ANCCG Meeting

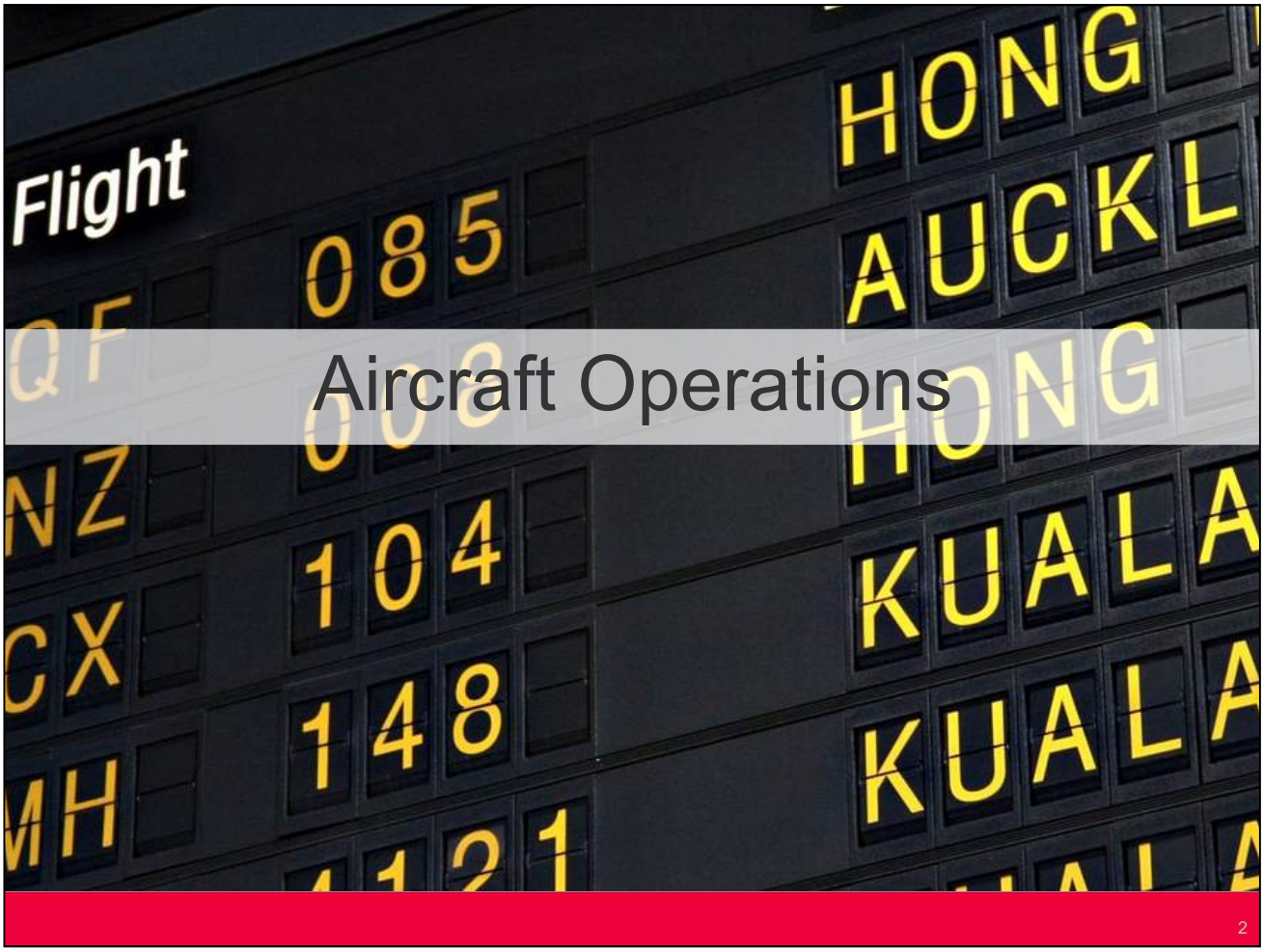
Monitoring Period

November 2019 – January 2020

Meeting: 9 March 2020

MARSHALL DAY Acoustics

NB: Glossary of terminology given in Appendix A



Aircraft Operations

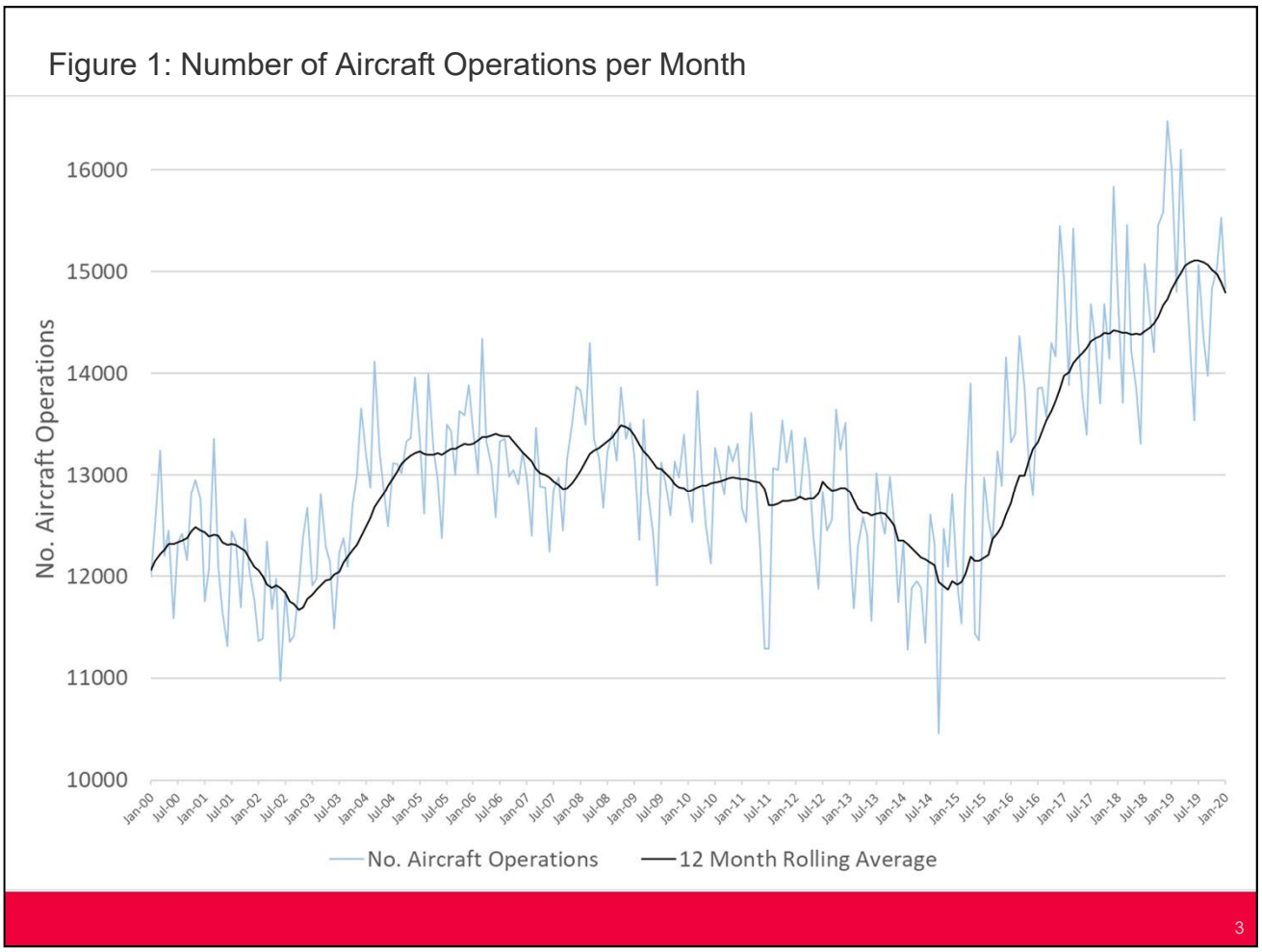


Figure 1 shows the number of aircraft operations per month since the year 2000 (blue line) and the 12 month rolling average (black line).

Aircraft operations have fluctuated over the years with a dip in 2002 and 2014.

Since 2015 aircraft operations have increased steadily.

The number of aircraft operations in the three month period November 2019 to January 2020 has decreased by 6% when compared to the same period last year.

Daytime operations have decreased by 6% and night-time operations have increased by 1% when compared to the same period last year.

Table 1: Summary of Aircraft Operations

Operation	Total	Day	Night
Arrivals	22,732	19,200	3,532
Departures	22,619	20,554	2,065
Circuit	64	63	1
Total	**45,415**	**39,817**	**5,598**

Table 2: Average Daily Aircraft Operations

Total	Day	Night
494	433	61

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Table 1 shows a breakdown of aircraft operations in the three month period November 2019 to January 2020.

Table 2 shows that there were on average 494 aircraft operations that occurred per day (24 hour period), 61 of these were at night-time.

Figure 2: Aircraft Operations by Time

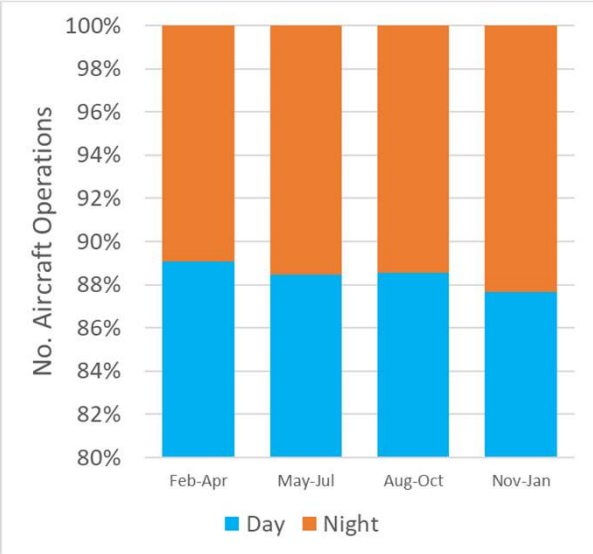

Figure 3: Aircraft Operations by Aircraft Type

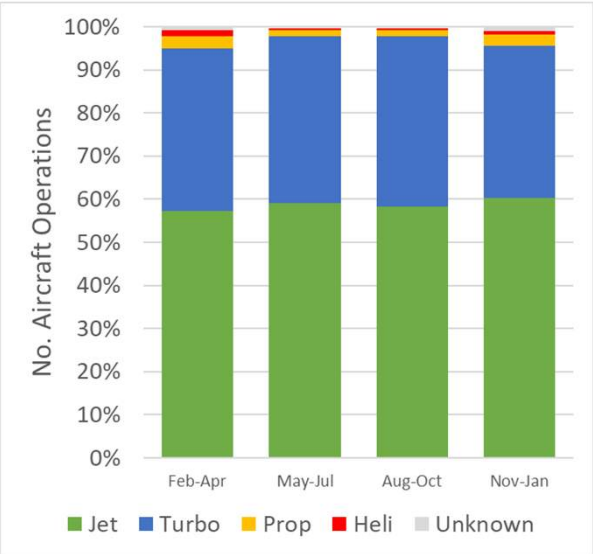

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Figure 2 shows the breakdown of aircraft operations by time of day for the three month period November 2019 to January 2020 and the three quarters preceding.

For the three month period November 2019 to January 2020 the majority (88%) of aircraft operations occurred in the daytime between 7am and 10pm and the remainder (12%) occurred at night-time.

This was similar to previous quarters.

Figure 3 shows the breakdown of aircraft operations by aircraft type in the three month period November 2019 to January 2020 and the three quarters preceding.

For the three month period November 2019 to January 2020 the majority (60%) of aircraft operations were jets with 35% being turboprops.

Propeller and helicopter aircraft made up 3% of the total aircraft operations during this period.

This was similar to previous quarters.

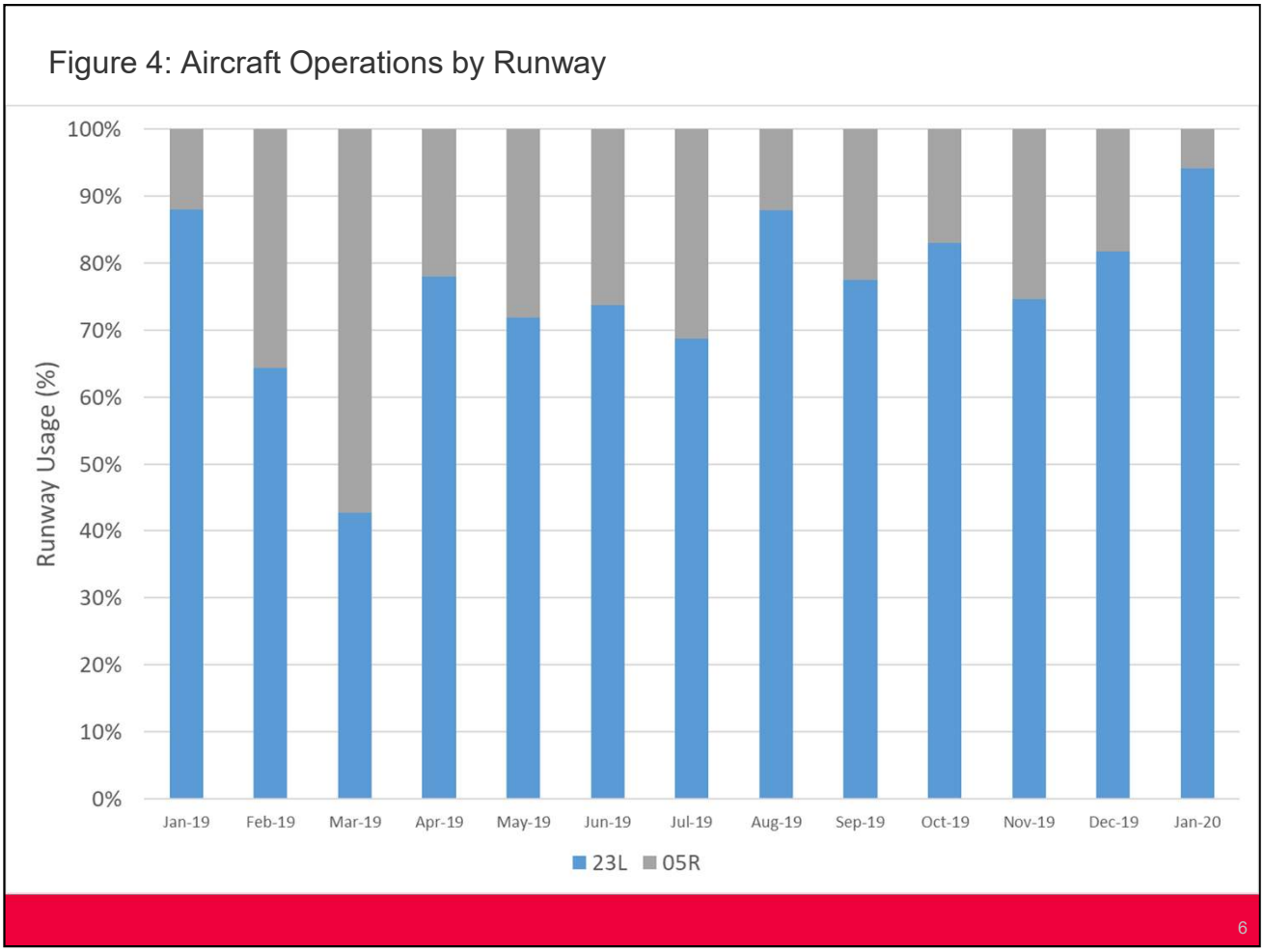

Figure 4 shows the percentage of aircraft operations that used each runway (23L and 05R) over the past 13 months.

Runway 23L is used when westerly winds prevail and Runway 05R is used when easterly winds prevail (refer glossary for explanation)

The historical average runway usage is RW23L 70%/RW05R 30%

The runway usage in the three month period November 2019 to January 2020 was RW23L 83%/RW05R 17%.

The runway use in the same quarter last year was RW23L 76%/RW05R 24%

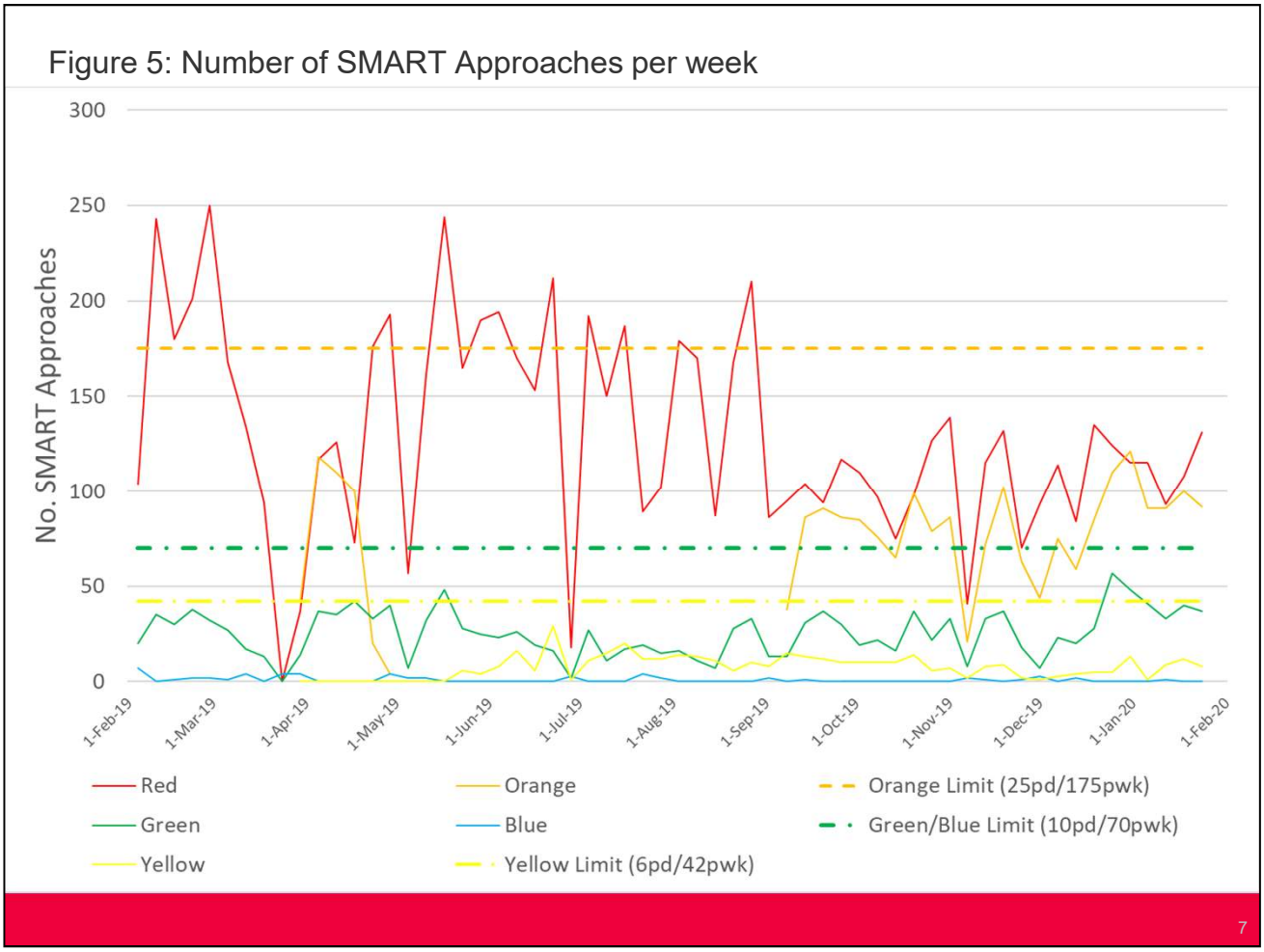

Figure 5 shows the number of SMART flights flown in the past 12 months.

The SMART Approaches are named as follows:

- Blue X05A – International arrivals from the north on Runway 05R overflying Lynfield
- Green X23A - International arrivals from the north on Runway 23L overflying Highbrook
- Yellow U23 - International arrivals from the north on Runway 23L overflying Whitford
- Red – Domestic arrivals from the south on Runway 23L overflying Wattle Downs
- Orange S23 – Domestic arrivals from the south on Runway 23L overflying Clevedon

There is a limit of:

- 10 SMART approaches per day on the Green and Blue SMART approaches
- 6 per day on the Yellow SMART approach
- 25 per day on the Orange SMART approach

This limit has been complied with over the past 12 months.

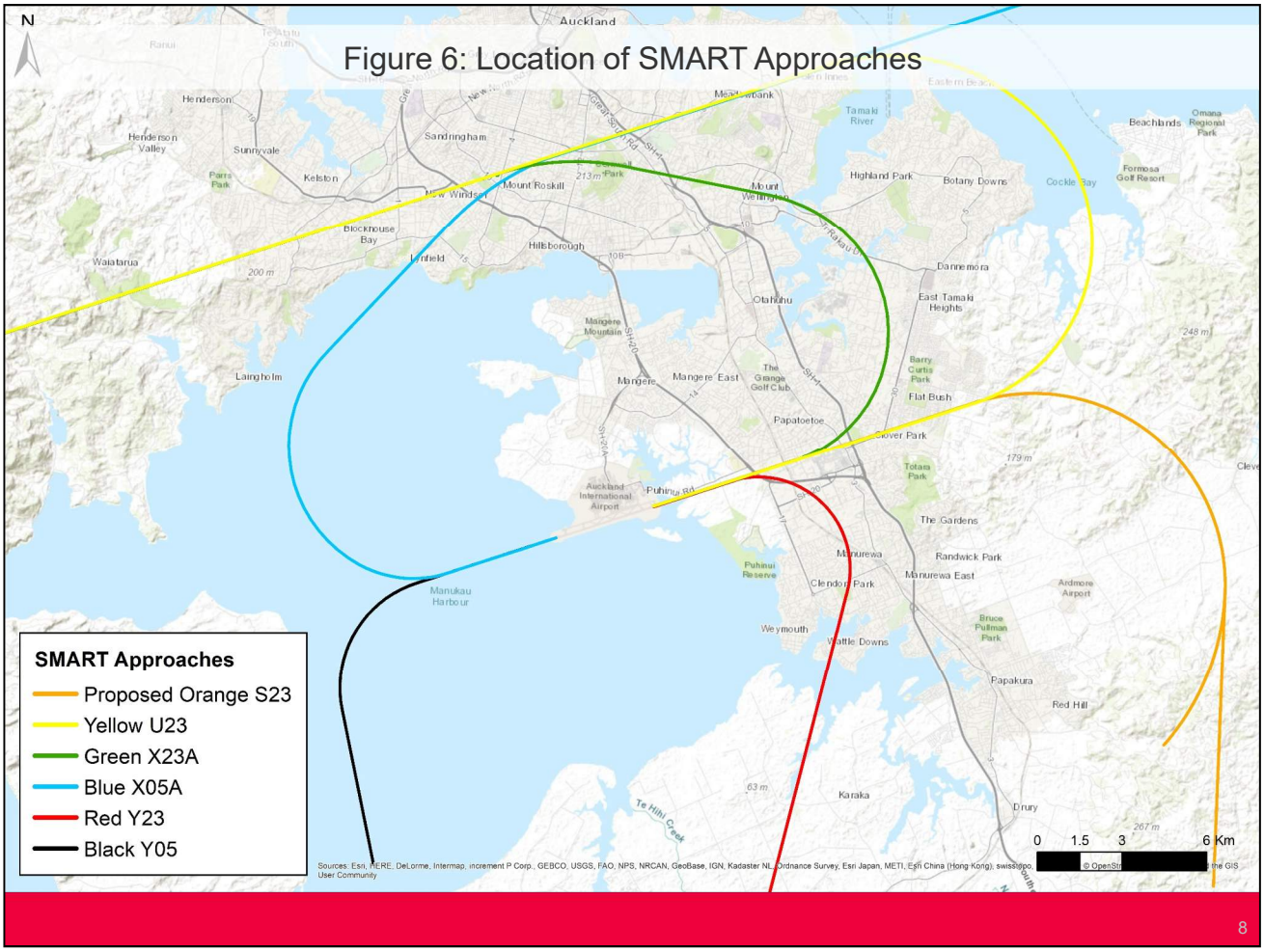

Figure 6 shows the location of the SMART approach flight paths.


Flight Path Diagrams
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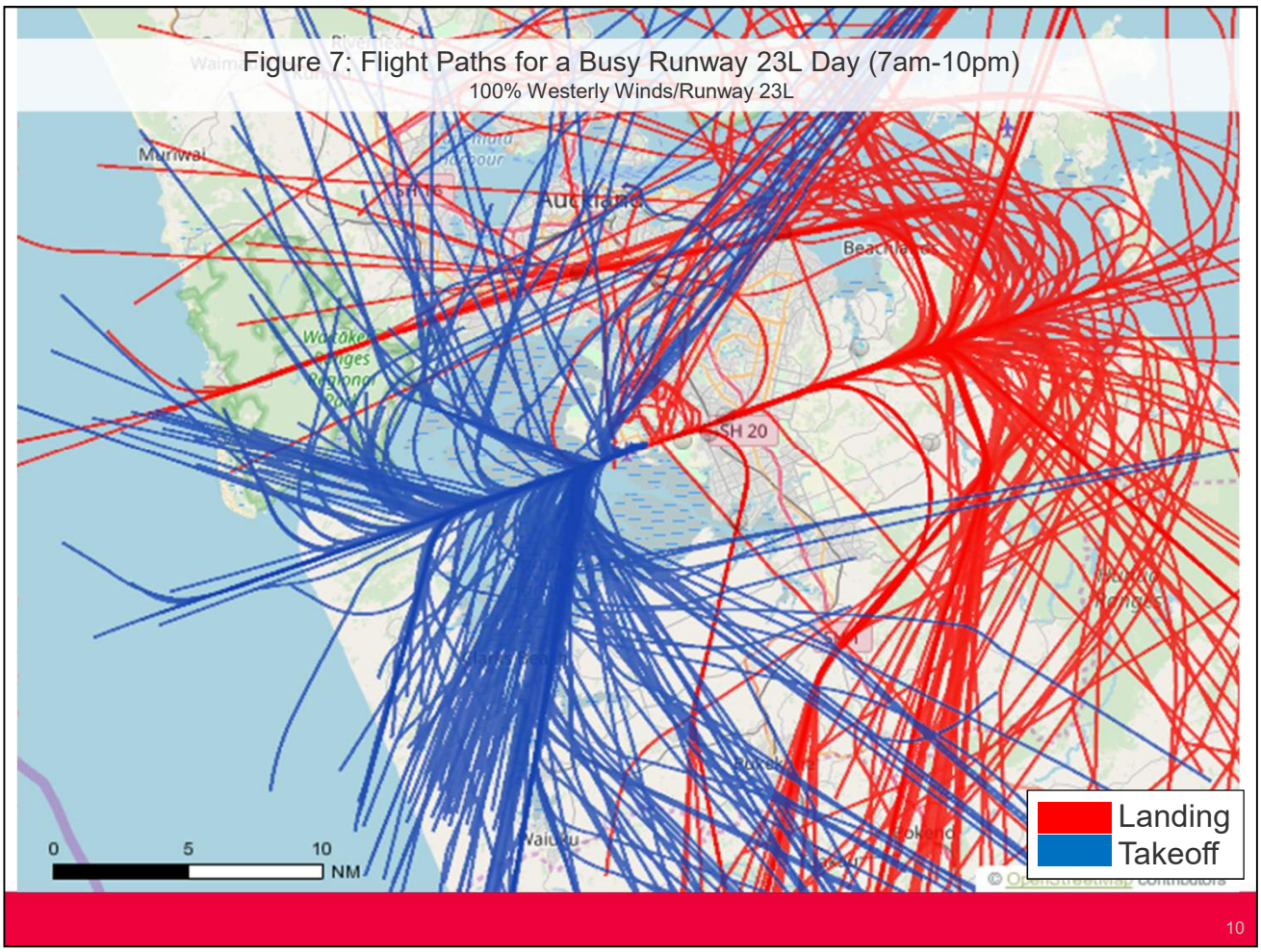

Figure 7 shows the daytime (7am-10pm) flight paths for Friday 20 December 2019, the busiest day in the three month period November 2019 to January 2020 when Runway 23L was primarily in use.

The red lines indicate arrivals and the blue lines indicate departures.

The runway usage in this 24 hour period was Runway 23L (westerly) 100%.

There were 502 daytime flights on this day.

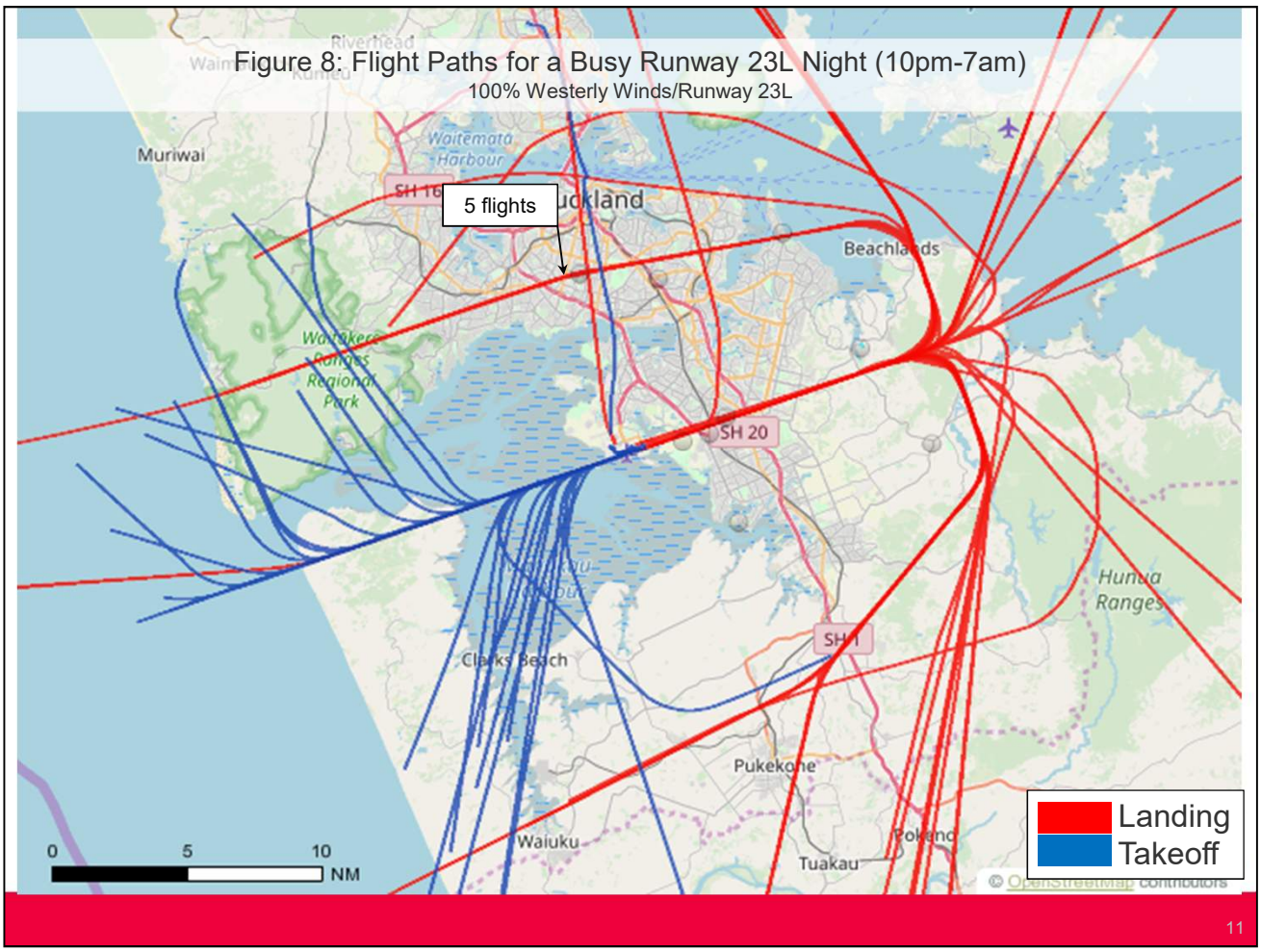

Figure 8 shows the night-time (10pm-7am) flight paths for Friday 20 December 2019, the busiest night in the three month period November 2019 to January 2020 when Runway 23L was primarily in use.

The red lines indicate arrivals and the blue lines indicate departures.

The runway usage in this 24 hour period was Runway 23L (westerly) 100%.

There were 82 night-time flights on this night.

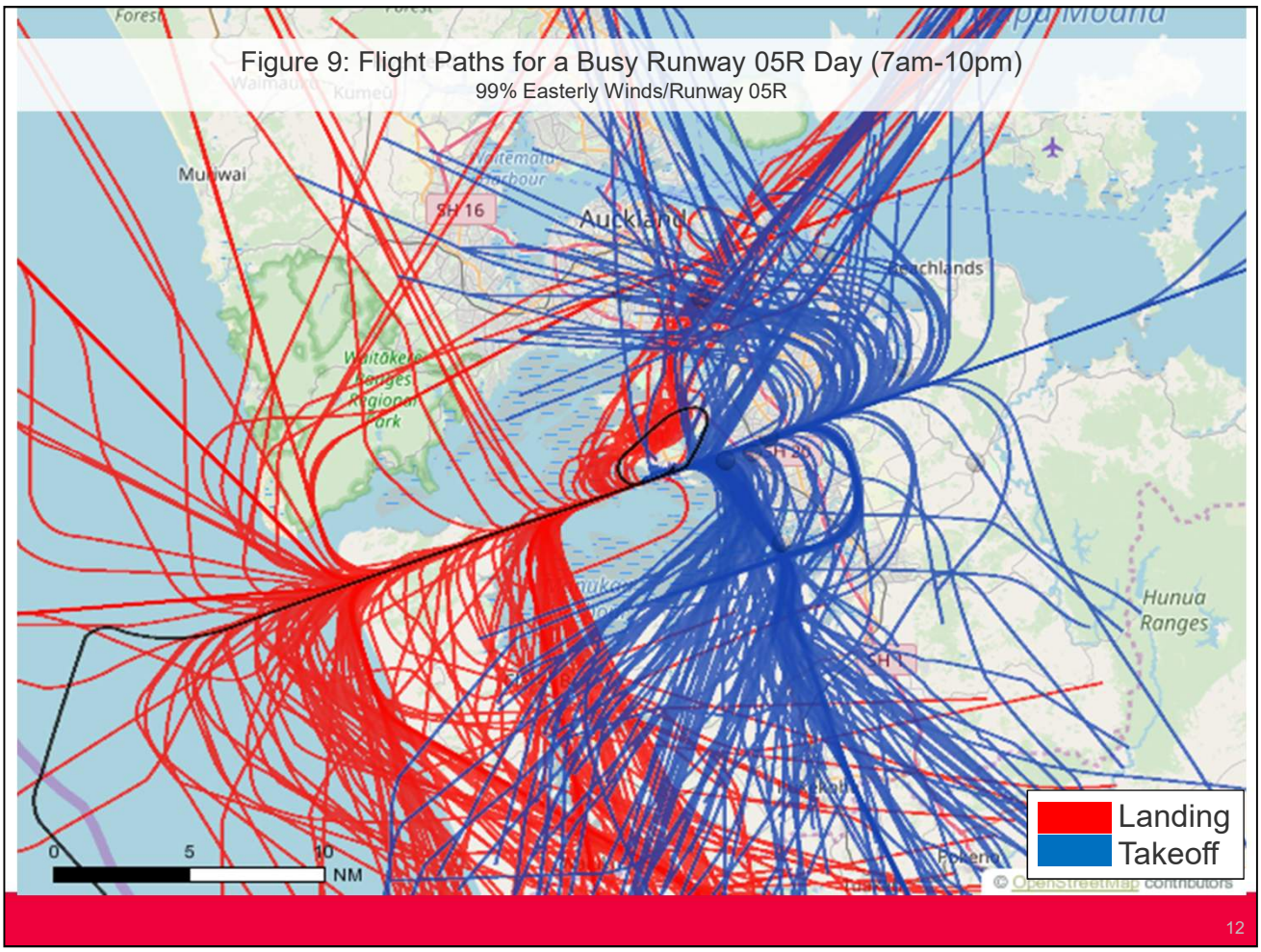

Figure 9 shows the daytime (7am-10pm) flight paths for Friday 29 November 2019, the busiest day in the three month period November 2019 to January 2020 when Runway 05R was primarily in use.

The red lines indicate arrivals and the blue lines indicate departures.

The runway usage in this 24 hour period was Runway 05R (easterly) 99%.

There were 506 daytime flights on this day.

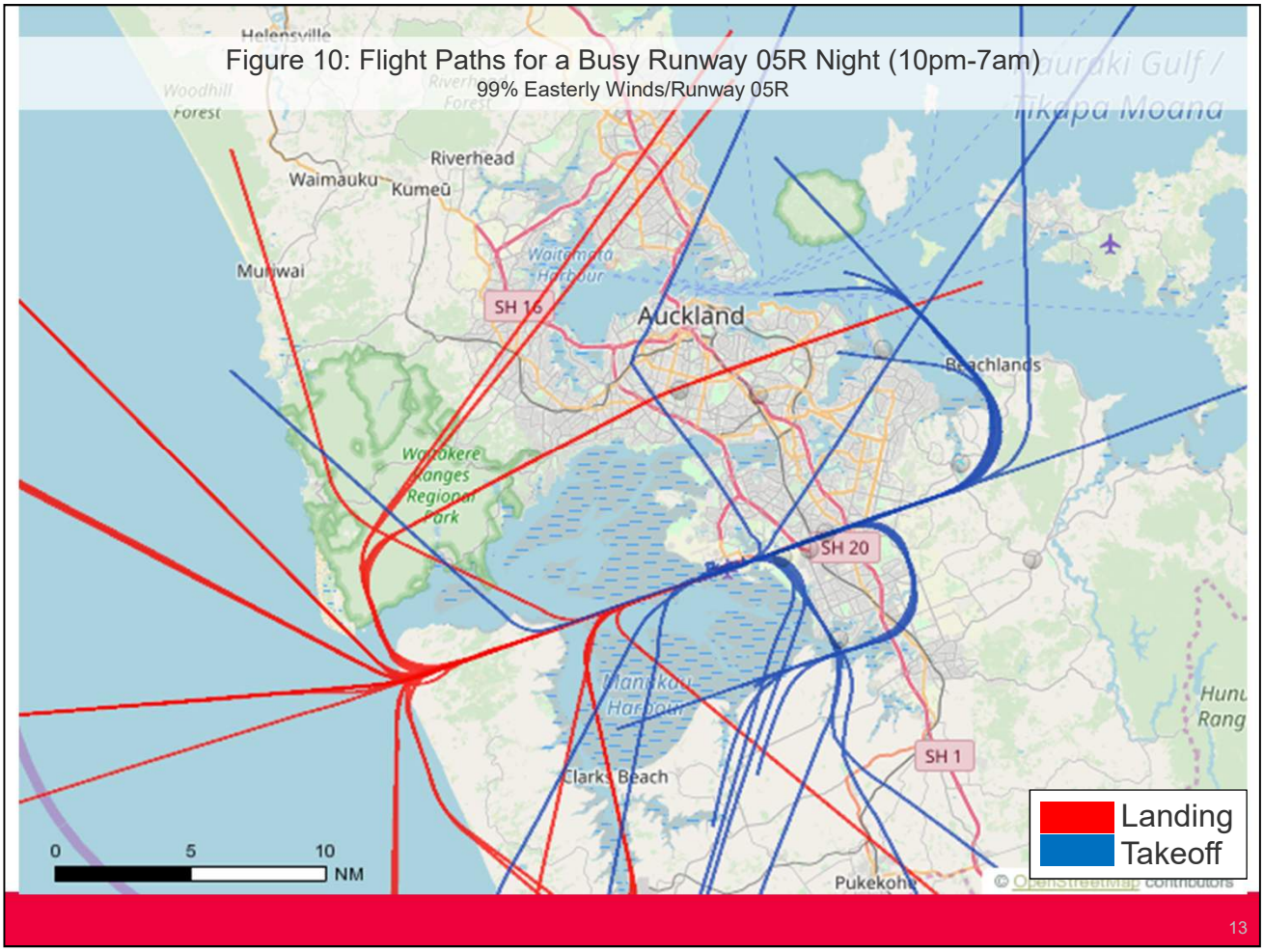

Figure 10 shows the night-time (10pm-7am) flight paths for Friday 29 November 2019, the busiest night in the three month period November 2019 to January 2020 when Runway 05R was primarily in use.

The red lines indicate arrivals and the blue lines indicate departures.

The runway usage in this 24 hour period was Runway 05R (easterly) 99%.

There were 67 night-time flights on this night.

Noise Complaints

Figure 11: Number of Aircraft Noise Complaints per Month

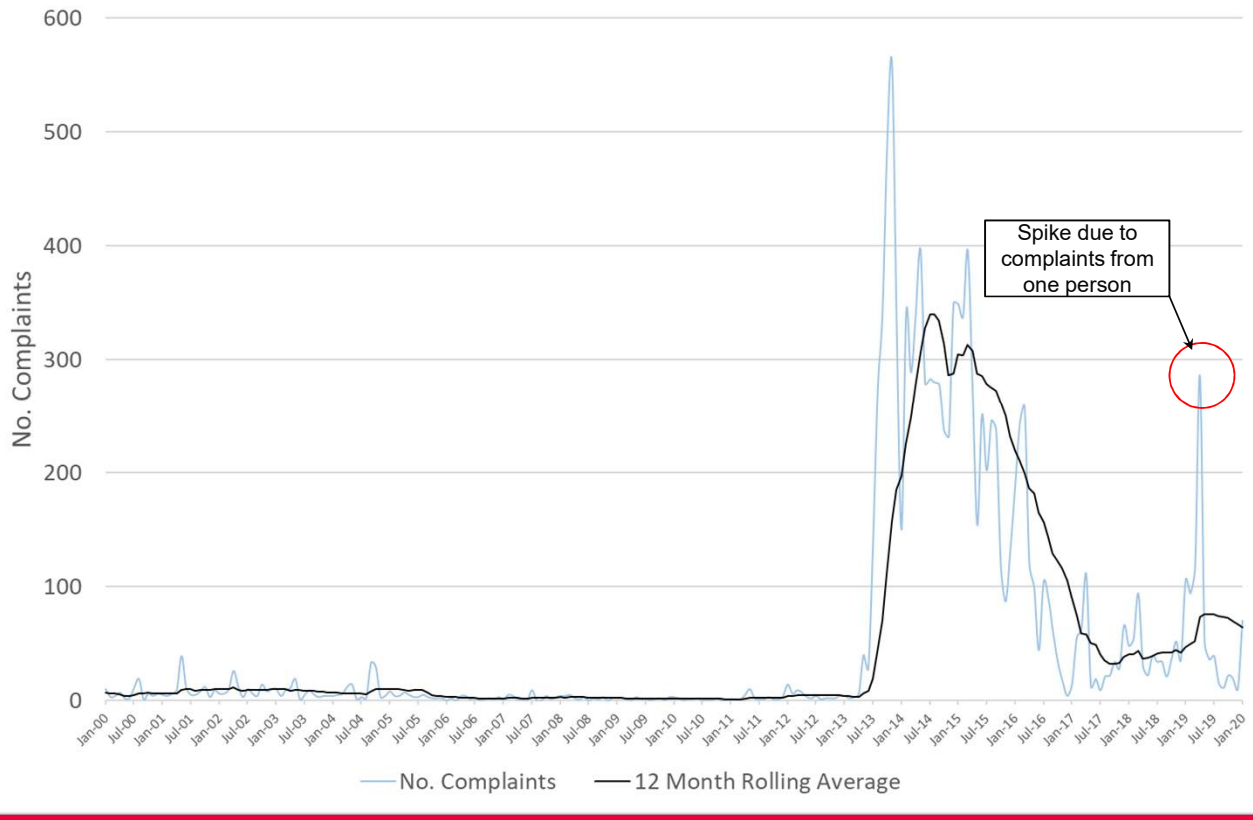

Figure 11 shows the total number of aircraft noise complaints made per month since the year 2000 (blue line) and the 12 month rolling average (black line).

Aircraft noise complaints were low up until 2013 when the number of complaints increased from about 2 per month to a peak of 560 in November 2013 and have decreased steadily since then.

This increase in complaints coincided with the 2012/13 SMART trials where community awareness to noise was heightened.

The number of noise complaints in the three month period November 2019 to January 2020 has decreased from 194 to 99 when compared to the same period last year.

Table 3: Summary of Noise Complaints

	Nov	Dec	Jan	Nov-Jan	Aug-Oct	May-Jul	Feb-Apr
Number of Complaints	19	10	70	99	48	126	498
Specific	*13*	*8*	*66*	*87*	*39*	*100*	*440*
Generic	*4*	*1*	*4*	*9*	*9*	*23*	*53*
Question	*2*	*1*	*0*	*3*	*0*	*3*	*5*
Number of People Complaining	10	7	10	22	18	33	51

Note: Four people made 70% (69) of the complaints for the three month period. These people were located in Greenlane, Manukau Heads, Beachlands, & One Tree Hill.

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Table 3 shows a breakdown of the noise complaints in the three month period November 2019 to January 2020 with the previous three quarters shown for reference.

A particular person, may have made several complaints over time. These individual complaints could have been regarding one specific aircraft operation or a more general complaint which does not reference a specific aircraft operation.

There are two types of general complaints, 'generic' and 'question'. The first relates to people lodging a general complaint about aircraft noise rather than a specific event, the second relates to people enquiring to ask for information about aircraft noise or management of noise. We therefore refer to:

- The number of 'complainants' (no. of people who complain),
- The number of 'generic' noise complaints (e.g. " there was more aircraft noise last night")
- The number of 'question' noise enquiries (e.g. "can you tell me more about how noise is managed at the airport")
- The number of 'specific' event complaints (e.g. "the 6:25pm flight was noisy")

There were a total of 99 complaints in the three month period November 2019 to January 2020, 88% related to specific aircraft events, 9% were generic complaints and 3% were question enquiries. Four people made 70% (69) of the complaints for the three month period.

The number of complaints between November 2019 to January 2020 was higher than the complaints received in the previous quarter (August to October).

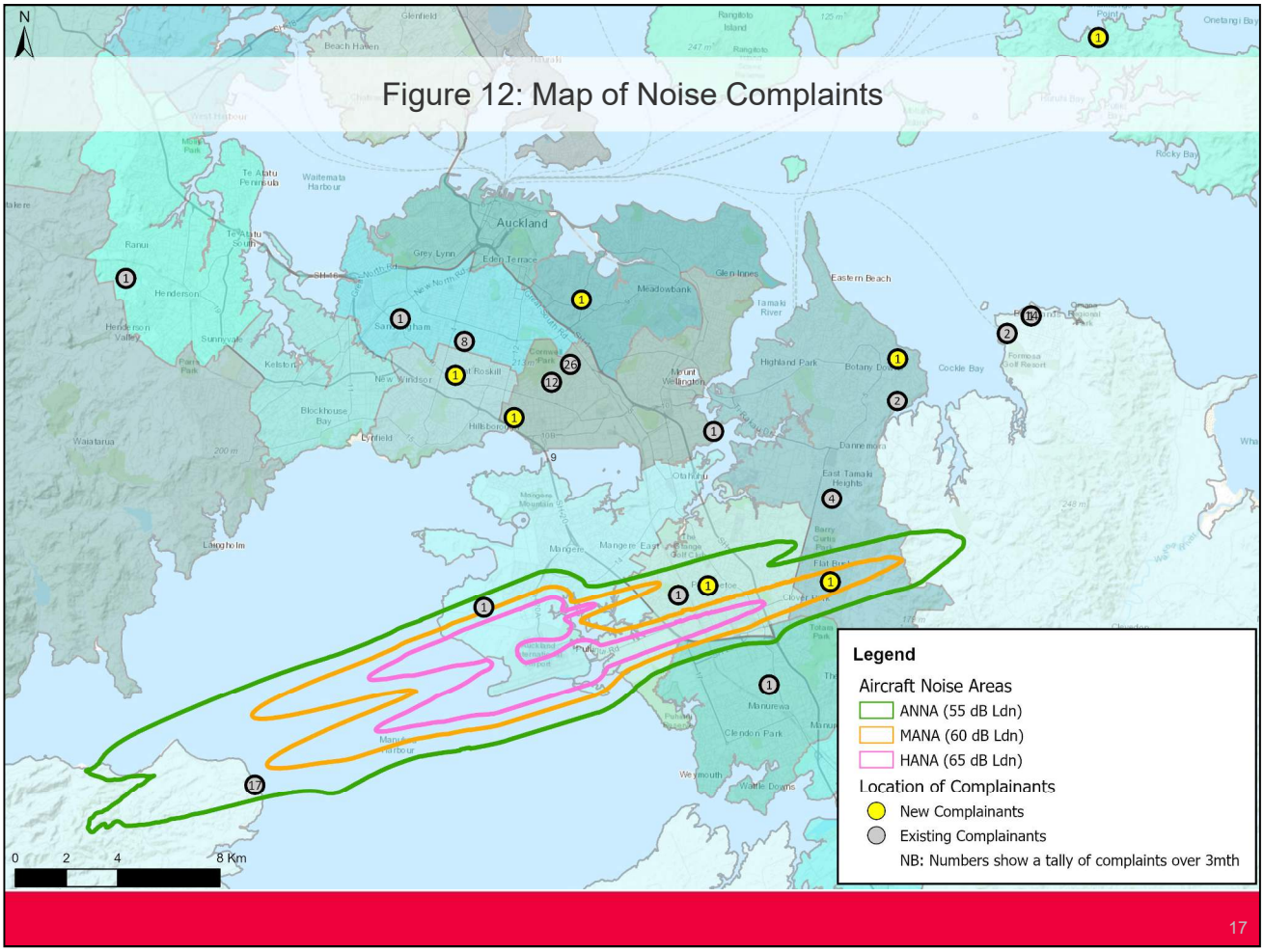


Figure 12 shows a map with the location of each complainant.

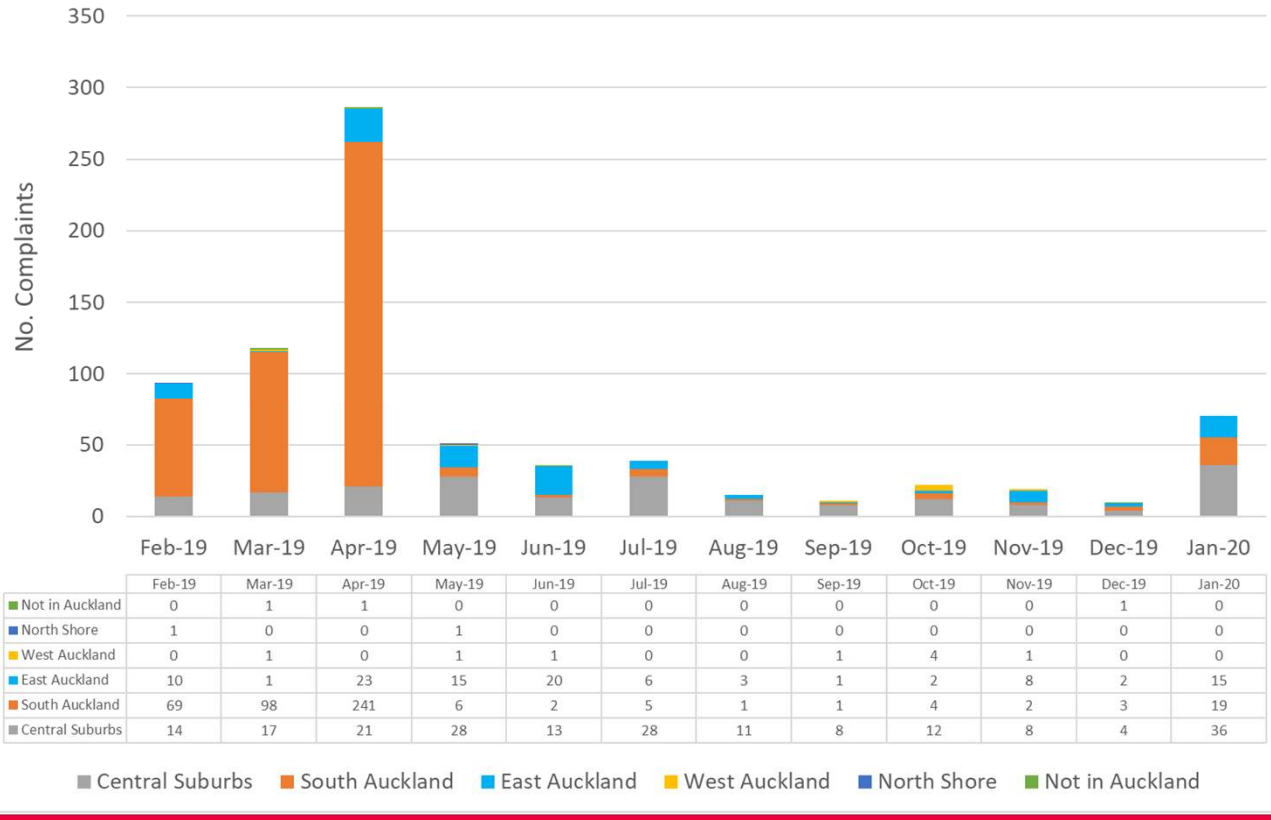
Each point represents the location of a person who complained in the three month period November 2019 to January 2020.

The colour of the point represents whether it was an existing complainant (grey - someone who has complained before) or a new complainant (yellow - someone who hasn't complained before).

The numbers on top of each point give the number of complaints made by each person in the three month period.

The complaints are spread all over Auckland.

Figure 13: Number of Noise Complaints by Area



	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20
Not in Auckland	0	1	1	0	0	0	0	0	0	0	1	0
North Shore	1	0	0	1	0	0	0	0	0	0	0	0
West Auckland	0	1	0	1	1	0	0	1	4	1	0	0
East Auckland	10	1	23	15	20	6	3	1	2	8	2	15
South Auckland	69	98	241	6	2	5	1	1	4	2	3	19
Central Suburbs	14	17	21	28	13	28	11	8	12	8	4	36

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Figure 13 shows the number of complaints made by people residing in different areas of Auckland over the past 12 months.

Around half the complaints in the three month period November 2019 to January 2020 were from the Central Suburbs, with the other half mostly a combination of South and East Auckland.

A list of which suburbs fall into each area is provided in Appendix C.

Figure 14: Noise Complaints by Time

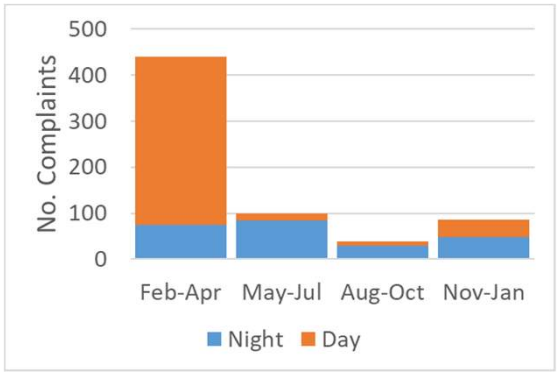


Figure 15: Noise Complaints by Runway

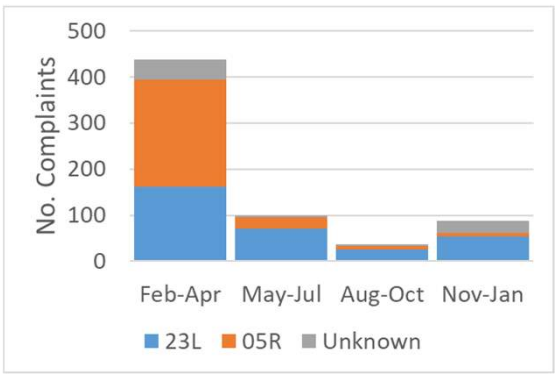


Figure 16: Noise Complaints by Aircraft

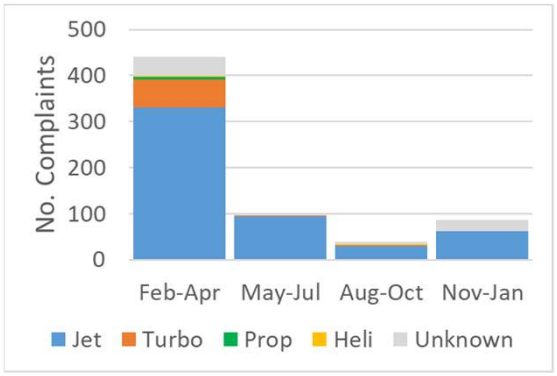
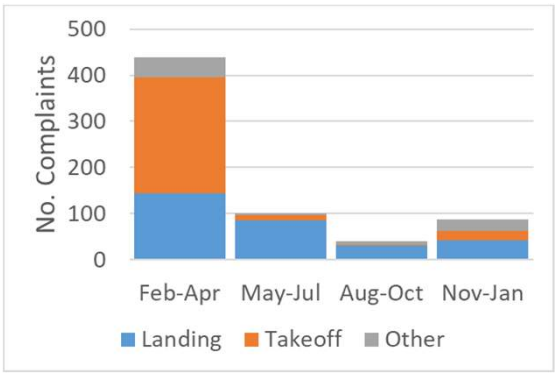


Figure 17: Noise Complaints by Operation



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Figures 14-17 show a breakdown of the ‘specific’ aircraft noise complaints made in the three month period November 2019 to January 2020 and the three quarters preceding.

Night-time flights made up 55% of the complaints in the three month period. The majority of complaints related to jet arrivals on runway 23L.

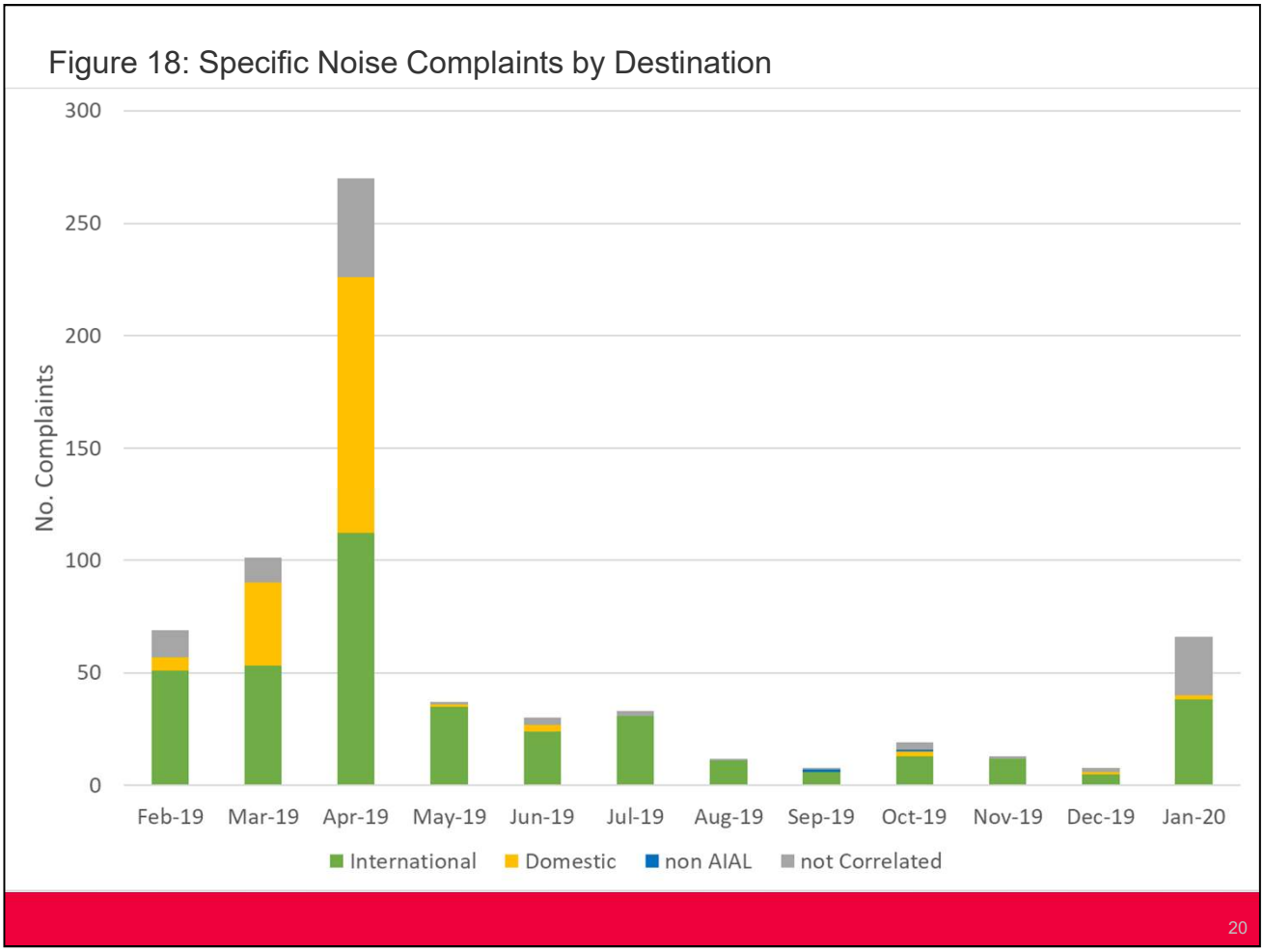

Figure 18 shows the number of specific aircraft complaints made about international and domestic flights over the past 12 months.

The complaints in the three month period November 2019 to January 2020 were mainly regarding international flights.

Note that a number of specific aircraft complaints were not matched with a flight.

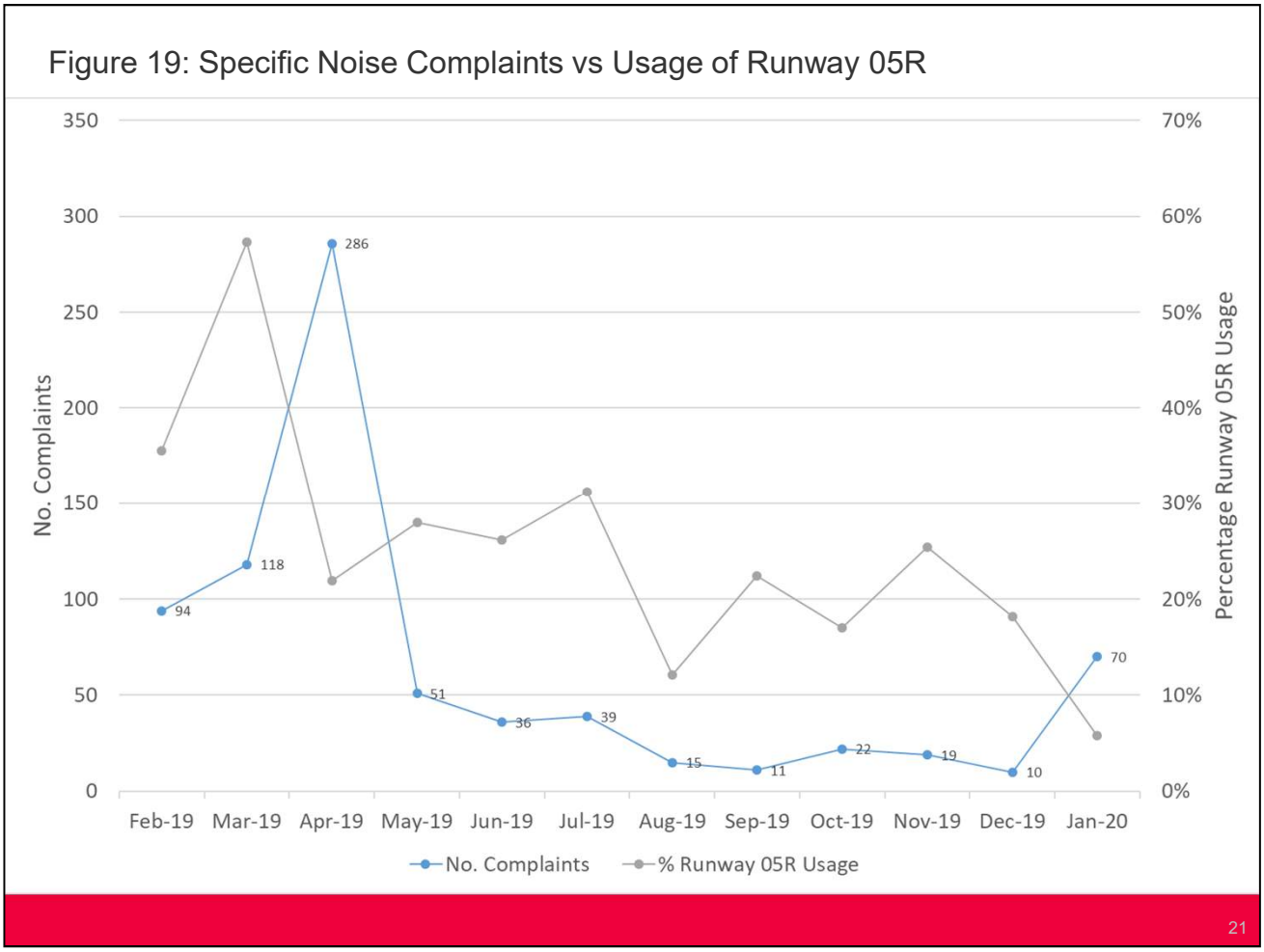

Figure 19 shows the number of specific noise complaints per month received in the past 12 months compared to the usage of Runway 05R.

Usage of Runway 05R is associated with easterly winds which cause departing aircraft to depart to the east over populated areas instead of over the Manukau Harbour (as occurs in the predominant westerly winds).

Departing aircraft are generally louder than arriving aircraft.

There is a general correlation between runway usage and the number of complaints in recent months.

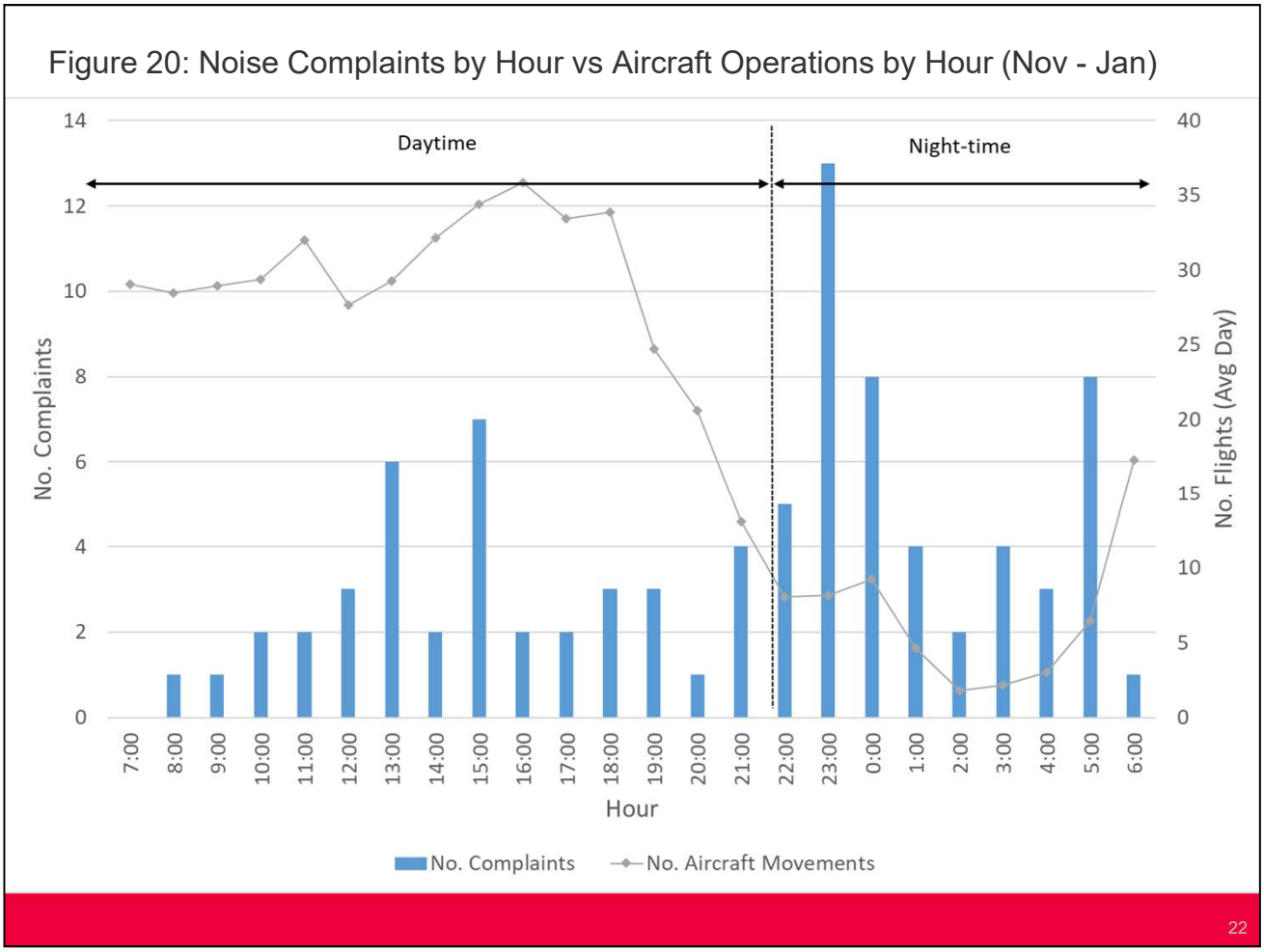

Figure 20 shows the number of specific aircraft noise complaints and the number of aircraft operations per hour.

The blue bars show the number of complaints that related to an aircraft operation in each hour of the day in the three month period November 2019 to January 2020.

The gray line shows the average daily aircraft operations that occurred in each hour of the day during this period.

The complaints were mainly at night. There is little correlation between the number of aircraft operations each hour and the number of complaints.

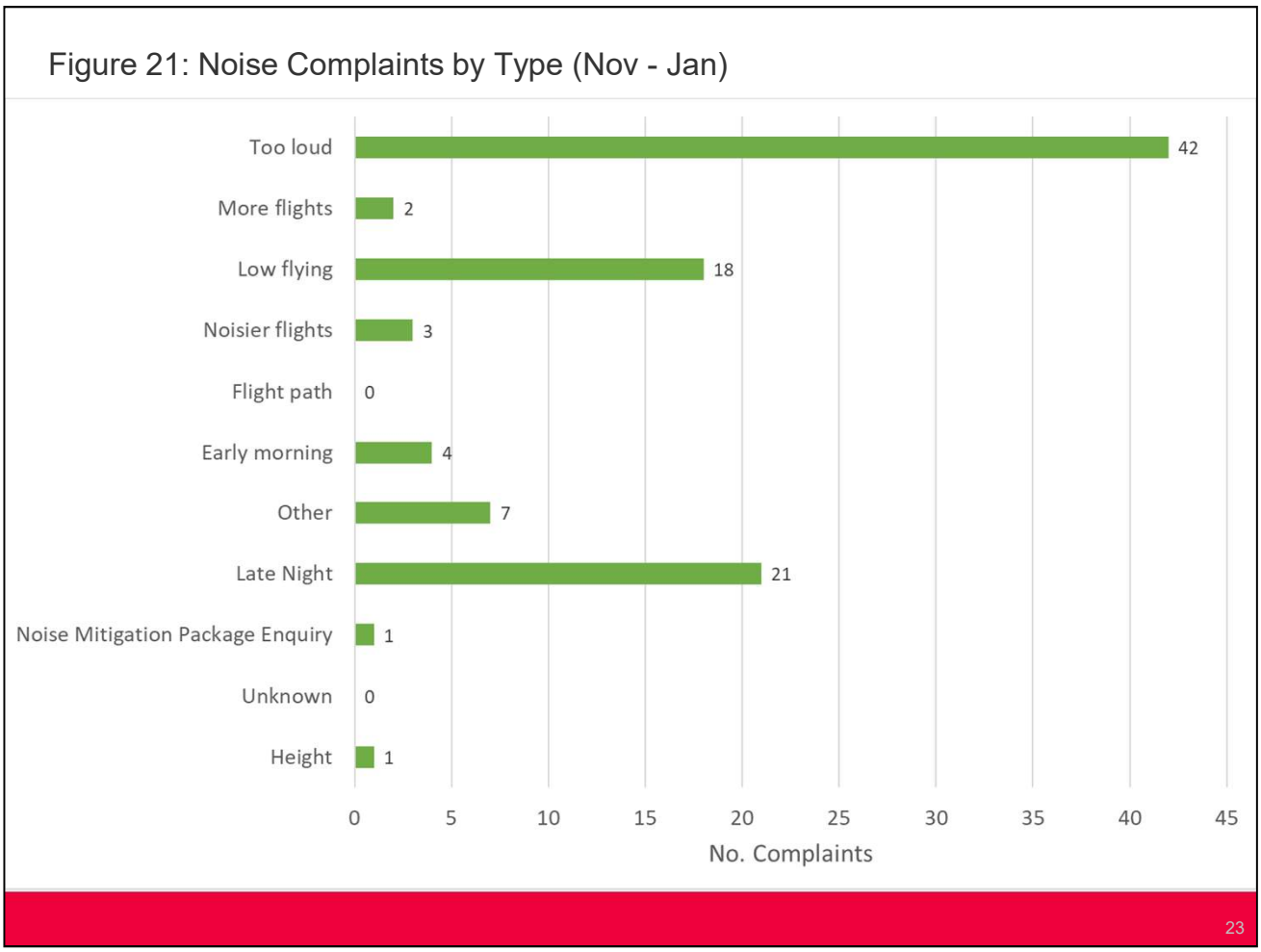

Figure 21 shows the reason for each noise complaint. This includes generic and specific complaints.

Aircraft operations being too loud was the main reason for the complaints (42%) in the three month period November 2019 to January 2020.

Late night flights and low flying flights were the second and third most prevalent reason.

A full description of each cause is given in Appendix B.

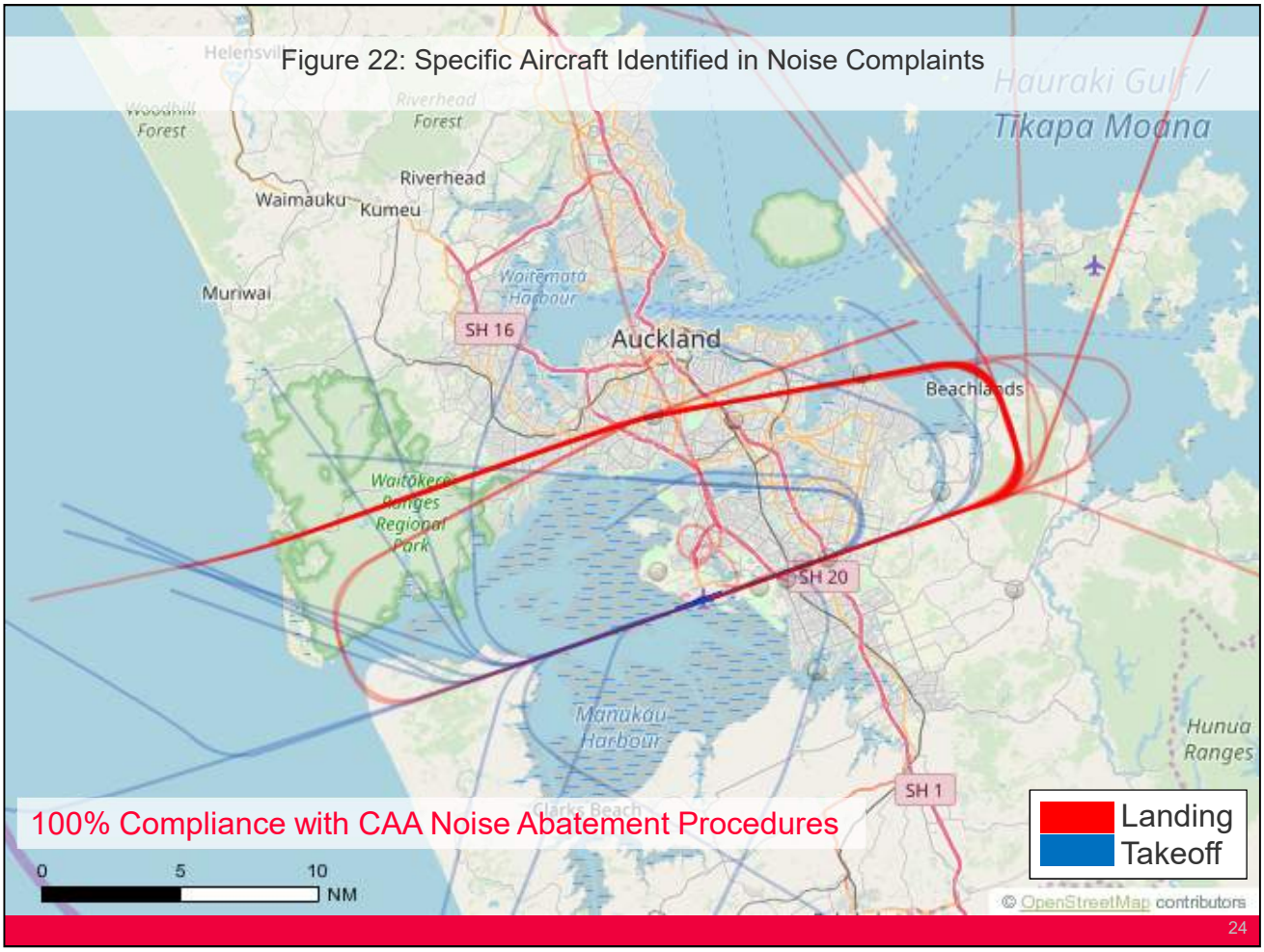

Figure 22 shows the flight paths for specific aircraft from Auckland Airport identified in noise complaints for the three month period November 2019 to January 2020.

The red lines indicate arrivals, the blue lines indicate departures.

There were 87 noise complaints that related to specific aircraft during this period. 62 of these operated out of Auckland Airport – the 62 Auckland Airport aircraft events have been reviewed and all of them complied with the Civil Aviation Authority Noise Abatement Procedures.

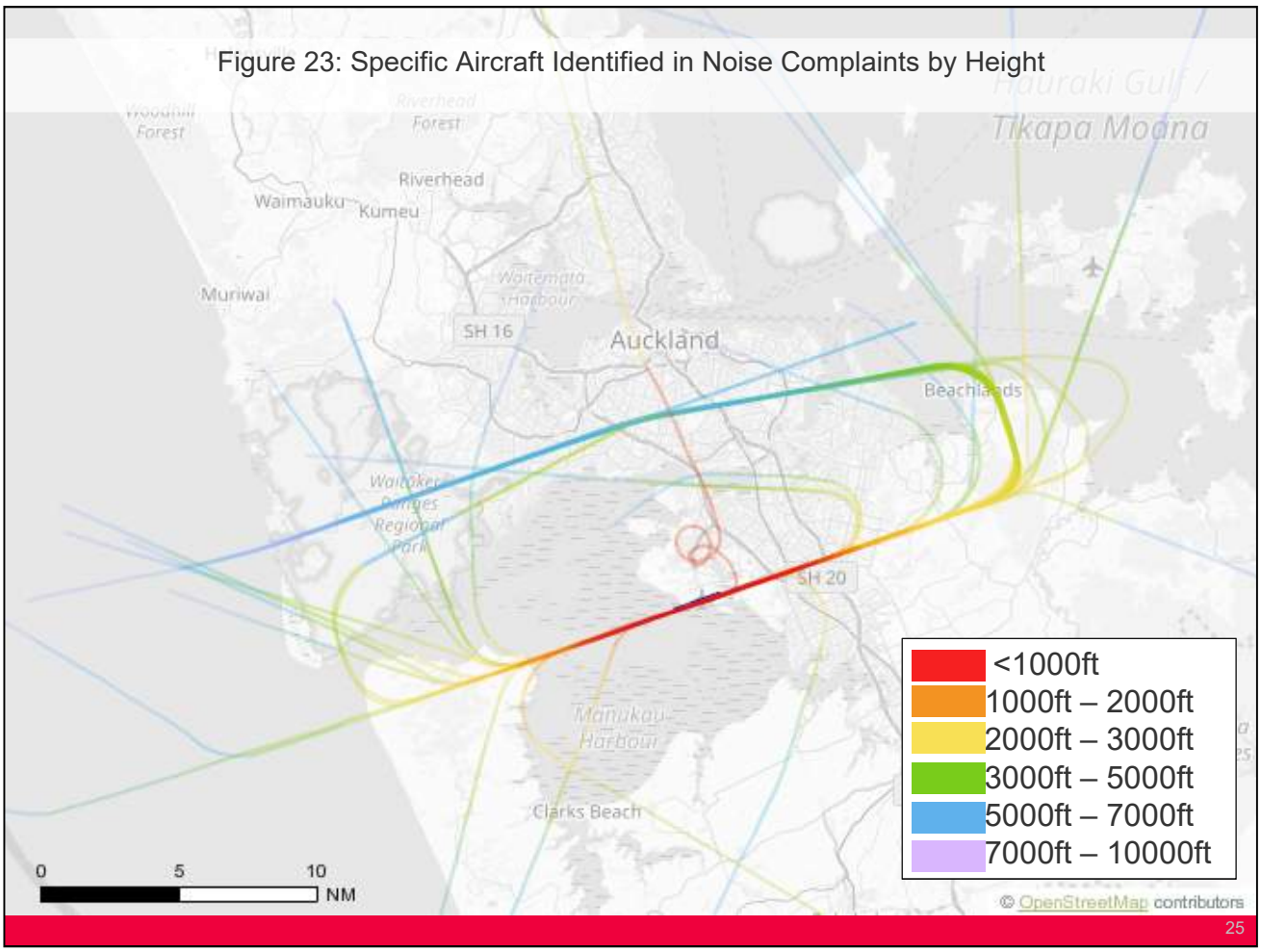

Figure 23 shows the flight paths for the 62 specific aircraft identified from Auckland Airport in noise complaints for the three month period November 2019 to January 2020.

The flight paths are shown in terms of altitude.


Noise Monitoring
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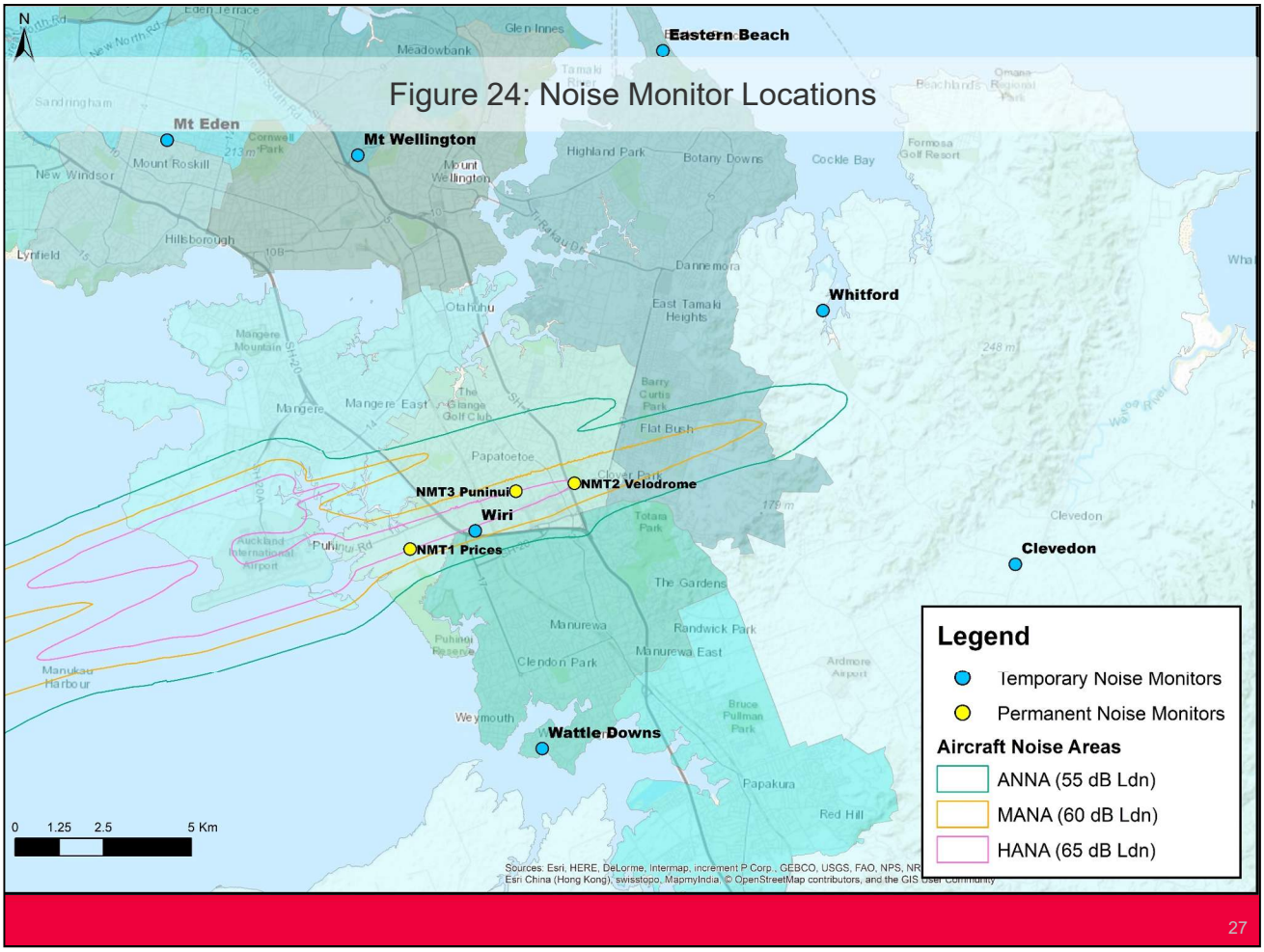

Figure 24 shows the location of Auckland Airport's three permanent and seven temporary noise monitors.

All of the permanent noise monitors are located on the outer boundary of the HANA which is set at 65 dB L_{dn} for future aircraft operations.

The Velodrome logger was vandalized in early November 2019 and is currently being repaired.

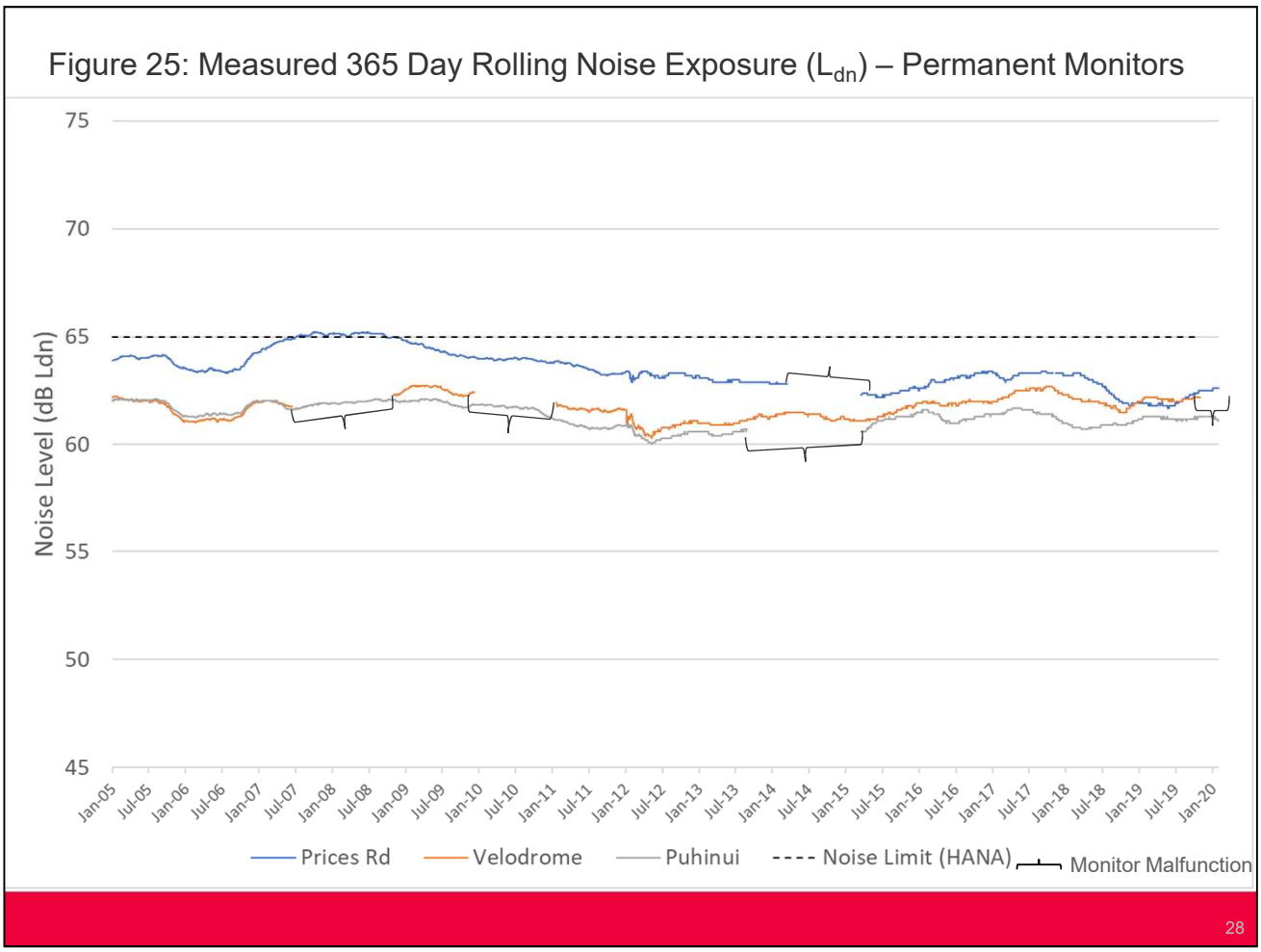

Figure 25 shows the rolling 365 day Noise Exposure (L_{dn}) at the permanent noise monitors since January 2005.

The noise limit in the District Plan is 65 dB L_{dn} (rolling 365 day) at the boundary of the HANA.

The rolling 365 day L_{dn} is the average L_{dn} noise level over 365 days calculated each day and is the overall average L_{dn} for the 365 days preceding and including the day of the calculation.

For example the point for 31 December 2005 represents the average L_{dn} noise level from 1 January 2005 to 31 December 2005.

The rolling 365-day L_{dn} was below the 65 dB L_{dn} noise limit in the three month period November 2019 to January 2020.

The noise levels in the three month period have increased by 0.7 dB at Prices Rd and decreased by 0.2 dB at Puhinui compared to the same quarter last year. The Velodrome logger was vandalized in early November 2019 and is currently being repaired.

The noise levels in the three month period are 1 to 3 dB lower than in 2007/2008 when noise levels were highest.

A change in noise level of 1 to 2 dB is not generally perceptible to the human ear.

Table 4: Measured Noise Exposure (L_{dn}) for each Financial Year – Permanent Monitors

Financial Year	Prices Rd	Velodrome	Puhinui
FY06 (Jul-05 to Jun-06)	63.4	61.2	61.4
FY07 (Jul-06 to Jun-07)	65.0	61.8	61.7
FY08 (Jul-07 to Jun-08)	65.2	No Data	62.1
FY09 (Jul-08 to Jun-09)	64.3	62.6	62.0
FY10 (Jul-09 to Jun-10)	64.0	62.4	61.8
FY11 (Jul-10 to Jun-11)	63.5	61.6	60.7
FY12 (Jul-11 to Jun-12)	63.1	60.8	60.3
FY13 (Jul-12 to Jun-13)	63.0	61.0	60.6
FY14 (Jul-13 to Jun-14)	63.6	61.4	60.3
FY15 (Jul-14 to Jun-15)	62.2	61.3	61.1
FY16 (Jul-15 to Jun-16)	63.1	61.9	61.0
FY17 (Jul-16 to Jun-17)	63.3	62.5	61.6
FY18 (Jul-17 to Jun-18)	62.8	61.9	60.9
FY19 (Jul-18 to Jun-19)	61.9	62.0	61.2

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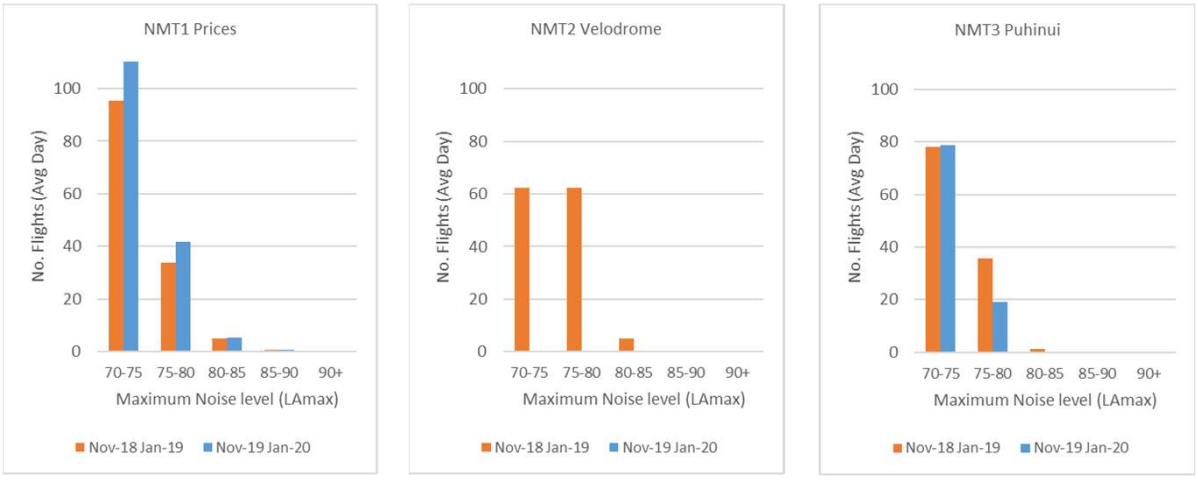
Table 4 shows the Noise Exposure (L_{dn}) at the permanent noise monitors for each financial year (1-Jul – 30-Jun) since 2006

The noise limit in the District Plan is 65 dB L_{dn} (rolling 365 day) at the boundary of the HANA.

Figure 26: Number of Aircraft Noise Events in Each Noise Band
Permanent Monitors (L_{Amax} – Maximum Noise Level)



NB: Aircraft noise events over 70-75 L_{Amax} start to become disturbing inside houses with windows open as they have the potential to interfere with watching tv, talking etc.

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Figure 26 shows the average daily number of aircraft that overflew each permanent noise monitor in each noise band in the three month period November to January in 2018-2019 (Orange bars) and 2019-2020 (Blue bars).

L_{Amax} is the maximum noise level experienced as an aircraft overflies a monitor.

The permanent noise monitors receive 105-185 events above 70 L_{Amax} per day.

The Velodrome logger was vandalized in early November 2019 and is currently being repaired, so there is no data from it for November 2019 to January 2020.

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Table 5: Correlation of Aircraft Operations with Captured Noise Events
Permanent Monitors

	NMT1 Prices	NMT2 Velodrome	NMT3 Puhinui
Total Aircraft Operations	21,238	16,489	17,567
No. Aircraft Operations Captured by Monitors	18,186	-	15,283
Correlation	86%	-	87%

NB: Generally a correlation of >80% is considered reasonable. The aircraft that are missed are the lower noise level events and will not have any effect on the overall noise level.

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Table 5 shows the number of aircraft that flew in the vicinity of each permanent noise monitor and the number of aircraft noise events that were correlated with an aircraft flyover in the three month period November 2019 to January 2020.

Generally a noise monitor is unable to pick up each and every noise event due to ambient noise, inclement weather or other factors.

This table shows how well each noise monitor is performing in correlating aircraft noise events.

The Velodrome logger was vandalized in early November 2019 and is currently being repaired, so there is no data from it for November 2019 to January 2020.

Table 6: Temporary Noise Monitor Summary of Measured Aircraft Events

	Date Deployed	Days in Field	Measured L_{dn}	Average L_{Amax}
Mt Eden	1-Apr-15	1767	40	62
Mt Wellington	17-Apr-15	1751	40	65
Eastern Beach	11-Jun-15	1696	42	61
Wiri	4-May-17	1005	60	75
Wattle Downs	23-Dec-17	770	48	67
Clevedon	10-Mar-18	694	28	56
Whitford (Trig)	1-Dec-19	61	47	58

NB: The noise loggers at Mt Eden, Mt Wellington, Eastern Beach and Wattle Downs experienced a software bug from August to November 2019 which impacted the timestamp of the logged data. This impacted the correlation of noise events with Airways Radar data and the data had to be correlated manually. The manual correlation is not as accurate as Casper and thus the values may differ from usual. This bug has now been resolved with the manufacturer.

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Table 6 gives a summary of the measured noise levels at each temporary noise monitor since deployment (up until 31 January 2020).

The measured L_{dn} for aircraft noise ranges from 28-48 dB L_{dn} across the various temporary monitor locations, with the exception of the noise monitor in Wiri where noise levels were 60 dB L_{dn}.

New Zealand Standard NZS 6805 states that areas exposed to noise levels below 55 dB L_{dn} are suitable for residential development. The noise levels measured at the temporary noise monitors are 7-27 dB below the 55 dB L_{dn} New Zealand Standard, with the exception of the noise monitor in Wiri.

The noise levels measured at the Wiri noise monitor are 5 dB above the NZS 6805 guideline which is why this location is within the Moderate Aircraft Noise Area.

The average L_{Amax} ranges from 56-67 dB L_{Amax} across the various monitors with the exception of the noise monitor in Wiri where noise levels were 75 dB L_{Amax}.

The average L_{Amax} is calculated by averaging the maximum level from all of the individual aircraft noise events during the monitoring period.

The L_{Amax} differs for each aircraft operation depending on the aircraft type, type of operation etc.

Aircraft noise events over 70-75 L_{Amax} start to become disturbing inside houses with windows open as they have the potential to interfere with watching tv, talking etc.

There was generally less than one flyover recorded at the temporary monitors above 70 dB L_{Amax} apart from the noise monitors in Wiri and Wattle Downs both had 8 & 14 noise events, respectively above 70 dB L_{amax}.

Figure 27: Measured Monthly Noise Exposure (L_{dn}) – Central Suburbs Temporary Monitors

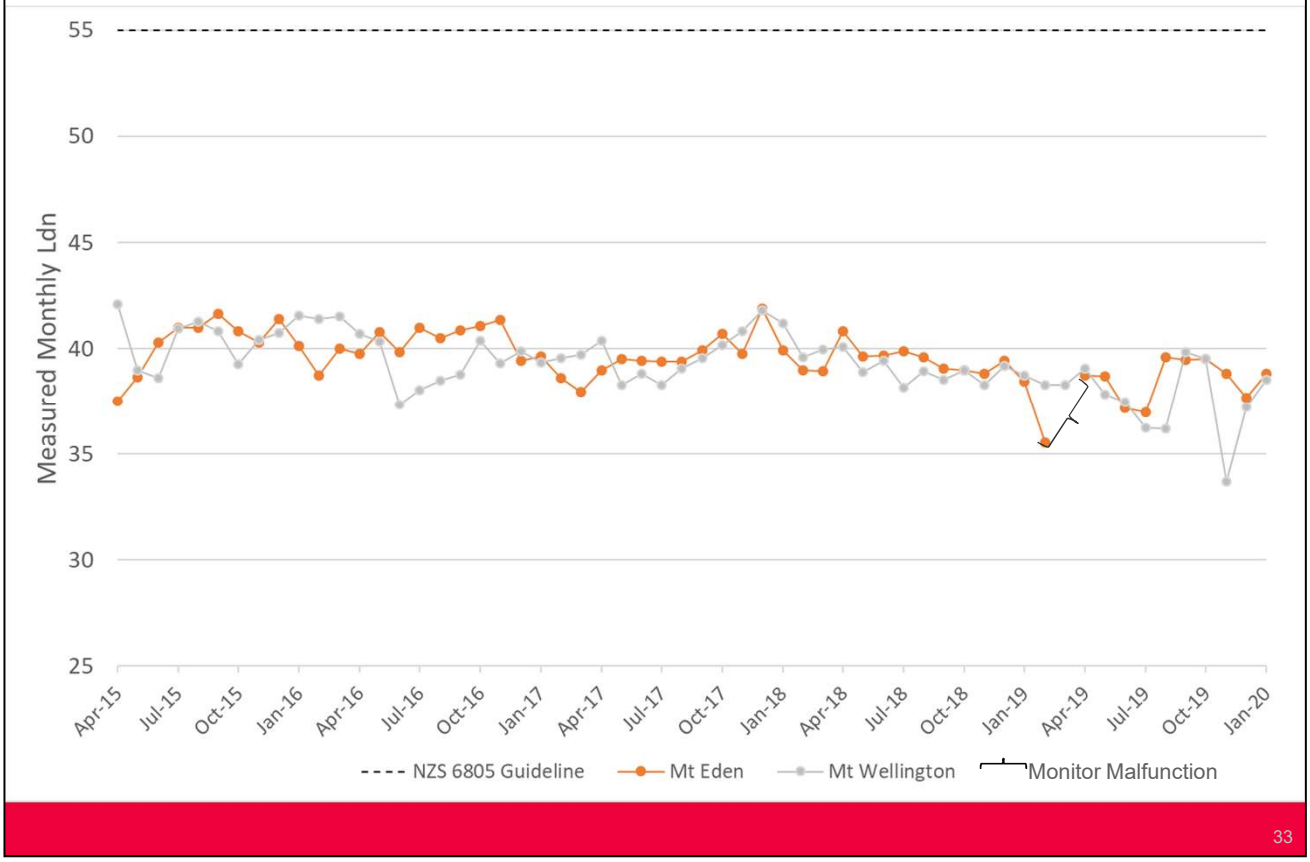


Figure 27 shows the monthly Noise Exposure (L_{dn}) trends for aircraft noise at the temporary noise monitors in the Central Suburbs since their deployment.

The L_{dn} fluctuates month on month by 6-8 dB at each noise monitor depending on aircraft operations, wind direction and other factors.

There are no notable trends in the data.

The measured L_{dn} for aircraft noise ranges from 34-42 dB L_{dn} per month across the Central Suburb monitor locations.

New Zealand Standard NZS 6805 states that areas exposed to noise levels below 55 dB L_{dn} are suitable for residential development.

The noise levels measured at the temporary noise monitors in the Central Suburbs are 13-21 dB below this level.

Figure 28: Measured Monthly Noise Exposure (L_{dn}) – Eastern Suburbs Temporary Monitors

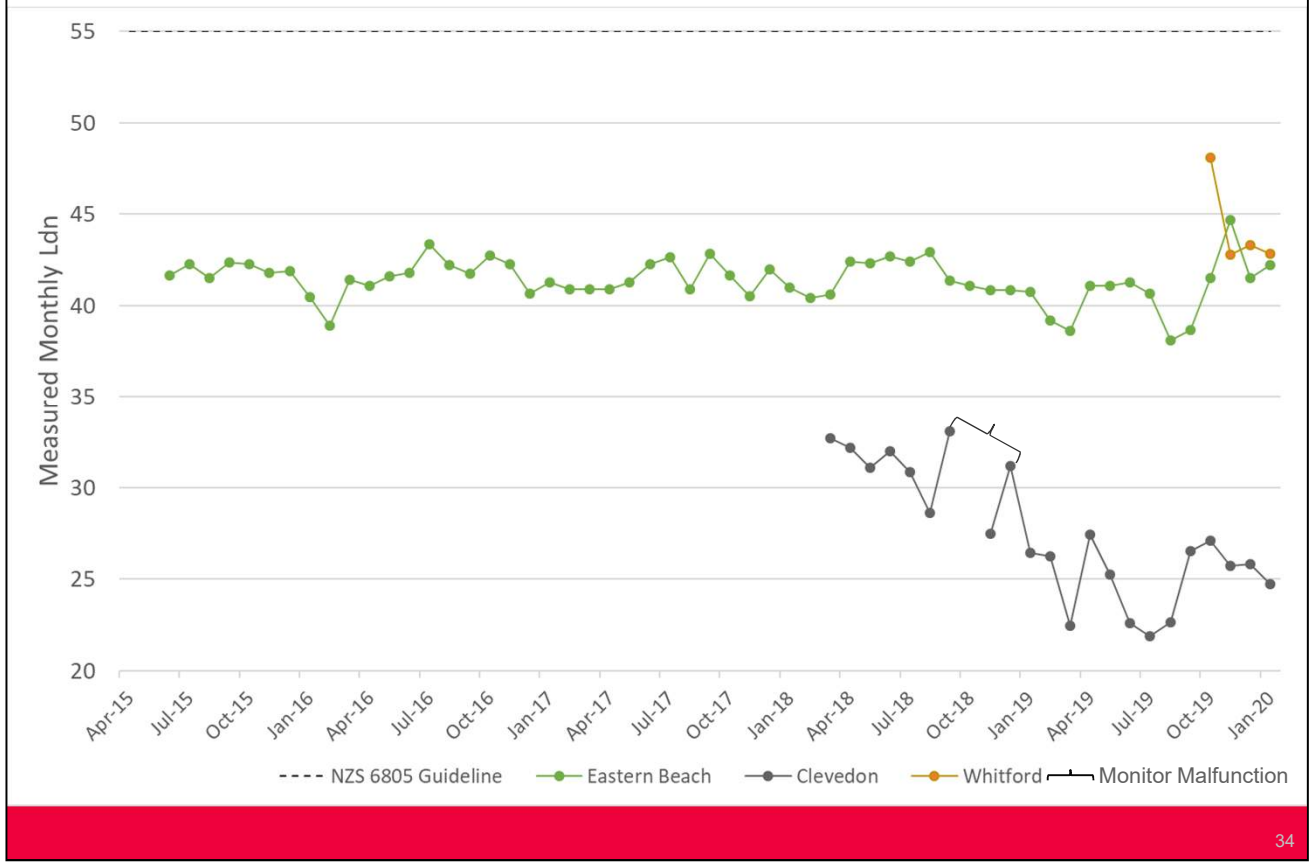


Figure 28 shows the monthly Noise Exposure (L_{dn}) trends for aircraft noise at the temporary noise monitors in East Auckland since their deployment.

The L_{dn} fluctuates month on month by 5-11 dB at each noise monitor depending on aircraft operations, wind direction and other factors.

There are no significant trends in the data.

The measured L_{dn} for aircraft noise ranges from 22-48 dB L_{dn} per month across the Eastern Suburb monitor locations.

New Zealand Standard NZS 6805 states that areas exposed to noise levels below 55 dB L_{dn} are suitable for residential development.

The noise levels measured at the temporary noise monitors are 7-33 dB below this level.

Figure 29: Measured Monthly Noise Exposure (L_{dn}) – Southern Suburbs Temporary Monitors

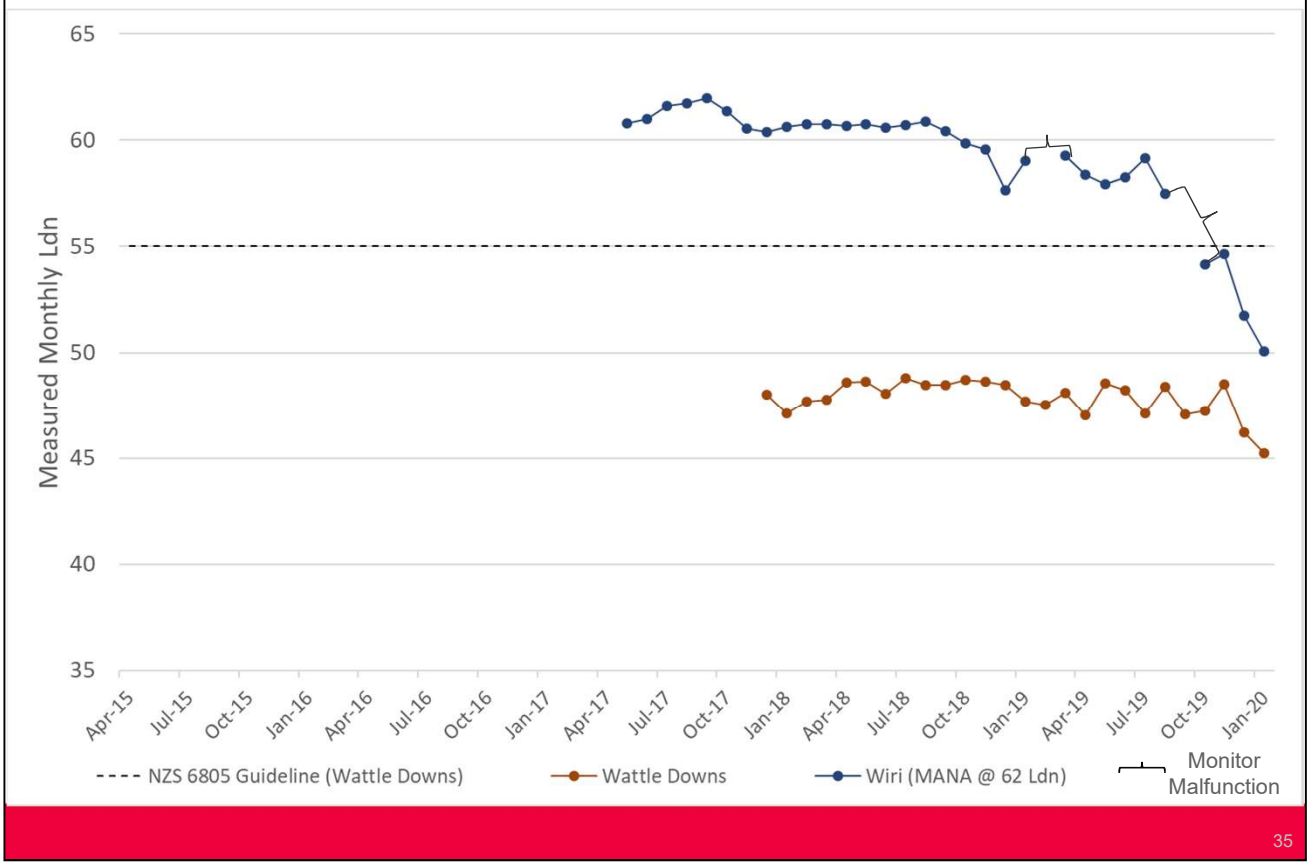


Figure 29 shows the monthly Noise Exposure (L_{dn}) trends for aircraft noise at the temporary noise monitors in South Auckland since their deployment.

The L_{dn} fluctuates month on month by around 4-12 dB at each noise monitor depending on aircraft operations, wind direction and other factors.

There are no significant trends in the data.

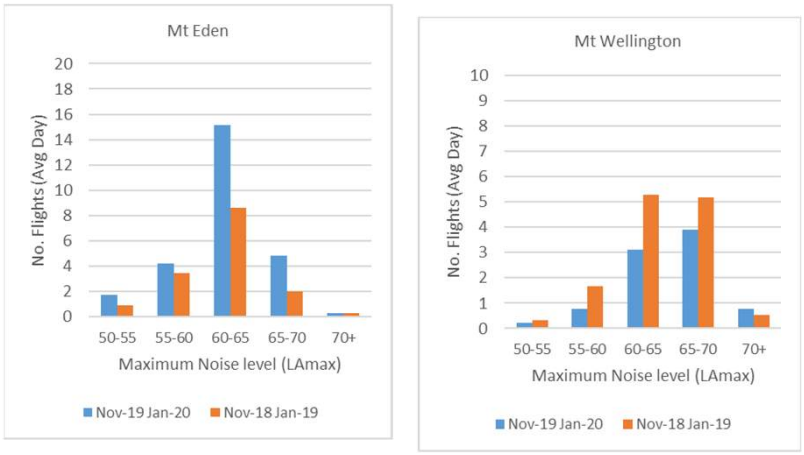
The measured L_{dn} for aircraft noise ranges from 45-62 dB L_{dn} per month across the Southern Suburb monitor locations.

New Zealand Standard NZS 6805 states that areas exposed to noise levels below 55 dB L_{dn} are suitable for residential development.

The noise level measured at the Wattle Downs noise monitor is 7 dB below this level.

This noise level measured at the Wiri noise monitor is 5 dB above the NZS 6805 guideline which is why this location is within the Moderate Aircraft Noise Area.

Figure 30: Number of Aircraft Noise Events in Each Noise Band
Central Suburbs Monitors (L_{Amax} – Maximum Noise Level)



NB: Aircraft noise events over 70-75 L_{Amax} start to become disturbing inside houses with windows open as they have the potential to interfere with watching tv, talking etc.

The number of noise events at the Mt Eden noise monitor was uncharacteristically high due to the timestamp bug mentioned previously. This is because the aircraft noise in this area is low compared to the background noise making triggering of noise events difficult without Airways Radar data. Many of the triggered events are likely not associated with Aircraft Noise.

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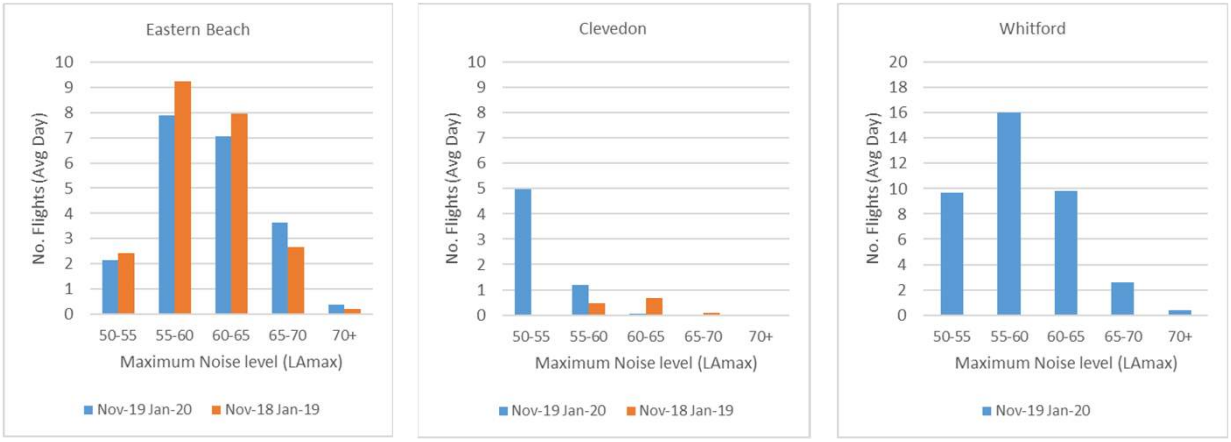
Figure 30 shows the average daily number of aircraft that overflew each of the Central Suburbs temporary noise monitors in each noise band in the three month period November to January 2018/19 (Orange bars) and 2019/20 (Blue bars).

L_{Amax} is the maximum noise level experienced as an aircraft overflies a monitor.

The Mt Wellington noise monitor received less than one event above 70 L_{Amax} per day.

Figure 31: Number of Aircraft Noise Events in Each Noise Band
Eastern Suburbs Monitors (L_{Amax} – Maximum Noise Level)



NB: Aircraft noise events over 70-75 L_{Amax} start to become disturbing inside houses with windows open as they have the potential to interfere with watching tv, talking etc.

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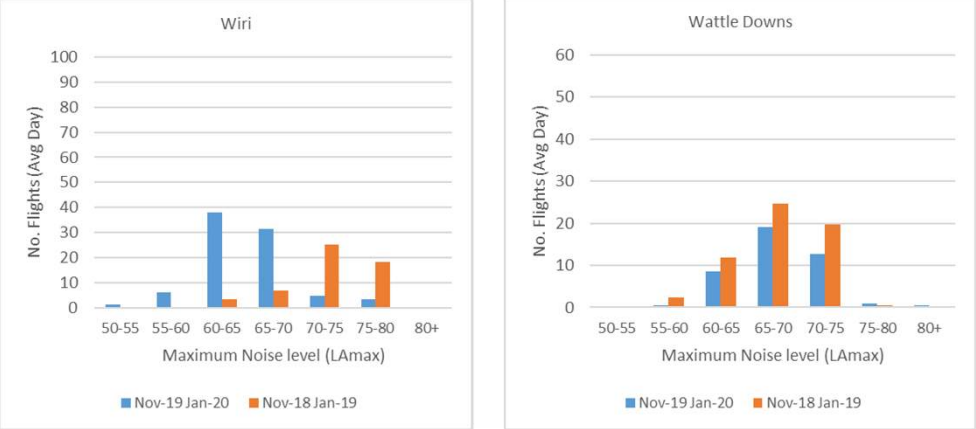
Figure 31 shows the average daily number of aircraft that overflew each of the Eastern Suburbs temporary noise monitors in each noise band in the three month period November to January 2018/19 (Orange bars) and 2019/20 (Blue bars).

L_{Amax} is the maximum noise level experienced as an aircraft overflies a monitor.

These noise monitors received less than one event above 70 L_{Amax} per day.

Figure 32: Number of Aircraft Noise Events in Each Noise Band
Southern Suburbs Monitors (L_{Amax} – Maximum Noise Level)



NB: Aircraft noise events over 70-75 L_{Amax} start to become disturbing inside houses with windows open as they have the potential to interfere with watching tv, talking etc.

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Figure 32 shows the average daily number of aircraft that overflew the Southern Suburbs temporary noise monitors in each noise band in the three month period November to January 2018/19 (Orange bars) and 2019/20 (Blue bars).

L_{Amax} is the maximum noise level experienced as an aircraft overflies a monitor.

The Wiri noise monitor receives approximately 8 events above 70 L_{Amax} per day.

The Wattle Downs noise monitor receives approximately 14 events above 70 L_{Amax} per day.


Engine Testing
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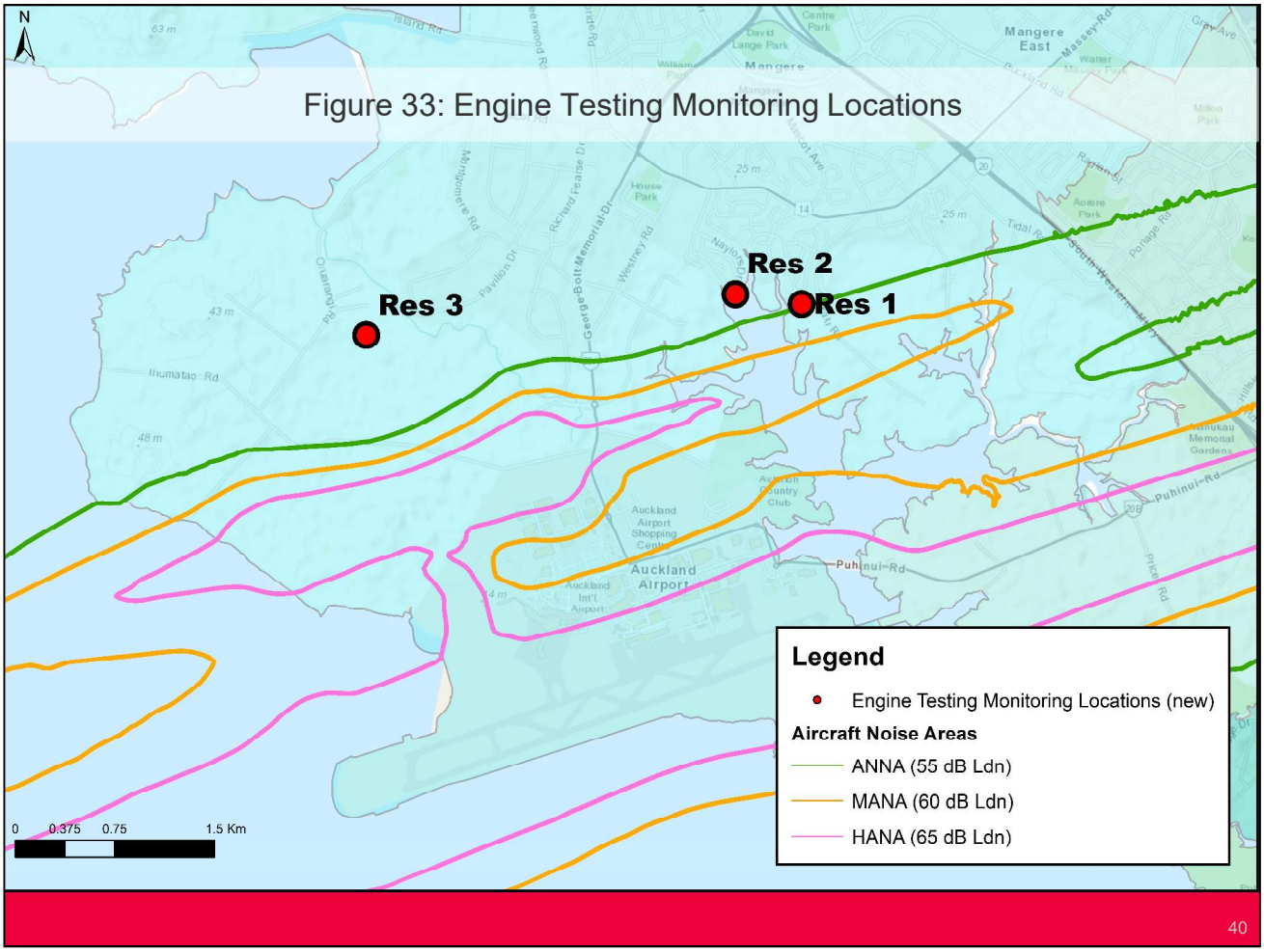
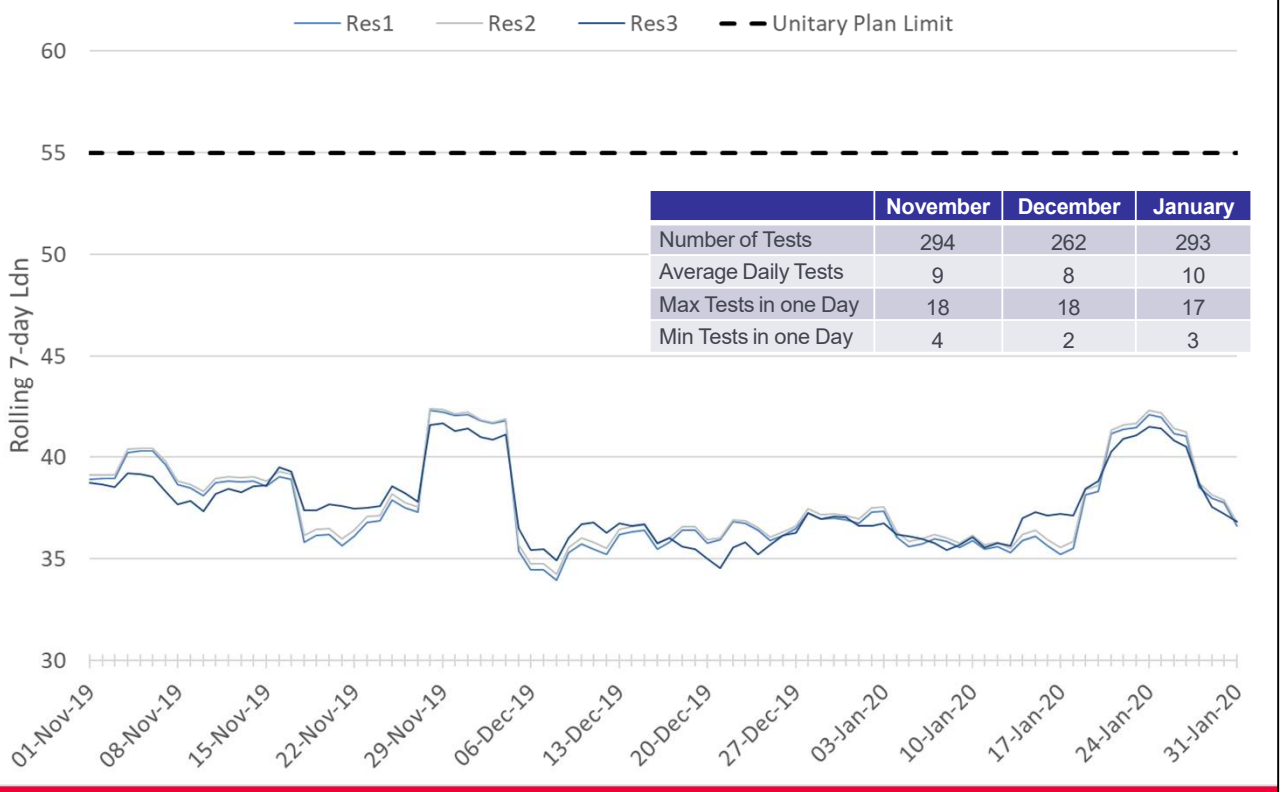


Figure 33 shows the three locations where compliance with the engine testing noise rule is calculated.

Figure 34: Engine Testing Summary



	November	December	January
Number of Tests	294	262	293
Average Daily Tests	9	8	10
Max Tests in one Day	18	18	17
Min Tests in one Day	4	2	3

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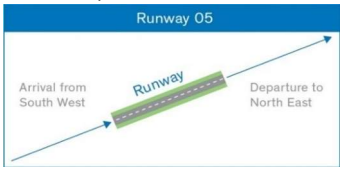
Figure 34 shows the rolling 7 day average noise level for engine testing activity at the airport in the three month period November 2019 to January 2020 .

The District Plan noise limit for engine testing activity is 55 dB L_{dn} (7 day rolling).

The engine testing noise levels were compliant with the 55 L_{dn} noise limit.

The Table insert shows the maximum, minimum and average number of engine tests performed on an average day in each month along with the total number of tests completed in each month.

Appendix A: Glossary of Terminology

Term	Definition
Daytime	The period from 7:00am to 10:00pm
Night-time	The Period from 10:00pm to 7:00am
Runway 23L/Runway 05R	Occurs in Westerly Wind Conditions  Occurs in Easterly Wind Conditions 
Complaint Type	
“Specific” complaint	Complaints relating to a specific aircraft operation.
“Generic” complaint	Complaints that don’t relate to a specific aircraft operation but relate to noise in general.
“Question” enquiry	An enquiry to find out more information about noise related topics.
“Aircraft” Noise	Noise that is from aircraft operations only.
“Ambient” Noise	The total noise that is from general ambient noise sources (cars, wind etc.). Includes noise from aircraft operations.
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
L_{dn} – Noise Exposure	The average A-weighted noise level over a day/month/year with a 10 dB penalty applied to the night-time (10pm – 7am).
L_{Amax} – Maximum Noise Level	The highest A-weighted noise level which occurs during an aircraft operation.
ANNA	Aircraft Noise Notification Area – Set at 55-60 dB L_{dn}
MANA	Moderate Aircraft Noise Area – Set at 60-65 dB L_{dn}
HANA	High Aircraft Noise Area – Set at 65+ dB L_{dn}

Appendix B: Noise Complaint Type

Cause	Description
Low flying	Aircraft flying at a low altitude
Too loud	Aircraft making too much noise
Early morning	Aircraft flying in the early morning
Late night	Aircraft flying late at night or overnight
Height	Aircraft flying higher or lower than usual
More flights	More aircraft operations than usual
Noisier flights	Aircraft are noisier than usual
Flight path	Aircraft flying on a different flight path than usual
Other	The disturbance is different from those listed
Unknown	Cause not stated
Noise Mitigation Package Enquiry	Enquiry relating to the Noise Mitigation Packages

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Appendix C: Suburbs by Area

Suburb	Area
Alfriston	South Auckland
Anawhata	West Auckland
Arkles Bay	North Shore
Auckland	Central Suburbs
Avondale	West Auckland
Beachlands	East Auckland
Birkdale	North Shore
Birkenhead	North Shore
Blockhouse Bay	West Auckland
Botany Downs	East Auckland
Bucklands Beach	East Auckland
Chatswood	North Shore
Clendon Park	South Auckland
Clover Park	South Auckland
Coatesville	North Shore
Cockle Bay	East Auckland
Cornwallis	West Auckland
Drury	South Auckland
East Tamaki	East Auckland
East Tamaki Heights	East Auckland
Ellerslie	Central Suburbs
Epsom	Central Suburbs
Farm Cove	East Auckland
Flat Bush	East Auckland
Forrest Hill	North Shore
Glendowie	Central Suburbs
Glenfield	North Shore
Goodwood Heights	South Auckland
Greenlane	Central Suburbs
Grey Lynn	Central Suburbs

Suburb	Area
Half Moon Bay	East Auckland
Hauraki	North Shore
Henderson Valley	West Auckland
Herne Bay	Central Suburbs
Howick	East Auckland
Huntly	Not in Auckland
Hunua	South Auckland
Karaka	South Auckland
Laingholm	West Auckland
Long Bay	North Shore
Lynfield	West Auckland
Mangere	South Auckland
Mangere Bridge	South Auckland
Mangere East	South Auckland
Manukau	South Auckland
Manukau Heads	South Auckland
Manurewa	South Auckland
Meadowbank	Central Suburbs
Mellons Bay	East Auckland
Milford	North Shore
Mount Albert	Central Suburbs
Mount Eden	Central Suburbs
Mount Roskill	Central Suburbs
Mount Wellington	Central Suburbs
Muriwai	West Auckland
Newmarket	Central Suburbs
Northcote Point	North Shore
Northcross	North Shore
Northpark	South Auckland
One Tree Hill	Central Suburbs

Suburb	Area
Onehunga	Central Suburbs
Onewhero	Not in Auckland
Orakei	East Auckland
Oratia	Central Suburbs
Otahuhu	South Auckland
Otara	South Auckland
Pakuranga	East Auckland
Pakuranga Heights	East Auckland
Panmure	Central Suburbs
Papakura	South Auckland
Papatoetoe	South Auckland
Patumahoe	South Auckland
Point Chevalier	Central Suburbs
Point England	Central Suburbs
Pollok	South Auckland
Ponsonby	Central Suburbs
Randwick Park	South Auckland
Ranui	West Auckland
Remuera	Central Suburbs
Rothesay Bay	North Shore
Royal Oak	Central Suburbs
Saint Heliers	Central Suburbs
Saint Johns	Central Suburbs
Saint Marys Bay	Central Suburbs
Sandringham	Central Suburbs
Shamrock Park	East Auckland
Shelly Park	South Auckland
Silverdale	North Shore
Snells Beach	Not in Auckland
Somerville	South Auckland

Suburb	Area
Stanley Point	North Shore
Sunnyhills	East Auckland
Takanini	South Auckland
Te Atatu South	West Auckland
The Gardens	South Auckland
Titirangi	West Auckland
Totara Heights	South Auckland
Totara Vale	South Auckland
Waitakere	West Auckland
Waiuku	South Auckland
Wattle Downs	South Auckland
Westmere	Central Suburbs
Weymouth	South Auckland
Whanganui	Not in Auckland
Whangaparaoa	North Shore
Whangaripo	Not in Auckland
Whitford	East Auckland
Wiri	South Auckland