ANCCG Meeting

Monitoring Period

May 2020 – July 2020

Meeting: 14 September 2020

MARSHALL DAY Acoustics

NB: Glossary of terminology given in Appendix A

Aircraft Operations

Figure 1: Number of Aircraft Operations per Month

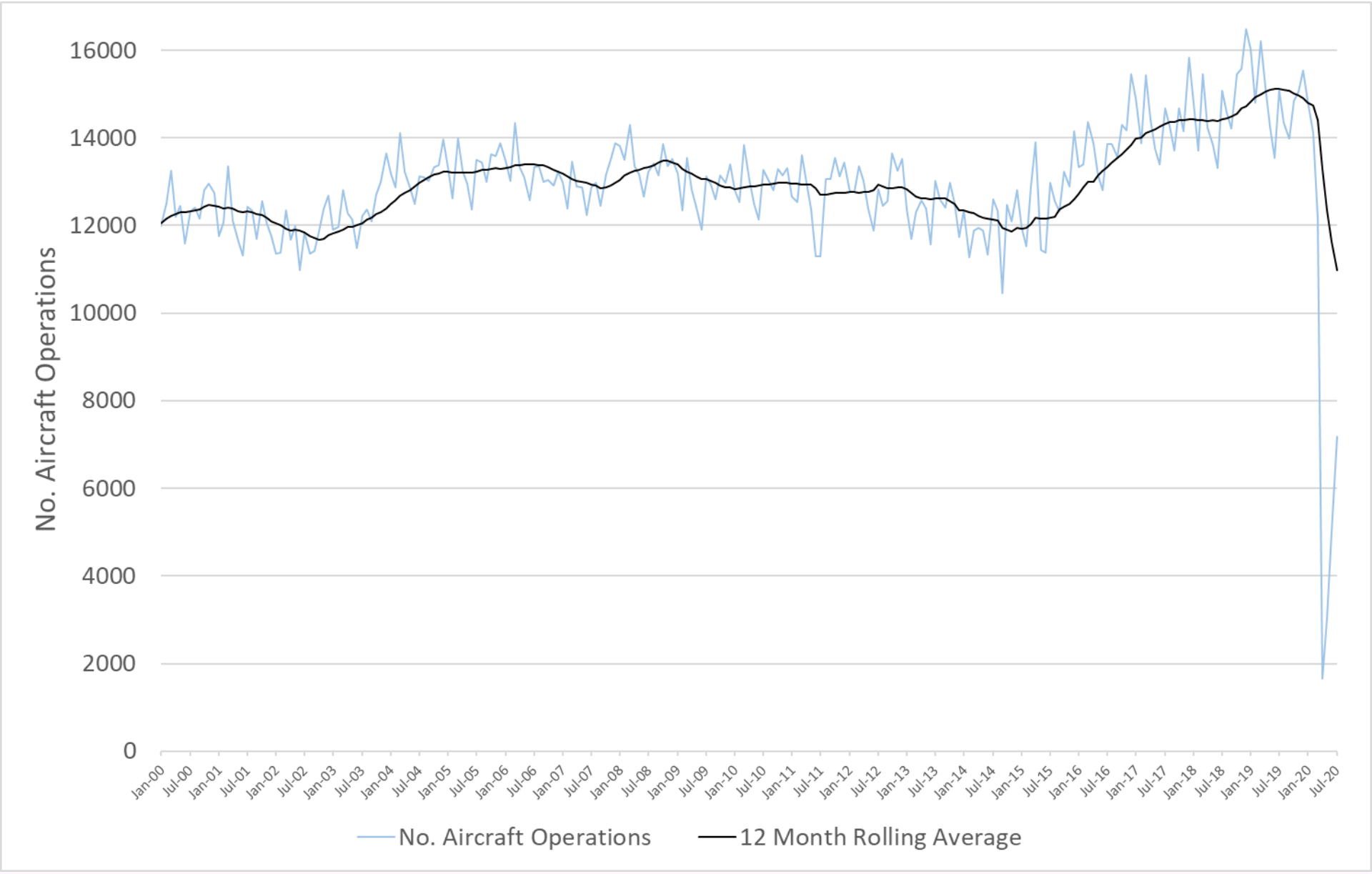


Table 1: Summary of Aircraft Operations

Operation	Total	Day	Night
Arrivals	7,568	6,665	903
Departures	7,610	6,899	711
Circuit	48	47	1
Total	**15,226**	**13,611**	**1,615**

Table 2: Average Daily Aircraft Operations

Total	Day	Night
166	148	18

MARSHALL DAY Acoustics

Figure 2: Aircraft Operations by Time

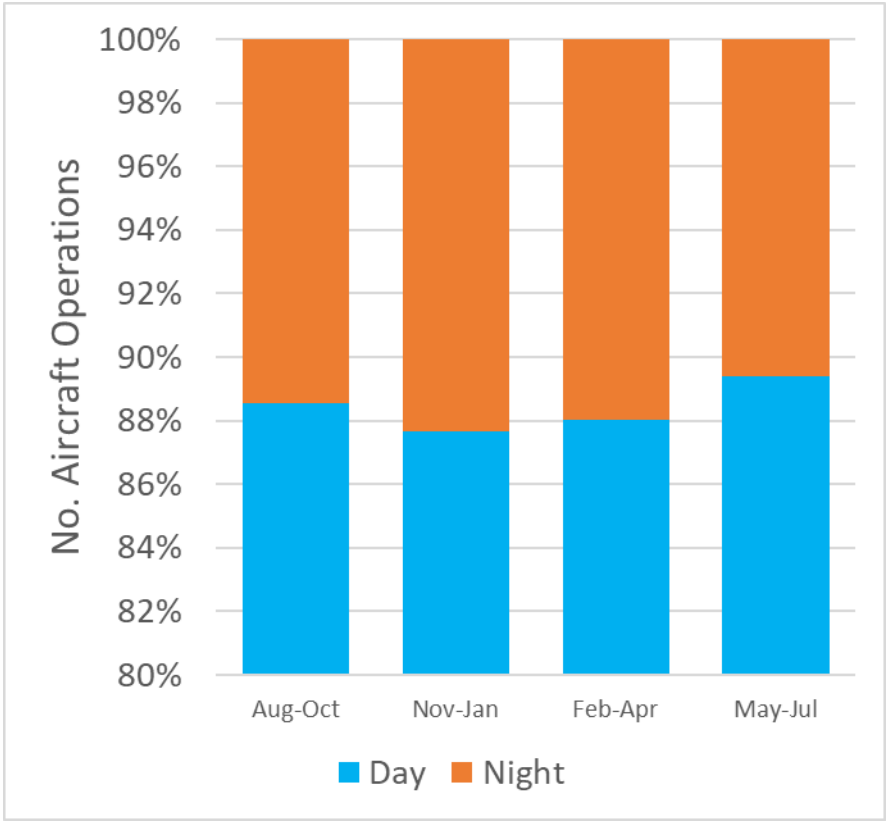
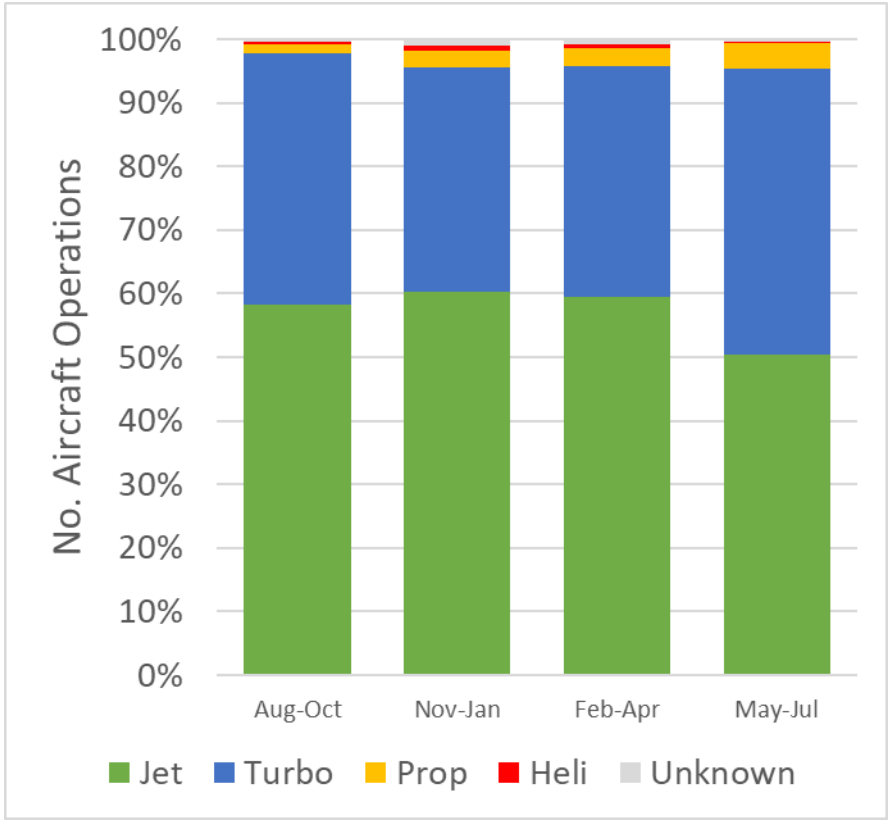


Figure 3: Aircraft Operations by Aircraft Type



MARSHALL DAY Acoustics

Figure 4: Aircraft Operations by Runway

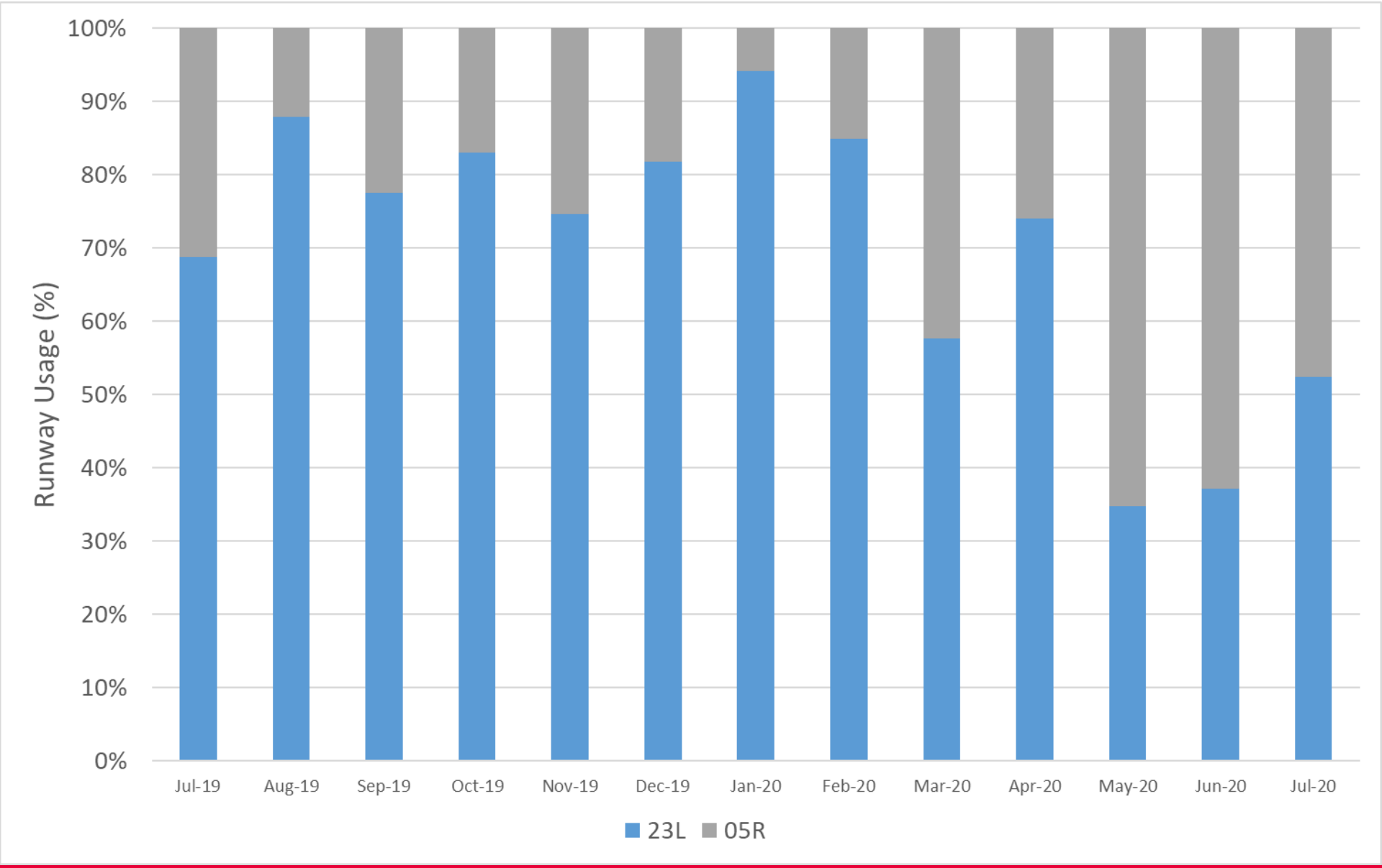


Figure 5: Number of SMART Approaches per week

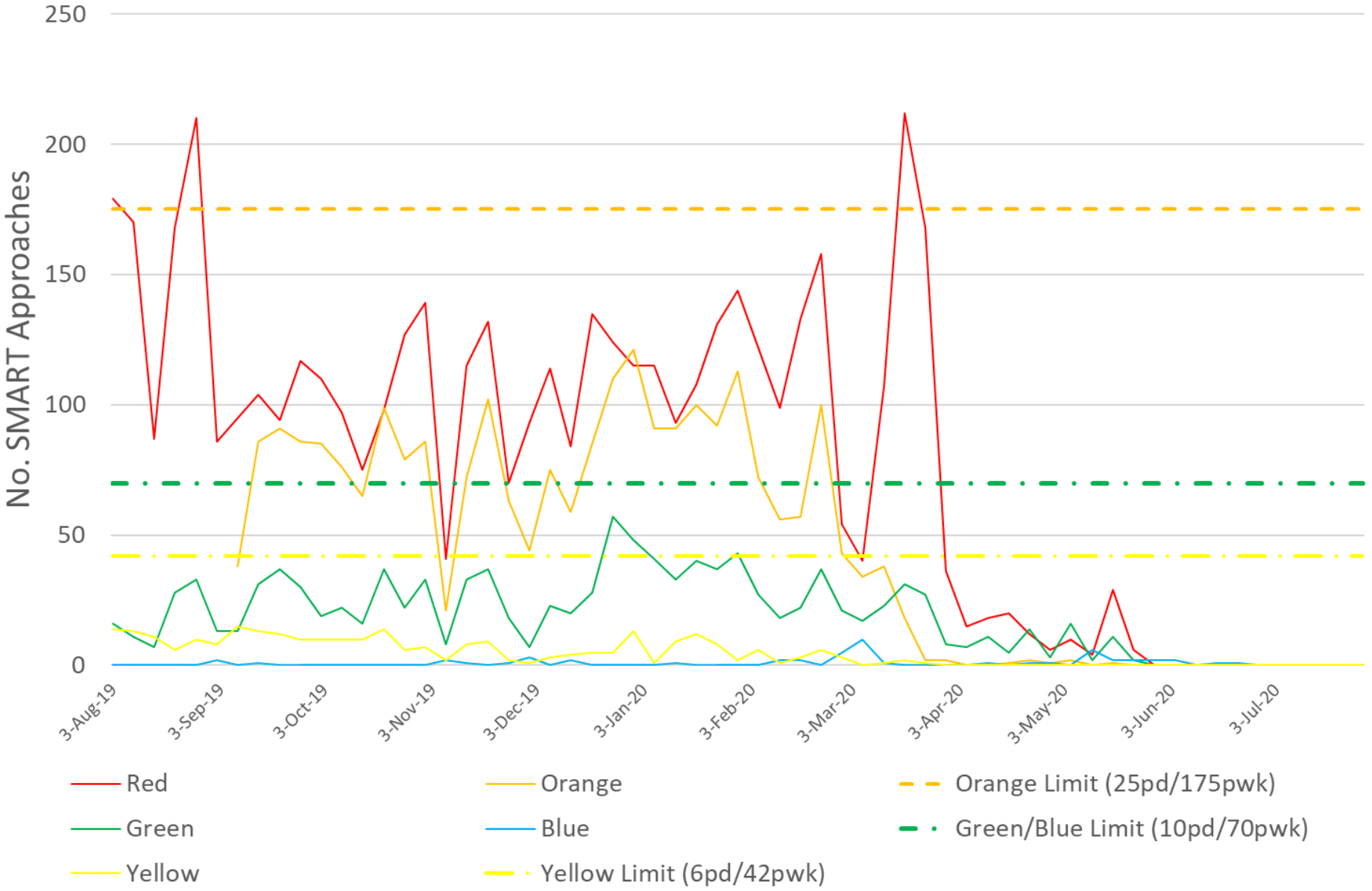
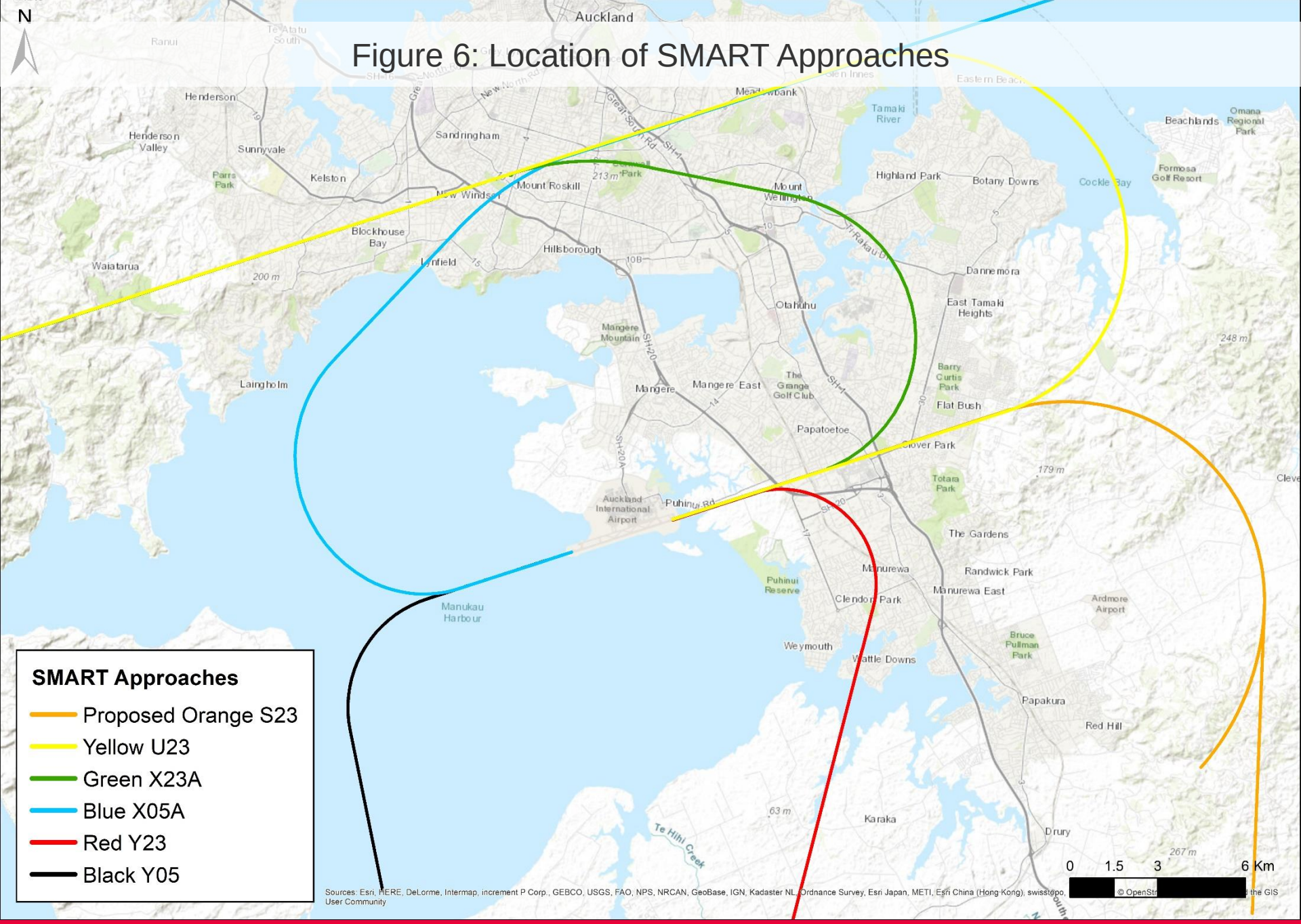


Figure 6: Location of SMART Approaches



Flight Path Diagrams

Figure 7: Flight Paths for a Busy Runway 23L Day (7am-10pm)

97% Westerly Winds/Runway 23L

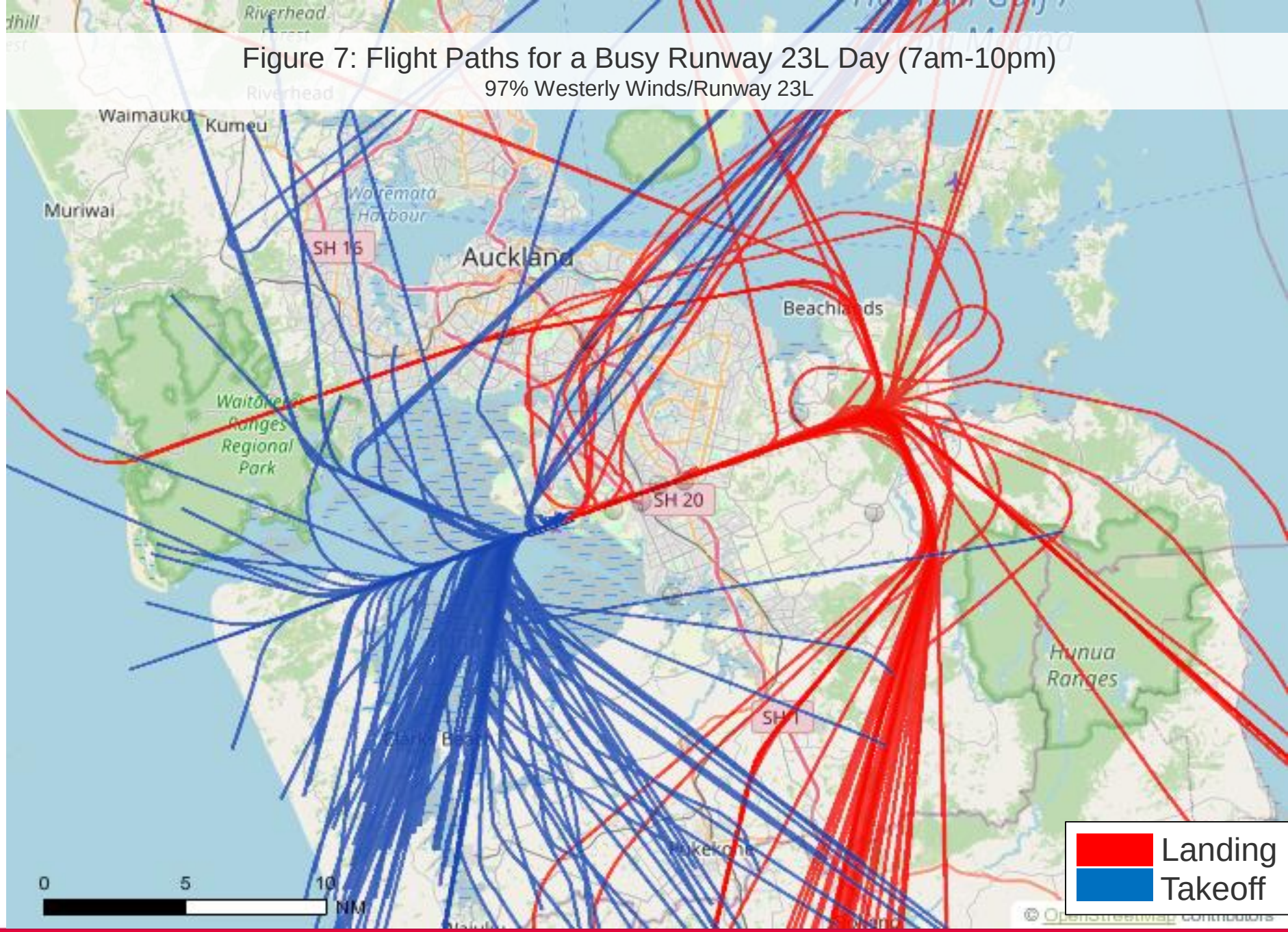


Figure 8: Flight Paths for a Busy Runway 23L Night (10pm-7am)

97% Westerly Winds/Runway 23L

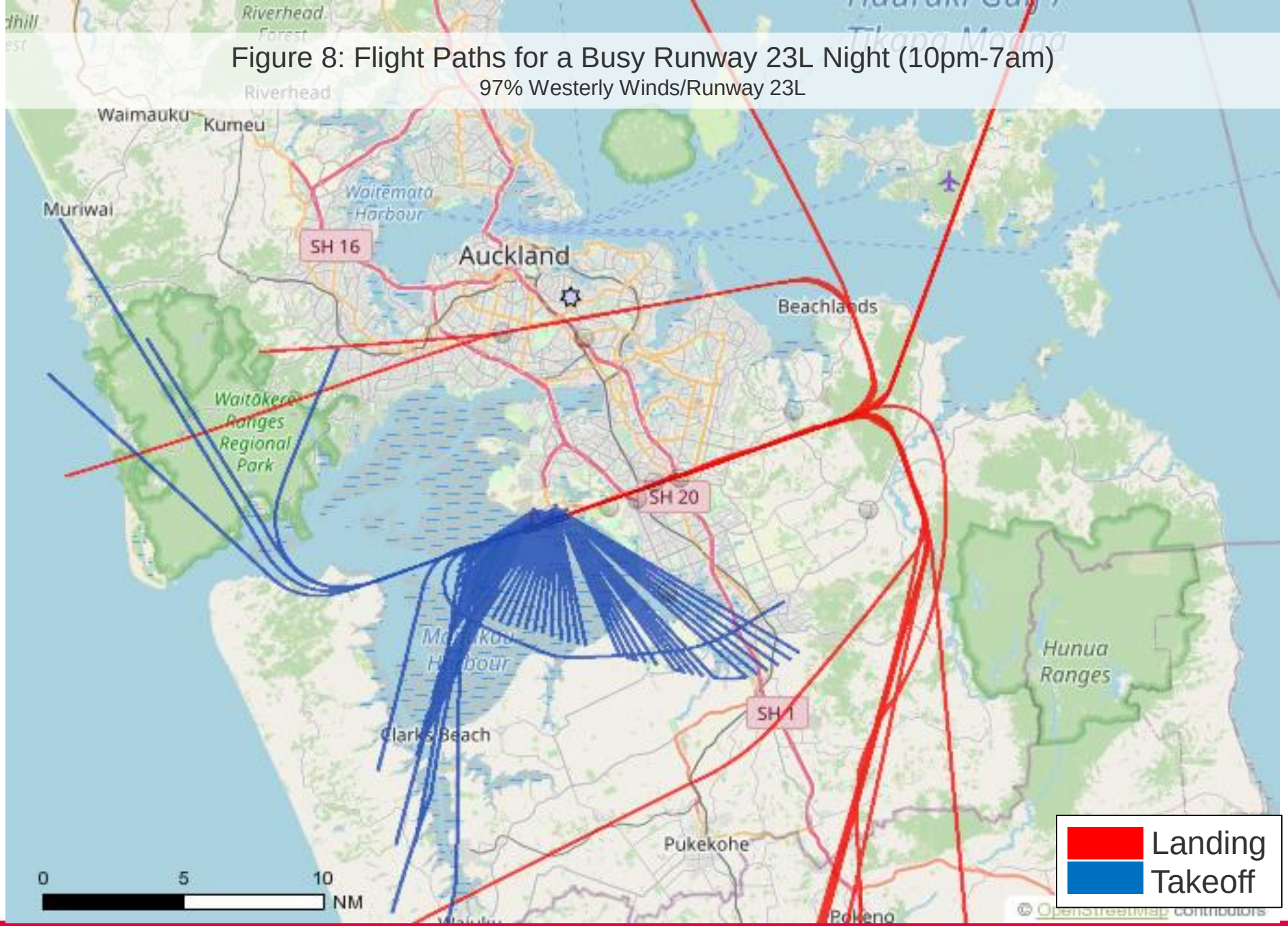


Figure 9: Flight Paths for a Busy Runway 05R Day (7am-10pm)

100% Easterly Winds/Runway 05R

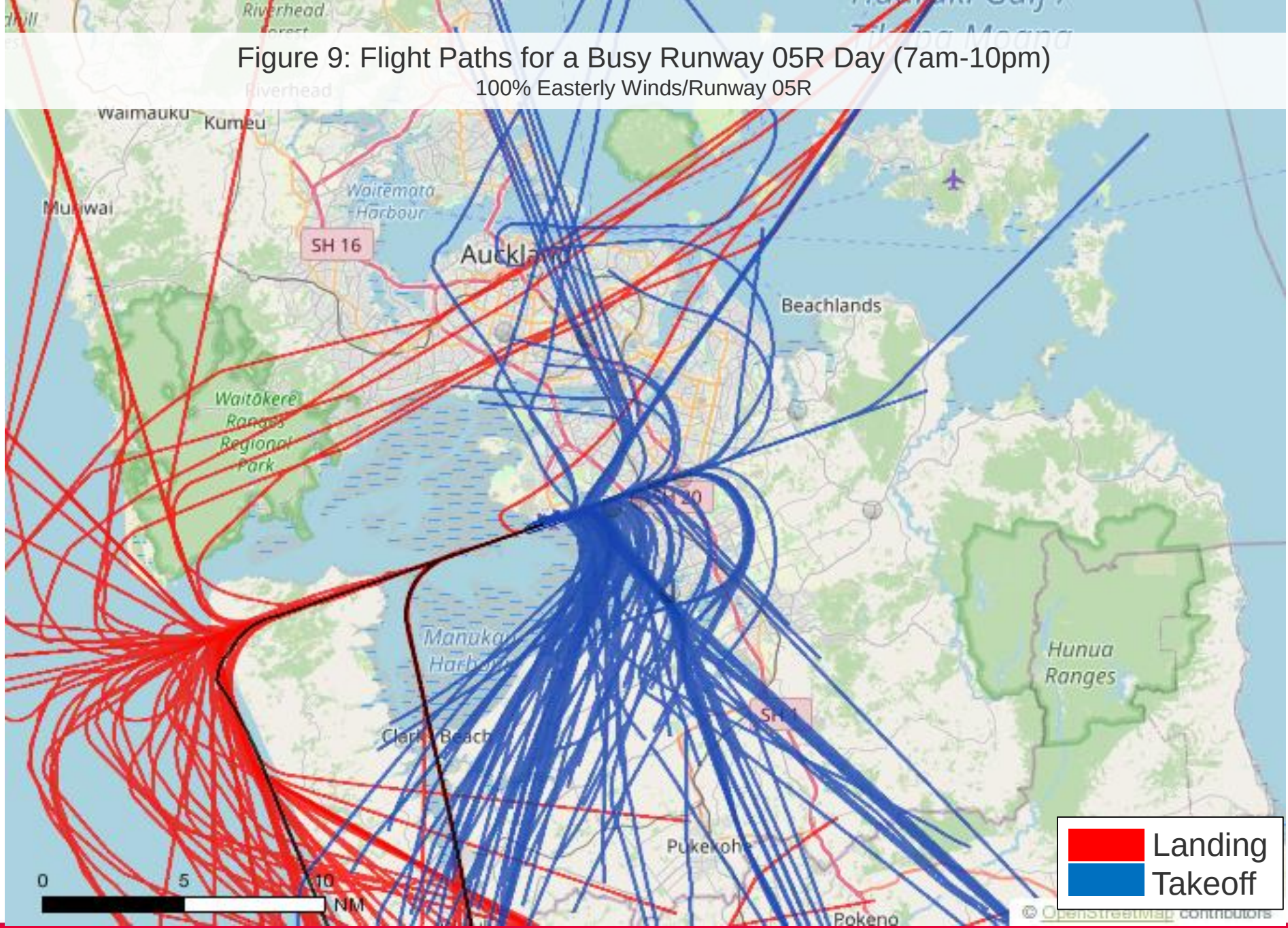
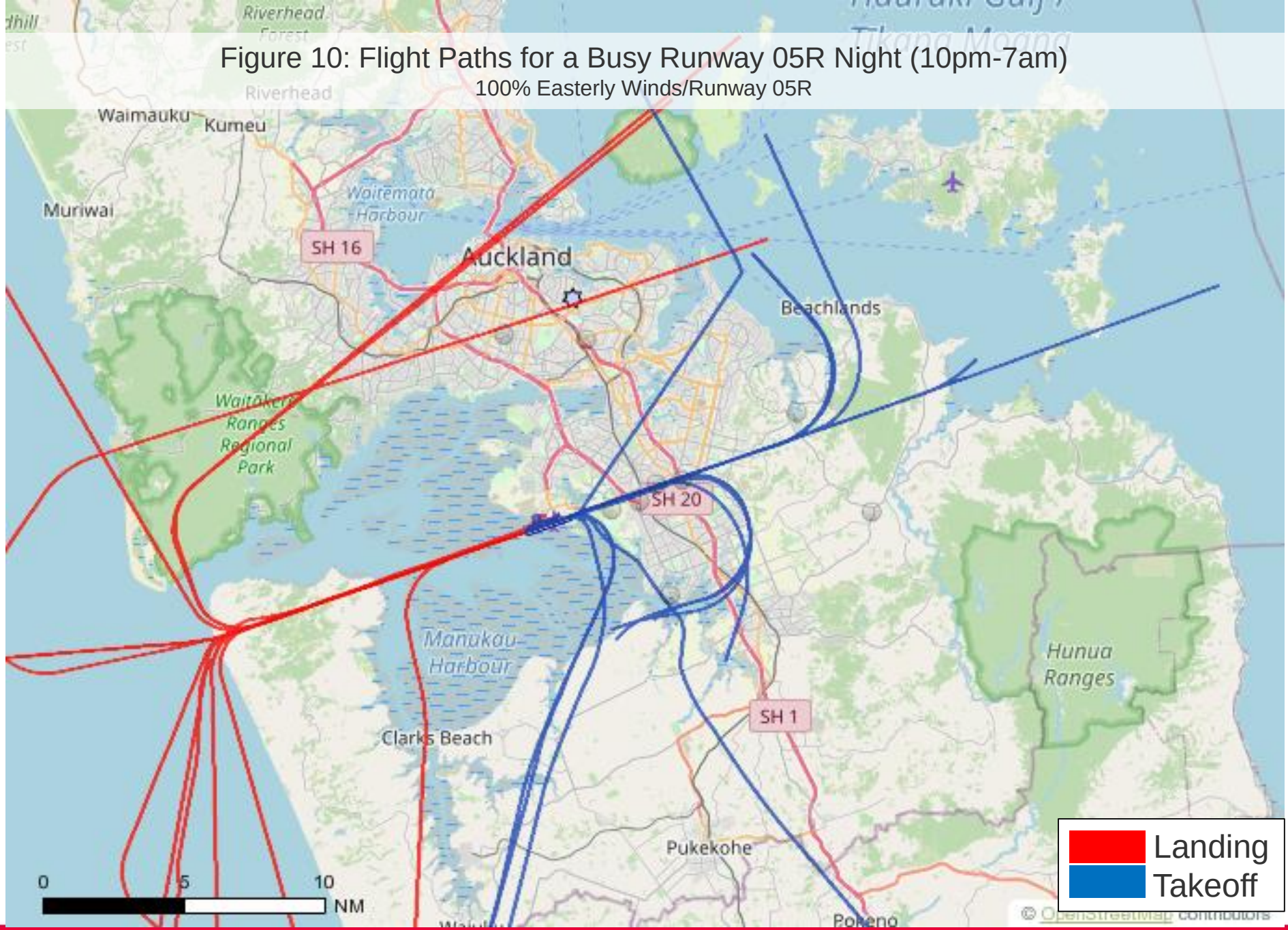


Figure 10: Flight Paths for a Busy Runway 05R Night (10pm-7am)

100% Easterly Winds/Runway 05R



Noise Complaints

Figure 11: Number of Aircraft Noise Complaints per Month

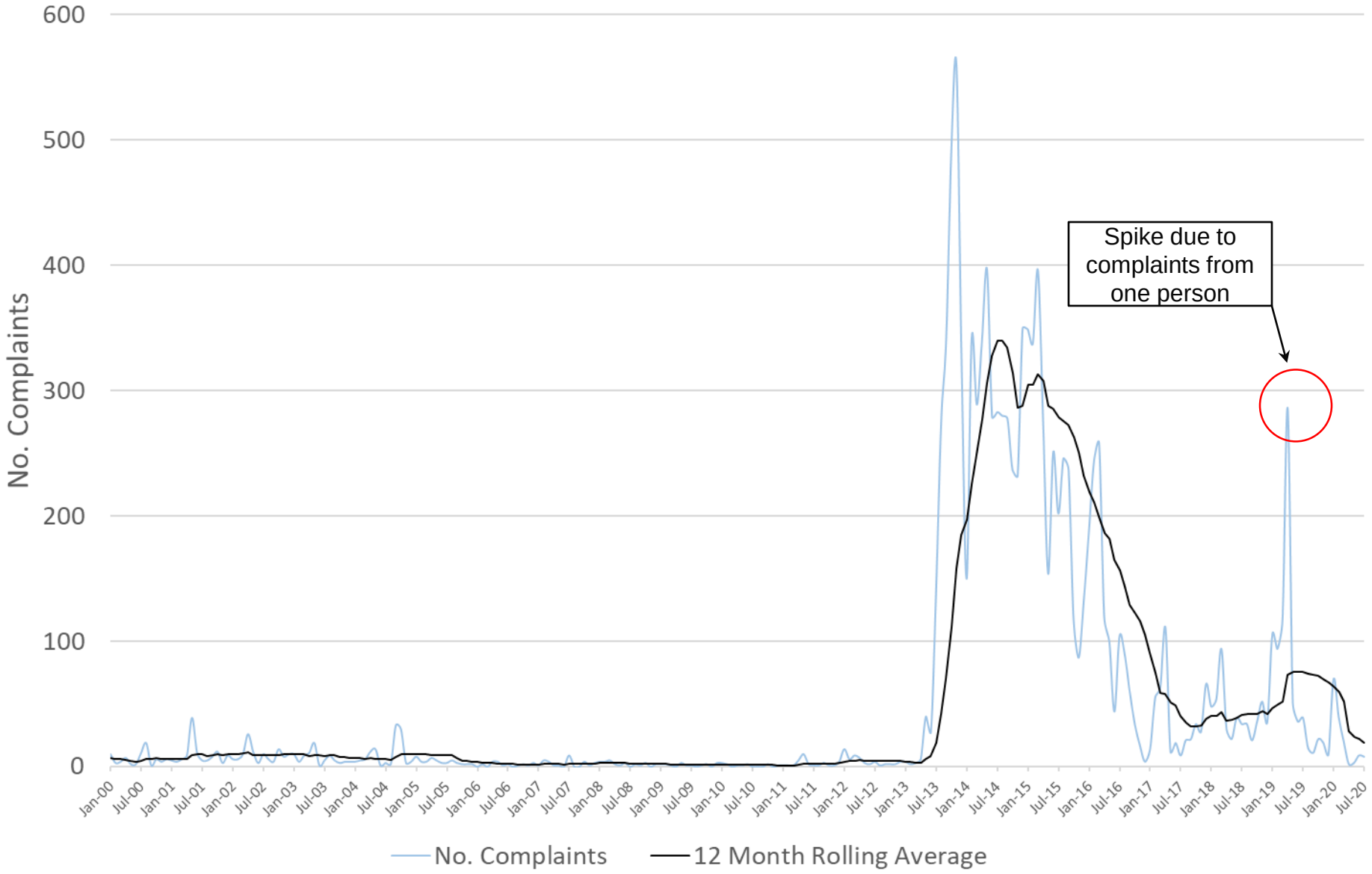


Table 3: Summary of Noise Complaints

	May	Jun	Jul	May-Jul	Feb-Apr	Nov-Jan	Aug-Oct
Number of Complaints	3	9	7	19	62	99	48
Specific	1	7	4	*12*	*55*	*87*	*39*
Generic	2	1	2	*5*	*5*	*9*	*9*
Question	0	1	1	*2*	*2*	*3*	*0*
Number of People Complaining	3	5	5	19	20	22	18

Note: One person made 30% (6) of the complaints for the three-month period. They were located in Remuera

MARSHALL DAY Acoustics

Figure 12: Map of Noise Complaints

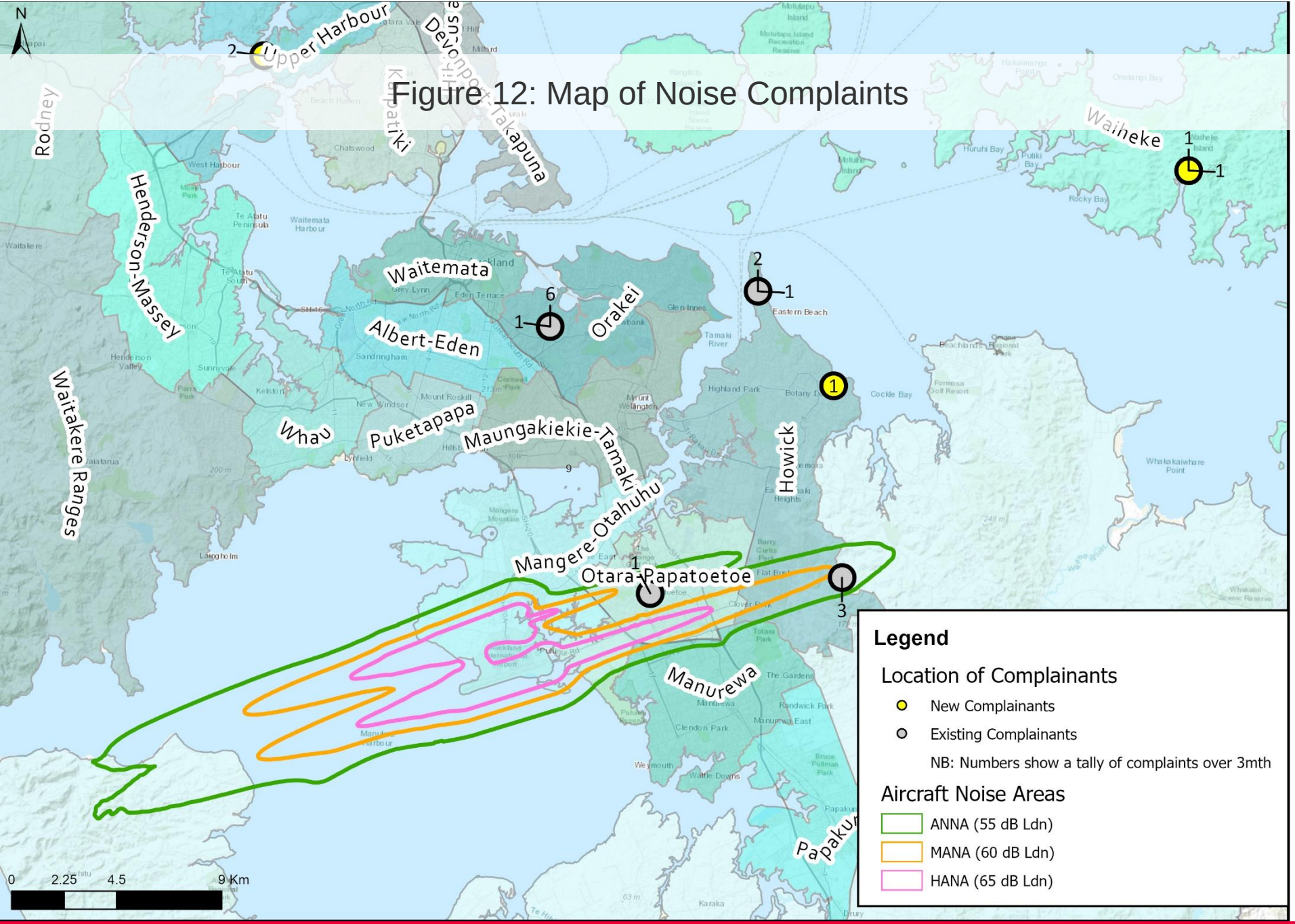
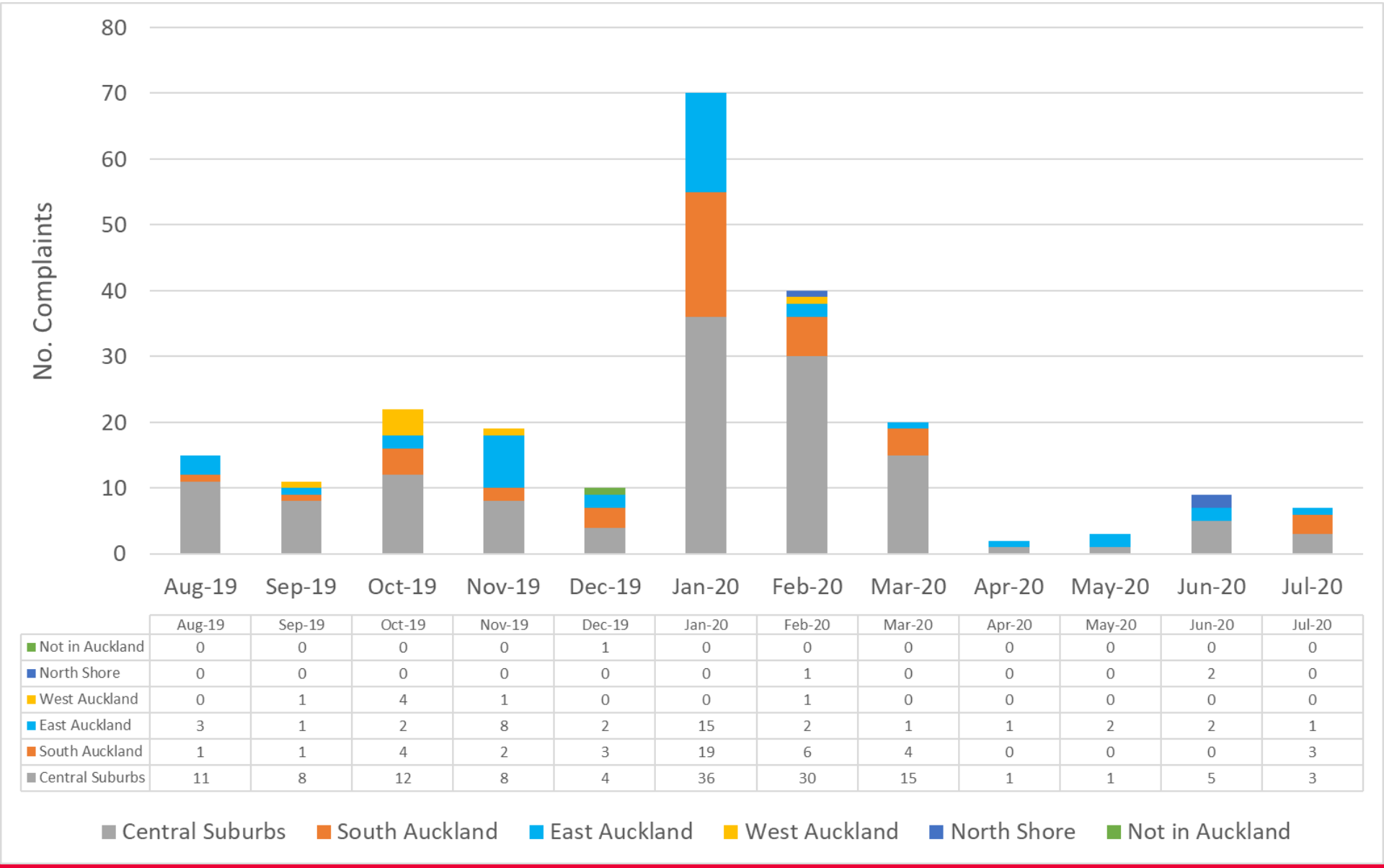


Figure 13: Number of Noise Complaints by Area



	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20
Not in Auckland	0	0	0	0	1	0	0	0	0	0	0	0
North Shore	0	0	0	0	0	0	1	0	0	0	2	0
West Auckland	0	1	4	1	0	0	1	0	0	0	0	0
East Auckland	3	1	2	8	2	15	2	1	1	2	2	1
South Auckland	1	1	4	2	3	19	6	4	0	0	0	3
Central Suburbs	11	8	12	8	4	36	30	15	1	1	5	3

Figure 14: Noise Complaints by Time

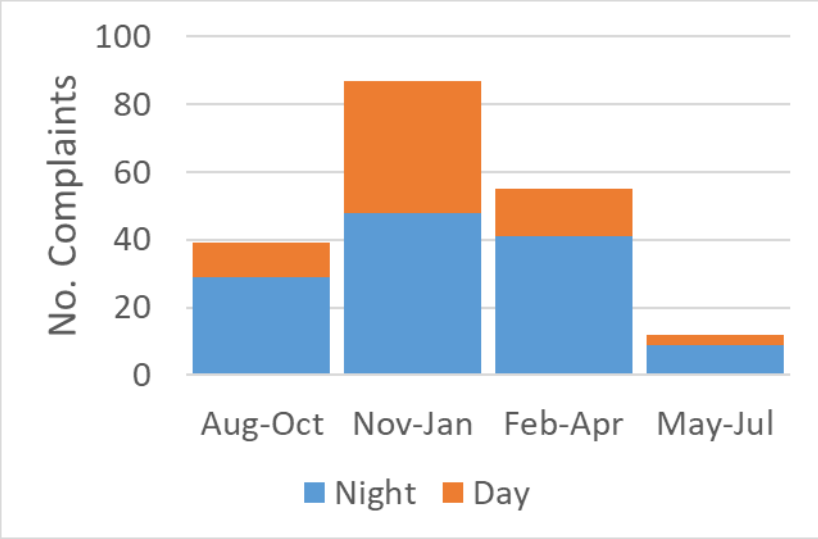


Figure 15: Noise Complaints by Runway

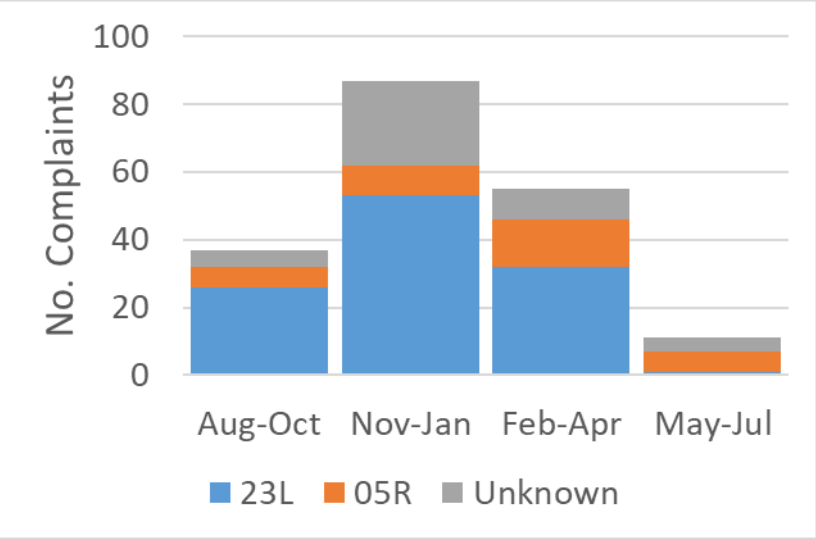


Figure 16: Noise Complaints by Aircraft

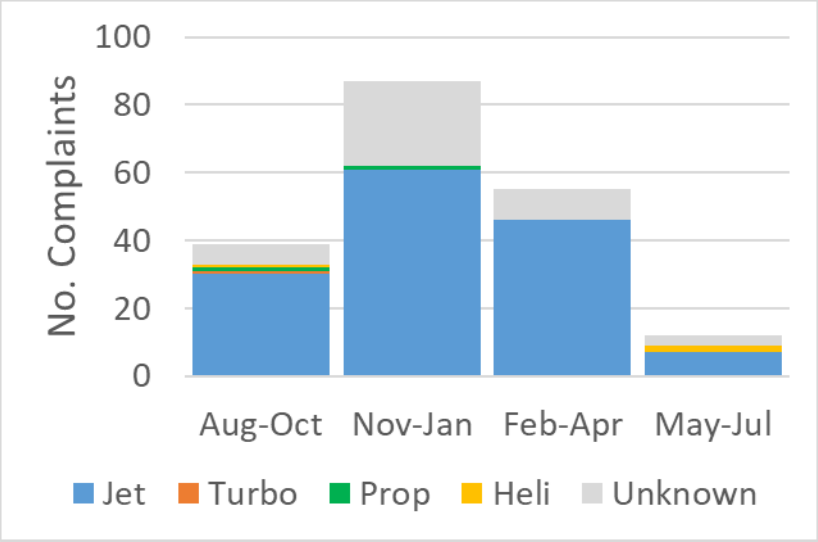


Figure 17: Noise Complaints by Operation

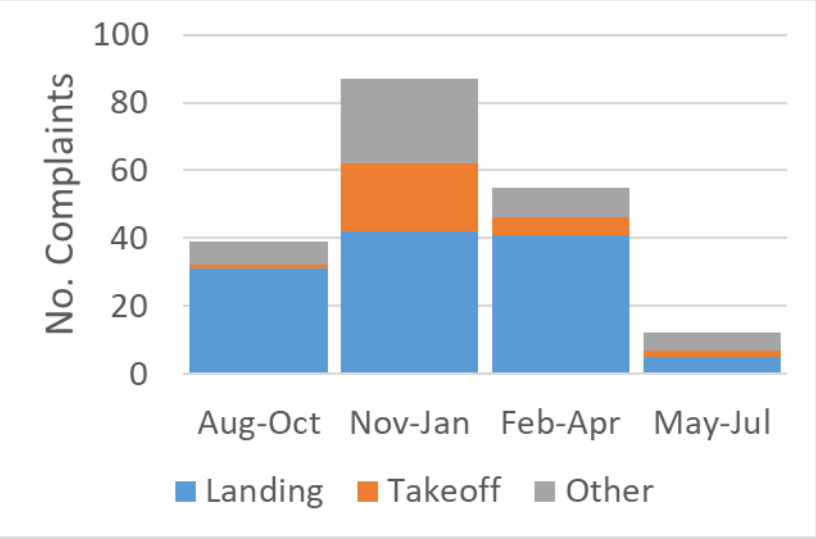


Figure 18: Specific Noise Complaints by Destination

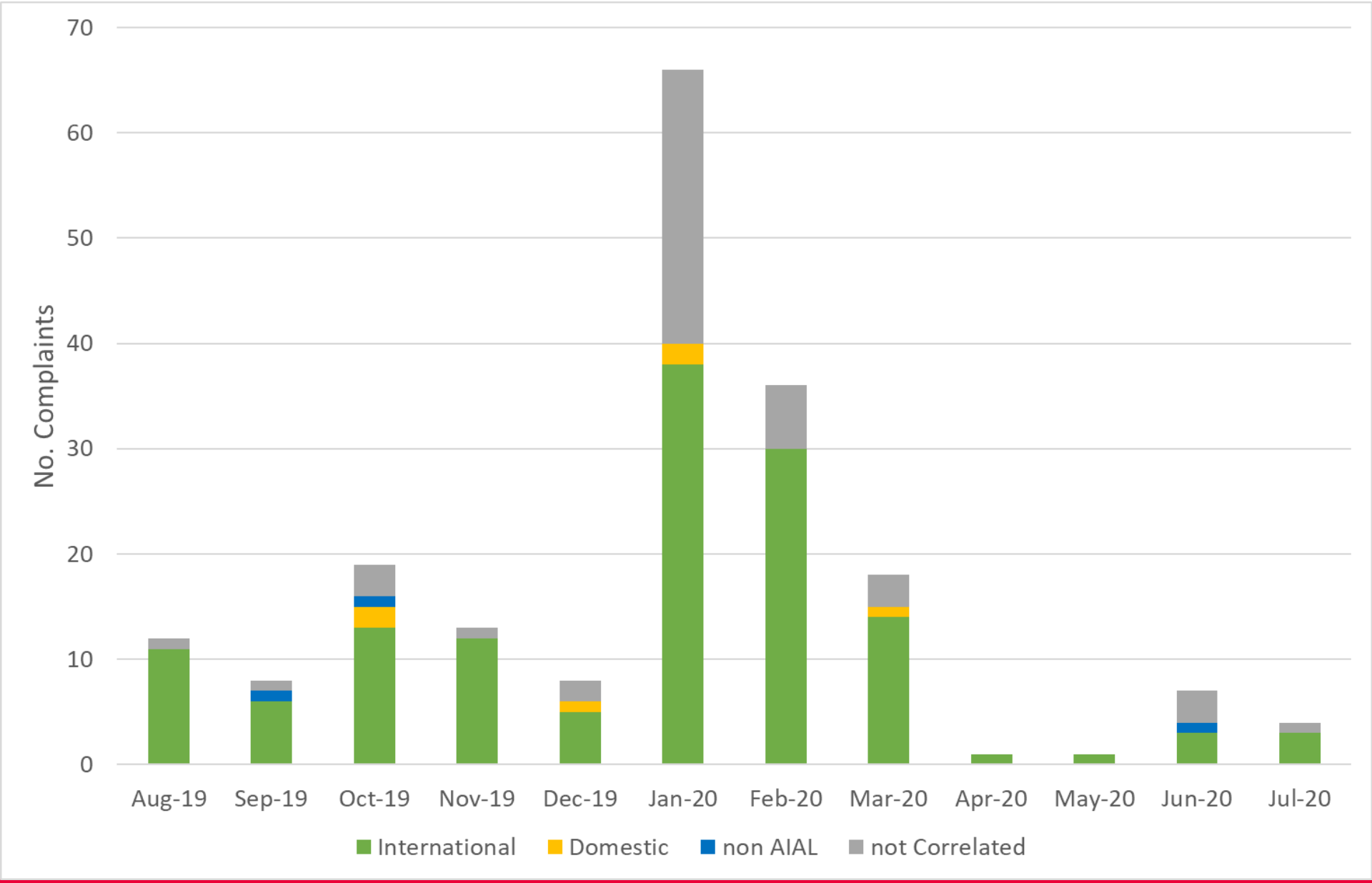


Figure 19: Specific Noise Complaints vs Usage of Runway 05R

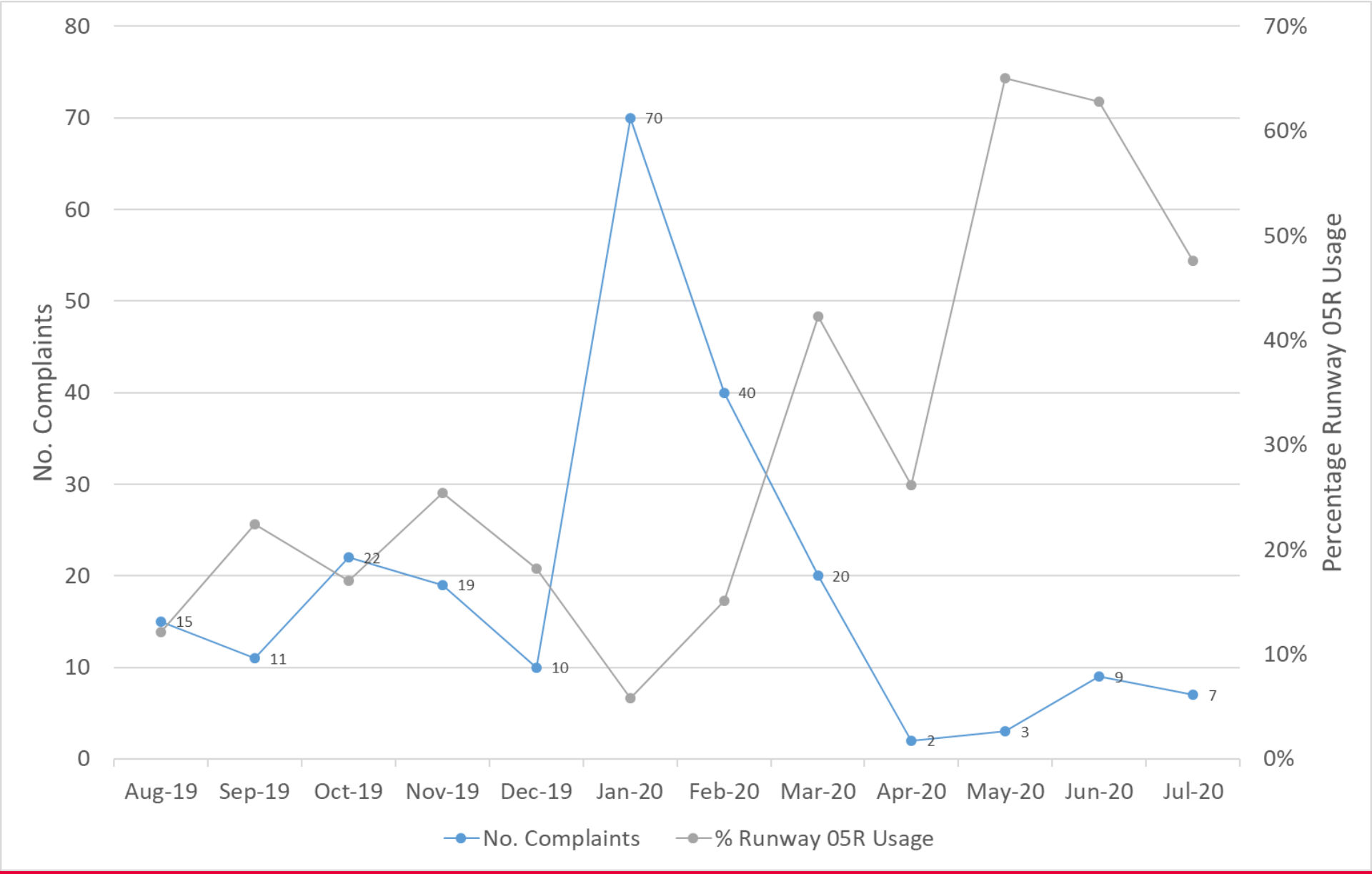


Figure 20: Noise Complaints by Hour vs Aircraft Operations by Hour (May - Jul)

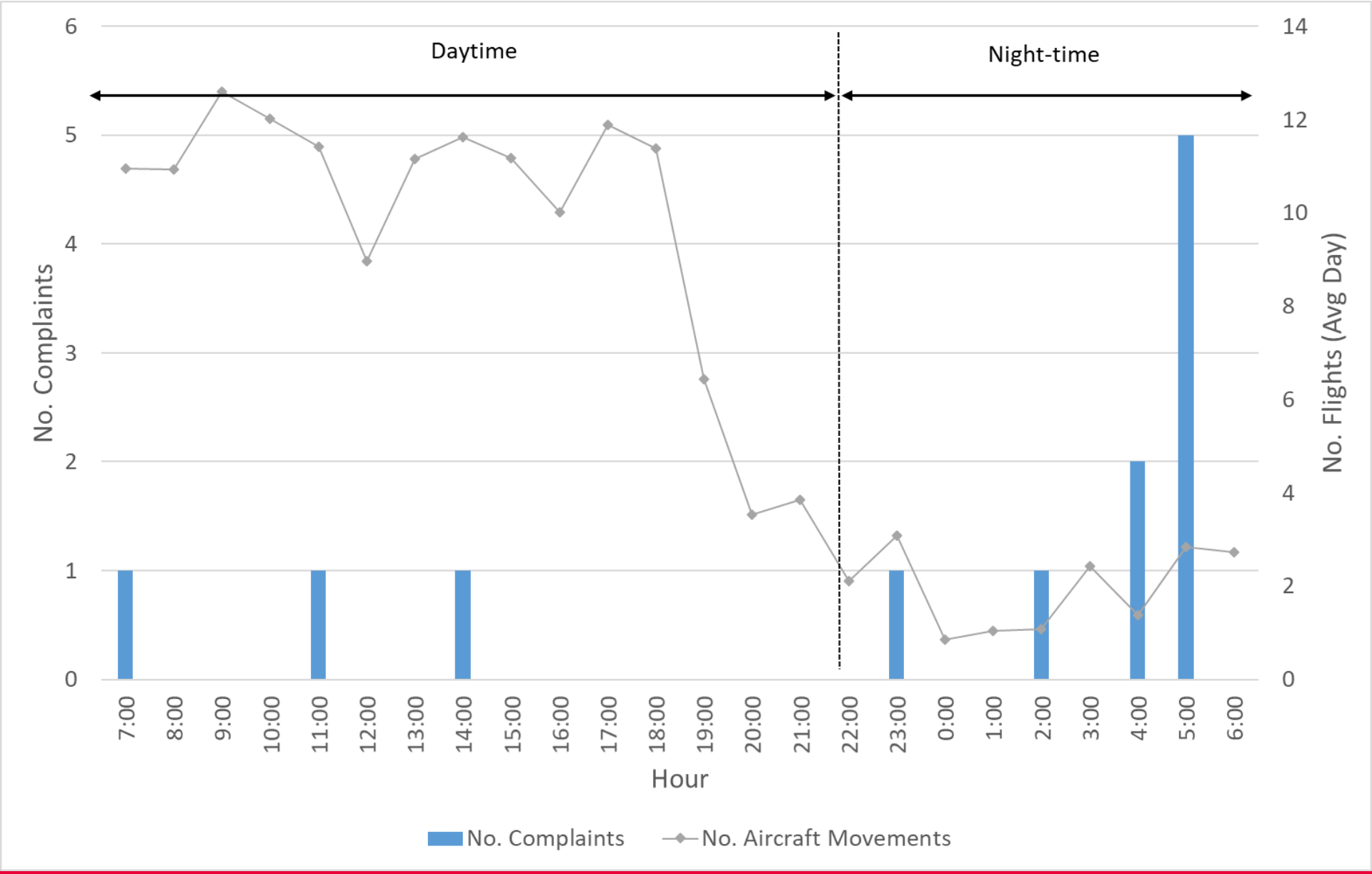


Figure 21: Noise Complaints by Type (May - Jul)

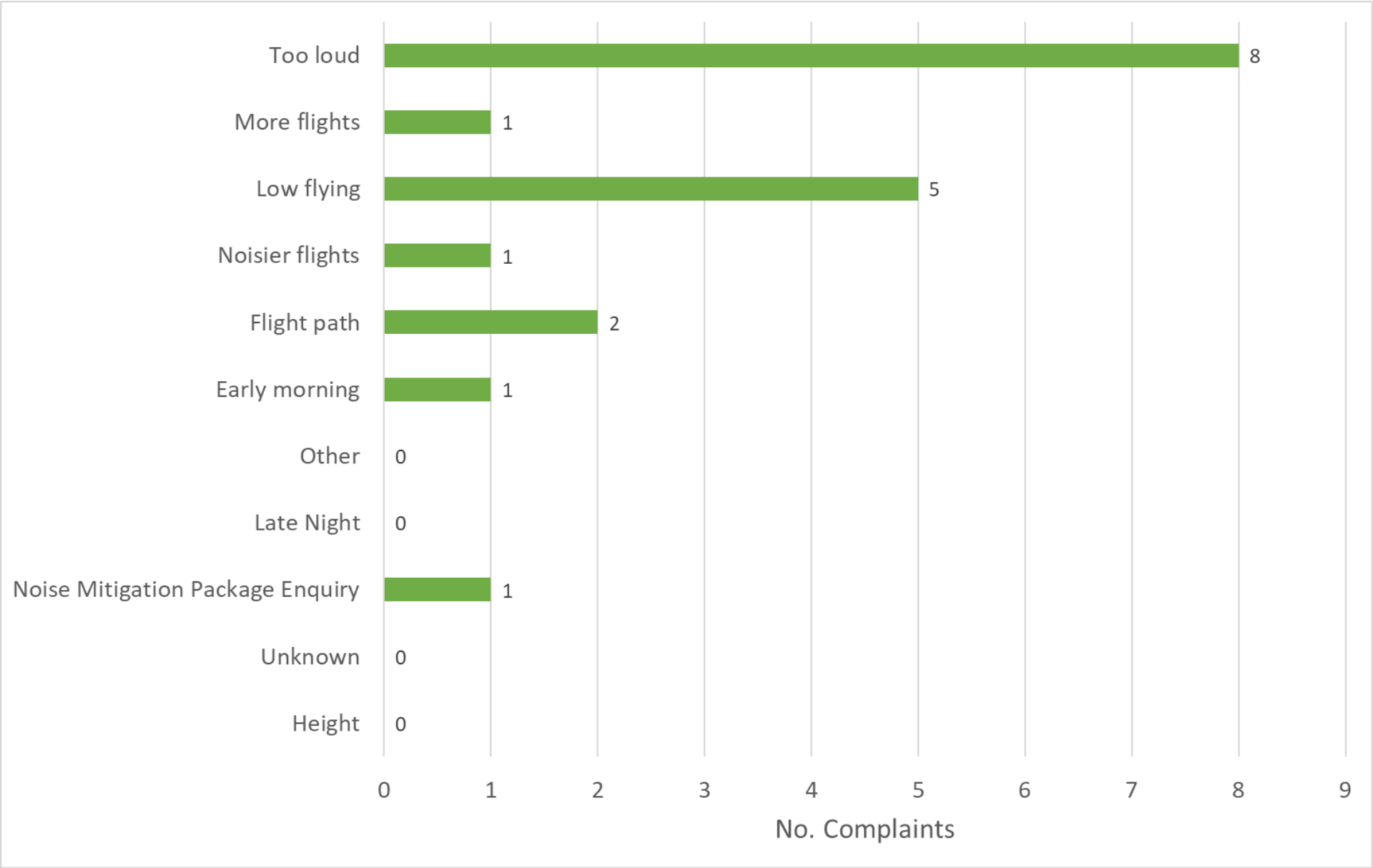
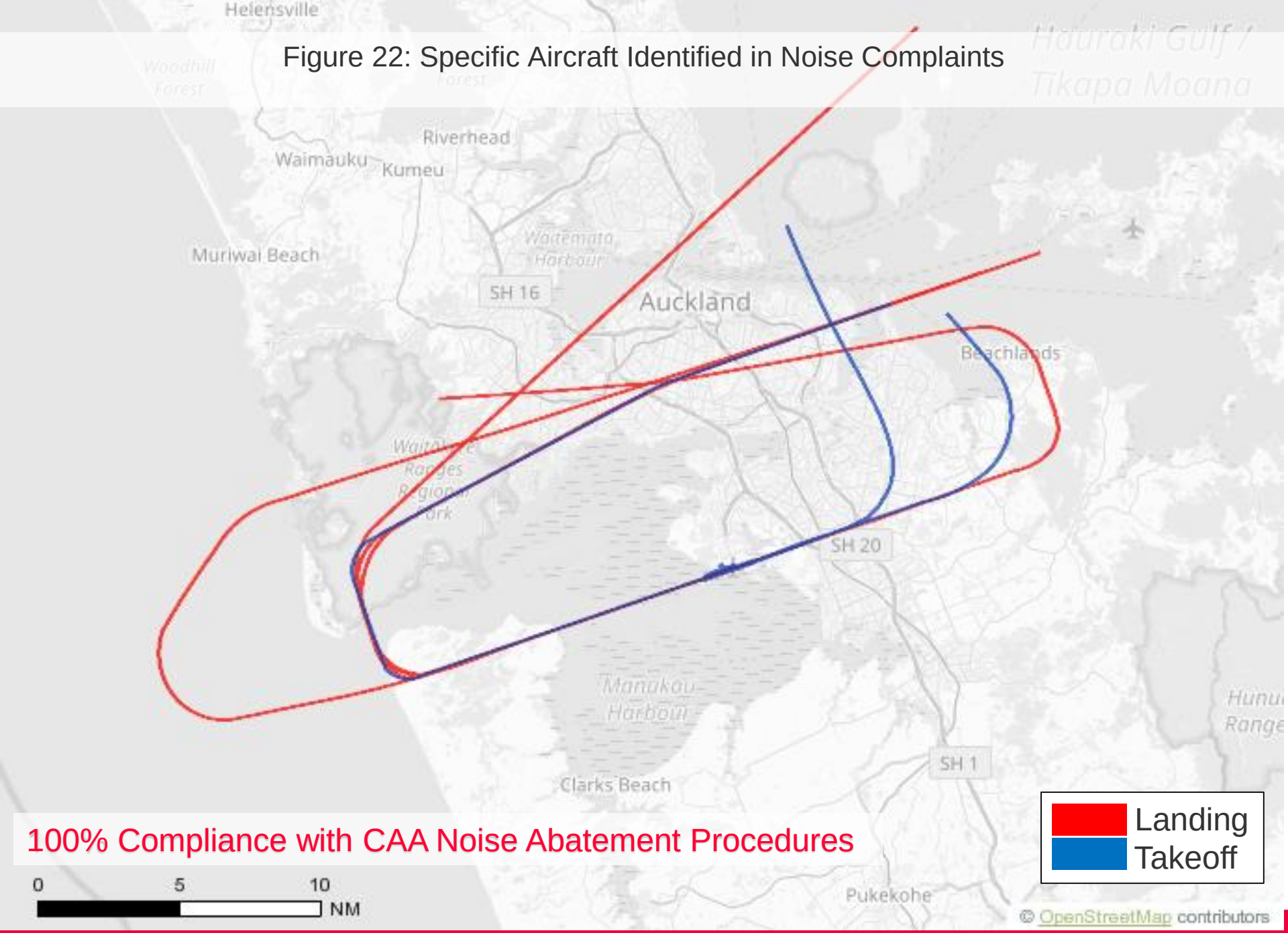
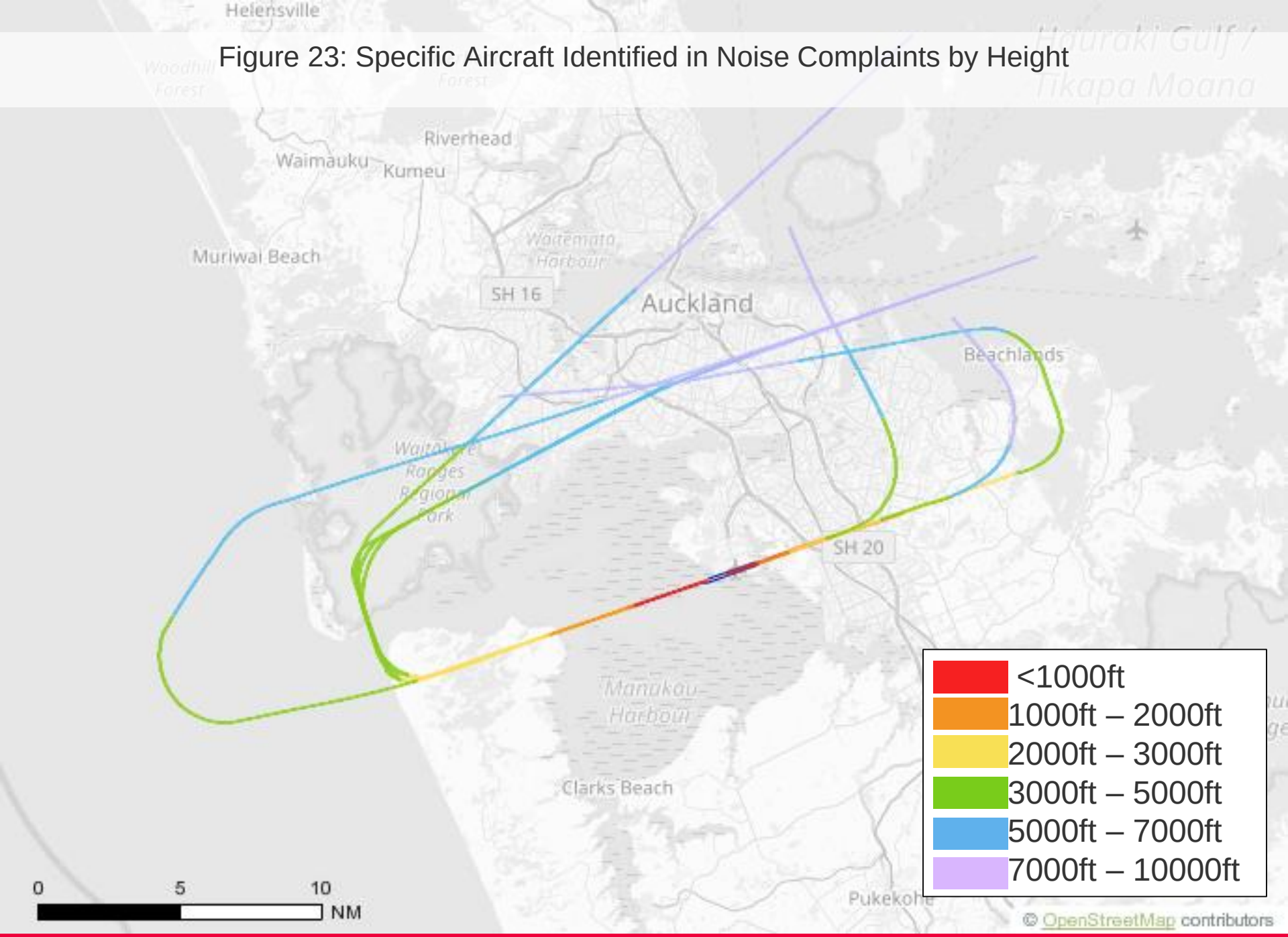


Figure 22: Specific Aircraft Identified in Noise Complaints



100% Compliance with CAA Noise Abatement Procedures

Figure 23: Specific Aircraft Identified in Noise Complaints by Height



Noise Monitoring

Figure 24: Noise Monitor Locations

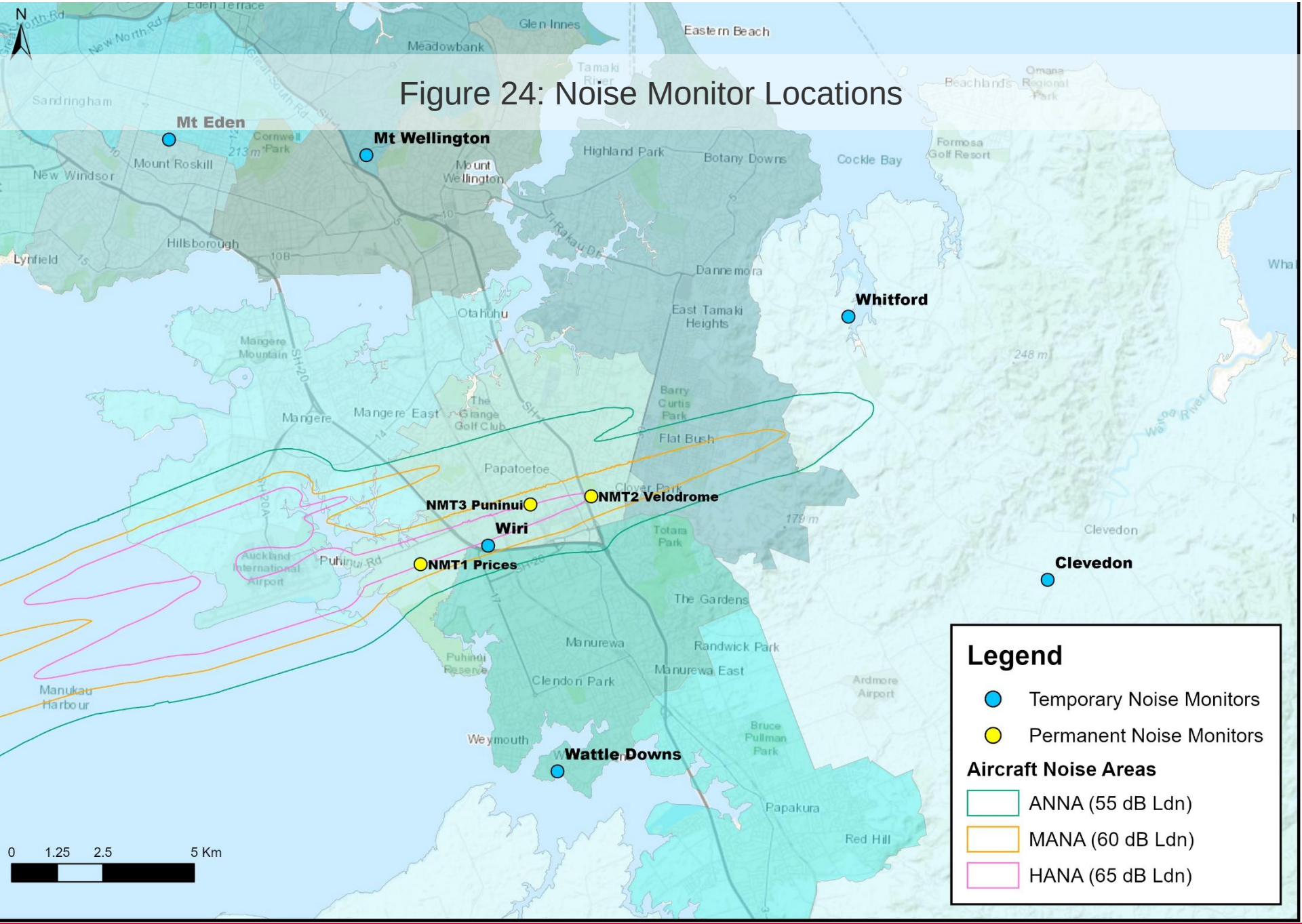


Figure 25: Measured 365 Day Rolling Noise Exposure (L_{dn}) – Permanent Monitors

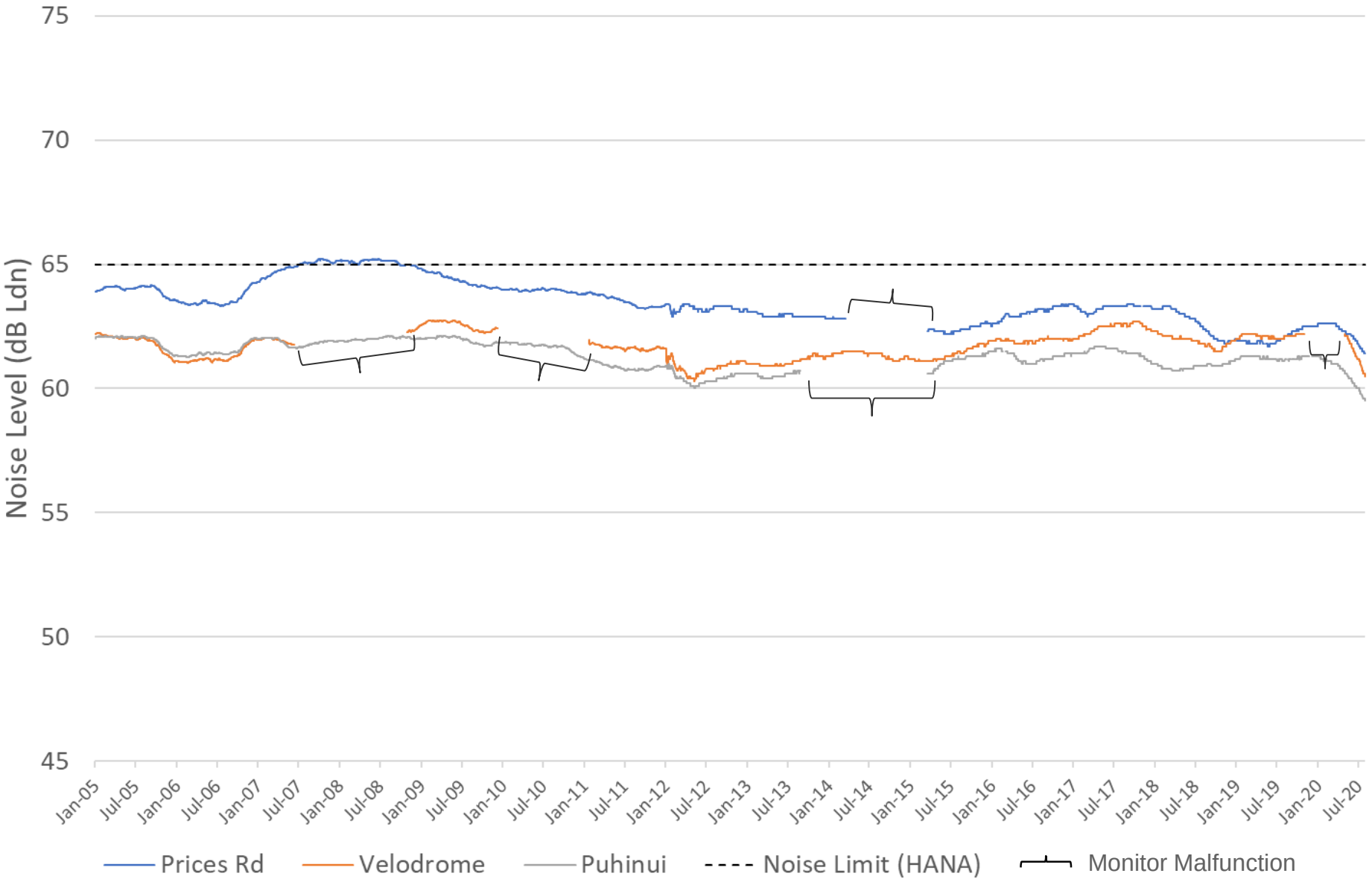
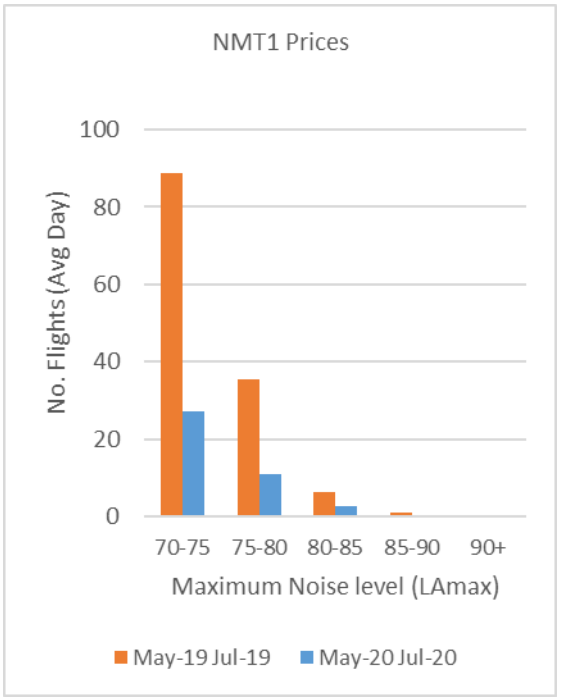
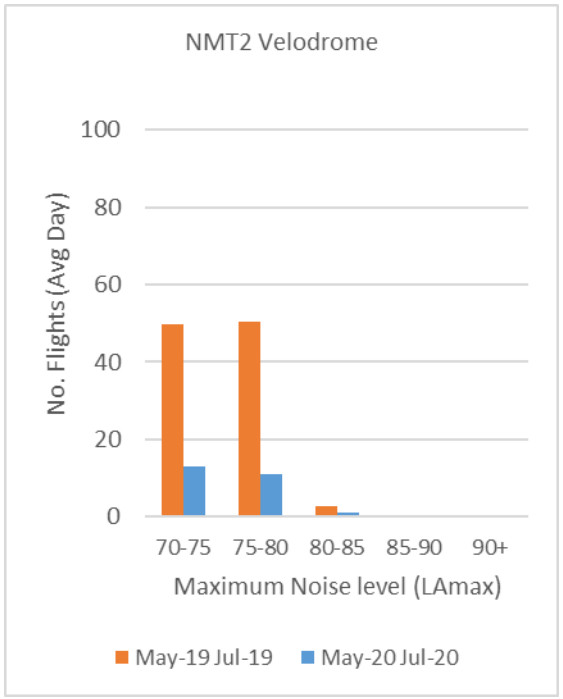


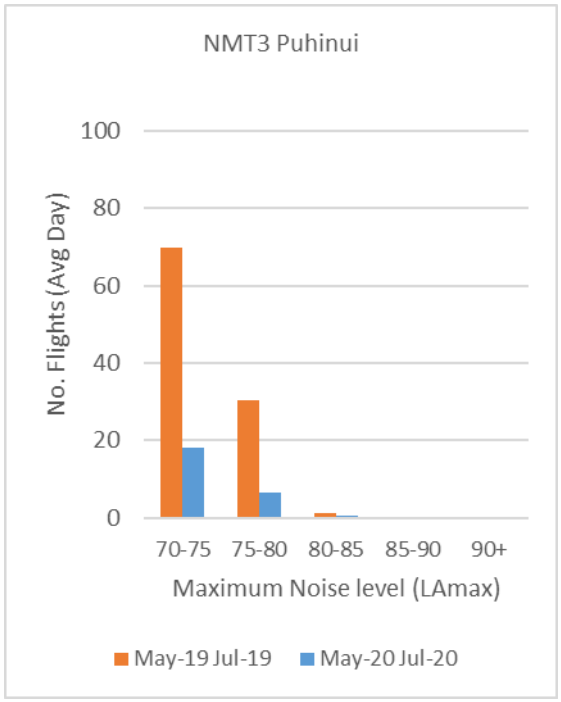
Table 4: Measured Noise Exposure (L_{dn}) for each Financial Year – Permanent Monitors

Financial Year	Prices Rd	Velodrome	Puhinui
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
FY20 (Jul-19 to Jun-20)	61.8	61.2	60.0

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.

MARSHALL DAY Acoustics

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

	NMT1 Prices	NMT2 Velodrome	NMT3 Puhinui
Total Aircraft Operations	6,142	4,024	4,199
No. Aircraft Operations Captured by Monitors	5,445	2,410	3,827
Correlation	89%	60%	91%

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

The lower than normal correlation at the Velodrome monitor appears to be due to a number of departure flights on 05R which turn left then turn back over the Veledrome monitor. These events were picked up in the aircraft operations gate analysis but not in the noise monitoring results as the flights were at a high altitude by the time they overflew the noise monitor.

MARSHALL DAY Acoustics

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	1949	39	62
Mt Wellington	17-Apr-15	1933	39	65
Wiri	4-May-17	1187	59	75
Wattle Downs	23-Dec-17	952	47	67
Clevedon	10-Mar-18	876	28	55
Whitford (Trig)	1-Dec-19	327	45	59

MARSHALL DAY Acoustics

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

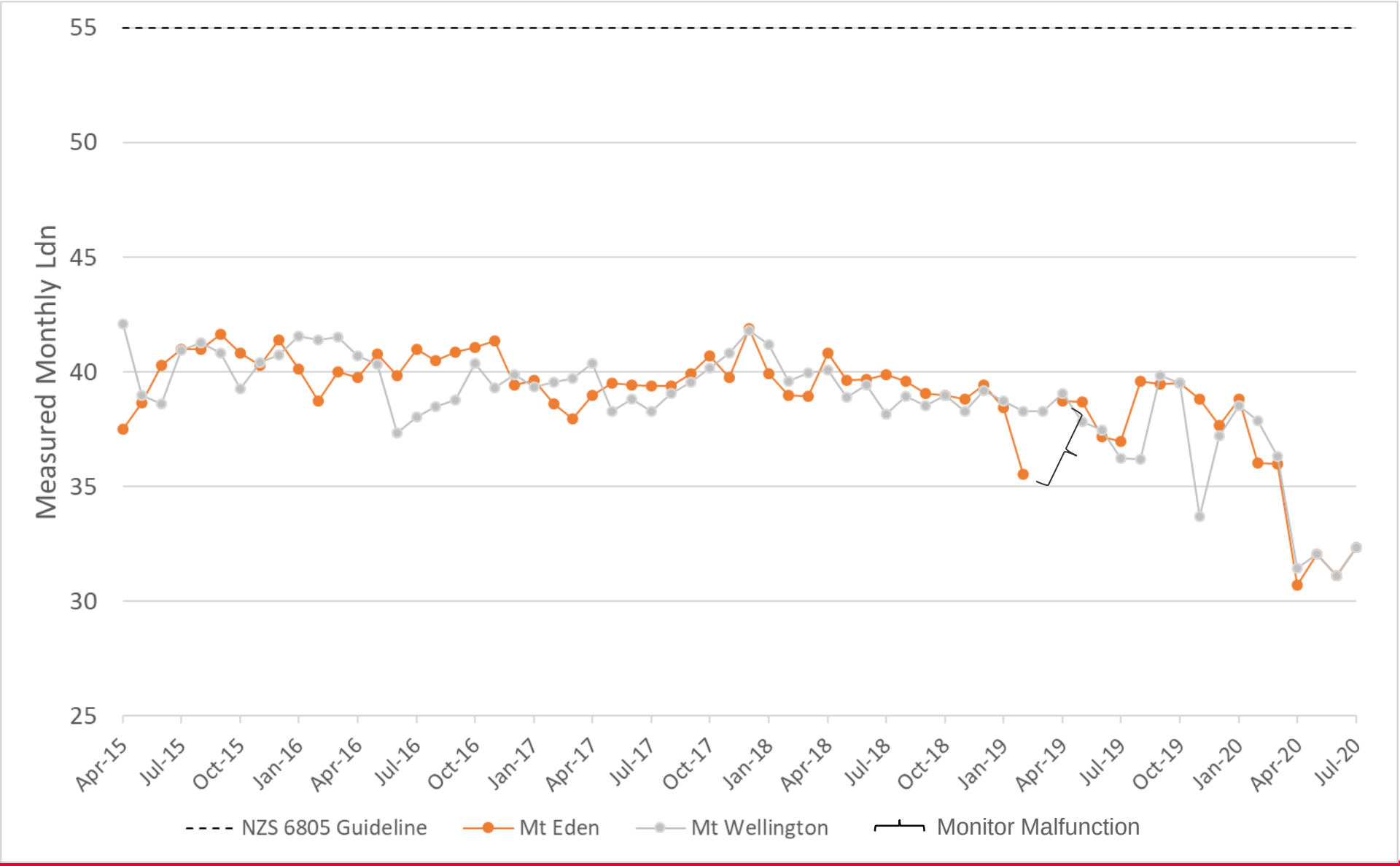


Figure 28: Measured Monthly Noise Exposure (L_{dn}) – Eastern Suburbs Temporary Monitors

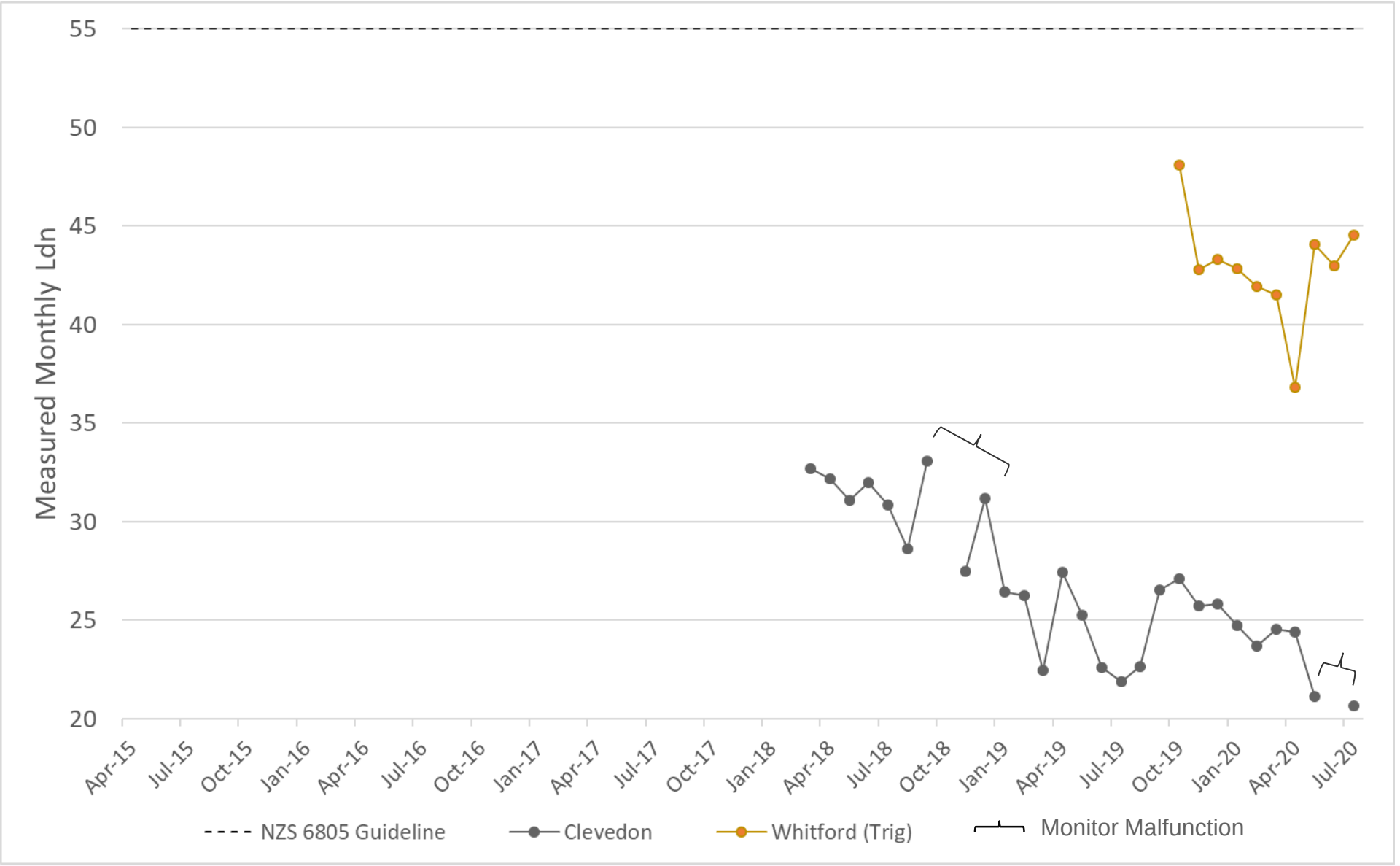


Figure 29: Measured Monthly Noise Exposure (L_{dn}) – Southern Suburbs Temporary Monitors

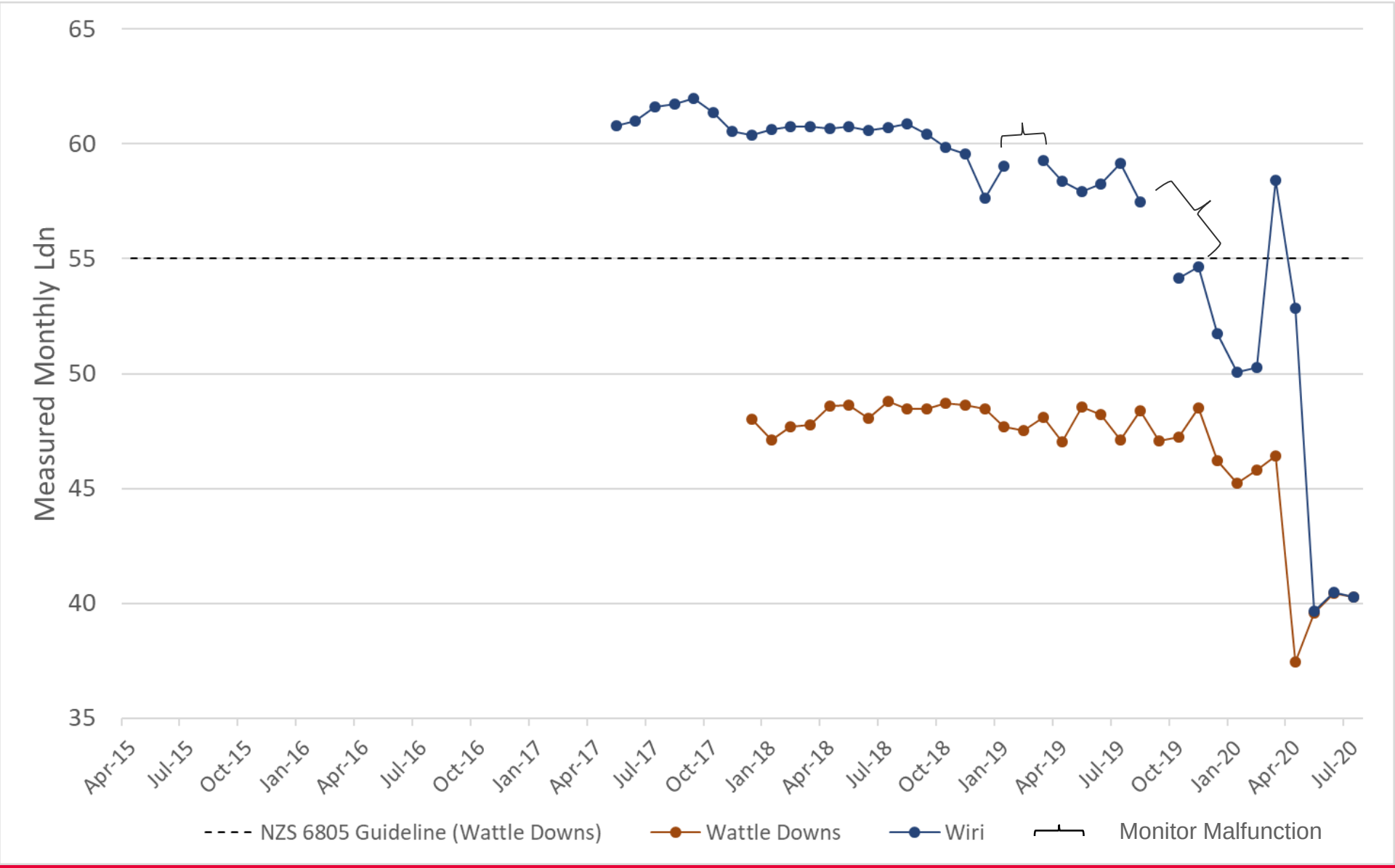
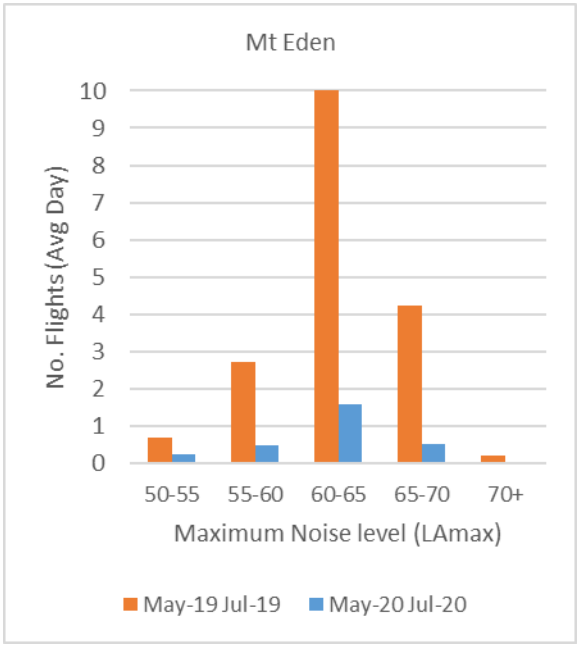
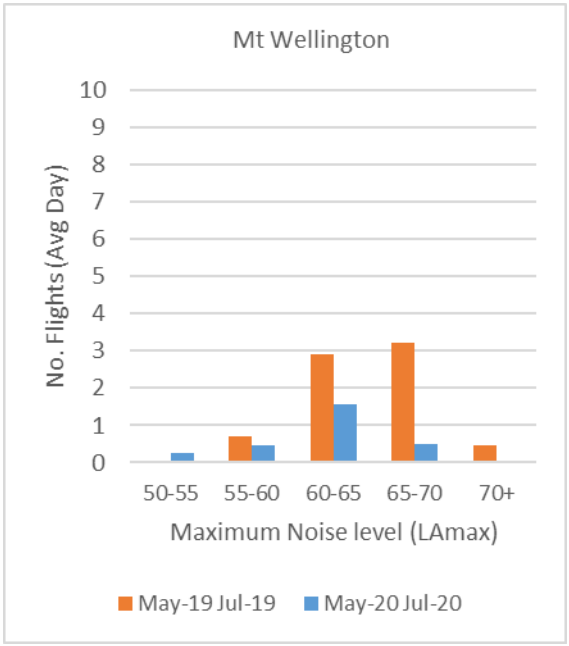


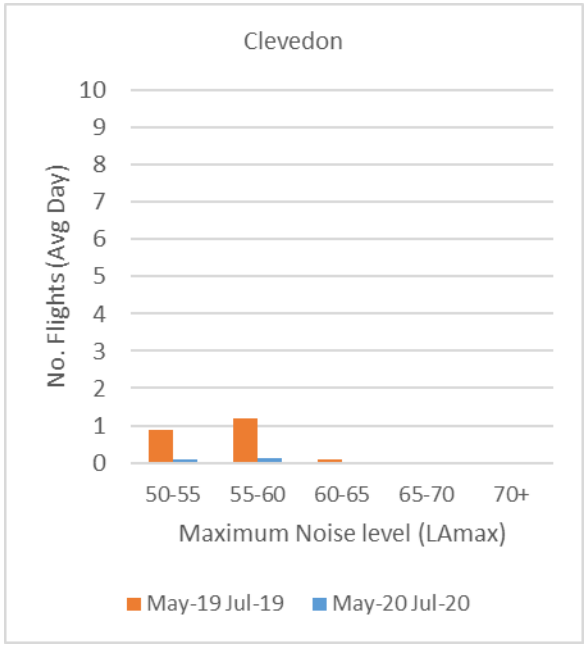
Figure 30: Number of Aircraft Noise Events in Each Noise Band Central Suburbs Monitors (L_{Amax} – Maximum Noise Level)

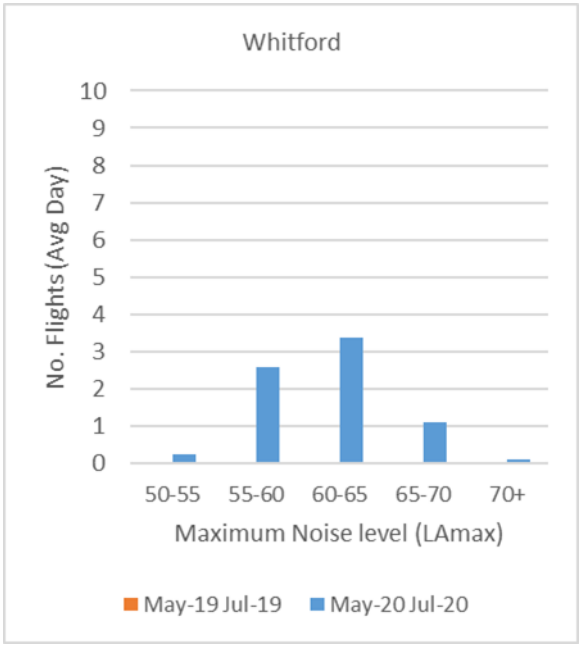




NB: Aircraft noise events over 70-75 L_{Amax} start to become disturbing inside houses with windows open as they have the potential to interfere with watching tv, talking etc.

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

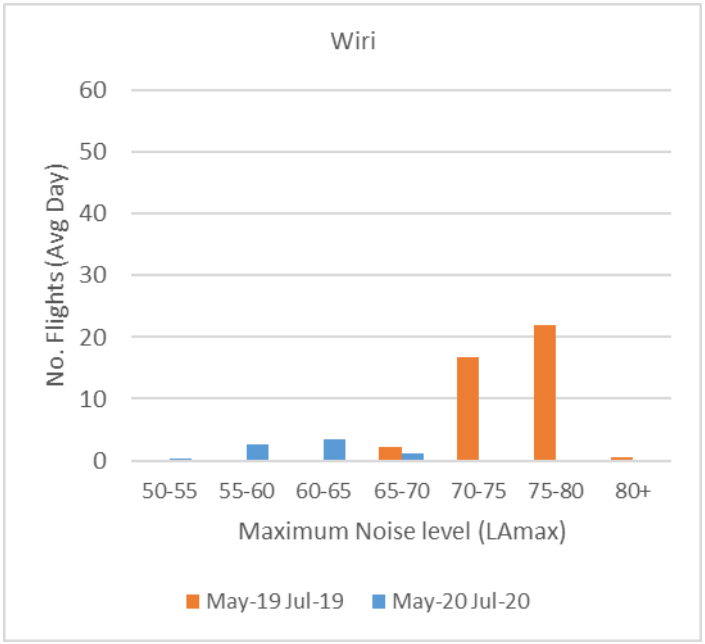


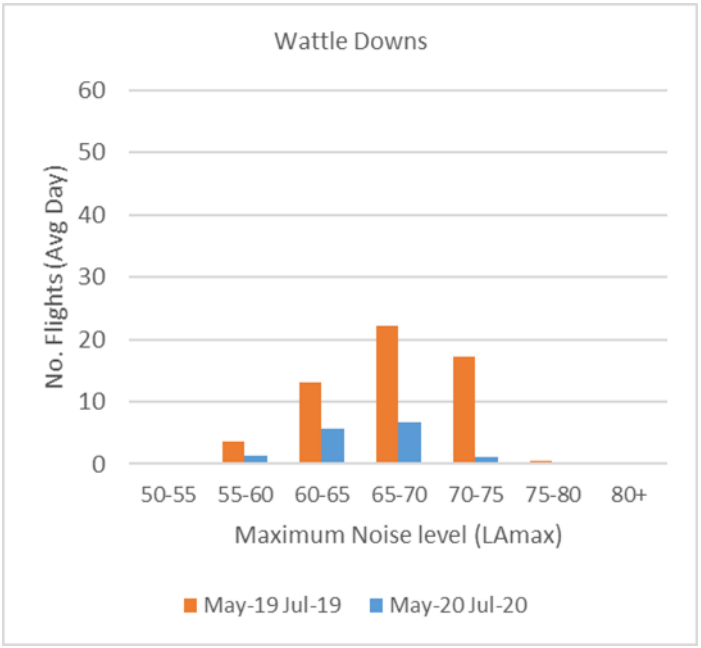


NB: Aircraft noise events over 70-75 L_{Amax} start to become disturbing inside houses with windows open as they have the potential to interfere with watching tv, talking etc.

MARSHALL DAY Acoustics

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.

Engine Testing

Figure 33: Engine Testing Monitoring Locations

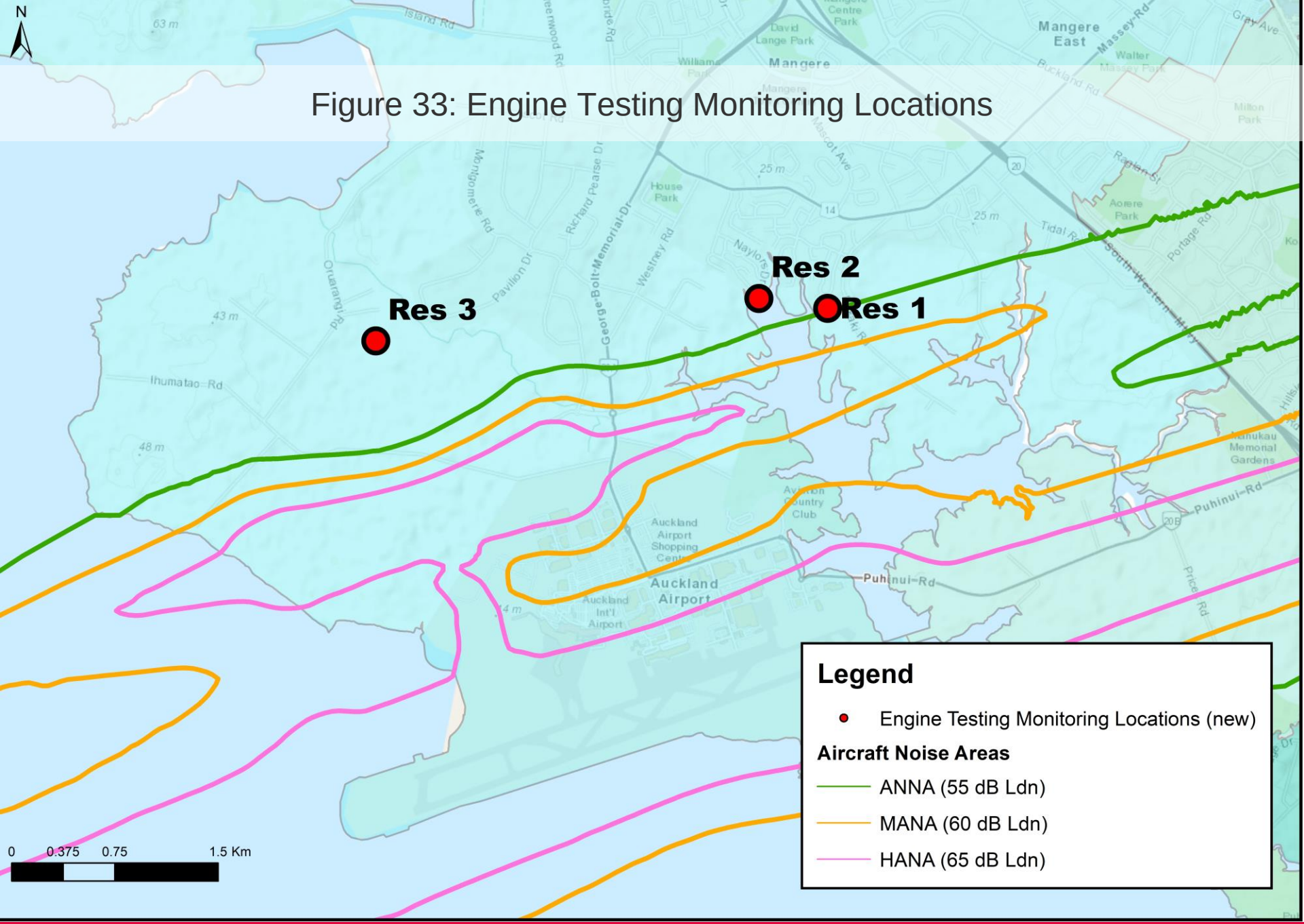
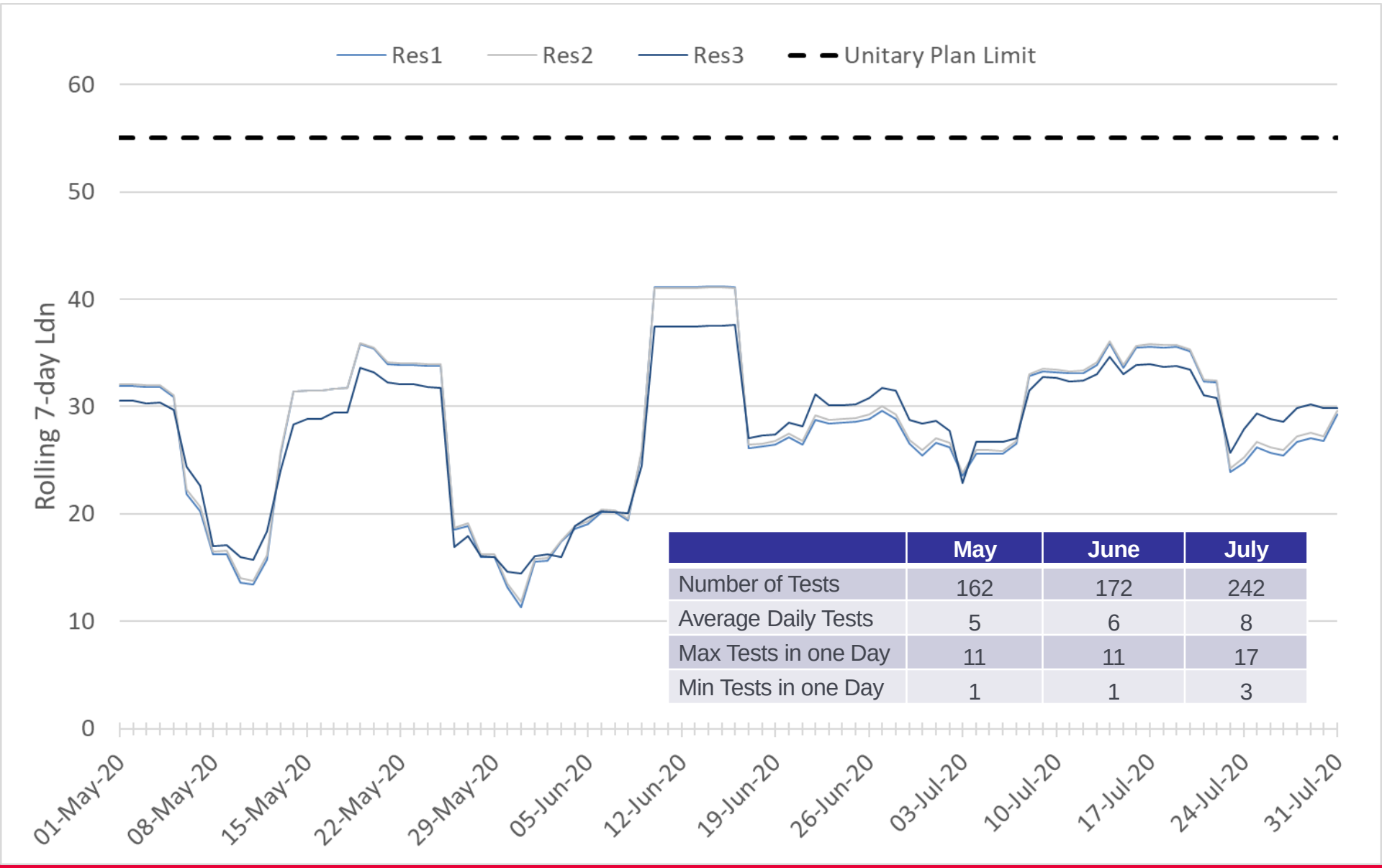
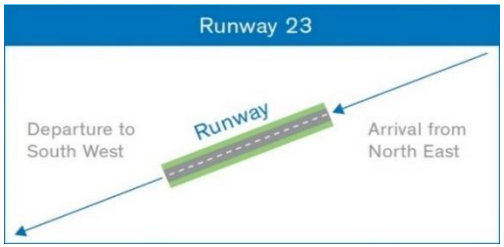
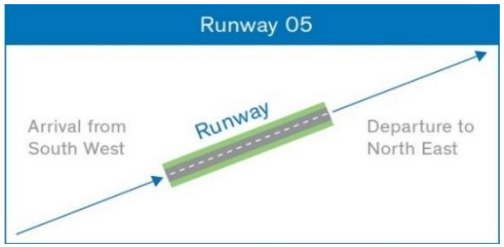


Figure 34: Engine Testing Summary



	May	June	July
Number of Tests	162	172	242
Average Daily Tests	5	6	8
Max Tests in one Day	11	11	17
Min Tests in one Day	1	1	3

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

MARSHALL DAY Acoustics

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