Analysing Reverse Sensitivty Effects in Queenstown Lakes District

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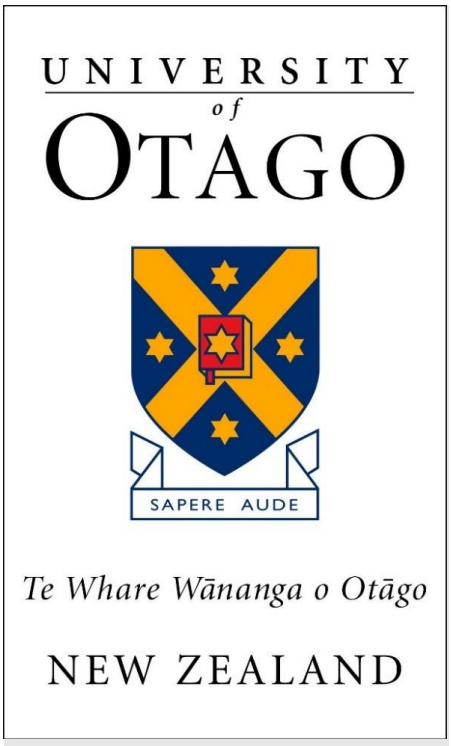
MASTER OF PLANNING

PLAN 435/535



A research report submitted in fulfilment of the requirements for Planning Case Study 2021 – Plan 435/535

Client:

Queenstown Lakes District Council

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This report represents work undertaken by students from the Master of Planning programme at the University of Otago and should in no way be seen to represent the views of the University of Otago or the Queenstown Lakes District Council.

Executive Summary

New Zealand is experiencing a sustained period of population growth and a need for density to follow suit. With limited space for housing developments and for commercial/industrial developments, space is in high demand. Central Government, Local Government and developers are looking for ways to alleviate the pressures of a growing population and the need to house it. The term reverse sensitivity has arisen to describe the challenges associated with new development around existing land-uses. This term is difficult to define in planning legislation, as it is not mentioned in the Resource Management Act 1991. However, it has emerged in respective case law and has slowly emerged in territorial District Plans.

This research is situated in the Queenstown Lakes District, with a spotlight on the Gibbston Valley, where reverse sensitivity has become and will continue be an issue in the future. In the Frankton Arm and Queenstown Central, reverse sensitivity has become an increasingly prominent issue in the last decade, as the Queenstown International Airport (QIA) has experienced continual growth in demand from domestic and international arrivals and departures. With this need for expansion, there is also coinciding factor of housing demand, and need for development in Queenstown, which has been an issue for the past 20 years.

Project Aim:

This project is structured around two aims.

1. To explore the reverse sensitivity effects in relation to the Queenstown Airport and residential development in rural areas, with a particular regard to the Gibbston Valley.
2. To provide suggestions for planning response options to managed reverse sensitivity effects.

The purpose of this report is to explore the current reverse sensitivity impacts that the QIA has on the Frankton Arm, Shotover Country and Queenstown Central. The report also explores the reverse sensitivity impacts of residential development in rural areas, specifically the Gibbston Valley. The research therefore focused on three key objectives:

1. Understanding the origins of the diversity of reverse sensitivity effects associated with the Queenstown International Airport.
2. Understanding the factors affecting the broader perception of, and vulnerability to, reverse sensitivity.
3. Considering how the effects of reverse sensitivity in the Queenstown Lakes District impact land-use planning and amenity in the region.

Methodology Employed:

To undertake this research project, a mixed-methods approach was used for both primary and secondary data. The project also used a qualitative approach to respond to the research questions. Primary data was collected during a field week to the Queenstown Lakes District in May 2021, where key stakeholders were engaged with. To supplement the primary data, GIS Mapping was used to show spatial, population and density changes in relation to the airport. Secondly, a comparative policy analysis of the QLDC district plan, and various other district plans and relevant policy and planning frameworks, while reviewing relevant literature. Finally, a media analysis was conducted to determine the predominant reverse sensitivity issues, which mainly related to the airport.

Key Findings:

Interviewees highlighted the need to find a balance between expanding the operational capacity of the airport and the wants and needs of the local community. The research collected indicated strong opposition to proposals aimed at increasing the airports capacity, with issues relating to both the increased levels of noise-emissions and concerns regarding growth to the area in general being raised by participants. .

The findings of this research can be classified into several key themes including:

- *People/Community*
  - Challenges in terms of who has access to mitigation methods and who doesn't

- *Social Engagement/Relationships*

- The key informant interviews indicated that the existing relationship between community members and the airport is tense, with local opposition to proposals regarding an increase in the airport's operational capacity.
- Community members have also raised a lack of meaningful engagement taking place between parties which has exacerbated conflicts on issues that have occurred.
- It was also noted that there existed a lack of knowledge of what reverse sensitivity is and how such issues can be addressed within the community.

- *Growth - including impacts of growth and growth trajectories.*
  - The research collected indicated strong opposition to proposals aimed at increasing the airports capacity, with issues relating to both the increased levels of noise-emissions and concerns regarding growth to the area in general being raised by participants

- *Impacts of Reverse Sensitivity*
  - Impacts of Reverse Sensitivity go beyond auditory impacts – thereby making measuring impacts harder.
  - "Noise doesn't stop at lines on a map" – Key Informant 8
  - It was also found that noise-emissions associated with the airport's operations were noted to have decreased the amenity value of outdoor spaces in its vicinity.
  - The key informant interviews also highlighted issues surrounding the use of covenants on land titles and a lack of awareness on the rights that such covenants entail.

Gibbston Context:

Reverse sensitivity effects in Gibbston Valley related to the viticultural industry in the area, and its associated commercial activities as well as the development of resort homes in the region. Policy documents indicated the desire of the QLDC to ensure that potential adverse effects on viticultural activities taking place in Gibbston Valley would be addressed or mitigated. The region's classification as an Outstanding Natural Landscape recognises the importance of its preservation and a desire to mitigate the negative impacts to the areas natural

landscape. Policies have been included within the QLDC's Proposed District Plan Gibbston Resort Zone which address potential effects on the soil quality in the region, with density limits being included as well as prohibiting developments on prime soils.

Recommendations:

To address the issues relating to Queenstown International Airport four recommendations have been produced as options to address issues that were noted during the research process:

1. **To complete a full air noise mapping assessment and well-being survey to show the full extent of noise generated from Queenstown International Airport.**

2. **To develop effective strategies for communication around reverse sensitivity issues, in order to foster positive relationships.**

3. **To establish a collaborative initiative which aims to assist the various forms of noise mitigation.**

4. **To establish a cross-regional taskforce to evaluate the impacts of tourism in the broader lower-South Island.**

Acknowledgements

The reverse sensitivity group would like to acknowledge and thank the people who supported and contribute to this report.

To our client, the Queenstown Lakes District Council and Emily Grace. Thank you for providing guidance on the research brief, our research direction and contextualising how reverse sensitivity may be perceived in the Queenstown District.

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Finally, thank you to our fellow MPlan cohort for making the paper enjoyable. We all bonded in a unique way during our field week away in Queenstown. Given that the start of our academic year was delayed, with the course starting later than expected, it took time for mutual understandings and friendships to be made. However, we can truly say that by the end, we all have a better understanding of each other than we did at the start

"Ehara taku toa i te toa takitahi, engari kē he toa takitini –
My success should not be bestowed onto me alone, it was not individual success but the success of a collective"

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Abbreviation List

2GP – Second Generation Plan

DHB – District Health Board

DP – District Plan

GIS – Geographic Information Systems

LGA – Local Government Act 2002

MfE- Ministry for the Environment

MPI – Ministry of Primary Industries

NIMBY – Not In My Back Yard

NPS-HPL – National Policy Statement for Highly Productive Land

NPS-UD – National Policy Statement for Urban Development 2019

ONL- Outstanding Natural Landscape

PDP – Proposed District Plan

QAC – Queenstown Airport Corporation

QAL – Quality of Life

QIA – Queenstown International Airport.

QLDC – Queenstown Lakes District Council

ORC – Otago Regional Council

RMA – Resource Management Act 1991

CHAPTER 1: Introduction

Aotearoa, New Zealand (hereafter New Zealand) has been experiencing growth in the many urban centres throughout the country. As a result there has been an increased demand placed on local governments to rezone land for residential development. Often this land is located near sights that already have an established use. When this occurs, there can be a conflict between the differing parties and this conflict can create reverse sensitivity issues. Reverse sensitivity is a unique aspect of the planning profession in New Zealand, as it contradicts the common law rule of nuisance and creates legal vulnerability for established activities. These vulnerabilities are created by complaints for perceived adverse environmental impacts by the occupiers of the surrounding land. An individual's private land rights are reduced if the existing land-use has interest for the greater public good (Stewart, 2006). Reverse sensitivity can often have a wide variety of complaints associated with it, however, with the area of focus for this research, common complaints include dust, noise and odour.

As urban growth has become a growing concern among both local and central government in New Zealand, there has been pressure to accommodate growth of the population from both internal and external factors, which is often achieved by blurring the lines between rural and or industrial land with residential zoned land. The Queenstown Lakes District Council (QLDC) is undergoing the annual processes required by the Resource Management Act 1991 (RMA 1991) to provide a new District Plan every 10 years. By doing so, there may be changes in the rules, zoning and land-uses of various activities which previously may not have been accounted for or were accounted but need changing. In this instance, the Council has both an Operative District Plan (DP) and a Proposed District Plan (PDP), which is subject to appeals. Stage 1 of this process became notified in 2015, as Council sought public consultation on changes to some chapters that were released. In 2016, Council commenced Stage 2, which had a focus on Townships, Industrial and Transport Chapters. Both Stage 1 and 2 are at a point where decisions have been released from a hearing process and are currently open for appeals. Stage 3 and 3B became notified in September and October 2019. Council was expected to have recommendations for the hearing panel in March 2021.

As seen in Figure 1, Queenstown is located in the central lower South Island. Over time the region has become an increasingly popular destination for both domestic and international tourists, as it is located and connected with other popular tourism destinations such as Milford Sound, Te Anau and Franz Josef. This demand and the growth of Queenstown will be discussed in Chapter 2, as the pressure of the tourism sector is requiring both temporary and permanent residential housing, increased services, improved infrastructure, but also to allow for increased capacity to accommodate increasing levels of tourists to the region, who often arrive through domestic or international flights, which is important given the centralised nature of Queenstown. At present, Queenstown is the only airport in the central lower South Island with the facilities to accommodate direct Trans-Tasman flights.

Figure 1: Location of Queenstown. Sourced from Queenstownnz.co.nz (2021c)

1.1. Reverse Sensitivity in Queenstown

Reverse sensitivity is a contextual term used in New Zealand planning and law, under the guidance of the Resource Management Act 1991 (RMA). However, the term reverse sensitivity does not specifically appear in the RMA 1991. The term, however, does appear in *Auckland Regional Council v Auckland City Council (RMA 10/97)*. Reverse sensitivity in this case was defined as "the effects of the existence of sensitive activities on other activities in their vicinity, particularly by leading to restraints in the carrying on of those activities"

(Pardy and Kerr, 1999, p. 94). Local authorities typically provide for potential reverse sensitivity affects within District Plans. However, it is often through the creation of buffer zones around activities which are non-nuisance complying and can create adverse effects as a result of that activity (Wilson, 2013).

Within the Queenstown Lakes District, there are two locations where there is a possibility reverse sensitivity may occur or may have already occurred. It is important to understand the reasons why reverse sensitivity has occurred or why it may occur. For the purpose of this research and based on a brief provided by the QLDC, the sites of interests are the Queenstown International Airport (QIA), and land in the Gibbston Valley which under the Proposed District Plan has been re-zoned as a resort zone, which will involve the increase of residential development.

1.2. Interpretation of the Brief:

The research brief was prepared by the QLDC. The brief had an overarching idea to investigate reverse sensitivity effects associated with airport operations and residential activities in rural areas of Queenstown, and to identify a planning response for managing the effects of reverse sensitivity and provide recommendations to Council. The research aims to provide insight into how reverse sensitivity has emerged, been dealt with, and can be managed in the future in relation to the continual growth of the airport. For the Gibbston Valley case study, the research will provide a new perspective on residential development in rural areas, specifically where there is an existing strong viticulture industry. It is evident that there is a housing dilemma in Queenstown, and the Council is looking at ways to address this, and it may result in the rezoning of land in the Gibbston Valley. However, based on the brief, a research focus was adverse effects that may be generated as a result of residential development, and the potential reverse sensitivity effects that may arise against the viticulture activities. Discussion with a key contact at the QLDC resulted in the decision that for the purpose of this research, it would be best to steer clear of the scientific reasoning for noise, specifically in relation to the airport. The focus shifted towards the ways in which reverse sensitivity has been managed, and how it is being addressed in the future respectively to the airport and residential development in the Gibbston Valley.

1.3. Research Aim and Questions

The aims of this project are two-fold. The aim is as follows:

To explore the reverse sensitivity effects in relation to the Queenstown Airport and residential development in rural areas, with a particular regard to the Gibbston Valley; To provide suggestions for planning response options to managed reverse sensitivity effects.

To address the aims of this project, three research questions have been create. These are as follow:

1. What are the diverse impacts of reverse sensitivity associated to the Queenstown International Airport and rural residential development in the Gibbston Valley? (This question has been broken down into 1A – Focusing on the Queenstown International Airport, and 1B – Focusing on the Gibbston Valley, in Chapter 6)
2. What are the factors affecting the broader perception of, and vulnerability to, reverse sensitivity?;
3. How do the effects of reverse sensitivity in the Queenstown Lakes District affect land-use planning and amenity?

1.4. Report Structure:

This report contains 10 chapters. Chapter One serves as introductory chapter that will establish the parameters for this research project. Chapter Two provides an overview of the context of Queenstown Lakes District. It includes a brief discussion of the history, environment, population, and socio-economic profile of the study area. Chapter Three provides an extensive literature review, which discusses international case studies and relevant material to understanding reverse sensitivity in relation to airports and to residential development in rural areas, specifically where viticulture is present. A review of local case studies is also discussed. Chapter Four discusses the methodology used to answer the research aims and

questions. Chapter Five analyses both national and local policy. This review of the relevant statutory and non-statutory documents provides an understanding of the planning framework that manages reverse sensitivity in Queenstown. Chapters Six and Seven addresses research question one which was set out in our introduction. Chapter Six focuses on the QIA, while Chapter Seven focuses on the Gibbston Valley area. Chapter Eight focuses on the second research question for this report – providing a discussion of the factors which affect perception of reverse sensitivity issues. Chapter Nine addresses the third research question and will conclude the results and discussion section of this report. Chapter Ten is the conclusion of this report and summarises the points that have been made throughout it. This chapter also includes a set of proposed recommendations that may serve to address the reverse sensitivity issues discussed throughout the report.

CHAPTER 2: Context

The Tāhuna/Queenstown Lakes District (hereafter referred to as Queenstown) is a large district of 8,467 km^2 in the south of the Te Waipounamu/South Island of New Zealand. Around 90% of the region consists of sparsely populated mountainous landscape with high country pastures which extends from the peaks of the Southern Alps to Lake Hāwea, Lake Wānaka and Lake Wakatipu (Woods, 2011). With the district boasting large-scale natural environments, and highly attractive recreational opportunities, the district has been branded unofficially as the 'Adventure Capital of the World', with many domestic and international tourists visiting yearly (Woods, 2011). This chapter provides a contextual foundation which serves to establish the importance of this research into reverse sensitivity.

2.1. *The History of Early Queenstown*

Māori history in the Queenstown Lakes District dates back 700 years. However, this area was never settled by Māori. Rather, the area was used by Māori for summer hunting of moa, and for the discovery of pounamu (greenstone) (Southern Discoveries, 2021). The emergence of an establishing, post-colonial Queenstown can be traced back to the late 19th century, when William Rees, a Welshman, migrated from Australia to New Zealand with the aspirations to take advantage of the Otago Wastelands Act 1855 - which had a purpose to develop farms in un-inhabited areas of the lower South Island (Spinnaker Bay, 2021). Rees arrived in the Queenstown area in 1860, with a fellow grazer, to see if the land was viable for grazing of sheep herds. Rees established a parcel of land which was 240,000 acres - where the central business district is today (Spinnaker Bay, 2021; Te Ara, 2021). Two years after Rees established a successful farming base, a worker on Rees' farm was walking through the Shotover River in November of 1862 and discovered a small nugget of gold. As a result, 'The Camp' was established in the centre of Queenstown, with central Queenstown subsequently declared as a goldfield. This shift toward mining saw significant changes to the surrounding environment, with the existing farming landscape being lost (Te Ara, 2021). Approximately 8000 gold miners flocked to the area, with many coming from Europe, Australia and China (Woods, 2011). However, by 1870 the gold-rush was over, and the miners left for new pastures on the West Coast, or overseas - which saw the population of the area

decline rapidly. As a result, the area returned to the prior land-uses that founded the region, including sheep farming and the exportation of products to Britain (Woods, 2011). Through the first half of the 20th century, the population of Queenstown was estimated to be less than 1000 people, with the occasional increase because of summer holidaymakers. Over time Queenstown's population had increased significantly to 39,153. However, this is comprised of a transient population and may have been affected by COVID-19, and this will be discussed later in the section 2.5.1 (Stats NZ 2018; Te Ara, 2021).

2.2. *Modern Queenstown*

As shown in Figure 3, the population of Queenstown has risen dramatically since the turn of the 21st century, and total land area that has been developed has sprawled to include the areas Frankton, Calvin Heights and Shotover Country. The perceived gradual growth of the Queenstown Lakes District economy was realised in the early 20th century, as tourists arrived in the area to view the mountain scenery and take lake excursions in Wanaka (Woods, 2011). Since the 1980s, there was a rejuvenation period for Queenstown, with international attention growing, with the film industry starting in the Queenstown district in 1987. In 1988, the wine industry developed in the region, specifically in the Gibbston Valley where the climate was ideal for viticulture. This emergence of the viticulture industry resulted in the diversification of the Queenstown economy (Wilson, 2010). With growing recognition for high-quality wine, and scenic vista Queenstown's international reputation grew. By 1998, there was an expansion to the Australian tourism market with Trans-Tasman flights bringing in tourists, mainly during winter for the growing amount of ski fields in the region (Wilson, 2010).

After 1991, when the then National Government introduced the Resource Management Act 1991 (RMA), there was a shift in the primary role for local government. It was not until the Local Government Act 2002 (LGA) was introduced which allowed local government authorities to take greater control in the management of their designated boundaries. The QLDC engaged with the community to produce a report following in 2002, which council subsequently adopted within their own planning process (Wilson, 2010). A strategic framework, "Tomorrow's Queenstown" was created in 2002 which laid out a vision for Queenstown through to 2020, which included the delineation of rural areas from the compact urban areas. The framework also cemented tourism as the main driver of the local economy

(Queenstown Lakes District Council, 2002; Wilson, 2010). This framework was planned and dispersed over two centralised hubs of Frankton and Queenstown which would be subjected to twelve priorities, however for the purpose of this research there are six which are of importance:

1. Managing population growth
2. Protecting the landscape
3. Managing visitor growth
4. Improving access and transport networks
5. Planning our future
6. Protecting the natural environment.

2.3. *Growth of Frankton*

Frankton is a suburb of Queenstown positioned at the eastern end of Lake Wakatipu, up the Frankton Arm. The Queenstown International Airport (QIA) is located in Frankton. Significant development has occurred in the airport zone, including the Five Mile Shopping Centre which is the most recent development situated off Grant Road. The Five Mile Shopping Centre includes large supermarkets and department stores. The Remarkables Park Town Centre is also found in Frankton, which is a shopping mall – containing several retail shops and another supermarket. Much of the population of Frankton live in-between the airport and Lake Wakatipu. Census data provides shows that the population has been increasing exponentially growing to 2,154 in 2006, increasing to 2,307 in 2013, finally peaking at 2,895 in 2018 (Stats NZ, 2018).

2.4. Growth of Queenstown International Airport

The eventual growth of the QIA is rather long and extensive, with the area changing dramatically from the early 20th century. The following section provides a brief overview of the airport expansions which occurred due to rises in tourism demand. In 1935, an airstrip was developed on the Frankton flats. In the same year, the Queenstown International Airport was

granted its first licence to operate by the Civil Aviation Authority (Queenstownairport.co.nz, 2021) . By 1950, the number of commercial flights in and out of the airport had increased to having five main operators out of the airport. The first sign of the airports needs to grow came in 1964, when Mount Cook Airlines secured a licence to fly a DC-3 into the Queenstown/Frankton airfield. At this time, a small terminal building was established, and the length of the runway was expanded to 1500m. However, by 1969, this need for expansion increased with demand and initial plans to expand the airport terminal and surrounding amenities commencing. By 1974, the upgrades were completed and were "ready to welcome in a new era of travel, tourism and connectivity for the local community" (Queenstownairport.co.nz, 2021).

During the 1990s, when demand for tourism to Queenstown started to grow rapidly, Air New Zealand introduced Boeing 737-200 flights into Queenstown, which had to be fitted with hush kits, which are designed to reduce the impact of aircraft noise for local residents. In the mid-1990s, Queenstown Airport opened its market to Trans-Tasman flights linking Queenstown to Australia, which coincided with an extension of the runway. By 2001, the runway extension and terminal upgrade was completed, with a total runway length of 1,911m (the final length) and a $6 million dollar terminal upgrade (Queenstownairport.co.nz, 2021). After a decade of steady growth, there were minor additions made to the airport - including a 2007 $33 million dollar terminal upgrade and car park expansion. 2011 saw a new crosswind runway built and onsite fuel farms were opened (Queenstownairport.co.nz, 2021). The biggest change to the operation of the airport since the 1990s, occurred in 2016, which at the beginning of the year, saw the first approval for after-dark flights for domestic operation, and in mid-2016, Jetstar got approval for after-dark flights operating a Trans-Tasman option. 2017 saw Australian airlines Qantas and Virgin Australia follow both Jetstar and Air New Zealand by gaining approval for after dark flights. The result of this saw the operating hours of the airport expand to 6am-10pm. However, arriving or departures from the airport commonly start at 7am as a result of community engagement (Queenstownairport.co.nz, 2021). Below in Figure 2 is the current built form of the QIA.

Figure 2: Current Built form of the Airport. Sourced from https://www.queenstownairport.co.nz/assets/Uploads/_resampled/ScaleWidthWyI3MDAiXQ/Queenstown-Airport-2017-aerial.jpg

2.5. Uncontrollable Growth

The growth of Queenstown cannot be underestimated. Since the new millennium, Queenstown has averaged annual growth rates of between 6 and 8 percent. However, there was a gradual decline from 2007 and 2012 (Woods, 2011). A growth period ensued from 2013 with growth rapidly increasing to an all-time high of 9% in 2019, however took a small decline 2020 due to the COVID-19 pandemic, which is illustrated in Figure 3 (Woods, 2011). As a result of this rapid growth, there has been an increase in international property investors buying rural land, most commonly farming land, and then turning this land into subdivisions for residential development, often in the area of the Frankton basin. In 2004, the QLDC processed nearly 600 permits and consent for new dwellings with an estimated value of $200 million (Woods, 2011). Currently, housing accessibility and demand does not meet the population growth that the district is experiencing.

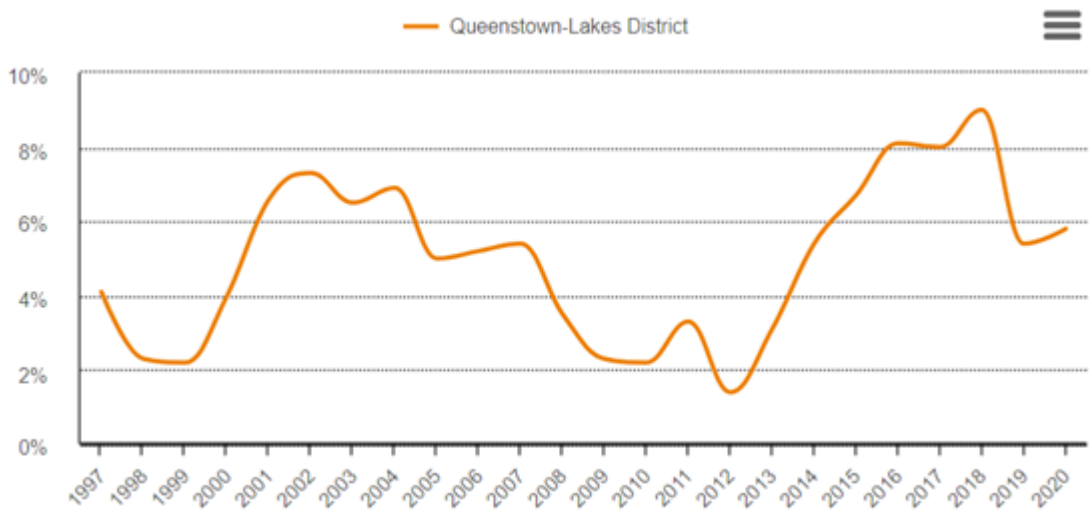

Figure 3: Population Growth in the Queenstown-Lakes District. Sourced from https://ecoprofile.infometrics.co.nz/queenstown-lakes%2Bdistrict/Population/Growth

2.5.1. Tourism Demand

Prior to 2020 and the emergence of the COVID-19 pandemic, the Queenstown district attracted more than 3 million visitors annually (Roy, 2020), and reports from Queenstown NZ (2020) show that during the year of 2019 between peak months of July through to September, visitors were estimated to be over 600,000, with many arriving through the international airport. In 2019, 199,000 domestic arrivals landed in Queenstown and 118,200 landed from international flights during this quarter (QueenstownNZ, 2021a). With this level of arrivals, the QIA must cater for many international flights which are designed for long-haul flights. By 2016, a total of 1.1 million seats had landed at the QIA, which was an increase from the period of 2001 to 2016 with seats filled averaging 0.58 million (Tsui and Henderson, 2018). The continual demand placed on the airport by growing tourist numbers arriving via international and domestic flights, over time has resulted in the need for the airport to have foresight and plan for the potential demand. It is important that the QIA plans for tourism demand, as tourists place extra stress on infrastructure surrounding the airport and the wider Queenstown district. A survey conducted between 2018 and 2019 showed that of those that partook, three quarters found that there was too much pressure on the area from international tourists (Otago Daily Times, 2019). Prior to COVID-19, Queenstown had a population of approximately 40,000 residents, during peak tourism season, this number can triple to a total

of 110,000 residents/visitors. This increase places infrastructure such as roads, parking, housing, and freedom camping facilities (Speedy, 2019). One resident is quoted saying that "it can't just keep growing exponentially [Queenstown], because the infrastructure isn't keeping up currently ... I personally think Queenstown is at its maximum" (Speedy, 2019).

With the focus of this research looking at the impacts the QIA has on the surrounding community, and the potential impacts that residential development in the rural area of Gibbston Valley may have on the surrounding viticultural activities, there are policies and plans which guide the development, growth and operations which will be discussed in the Chapter 5. The following chapter provides a broad overview of academic literature from both national and international case studies to find a conclusive understanding of what reverse sensitivity is, but also regarding the issue of reverse sensitivity from airports and residential development in rural areas.

CHAPTER 3: Literature Review

Reverse sensitivity is a contextual term used within New Zealand Planning under the Resource Management Act, 1991 (RMA). The word sensitivity refers to the vulnerability of existing land-uses to complaints from new developments. As a planning tool, the term can be considered to have the objectives of preventing the effects of new activities on existing land-use activities in the surrounding areas. Pardy and Kerr, (1999). Pardy and Kerr (1999) state that reverse sensitivity is a "legitimate" circumstance to restrict or prohibit the development of land and land-use activities under the RMA law. Though the term does not appear in the RMA, it is set and defined through precedent. *Auckland Regional Council v Auckland City Council (RMA 10/97)* outlines the term - “to the effects of the existence of sensitive activities on other activities in their vicinity, particularly by leading to restraints in the carrying on those activities” (Pardy and Kerr, 1999, p. 94). This outlines that new activities that will be adversely affected by existing activities should not be approved (Pardy and Kerr, 1999). This precedent establishes that new activities which will be adversely affected by existing activities should not be approved. This is due to the risk of opposition and complaints from neighbouring, incompatible, land-uses curtailing existing operations. This justifies restrictions on resource consents concerned with the RMA principles (Stewart, 2006). In this instance, the word *effect* is crucial as it includes any future or possible effects that can be caused. Though it is difficult to establish a possible effect, it is important to consider - for the sake of further land-use and limit restrictions on surrounding land for future activities (Pardy and Kerr, 1999). Stewart (2006) indicates that although the concept of reverse sensitivity is undesirable, without it, a number of complicated legal situations could arise. Without the legal concept of reverse sensitivity, new land-uses could be allowed to bring nuisance claims upon prior land-users. However, Stewart (2006) also argues that the law of private nuisance and the RMA require reconciliation.

3.1 The Law of Nuisance and Reverse Sensitivity

Reverse sensitivity is not an international term that is recognised or used; it is a New Zealand term developed through the RMA. However, it is closely associated with international principle of the Law of Nuisance. Nuisance is a complicated legal principle, with various understandings of the definition, creating complications and contestation as to whether the

law is concerned with the *plaintiff's* ability to enjoy and use the land, or whether the *land* is capable of being enjoyed and used (Nolan, 2019). Nolan states that it is the latter of which the Law of Nuisance should be concerned with.

Nolan (2019) further contextualises the inference with the usability of land as one of the central features in the idea of nuisance and the ability to bring action against the nuisance. The Law of Nuisance in Ball (2020) is highly focused on the ideas of property and property rights, indicating the need for plaintiffs to have a stake in the land, for example, owning land near industrial or rural activities that directly affect the plaintiff by causing a nuisance. Ball (2020) discusses the idea of nuisance being a tort (something that gives rise or injury) against the land; thus, the plaintiff must have direct interest in the land. Thus, if one is to complain about nuisance, there must be an interest in property protection. Within the law, this can be considered a property-based approach (Ball, 2020). Ball discusses the three types of a nuisance – "encroachment, physical damage and interfering with comfort and convenient enjoyment of land" (Ball, 2020, p. 435), indicating the inherent link to the land. Nolan (2019) furthers this idea, with a focus on rights that are impacted through nuisance, stating the law of nuisance provides a "protective cloak" to the amenities which are influenced by nuisance on private land (Nolan, 2019, p. 74). Stewart (2006) states that this principle of owners suitable is not absolute but instead somewhat contingent on the interest of other landowners; thus adding to the understanding of the law of nuisance and highlighting its complexities. Ultimately, the law of nuisance is centred around the resolution of land-use contestation (Bishop and Jenkins, 2011).

The strengths of Ball's (2020) argument put the idea of property rights into the forefront. When compared to reverse sensitivity, as Pardy and Kerr (1999) point out, Ball's (2020) argument considers the established activity first, not considering other effects such as environmental concern. Instead, the aim of reverse sensitivity is to maintain status-quo: limiting surrounding development and enjoyment of land (Ball, 2020; Pardy and Kerr, 1999). Ball (2020) indicates that this type of thinking and defence is a violation of property rights, due to existing activities being favoured over new rights of property owners. When considering the RMA, this can be seen as a defence against the fine line principles it is intended to protect. Nolan (2019), however, considers the ideas of the capacity of the land, the ideas of its usefulness, and the overall enjoyment as a critical component of the Law of Nuisance. Through this understanding, it can be gathered that ownership is not the only component which should or could be

considered regarding nuisance and the usability of the land. Thus, this raises the question of what activities the surrounding land can be used for; if the surrounding land is of low value and not suitable for particular activities, should judicial decision fall in favour of the defendant? Bishop and Jenkins (2011) outline the importance of the individual and the use of the law to declare a private interest. Bishop and Jenkins (2011) further outline the use of law to develop ideas of public interest. This is a critical idea and a strength of the literature by providing an alternative use for the law that is not inherently individualist. This can be considered an important concept when precedent is considered, creating public interests in the Law of Nuisance and considering how this could affect the defence of reverse sensitivity.

It is critical to understand the law of nuisance when gaining an understanding of reverse sensitivity. The idea of the tort law is "where there is a right, there is a remedy" (Ball, 2020, p. 438). If there is property ownership, or a stake in surrounding land of a nuisance, that affects the principles of the enjoyment of land, then there is a right for a plaintiff to seek compensation or change for their loss of rights over private property. This principle conflicts with reverse sensitivity as it is the defence for existing activities versus private property rights. Where there is an established activity that creates sensitivities, objection to new development or land uses will occur under reverse sensitivity - creating implications for land ownership and land rights within New Zealand and the RMA. Understanding these implications critically informs the research and the ability to approach reverse sensitivity in Queenstown. Understanding property rights informs the ability to critically analyse the contestation occurring in the Gibbston valley development and the impacts upon residents in the airport's surrounding area. These particular topics lack research in the international literature regarding reverse sensitivity and law of nuisance focused on airport noise, and similarly with vineyard activity and highway noise pollution in the Queenstown/Gibbston Valley context.

3.2 Impacts of Reverse Sensitivity

The impacts of reverse sensitivity vary, which have various effects on laws and practices within the New Zealand context. Pardy and Kerr (1999) developed key consequences of the effects of reverse sensitivity. Firstly, through common law rule of a nuisance. In this instance, it allows the legal defence to use the idea of the plaintiff *coming to* the nuisance, indicating that the nuisance did not exist until the plaintiff arrived. However, this

conflicts with the law of private ownership, which states that the right to quiet enjoyment or no nuisance is absolute, not based on surrounding activities. This leads to the ideas of the unreasonable effects continuing – these may cause significant environmental harm, which then leads to the idea of the RMA becoming merely a piece of planning legislation and not an environmental protection document as it is outlined to be (Stewart, 2006). Indicating specific activities may not be subject to environmental standards and test, under the RMA with reference to the principles for reverse sensitivity. Reverse sensitivity restricts the ideas of private property, the rights associated with it and becomes subject to the ideas of public influence and benefit. This leads to the requirement of private landowners to object to proposed activities that may adversely affect their peaceful enjoyment of the land and in order for the owner's private property rights to use the land to still to be intact. These factors lead to the complications of consent applications where notification becomes more prominent in the planning system (Pardy and Kerr, 1999). These ideas are also critical for the research conducted in Queenstown, New Zealand - through understanding reverse sensitivity, we can acknowledge the gaps in the literature concerning the Queenstown International Airport (QIA) in Frankton and the Gibbston Valley in Queenstown Lakes District. In the research undertaken here, understanding reverse sensitivity is a key step in understanding the context of the Queenstown Lakes District.

Pardy and Kerr (1999) further develop the nature of the interaction between private nuisance law and reverse sensitivity. Pardy and Kerr (1999) discuss the complicated situation of reverse sensitivity and plaintiffs of the nuisance, outlining that design and precedent have allowed the principle of reverse sensitivity to dictate the application of the nuisance rule. If planning permission is given to a possible plaintiff, then action upon the nuisance can be taken, which contradicts the nuisance law (Pardy and Kerr, 1999). The defence for reverse sensitivity, in that the nuisance did not exist before the arrival of the plaintiff, thus restricts and encroaches on landowners abilities to start new activities due to possible sensitivities (Pardy and Kerr, 1999). The idea of a nuisance law is to restrict actions that are considered unreasonable. However, the principle of reverse sensitivity allows a loophole to this effect. Reverse sensitivity is a tool used to continue the current status, with its favour typically falling to the already established (nuisance or potentially hazardous) activity. The principle of reverse sensitivity therefore has the ability to dictate nearby land-use decisions, causing land-use restrictions and value concerns. Pardy and Kerr (1999) note that the value of reverse sensitivity

results in the idea that any activity with effect-causing potential should be opposed, due to the possible risk of reverse sensitivities in the future.

3.3 Reverse Sensitivity and Planning in New Zealand

Stewart (2006) indicates that local authorities have the right to provide provisions for reverse sensitivity within district plans. Wilson (2013) furthers this, discussing the ability of local authorities to create buffer zones. Buffer zones are strategies for separating incompatible activities - creating space between non-nuisance complying activities in order to minimise adverse effects, particularly on surrounding landowners. The implications of creating a hierarchy of acceptable land-uses, and the precedent of buffer zone development for activities that may produce adverse social and environmental effects could be seen as negligent. Wilson (2013) highlights several district authorities which have provisions for "separation distances", such as South Waikato and Tauranga District Councils. However, Wilson (2013) also indicates the term 'reverse sensitivity' is not always used, instead councils may employ the terms 'avoid, remedy, and mitigate' adverse effects – as outlined in the RMA. Western Bay of Plenty District Plan does account for, and uses, the term reverse sensitivity. The term 'reverse sensitivity' is put in place in response to rural activities that could cause adverse effects to the surrounding area. However, Western Bay of Plenty Council does employ the term 'reverse sensitivity' in relation to industrial activities and activities that could cause future effects (Wilson, 2013). Auckland Regional Council is one of the few councils to have a more extensive history with reverse sensitivity. Wilson (2013) outlines several management strategies that the council employs to mitigate effects. These include the principle of buffer zones, notional boundaries, and areas of air quality management. These management strategies and the awareness of reverse sensitivity are critical to ensuring the RMA is adhered to, with conflict being kept to a minimum.

Wilson (2013) provides significant knowledge of planning within reverse sensitivity, outlining management principles. The need for regional and district plans to outline reverse sensitivity is an important consideration when creating rules, policies and objectives around effective management. The idea of buffer zones is an essential concept in reverse sensitivity and the management of adverse effects. Wilson (2013) shows the process of recognition of reverse sensitivity through buffer zones creates land-use zoning ranging from industrial through to residential; zoning is a prominent tool used within New Zealand. Wilson

(2013) further explains that particular buffer zones can be provided as a management technique to restrict types of development so as to not create adverse effects. This article shows a significant understanding of reverse sensitivity and possible management techniques. However, it fails to acknowledge why some district and regional plans include reverse sensitivity, and others do not. This is a critical gap in the literature and provides a rationale for research in the Queenstown/Gibbston Valley area. Specifically looking at why the Queenstown Lakes District Council (QLDC) have not decided to implement reverse sensitivity or consider it considering the effects from the airport and other rural activities that occur.

There are significant amounts of literature, both national and international, on the ideas of nuisance and the Law of Nuisance. However, there is a lack of literature focused on the principle of reverse sensitivity and broader literature which relates to the research on the Queenstown/Gibbston Valley area's sensitivities. While the literature is informative and provides the ability to analyse the international literature, it travels the path of law research with very little concentration on planning implications throughout the world and in specific cases in New Zealand. The research has been helpful to create a rationale for the research on reverse sensitivity in the Queenstown/Gibbston Valley area. It allows further development on the implications and possible recommendations for the future in this area and other areas in a New Zealand context.

3.4 Noise Emissions

A significant body of research has emerged surrounding the noise emissions associated with transportation infrastructure such as highways, railways, and airports (Lechner *et al.*, 2019; Wothge *et al.*, 2017). Planning authorities have attempted to address the adverse effects of extended noise exposure through the use of noise impact assessments and GIS-based mapping initiatives. Such initiatives have been used by authorities to better develop and implement appropriate land-uses for areas in the vicinity of noise emitting nodes such as airports. Airport operational capacities may be limited by opposition groups and complaints from residents in the vicinity of the airports and flight paths (Sadr *et al.*, 2014). The potential expansion of the operational capacity of QIA has been opposed by the Frankton Community Association, a group that represents the residents surrounding the airport. However, it is also important to acknowledge that groups that may be located more geographically distant from the node can also highly oppose operations and development. This may, in part, be due to the

fact that these groups receive little monetary support to modify their homes in response to noise, or their noise exposure may have increased following the purchase or building of their homes as a result of changes in flight regularity, or engine size.

3.5 Public Perception of Noise

Noise can be defined as 'unwanted sound' (Basner *et al.*, 2017). Aircraft noise can be recognised as a contentious aspect of airport development and expansion. Noise exposure can have a multitude of health impacts, and noise mitigation and exposure minimisation have been increasingly recognised as important policy goals. Noise-annoyance can be evaluated on both an individual and community level (Basner *et al.*, 2017), with the community annoyance level referring to the average level of annoyance across a particular group.

Airport development and airport noise management are contested spaces. Airport capacity is associated with economic prosperity and growth (Freestone & Baker, 2011), particularly in a context such as Queenstown where the local economy is highly dependent on the Tourism sector, as discussed in Chapter 2, Section 2.5. In particular, airport developments play an important role in supporting employment in the service sector (Freestone & Baker, 2011). Inter-regional connectivity can therefore play an important role in a region's economic vitality and development. However, questions remain around the way the benefits of airport development are shared across communities, compared to the more concentrated nature of the costs of airport development, such as noise exposure. The economic benefits of airport development must, therefore, also be weighed against the impacts of airports on neighbouring residents and land users. In particular, airport noise remains a conflictual and universal issue for airport developments. Given the continued urban development within close proximity to Queenstown International Airport, there is therefore the potential for significant reverse sensitivity impacts associated with noise pollution. However, community opinions on airport development and perception of acoustic nuisance are not uniform and depend on a variety of factors, such as personal nuisance sensitivity, environmental values and economic benefit from airport development (Santos *et al.*, 2018). Furthermore, it is important to consider the factors which impact an individual's vulnerability to the impacts of airport development.

3.6 Health and Quality of Life Dimensions

Noise exposure has numerous impacts on physiological and psychological health. Although the impacts of noise are often considered in relation to hearing processes the effects of noise exposure can be considered either auditory (affecting hearing organs) or non-auditory (other effects upon health and Quality of Life). The auditory impacts of noise exposure, such as hearing loss or damage, are well-known (Clark & Stansfeld, 2007). However, in contrast to these auditory impacts, the non-auditory effects may also be a result of the stress or annoyance produced by the noise exposure (Clark & Stansfeld, 2007). Furthermore, the most commonly studied form of noise is exposure to noise in the workplace; occupational noise (Basner *et al.*, 2014). Although occupational noise can have a number of significant health impacts, for the purposes of this literature review the focus will instead be on environmental noise exposure - or the noise individuals experience in the home from the surrounding (external) environment.

Types of environmental noise may include transport and traffic noise, construction noise, industrial noise and aircraft noise (Muzet, 2007; Basner *et al.*, 2014). The non-auditory impacts of this noise extend beyond the risks of hearing loss to include issues such as sleep disturbances, high blood pressure, increased cardiovascular disease risk and immune system dysfunctions (Basner *et al.*, 2014). Thus, airport noise can detrimentally affect various quality of life (QOL) factors, including both physical and mental health dimensions. Basner *et al.* (2014) explore a variety of non-auditory impacts of noise exposure; including annoyance, cardiovascular risk as well as impacts on cognition and sleep. Basner *et al.* analyse existing studies of noise – stating that existing scholarship on environmental and occupational noise has demonstrated a higher prevalence of cardiovascular disease and mortality by cardiovascular causes in populations with increased noise exposure. Basner *et al.* (2014) highlight how noise exposure can lead to increases in blood pressure, changes in heart rate, and the production and release of stress hormones – leading to increased incidence of cardiovascular disease due to noise exposure. These includes issues such as atherosclerosis, myocardial infarction, and hypertension (Stansfeld, 2015). These changes in cardiovascular function can be a result of both emotional and annoyance responses, as well as non-conscious physiological process (Basner *et al.*, 2014). Given this, these health impacts and QOL impacts can occur at lower decibel levels than those considered to produce auditory harm.

However, in acknowledging the potential health impacts of noise exposure it is also important to recognising differing the subjectivity of sensitivity to environmental noise. As discussed by Job (1995), there is no specific tipping point at which noise becomes problematic. Instead, individual and situational factors influence the degree to which noise-annoyance occurs. The following section will discuss these factors. Stallen (1999) refers to a psychological-stress model of noise-annoyance - discussing how noise-annoyance is a product of a variety of socio-psychological factors, including perceived control, as well as acoustic stimulus. Stallen (1999) states that annoyance is a product of both the noise itself as well as an individual's ability to cope or respond to it – with a decreased feeling of control leading to increased levels of psychological stress.

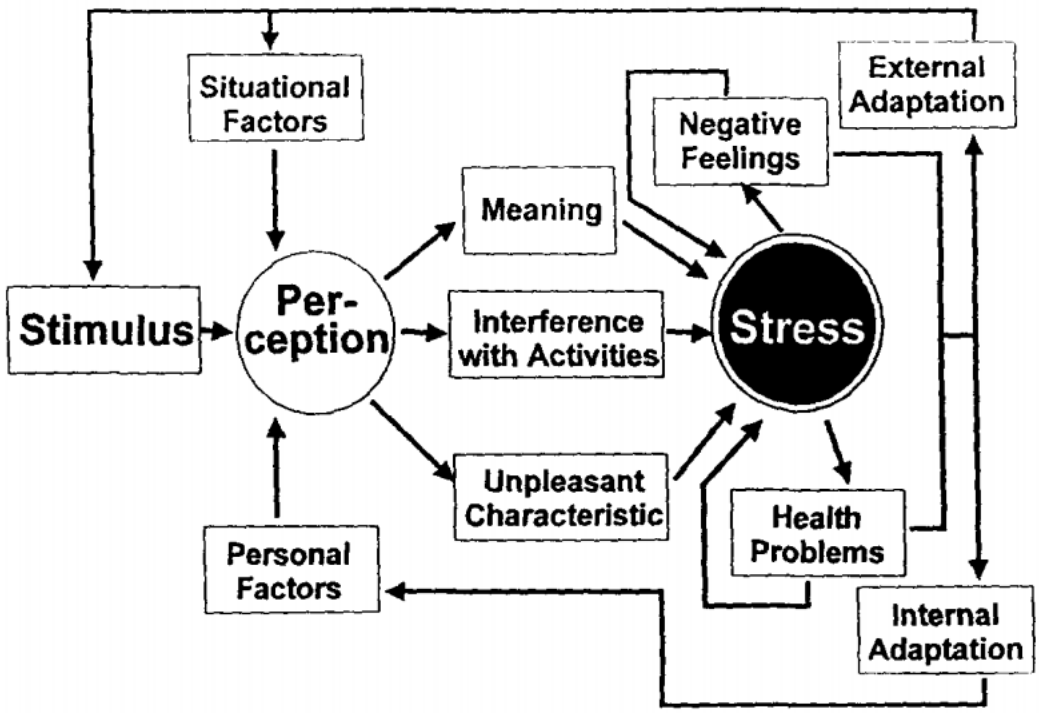

Figure 4: Gunn Patterson Stress Model (from Lercher, 1996).

Furthermore, Schreckenberg *et al.* 2010 discuss how existing vulnerabilities such as mental health disorders, personality variables such as neuroticism and sleep disorders may amplify an individual's tendency toward noise-annoyance. Given this understanding of noise-annoyance, it is important to consider the psychological impacts of noise. Clark and Stansfeld (2007) highlight a link between increased noise exposure and noise annoyance and psychiatric symptoms such as depressive mood dysfunctions and anxiety disorders.

However, the authors state that noise is "probably not associated with serious psychological ill-health."

Given the location of the Queenstown airport, and the proximity of schools within the airport zone it is important to consider the impact of noise on academic and cognitive performance. Exposure to noise at home and in learning environments can lead to lower academic performance in children (Clark et al., 2006). Researchers involved in the RANCH study, which investigated the academic performance of children in schools neighbouring large airports (Heathrow, Schipol, and Madrid-Bajaras), found a linear relationship between noise exposure and delays in reading comprehension and recognition memory (Basner *et al*, 2014).

3.7 Community Acceptance and Communication Tools

Airport expansion – both physically, and the extension of operational hours – can be a contentious approach amongst nearby communities. Opposition to airport expansion arises as a result of the interaction between social values and interpersonal conflicts.

However, there are a number of factors which can influence how accepted expansion is by residents. In particular, Liebe *et al.* (2020) highlight the distribution of positive and negative impacts of development, as well as the procedural justice dimensions of decision-making influence the social acceptance of airport expansion scenarios. Liebe *et al.* (2020) note that while participatory processes can be complex and resource intensive, they often lead to greater acceptance of development. This can be related back to the idea of control, or perceived control over noise exposure - as participatory processes can be considered to provide communities with a greater feeling of control over development trajectories and their associated effects. In a study by Liebe et al. (2020) the provision of avenues for engagement resulted in decreased perception of airport expansion as unfair and decreased overall opposition to expansion. According to Heyes et al. (2021) current research into airport noise has involved a greater focus on the incorporation of public participation into management strategies. These approaches include community engagement which provides for participation and social learning. Heyes *et al.* also highlight how it is important to recognise context in determining these processes – as opposed to transposing strategies from elsewhere. However, the authors recognise that for smaller, developing, airports creating tailored approaches may be challenges due to challenges with resources.

One of the most commonly used tools in airport noise management is the development of noise maps. These maps can help to reduce uncertainty and support an enhanced sense of control over noise exposure by conveying information about expected noise levels to community members. However, Freestone and Baker (2018) discuss the insufficiency of noise contour maps in accurately conveying the potential impacts of acoustic noise, due to variations in flight paths. Freestone and Baker (2018) also discuss how the presentation of noise information to community members may be overly technical in nature. Additionally, public opinion and acceptance are also highly dependent on trust and participation in decision-making processes. One, pejorative, term which frequently arises is the phenomenon of NIMBY (Not In My Back Yard) reactions. However, these reactions may instead arise from a lack of trust or shared knowledge in decision-making processes (Freestone and Baker, 2018)

Complexities present within the planning profession are evident within airport development and operation. These complexities are a result of the variety of impacts on various actors affected by airport development. Rapid changes are present in an urbanising world that include multilevel actors having to collaborate to effectively manage such developments (Hohn & Neuer, 2006; Shilon & Kallus, 2018). Airports present particularly difficult challenges for planning authorities due to their pervasive impacts on actors associated with their direct operations and the wider community as a whole (Colomer, 2018). Airports are physical nodes that enable connections, flows of people, commodities, and knowledge for the areas surrounding them (Freestone & Baker, 2011). As a result of this interconnectivity, public authorities such as councils can find themselves under pressure to promote expansion projects of airports to increase commodity flows into cities. Furthermore, airports may attract other development within these zones – including commercial developments such as malls or shopping centres (Freestone & Baker, 2011). These resulting developments may pose their own reverse sensitivity challenges such as congestion or noise. The Queenstown-Lakes District Council (QLDC) are the majority shareholder of the Queenstown Airport Corporation (QAC) and have promoted the expansion of the airport's operational capacity, with an upper goal of servicing five million passenger seats per annum into the city (Queenstown Airport, 2016).

3.8 Case Studies

To address planning related issues associated with airports numerous studies have examined the effectiveness of previously implemented planning tools designed to support noise mitigation efforts. Action plans and noise mapping are examples of such tools and have been used worldwide numerous times to address issues of noise pollution directly affecting modern human lifestyles (Lechner *et al.,* 2019). Such tools were developed to assess the impact Innsbruck Airport has on the surrounding areas and the city as a whole.

3.8.1 Innsbruck Airport

Noise pollution has become a serious concern for planning and regulatory authorities in alpine settlements. Austria is a member of the European Union – as a result, its authorities are obligated to undertake noise mapping efforts every five years, with Innsbruck's authorities undertaking a cross-sectional noise impact study on its population (Lechner *et al.,* 2019). A pilot program - known in English as the Total Noise Investigation Innsbruck - was undertaken in 2017 to map the total noise pollution present within the city with the results of the program being presented in Figure 5 (Lechner *et al.,* 2019). While noise mapping initiatives are commonly undertaken by authorities, this study was novel in the fact that it aimed to create a representative and comprehensive dataset which could be used to assess the overall noise burden and annoyance experienced by Innsbruck's population (Lechner, *et al.,* 2019). This would allow the cities decision-makers to develop land-use plans that would incorporate appropriate noise mitigation measures for areas with high exposure to noise pollution.

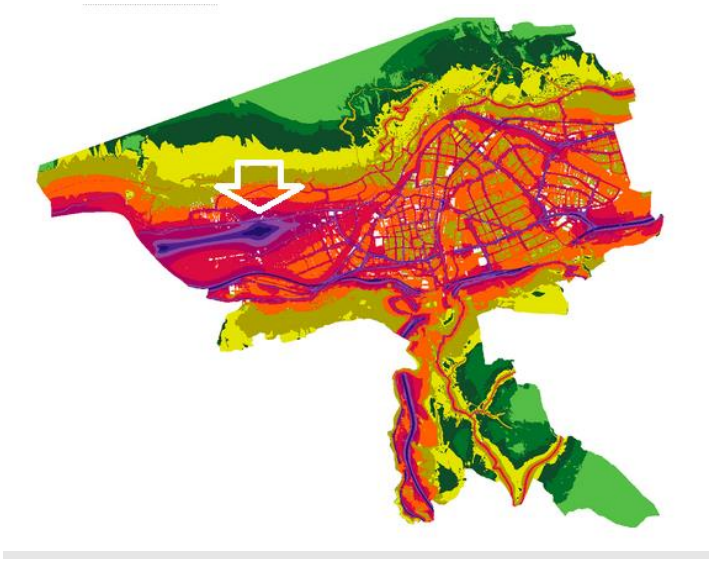

Figure 5: Noise impact map of Innsbruck. White Arrow indicates airport location. Taken from (https://www.tirol.gv.at/arbeit-wirtschaft/esa/laerm/gesamtlaermbetrachtung-innsbruck)

The Innsbruck study was a Noise Related Annoyance Cognition and Health (NORAH) study. Such studies and research initiatives focus on the physiological and psychological long-term effects of noise exposure. Studies have been undertaken across several European case studies, with the initial study focusing on residents in the neighbourhoods surrounding Frankfurt airport (Wothge *et al.,* 2017). Such research was undertaken to develop a better understanding of the combined noise effects from different sources. The study of noise annoyance on residents living near Frankfurt's airport found that total noise annoyance grows significantly with the increase of the combination of noise sources, such as airport infrastructure operations. It was also noted that total annoyance levels are higher if aircraft-related noise is the dominant noise source (Wothge *et al.,* 2017). The information gathered found that combining complaints from separate noise sources together into a single model of total annoyance was appropriate for the work being undertaken (Lechner *et al.,* 2019). Research on the model developed found the total-annoyance model was more suitable for use by authorities than a dominant source model and thus was more considerable for legal applications to address noise pollution (Lechner *et al.*, 2019).

The Innsbruck study was developed as a cross-sectional representation of the city's population, with sampling based on a demographic breakdown of the nine districts of Innsbruck. The study found that self-reported noise annoyance responders and those with access to a quiet façade within their dwellings were significantly represented in the annoyed and highly annoyed categories of the study (Lechner *et al.,* 2019). While these factors led to greater

levels of noise annoyance it was also noted that sponsored installations of noise dampening windows led to decreased reports of noise annoyance (Lechner *et al.,* 2019). These results indicate that council-led noise mitigation initiatives could act as an effective tool in addressing noise complaints from residents. The use of an overall noise impact assessment was demonstrated as being an effective noise mitigation tool, with it being especially useful for addressing regulatory approval procedures. It is important to note that in Austria, the general approach for rating noise is the assessment of annoyance after the change of actual local conditions (Lechner *et al.,* 2019). It was also found that the higher noise level from roads led to an increase in additional levels of a specific noise source (Lechner *et al.,* 2019). This would indicate that an overall noise protection a comprehensive approach should be taken by authorities instead of focusing on specific sources.

3.8.2 Relevance to Queenstown Airport

The results collected from the Innsbruck study focused on the impacts on urban spaces, and the researchers raised that transferring the results to the setting of rural areas should be undertaken with care (Lechner *et al.,* 2019). The topographic conditions present in Queenstown and its surrounding settlements have put pressure on where developments can appropriately be undertaken. As seen in Figure 6 State Highway 6 and 6A converge within Frankton and are also located nearby to Queenstown Airport. The development of an overall noise impact assessment of the area could support decision-makers in developing land-use plans that appropriately employ noise mitigation measures in the area surrounding the airport. The research undertaken in Innsbruck highlights how council-led initiatives could be used within Queenstown and Frankton to reduce issues surrounding noise-related reverse sensitivity issues that could arise. The development of a comprehensive in-depth impact assessment would support the QLDC in addressing such issues in the future in developing a greater understanding of noise pollution issues, and what mitigation methods would be appropriate to deal with such issues.

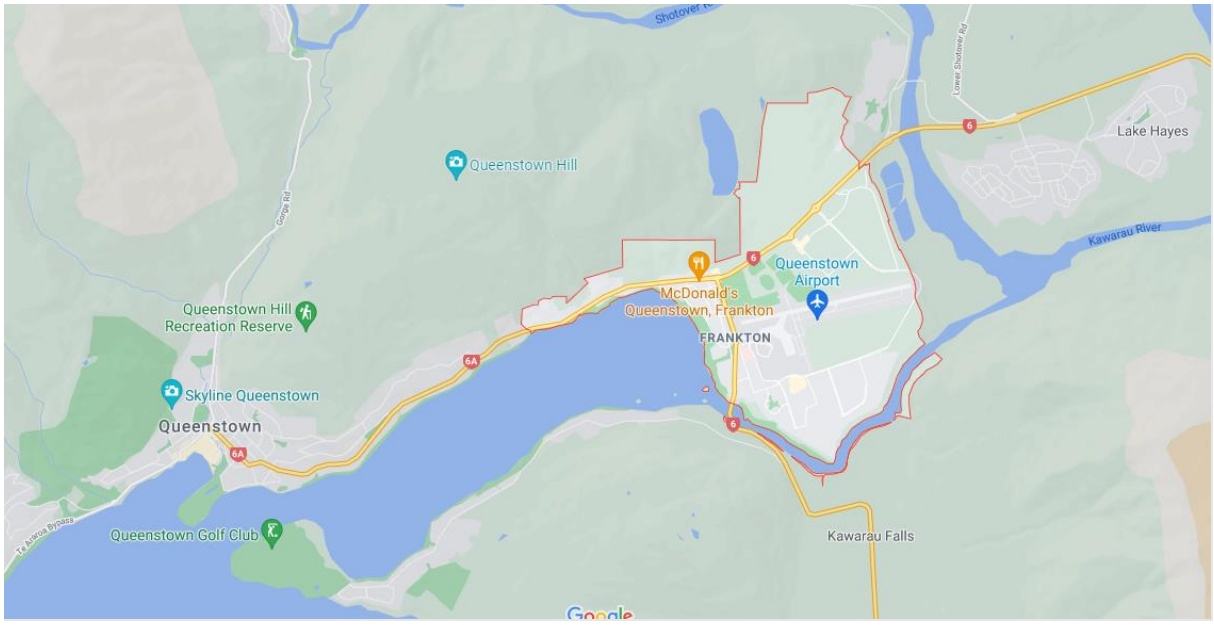

Figure 6: Map of Queenstown and Frankton . Taken from (https://www.google.com/maps/place/Frankton,+Queenstown/@-45.0196228,168.715481,13.22z/data=!4m5!3m4!1s0xa9d51e679154a3bf:0x500ef868479c7f0!8m2!3d-45.021533!4d168.7341503)

3.8.3 Innsbruck Summary

In conclusion, local authorities have attempted to develop noise mitigation planning regulations to address issues of noise pollution and its potential impacts on future developments. Such mitigation measures are extremely important for cities such as Innsbruck and Queenstown which are heavily constrained by their natural landscapes. The development of noise impact assessments support decision-makers in addressing topographical limitations more appropriately by developing an in-depth understanding of specific noise-related impacts different spaces deal with. The development of an overall noise impact assessment would allow the QLDC and other such councils to develop planning documents that incorporate effective noise mitigation measures.

3.9 Environmental Noise Mapping and GIS Use for Land-use Management: Larnaca International Airport Case Study

Noise pollution from transportation infrastructure such as airports is an ongoing issue that planning authorities must address when producing district and regional plans. Noise pollution resulting from airports is a significant concern for planning authorities due to the wide spatial area that is affected by the airport's operations, in both the immediate vicinity of the facility and the flight paths leading into the airport (Vogiatzis, 2012). In dealing with noise

pollution, authorities may use tools such as noise maps and boundaries to plan effective land-use zones to help minimise the impacts from high-level noise emitting activities. This has been prioritised due to studies showing a positive correlation between serious health conditions and continuous exposure to noise (Sadr *et al.,* 2014). The development of technologies such as Geographic Information Systems (GIS) have been used to further develop the amount of information authorities and developers can access through noise maps. Such tools allow authorities to develop and detail increasingly accurate spatial patterns of environmental noise within modern urban spaces. The importance of such technologies has been raised in academic papers that have highlighted such tools as being an important factor in developing more accurate impact assessments (Ko *et al.,* 2011). Such improvements to impact assessments will allow authorities to better establish policies that can effectively mitigate or prevent the hazardous effects related to noise pollution on surrounding developments and communities (Ko *et al.,* 2011). The impact of noise pollution on residential and mixed-use land-use zones was explored in a paper by Vogiatzis, in which he examines how planning authorities attempted to mitigate noise pollution impacts associated with the expansion of Larnaca International Airport in Cyprus.

3.8.5 Larnaca Airport Case Study

A proposed extension of Larnaca Airport in Cyprus was brought to the attention of the local planning authorities due to the potential impacts of increased airport capacity. Due to concerns surrounding the potential adverse effects from airport-related activities, a noise map was produced to develop a better understanding of the impacts on the surrounding communities located in the vicinity of Larnaca Airport (Vogiatzis, 2012). This information was also collected to assist in the development of a local action plan to address issues in the surrounding area, such as increased exposure to noise. The noise map and local action plan support local authorities in accurately determining the acoustic effects from the airport and estimate the potential effects of increasing this capacity (Vogiatzis, 2012). The development of such maps also provided for the appropriate zoning of land-use activities which could take place – with the development of areas with different decibel limits. In relation to planning legislation within Cyprus, it was found that regulations regarding the impacts from airport development projects and their operations on surrounding areas had become more stringent. Efforts across the European Union have been undertaken to address the negative impacts of continuous exposure to different levels of noise, leading to

the development of the action plan regarding the expansion of Larnaca Airport (Vogiatzis, 2012).

The Larnaca action plan noted that the existing land-uses in the area surrounding Larnaca Airport consisted of residential, outdoor development areas and parks. Local authorities utilised the collected data to develop a plan to mitigate the impacts of noise pollution on the established surrounding communities, along with establishing what future activities could take place in different spaces in the surrounding area (Vogiatzis, 2012). Continuing noise monitoring efforts post-development was also raised as an important mitigation tactic due to the complex nature of the surrounding urban environment. The importance of ongoing monitoring was also raised in relation to the operational capacity of the airport. Research has found that complaints from communities regarding noise pollution are a major force against increasing capacity (Sadr *et al.,* 2014). Monitoring is also a useful tool in establishing what future measures may need to be taken in order to meet the desired outcomes of projects, and allows authorities to find out if established noise mitigation mechanisms are effective. The use of GIS by the authorities in Larnaca has aided in the development of effective mitigation strategies which address the issues of the proposed expansion of the airport and to accurately develop appropriate land-use zones surrounding the airport.

3.9.1 Geographic Information Systems

The use of digital tools such as GIS have become commonplace and are utilised to accurately determine the impacts of topographical features in relation to acoustic impacts from activities. Natural features such as mountains can impact the level of disturbance experienced in different locations from noise-related activities. Furthermore, man-made features such as construction density and urban form can also impact the decibel levels experienced in differing locations (Vogiatzis, 2012). This disruption of noise patterns creates a challenge for planning authorities in developing accurate plans which provide for the effective mitigation of the negative social and economic effects which may arise from adverse acoustic impacts. As urban spaces contain numerous individual bodies that affect noise levels, GIS is utilised to store large data sets to allow planners to develop increasingly effective mitigation plans (Sadr *et al.,* 2014). It has also been established that GIS can have a significant impact as a decision-making support tool for planning authorities when dealing with a wide range of spatial data types (Aydin *et al.,* 2010). Due to the variety in land-use zones surrounding the

airport, GIS was a useful tool in determining if certain activities were appropriate regarding the noise exposure different locations experienced.

The use of GIS also allows planning authorities to more accurately detail noise-related issues and enables the development of more specific plans that minimise noise-related land-use limitations. This can be done to develop a better understanding of existing developments and has been used to implement regulations regarding upgrades to existing housing stock to mitigate impacts from noise pollution. GIS analysis can aid in determining appropriate zones regarding future developments and can help in the creation of specific criteria such developments would need to meet such as using noise-insulating materials in developments above a decided threshold (Aydin *et al.,* 2010). This was seen when authorities in Tehran implemented legislation regarding what activities could be undertaken in future developments surrounding the proposed Imam Khomeini International Airport, which at the time of the proposal was surrounded by agricultural and rural land-use zones (Sadr *et al.,* 2014).

3.9.2 Impacts of Queenstown International Airport.

As seen in Figure 7, the Queenstown International Airport is surrounded by topographical boundaries which limit the flight paths that aeroplanes can utilise for take-off, approach, and landing. This boundary has limited the spaces which can be utilised for the airport's operational activities and raises issues surrounding reverse-sensitivity impacts of airport operations. The development of the noise map as seen in Figure 7 has utilised GIS to display the differing levels of noise impact spaces surrounding the airport experience. GIS maps such as this are useful tools planning authorities can use to establish appropriate land-use zones for future development. For cities with topographical limitations such as Queenstown, extensive mapping efforts are useful tools for effectively managing the limited spaces available for developments.

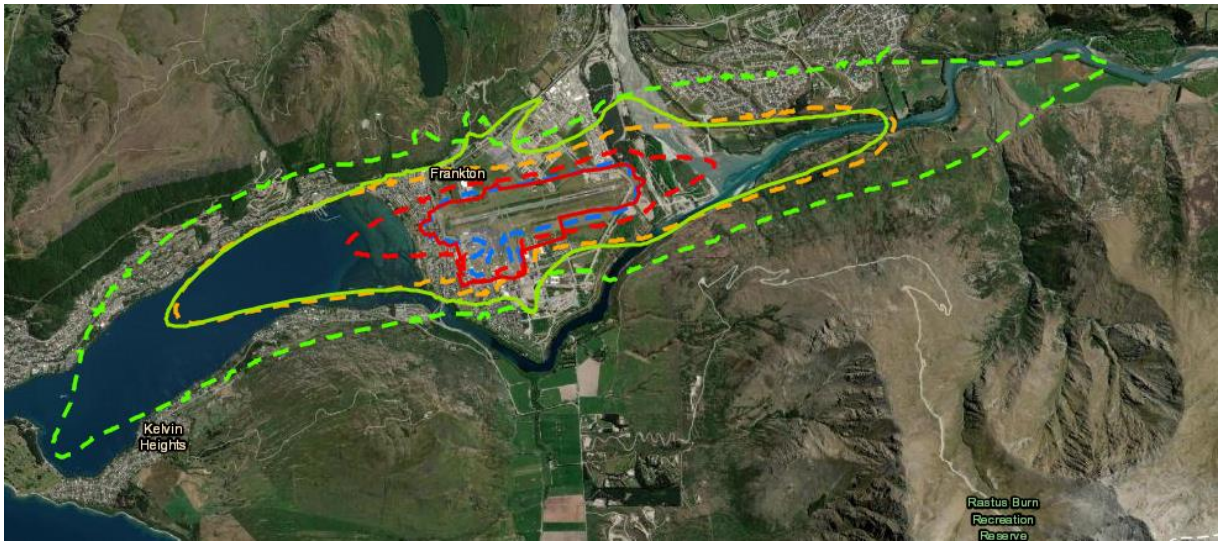

Figure 7: GIS Map of Noise Restriction Zones surrounding Queenstown International Airport. Taken from Queenstownairport.co.nz/GISmaps

The privatisation of airports has also shown to create pressures regarding planning authorities. The private operators of airports in Cyprus and Australia have raised concerns surrounding noise complaints with councils and planning authorities - as their primary goals are to increase the operational capacity of their airports to increase revenue (Freestone and Baker, 2010). Queenstown Airport is governed by a board of directors and is owned by the Queenstown Lakes District Council and Auckland International Airport Limited (Queenstownairport.co.nz, 2021). As the council owns 75.01% of the shares it acts as the majority shareholder of the airport however, as it is partially owned by a private entity conflicts of interest are possible as Auckland International Airport Limited's goals are primarily profit-driven.

In conclusion, authorities have to develop plans and mitigation tools to address issues of noise pollution for airport developments projects and their ongoing operations. The noise pollution emitted from such developments may limit the types of developments that are appropriate in close proximity to airports. In the context of Queenstown, the topographical limitations of the city have led to pressures upon the granting of consents for developments in the spaces surrounding the airport. These pressures highlight the importance of the development of tools such as noise maps to help in the creation of efficient and effective land-use plans. The use of GIS allows planners to incorporate greater levels of data into noise maps and land-use plans. Increasing the use of GIS in decision-making could be an effective tool in

assisting local authorities in developing noise-impact and mitigation plans which are appropriate for the physical and social environments in which the operate.

3.10 Viticulture and Associated Development

The intensification and diversification of activities in rural areas have occurred at a fast pace in the last two decades (Andrew and Dymond, 2013; Curran-Cournane *et al*., 2018). The potential for reverse sensitivity effects is increased with urban expansion, as it involves land use change in an established rural environment (Wilson, 2013). Increasing population growth and a growing trend in rural-residential living are two main factors of this change (Andrew and Dymond, 2013; Curran-Cournane *et al*., 2018). Tension is commonly created among communities as restrictions are usually placed upon pre-existing rural activities, rather than new housing developments (Quality Planning, 2021). Commonly, it is in the interest of a Territorial Authority to allow people to provide for their economic wellbeing, while using standards to protect rural amenity values (Ministry for the Environment, 1991). However, conflict is often created as people have differing amenity values and interests. Although most district policies seek to enable established rural land uses to operate sustainably in New Zealand if it does not majorly impact human health.

3.10.1 Importance of the Wine Industry to New Zealand's Economy

The wine industry is attributed as being one of New Zealand's fastest growing primary economic activities, worth over NZ$1.9 billion (US$1.3 billion) and vineyards covering 38,000 ha of productive land (Cradock-Henry and Fountain, 2019; New Zealand Winegrowers, 2020). A majority of New Zealand's wineries are considered to be small boutique operations, as approximately three quarters conduct winegrowing operations on less than 20 hectares (Cradock-Henry and Fountain, 2019). To maintain a sustainable operation, most wineries create and support multiple commercial and recreation activities within their site boundary (Baird *et al.,* 2018; Crick et al., 2020). Common activities include cellar door visits, restaurants and providing accommodation. These activities provide significant economic attraction to the winery itself but also to the wider geographic area.

The COVID-19 pandemic has had major impact on wineries which focus on wine tourism in particular, caused by the lack of overseas tourists (New Zealand Winegrowers, 2020). However, the rise in domestic New Zealand tourism has helped to fill the market

when domestic travel is allowed to occur. Despite the challenges of the pandemic, the New Zealand wine industry managed to achieve record exports up 6 per cent on the previous year (New Zealand Winegrowers, 2020). Aside from economic impacts, COVID-19 has created several challenges during harvest season due to labour shortages and enforcing physical distancing practices (New Zealand Winegrowers, 2020).

3.10.2 Winegrowing Impacts on Rural Living - Noise

The expansion of rural-residential living alongside the diversification of rural farming activities such as winegrowing may increasingly result in conflict, as the two activities tend to have some contrasting interests. Winegrowing involves multiple land-use activities within one site (Baird *et al.,* 2018; Cradock-Henry and Fountain, 2019). The primary production of wine growing operations regularly involve several activities that generate noise beyond the site boundary including frost fans, helicopters and bird-scaring devices (Quality Planning, 2021). Aside from primary production, many wineries accommodate several recreational and explorational ventures to supplement financial gaps in running a small-scale business (Baird *et al.,* 2018; Crick *et al.,* 2020). However, it is important to consider that this vertical integration also contributes to affecting amenity value of rural areas, as noise and other nuisance factors are created from an increased number of people in the area (Cradock-Henry and Fountain, 2019).

3.10.3 New Zealand Legislation on Managing Reverse Sensitivity

New Zealand faces a complex issue of attempting to accommodate a housing crisis coupled with a need to preserve highly productive land for producing agricultural goods and maintaining economic stability (Andrew and Dymond, 2013). Currently there is no legislation to manage reverse sensitivity effects, however the Ministry of Primary Industries (MPI) and the Ministry for the Environment (MfE) are proposing a National Policy Statement for Highly Productive Land (NPS-HPL) to improve the protection of highly productive land under the RMA. Submissions on the proposed NPS-HPL identifies that stakeholders in the primary sector and territorial authorities are concerned that reverse sensitivity effects place constraints for production on highly productive land. As a result, the MPI and the MfE want to include a policy to manage reverse sensitivity effects that supports primary production while ensuring it does not impose too many constraints on new sensitive or ‘potentially incompatible activities’ (Ministry of Primary Industries, 2019). To

increase the level of equity, the NPS-HPL recommends foremost that the activity 'causing the adverse effects should internalise those effects to the extent practicable' (Ministry of Primary Industries, 2019). If the established activity is unable to internalise these adverse effects and the sustained presence of such activity in the area is important locally, regionally or nationally, then the constraints should be placed on new sensitive and incompatible activities (Ministry of Primary Industries, 2019).

The inclusion of a policy for reverse sensitivity effects in a National Policy Statement demonstrates the importance of addressing the issue. However, several submissions on the NPS-HPL show concern of conflicting interests between policies in the proposed NPS-HPL and the National Policy Statement for Urban Development (NPS-UD). For example, Wine Marlborough argue that there is 'a tension between the NPS-HPL to protect land and the NPS-UD to accommodate growth and exclude rules that don't constrain growth' (Wine Marlborough, 2019). There is a general concern that the opposing objectives between these two NPS' makes it difficult for local authorities to implement restrictions on actions, without facing contradictions. In addition, the Marlborough District Council (MDC) suggests that relying on solely the NPS-HPL to manage reverse sensitivity effects is not effective in all cases, as not all urban centres are in close proximity of highly productive land (MDC, 2019). In this context, there may be merit in considering the inclusion of a specific policy for managing reverse sensitivity effects associated with urban expansion in the NPS-UD.

3.10.4 Gibbston Character Zone

In the Queenstown Lakes District Operative Plan, the main purpose of the Gibbston Character Zone is to preserve viticulture and commercial activities that are associated with it (objective 23.1). Noise limits for non-residential activities in rural areas are stated in the QLDC operative plan. However, these do not apply to primary production tools such as bird scaring devices, agricultural machinery, and frost fans within the Gibbston Character Zone as long as they follow operation instructions specified by the manufacturer (rule 5.7.5.2(iii)) and do not exceed 85 dB L_{AFmax} at any point within the site boundary (Queenstown Lakes District Council, 2010). The fact that the noise limit is much higher (85 dB L_{AFmax}) and an absence of differing limits for different hours of the day, indicates that winegrowing activities are supported by the council within the Gibbston Character Zone

(Queenstown Lakes District Council, 2010). Although, viticultural production remains under pressure from complaints by rural residents.

3.11 Concluding Summary

This chapter has explored literature relevant to reverse sensitivity, noise exposure and community acceptance of noise exposure, as well as a number of case studies. This included exploration of the impacts of noise exposure on health and quality of life dimensions. Furthermore, case studies were used in order to develop an understanding of how planning and government authorities have attempted to address reserve sensitivity. Examining international case studies allowed for a comparative analysis of different approaches to be undertaken for this research project. The case studies highlighted how noise-mapping can be used in the development of land-use zoning systems, with the use of GIS for this purpose becoming apparent in the available literature. It was noted that a gap in the literature occurred in the examination of long-term monitoring of the successes of such undertakings. This can be tied to themes which emerge from the scholarship around community acceptance – such as the need for feelings of participation and control in regard to decisions around noise management.

CHAPTER 4: Methodology

This section outlines the research framework and methodology used within this research project. These methods were selected in order to address the research questions outlined in section1.3. In order to obtain an in-depth knowledge of the reverse sensitivity effects within the Queenstown Lakes District, specifically in the Gibbston Valley and central Queenstown a mixed-methods approach has been employed within this research process. The first section of this chapter provides a detailed account of the methods being used within this research project - followed by a description of the analysis used to answer the research questions set out for this report. This includes a discussion of both the primary research methods used, as well as the secondary research conducted. Secondly, this chapter establishes the project's limitations as well as the positionality of the research group, so as to provide for an objective discussion of the results found.

4.1 Research Methods:

By applying a mixed-methods approach to this research project a range of data can be gathered to provide an integrated analysis of the context of Queenstown Lakes District and their relationship with reverse sensitivity. The ability to apply a mixed-methods approach will allow the connections, themes and patterns within the data to be brought to the surface and tied together in order to develop a clear conclusion and understanding on the context of Queenstown Lakes (Steinberg and Steinberg, 2015). The use of qualitative methods allows for a flexible approach be taken to data collection and can provide a variety of data as a result (Stevens et al., 2018, pp. 21).

4.2 Data Collection:

In accordance with the mixed-methods approach employed by the research team, this research employed both primary and secondary research methods. Primary methods included qualitative interviews and GIS mapping. Secondary methods involved a literature review and a policy review to situate the research within the local context. Fieldwork comprised of key informant interviews and a four day-long site visit to Queenstown. The research team had considered the use of questionnaires as another form of data collation.

However, a consideration of the ethical implications of this research resulted in the rejection of the use of surveys due to the potentially sensitive nature of the topic, and the potential for controversy around the research.

4.2.1 Key Informant Interviews:

The use of key stakeholder interviews provides a flexible way of gathering large amounts of specific information regarding specific subjects. There are three ways in which interviews can be organised; structured, semi-structured and unstructured types are generally used. For the purpose of this research, semi-structured interviews will be used. As Stevens *et al*. (2018 pp.21) suggests, semi-structured interviews generally have pre-set questions and the subsequent order of them. Semi-structured interviews allow for a more flexible interview – with the potential for the course of the conversation to shift, based on topics that emerge throughout the interview. This may enable the interview to focus on what the interviewee considers important and enabling co-production of research and thus helping reduce bias within the research process. The semi-structured nature may also allow the researcher to develop further questions that are not originally part of the schedule questions (Stevens et al., 2018, pp. 23). Question schedules were modified based on the key informants. For example, different topic guides were created for community members in the airport area than for airport representatives, a set of these questions is included in Appendix A.

When crafting the questions that were intended to be asked in the interviews, the research team had to ensure that they were not misleading or guiding towards an answer that we had already concluded on. As a result, all questions had to be drafted in a neutral tone, where those that are interviewed have the ability to respond in an adequate and fair way. Questions were drafted in order to provide data to answer the four overall research questions, aims and objectives. To ensure that answers to questions were simply not a yes/no response, the research team adopted open-ended questions. Stevens et al., (2018, pp. 24) suggest that open-ended questions elicit more than the simple yes or no answers. Open questions provide interviewees the opportunity to answer in whatever way they wish, and to elaborate on an answer or discussions during the interview. If the interviewer believes that more information can be gathered, they may use probing questions to gather more information. The downside of this approach is that responses may often be long and require greater time on focused analysis of the

data. Over the four-day field research (4th May to 7th of May) eight interviews were conducted, with 11 key informants emerging.

Table 1: List of Key Informants

KI 1	Southern DHB representative
KI 2	Southern DHB representative
KI 3	Councillor
KI 4	Council planner
KI 5	Council planner
KI 6	Golf course representative
KI 7	Developer
KI 8	Airport representative
KI 9	Airport representative
KI 10	Community representative
KI 11	Community representative

4.2.2 GIS Mapping:

Geographic Information Systems (GIS) is a database programme that allows for the storage, collection and analysis of spatial data. This system compiles this stored data sets to be mapped in GIS software and produces high-quality map/visual perspective of data (Steinberg and Steinberg, 2015). GIS is a significant aspect of data collection within planning practice and spatial analysis of the data within the parameters of space, place and time can occur. Looking at the context of place, GIS enables common themes and characteristics to emerge and how they can relate to other forms of data and information throughout the research (Steinberg and Steinberg, 2015). For the purpose of this research, GIS mapping was used to show a comparative analysis of changes over time in the Queenstown area. The specific areas of focus will be population growth and changes in the area, Queenstown International Airport (QIA) noise boundary map changes, and development growth and expansion in the Frankton Arm. This will be useful to show the development of the area over time, illustrating the changes in airport noise management boundaries and the changes in houses/businesses and surrounding activities affected, and the potential impact aircraft noise has on people within the boundaries.

4.3 Secondary Research Methods

Secondary research methods were used to provide further analysis and understanding to this research. A literature review, policy review and media analysis were used and will be discussed in this section.

4.3.1 Literature Review / Policy Review:

The development of a literature review aims to provide the research team with academic research and knowledge that has emerged previously, and may in some way inform the current research. A well-developed literature review supports development of a strong research framework- including aims and objectives. Several case studies have been incorporated in the review; offering context and insight into how both national and international case studies have responded to similar reverse sensitivity issues. Analysis of similar contexts can provide a broad and general understanding of issues in the Queenstown Lakes District and support further analysis of primary data produced in this research project.

In order to understand the aims, objectives and rules of development in the specific areas contained within the research brief, a review of the Queenstown Lakes District Council's operative district plan and proposed district plan has been conducted. Comparative analyses with other Council's district plans, such as the Marlborough and Hawkes Bay District Councils have also been undertaken, to examine how these districts deal with similar issues, particularly in relation to viticulture. Other plans, management strategies and national policy standards have been analysed to inform part of the policy review. These guidelines shape both airport management and residential development in rural areas.

4.3.2. Media Analysis:

A media analysis was conducted, which examined the overall coverage of community perspectives in of QIA in order to gain insight to the key issues as well as how these issues were represented by the media. Content analysis is a way to study a vast range of 'texts' from transcripts of interviews and discussions in clinical and social research, the narrative and form of films and TV drama, and the editorial and advertising content newspapers, magazines and

electronic media (Macnamara, 2005). Media analysis is a crucial analytical method, it can uncover how a problems or scenarios are being portrayed, and in turn understand how these portrayals may influence the local, regional and national communities' views on the situation (Macnamara, 2005).

Content analysis can be used to study a vast array of texts to understand themes and frames in which a problem/ scenario is being portrayed. Media sources provide a critical perspective on how key stakeholders have presented the issues of reverse sensitivity or issues of that nature in public debates. Media analysis was used for this project to investigate how growth of the QIA noise boundary is being perceived and portrayed by the media. 12 online articles were gathered and investigated from 2 different news media websites from July of 2018 to October of 2020. This allowed for the identification of key issues that relate to the research areas.

In the case of the QIA, media articles were selected based on title and relevance to the project. The technique of open coding was adopted when analysing the media articles, which allowed for themes to be recognised. The media analysis categorised these articles into the categories of Positive, Negative and Neutral. Positive articles were generally in favour of expansion of the noise boundary, and or relocation of the QIA. Negative articles portrayed negative views on the noise boundary expansion and relocation of the QIA. Neutral articles generally portrayed both sides of the problem at hand, but they had an unbiased positionality when commenting on decisions, actions or opinions from the airport, council and community members. In addition to these themes, articles were also categorized as being Explanatory which meant that these articles emphasised the provision of a 'timeline' of the events and proposals involved in the Queenstown Airport noise boundaries and expansion. Based on the similarities with other forms of primary and secondary analysis, the same themes used in the interviews were used for the media analysis. These themes were People and Community, Social Engagement and Relationships, Growth, and Impacts.

4.4 Data Analysis

"The essential difference between quantitative analysis and qualitative analysis is that with the former, you need to have completed your data collection before you can start analysis, while with the latter, analysis is often carried out concurrently with data collection" (Walliman, 2006, pp. 129). Data analysis allows for patterns and trends to be identified within the data,

and for these patterns to be explained. The type of analysis differs between each form of data collected, particularly between qualitative and quantitative collection methods. It is important to transform raw data into workable information in order to identify key themes within the data and understand the issues which have arisen in order to identify key themes within the data and establish their relevance to research objectives (Walliman, 2006).

4.4.1 Key Informant Interview Analysis

The use of effective data analysis improves the understanding of the data gathered and can assist in drawing out meanings contained within the information provided. The first stage of the analytical process involves the transcription of key informant interviews from audio recordings (Stevens et al., 2018, pp. 27). Following the data being transcribed, specific information, themes and trends may start to be collated, into the "expected data" (data which is expected to be gathered from the interview based on the research objectives) and "unexpected data" (data which is unexpected, and is not outlined in the objectives); as a result coding can occur through set themes (Stevens et al., 2018). Coding of themes is often completed through the use of an open coding technique, as at times important themes can emerge that were not included in the predetermined set of themes. The use of open coding techniques alongside themes and topics that were common through the literature and interviews, which has allowed for the information to be analysed in greater detail (Vaughn and Turner, 2016). Open coding is a way of analysing textual content through labelling concepts and defining and developing categories based on the properties and dimensions of these concepts (Khandkar, 2009). This is beneficial to the research as it ensures important findings do not fall into a pre-defined, set category. The coded data is then used to form the basis of the findings and themes of this research report.

Initial coding for both key informant interviews and media analysis was conducted according to four key themes, these are compilated in Table 2. These themes commonly occurred throughout key informant interviews, and as such, was deemed to be important for the guidance of this research. Similarly, the key themes commonly occur in academic literature used for the report's literature review. This illustrates a correlation between what has been previously studied and examined, and what information was provided during field research.

A common theme through both the literature and interviews was the idea of people and community, as they are often the primary recipients of reverse sensitivity effects. A further theme that emerged was the idea of how the private sector, the public sector and community can socially engage better and foster stronger relationships between council, airport and the community. Topics also arose through the key informant interviews that growth and the impact of reverse sensitivity is a likely factor that needs to be accounted for, hence the inclusion of it in our coding table. There were multiple different themes that could have been included, however, the research team felt that these four themes were a key thread through the interviews and media articles, and literature, that they should be the predetermining themes.

Table 2: Table of Key Themes for Coding Key Informant Interviews and Media Analysis

Key Themes
People/Community
Social Engagement/Relationships
Growth
Impacts of Reverse Sensitivity

4.4.2 GIS Analysis

Analysis of the information and maps generated by GIS software helps contextualise information gathered through qualitative data and interviews. The maps will have various layers to show changes over time in the area - in relation to population growth, housing developments, commercial and industrial developments and airport noise management boundaries. The analysis GIS maps will support the research team in understanding the spatial spread of the development in the Queenstown Lakes District, and how this development has affected, or been affected by reverse sensitivity issues.

4.5 Ethical Considerations

Ethical considerations must be discussed and understood to ensure that the research remains safe and minimises any risks to participants, public and the researchers (Sieber and Tolich, 2013). There are two main ethical considerations which need to be accounted for in the research. The first is that ensuring all participants are willing and give their

consent to participate in the research and second, is ensuring that GIS information is gathered with consent given, but also information given to those that may have questions.

Prior to fieldwork commencing in Queenstown, ethical approval was gained from the University of Otago Human Ethics Committee. Key informants were also provided with an information sheet (Appendix A) and talked through the projects aim and objectives and were given a consent form to sign before any interviewing started (Appendix A). Participants were advised that there was no obligation to answer all questions and they could withdraw from the interview at any point if they wished to do so. Informants were asked whether they prefer to remain anonymous or would like to be referred to in the final report. Permission to record the interview was also obtained. Following these protocols indicates that the research has remained centred around key ethical principles, but also helps to ensure that participants are informed of the aim of the project and engage with the research process voluntarily and their contribution does not cause any harm to them or others.

4.6 Methodological Considerations/Limitations

Although all attempts were made to ensure a sound research process, there are always limitations to the methodological framework used. The research team recognises that the sample size of both key informants and information provided for GIS mapping, is relatively small. As a result, it may not entirely be a true representation of the views concerning the research topic of reverse sensitivity to the QIA and residential development in rural areas of the Gibbston Valley. While the key informants interviewed are a representation of a number of different opinions, other stakeholders were missed during the research week due to having busy schedules, were not able to meet and their reluctance to discuss particular issues - resulting in a lack of diverse opinions being obtained during the short four-day field week. To counter this problem, the research team attempted to recruit informants from a variety of backgrounds to obtain a range of perspectives. It was difficult to find informants who had enough information or understanding of reverse sensitivity and the effects that it generates. Furthermore, it is acknowledged that interviews are typically most successful when the interviewee knows a lot about particular topic. However, given that reverse sensitivity is a complex issue, and the term forms part of planning lexicon, the effectiveness of the research is likely to be limited by the technical nature of the research area.

It was decided in collaboration with a planner from the QLDC and our research supervisor, that questionnaires should not be used for this research topic. Given that the issue, for some people, may be quiet sensitive, this may raise concerns, and potentially lead to the health and safety of the research team being in jeopardy. With this in mind, we are not able to truly get a representation of the community and their thoughts and opinions in relation to the research topic. To counter this, the research team has sought to speak to the Frankton Community Group and Gibbston Valley Community Group to try and get a general understanding of the community.

4.6.1 Positionality

Within in all forms of mixed-methods research it is imperative that positionality of the research team is addressed in order to ethically outline the perspectives and starting points of the research team, and to outline any and all biases that may occur in the research despite all accounts of unbiased approaches. The research team included a mixture of first and second year Master of Planning students from the University of Otago, with a variety of backgrounds and political views shaping the diversity of the team It is important that we acknowledge that as researches, it may be perceived that we are in a position of power. To ensure all participants felt that there was no researcher power, interviews were conducted in places that were comfortable to them, such as their private home, workplace, or café. Our backgrounds influence the approach to the research, and it is critically to recognise this to allow a fairer and more opened-minded approach to the research task at hand (Rolin, 2009; England, 1994). Throughout the research process, attempts were made to reduce bias through considering our positionality and ethical dimensions through the process. Due to the time constraints, the research may not have a truly balanced results, given the inability to get in direct contact with various individuals who may have contributed in a different matter to the results. Information was also scarce in relation to the Gibbston Valley portion of this research and is purely based on desktop research involving other council's District Plans, and an Environment Court decision.

4.7 Concluding Summary

This chapter has outlined and described the methods used to conduct the research, including potential limitations of the approaches used. A mixed methods approach has been

used to gain more accurate results. This included primary data collection to gauge stakeholder perspectives and opinions on the research topic. Additionally, GIS was used to map information gathered from Statistics New Zealand, specifically census data, GIS Maps generated by the QLDC, and Queenstown Airport Corporation were layered in GIS software to produce a series of maps. Secondary data collection included a review of academic literature, pertaining to the topic and an analysis of relevant planning documents in Queenstown, and wider New Zealand. However, the effectiveness of the research was limited by informants being unavailable or unwilling to participate in the research. The following chapter will provide a policy analysis of the relevant planning documents both statutory and non-statutory in relation to the research topic.

CHAPTER 5 Policy Review:

This section seeks to address the legislative and planning frameworks which are relevant to Queenstown and Reverse Sensitivity. The Resource Management Act 1991 (RMA) is the overarching framework and legal foundation for all planning in New Zealand (Ministry for the Environment, 1991). As such the RMA gives direction to an array of planning instruments developed at the national, regional, and local level. All lower-level planning documents must give effect to those at higher levels, and all must be in line with the guiding principles of the RMA (Ministry for the Environment, 1991). To understand Queenstown and its planning system an analysis of the planning tools and instruments at each level of legislation that are of relevant to this project. In doing so this will provide a holistic view of the planning systems in Queenstown, and then provide a comparison to other district plans throughout New Zealand, which will then assist in informing the recommendations towards the end of this project.

5.1 Resource Management Act 1991

The RMA is the key piece of legislation which governs the management of all natural and physical resources in New Zealand (Ministry for the Environment 1991). The RMA itself does not have a specific mention of reverse sensitivity, however there are principals and functions within the RMA which as the basis for reverse sensitivity. Under Part 2, Section 5, the purpose stated in the RMA is to promote sustainable management of the natural and physical resources in New Zealand, this is done by managing the use, development, and protection of natural and physical resources (Ministry for the Environment, 1991). This must be done in a way that enables people and communities to provide for their social, economic and cultural wellbeing and health and safety while a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and c) avoiding, remedying, or mitigating any adverse effects of activities on the environment (Ministry for the Environment, 1991). The environment in the RMA includes ecosystems and their constituent parts, including people and communities and all natural and physical resources, and amenity values.

Due to people and communities being at the centre of the interpretation of the environment, when looking at the purpose of the RMA and seeing the third point states that social economic and cultural wellbeing must be meet while still avoiding, remedying, or mitigating any adverse effects of activities on the environment (Ministry for the Environment, 1991). This also relates to how adverse effects on people are mitigated, which is what reverse sensitivity is defined as doing. Reverse sensitivity is how people respond to the adverse effects felt by people and communities are remedying or mitigating the adverse effects that impact them.

In Section 17 of the RMA, titled *'Adverse Effects'* the guiding elements of reverse sensitivity are alluded to (Ministry for the Environment, 1991). When looking at adverse effects in the environment there is a duty to avoid, remedy or mitigate adverse effects that arise from an activity. As the environment includes people and communities when an activity produces any adverse effects on people or communities, there is a duty to either avoid, remedy, or mitigate these effects (Ministry for the Environment, 1991). When this occurs an abatement notice may be served that requires a person to implement means to avoid, remedy, or mitigate any actual or likely adverse effect on the environment caused by, or on behalf of, that person (Ministry for the Environment, 1991). This section alludes to the guiding principle of reverse sensitivity, which is the duty to mitigate and remedy the adverse effects on the environment and those that live it in that occur from activities (Ministry for the Environment, 1991).

As the RMA is the overarching framework and legal foundation for all planning documents in New Zealand and as such all lower order documents must be guided from the key principals and functions of the RMA and follow a hierarchy of documents (Ministry for the Environment, 1991). The RMA does not define or specify reverse sensitivity as it is a term from the common law of nuisance, however as identified above the principals from within the RMA flow into the lower order documents which then ensure that adverse effects are identified and dealt with accordingly (Ministry for the Environment, 1991).

5.2 National Level Planning Instruments

The National Policy Statement for Urban Development (NPS-UD) 2020 sets out the objectives and policies for planning for well-functioning urban environments under the RMA (Ministry for the Environment and Ministry of Housing and Development, 2020). The NPS-UD directs local authorities to ensure that planning is responsive to changes and

meets the demands of new development capacity. As the NPS-UD is set out to achieve new development at a large scale, there is the potential of reverse sensitivity effects as these developments occur (Ministry for the Environment and Ministry of Housing and Development, 2020). The first objective of the NPS-UD is that

> New Zealand has well-functioning urban environments that enable all people and communities to provide for their social, economic, and cultural wellbeing, and for their health and safety, now and into the future (Ministry for the Environment and Ministry of Housing and Development, 2020).

Based on this people and community's wellbeing, health and safety must be provided for by urban environments. When there is constant exposure to noise, wellbeing and health can no longer be provided for as the result of being exposed to either high levels of noise or constant noise is extremely detrimental to human health (Lawton and Fujiwara, 2015). While airports are a vital part of a functional and economically prosperous city, wellbeing as well as health and safety for people and the communities must be provided for at the same time (Office of the Auditor General, 2021).

Within the NPS-UD Policy 6 discusses the potential of adverse effects when making planning decisions (Ministry for the Environment and Ministry of Housing and Urban Development, 2020).As the NPS-UD affects urban environments and the local policy documents within that area, it states:

> "*That the planned urban built form in those RMA planning documents may involve significant changes to an area, and those changes: (i) may detract from amenity values appreciated by some people but improve amenity values appreciated by other people, communities, and future generations, including by providing increased and varied housing densities and types; and (ii) are not, of themselves, an adverse effect."* (Ministry for the Environment and Ministry of Housing and Development, 2020).

By ensuring that decisions makers are not an adverse effect in of themselves, it puts a responsibility on the decision maker to ensure that the adverse effects which can occur by providing housing this is taking into consideration reverse sensitivity.

5.3 Queenstown Lakes Proposed District Plan

The Queenstown Lakes Proposed District Plan was published in 2019, however the district plan review began in 2015. The Proposed District Plan (PDP) sets out to provide a more accessible and transparent plan that provides a clear strategic direction for the district (Queenstown Lakes District Council, 2020). This policy review will primarily be using chapters 3,4,6,17,23, and 45 as they provide the most relevance towards reverse sensitivity (Queenstown Lakes District Council, 2020). The principals of reverse sensitivity are both stated and implied throughout the PDP, this review will investigate these for the Urban Airport Zone and the Gibbston Valley zone to ensure that the varying types of reverse sensitivity are addressed for the different areas (Queenstown Lakes District Council, 2020).

5.3.1 Gibbston Valley

The Gibbston Valley is classed as an Outstanding Natural Landscape (ONL). Through the proposed District Plan the Gibbson valley is mostly zoned the Gibbston Character zone (Queenstown Lakes District Council, 2020). This zoning is done to ensure the primary use of the area is for viticulture and commercial activities with an affiliation to viticulture within the confined space of the Gibbston Valley. Gibbston Valley is recognised as having distinctive character and sense of place (Queenstown Lakes District Council, 2020). It incorporates terraced areas above the Kawarau River, lying between and including Chard Farm and Waitiri. While the zone has experienced residential subdivision and development, this activity has created the potential for the distinctive character to be degraded as well at the potential for conflict to arise with anticipated intensive viticultural activities (Queenstown Lakes District Council, 2020). This conflict arises from reverse sensitivity, where incoming residential owners object to the activities and noises, odours, and other such effects that are a part of viticulture but not typically a part of residential areas.

However, within the Gibbston Valley there is also the Gibbston Valley Resort Zone, the purpose of which is to provide for the development of a resort principally for visitor accommodation with an overall focus on onsite visitor activities based on the rural resources of the Gibbston Valley, winery tourism, and appreciation of the landscape (Queenstown Lakes

District Council, 2020). This includes an area named the Vintners Village which plans to provide for 152 houses and units at a low average density scale.

In efforts to address these potential issues there are several rules and provisions which restrict activities in this area. The retention of distinctive landscapes is discussed in strategic Objective 3.2.5.1 as;

> *"The landscape and visual amenity values and the natural character of Outstanding Natural Landscapes and Outstanding Natural Features are protected from adverse effects of subdivision, use and development that are more than minor and/or not temporary in duration"* (Queenstown Lakes District Council, 2020).

This objective is designed to ensure that areas of ONL are protected from the adverse effects of subdivision and development.

5.3.2 Urban, Residential and the Airport Zone

The urban and residential development that occurs in Queenstown is discussed in chapter three of the Proposed District Plan. Chapter three outlines the objectives and policies for managing the spatial location and layout of urban development (Queenstown Lakes District Council, 2020). Due to the increase in large-scale development in the area there is the potential for reverse sensitivity issues to arise. The second issue outlined in this chapter discusses ensuring that urban growth is managed in a strategic and integrated manner (Queenstown Lakes District Council, 2020). By insuring this it achieves a built environment that provides desirable, healthy and safe place to work, play and live. As Queenstown has expanded significantly over time more development has been expanding out further into the Frankton area putting in close proximity to the airport. The noise associated with airports can create significant issues for reverse sensitivity as residents who previously did not have an issue with noise can be impacted through an increase of activity or airport expansion. As such there is a variety of objectives and policies that aim to address and mitigate these issues as seen below.

> *Policy 4.2.2.1:*
> *Integrate urban development with existing or proposed infrastructure so that:*

a. *Urban development is serviced by infrastructure of sufficient capacity; and reverse sensitivity effects of activities on regionally significant infrastructure are minimised; and...* (Queenstown Lakes District Council, 2020).

As outlined by this policy, the urban development is serviced by sensitivity effects. The consideration of reverse sensitivity effects for infrastructure is important, as airports are considered both nationally and regionally significant infrastructure (Queenstown Lakes District Council, 2020). This policy ensures that reverse sensitivity effects of activities on airports are minimised. This policy further emphasises that the infrastructure component of airports shall be protected from reverse sensitivity effects from any activity which might be sensitive to aircraft noise.

Policy 4.2.216
"Protect the airport from reverse sensitivity effects of any Activity Sensitive to Aircraft Noise via a range of zoning methods" (Queenstown Lakes District Council, 2020).

Similarly, Policy 4.2.216 allows for the protection of the airport from reverse sensitivity effects related to noise. The protection this policy provides that the airport can continue to operate without the vulnerability of being subjected to complaints from more sensitive land use activities. Throughout the plan there are various ways that this protection is incorporated such as setbacks for residential and commercial activities.

Policy 4.2.216 mirrors that of Objective 36.2.1, which is outlined in Chapter 36: district wide matters; noise, which states that:

"The adverse effects of noise emissions are controlled to a reasonable level to manage the potential for conflict arising from adverse noise effects between land use activities". (Queenstown Lakes District Council, 2020).

This objective outlines the QLDC goals to mitigate and address the conflicts that arise relating to noise effects, under this objective Policy 36.2.1.2 also states that "Avoid, remedy or mitigate adverse noise reverse sensitivity effects" (Queenstown Lakes District Council, 2020). Noise can cause adverse effects on amenity values as well as impacts on the health and wellbeing of people and communities (Lawton and Fujiwara, 2015), this topic be addressed in more detail

through the literature review. As such, these objectives and policies are introduced to reduce the impact on people, communities and environments, by ensuring that noise emissions are controlled and adverse effects from those noise emissions are addressed through avoidance, remedy or mitigate to create better outcomes for the people of Queenstown.

The Queenstown Airport which is discussed in Chapter 17 of the PDP states that in Objective 17.2.3:

> "*An acceptable level of noise amenity and high levels of general amenity is provided for those using Queenstown and Wanaka Airports and on neighbouring land, while taking into account the Airport's role and function"*. (Queenstown Lakes District Council, 2020).

Creating an Airport Zone in the PDP allows for a set of specific objectives and policies to be implemented to ensure appropriate performance standards are implemented to manage the effects of the airport. This chapter outlines the specific setback rules and building requirements and performance standards which are implemented to address reverse sensitivity issues indirectly. The PDP provides protection for airports and the noise emissions associated with its operation (Queenstown Lakes District Council, 2020).

5.5 District Plans in New Zealand

By looking at other district plans and how reverse sensitivity is addressed will provide an analysis tool to compare how the PDP addresses reverse sensitivity compared to other districts in New Zealand. This section will identify four different district plans and how reverse sensitivity is addressed within these plans and provide context for the PDP.

5.5.1 Dunedin City Council

The Dunedin City Council Second Generation Plan (2GP) is the District Plan for Dunedin and throughout has numerous objectives, policies and rules that addresses reverse sensitivity for various activities (Dunedin City Council, 2021).The definition within the 2GP provides a good overview of reverse sensitivity and outlines the factors involved for reverse sensitivity to occur.

> *"When lawful activities that create effects beyond site boundaries are affected by uses establishing nearby that may have sensitivity to, and subsequently complain about these effects; and seek to limit the ability of the activities to continue... The most common example is new residential activities establishing next to farming or industrial operations, or airports, which can lead to the new residents complaining about noise, odour or other nuisance effects from those established activities."* (Dunedin City Council, 2021).

This definition of reverse sensitivity provides an overview of some of the conditions and activities which typically trigger reverse sensitivity actions. As a variety of activities can trigger reverse sensitivity it is discussed in numerous places throughout the plan as it fits applies to numerous chapters including network utilities, public health and safety, the various management zones, the Dunedin Hospital and the University and Polytechnic Campus (Dunedin City Council, 2021).When looking at reverse sensitivity in relation to the Dunedin International Airport it is first addressed in Policy 2.3.1.1 which states that:

> *"The Dunedin International Airport should be protected from activities that may lead to reverse sensitivity".* (Dunedin City Council, 2021)

This policy is important as it provides protection to the airport from reverse sensitivity effects and allows for the airport to be a significant contributor to the economic prosperity of Dunedin. The activities that pose a threat to the airport are discussed further in section 24, Dunedin International Airport under the Major Facility Zones of the District Plan. Throughout this section it lays out a strict set of activities allowed in the Dunedin International Airport Major Facility Zone ((Dunedin City Council, 2021). By implementing rules such as setbacks, noise boundaries and restrictions for activities it protects the airport from reverse sensitivity. These restrict noise sensitive activities from being allowed within the air noise boundary. Reverse sensitivity is also addressed in Section 9, Public Health and Safety which discusses that noise generated from almost all land use activities and that where the noise is excessive, unreasonable or extended over long periods of time, there is a risk that the health of people will be adversely affected (Dunedin City Council, 2021).

> *"Some environments and activities are particularly vulnerable to excessive or unreasonable noise, and these 'noise sensitive activities' require protection to ensure*

> *that adverse effects on the health of people are suitably managed, and reverse sensitivity issues are avoided."* (Dunedin City Council, 2021)

By ensuring that people are protected from excessive or unreasonable noise and that no noise sensitive actives can occur in these areas protects against reverse sensitivity.

5.5.2 Wellington City Council

The Wellington City Council District Plan also identifies objectives, polices and rules relating to reverse sensitivity. In the residential rules section of the plan, in the relevant policies for preparing resource consent applications rule 5.3.10.B states that;

> *"The construction, alteration of, and addition to residential buildings, accessory buildings and residential structures where the result will be two household units on a site within the Air noise boundary depicted on Map 35 is a Discretionary Activity (Restricted) in respect of:*
>
> 1. *the level of exposure of the site to permitted airport related noise*
> 2. *any special characteristics of the site, and the design and materials of the building(s) or structure(s) that influence the level of permitted airport related noise received*
> 3. *the health and amenity of occupiers of the new, altered or added to building(s) and/or structures(s)*
> 4. *the potential for reverse sensitivity effects on permitted airport activities" (Wellington City Council, 2021).*

By having rules which address the potential reverse sensitivity prior to building, it prevents the future risk of residents being impacted by the reverse sensitivity issues specifically relating noise generation. The Wellington District Plan also identified the airport as an existing noise source that may be incompatible with residents in nearby Centre Areas (Wellington City Council, 2021). Residential development puts constraints on the airport, as the airport is one of the cornerstones of Wellington's economy it requires protection from noise sensitive activities. As a result of this the Wellington City Council when assessing applications for buildings within Wellington International Airport Air Noise Boundary must consider whether

the development is likely to lead to potential conflict with and cause adverse effects, including reverse sensitivity effects, on airport activities (Wellington City Council, 2021).

5.5.3 Christchurch City Council

As a part of the Christchurch City Council District Plan, reverse sensitivity is discussed in a variety of ways. Within the definition of the airport noise boundary there is a note included to state that:

> *"The Air Noise Boundary defines an area around Christchurch International Airport in which the future daily aircraft noise exposure from aircraft operations is sufficiently high as to require prohibition on new sensitive activities, to avoid adverse noise effects and reverse sensitivity issues." (Christchurch City Council, 2017)*

Setting an air noise boundary allows for the avoidance of adverse noise effects and reverse sensitivity effects. Given the importance of airports for a city's economic growth, the creation of airport noise boundary allows for the operation if airports in city environments, without the risk of reverse sensitivity. This sentiment is further emphasised in objective 3.3.12 which states that:

b. *"Strategic infrastructure, including its role and function, is protected from incompatible development and activities by avoiding adverse effects from them, including reverse sensitivity effects. This includes:*

i.....

ii.....

iii. *avoiding new noise sensitive activities within the 50dB Ldn Air Noise Contour and the 50dB Ldn Engine Testing Contour for Christchurch International Airport, except:*

a. *within an existing residentially zoned urban area; or*
b. *within a Residential Greenfield Priority Area identified in the Canterbury Regional Policy Statement Chapter 6, Map A; or*
c. *for permitted activities within the Specific Purpose (Golf Resort) Zone of the District Plan, or activities authorised by a resource consent granted on or before 6 December 2013; and*

d. *for permitted, controlled, restricted discretionary and discretionary activities within the Specific Purpose (Tertiary Education) Zone at the University of Canterbury; and …" (Christchurch City Council, 2017)*

The Christchurch City Council provides a series of rules that protect the airport against reverse sensitivity. These various rules present as definitions, noise boundaries, and restriction of activities in the district plan which allow for the continued operation of the airport.

5.5.4 Whangarei District Council

The Whangarei District Council district plan defines reverse sensitivity as:

> "*Reverse Sensitivity means the potential for the operation of an existing lawfully established activity to be constrained or curtailed by the more recent establishment of other activities which are sensitive to the pre-existing activity"* (Whangarei District Council, 2017).

By including this definition within the start of the plan it allows for a clear understanding of what reverse sensitivity means and how it affects different areas within Whangarei. Reverse sensitivity is further identified in the 'Noise and Vibration' chapter of the District Plan, which states that excessive noise can detract from character and amenity values (Whangarei District Council, 2017). This section discusses that noise generating activities can be restricted by noise sensitive activities that seek a higher level of amenity (reverse sensitivity). In urban areas or mixed-use zones, noise is identified as a significant issue; noise emitting issues can be located next to noise sensitive activities such as residential uses (Whangarei District Council, 2017).

By identifying this and that noise can be a contentious issue with significant impacts it allows for policies and rules to be introduced such as;

> *"2. To avoid reverse sensitivity effects by:*
> *a. Requiring suitable acoustic design standards for noise sensitive activities located in or adjacent to areas anticipating high noise levels.*
> *b. Restricting noise sensitive activities in Environments where they could unduly compromise the continuing operation of appropriate business activities.*

c. Considering the use of other mechanisms, such as noise control boundaries" (Whangarei District Council, 2017).

The 'Noise and Vibration' chapter discusses the air noise boundary for the Whangarei Airport. Air noise boundaries are a common tool used in District Plans to help protect and prevent against reverse sensitivity (Whangarei District Council, 2017). Some of the rules that are laid out within this chapter are targeted specifically to the airport as identified below.

"2. Within the Air Noise Boundary:
a. new noise sensitive activities are prohibited activities
b. Visitor Accommodation is a discretionary activity:
Note 2 - Notification: Council has identified reverse sensitivity effects that new noise-sensitive activities may have on the safe and efficient operation of the Whangarei Airport. It has also identified potential adverse effects of the Airport on noise-sensitive activities. Therefore, applications for resource consent may require the written approval of the Whangarei Airport as an affected party if such applications are to be considered on a non-notified basis" (Whangarei District Council, 2017).

Whangarei District Plan provides a good set of objectives, policies and rules that discuss reverse sensitivity and how to manage and address the issues associated with it.

5.8 Concluding Summary

Reverse sensitivity is embedded through a variety of different plans and legislation in New Zealand and provides a unique set of tools to help improve people's lives. Reverse sensitivity is not specially named in the RMA, but its ideologies are and as such these have filtered down into district plans. By looking at first the Queenstown Lakes District Council (QLDC) PDP and identifying where reverse sensitivity is used in the district plan and then analysing these objectives, policies and rules to see if they are effective in addressing the challenges that are currently associated with reverse sensitivity in Queenstown. By looking at other district councils and how reverse sensitivity is addressed in their plans, a comparison between the different districts and reverse sensitivity can be seen.

There are some common trends which have occurred throughout to help tackle reverse sensitivity in particular towards airports. The most common trend is implementing an air noise boundary and restricting activities within that space, this prevents reverse sensitivity from occurring. This strategy seems to work if there are no established uses in the area, however like in the case of Queenstown where there are activities such as businesses and housing within or adjacent to the boundary this boundary is not as effective for those already impacted. When this occurs rules such as those stated in the QLDC PDP and the Dunedin City Councils 2GP which require noise sensitive to consider the health and wellbeing of the people impacted by the noise generating activities. While these rules are great for smaller noise generating activities, due to the economic significance of airports, most district plans provide a specific rule which protects the airport from reverse sensitivity effects. There are a lot of commonalities between the five district plans identified above, through analysing these as well as the RMA and NPS-UD this provides a clear background of the use of reverse sensitivity in polices in New Zealand.

CHAPTER 6: Research Question 1A

The term reverse sensitivity refers to the vulnerability of existing land uses to new land uses and vice versa. In a New Zealand context, reverse sensitivity issues may result in the limiting of development and a failure to address reverse sensitivity issues associated with development, resulting in tension and contestation within communities. Responding to reverse sensitivity issues, therefore, requires approaches that are context-specific. This chapter will discuss research objective one: understanding the origins of the diversity of reverse sensitivity effects associated with the Queenstown International Airport (QIA). This chapter will explore the development which has occurred in the airport area, the effects this has had on the surrounding community, and the strategies employed for managing these effects. This chapter will also discuss how some of the reverse sensitivity effects have been ineffectively dealt with and barriers that exist to address other reverse sensitivity effects successfully.

6.1 History of the Airport

Within recent years Queenstown has experienced rapid growth. This growth includes growth both in regional development and population as well as growth in the tourism sector. The population growth between 2006 and 2018 is shown in Figure 8 below – as seen in Figure 8, significant growth has occurred within the area surrounding the airport, including within the Outer Control Boundary. The QIA can be acknowledged as infrastructure critical for the region, as the local economy depends significantly upon tourism – with around 60% of the region's economy dependent on tourism (Martin Jenkins, 2020). Furthermore, around two-thirds of jobs in the local economy are dependent on tourism (Martin Jenkins, 2020). Prior to March 2020, the QIA was on a trajectory of continued growth and expansion. The airport is predicted to require an expanded capacity within the next two years. This continued growth has been the source of many reverse sensitivity effects in the area, and as a result, has produced tensions between airport and community. One interviewee discussed existing growth trajectories, stating that:

> And the city at the time was just absolutely hell bent on - and the mayor to be fair. Were hell bent on growth. And it did not really matter what was impacted by the community, they just said we need more tourists here. (Key Informant Interview 11)

As discussed in Chapter 6, the QLDC has employed a variety of mechanisms to manage the growth and development in the airport area and the reverse sensitivity effects associated with development. These have included policies provided for in the proposed district plan, which assert that the infrastructure capacity of the airport shall be protected, as the airport is considered significant operation. In particular, the QLDC has employed a variety of zoning mechanisms in order to minimise reverse sensitivity effects:

> *Policy 4.2.216*
>
> *"Protect the airport from reverse sensitivity effects of any Activity Sensitive to Aircraft Noise via a range of zoning methods."*

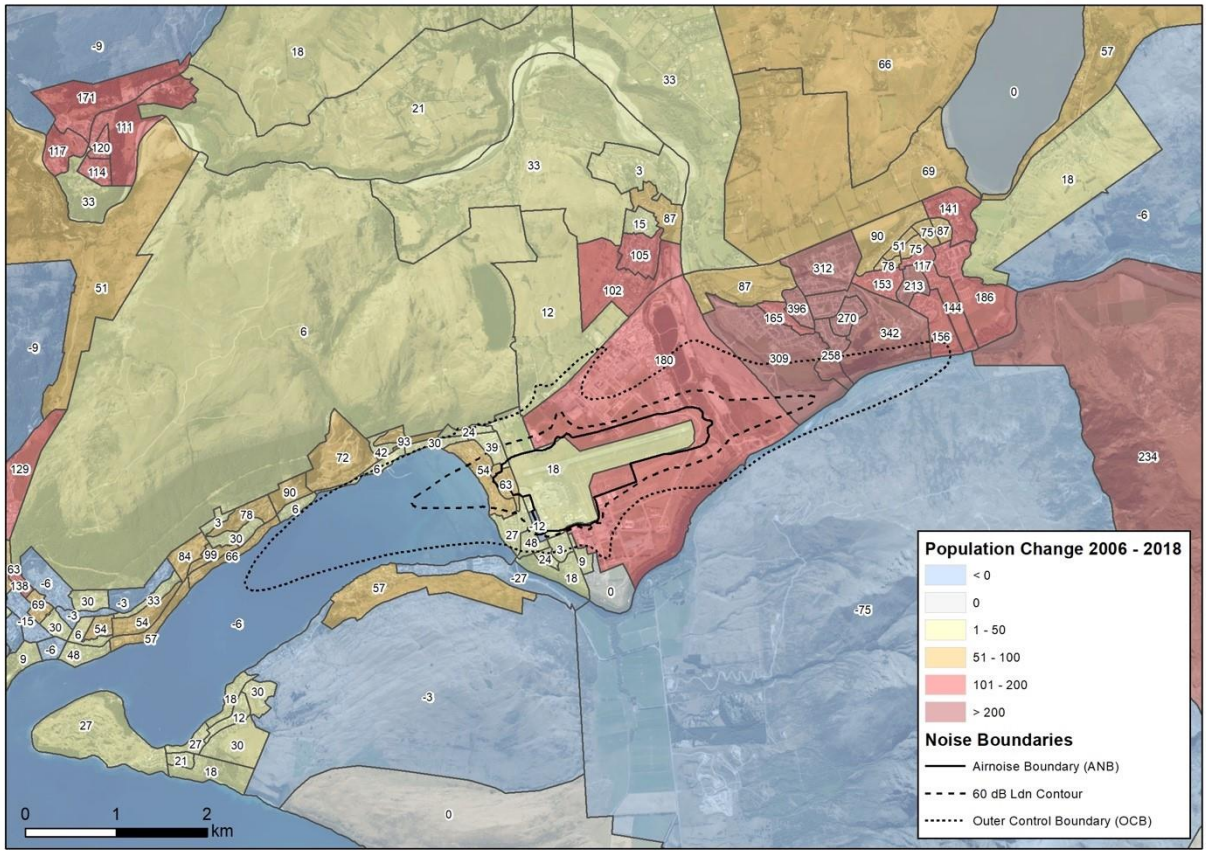

Figure 8: GIS Map of Population Change in Queenstown between 2006 and 2018. Information sourced from Statistics New Zealand

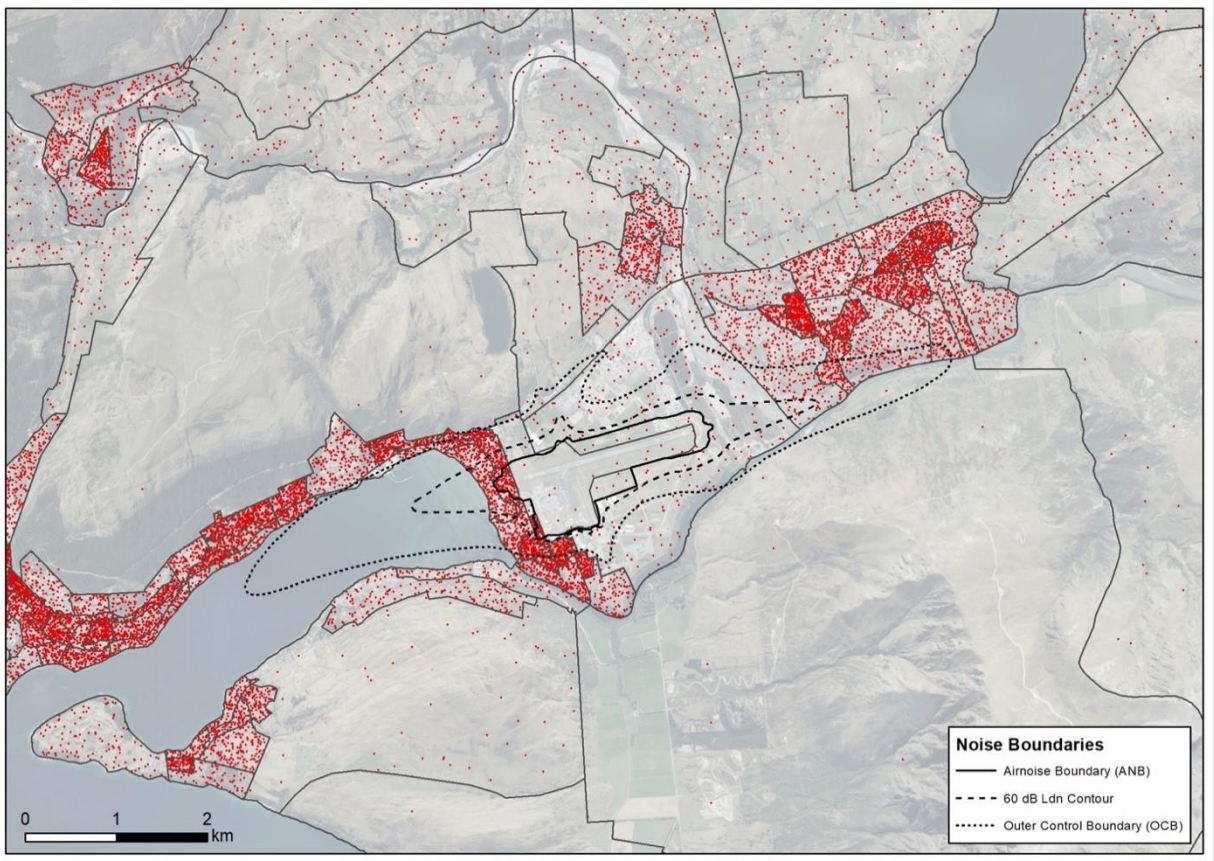

Figure 9: Queenstown International Airport Noise Boundaries Overlayed Dwelling Locations

6.2 Diversity of Reverse Sensitivity Impacts

A majority of the reverse sensitivity impacts that emerged in this research can be classified as either *noise impacts* or *growth and congestion impacts*. Furthermore, the steps taken by the Queenstown Airport Corporation (QAC) and Queenstown Lakes District Council (QLDC) to mitigate the impacts of noise exposure can also have impacts on the overall quality of life in the region. The diversity of impacts in the Queenstown Lakes District due to reverse sensitivity has resulted in zoning complications. The impacts of zoning around the Airport has been shown to impact the level of noise, comfort and broader issues related to health impacts. With the growth in the region, these impacts are not expected to slow down. Zoning around airports often considered in the planning phase of development, with apparent reverse sensitivity affects being present in airports operational needs. Nikorowicz-Zatorska (2018) highlight the importance of zoning around airport locations, with the International Civil Aviation Organisation setting out best practice regarding planning and zoning for airports (Nikorowicz-Zatorska, 2018). In locations such as Queenstown, the historical placement and influence has resulted in development occurring over time, with zoning applied to cope with

the growth and limits of space in the district. This factor has led to the development of reverse sensitivity of airport operations in the district. In Figure 12 in Section 6.2.3 below, the significance of growth since 2006 is shown. The development of zoning has had to work alongside the airport with mitigation strategies to address how best to deal with development while allowing for the Airport's operational growth.

Key Informant 5 refers to the issues of zoning and the implications surrounding open space. In the Proposed District Plan (PDP) for the QLDC, the open space chapter refers to recreational space and amenity value of landscapes, natural character and informal open space (Queenstown Lakes District Council, 2021). The impacts for zoning and airport involvement relate to preserving environmental amenity value and the appearance of that space. The impacts of noise and operational effects can limit the ability for open space to be significantly enjoyed and places stressors on those wishing to enjoy it. Key Informant 5 states, "and people still want to enjoy the outside of the house, they don't want to be locked in and that sort of stuff." Alluding to the impacts that noise has on how residents and tourists alike can enjoy open space and the amenity value that it provides to the region. Chapter 9 refers to the amenity value and land-use planning in a greater level of detail.

The impacts of low density suburban residential zoning have seen consistent development occur in the area and resulted in a diversity of reverse sensitivity impacts. One of the major concerns is the location of the Lakes District Hospital within the air-noise boundary and neighbouring the QIA. This results in a wide scope of vulnerable people being affected by noise pollution and a lack of mitigation targets towards the hospital. Due to the vulnerable nature of patients in recovery, we could not conduct primary research regarding the effects of noise on patient well-being. However, Key Informant 1 provided anecdotes on current status of the mitigation strategies, "This is an old building and apart from closing windows, we don't really have too many other options. If you think about just to mitigate the impacts for the population". Key Informant 5 highlights the lack of mitigation offered and provided by QLDC and the Airport. This causes concerns, and study and analysis should be considered into the impacts for patients.

Zoning in the Queenstown Lakes District is a considerable difficulty, with restrictions on access to space and the need to consider densification alongside growth highlight the need for

a balanced approach with planning mechanisms. The analysis of zoning implications and development of Queenstown shows that zoning is an important aspect of noise mitigation and mitigations of reverse sensitivity effects in the district.

6.2.1 Noise Boundary Issues

As seen in the district plans produced by councils such as the Wellington City Council and Christchurch City Council, air noise boundaries are commonly used by such bodies to address reverse sensitivity issues. The activity restrictions put in place in areas subject to high levels of noise emissions exist to ensure that reverse sensitivity issues are mitigated to allow for the continuation of operational activities, in this case the Queenstown International Airport. An important factor to consider when discussing the effectiveness of such boundaries is the relationship between the QLDC, QAC and the local community members located within and surrounding the established noise boundary area. QAC has engaged with the community regarding the Airport's operational hours, with limitations being implemented when the airport can have incoming and outgoing flights (Queenstown Airport, 2021). The media analysis (Appendix C) highlights the tension between community members and QAC regarding the airport expanding the established noise boundary limits.

Expanding the air noise boundary has been a contentious issue that has been opposed when raised in proposals. An ODT article (refer to Appendix C) indicated that 92.5% of online respondents to the proposal were against it, with the remainder being unsure or neutral to the expansion. Queenstown International Airport operates a noise mitigation program to reduce the effects felt by residents within the air noise boundary, with existing homes in the inner boundary having access to 100% funding for noise insulation and 75% funding offered to install mechanical ventilation systems in the mid-noise boundary. When providing this funding a no-complaint covenant is put on land-titles, with this establishing that landowners can not complain about legally made noise. Regarding such relationships and programs, the New Zealand Policy Statement on Urban Development (Ministry for the Environment and Ministry of Housing and Development, 2020) outlines that wellbeing of New Zealanders and their communities are an imperative goal for health, safety, culture, and economic well-being of the country's regions. This shows the importance of establishing and maintaining a healthy

relationship between the QLDC, QIA, and the local community where the effects of reverse sensitivity are concerned.

The most notable issue with Queenstown Airports operational noise boundaries relates to the effects produced and felt by the community and how that affects the perceived amenity value. Key Informant 1 adds, “Yeah, just to reiterate look at the impact on the population across the whole flight path. As well, Gibbston is a concern as [inaudible]. So I think, looking at Shotover Country and Kelvin Heights would be really important as well.”. Here Key Informant 1 is able to highlight the real effects felt across the region, the impacts of topography being a considerable influence on how noise in the region travels and its ability to reach outside of the established noise boundaries. Key informant 8 outlines the acknowledgement of noise and its relationship with boundaries “you know that we've got lines on a map, but noise doesn't stop and a line on a map” indicating the awareness of the problems with noise boundaries. These issues are unlike to dissipate, it is up to the QLDC and Queenstown Airport Cooperation to find a balance between development pressures, growth and zoning that would allow for more harmonious integration of aircraft noise.

6.2.2 Secondary Quality of Life Impacts:

One of the key themes that was observed throughout this research was that the level of noise itself was not the primary issue. The secondary impacts on quality of life were brought up more often by community members, and local institutions, as opposed to QAC representatives. The placement of noise boundaries results in restrictions that impact the level of freedom and actions that residents are allowed to conduct without disturbance in their homes. Continued airport development has resulted in a variety of impacts upon the quality of life of Frankton residents, and residents in the wider Queenstown area. These impacts are summarised in Figure 10, shown below, and include issues such as traffic congestion, loss of amenity such as the golf course, and the inconsistency of noise events, as well as the impact of mitigation measures on well-being.

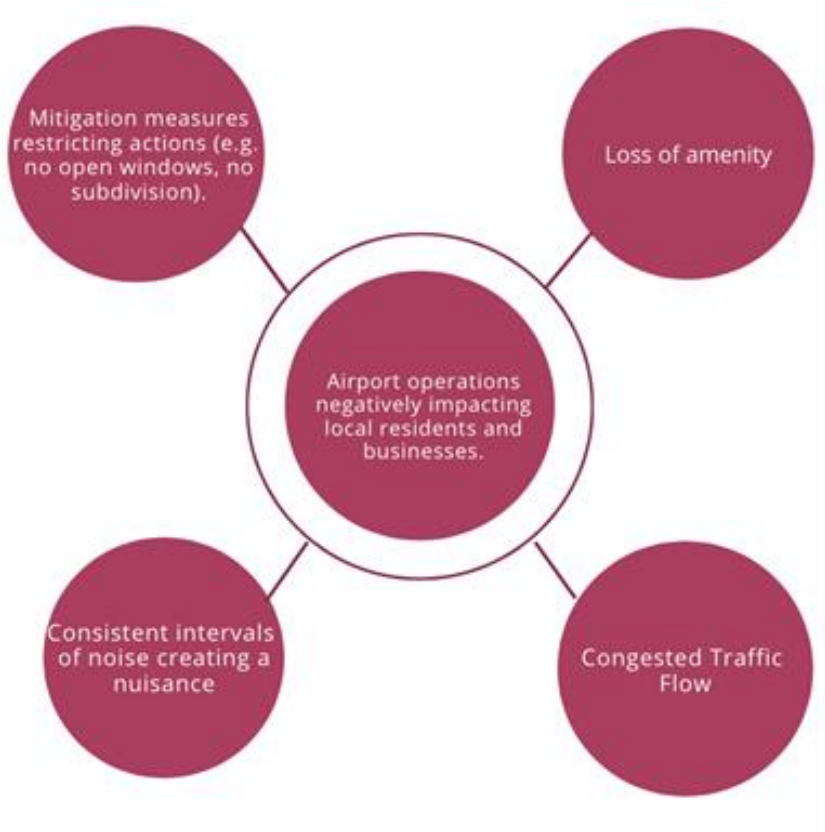

Figure 10: Impacts of Airport Operations

> Well, the airport has actually dictated what we can and can't do it because we can't subdivide our sections here. You know we would have liked to as as we got older my wife and I, we would have liked to have put a perhaps, say a low-level house out the front here all on one level for us to live in. (Key Informant 11).

One interviewee also highlighted concerns around continued development in the broader airport area, resulting in issues such as congestion, stating that:

> **And that corner, for some reason, they want to put all these other things there, which is again gonna have traffic congestion, y'know? Every- everywhere they look, they seem to want to jam everything into the one area.** Like bus hubs, bus transfers, emergency services, all this nonsense and they've also got all the playing fields next door, where people come to congregate at certain times, swimming pool everything else. They seem to want to do that. **Whereas everybody said we need a green space**. (Key Informant 11).

> But noise **has definitely crept up on everybody, and when people say that Queenstown is spoiled, I think a lot of it is talk about noise and, um traffic and density… you have to remember that the airport is at the centre of everything, and cars are going everywhere** and often on the wrong side of the road. Frankton airport before COVID was just a nightmare. In fact, my husband got totalled once in his car by somebody just driving on the wrong side of the road coming out of the airport. (Key Informant 10).

However, although the community group representatives highlighted frustration with congestion associated with the airport, other interviewees acknowledged that although congestion is an issue, these congestion challenges stem from broader growth challenges in the region, as opposed to just airport related tourist numbers. These counter perspectives are shown below:

> Who are complaining about the airport being here is that is **they don't like the noise they make now, don't like the traffic congestion that they thought they caused**. Except we found out through COVID that they didn't cause the traffic congestion because the traffic in the COVID nosedive the tourists and the traffic congestion basically never changed. **So the traffic congestion in this town is caused by the locals**. It's not caused that much by the visitors. (Key Informant 7)

> The whole debate [around changing noise boundaries in 2018] morphed into a growth, tourism, sort of discussion**, infrastructure, all the strains and pressures as a community we were having at the time**…And then there was also in where are we going to grow to what size are we going to grow? It's all these questions of how are we going to find that … what's don't do anything until the infrastructures in and all these sorts of questions came out? (Key Informant 3)

The first quote above "whereas everybody said we need a green space" also highlights a desire for the provision of environmental amenity and green space in the airport area. Furthermore, a resident in the Frankton area also expressed concern around the quality of amenity and green space within the area; stating that the provision of *quality* greenspace – in the form of a good

golf course – may improve the acceptability of airport expansion and loss of overall green space:

> There are nine holes there but, but, and to be fair **- if they did it really well** and they did six holes, six really good holes. **I think the community and the golfers and everybody... and had the driving range, they would accept that**. Yeah, so you know you can play still six holes or nine holes or 18 holes if you want to go around three times. (Key Informant Interview 10).

This issue of development and congestion can be associated with the trends of what Freestone (2009) calls 'Airport-Led Urban Development' and 'airport commercialisation.' According to Freestone and Baker (2011) airports "have become design, economic growth, and city branding hotspots" due to their critical position within global trade, travel and tourism networks. This has resulted in the emergence of the airport as a broader area which extends beyond the physical space of the QIA itself and incorporates a variety of facilities including office buildings, shopping malls, accommodation and more. Thus, it is critical to acknowledge that reverse sensitivity issues may emerge not only from airport operations, but also from the ways in which commercial and other development occurs within the broader airport area. The following section will discuss the issue of growth in the area, and the various tensions surround development in the broader airport area.

6.2.3 GIS Data Analysis:

This GIS data shows the development of the Queenstown airport noise boundaries lines, the increase in density between the year 2006 and 2018. This data aids in the analysis of the origins of reverse sensitivity in the Queenstown Lakes District.

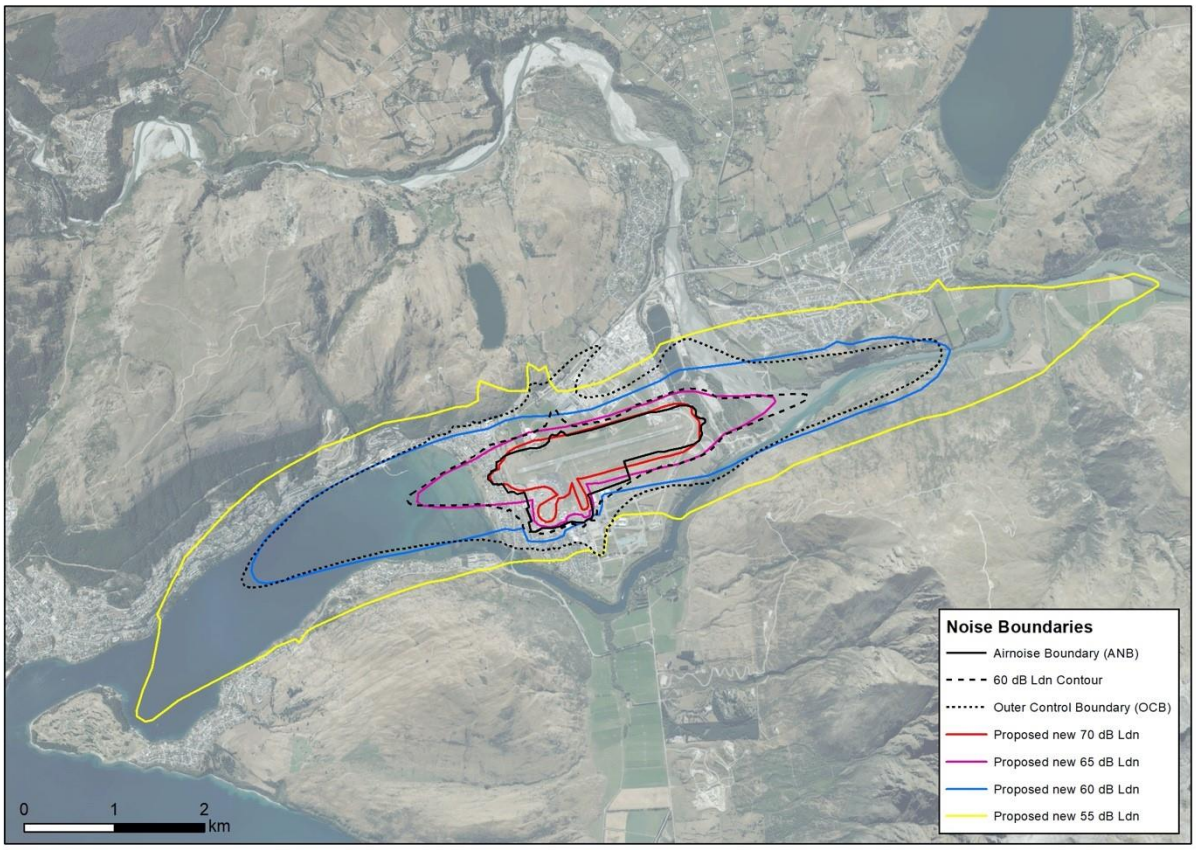

Figure 11: GIS Proposed Noise Boundaries for the Queenstown International Airport

Figure 11 displays the current air noise boundaries alongside the proposed air noise boundaries from the 2018 Proposed Noise Changes by the Queenstown Airport Corporation. This report was developed to gain perspectives of the community and build a relationship and conversation around the expansion of noise boundaries for arriving and departing flights. It's important to note this process of community consultation was not a formal process under the Resource Management Act (Ministry for the Environment, 1991) rather a process in order to gage the communities reaction to the possibilities and likely need (now some point in the future) of expanding the noise boundary in order to accommodate the growing demand of tourism in Queenstown, New Zealand.

Figure 12: GIS data of Queenstown Noise Boundaries side by side analysis from 2006-2018

Figure 12's spatial analysis of data shows the a noise boundary comparison of 2006 and 2018. This GIS image shows that over this 12 year period there has been no changes to the existing noise boundary in Queenstown. The proposed noise boundary changes occurred in 2018. The GIS image does however show some of the changes in density over the 12 year period.

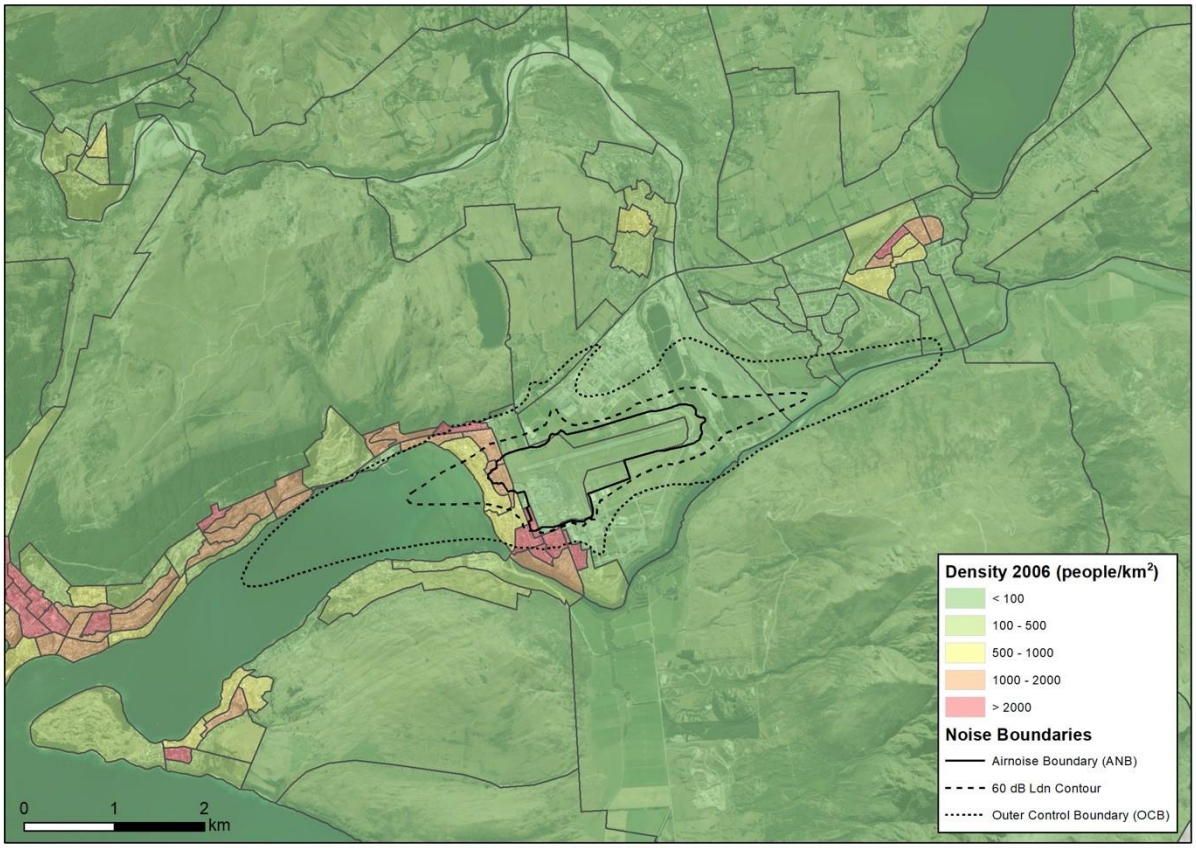

Figure 13: GIS data of Queenstown's density in 2006.

Figure 13 shows the density level against the noise boundaries of Queenstown airport from the year 2006. Density levels of between 500 to greater than 2000 occupants density can be seen through air noise boundary (ANB – black solid line) within this boundary reaches 65 decibels or greater (Queenstown Airport Noise Management, 2021), through to the 60 decibel zone contour.

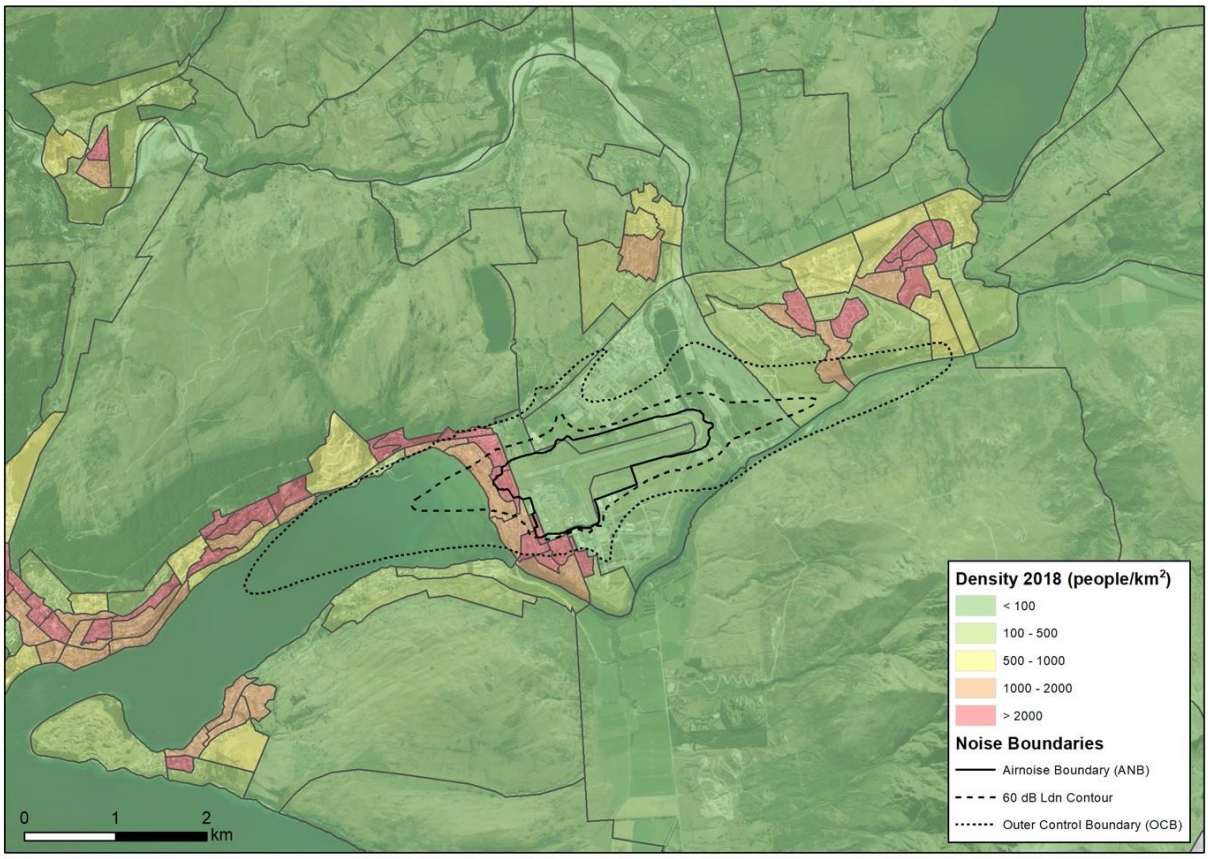

Figure 14: GIS data of Queenstown's density in 2018.

Figure 14 shows the density levels of Queenstown against the noise boundaries form the airport the year 2018. Compared to Figure 13 this image indicates an increase in density within the noise boundary. Within the air noise boundary (ANB – black solid line) 1000-2000 to greater than 2000 occupant density is shown. In the 60 decibel landing contour (dashed line) carries occupancy of 1000-2000 and the outer control boundary (OCB – dotted line) carries occupancy of 500-1000 people.

6.2.4 Growth and Predicted Growth

Graph Analysis: Data source: Queenstown Airport Corporation (2018)

Figure 15: Current and Proposed Air Traffic Volumes for Queenstown Airport (Data source: Queenstown Airport Corporation, 2018).

Figure 15 shows the current air traffic volumes of Queenstown Airport (2018) and the predicted growth of air traffic in the region for the near future – (this was a pre-COVID19 estimation of growth), comparing these numbers side by side allows a comparative look at the increase, especially concerning scheduled flights.

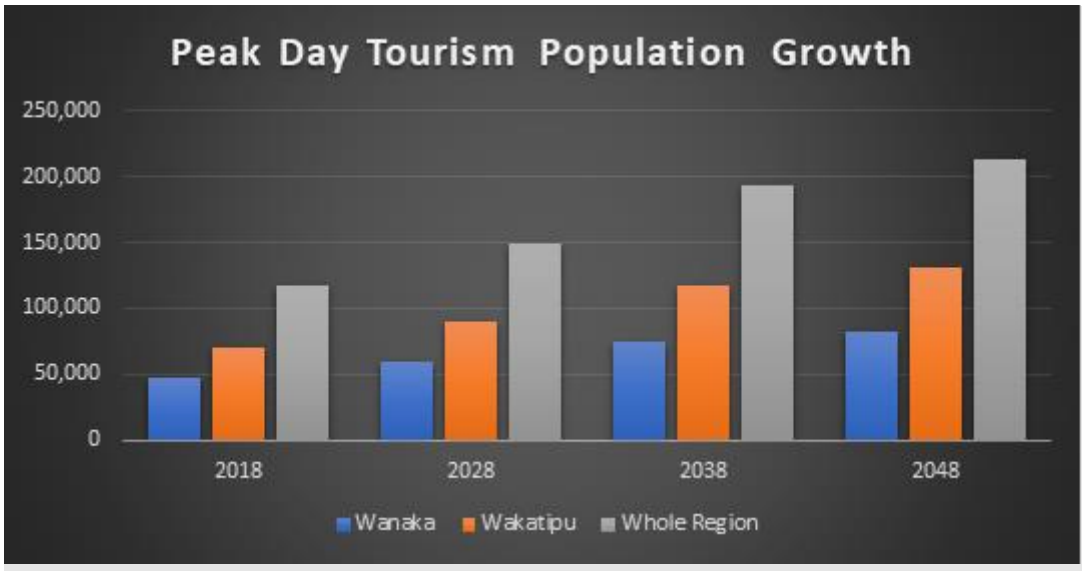

Figure 16: Current and Proposed Tourism Population Growth for the Queenstown Region (Data source: Queenstown Airport Corporation, 2018).

Figure 16 shows a growth comparison of the tourism population in the Queenstown region, focusing on Wanaka and Wakatipu. The graph shows the rise in expect tourism numbers over increments of 10 years – (this was a pre-COVID19 estimation of growth). This graph shows the possible growth of tourism in the area, due to recent events, likely to occur over a longer period. Higher tourism numbers will result in more frequent flights and the need for growth to be considered at the QIA.

However, although Queenstown has experienced substantial growth in recent years, not all perspectives on continued growth were positive. Key informant interviews highlighted how some opposition to airport development was not only a result of noise issues but also a broader frustration with increased tourism and its associated effects:

> And it talks a little bit about where things are going to grow, more settlements are going to grow. And **from a reverse sensitivity point of view, it is a bit of a concern with the amount of residential activity that they're suggesting will be in the Frankton flats area.** (Key Informant 8).

> **Because not much of it, I expect, is about the noise effects of the Airport, it's about the impacts of growth generally.** And if the airport goes from receiving 2 million visitors a year to 5 million, the effects that has on the district generally not the specific this is what noise does to us. So those [community] groups that complain about the Airport are not doing it, in my opinion, primarily because of noise effects in, in the immediate area. **They're doing it because they don't want the growth and they don't want the tourists and all that kind of stuff.** (Key Informant 4).

The above quotes highlight conflict around the community aspirations for growth in the area. The tensions that ongoing airport developments have created between QIA, QLDC and the community are discussed further in Chapter 7. This chapter will address the factors that affect the perception of and vulnerability to reverse sensitivity issues.

6.3 Strategies Employed by the Airport – What do they actually do? And what does this mean?

The QIA employs an approach to noise exposure that focuses on the idea of the 'bucket of sound.' An airport representative describe this as:

> There's the bucket. So, you can't take individual results, obviously, because one, one sort of event is really quite loud. So, you have to sort of average off over a 24-hour period, what the average noise is - our operating hours are between 6am and 10pm. (Key Informant 8).

The idea of the bucket of sound is to monitor the amount of noise energy being produced within the noise boundaries without exceeding the requirements put on the Airports operations. The noise boundaries outline's where noise exposure can or may occur with the bucket of sound monitoring the noise energy over 3 months (Queenstown Airport Corporation, 2018). The QIA has developed a detailed noise mitigation plan that covers engagement with the community, monitoring and reporting noise levels, the strategies for avoidance, remediation and mitigation of noise exposure. From the perspective of the Airport the goal of noise mitigation is, "to ensure that you can live comfortably in your house with the doors and windows closed, and not have an interruption in your critical listening environments" (Key Informant 8). Furthermore, the plan also outlines the processes for dealing with complaints. The mitigation plan is based on the idea that noise is inherently connected with the operations of the QIA. Thus, a significant portion of the plan also relates to community relations and managing effects on the community. The airport also operates a noise mitigation programme to affected residences. This involves offering 100% funding to homes in the inner noise boundary for sound installation and ventilation, as well as 75% funding for mid-noise boundary homes (Queenstown Airport Corporation, 2018).

One of the key limitations with the strategies employed by the QIA is the lack of accountability regarding monitoring, reporting and community consultation/engagement. These issues result from the lack of recognition from the airport about the importance of community and community well-being regarding noise pollution and spatial amenity. Chapter 7 will include a

further discussion of social engagement strategies and the limitations for responding to reverse sensitivity issues.

Understanding the strengths of data collection, both through quantitative and qualitative methods, this process allows for a wider range of data to gathered, creating a process that informs the strategies to implement for addressing the situation of aircraft noise in the Queenstown region but also outlines the possible scope of the issue of noise pollution and the issues of reverse sensitivity in the Queenstown Lakes District (Heyes *et al.,* 2021). This idea also allows for a more human-centric approach that would outline the most suitable strategies to implement regrading zoning, land-use activities and how best to begin discussions on growth in the region.

6.4 Concluding Summary of Research Question 1A

Research question one has provided the ability to assess the diversity of impacts in relation reverse sensitivity impacts produced through aircraft noise in the Queenstown Lakes District. An assessment of zoning impacts and their relationship to reverse sensitivity allows a brief look into how complicated the airport's location is regarding development and growth impacts. Throughout this research question, issues of noise boundaries have been raised and discussed in order to appreciate the unique position of Queenstown and its residents fully. Through this the secondary quality of life impacts emerged, contextualising noise issues and reverse sensitivity effects. The final result has outline in what way the air noise boundaries fail to protect the community and how balance is the sort after goal regarding the minimisation of reverse sensitivity in the Queenstown Lakes District

CHAPTER 7: Research Question 1B: Gibbston Valley

Gibbston Valley is a rural region located in central Otago which is known for viticulture, with the region containing several award-winning vineyards. As seen in Figure 17 the valley is the primary route that connects the towns of Cromwell and Queenstown, and as such is an important thoroughfare for traffic travelling to and from Queenstown. Gibbston Valley is located 28 kilometres from Queenstown and is connected to it by State Highway 6. Gibbston Valley is primarily zoned for rural land use, with much of the area being within the Gibbston Character Zone which is under the authority of the Queenstown Lakes District Council (QLDC) (Queenstown Lakes District Council, 2020).

One of the aims within the research brief provided by the QLDC set out a need to develop an understanding of the reverse sensitivity effects to residential development within rural areas, with an emphasis being put on such effects within Gibbston Valley. Gibbston Valley's proximity to Queenstown has brought pressure on the QLDC to allow the space to be developed, an issue that will be explored concerning reverse sensitivity effects within this case study.

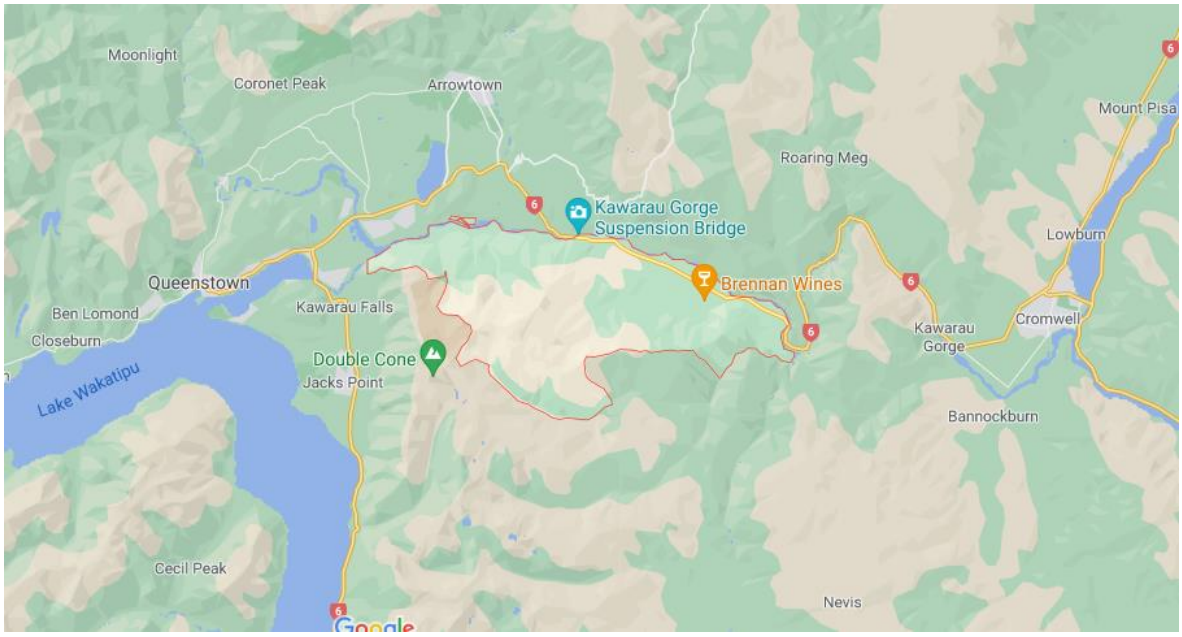

Figure 17: Gibbston Valley. Taken from https://www.google.com/maps/place/Gibbston/@-45.022413,168.7718819,10.75z/data=!4m5!3m4!1s0xa9d52745fcbe2101:0x500ef8684796f80!8m2!3d-45.0233062!4d168.9568142

Gibbston Valley is renowned for its viticulture, with the region being known for its pinot noir wines. The region has been called the ‘valley of the vines’, with viticulture being the primary industry in the valley (Queenstown.co.nz, 2021d). The vineyards are located between the valley’s hills and the Kawarau gorge, with several different vineyards such as Gibbston Valley Winery, Peregrine Wines and Chard Farm being located there (Queenstownnz.co.nz, 2021c). The Gibbston Valley also contains a section of the Queenstown Trail Cycle Trail, known as the Gibbston Valley Wine Trail which connects the valley with the surrounding regions. The development of projects such as the cycle trail has been undertaken to promote tourism within the region while promoting the pre-existing qualities present within the valley. The Queenstown trail allows tourists to travel between the different vineyards within Gibbston Valley without having to drive. This has also been developed as a tourist activity available to people located in Queenstown through a shuttle that operates between Gibbston Valley Winery and central Queenstown (Queenstownnz.co.nz, 2021c).

Most of the flat terrain seen in Figure 18 falls within the Gibbston Character Zone established by the QLDC however, a zoning appeal has been made to have a portion of this space rezoned into what is known as the ‘Gibbston Valley Resort Zone’ (Queenstown Lakes District Council, 2020).

Figure 18: Gibbston Valley. Photo taken looking East from the Crown Range Highway.

7.1 Queenstown Lakes District Council

The QLDC acts as the authority that manages the Gibbston Valley through their operative district plan and established land-use zones. Through the District Plan, the QLDC has established how best to manage areas such as Gibbston Valley through establishing land-use zones that dictate what activities can take place in different areas. In the case of Gibbston Valley, the QLDC established the Gibbston Valley Character Zone to preserve the existing rural activities in the area. The QLDC District Plan sets out that its primary concern for Gibbston Valley is the impact rural spaces will have on future residential developments that could occur within the area (Queenstown Lakes District Council, 2020).

Gibbston Valley is classified as an Outstanding Natural Landscape within the QLDC's district plan and because of this, objectives and policies within the district plan focus on the current industries that are present in the area, with an emphasis on viticulture and horticulture

(Queenstown Lakes District Council, 2020). The Gibbston Valley Character Zone was implemented to zone spaces within the valley to preserve their viticulture and horticulture uses (Queenstown Lakes District Council, 2020). The QLDC utilised the Gibbston Valley Character Zone to preserve and promote the current land-use activities in the area and is an important tool that the council uses to mitigate the negative impacts that potential developments could have on Gibbston Valley.

7.2 Gibbston Valley Character Zone

The Gibbston Valley Character Zone is the primary tool that the QLDC use to establish controls on development that can take place within the area. The primary purpose of the zone is to provide for the viticulture and commercial activities that take place in the space. Since the establishment of the viticultural industry within the valley, it has taken precedent as the predominant industry that should be protected from negative effects that could arise through potential development initiatives (Queenstown Lakes District Council, 2020). Viticulture and other rural industries that are present in the Gibbston Valley have led to the space being recognised as having a distinctive character from the surrounding regions, and because of this, the QLDC have implemented objectives and policies within their district plan to preserve these character traits (Queenstown Lakes District Council, 2020). The QLDC establishes a legislative regime that attempts to preserve the contemporary land-uses present within the Gibbston Valley and attempts to restrict intensive land-use activities that could potentially negatively affect the areas renowned vineyards.

While the QLDC acknowledges the importance of preserving the character of Gibbston Valley it is important to note that the character zone has experienced subdivisions and developments, with an example of this being the planned Gibbston Valley Resort Zone and the proposed developments that will take place within it. The QLDC has recognised that such actions create the potential to degrade the character of the region and create points of conflict between established viticultural activities and proposed residential developments (Queenstown Lakes District Council, 2020). The QLDC have established objectives, policies, and rules within their plan to protect the contemporary land-uses within the Gibbston Valley which restrict certain land-uses within the area. This limits potential reverse sensitivity effects that could occur if high-intensity activities were permitted to take place in Gibbston Valley and the surrounding areas.

The objectives that are included within the Gibbston Valley Character Zone section of the district plan focus on preserving the economic viability of the area through mitigating potential impacts on the regions natural resources, with land-use restrictions being used to do this. Objective 23.2.1 states that "the economic viability, character, and landscape values of Gibbston Valley Character Zone are protected by enabling viticulture and other appropriate activities that rely on the rural resource of the Gibbston Valley and managing the adverse effects resulting from other activities locating in the Zone' (Queenstown Lakes District Council, 2020). This objective establishes the importance of preserving the existing land-uses within the area that accentuate the character of the region while mitigating adverse impacts that occur from other activities that take place within the valley. The policies associated with this objective further emphasise the protection of the rural activities present within Gibbston Valley with Policy 23.2.1.2 stating, "Ensure land with potential value for rural productive activities is not compromised by the inappropriate location of other developments and buildings" (Queenstown Lakes District Council, 2020). Such policies highlight the administrative approach taken by the QLDC who have implemented a system that attempts to mitigate potential adverse effects that could occur through certain types of developments while acknowledging that other land-use activities will take place within the region.

Regarding the RMA, the QLDC's district plan establishes a regime that promotes the sustainable use of the natural resources within Gibbston Valley, with Objectives 23.2.2 and 23.2.3 focusing on sustaining the life-supporting capacity of the region's soils and water. This is addressed through the implementation of an integrated management system of the effects of activities that are present within the character zone, with the region's waterways being managed in conjunction with the Otago Regional Council (ORC) (Queenstown Lakes District Council, 2020). Such objectives again highlight how the QLDC has primarily focused on preserving the rural activities that take place within the Gibbston Valley through mitigating potential adverse effects to the region's natural resources.

The strategy of mitigation can again be seen in Objective 23.2.4 which states "Land management practices that recognise and accord with the environmental sensitivity and amenity values of the Gibbston Character Zone are encouraged" (Queenstown Lakes District Council, 2020). The policies under this objective encourage developments that promote activities that fall in line with the established activities that currently take place in the area.

These policies highlight issues such as the appropriate management of vegetation cover, operating at a noise level that is not inconsistent with rural productive activities and the character of the area, control access to ensure the safe and efficient movement of traffic on road and for users of the walkways and cycleways present, and manage forestry activities in ways which avoid adverse effects on the region's landscape (Queenstown Lakes District Council, 2020). The objectives and policies within this chapter of the district plan establish a system of protection and preservation of the existing land-use activities within the Gibbston Valley, focusing on the rural activities that are present in the area. It is also important to note that the QLDC's plan acknowledges that other types of activities will take place in the area, and primarily address such adverse effects through the implementation of mitigation efforts such as restricting high-intensity developments.

7.3 Gibbston Valley Resort Zone

A plan change appeal was created to implement the Gibbston Valley Resort Zone near established viticulture land-use zones. The purpose of the resort zone was to provide a zone for the development of a resort, principally for visitor accommodation that would make use of onsite visitor activities that were appropriate to the rural resources of the Gibbston Valley, winery tourism, and the appreciation of the natural landscape (Queenstown Lakes District Council, 2020). The wording of the proposed activities that would take place within the proposed resort zone has been specifically designed to adhere to the objectives and policies present in the character zone section of the district plan. The proposed zone has highlighted how activities that would take place within it would have minimal adverse effects on the existing land-uses in the area while providing accommodation for tourists who would make use of the pre-existing activities.

The purpose section of the proposed resort zone also raises how it will mitigate the adverse effects of the planned developments in the zone on the natural resources present within the Gibbston Valley. The plan also mentions that the proposed residential activity will be undertaken at a limited scale, with a low average density of development to minimise the adverse impacts such an activity could have on the natural environment (Queenstown Lakes District Council, 2020). The structure plan for the zone in Schedule 45.7 was developed to ensure that future developments would be carried out in an integrated and planned manner and identified areas for developments in landscapes that could absorb change (Queenstown Lakes

District Council, 2020). The structure plan also identified the location of productive and landscape plantings covering existing and proposed areas to be planted and managed as productive areas to maintain the values in the plan of productive soils, rural productivity, and the rural working character values of the Gibbston area (Queenstown Lakes District Council, 2020).

The proposed resort zone has one objective which looks to mitigate the adverse effects of residential activities while highlighting the positive aspects of the rural activities present in Gibbston Valley. Objective 45.2.1 states "Visitor accommodation, viticulture, horticulture, commercial, tourism and limited residential activities developed in an integrated and planned manner with particular regard to the maintenance and enhancement of the landscape, ecological values, soil values, productive land use and economic substantiality" (Queenstown Lakes District Council, 2020). This objective emphasizes how the proposed resort zone will address potential adverse effects to the established land uses in the surrounding areas while promoting the sustainable use of the region's natural resources. The policies associated with Objective 45.2.1 establish how such developments will mitigate their impact on Gibbston, with Policy 45.2.1.3 encouraging the development of activities in appropriate locations identified by the structure plan while promoting commercial activities that are complementary to onsite visitor activities and experiences (Queenstown Lakes District Council, 2020).

7.3.1 Marlborough Case Study

To analyse the conditions in which residential activities can occur in the rural zone of the Gibbston Valley, a case study has been used to show ways in which reverse sensitivity effects can be managed. For this purpose, an analysis has been done on the Marlborough Resource Management Plan as it covers scenarios which are not too dissimilar to that of the Gibbston Valley. In the Policy Review in Chapter 5, there is a brief overview of what the Marlborough Resource Management Plan defines as reverse sensitivity

Under Section 10.2 'Involving the Community' of the Operative Resource Management Plan, there is an acknowledgement that the community and the environment interact and have impacts on both respectively. The Resource Management Plan recognises this,

> *Maintaining good environmental quality is essential to satisfying the expectations of: cultural, health, conservation and recreation groups; our primary production industries, including viticulture, horticulture, agriculture, forestry, fisheries and aquaculture; and our tourism opportunities; and exporters and our overseas markets … In short, maintaining good environmental quality is a prerequisite to Marlborough sustaining its community wellbeing into the future. (Marlborough District Council, 2011).*

This provides a statement of intent from the Marlborough District Council indicating that every effort will be made to ensure that residential growth can occur, but if this growth occurs in rural zones, then existing primary production industries will be protected from a ramification of residential development.

In Chapter 12 – Rural Environments, of the Marlborough District Plan outlines planning rules, policies and objectives for land, which is predominantly used for primary production industries, Section 12.2 – Wairau Plain, address the various principal land uses, which include: horticulture, viticulture, mixed farming and more. Under section 12.2.1.2 – Protection of rural amenity values; the plan recognises that the rural areas are the setting for a range of activities which result in levels of noise, dust, smell and traffic generation which will often be contrary to the expectation of people more used to the amenity of urban areas. It is accepted that the Wairau Plain has traditionally be a zone where intensification of agricultural farming has occurred, however, new opportunities have arisen for rural people wishing to exploit new opportunities or having to because of economic necessity; or because of influx of people wishing to farm small rural properties which are being prepared to try a range of new pastoral and horticultural enterprises. The plan accounts that there is pressure to build residential dwelling in rural areas for people wishing to live in and enjoy the rural environment, or people wishing to farm blocks on a part time basis. However, the plan accepts that the consequence of the variety of the rural activities alongside residential activities in the rural area, means that some farming activities have become the subject of complaints from people residing in rural areas. Noise generated from bird scarers and wind machines for frost control can become the subject of complaints from people living near intensive horticulture areas. The Council accepts that there is a duty under Section 17 of the Resource Management Act 1991 to avoid, remedy or mitigate any adverse effects, Council recognises that the principle rural activities will inherently involve effects that may not meet the expectations of an urban environment. Urban

activities at the rural/urban interface, must expect to compromise their urban amenity expectations where they are justifiable and reasonable effects as a result of primary production activities in the rural environment (Marlborough District Council, 2011). For this case study, a respective winery located in the Marlborough region was chosen to access the rules that it must comply with regarding noise, and the way in which residential development that occurs near it must comply with. The winery in question is located at 469 New Renwick Road, Fairhall and is the Villa Maria Estate Winery. Located near this location, is a residential zone, where the closest dwelling to the winery is 240 metres from the closest field of the winery. As shown in Figure 19, the winery is situated in the centre of the figure, with the various fields used for viticulture dominating the landscape, with residential development and a golf course situated to the east of the winery.

Figure 19: Aerial Image of Villa Maria Estate Winery, Marlborough and residential development. Sourced: Google Earth 2021.

In the Wairau Awatere portion of the Marlborough Resource Management Plan, Section 30.1.4 – Noise, outlines the rules specific to wineries broadly. Under Section 30.1.4.1 states that:

Unless otherwise specified for in Rule 30.1.4.2 all activities shall be conducted so as to ensure that noise arising from such activities within the zone does not exceed the following noise limits at or within the boundary of any land with a Residential or Rural Residential Zoning or within the notional boundary of any dwelling on another site:

a. *55 dBA: L10 0700 hrs to 2200 hrs Monday to Saturday and 0900 hrs to 1900 hrs Sunday*

b. *45 dBA L10: At all other times*

c. *75 dBA Lmax: On any day between 2200 hrs to 0700 hrs*

Except as provided for elsewhere and provided that the above noise limits shall not apply to temporary military training and normal agricultural and forestry practice (Marlborough District Council, 2011).

Wineries generally use devices which aim to protect their vitally important crops from birds predominantly. Under Rule 30.1.4.2.2 – Audible Bird Scaring Devices, rules are stated regarding the noise generated from the devices. There are several rules which restrict the operation and use of the bird-scaring devices, including:

a. Shall be operated between 7.00pm and 6.30am prior to the introduction of daylight saving and 8.00pm and 7.00 am during daylight saving months;
b) Shall be operated within 160 metres of the boundary or notional boundary of the nearest residential dwelling (excluding a residential dwelling on the same property as the audible bird-scaring device);
c) Shall be operated within 800 metres of any rest home, public or private hospital;
d) Shall be operated for any continuous period exceeding two seconds or at a frequency greater than 10 times in any hour in the case of airhorns, sirens, or any amplified signal; and
e) May emit sound at a level greater than 65 dBA weighted sound exposure level measured at or within the boundary or notional boundary of the nearest residential dwelling (excluding a residential dwelling on the same property as the audible bird-scaring device).

Rule 30.1.4.2.3 – Noise Sensitive Activities sets out rules relating to

a. new dwelling houses, visitor accommodation or other habitable buildings located within 300 metres of any frost fan not within the same site shall be designed and constructed so that within the external building envelope surrounding any bedroom (when the windows are closed), airborne sound insulation meets the following single-number rating for airborne sound insulation, determined in accordance with AS/NZS ISO 717.1:2004 Acoustics – Rating of sound insulation in buildings and of building elements Part 1 – Airborne sound insulation (Marlborough District Council, 2011).

Furthermore, Under Chapter 31 – Rural Residential, Rule 31.1.5.1 – Noise Sensitive Activities relating to Frost Fans states that;

a. any new dwelling house, visitor accommodation or other habitable building located within 300 metres of any frost fan not within the same site shall be designed and constructed so that within the external building envelope surrounding any bedroom (when the windows are closed), airborne sound insulation meets the following single-number rating for airborne sound insulation, determined in accordance with AS/NZS ISO 717.1:2004 Acoustics – Rating of sound insulation in buildings and of building elements Part 1 – Airborne sound insulation:
b. Dwellings located less than 300m and more than 200m from the nearest frost fan $D_{nT,w} + C_{tr503150} \geq 27$ dB
c. Dwellings located less than 200m and more than 100m from the nearest frost fan $D_{nT,w} + C_{tr503150} \geq 32$
d. Dwellings located less than 100m from the nearest frost fan $D_{nT,w} + C_{tr503150} \geq 37$ dB
e. For the purposes of this rule, "external building envelope" means an envelope defined by the outermost physical parts of the building, normally the cladding and roof.
f. Sub-clauses a) and b) of this rule shall also apply to any alteration of an existing dwelling house, visitor accommodation or other habitable building located within 300 metres of the closest frost fan selected for the purpose of sub-clause a) of this rule, where a new bedroom forms part of the alteration. For the avoidance of doubt only the new bedroom has to be treated in accordance with paragraphs a) and b) of this rule.

g. For the purpose of this rule, "frost fan" includes any lawfully established frost fan, and includes a proposed frost fan for which a resource consent has been granted and "site" has the meaning of "single land holding."

The rules above imply that the Council has worked in mediation with wineries in the region, to develop a strategy in which protects the winery from the potential reverse sensitivity effects of residential development in the rural zone. By agreeing to specific rules regarding the times in which both bird scaring devices and frost fans can be used and the distance in which they can be located and operated near a boundary are methods used to reduce the impact. However, the Council also introduced rules which determine all new builds must be designed in such a way that they be located 300 metres of more from the nearest frost fan, and that the bedrooms must comply with rules 31.1.5.1 a) and b), which ensures that they generally will be located furthest from the point where the house meets the 300 metres of greater mark. By looking at this case study, there are general similarities to the Gibbston Valley proposal for a resort development. Using this case study can provide the QLDC some general guidance for how reverse sensitivity effects have been managed elsewhere in New Zealand through planning rules, policies and objectives which can protect existing viticultural activities.

7.4 Summary of Gibbston Case Study

In summary, the Gibbston Valley has been noted as having a distinct character and natural landscape that needs to be protected. The QLDC District Plan established the Gibbston Valley Character Zone to control the types of activities that can take place to mitigate against adverse effects from certain types of high-intensity developments. The character zone outlines objectives and policies that mitigate potential adverse impacts developments could have on the area and focuses on preserving the rural land-use activities that take place. The importance of the viticultural and horticultural industries in the area have led to the development of policies that protect their interests. This has led to the promotion of low-intensity land-use activities in the area, with tourist activities such as winery tours and the development of a cycleway being prioritised over high-intensity developments. The Marlborough case study provided a contextual analysis of how another district council manages reverse sensitivity effects in relation to viticulture, and potential ways in which the QLDC may approach managing the effects in their District Plan. The Gibbston Valley Resort Zone and the proposed residential activities that it outlines have been developed regarding the existing land-uses in the area and

outlines how adverse impacts will be mitigated while promoting existing activities such as tourism. It is important to note the potential reverse sensitivity effects that could occur between the proposed residential activities and the established rural activities as the area has seen limited residential developments in the past.

CHAPTER 8: Research Question 2

This section will discuss the different factors which influence the perception of reverse sensitivity effects and how certain groups can be more vulnerable to noise-annoyance than others. The key informant interviews demonstrated that both the perception of and vulnerability to reverse sensitivity effects is made up of several factors that occur on different scales to create a complex situation. The varying backgrounds of these key informants demonstrate different interests and uses that the community and stakeholders desire from the region's limited land resources. As established in Chapter 9 the strength of relationships between communities and decision-makers plays an important role in determining how communities and individuals perceive noise. This remains relevant to the Queenstown context where different groups have felt different levels of inclusion in conversations around airport operations and development. This section will therefore discuss existing relationships between the Queenstown Lakes District Council (QLDC), community and the Queenstown International Airport (QIA), as well as the ways that COVID-19 may reshape relationships. Furthermore, the chapter will also touch on potential ways to build trust and feelings of control around noise exposure.

8.1 Balance of Power between Community and the Airport

A key theme that was found throughout the key informant interviews, was the importance and need to create a balance between the needs of the community and the airport. All informants, except representatives from the airport itself, emphasised a desperate need to create a balance between the two. Key Informant 4 from the QLDC summarises this idea:

> …we don't have much open space in the district. And we have to be able to use it to **meet the community's needs**. And so where's that **balance** between the needs of the community versus the needs of the Airport. (Key Informant 4).

Representatives from the Queenstown Airport Corporation (QAC) acknowledged that the facility is a part of the community and therefore needs to serve the area and its values. Additionally, as the Council is a key stakeholder in the facility, one of the representatives

explains that local ratepayers tend to feel more of a sense of entitlement as the operations of the facility should be inclined to accommodate community needs.

> And you know, that this is where the **balance** comes in. And we are **part of the community**, we are owned by the Council, our ratepayers feel that sort of **real sense of ownership** of the airport. (Key Informant 8).

The QAC representatives maintain that their facility plays a vital role in providing connectivity and economic success for the region. The representatives from the airport are aware that it is important to maintain a balance between their operations and vital noise activities in the Frankton area. Although, it would appear that they were unsure how to achieve and maintain a balance.

In recent years there have been significant tensions within the community around airport expansion and operations. In 2018 the Queenstown Airport Committee released a consulting document around changing the noise boundaries. However, due to tensions emerging regarding the proposals, the document was scrapped. The consultation process resulted in 92.5% of respondents opposing the proposed changes to the boundaries.

Nonetheless, the media analysis produced in this project highlights several differing perspectives on development emerged during this period. These differing perspectives on development, and the ways in which community relationships are incorporated into development, are shown in table # below.

Table 3: Perspectives on development during 2018's noise boundary consultation process.

Source	**Date**	**Quotation**	**Relationships**
Queenstown Airport wants to increase noise limits to allow for massive expansion.	02.10.2018	"It's not an option for us to breach those boundaries**. It's the critical part of our social licence** to operate as an airport."	Highlights the importance of positive community relationships to the airport operation.

ODT - Minimal Support for airport noise expansion	3.10.18	"We have said no to the airport driving the future of the district and we will continue to do so."	Highlights community frustration with the power of the airport in determining development.
Airport no stranger to debate in community	23.08.20	"The overwhelming majority view in the community was, 'it's too much' ... it was a bridge too far."	Community frustration with scale of proposed development being out of sync with community aspirations.
Queenstown Airport Corporation Statement of Intent 2020-22	2020	"To ensure that the airport remains an effective service provider, profitable and sustainable **as well as a good neighbour,** conscious of the need to maintain our social license to operate within the communities we serve." (Queenstown Airport Corporation, 2020)	Highlights how the council is committed to social sustainability. However, this is not a sole focus.

As seen in Table 3, while the Queenstown Airport Committee highlighted community relationships as important, community members were largely opposed to the development and did not feel as though their aspirations and perspectives has been adequately considered. In the course of the interviews carried out for this project, interviewees also highlighted tensions between the community, council and airport around development trajectories. In an interview a local councillor stated:

> **There's still a lot of trust issues around this issue with the community and QLDC and with the airpor**t, I think that will have to be rebuilt in some way. (Key Informant 3).

> I think Council ... I think the airport were surprised about the ferocity of the feedback. Council took a step back and went, 'whoa, what's going on? what happened?' The, it was one of the main issues, probably the main issue. Whatever was going to happen with this airport? **I think the community wanted more control from the council over the airport.** (Key Informant 3).

Community members, QLDC and the QIA have demonstrated different perspectives on the effectiveness of consultation and engagement. The difference in these perspectives can be demonstrated in the quotations below:

> So, it's, it's not a QAC Committee, **it's a true community committee** [the airport liaison committee] that we, we administer it, because we've got the resources to do it. But it's certainly sort of an independent organization, those representatives are engaged directly by QLDC, as well. (Key Informant 8). *Emphasis researchers' own.*

> I've been to a couple of meetings where they said that they were meetings... where we were to be informed … and they haven't been really informed, informative meetings at all. They've held the meetings and they've selected two or three of us from the community association to go along…**we felt that they, they invited us because they had to**. They had to have a consultation meeting. **So, they deemed bringing two or three of us along from the community, that they were consulting. They weren't, they were telling us what they were going to do**. (Key Informant 11). *Emphasis researchers' own.*

The juxtaposition between these two perspectives highlights a difference in opinion around how effectively the airport was engaging, and the intentions behind the engagement process. There is therefore a question of how meaningful past consultation has been. Some informants took the idea of shifting power a step further and heavily suggested that the aspirations of the community need to be taken into consideration first.

> But you'll still get an intensification of Frankton, you'll still get that friction. So, it's just a matter of how it's not up to the community to adapt and change to what the airport wants. It's now up to the airport to change and adapt to what the community wants. (Key Informant 3).

The above quote suggests a community perspective that the interests of the airport have historically taken precedent over the interests of the community in Frankton.

8.2 Social Engagement and Relationships

Throughout the analysis of key informant interviews, it was apparent that increased social engagement and cooperation between the QAC, QLDC and community members greatly affected relationships and perception of noise pollution. An example of good cooperation and relationship building is shown between the Lakes District Hospital, the QAC and QLDC.

> There is a good relationship between and obviously [the] Southern DHB and the airport for me was I guess, because we are a small town where everyone does play nicely. So [the] information is shared as good as they can because we have an airport right in the middle of a residential area (Key Informant 1).

The relationship appears to be stronger as there is more involvement and consultation between the groups, including engagement from the QLDC to educate hospital staff on potential mitigation measures. However, the informant acknowledged that the old age of the building and a lack of spare budget in the DHB prevents them from implementing any improved mitigation measures such as double-glazing windows and sound insulation. From this analysis, it is evident that the hospital is willing to accommodate the operations of the airport as they understand that it is a necessary service for the region. Nonetheless, it appears that there is a common divide between different groups as tension is created between different interests and political dynamics:

> You've got the council and the airport taking one point of view, actually, probably the mayor and the airport take one point of view … Probably,

> because they know how they get elected … There's no there's nobody standing on council saying –' I'm really all for this airport getting bigger and making more noise', because they know it's a ticket to not to getting to be on Council. (Key Informant 7).

In 2010, Auckland International Airport Limited acquired a 24.99% shareholding in the QIA (Queenstown Airport Corporation, 2018). Some informants suggested that off-site ownership has caused a gradual change from community to a more commercial-based focus, as international thoroughfare has expanded. This expansion has meant that the QIA has changed their focus to accommodate and attract more overseas tourists, however, it may be at the expense of trust and harmony with the community. Although, the long-term impacts of COVID-19 may transform this approach as domestic tourism is the most viable option at present and in the near future.

8.4 Impacts of Noise

Prior to conducting the research, it was acknowledged that there were activities and land uses close to the airport that were potentially vulnerable to noise. As established in the literature review noise can have direct auditory impacts, and the noise can also produce stress and noise-annoyance within communities (Clark & Stansfeld, 2007).

One noise-type that was identified as particularly frustrating was the sound of helicopters – which was exacerbated by their comparative frequency. Some quotes discussing the impact of helicopter noise are shown below in Table 4.

Table 44: Helicopter movements and noise creating public nuisance.

KI 1	"The other thing is helicopter for us. It's good. Having the choppers nearby, we actually have our own helipad here. And that is seriously loud..."
KI 11	"The helicopters are also something that a lot of people are probably more annoyed at than the Jets... Like there are a lot of helicopter movements during the day. And, and of course with the rescue helicopter now, we have quite a lot of movements at night."

Table 4 suggest that the level of noise created, and the frequency of helicopter movements create more disturbance than a jet airliner. The establishment of a dedicated daytime rescue helicopter base for the Queenstown district in 2018 has undoubtedly contributed greatly to the effectiveness of emergency services in the area (Walton, 2018b). Although, the intensified number of movements during both day and night has led to a larger loss of amenity for residents, than solely commercial jets.

8.3 Frequency of Aircraft Noise

From informant interviews, it was clear that the frequency of flights was more of a concern than the level of noise alone, as increased frequency makes it more difficult to endure, as seen in Table 5.

Table 55: Noise frequency impacting residential lifestyle and health.

KI 7	"We worked out that that probably have a plane landing and taking off every six minutes. So yeah, I think that would that really impact on people's, you know, the quality of the enjoyment of their life? Probably not good for the mental health either."
KI 10	"But you would feel a little apologetic about it, that when you have people about outside. Because you definitely all just have to stop talking. And then it could be like, every 10 minutes, you'd have to stop talking… And, you know, this is a... place renowned for its beauty and its landscapes, and it's what people come here to be part of. Here we go *loud audible plane noises*"

In contrast, one informant proposed that the frequency may be exaggerated by some residents, as the noise agitates them. The informant expresses that the frequency of flights only at peak times pre-COVID were becoming a nuisance to them.

> I mean, the frequency is not every five minutes. It was, it was at peak time becoming, y'know, quite a problem Sunday afternoons. There were always you know there was quite a, a sort of a pattern to it. (Key Informant 11)

Similar to other factors associated with noise boundaries, this quote would suggest that the perception of flight patterns differs between individuals and their level of tolerance. Although,

it is important to note that this informant potentially has a distinct perspective to some other informants as their family is highly involved in aviation, thus enhancing their tolerance to noise pollution.

Another issue that an informant expressed concern about was that the expansion of the airport would lead to more disturbance and a loss of serenity.

> [Loud plane noise overhead] So I did the calculation if the airport expanded to the movements of it wanted to, there's going to be one every four minutes with that noise that you're hearing now. Imagine that going past every four minutes. (Key Informant 10)

8.4 Expectations of Living in Queenstown

Noise pollution is an exceedingly difficult factor to control as people perceive noise differently depending on several factors that influence their level of tolerance (Nolan, 2019). Vulnerability to noise is not only caused by health effects, but by behaviour and cultural factors. However, some key informants indicated that aircraft noise is a factor that people should acknowledge and be willing to accept if they wish to live in the area.

Table 66: Acceptance of noise as a consequence of living in the area.

KI 1	**"**I haven't had any complaints or feedback from patients. I think if you're from Queenstown, it is part of living here."
KI 10	"I mean, it's noise, I guess that you've come to accept. So it's just that incremental noise. And we've all kind of, but you know, we always seek out quiet places to walk don't you?"

These quotes, shown in Table 6, demonstrate that residents often possess pretence knowledge that aircraft noise should be an expected requirement of being able to live in the area, but also it is a part of the nature of Queenstown. However, this perspective neglects the reality that there are a number of residents in the area who have lived in the Frankton area, or other areas affected by airport noise, for a significant period. Within recent years the QIA has experienced increased flight numbers – resulting in greater noise exposure for surrounding areas and the expansion of noise boundaries. Key Informant 11 is a long-term Frankton resident, who

discussed their perspective on the changes in QIA activity during the period of their residence there:

> Well, the noise boundary that was created, you know, they had the median fan and then they had an intermediate one out further and a more general one. So that all came about after we arrived here and really, certainly when, there was nothing here when we first came in.
>
> …
>
> But when they did that, uhh... The planes, first and foremost the Air New Zealand planes had hush kits on them, and so they were relatively quiet when they came in and they were very few of them anyway. The frequency was like two or three a day really, maximum, and it grew and grew and grew. And so, we've had more and more... aviation activity. (Key Informant Interview 11).

8.4.1 Growth

One of the key themes that was identified from the key informant interviews was the extent to which population and tourism growth is exacerbated by the airport. Some informants displayed concern not only for the potential of increased reverse sensitivity effects due to an expansion of the airport, but they also emphasise that the current state of the airport is not ideal for its location.

> Um, I think just it's, you know, it's not just a noise effect. It's the effect of all those people landing in a spot that could absorb the population of Queenstown expansion for the next 40 years of who chose to. (Key Informant 10).

Despite demonstrating a fairly consistent idea of the negative impacts of noise on people's health and lifestyle, some informants had conflicting thoughts about whether the airport should expand and accommodate projected growth, as seen in Figure 20.

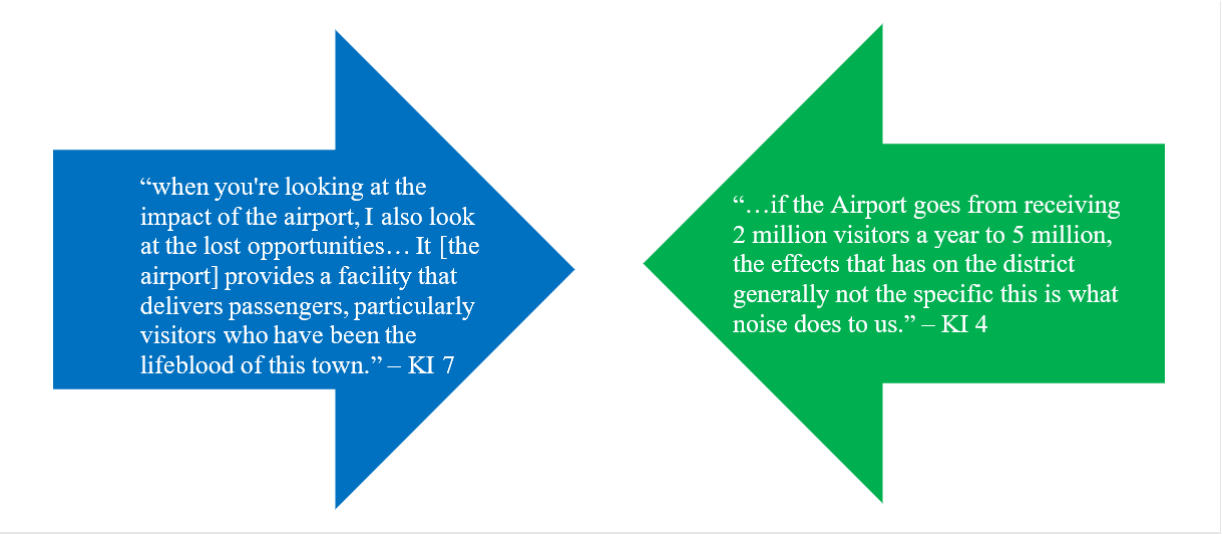

Figure 20: Conflicting Ideas on Future Growth in Queenstown.

Overall, as seen in Figure 21, the positions of each informant tended influence their broad outlook on development and growth trajectories. The limited amount of appropriate land for urban expansion and the desire to uphold and develop economic growth from tourism creates a consistent divide between people.

Figure 21: Perception of Supporting the Expansion of the Airport to Accommodate Future Growth of Queenstown

From the interviews, it was clear that the perception of supporting increasing growth was highly affected by economic gains and personal convenience for business travel, as seen in

Table 7. Meanwhile, common factors that contributed to a negative angle included loss of amenity, impacts of high congestion and interference with other community services such as recreational and residential areas.

Table 77: Contrasting perspectives on supporting future population and tourism growth of Queenstown.

Positive Perspectives	Negative Perspectives
"... the airport is an absolute critical part of connectivity for the region, and for the economic success of the region as well." - KI 8.	"The whole debate morphed into a growth, tourism, sort of discussion, infrastructure, all the strains and pressures as a community we were having at the time. So, all got wrapped up into this growth discussion... because it wasn't just a noise boundary issue. It's just a growth issue." - KI 3.
"... the positive impact for the town from the airport is in its current size. It provides a facility that delivers passengers, particularly visitors who have been the lifeblood of this town" - KI 7.	"So those [community] groups that complain about the Airport are not doing it, in my opinion, primarily because of noise effects in, in the immediate area. They're doing it because they don't want the growth and they don't want the tourists and all that kind of stuff" - KI 4.
	"Um I think just it's, you know, it's not just a noise effect. It's the effect of all those people landing in a spot that could absorb the population of Queenstown expansion for the next 40 years" - KI 10.

Interestingly some groups remained relatively neutral about the expansion of the boundary and subsequent growth of the area. These groups included the hospital, planners and local councillors. An informant from the Lakes District Hospital explained that the services that the airport provides are essential to conducting operations effectively via supplying resources and providing the Lakes District Air Rescue Trust. The effects of COVID-19 have created another benefit of the location of the airport, as the informant explained that immediate quarantine measures are easier to take place due to its vicinity. However, when asked about growth there was no sense of any strong opinion of support or opposition.

The position of planners is strongly shaped by the position of the council. The QLDC is the majority shareholder of the QIA at 75.01% and therefore are inclined to support current

operations and future growth of the airport. However, as a territorial authority, they are also required to ensure the needs of the community are met. This mix of interest between community service and commercial activity creates a grey area regarding opinion on growth. There is also a clear disparity between the aspirations of the airport and that of the community. However, one planner questions the extent to which preventing the airport from further expansion will impact the region economically, and how this can be balanced against other quality of life indicators. The planner stated that:

> There's potential economic costs from the Airport being restricted. But how great is that really? And how does that compare, like what's the size of the benefit the public gets from using that thing [recreational open-space]. (Key Informant 4).

However, concerns around the scale and rate of growth have resulted in some community animosity towards the airport, with particular concerns around increased congestion.

> And to the credit to the airport, I think, was six weeks, the consultation, they put out - it was a very long time. And as that time progressed, you could see the animosity towards the airport just increasing and getting more, more vicious, not vicious, but more alarmist and more. And then, then it morphed out of just what the airport was doing with it. **The whole debate morphed into a growth, tourism, sort of discussion, infrastructure, all the strains and pressures as a community we were having at the time. So, it all got wrapped up into this growth discussion.** (Key Informant 3).

8.4.2 Perception of Relocating the Airport

In recent years there has been substantial public discussion around the development of the Tarras airport, and the potential decrease in air traffic at the QIA as a result. However, the relocation of QIA and the development of the Tarras airport, remain contentious issues within the Queenstown Lakes District. Nonetheless, different sectors of the community hold different perspectives on relocation, and the potential economic impacts it may have on the region. The conversations which emerged around shifting the airport location can also be tied to discussions around the perceived fairness of costs versus benefits. One issue which was prevalent in the media analysis was discussions around the development of the Tarras airport; enabling the movement of air traffic away from the Queenstown airport. Several key

informants were strongly in favour of the project, and expressed further support for a more equal distribution of air traffic across the lower South Island:

> **We believe that tourism is really important for the region. But we think that also that perhaps Wanaka and places like that, they should take their share.** And, and I know that Invercargill has now got a Jet, and they're thinking of doing it twice a week and that would be fantastic if it took some of the load off here. And people went the other way around, you know, so it would, instead of going from here to Milford to Steward Island or whatever, they could do that, and so **everybody shares the load but every also, everybody still benefits**. (Key Informant 11).

These quotes indicate support for changing the scale at which airport management is considered, demonstrating support for a broader, more regional approach to the ways the impacts of tourism are managed.

8.4.3 Covid-19 and Airport-Community Relationships

It is also interesting to consider the impact of COVID-19 on airport operations and the broader Queenstown-Lakes community. Several interview participants highlighted how they were not opposed to the operation of the airport and acknowledged its importance in the community but remained frustrated by the continued expansion, and the nature of the conversations around expansion. COVID-19 also has the potential to reshape potential expansion plans due to dramatic changes in visitor numbers. This may potentially create time for more effective consultation around expansion – and what it means for the surrounding community. Prior to the COVID-19 pandemic and the resulting suspension of international tourism, the Queenstown Airport was estimated to require expansion within two years to cope with the trend of increasing passenger numbers. However, the cessation of this trend has afforded time for the further development of a strategy for expansion:

> Well, the airport saying within five years, the demand will be pre-COVID levels. Now, we can argue whether that's going to happen or it's not going to happen… like we've got to start thinking about how, **how are we going to deal with these different scenarios and how we're going to talk or communicate, the framework on how we're going to deal with the airport, to the community**. (Key Informant 8)

> The one silver lining out of COVID is **it's allowed the community to take a deep breath and go and actually reconnect with what makes us special.** (Key Informant 3).

> But the airport's attached tourism... and they'll... no one will ever come if you move the airport, **no one will ever come again. But I mean, is that a bad thing**? Because we've actually trying to put a break on tourism. (Key Informant 10).

The above quotations touch upon the uncertainties in the airport scenarios created by the COVID-19 pandemic and how, from the perspective of the community, communication and building relationships is an important part of responding to uncertainty. Furthermore, the quote from a community group member (KI10) highlights an interesting perspective on development. While the QIA is widely recognised as an important contributor to the local, tourism-based, economy there remains a question of how sustainable this is long term, and whether the broader community wants this trajectory of increased tourism to continue. This can also be linked to a broader debate around the sustainability of aviation, and the position of airports in a world which is increasingly concerned with the impacts of climate change. Charles *et al.* (2007) discuss the importance of considering long-term sustainability in airport expansion strategies, highlighting how the continual growth model of airport development is likely to be challenged by environmental concerns.

> It [the spatial plan] has to be considered in tandem with what is happening to the whole region, and how that might develop and grow over time so that we don't get into a situation. So that so that people are making conscious deliberate decisions about the future and climate change considerations and all of the well-being measures that we measure ourselves against, and, and we'll be doing more as a business and as a community play into that". (Key Informant 9)

Furthermore, COVID-19 highlights the risks of reliance on tourism, and the vulnerability this creates for the regional economy. There is therefore a need to consider airport sustainability as a three-pillar concept – incorporating environmental, social and economic dimensions. Freestone and Baker (2011) discuss airport-urban development and the

importance of developing growth strategies stating that: “with more audible political and community discussion about the limits to growth, the need for demand management, and urging reconsideration of government policies that facilitate market demand for air travel, there are serious implications for the attendant growth and prosperity of development dependent on unconstrained air travel.” Within the Queenstown context, community concern around growth appears to have only been amplified by the events of the past 18 months. There is therefore an opportunity to re-evaluate approaches to growth and tourism in the Queenstown Lakes District in the context of COVID-19 – with a particular need for further research on tourism numbers and growth post-pandemic. The following section will explore the idea of social sustainability, through a brief discussion of the idea of participatory decision-making in airport management.

8.4.4 Community Acceptance

Heyes *et al.* (2021) define three dimensions of successful noise management: **viability**, **feasibility** and **desirability.** The authors state that: “these factors are heavily influenced by the characteristics of each airport, meaning that not only are universal best practice management actions difficult to propose.” Heyes et al. (2019) highlight how airport noise management is often unstructured in nature, thus leading to the fragmented implementation of mitigation strategies such as insulation. Furthermore, acceptance of noise management strategies is also significantly influenced by the ways in which these strategies are communicated to the public.

The effective communication of technical information is a critical part of conducting effective participatory decision-making. In particular, Heyes et al. (2021) although noise exposure is often presented to the public in terms of ‘aggregated noise metrics,’ noise annoyance - and thus the impact of noise exposure on individuals and communities - may be better explained by sudden noise events and their timing as opposed to this total noise exposure. Thus, communication of noise issues may play an important role in determining the desirability of noise management strategies for communities. Key Informant 7 discussed how the ways in which noise exposure in Queenstown is classified do not sufficiently represent how residents actually experience noise, stating that:

> Noise footprints are calculated as a concept called average noise .... So, the INM model that works on average noise, there is no such thing as average noise. You and I can’t hear average noise, it's a theoretical construct ... what you and I can hear is, is actual

> noise... So, the INM Model about average, really doesn't - it's not perfect in terms of saying – where is the greatest impact of the noise? (Key Informant 7).

Furthermore, the interviewee highlighted further challenges in the way the impacts of airport noise are estimated. In particular, the interviewee discussed how technology changes have resulted in decreased noise produced by airports:

> And the second thing about airports is that they always judge their noise footprint at the current point in time. They make no effort whatsoever to build in technological improvement. (Key Informant 7).

Key Informant 7 also highlighted how airports often still estimate total noise based on the noisiest aircraft – "They don't use the latest technology planes - they actually choose the noisiest possible plane so that they can build the noise footprint." Although the interviewee highlighted this as a failure of current communication strategies it could also be considered to give residents a more effective representation of what kind of noise they may be exposed to. However, given that noise information is often presented in quite a technical way, there remain questions on how effective this method of communication is in terms of fostering community understanding and acceptance:

> I wouldn't say that would be a massive discrepancy between if you stood along there at the boundary and you stood here, out there on that lawn I don't think there would be a hell of a lot of difference. (Key Informant 11).

Heyes *et al's.* (2021) concepts of viability, feasibility and desirability can be related to broader issues of airport development and reverse sensitivity issues. As discussed in the preceding sections, it is critical to acknowledge that although noise issues dominate many discussions around Queenstown International Airport's operations, there are also a number of other effects associated with development in the area. Residents expressed concerns around the development of noise boundaries and restrictions these can create around undertaking actions on private property – such as renovations and subdivisions.

One option for managing conflict in the area may involve the use of Public Participation GIS (PPGIS). PPGIS can help to negotiate the complexities of land-use conflicts – allowing communities to express what they consider important within particular geographic areas, and thus aid in developing consensus around what activities may be appropriate in particular zones (Brown and Raymond, 2014). As established above, many residents expressed a desire for a more balanced approach to airport operations. Rather than seeking a stop to the operation of the airport, many expressed a desire for greater consideration of what activities and locations are particularly frustrating. The use of PPGIS may aid in helping to develop consensus around the course of development, and whether particular developments in the broader airport area are socially acceptable or desirable.

8.5 Summary of Research Question 2

In conclusion, this chapter has addressed the factors that contribute to vulnerability to, and perception of reverse sensitivity issues. Understanding how communities and individuals perceive reverse sensitivity issues can aid in developing strategies for responding to reverse sensitivity issues in a way that is informed by what communities may be frustrated with and why. Reverse sensitivity in Queenstown is often associated with noise; however, this is not necessarily the primary issue. The noise boundaries and restrictions are limiting actions relating to renovations and subdivision; the growth of the airport and the surrounding area is creating congestion, and the limitations and control of the airport is creating animosity between residents and the authority. There are many factors that comprise reverse sensitivity in Queenstown, and as such these varying factors can affect the broader perception of, and vulnerability to, reverse sensitivity.

It is clear that the perspectives of individuals were very multifaceted. Most of the key informants are residents themselves and drew on their personal experience, however, they also represent businesses or community groups that hold particular interests and actions that can influence their perspectives. The positions of each informant tended to influence on their broad outlook on development and growth trajectories. When answering this question of the different factors which influence the perception of reverse sensitivity effects and how certain groups can be more vulnerable to noise-annoyance than others it is important to look into the roles that each member has in the community or for work and the influence this might have on their perspective of the airport.

In considering this research it is also important to acknowledge that this field research was conducted post-COVID-19, in a context where the number of tourists and therefore flights are drastically lower than in previous years. While there is a current appreciation for less flight traffic among many residents, this is likely not going to be the case looking into the future and brings the question of what the future projections of tourism in Queenstown are likely to be. As the residents were able to experience relative quiet during peak COVID-19 and as the number of flights has still not returned to its full capacity, when the time comes there is the potential that it will come with a great deal of community pushback. However, the change in growth trajectories as a result of COVID-19 also brings about the opportunity to consider 'what makes Frankton special,' and to improve the desirability of airport management options to community members

CHAPTER 9: Research Question 3

This chapter will cover the results and discussion of question three; how do the effects of reverse sensitivity in the Queenstown Lakes District affect land-use planning amenity. In order to consider how the effects of reverse sensitivity in the Queenstown Lakes District impact land-use planning and amenity in the region. This particular topic has been outlined in the brief supplied by the Queenstown Lakes District Council (QLDC). The effects of reverse sensitivity on land-use planning and amenity lack clarity and understanding in New Zealand literature and the discipline of planning.

9.1 The Interaction of Community with Reverse Sensitivity and Amenity

People and community have been among the leading emerging themes throughout the research project. They look at how people and the community interact with reverse sensitivity in their everyday lives and experiences. This concept is critical for this project as planning directly relates to how the community are able to live in a space as well as how they navigate and relate to the space and how they view their surroundings, directly relating to the ideas of amenity (Mahmoudi et al, 2013). Policy Six of the National Policy Statement for Urban Planning Development states:

> *"That the planned urban built form in those RMA planning documents may involve significant changes to an area, and those changes: (i) may detract from amenity values appreciated by some people, but improve amenity values appreciated by other people…"* (Ministry for the Environment and Ministry of Housing and Urban Development, 2020)

This policy outlines the varied opinions of a community on developments that affect how space is used and how amenity values are appreciated. With regards to reverse sensitivity, developments such as noise boundary expansions or increases in the agricultural industry may directly result in either the decrease of amenity values or, in some cases, the increase in perceptions of amenity value. Amenity and development should consider the human well-being and livelihoods, especially where long term development and pressure for growth is concerned (Mahmoudi et al, 2013). The Queenstown case study has provided a good rationale for reverse

sensitivities importance and why amenity should be considered in tandem with the expansion of existing activities. Through the interview process, the value of amenity was valued highly in the Queenstown Lakes District by key informants. For example, Key Informant 5 states, "people still want to enjoy the outside of the house, they don't want to be locked in and that sort of stuff." This quote directly attributes the disruption of quiet open spaces to airport noise – resulting in a decrease in the perceived amenity value of Queenstown for the existing community.

Key Informant 8 highlights the effects of noise and its lack of control, "we've got lines on a map, but noise doesn't stop on a line on a map." This quote highlights that noise is a complicated sensitivity. While the outlines of noise boundaries provide a guide for where the noise may be heard and to what decibel, it does not outline what the real effects and reach of aircraft noise are in the District. This results in a large portion of the community affected without the information and guidance needed to find solace from noise impacts. The development of airports and their effects in this context is thus under-studied, with the Queenstown International Airport (QIA) not providing adequate data of the impact on the surrounding community. Key Informant 8's quote further highlights the risks associated with the QIA's future plans of expansion. Higher volumes of air traffic and continuous noise further disrupting the ideas of peace and the right for nuisances to not infringe or interfere with the comfort and convenient enjoyment of land (Ball, 2020, p. 435); this idea posed by Ball (2020) further highlights the complications of sensitivities around noise. These noise exposure sensitivities can result in sleeping difficulties, heart disease and learning difficulties (Lechner *et al.*, 2019). These concerns are further highlighted throughout media sources that were analysed for this research. Table 8 is a breakdown of the article concerning amenity and the issue of education and health impacts from noise on the community.

Table 88: Stuff Article Media Review

Stuff Article Name	*People and community*	*Framing/view of the article*
Queenstown Airport wants to increase noise limits to	The corporation was speaking to the Ministry of Education and Ministry of Health about the implications for the schools and hospital	Informative. Seemed positive and supportive of the decision. Very growth focused on the houses that

allow for massive expansion. 17/7/18 (Jamieson, 2018)		would be affected. Is a slight impact and relationships focused however.

Though the article has a positive outlook on growth, it does highlight the concerns for the community and how it could be impacted through heightened noise exposure. The article provides an informative analysis of the situation in Queenstown surrounding health, well-being and education impacts that concern individuals and the community.

Airports in locations surrounding residential areas pose further complications for land-use planning. One of the major issues is determining what land-uses are appropriate for sites that surround airports. In considering the implications for both the existing community and future communities that may be affected if residential development was to expand. The QIA has experienced a level of contestation over land use and its expansions in the past. An example of the land-use changes that the QIA has already experienced is through the neighbouring golf course, where the sale or acquirement of land was sort after to extend the airport's runway "I know it (old holes) used to be where the current end of the runway is**"** (Key Informant 6). In this quote, the key informant discusses the changes in land use from an 18-hole golf course to a 9-hole course to accommodate airport expansion.

Land-use implications, similar to land-use changes around the airport, should be seriously considered for the future of Queenstown and its community as changes to recreational amenity and amenity of place are significant considerations and challenges for the future. Land-use planning further concerns the RMA as the guiding principle for how land is used; this is an essential consideration as people and community are intertwined with the environment. Therefore, any activity needs to be considered in conjunction with adverse effects on people and the community, with a responsibility to ensure activities avoid mitigate or remedy adverse effects that an activity may cause (Ministry for the Environment, 1991). The QIA is an example of an activity that produces adverse effects. This requires the council's involvement to ensure all is being done to minimise negative aspects of air traffic and noise

pollution for the enjoyment of the community. The Law of Nuisance is further involved in the ideas of noise mitigation and the right to peaceful enjoyment. The Law of Nuisance is centred around the resolution of land-use contestation (Bishop and Jenkins, 2011), building on the ideas of the RMA. Key Informant 10 highlights the importance of mitigation and community consideration, especially considering future land-use obligations and changes.

> *Loud plane noise overhead* "So I did the calculation if the airport expanded to the movements of it wanted to, there's going to **be one every four minutes with that noise that you're hearing now**. Imagine that going past every four minutes."
> [it would be a significant loss of serenity]
> "It is! Yes, absolutely. So um... you know, **I have had friends that have sort of been driven away, they sort of gone to Arrowtown or somewhere else**." (Key Informant 10).

Key Informant 10 outlines the difficulties around land-use changes and how they affect the existing community, with knowledge of people who have moved out of the impact zone due to noise effects produced from the airport to find value in other locations amenities, because of the perceived loss of amenity within Queenstown.

9.2 The impacts of effects on community relations, amenity and land-use

Where land-use planning and amenity are concerned, it is important to consider how the respective parties engage with the community and how the relationships are being built and fostered for both the community and the activity. This is a significant aspect for QIA and the QLDC to consider as the relationship with the community influences the public perception surrounding the activity. For example, Key Informant 10 alludes to the current state of the relationship:

> You know, of course, that there's covenants on all of Shotover Country. **They can't reject the airport...** So when they did that subdivision, the airport got in and said well **we'll let you have the subdivision, you know, as a submitter. But we don't, we... you're not, you're not allowed to make any objections as a community to the airport**. And I've got a feeling it might be similar among Jack's Point, I'm just not sure, I can't remember. (Key Informant 10).

This quote demonstrates a lack of concern and dedication to the relationship between the communities in Queenstown Lakes District and the QIA. It further highlights the need for the involvement of the QLDC in community relations. The planning instrument of covenants on titles is not outside of the norm; however, they should carefully inform them of rights and how it is approached by the QIA based on concerns the community may have. However, Key Informant 8 highlights the reasoning behind such tactics:

> when we do the when we do the **noise mitigation program**, we ask for covenant to be put on the titles of those homes. And that's, then it's not particularly onerous. It says, you can, **you can't complain about noise that's legally made**, that doesn't stop us receiving or acting on any complaints, because **we still want to be a good neighbour**, and all the rest of it. And it also says you can't rip out the things we've put into your house to get it. (Key Informant 8).

Key Informant 8 shows the reasoning behind the need for convents in areas that are affected by noise and where noise can impact the amenity of space - such as the risks towards the operations of the airport and the broader implications that could have for tourism. The airport also employs a mitigation programme, highlighting its responsibility to the surrounding communities. This programme involves the installation of soundproofing and ventilation systems (as discussed in Chapter 6). Some questions arise from this quote, however, as although they outline their commitment to being "good neighbours" and have outlined their mitigation programme. There are questions around whether they are achieving these, how these are measured as being fulfilled. Furthermore, as QLDC is a significant stakeholder, how are they involved in these processes to ensure the amenity of Queenstown and the issues surrounding land use and future land use is constantly a topic for discussion, both within the council and with the community.

The relationship with the community is a crucial element for emerging land-use activities, as they should, in particular instances, have the right to deny or accept the new use. New uses can affect the amenity of the surrounding area and thus influence the relationship with the community. As outlined by the New Zealand policy statement on Urban Development, policies surrounding the well-being of New Zealanders and the communities they live in is an imperative goal for the health, safety, culture and economic well-being of those regions.

> *"New Zealand has well-functioning urban environments that enable all people and communities to provide for their social, economic, and cultural wellbeing, and for their health and safety, now and into the future."* (Ministry of the Environment and Ministry of Housing and Develop, 2020)

The policy thus highlights the importance of community, their relationship with the council and the airport regarding current and future sensitives in the Queenstown Lakes District. The value of amenity in this sense is also highlighted when focusing on urban environments that serve the people. In the context of the Queenstown Lakes District, amenity perception, value and community amenity are critical aspects of future land-use considerations, with a policy such as this indicating its emerging importance within New Zealand development.

Further impacts have included those associated with amenity. In a growing community such as Queenstown, the impacts from noise and other reverse sensitivities, such as road congestion, residents have begun to feel the impacts more widely. Addressing the airport more directly and its emerging growth constraints, the risks to enlargement of either the QIA and its operations or the possible enlargements to Wanaka Airport have caused a significant amount of concern within the community. From the media analysis of the Stuff New Zealand article, there is an evident negative framing of perceived, expected and possible growth of the region. Below is an extract from the 2019 Stuff article on growth:

Table 99: Stuff Article on Airport Growth

Stuff Article Name	*Impacts*	*Framing/view of the article*
Architects propose selling Queenstown airport for $1.6 billion and building anew in	Planned development at the current site in Frankton and at Wanaka Airport would destroy the amenities for residents in thousands of nearby houses, they told a crowd of 200.	Negative to airport growth at Queenstown, however there was opposition at the end of the article and talk of other options, however article suggested arch option in lighter mood.

Central Otago. 30/4/19		

It is evident through this article that a negative framing of the article has resulted through the discussions of growth. Amenity has further been a genuine and highly sensitive topic for those in the Wanaka region as serious changes in amenity would occur. Key Informant 4 discusses the complexities of moving the airport **"**So there's some people talking about "Oh well **we'll move the Airport to Wanaka". But then, like you said, what impact will that have on Queenstown's economy? And how will that impact Wanaka**? **Will that become the new problem**? Y'know?" (Key Informant 4). This quote highlights the complexities of moving QIA, both in terms of an economic standpoint and creating more problems for the Wanaka community. The quote further alludes to various impacts that would occur if operations at Wanaka Airport were to increase, such as that on the amenity value of the area, health and well-being of the community and how land-use planning would have to change in certain circumstances. Reverse sensitivity effects would then have to be a guiding concern for the development of the area in such a way.

A second Stuff article further supports this discussion and the impacts of noise on community relations, amenity and land use. The three intertwine in a unique way, where the effects of land-use planning directly affect amenity, both the value of amenity and its perceived amenity of space. These understandings affect the community, their well-being, sense of place and comfort. Below is an extract of a 2018 article from Stuff New Zealand on increased noise levels and impacts on the community.

Table 1010: Stuff Article on Noise Level

Stuff Article Name	*Impacts*	*Framing/view of the article*
Queenstown airport backs off raising noise limits after massive	Opponents, which included local residents, businesses and three schools, were concerned raised noise levels would have a negative impact on quality of life and health, on the natural environment, and would adversely affect	Negative – talks about impacts and the opposed members of Queenstown.

opposition from residents 2/10/18 (Cropp, 2018)	potential commercial developments in the area.	

Table 10 shows that the article is framed in a negative point of view, where the interviewees oppose the growth and development of the area to a certain extent. Through the analysis of the article, it is clear that adverse impacts would be experienced in several ways, such as quality of life, health and effects on the natural environment. This article points out the difficulties in developing a region, as creating a balance between development and community is a significant struggle. However, it is clear that if further development in the area was to occur, it needs to be with community support. Building on community support is needed to consider appropriate planning mechanisms to allow for suitable land-use planning and development, enhancing the amenity value of the Queenstown Lakes District. Key Informant 7 discusses the struggles with reverse sensitivity effects from aircraft noise and the impacts that it has on amenity in the Queenstown district:

> We worked out that that probably have a plane landing and taking off every six minutes. So yeah, **I think that would that really impact on people's, you know, the quality of the enjoyment of their life? Probably not good for the mental health either.** And, and so I don't, **would you measure it in terms of people leaving? Probably not, but when you measure it in terms of, you know, do they actually enjoy it? And is it good for them to say no?** (Key Informant 7).

The

quote above provides a level of context to the issues in the Queenstown district and how they are perceived by those who live there. It highlights the struggles with noise as it impacts mental health, amenity value of the environment and quality of life in the region. Key Informant 7 provides an understanding of why reverse sensitivity considerations are essential, furthermore highlighting why they need to be considered in conjunction with land-use planning mechanism and amenity understandings as they intertwine to affect the lives of the community.

9.3 Reverse sensitivity, land-use planning and activities issues

Reverse sensitivity and its characteristics within planning and New Zealand's law framework result in the favour of existing activities. Key Informant 5 outlines:

> What caused us problems recently with our open space chapter, is that there's a camping ground down in Frankton close to the lake and so that's, **that's visitor accommodation and is classed as a noise sensitive activity**, which is another bit in the plan that's important to kind of understand or stuff - but the other acronym is SCN activities sensitive to aircraft craft noise (Key Informant 5).

Key Informant 5 outlines the difficulties in establishing new activities which would also accommodate the growth in tourism and the possible uses of land in the Queenstown Lakes District. However, the use of land and the possible activities which can be accommodated on that land are based upon the sensitives which they could be subjected to. In a New Zealand context, a precedent has been set through several cases, which allows for the resulting changes of land-use and the submissions from opposing groups to occur. In the Queenstown context, reverse sensitivity effects and possible effects are often ruled in favour of the airport based on its perceived need over other types of land-uses. Key Informant 8, in the previous section, highlights the strategies used to preserve the rights of the airport and their production of legal noise "you can't complain about noise that's legally made" - outlining the use of covenants as a tool for reverse sensitivity. These mitigation strategies do not necessarily change the plan for how the land is used. Instead, they allow land to be used with 'no complaint' covenants applied to protect the operational capacity of the QIA. There are concerns that arise with this strategy, mainly concerning community involvement and the ability for meaningful consultation, relationships and mutual understanding of the rationale behind its implementation. Key Informant 10 alludes to these issues:

> You know, of course, **that there's covenants on all of Shotover Country. They can't reject the airport... So when they did that subdivision, the airport got in and said well we'll let you have the subdivision, you know, as a submitter. But we don't, we... you're not, you're not allowed to make any objections as a community to the airport.** And I've got a feeling it might be similar among Jack's Point, I'm just not sure, I can't remember. (Key Informant 10).

Key Informant 10 expresses some frustration with such a policy. However, we were unable to get in touch with the Shotover community to gauge a fair representation of their positioning on the covenants and the airport's activities. These types of community groups should be involved in constant consultation with the airport and council to ensure the strategies in place are working to the fullest extent possible. Policy 4.2.216 mirrors that of Objective 36.2.1, which is outlined in Chapter 36: district wide matters; noise, which states that:

> The adverse effects of noise emissions are controlled to a reasonable level to manage the potential for conflict arising from adverse noise effects between land use activities (Queenstown Lakes District Council, 2020)

The policies that are outlined in the QLDC's District Plan allude to the significance of the QIA and the council's concern for reverse sensitivity effects and the types of emerging land-use activities which could have a further impact on the operational capacities of the airport.

Reverse sensitivity and noise management strategies have seen the development of covenants over particular locations of the region affected by aircraft noise. The use of covenants as a planning mechanism in Queenstown Lakes District is an example of legal instruments under the RMA to enforce restrictions on what private landowners can do with their land (Mead and Ryan, 2012). The issue with the covenant process in the Queenstown district and employed by the Queenstown Airport Cooperation (QAC) and the QLDC is that the current covenants in place are not there to preserve amenity value or restrict subdividing. Instead, they provide for the protection of aircraft noise and operations at the QIA. Using this tool as a mitigation strategy by the airport is problematic, raising questions about the use of covenants as a strategy to limit the effects of reverse sensitivity. Furthermore, covenants are generally imposed to protect land and for the continued sustainable management of resources in New Zealand (Mead and Ryan, 2012). In the case of the airport, sustainable management is not the consideration, rather operational capacity and limitation of community pushback seem to be the driving forces. The idea of covenants as a planning mechanism creates an issue of community engagement being limited, with voices and community values not being considered. An open dialogue should be revisited in locations where covenants are enforced to understand the extent of noise effects in the community.

9.4 Analysis of Growth Effects on Land-Use Planning and Amenity

Population growth and the changes to land-use planning within the Queenstown Lakes District is emerging in a variety of ways, as presented throughout the project's results. The impact of COVID-19 has seen this tourism specific growth slow. However, in the future, the belief is that this growth will return and influence the way the QLDC plan and how the QIA will operate. These kinds of considerations are crucial to understand, as they will inevitably impact on how the QLDC deal with reverse sensitivity, land-use and amenity. Land-use planning is an effective tool used to cope with growth; it allows for the assessment of activities in the region compared with the usability of land. With the effects of growth, land-use planning instruments need to be used in a way that meets the needs of a growing community - without putting reverse sensitivity pressures on existing activities. Through the GIS analysis, as seen in Figures 23 and 24, which were established to give context to the growth debate, growth has mainly occurred in the areas which the airport noise boundaries cover. Figure 22 below shows the population of Queenstown in 2006 represented through dot density, with the airport noise boundaries overlaid to show the location of the population in comparison to the airport. Within the Air Noise Boundary (ANB – solid black line) and the 60-decibel landing contour (dashed lines) shows a relatively high representation of the population in 2006.

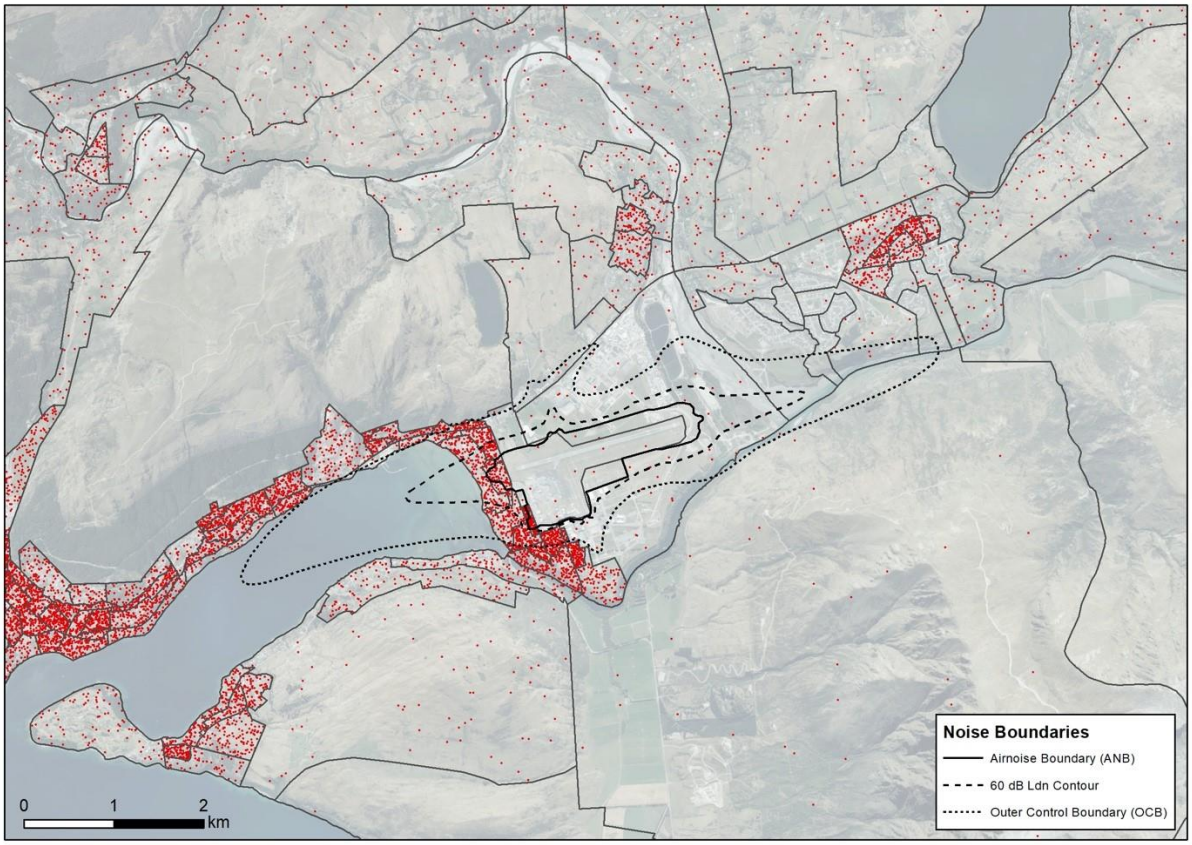

Figure 22: GIS data of Queenstown population 2006 (dot density)

Figure 23 below shows the population of Queenstown in 2018, represented through dot density with the airport noise boundaries overlaid. The increase in population is evident in comparison to the 2006 model; this growth is seen throughout the noise boundary contours and indicating the increase in possible sensitivities surrounding airport noise.

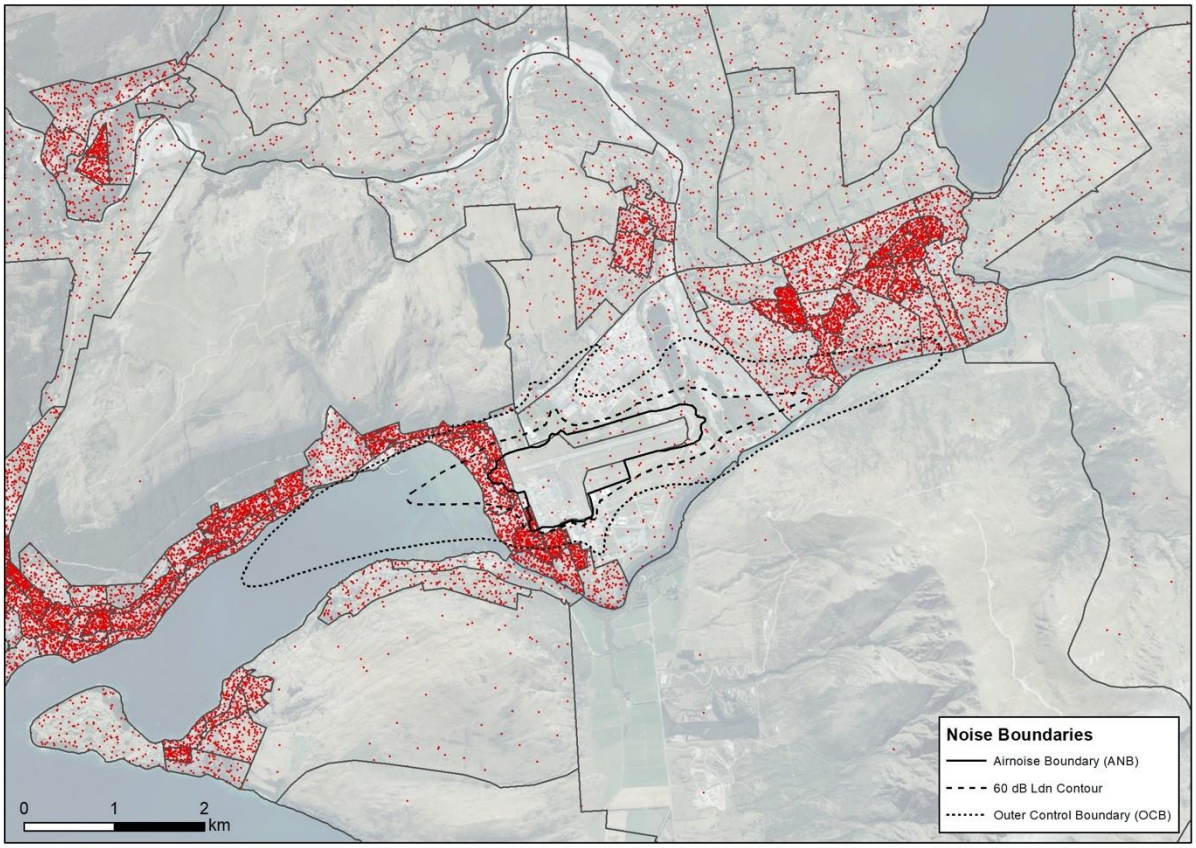

Figure 23: GIS data of Queenstown population 2018 (dot density)

Both Figures 22 and 23 show a detailed dot analysis of the Queenstown Lakes District in the respective years. Figure 23 shows the extent of growth in the region experienced over the last 12 years, highlighting the relatively fast growth rate of the region (Woods, 2011). This growth is not expected to slow down, and the influence of outside factors, such as the housing crisis, has led to the continuous need for development (Cheng *et al.*, 2020) Both also highlight the extent of development with the noise boundary lines, the lines depicted in both graphs have not experienced any changes over the 12 years. Raising the question of if the lines do change and noise boundaries are extended, how many more development will be affected in the future. Key Informant 13 highlights the issues not only concerning the community but also concerning the QLDC and their ability to respond.

> The whole debate morphed into a **growth, tourism, sort of discussion, infrastructure, all the strains and pressures as a community we were having at the time. So, all got wrapped up into this growth discussion.** And that's when I go back to how the election, we're looking to the QLDC to sort all that out, **because it wasn't just a noise**

> **boundary issue. It's just a growth issue. How do you manage growth?** (Key Informant 13)

Key Informant 13 highlights the discussions around the developments of Queenstown extend beyond that of noise boundaries issues, but rather the capacity for the region to absorb growth, fund and provide the needed infrastructure, all while ensuring new developments are not subjected to negative sensitives.

Such policies in the QLDC proposed district plan outline the adherence to the New Zealand policy statement on urban development, indicating the awareness of future growth in the region. Furthermore, they outline the need to reconcile existing and future infrastructure development to a standard that minimises the reverse sensitivity effects produced by close proximity to the QIA operations.

> *Integrate urban development with existing or proposed infrastructure so that:*
> a. *Urban development is serviced by infrastructure of sufficient capacity; and reverse sensitivity effects of activities on regionally significant infrastructure are minimised; and...* (Queenstown Lakes District Council, 2020)

Key Informant 8 highlights the airports' responsibilities in creating a sense of balance for both operations, community and expected growth "That was part of what we did through the PC 35 is looking at what, you know, **what's the right approach to balance? what's already existing and what could come new**" (Key Informant 8). This quote highlights firstly the changes that have occurred to due Queenstown Airport Corporations submissions, such as plan Change 35 and the need to reconcile changes with the balance of growth, community involvement and considerations. It also ensures the variety of challenges to sensitivities are limited as much as possible without hindering new growth and development. Policy 4.2.216 further outlines the need to protect the airport, the wider community and the changes in land-use activities in the region from the predicted growth of the airport:

> a. *"Protect the airport from reverse sensitivity effects of any Activity Sensitive to Aircraft Noise via a range of zoning methods"* (Queenstown Lakes District Council, 2020)

The application of zoning methods is a tool used in order to preserve the amenity of space and to limit the impacts of sensitives to the existing community (Wilson, 2013). Wilson (2013) further highlights the use of zoning as a management strategy for sensitivities. For land-use and amenity, the strengths of zoning allows for growth of development infrastructure and the growth of the region's population to be absorb in locations which preserve amenity and the community. Key Informant 10 further outlines some of the struggles with the airport and the zoning strategies.

> "Um I think just it's, you know, it's not just a noise effect. **It's the effect of all those people landing in a spot that could absorb the population of Queenstown expansion for the next 40 years of who chose to**. So, **it's about do we accept the sort of diversified spread-out model with the airport in the centre? Or do you have a more compact model with the airport with an hours distance somewhere... I mean, the question is, would it stop a tourist coming here?** I don't know." (Key informant 10 i).

Key Informant 10 outlines the struggles with zoning in Queenstown, specifically regarding the growth and the absorption of that growth in the district, highlighting zoning and land-use activities in relation to the airports' location. With concerns of growth, Key Informant 10 highlights the complexities associated with moving the QIA and the overall struggles with land-use activities in the region due to the current QIA placement.

9.5 Summary of Research Question 3

The influence of the QIA has been significant in the emerging results for impacts on amenity and land-use in the Queenstown Lakes District. The major impacts that have consistently been outlined are the effects of noise on the community and activities within the region; the effects of land-use planning mechanisms in noise mitigation and the effects these may have in the future with excepted growth; the impact of noise on amenity value, perceived amenity and community amenity in the Queenstown district. Research question 3 has allowed an exploration of the impacts of noise on planning mechanisms and how they interact with the community in the District. By understanding these effects, mitigation processes can change and develop methods that put the community and its future growth at the forefront of the QLDC and the QIA.

CHAPTER 10: Recommendations and Conclusion

This research aimed to explore the reverse sensitivity effects in relation to the Queenstown International Airport and residential development in rural areas, with particular regard to the Gibbston Valley; To provide suggestions for planning response options to managed reverse sensitivity effects. This was undertaken by identifying suitable research questions which then guided the review of literature, analysis of relevant policy and primary research. The questions which have guided the research and have been addressed in this report are:

1. What are the diverse impacts of reverse sensitivity associated with the Queenstown Airport and rural residential development in the Gibbston Valley?;
2. What are the factors affecting the broader perception of, and vulnerability to, reverse sensitivity?;
3. How do the effects of reverse sensitivity in the Queenstown Lakes District affect land-use planning and amenity?

The literature review revealed that there is a limited knowledge of what actually defines reverse sensitivity in the New Zealand setting. The concept of Law of Nuisance was the guiding principle to understand the term of reverse sensitivity. The common perception of reverse sensitivity relates to the idea of existing land uses and activities being subjected to new activities occurring in its vicinity receiving complaints towards the existing activity. At times, complaints are only if the activity produces major effects such as noise, smell or visual impacts. There is a presence throughout the policy review that district councils aim to protect existing activities such as airports and wineries from being subjected to reverse sensitivity complaints. The literature review further looked at the impacts that large scale activities such as airports can affect the health of the human body, both mentally and physically. The literature review highlighted that constant noise disruption can impede sleep patterns of the human body if appropriate measures are not taken to mitigate the effect of noise. Continually exposure to the effects of noise, not just from airports, but also wineries, can start to impact mental health. Under the Resource Management Act 1991 (RMA), the environment includes both the natural, the built form and the people and community that inhabit it. There is a duty to protect and

provide for their social, economic and cultural wellbeing and health and safety. Due to people and communities being at the centre of the RMA definition of environment, reverse sensitivity principles are seen as the linkage between the RMA and the effect on people and communities are mitigated, remedied or avoided.

The report covered four unique case studies, which could be applied to the Queenstown setting. Two of these case studies, Innsbruck – Austria, and Larnaca – Cyprus, provided contextual examples of how they have managed reverse sensitivity effects in relation to airports specifically. Innsbruck was important for this report as it had similar environmental conditions to that of Queenstown. The Larnaca case study provided an example of how Geographic Information Systems (GIS) can be used to visualise how the effects of noise impact the surrounding environment. Two local case studies in Pukekohe and Marlborough provided a contextual analysis of how reverse sensitivity is managed in New Zealand. All four case studies provided valuable guidance on how best to approach the research topic.

The research findings identified four key themes which should be considered when discussing reverse sensitivity effects in the Queenstown Lakes District:

1. Understanding the perspectives of the people/community
2. The need for greater social engagement and development of relationships
3. The need to understand the potential impacts further growth may have
4. How the existing impacts are accounted for and managed

These themes have been discussed extensively within the results and discussion chapters, informing the development of specific conclusions and relevant recommendations which may have value to achieving greater community understanding of reverse sensitivity. As a result, this research has developed four recommendations which are purely the thoughts of the research team based on the information gathered from key informants and secondary data.

Recommendation 1 – To complete a full air noise mapping assessment and well-being survey to show the full extent of noise generated from the Queenstown International Airport.

While the Queenstown International Airport does provide air noise boundaries, our research has found that the noise generated extends beyond the lines shown on the map. A comprehensive noise analysis from various areas in Queenstown coinciding with a survey to find out how noise affects residents will provide a clear idea of the extent of noise generated from Queenstown International Airport.

From interviews with key informants, it was suggested that the current airport boundary does not include a significant portion of the affected homes and businesses. Residents have had to install noise proofing to their homes at their own cost to try and drown out the noise of the airport, as the effects were so debilitating despite not being included in the air noise boundary. The completion of a full air noise mapping assessment that highlights the full extent of noise generated from the Queenstown International Airport in coalition with a well-being survey will help assess the extent of the noise generated and the impacts associated. This information can be used to help support effective communication around noise exposure issues, and help create even knowledge platforms between airport, council and community.

Recommendation 2: To develop effective strategies for communication around reverse sensitivity issues, in order to foster positive relationships.

1. Create accessible documents which inform residents around reverse sensitivity/noise exposure challenges.
2. Encourage bi-directional engagement on reverse sensitivity issues.

Based on the results gathered through the research, a common trend from the majority was that there needs to be a greater level of education provided by the Queenstown Lakes District Council on what reverse sensitivity means, respectively in relation to the Queenstown International Airport and the Gibbston Valley. As discussed in the literature review a study by Liebe et al. (2020) suggested that the provision for engagement resulted in decreased perception of airport expansion as unfair and decreased overall opposition to expansion.

Currently, based on key informant analysis, there is a clear lack of understanding of the impacts that reverse sensitivity has on the community. According to Key Informant 3:

> How we see the airport moving forward not making any decisions on what they should or shouldn't do, but more about just establishing relationships because they were pretty strained, because you had counsellors here in the political heat put on them by the actions or the actions but the, the tension, here for trying to inform what the planes were but the planes were not going to wash with the community. So that anger towards x came back to both the airport and QLDC.

Table 11: Recommendations for bi-directional engagement

The establishment of a bi-directional engagement process could involve:
3. Bi-monthly open community meetings where the QAC and QLDC host community evenings where discussion panels, focus groups and issues can be raised from the community. While no concrete decisions have to be made at these meetings, it can provide an opportunity for representatives from the QAC and QLDC to communicate in a language which is accessible
4. The continuance of the Airport Liaison committee, with greater oversight by QLDC and potential neutral mediators. The frequency of these meetings could also be increased.
5. The utilisation of PPGIS and participatory mapping tools.
The establishment of a bi-directional engagement process could assist in:
6. Affirming the legitimacy of decisions made around noise management.
7. Establishing greater consensus in terms of how the broader community feeling about noise challenges in the Frankton, and other, regions.
8. Supporting community members in feeling a greater sense of control over noise exposure.

It was highlighted that there is a fraught relationship between the community, the QLDC and the Queenstown Airport Corporation (QAC). Given the scale the airport was operated at prior to 2020 and COVID-19, the community was bearing continual impacts on their social environment, however when communicating their frustrations, it was felt that there was little acknowledgement of the communities' issues and frustrations. Building trust between the airport, council and community involves a changing nature of community engagement. Although the airport discarded the noise boundary changes proposed in 2018, due to public opposition, this consultation process represents an approach to engagement which focuses on singular events – as opposed to an ongoing, bi-directional strategy. Based on this, one recommendation is the development of an open dialogue between respective parties. This could assist in restoring community agency, and feelings of recognition in decision-making processes, and help to ensure that there is a mutual understanding between the parties. Furthermore, there is an opportunity for any potential new residents to the Queenstown Lakes District, specifically in Frankton, Kelvin Heights and Shotover Country to receive detailed information regarding the likely impacts that they would experience if they chose to live in these specific areas. This information could be broadly spread to cover the wider Queenstown area, given that during field research, noise generated from aircraft could be heard from Queenstown Hill, which encapsulates both temporary and permanent residents.

Participatory mapping tools could be used in both the Airport and Gibbston contexts. As discussed in Chapters 3 and 7, desirability of management options plays an important role in determining whether noise exposure, airport management strategies, and other reverse sensitivity challenges are accepted by the broader public. Participatory mapping tools such as PPGIS can aid in developing more detailed understandings of where reverse sensitivity issues emerge from – and thus define what the actual reverse sensitivity challenges are. Defining the nature of the problem is a critical step in devising appropriate solutions. In the context of the airport, this participatory mapping approach should involve the incorporation of non-acoustic, secondary factors, such as those discussed in Chapter 6 of this report. These include the impacts of mitigation strategies, congestion and more.

Recommendation 3 – To establish a collaborative initiative which aims to assist the various forms of noise mitigation.

One recommendation that the research team propose is that a QLDC led, collaborative, initiative with the aim of developing some form of monetary fund which residents who reside outside of the Queenstown International Airport's inner noise boundary can access. Currently, the Queenstown Airport Corporation (QAC) fund 100% costs for noise mitigation instruments to be installed into houses and businesses that fall within the inner noise boundary. However, in the mid-boundary the QAC will fund 75% of ventilation systems for houses, so residents can keep their windows and doors shut. However, in practice, this limits quality of life people experience. Funding by QAC stops at the outer noise boundary: many residents and developers have to either fund retrofitting of their existing homes or have to include noise mitigation tools in new builds. It was stated that the Queenstown Hospital at present, does not have adequate noise mitigation, especially given it is the primary location for healthcare in the district.

A recommendation is that the QLDC, given their 75% share in QAC, facilitates discussions with the remaining 25% shareholder in Auckland International Airport Limited, to explore possibilities of increasing the costs associated with flight travel to and from the QIA, and a portion of the revenue goes into a fund which can be accessed by those that fall in the outer noise control boundary. The Council could also look at the revenue coming from the profits generated broadly from the airport, and a portion of these funds be contribute towards the established fund.

Recommendation 4 – To establish a cross-regional taskforce to evaluate the impacts of tourism in the broader lower-South Island.

The establishment of a new inter-regional taskforce to evaluate the impacts of tourism in the broader lower South Island should be created. This taskforce would ideally have the involvement of Ngāi Tahu, Queenstown Lakes District Council (QLDC) and Queenstown Airport Corporation (QAC), Dunedin City Council and Dunedin Airport, Christchurch City Council and Christchurch International Airport Limited, Invercargill City Council and Invercargill Airport Limited, alongside Air New Zealand and Jetstar given they are both national air travel providers. Christchurch City Council and Christchurch International Airport

Limited should be included in this taskforce due to their investment in the Tarras Airport development. Developing a broader-scale approach to considering the impacts of tourism in the district, could also involve undertaking a Cost Benefit Analysis of relocating the QIA.

The formation of this taskforce would take into account the need for better connectivity to the lower South Island from the rest of New Zealand. Furthermore, the taskforce would also promote procedural justice within tourism management – enabling deeper consideration of who bears the costs and benefits of tourism. The dispersing of incoming air traffic to other lower South Island airports would see the overall effects of reverse sensitivity from the Queenstown International Airport (QIA) decrease. At present, key informants indicated that a flight arriving at QIA and departing was every 3 minutes on average. The time between flights arriving and departing could be increased if flights were dispersed to other airports as previously mentioned. A disadvantage of this approach is that direct revenue for the QAC would take a subsequent decrease but could be mitigated with the offering of tourists either departing from the QIA if they entered the lower South Island elsewhere, and vice versa.

Implementing this approach to managing travel to the lower South Island with the expected growth in tourism demand in a post-COVID-19 world, could encourage and foster a greater relationship between the Queenstown community and the QAC as it would be an acknowledgement that the communities' aspirations of less frequent flights resulting in less effects on human health would be seen as a step in the right direction. In the long term, this option would provide a greater sense of "supporting local" as it would encourage both domestic and international tourists to take routes around the lower South Island that otherwise would not occur if they flew directly in and out of the Queenstown International Airport.

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APPENDIX A: Ethics Application Form, Information Sheet and Questions

Form Updated: November 2019

UNIVERSITY OF OTAGO HUMAN ETHICS COMMITTEE

APPLICATION FORM: CATEGORY B

(Departmental Approval)

Please ensure you are using the latest application form available from: http://www.otago.ac.nz/council/committees/committees/HumanEthicsCommittees.html

1. University of Otago staff member responsible for project:

Surname First Name Title (Mr/Ms/Mrs/Dr/Assoc. Prof./Prof.)

Thompson-Fawcett, Michelle, Professor

2. Department/School:

School of Geography/ Te Ihowhenua

3. Contact details of staff member responsible *(always include your email address)***:**

Room 4C17, Richardson Building

Ph: 03 479 8785

Email: michelle.thompson-fawcett@otago.ac.nz

4. Title of project:

Reverse Sensitivity Challenges in Queenstown

5. Indicate type of project and names of other investigators and students:

X

Student Research	**Names**
Katie Knopp *Sean Widdowson* *George van Pelt* *Matthew Campbell*	*Mia Te Tana* *Hannah McDonald* *Bailee Eastlake*
Level of Study (e.g. PhD, Masters, Hons)	Master of Planning

6. When will recruitment and data collection commence?

Recruitment: Initial contact will begin to be made starting from April 2021.

Data collection: 20th April, 2021.

When will data collection be completed?

31st May, 2021.

7. Brief description in lay terms of the aim of the project, and outline of the research questions that will be answered (approx. 200 words)**:**

The aims of this project are two-fold. The aim of this project is to explore the reverse sensitivity effects in relation to the Queenstown Airport and residential development in rural areas, with a particular regard to the Gibbston Valley area. The second aim of this project is to provide suggestions for planning response options to manage reverse sensitivity effects. As a result, the project is centred around several key objectives:

1. To understand the origin of the diversity of reverse sensitivity impacts associated with the Queenstown Airport and rural-residential development in the Gibbston Valley.
2. To develop an understanding of the factors affecting broader perception of, and vulnerability to, reverse sensitivity.
3. To develop recommendations for the QLDC regarding managing and responding to reverse sensitivity.

8. Brief description of the method. Include a description of who the participants are, how the participants will be recruited, and what they will be asked to do and how the data will be used and stored

The methods to be used in the project are as follows:

1) Online Data and Media Analysis - The use of online data and the analysis of media articles allows the research team an opportunity to gain information that may not be readily available through the interview process. What this allows is for supplementary information to be used to support any findings the research team conclude. It will be useful to use media articles for certain aspects of this research, as information for the research location may be scarce, so using information from a similar location and focus of research can be beneficial. All information used will be done so with the appropriate referencing of authors, media outlets, and if need be, the appropriate use of anonymity for any sensitive information.

2) Semi-Structured Interviews – interviews will be conducted with key people involved in the airport development and residential developments in the Gibbston Valley and are involved in the community engagement process:
   a. Council Officers: including project managers, planners and technical experts.
   b. Elected Councillor for respective area of Queenstown
   c. Key Economic Stakeholders: Such as consultants engaged in the development of the airport and the developments that have occurred surrounding the airport. Winery managers/owners and key leaders for development in the Gibbston Valley
   d. Community members: Those Queenstown and Frankton residents who may be concerned with relevant planning issues or involved with local community groups.

Participant Recruitment will be on advice from both the QLDC contact and others recruited while in the discussions with members in the field. The total number of participants interviewed is to be between 8-12.

Interviews: Participants will be asked to engage in an interview that will take between 30-60 minutes. Depending on the COVID-19 Alert Level, this will occur in person, with appropriate social distancing as required, and or will be conducted via Zoom, Skype or Telephone as preferred by the interviewee. With the participants' permission, interviews will be recorded and later transcribed by the research team.

Informed Consent: All interview participants will be presented with an information sheet and asked to sign a consent form prior to agreeing to participate in the research (see attached consent form and information sheet). The information sheet will outline the topics and goals of the research, the voluntary nature of participation as well as what will happen with the data and the information they provide. Furthermore, participants will be informed that they may withdraw from the project at any point without any disadvantage to themselves. In addition, they will be informed that their identity will not be revealed in any publications or material produced summarising the research findings and that instead a pseudonym will be used unless they prefer to be named. However, interview participants will also be warned that due to the nature of the research, those very familiar with the research context may be able to identify people through what is said or quoted even if not named.

Data Storage: All data (from interviews, participant observation, and that provided by the Council) will be securely stored in such a way that only the research team will be able to gain access to it. Any

personal information held on the participants such as contact details and audio files after they have been transcribed will be destroyed at the completion of the research.

3) GIS Mapping - GIS mapping will be used to map the location of complaints received by the Queenstown Airport and the Queenstown Lakes District Council. If the Council and Airport allow for the information to be shared with the research group, we will ask that only the addresses be given, with evidence of names, and contact information removed for the purpose of anonymity. The information will be used to take GPS location data and uploaded into respective GIS software to generate a map. Other information will be gathered in relation to 'Frost Fan' locations at selected vineyards in the Gibbston valley, with GPS locations gathered. However, this may not be required if the vineyards do not have frost fans, and or already have that information which they can impart to the research team. The use of census data will also be used to create a map showing residential changes around the Queenstown Airport and the Gibbston Valley. This information will be gathered from Statistics New Zealand.

   To ensure that those who have made complaints to the Council and Airport retain their anonymity, the group will remove the map used in the final report, should any of those that we interviewed request a copy, it shall be removed for privacy purposes.

   The data that will be provided to the research group will be securely stored in such a way that only the research team will be able to gain access to it. Any information given will be destroyed at the completion of the research.

4) Site Visits – Site Visits will be conducted by the research team following appropriate health and safety guidelines provided by the University of Otago. All site visits will be done with appropriate consent from the management or respective personal of the site in question. The research team may take photos/video evidence of the site for use in the final report. If it is requested by the management or respective personal that they do not want the images to be made publicly available, then the images shall be removed in the final report. During site visits, the research team may use GIS technology to map the location for the use on a GIS map that will be produced.

9. Disclose and discuss any potential problems and how they will be managed: (For example: medical/legal problems, issues with disclosure, conflict of interest, safety of the researcher, safeguards to participant anonymity if open access to data is proposed etc)

There are no medical/legal problems, issues with disclosure, or conflict of interest issues with this project. Due to the nature of the research, it is unlikely that interviewees will be exposed to any harm or discomfort. No research is being taken undertaken involving vulnerable participants. However, steps will be taken to ensure that any risk of discomfort will be minimised. This includes establishing informed and uncoerced consent prior to the interview – through the presentation of a detailed information sheet and consent form. Participants will also be informed prior to the interview beginning – both through the consent form and verbally – that if at any point they become uncomfortable they may refuse to answer a question or terminate the interview.

Furthermore, in order to prevent deception, prior to all interviews the research team will make it clear to interview participants the researchers do not represent the Queenstown Lakes District Council and are undertaking the research as part of the Master of Planning programme. Thus, participants will be made aware that this research is of an informative nature and not part of official Council decision-making processes. The research team will also wear University of Otago identification while conducting research in public, including on-site visits, in order to reinforce this independence from the Council and to attempt to minimise any conflict that could arise from the presence of the researchers in public.

As researchers, we acknowledge that there is likely to be a range of different perspectives between interviewees and thus, that interview participants make seek to be advised as to what other interviewees have said within the interview process. Given this, the research team will attempt to ensure that the transfer of information does not occur. Additionally, care will be taken by the researchers to assume a neutral position throughout the interview process. The research team also understand that there are a number of cultural, social and commercial sensitivities associated with this research project.

All participants will be offered the opportunity to remain anonymous within the research report, although participants may also choose to waive anonymity. Unless this preference to waive anonymity is indicated, participants' identity will be concealed through the use of pseudonyms, and any identifying contextual information will be treated with so as to avoid as far as possible identifying the individual interviewee. The interviewee will however, be advised that it is not always possible to fully maintain anonymity from people who know the context well or were also at the events described. Furthermore, given the potentially contentious nature of the research, every attempt will be made to prevent the transfer of information between interviewees. The researchers will maintain personal safety, and the safety of the interviewees by conducting interviews.

***Applicant's Signature:** .....

Name (please print): …….

Date: .....

**The signatory should be the staff member detailed at Question 1.*

ACTION TAKEN

☐ Approved by HOD ☐ Approved by Departmental Ethics Committee

☐ Referred to UO Human Ethics Committee

Signature of **Head of Department*:* .....

Name of HOD (please print): …….

Date: .....

**Where the Head of Department is also the Applicant, then an appropriate senior staff member must sign on behalf of the Department or School.

Departmental approval: *I have read this application and believe it to be valid research and ethically sound. I approve the research design. The research proposed in this application is compatible with the University of Otago policies and I give my approval and consent for the application to be forwarded to the University of Otago Human Ethics Committee (to be reported to the next meeting).*

IMPORTANT NOTE: As soon as this proposal has been considered and approved at departmental level, the completed form, together with copies of any Information Sheet, Consent Form, recruitment advertisement for participants, and survey or questionnaires should be **emailed as one complete fully-signed PDF to** HECapplications@otago.ac.nz

REVERSE SENSITIVITY CHALLENGES IN QUEENSTOWN

INFORMATION SHEET FOR INTERVIEW PARTICIPANTS

Thank you for showing an interest in this project. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate, we thank you. If you decide not to take part there will be no disadvantage to you and we thank you for considering our request.

What is the Aim of the Project?

This project is being conducted as part of the Master of Planning degree at the University of Otago. The aim of the project is to explore reverse sensitivity effects in relation to the Queenstown Airport and residential development in rural areas, with a particular regard to the Gibbston Valley area. We are interested in your experiences and opinions in relation to the effects of the Queenstown airport or residential development in rural areas.

A report of the research will be provided to the Queenstown Lakes District Council upon completion of the research,

What Types of Participants are being sought?

The researchers seek to contact various key stakeholders, who may include residents/community groups, local businesses, Council staff, planning consultants, amongst other groups. Interviewees are to be recruited through discussions with Council staff, identification through local media, and word of mouth.

What will Participants be asked to do?

Should you agree to take part in this project, you will be asked to participate in an interview of between 30 and 60 minutes in length. With your permission we will audio record this interview to enable later interview transcription by the researchers.

During the course of the interview, you may refuse to answer any questions, or request a change in topic of conversation. Furthermore, you may request to stop the interview at any time without any detriment to yourself. Participants may also withdraw themselves and any information provided in the interview at any point prior to the 1st of June 2021. Please be aware that you may decide not to take part in the project, or withdraw from this project, without any disadvantage to yourself.

What Data or Information will be collected and what use will be made of it?

This research will involve the use of the semi-structured interview style. This involves the exploration of a series of key topics, and some proposed questions. As a result, the interview process remains open and takes the form of a conversation around these topics. Given this, the School of Geography has been made aware of the broad topics of conversation but has not reviewed specific questions. The general line of questioning may include areas such as: experiences of living or working in the airport area, experience of residence in the Gibbston Valley, knowledge of noise exposure, nature of communications around reverse sensitivity issues, and general perceptions of reverse sensitivity. However, it is critical to note that because the researchers are not using previously prescribed questions, the course of the interview may change based on your answers. As stated above, if you feel uncomfortable at any time you may refuse answer a question, request a change of topic or request that the interview end immediately.

With your expressed permission (please indicate on the attached consent form) we will audio record the interview to be transcribed by the research team. As a result, the audio recording of your interview will be available only to the research team. During the transcription process all participants will be anonymised and referred to using pseudonyms. If desired (please indicate on the consent form) you will be offered the opportunity to have you name publicly available.

No material that could personally identify you will be used in any reports on this study. However, people very familiar with the context may be able to identify you through what is said in the interview process. A final report on the research will be made available to the QLDC, however all attempts will be made to provide for anonymity unless you prefer otherwise. The QLDC will not have access to any personal or identifying information. Following the conclusion of the project all identifying information will be destroyed.

The results of the project may be published and will be available in the School of Geography Library (Dunedin, New Zealand).

Can Participants change their mind and withdraw from the project?

All participants are available to withdraw from the project prior to the 1st of June 2021 without any disadvantage to themselves.

What if Participants have any Questions?

If you have any questions about our project, either now or in the future, please feel free to contact either:

Katie Knopp
School of Geography
knoka239@student.otago.ac.nz

and

Professor Michelle Thompson-Fawcett
School of Geography
+64 3 479 8762
michelle.thompson-fawcett@otago.ac.nz

This study has been approved by the School of Geography. However, if you have any concerns about the ethical conduct of the research you may contact the University of Otago Human Ethics Committee through the Human Ethics Committee Administrator (ph +643 479 8256 or email gary.witte@otago.ac.nz). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.

REVERSE SENSITIVITY CHALLENGES IN QUEENSTOWN

CONSENT FORM FOR *PARTICIPANTS*

I have read the Information Sheet concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any stage.

I know that:

1. My participation in the project is entirely voluntary;
2. My interview responses will be audio-recorded;
3. I am free to withdraw from the project prior to the 1st of June 2021;
4. Personal identifying information (such as audio recordings) will be destroyed at the conclusion of the project;
5. This project involves a semi-structured questioning technique. The general line of questioning may include areas such as: general perceptions and opinions of land-use changes, experiences of living or working in the airport/Gibbston Valley areas, knowledge of noise exposure and the nature of communications around land-use changes. The precise nature of the questions that will be asked has not been determined in advance, but will depend on the way in which the interview develops and in the event that the line of questioning develops in such a way that I feel uncomfortable I may decline to answer any particular question(s) or may withdraw from the project without any disadvantage of any kind;
6. Results from this research may be published and will be made available to the Queenstown Lakes District Council. However, all reasonable attempts will be made to preserve anonymity if this is my preference (please indicate below).

   I, as the participant:

a) agree that my name can be made publicly available ☐

OR

b) request that my name be kept anonymous ☐

I agree to take part in this project.

....

(Signature of participant) (Date)

.....

(Printed Name)

Appendix A: List of Sample Questions for Interviews:

- Personal experience in the space, role, resident?

Gibbston Valley Questions

- What is your opinion on the re-zoning of land for resort/residential development?
- How likely do you think this trend is likely to continue?
- How likely is this will impact you, your business etc.
- If so, how?
- How do you think it may affect other businesses, and or future business in the Valley?
- What do you know regarding current strategies to mitigate tensions between land use types?
- Noise mitigation?
- Other issues?
- From where have you accessed information regarding re-zoning?
- Discussion with council?
- Other groups?
- Have you had conversations with wineries in other regions?
- If so, what have you found out? Did you adapt or incorporate any of these ideas into how you run your business?

Airport Questions:

Questions for residents, community groups:

- How are you affected by the airport land-use/operation?
- What do you know about current management strategies?
- How were you informed about these?
- From council?
- Other residents?

- How accessible do you find this information?
- What do you think about current (noise management) strategies around the Queenstown airport area?
- What do you think might be the best option for managing these issues?

Questions for airport/council/planners:

- What informed your noise management strategies, what were your key considerations in developing these strategies.
- Are you aware of any complaints from local businesses or residents?
- How do you work to address these?
- Are you expecting to increase working hours to accommodate increased flights?
- Change in impacts, tensions, challenges, strategies?
- Do you support these land-use strategies employed by the QLDC?
- What do you think might be the best option for managing these issues?

- Any other thoughts?

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Questions for Queenstown Airport

What informed your noise management strategies, what were your key considerations in developing these strategies.

Are you aware of any complaints from local businesses or residents?

- How do you work to address these?

What is the role of the airport liaison committee? In terms of noise management/planning?

- How often is the noise management plan updated/reviewed/changed?

What do you know about any mitigation responses that the community and local business that surround the airport have undertaken to address noise?

Are you expecting to increase working hours to accommodate increased flights

- Change in impacts, tensions, challenges, strategies?

Do you support the land-use strategies employed by the QLDC?

- Under sustainable management, district wide rules, transport, open space zones within the plan
- Queenstown Airport mixed-use zone? Did you consult on this?

What do you think might be the best option for managing these issues?

What do you consider the main challenges for noise?

What are the future plans for airport expansion? What, if any consultation been conducted?

How does noise impact the way you plan for the airport?

Anything else you would like to share with us that has not been covered in the interview?

Questions for the Hospital:

Are you affected by the airport land-use/operation?
- How?
- Operations of the hospital?
- Care for patients?
- Employee care?

Have you experienced an increase of patients affected by noise?

What do you know about current management strategies?

How were you informed about these?

- From council?
- Other residents?

How accessible do you find this information?

How would you classify the relationship between you and the airport?

What do you think about current (noise management) strategies around the Queenstown airport area?

Do you think there are issues surrounding the airport noise?
- If so, how do you think this would be best managed, and by whom?

Do you receive complaints from patients? How do you deal with these?

How do you see future development concerning the airport progressing?

What are your views on the development of the area?

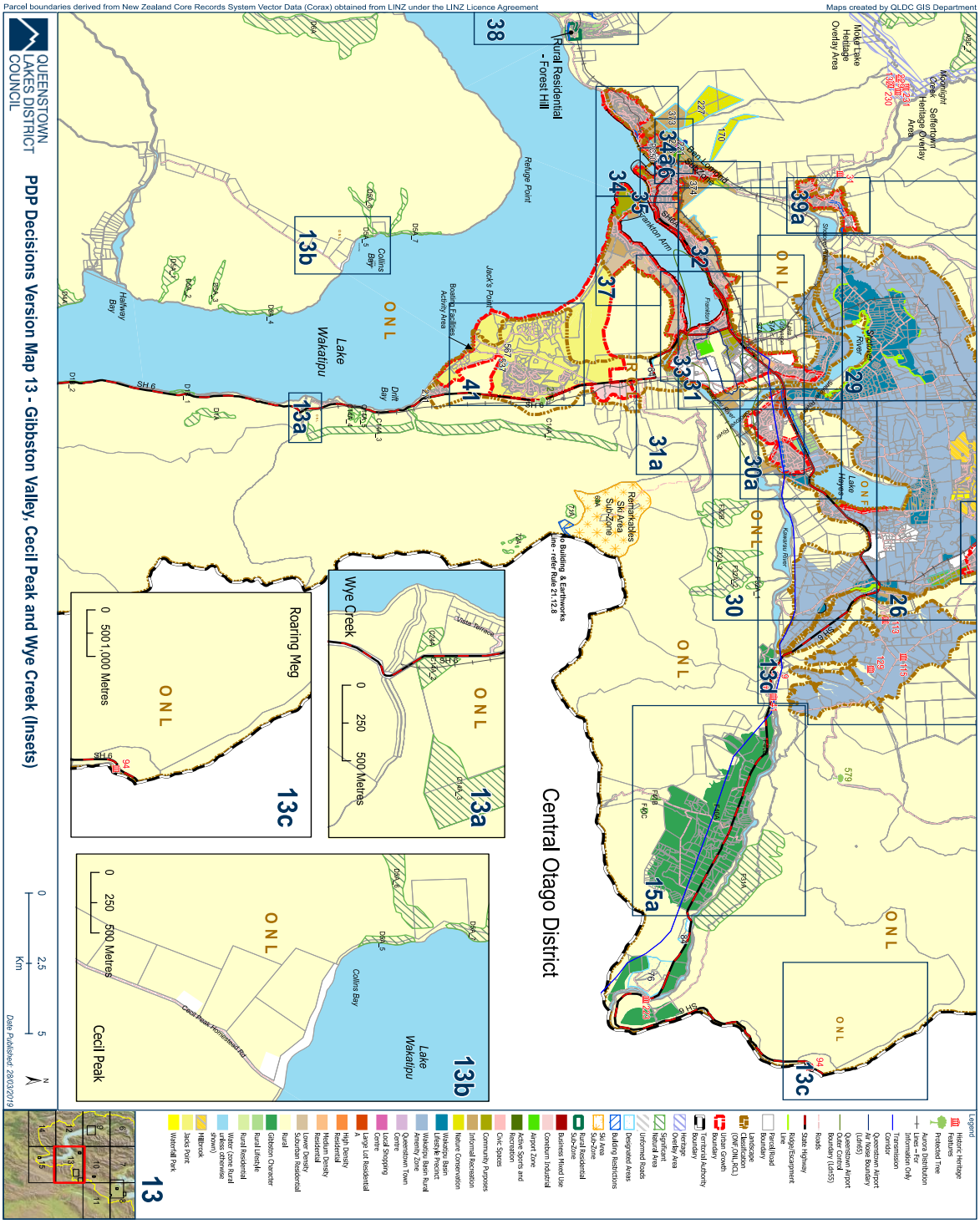
What is your position on the relocation of the airport?
- How would this affect the hospital

Have you had to do anything to mitigate the impacts from the airport?

- If so, what are these?

Anything else you would like to share with us that has not been covered in the interview?

APPENDIX B: Proposed District Plan 2019 Land Use Map QLDC



Map of Zoning in the Frankton Flat area (Source Queenstown Lakes District Council, 2020).

APPENDIX C: Media Analysis Tables

Otago Daily Times Media Analysis Table

Name	Date	View on Airport/ Gibbston Valley Growth	People/ Community	Social Engagement/ Relationships	Growth	Impacts
ODT - Minimal Support for airport noise expansion: *Had negative emphasis on growth of noise boundaries. Had a lot on people, results of the survey, and impacts.*	03/10/18	Negative	-Low level of support with aircraft noise boundary including another 3000 homes. -New business and community group were in opposition. -'We have said no to the airport driving the future of the district and we will continue to do so." -Public bodies and schools came out in opposition. The additional adverse effects on nearby schools were mentioned 149 times by survey respondents. -Wakatipu High School, Remarkables Primary School, Kingsview School and the Wakatipu Playcentre, which are all located within the airport's proposed boundaries, opposed the proposals	-A staggering 92.5% of the online survey respondents opposed the plans, while the remainder said they were unsure or neutral. -Only 4% of 1500 people who responded to it's consultation survey backed the proposal. -The Southern District Health Board also objected, stating there was "no evidence that wider public health impacts had been considered" by the airport and that Lakes District Hospital could be adversely affected. -The consultation data showed the level of community engagement over the proposals was far higher than many of the council's recent, high-profile projects, including its 10-year plan.	-The Airport's operating capacity would be increased approx 2 and a half times. -Queenstwon stakeholders group (QSG) and Frankton Com Asc chairman welcomed pause, but 'stressed expansion was a "fundamental tipping point."	-Remarkables Primary School's board of trustees stated it ''cannot support even entertaining a proposed boundary change to QAC operations''. The board claimed the expansion would be ''seriously damaging to learning''. -The top three negative effects respondents said the proposed expansion would have were: strain on destination infrastructure, impact on the quality of life of residents and additional noise for those living within the boundaries. -Mr Lewers -> The negative impacts of the airport expanding and increasing flights were damning and real, he said.

						''Queenstown is at risk of becoming just a noisy and chaotic airport hub. -''There is also a growing global trend of local residents feeling the negative impact of uncontrolled tourism growth, and we need to be smarter than that.'' -Mr Lewers noted many objectors to the airport expansion feared Queenstown's already creaking infrastructure and environment would be pushed beyond its limits, destroying the tourism asset and residents' quality of life. That fear was echoed over the hill in Wanaka.A representative of recreational flyers at Wanaka Airport, Sean Gilbertson, described the QAC's shift in focus to Wanaka Airport as ''unfair on Wanaka''.''This is coming down our line far earlier than anticipated, and it was never sold to us like this.''As the regulator, QLDC would have to approve any proposal by

						QAC to extend its noise boundaries.
ODT - Queenstown Airport in holding pattern: *Had a lot on relationships/ social engagement.*	04/03/19	Explanatory, more negative of expansion in Qtown.		-"We have increased the frequency of our noise monitoring programme and are working closely with our airline customers to manage the rate of growth via flight schedules and route planning. -Work is ongoing master planning for both Queenstown and Wanaka airports - QAC was granted a 100-year lease on Wanaka Airport by Queenstown Lakes District Council (QLDC) in April last year. QLDC owns 75.01% of the shares in QAC, with the rest owned by Auckland Airport. The SOI was made to QLDC and will be heard by councillors at Thursday's full council meeting. -Ultimately, we aim to bring the long-term planning for Queenstown and Wanaka airports together to present a dual-airport proposition which will support and provide value to the communities we serve.' -Expansion of Wanaka Airport was supported by 52% of the members of the Wanaka Chamber of Commerce who took part in	-"We will need to manage growth to ensure compliance with our noise boundaries, which we expect to reach within the next three years," it reads. -It states the priority over the next two years will be to increase capacity within the current terminal footprint to "provide for a modest level of growth". -The proposed district plan variation would have enabled 41,600 flights to land in Queenstown by 2045 -- double the 21,000 movements allowed for by the present inner and outer noise boundaries. It would have allowed a more-than-doubling of annual passenger movements from 2.05 million to about 5.1 million. -The SOI adds: "While we continue to shape our long-	-"Over time, capacity will be constrained at Queenstown Airport if the noise boundaries are not expanded, with the expected effects being more limited flight choices and other changes in commercial behaviour.''

				a survey late last year. Some 72% favoured the return of domestic flights to Wanaka Airport, and several said they would prefer smaller, non-jet aircraft. The top concern was it would "change the fabric of the Wanaka community". -The SOI also gives something of a nod towards calls for Invercargill and Dunedin airports to share the load regionally, although "operations" are second in a list of "opportunities". "We will also continue to work closely with the airports in the broader region, including Invercargill and Dunedin airports, to explore joint opportunities in the areas of health, safety and security, operations, sustainability, and supporting strategic regional tourism initiatives." -The airport put its expansion plans on hold in October after strong opposition from 94% of the community and businesses who responded to consultation. -"Our ongoing work with, and the support of, the communities across the Southern Lakes region is	term plans, we are conscious that we need to manage future airport growth in a sustainable manner.	

				underpinned by a mindfulness of our social licence to operate and a commitment to social, economic and environmental sustainability."		
ODT - QAC gains rights in Wanaka Airport Push	22/08/19	Positive for growth in of Wanaka Airport to accommodate growth Qtown AP couldn't have. Has negative finish with Ms Beattie	-Wanaka Stakeholders Group member Sharon Beattie pointed out today the authority allowed the QAC to "compulsorily acquire private land for its projects". Ms Beattie said it also allowed the QAC to apply to the council to designate land, under the district plan, for a particular work or project, undertake work in an emergency and get resource consents after and go on to private land, after giving notice, to undertake investigations. In June, the group wrote to the Minister for the Environment, David Parker, "outlining its concerns about the authority being transferred to QAC". The group opposes the development of Wanaka Airport for jet aircraft.	-Queenstown Airport Corporation's general manager property and planning, Rachel Tregidga, said today the approval by the Ministry for the Environment "was routine for infrastructure providers, including airport operators". "It enables them to operate efficiently and utilise the existing designation provisions of the Resource Management Act."The approval recognised QAC as being responsible for the operation, maintenance and development of Wanaka Airport. The Queenstown Lakes District Council (QLDC), which is the majority owner of the QAC, was the previous requiring authority.The QAC has managed Wanaka Airport since 2009. -The public was consulted and a hearing panel considered submissions.	-The Queenstown Airport Corporation has been granted requiring authority status for Wanaka Airport, giving it strong legislative powers to operate and develop the airport. -As an example of how the QLDC used the authority, in 2013 it achieved district plan change 26 designating noise boundaries on land around Wanaka Airport to "accommodate future growth". -A council report at the time said the noise boundaries were to accommodate "the possible introduction of scheduled flights using jet aircraft such as the Boeing 737-300 ... from about 2020 onwards."	-Through the designation, noise limits were imposed on the airport, and new development near the airport "sensitive to aircraft noise" became a prohibited activity.

ODT - Commercial rivalry behind airport plan	17/08/20	Positive discussion on Qtown airport taking matters into their own hands with growth, and not letting CIAL take money with their own development.		-Commercial rivalry between Christchurch and Queenstown has been confirmed as the reason Christchurch International Airport Ltd (CIAL) plans to build an international airport at Tarras. -John Harris, who leads the Tarras group opposed to the new airport, has secured an email under the Official Information Act showing CIAL's plan for Tarras was for the company's own commercial benefit. -He described CIAL's purchase of 750ha of land at Tarras as "a defensive hedge to help protect the current [Christchurch Airport] market share against any alternative Central Otago airport expansion/development". -The only Central Otago "party" planning airport expansion is the Queenstown Airport Corporation (QAC), which is majority owned by the Queenstown Lakes District Council. It wants to expand noise limits at Queenstown Airport and develop Wanaka Airport for jet aircraft. After being shown the email, Queenstown Mayor Jim	-The review "validates the potential longer-term strategic risks to CIAL from further jet-capable airport infrastructure development by another party in the Central Otago region to meet longer-term forecast demand for aviation into the South Island". -"CIAL has therefore sought and now secured a land bank in the optimal aviation location in Central Otago."	-"would deliver widespread social and economic benefits to regions across the South Island".

				Boult described it as "fascinating indeed". "This comment calls into question the whole intent of CIAL in coming up with this pipe dream. -"In my view, this clearly signals serious concern about the commercial attractiveness of Christchurch's offering and is actually a big vote of confidence in Central Otago. -"Their aim seems to be to thwart the intent of any other party, presumably QAC, from cornering any future opportunity to create a long-haul airport in this part of the world. "Given that QAC and council have made it clear that wide-body long-haul jets are not part of our plans, we are not actually in competition with them.		
ODT - Airport no stranger to debate in community	22/08/20	Explantory, fairly gave against and current positions of residents and airport.	-Airport chief executive Colin Keel, appointed in 2016, had to grapple with the airport's 30-year master plan and an uprising from some sectors of the community. In part, the issue is about air noise boundaries — and a desire, pre-Covid-19, to increase them.	-Initially the airport wanted to enable 41,600 flights to land in the resort by 2045, an average of 114 a day, but after an outcry from the community that plan was put on hold in 2018. -Last year, two Queenstown Airport Corporation (QAC) proposals were listed by the council — majority	-Mt Cook Group, which secured its licence to Queenstown in 1964, was the real catalyst for change. -One was to expand air noise boundaries to accommodate a maximum of 5.2million passenger	-The concern was about aircraft noise — at that stage, Mr Tapper said, the Boeings had to be fitted with hush kits to reduce the engine noise. -"But given the fragility and the fluidity of the situation that we're in,

			-Former Frankton Community Association president Glyn Lewers — now a district councillor — said the extent of the air noise boundaries, when they were revealed in 2018, came as a shock to Frankton residents. "The overwhelming majority view in the community was, 'it's too much' ... it was a bridge too far." -In the past five years the airport had had compound growth of about 15% year-on-year, he said, and the community had struggled. "It was too fast, nothing was keeping up and it was just starting to get overwhelming. "You coupled that with the cost living pressures, you could understand why this angst was just bubbling away and it just festered. "In some respects I feel like the airport was the lightning rod for this outpouring of annoyance towards just normal living." In some respects, Covid-19 had been a blessing, Cr Lewers said. --In the Frankton community it confirmed the airport's importance to the economic vitality of Frankton and the Wakatipu,	shareholder of the airport — on the Government's electronic tender service system, looking for consultants to assess the social and economic effects of airport development. -Primarily, it gave the community and the airport time to "really find what we want ... and not work at cross-purposes, but come together and work together on that". -"We've got a passionate and engaged community in this part of New Zealand, and I think that's a terrific thing to have, but that cross-section of views need to be balanced ... and not extreme."	movements and develop Wanaka Airport for domestic services initially, with capacity for international capable jet services in the future. Two alternatives were distributing flights to Christchurch, Dunedin and Invercargill Airports with "little or no growth" at Queenstown or Wanaka Airports, and no growth at Queenstown Airport and development of commercial flights at Wanaka Airport. -"Frankton was established in 1863, the airport's 85 years old."Both ... have grown together ... and there's nothing stopping us being good neighbours and actually driving together for another 85-odd years." -The airport's existing air noise boundaries had had "about two years of space" before they	that could change and it could change on a dime. "It's fair to say some of the more challenging issues we've confronted over the last several years, related to the growth of the district ... have been moved down the road ... by some years."

			and reiterated its importance as an employer. "I'm talking to pilots and cleaners and Customs officers ... it's those sorts of people — they're part of the community and the airport actually provides employment and work for us," he said.		would reach capacity, before Covid-19, he said. "We will never, in the next 10 to 15 years, see anywhere near the number of movements — even if Covid goes away." Further, the advancements in aircraft technology — where planes had greater capacity, and significantly less engine noise — would play a major part. -"This airport here's got a lot of capacity left in it and, with modern airplanes and the effects of Covid, we don't have a problem here for at least another 20 years, I'd say."	
ODT - Airport Expansion plans on hold	24/10/20	Explanatory - discussed why growth would not be an issue for a little while due to Covid.		-As part of its financial forecasts, the QAC noted the full extent and duration of Covid-19 were not clear yet, significant elements of its cost base were outside its control and it had significant and ongoing legal costs as a result of a High Court claim brought by the WSG. Asked to comment on the SOI, WSG deputy chairman	-The SOI states the QAC "will not apply to expand air noise boundaries at Queenstown Airport, nor progress plans to develop Wanaka [Airport]", over the period covered by the SOI. The SOI covers the period from July 1,	-While it did reiterate previous statements wide-body jets would not be part of long-term planning for Wanaka Airport, it did not rule out introducing commercial jet services at Wanaka at some later point — a prospect that has been strongly opposed by the

				Mark Sinclair said it did not address key issues about Wanaka Airport. "We're reserving further comment until the High Court judgement comes out sometime in the next few weeks."	2020, to June 30, 2023. -It said uncertainty caused by Covid-19 meant Queenstown Airport was not expected to reach existing air noise boundaries for "many years" -However, it noted the rate of growth "began to moderate" last year and had since been significantly impacted by Covid-19. It acknowledged the pace of recovery "remains uncertain" and it assumes international air travel will not resume until next year. -It planned to continue with a $36 million terminal upgrade programme, covering seismic improvements to its Queenstown Airport terminal over the next three years, as well as accommodating new passenger security screening equipment.	Wanaka Stakeholders Group (WSG). -A recent socioeconomic impact assessment estimated Queenstown and Wanaka Airports contributed about $526 million to the Lakes district's $3.06 billion GDP last year. "About $40 million of this was related to airport operations, and a further $486 million to visitor expenditure attributable to the airports," the SOI said.

Name	Date	View on Airport/ Gibbston Valley Growth	People/ Community	Social Engagement/ Relationships	Growth	Impacts
STUFF - Queenstown Airport wants to increase noise limits to allow for massive expansion.	17/07/18	Informative. Seemed positive and supportive of the decision. very growth focused on the houses that would be affected. Is a slight impact and relationships focus however.		-The airport has revealed proposed new noise boundaries to accommodate the growth and will offer to buy some homes and spend "tens of millions" on noise mitigation packages for others if the changes proceed. -"It's not an option for us to breach those boundaries. It's the critical part of our social licence to operate as an airport." -A new inside noise boundary, featuring houses that will be subjected over 70 decibels, is proposed and the airport will offer to acquire the 34 homes in that zone. It would not seek to make the acquisition compulsory. -Existing homes in that zone will be offered a mitigation package including insultation and mechanical ventilation. -Some will be eligible for 75 per cent funding of a mechanical ventilation package. -The corporation was speaking to the Ministry of	-It is forecasting the current 2 million annual passenger movements at the airport will increase to over 5 million by 2031. However, the growth is restricted by noise boundary limits, set by the Queenstown Lakes District Council's District Plan. -Airport chief executive Colin Keel said it is expected to reach the limits of its current noise boundaries in the next three or four years. -Therefore, the airport is proposing to extend the existing boundaries to include large parts of Frankton, Kelvin Heights, Queenstown and Shotover Country as areas recognised as affected by aircraft noise. The existing area where noise levels are between 65 and 70dB includes 41 homes. It will increase to cover 99 homes, Remarkables Primary School and a larger chunk of Lakes District Hospital. -The number of homes in the "outer control boundary", subject to noise levels over 55dB, will increase from 750 to 3837.	-Thousands of Queenstown homes, four schools and a hospital will be affected by increased aircraft noise as part of Queenstown Airport Corporation's massive growth plan. -A new inside noise boundary, featuring houses that will be subjected over 70 decibels -All new buildings will be subject to building controls including acoustic treatment.

				Education and Ministry of Health about the implications for the schools and hospital.	-t is expected the number of annual aircraft movements, which includes helicopters and light planes, will increase from almost 59,000 to more than 88,000. -Keel said the noise levels would lift incrementally, as the number of flights increased.	
Stuff - Queenstown Airport backs off raising noise limits after massive opposition from residents.	02/10/18	Negative - talks about impacts and the opposed members of qt.	-Frankton Community Association chair Glyn Lewers said the decision to "hit the pause button" was pleasing for thousands of residents who would be affected by any increase in noise limits. -"I don't want to see them shifting the problem from Queenstown to Wanaka, I don't want to see either destination become just a transport hub; they're both jewels in the tourism crown and we don't want to be spoiling them with mass movements of visitors. -"What we don't want to see is that in the next 12 to 24 months we're having this same conversation again."	-In the face of strong opposition Queenstown Airport has - for now - backed away from increasing aircraft noise limits to allow for future tourism growth. -QAC received more than 1500 responses to its public consultation and just over 90 per cent were opposed to the idea of expanding noise boundaries to provide for planned growth of up to 5.1 million passengers a year. -When asked how to avoid or mitigate aircraft noise, respondents wanted flights to remain at current levels or be reduced, with additional forecast growth directed to other locations - such as Invercargill - or to a new airport on another site.	-The latter option was also raised by Air New Zealand which supported the proposed change to noise boundaries along with 53 other respondents, most of whom live outside the affected area. -Keel said it was clear from the public consultation that many people linked any increase in airport activity to wider questions around regional growth, and for that reason they needed to integrate airport planning with that being done by other organisations, particularly Queenstown Lakes District Council. -"We're trying to strike the right balance between creating a sustainable platform for long term growth, and the effect of such growth on the community," he said. -Queenstown Mayor Jim Boult said the the airport	-Opponents, which included local residents, businesses and three schools, were concerned raised noise levels would have a negative impact on quality of life and health, on the natural environment, and would adversely affect potential commercial developments in the area. -About two thirds saw no benefit in the long term growth proposed by the airport on the grounds that increasing tourist numbers would have a detrimental impact on the visitor experience,

					noise debate had highlighted the importance of looking at the broader implications of visitor growth. -"Council certainly supports an integrated approach as suggested by the QAC team to ensure the right outcome for the community, for visitors to our district and for the associated tourism sector. "The future growth of the district, what that may look like and how that impacts our community, is something that this Council is very focused on."	while imposing significant costs on residents and the wider community.
Stuff - Mixed response to call for new Central Otago airport	18/09/18	A very neutral review of options. Don't want to cause further adverse effects. Talked all options openly with little positionality.	-The promoter of a new airport near Lumsden is dusting off his plans, but the Frankton Community Association said it would only shift the noise problem elsewhere. -Chair of the Frankton Community Association Glyn Lewers is unconvinced about siting a new airport at Castlerock.	The airline (AIR NZ) last week came out in support of Queenstown Airport proposals to increase noise limits, however, it said a new regional airport would still be needed to accommodate future visitor growth. -Lewers does not buy that argument. He said limiting flights into Queenstown would disperse visitors by forcing them to come via other centres, and major Queenstown tour companies had told him that visitors flying direct into the resort spent less time in the South Island. That was backed up by	-it was too far from Queenstown and the roads could not cope with the higher volumes of traffic (didn't want it in wrong place). -Airport company plans would increase noise levels in 3000 homes and it is offering to reduce the impact by installing double glazing and ventilation systems. -In its submission Air New Zealand pointed out that while the changes would allow for short term growth, in the longer term a new Central Otago terminal was needed, and it would help disperse visitors more widely.	-He said retaining the current noise boundaries, capping flights into Queenstown, and sending the overflow of flights through existing airports such as Christchurch was a much better option. (impact of not moving it).

				Christchurch Airport. A spokeswoman said Ministry of Business, Innovation, and Employment statistics showed international visitors arriving into Christchurch spent 40 per cent more time in the South Island, and visited more than twice as many regions as those that flew direct into Queenstown. -The Queenstown Airport company received nearly 1500 responses to an online survey over its plans.		
Stuff - Architects propose selling Queenstown airport for $1.6 billion and building anew in Central Otago.	30/04/19	Negative to airport growth at Queenstown, however there was opposition at the end of the article and talk of other options, however article suggested arch option in lighter mood.	-Queenstown architects Gillian Macleod and David Jerram told a public meeting the current airport could not cope with predicted tourism growth. -Macleod and Jerram suggested a new airport could be built about an hour's drive away in the Tarras-Cromwell basin. The area has about 100 houses within a 12km radius. -This week the corporation revealed Wanaka plans would likely include domestic turbo-prop and narrow-body jet flights from 2025. Groups are	-More than 90 per cent of the 1500 submissions were opposed to the plan forcing the airport to backtrack and focus on developing a "dual airport" with Wanaka Airport.	-Macleod said the 137ha existing airport at Frankton could be redeveloped with houses for 5000 residents, roads and connections across Frankton and the development of the existing hospital. -The architects prepared their vision following Queenstown Airport Corporation plans last year to expand noise boundaries at Queenstown Airport to accommodate 5.1 million passengers a year. -This week the corporation revealed Wanaka plans would likely include domestic turbo-prop and	-Planned development at the current site in Frankton and at Wanaka Airport would destroy the amenities for residents in thousands of nearby houses, they told a crowd of 200. -As 51 per cent of departures and arrivals at Queenstown Airport were from Wanaka or Central Otago, it should lower transport

			rallying to oppose the plans. -One man questioned the fate of the about 700 people who were directly employed at the airport and the many more who were indirectly employed. -Air Milford owner Hank Sproull said there was no consideration of the operators who flew from Queenstown to Milford. "If you take the airport away from Queenstown you take the heart out of Queenstown."		narrow-body jet flights from 2025. Groups are rallying to oppose the plans. -He said the corporation's current development plans included a costly new terminal and purchasing Lot 6 from Remarkables Park, which the Environment Court approved this year. "I think they've completely underestimated what it's going to cost them and I don't think they've got the probably $150m it's going to cost them to buy it." -The current Queenstown Airport was sitting on an estimated $1.6b "goldmine" and could be used to fund a new airport, or it could be built privately, he said. -Growth at the current airport needed to be managed, he said.	numbers in the gorge, he said.
Stuff - Queenstown and Wanaka airport expansion strategy grounded again.	26/08/19	Negative - made it seem that the SOI was not reasonable and needed a lot more work before it would be accepted by the council. Seemed as if they were 'dreaming' that would suffice.	-Fears the airport would be able to expand noise boundaries in Queenstown or begin scheduled jet flights in Wānaka were expressed by some of the 70-strong crowd at Monday's meeting. -"The Upper Clutha community that we represent is dead against what you are doing," Wanaka Stakeholders	-A major Queenstown Airport shareholder has rejected the organisations growth goals for the third time in a year, amid community backlash over possible expansion. -In a rare move, the Queenstown Lakes District Council voted 7-4 to reject the annual Statement of Intent (SOI) on Monday. -Queenstown resident Kirsty Sharpe called for the	-It has been approved with little discussion in recent years, but growing discontent over unconstrained growth in visitor numbers has led to strong resistance to the corporation's growth goals. -Councillor Alexa Forbes led the opposition, claiming the SOI read as an intent for growth numbers and revenue.	-Health advocate Marion Poore spoke of the health and environmental effects the airport was having on the community and the fear they would be transferred to Wanaka. -"It seems to me that the limits of tolerance for growth at any cost

			Group deputy chairman Mark Sinclair said. -Cath Gilmour announced the newly formed Protect Queenstown would join with the Wanaka Stakeholders Group to seek a judicial review if the council supported the proposed SOI. -Forbes said there was also no mention of the concerns over Wānaka being set up as the overflow for Queenstown passenger numbers. Neither matter made the list of the airport's strategic priorities, she said. "They are critical issues that need nothing more than to be included in the work stream as intent."	airport board to make a change in direction, to include community representatives and put on cap on noise boundaries. -The council first rejected the SOI in March, calling for the airport to rewrite sections. In June, the council narrowly agreed to officially received the revised SOI to allow the airport to keep operating but requested further amendments. As public discontent grew mayor Jim Boult, a former chief executive of Christchurch Airport, declared a "fresh approach" at the council's August meeting. -He promised the council would not consider or accept any change to Queenstown Airport's air noise boundaries or allow further development of commercial services at Wānaka until economic impact, social impact and sustainability reviews had been completed. -Seven councillors voted to reject the SOI and called for the airport corporation to revise again and present	"At an absolute minimum the airport needs to be planning for what happens when it reaches its noise boundaries. Where is the plan for that?" -Airport chief executive Colin Keel said the airport expected to reach its Queenstown noise boundaries within three years.	have been reached in this community."

				it to the council's October meeting. All of the 10 councillors and the mayor supported the council's plan to halt any changes to noise boundaries at Queenstown Airport or the development of commercial services at Wānaka Airport until an independent economic impact assessment, social impact assessment and Queenstown Airport Sustainability Review were completed.		
Stuff - Split Council commits to halting growth at Queenstown Airport - for now	25/02/20	Negative - in growth outside of current noise boundaries, which can still grow approx 20 percent. Does not lead to growth of airport more so just growth within legal and current restrictions.	-Community groups were delighted the council, which owns 75.01 per cent of Queenstown Airport Corporation (QAC), changed the wording of a statement of expectations at its meeting on Tuesday. The original document said it would "minimise" the need for changes to established noise boundaries at the airport, but the wording was changing to say "continue to operate within existing boundaries". -Councillor John MacDonald said the document could be reviewed later to allow for	-Kelvin Peninsula Community Association chairman David Mayhew told the council he was uncomfortable with the word "minimise" in the original document. -The council and QAC have committed to having an independent economic and social impact assessment completed on the future of both airports before allowing any further development.	-"This language not only leaves a door open, it positively invites QAC to extend boundaries ... even with the existing boundaries there's room for 20 per cent growth."	-Council corporate services general manager Meaghan Miller said the changed wording might set an expectation that could be difficult to reverse.

			growth, but he felt Tuesday's decision "signals what the community wants to see". -There was a massive public backlash to plans by QAC to increase noise boundaries in 2018, which would have allowed visitor arrivals to double in the next 20 years. -The plan was dumped and focus moved instead to developing Wanaka Airport. However, that has sparked emotional debate in Wanaka, which some say has turned ugly.			