



# **Rhode Island**

## Airport Corporation

### **Data Report for the Rhode Island T.F. Green International Airport Air Monitoring Program**

**Reporting Period: April 2023 – June 2023**

## Table of Contents

|   |           |
|---|-----------|
| <b>Section 1: Introduction .....</b>              | <b>2</b>  |
| <b>Section 2: Sampling Program.....</b>           | <b>3</b>  |
| 2.1 Station Locations.....                        | 3         |
| 2.2 Program Description .....                     | 5         |
| 2.3 Sampling Methods.....                         | 5         |
| 2.4 Environmental Control.....                    | 5         |
| <b>Section 3: Summary of Monitoring Data.....</b> | <b>6</b>  |
| 3.1 Overview .....                                | 6         |
| 3.2 Data Completeness.....                        | 6         |
| 3.3 Summary of Black Carbon Data.....             | 7         |
| 3.4 Summary of Ultrafine Particulate Data.....    | 14        |
| 3.5 Summary of Meteorological Data.....           | 21        |
| 3.6 Summary of Runway Usage Data.....             | 30        |
| <b>Section 4: Quality Control.....</b>            | <b>31</b> |
| 4.1 Quality Control Activities.....               | 31        |

## **Section 1: Introduction**

Under Section 1-7-1 of the State of Rhode Island General Laws (The Permanent Air Quality Monitoring Act, or “the Act”), RIAC is required to “design, acquire, install, operate, and maintain a long-term air monitoring program in the vicinity of T.F. Green Airport”. This report summarizes the monitoring activities and results of the RIAC Air Monitoring Program for the Second Quarter of 2023 (April 1, 2023 to June 30, 2023).

The RIAC Air Monitoring Program includes ambient air monitoring for black carbon and particulate matter (PM<sub>0.1</sub>) at four stations around Rhode Island T.F. Green International Airport. In addition, select meteorological parameters (wind speed and direction, ambient temperature, and relative humidity) measured at the airport are summarized in this report. Flight operations are also summarized in this report.

## Section 2: Sampling Program

### 2.1 Station Locations

The four Warwick, RI monitoring sites are described below:

1. Fieldview (former location of 138 Fieldview Drive) – Located south-southwest of the airfield approximately 500 feet from Taxiway M and 2,200 feet from the end of Runway 5. Adjoining land uses include single-family residential to the west and south, long-term parking for the airport and the Terminal Ramp to the north, and the taxiway/runway system to the east.
2. Lydick (western end of Lydick Avenue) – Located adjacent to the Spring Green neighborhood and the airport's northeastern property line, approximately 3,500 feet from the end of Runway 23. Adjoining land uses include the airport to the south, commercial properties to the west, and single-family residential to the north, east, and south.
3. Smith St. (Relocated Fire Station) – Located east of Greenlawn St on the south side of Smith St approximately 1,900 feet south and east of Runway 5. Adjoining land uses include the airport to the north, open space (FAA lighting system for RWY 5) to the west and single family residential to the south, east, and west.
4. Pembroke (adjacent to Winslow Park athletic facility) – Located due east of the airport approximately 2,150 feet from the intersection of Runways 5/23 and 16/34. Adjoining land uses are the airport to the west, and residential or recreational fields to the north, east, and south.

The locations of the monitoring sites are shown on Figure 2.1.



Figure 2.1. Monitoring Station Locations. Google Earth

## 2.2 Program Description

Table 2.1 presents the monitoring configurations of each of the RIAC monitoring stations.

**Table 2.1. Sampling Configuration of the Four Monitoring Stations in the RIAC Air Quality Monitoring Program.**

| Parameters                          | Sampling and Analysis Equipment                 | Summary Description   |
|-------------------------------------|---|---|
| Ultra-fine PM < 0.1 microns (PM0.1) | Water-based Condensation Particle Counter (EPC) | Real-time measurements based on light (infrared) scattering characteristics of airborne PM. |
| Black Carbon (BC)                   | Aethalometer monitors                           | Real-time measurements based on the light absorbing characteristics of soot.                |

## 2.3 Sampling Methods

Sampling of ambient air for the measurement of pollutant concentrations and atmospheric conditions was performed by appropriate monitoring methods. This assures that the air sampled was representative of the ambient air and that the measurements were representative of the actual pollutant concentrations.

### 2.3.1 Reference and Acceptable Methods

The instruments and systems used to collect ultrafine particulate and black carbon are acceptable real-time samplers for measurements but they are not EPA certified. Descriptions of each of these monitoring methods are presented below.

#### 2.3.1.1 Black carbon

Optically-absorbing black-carbon (BC) aerosol particles, which are a characteristic of diesel and jet exhaust, were continuously measured by a Magee Scientific Model AE-22 aethalometer. The aethalometer is equipped with a PM<sub>2.5</sub> inlet to ensure BC in the respirable size range is measured.

#### 2.3.1.2 Ultrafine particles

Total particle count was measured using real-time, water-based condensation particle counters (EPC). The particle counters are equipped with an inlet cyclone to screen out particles larger than 3 μm. The majority of particles counted have a diameter of 0.1 μm or less.

## 2.4 Environmental Control

To help ensure proper performance, all analyzers and supporting equipment were installed and continue to operate in a temperature-controlled environment. An insulated enclosure with a thermostatically controlled heater was installed to house the analyzers, samplers, data acquisition system, materials, supplies, and storage of project documentation.

During the warmer months a built-in Environmental Condition Unit (ECU) maintains appropriate temperatures in the shelter. The shelter is maintained between 20 and 30 °C and is designed to minimize rapid fluctuations in temperature.

## Section 3: Summary of Monitoring Data

### 3.1 Overview

The Clean Air Act requires EPA to set National Ambient Air Quality Standards (NAAQS). There are no NAAQS for Black Carbon or Ultrafine Particulates (PM<sub>0.1</sub>).

Meteorological data obtained from the local National Weather Service Station at Rhode Island T.F. Green International Airport is summarized in Section 3.5. Runway usage data is summarized in Section 3.6.

### 3.2 Data Completeness

Second Quarter 2023 data capture is presented in the table below.

**Table 3.2. Data Recovery from Continuous Monitors.**

| Site                         | Valid Hours | Total Hours | Recovery |
|------------------------------|-------------|-------------|----------|
| <b>Fieldview</b>             |             |             |          |
| Aethalometer                 | 2133        | 2184        | 97.66%   |
| Ultrafine Particulate Matter | 2164        | 2184        | 99.08%   |
| <b>Lydick</b>                |             |             |          |
| Aethalometer                 | 2173        | 2184        | 99.50%   |
| Ultrafine Particulate Matter | 2163        | 2184        | 99.04%   |
| <b>Pembroke</b>              |             |             |          |
| Aethalometer                 | 2107        | 2184        | 96.47%   |
| Ultrafine Particulate Matter | 2118        | 2184        | 96.98%   |
| <b>Smith St*</b>             |             |             |          |
| Aethalometer                 | 2169        | 2184        | 99.31%   |
| Ultrafine Particulate Matter | 2136        | 2184        | 97.80%   |

### 3.3 Summary of Black Carbon Data

#### 3.3.1 Real-Time Black Carbon Data

The black carbon data is collected at one minute increments with an aethalometer at each monitoring site. Hourly data is calculated. Previous quarter data are presented by site in Tables 3.3.1-3.3.8. Current data are presented in Figures 3. 1- 3.8.

- **Fieldview:**

- The highest hourly value was 3,343 ng/m<sup>3</sup>. Previous quarter Maxima are displayed below.

**Table 3.3.1 Fieldview Previous Quarter Maxima values**

| Fieldview | 2023  | 2022  | 2021  | 2020  | 2019   | 2018  | 2017   |
|-----------|-------|-------|-------|-------|--------|-------|--------|
| Quarter 1 | 3,263 | 2,620 | 1,353 | 2,621 | 2,101  | 2,622 | 2513.4 |
| Quarter 2 |       | 2,943 | 1,840 | 4,436 | 1,253  | 2,264 | 1755.9 |
| Quarter 3 |       | 3,113 | 6,123 | 3,090 | 30,767 | 2,135 | 3,362  |
| Quarter 4 |       | 6,611 | 3,086 | 2,837 | 2,933  | 2,965 | 2,808  |

- The average hourly value was 333 ng/m<sup>3</sup>. Previous quarter averages are displayed below.

**Table 3.3.2 Fieldview Previous Quarter Average values**

| Fieldview | 2023 | 2022 | 2021 | 2020 | 2019 | 2018 | 2017  |
|-----------|------|------|------|------|------|------|-------|
| Quarter 1 | 364  | 384  | 195  | 273  | 228  | 308  | 257.1 |
| Quarter 2 |      | 247  | 215  | 207  | 196  | 281  | 343.2 |
| Quarter 3 |      | 402  | 505  | 262  | 308  | 305  | 436.5 |
| Quarter 4 |      | 431  | 442  | 296  | 315  | 251  | 312   |

- **Smith:**

- The highest hourly value was 3,297 ng/m<sup>3</sup>. Previous quarter averages are displayed below. Previous quarter maxima are displayed below.

**Table 3.3.3 Smith Previous Quarter Maxima values**

| Smith     | 2023  | 2022  | 2021  | 2020           |
|-----------|-------|-------|-------|----------------|
| Quarter 1 | 2,055 | 3,395 | 1,880 | Not in service |
| Quarter 2 |       | 5,045 | 2,017 | 5,689          |
| Quarter 3 |       | 2,616 | 5,031 | 4,187          |
| Quarter 4 |       | 5,381 | 4,033 | 4,595          |



- The average hourly value was 351 ng/m<sup>3</sup>. Previous quarter averages are displayed below.

**Table 3.3.4 Smith Previous Quarter Average values**

| Smith     |     | 2022 | 2021 | 2020           |
|-----------|-----|------|------|----------------|
| Quarter 1 | 211 | 412  | 218  | Not in service |
| Quarter 2 |     | 282  | 216  | 230            |
| Quarter 3 |     | 355  | 357  | 310            |
| Quarter 4 |     | 402  | 419  | 347            |

- Lydick:

- The highest hourly value was 2,502 ng/m<sup>3</sup>. Previous quarter maxima are displayed below.

| Lydick    | 2023  | 2022  | 2021  | 2020  | 2019  | 2018  | 2017    |
|-----------|-------|-------|-------|-------|-------|-------|---------|
| Quarter 1 | 1,875 | 3,265 | 1,673 | 2,685 | 2,113 | 3,523 | 5,057.6 |
| Quarter 2 |       | 1,975 | 2,335 | 5,302 | 2,143 | 2,233 | 2150.8  |
| Quarter 3 |       | 1,897 | 4,286 | 3,464 | 7,605 | 4,587 | 4,381   |
| Quarter 4 |       | 2,731 | 2,305 | 4,704 | 3,240 | 4,478 | 4,849   |

- The average hourly value was 301 ng/m<sup>3</sup>. Previous quarter averages are displayed below.

| Lydick    | 2023 | 2022 | 2021 | 2020 | 2019 | 2018 | 2017  |
|-----------|------|------|------|------|------|------|-------|
| Quarter 1 | 227  | 271  | 220  | 259  | 265  | 262  | 466.0 |
| Quarter 2 |      | 199  | 213  | 197  | 197  | 266  | 440.1 |
| Quarter 3 |      | 265  | 338  | 309  | 329  | 310  | 615.9 |
| Quarter 4 |      | 288  | 328  | 340  | 318  | 276  | 450   |

- Pembroke:

- The highest hourly value was 6,178 ng/m<sup>3</sup>. Previous quarter maxima are listed below.

| Pembroke  | 2023  | 2022  | 2021  | 2020  | 2019   | 2018   | 2017   |
|-----------|-------|-------|-------|-------|--------|--------|--------|
| Quarter 1 | 2,082 | 3,877 | 6,512 | 3,151 | 12,062 | 4,568  | 5253.9 |
| Quarter 2 |       | 6,930 | 2,386 | 3,742 | 1,975  | 16,521 | 2241.5 |
| Quarter 3 |       | 1,650 | 5,005 | 7,225 | 3,989  | 6,531  | 8141.7 |
| Quarter 4 |       | 2,941 | 2,460 | 5,481 | 3,631  | 7,839  | 17,452 |

- The average hourly value was 393 ng/m<sup>3</sup>. Previous quarter averages are displayed below.

**Table 3.3.8 Pembroke Previous Quarter Average values**

| <b>Pembroke</b> | <b>2023</b> | <b>2022</b> | <b>2021</b> | <b>2020</b> | <b>2019</b> | <b>2018</b> | <b>2017</b> |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Quarter 1       | 298         | 305         | 497         | 353         | 392         | 178         | 484.4       |
| Quarter 2       |             | 545         | 221         | 241         | 238         | 437         | 417.8       |
| Quarter 3       |             | 244         | 349         | 361         | 380         | 400         | 619.2       |
| Quarter 4       |             | 252         | 362         | 428         | 420         | 434         | 409         |

Figure 3.1. Plot of Hourly Average Black Carbon Concentrations (ng/m3) at Fieldview,

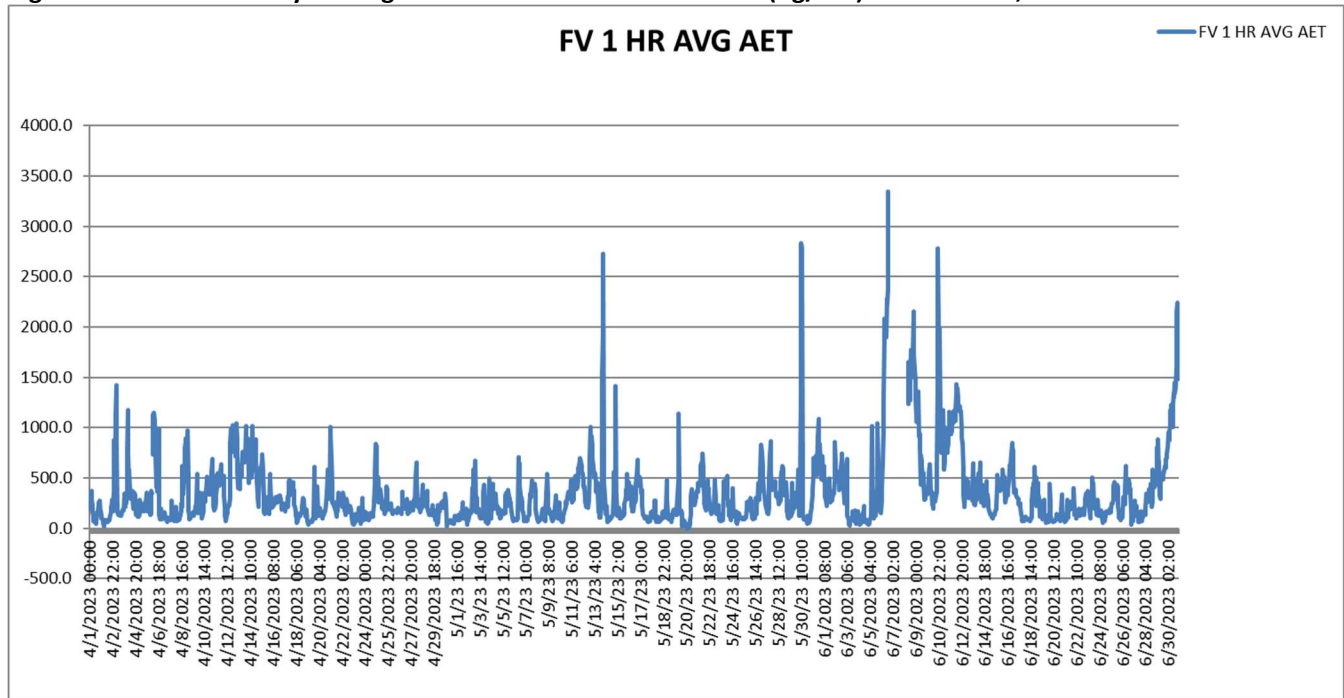


Figure 3.2. Plot of Hourly Maximum Black Carbon Concentrations (ng/m3) at Fieldview

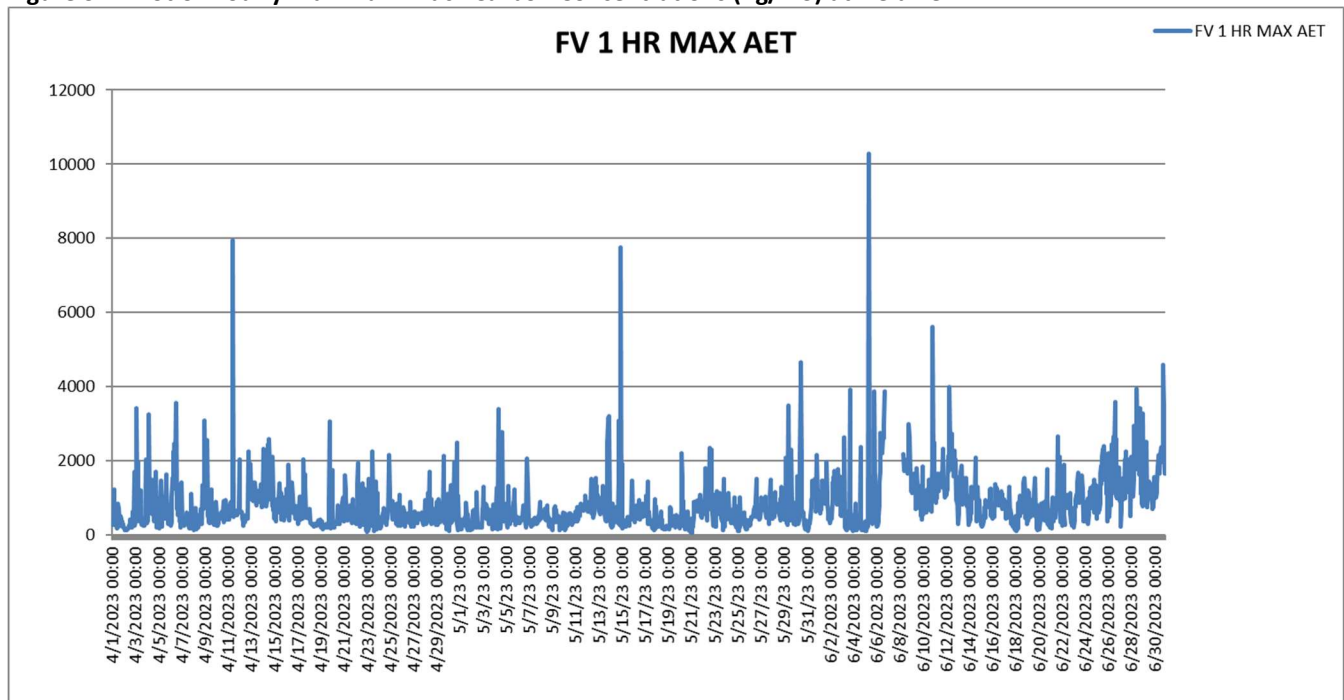


Figure 3.3. Plot of Hourly Average Black Carbon Concentrations (ng/m3) at Smith,

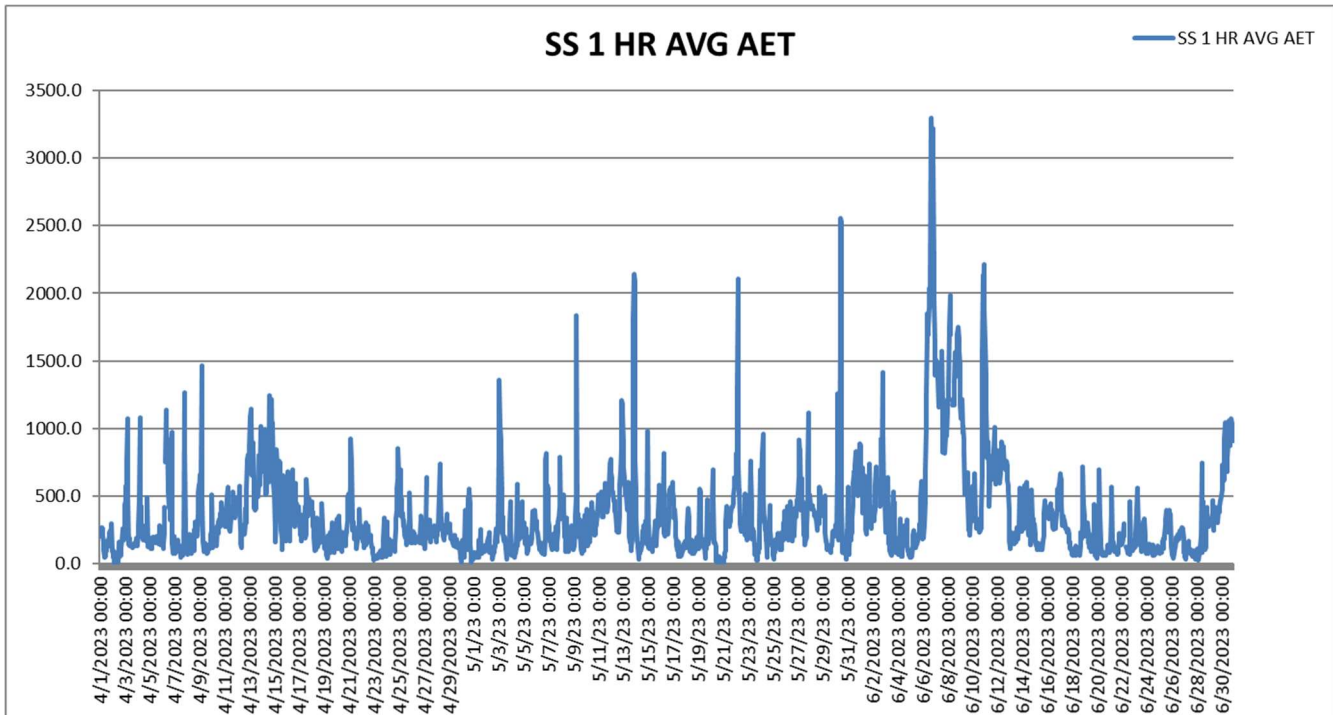
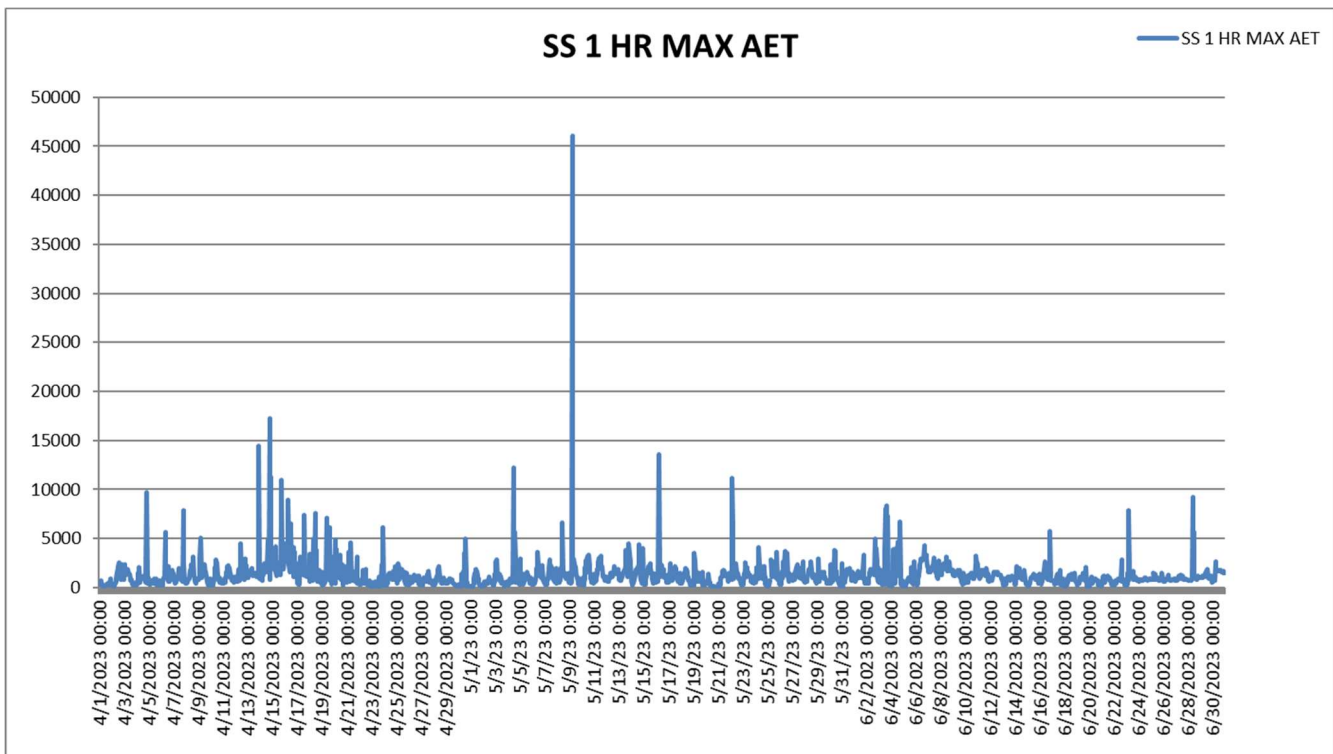


Figure 3.4. Plot of Hourly Maximum Black Carbon Concentrations (ng/m3) at Smith,



Black Carbon Lydick Site

Figure 3.5. Plot of Hourly Average Black Carbon Concentrations (ng/m3) at Lydick

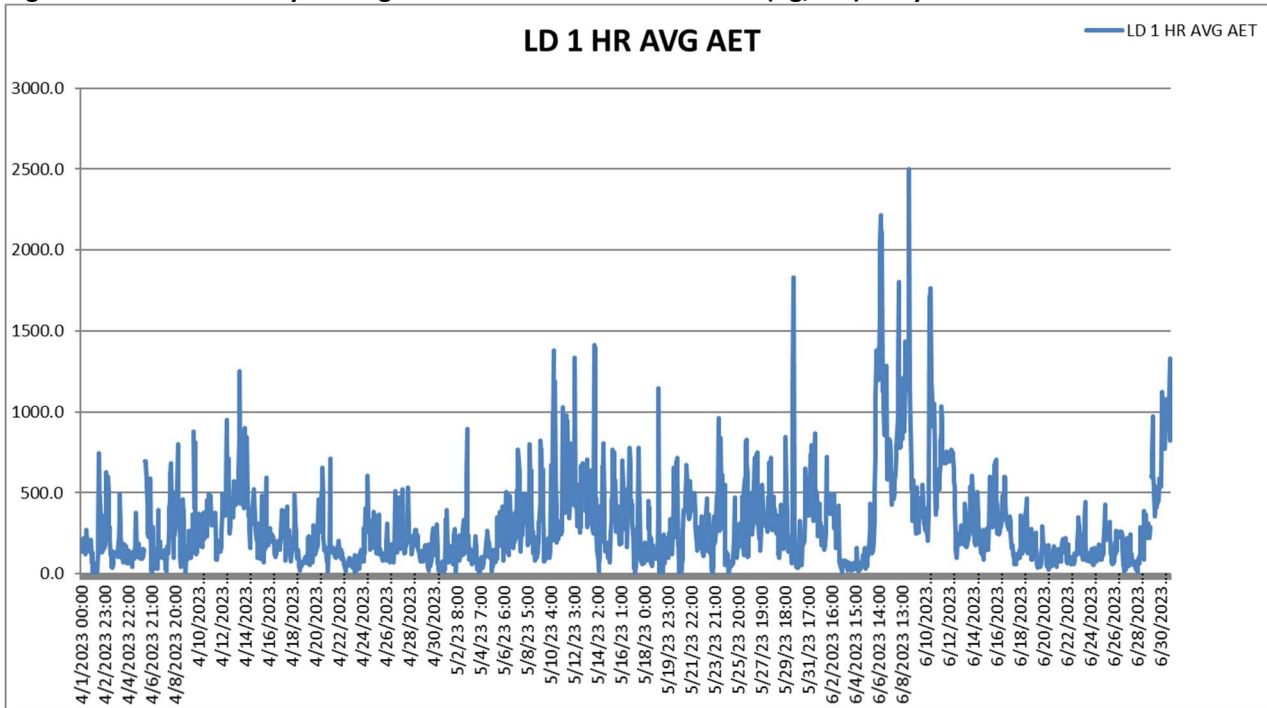
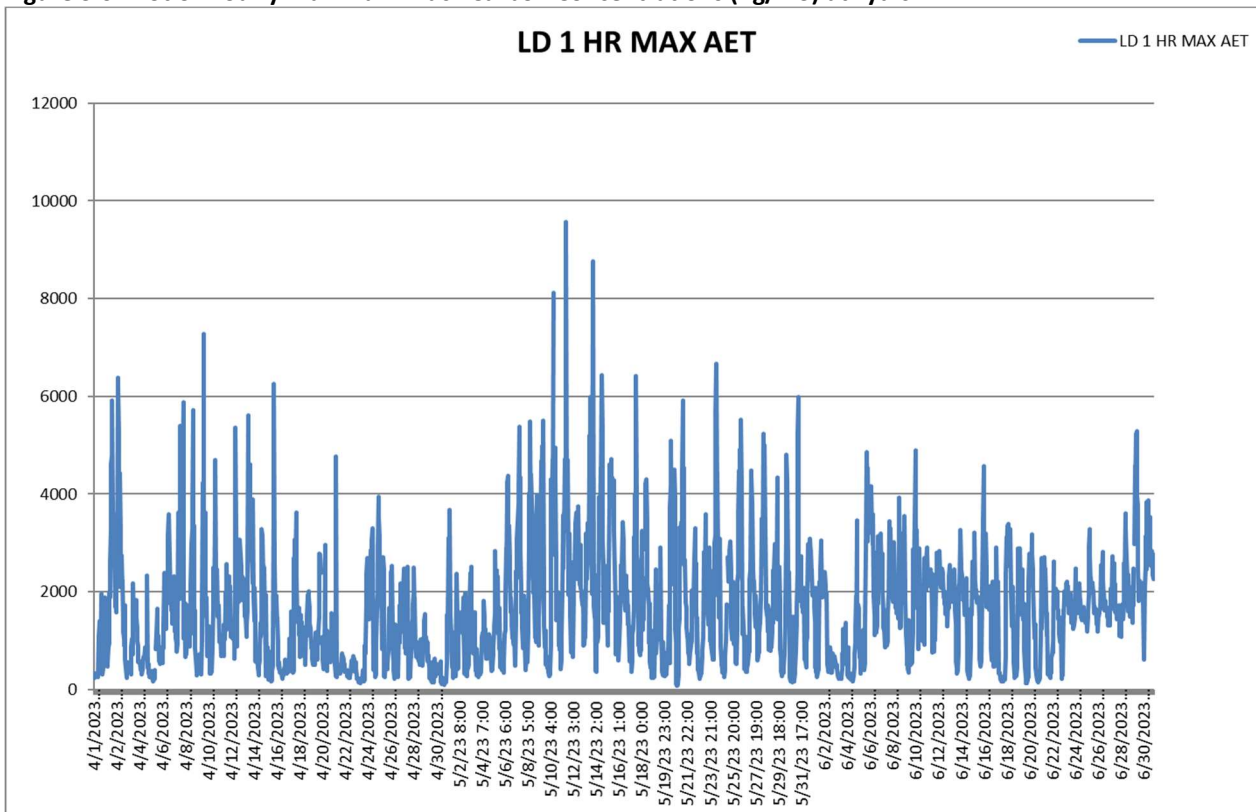


Figure 3.6. Plot of Hourly Maximum Black Carbon Concentrations (ng/m3) at Lydick



Black Carbon Pembroke Site

Figure 3.7. Plot of Hourly Average Black Carbon Concentrations (ng/m3) at Pembroke

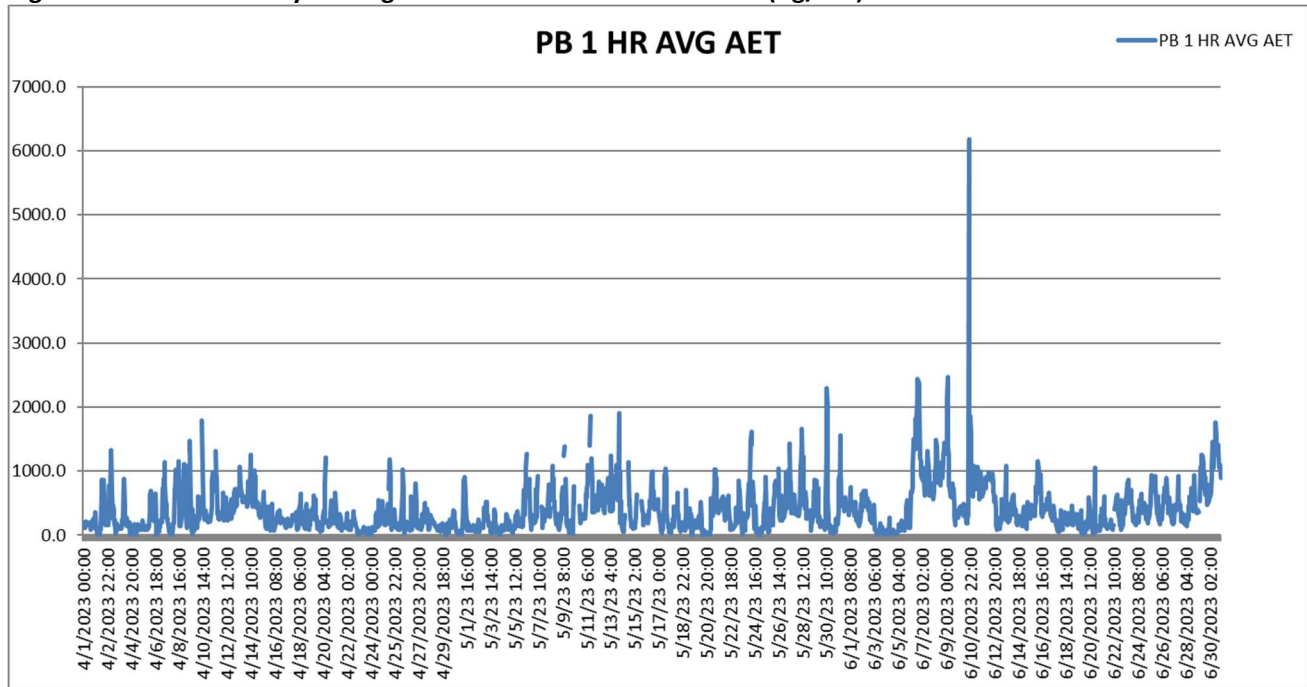
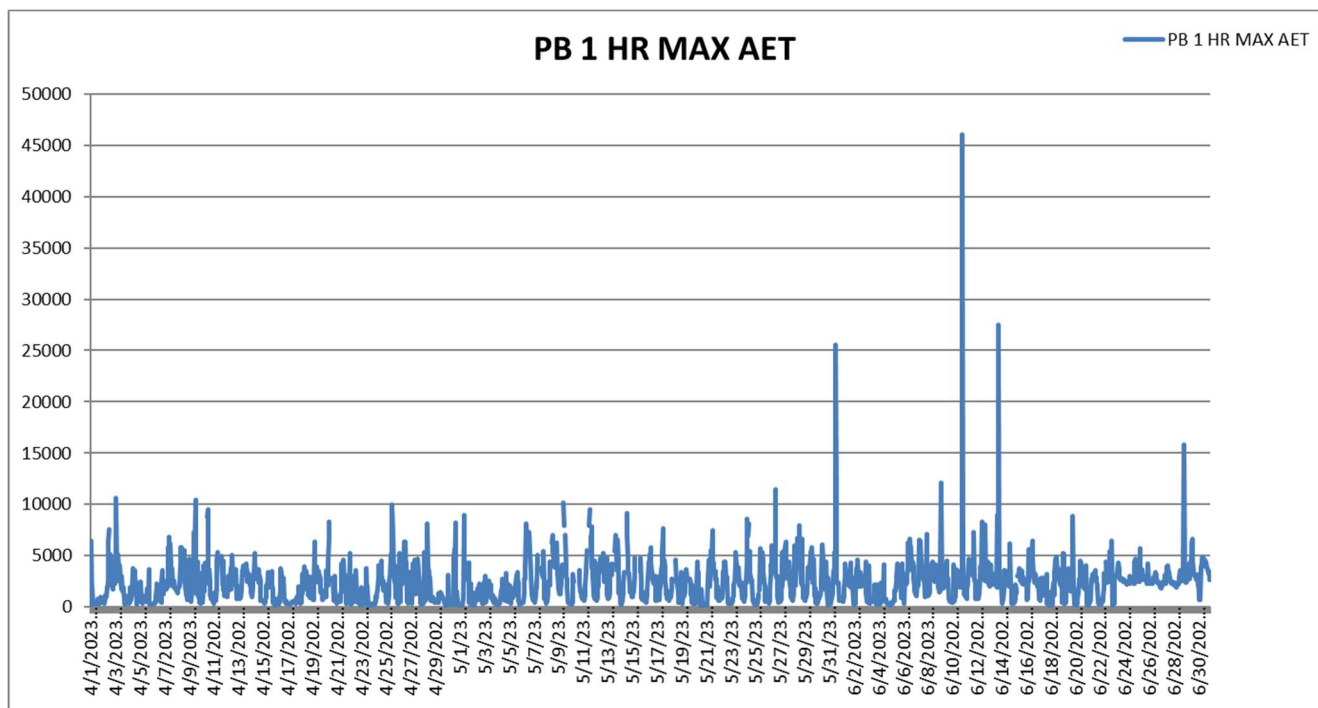


Figure 3.8. Plot of Hourly Maximum Black Carbon Concentrations (ng/m3) at Pembroke



### 3.4 Summary of Ultrafine Particulate Data

#### 3.4.1 Real-Time Ultrafine Particulate Data

The ultrafine particulate data is collected in one minute increments with a particle counter equipped with an inlet cyclone to screen out particles larger than 3 mm. The majority of particles counted have a diameter of 0.1 mm or less. Hourly data is calculated. Previous quarter data is presented in Tables 3.4.1-3.4.8. Current quarter data is presented in Figures 3.9 – 3.16.

- Fieldview
  - The highest hourly value was 61,179 particles/cm<sup>3</sup>. Previous quarter maxima values are displayed below.

**Table 3.4.1 Fieldview Previous Quarter Maxima values**

| Fieldview | 2023   | 2022    | 2021   | 2020    | 2019    | 2018      | 2017     |
|-----------|--------|---------|--------|---------|---------|-----------|----------|
| Quarter 1 | 65,274 | 85,360  | 69,795 | 126,532 | 86,797  | 185,489   | 86,331   |
| Quarter 2 |        | 65,852  | 53,107 | 64,470  | 58,246  | 105,520   | 57,144   |
| Quarter 3 |        | 113,223 | 86,484 | 50,773  | 122,349 | 39,388    | 55,171.5 |
| Quarter 4 |        | 184,168 | 97,909 | 93,978  | 118,215 | 8,566,778 | 155,878  |

- The average hourly value was 8,390 particles/cm<sup>3</sup>. Previous quarter average values are displayed below.

**Table 3.4.2 Fieldview Previous Quarter Average values**

| Fieldview | 2023  | 2022   | 2021   | 2020   | 2019   | 2018   | 2017    |
|-----------|-------|--------|--------|--------|--------|--------|---------|
| Quarter 1 | 9,253 | 10,310 | 8,441  | 10,717 | 5,158  | 10,823 | 11,247  |
| Quarter 2 |       | 9,273  | 8,167  | 6,240  | 3,603  | 9,171  | 7,064   |
| Quarter 3 |       | 8,536  | 8,309  | 6,604  | 5,224  | 1,454  | 6,439.7 |
| Quarter 4 |       | 10,584 | 10,537 | 8,988  | 13,919 | 29,702 | 7,914   |

- Smith

- The highest hourly value was 68,844 particles/cm<sup>3</sup>. Previous quarter maxima values are displayed below.

**Table 3.4.3 Smith Previous Quarter Maxima values**

| Smith     | 2023   | 2022   | 2021   | 2020           |
|-----------|--------|--------|--------|----------------|
| Quarter 1 | 65,742 | 62,115 | 55,947 | Not in service |
| Quarter 2 |        | 64,130 | 69,903 | 47,969         |
| Quarter 3 |        | 70,358 | 75,983 | 15,573         |
| Quarter 4 |        | 96,719 | 81,992 | 60,487         |

- The average hourly value was 5,982 particles/cm<sup>3</sup>. Previous quarter average values are displayed below.

**Table 3.4.4 Smith Previous Quarter Average values**

| Smith     | 2023  | 2022  | 2021  | 2020           |
|-----------|-------|-------|-------|----------------|
| Quarter 1 | 7,580 | 7,769 | 8,898 | Not in service |
| Quarter 2 |       | 6,159 | 7,057 | 3,732          |
| Quarter 3 |       | 5,759 | 6,044 | 1,119          |
| Quarter 4 |       | 8,860 | 7,124 | 6,418          |



- Lydick
  - The highest hourly value was 129,966 particles/cm<sup>3</sup>. Previous quarter maxima values are displayed below.

**Table 3.4.5 Lydick Previous Quarter Maxima values**

| <b>Lydick</b> | <b>2023</b> | <b>2022</b> | <b>2021</b> | <b>2020</b> | <b>2019</b> | <b>2018</b> | <b>2017</b> |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Quarter 1     | 143,065     | 155,344     | 103,110     | 144,057     | 8,973       | 130,013     | 178,827     |
| Quarter 2     |             | 133,688     | 165,123     | 5,854,417   | 138,661     | 104,876     | 131,813     |
| Quarter 3     |             | 111,723     | 184,635     | 115,319     | 109,521     | 2,507,171   | 134,418     |
| Quarter 4     |             | 145,957     | 149,078     | 81,028      | 124,711     | 3,256,429   | 183,703     |

- The average hourly value was 9,491 particles/cm<sup>3</sup>. Previous quarter average values are displayed below.

**Table 3.4.6 Lydick Previous Quarter Average values**

| <b>Lydick</b> | <b>2023</b> | <b>2022</b> | <b>2021</b> | <b>2020</b> | <b>2019</b> | <b>2018</b> | <b>2017</b> |
|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Quarter 1     | 10,624      | 12,811      | 9,279       | 11,848      | 80          | 12,563      | 14,418      |
| Quarter 2     |             | 10,094      | 10,890      | 18,979      | 7,149       | 10,076      | 9,894       |
| Quarter 3     |             | 11,367      | 11,374      | 8,336       | 11,281      | 11,217      | 10,936      |
| Quarter 4     |             | 13,271      | 13,462      | 10,632      | 11,034      | 10,177      | 13,928      |

- Pembroke
  - The highest hourly value was 84,063 particles/cm<sup>3</sup>. Previous quarter maxima values are displayed below.

**Table 3.4.7 Pembroke Previous Quarter Maxima values**

| <b>Pembroke</b> | <b>2023</b> | <b>2022</b> | <b>2021</b> | <b>2020</b> | <b>2019</b> | <b>2018</b> | <b>2017</b> |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Quarter 1       | 126,585     | 90,833      | 61,512      | 104,860     | 110,190     | 313,993     | 94,188      |
| Quarter 2       |             | 47,352      | 56,828      | 46,331      | 71,270      | 60,853      | 106,170     |
| Quarter 3       |             | 63,888      | 50,279      | 56,856      | 104,264     | 52,695      | 84,650      |
| Quarter 4       |             | 110,990     | 75,917      | 89,007      | 109,981     | 100,504     | 134,074     |

- The average hourly value was 8,479 particles/cm<sup>3</sup>. Previous quarter average values are displayed below.

**Table 3.4.8 Pembroke Previous Quarter Average values**

| <b>Pembroke</b> | <b>2023</b> | <b>2022</b> | <b>2021</b> | <b>2020</b> | <b>2019</b> | <b>2018</b> | <b>2017</b> |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Quarter 1       | 11,594      | 7,120       | 11,406      | 12,081      | 6,331       | 14,835      | 16,033      |
| Quarter 2       |             | 5,450       | 7,624       | 5,680       | 5,425       | 8,319       | 9,866       |
| Quarter 3       |             | 6,779       | 5,855       | 6,773       | 8,759       | 6,743       | 9,855       |
| Quarter 4       |             | 11,867      | 8,271       | 10,797      | 12,726      | 13,404      | 16,647      |

Ultrafine PM Fieldview Site

Figure 3.9. Plot of Hourly Average Ultrafine Particles (PM0.1) at Fieldview

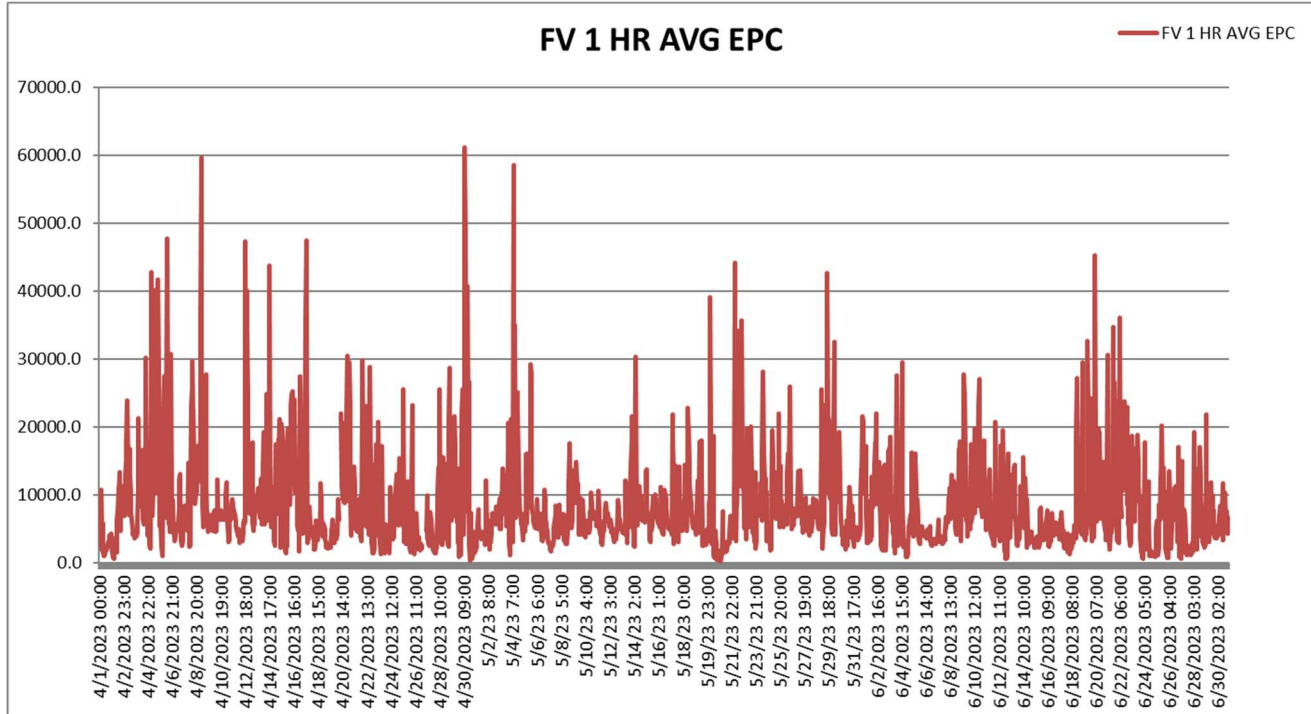
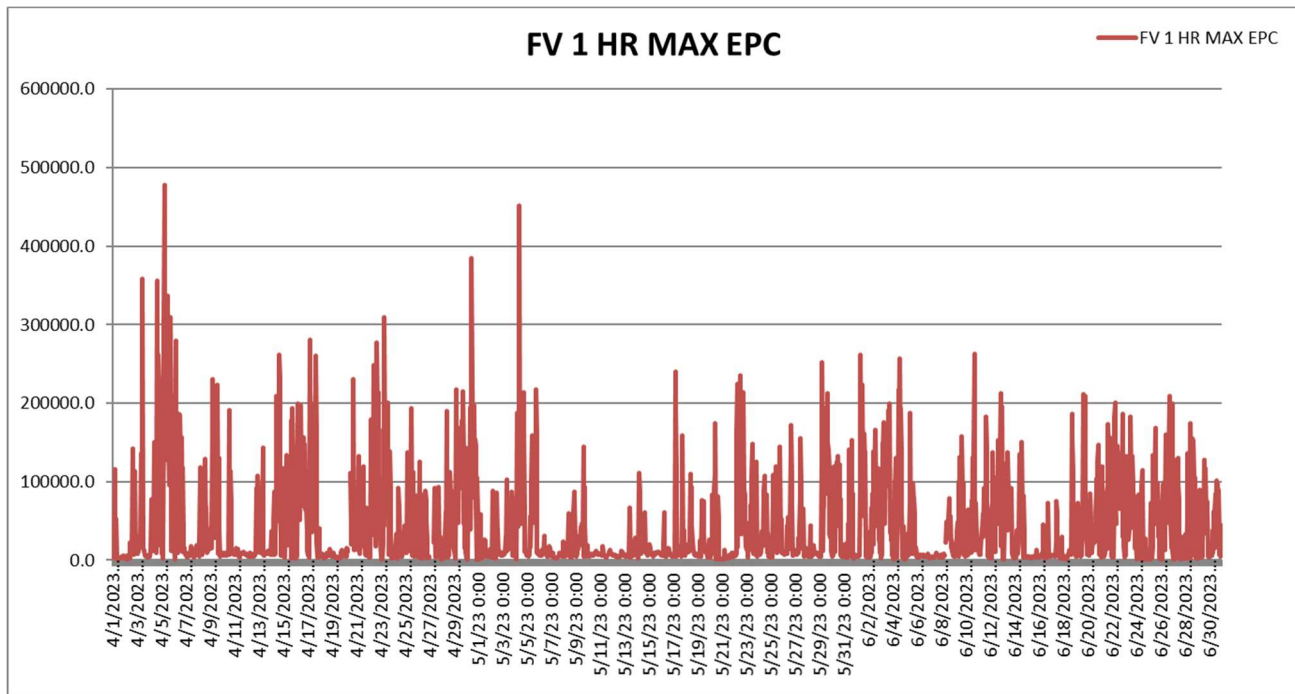


Figure 3.10. Plot of Hourly Maximum Ultrafine Particles (PM0.1) at Fieldview



Reporting period April 2023 – June 2023  
 RIAC – RI T.F. Green International Airport

July 2023

Ultrafine PM Smith Site

Figure 3.11. Plot of Hourly Average Ultrafine Particles (PM0.1) at Smith

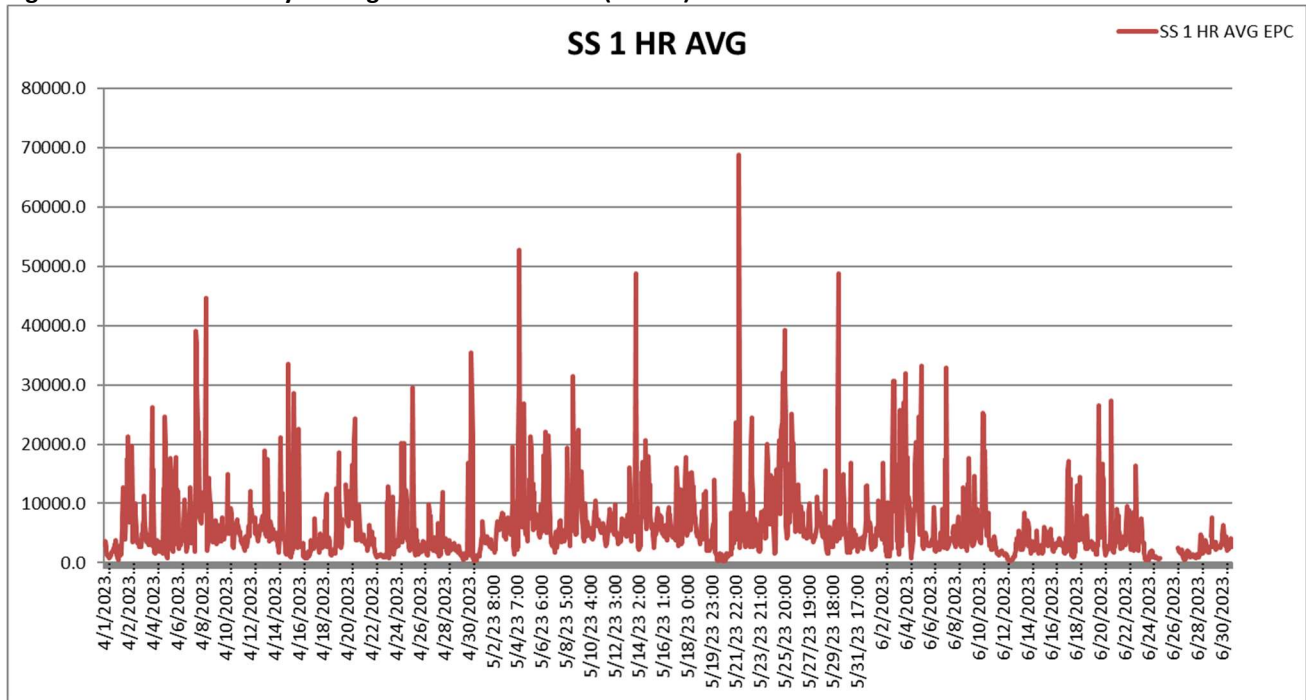
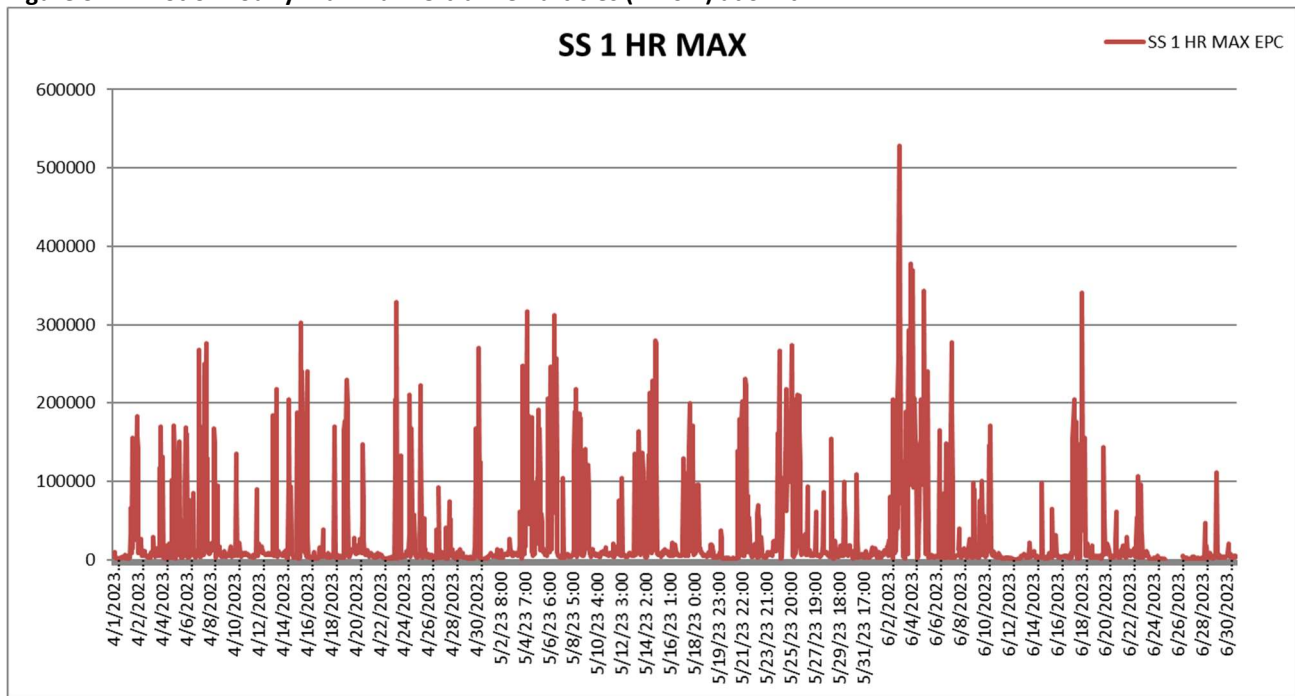


Figure 3.12. Plot of Hourly Maximum Ultrafine Particles (PM0.1) at Smith



Reporting period April 2023 – June 2023  
RIAC – RI T.F. Green International Airport

July 2023

Figure 3.13. Plot of Hourly Average Ultrafine Particles (PM0.1) at Lydick

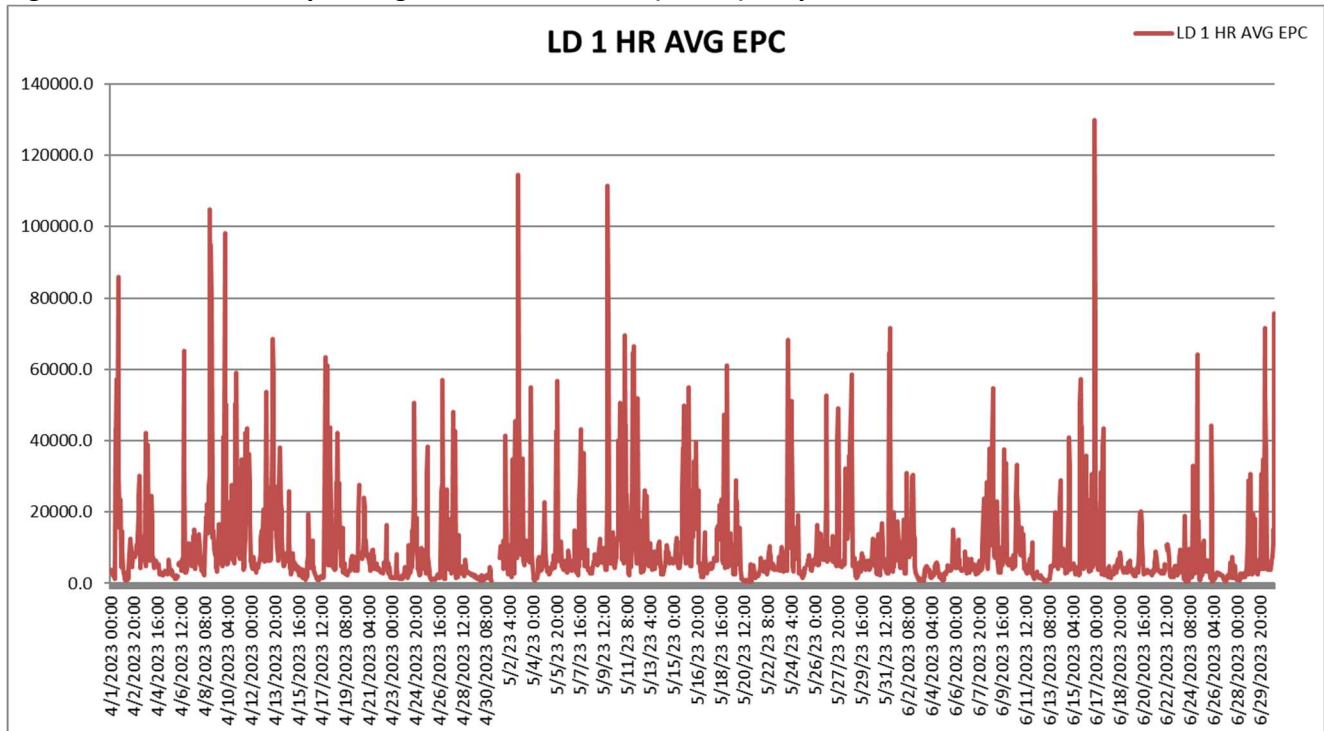
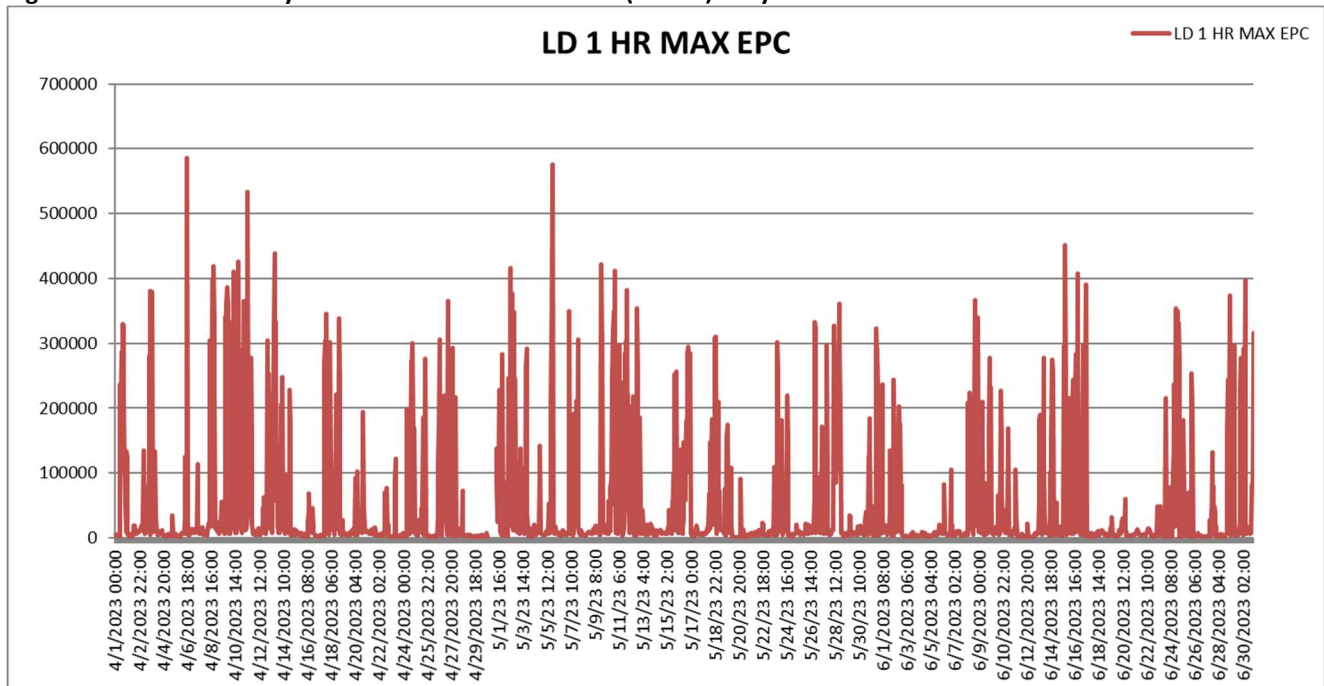


Figure 3.14. Plot of Hourly Maximum Ultrafine Particles (PM0.1) at Lydick



Reporting period April 2023 – June 2023  
RIAC – RI T.F. Green International Airport

July 2023

Ultrafine PM Pembroke Site

Figure 3.15. Plot of Hourly Average Ultrafine Particles (PM<sub>0.1</sub>) at Pembroke

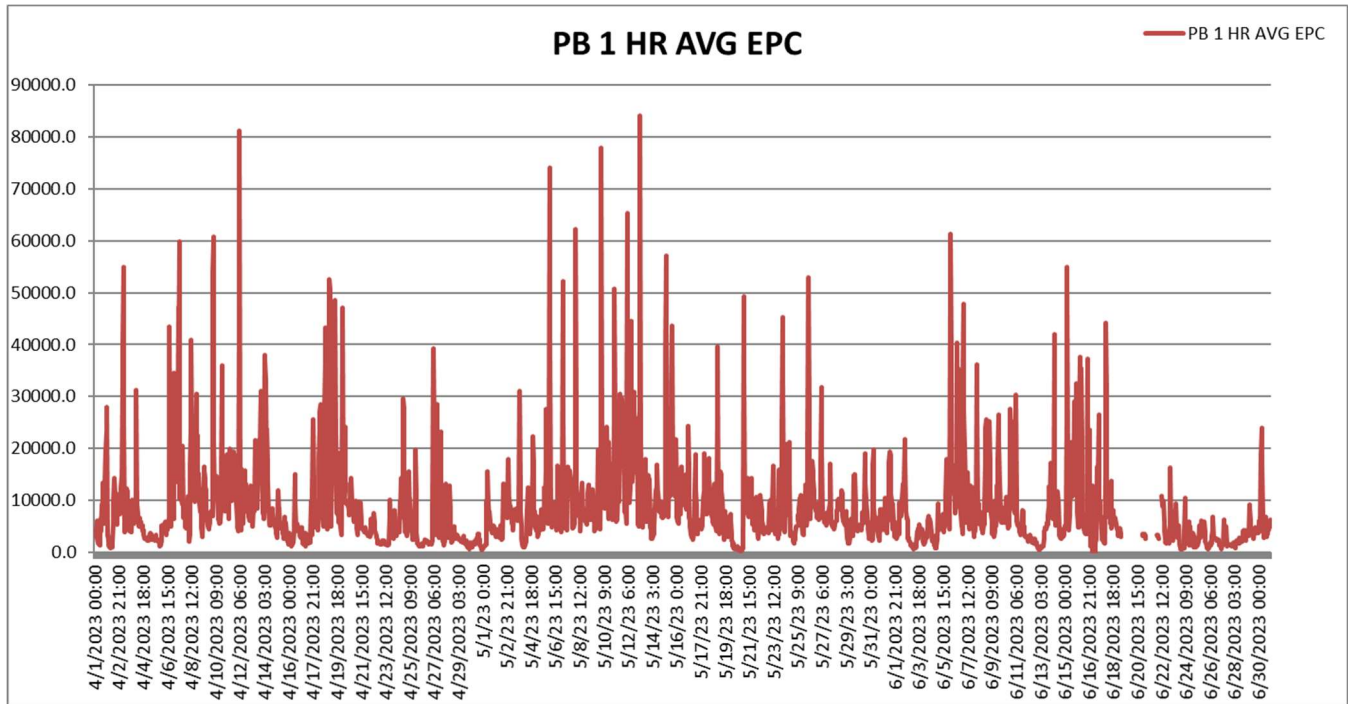
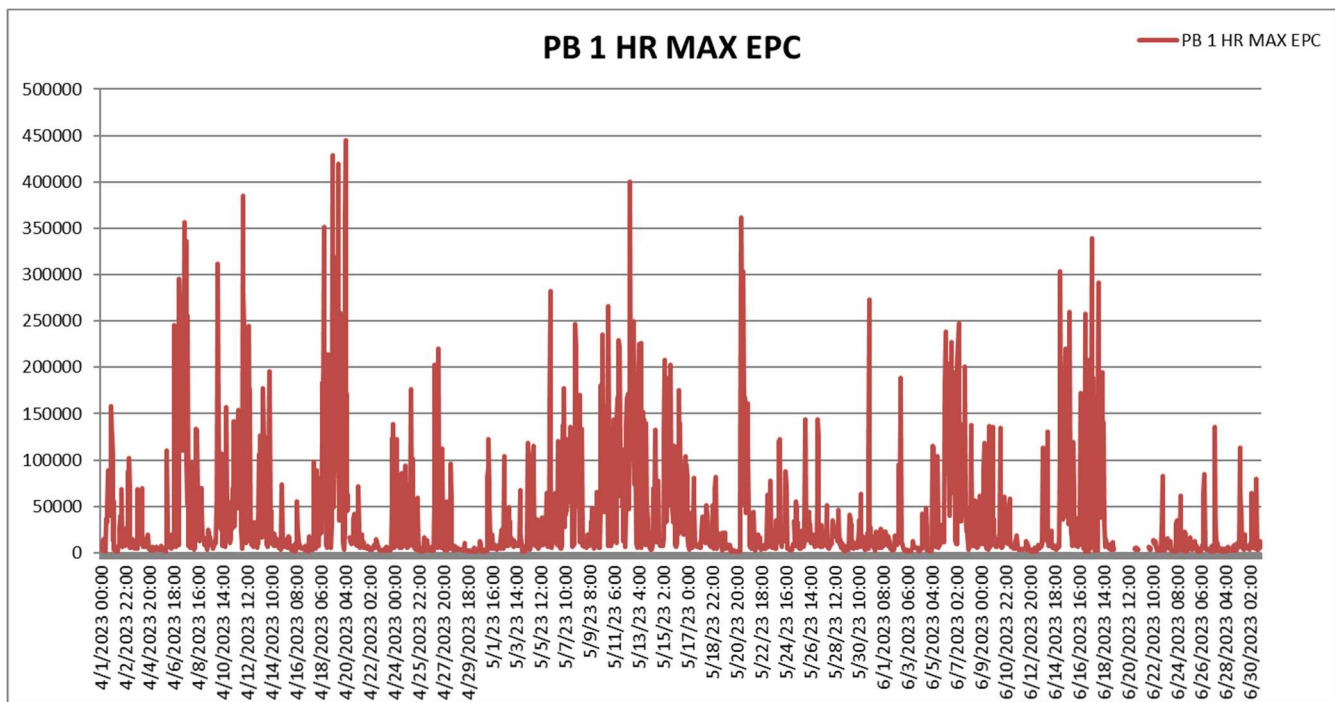


Figure 3.16. Plot of Hourly Maximum Ultrafine Particles (PM<sub>0.1</sub>) at Pembroke



### 3.5 Summary of Meteorological Data

#### 3.5.1 Hourly Average Meteorological Data

Meteorological data was acquired from the National Weather Service station at Rhode Island T. F. Green International Airport. The parameters summarized below include: wind direction, wind speed, temperature, and relative humidity.

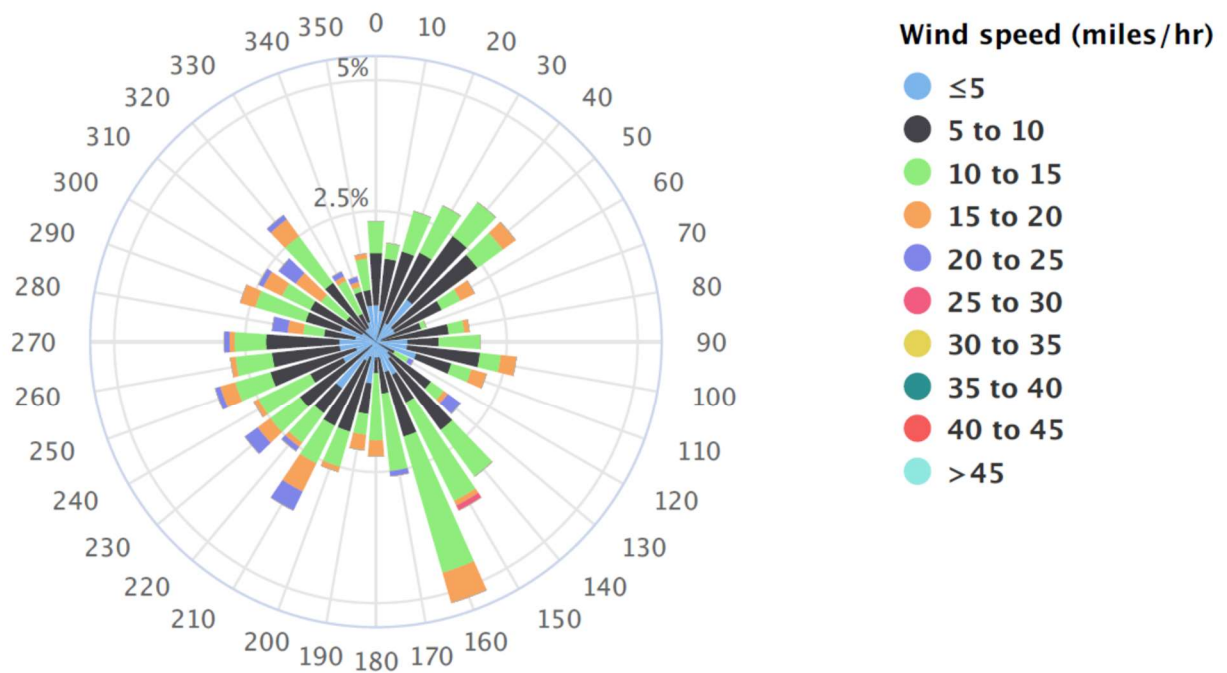
#### 3.5.2 Wind Rose Summary

Wind roses for each month of the period as well as for the quarter are presented in Figures 3.17 through 3.20, respectively. Windroses are from the Northeast Regional Climate Center (NRCC) (<http://www.nrcc.cornell.edu/wxstation/windroses/windroses.html.edu>).

Figure 3.17. Wind Rose for April 2023.

### RHODE ISLAND T.F. GREEN INTERNATIONAL AIRPORT, RI

Percent of winds blowing from the indicated direction  
Date range: 2023-04-01 through 2023-04-30

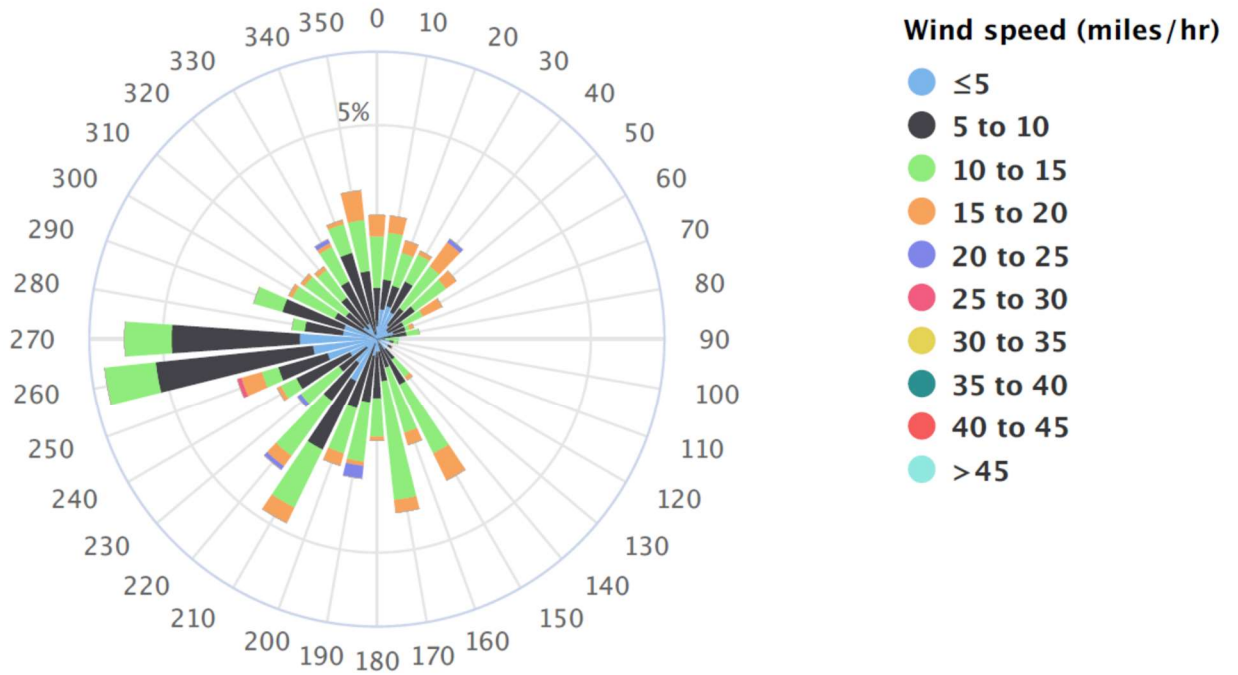


Powered by ACIS

Figure 3.18. Wind Rose for May 2023

# RHODE ISLAND T.F. GREEN INTERNATIONAL AIRPORT, RI

Percent of winds blowing from the indicated direction  
Date range: 2023-05-01 through 2023-05-31

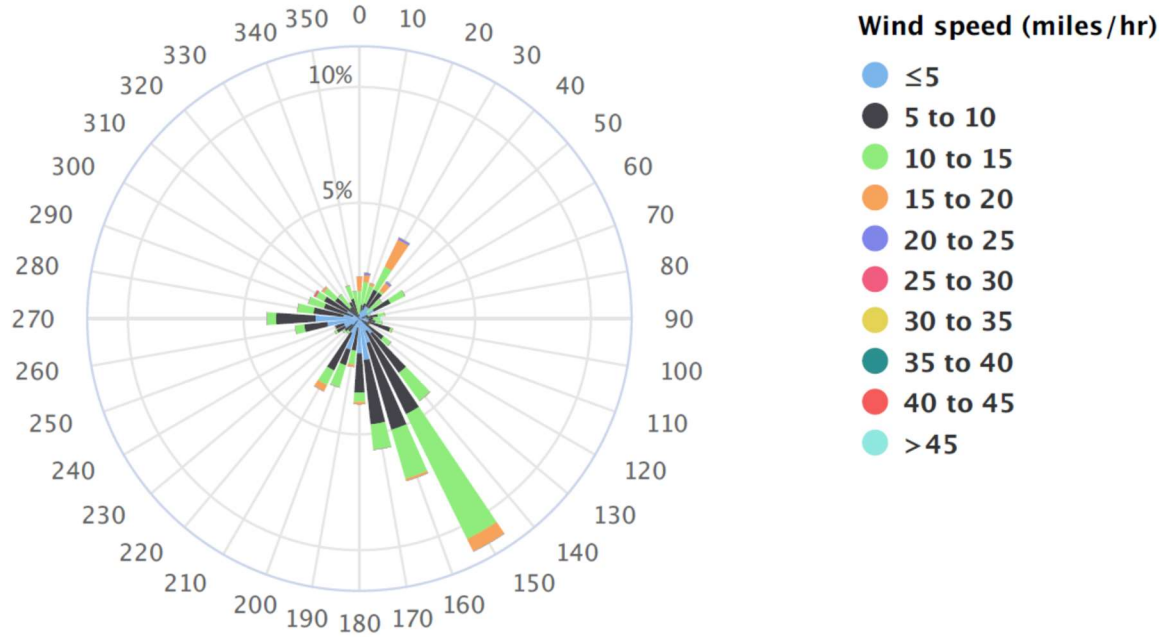


Powered by ACIS

Figure 3.19. Wind Rose for June 2023.

## RHODE ISLAND T.F. GREEN INTERNATIONAL AIRPORT, RI

Percent of winds blowing from the indicated direction  
Date range: 2023-06-01 through 2023-06-30



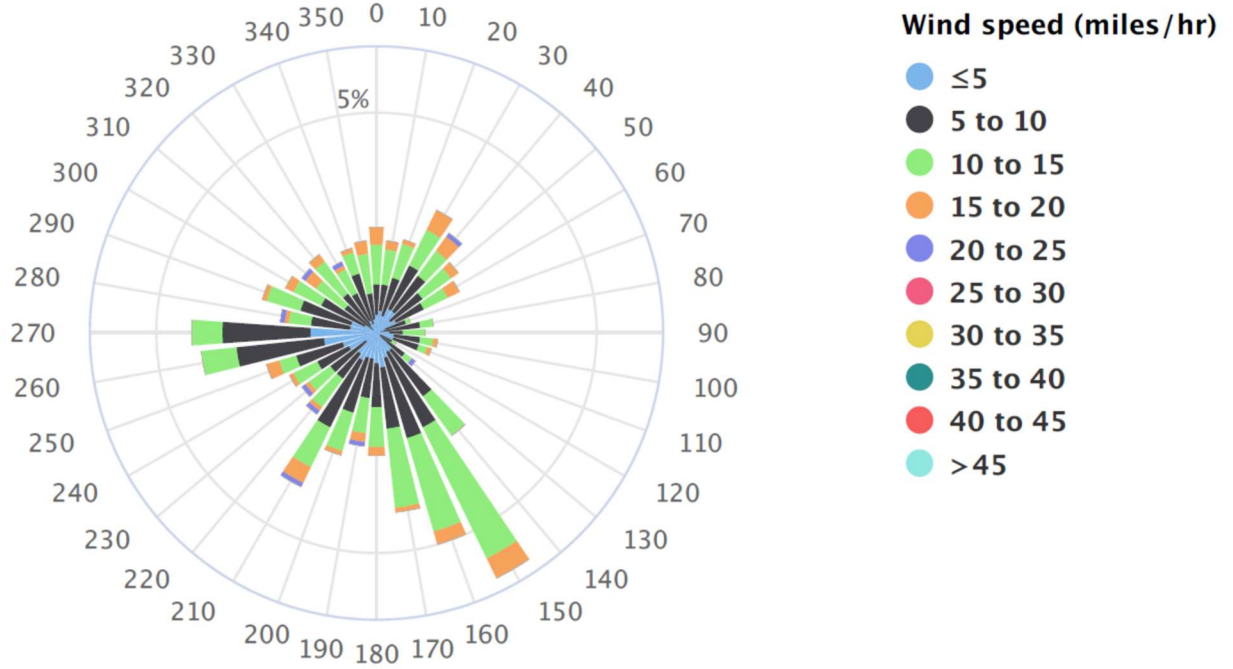
Powered by ACIS



Figure 3.20. Wind Rose for 2nd Quarter 2023

# RHODE ISLAND T.F. GREEN INTERNATIONAL AIRPORT, RI

Percent of winds blowing from the indicated direction  
Date range: 2023-04-01 through 2023-06-30



Powered by ACIS

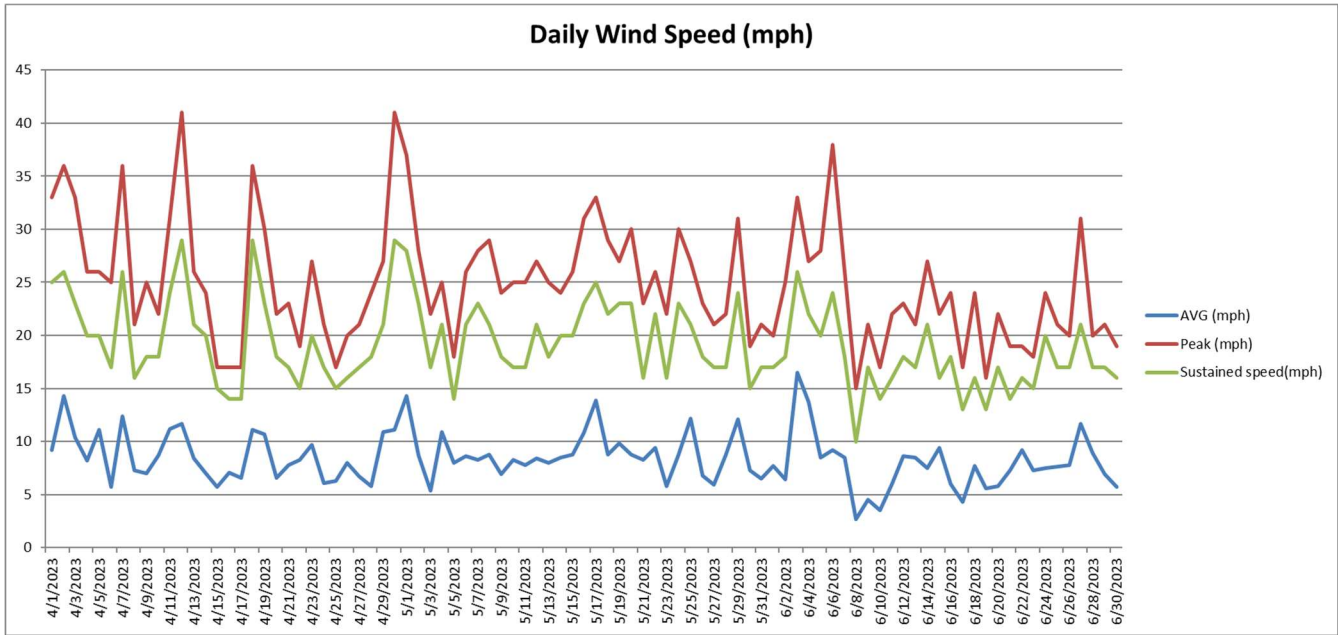
### 3.5.1 Wind Speed

The 10-meter wind speed summary is presented below and in Figure 3.21.

**Table 3.5.3. Daily Average, Peak and Sustained Wind Speed (mph)**

| Date | AVG  | Peak | Sustained | Date | AVG  | Peak | Sustained | Date | AVG  | Peak | Sustained |
|------|------|------|-----------|------|------|------|-----------|------|------|------|-----------|
| 4/1  | 9.2  | 33   | 25        | 5/1  | 14.3 | 37   | 28        | 6/1  | 7.7  | 20   | 17        |
| 4/2  | 14.3 | 36   | 26        | 5/2  | 8.7  | 28   | 23        | 6/2  | 6.4  | 25   | 18        |
| 4/3  | 10.4 | 33   | 23        | 5/3  | 5.4  | 22   | 17        | 6/3  | 16.5 | 33   | 26        |
| 4/4  | 8.2  | 26   | 20        | 5/4  | 10.9 | 25   | 21        | 6/4  | 13.7 | 27   | 22        |
| 4/5  | 11.1 | 26   | 20        | 5/5  | 8    | 18   | 14        | 6/5  | 8.5  | 28   | 20        |
| 4/6  | 5.7  | 25   | 17        | 5/6  | 8.6  | 26   | 21        | 6/6  | 9.2  | 38   | 24        |
| 4/7  | 12.4 | 36   | 26        | 5/7  | 8.3  | 28   | 23        | 6/7  | 8.5  | 26   | 18        |
| 4/8  | 7.3  | 21   | 16        | 5/8  | 8.8  | 29   | 21        | 6/8  | 2.7  | 15   | 10        |
| 4/9  | 7    | 25   | 18        | 5/9  | 6.9  | 24   | 18        | 6/9  | 4.5  | 21   | 17        |
| 4/10 | 8.7  | 22   | 18        | 5/10 | 8.3  | 25   | 17        | 6/10 | 3.5  | 17   | 14        |
| 4/11 | 11.2 | 31   | 24        | 5/11 | 7.8  | 25   | 17        | 6/11 | 6    | 22   | 16        |
| 4/12 | 11.7 | 41   | 29        | 5/12 | 8.4  | 27   | 21        | 6/12 | 8.6  | 23   | 18        |
| 4/13 | 8.4  | 26   | 21        | 5/13 | 8    | 25   | 18        | 6/13 | 8.5  | 21   | 17        |
| 4/14 | 7    | 24   | 20        | 5/14 | 8.5  | 24   | 20        | 6/14 | 7.5  | 27   | 21        |
| 4/15 | 5.7  | 17   | 15        | 5/15 | 8.8  | 26   | 20        | 6/15 | 9.4  | 22   | 16        |
| 4/16 | 7.1  | 17   | 14        | 5/16 | 10.8 | 31   | 23        | 6/16 | 6    | 24   | 18        |
| 4/17 | 6.6  | 17   | 14        | 5/17 | 13.9 | 33   | 25        | 6/17 | 4.3  | 17   | 13        |
| 4/18 | 11.1 | 36   | 29        | 5/18 | 8.8  | 29   | 22        | 6/18 | 7.7  | 24   | 16        |
| 4/19 | 10.7 | 30   | 23        | 5/19 | 9.8  | 27   | 23        | 6/19 | 5.6  | 16   | 13        |
| 4/20 | 6.6  | 22   | 18        | 5/20 | 8.8  | 30   | 23        | 6/20 | 5.8  | 22   | 17        |
| 4/21 | 7.8  | 23   | 17        | 5/21 | 8.3  | 23   | 16        | 6/21 | 7.3  | 19   | 14        |
| 4/22 | 8.3  | 19   | 15        | 5/22 | 9.4  | 26   | 22        | 6/22 | 9.2  | 19   | 16        |
| 4/23 | 9.7  | 27   | 20        | 5/23 | 5.8  | 22   | 16        | 6/23 | 7.3  | 18   | 15        |
| 4/24 | 6.1  | 21   | 17        | 5/24 | 8.8  | 30   | 23        | 6/24 | 7.5  | 24   | 20        |
| 4/25 | 6.3  | 17   | 15        | 5/25 | 12.2 | 27   | 21        | 6/25 | 7.6  | 21   | 17        |
| 4/26 | 8    | 20   | 16        | 5/26 | 6.8  | 23   | 18        | 6/26 | 7.8  | 20   | 17        |
| 4/27 | 6.7  | 21   | 17        | 5/27 | 5.9  | 21   | 17        | 6/27 | 11.7 | 31   | 21        |
| 4/28 | 5.8  | 24   | 18        | 5/28 | 8.8  | 22   | 17        | 6/28 | 8.9  | 20   | 17        |
| 4/29 | 10.9 | 27   | 21        | 5/29 | 12.1 | 31   | 24        | 6/29 | 6.9  | 21   | 17        |
| 4/30 | 11.1 | 41   | 29        | 5/30 | 7.3  | 19   | 15        | 6/30 | 5.7  | 19   | 16        |
|      |      |      |           | 5/31 | 6.5  | 21   | 17        |      |      |      |           |

Figure 3.21. Plot of Daily Average, Peak, and Sustained Wind Speed (mph).



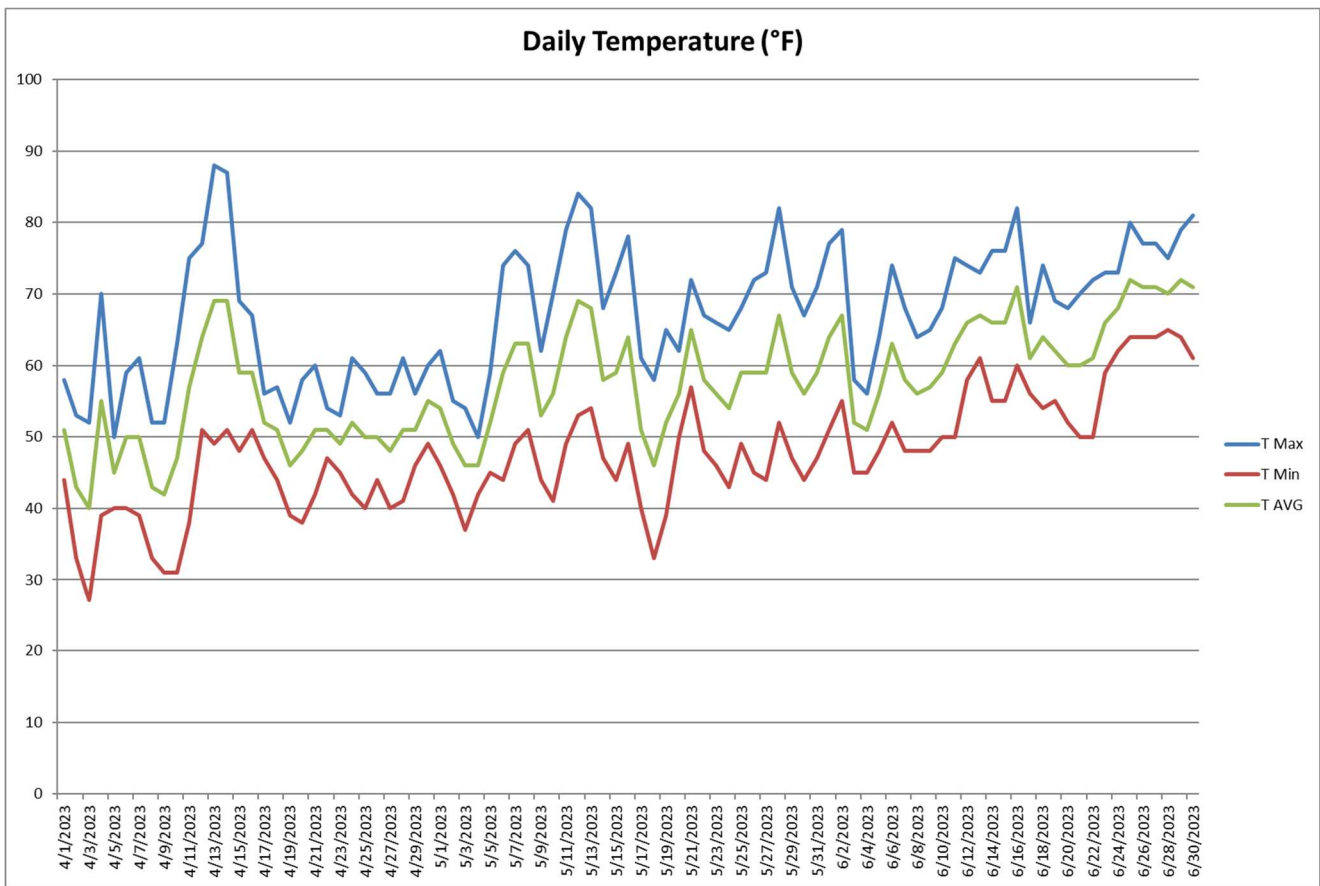
### 3.5.2 Temperature Summary

The daily temperature data is presented below and Figure 3.22.

**Table 3.5.4. Daily Average, Maximum, and Minimum Temperatures (°F)**

| Date | Tmax | Tmin | Tavg | Date | Tmax | Tmin | Tavg | Date | Tmax | Tmin | Tavg |
|------|------|------|------|------|------|------|------|------|------|------|------|
| 4/1  | 58   | 44   | 51   | 5/1  | 62   | 46   | 54   | 6/1  | 77   | 51   | 64   |
| 4/2  | 53   | 33   | 43   | 5/2  | 55   | 42   | 49   | 6/2  | 79   | 55   | 67   |
| 4/3  | 52   | 27   | 40   | 5/3  | 54   | 37   | 46   | 6/3  | 58   | 45   | 52   |
| 4/4  | 70   | 39   | 55   | 5/4  | 50   | 42   | 46   | 6/4  | 56   | 45   | 51   |
| 4/5  | 50   | 40   | 45   | 5/5  | 59   | 45   | 52   | 6/5  | 64   | 48   | 56   |
| 4/6  | 59   | 40   | 50   | 5/6  | 74   | 44   | 59   | 6/6  | 74   | 52   | 63   |
| 4/7  | 61   | 39   | 50   | 5/7  | 76   | 49   | 63   | 6/7  | 68   | 48   | 58   |
| 4/8  | 52   | 33   | 43   | 5/8  | 74   | 51   | 63   | 6/8  | 64   | 48   | 56   |
| 4/9  | 52   | 31   | 42   | 5/9  | 62   | 44   | 53   | 6/9  | 65   | 48   | 57   |
| 4/10 | 63   | 31   | 47   | 5/10 | 70   | 41   | 56   | 6/10 | 68   | 50   | 59   |
| 4/11 | 75   | 38   | 57   | 5/11 | 79   | 49   | 64   | 6/11 | 75   | 50   | 63   |
| 4/12 | 77   | 51   | 64   | 5/12 | 84   | 53   | 69   | 6/12 | 74   | 58   | 66   |
| 4/13 | 88   | 49   | 69   | 5/13 | 82   | 54   | 68   | 6/13 | 73   | 61   | 67   |
| 4/14 | 87   | 51   | 69   | 5/14 | 68   | 47   | 58   | 6/14 | 76   | 55   | 66   |
| 4/15 | 69   | 48   | 59   | 5/15 | 73   | 44   | 59   | 6/15 | 76   | 55   | 66   |
| 4/16 | 67   | 51   | 59   | 5/16 | 78   | 49   | 64   | 6/16 | 82   | 60   | 71   |
| 4/17 | 56   | 47   | 52   | 5/17 | 61   | 40   | 51   | 6/17 | 66   | 56   | 61   |
| 4/18 | 57   | 44   | 51   | 5/18 | 58   | 33   | 46   | 6/18 | 74   | 54   | 64   |
| 4/19 | 52   | 39   | 46   | 5/19 | 65   | 39   | 52   | 6/19 | 69   | 55   | 62   |
| 4/20 | 58   | 38   | 48   | 5/20 | 62   | 50   | 56   | 6/20 | 68   | 52   | 60   |
| 4/21 | 60   | 42   | 51   | 5/21 | 72   | 57   | 65   | 6/21 | 70   | 50   | 60   |
| 4/22 | 54   | 47   | 51   | 5/22 | 67   | 48   | 58   | 6/22 | 72   | 50   | 61   |
| 4/23 | 53   | 45   | 49   | 5/23 | 66   | 46   | 56   | 6/23 | 73   | 59   | 66   |
| 4/24 | 61   | 42   | 52   | 5/24 | 65   | 43   | 54   | 6/24 | 73   | 62   | 68   |
| 4/25 | 59   | 40   | 50   | 5/25 | 68   | 49   | 59   | 6/25 | 80   | 64   | 72   |
| 4/26 | 56   | 44   | 50   | 5/26 | 72   | 45   | 59   | 6/26 | 77   | 64   | 71   |
| 4/27 | 56   | 40   | 48   | 5/27 | 73   | 44   | 59   | 6/27 | 77   | 64   | 71   |
| 4/28 | 61   | 41   | 51   | 5/28 | 82   | 52   | 67   | 6/28 | 75   | 65   | 70   |
| 4/29 | 56   | 46   | 51   | 5/29 | 71   | 47   | 59   | 6/29 | 79   | 64   | 72   |
| 4/30 | 60   | 49   | 55   | 5/30 | 67   | 44   | 56   | 6/30 | 81   | 61   | 71   |
|      |      |      |      | 5/31 | 71   | 47   | 59   |      |      |      |      |

Figure 3.22. Plot of Daily Average, Maximum, and Minimum Temperatures (°F).



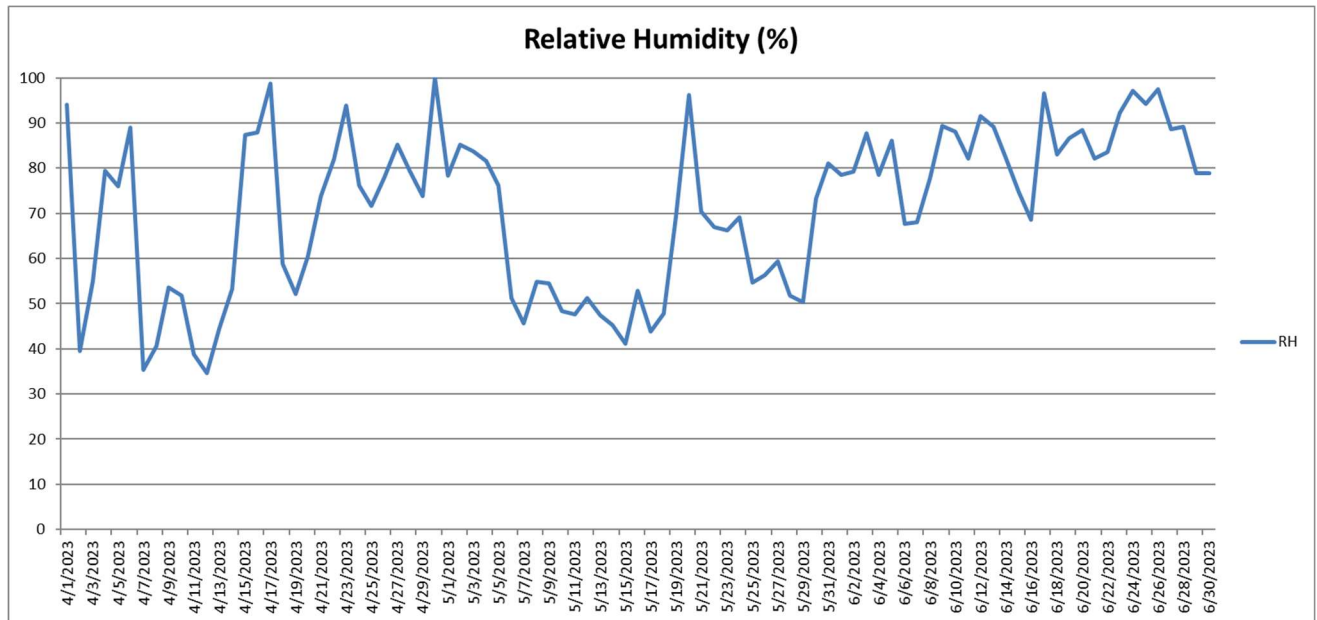
### 3.5.3 Relative Humidity Data

The average daily relative humidity data is presented below and Figure 3.23. Daily averages were calculated using NCDC hourly reported values.

**Table 3.5.3 Daily Relative Humidity (%)**

| Date | RH (%) | Date | RH (%) | Date | RH (%) |
|------|--------|------|--------|------|--------|
| 4/1  | 94     | 5/1  | 78     | 6/1  | 78     |
| 4/2  | 39     | 5/2  | 85     | 6/2  | 79     |
| 4/3  | 55     | 5/3  | 84     | 6/3  | 88     |
| 4/4  | 79     | 5/4  | 82     | 6/4  | 79     |
| 4/5  | 76     | 5/5  | 76     | 6/5  | 86     |
| 4/6  | 89     | 5/6  | 51     | 6/6  | 68     |
| 4/7  | 35     | 5/7  | 46     | 6/7  | 68     |
| 4/8  | 41     | 5/8  | 55     | 6/8  | 78     |
| 4/9  | 54     | 5/9  | 55     | 6/9  | 89     |
| 4/10 | 52     | 5/10 | 48     | 6/10 | 88     |
| 4/11 | 39     | 5/11 | 48     | 6/11 | 82     |
| 4/12 | 35     | 5/12 | 51     | 6/12 | 92     |
| 4/13 | 44     | 5/13 | 47     | 6/13 | 89     |
| 4/14 | 53     | 5/14 | 45     | 6/14 | 82     |
| 4/15 | 87     | 5/15 | 41     | 6/15 | 75     |
| 4/16 | 88     | 5/16 | 53     | 6/16 | 69     |
| 4/17 | 99     | 5/17 | 44     | 6/17 | 97     |
| 4/18 | 59     | 5/18 | 48     | 6/18 | 83     |
| 4/19 | 52     | 5/19 | 69     | 6/19 | 87     |
| 4/20 | 60     | 5/20 | 96     | 6/20 | 89     |
| 4/21 | 74     | 5/21 | 70     | 6/21 | 82     |
| 4/22 | 82     | 5/22 | 67     | 6/22 | 84     |
| 4/23 | 94     | 5/23 | 66     | 6/23 | 92     |
| 4/24 | 76     | 5/24 | 69     | 6/24 | 97     |
| 4/25 | 72     | 5/25 | 55     | 6/25 | 94     |
| 4/26 | 78     | 5/26 | 56     | 6/26 | 97     |
| 4/27 | 85     | 5/27 | 59     | 6/27 | 89     |
| 4/28 | 79     | 5/28 | 52     | 6/28 | 89     |
| 4/29 | 74     | 5/29 | 50     | 6/29 | 79     |
| 4/30 | 100    | 5/30 | 73     | 6/30 | 79     |
|      |        | 5/31 | 81     |      |        |

**Figure 3.23. Plot of Daily Average Relative Humidity (RH %)**



### 3.6 Summary of Runway Usage Data

#### 3.6.1 Runway Usage Data

There were 16,212 aircraft operations during Second Quarter 2023. Table 3.6.1 presents previous quarter’s aircraft operations. Table 3.6.2 summarizes arrivals and departures for each runway for each month of the quarter as well as the cumulative total.

**Table 3.6.1. Quarterly Aircraft Operations.**

|           | 2023   | 2022   | 2021   | 2020   | 2019   | 2018   | 2017   |
|-----------|--------|--------|--------|--------|--------|--------|--------|
| Quarter 1 | 13,600 | 13,294 | 9,022  | 15,917 | 13,663 | 15,499 | 12,316 |
| Quarter 2 |        | 15,974 | 13,651 | 7,854  | 16,473 | 18,257 | 15,537 |
| Quarter 3 |        | 17,327 | 15,291 | 11,435 | 18,334 | 17,312 | 16,898 |
| Quarter 4 |        | 15,364 | 14,470 | 9,543  | 15,917 | 15,057 | 16,891 |

**Table 3.6.2. Summary of Runway Usage.**

| Runway | Operation     | APR     |         | MAY     |         | JUN     |         | Total   |         |
|--------|---------------|---------|---------|---------|---------|---------|---------|---------|---------|
|        |               | Flights | Percent | Flights | Percent | Flights | Percent | Flights | Percent |
| 5      | Arrivals      | 817     | 15.6%   | 910     | 15.7%   | 616     | 11.9%   | 2343    | 14.5%   |
| 5      | Departures    | 778     | 14.8%   | 955     | 16.5%   | 570     | 11.0%   | 2303    | 14.2%   |
| 16     | Arrivals      | 141     | 2.7%    | 94      | 1.6%    | 243     | 4.7%    | 478     | 2.9%    |
| 16     | Departures    | 140     | 2.7%    | 83      | 1.4%    | 237     | 4.6%    | 460     | 2.8%    |
| 23     | Arrivals      | 1370    | 26.1%   | 1577    | 27.3%   | 1526    | 29.5%   | 4473    | 27.6%   |
| 23     | Departures    | 1427    | 27.2%   | 1607    | 27.8%   | 1594    | 30.8%   | 4628    | 28.5%   |
| 34     | Arrivals      | 284     | 5.4%    | 298     | 5.1%    | 197     | 3.8%    | 779     | 4.8%    |
| 34     | Departures    | 254     | 4.8%    | 199     | 3.4%    | 165     | 3.2%    | 618     | 3.8%    |
| HELO   | Arrivals      | 20      | 0.4%    | 35      | 0.6%    | 15      | 0.3%    | 70      | 0.4%    |
| HELO   | Departures    | 18      | 0.3%    | 29      | 0.5%    | 13      | 0.3%    | 60      | 0.4%    |
|        | <b>Totals</b> | 5249    |         | 5787    |         | 5176    |         | 16212   |         |

## Section 4: Quality Control

### 4.1 Quality Control Activities

Quality controls (QC) are implemented to ensure high quality of all collected data. QC activities include weekly site checks. Site checks include performance checks on the operational, real-time samplers. RIAC continues to work with RIDEM/RIDOH to revise and improve quality controls. RIDOH Air Quality Laboratory technician conducted Quality Assurance visit in April 2023 and provided technical support throughout the quarter.