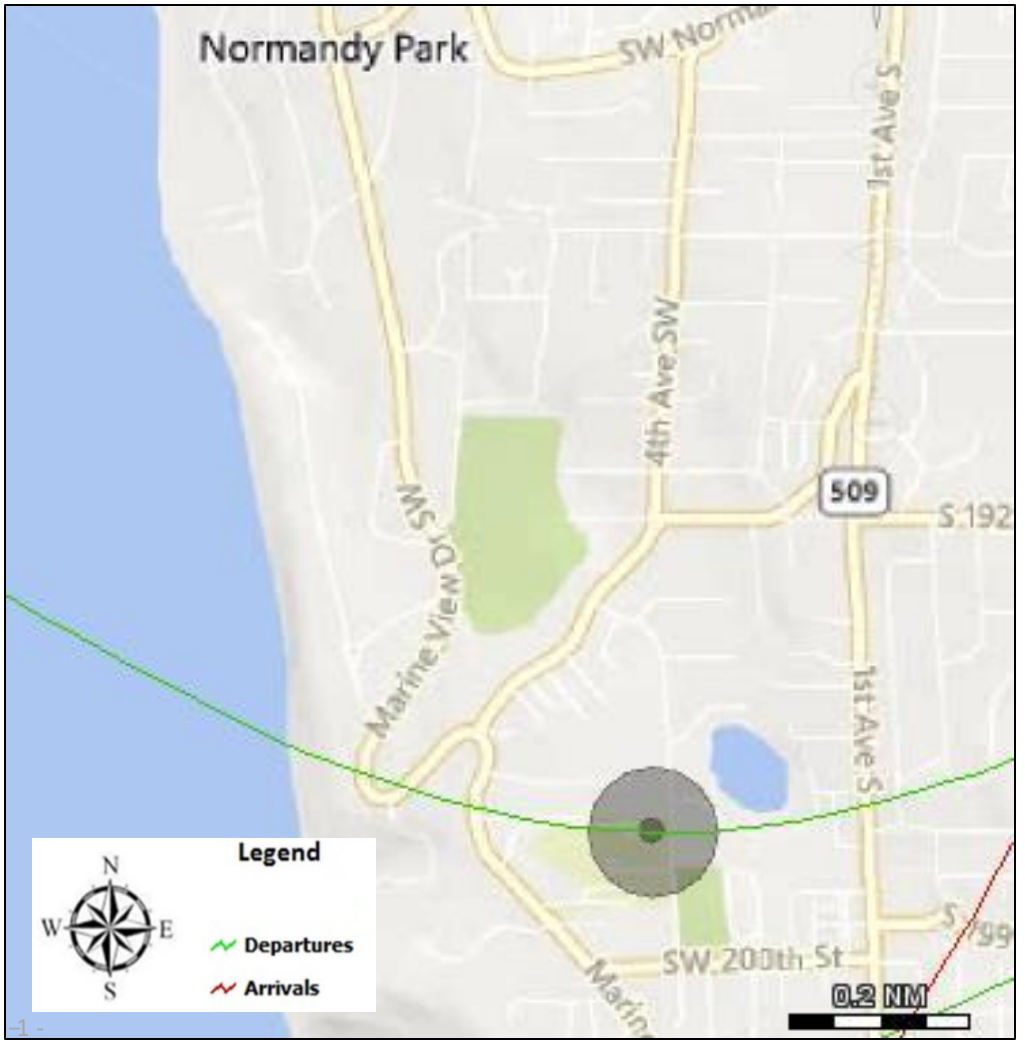
Airport Noise Programs Portable Noise Monitor Report

Marvista Elementary 19800 Marine View Dr SW, Normandy Park

Data collected from March 17 to May 19, 2021



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Summary

The Port of Seattle Airport Noise Programs Office installed a portable noise monitor to temporarily measure aircraft and community noise at Marvista Elementary, located within neighborhood community in the City of Normandy Park. Marvista Elementary was selected as the monitoring location at the recommendation and request of the City of Normandy Park.

The portable classroom provided exterior power to the noise monitoring equipment. The equipment was placed on the southwest end of metal decking for Portable classrooms P-1 & P-2

The Port of Seattle has a total of 24 permanent noise monitors located throughout the local Seattle area. The closest Port of Seattle noise monitor to Marvista Elementary is located at 1217 S 207th Street (SEA17), approximately 1.09 nautical miles distant. Noise Monitor SEA17 is situated directly under the third runway's flight corridor, making the Marvista location a good candidate for measuring any sideline noise from operations on the third runway. Marvista elementary is located approximately 1.34 nautical miles from SEA's westernmost runway 16R/34L, commonly referred to as "third runway".

Noise data collection at Marvista Elementary began on March 17, 2021 and the last full day of data was May 18, 2021. The portable noise monitor was removed from Marvista Elementary on May 19th. During this period SEA operated in south-flow 64% of the time and north-flow 36%, which is typical for Winter months when winds are primarily from the south. During south-flow operations, aircraft depart the runways to the south and approach for landing from the north. For the year 2020, SEA operated in south- flow 78% of the time.

LEQ and SEL noise levels were recorded at the Marvista location. The SEL, or Sound Exposure Level, metric represents the acoustic energy of an individual aircraft noise event as if it occurred over a 1 second time period. LEQ is the Equivalent Continuous Sound Pressure Level, the constant noise level that would result in the same total sound energy being produced over a given period, in this case a 24-hour day. LEQ depicts daily aircraft and community noise levels. Data for both of these noise metrics can be viewed and downloaded on the Port's Tableau Noise data site

Portable Monitor Location

Map shows the location of portable noise monitoring site in relation to existing permanent noise monitoring sites (shown as gray dots on map)

SEA16 Sylvester Middle School
16222 Sylvester Rd
Burien WA

Marvista Elementary
19800 Marine View Dr SW,
Normandy Park

SEA17 1217 S 207th Street
SeaTac, WA

SEA18 1205 S 226th Street
Des Moines, WA

Location Details

The location selected was on the south side of portable classrooms at Marvista Elementary on the metal deck and ramp leading to the classroom entry.

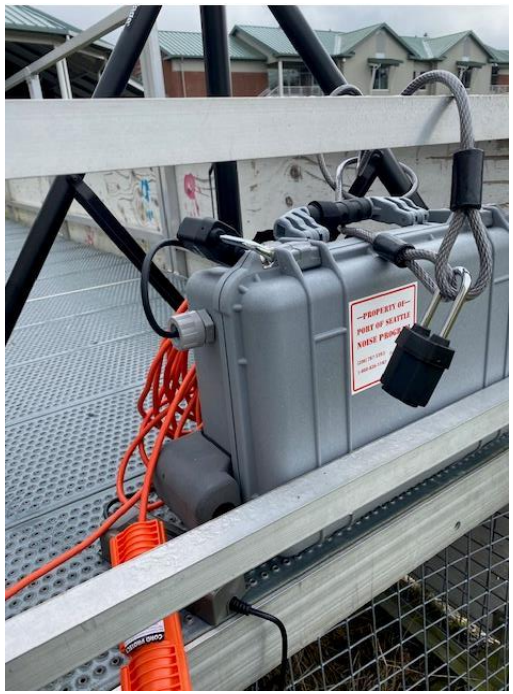
Yellow star notes the approximate location of the portable noise monitor on school property.

Installation of Portable B002

Portable noise monitoring microphone mast and equipment box was placed on the metal deck on the southwest side of the school's portable classrooms. The north side of the classroom building is the school bus parking lot. Photo above depicts view to the west, overlooking a portion of the playfield at Marvista Elementary.

Installation of Portable B002

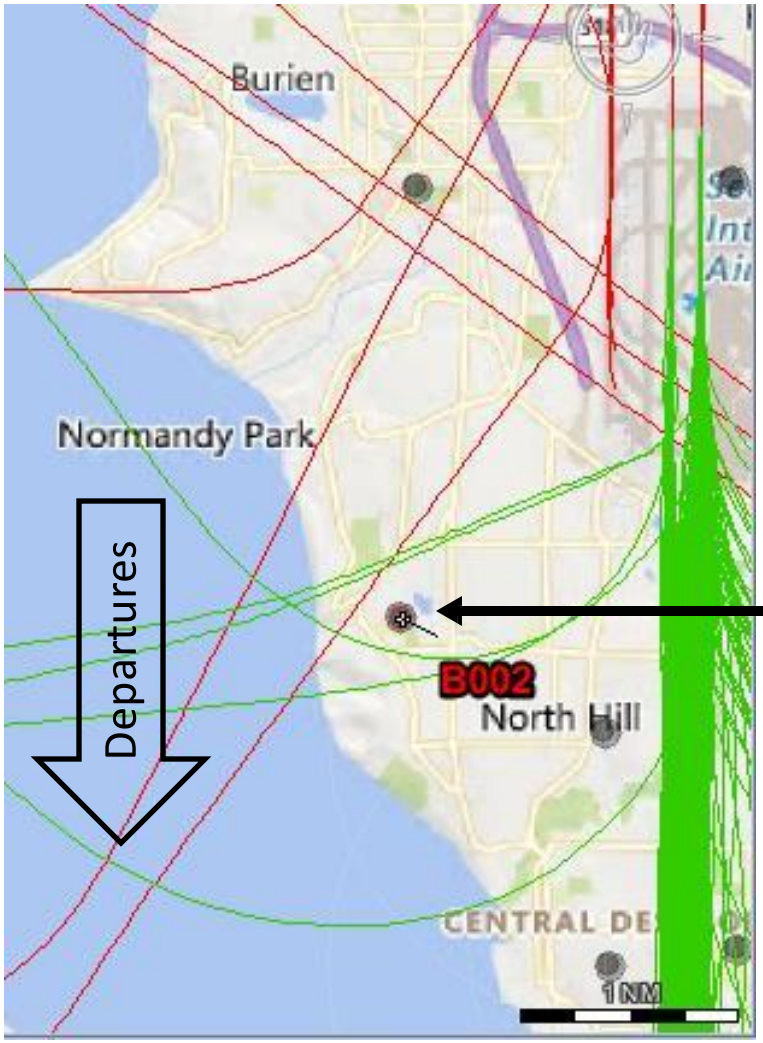
The school was on a modified schedule due to COVID-19 during the time of monitoring noise. In April the power cord for the noise monitoring equipment was inadvertently unplugged resulting in a of data loss, from 12:17am on April 20th to 9:27a, on April 23, 2021. Staff secured the outlet protective cover to prevent the extension cord from becoming unplugged for the remaining monitoring time. There was also missing data from 12:13am, on May 15th to 4:11am on May 16 due to a corrupt data file that resulted in data that could not be recovered.



SEA Flight Paths and Traffic Flow Direction

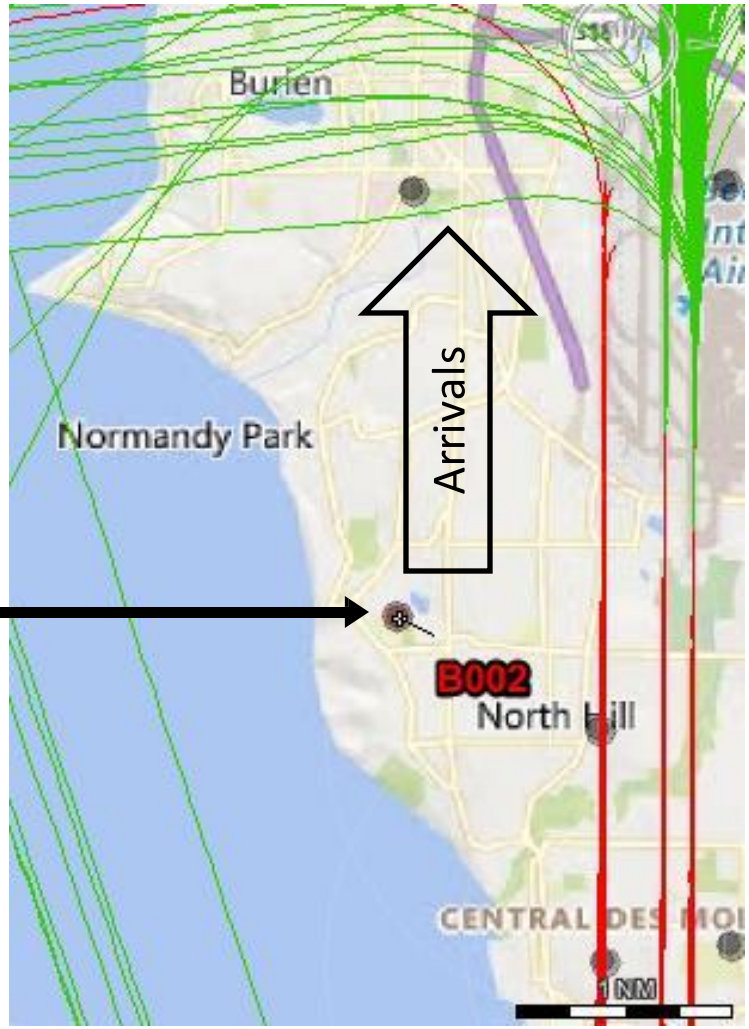
Aircraft primarily take-off and land facing into the prevailing winds. SEA operates in a south-flow or north-flow condition, depending upon the direction of the prevailing winds. More information about flight patterns at SEA can be found on our website: www.portseattle.org/projects/flight-patterns

South-flow March 17, 2021



During south-flow operations at SEA, departing aircraft passed nearby portable noise monitor B002 at Marvista Elementary.

North-flow April 11, 2021



During north-flow operations at SEA, arriving aircraft passed nearby portable noise monitor B002 at Marvista Elementary.

Marvista Elementary
Portable B002

Flight track map for April 4, 2021

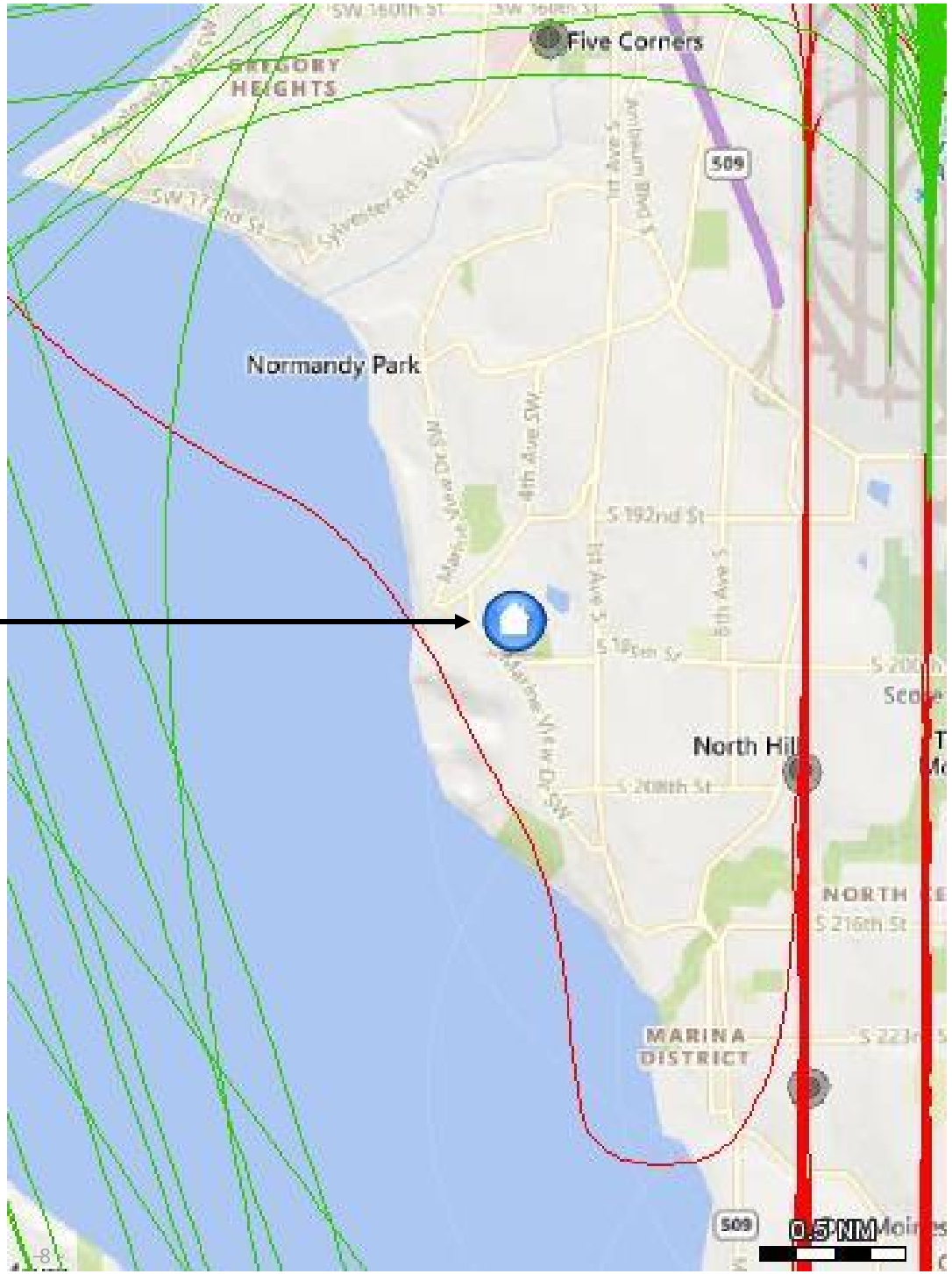
24 hours

Jet and Propeller Aircraft

970 total operations

This map represents typical north flow operations

Portable B002 at Marvista Elementary



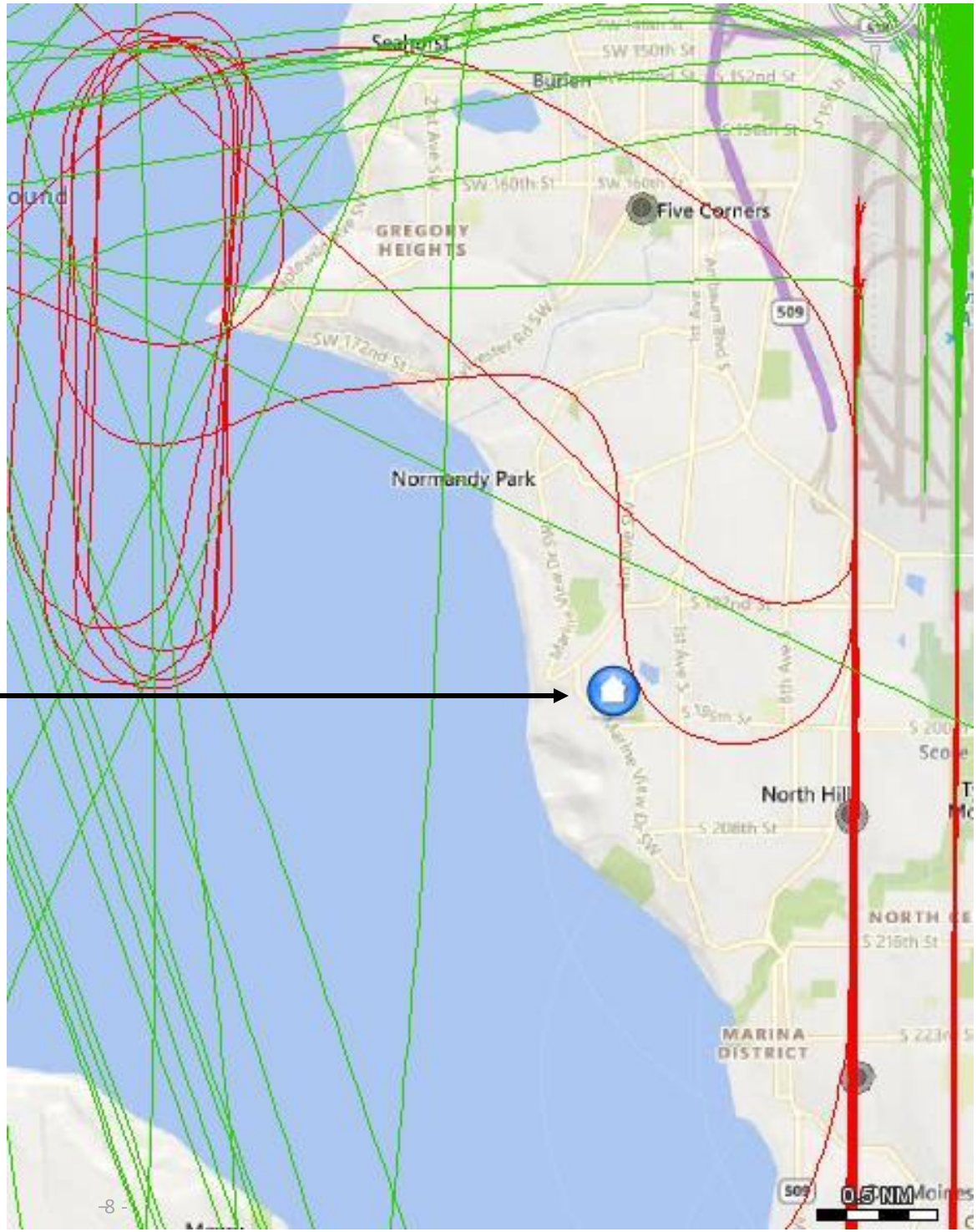
Legend

- Departures
- Arrivals

Flight track map for May 15, 2021
24 hours
Jet and Propeller Aircraft
1075 total operations

This map represents typical north flow operations

Portable B002 at Marvista Elementary



Legend

N
W E
S

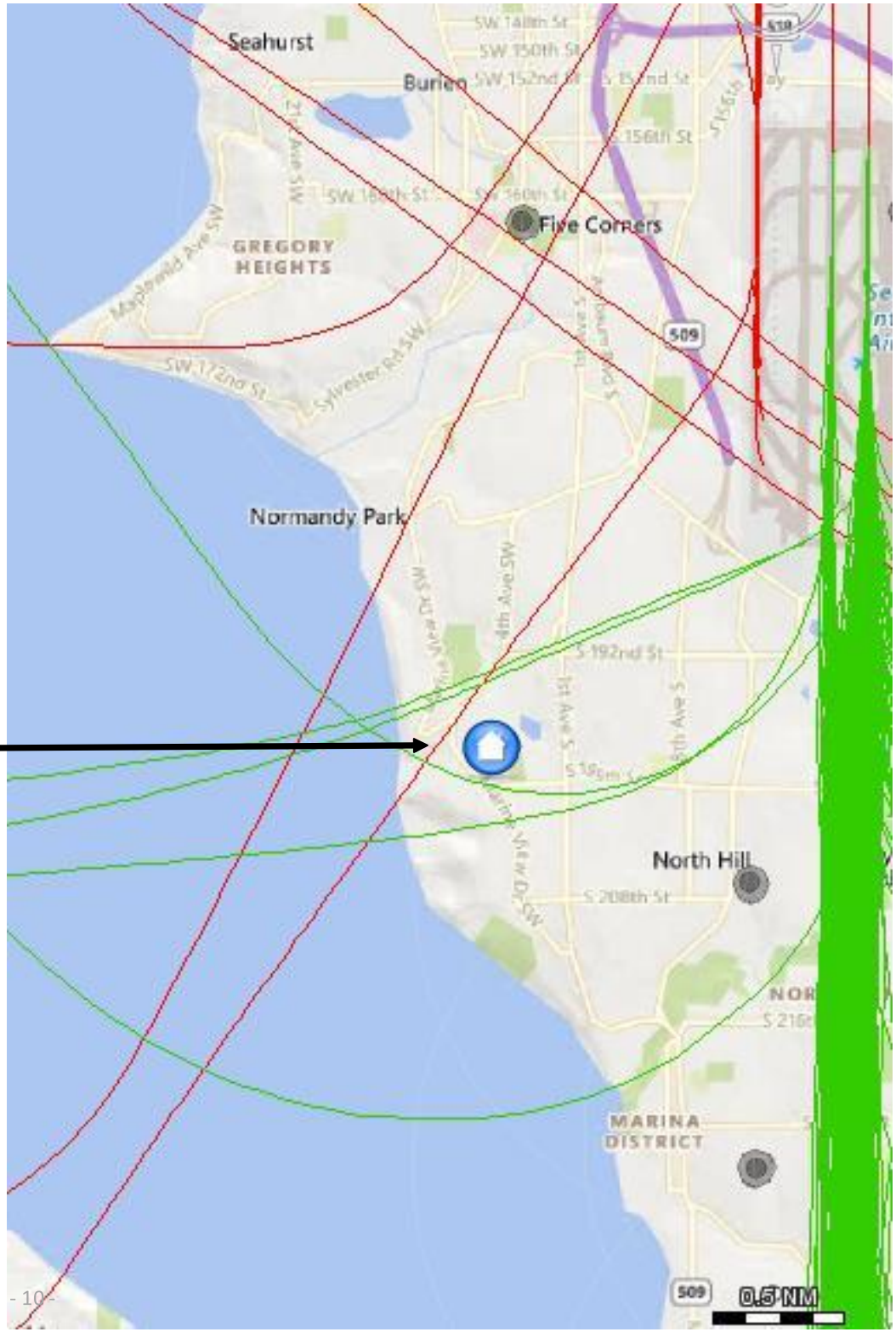
Departures

Arrivals

Flight track map for March 18, 2021
24 hours
Jet and Propeller Aircraft
957 total operations

This map represents typical south flow operations

Portable B002 at Marvista Elementary



Legend

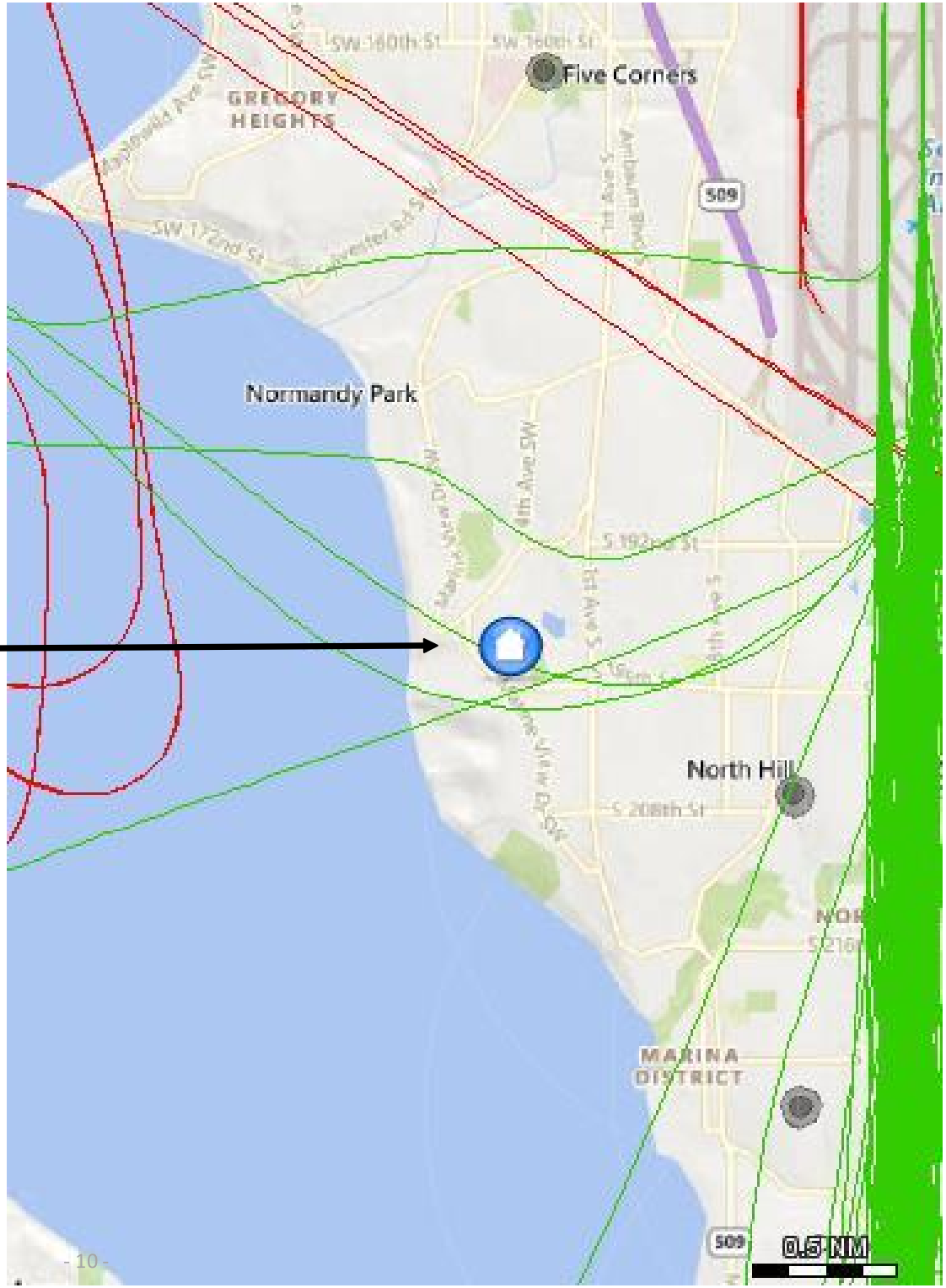
Departures

Arrivals

Flight track map for May 17, 2021
24 hours
Jet and Propeller Aircraft
1101 total operations

This map represents typical south flow operations

Portable B002 at Marvista Elementary



Legend

Departures

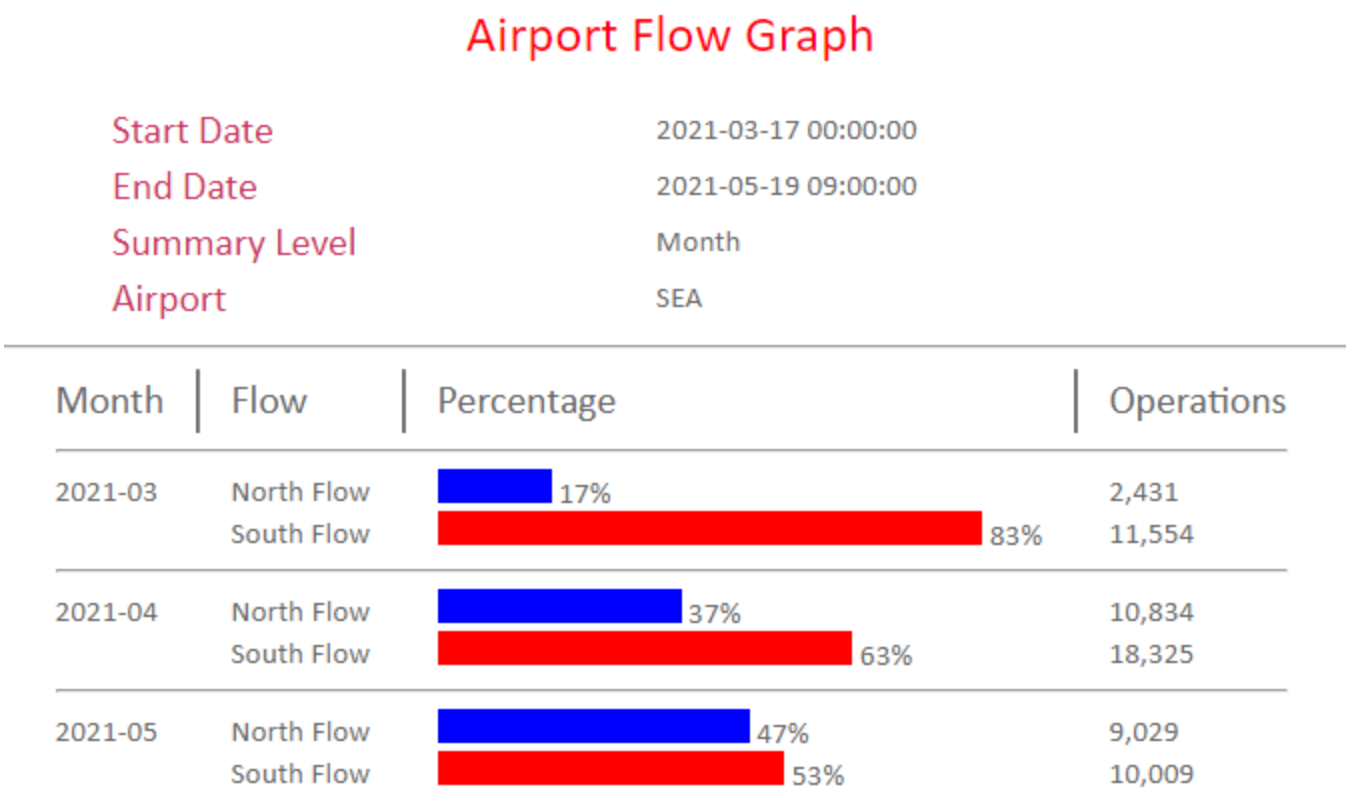
Arrivals

Traffic Flow— March 17 to 9:00am on May 19, 2021

The graph below shows the percentage of north-flow and south-flow operations for SEA and total operations for each flow.

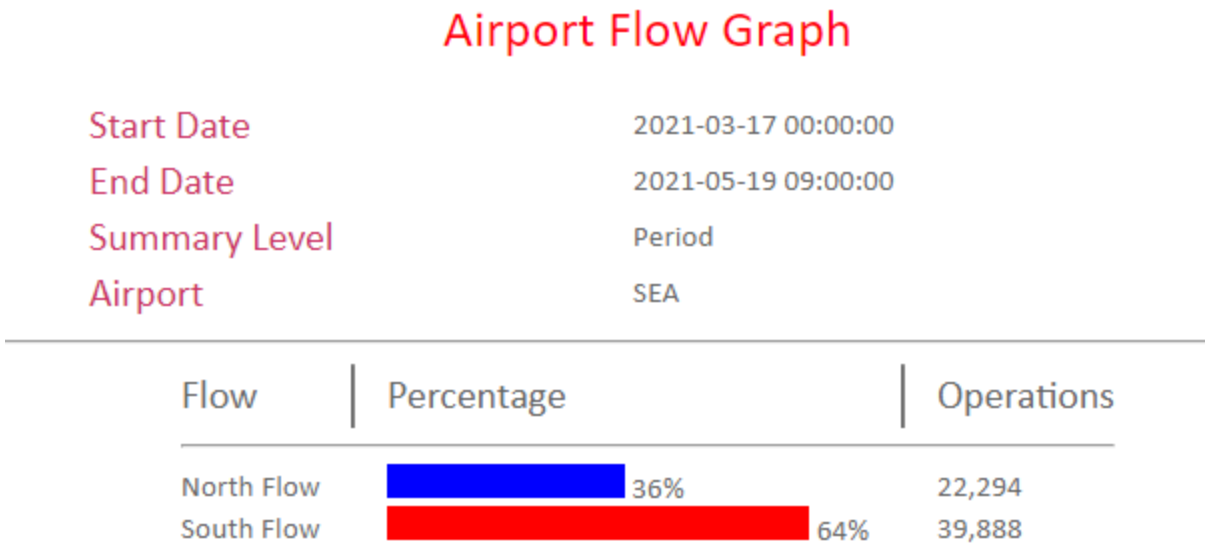
The portable noise monitor was removed from Marvista on May 19th around 9am. The last full day of data at this location was May 18, 2021.

Monthly operations at SEA were primarily South Flow
from March 17th to May 19, 2021.

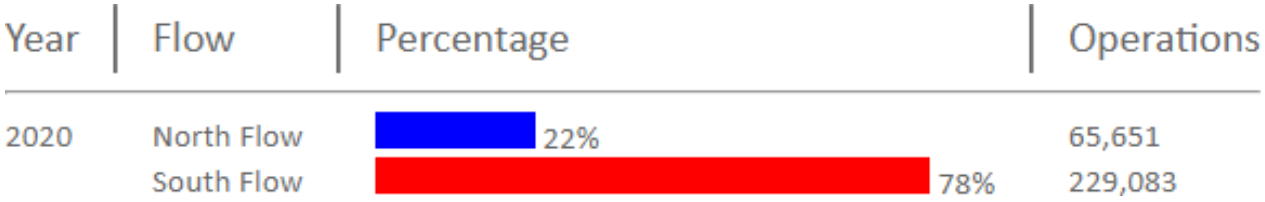


Traffic Flow— March 17 to 9:00am on May 19, 2021

Monthly operations at SEA were primarily South Flow
from March 17, 2021, to May 19, 2021.



The graph above shows the percentage of north-flow and south-flow operations for SEA, and the total operations numbers for each flow during the entire time the portable noise monitor was collecting data at Marvista Elementary. The graph below shows the total percentages and operations for SEA for all of 2020, based upon operations tracked in the Port of Seattle flight tracking system.



Appendix

Port of Seattle

Airport Noise Programs, Aircraft Noise Monitoring System (includes map of where the Port of Seattle permanent noise monitors are located) www.portseattle.org/page/aircraft-noise-monitoring-system

Airport Noise Programs, Noise Abatement Procedures for Jet Aircraft www.portseattle.org/projects/noise-abatement-procedures-jet-aircraft

Airport Noise Programs, Flight Patterns (maps and explanations of north-flow and south-flow operations at Sea-Tac Airport) www.portseattle.org/projects/flight-patterns

Airport Noise Programs Questions and Answers www.portseattle.org/page/airport-noise-programs-questions-and-answers

Federal Aviation Administration (FAA)

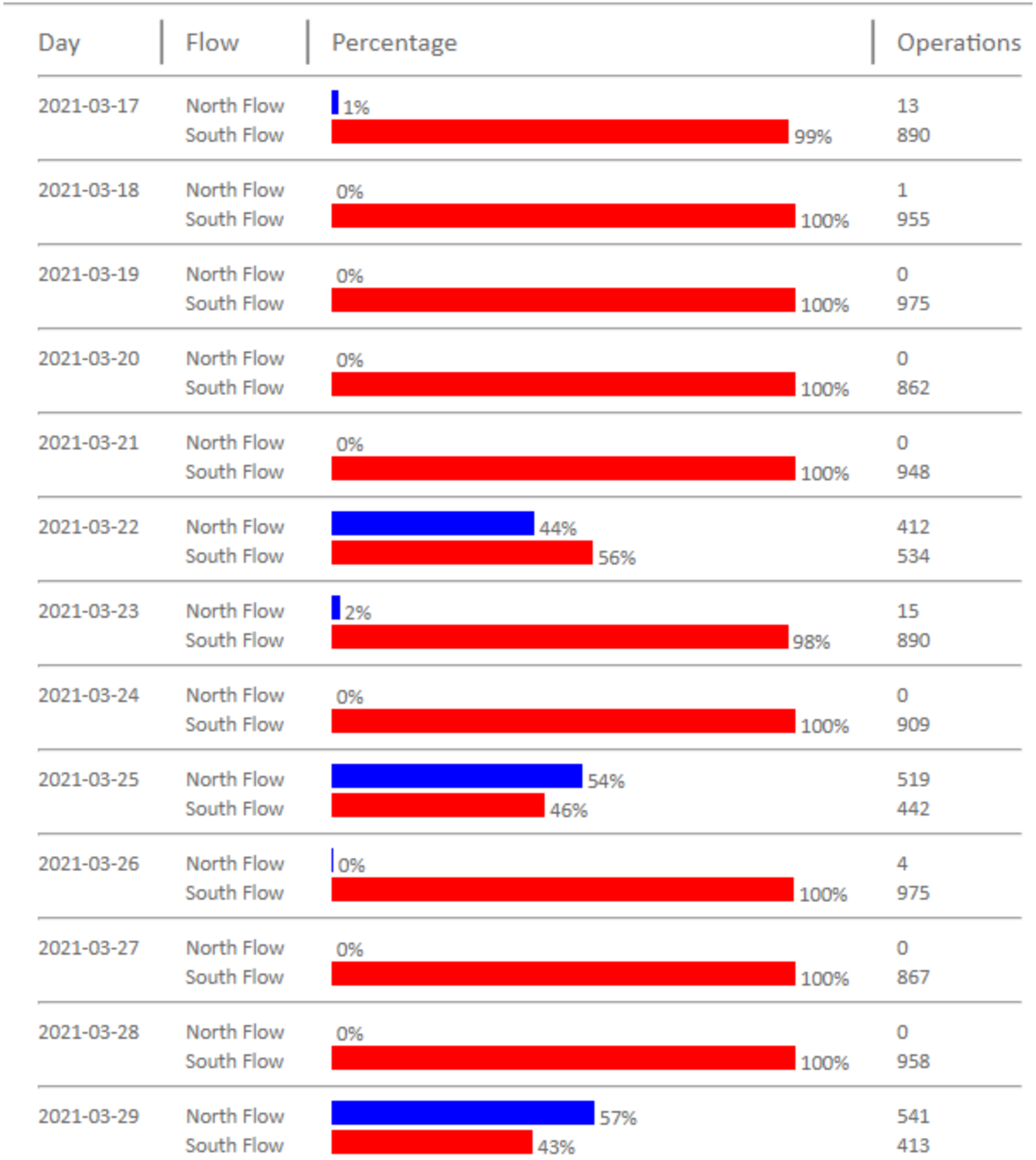
Fundamentals of Noise and Sound www.faa.gov/regulations_policies/policy_guidance/noise/basics/

Aviation Noise www.faa.gov/regulations_policies/policy_guidance/noise/

Community Response to Noise www.faa.gov/regulations_policies/policy_guidance/noise/community/

Appendix - Traffic Flow

Daily overview of traffic flow direction at SEA, along with the daily operations count to the right of the percentages graph.



Day	Flow	Percentage	Operations
2021-03-17	North Flow	1%	13
	South Flow	99%	890
2021-03-18	North Flow	0%	1
	South Flow	100%	955
2021-03-19	North Flow	0%	0
	South Flow	100%	975
2021-03-20	North Flow	0%	0
	South Flow	100%	862
2021-03-21	North Flow	0%	0
	South Flow	100%	948
2021-03-22	North Flow	44%	412
	South Flow	56%	534
2021-03-23	North Flow	2%	15
	South Flow	98%	890
2021-03-24	North Flow	0%	0
	South Flow	100%	909
2021-03-25	North Flow	54%	519
	South Flow	46%	442
2021-03-26	North Flow	0%	4
	South Flow	100%	975
2021-03-27	North Flow	0%	0
	South Flow	100%	867
2021-03-28	North Flow	0%	0
	South Flow	100%	958
2021-03-29	North Flow	57%	541
	South Flow	43%	413

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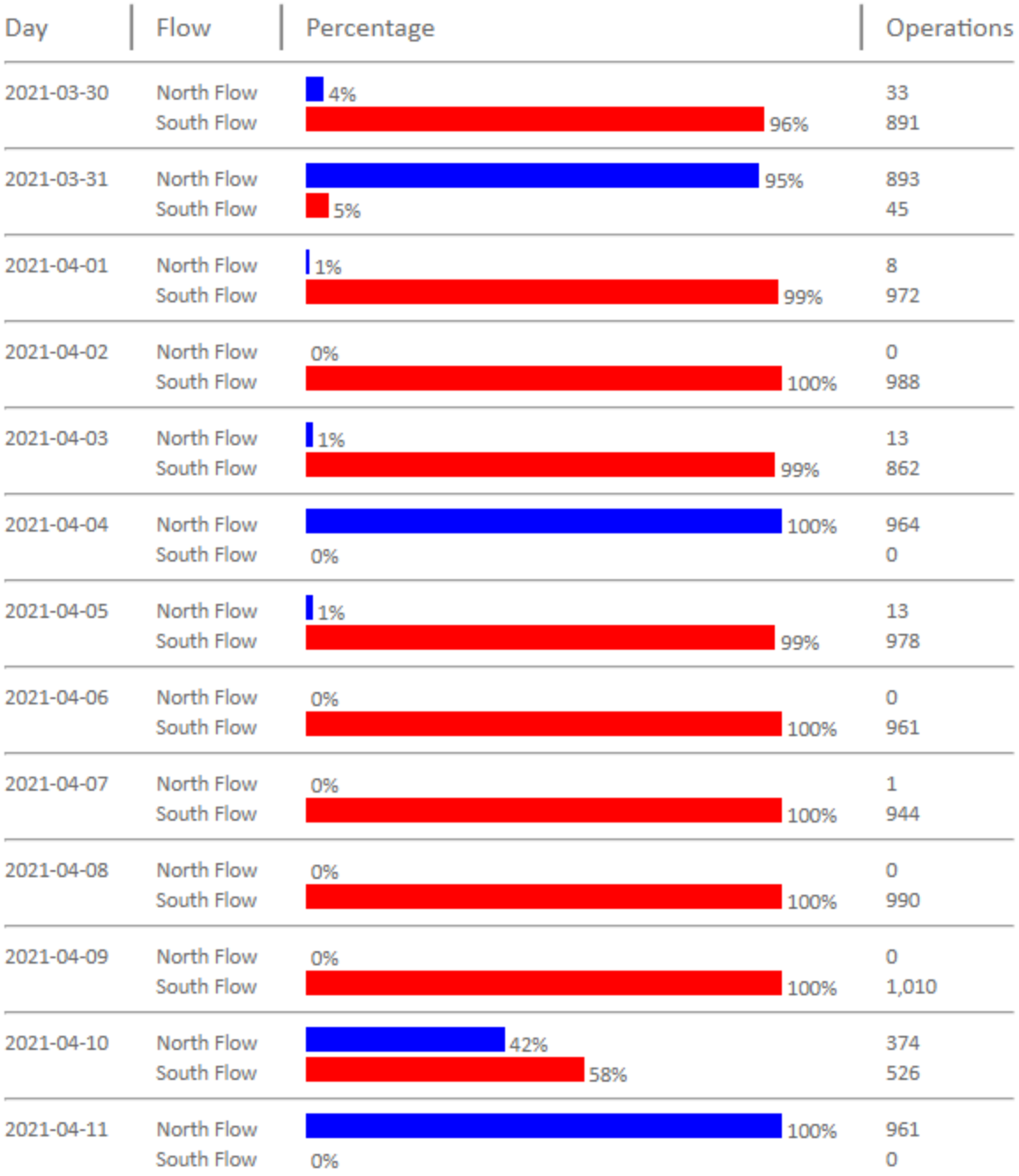

Day	Flow	Percentage	Operations
2021-03-30	North Flow	4%	33
	South Flow	96%	891
2021-03-31	North Flow	95%	893
	South Flow	5%	45
2021-04-01	North Flow	1%	8
	South Flow	99%	972
2021-04-02	North Flow	0%	0
	South Flow	100%	988
2021-04-03	North Flow	1%	13
	South Flow	99%	862
2021-04-04	North Flow	100%	964
	South Flow	0%	0
2021-04-05	North Flow	1%	13
	South Flow	99%	978
2021-04-06	North Flow	0%	0
	South Flow	100%	961
2021-04-07	North Flow	0%	1
	South Flow	100%	944
2021-04-08	North Flow	0%	0
	South Flow	100%	990
2021-04-09	North Flow	0%	0
	South Flow	100%	1,010
2021-04-10	North Flow	42%	374
	South Flow	58%	526
2021-04-11	North Flow	100%	961
	South Flow	0%	0

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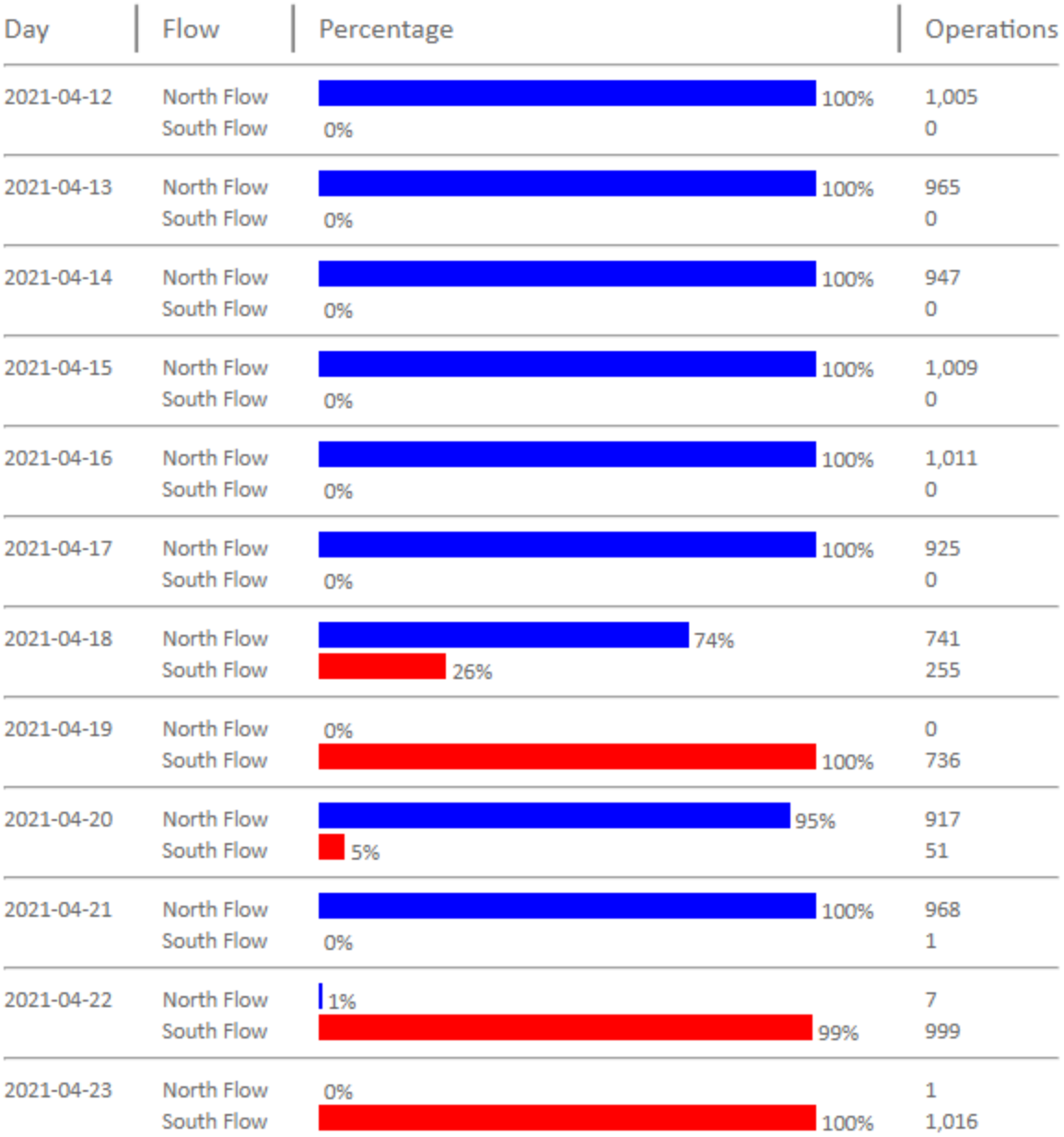

Day	Flow	Percentage	Operations
2021-04-12	North Flow	100%	1,005
	South Flow	0%	0
2021-04-13	North Flow	100%	965
	South Flow	0%	0
2021-04-14	North Flow	100%	947
	South Flow	0%	0
2021-04-15	North Flow	100%	1,009
	South Flow	0%	0
2021-04-16	North Flow	100%	1,011
	South Flow	0%	0
2021-04-17	North Flow	100%	925
	South Flow	0%	0
2021-04-18	North Flow	74%	741
	South Flow	26%	255
2021-04-19	North Flow	0%	0
	South Flow	100%	736
2021-04-20	North Flow	95%	917
	South Flow	5%	51
2021-04-21	North Flow	100%	968
	South Flow	0%	1
2021-04-22	North Flow	1%	7
	South Flow	99%	999
2021-04-23	North Flow	0%	1
	South Flow	100%	1,016

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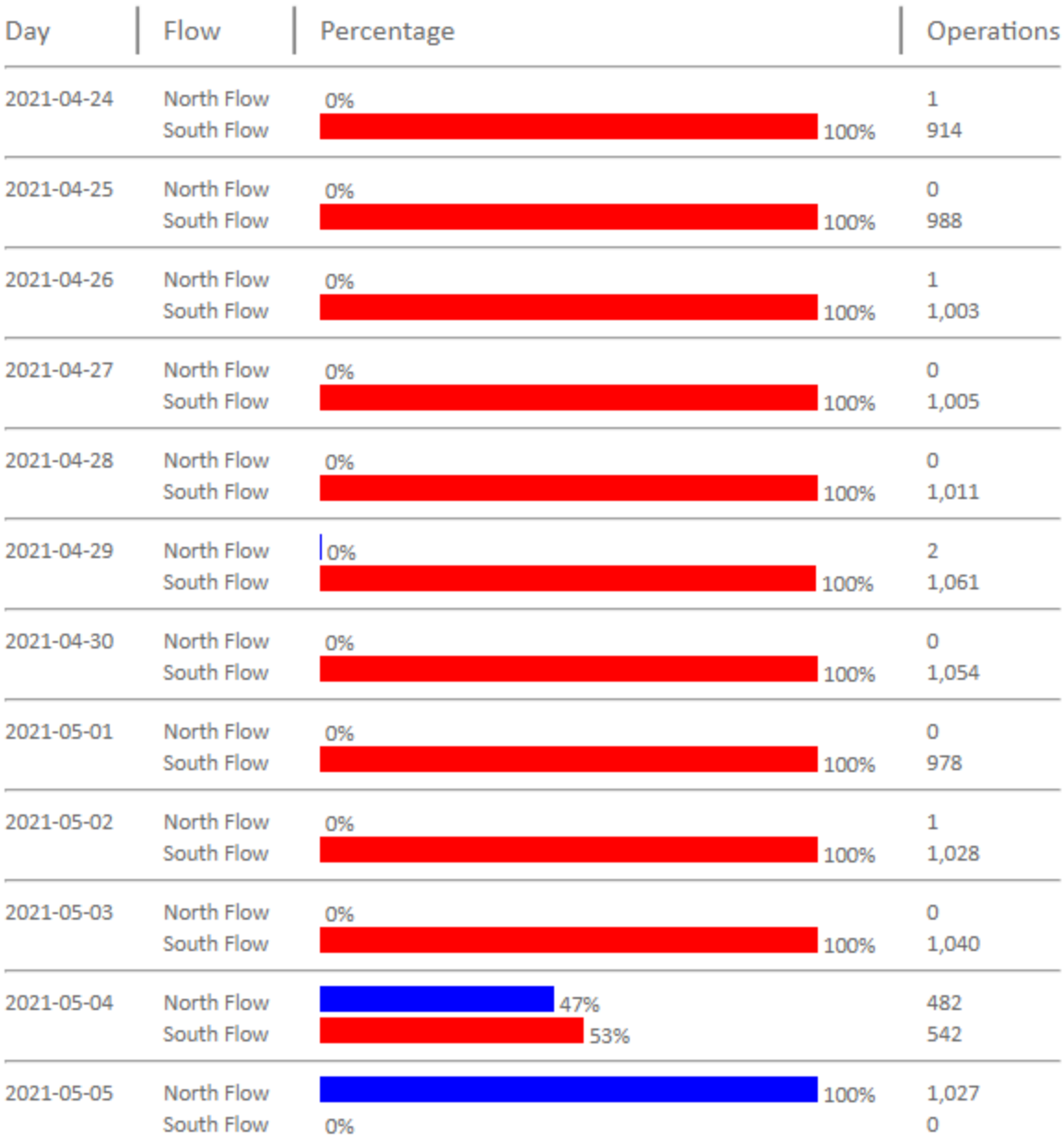

Day	Flow	Percentage	Operations
2021-04-24	North Flow	0%	1
	South Flow	100%	914
2021-04-25	North Flow	0%	0
	South Flow	100%	988
2021-04-26	North Flow	0%	1
	South Flow	100%	1,003
2021-04-27	North Flow	0%	0
	South Flow	100%	1,005
2021-04-28	North Flow	0%	0
	South Flow	100%	1,011
2021-04-29	North Flow	0%	2
	South Flow	100%	1,061
2021-04-30	North Flow	0%	0
	South Flow	100%	1,054
2021-05-01	North Flow	0%	0
	South Flow	100%	978
2021-05-02	North Flow	0%	1
	South Flow	100%	1,028
2021-05-03	North Flow	0%	0
	South Flow	100%	1,040
2021-05-04	North Flow	47%	482
	South Flow	53%	542
2021-05-05	North Flow	100%	1,027
	South Flow	0%	0

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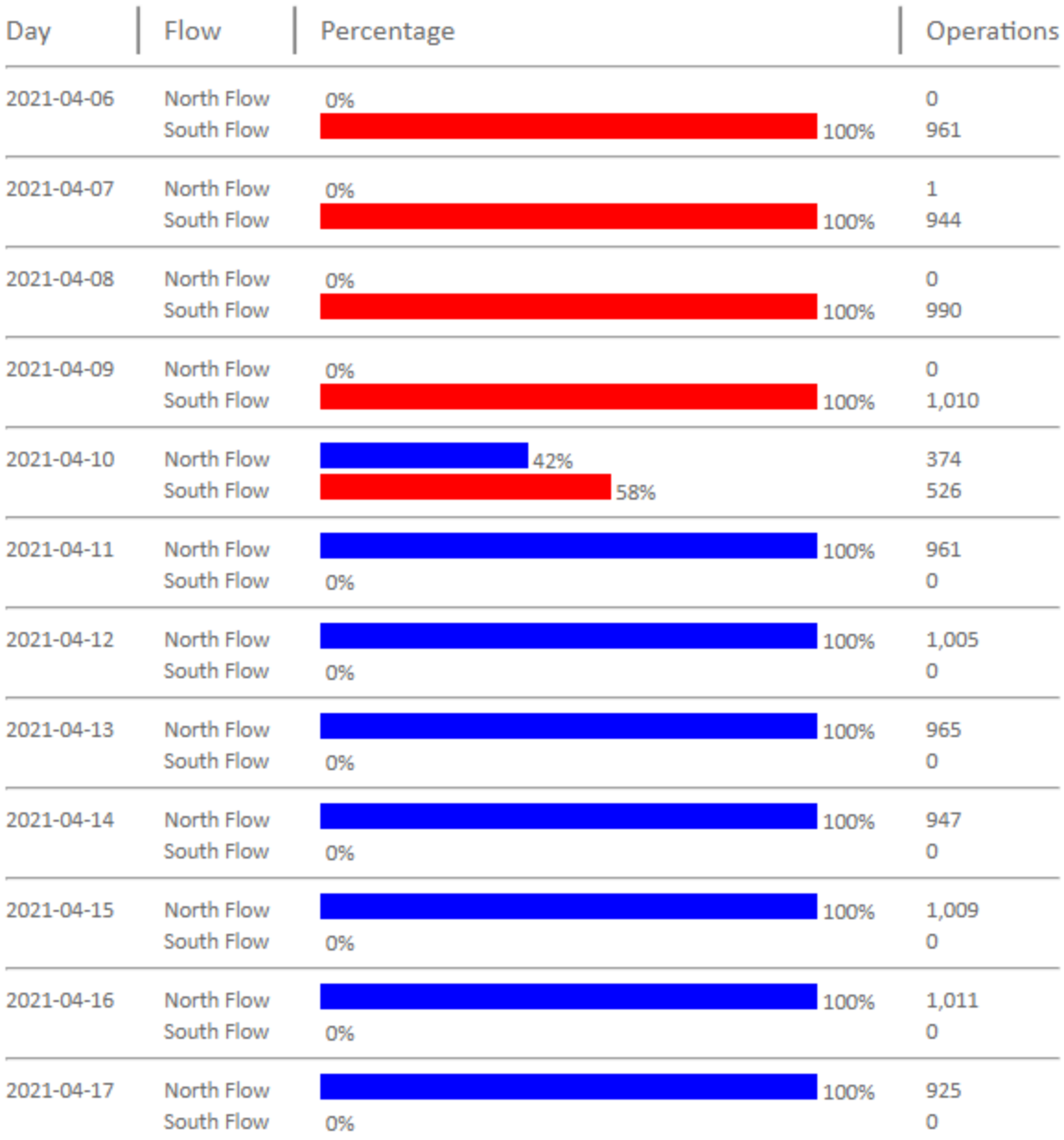

Day	Flow	Percentage	Operations
2021-04-06	North Flow	0%	0
	South Flow	100%	961
2021-04-07	North Flow	0%	1
	South Flow	100%	944
2021-04-08	North Flow	0%	0
	South Flow	100%	990
2021-04-09	North Flow	0%	0
	South Flow	100%	1,010
2021-04-10	North Flow	42%	374
	South Flow	58%	526
2021-04-11	North Flow	100%	961
	South Flow	0%	0
2021-04-12	North Flow	100%	1,005
	South Flow	0%	0
2021-04-13	North Flow	100%	965
	South Flow	0%	0
2021-04-14	North Flow	100%	947
	South Flow	0%	0
2021-04-15	North Flow	100%	1,009
	South Flow	0%	0
2021-04-16	North Flow	100%	1,011
	South Flow	0%	0
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	South Flow	0%	0

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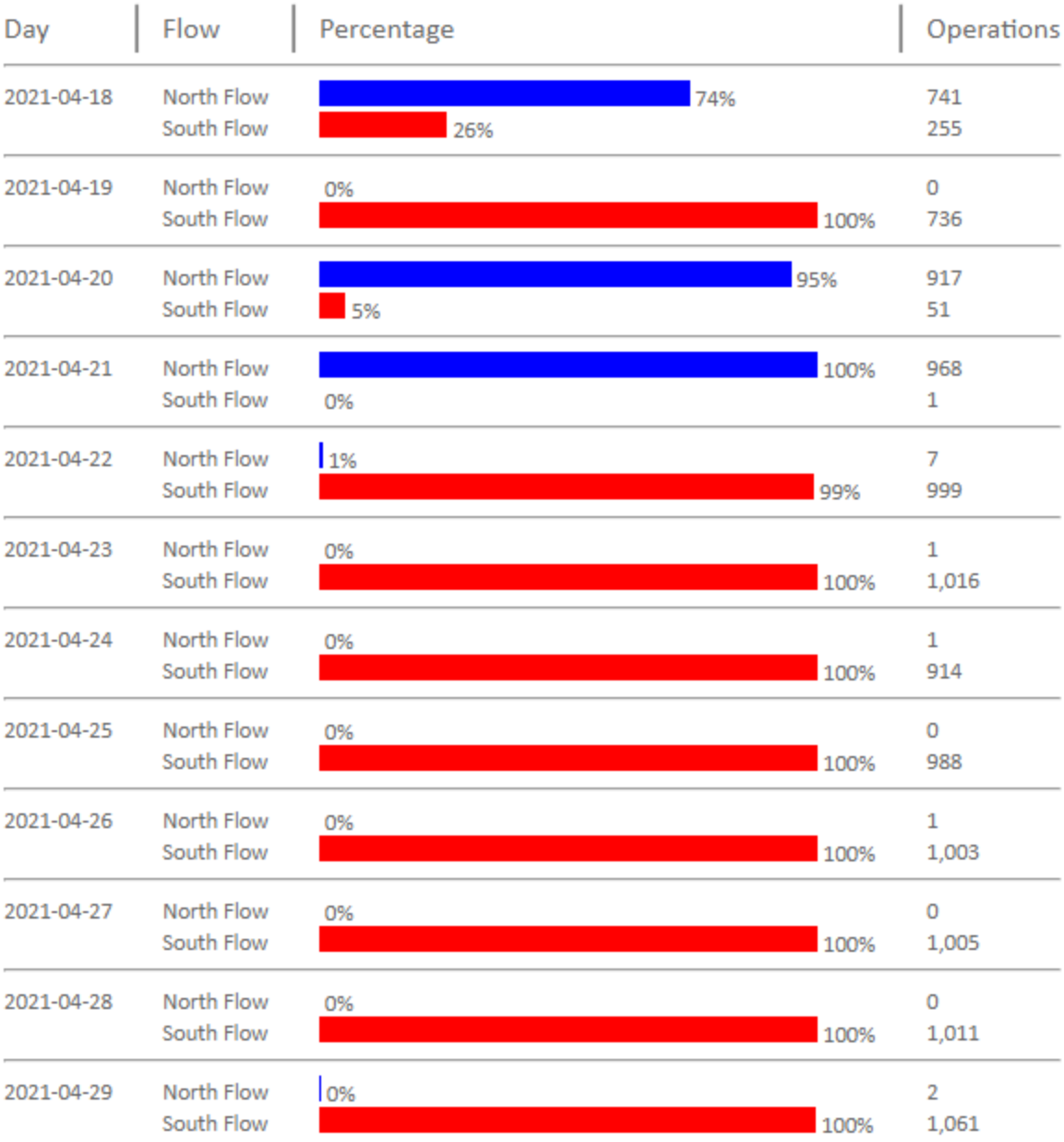

Day	Flow	Percentage	Operations
2021-04-18	North Flow	74%	741
	South Flow	26%	255
2021-04-19	North Flow	0%	0
	South Flow	100%	736
2021-04-20	North Flow	95%	917
	South Flow	5%	51
2021-04-21	North Flow	100%	968
	South Flow	0%	1
2021-04-22	North Flow	1%	7
	South Flow	99%	999
2021-04-23	North Flow	0%	1
	South Flow	100%	1,016
2021-04-24	North Flow	0%	1
	South Flow	100%	914
2021-04-25	North Flow	0%	0
	South Flow	100%	988
2021-04-26	North Flow	0%	1
	South Flow	100%	1,003
2021-04-27	North Flow	0%	0
	South Flow	100%	1,005
2021-04-28	North Flow	0%	0
	South Flow	100%	1,011
2021-04-29	North Flow	0%	2
	South Flow	100%	1,061

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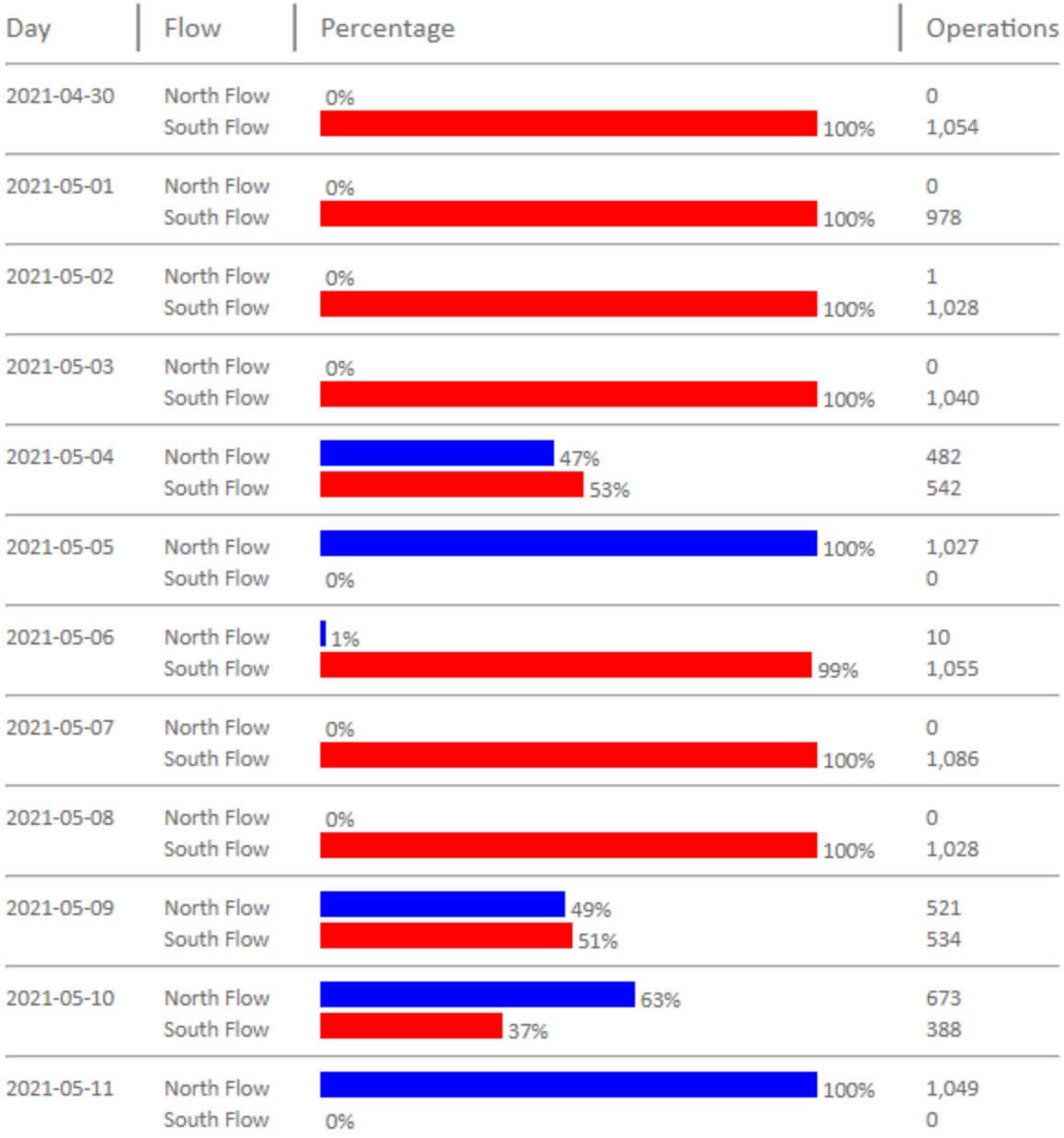

Day	Flow	Percentage	Operations
2021-04-30	North Flow	0%	0
	South Flow	100%	1,054
2021-05-01	North Flow	0%	0
	South Flow	100%	978
2021-05-02	North Flow	0%	1
	South Flow	100%	1,028
2021-05-03	North Flow	0%	0
	South Flow	100%	1,040
2021-05-04	North Flow	47%	482
	South Flow	53%	542
2021-05-05	North Flow	100%	1,027
	South Flow	0%	0
2021-05-06	North Flow	1%	10
	South Flow	99%	1,055
2021-05-07	North Flow	0%	0
	South Flow	100%	1,086
2021-05-08	North Flow	0%	0
	South Flow	100%	1,028
2021-05-09	North Flow	49%	521
	South Flow	51%	534
2021-05-10	North Flow	63%	673
	South Flow	37%	388
2021-05-11	North Flow	100%	1,049
	South Flow	0%	0

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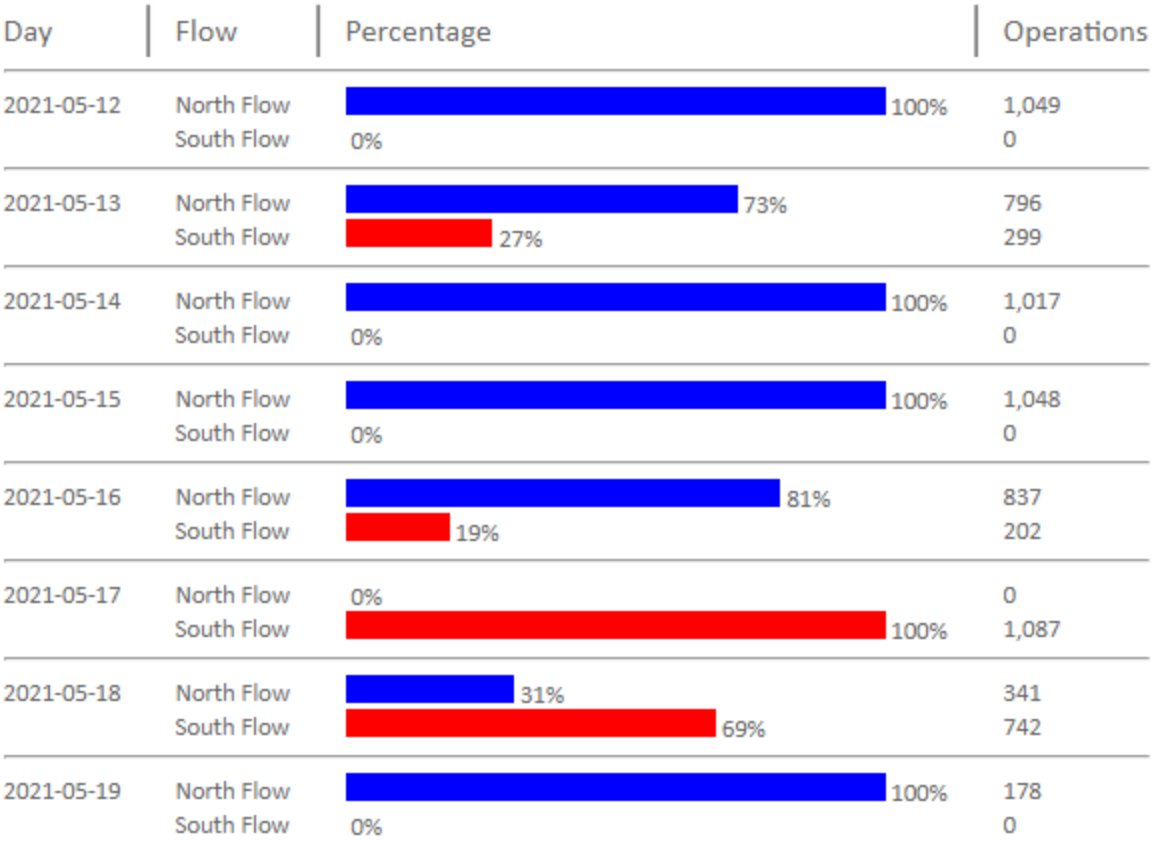

Day	Flow	Percentage	Operations
2021-05-12	North Flow	100%	1,049
	South Flow	0%	0
2021-05-13	North Flow	73%	796
	South Flow	27%	299
2021-05-14	North Flow	100%	1,017
	South Flow	0%	0
2021-05-15	North Flow	100%	1,048
	South Flow	0%	0
2021-05-16	North Flow	81%	837
	South Flow	19%	202
2021-05-17	North Flow	0%	0
	South Flow	100%	1,087
2021-05-18	North Flow	31%	341
	South Flow	69%	742
2021-05-19	North Flow	100%	178
	South Flow	0%	0

Appendix - Noise Metrics: Daily LEQ at Marvista

Equivalent Sound Level (LEQ)

The equivalent sound level (LEQ) measures the average acoustic energy over a period of time to take account of the cumulative effect of multiple noise events. This could, for example, provide a measure of the aggregate sound at a location that has aircraft overflights throughout the day. LEQ is defined as the level of continuous sound over a given time period that would deliver the same account of energy as the actual, varying sound exposure.

Date	NMT	LEQ Community Noise average comminity noise (all recored noise not correlated with an aircraft overflight)	LEQ Aircraft Noise average aircraft noise levels	LEQ Total
3/17/2021 0:00	B002	51	50	53
3/18/2021 0:00	B002	49	46	50
3/19/2021 0:00	B002	50	47	51
3/20/2021 0:00	B002	47	43	48
3/21/2021 0:00	B002	48	45	50
3/22/2021 0:00	B002	51	46	52
3/23/2021 0:00	B002	52	44	53
3/24/2021 0:00	B002	51	47	52
3/25/2021 0:00	B002	53	44	53
3/26/2021 0:00	B002	53	42	53
3/27/2021 0:00	B002	53	43	54
3/28/2021 0:00	B002	54	46	54
3/29/2021 0:00	B002	49	44	50
3/30/2021 0:00	B002	64	44	64
3/31/2021 0:00	B002	53	49	54

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Equivalent Sound Level (LEQ)

The equivalent sound level (LEQ) measures the aver- age acoustic energy over a period of time to take account of the cumulative effect of multiple noise events. This could, for example, provide a measure of the aggregate sound at a location that has aircraft overflights throughout the day. LEQ is defined as the level of continuous sound over a given time period that would deliver the same account of energy as the actual, varying sound exposure.

Date	NMT	LEQ Community Noise average comminity noise (all recored noise not correlated with an aircraft overflight)	LEQ Aircraft Noise average aircraft noise levels	LEQ Total
4/1/2021 0:00	B002	47	44	49
4/2/2021 0:00	B002	48	42	49
4/3/2021 0:00	B002	49	44	50
4/4/2021 0:00	B002	48	42	49
4/5/2021 0:00	B002	51	44	52
4/6/2021 0:00	B002	50	45	51
4/7/2021 0:00	B002	50	46	51
4/8/2021 0:00	B002	51	47	52
4/9/2021 0:00	B002	48	44	50
4/10/2021 0:00	B002	50	45	51
4/11/2021 0:00	B002	48	41	49
4/12/2021 0:00	B002	48	45	50
4/13/2021 0:00	B002	50	47	52
4/14/2021 0:00	B002	49	41	50
4/15/2021 0:00	B002	52	48	53
4/16/2021 0:00	B002	53	44	53
4/17/2021 0:00	B002	54	38	54
4/18/2021 0:00	B002	53	40	53
4/19/2021 0:00	B002	53	45	54
4/20/2021 0:00	B002	54	47	55
4/23/2021 0:00	B002	48	45	50
4/24/2021 0:00	B002	49	42	50

Appendix - Noise Metrics: Daily LEQ at Marvista

Equivalent Sound Level (LEQ)

The equivalent sound level (LEQ) measures the aver- age acoustic energy over a period of time to take ac- count of the cumulative effect of multiple noise events. This could, for example, provide a measure of the aggregate sound at a location that has aircraft overflights throughout the day. LEQ is defined as the level of continuous sound over a given time period that would deliver the same account of energy as the actual, varying sound exposure.

Date	NMT	LEQ Community Noise average comminity noise (all recored noise not correlated with an aircraft overflight)	LEQ Aircraft Noise average aircraft noise levels	LEQ Total
4/25/2021 0:00	B002	53	41	53
4/26/2021 0:00	B002	56	43	57
4/27/2021 0:00	B002	54	46	55
4/28/2021 0:00	B002	53	47	54
4/29/2021 0:00	B002	54	54	57
4/30/2021 0:00	B002	50	44	51
5/1/2021 0:00	B002	50	43	51
5/2/2021 0:00	B002	52	43	52
5/3/2021 0:00	B002	50	43	51
5/4/2021 0:00	B002	52	43	53
5/5/2021 0:00	B002	54	48	55
5/6/2021 0:00	B002	52	44	52
5/7/2021 0:00	B002	49	44	50
5/8/2021 0:00	B002	48	41	49
5/9/2021 0:00	B002	49	42	50
5/10/2021 0:00	B002	49	44	50
5/11/2021 0:00	B002	49	47	51
5/12/2021 0:00	B002	48	44	50
5/13/2021 0:00	B002	50	46	51
5/14/2021 0:00	B002	56	44	56
5/15/2021 0:00	B002	46	39	47
5/16/2021 0:00	B002	49	40	49
5/17/2021 0:00	B002	48	44	50
5/18/2021 0:00	B002	52	48	54

Appendix - Basic Noise Metrics

Sound Exposure Level (SEL)

The Sound Exposure Level (SEL) metric represents all the acoustical energy (sound pressure) of an individual noise event as if that event had occurred within a one-second time period. SEL captures both the level (magnitude) and the duration of a sound event in a single numerical quantity, by "squeezing" all the noise energy from an event into one second. This provides a uniform way to make comparisons among noise events of various durations.

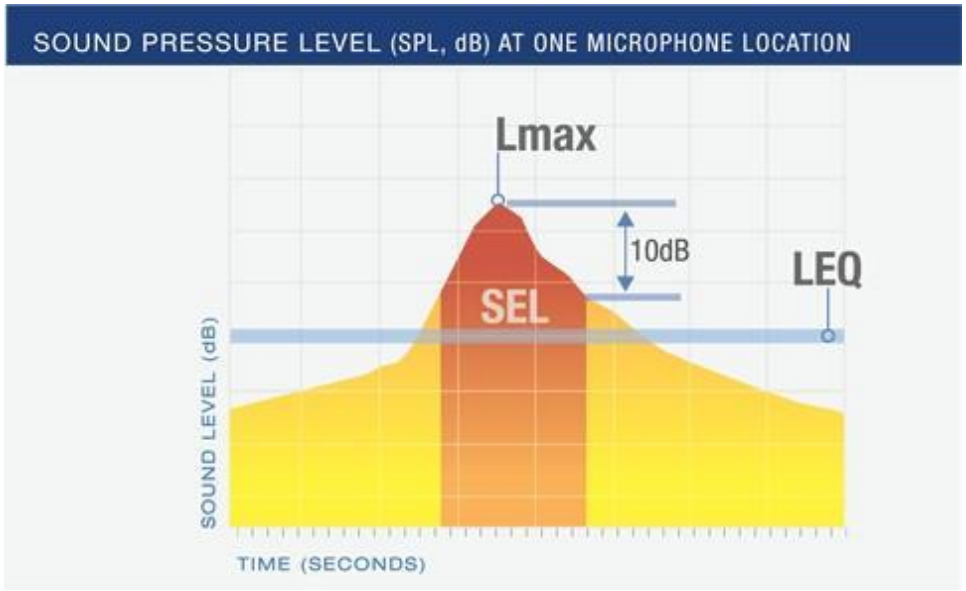
Equivalent Sound Level (LEQ)

The equivalent sound level (LEQ) measures the average acoustic energy over a period of time to take account of the cumulative effect of multiple noise events. This could, for example, provide a measure of the aggregate sound at a location that has aircraft overflights throughout the day. LEQ is defined as the level of continuous sound over a given time period that would deliver the same account of energy as the actual, varying sound exposure.

Maximum Sound Level (Lmax)

This is the highest level displayed on a sound level during a noise event or time period. *Peak is not the same as Maximum Sound Level.*

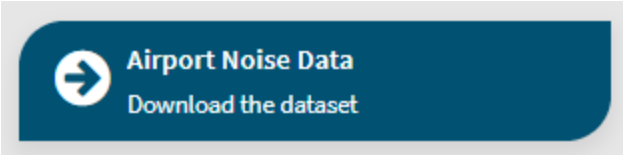
Source: FAA website: https://www.faa.gov/regulations_policies/policy_guidance/noise/basics/



Appendix - SEL Reports Available Online

SEL

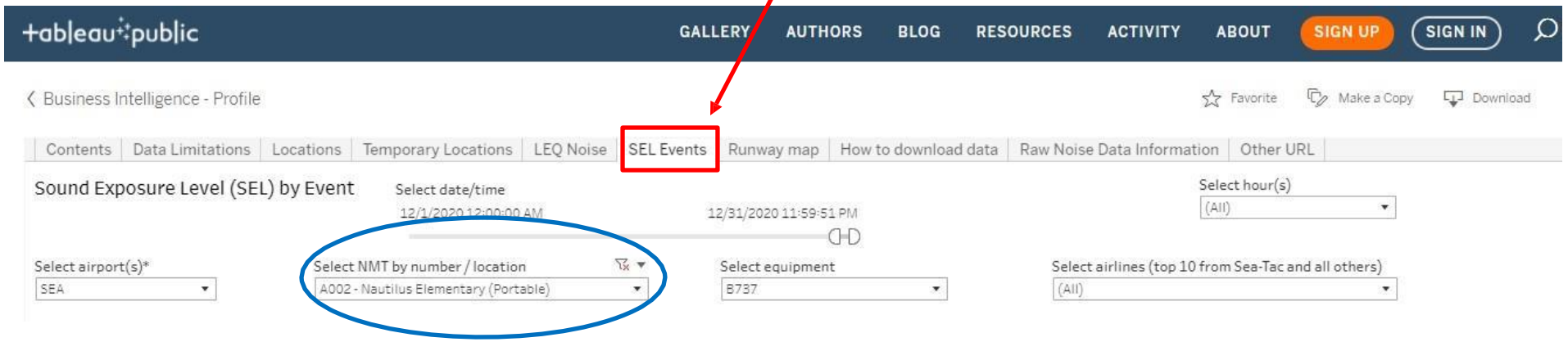
SEL—Sound Exposure Level of a noise event is measured over time between the initial and final points when the noise level exceeds a predetermined threshold and its energy is compressed into one second.



SEL data can be found on the Port of Seattle, SEA noise monitoring system data page:

https://public.tableau.com/profile/portofseattlebi#!/vizhome/Sea-Tacnoisemonitoringsystemdata/Contents

There you will find the SEL EVENTS tab



Data for the portable noise monitor B002—Marvista Elementary is available on the drop down, this allows you to view and download the SEL noise events for the time the noise monitor was deployed, from March 17, 202, to May 19, 2021. No SEL data is available at this location from 00:17 on April 20 to 09:27 on April 23, 2021. You can also download and compare SEL events at other noise monitors from the drop-down menu.