GROUND-BASED SAMPLING FOR TOXINS
NOVEMBER MONTHLY REPORT

November 1 – November 30, 2023

**Operational Summaries,
Data Summaries and Plots**

Prepared for

**DEREK PRICE
AIR TOXICS AND OZONE PRECURSOR SECTION
COLORADO DEPARTMENT OF PUBLIC HEALTH & ENVIRONMENT**
4300 CHERRY CREEK DRIVE SOUTH
DENVER, CO 80246

Prepared by

Air Resource
SPECIALISTS

1901 Sharp Point Drive, Suite F
Fort Collins, CO 80525
970-484-7941
www.air-resource.com

December 22, 2023

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0   INTRODUCTION

The Colorado Department of Public Health & Environment Air Pollution Control Division (APCD) is conducting twelve (12) months of community monitoring as a result of the Air Toxics Act (Colorado HB21-1189). The bill created a new program at APCD to regulate toxics air contaminates at four (4) covered facilities located in Commerce City, Henderson, and Pueblo. As a part of this program, APCD is establishing a community monitoring program that prioritizes disproportionately impacted communities to better protect public health. The objectives of the monitoring program consist of monitoring for benzene, hydrogen sulfide (H_2S), and hydrogen cyanide (HCN), with supporting meteorological measurements, to help characterize impacts on the surrounding disproportionately impacted communities.

The facilities covered by HB21-1189 are the Suncor Refinery (Commerce City), the Phillips 66 Pipeline Terminal (Commerce City), the Sinclair Pipeline Terminal (Henderson), and Goodrich Carbon Products (Pueblo). These facilities have been divided into three (3) sampling regions. Air Resource Specialists, Inc. (ARS) is the contractor responsible for this monitoring effort, which will consist of thirty (30) days of sampling of each compound at each sampling region per quarter.

This monthly data submittal report describes all work performed by Air Resource Specialists, Inc. (ARS) for the project site for the monitoring period November 1 through November 30, 2023.

Any questions regarding the content of this report or the accompanying digital data files should be addressed to:

Christian Kirk, Project Manager
ckirk@air-resource.com
Air Resource Specialists, Inc.
1901 Sharp Point Drive, Suite F
Fort Collins, Colorado 80525
Telephone: 970-484-7941

2.0   OPERATIONAL SUMMARIES

Operational activities for this project consist of site installations, routine sampling per an established schedule, quarterly maintenance visits, and emergency visits.

Significant events that occurred during the November 1 through November 30, 2023, timeframe include the following:

- The HCN sample for the A1 site on 11/20/2023 and the HCN sample for the C1 site on 11/22/2023 were reported as samples above the detection limit by margins smaller than the expected uncertainty of the measurements. These samples are likely non-detects.

Significant deviations from the established sampling schedule include:

- None

Sampling issues or corrective actions taken include:

- The HCN sample on 11/8/2023 at the B1 site (DuPont Elementary) was invalidated due to a faulty sampling pump.

3.0   AIR TOXICS SAMPLING STATISTICS

Statistics for samples collected during the November 1 to November 30, 2023, monitoring period are displayed in the table below. The table compares samples collected for each monitoring region against the requirements of the project. The statement of work requires 30 sampling days per quarter. Benzene and H2S sampling frequency is twice the requirement in the statement of work. Collection statistics are slightly skewed since this report encompasses more than a month of data. Duplicate samples and field blanks are required to be collected at a 10% rate over the course of each quarter.

Table 3-1

14-day Benzene Sample Collection
November 1 to November 30, 2023

Sampling Region	Site	Monthly		Quarterly	
		Collected	Required	Collected	Required
A	A1	2	1	4	3
B	B1	2	1	4	3
C	C1	2	1	4	3

Table 3-2

Benzene Duplicate Sample and Field Blank Collection
November 1 to November 30, 2023

Duplicate		Field Blank	
Collected	%	Collected	%
1	17%	1	17%

Table 3-3

14-day H_2S Sample Collection
November 1 to November 30, 2023

Sampling Region	Site	Monthly		Quarterly	
		Collected	Required	Collected	Required
A	A1	2	1	4	3
B	B1	2	1	4	3
C	C1	2	1	4	3

Table 3-4

H$_2$S Duplicate Sample and Field Blank Collection
November 1 to November 30, 2023

Duplicate		Field Blank	
Collected	%	Collected	%
1	17%	1	17%

Table 3-5

HCN Sample Collection
November 1 to November 30, 2023

Sampling Region	Site	Monthly		Quarterly	
		Collected	Required	Collected	Required
A	A1	10	10	21	30
B	B1	9	10	20	30
C	C1	10	10	21	30

Table 3-6

HCN Duplicate Sample and Field Blank Collection
November 1 to November 30, 2023

Duplicate		Field Blank	
Collected	%	Collected	%
3	10%	3	10%

4.0 AIR TOXIC DATA SUMMARIES

The tables below summarize the air toxics data collected during the period of November 1 to November 30, 2023.

Table 4-1

14-Day Benzene Data
November 1 to November 30, 2023

SITE	Sampling Start Day	Sampling End Day	Days	Concentration (ppb)	MDL (ppb)	Notes
A1	10/25/2023	11/8/2023	14	0.354	0.0594	
A1	11/8/2023	11/22/2023	14	0.285	0.0597	
A1	11/8/2023	11/22/2023	14	0.284	0.0597	Duplicate
A1	11/8/2023	11/22/2023	14	ND	0.0597	Blank
B1	10/25/2023	11/8/2023	14	0.393	0.0595	
B1	11/8/2023	11/22/2023	14	0.397	0.0598	
C1	10/25/2023	11/8/2023	14	0.158	0.0592	
C1	11/8/2023	11/22/2023	14	0.148	0.0598	
		Maximum		0.397		
		Minimum		0.148		
		Average		0.288		

Table 4-2

14-Day H$_2$S Data
November 1 to November 30, 2023

SITE	Sampling Start Day	Sampling End Day	Days	Concentration (ppb)	LOD (ppb)	Notes
A1	10/25/2023	11/8/2023	14	0.350	0.04	
A1	11/8/2023	11/22/2023	14	0.271	0.04	
B1	10/25/2023	11/8/2023	14	0.545	0.04	
B1	11/8/2023	11/22/2023	14	0.455	0.04	
B1	11/8/2023	11/22/2023	14	0.426	0.04	Duplicate
B1	11/8/2023	11/22/2023	14	ND	0.04	Blank
C1	10/25/2023	11/8/2023	14	ND	0.04	
C1	11/8/2023	11/22/2023	14	0.147	0.04	
		Maximum		0.545		
		Minimum		0.147		
		Average		0.366		

Table 4-3

HCN Data
November 1 to November 30, 2023

SITE	Sampling Date	Duration (min)	Concentration (ppb)	MDL (ppb)	Notes
A1	11/02/2023 08:10	485	ND	0.8	
A1	11/06/2023 09:29	429	ND	0.9	
A1	11/08/2023 08:28	475	ND	0.8	
A1	11/10/2023 08:05	457	ND	0.8	
A1	11/14/2023 08:48	439	ND	0.9	
A1	11/16/2023 07:53	469	ND	0.8	
A1	11/20/2023 06:41	416	ND	0.9	
A1	11/22/2023 08:09	473	ND	0.8	
A1	11/22/2023 08:10	473	ND	0.8	Duplicate
A1	11/22/2023 08:09	0	ND	0.8	Blank
A1	11/28/2023 04:55	415	ND	0.9	
A1	11/30/2023 07:47	461	ND	0.8	
B1	11/02/2023 07:41	541	ND	0.7	
B1	11/06/2023 08:58	484	ND	0.8	
B1	11/10/2023 07:38	505	ND	0.8	
B1	11/14/2023 08:07	497	ND	0.8	
B1	11/16/2023 07:24	522	ND	0.7	
B1	11/20/2023 06:16	459	ND	0.8	
B1	11/22/2023 07:33	533	ND	0.7	
B1	11/28/2023 04:33	461	ND	0.9	
B1	11/30/2023 07:17	515	ND	0.7	
B1	11/30/2023 07:24	510	ND	0.7	Duplicate
B1	11/30/2023 07:17	0	ND	0.7	Blank
C1	11/2/2023 10:47	180	ND	2.2	
C1	11/6/2023 11:30	180	ND	2.1	
C1	11/8/2023 10:45	180	ND	2.1	
C1	11/10/2023 10:21	180	ND	2.1	
C1	11/14/2023 11:00	180	ND	2.2	
C1	11/16/2023 10:18	185	ND	2.2	
C1	11/20/2023 8:35	180	ND	2.1	
C1	11/22/2023 10:35	180	ND	2.2	
C1	11/28/2023 6:59	180	ND	2.3	
C1	11/28/2023 7:00	180	ND	2.1	Duplicate
C1	11/28/2023 6:59	0	ND	2.3	Blank
C1	11/30/2023 10:15	182	ND	2.2	

4.1 METEOROLOGICAL DATA COLLECTION STATISTICS AND SUMMARIES

The tables and graphs below summarize the meteorological data collected during the period of November 1 to November 30, 2023.

4.1.1 Site A1

- Data Collection Statistics for A1 - Hourly Data

- Wind Rose for A1

- Stackplots - Hourly Data

4.1.2 Site B1

- Data Collection Statistics for B1 - Hourly Data

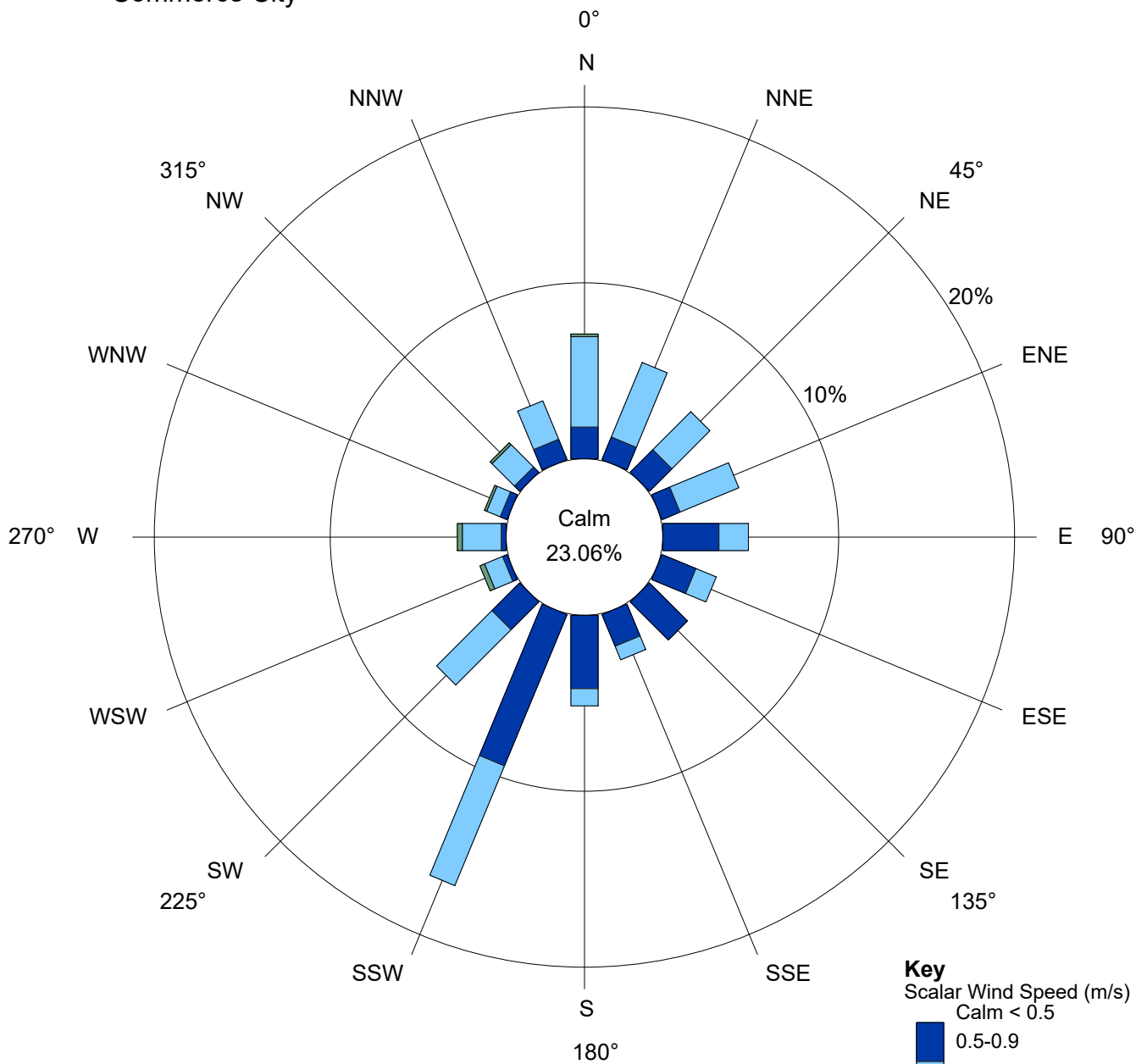- Wind Rose for B1

- Stackplots - Hourly Data

4.1.3 Site C1

- Data Collection Statistics for C1 - Hourly Data

- Wind Rose for C1

- Stackplots - Hourly Data

Table 4-4

Data Collection Statistics

Colorado Air Toxics - A1
Commerce City

11/01/2023 - 11/30/2023

Parameter	Interval	Par Code	No. Possible	No. Collected	% Collected	No. Valid	% Valid
Relative Humidity - external	hourly	RH	720	720	100.0	720	100.0
Standard Deviation for Wind Direction	hourly	SDWD	720	720	100.0	720	100.0
Solar Radiation	hourly	SOL	720	720	100.0	720	100.0
Scalar Wind Direction	hourly	SWD	720	720	100.0	720	100.0
Scalar Wind Speed	hourly	SWS	720	720	100.0	720	100.0
Ambient Temperature (aspirated)	hourly	TMP	720	720	100.0	720	100.0
Vector Wind Direction	hourly	VWD	720	720	100.0	720	100.0
Vector Wind Speed	hourly	VWS	720	720	100.0	720	100.0

Note: The percent valid is calculated against the number possible.

Automatic zeros and spans are performed daily on most ambient gas analyzers and ambient data can only be reported if the duration of these events is less than 25% of the hour. As a result, the maximum percent valid is generally less than 100%.

Figure 4-1

Colorado Air Toxics - A1
Commerce City

Wind Rose

11/01/2023 - 11/30/2023

100.0% Collected 100.0% Valid
720 Possible /720 Collected /720 Valid
Collection Statistics Include:
Wind Speed and Wind Direction
(SWS-1; SWD-1)

Key
Scalar Wind Speed (m/s)
Calm < 0.5

■	0.5-0.9
■	1.0-3.9
■	4.0-6.9
■	7.0-9.9
■	10.0-12.9
■	13.0-15.9
■	16.0-18.9
■	19.0+

Figure 4-2
Colorado Air Toxics - A1 (Commerce City) - Hourly Meteorological Data
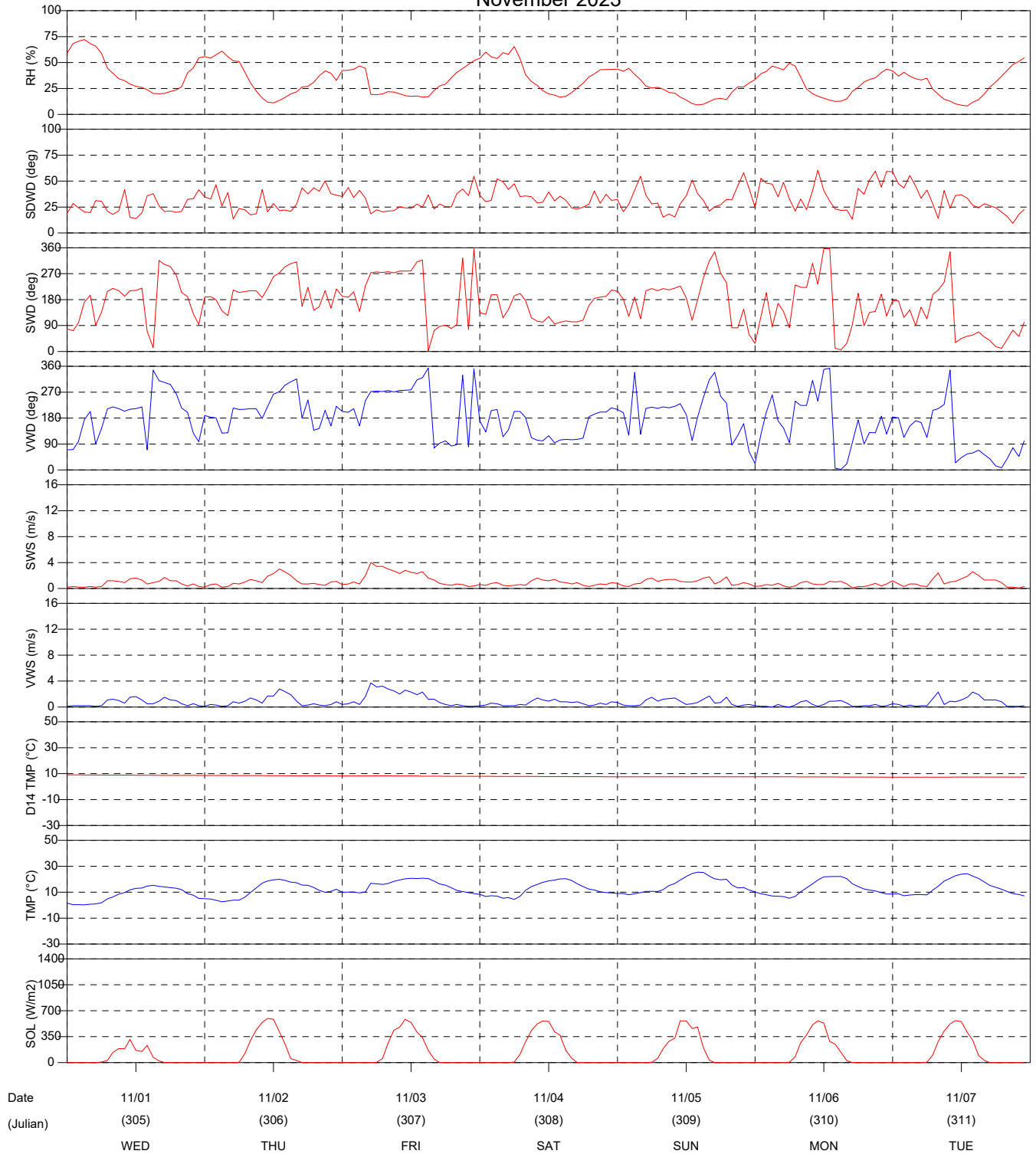November 2023

Figure 4-3
Colorado Air Toxics - A1 (Commerce City) - Hourly Meteorological Data
November 2023

Figure 4-4
Colorado Air Toxics - A1 (Commerce City) - Hourly Meteorological Data
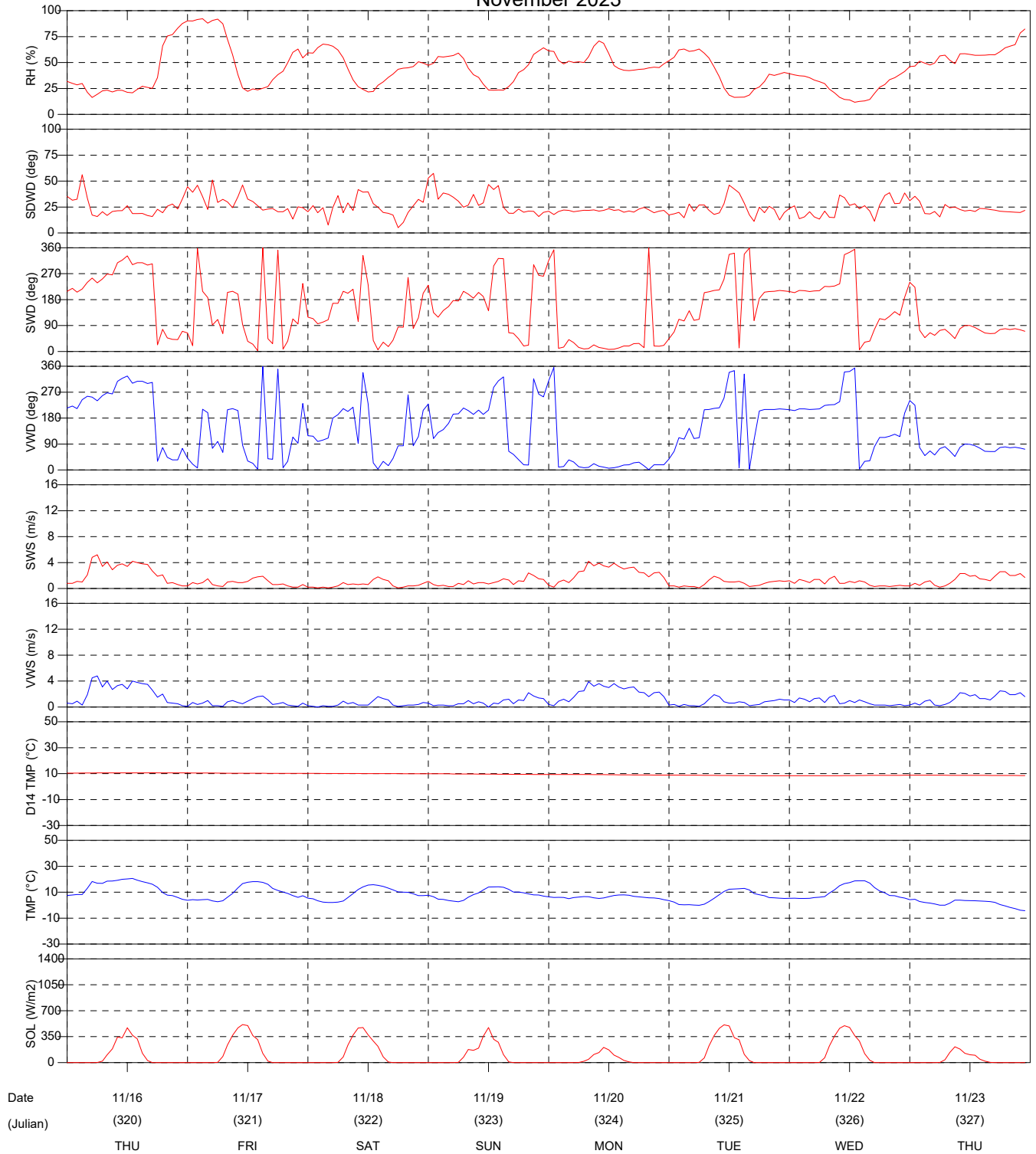November 2023

Figure 4-5
Colorado Air Toxics - A1 (Commerce City) - Hourly Meteorological Data
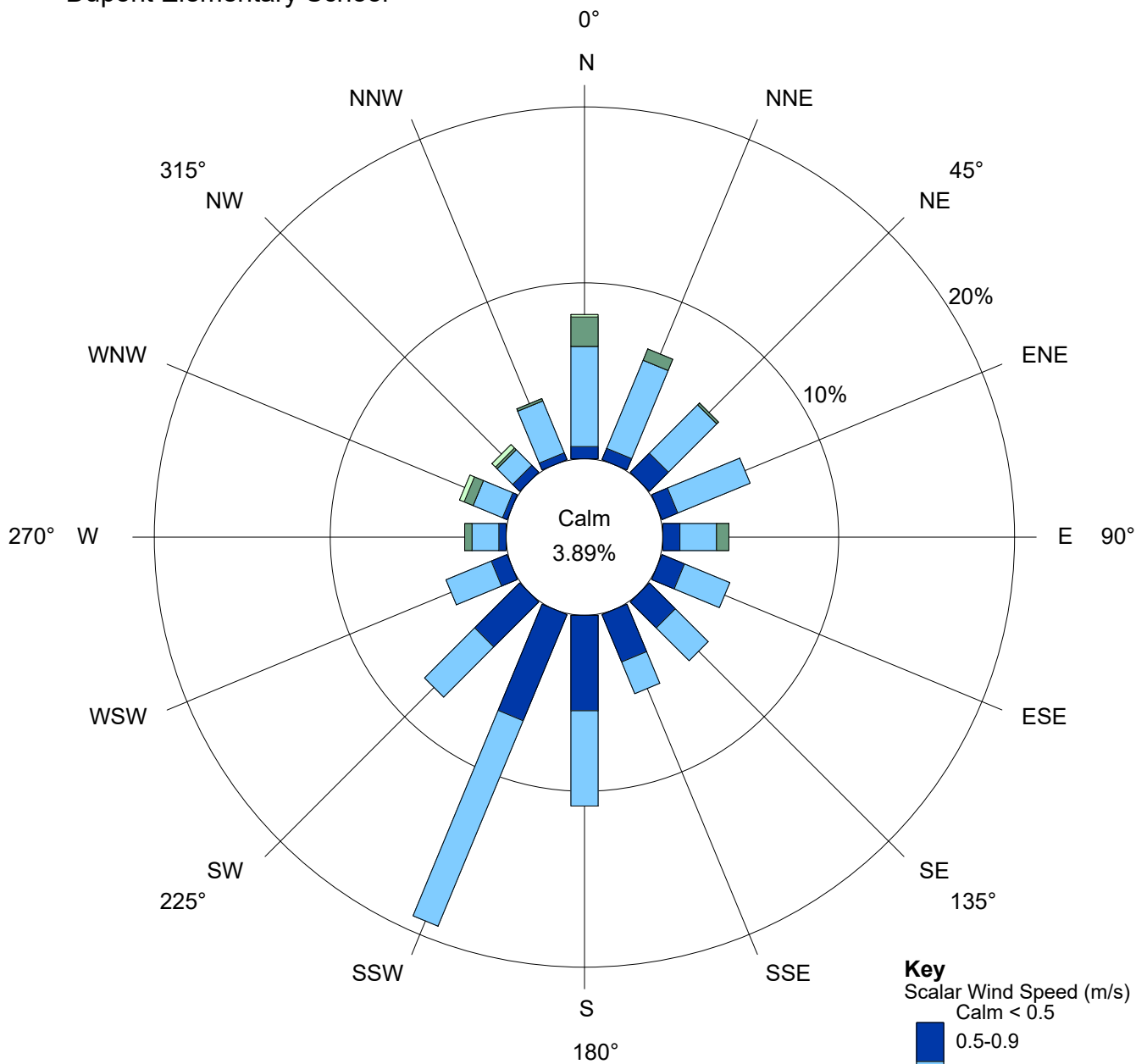November 2023

Table 4-5

Data Collection Statistics Colorado Air Toxics - B1 Dupont Elementary School 11/01/2023 - 11/30/2023							

Parameter	Interval	Par Code	No. Possible	No. Collected	% Collected	No. Valid	% Valid
Relative Humidity - external	hourly	RH	720	720	100.0	720	100.0
Standard Deviation for Wind Direction	hourly	SDWD	720	720	100.0	720	100.0
Solar Radiation	hourly	SOL	720	720	100.0	720	100.0
Scalar Wind Direction	hourly	SWD	720	720	100.0	720	100.0
Scalar Wind Speed	hourly	SWS	720	720	100.0	720	100.0
Ambient Temperature (aspirated)	hourly	TMP	720	720	100.0	720	100.0
Vector Wind Direction	hourly	VWD	720	720	100.0	720	100.0
Vector Wind Speed	hourly	VWS	720	720	100.0	720	100.0

Note: The percent valid is calculated against the number possible.

Automatic zeros and spans are performed daily on most ambient gas analyzers and ambient data can only be reported if the duration of these events is less than 25% of the hour. As a result, the maximum percent valid is generally less than 100%.

Figure 4-6

Colorado Air Toxics - B1
Dupont Elementary School

Wind Rose

11/01/2023 - 11/30/2023

100.0% Collected 100.0% Valid
720 Possible /720 Collected /720 Valid
Collection Statistics Include:
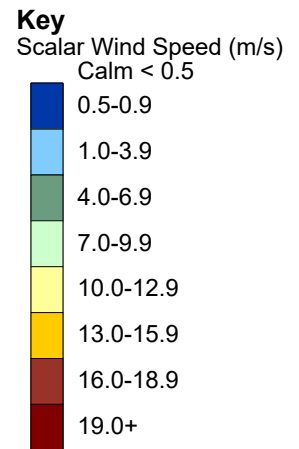Wind Speed and Wind Direction
(SWS-1; SWD-1)

Key
Scalar Wind Speed (m/s)
Calm < 0.5
0.5-0.9
1.0-3.9
4.0-6.9
7.0-9.9
10.0-12.9
13.0-15.9
16.0-18.9
19.0+

Figure 4-7

Colorado Air Toxics - B1 (DuPont Elementary School) - Hourly Meteorological Data
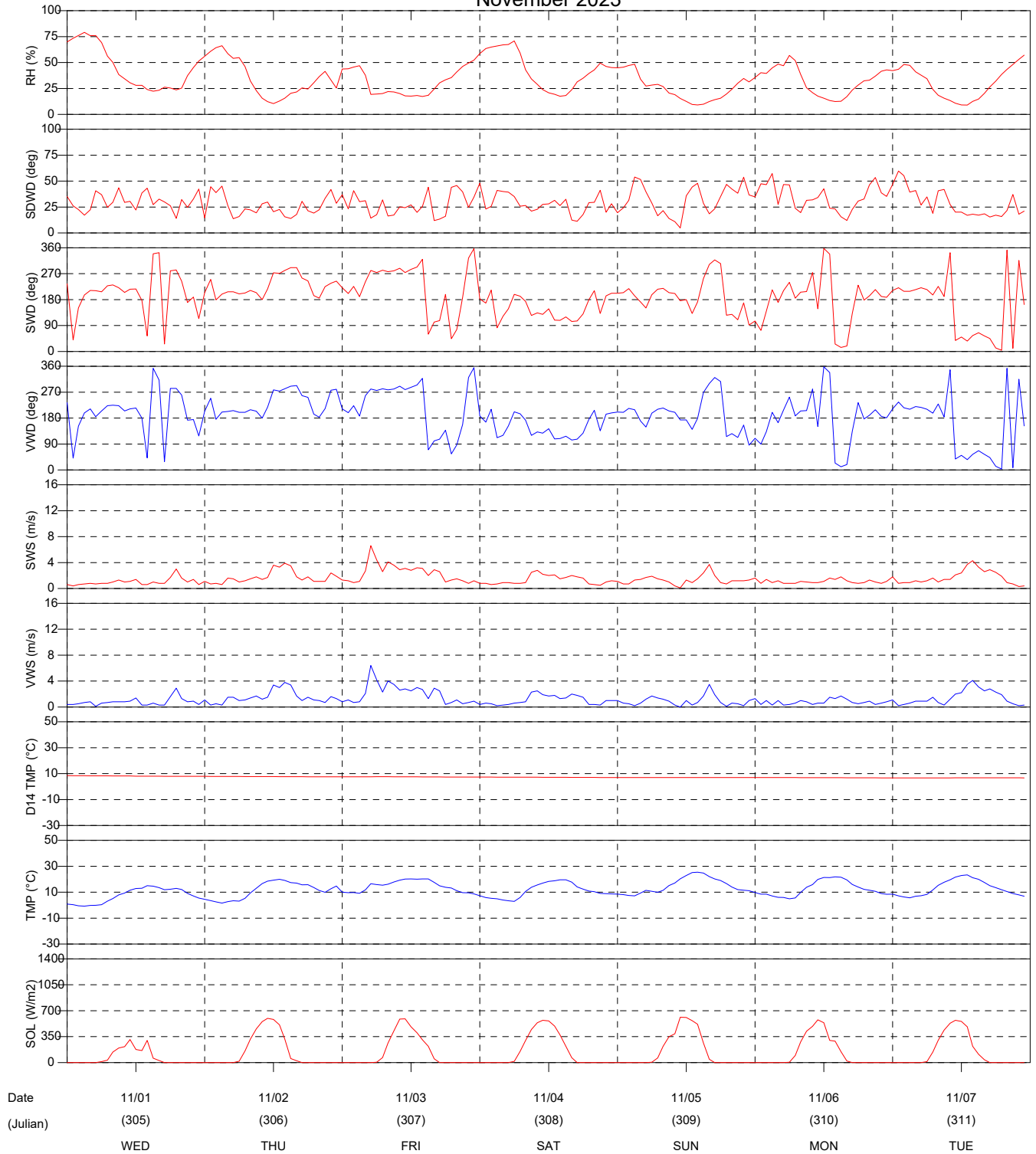
November 2023

Figure 4-8

Colorado Air Toxics - B1 (DuPont Elementary School) - Hourly Meteorological Data

November 2023

Figure 4-9
Colorado Air Toxics - B1 (DuPont Elementary School) - Hourly Meteorological Data
November 2023

Figure 4-10
Colorado Air Toxics - B1 (DuPont Elementary School) - Hourly Meteorological Data
November 2023

Table 4-6

Data Collection Statistics
Colorado Air Toxics - C1 Pueblo
11/01/2023 - 11/30/2023

Parameter	Interval	Par Code	No. Possible	No. Collected	% Collected	No. Valid	% Valid
Relative Humidity - external	hourly	RH	720	720	100.0	720	100.0
Standard Deviation for Wind Direction	hourly	SDWD	720	720	100.0	720	100.0
Solar Radiation	hourly	SOL	720	720	100.0	720	100.0
Scalar Wind Direction	hourly	SWD	720	720	100.0	720	100.0
Scalar Wind Speed	hourly	SWS	720	720	100.0	720	100.0
Ambient Temperature (aspirated)	hourly	TMP	720	720	100.0	720	100.0
Vector Wind Direction	hourly	VWD	720	720	100.0	720	100.0
Vector Wind Speed	hourly	VWS	720	720	100.0	720	100.0

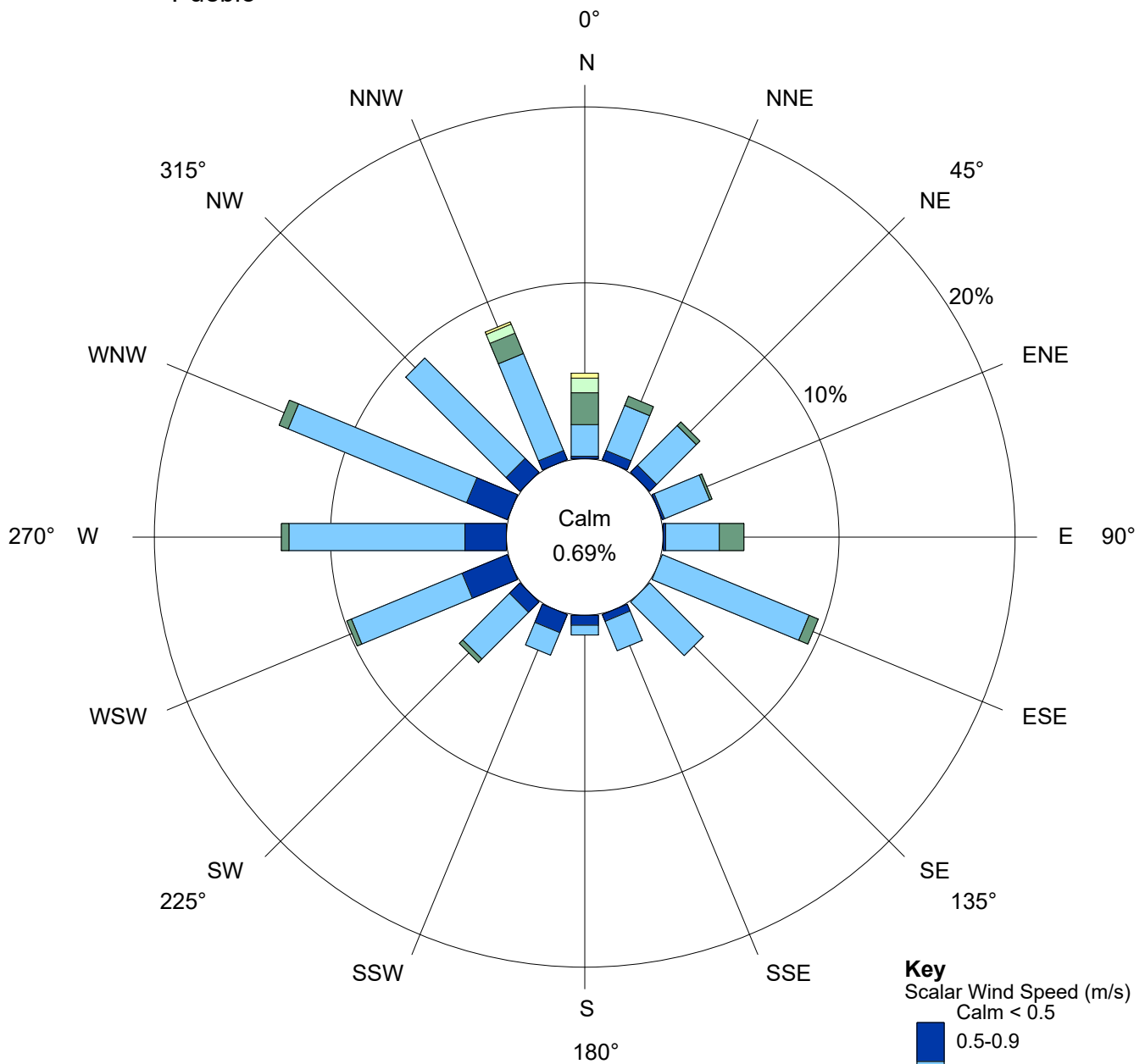Note: The percent valid is calculated against the number possible.

Automatic zeros and spans are performed daily on most ambient gas analyzers and ambient data can only be reported if the duration of these events is less than 25% of the hour. As a result, the maximum percent valid is generally less than 100%.

Figure 4-11

Colorado Air Toxics - C1 Pueblo

Wind Rose

11/01/2023 - 11/30/2023

0°
N

NNW

NNE

315°
NW

45°
NE

20%

WNW

ENE

10%

270° W

E 90°

Calm
0.69%

WSW

ESE

SW
225°

SE
135°

SSW

SSE

S
180°

100.0% Collected   100.0% Valid

720 Possible /720 Collected /720 Valid

Collection Statistics Include:

Wind Speed and Wind Direction
(SWS-1; SWD-1)

Key
Scalar Wind Speed (m/s)
Calm < 0.5

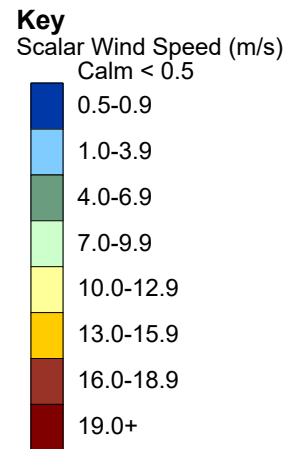|	
■	0.5-0.9
■	1.0-3.9
■	4.0-6.9
■	7.0-9.9
■	10.0-12.9
■	13.0-15.9
■	16.0-18.9
■	19.0+

Figure 4-12
Colorado Air Toxics - C1 (Pueblo) - Hourly Met Data
November 2023

Figure 4-13
Colorado Air Toxics - C1 (Pueblo) - Hourly Met Data
November 2023

Figure 4-14
Colorado Air Toxics - C1 (Pueblo) - Hourly Met Data
November 2023

Figure 4-15
Colorado Air Toxics - C1 (Pueblo) - Hourly Met Data
November 2023

Date	11/24	11/25	11/26	11/27	11/28	11/29	11/30
(Julian)	(328)	(329)	(330)	(331)	(332)	(333)	(334)
	FRI	SAT	SUN	MON	TUE	WED	THU