation contributes about 2-3% of the world's global carbon emissions. These are expected to grow despite innovative technologies, increasing fuel efficiencies and some significant global targets to cap emissions.

Global agreements to mitigate climate change include:

- *The Paris Agreement*[193] – This came in to force in November 2016. It sets a target to ensure global temperatures do not rise by more than 2 degrees Celsius by 2100 compared to pre-industrial era levels. The Agreement requires all countries to regularly present and report on what they will do to reduce GHG emissions and meet this target. This reporting includes reporting on domestic aviation emissions. These efforts, called 'Nationally Determined Contributions', are reviewed as a collective every 5 years. New Zealand is one of 195 signatories to the agreement. International aviation and shipping emissions are not directly included in the target agreement.
- *CORSIA* – Member States of the International Civil Aviation Organisation have established the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) which aims to have carbon neutral growth in global airline emissions from 2020, based on the average of 2019 and 2020 emission levels. Airline carriers must report on their international CO_2 emissions on an annual basis from 1 January 2019 but State participation for offsetting is voluntary until 2026[194]. A criticism of CORSIA is that is heavily focused on offsetting rather than reducing emissions.
- *IATA* – The International Air Transport Agency has set similar targets with its 290 members (which serve 82% of total air traffic[195]). Targets include being carbon neutral in net aviation emission growth from 2020 and reducing net emissions by 50% of 2005 levels by 2050[196]. A key criticism of the IATA targets is that there is no set mechanism to achieve them.

192 (NASA, 2020)
193 (United Nations Climate Change, 2019)
194 (International Civil Aviation Organization, 2020) see especially FAQs
195 (International Air Transport Association, 2020)
196 (International Air Transport Association, 2020)

Major aircraft developers

Boeing[197], Airbus[198], Bombardier[199] and ATR[200], suppliers of aircraft to New Zealand airlines, all support the industry's aims to meet the IATA targets. Designing more efficient and less noisy airplanes, improving operational efficiencies through new technology and developing sustainable aviation fuel sources (such as bio and other chemical fuels) are ways in which they are supporting the targets. They are also undertaking initiatives to reducing the footprint of their own operations and taking a whole of life approach to aircraft development.

Boeing has a special focus on testing technologies that may reduce fuel use, emissions and noise including research into hybrid, solar and electric powered aircraft. They have tested over 50 new technologies since 2012[201]. Airbus has a special priority of reducing noise on its aircrafts. The A320 neo is said to deliver per seat fuel improvements of 20% and a 50% noise reduction footprint compared to previous generation aircraft[202] (of which Air New Zealand has 10 in operation and another 10 on order[203]).

Electric aircraft are also set to reduce emissions and a select number of producers are already testing protypes for small passenger planes. Some of these producers are subsidiaries of the larger aircraft manufacturers[204]. Some hybrid and electric aircrafts are expected to enter the market in the next decade. However, large long-haul electric passenger aircrafts are unlikely to become commercially or technically viable within the next 2-3 decades[205].

Social trends

Flight shaming

Society is generally much more conscientious of the environmental impacts of air travel. A movement of 'flight shaming' has become widespread throughout Europe with flight free campaigns and similar initiatives occurring in the UK, Belgium, France, and Canada[206]. In Sweden where the movement started (by Greta Thunberg's mother and Greta's newfound high profile), passenger numbers through its airports dropped by 4% in 2019 on the previous year which also experienced a decline in passenger numbers[207][208] with flight shaming said to have played a part in the declining numbers.

'Fly Less Kiwis' have created their own version of the movement which if it takes hold could have serious impacts on New Zealand's Tourism Industry[209]. However, infrastructure and geographic constraints and a lack of alternative high-speed transport options in New Zealand mean it is unlikely to take off here.[210] A softer approach is more realistic with people reducing the number domestic and trans-Tasman flights for short trips like long weekend holidays and opting to drive or holiday closer to home.

Decision-making precedent

Climate change considerations in decision-making continues to be actioned at local and national levels as government's pledge their commitment to combat climate change. The UK's appeal court recently ruled the construction of a third runway at Heathrow Airport illegal because decision-

197 (Boeing, 2020)
198 (Airbus, 2020)
199 (Bombardier, 2020)
200 (ATR, 2020)
201 (Boeing, 2020)
202 (Airbus, 2020)
203 (Air New Zealand , 2020)
204 For example see (Airbus, 2020) and (Hawkins, 2019)
205 (Bowler T. , 2019)
206 (Timperley, 2019)
207 (BBC, 2020)
208 (Hoikkala & Magnusson, 2019)
209 (TVNZ, 2019)
210 (Ministry of Transport, 2017, p. 46)

makers failed to consider the flow on impacts of the development and the UK's climate commitments under the Paris Agreement[211]. This ruling was the first major one to be made based on the Paris Agreement. It is likely to set a precedent for other decisions makers around the world on similar issues.

COVID-19 and new ways of working

COVID-19 has temporarily halted air travel and has had severe impacts on the viability of airlines worldwide. It is likely that there will be a long recovery period from the impacts of the virus and economic fallout, and low demand for air services will remain as people continue to be cautious of travelling. Demand for air travel may also be impacted in the longer term as more people decide to conduct work remotely, having now built the capability and capacity to do so.

Nationally

As of 2017, New Zealand made up 0.17% of global emissions but was the 5th highest emitter on a per capita basis in the OECD[212]. Domestic aviation made up 1.2% of total gross New Zealand emissions in 2017

New Zealand has signed up to a range of international agreements which affect our domestic objectives and initiatives with regards to emissions, climate change and airports and aircrafts role in these. International commitments include being[213]:

- A signatory to the Paris Agreement and its predecessor the Kyoto Protocol.
- A member of the United Nations Framework Convention on Climate Change, which helps negotiate climate change agreements.
- A member of the Intergovernmental Panel on Climate Change.
- A part to the convention on International Civil Aviation.

New Zealand also intends to voluntarily join CORSIA when it comes into effect in 2021[214].

Domestic activities and initiatives include:

- Encouragement from various ministries, including the Ministry for the Environment (MfE) to fly (and drive) less noting that reducing the number of flights "has shown to be one of the most effective climate change actions you can take."[215]
- Encouraging organisations to closely measure and reduce their emissions footprint, by using MfE's 2019 guide for organisations on how to calculate their emissions inventory.
- Funding climate change research and development initiatives. For example, MBIE is funding Victoria University Robinson Institute's project to combat climate change by developing an electric motor that could power a jet plane[216].
- New Southern Sky[217], a 10 year initiative (approved by cabinet in 2014) established to improve New Zealand's airspace and air navigation system by 2023, leading to more efficient air operations, reducing emissions while increasing safety.

211 (Carrington, 2020)
212 (Organisation for Economic Co-operation and Development, 2017)
213 (New Zealand Foreign Affairs and Trade, 2020)
214 (Ministry of Transport, 2020)
215 (Ministry for the Environment)
216 (Ministry of Business, Innovation and Employment)
217 (New Southern Sky, n.d.)

- The Climate Change Response (Zero Carbon) Amendment Bill. Enacted in 2019 it sets out targets to reach net zero emissions by 2050 for all greenhouse gases except for biogenetic methane, which has lower, staggered reduction targets up until 2050. The targets do not include international aviation nor shipping in line with our international agreements and in part due to implementation and attribution complexities.
- The Emissions Trading Scheme, which captures emissions associated with domestic aviation fuel consumption.
- An Aviation Emissions Reduction Action Plan[218], released in 2016 as a plan to manage New Zealand's International and Domestic Aviation Emissions.
- An Airspace Policy and Plan[219] developed by the Civil Aviation Authority which gives guidance to the aviation sector on airspace design, designation, and airspace technologies and investment.

It is also worth noting that The Crown owns Airways New Zealand, the air traffic services provider in New Zealand. It is also a majority shareholder in Air New Zealand and holds a 'Kiwi share' which gives the Government special rights with the ability to maintain substantial ownership of the airline.

Airlines

All carriers that operate in New Zealand have committed to the IATA targets. Activities to reduce emissions include modernising fleets, electrifying ground equipment and improving flight operations (such as flight paths). Air New Zealand continues to modernise its fleet[220] by buying the latest fuel-efficient models from Boeing and Airbus such as A320neo's. These have been introduced on Queenstown Airport routes and are said to deliver per seat fuel improvements of 20% and a 50% noise reduction footprint compared to previous generation aircraft[221]. More generally, Air New Zealand has improved its fuel efficiency by 2% per year on average since 2009[222].

Biofuels in aviation remain cost prohibitive but all airlines are exploring and supporting their commercialisation as a sustainable fuel. In 2019 Qantas Group[223] (which includes Jetstar) committed A$50 million to developing sustainable aviation fuel in Australian. Virgin Australia[224] recently trialled biofuels in their Brisbane fleet. Hybrid and electric aircrafts are expected to enter the market in the next decade and Air New Zealand believes it could be a viable option for their regional network[225]. Airlines recognise that without these technologies they are unable to realise significant emissions reductions.

All airlines work to offset their carbon emissions by supporting community environmental efforts (such as planting trees) and through Fly Carbon Neutral programmes which allow customers to pay to offset their individual emissions when booking a flight. Limitations in these offsetting programmes include low uptake by customers and a costing based on national carbon market prices not on actual economic nor social cost per tonne of emissions.

218 (Ministry of Transport, 2016)
219 (Ministry of Transport, 2018)
220 (Air New Zealand , 2020)
221 (Airbus, 2020)
222 (Air New Zealand, 2019)
223 (Qantas Group, 2020)
224 (Virgin Australia, 2020)
225 (Air New Zealand, 2019)

Regionally

Otago District

Climate change is expected to have impacts on the Otago region. The Ministry for the Environment estimates that temperatures in the region are likely to increase to 0.6˚C to 0.9˚C by 2040, relative to 1995. Otago is also expected to become wetter overall, especially during winter and spring with more lengthy droughts during summer[226].

Climate change is a priority for the Otago District Council as outlined in their Long Term Plan[227]. The Council is also a signatory of the Local Government Leaders Climate Change Declaration, which notes the need for strong leadership and a holistic approach to climate change. To ensure the region is resilient in the face of a changing climate the Council continues to undertake climate change risk assessments and prepare for and adapt to climate change. This preparation and adaption has a strong focus on infrastructure resilience. Reducing emissions is also a priority, and a regional air quality strategy is in place.

Queenstown-Lakes district

A 2018 report by Tonkin and Taylor, commissioned by the QLDC, estimated that total gross emissions[228] in the Queenstown-Lakes district in 2017 were 685,020 tCO_2e through the stationary energy, transport, waste, and livestock sectors. Transport made up 50% of these emissions. Of total gross emissions, 11% were attributable to aviation. This included emissions from aircraft in the air, grounded aircraft, and airport vehicles.

Using the total 2017 resident population this equates to emissions of 18.5 tCO_2e per capita in 2017 or 10.8 tCO_2e/capita/year when visitors are included. This is relatively higher than the average New Zealand city which has a resident per capita/year tCO_2e of around 7, and 4.8 when visitors are considered. In terms of direct airport emissions in the QLDC, QAC is currently undertaking carbon mapping as part of their three-phase energy management programme.

Climate change is expected to have impacts on the Queenstown-Lakes district over the next 80 years. Temperatures are estimated to warm by several degrees by the end of the 21st century and as much as 7 degrees depending on locality and emission levels[229]. Snow cover and frost days are likely to decrease while extreme rainfall events are likely to become more frequent.

In 2019 QLDC declared a climate emergency. This declaration means that the council must ensure any impacts on the environment and climate change are considered when making policy, processes, and project decisions. They can be accountable for this by the community.

QLDC also recently approved the Climate Action Plan 2019-2022. The Plan sets out goals to achieve net zero carbon emissions by 2050 across the district and ensure the district is resilient in its ability to manage the impacts of climate change. The plan will have a rolling three year horizon and be reviewed annually.

More generally, the District Plan also pledges the Council's commitment to the natural environment and its protection of this in various forms such as focusing on reducing emissions and a consideration of climate change impacts. In addition, there are a number of advocacy and community groups

226 (Ministry for the Environment, n.d.)

227 (Otago Regional Council, 2020)

228 That is before forestry and any other offsets are accounted for. For the full report see (Tonkin and Taylor Limited, 2018)

229 (Bodeker Scientific, 2019)

in the Queenstown-Lakes district who have their own climate change related agendas and initiatives.

Queenstown Airport Corporation

QAC has expressed its support for the QLD's Climate Action Plan noting it is committed to playing its part in achieving net zero emissions by 2050[230]. Specific actions and initiatives by the airport include:

- developing a sustainability framework, under which emissions reduction is an organisational priority.
- implementing strategies for saving energy, reducing waste, and reducing carbon emissions.
- implementing an environmental management system which includes an energy management plan and carbon mapping.
- resurfacing and widening their tarmac with recycled materials in a joint project with Downer in 2017.
- using Performance Based Navigation technology since 2003 which through flight path improvements significantly reduces aircraft fuel consumption and emissions
- being a chosen location for Air New Zealand's trial of new zero-emission Mobile Electric Ground Power Unit's (GPU) on its A320 jets. These GPUs do not produce carbon emissions nor noise whilst parked at the gate.

Technical details

The science – GHGs and radiative forcing

Common greenhouse gases (generally and) from airport activities include carbon dioxide (CO_2), nitrous oxide (N_2O) and methane (CH_4). These gases are linked to the changing temperature of the earth's climate over time.

- carbon dioxide accumulates in the atmosphere for potentially thousands of years trapping sunlight and warming the earth
- nitrous oxide reacts with other gases in the atmosphere resulting in both cooling and/or warming effects with the net result tending to be an overall warming effect at altitude[231]; and
- methane is a short-lived gas but has a greater warming effect than CO_2.[232]

N_2O and CH_4 are often presented as CO_2 equivalent metrics based on their global warming potential.

Airport related activities also release parties (such as soot and sulphate), water vapour, contrail-cirrus clouds and non-CO_2 emissions which contribute to climate change. To account for the impacts these have on the earth's climate, scientists apply a 'Radiative Forcing' multiplier to the quantity of emissions calculated.

Radiative forcing (RF) is a common indicator of climate impact from activities, measured in watts per square metre. It shows the change in the balance between the energy the Earth receives from the Sun, and the Earth radiates to space, since 1750[233]. The RF multiplier is a linear multiplication factor that attempts to capture this climate impact.

230 (Queenstown Airport Corporation, 2020)

231 (Dessens, Kohler, Rogers, Jones, & Pylecd, 2014)

232 (National Geographic, 2019)

233 (European Union Aviation Safety Authority)

There is still significant uncertainty in the scientific community on what an appropriate factor is. Common current international practice is to use a multiplier of 1.90, suggesting that the climate effects of emissions are almost twice the impact of a CO_2 equivalent unit itself[234].

Measuring airport related emissions – technical notes

In New Zealand aviation emissions are calculated by domestic fuel consumption. Fuel sold in New Zealand for an outbound flight to an international destination is reported as a memo item in New Zealand's National Inventory. The Ministry for the Environment provides organisational guidance for measuring aircraft emissions based on a range of international standards and guidelines[235]. Our analysis follows the MfE guidance[236].

Aircrafts – domestic, commercial

Emissions from commercial, scheduled aircrafts are measured according to whether flights are domestic or international. This is because domestic aviation emissions can be calculated through domestic fuel consumption, whereas international flights are difficult to track and attribute to a specific country[237]. MfE's guidance provides a per passenger per kilometre measure of the emissions produced for a flight. Calculations are based on aircraft type and an 80% capacity loading rate.

Knowing the loading rates used for specific aircraft and the kilometres travelled, per tonne emissions for an entire flight path can be calculated. We completed this in our analysis by using MfE's emissions figures for 'jet aircraft' to calculate emissions on flight paths that use A320s and A321s (eg Auckland to Queenstown). Figures for 'medium aircraft' were used for ATRs which are used on smaller domestic routes, mainly Christchurch to Queenstown.

Calculations of emissions per flight path included a radiative forcing multiplier of 1.9 to factor in the wider global warming potential that the aviation emissions produce.

Having calculated the emissions for each route e.g. Wellington to Auckland, this was multiplied by the number of times each of these routes would be flown for each scenario in each year. The number of times a route is flown is based on 2019 flight movements. Using figures on aircraft movements per route and per aircraft type, we could determine which flight paths account for what portion of a certain aircraft type's movements in a year. Due to uncertainty and for simplification we assume this portion remains constant from 2020-2050. The portion was applied to the aircraft movement figures under each scenario for each aircraft type and summed to give total domestic emissions for each year and each scenario.

These emissions are the total amount of emissions emitted on the full flight path. We did not attempt to attribute a relevant portion of this to the Queenstown-Lakes district.

Aircrafts – international, commercial

International air travel emissions can be measured by passenger class, also calculated at a per passenger per kilometre rate. Aviation statistics on fuel consumption, loading, flight distance and aircraft type from the UK are used to provide these emissions estimates[238]. They include an uplift factor of 8% to account for additional emissions created due to delays and flight path

234 (Ministry for the Environment, 2019) See section 6.4

235 Including advice from Intergovernmental panel on Climate Change, International Organisation for Standardisation standards for organisational level for quantification and reporting of GHG emissions and removals (International Organization for Standardisation, 2018), also (Greenhouse Gas Protocol, 2015), and the (Department of Business, Energy and Industrial Strategy , 2018)

236 (Ministry for the Environment, 2019)

237 Fuel sold in New Zealand for an outbound flight to an international destination is reported as a memo item by New Zealand in its National Inventory, whereas domestic flight emissions are reported on as part of New Zealand's Emissions Trading Scheme.

238 (Department of Business, Energy and Industrial Strategy , 2018)

variation (which is higher than the estimated 5% figure for New Zealand[239]). A radiative forcing multiplier of 1.9 is also applied. Again, using these emissions figures per tonne emissions for an entire flight path can be calculated. These calculations are likely to overstate emissions for flights to and from New Zealand due to the higher uplift factor and a higher seating capacity used in the underlying methodology.

To determine per tonne emissions for an entire flight path, we used 'average passenger' as the travel class, and 'short haul' as the emissions source for flights to Australia, and 'long haul' for flights further abroad such as Kuala Lumpur for the new airport movements in Scenario 4.

Calculations of emissions per flight path included a radiative forcing multiplier of 1.9 to factor in the wider global warming potential that the aviation emissions produce.

Having calculated the emissions for each route e.g. Queenstown to Melbourne, this was multiplied by the number of times each of these routes would be flown for each scenario in each year. The number of times a route is flown is based on 2019 flight movements. Using figures on aircraft movements per route and per aircraft type, we could determine which flight paths account for what portion of a certain aircraft type's movements in a year. Due to uncertainty and for simplification we assume this portion remains constant from 2020-2050. The portion was applied to the aircraft movement figures under each scenario for each aircraft type and summed to give total international emissions for each year and each scenario.

These emissions are the total amount of emissions emitted on the full flight path. We did not attempt to attribute a relevant portion of this to the Queenstown-Lakes District.

Aircrafts – domestic, general aviation

The emissions from domestic general aviation such as helicopters and small aircraft can also be measured through fuel consumption. MfE's guidance lists a small number of small aircraft types and their relevant emissions. However due to data limitations and the restricted scope of this analysis emissions from general aviation activity have not been calculated. A full environmental impact assessment is required to capture these emissions and provide this level of detailed analysis.

Total aircraft emissions

To summarise, where referred to in this report aircraft emissions are those from international and domestic scheduled flights which fly to and from the QLD. They are the total CO_2 equivalent emissions emitted into the atmosphere at a global level. They may be discussed at a point in time, often in the year 2050 or total emissions for a time period, often 2020-2050.

Costing emissions – common methods

Putting a financial figure on a tonne of carbon dioxide and carbon equivalent is typically done arbitrarily, through calculating the social cost of carbon (SCC) or via abatement cost calculations. SSC's are the welfare costs to society that result when one extra tonne of $CO_{2\text{-}e}$ is emitted and impacts on the climate. Calculations are usually made using Integrated Assessment Models (IAMs) which rely heavily on the modeller's assumptions[240]. Abatement costs are calculated based on a target being met usually through a range of scenarios which include assumptions on policies, technology and societal responses to the mechanisms being used to meet targets.

The current price of $CO_{2\text{-}e/t}$ (called an NZU) in New Zealand is capped at $25 NZD under a price ceiling in the Emissions Trading Scheme. This

[239] Airways New Zealand, see page 58 of (Ministry for the Environment, 2019)

[240] Specifically, they are most impacted by assumptions made on the climate damage anticipated and the discount rate applied. See (Environmental Protection Agency, 2016), (Pezzey, 2018) and (Stern, 2015)

scheme includes domestic (but not international) aviation emissions through fuel purchased[241]. The market determines the current price per tonne based on supply and demand for the number of NZU's available in the market but an NZU can be bought and sold from the Government at $25/NZU. $25 per tonne is not a quantified economic nor social cost of emission per tonne but is an attempt to capture the externalities of emissions. It acts as a mechanism to incentivise the reduction of greenhouse gas emissions in NZ while preventing high market volatility within the scheme.

Costing of the economic and social cost of carbon and carbon equivalents in New Zealand has focused on the options explored in setting domestic emission reduction targets under the Zero Carbon Bill, which has now come into effect[242]. A 2018 study commissioned by the Productivity Commission estimated that for New Zealand to effectively transition to net zero carbon emissions the price of $CO_{2\text{-e/t}}$ would need to rise to $157 to $250 per tonne by 2050 depending on the pace of technology change[243]. The three consultancies (VIVID, Motu and Concept) which modelled these figures also estimated that to meet net zero emissions the annual average price would be between $76 and $100 per tonne of $CO_{2\text{-e}}$ between 2018-2050, again depending on the pace of technology[244].

Other models were completed by NZIER who estimated that the average annual price of $CO_{2\text{-e/t}}$ to meet net zero emissions would be between $272 – $845 $CO_{2\text{-e/t}}$ by 2050. This range is so large due to the varying innovation scenarios in the energy, agriculture and transport sectors which were selected[245]. These pricing estimates must be read with caution due to the uncertainties that projections over such a distant time horizon present. It is also worth noting that international aviation (and shipping) emissions have not been considered in the net zero targets so are not fully captured in these prices.

Both modelling studies have been used in this analysis to provide a cost range for emissions produced in each scenario between 2020-2050, however these ranges should be read as indicative only due to underlying assumptions in the original modelling. Caution should also be noted when interpreting the emissions price that these models provide. 'Emissions price' is the cost of transitional policies that may be required for New Zealand to meet zero carbon targets by 2050. They are not individual costs to businesses or individuals.

Costs in this analysis are based only on the quantity of domestic aviation emissions produced under each scenario, without radiative forcing to give the pure carbon equivalent emitted. This is in line with how New Zealand currently calculates it emissions under the ETS. International flight emissions are not considered as they are not typically a cost to New Zealand (for simplicity we have ignored the fact that some fuel for international flights may be purchased in New Zealand and would be accounted for).

A low price of $76 per tonne as per VIVID's modelling was applied to total domestic emissions without radiative forcing, to determine the low end of the scale of cost. The high end of the cost range used an emissions price of $845 per tonne of CO_2 equivalent, which is based on NZIER's modelling.

241 (Environmental Protection Authority, n.d.). Air New Zealand currently costs of the offset of a passenger's emissions under their FlyNeutral initiative at $25 per tonne in line with the ETS price ceiling.

242 The target options explored were net zero carbon dioxide emissions by 2050, net zero long-lived gases and stabilized short-lived gases by 2050, and net zero emissions of all GHGs by 2050. The enacted target under New Zealand's Climate Change Response (Zero Carbon) Amendment Bill (see section Part 1B Emission reduction Subpart 1—2050 target, 5O), sets a target of net zero emissions for all gases by 2050 excluding biogenetic methane which has increasing reduction targets over time. (New Zealand Government)

243 (New Zealand Productivity Commission, 2018) see especially page 144

244 (Ministry for the Environment, 2018)

245 For full technical details of the modelling undertaken by NZIER the reader is referred to (NZIER, 2018)

APPENDIX 6: MITIGATING AIRPORT IMPACTS

Steps taken by Queenstown Airport Corporation

QAC has taken a number of steps to address impacts and issues associated with its operations, especially in its approach to sustainability. These go beyond its permitted activities around noise boundaries.

QAC's Statement of Intent

The SOI sets out QAC's key objectives, the nature and scope of the activities it will undertake, and the financial targets and non-financial measures by which QAC's performance may be judged. QAC takes relevant QLDC policies into account when setting its objectives and performance targets.

The latest SOI suggests a much stronger focus on sustainability in relation to operations, but also tourism.

One of the four themes in the SOI is to "make sustainable use of our land and respecting our unique environment". A priority within this theme is to

> *"manage our impact on the environment and community in a sustainable way".*[246]

To achieve this QAC will

> *"ensure an environmentally sustainable approach to our business activities (including land use, water, energy, waste and noise management) and identify opportunities to influence others to do the same".*[247]

Sustainability framework

A key initiative for QAC is to embed a sustainability framework across its business operation. The sustainability framework is aligned with the Vision Beyond 2050 goal that:

> *"our district is a place where our quality of life is enhanced by growth through innovation and thoughtful management."*

Key areas of the framework include:

- carbon and waste reduction
- robust target setting, measurement, and reporting
- regional sustainability leadership through adopting the globally recognised Future-Fit[248] benchmark approach
- incorporating activities to influence the aviation industry and airlines to reduce the carbon footprint associated with flying into and out of the district.

The QAC has also committed to support sustainable tourism by:

- championing Tourism New Zealand's Tiaki Promise – Care for NZ initiative, in partnership with RTOs

246 (Queenstown Airport Corporation, 2020, p. 8)

247 (Queenstown Airport Corporation, 2020, p. 6)

248 The Future-Fit Business Benchmark is a strategic management tool to for companies to assess, measure and manage the impacts of their activities. The approach helps companies align their success with that of society.

- continuing its commitment to Tourism Industry Aotearoa's Tourism Sustainability Commitment
- collaborating with other airports of the lower South Island on environmental sustainability, health and safety, and regional sustainable tourism initiatives
- being a proactive participant in promoting a sustainable tourism industry and supporting economic diversification in the district
- making measurable improvements and identifying opportunities to influence others.

The Council agreed to accept the SOI in its current form, with the inclusion of a disclaimer that most of the information in the document is based on the pre-COVID-19 environment.

Climate Action Plan

QAC has expressed its support for the QLDC's Climate Action Plan, noting it is committed to playing its part in achieving net zero emissions by 2050.[249] Specific actions and initiatives by the airport include:

- developing a sustainability framework, under which emissions reduction is an organisational priority
- implementing strategies for saving energy, reducing waste, and reducing carbon emissions
- implementing an environmental management system that includes an energy management plan and carbon mapping
- using Performance Based Navigation technology since 2003, which through flight path improvements significantly reduces aircraft fuel consumption and emissions
- being a chosen location for Air New Zealand's trial of new zero-emission Mobile Electric Ground Power Units (GPUs) on its A320 jets. These GPUs do not produce carbon emissions or noise while parked at the gate.

Noise Management Plan

QAC's Noise Management Plan[250] sets out various actions to manage and mitigate noise within these boundaries, including:

- establishing the Queenstown Airport Liaison Committee to monitor noise complaints and mitigation, and to liaise with the local community
- retaining an acoustic consultant to help the airport design a monitoring programme for noise mitigation and to investigate non-compliance
- working with affected property owners to install acoustic insulation and mechanical ventilation systems to reduce noise impacts
- setting, modelling, and monitoring noise restrictions in line with the current noise boundaries
- restricting engine noise testing in line with the rules in the District Plan
- encouraging considerate flying practices.

249 (Queenstown Airport Corporation, 2020)

250 (Queenstown Airport Corporation, 2020)

Systems planning by QLDC and partners

Spatial Plan[251]

As a high-growth council, QLDC is required to have a future development strategy in place under the National Policy Statement for Urban Development Capacity.

QLDC has formed a partnership with central government and Kāi Tahu to deliver a joint Spatial Plan. It is a project QLDC is delivering with its partners to lead the community conversation on growth. The Spatial Plan will serve as the future development strategy for the district (including Cromwell).

The Spatial Plan will consider:

- the existing and future structure of urban areas
- existing and future infrastructure needs
- priority areas for investment and action
- areas to protect and enhance
- areas subject to constraints
- other strategically significant priorities.

The Spatial Plan will take an intentional view of the future to ensure that development is strategic and integrated to the benefit of the district's communities including how they interact with each other and with the wider lower South Island. It will identify what actions and investments are needed.

While growth is the key driver for the spatial plan, other key drivers include:

- protection of the environment
- housing affordability
- transport
- economic diversification
- sustainable tourism.

Once completed, the Spatial Plan will be the document that provides the long-term overarching view of what the district wants. It will sit over the top of other Masterplans, strategies and district plans to ensure a consistent and comprehensive approach to development across the district.

Masterplans

The Queenstown Town Centre Masterplan was completed in 2017 with a vision of "supporting a thriving heart to Queenstown, now and into the future".

Underpinning the Masterplan is the need for the Queenstown Town Centre to deliver an attractive experience to locals and visitors that brings locals back to town and keep the visitors coming to the region.[252]

Masterplans are being consulted on for Wānaka and Frankton and all will sit under the umbrella of the Spatial Plan. The Wānaka and Frankton Masterplans are scheduled to be completed in 2020.

The Wānaka and Frankton Masterplans will consider the potential role for airports in their area and draw on the information in this report.

[251] The Spatial Plan and Masterplans for Wānaka and Frankton.

[252] (Rationale, 2017)

Infrastructure Asset Management Strategy

The Infrastructure Asset Management Strategy[253] details the challenges that will impact the district over a 30-year period (2018–2048), as they relate to transport, water, wastewater, stormwater, and solid waste. By covering 30 years the strategy accommodates the needs of both current and future generations, by providing good-quality, cost-effective infrastructure that responds to:

- a demanding natural environment
- growth in population and visitor numbers
- the complexity of our built environment
- our challenging economy, and
- legislative changes.

Transport/congestion

Way to Go Wakatipu is a collaborative partnership between QLDC, NZTA and Otago Regional Council. It was formed to develop and deliver a safe, connected, and accessible transport network for the Wakatipu area.

Way to Go Wakatipu will contribute to and build on a number of projects already underway, including:

- Queenstown Town Centre (detailed business case)
- Frankton to Queenstown (single stage business case)
- Wakatipu Active Travel Network (single stage business case)
- Grant Road to Kawarau Falls Bridge (detailed business case)
- Frankton Masterplan (programme business case)
- Lake Wakatipu Public Water Ferry Service (detailed business case)
- Queenstown Transport Modelling (to feed into business case projects).

The development of a **Network Operating Framework for Wānaka and the surrounding area**[254] is in response to current and predicted future growth in Wānaka and surrounds, to support the development of a Masterplan for the Wānaka town centre and to inform the integrated transport Programme Business Case. The framework provides a collaborative and integrated 'one network' approach to managing the transport system.

Action on climate change and environmental impacts by government and business

Climate change and environmental impacts are front of mind for governments and businesses, in response to community concern.

Central government and the Paris Agreement

The Paris Agreement[255]came in to force in November 2016, setting a target of ensuring global temperatures rise by no more than 2 degrees Celsius by 2100 compared to pre-industrial levels. New Zealand is one of 195 signatories to the Agreement.

253 (Queenstown-Lakes District Council, 2018)

254 (GHD, 2018)

255 (United Nations Climate Change, 2019)

The Paris Agreement requires all signatory countries to regularly present and report on what they will do to reduce greenhouse gas (GHG) emissions and meet this target. This includes reporting on domestic aviation emissions. These efforts, called 'Nationally Determined Contributions', are reviewed collectively every five years. International aviation and shipping emissions are not directly included in the target agreement.

More recently, New Zealand passed the Climate Change Response (Zero Carbon) Amendment Act, providing a framework for developing and implementing clear and stable policies that:

- contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5 degrees Celsius above pre-industrial levels
- allow New Zealand to prepare for, and adapt to, the effects of climate change.

Climate action by QLDC

The Queenstown-Lakes district has also taken a strong position on climate change. QLDC declared a climate-change emergency in June 2019 and developed a plan for addressing climate change.

The goals for the Climate Action Plan[256] are to achieve net zero carbon emissions by 2050 and to be resilient against the local impact of climate change across the whole district. Specific to Queenstown Airport, the Climate Action Plan sets out a number of actions, including:

- carrying out an assessment of the aviation emissions profile
- advocating to government for sustainable aviation emissions reduction strategies
- requiring QAC's airports to demonstrate industry-leading sustainability practices, in alignment with the district's emissions reduction Masterplan.

These actions have all been included in the QAC's latest Statement of Intent.

More generally, the District Plan also pledges the Council's commitment to protect the natural environment in various ways such as reducing emissions and taking account of climate change impacts. There are also a number of advocacy and community groups in Queenstown-Lakes who have their own climate change-related agendas and initiatives.

Air transport sector

CORSIA

Member States of the International Civil Aviation Organisation have established the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), which aims to have carbon-neutral growth in global airline emissions from 2020, based on the average of 2019 and 2020 emission levels. Airline carriers must report annually on their international CO_2 emissions from 1 January 2019, but State participation for offsetting is voluntary until 2026.[257] A criticism of CORSIA is that it is heavily focused on offsetting rather than reducing emissions.

International Air Transport Agency (IATA)

The IATA has set similar targets for its 290 members (which serve 82% of total air traffic[258]). Targets include being carbon neutral in net aviation emission growth from 2020 and reducing net emissions by 50% of 2005

256 (Queenstown-Lakes District Council, 2020)

257 (International Civil Aviation Organization, 2020) see especially FAQs

258 (International Air Transport Association, 2020)

levels by 2050.[259] A key criticism of the IATA targets is that there is no set mechanism to achieve them.

Boeing[260], Airbus[261], Bombardier[262] and ATR[263], suppliers of aircraft to New Zealand airlines, all support the industry's aim of meeting the IATA targets. Designing more efficient and quieter aircraft, improving operational efficiencies through new technology, and developing sustainable aviation fuel sources (such as bio and other chemical fuels) are ways in which they are supporting the targets. They are also taking action to reduce the footprint of their own operations and taking a whole-of-life approach to aircraft development.

Boeing has a special focus on testing technologies that may reduce fuel use, emissions, and noise, including research into hybrid, solar and electric powered aircraft. They have tested over 50 new technologies since 2012.[264] Airbus has a special priority of reducing noise on its aircraft. The A320neo is said to deliver per-seat fuel improvements of 20% and a 50% noise reduction footprint compared to previous generation aircraft[265] (Air New Zealand have 11 A320/A321neo aircraft in operation and another nine on order[266]).

Electric aircraft are also set to reduce emissions, and a select number of producers are already testing protypes for small passenger planes. Some of these producers are subsidiaries of the larger aircraft manufacturers[267]. Some hybrid and electric aircrafts are expected to enter the market in the next decade. However, large long-haul electric passenger aircrafts are unlikely to become commercially or technically viable within the next 20 to 30 years.[268]

House prices / cost of living

Both local government and central government have instigated measures to increase the supply of affordable housing in the district. The Queenstown-Lakes Community Housing Trust administers a range of housing programmes designed to help low to moderate income households into affordable housing.[269]

QLDC and the government have worked in partnership on a number of initiatives to improve housing affordability. They have signed a Housing Accord designed to increase land supply and to streamline new housing developments.[270] The district has been identified as one of the areas targeted by the government's Urban Growth Agenda (UGA). The UGA focuses on improving housing affordability by addressing the land supply constraints, development capacity, infrastructure provision and planning constraints.

A partnership agreement between the Crown, QLDC and Kai Tahu is in the process of being finalised. A key objective of the partnership is to manage growing tourism and housing pressures.[271] The government has also

259 (International Air Transport Association, 2020)
260 (Boeing, 2020)
261 (Airbus, 2020)
262 (Bombardier, 2020)
263 (ATR, 2020)
264 (Boeing, 2020)
265 (Airbus, 2020)
266 (Air New Zealand , 2020)
267 For example see (Airbus, 2020) and (Hawkins, 2019)
268 (Bowler T. , 2019)
269 (Community Housing Trust Queenstown Lakes, 2020)
270 (Ministry of Housing and Urban Development, 2020)
271 The purpose of the partnership is to "manage growing tourism and housing pressures and to develop a long-term strategy and investment plan for the future development of the area that improves community well-being, maintains a world-class visitor experience and protects the environment".

provided loans from its Housing Infrastructure Fund[272] totalling $76 million to fund three separate projects building infrastructure to support housing development.[273]

Airport safety and security

Enhanced safety and security measures at airports, including in New Zealand, continue to be implemented. The New Zealand Civil Aviation Association (CAA) overseas the regulatory framework that is designed to keep New Zealand aviation safe and secure. Regulations are reviewed regularly to ensure that they are in keeping with international practices.

[272] The Housing Infrastructure Fund is a $1 billion fund that provided 10 year interest free loans to high growth councils.

[273] (Ministry of Housing and Urban Development, 2020)

APPENDIX 7: FRAMEWORKS FOR ASSESSING IMPACTS

To cover the range of impacts identified in the stakeholder engagement and allow us to consider them through a community outcomes lens, we reviewed and considered a range of frameworks.

New Zealand Treasury – Living Standards Framework

The Treasury's Living Standards Framework is a tool that emphasises the diversity of outcomes that are meaningful for New Zealanders. The framework provides a shared understanding of what helps achieve higher living standards to support intergenerational well-being.

The Framework includes

- the 12 domains of current well-being outcomes
- four capital stocks that support well-being now and into the future
- risk and resilience.

The Treasury Living Standards Framework is presented in the following figure.

Figure 35: Treasury's Living Standards Framework

Source: New Zealand Treasury

It is important to note the distribution of the capitals across people, place, and time/generations.

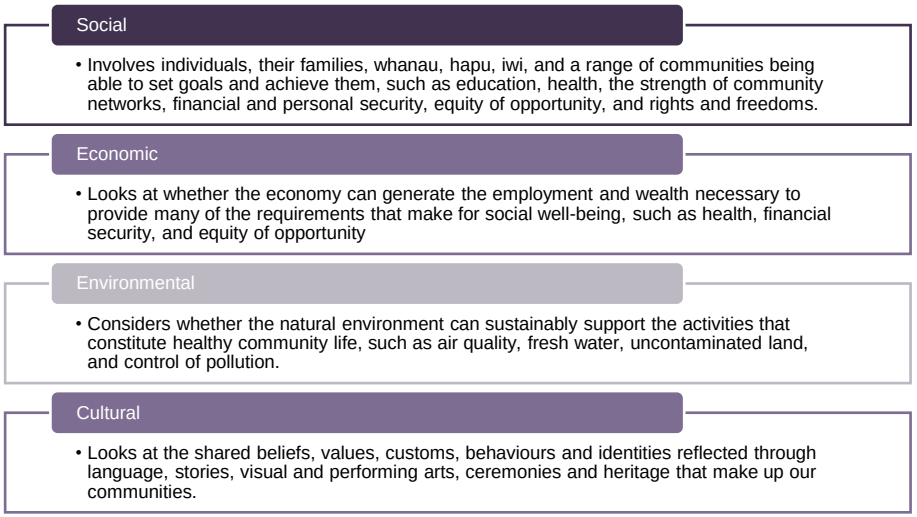
Local Government Act – Four Well-beings

The purpose of local government is set out in the Local Government Act S10(1). The purpose of local government is—

a to enable democratic local decision-making and action by, and on behalf of, communities

b to promote the social, economic, environmental, and cultural well-being of communities in the present and for the future.

Figure 36: Local Government Act – Four Well-beings



Source: SOLGM

There is a strong alignment between the Living Standards Framework and the four well-beings. In particular, the 12 domains of current well-being can all be re-framed into the four well-beings.

The four capitals are loosely aligned to the four well-beings (Natural capital – environmental well-being; human capital – cultural well-being; social capital – social well-being; financial and physical capital – economic well-being).

Community outcomes for Queenstown-Lakes district

Having an over-arching understanding of what the community wants is important when considering the impacts and their relevance to the analysis. This is because certain airport activities can have positive or negative impacts, and to different degrees, depending upon the individual perspective. Similarly, responses to mitigate negative impacts can have detrimental effects on other communities or groups. As examples:

- Employment and profits generated from visitors spend is good if you are an accommodation provider. It is not so good if you are a parent on the school run fighting traffic caused by all the visitors who are clogging the streets.
- There is strong agreement across the district that climate change is a major negative impact. However, the effects of global change at a global level.
- Noise impacts are increasingly negative the closer you live to the airport. People further from the airport are less likely to consider noise an impact.

There are three key processes that provide guidance on community outcomes that have been agreed to by the Queenstown-Lakes community through robust engagement processes. These are the Council's LTP which guides the Council's activity, and Vision beyond 2050 and Whai Ora, which underpin the Spatial Planning process. These give us a high-level understanding of what is important to the community.

Whai Ora distils the community outcomes into three key areas – sustainability, resilience, and well-being. The six outcomes in Vision beyond 2050 and LTP 2020-2030 are consistent and align with the Whai Ora outcome areas as shown in Table 64.

Table 64: Community outcomes

Whai Ora	Vision beyond 2050	LTP 2020-2023
Sustainability	Pride in sharing paradise	Environmental sustainability and low-impact living are highly valued
	A deafening dawn chorus	World-class landscapes are protected
		Sustainable growth management
	Clean connectivity	Efficient and effective infrastructure
Resilience	Disaster-defying resilience	Communities are resilient and prepared for civil defence emergency events
Well-being	Thriving people	Communities have a good standard of living and well-being
	Soaring creativity	

These community outcomes for the Queenstown-Lakes district are a combination, and a cross-section, of the four well-beings (local government) and the Living Standards (central government) Frameworks.