

# Summary of Measured Noise Levels in the Town of Superior, Colorado due to Rocky Mountain Metropolitan Airport Operations

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April 2024



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## Monthly Summary – April 2024 (Water Bladder Site)

The following summarizes the noise levels measured at the Water Bladder measurement location located off S. Torreys Peak Dr. and aircraft operations detected over the Town of Superior for the month of April 2024. Additional information regarding the measurements is attached.

- Over the entire month, a total of 11,181 aircraft operations<sup>1</sup> occurred within 1.25 miles of the measurement location (the distance within which aircraft are audible).
- Of these, 6,959 were touch and go (T&G) operations (62%).
- Over the entire month, aircraft operations were clearly noticeable (aircraft noise measured at approximately 5 dBA above the ambient sound level) for 7,975 minutes (133 hours).
- If T&G operations were not conducted at the airport, an analysis of the measurement data indicates that noticeable aircraft operations would decrease to 2,312 minutes (39 hours), which is a 71% reduction.
- The following summarizes the April 2024 noise survey results.

**Table 1 - Summary of Measured Noise Levels and Aircraft Operations in April 2024**

Operations	Quantity	Audible aircraft operations	Aircraft noise above ambient (dBA)	Aircraft 5 dBA Above Ambient (minutes)	Aircraft 10 dBA Above Ambient (minutes)	Aircraft 20 dBA Above Ambient (minutes)
All	Total for month	11,181	---	7,975	4,872	678
	Daily average	373	16	307	187	23
Touch and Go Removed	Total for month	5,256	---	2,312	1,301	149
	Daily average	175	10	89	50	5

- Figure 1 shows the flight paths on April 8, a day with total operations close to the median for the month. Note the concentration of T&G operations over the Town of Superior and Boulder County.
- Figure 2 shows the measured noise levels and concurrent aircraft activity for this day. Maximum noise levels generated by individual aircraft operations exceeded the ambient sound level by the following levels for the durations noted:
  - 5 dBA (clearly noticeable), 379 minutes.
  - 10 dBA (significant increase), 250 minutes.
  - 20 dBA (much louder), 46 minutes.
- Table 2 shows the hourly average noise levels and operation counts for this day.
- Figure 3 shows an hour on this day, during which time the measured level rarely reached ambient conditions (37 dBA), meaning that aircraft noise was almost constantly present.
- Figure 4 shows the flight paths for the entire month of April 2024.

<sup>1</sup> This report counts each touch-and-go operation as a single operation. The Federal Aviation Administration counts each touch-and-go operation as two operations.

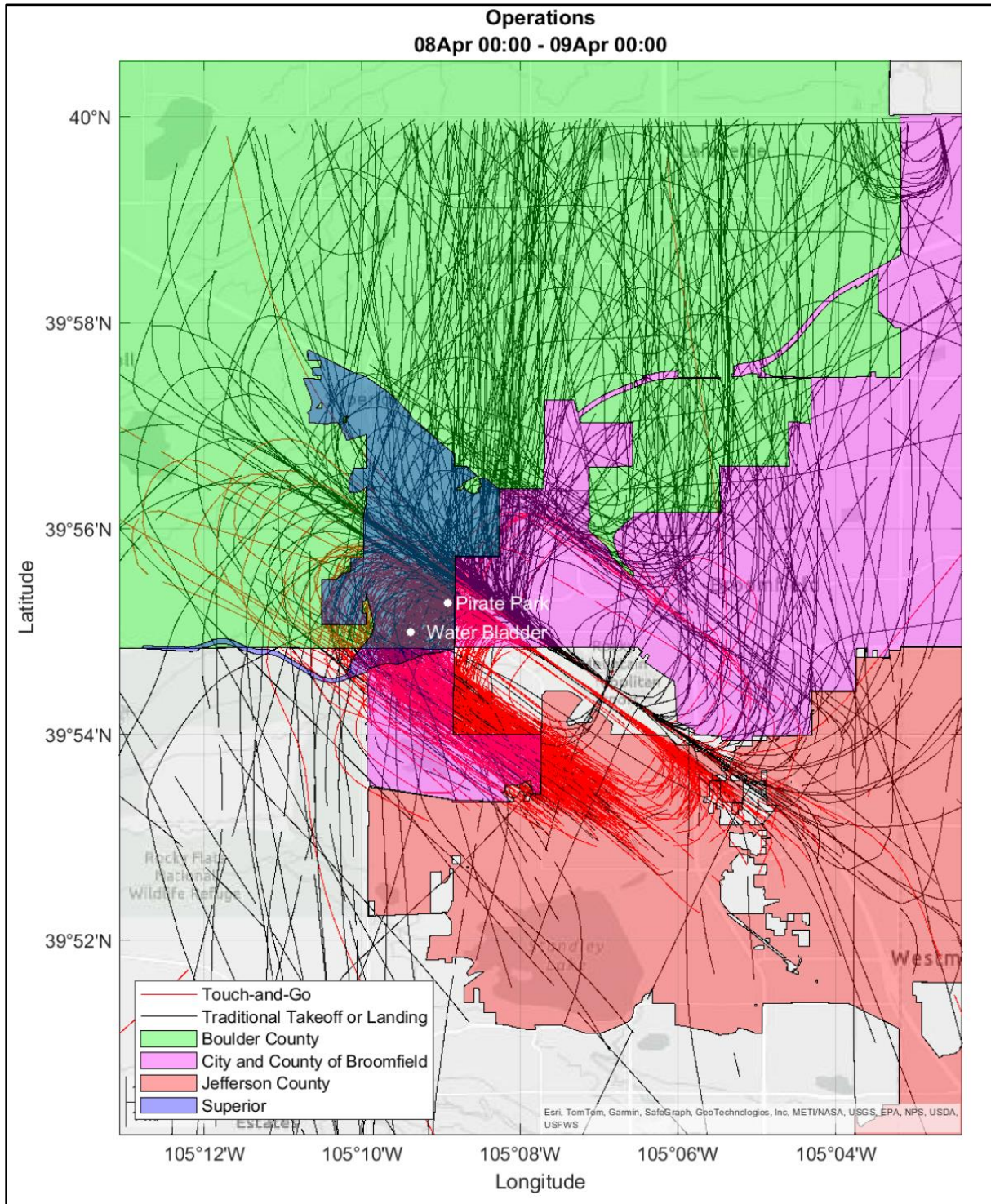


Figure 1 – Flight Paths on Median Day in April 2024 (600 Operations, 288 T&G)

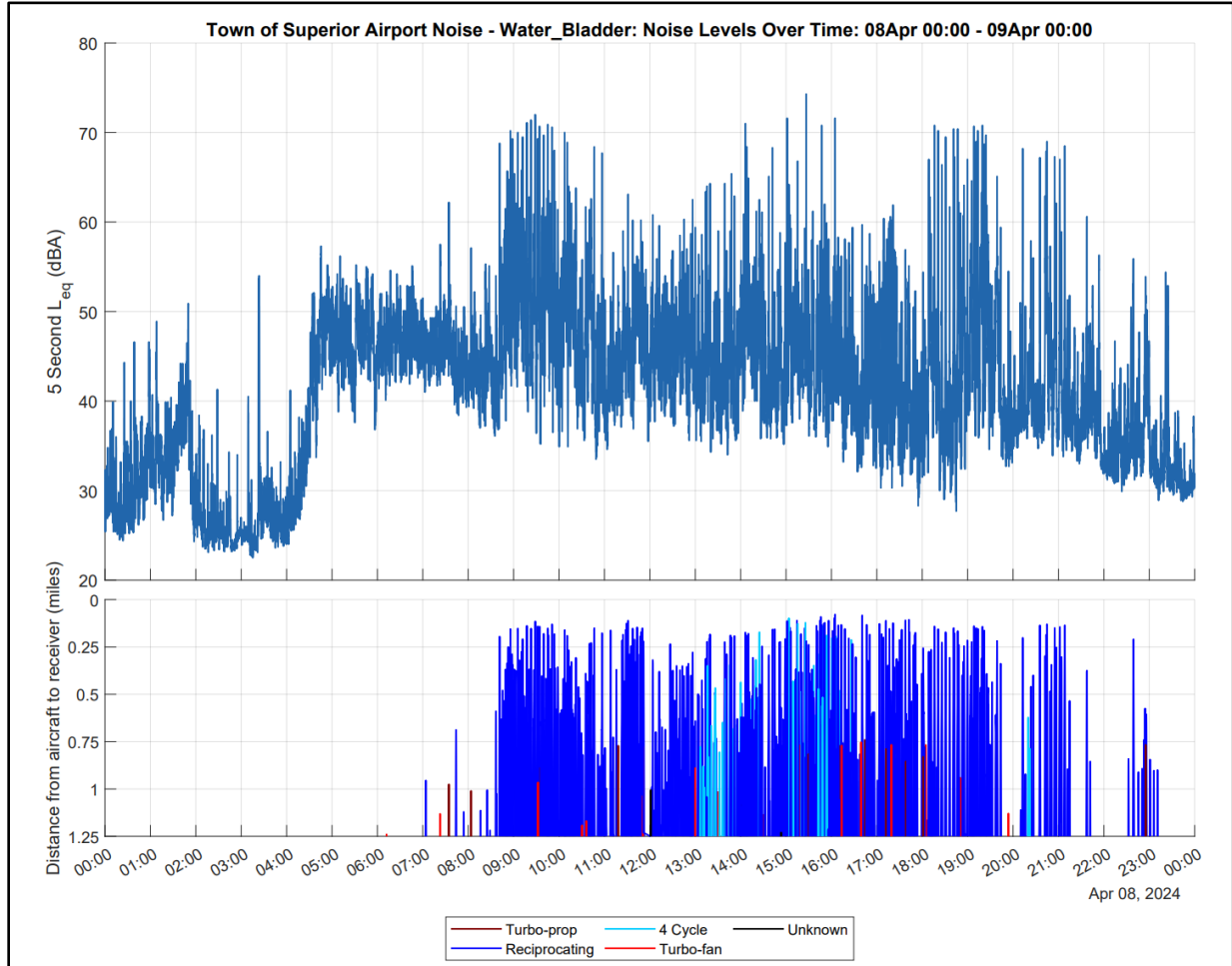


Figure 2 – Noise Levels and Aircraft Operations on Median Day (Water Bladder)

Table 2 – Hourly Noise Levels and Aircraft Operations on Median Day (Water Bladder)

Time	7 am	8 am	9 am	10 am	11 am	12 pm	1 pm	2 pm	3 pm	4 pm	5 pm	6 pm	7 pm	8 pm	9 pm
Average Noise Level (dBA)	47	53	58	53	48	49	50	52	53	49	48	54	53	51	47
Number of Operations	5	22	49	41	53	52	50	63	67	55	49	30	29	13	8

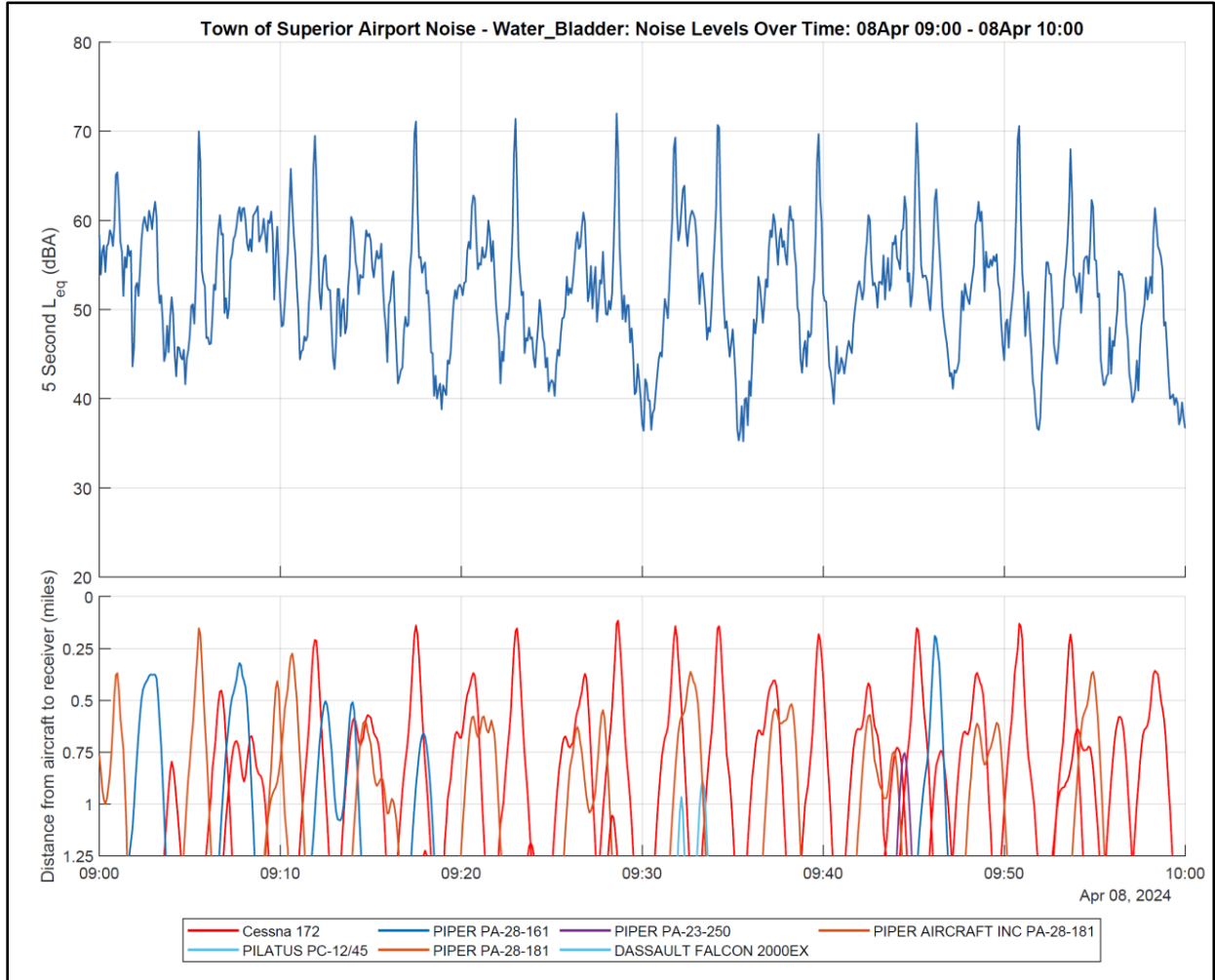


Figure 3 – Noise Levels and Aircraft Operations during an Example Hour on Median Day (Water Bladder)



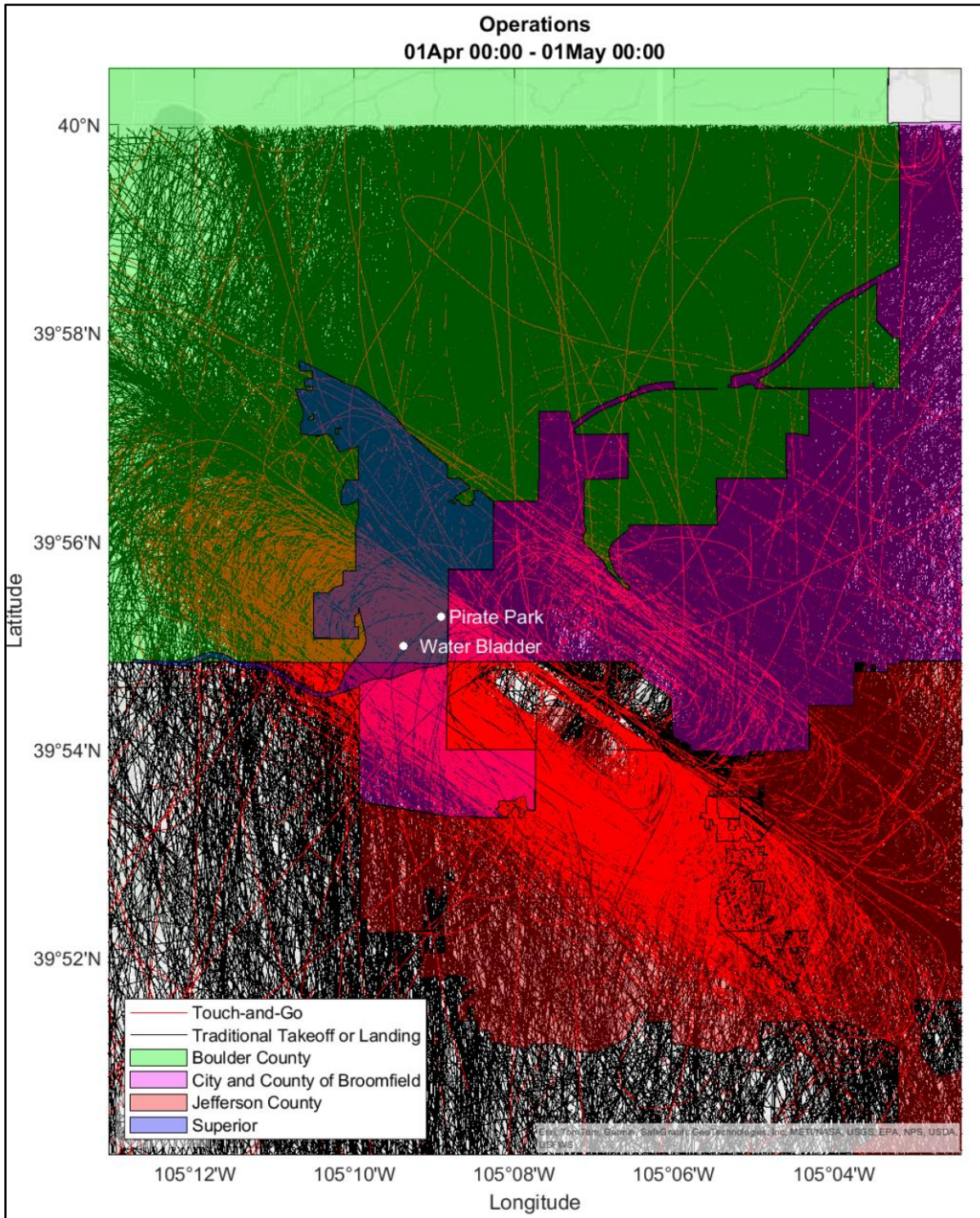


Figure 4 – All Flight Paths in April 2024 (16,339 Operations; 7,977 T&G)

## Monthly Summary – April 2024 (Pirate Park Site)

The following summarizes the noise levels measured at the Pirate Park measurement site located near Pirate Park off Yarrow Circle and aircraft operations detected over the Town of Superior for the month of April 2024. Note the Pirate Park location was not operating until April 5. Additional information regarding the measurements is attached.

- Over the entire month, a total of 11,934 aircraft operations<sup>2</sup> occurred within 1.25 miles of the measurement location (the distance within which aircraft are audible).
- Of these, 7,191 were touch and go (T&G) operations (60%).
- Over the entire month, aircraft operations were clearly noticeable (aircraft noise measured at approximately 5 dBA above the ambient sound level) for 6,369 minutes (106 hours).
- If T&G operations were not conducted at the airport, an analysis of the measurement data indicates that noticeable aircraft operations would decrease to 2,537 minutes (42 hours), which is a 60% reduction.
- Aircraft noise exceeds the ambient noise level by 20 dBA or more for a significant amount of time at this site (almost one hour per day).
- The following summarizes the April 2024 noise survey. Note the minutes 20 dBA above ambient are much higher than at the Water Bladder, due to the closer proximity to the runway and the lower, climbing, aircraft.

**Table 3 - Summary of Measured Noise Levels and Aircraft Operations in April 2024**

Operations	Quantity	Audible aircraft operations	Aircraft noise above ambient (dBA)	Aircraft 5 dBA Above Ambient (minutes)	Aircraft 10 dBA Above Ambient (minutes)	Aircraft 20 dBA Above Ambient (minutes)
All	Total for month	11,934	---	6,369	4,488	1,313
	Daily average	398	60	277	195	57
Touch and Go Removed	Total for month	5,800	---	2,537	1,776	448
	Daily average	193	56	110	77	19

- Figure 5 shows the measured noise levels and concurrent aircraft activity for April 8, a day with total operations close to the median for the month. Maximum noise levels generated by individual aircraft operations exceeded the ambient sound level by the following levels for the durations noted:
  - 5 dBA (clearly noticeable), 385 minutes.
  - 10 dBA (significant increase), 298 minutes.
  - 20 dBA (much louder), 108 minutes.
- Table 4 shows the hourly average noise levels and operation counts for this day.
- Figure 6 shows an hour on this day, during which time the measured level rarely reached ambient conditions (38 dBA), meaning that aircraft noise was almost constantly present.

<sup>2</sup> This report counts each touch-and-go operation as a single operation. The Federal Aviation Administration counts each touch-and-go operation as two operations.

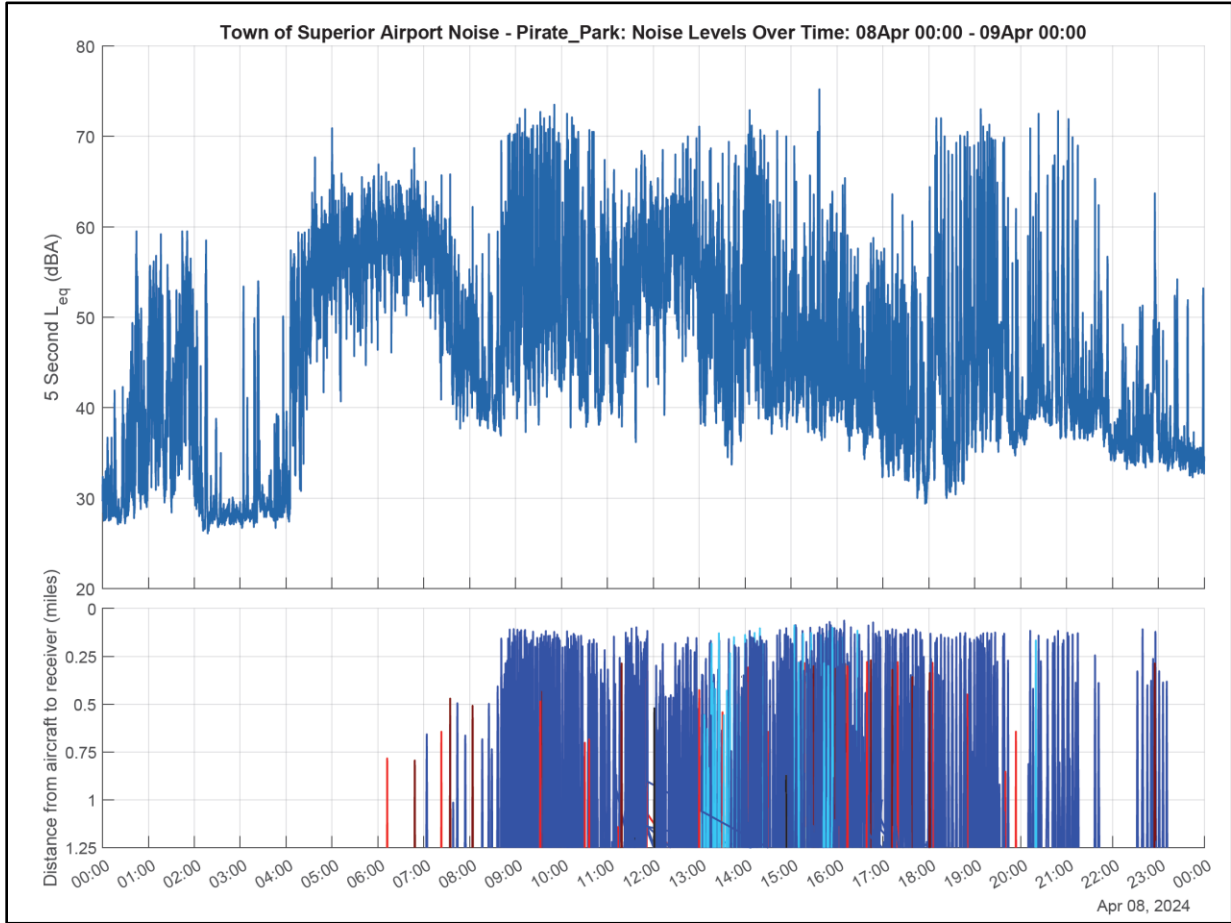


Figure 5 – Noise Levels and Aircraft Operations on Median Day (Pirate Park)

Table 4 – Hourly Noise Levels and Aircraft Operations on Median Day (Pirate Park)

Time	7 am	8 am	9 am	10 am	11 am	12 pm	1 pm	2 pm	3 pm	4 pm	5 pm	6 pm	7 pm	8 pm	9 pm
Average Noise Level (dBA)	56	55	61	58	58	59	56	58	54	49	46	56	56	54	51
Number of Operations	5	22	49	41	53	52	50	63	67	55	49	30	29	13	8



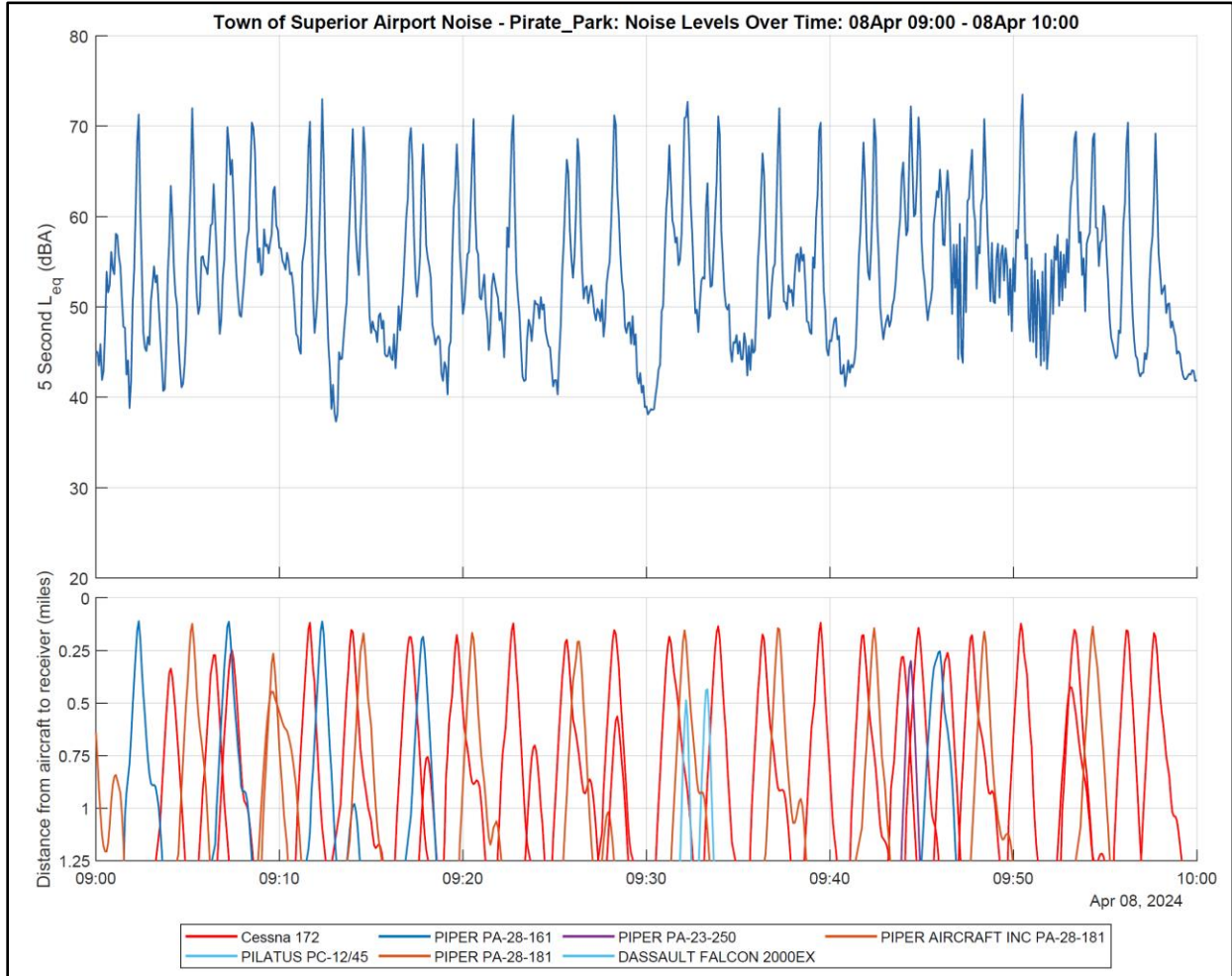


Figure 6 – Noise Levels and Aircraft Operations during an Example Hour on Median Day (Pirate Park)

# Detailed Results

## 1. Measurement Locations and Flight Paths

Noise level monitors were placed at the locations shown in Figure 1-1 and configured to continually measure noise levels. The Water Bladder and Community Center meters were in service for the entirety of April 2024. The North Pool meter was moved to Pirate Park on April 5. The selection of measurement locations considered proximity of Town of Superior residences, aircraft flight paths, and availability of public land. The Water Bladder location was chosen as it is removed from busy roads and in the flight path of touch and go operations. The Community Center location was chosen as it is directly in the flight path of the runway 12 L. The Pirate Park location was chosen as it is directly in the flight path of runway 12 R while still being nearby to residences.

Aircraft flight paths are limited due to Denver International Airport airspace to the east and mountains to the west. This, along with prevailing wind patterns, pushes a majority of operations over the town, as shown in Figures 1 and 4 (above).

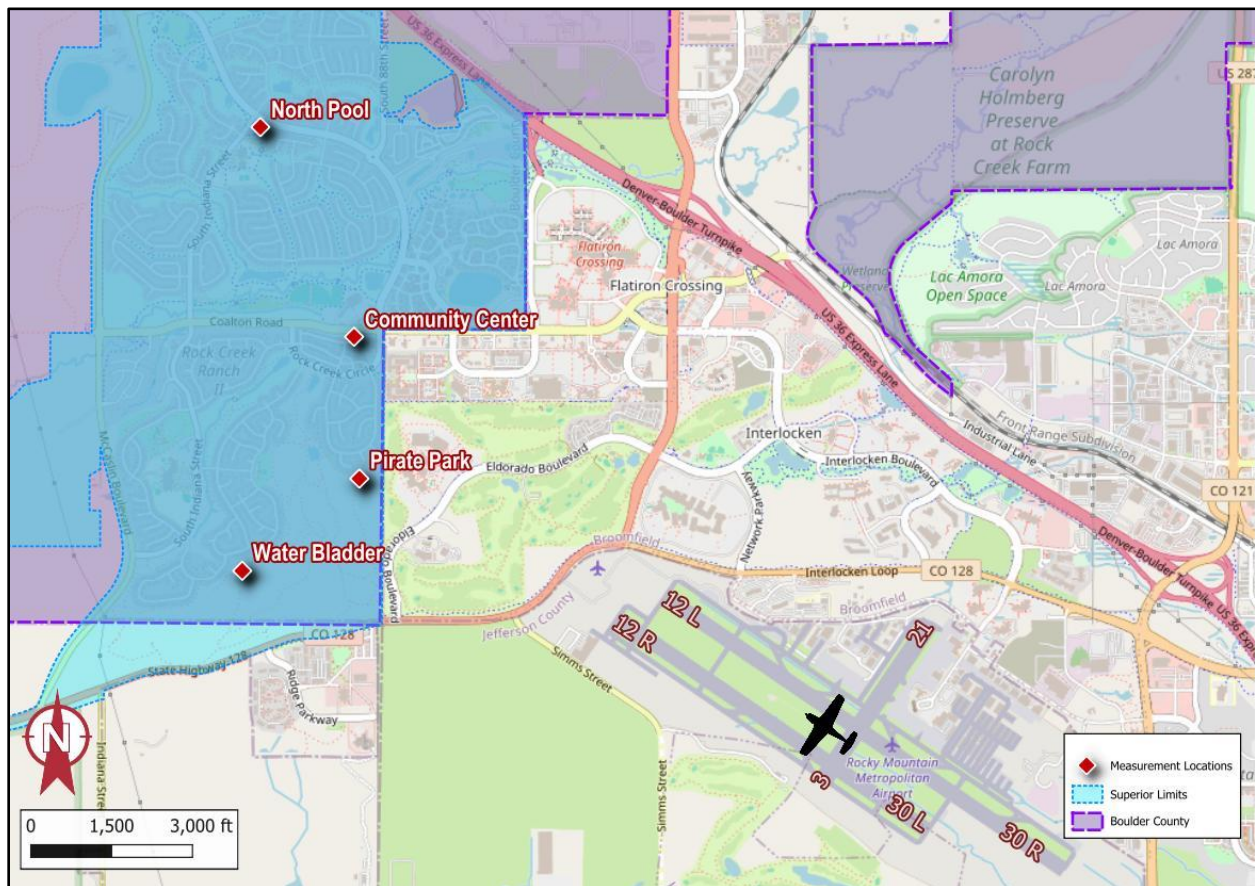


Figure 1-1. Measurement Locations and Airport

## **2. Noise and Aircraft Operations Measurement Procedures**

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Noise levels were measured in accordance with applicable acoustical standards as well as the author's experience in this specialized field. The following sections describe the acoustical standards followed, measurement equipment specifications and settings, measurement duration, ground wind measurement equipment, and aircraft operations data integration.

### **2.1 Applicable Noise Measurement and Analysis Standards**

The measurements were executed in accordance with the relevant aspects of the following standards:

1. Noise measurement equipment meets the Type 1 specifications of American National Standards Institute (ANSI) standard S1.4-2014 (R2024) American National Standard Specification for Sound Level Meters.
2. ANSI S1.11-2004 (R2009), Electroacoustics - Octave-band and Fractional-octave-band Filters - Part 1: Specifications.
3. ANSI S1.40-2006 (R2016), American National Standard Specifications and Verification Procedures for Sound Calibrators.
4. The measurement and analysis procedures followed the applicable portions of ANSI S12.9-2013 Part 3 (R2018) Quantities and Procedures for Description and Measurement of Environmental Sound - Part 3: Short-Term Measurements with an Observer Present.
5. ANSI S12.18-1994 (R2019) Outdoor Measurement of Sound Pressure Level.
6. ANSI S1.13-2020 American National Standard Measurement of Sound Pressure Level in Air.

### **2.2 Noise Measurement Equipment**

Noise levels were measured using Larson Davis Model 831 sound level meters with associated preamplifiers and ½ inch free-field precision microphones. All measurement and field calibration equipment were certified by a traceable laboratory within 18 months prior to the measurements. Field calibrations were conducted on April 16, 2024, and the drift in the measured noise level was well within tolerance (Water Bladder 0.0 dB, and Community Center - 0.6 dB). Calibration certificates and records are available upon request. The microphones were mounted on steel poles and positioned five feet above the ground (per ANSI S12.9). The microphones were covered with hydrophobically treated 7-inch diameter, 80-pores-per-inch density windscreens (ACO Pacific Model WS7-80T). Audio from each sound level meter was recorded using Tascam DR-05X digital recorders. The sound level meters were configured to continuously measure and record 5-second and 1-hour averages of the following metrics: overall  $L_{eq}$ ,  $L_{10}$ ,  $L_{50}$ , and  $L_{90}$ , as well as one-third octave band  $L_{eq}$  levels (6.3 Hz to 20 kHz).

### **2.3 Aircraft Position Measurement Equipment**

Aircraft position data is being collected in the area with an Automatic Dependent Surveillance-Broadcast (ADS-B) monitoring system that receives real-time data from each aircraft in the area,

including location, speed, and a unique identifier (hex code). Aircraft position data is being logged on 5-second intervals and is combined with the Federal Aviation Administration (FAA) aircraft registration database to get additional information for each aircraft, including make/model, engine type, and owner. Aircraft from flight schools were identified based on the owner and listed registration numbers from the flight school websites. Altitude data from the aircraft is based on barometric pressure on the aircraft and is not corrected for barometric pressure on the ground. During data processing, the altitude data is corrected based on barometric pressure from the airport. Aircraft above 11,000 feet are filtered out of the database to eliminate from the analysis aircraft that are passing overhead.

## **2.4 Meteorological Data**

Wind speeds and direction are being measured continuously at each long-term monitoring site using Vaisala WXT530 series sonic anemometers, mounted on steel poles approximately 6.5 feet above the ground (per ANSI S12.18) and placed within approximately 10 feet of the microphones. Barometric pressure data was obtained from the airport's weather station.

## **2.5 Resulting Measurement Database**

This report presents the results of measurements conducted throughout the month of April 2024. A total of 720 hours of continuous noise, aircraft, and ground wind data were collected. All data was organized into a single database, and data was time synchronized through the cellular network.

Figure 2-1 shows noise levels versus time (top graph) and distance to the nearest aircraft over time (bottom graph) for an example one-hour period at the Water Bladder. This example shows a single aircraft doing touch and go exercises, which involves landing the airplane and immediately taking off again, and results in the airplane circling over the microphone every 5 to 10 minutes. Note the ambient sound level, the level occurring with no aircraft present, is approximately 35 dBA during this example hour. With aircraft present levels are as high as 70 dBA, which is a 35 dBA increase over the ambient sound level.

Figure 2-2 shows the measured noise levels and aircraft operations for a representative hour with frequent aircraft operations. During this hour the ambient sound level for this day of 38 dBA is reached only for a few minutes because there was very little time when aircraft noise was not audible.



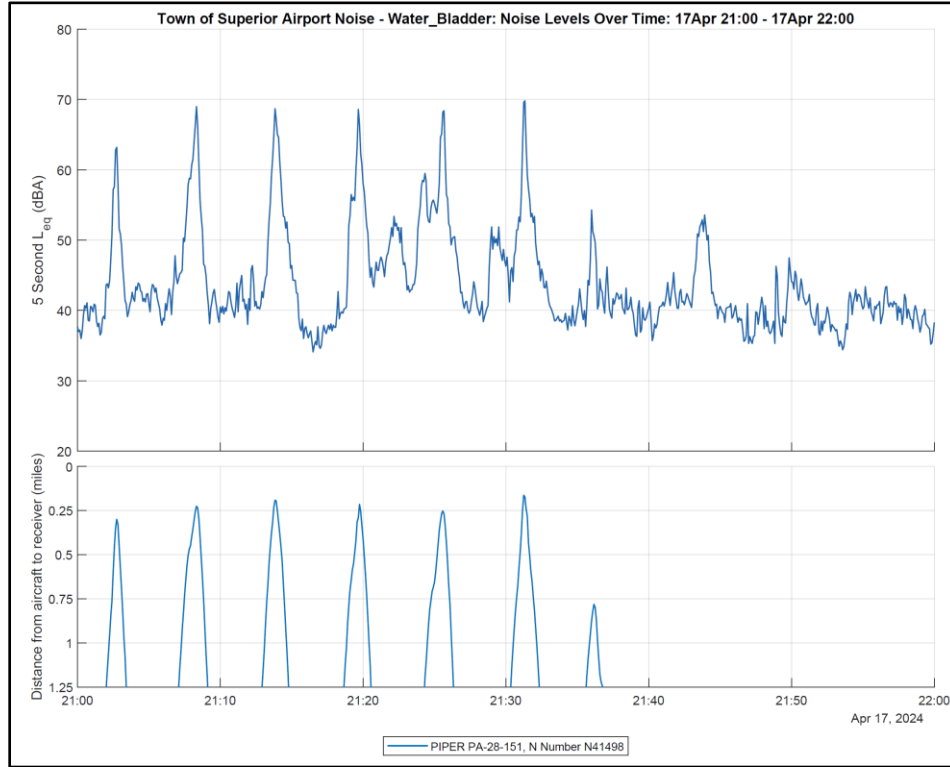


Figure 2-1. Example Time Plot of Measured Noise Levels - Touch and Go Operations

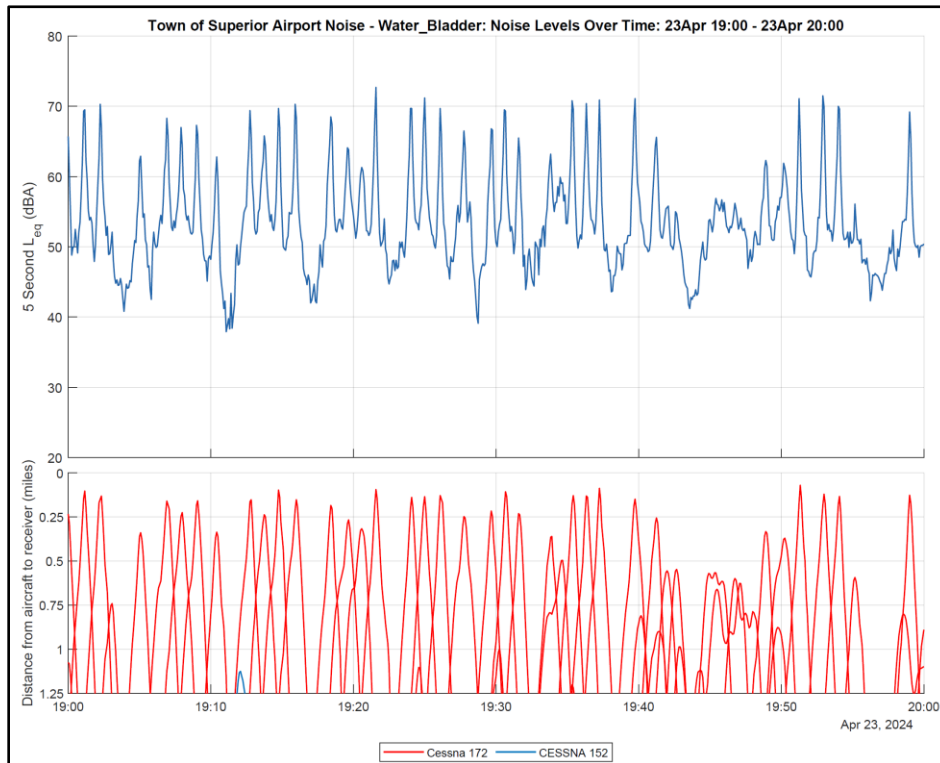


Figure 2-2. Example Time Plot During an Hour with Frequent Aircraft Operations

### 3. Data Analysis Procedures

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The measured noise level and aircraft operations data was analyzed as follows.

#### 3.1 Duration of Analysis Intervals

The measured data was recorded and analyzed in 5-second intervals. This interval was chosen because it provides sufficient resolution to capture changes in noise levels against aircraft proximity over time. Results are summarized and presented herein in terms of daily averages of noise levels when aircraft are present versus ambient noise levels in the area (noise generated by non-aircraft sources, such as distant roadway traffic).

#### 3.2 Aircraft Types and Operations

Each 5-second ADS-B sample was classified into one of five operational types: (1) on-the-ground, (2) flyover, (3) touch and go (T&G), (4) takeoff, and (5) landing. The number of operations per day for each operational type is shown in Table 3-1. Samples classified as on-the-ground were excluded from further analysis as planes would not be audible during these times, and samples for aircraft above 11,000 feet or classified as flyovers were excluded from further analysis as these operations were not generated by this airport.

Each aircraft detected in the month is analyzed separately. Each 5-second sample in which the individual aircraft's signal was detected is arranged into a table in chronological order. Each sample is labeled as on the ground (known from the positional information) or airborne. Airborne samples are then grouped into events, which include takeoff, landing, touch and go operation, and flyover. Starting with the first 5-second sample in time where the aircraft was detected as being airborne, the following logic is applied. This is also shown in the table below.

- If the previous sample was on the ground, and a sample within the next 20 minutes is on the ground, the entire window of samples when the aircraft was airborne is classified as touch and go.
- If the previous sample was on the ground, and no samples within the next 20 minutes are on the ground, the entire 20-minute window of samples is classified as takeoff.
- If the previous sample was not on the ground, and a sample within the next 20 minutes is on the ground, the entire window of samples when the aircraft was airborne is classified as landing.
- If the previous sample was not on the ground, and no samples within the next 20 minutes are on the ground, the entire 20-minute window of samples is classified as flyover.

	Is on the ground within the next 20 minutes	Is not on the ground within the next 20 minutes
Previous sample is on the ground	Touch and Go	Take-off
Previous sample is not on the ground	Landing	Flyover

Additionally, T&G operations were further classified as initial (the initial take off) or subsequent (subsequent touch and go landings and takeoffs) depending on whether or not the last operation of the aircraft was classified as a T&G operation. As described in more detail below, this was done to allow for the estimation of noise levels for a scenario where T&G operations occurred at another distant airfield.

Each ADS-B sample was also classified by aircraft engine type, as shown in Table 3-2. Aircraft engine type is identified from the aircraft registration “N Number” broadcast by the aircraft, and the FAA aircraft registration database, which provides details about each registered aircraft. Flight schools are identified based on the aircraft registered owner, a list of planes and N Numbers on each flight school’s website, and observations of aircraft at the airport. Most aircraft are identified as piston engine (reciprocating or 4-cycle) and the majority of them are registered to flight schools.

### **3.3 Ambient Sound Levels**

For the purposes of this analysis, the ambient daytime noise levels for each day are defined as the  $L_{90}$  dBA noise level measured during daytime hours. This is calculated by ordering all 5-second  $L_{eq}$  dBA noise level samples measured between 7:00 AM and 10:00 PM and taking the 90<sup>th</sup> percentile, which is the noise level exceeded 90 percent of the time. Noise level contributions from aircraft operations are effectively removed with the  $L_{90}$  metric.

### **3.4 Aircraft Noise Levels**

Aircraft noise levels represent the 5-second measurement samples when any aircraft operations were audible. Noise levels are plotted against the concurrently measured distance from each aircraft to quantify the relationship between these two variables. The data indicates that at distances of 1 to 1.25 miles, aircraft begin to have an effect on noise levels and, at distances of 1 mile or less from the measurement location aircraft have a significant influence on measured noise levels. For the purposes of this analysis operations were considered audible if the aircraft came within 1.25 miles of a measurement site at any time during the operation.

### **3.5 Aircraft Noise Levels without T&G Operations**

Aircraft noise levels without T&G operations represent the average of all 5-second samples taken when aircraft operations were audible, but with noise level during all times when an aircraft operation was classified as a subsequent T&G set to the ambient sound level for that day. This simulates what the average noise level would be if T&G operations took place elsewhere, i.e., a distant airfield. Initial T&G operations were not removed from the analysis because an aircraft would need to takeoff from the airport even if T&G operations were located elsewhere. This initial T&G operation represents the takeoff.

**Table 3-1. Aircraft Operations<sup>3</sup> by Type**

Day	Operation Type			Total Operations	Percentage T&G	Total Number of Unique Aircraft
	T&G	Takeoff	Landing			
1-Apr-24	33	32	34	99	33%	46
2-Apr-24	354	232	232	818	43%	143
3-Apr-24	368	235	228	831	44%	151
4-Apr-24	336	239	237	812	41%	146
5-Apr-24	99	83	81	263	38%	87
6-Apr-24	0	2	0	2	0%	2
7-Apr-24	1	18	7	26	4%	21
8-Apr-24	288	209	103	600	48%	123
9-Apr-24	605	254	160	1,019	59%	145
10-Apr-24	334	182	111	627	53%	119
11-Apr-24	488	262	256	1,006	49%	146
12-Apr-24	602	245	198	1,045	58%	139
13-Apr-24	400	182	162	744	54%	120
14-Apr-24	411	198	189	798	52%	137
15-Apr-24	232	124	101	457	51%	105
16-Apr-24	6	32	8	46	13%	30
17-Apr-24	299	243	123	665	45%	129
18-Apr-24	1	33	14	48	2%	34
19-Apr-24	0	35	2	37	0%	32
20-Apr-24	0	4	0	4	0%	3
21-Apr-24	406	173	189	768	53%	146
22-Apr-24	165	193	95	453	36%	122
23-Apr-24	398	208	188	794	50%	132
24-Apr-24	485	283	266	1,034	47%	170
25-Apr-24	230	134	132	496	46%	123
26-Apr-24	261	137	130	528	49%	122
27-Apr-24	0	12	15	27	0%	19
28-Apr-24	413	148	149	710	58%	128
29-Apr-24	487	265	258	1,010	48%	166
30-Apr-24	275	146	151	572	48%	137
Month Total	7,977	4,543	3,819	16,339	49%	-

<sup>3</sup> This report counts each touch-and-go operation as a single operation. The Federal Aviation Administration counts each touch-and-go operation as two operations.



**Table 3-2. Aircraft Operations<sup>4</sup> by Aircraft Engine Type**

Day	Engine Type					
	Piston	Turboprop	Turboshaft	Turbojet	Turbofan	Unknown
1-Apr-24	27	9	0	0	48	15
2-Apr-24	733	22	5	0	45	13
3-Apr-24	759	21	3	0	46	2
4-Apr-24	734	14	5	0	47	12
5-Apr-24	202	12	4	0	32	13
6-Apr-24	0	1	0	0	1	0
7-Apr-24	3	2	0	0	19	2
8-Apr-24	524	17	3	0	36	20
9-Apr-24	761	15	3	0	26	214
10-Apr-24	456	8	6	0	35	122
11-Apr-24	822	19	9	0	38	118
12-Apr-24	827	8	4	0	37	169
13-Apr-24	595	18	4	0	26	101
14-Apr-24	624	8	0	0	36	130
15-Apr-24	357	12	5	0	34	49
16-Apr-24	19	9	3	0	15	0
17-Apr-24	578	14	6	0	42	25
18-Apr-24	1	12	0	0	29	6
19-Apr-24	4	6	0	0	26	1
20-Apr-24	0	0	0	0	4	0
21-Apr-24	670	17	8	0	39	34
22-Apr-24	397	8	7	0	34	7
23-Apr-24	728	13	5	0	35	13
24-Apr-24	861	16	6	0	50	101
25-Apr-24	417	12	7	0	49	11
26-Apr-24	439	11	9	0	37	32
27-Apr-24	0	0	0	0	26	1
28-Apr-24	640	8	0	0	51	11
29-Apr-24	853	16	6	0	51	84
30-Apr-24	506	14	5	0	38	9
Month Total	13,537	342	113	0	1,032	1,315

<sup>4</sup> This report counts each touch-and-go operation as a single operation. The Federal Aviation Administration counts each touch-and-go operation as two operations.

## 4. Noise Measurement and Analysis Results

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Tables 4-1 through 4-3 provide a summary of the noise levels and aircraft operations measured during each day of April 2024 at each of the three measurement locations, respectively. Note there is no noise data from April 6 and 7 at the Water Bladder and Pirate Park as ground wind speeds were too high to collect accurate data. The tables provide the following information:

- The daily measured ambient (background) sound level ( $L_{90}$ ).
- The number of audible aircraft operations each day. For the purposes of this analysis operations were considered audible if aircraft came within 1.25 miles of a measurement site, based on an analysis of measured noise level and aircraft distance data. This will exclude any takeoffs and landings to and from runways 30 L and 30 R.
- The average measured noise level with aircraft from the airport present (within 1.25 miles).
- The number of decibels that aircraft noise is above the daily ambient sound level.
- The number of minutes each day that aircraft were present, and the noise level they generated that exceeded the ambient sound level by 5, 10, and 20 dBA, respectively.
- This information is then repeated with T&G operations excluded from the analysis.

**Table 4-1. Summary of Measured Noise Levels<sup>5</sup> and Aircraft Operations<sup>6</sup> – Water Bladder**

Date	Ambient Noise Level (dBA)	Daytime - All Operations						Daytime - T&G Operation Removed					
		Number of Audible Operations	Average Noise Level with Aircraft (dBA)	Aircraft Noise Level Increase Above Ambient (dBA)	Duration of Aircraft Noise Levels Above Ambient (Minutes)			Number of Audible Operations	Average Noise Level with Aircraft (dBA)	Aircraft Noise Level Increase Above Ambient (dBA)	Duration of Aircraft Noise Levels Above Ambient (Minutes)		
					> 5 dBA	> 10 dBA	> 20 dBA				> 5dBA	> 10 dBA	> 20 dBA
1-Apr-24	38	47	57	19	34	26	6	33	51	13	18	13	2
2-Apr-24	39	555	56	17	417	274	39	278	50	11	128	81	9
3-Apr-24	41	549	57	16	482	322	42	224	50	9	112	69	6
4-Apr-24	37	568	54	16	378	231	32	285	47	9	103	59	6
5-Apr-24	41	178	57	16	131	92	9	111	50	9	41	26	2
6-Apr-24	-	0	-	-	-	-	-	0	-	-	-	-	-
7-Apr-24	-	11	-	-	-	-	-	11	-	-	-	-	-
8-Apr-24	37	482	55	18	379	250	46	256	49	12	147	91	12
9-Apr-24	38	669	56	18	494	316	52	303	49	11	135	77	9
10-Apr-24	37	405	56	19	367	260	51	219	50	13	148	96	15
11-Apr-24	38	649	49	12	385	160	10	306	45	7	108	45	3
12-Apr-24	37	699	52	15	433	250	32	312	46	9	109	60	7
13-Apr-24	37	494	53	16	317	198	29	228	50	13	110	67	10
14-Apr-24	38	557	54	16	365	207	29	282	49	11	129	60	6
15-Apr-24	42	332	57	15	204	112	17	143	51	9	51	27	5
16-Apr-24	40	22	53	14	7	4	0	19	51	11	5	3	0
17-Apr-24	37	529	55	18	446	334	46	283	49	12	147	106	10
18-Apr-24	34	26	55	21	9	8	3	26	55	21	9	8	3
19-Apr-24	35	23	58	23	6	6	3	23	58	23	6	6	3
20-Apr-24	31	3	52	21	0	0	0	3	52	21	0	0	0
21-Apr-24	38	551	52	14	340	170	16	229	46	7	83	40	4
22-Apr-24	39	304	56	17	259	178	24	181	52	12	110	71	8
23-Apr-24	38	573	55	16	413	258	35	254	48	10	117	67	7
24-Apr-24	40	690	55	15	423	235	29	312	49	9	125	56	4
25-Apr-24	41	325	55	15	254	153	14	127	47	6	47	25	2
26-Apr-24	41	347	57	16	273	172	26	139	48	7	51	24	3
27-Apr-24	38	10	56	17	2	2	0	10	56	17	2	2	0
28-Apr-24	41	524	57	17	411	265	41	173	48	8	73	42	5
29-Apr-24	42	643	56	15	441	249	28	297	50	8	126	56	5
30-Apr-24	41	416	56	15	320	153	19	189	51	9	88	40	4
<b>Monthly Average</b>	<b>38</b>	<b>373</b>	<b>55</b>	<b>17</b>	<b>285</b>	<b>175</b>	<b>24</b>	<b>175</b>	<b>50</b>	<b>11</b>	<b>83</b>	<b>47</b>	<b>5</b>
<b>Monthly Total</b>	<b>-</b>	<b>11,181</b>	<b>-</b>	<b>-</b>	<b>7,990</b>	<b>4,886</b>	<b>677</b>	<b>5,256</b>	<b>-</b>	<b>-</b>	<b>2,328</b>	<b>1,315</b>	<b>148</b>

<sup>5</sup> Ground wind speeds were too high to capture valid data on April 6<sup>th</sup> and 7<sup>th</sup>.

<sup>6</sup> This report counts each touch-and-go operation as a single operation. The Federal Aviation Administration counts each touch-and-go operation as two operations.

**Table 4-2. Summary of Measured Noise Levels and Aircraft Operations<sup>7</sup> – Community Center**

Date	Ambient Noise Level (dBA)	Daytime - All Operations						Daytime - T&G Operation Removed					
		Number of Audible Operations	Average Noise Level with Aircraft (dBA)	Aircraft Noise Level Increase Above Ambient (dBA)	Duration of Aircraft Noise Levels Above Ambient (Minutes)			Number of Audible Operations	Average Noise Level with Aircraft (dBA)	Aircraft Noise Level Increase Above Ambient (dBA)	Duration of Aircraft Noise Levels Above Ambient (Minutes)		
					> 5 dBA	> 10 dBA	> 20 dBA				> 5dBA	> 10 dBA	> 20 dBA
1-Apr-24	44	58	56	12	22	7	1	40	54	10	16	5	1
2-Apr-24	44	581	58	14	319	153	20	304	56	12	177	89	14
3-Apr-24	45	590	57	13	297	143	19	264	55	11	144	73	12
4-Apr-24	44	576	56	12	243	92	15	293	54	10	120	46	8
5-Apr-24	43	181	58	16	129	73	13	114	57	14	70	40	8
6-Apr-24	49	2	46	0	0	0	0	2	46	0	0	0	0
7-Apr-24	42	18	48	6	4	1	0	18	48	6	4	1	0
8-Apr-24	44	493	56	12	216	82	12	268	53	10	126	46	7
9-Apr-24	44	685	57	12	283	118	18	323	54	10	136	57	9
10-Apr-24	45	428	56	11	189	64	7	237	54	9	110	36	4
11-Apr-24	45	663	53	8	182	39	4	314	50	6	98	21	2
12-Apr-24	44	732	54	10	236	82	9	328	52	7	114	40	5
13-Apr-24	45	513	55	10	166	52	5	241	53	8	90	29	3
14-Apr-24	42	571	56	14	280	112	18	288	54	12	167	66	10
15-Apr-24	43	339	55	12	140	57	7	153	52	9	68	28	4
16-Apr-24	45	31	52	8	9	2	0	28	51	6	8	1	0
17-Apr-24	46	549	58	12	229	101	15	302	56	10	130	58	10
18-Apr-24	47	33	52	5	6	1	0	33	52	5	6	1	0
19-Apr-24	47	32	53	6	8	0	0	32	53	6	8	0	0
20-Apr-24	41	4	46	6	1	0	0	4	46	6	1	0	0
21-Apr-24	42	573	54	12	252	77	9	234	50	8	113	35	3
22-Apr-24	43	332	58	14	171	83	13	210	56	12	103	49	7
23-Apr-24	45	604	56	11	230	84	9	279	53	8	108	39	5
24-Apr-24	47	716	57	10	241	91	10	343	55	8	127	49	5
25-Apr-24	45	353	58	14	180	79	13	154	55	11	74	33	6
26-Apr-24	46	373	57	11	151	66	8	163	54	8	65	28	4
27-Apr-24	48	12	54	6	3	0	0	12	54	6	3	0	0
28-Apr-24	43	547	59	16	268	123	21	192	55	12	92	42	8
29-Apr-24	44	681	59	15	333	175	30	337	56	12	160	83	15
30-Apr-24	45	429	58	13	186	69	11	202	54	9	83	31	5
<b>Monthly Average</b>	<b>44</b>	<b>390</b>	<b>55</b>	<b>11</b>	<b>166</b>	<b>68</b>	<b>9</b>	<b>190</b>	<b>53</b>	<b>9</b>	<b>84</b>	<b>34</b>	<b>5</b>
<b>Monthly Total</b>	<b>-</b>	<b>11,699</b>	<b>-</b>	<b>-</b>	<b>4,972</b>	<b>2,026</b>	<b>285</b>	<b>5,712</b>	<b>-</b>	<b>-</b>	<b>2,522</b>	<b>1,025</b>	<b>155</b>

<sup>7</sup> This report counts each touch-and-go operation as a single operation. The Federal Aviation Administration counts each touch-and-go operation as two operations.



**Table 4-3. Summary of Measured Noise Levels<sup>8</sup> and Aircraft Operations<sup>9</sup> – Pirate Park**

Date	Ambient Noise Level (dBA)	Daytime - All Operations						Daytime - T&G Operation Removed					
		Number of Audible Operations	Average Noise Level with Aircraft (dBA)	Aircraft Noise Level Increase Above Ambient (dBA)	Duration of Aircraft Noise Levels Above Ambient (Minutes)			Number of Audible Operations	Average Noise Level with Aircraft (dBA)	Aircraft Noise Level Increase Above Ambient (dBA)	Duration of Aircraft Noise Levels Above Ambient (Minutes)		
					> 5 dBA	> 10 dBA	> 20 dBA				> 5dBA	> 10 dBA	> 20 dBA
1-Apr-24	-	58	-	-	-	-	-	41	-	-	-	-	-
2-Apr-24	-	588	-	-	-	-	-	309	-	-	-	-	-
3-Apr-24	-	594	-	-	-	-	-	268	-	-	-	-	-
4-Apr-24	-	580	-	-	-	-	-	297	-	-	-	-	-
5-Apr-24	-	186	-	-	-	-	-	119	-	-	-	-	-
6-Apr-24	-	2	-	-	-	-	-	2	-	-	-	-	-
7-Apr-24	-	18	-	-	-	-	-	18	-	-	-	-	-
8-Apr-24	38	498	59	21	385	298	108	271	55	17	184	142	51
9-Apr-24	40	737	59	20	465	315	91	332	54	14	170	112	26
10-Apr-24	39	446	59	20	368	271	83	246	54	16	172	126	34
11-Apr-24	39	675	52	14	348	178	20	324	49	10	150	78	10
12-Apr-24	38	779	56	19	440	303	74	333	51	13	158	103	21
13-Apr-24	38	524	58	20	328	231	70	243	54	16	144	104	30
14-Apr-24	39	590	58	20	380	282	73	293	54	15	175	130	30
15-Apr-24	42	345	60	18	194	117	29	154	55	13	78	47	8
16-Apr-24	42	34	60	18	18	15	4	31	59	17	15	12	3
17-Apr-24	39	557	59	20	409	292	87	309	54	15	183	130	32
18-Apr-24	36	33	62	25	15	13	6	33	62	25	15	13	6
19-Apr-24	39	33	60	21	9	7	3	33	60	21	9	7	3
20-Apr-24	34	4	58	24	1	1	1	4	58	24	1	1	1
21-Apr-24	38	577	54	17	297	180	27	236	50	12	106	63	12
22-Apr-24	39	335	61	21	279	221	75	211	57	18	142	112	36
23-Apr-24	40	609	58	19	205	131	32	281	54	14	96	58	14
24-Apr-24	42	716	59	18	402	257	56	340	54	12	160	100	17
25-Apr-24	41	355	81	40	268	192	68	156	66	25	84	59	15
26-Apr-24	41	375	66	26	289	210	68	165	65	24	78	56	13
27-Apr-24	40	12	64	24	6	5	3	12	64	24	6	5	3
28-Apr-24	38	554	61	24	456	365	139	194	54	16	115	91	29
29-Apr-24	38	686	61	22	507	400	146	339	54	16	189	148	42
30-Apr-24	42	434	61	19	300	207	47	206	55	14	110	78	13
<b>Monthly Average</b>	<b>39</b>	<b>398</b>	<b>60</b>	<b>21</b>	<b>277</b>	<b>195</b>	<b>57</b>	<b>193</b>	<b>56</b>	<b>17</b>	<b>110</b>	<b>77</b>	<b>19</b>
<b>Monthly Total</b>	<b>-</b>	<b>11,934</b>	<b>-</b>	<b>-</b>	<b>6,369</b>	<b>4,488</b>	<b>1,313</b>	<b>5,800</b>	<b>1,291</b>	<b>-</b>	<b>2,537</b>	<b>1,776</b>	<b>448</b>

<sup>8</sup> The Pirate Park measurement site was not operational until April 5<sup>th</sup>, and ground wind speeds were too high to capture valid data on April 6<sup>th</sup> and 7<sup>th</sup>.

<sup>9</sup> This report counts each touch-and-go operation as a single operation. The Federal Aviation Administration counts each touch-and-go operation as two operations.