



**Minutes of the Queenstown Airport Liaison Committee held at Queenstown Airport
Monday 1 March 2021**

Present: Jane Taylor (Chair)
Clayton Lightfoot (Airways) via video conference
Patrick Whelan (Airline representative, BARNZ) via video conference
Greg Miller (Community Representative)
Grant Stewart (General Aviation)
Colin Keel (QAC CEO)
Rachel Tregidga (QAC GM Property & Planning)

Apologies: Steve Mclsaac (Community Representative)
Alana Standish (QLDC)

1. Welcome and Apologies

The meeting commenced at 6.15pm. The Chair welcomed participants to the meeting and declared the meeting open.

2. Residents to Address QALC

There were no residents wishing to address the meeting.

3. Minutes of Previous Meeting

The minutes from the Queenstown Airport Liaison Committee on 30 November 2020 were approved as a true and correct record, subject to the following amendments:

- Recording Grant Stewart as present
- Recording Greg Miller as an apology
- Amending the date in item 4.1 from October 2021 to October 2020.

3a. Actions and progress status from this and previous meetings

Date Raised	Action	Response	Status
2019/20	After new representation on the Committee is finalised, noise training sessions will be organised, which would also be open to all members. Rachel to action.	Ongoing	Open
2019/20	QAC to progress the real estate agent training initiative (info pack and evening). Rachel to action	Ongoing	Open

Date Raised	Action	Response	Status
1 Mar 21	Enquiry received 12 February 2021 to be responded to.	Completed	Closed
1 Mar 21	Draft 2022-2024 Statement of Intent to be circulated to the Committee	Completed	Closed
1 Mar 21	The 2020 Compliance Annual Air Noise Contours full report to be circulated to the Committee. The report has also been made available on the Queenstown Airport Corporation website.	Completed	Closed

4. Standing Agenda Items

4.1 Aircraft Activities

The scheduled airline landings, helicopter landings, and fixed wing landings for the three-month period to the end of February 2021 were presented and noted.

4.2 Unplanned engine testing

On 28 November 2020 there was an Air New Zealand A320 that required on-stand idle engine testing for approximately 5 minutes.

4.3 Complaints register summary

One new noise enquiry was received on 12 February 2021. This enquiry is still to be responded to. This is to be added to the actions and progress status from the previous meeting.

5. Operational Report

The Operational Report was taken as read. It was noted that the draft Statement of Intent (SOI) was relevant to the Committee as it includes 3-year forecast projections. It was requested that once available that this document be circulated to the Committee.

5.1 Noise contours

The Committee received the 2020 Compliance Annual Air Noise Contours (CAANC), and noted that compliance was achieved for the 2020 calendar year. The Committee requested that the full report be circulated. The full report will also be made available on the Queenstown Airport Corporation website.

5.2 Noise Management Plan

Interviews are progressing for the two community representative positions for Frankton and Shotover County/Lake Hayes Estate. The Frankton representative is close to being able to be appointed.

5.3 Noise Mitigation Programme

The projected contours show that as expected the Air Noise Boundary (ANB) has retracted, resulting in no noise mitigation required for any homes within this boundary. However, the mid noise boundary, whilst having significantly retracted, anticipates approximately 15 homes requiring mitigation. QAC is

required to make offers to those homes, and confirmed to the Committee that offers were made pre-COVID. These homes require partial mitigation (mechanical ventilation), funded 75% by QAC, 25% by the homeowner.

6. General Business

Colin Keel provided a brief commentary on QAC's interim results; its COVID response to provide support to Queenstown and Wanaka Airport tenants; and the current capital programme – specifically the Queenstown Airport Terminal Upgrade Programme to address passenger screening and seismic upgrades.

The meeting closed at 7.10pm.

Date of next meeting -

- 6.15pm, Tuesday 4th May, 2021



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QUEENSTOWN AIRPORT
2020 NOISE COMPLIANCE REPORT
Rp 001 20200327 | 3 March 2021



Project: Queenstown Airport 2020 Noise Compliance Report

Prepared for: Queenstown Airport Corporation
PO Box 2641
Queenstown 9349

Attention: Rachel Tregidga

Report No.: Rp 001 20210079

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Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
		Client Draft	2 March 2021	Steve Peakall	Chris Day
	R01	Include PAANC	18 May 2021	Steve Peakall	

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1.0 INTRODUCTION

Marshall Day Acoustics (MDA) has been engaged by Queenstown Airport Corporation (QAC) to undertake noise compliance assessment for 2020 with respect to the relevant Queenstown Lakes District Council District Plan (QLDP) obligations.

This report has been prepared by MDA on behalf of QAC and provides an overview of the noise compliance programme for 2020 including calculation of noise contours known as the Compliance Annual Aircraft Noise Contours (CAANC) to determine compliance or otherwise with the Airnoise Boundary and Outer Control Boundary and the aircraft noise monitoring related designation conditions applicable to the airport.

A glossary of terms is provided in Appendix A.

2.0 STATUTORY REQUIREMENTS

The relevant Designation conditions relating to airport noise compliance at Queenstown is given below:

Designation D1

7. *The Airport shall be managed so that the noise from aircraft operations does not exceed 65 dB L_{dn} outside the Air Noise Boundary (ANB) or 55 dB L_{dn} outside the Outer Control Boundary (OCB). The ANB and OCB are as shown on the District Plan Maps. Compliance with the ANB and OCB shall be determined on the basis of the Compliance AANC required to be prepared by Condition 8 and 9.*
8. *Each year, QAC, shall produce 55 dB, 60 dB and 65 dB AANC, using airport noise prediction software to be determined by the QALC [Queenstown Airport Liaison Committee] in accordance with the NMP and records of actual aircraft movements for the busiest three consecutive months of the preceding year.*
9. *At least every three years, QAC shall undertake a monitoring programme to compare the measured aircraft noise levels with the AANC. The AANC shall be corrected for any differences arising from the measured levels to produce the Compliance AANC. The monitoring programme shall include the following measurements within a three year period: a minimum of one month summer and one month winter undertaken at a minimum of three points located west, north-east and south of the airport with the exact positions to be determined by the QALC under the NMP.*
10. *Each year the Compliance and Projected AANC (required under conditions 9 and 14 respectively) shall be reported to the QALC. Compliance AANC produced for years when noise measurements have not been undertaken shall be prepared using the same corrections determined from the most recently measured aircraft noise levels undertaken for Condition 9.*

Other Noise

11. *Sound from activities which are outside the scope of NZS 6805:1992, shall comply with the District Plan noise limits set in the zone standards for each zone in which the sound is received. This requirement includes engine testing other than for essential unplanned engine testing of aircraft for scheduled passenger services.*
12. *No noise limits shall apply to essential unplanned engine testing of aircraft for scheduled passenger services. The NMP shall detail noise management practices for unplanned engine testing including preferred locations and times. Following each unplanned engine test the QAC shall report to the next meeting of the QALC why the testing was required and what noise management practices were followed.*

- 14 Each year QAC shall produce 55 dB, 60 dB and 65 dB Projected AANC for the purpose of determining when mitigation shall be offered under Conditions 15 and 16 using the same aircraft noise prediction software as used for the Compliance AANC required under Condition 8, adjusted for annual growth estimated for the following year based on trends derived from historical aircraft movement data.

This noise monitoring report details information required under Designation condition D1.7 of the QLDP. The purpose of this report is to assess compliance of aircraft operations with conditions D1.8 and D1.9 for the period of 1 January 2020 to 31 December 2020.

2.1 Noise Limits - Aircraft Operations

Rule D1.7 states that “The Airport shall be managed so that the noise from aircraft operations does not exceed 65 dB L_{dn} outside the Air Noise Boundary (ANB) or 55 dB L_{dn} outside the Outer Control Boundary (OCB). The ANB and OCB are as shown on the District Plan Maps.”

The noise boundaries are shown on the QLDP planning map in Figure 1 and overlaid on aerial photography in Figure 2.

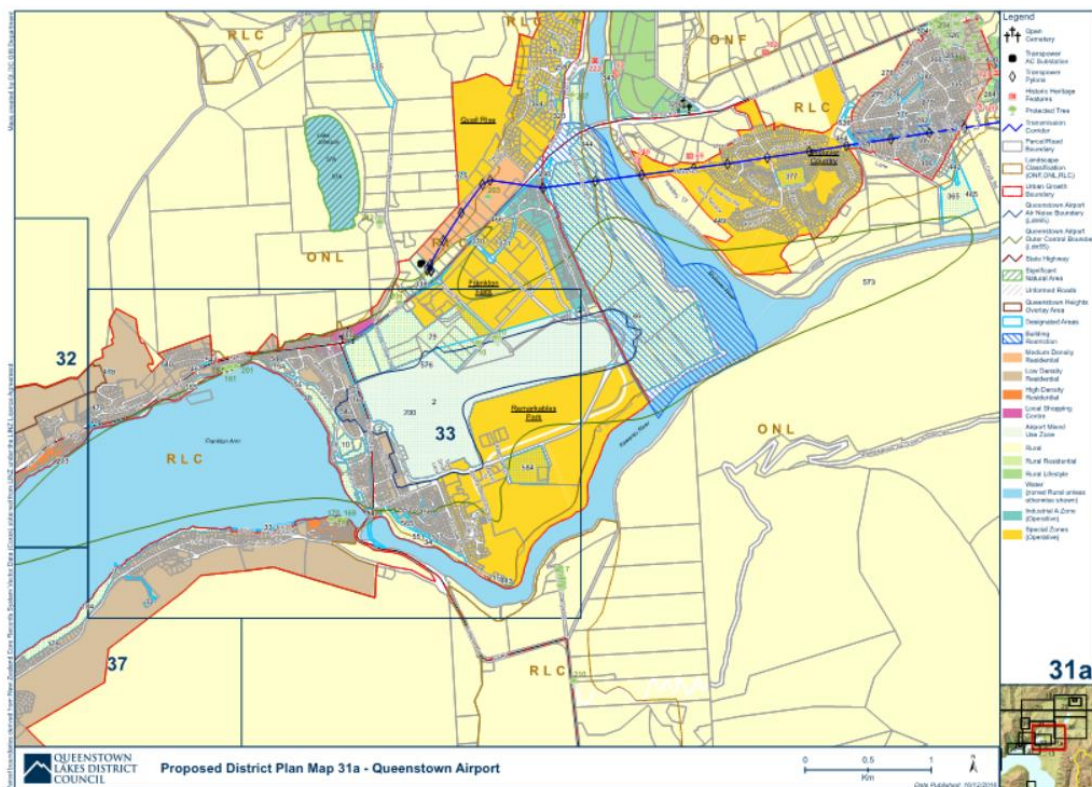


Figure 1: QLDP noise boundaries

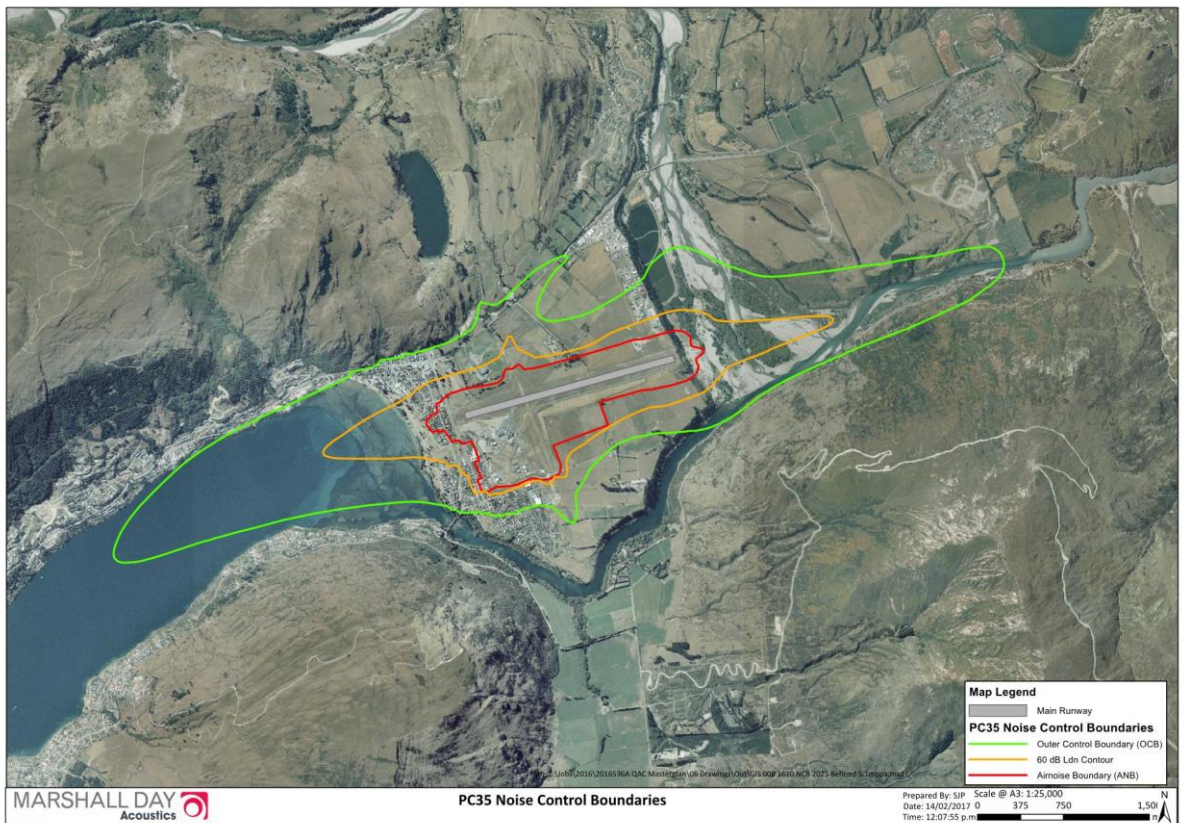


Figure 2: Queenstown Airport noise boundaries

3.0 OPERATIONAL NOISE MODELLING

3.1 Summary of Operational Aircraft Movements

Based on the information provided by QAC and derived from Airways data, for the year 2020 there were 20,832 fixed-wing movements and 17,999 helicopter movements at Queenstown, with a total number of 38,831 movements. This was approximately 17,000 less than for 2019.

The reduced number of aircraft movements in 2020 compared with 2019 is due to the global Covid-19 pandemic and its impacts on travel (and therefore on the aviation industry) from mid-March onwards. Movement numbers dropped dramatically when the New Zealand borders were effectively closed in mid-March. Total aircraft movements started climbing again as domestic travel increased during periods of the year where local 'Lockdown' restrictions had eased.

The busiest three months for aircraft movements in 2020 were therefore January, February and March. A summary of the movement data input into the Integrated Noise Model (INM) used to produce the 2020 Annual Aircraft Noise Contours (AANC) is provided in section 3.2 of this report.

3.2 Modelling Methodology

To ensure consistency with the noise boundaries in the QLDP and in accordance with the Noise Management Plan, noise compliance contouring has previously been confirmed by the QALC (in 2015) to be calculated using version 7a of the Integrated Noise Model (INM) developed by the US Federal Aviation Authority.

The INM software (like most software), has been upgraded regularly over the last 10 years. Each update to the INM program has resulted in slightly different calculation results. As the District Plan contour and AANC are both used for noise control purposes, and as the District Plan contours are

used as the basis of determining appropriate land use planning controls and the selection of mitigation treatment, it is therefore considered that the same software version should be used to prepare the AANC.

The total movements for the modelled scenario are shown in Table 1 as well as a breakdown of the day and night-time movements. Night-time movements are those that occur between 10pm and 7am. The number of night-time movements is relevant as night-time activity has an associated +10 decibel adjustment.

Table 1 Summary of Modelled Aircraft Movements

	Busiest 3 Months (Jan-Feb-Mar 2020)
Total Movements	15,396
Day Time Movements	15,393
Night Time Movements	3

Data provided by Airways includes actual runway usage data which has been used in the preparation of the 2020 AANC. The flight tracks used in the model are the same regular flight tracks that were used for the development of the noise control boundaries. Minor updates have been made over time to the tracks based on discussions with Airways regarding the RNP tracks percentages flown. It is considered that the tracks used in the noise modelling remain the best approximation of long-term average flight tracks flown.

3.3 2020 Annual Aircraft Noise Contour

The 2020 AANC, prepared using the methodology described above, is shown in Figure 1 Appendix B.

There is a requirement in Rule D1.9 that *“The AANC shall be corrected for any differences arising from the measured levels to produce the Compliance AANC.”*

The following sections detail the noise measurement programme and the derived adjustments. Section 5 reports the 2020 Compliance AANC.

4.0 NOISE MEASUREMENT PROGRAMME

Noise measurements are required so that QAC can monitor noise from aircraft operations at the Airport in accordance with the rules set out in Rule D1.9 of the QLDP. The purpose of the noise measurements is to calibrate the noise contouring calculations as well as to confirm compliance or otherwise with Rule D1.9.

Because noise measurements are only required every 3 years in accordance with rule D1.9, the most recent 2019 measurements have been used again to calibrate the noise model. Details of the noise measurement programme are contained in the 2018 Noise Monitoring Report.

This approach is considered robust, as the level of movements in early 2020 is of roughly the same order of magnitude as the movements in early 2019, and the 2019 measurements were undertaken at the same sites. In addition, in accordance with the Designation rule D1.9 measurements are only required every 3 years, so there is no technical obligation to have undertaken measurements in 2020. Rule D1.10 states that the CAANC *“shall be prepared using the same corrections determined from the most recently measured aircraft noise levels undertaken for Condition D1.9”*.

4.1 Adjustments to 2020 AANC

The difference of at least -1 dB at all three measurement locations in the last 2018 NMR shows that the measured values are generally 1 dB less than the calculated values (in this case this was the 2018 AANC contours). This difference of -1dB at each location is still regarded as showing very good

correlation between the measured and modelled noise levels, nevertheless an overall -1 dB adjustment is again recommended to the AANC to form the 'Compliance AANC'.

5.0 2020 COMPLIANCE ANNUAL AIRCRAFT NOISE CONTOUR (CAANC)

The Compliance AANC (CAANC) are obtained after the adjustments derived in the previous section are applied to the 2020 AANC.

The 2020 CAANC, prepared using the methodology described above, is shown in Figure 2 Appendix B. The 2020 CAANC demonstrates 2020 aircraft operations comply with the 65 dB L_{dn} Airnoise Boundary and 55 dB L_{dn} Outer Control Boundary.

Based on the observed number of movements in the remaining months of 2020, community noise levels would be significantly lower than detailed in this report at these times, primarily due to the impacts of the global Covid-19 pandemic.

6.0 2020 PROJECTED ANNUAL AIRCRAFT NOISE CONTOUR (PAANC)

Once the CAANC are produced, then in accordance with Rule D1.14 the Projected AANC (PAANC) can be prepared. This requires QAC to provide future year growth estimates so that these can be applied to the CAANC to produce the PAANC.

For this 2020 NMR, the 2020 CAANC provides the baseline for the 2020 (2021) PAANC. This shows the projected contours for 2021, based on the 2020 CAANC but with some future growth applied.

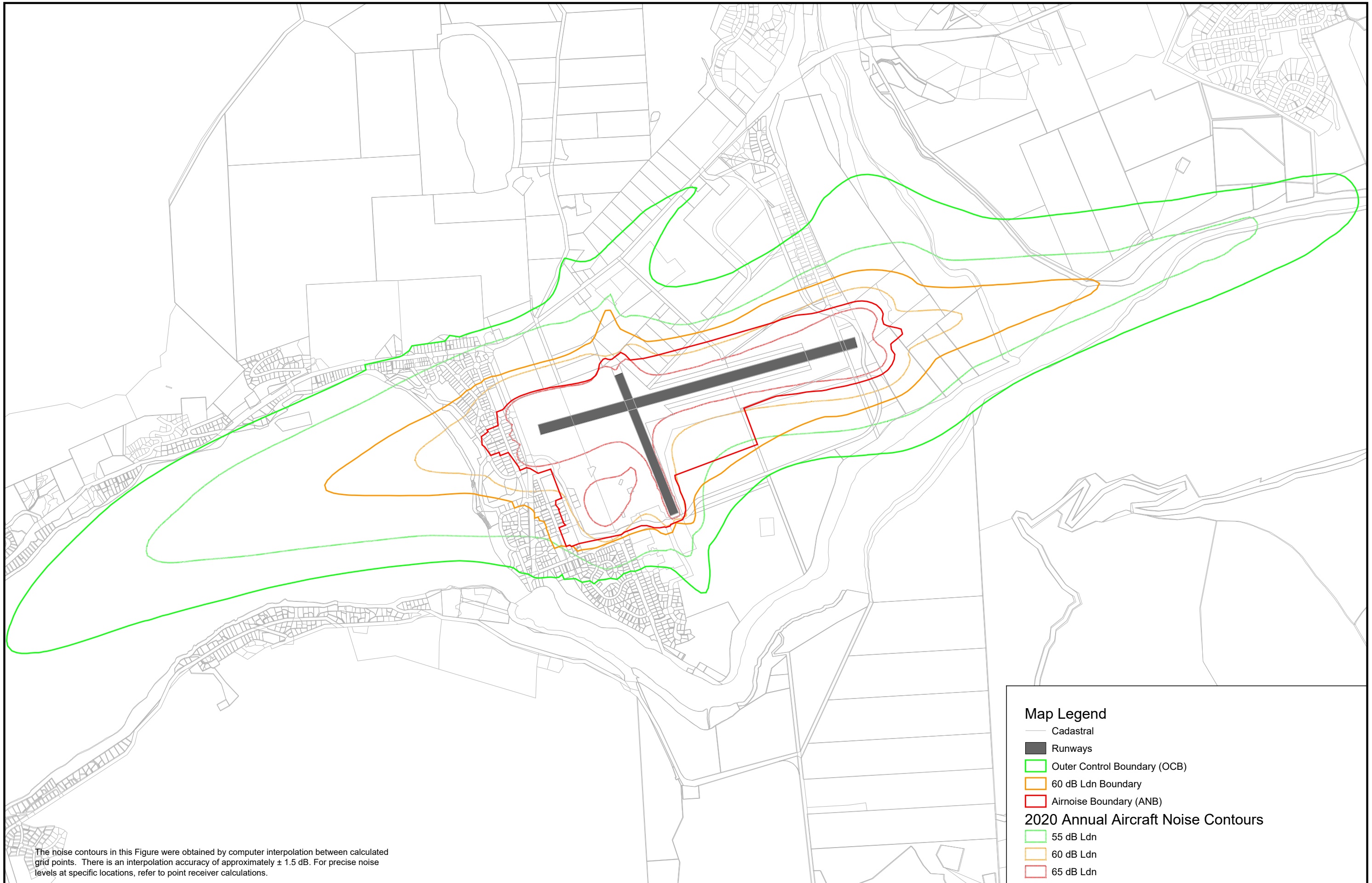
Figure 3 Appendix B shows the 2020 (2021) PAANC.

As can be seen, the 2020 (2021) PAANC are significantly smaller in extent than the 2020 CAANC. This is entirely due to the impacts of the global Covid-19 pandemic and the subsequent lack of domestic and international travel that is projected for 2021 because of Government initiated travel restrictions. This means there is a reduction in travel compared with the early parts of 2020. That is, significant negative growth is projected to occur.

APPENDIX A GLOSSARY OF TERMINOLOGY

Noise	A sound that is unwanted by, or distracting to, the receiver.
dB(A)	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
L_{dn}	The day night noise level which is calculated from the 24 hour L _{Aeq} with a 10 dB penalty applied to the night-time (2200-0700 hours) L _{Aeq} .
SEL or L_{AE}	<u>Sound Exposure Level</u> The sound level of one second duration which has the same amount of energy as the actual noise event measured. Usually used to measure the sound energy of a particular event, such as a train pass-by or an aircraft flyover
NZS 6805:1992	New Zealand Standard NZS 6805:1992 <i>“Airport Noise Management and Land Use Planning”</i>

APPENDIX B FIGURES



The noise contours in this Figure were obtained by computer interpolation between calculated grid points. There is an interpolation accuracy of approximately ± 1.5 dB. For precise noise levels at specific locations, refer to point receiver calculations.

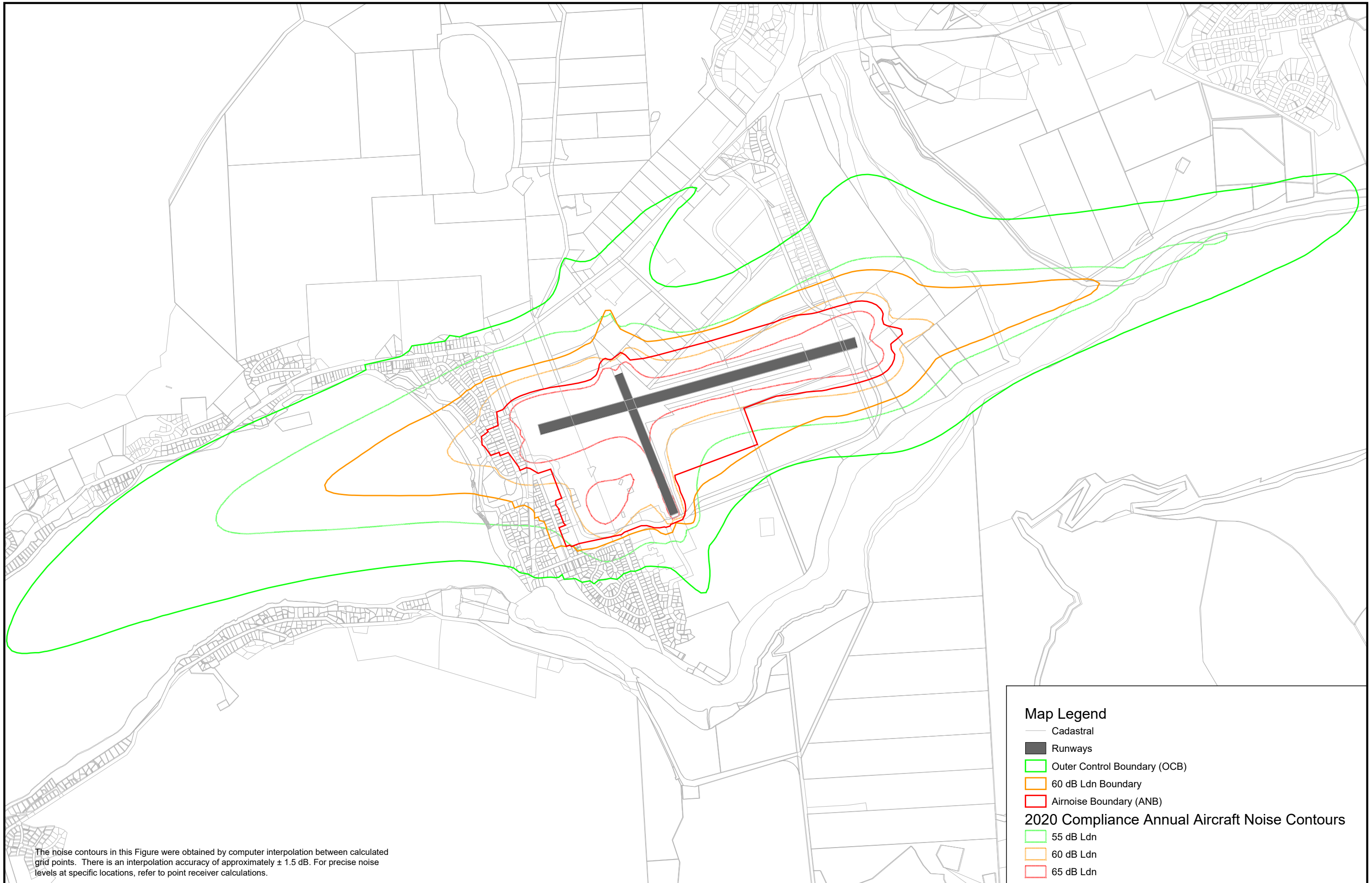
Map Legend

- Cadastral
- █ Runways
- Outer Control Boundary (OCB)
- 60 dB Ldn Boundary
- Airnoise Boundary (ANB)

2020 Annual Aircraft Noise Contours

- 55 dB Ldn
- 60 dB Ldn
- 65 dB Ldn





The noise contours in this Figure were obtained by computer interpolation between calculated grid points. There is an interpolation accuracy of approximately ± 1.5 dB. For precise noise levels at specific locations, refer to point receiver calculations.

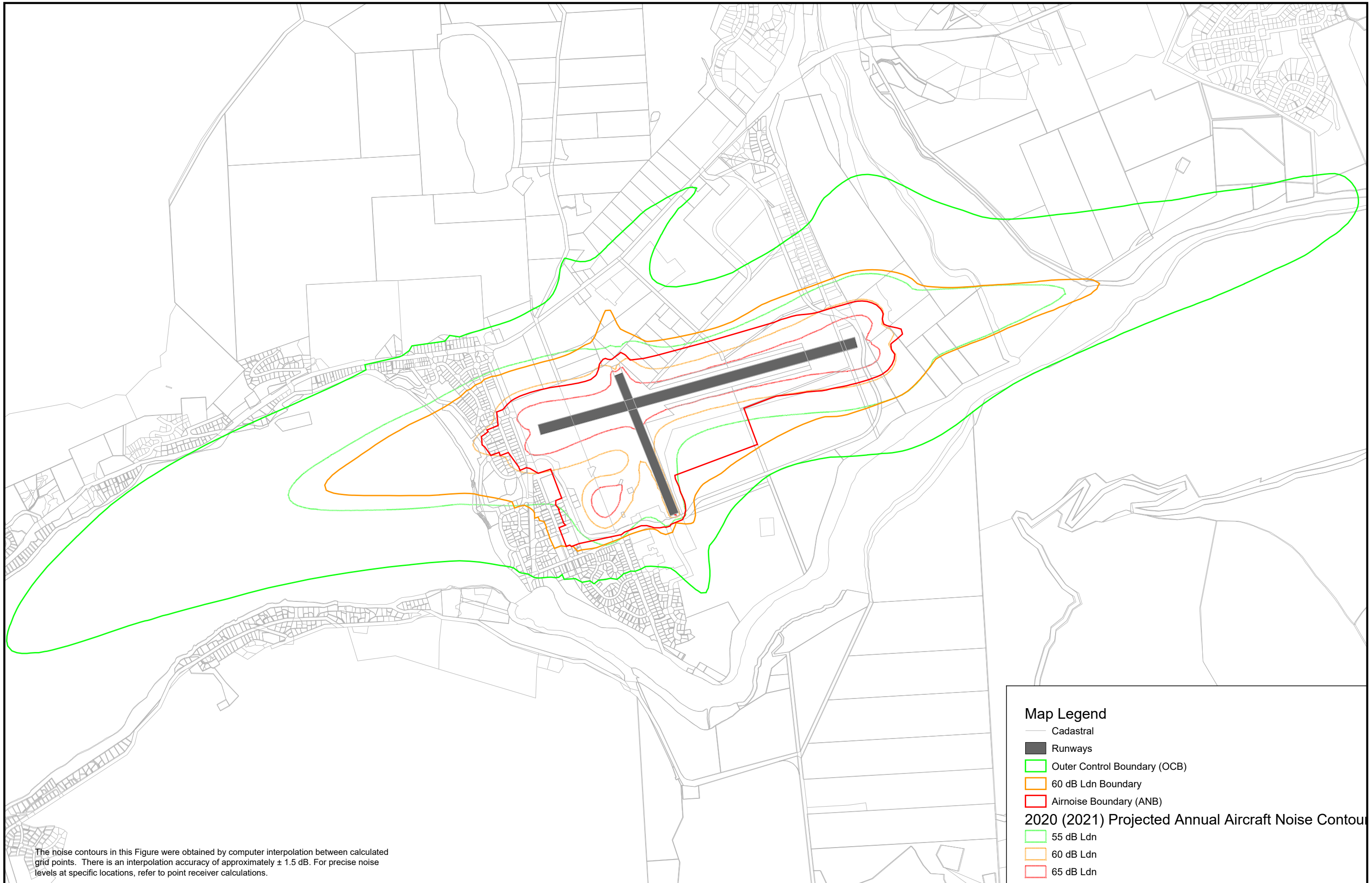
Map Legend

- Cadastral
- █ Runways
- Outer Control Boundary (OCB)
- 60 dB Ldn Boundary
- Airnoise Boundary (ANB)

2020 Compliance Annual Aircraft Noise Contours

- 55 dB Ldn
- 60 dB Ldn
- 65 dB Ldn





The noise contours in this Figure were obtained by computer interpolation between calculated grid points. There is an interpolation accuracy of approximately ± 1.5 dB. For precise noise levels at specific locations, refer to point receiver calculations.

Map Legend

- Cadastral
- Runways
- Outer Control Boundary (OCB)
- 60 dB Ldn Boundary
- Airnoise Boundary (ANB)

2020 (2021) Projected Annual Aircraft Noise Contours

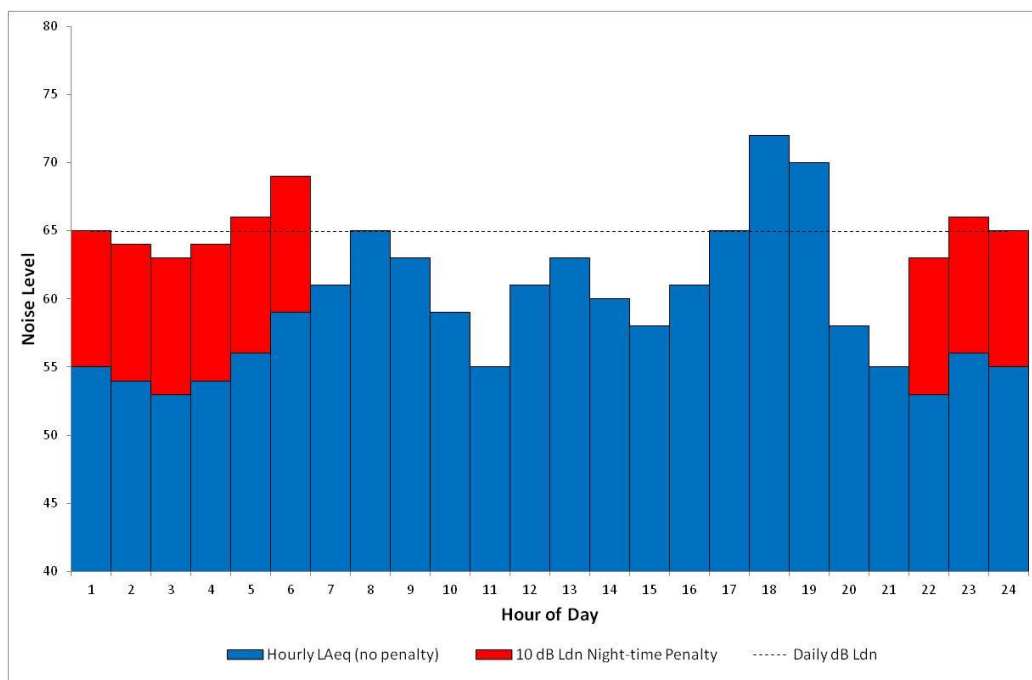
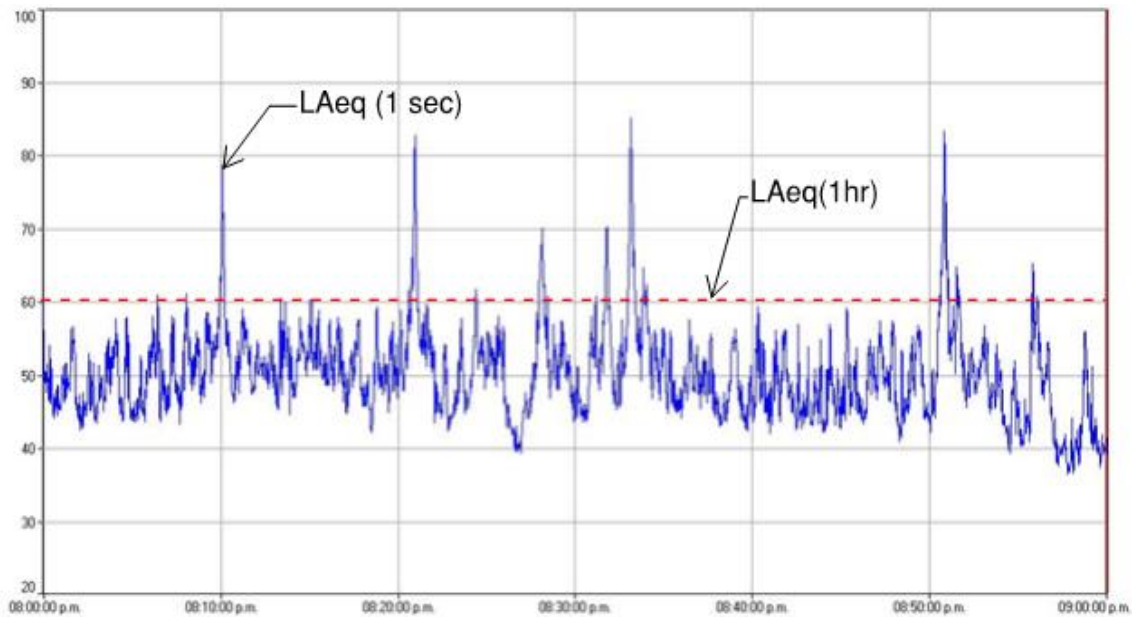
- 55 dB Ldn
- 60 dB Ldn
- 65 dB Ldn



APPENDIX C CALCULATION OF L_{DN}

The graphs below show how L_{dn} is calculated. The average hourly aircraft noise level (L_{Aeq}) is determined and a 10 decibel penalty applied to night time aircraft events (10pm-7am). The average of the hourly L_{Aeq} values is determined over a 24 hour period which then gives the L_{dn}.

The first graph shows an hour's worth of L_{Aeq} data. From this, the data which corresponds to aircraft noise is identified and the 1 hour L_{Aeq} noise level from aircraft noise is calculated. This 1 hour aircraft L_{Aeq} represents one of the bars on the second graph. After applying the 10 dB Penalty to night-time hours, all of the bars on the second graph are then averaged to calculate the overall daily L_{dn} value. For Queenstown Airport the noise limits are based on the busiest consecutive 3 months of aircraft movements and hence the L_{dn} is also based on a value averaged over this busiest 3 months.





Minutes of the Queenstown Airport Liaison Committee held at Queenstown Airport

Tuesday 4 May 2021

Present: Jane Taylor (Chair)
 Rachel Tregidga (QAC GM Property & Planning)
 Steve Mclsaac (Community Representative)
 Hayden Blackler (QLDC)
 Lee Summer, The Building Intelligence Group (TBIG)
 Steve Mclsaac (Community Representative)
 Clayton Lightfoot (Airways) via video conference
 Greg Miller (Community Representative) via video conference

Apologies: Patrick Whelan (Airline representative, BARNZ)
 Grant Stewart (General Aviation)
 Alana Standish (QLDC)
 Colin Keel (QAC CEO)

1. Welcome

The meeting commenced at 6.20pm. The Chair welcomed participants to the meeting and declared the meeting open.

2. Residents to Address QALC

There were no residents wishing to address the meeting.

3. Minutes of Previous Meeting

The minutes from the Queenstown Airport Liaison Committee on 1 March 2021 were approved as a true and correct record.

3a. Actions and progress status from this and previous meetings

Date Raised	Action	Response	Status
2019/20	After new representation on the Committee is finalised, noise training sessions will be organised, which would also be open to all members. Rachel to action.	Ongoing	Open
2019/20	QAC to progress the real estate agent training initiative (info pack and evening). Rachel to action	Ongoing	Open
May 2021	Present the 2021 Projected Annual Aircraft Noise Contours (PAANC)	At August 2021 meeting	Open

May 2021	Rachel to make contact with the Chair of the Lake Hayes & Shotover Country Community Association re a community representative.	Ongoing	Open
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4. Standing Agenda Items

4.1 Aircraft Activities

The scheduled airline landings, helicopter landings, and fixed wing landings for the two-month period to the end of April 2021 were presented. It was noted that the Trans-Tasman bubble opened on 19 April 2021.

4.2 Unplanned engine testing

None

4.3 Complaints register summary

There were two complaints regarding GA activity from Shotover Country residents. Initial indications show that these flights were using the correct path. These complaints will remain on the register for the next meeting to show QAC response.

5. Operational Report

The operational report was taken as read.

5.1 Noise contours

The 2021 Projected Annual Aircraft Noise Contours (PAANC) showing the anticipated contours for the 2021 calendar year are currently being prepared based on the latest forecasts, taking into account the opening of the trans-Tasman bubble. These will be presented at the August 2021 meeting.

5.2 Noise Management Plan

The Frankton community representative will soon be appointed. The Shotover County/Lake Hayes Estate community representative position is being re-advertised. Rachel to make contact with the Chair of the Lake Hayes & Shotover Country Community Association.

5.3 Noise Mitigation Programme

Lee Summer, from The Building Intelligence Group (TBIG) introduced himself to the committee. TBIG has been appointed by QAC to work on the Noise Mitigation Programme.

TBIG has commenced a review of the project status including due diligence of existing properties to understand any residual matters needing to be closed out. TBIG will also assist QAC with communications planning, budgeting for the next phase of works and updated procurement processes to continue with implementation. A more in-depth report on status and progress will be made at the August 2021 meeting.

6. General Business

The Chair noted that QAC Chief Executive Colin Keel will be leaving the business at the end of June 2021, and she thanked Colin on behalf of the Committee.

The meeting closed at 7.10pm.

Date of next meeting - 6.15pm, Wednesday 11 August 2021



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QUEENSTOWN AIRPORT
2020 NOISE COMPLIANCE REPORT
Rp 001 20200327 | 3 March 2021

Project: Queenstown Airport 2020 Noise Compliance Report

Prepared for: Queenstown Airport Corporation
PO Box 2641
Queenstown 9349

Attention: Rachel Tregidga

Report No.: Rp 001 20210079

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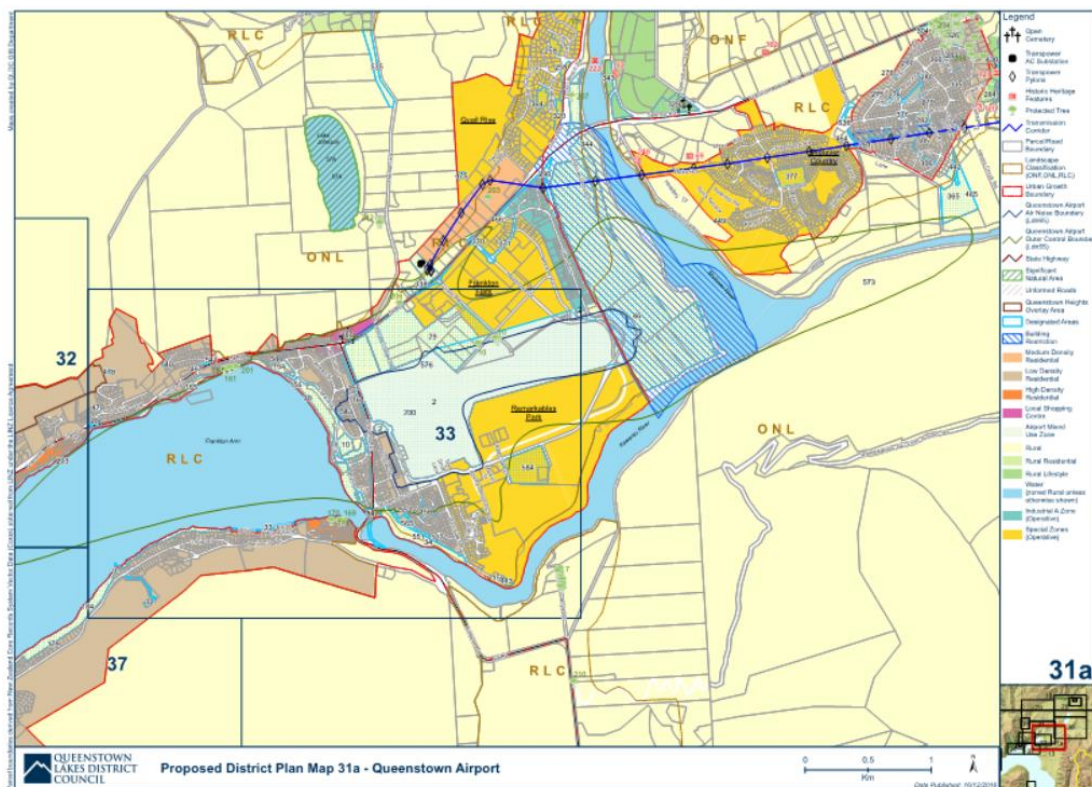


Figure 1: QLDP noise boundaries

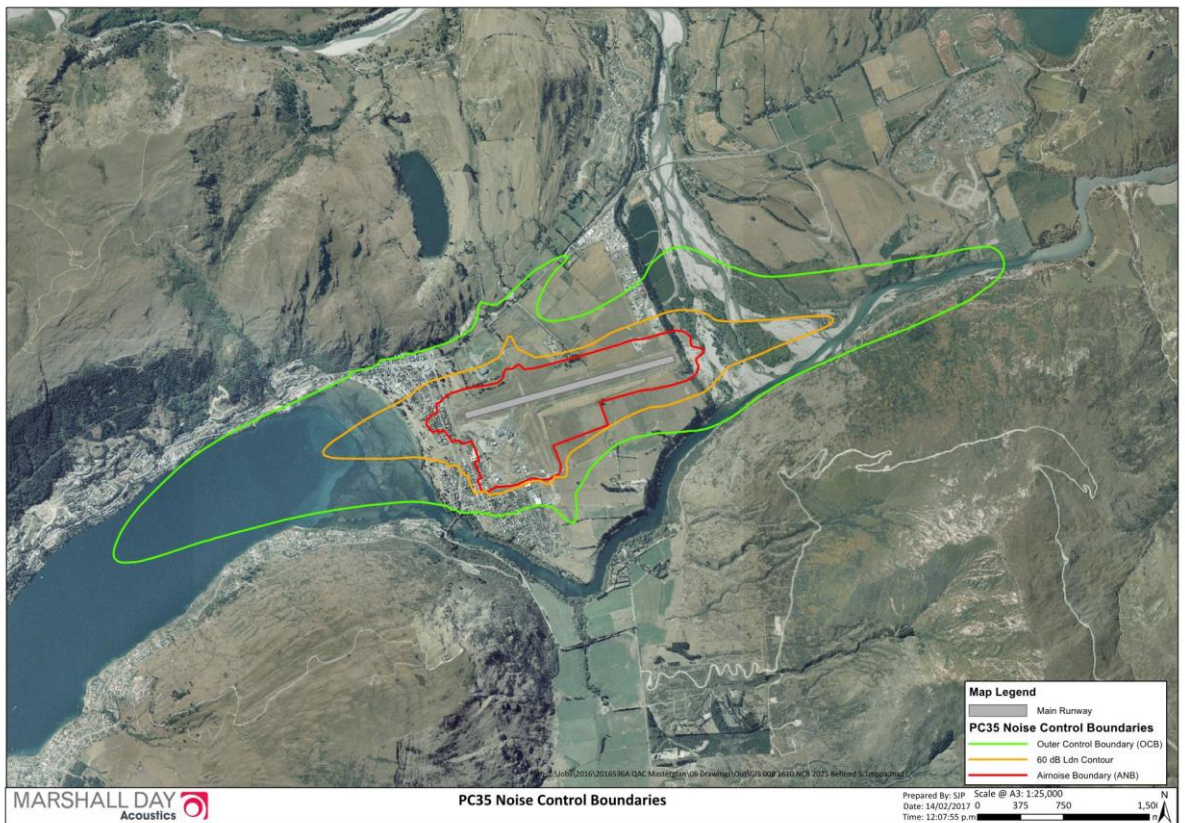


Figure 2: Queenstown Airport noise boundaries

3.0 OPERATIONAL NOISE MODELLING

3.1 Summary of Operational Aircraft Movements

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The busiest three months for aircraft movements in 2020 were therefore January, February and March. A summary of the movement data input into the Integrated Noise Model (INM) used to produce the 2020 Annual Aircraft Noise Contours (AANC) is provided in section 3.2 of this report.

3.2 Modelling Methodology

To ensure consistency with the noise boundaries in the QLDP and in accordance with the Noise Management Plan, noise compliance contouring has previously been confirmed by the QALC (in 2015) to be calculated using version 7a of the Integrated Noise Model (INM) developed by the US Federal Aviation Authority.

The INM software (like most software), has been upgraded regularly over the last 10 years. Each update to the INM program has resulted in slightly different calculation results. As the District Plan contour and AANC are both used for noise control purposes, and as the District Plan contours are

used as the basis of determining appropriate land use planning controls and the selection of mitigation treatment, it is therefore considered that the same software version should be used to prepare the AANC.

The total movements for the modelled scenario are shown in Table 1 as well as a breakdown of the day and night-time movements. Night-time movements are those that occur between 10pm and 7am. The number of night-time movements is relevant as night-time activity has an associated +10 decibel adjustment.

Table 1 Summary of Modelled Aircraft Movements

	Busiest 3 Months (Jan-Feb-Mar 2020)
Total Movements	15,396
Day Time Movements	15,393
Night Time Movements	3

Data provided by Airways includes actual runway usage data which has been used in the preparation of the 2020 AANC. The flight tracks used in the model are the same regular flight tracks that were used for the development of the noise control boundaries. Minor updates have been made over time to the tracks based on discussions with Airways regarding the RNP tracks percentages flown. It is considered that the tracks used in the noise modelling remain the best approximation of long-term average flight tracks flown.

3.3 2020 Annual Aircraft Noise Contour

The 2020 AANC, prepared using the methodology described above, is shown in Figure 1 Appendix B.

There is a requirement in Rule D1.9 that *“The AANC shall be corrected for any differences arising from the measured levels to produce the Compliance AANC.”*

The following sections detail the noise measurement programme and the derived adjustments. Section 5 reports the 2020 Compliance AANC.

4.0 NOISE MEASUREMENT PROGRAMME

Noise measurements are required so that QAC can monitor noise from aircraft operations at the Airport in accordance with the rules set out in Rule D1.9 of the QLDP. The purpose of the noise measurements is to calibrate the noise contouring calculations as well as to confirm compliance or otherwise with Rule D1.9.

Because noise measurements are only required every 3 years in accordance with rule D1.9, the most recent 2019 measurements have been used again to calibrate the noise model. Details of the noise measurement programme are contained in the 2018 Noise Monitoring Report.

This approach is considered robust, as the level of movements in early 2020 is of roughly the same order of magnitude as the movements in early 2019, and the 2019 measurements were undertaken at the same sites. In addition, in accordance with the Designation rule D1.9 measurements are only required every 3 years, so there is no technical obligation to have undertaken measurements in 2020. Rule D1.10 states that the CAANC *“shall be prepared using the same corrections determined from the most recently measured aircraft noise levels undertaken for Condition D1.9”*.

4.1 Adjustments to 2020 AANC

The difference of at least -1 dB at all three measurement locations in the last 2018 NMR shows that the measured values are generally 1 dB less than the calculated values (in this case this was the 2018 AANC contours). This difference of -1dB at each location is still regarded as showing very good

correlation between the measured and modelled noise levels, nevertheless an overall -1 dB adjustment is again recommended to the AANC to form the 'Compliance AANC'.

5.0 2020 COMPLIANCE ANNUAL AIRCRAFT NOISE CONTOUR (CAANC)

The Compliance AANC (CAANC) are obtained after the adjustments derived in the previous section are applied to the 2020 AANC.

The 2020 CAANC, prepared using the methodology described above, is shown in Figure 2 Appendix B. The 2020 CAANC demonstrates 2020 aircraft operations comply with the 65 dB L_{dn} Airnoise Boundary and 55 dB L_{dn} Outer Control Boundary.

Based on the observed number of movements in the remaining months of 2020, community noise levels would be significantly lower than detailed in this report at these times, primarily due to the impacts of the global Covid-19 pandemic.

6.0 2020 PROJECTED ANNUAL AIRCRAFT NOISE CONTOUR (PAANC)

Once the CAANC are produced, then in accordance with Rule D1.14 the Projected AANC (PAANC) can be prepared. This requires QAC to provide future year growth estimates so that these can be applied to the CAANC to produce the PAANC.

For this 2020 NMR, the 2020 CAANC provides the baseline for the 2020 (2021) PAANC. This shows the projected contours for 2021, based on the 2020 CAANC but with some future growth applied.

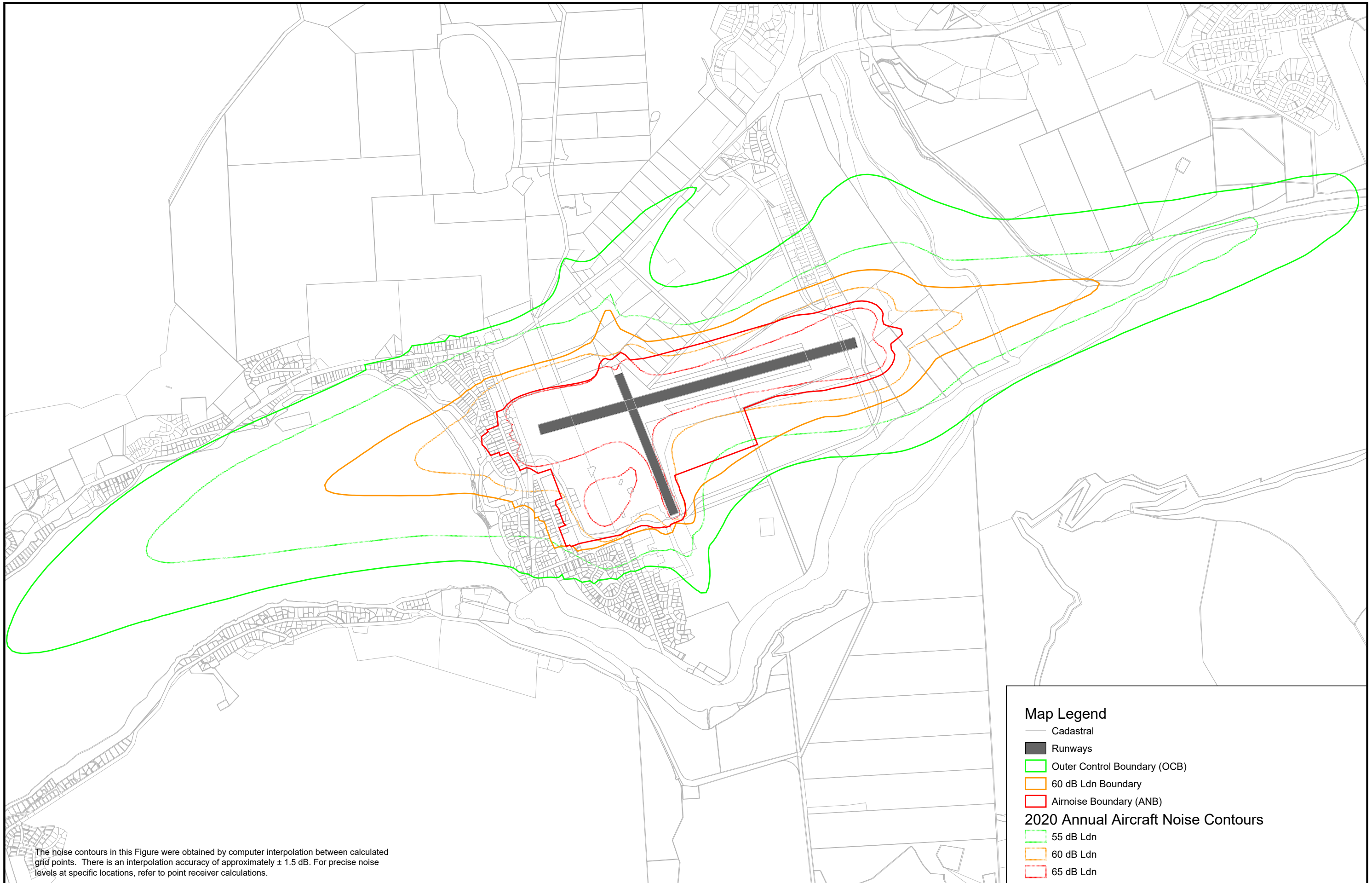
Figure 3 Appendix B shows the 2020 (2021) PAANC.

As can be seen, the 2020 (2021) PAANC are significantly smaller in extent than the 2020 CAANC. This is entirely due to the impacts of the global Covid-19 pandemic and the subsequent lack of domestic and international travel that is projected for 2021 because of Government initiated travel restrictions. This means there is a reduction in travel compared with the early parts of 2020. That is, significant negative growth is projected to occur.

APPENDIX A GLOSSARY OF TERMINOLOGY

Noise	A sound that is unwanted by, or distracting to, the receiver.
dB(A)	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
L_{dn}	The day night noise level which is calculated from the 24 hour L _{Aeq} with a 10 dB penalty applied to the night-time (2200-0700 hours) L _{Aeq} .
SEL or L_{AE}	<u>Sound Exposure Level</u> The sound level of one second duration which has the same amount of energy as the actual noise event measured. Usually used to measure the sound energy of a particular event, such as a train pass-by or an aircraft flyover
NZS 6805:1992	New Zealand Standard NZS 6805:1992 <i>“Airport Noise Management and Land Use Planning”</i>

APPENDIX B FIGURES



The noise contours in this Figure were obtained by computer interpolation between calculated grid points. There is an interpolation accuracy of approximately ± 1.5 dB. For precise noise levels at specific locations, refer to point receiver calculations.

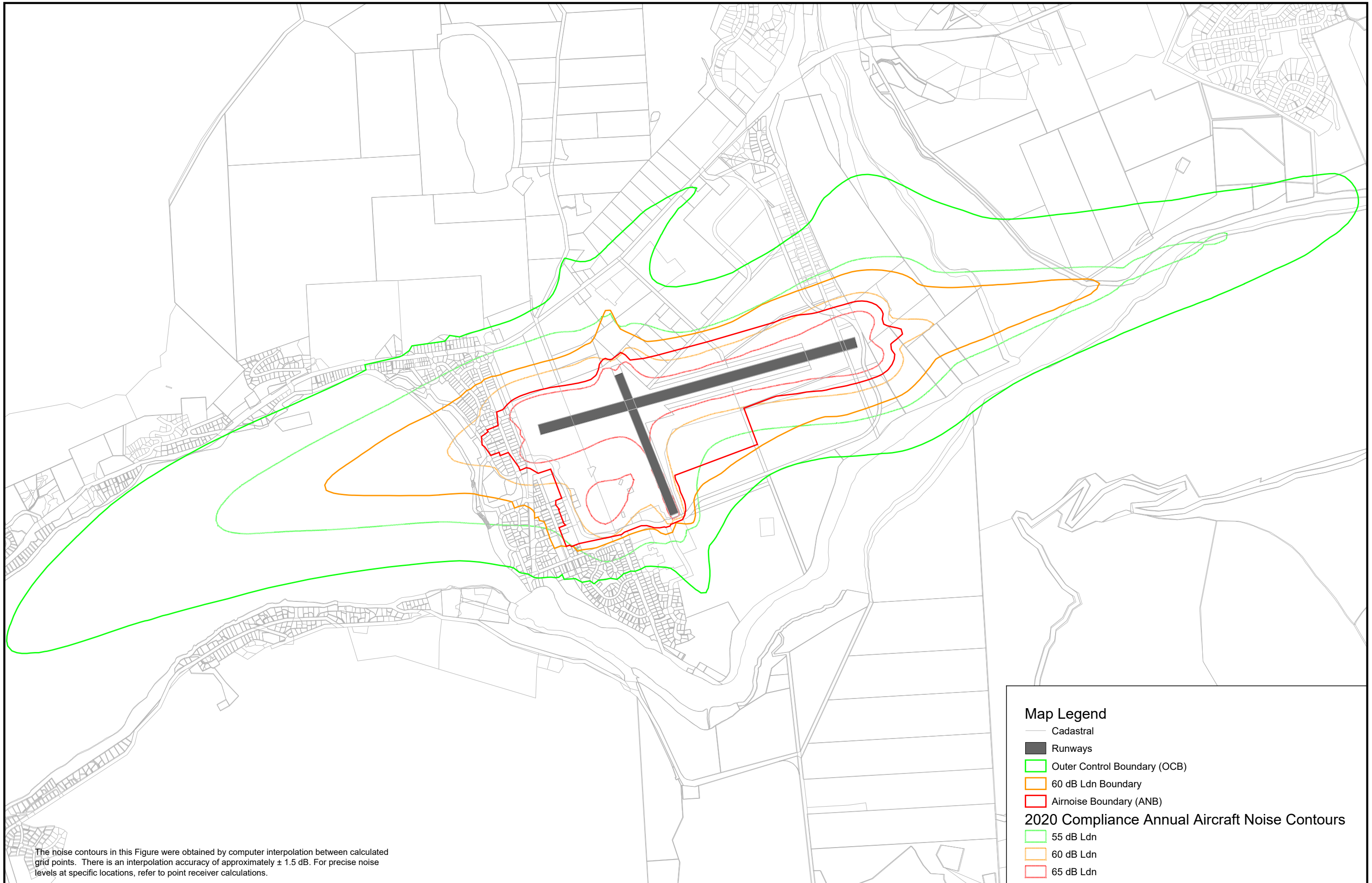
Map Legend

- Cadastral
- Runways
- Outer Control Boundary (OCB)
- 60 dB Ldn Boundary
- Airnoise Boundary (ANB)

2020 Annual Aircraft Noise Contours

- 55 dB Ldn
- 60 dB Ldn
- 65 dB Ldn





The noise contours in this Figure were obtained by computer interpolation between calculated grid points. There is an interpolation accuracy of approximately ± 1.5 dB. For precise noise levels at specific locations, refer to point receiver calculations.

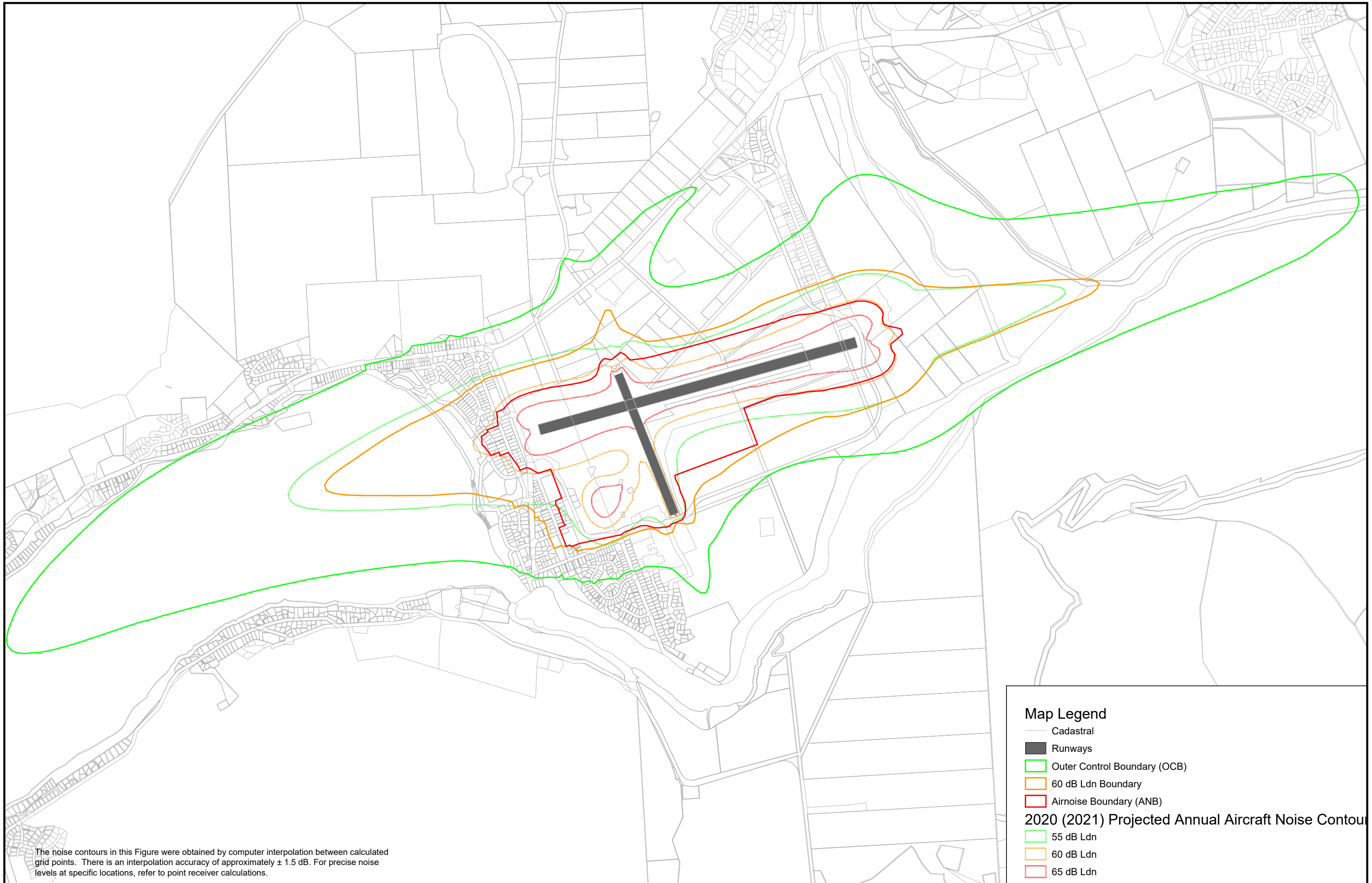
Map Legend

- Cadastral
- Runways
- Outer Control Boundary (OCB)
- 60 dB Ldn Boundary
- Airnoise Boundary (ANB)

2020 Compliance Annual Aircraft Noise Contours

- 55 dB Ldn
- 60 dB Ldn
- 65 dB Ldn





The noise contours in this Figure were obtained by computer interpolation between calculated grid points. There is an interpolation accuracy of approximately ± 1.5 dB. For precise noise levels at specific locations, refer to point receiver calculations.

Map Legend

- Cadastral
- Runways
- Outer Control Boundary (OCB)
- 60 dB Ldn Boundary
- Airnoise Boundary (ANB)

2020 (2021) Projected Annual Aircraft Noise Contours

- 55 dB Ldn
- 60 dB Ldn
- 65 dB Ldn



APPENDIX C CALCULATION OF L_{DN}

The graphs below show how L_{dn} is calculated. The average hourly aircraft noise level (L_{Aeq}) is determined and a 10 decibel penalty applied to night time aircraft events (10pm-7am). The average of the hourly L_{Aeq} values is determined over a 24 hour period which then gives the L_{dn}.

The first graph shows an hour's worth of L_{Aeq} data. From this, the data which corresponds to aircraft noise is identified and the 1 hour L_{Aeq} noise level from aircraft noise is calculated. This 1 hour aircraft L_{Aeq} represents one of the bars on the second graph. After applying the 10 dB Penalty to night-time hours, all of the bars on the second graph are then averaged to calculate the overall daily L_{dn} value. For Queenstown Airport the noise limits are based on the busiest consecutive 3 months of aircraft movements and hence the L_{dn} is also based on a value averaged over this busiest 3 months.

