Landfill Operations Assessment Report

Chiquita Canyon Landfill
29201 Henry Mayo Dr.
Castaic, CA 91384

01204123.21 | February 2021

3900 Kilroy Airport Way, Suite 100
Long Beach, CA 90806
562-426-9544

Table of Contents

Section Page

Figures

Tables

Appendices

This report was prepared
and review by:

Jeff Leadford, PE
Senior Project Engineer

Sol Sim, PE
Vice President and Chief Engineer

Patrick S. Sullivan, REPA, CPP, BCES
Senior Vice President

1.0 BACKGROUND

The Chiquita Canyon Landfill (Landfill or CCL) has received numerous odor complaints over the past year from neighborhoods surrounding the Landfill, especially in the Val Verde neighborhood located to the northwest. As a result of these complaints, the South Coast Air Quality Management District (SCAQMD or District) issued several notices of violation (NOVs) due to alleged odor impacts. Subsequent to the issuance of the NOVs, the SCAQMD and CCL entered into a Stipulated Order of Abatement (Stipulated Order), Case No. 6177-1. The Stipulated Order requires CCL to conduct various steps to investigate and develop a plan for mitigation of odors.

Condition 18 of the Stipulated Order requires CCL to retain a consultant as described below:

> *Respondent shall retain a consultant to assess the following aspects of the Landfill's operations. Upon completion of the assessment of operations, the consultant shall propose adjustments or modifications to landfill systems or operations that the consultant reasonably believes, based on its professional judgment, could reduce the potential emission of odors from the Landfill and related community impacts. The consultant shall include an assessment of the feasibility and limitations of any proposed operational adjustment or modification. The consultant shall document its proposals in a final report to be submitted to the South Coast AQMD (attn: Mary Reichert mreichert@aqmd.gov and Kathryn Roberts kroberts@aqmd.gov) on or before February 22, 2021.*

SCS Engineers (SCS) and Blue Ridge Services Montana, Inc. (BRSMT) were retained to complete the various assessment activities required under Condition 18 of the Stipulated Order. This Landfill Operations Assessment Report (Report) constitutes the final report required by Condition 18 of the Stipulated Order, as noted above.

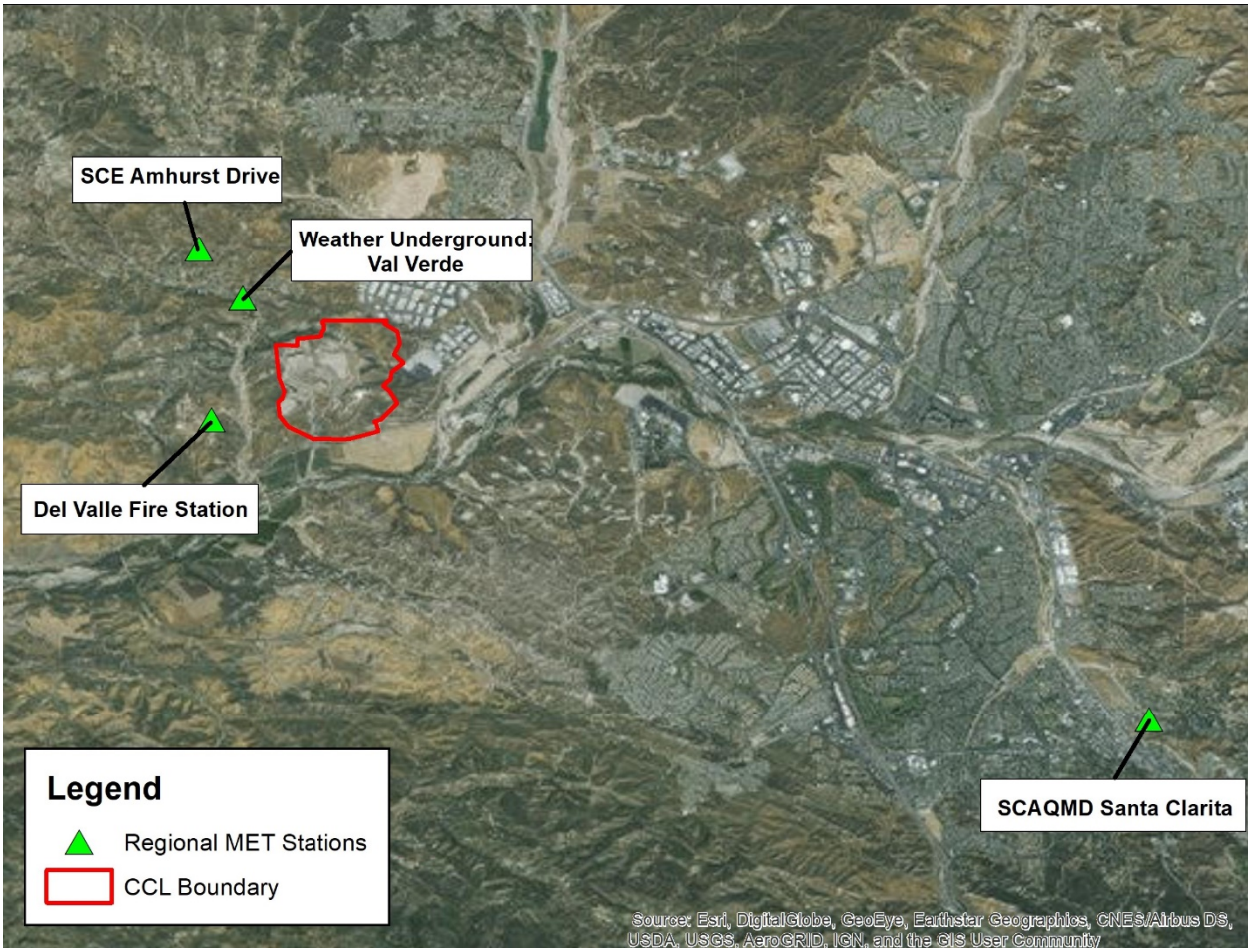
2.0 REGIONAL METEOROLOGICAL STUDY

Condition 18.a of the Stipulated Order requires the following analysis:

> *A study in the community of Val Verde based on available meteorological data to determine prevailing wind patterns in the community and related meteorological conditions. This study shall include an assessment of prevailing wind direction and speeds throughout the course of the past five calendar years.*

To address this requirement, SCS collected available regional meteorological (MET) data from 2016-2020 from a Santa Clarita MET station and two Val Verde MET stations. The Santa Clarita data is from the SCAQMD station in central Santa Clarita. The Val Verde MET stations are a Southern California Edison (SCE) station at Amhurst Drive in northwest Val Verde as well as a Weather Underground (WU) station from central Val Verde. The locations of each MET station in reference to the CCL boundary are available in **Figure 2-1**.

Figure 2-1: Regional MET Station Locations



SCS also obtained data from the Del Valle fire station west of Chiquito Canyon Road, which sits just west of the Landfill and forms its own canyon leading into Val Verde. After comparing wind roses from each MET station, it was clear that the fire station experiences a wind effect that does not correlate with the other MET stations analyzed (i.e., predominant winds from the north during day time hours). Based on these data, we believe this station is not representative of the regional or community-level winds that are occurring in this location. For this reason, the Del Valle station was not further evaluated in the regional/community wind analysis.

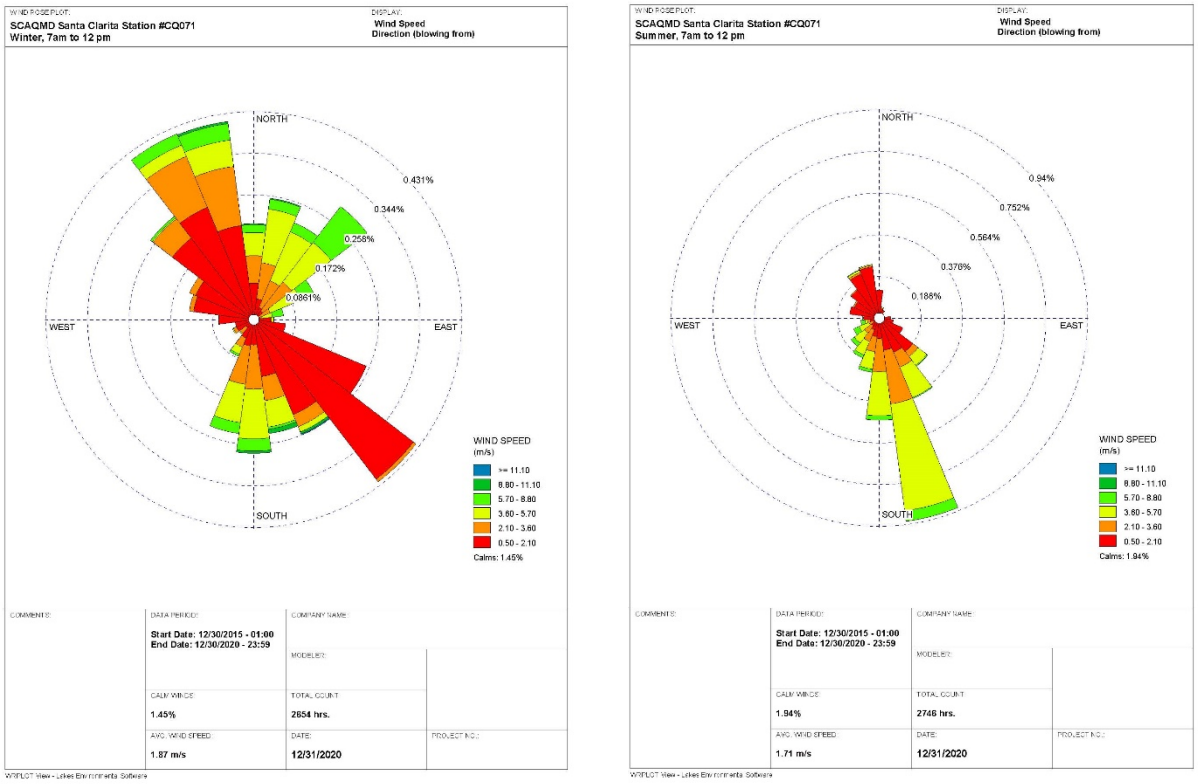
2.1 SANTA CLARITA ANALYSIS

The Santa Clarita station had the most comprehensive set of MET data available, with hourly data spanning the entire five-year period. Wind roses were created for each season and focused on the primary complaint hours of 7 AM to 12 PM (see Section 4 on the discussion of complaints). Because of its comprehensive data set and the fact that it is maintained by the SCAQMD, the Santa Clarita station was deemed to represent the typical regional wind patterns in this area of Los Angeles County. Where wind speed and direction are discussed below, we are describing the time period from 7 AM to Noon, unless otherwise noted.

A clear distinction in wind patterns is visible between winter and summer in **Figure 2-2** below. The winter months experience winds from all directions during the active hours, but from the northwest and southeast in particular. The summer months are significantly more focused from the southerly and southeasterly directions. The spring and fall wind roses were a combination of these two and can be found in **Appendix A** with hourly direction and wind speed patterns as well.

It would appear that the predominant regional day time winds in the summer and portions of the spring and fall are derived from the south/southeast. Winter winds have a significant northerly component and a lesser amount of southeast winds. Since the location of the verified complaints are in neighborhoods north/northwest of the Landfill, southerly wind conditions will be the focus of this odor assessment. In particular, since the Val Verde neighborhood is located northwest of the CCL, southeasterly winds are considered the most likely to result in potential odor impacts in the Val Verde area, based on wind conditions we observed in our analysis.

Figure 2-2: Santa Clarita Winter vs. Summer Wind Roses

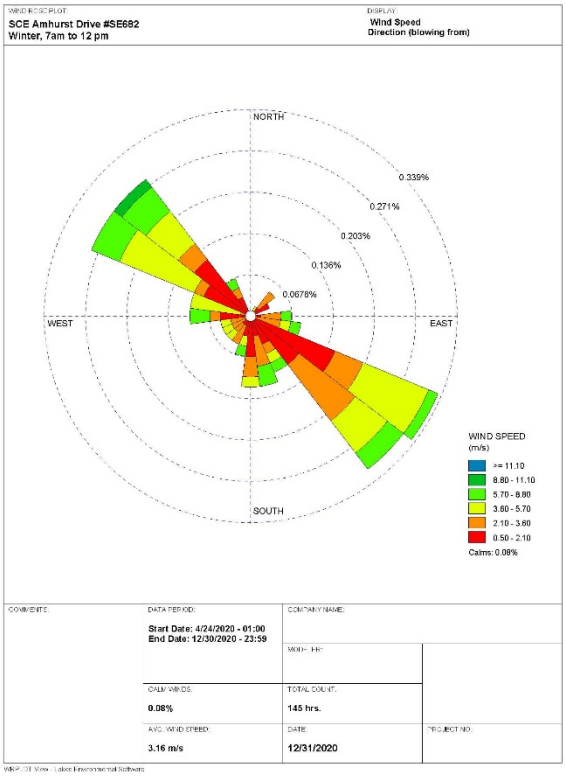


The average wind speed at the Santa Clarita station is about 2.2 meters per second (m/sec) (4.9 miles per hour [mph]). Slower winds above (red and orange) are more frequent from the north and southeast in the winter, where higher wind speeds (yellow and green) are specifically from the south-southeast direction in the summer. As shown in **Appendix A**, morning winds tend to be low to moderate in wind speed while afternoon winds tend to see increasing wind speeds.

2.2 VAL VERDE ANALYSIS

The SCE Amhurst MET station data was only available from April 2020 through December 2020. The WU station was only available from April 2017 through March 2018. This provided enough data for some seasonal analysis, but the data sets are more limited than the Santa Clarita station. The wind rose comparisons between winter and summer at each station during the active hours are shown in **Figures 2-3 and 2-4.**

Figure 2-3: SCE Amhurst Winter vs. Summer Wind Roses



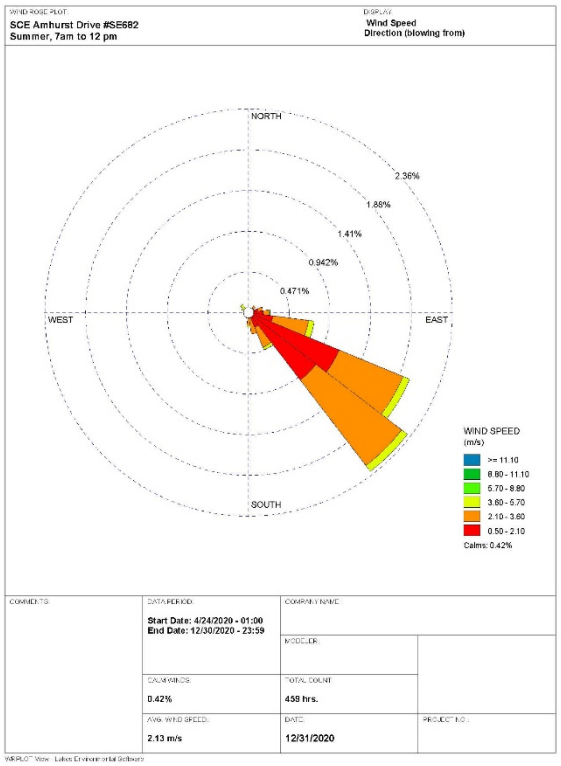
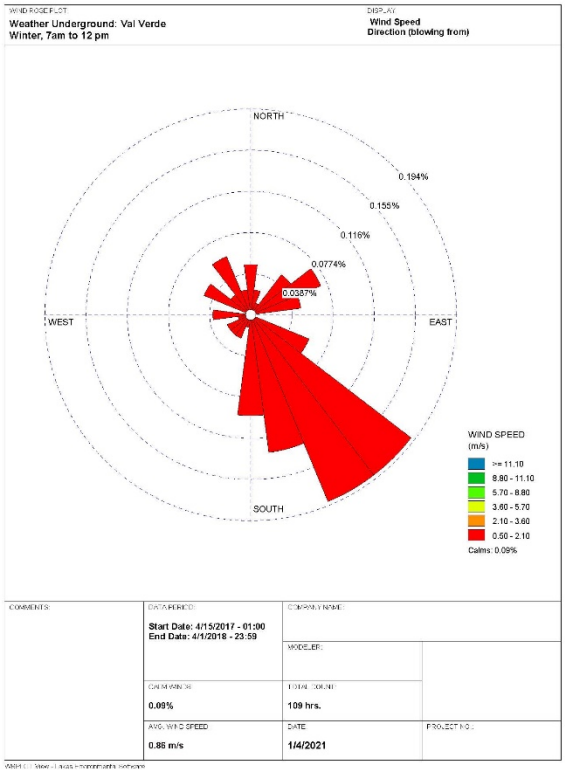


Figure 2-4: WU Val Verde Winter vs. Summer Wind Roses



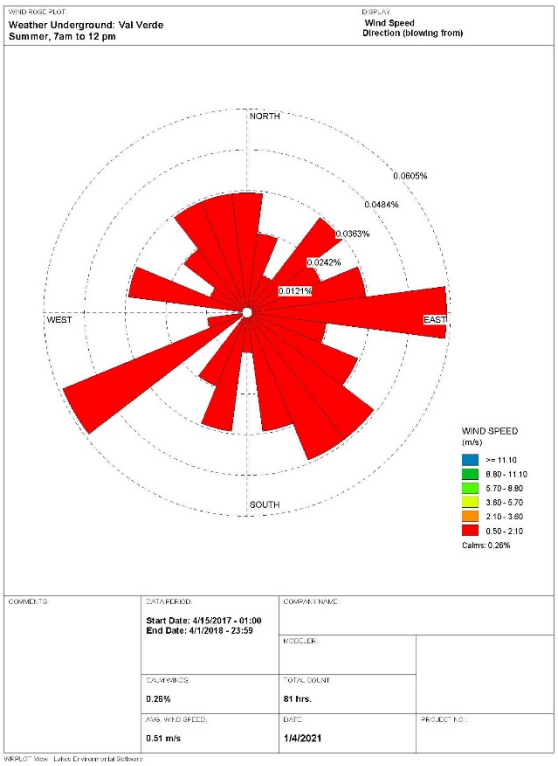


Figure 2-3 for the SCE station shows a similar pattern to the Santa Clarita MET station. Winter winds have a varied wind rose that emphasizes winds from the northwest and southeast, and summer winds almost entirely occur from the southeast. The spring and fall wind conditions (Appendix A) are also similar to the Santa Clarita station. This would suggest that the community-level wind conditions in the Val Verde neighborhood are similar to the regional conditions that exist in this area of Los Angeles County.

Wind speeds in the winter are similar between the Santa Clarita and SCE stations. However, wind speeds are clearly slower when derived from the southeast at SCE versus Santa Clarita. This may be because the mountain terrain is slowing these winds down as they exit the larger valley that Santa Clarita sits in.

Figure 2-4 for the WU station shows a major focus of winds from the southeast during the winter, but in the summer, the primary direction is inconclusive. Wind roses for spring (Appendix A) are focused from the northwest and southeast, as is true at Santa Clarita and SCE stations. The fall wind rose for the WU station is primarily from the south and southeast, also similar to Santa Clarita.

The data from WU does not show much variation in wind speed, with all speeds in the approximately 0.5 to 2.1 m/sec (1.1 to 4.7 mph) range. It is possible that this wind speed sensor is not as precise as on the other MET stations because of the lack of variability in wind speeds compared to nearby stations, and this may contribute to the discrepancy. As such, the wind speed data from the WU station may be less than reliable.

Seasonal wind roses for each of these MET stations and their hourly direction patterns can also be found in Appendix A. Appendix A also contains graphs of wind speeds and direction versus time of day, also broken down by season.

3.0 ON-SITE METEOROLOGICAL STUDY

Condition 18.b of the Stipulated Order requires the following analysis:

> *Onsite study to characterize wind patterns and related meteorological conditions at each of the locations identified for future landfill cell development. Study shall include an assessment of potential ridgeline and vegetative barriers between current and future landfill cell locations and the surrounding residential community.*

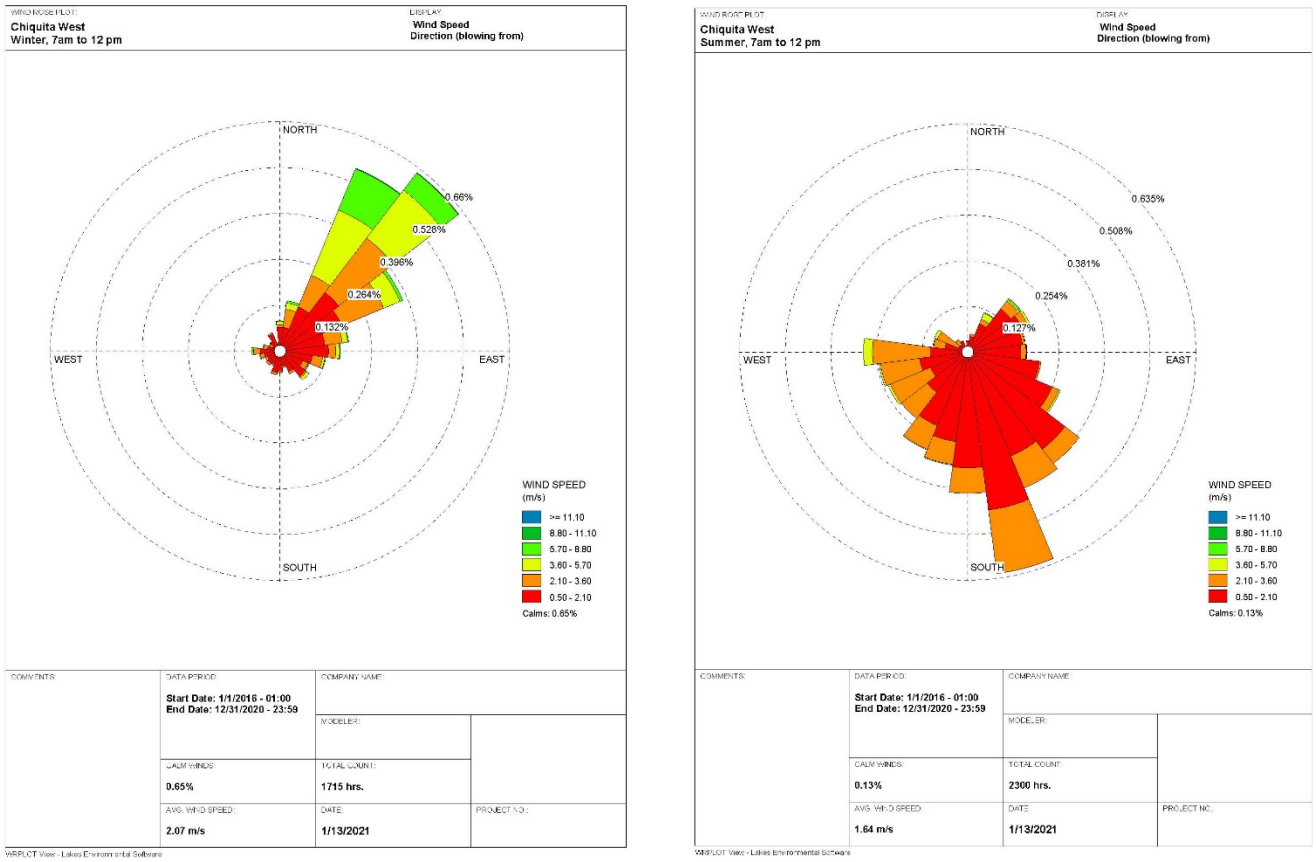
For on-site MET data, the Landfill has two long-term data sites, "Chiquita West," stationed on the western edge of the Landfill (near Cells 6 and 8) and "Chiquita Flare," located at the southern edge of waste near the landfill gas (LFG) flare station. In addition, Stations #1 through #3 were temporary MET sites that moved between the northeast and southwest edges of the facility. Since both long-term stations are located in southern portion of the Landfill, location-specific wind data for the landfill cells located in the northeastern portion of the Landfill are not available. **Figure 3-1** shows the location of each of these MET towers.

Figure 3-1: On-Site MET Station Locations

3.1 CHIQUITA WEST ANALYSIS

The Chiquita West station has data for the full five-year period from 2016 to 2020. Wind roses were created for each season and focused on the primary complaint hours of 7 AM to 12 PM (see Section 4 on the discussion of complaints). This information is presented on **Figure 3-2** for winter and summer.

Figure 3-2: Chiquita West Winter vs Summer Wind Roses



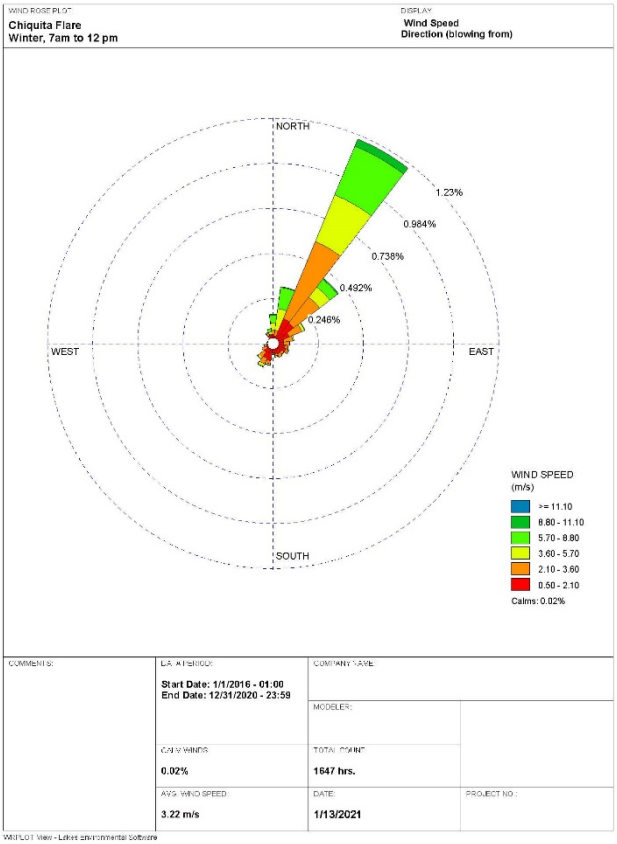
Wind patterns follow a similar seasonal shift noted on the SCE and Santa Clarita stations in the summer months, with morning winds focused as coming from the south and southeast directions and evening/overnight winds from the north. In the winter, however, the morning winds predominantly are from the northeast, rather than the northwest, without a southerly component. Fall and spring wind roses show wind patterns that are a combination of these two, and are available in **Appendix B**.

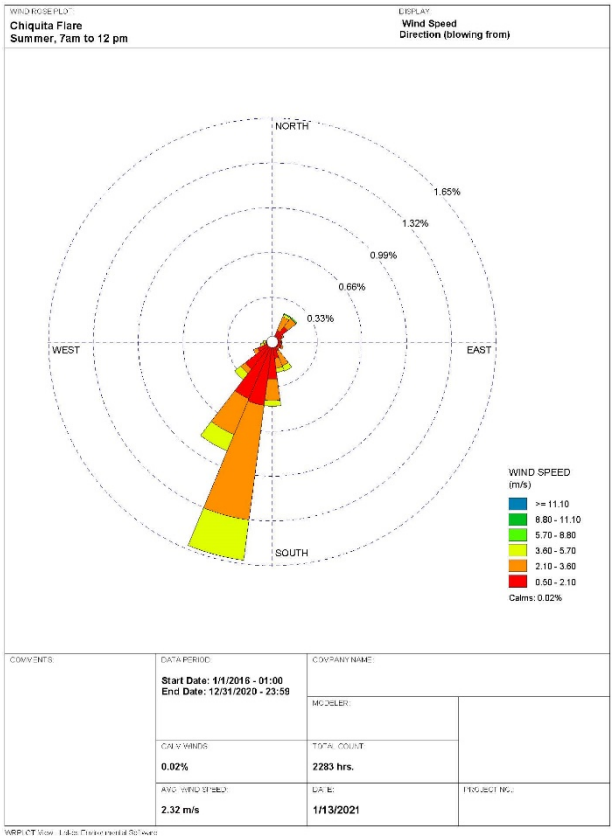
The average wind speed at Chiquita West is approximately 2.14 m/sec (4.8 mph). From the wind roses above, it is clear that the winter months see much higher wind speeds (green and yellow) and summer sees steady low wind speeds (red and orange). Afternoon winds tends to have higher winds speeds than morning winds as shown in the graphs in **Appendix B**.

3.2 CHIQUITA FLARE ANALYSIS

The Chiquita Flare station has data for the full five-year period as well. Wind roses were also analyzed for each season during the morning hours between 7 AM and Noon, as indicated above. This is illustrated in **Figure 3-3** for winter and summer.

Figure 3-3: Chiquita Flare Winter vs Summer Wind Roses





The winter months show a similar trend to the Chiquita West station, with winds primarily from the northeast. Winds tend to come more from the southwest during the summer months. This may be because the Chiquita Flare station is located in a valley-like depression that runs in a southwest to northeasterly direction, which may channel southeasterly regional winds toward the northeast. Thus, they appear as southwest winds at the Chiquita Flare station. Fall and spring wind roses show wind patterns that are a combination of these two, and are available in **Appendix B**.

The average wind speed at Chiquita Flare is 2.94 m/sec (6.6 mph). From the wind roses above, it is clear that the winter months also see much higher wind speeds (green and yellow), and summer sees steadier low wind speeds (red and orange) similar to the Chiquita West station. Afternoon winds tends to have higher winds speeds than morning winds as shown in the graphs in **Appendix B.**

3.3 STATION #1 THROUGH #3 ANALYSIS

CCL collected additional MET data, beyond their long-term stations, from temporary stations deployed during August and September 2020 in order to assess wind conditions after receiving NOVs from the SCAQMD. SCS has evaluated these data for our analysis; however, the limited time frame of the data make these data less valuable than the five-year data from the long-term stations.

The first temporary location of Stations #1 through #3 was operational from 8/13/2020 through 8/27/2020 (**Figure 3-1**). The second temporary location of each station was operational from 8/27/2020 through 9/11/2020. This does not give us enough data for a seasonal analysis, but the data was taken during the time of the largest percentage of complaints during the summer months of August and September 2020.

With a minimal data set, the best way to portray the data is by showing the average wind direction and speed per hour of the day. **Figures 3-4 through 3-6** show these graphs for location #1, which were placed at the northeast edge of the landfill.

Figure 3.4: Station 1, Location 1 MET Averages

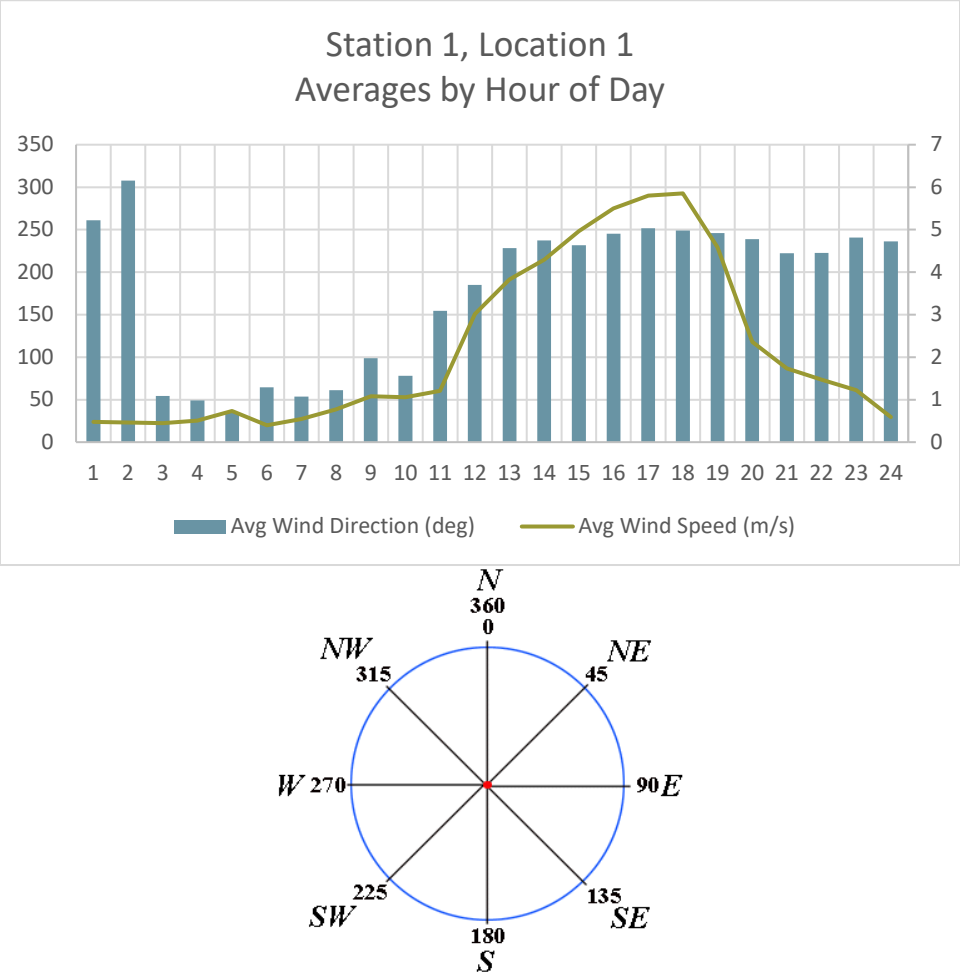
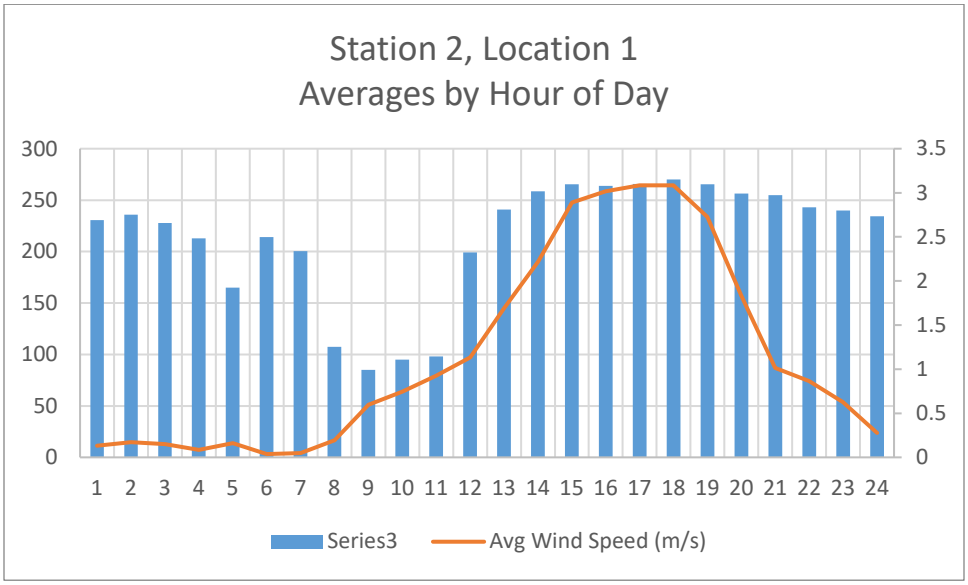


Figure 3-5: Station 2, Location 1 MET Averages



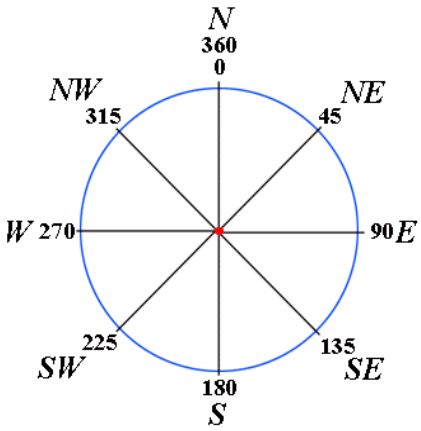
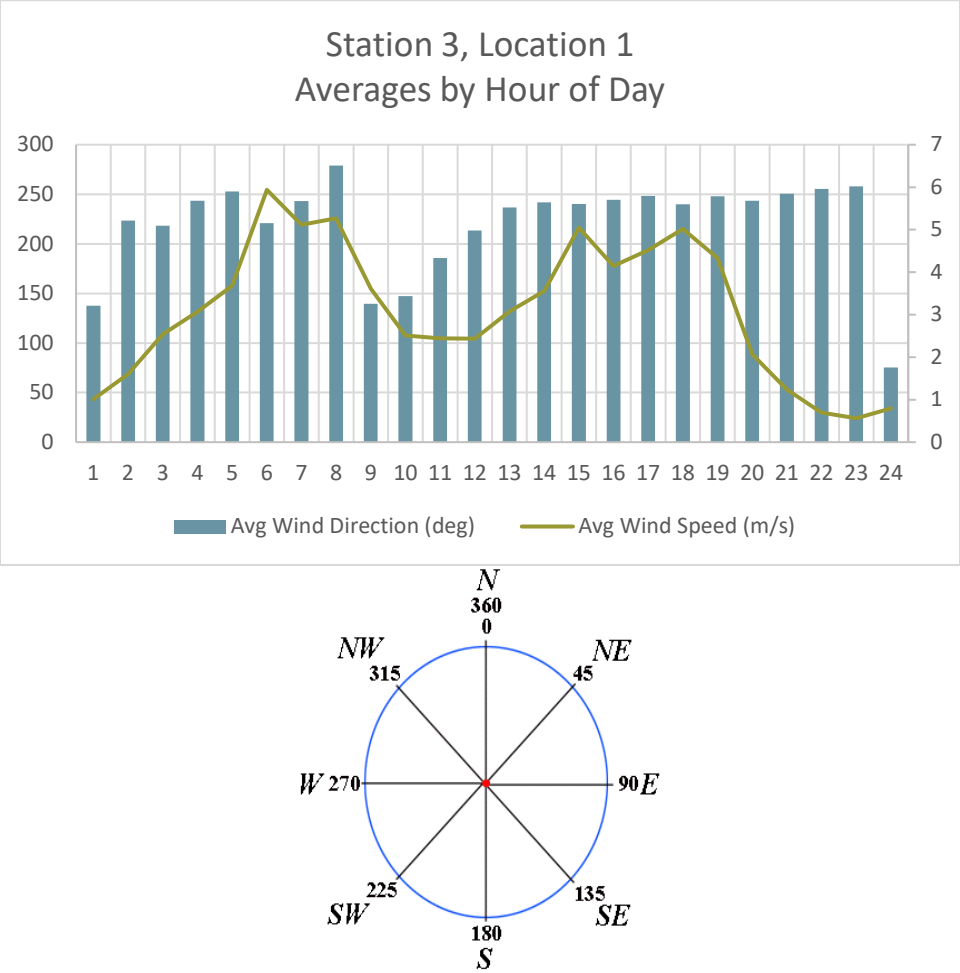


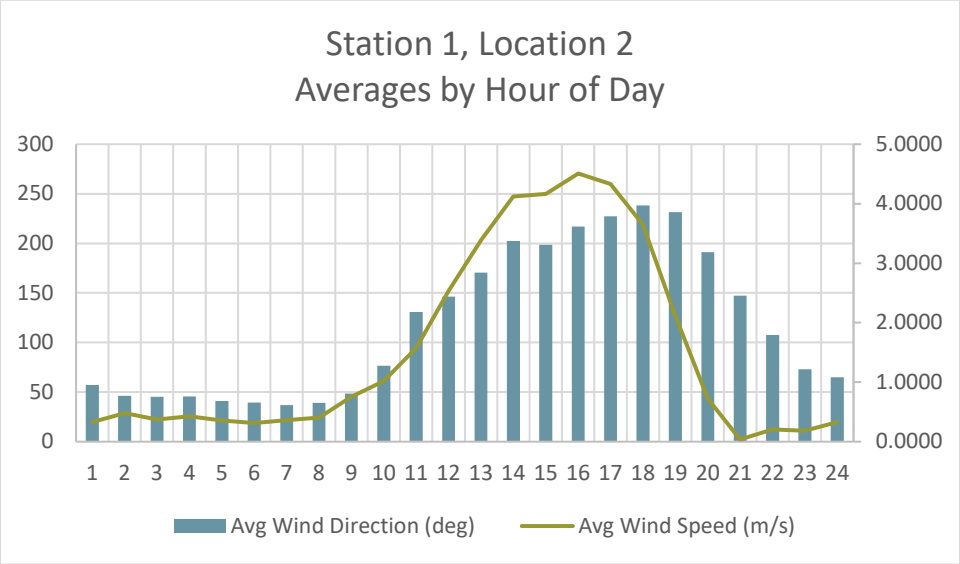
Figure 3-6: Station 3, Location 1 MET Averages



All of the stations at Location 1 do not seem to be correlated. This is most likely due to their placement on the edge of the sloped Landfill with a large ridgeline directly adjacent, which may be affecting wind conditions. In particular, Stations #2 and #3 are right up against the ridge. However, each station does show a similar trend that during the morning hours, the wind changes from the east, to from the south and then to from the west.

Figures 3-7 through 3-9 show the graphs for the stations at Location #2, which were placed at the western edge of the landfill.

Figure 3-7: Station 1, Location 2 MET Averages



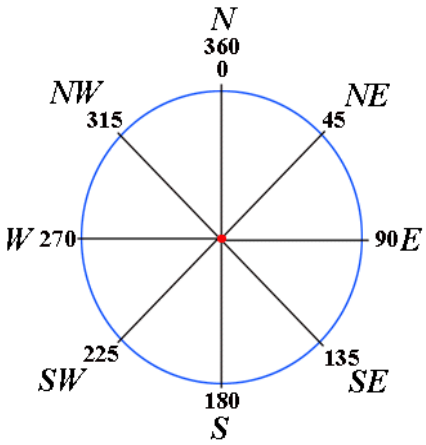


Figure 3-8: Station 2, Location 2 MET Averages

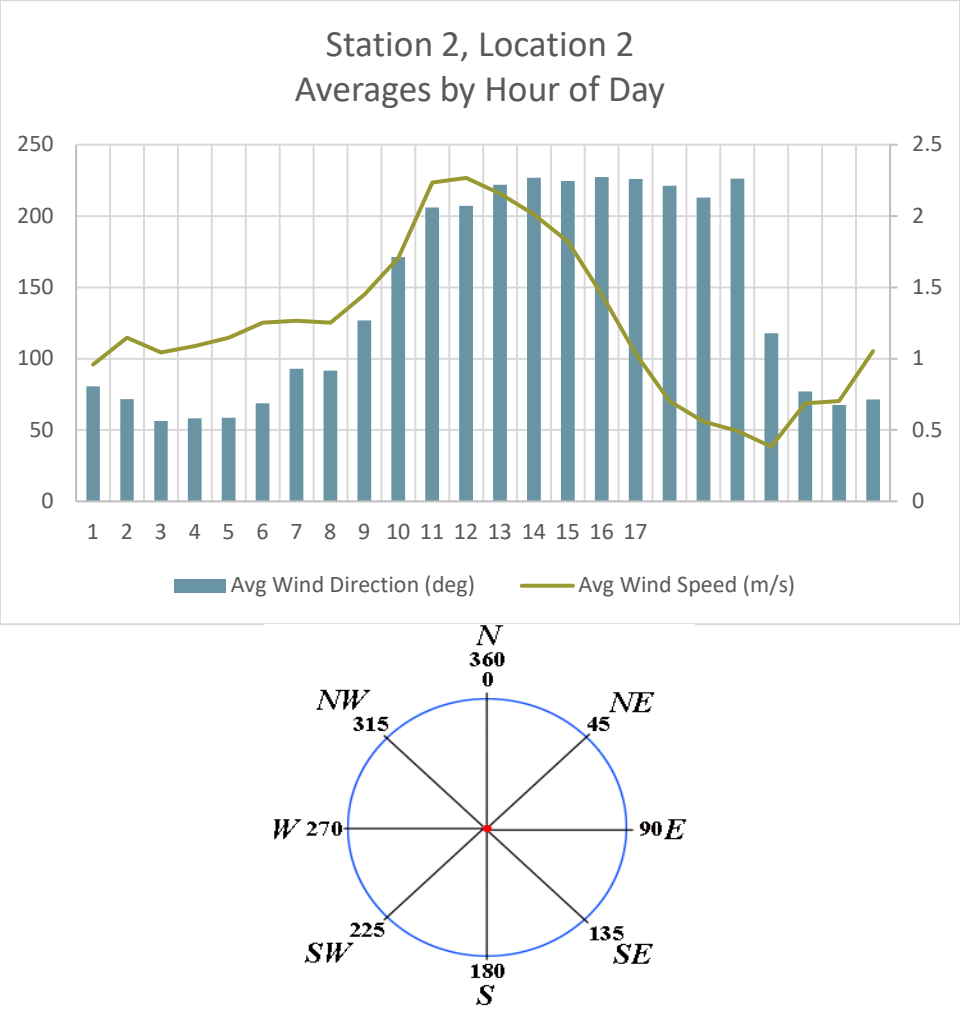
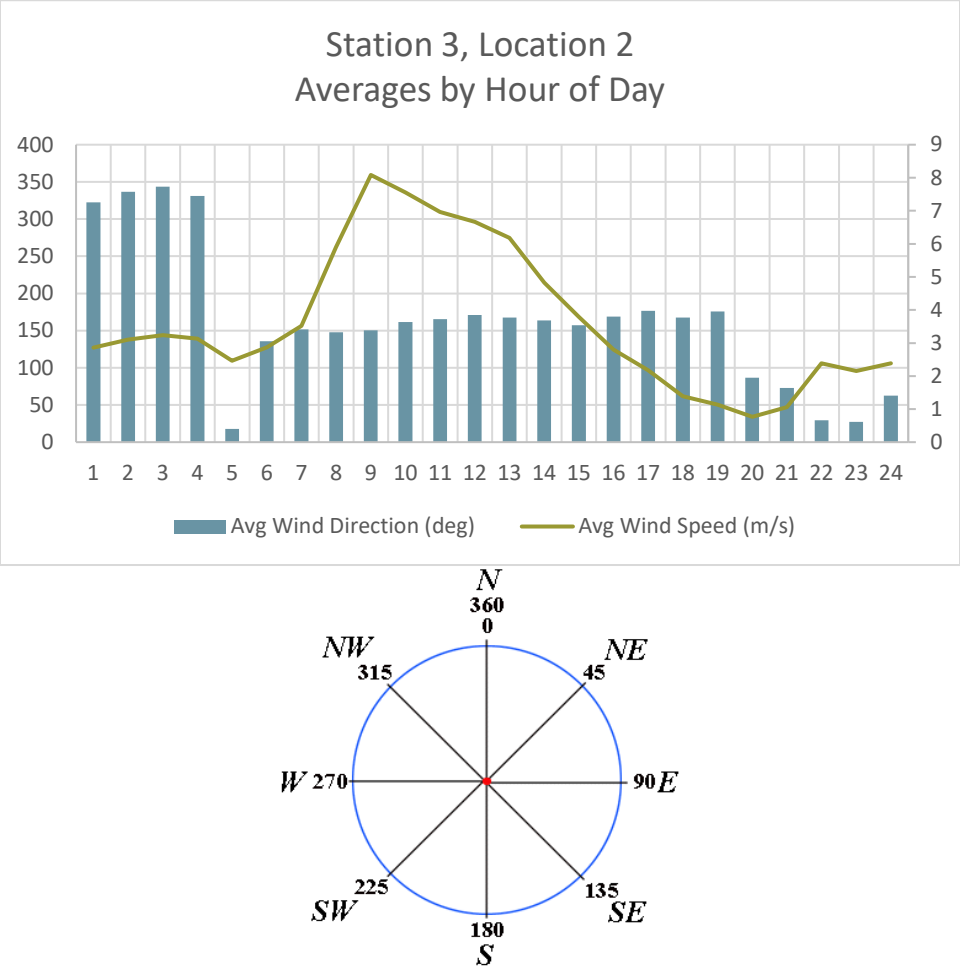


Figure 3-9: Station 3, Location 2 MET Averages



The Location 2 stations show a similar pattern during the active hours. Winds come from the east in the early morning, switching to from the south and then to from the west in the afternoon. Station 3, Location 2 keeps a steady southeastern wind throughout the day.

Wind roses for each of these on-site MET stations and their hourly direction patterns can be found in **Appendix B**. **Appendix B** also contains graphs of wind speeds and direction versus time of day for these stations.

Because the temporary on-site MET stations only have data for a limited time period and they are located adjacent to Landfill perimeters and ridgelines, they may not be as valuable for assessing wind conditions across the Site. However, they generally correlate data for the Chiquita West and Flare stations in terms of depicting the change in daily winds during the summer months.

3.4 WIND CONDITIONS AT FUTURE DEVELOPMENT CELLS

Figure 4-3 below shows future cell development plans and locations for the CCL. Wind patterns at Cells 6 and 8 in the southwest corner of the Landfill are most similar to the Chiquita West station and Station #1 through #3, Location 2 MET stations as described above. These stations are very close to these cell locations and, as such, CCL can continue to use the permanent Chiquita West station as representative of Cells 6 and 8.

Of the available data from existing MET stations, wind patterns at Cell 7 and Cells 9 through 13 in the northeast/northern portion of the CCL are most likely represented by the Chiquita Flare and Station #1 through #3, Location 1 MET stations. However, MET data is not available at each of the cell locations, and the long-term Chiquita Flare station is located in the southern portion of the Landfill at a large distance from these cells. The temporary stations at Location 1 were very close to the northern ridgeline, and the MET data may be affected by the topography in this portion of the Site. Thus, SCS cannot confirm with available data that the permanent Chiquita Flare station will be representative of the noted cells.

3.5 ON-SITE METEOROLOGICAL REVIEW FOR OPERATIONAL ANALYSIS

BRSMT conducted some additional MET data review for their operational analysis of the CCL. A summary of that analysis is provided below. Additional details as to how their on-site MET data review was used in the operational analysis is detailed in Appendix D.

3.5.1 Wind Speed

During the 92-day period (July through September 2020) evaluated by BRSMT, the wind speed averaged 3.3 mph, with each day's average varying from 1 to 4 mph. To better understand how the wind speed changed throughout the day, BRSMT subdivided the wind speed/direction into 6-hour quadrants (see Table 3-1 below). By doing this, BRSMT observed that wind speed also followed a specific daily pattern where very early morning winds (midnight to 6:00 AM) were lowest, averaging 1.5 mph. Conversely, afternoon winds were highest, averaging 6.5 mph between noon and 6:00 PM.

Table 3-1.Wind Speed Versus Time of Day (July to September 2020)

Time Period	Wind Direction	Wind Velocity
Midnight – 6:00 am	Southwest	1.5 mph
6:00 am – Noon	South	1.7 mph
Noon – 6:00 pm	South-Southeast	6.5 mph
6:00 pm – Midnight	Southwest	3 mph

Note that it has been BRSMT's experience that landfill odors, in general, tend to be more noticeable at winds speeds of <5 mph. At higher wind speeds, the additional turbulence and mixing appears to increase oxidation of many of the long-chain organic molecules that cause odor. Additionally, higher wind speeds translate to more dilution of odor as air volume across the landfill surface increases. Simply said, increasing wind speed typically equates to fewer odor complaints at most landfills.

Based on the local wind speed patterns, compared to CCL's hours of operation, BRSMT would expect any potential odor complaints generated by the Landfill to peak during the morning hours, before noon, and to be less likely after noon.

This is in fact, what the verified odor complaints appears to show. In addition, when BRSMT compared the time of those verified odor complaints to wind speeds just prior to those complaints, it was determined that most complaints occurred when wind speed was 2 mph or less. This correlated directly with SCS's findings.

3.5.2 Wind Direction

A basic review of the CCL's location compared to where most of the verified odor complaints were logged (Val Verde), one might naturally assume that a southeast wind is most likely to transport odor. However, when BRSMT looked at individual verified complaints versus wind direction and wind speed, it became apparent that winds from any southern quadrant could potentially lead to odor complaints.

As noted above, BRSMT also found that the vast majority of verified complaints were logged when wind speed was less than approximately 2 mph (see **Figure 3-10** at right).

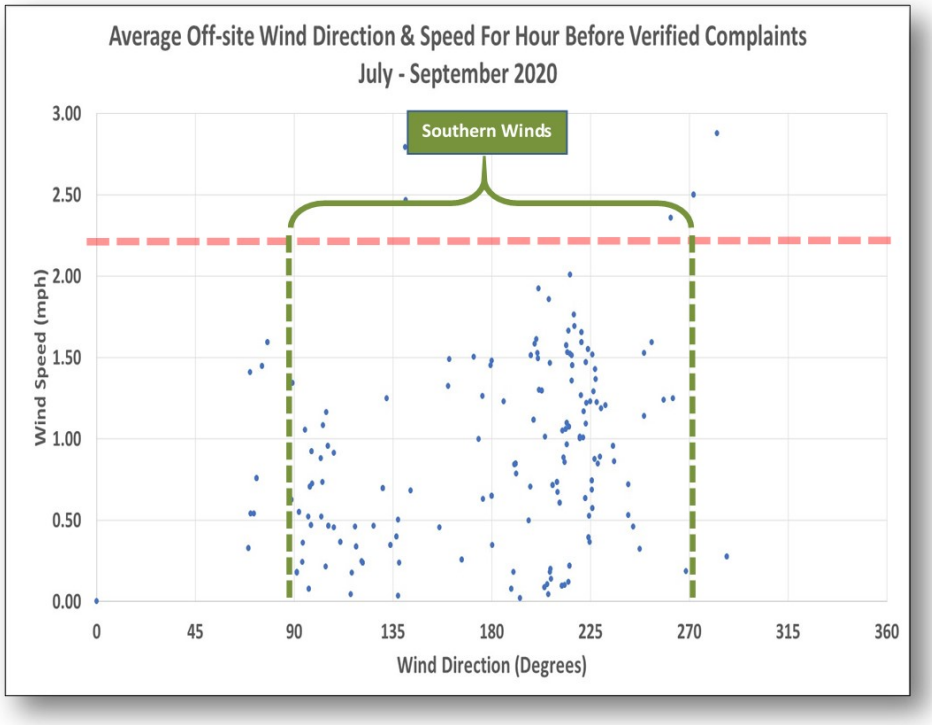


Figure 3-10. Average Off-site Wind Direction and Speed for Hour Before Verified Complaints

This information was based on an average of wind data logged at the off-site stations of SCE and Santa Clarita, as detailed above. BRSMT believes this to be representative of wind conditions from a "macro" (area-wide) perspective. However, wind patterns can change when observed from the "micro" perspective of specific onsite locations. To better understand these micro patterns, BRSMT conducted some detailed wind modeling on the CCL itself as described in Section 3.5.3 below.

3.5.3 Onsite Wind Flow Modeling

BRSMT observed wind patterns while onsite and performed computer-based wind-flow modeling to determine how wind acts from a micro-perspective.

Note that detailed wind modeling was limited due to available time. More comprehensive micro-modeling is recommended and would require additional time and correlation between computer-based wind modeling and onsite anemometers. None-the-less, BRSMT has many decades of experience evaluating onsite wind conditions associated with litter control and odor control.

BRSMT's wind modeling resulted in several findings key to their conclusions:

1. Wind from any southerly quadrant might lead to air movement toward Val Verde.
2. Potential odors might be transported via two routes (see **Figure 3-11**)

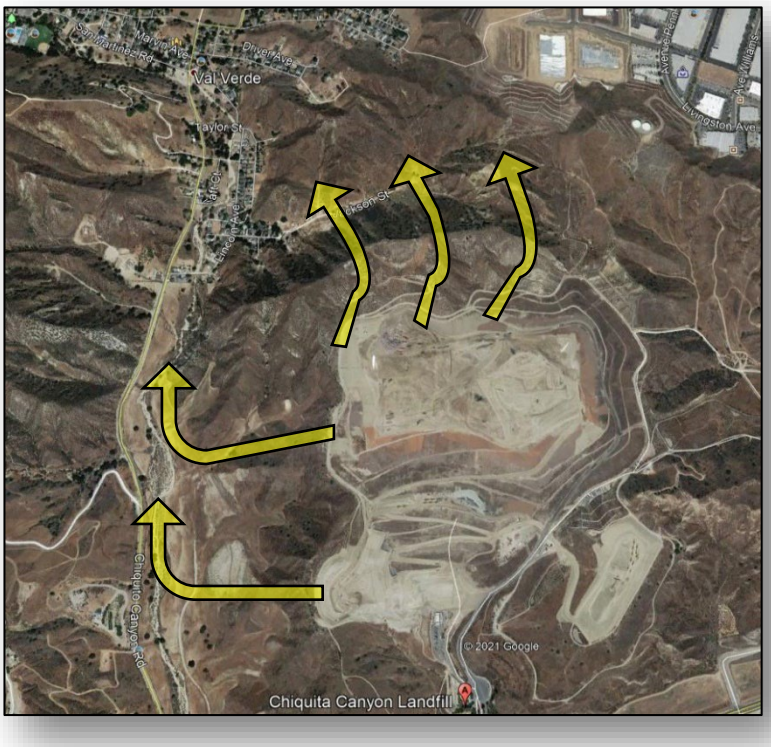


Figure 3-11. Potential Wind Flow Patterns at CCL

a. Over the steep northern ridge. At very low or intermittent wind speeds (<2 mph), potential odors may rise from the Landfill and spill over the ridge, dropping back down to at/near ground level. At higher sustained velocities (>3 mph), laminar flow may be established over the ridge, potentially carrying odors along a higher stratum, with less potential for any odors to reach the surrounding communities. At the present, the northern ridgeline appears to be a prominent barrier to wind flow, so these conditions are less likely at the current time. However, as the landfill fills, the potential for odors to transport over the north ridge may increase as the ridgeline becomes less prominent compared to the elevation of the Landfill, although minimal increases in heights are expected in these future cell locations in the northern portion of the Landfill.

b. Across the western outlets to Chiquito Canyon Road, then north toward Val Verde. There are two saddles (low points) along the western edge of the CCL where odors may flow. These are directly west of Cell 6 and Cell 8. Winds travel across those saddles was evident during one of BRSMT's days onsite when higher winds occurred. The pattern of windblown litter, a common landfill issue on windy days, clearly showed that wind is flowing from the Landfill, across the saddles to the west (see **Figure 3-12** below). Please refer to the Recommendations section of this Report for some specific suggestions on how to address this possible preferential pathway for air movement.

Windblown litter on west saddle

Figure 3-12. Windblown Litter on West Saddle

3. Strategically placed air flow disrupters (e.g., soil berms and/or wind deflection fences) may help reduce odors from leaving the Landfill by increasing low-level turbulence, which may promote faster oxidation of odor-causing molecules. Wind deflection fences work by pushing the laminar wind flow up and over the work area, while at the same time creating an eddy at the work zone. BRSMT further suggests that additional study regarding the effectiveness of ridgeline and/or vegetative barriers may be beneficial.

4. Additionally, these air flow disrupters may help retain concentrated odors at their source by the creation of vortices (see **Figure 3-13** below), which may allow more effective intermixing with neutralizer. This may be as simple as erecting litter screens both upwind and downwind of the CCL active working face.

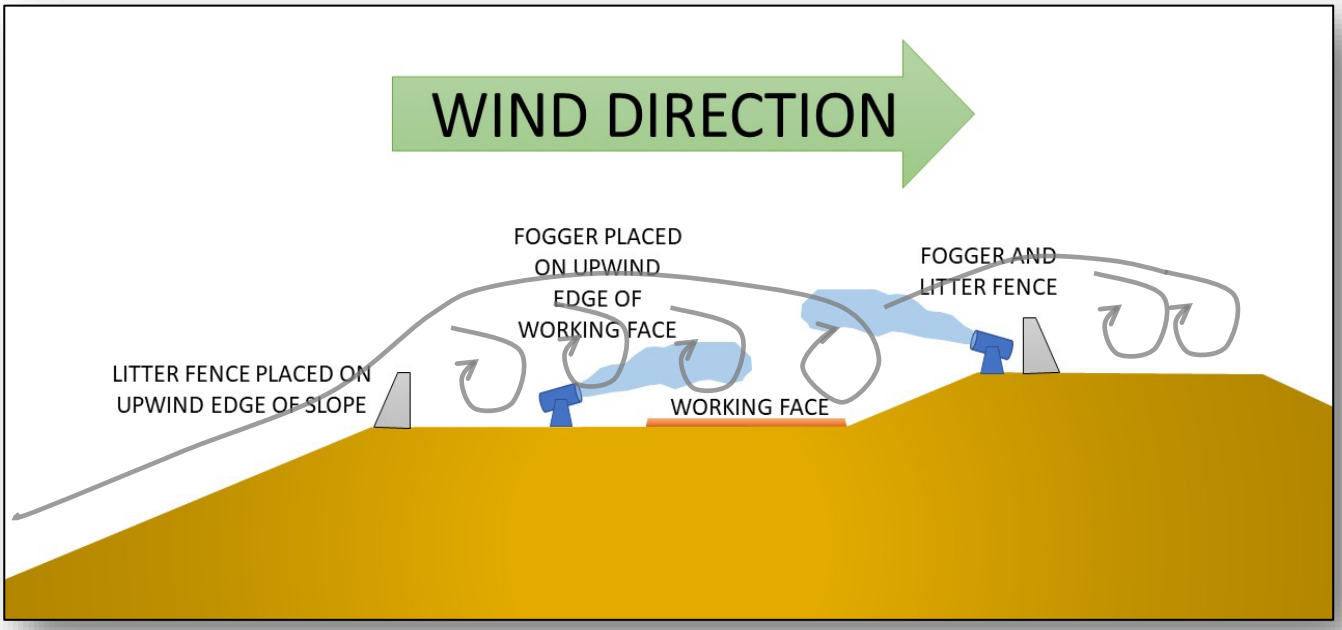


Figure 3-13. Vortexes May Help to Treat Concentrated Odors

4.0 COMPLAINT ANALYSIS

Condition 18.c requires the following analysis:

> *Analysis of verified complaint trends throughout the course of the past five calendar years.*

SCS reviewed all verified odor complaint and inspection submittals that included a time, date, and location stamp for the years of 2016 through 2020. Verified odor complaints were analyzed based on location, odor characteristics, dates, and time of day. A total of 358 complaints had enough data to perform this review.

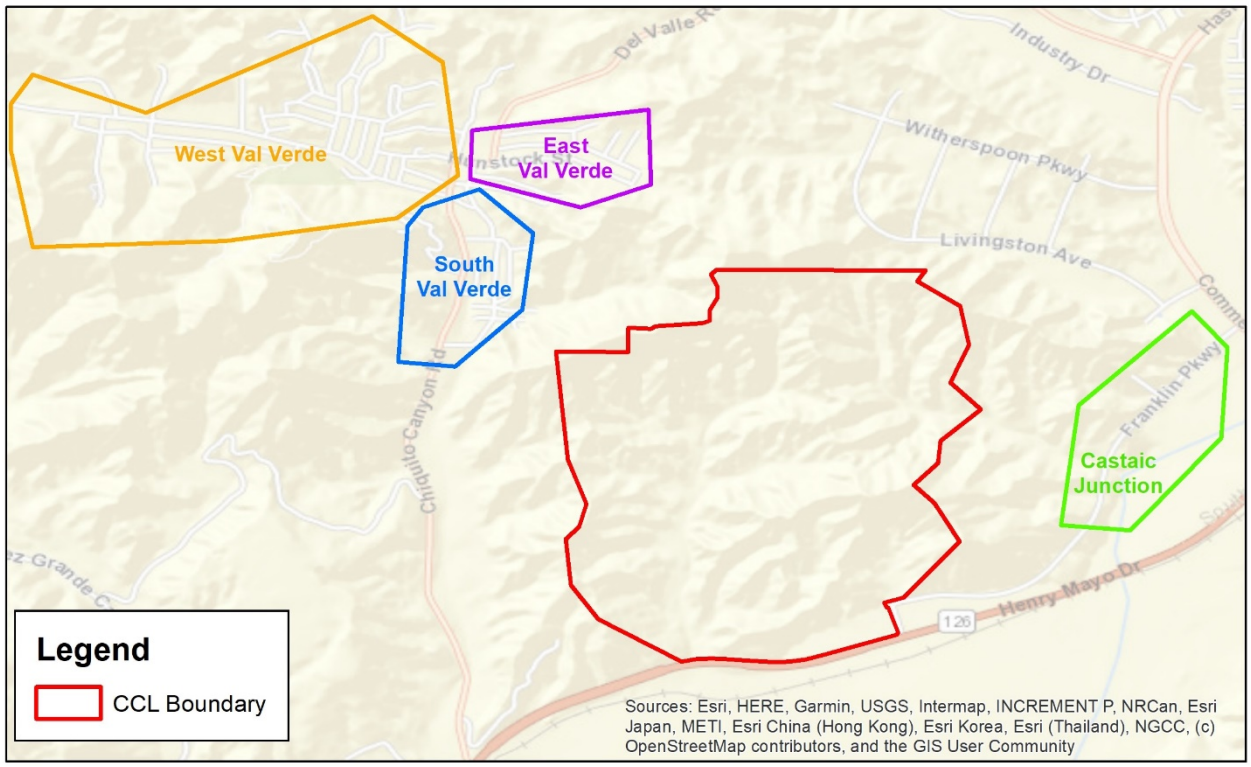
4.1 COMPLAINT LOCATION

The location attached to each complaint only showed the city and street from which the alleged odor was detected, so the analysis was limited without specific addresses. All complaints were sorted into four "area groupings" based on location:

- South Val Verde – 286 Complaints
- West Val Verde – 46 Complaints
- East Val Verde - 24 Complaints
- Castaic Junction – 2 Complaints

The majority of complaints (80%) are focused on the South Val Verde grouping with the street names generally located in the southern portion of south Val Verde. The location of each grouping is shown in **Figure 4-1**.

Figure 4-1: Complaint Location Area Grouping



As noted, the south Val Verde area contains the majority of complaints (80%) followed by east Val Verde (12.8%), west Val Verde (6.7%), and Castaic Junction (0.5%). The Castaic Junction area consists of mainly commercial and industrial space, whereas all three Val Verde groupings are primarily residential.

Several possible correlations are possible based on a review of the complaint data versus location of the complaint. First, south Val Verde is the closest area by distance to the CCL, so any possible odors would have less distance to travel to reach that area. Second, based on a review of topographic information, there are two distinct lower-lying "saddles" or drainage areas along the ridgeline at the western perimeter of the Landfill (**Figure 3-11**). One pathway that odors could travel would be to be carried over the ridgeline to the west via southeasterly winds, and then be channeled north up Chiquito Canyon Road, which is located directly west of the landfill. South Val Verde is directly in this channeled path along Chiquito Canyon Road. Please refer to the Recommendations section of this Report for some specific suggestions on how to address this possible preferential pathway for air movement.

The ridgeline that runs across the northern edge of the Landfill property boundary is more pronounced and does not currently appear to have obvious low points where leakage outside of the Landfill property could easily occur. This northern ridge may restrain or limit potential odors from carrying north of the Landfill. For odors to be carried to Castaic Junction, westerly winds would need to flow to the east across the Landfill.

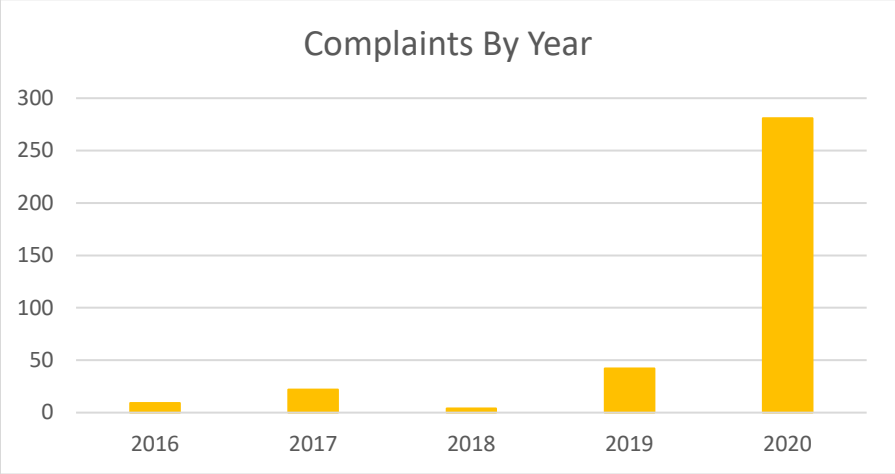
4.2 COMPLAINT DATES

Complaint dates were assessed based on year and month.

4.2.1 Complaint Date-By Year

Below are the complaints per year in **Figure 4-2**.

Figure 4.2: Complaints By Year, 2016 - 2020



There has been an increase in the number of verified odor complaints over the past year. The MET data analyzed was fairly homogenous over the last five years, so the basis for this increase in verified odor complaints was likely from another variable.

After reviewing landfill operations, it was found that Cells A, C, D, and 1 through 5 (what is considered the existing "Mound") reached capacity on December 28, 2019. At this point, a new cell, Cell 6, started accepting waste. The locations of these cells can be found in **Figure 4-3**. The greyed out section is the existing Mound.

Figure 4-3: Cell Locations

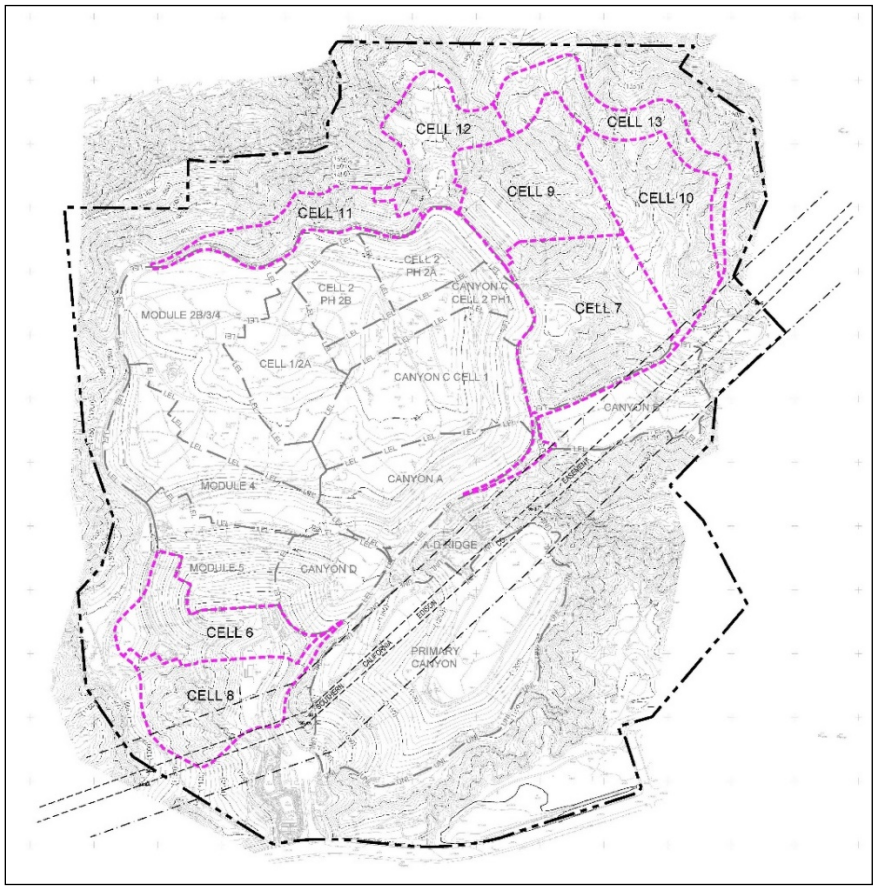


Figure 4-3 shows that Cell 6 is closer to Chiquito Canyon Road to the west. It also appears less protected from the ridge that forms CCL's western property boundary and is near the two identified drainage areas. Also, wind data from the Chiquita West station showed predominant morning winds from the southeast, which are the conditions most highly correlated with verified odor complaints in Val Verde, which may be explained if odors escaped to the west into the canyon in which Chiquito Canyon Road runs. The location of Cell 6 could be correlated to a higher number of verified complaints (over 275 in 2020) since Cell 6 became active as shown in **Figure 4-2**.

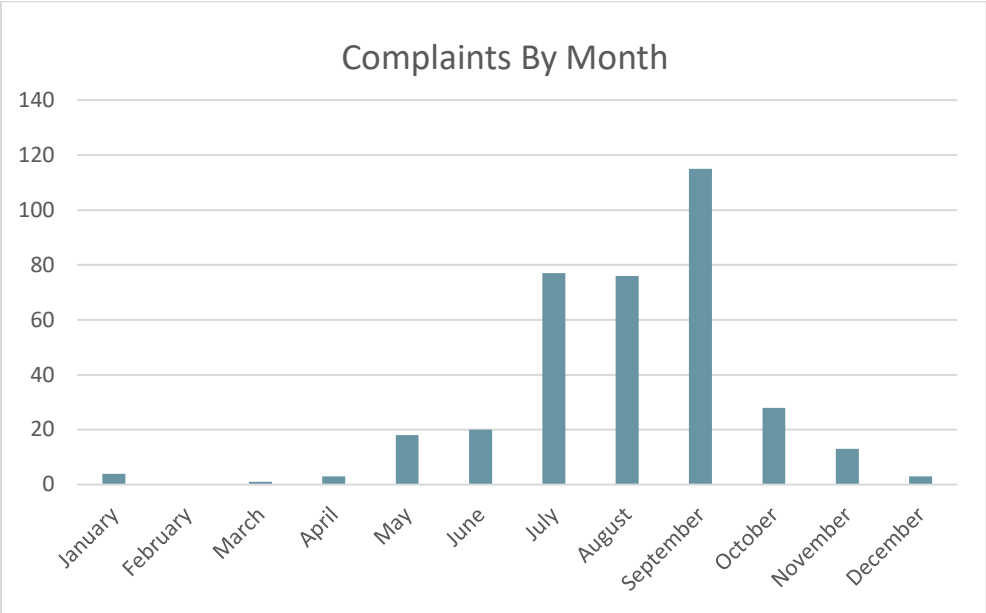
The lesser number of verified complaints (less than 100 in four years from 2016-2019) that occurred during filling in the Mound area would suggest that as disposal operations move into the more northern and eastern areas of the Landfill, the ridgeline in the northern portion of the Landfill is more protective and/or wind conditions may not be as conducive to transport odors to the northwest. Please note that, prior to 2020, CCL was using large orchard fans to assist in odor control. These were taken out of service to meet SCAQMD permitting requirements. The increase in verified odor complaints in 2020 is also correlated with the removal of these orchard fans.

Based on current fill sequencing plans, Cell 6 filling will continue until mid-2022. Following, Cell 6, filling operations will move south into Cell 8 for approximately 4 years until about 2026. After 2026, filling operations will move to the northeast to Cells 7 and then Cells 9-13 for the remainder of the site life in 2047.

4.2.2 Complaint Date-By Month

Monthly complaints are detailed below in **Figure 4-4.**

Figure 4-4: Complaints By Month, 2016 - 2020



A trend is visible when looking at the different months during the year. July, August, and September have seen the most complaints, followed by May, June, October, and November. Only a small number of complaints have occurred during December through April. This is consistent with the months of the year when southerly winds are predominant during the morning hours, which provides a strong correlation between seasonal southerly morning winds and odor complaints in the Val Verde neighborhood.

4.2.3 Complaint Date-By Season

Figure 4-4 above also showed a variation in odor complaints per season. Complaints are most prominent in the late spring, throughout the summer, and into the early fall months. The regional and on-site MET analyses in Sections 2 and 3 above suggest that the southerly winds that predominantly occur between 7 AM and 12 PM may be the reason that 98% of all complaints occur during this seasonal time period. Looking at the seasonal data, 48% of the complaints occurred during the summer months, 44% in the fall (mostly in September), 2% in the winter, and 6% in the spring.

4.3 COMPLAINT TIME

Complaints were next reviewed based on hour per day. **Figure 4-5** shows the spread of complaints over each hour of the five-year period. Note that since the time a complaint is logged may be different than the time a resident believed they were experiencing an odor, there is some uncertainty in the analysis of complaint versus time of day.

Figure 4-5: Complaints by Hour of Day, 2016 - 2020

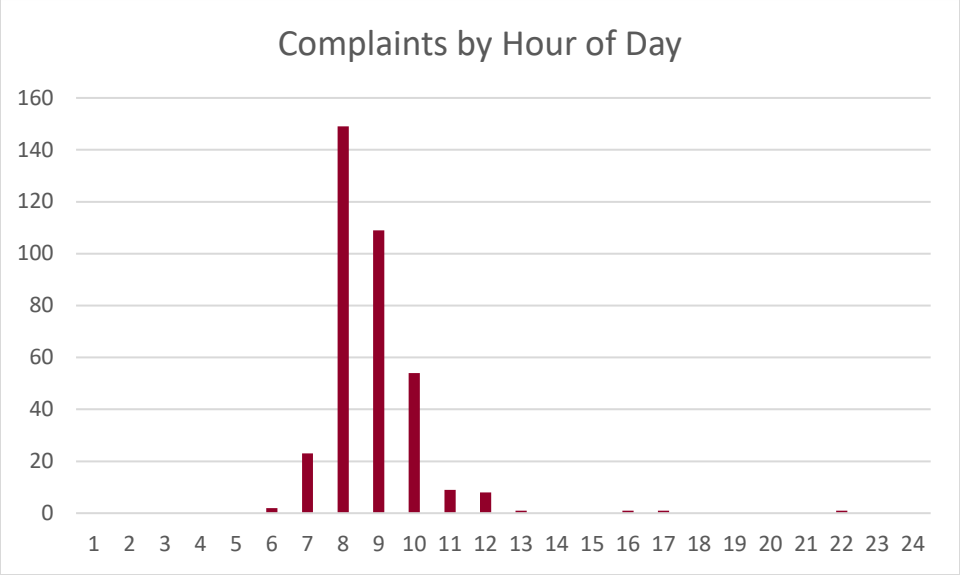


Figure 4.5 shows complaints by hour of day. As shown in the figure, 98% of the complaints occurred during the hours of 7 AM to Noon (352 out of 358 total). Consequently, this time period became the focus our analysis throughout this study.

4.3.1 Wind Direction during Complaint Time

SCS compared the timestamp on each complaint, and matched it with the closest wind direction data point available from the Chiquita Flare and Chiquita West MET stations. As noted above, there may be some uncertainty in this time stamp versus the time an alleged odor was being experienced. **Table 4-1** below shows the wind direction at the Chiquita Flare MET station at the time of each complaint.

Table 4-1: Wind Direction During Complaint – Chiquita Flare

Wind Direction	Cardinal Direction	Number of Complaints
0-45	NNE	44
45-90	ENE	24
90-135	ESE	39
135-180	SSE	64
180-225	SSW	110
225-270	WSW	56
270-315	WNW	1
315-360	NNW	6

Table 4-1 shows a strong correlation with southwesterly winds. This matches the station's summer wind rose in **Figure 3-3**. 75% of the complaint times had a wind direction with some southerly component.

Table 4-2 below shows the Chiquita West MET station wind directions during each complaint.

Table 4-2: Wind Direction During Complaint – Chiquita West

Wind Direction	Cardinal Direction	Number of Complaints
0-45	NNE	18
45-90	ENE	35
90-135	ESE	132
135-180	SSE	94
180-225	SSW	16
225-270	WSW	30
270-315	WNW	15
315-360	NNW	11

Table 4-2 shows a strong correlation with southeastern winds. This matches the station's summer wind rose in **Figure 3-2**. 76% of the complaint times had a wind direction with some southerly component.

The predominance of southeasterly winds at the western edge of the property (as shown at the Chiquita West station) and southwesterly winds in the more central area of the landfill (as shown at the Chiquita Flare station) supports a possible theory that active cells on the western edge of the property are more likely to be the source of possible odor complaints. When Cell 6 became active, complaints increased by 669%. This is likely related to the predominance of southeasterly winds during morning hours along the western perimeter of the Landfill.

Since the complaint time recorded may not match the exact time period when the individual was experiencing the alleged odor, the data in Tables 4-1 and 4-2 may have some uncertainty associated with it. However, at 75% or more of the verified complaints, this suggests a correlation between wind direction and verified complaints.

4.3.2 Wind Speed during Complaint Time

SCS also compared the timestamp on each complaint, and matched it with the closest wind speed data point available from the Chiquita Flare and Chiquita West MET stations. As with the wind direction versus time analysis, there may be some uncertainty in this time stamp versus the time an alleged odor was being experienced. Tables 4-3 and 4-4 below shows the Chiquita Flare MET station wind speeds at the time of each complaint.

Table 4-3: Wind Speed During Complaint – Chiquita Flare

Wind Speed (m/s)	Speed Characterization	Number of Complaints
0-0.5	Calm-Low	1
0.5-1	Low	77
1-1.5	Low	121
1.5-2	Low-Moderate	108
2-2.5	Low-Moderate	22
2.5-3	Moderate	4
3-3.5	Moderate-High	9
3.5<	High	2

The wind speeds were characterized based on an average wind speed of 2.94 m/sec at this MET station over the five-year period. The 0.5 to 2.5 m/sec range holds 95% of the total complaints. These wind speeds are considered low to moderate compared to the average.

Table 4-4: Wind Speed During Complaint – Chiquita West

Wind Speed (m/s)	Speed Characterization	Number of Complaints
0-0.5	Calm-Low	21
0.5-1	Low	135
1-1.5	Low-Moderate	140
1.5-2	Low-Moderate	40
2-2.5	Moderate	11
2.5-3	Moderate-high	5
3-3.5	Moderate-High	0
3.5<	High	1

These wind speeds were characterized based on an average wind speed of 2.14 m/sec at Chiquita West MET station. Chiquita West experienced lower wind speeds on average during the complaint times when compared to Chiquita Flare. The 0 to 2 m/sec time frame accounted for 95% of the total complaints. These wind speeds are considered calm to low-moderate compared to the average.

When these data are compared to the wind speed vs. time of day graphs in **Appendix B** for both stations, the data suggest that the low to moderate winds, appear to occur in the morning hours throughout the year, except for the winter and part of the fall for the Chiquita Flare station.

Since the complaint time recorded may not match the exact time period when the individual was experiencing the odor, the data in **Tables 4-3 and 4-4** may have some uncertainty associated with it. However, at 95% or more of the verified complaints, this suggests a correlation between low to moderate wind speeds and verified complaints.

4.4 COMPLAINT REVIEW FOR OPERATIONAL ANALYSIS

BRSMT conducted some additional complaint data review for their operational analysis of the CCL. A summary of that analysis is provided below. Additional details as to how the complaint data review was used in the operational analysis is detailed in **Appendix D**.

4.4.1 Profile of Odor Complaints

BRSMT developed an Odor Complaint Profile to help them understand the operational and climatological conditions that may lead to potential odor complaints. By characterizing how and when odors can be generated, transported, and received, BRSMT was better able to begin looking for correlation between odor complaints and CCL operations.

BRSMT selected a 3-month evaluation period, from July 1, 2020 through September 30, 2020, because this period represented the largest number of verified complaints. **Figure 4-6** shows a timelines of verified complaints.

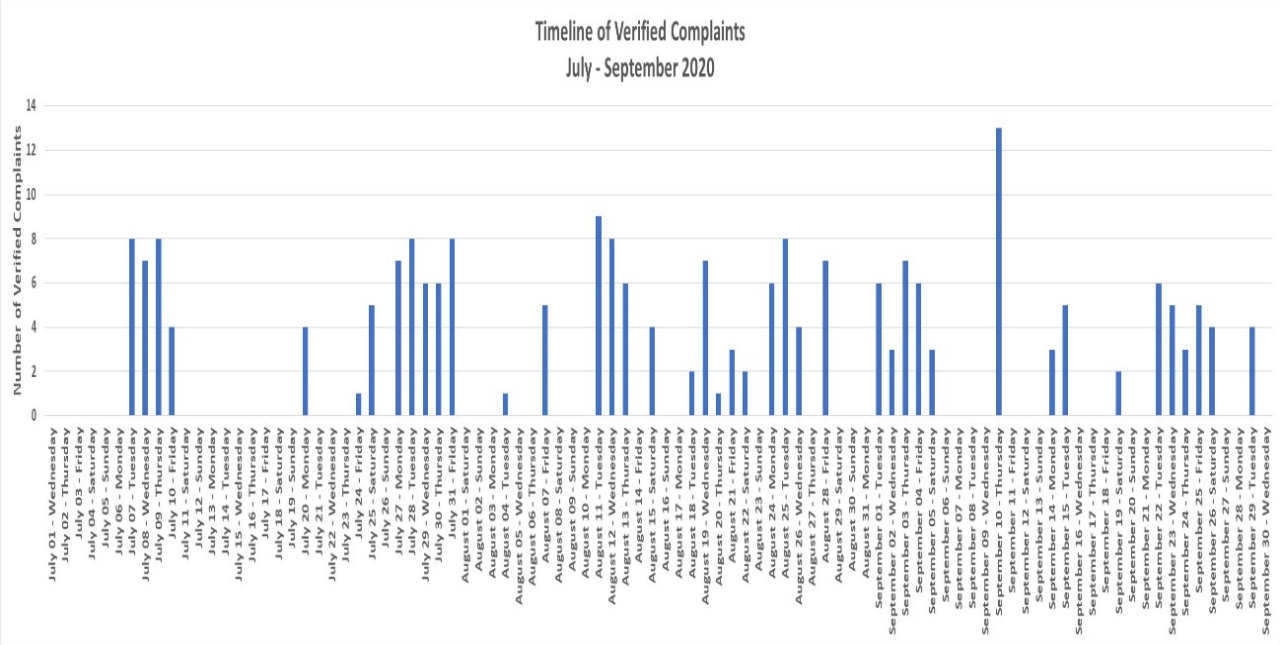


Figure 4-6. Timeline of Verified Complaints

During this 92-day time period, a total of 220 verified complaints were logged. Those 220 verified complaints were noted on 42 individual days. Some days received multiple complaints ranging from a low of one, to a high of 13. Tuesdays received the most verified complaints, while Mondays and Saturdays received the fewest. **Figure 4-7** provides a summary of the count and sum of verified complaints by time of week.

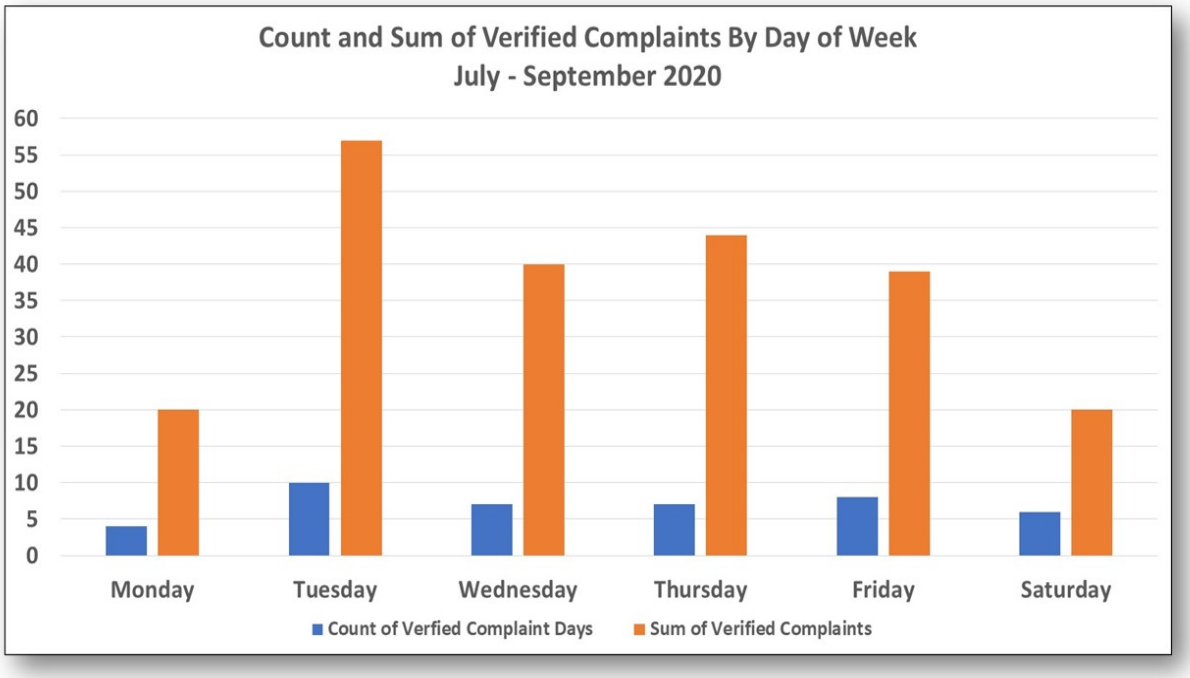


Figure 4-7. Count and Sum of Verified Complaints by Day of Week

BRSMT also observed that most complaints occurred in the morning, with nearly half of all complaints logged between 8:00-9:00 AM (see **Figure 4-8**). BRSMT has worked at numerous waste facilities that were dealing with potential odor issues and the morning odor phenomenon is common. In this case, it appears that the key factors are:

- Morning wind speeds are generally less than 5 mph, and wind data as recorded approximately 1 hour prior to the receipt of a complaint (to allow for transport time, detection, reporting, etc.), indicate that most complaints occurred when wind velocity was very low, generally less than 2 mph.
- Winds from the southern quadrants have the greatest potential to transport possible odors.
- Residents are often outside, on their way to work or school at/around this time of day.
- Some potentially odorous loads come into the facility around this time as detailed in **Appendix D**.
- CCL staff and BRSMT's onsite observations indicated that the most prevalent possible odors originated from the point source of specific inbound loads, and were not from landfill gas emissions.

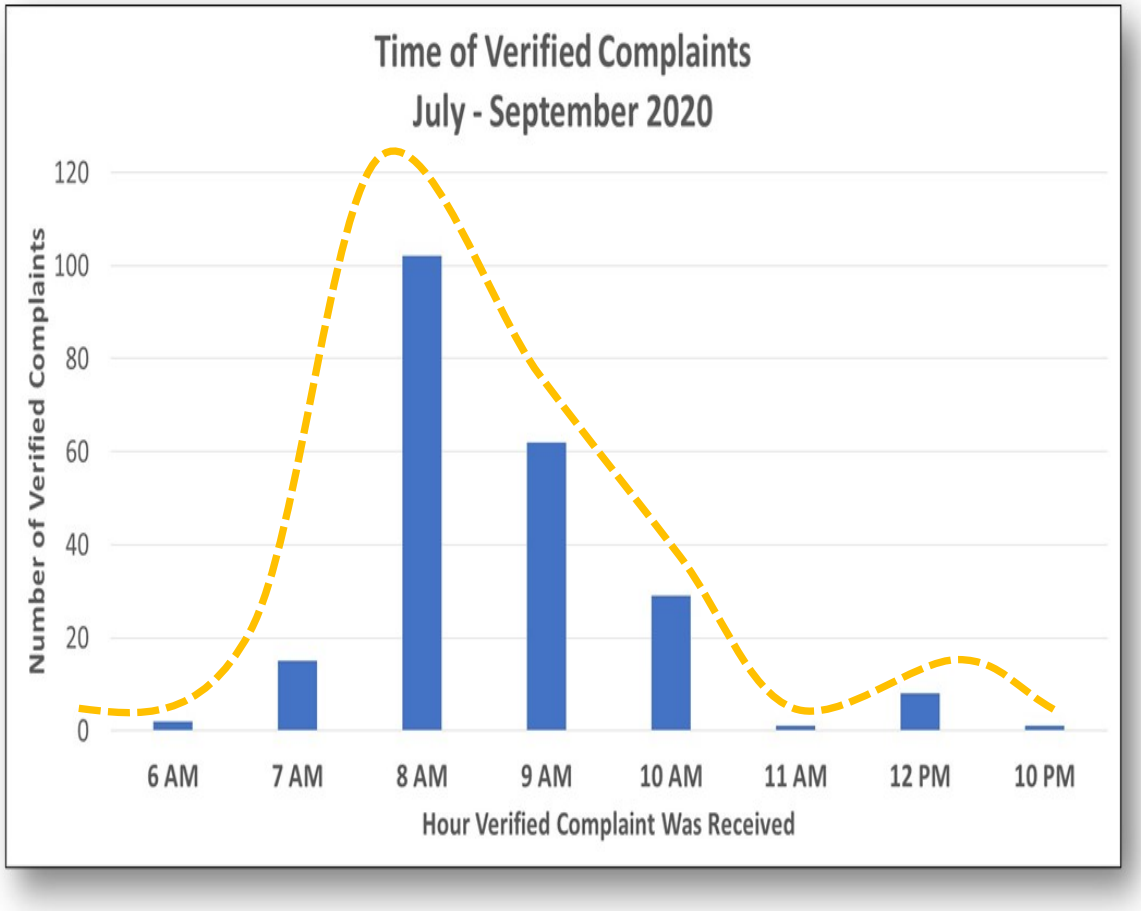


Figure 4-8. Time of Verified Complaints, July to September 2020

5.0 LANDFILL OPERATIONS REVIEW

SCS subcontracted with BRSMT to complete the tasks outlined in the Stipulated Order related to landfill operations. Blue Ridge is one of the foremost experts on all aspects of landfill operations, including managing odors. Their study covers Conditions 18d through 18k from the Stipulated Order as detailed below:

- *Onsite assessment for odiferous waste streams and waste stream combinations that includes a profiling of known waste streams, and a characterization of the total mix and any notable interactions between waste streams.*
- *Onsite assessment of when odorous wastes are received at the Landfill.*
- *Onsite assessment of fill sequencing and timing.*
- *Onsite assessment of solid waste receiving, queuing, unloading and compaction practices.*
- *Onsite assessment of cover material practices throughout and at the end of the operating day.*
- *Onsite assessment of odor neutralizer uses and applications.*
- *A list of general landfill best management practices to mitigate potential odors from a landfill.*
- *An evaluation of alternative or future working face and/or cell locations which may be maintained in parallel to the primary open working face/cell location for use in times of odor complaints*

BRSMT's landfill operations study is provided in **Appendix D**.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

6.1.1 Conclusions from Complaint and MET Data review

SCS took the MET studies in Sections 2 and 3 above and correlated them to the complaint analysis in Section 4. Based on this comparative analysis, SCS has reached the following conclusions:

1. The majority of odor complaints (80%) are made from southern Val Verde area, which is located just northwest of the landfill, along Chiquito Canyon Road. This area grouping is in the closest proximity to the Landfill and is in the pathway of preferential air movement from the Landfill to the community.

2. Active cells in the southwestern portion of the Landfill are more of a concern for potential odors leaving the Landfill because of the predominant southeasterly winds in this location. Also, the western ridgeline has several drainage pathways along the perimeter where odors could leave the Landfill boundary and move west toward Chiquito Canyon Road. Once outside of the Landfill, southerly winds could transport potential odors north toward Val Verde. The number of complaints increased significantly when filling started in Cell 6 in the southwestern portion of the Site. Additional analysis is warranted to confirm this potential preferential pathway for air movement, and based on the results, this area could become the focus for preventative measures.

3. Future cells in the northern and northeastern portions of CCL may have less potential for odors to leave the Landfill due to wind conditions (i.e., winds in the eastern portion of the site appear to blow more from the southwest to the northeast, away from the Val Verde community) and the northern ridgeline, which appears to be more protective in term of a physical barrier for air movement. However, as landfill elevations change with filling, this ridgeline will become less prominent and likely less protective.

4. Regional winds with any southerly component can potentially direct landfill possible odors off-site, particularly odors originating from the southwestern portion of the CCL. Winds with any southerly component account for over 75% of the complaints.

5. Morning winds during late spring (May), through the summer, and in the early fall (though October) have the most potential to cause potential odors to migrate from the Site to the Val Verde communities as this is when southerly winds are most predominant. Morning winds from 7 AM to Noon account for 98% of the complaints.

6. Low to moderate wind speeds correlate to the most verified odor complaints, specifically winds ranging from 0.5 to 2.0 m/sec (1.1 to 4.5 mph) on-site, since these conditions resulted in over 90% of the complaints. Winds under 2 mph are especially problematic. These wind speed conditions exist during the same morning hours from 7 AM to Noon, seasonally, and correlate to the morning seasonal southerly winds reported above.

7. Complete and representative MET data for the northeastern region of the Landfill, representing Cells 7 and 9-13, is not currently available to thoroughly understand on-site wind patterns at these locations. Therefore, any conclusions regarding wind conditions in these locations are limited by this fact.

8. There are presently no vegetative barriers at the Landfill or outside the landfill perimeter, which are acting as a potential barrier to wind or potential odor movement.

6.1.2 Conclusions from Landfill Operations Review

The conclusion drawn by BRSMT from the landfill operations review are detailed in **Appendix D** and are generally detailed within the body their report..

6.2 RECOMMENDATIONS

6.2.1 Recommendations Based on Met and Complaint Data

SCS is making the following recommendations based on the MET and complaint data analyses summarized in this Report.

1. Obtain consistent MET data from the northeast region of the landfill where Cells 7, and 9-13 are located. This will allow a better understanding of wind patterns in the region prior to Cell 7 filling operations. The proposed air quality monitoring program for the Landfill, as referenced in Condition 16.g of the Stipulated Order, could provide useful information if these stations will be equipped with MET data monitoring capabilities. As we currently understand it, several of the air quality monitoring station locations may be representative of the cell locations in the northeastern portion of the Landfill (**Appendix C**).

2. MET data should continue to be collected and reviewed from on-site stations to determine if MET conditions change over time with landfill operations due to the changing topography resulting from filling and grading operations. If the new air quality monitoring stations have MET data capabilities, these could be incorporated into this MET data collection and review effort.

3. Waste disposal in Cells 6 and 8 during morning hours (7 AM to Noon) during the months of concern (May through October) should be conducted using the operational recommendations provided by BRSMT (Section 6.2.2 and **Appendix D**). As discussed in Recommendation #4 below, wind condition forecasts should be monitored for other times of the year to estimate when these southerly winds, with low to moderate wind speeds, are expected to occur.

4. CCL should use publicly available services to provide applicable site personnel with a detailed daily wind forecast. This forecast should include hourly forecasted wind speed and direction to allow site operational to make operational adjustments to minimize odor potential during periods when odors have the most potential to migrate to impacted communities or when landfill operations are likely to produce the highest potential odors (e.g., odorous loads). MET data from on-site stations should be reviewed throughout the day to compare with the forecasted data and to make adjustments as wind conditions change.

5. SCS recommends additional study of the influence of these drainage areas on air movement along the western perimeter of the Landfill, which may be creating a preferential path for air movement outside of the Landfill. If these conditions are confirmed, CCL should consider the installation of a vegetative barrier or other air flow disruptors (see Figure 3-13 for an example) in this location. The study noted above could be used to properly cite and design a vegetative or other barrier.

6.2.2 Recommendations for Landfill Best Management Practices and Operational Changes

Through BRSMT's review of verified odor complaints, tonnage data, general operating conditions, and onsite observations, they have developed the following best management practices and recommendations to mitigate potential odors and drastically reduce future verified odor complaints.

1. Prohibiting odorous wastes such as sludge, biosolids and dead animals (these are not accepted at CCL).

2. Managing occasional (infrequent) odorous loads by preparing a hole for direct, immediate burial.

3. Accepting occasional (infrequent) odorous loads only with 24 hours advance notice.

4. Establishing standard operating procedures (SOPs) for recognizing, segregating, and handling odorous loads, to:

    a. Direct them to an Odor Control Zone (OC Zone) as described in below.

    b. Avoid spreading them – to minimize surface area.

    c. Bury or cover them promptly using non-odorous waste, soil, or alternative daily cover (ADC).

5. Improving odorous load detection training so that all CCL staff know how to identify odorous loads, and how to handle them.

6. Providing initial and periodic training for landfill workers based on the SOPs for dealing with potentially odorous loads.

7. Provide odor detection training for frequent CCL customers regarding how to recognize potentially odorous loads, and how to notify CCL staff when they are sending in a potentially odorous load.

8. Conducting more detailed, onsite observations to identify potentially odorous loads.

9. Creating a robust set of SOPs for CCL staff regarding all aspects of identifying and mitigating potentially odorous loads.

10. Identifying location(s) on the landfill where odorous loads can be received while minimizing the potential for off-site transport of odor.

11. Establishing an OC Zone to receive and process potentially odorous loads.

12. Effectively utilizing existing misting system(s) to dispense a masking and/or neutralizing agent that may include:

    a. A perimeter misting system.

    b. A mobile misting system (i.e., tank and sprayer on small tractor).

    c. A dispersing fan and integrated misting system.

13. Avoiding the use of a traditional water truck to dispense neutralizer because of its inability to atomize the neutralizer solution.

14. Increasing the application of neutralizer through dispersion fan and mister line usage, especially during critical wind conditions.

15. Assigning Landfill staff (an Odor Control Supervisor) to be solely responsible for managing implementation of odor control SOPs.

16. Developing a system for tracking Key Performance Indicators (KPIs) such as inbound tonnage of odorous, low/non-odor waste, misting fan fuel usage, and odor neutralizer consumption.

17. Continually monitoring the performance and effectiveness of the Odor Control Program.

18. We understand that CCL has applied for a SCAQMD permit to re-install its larger orchard fans. We suggest that their performance be evaluated once they are in place.

Appendix A

Regional MET Station Wind Rose and Hourly Analysis

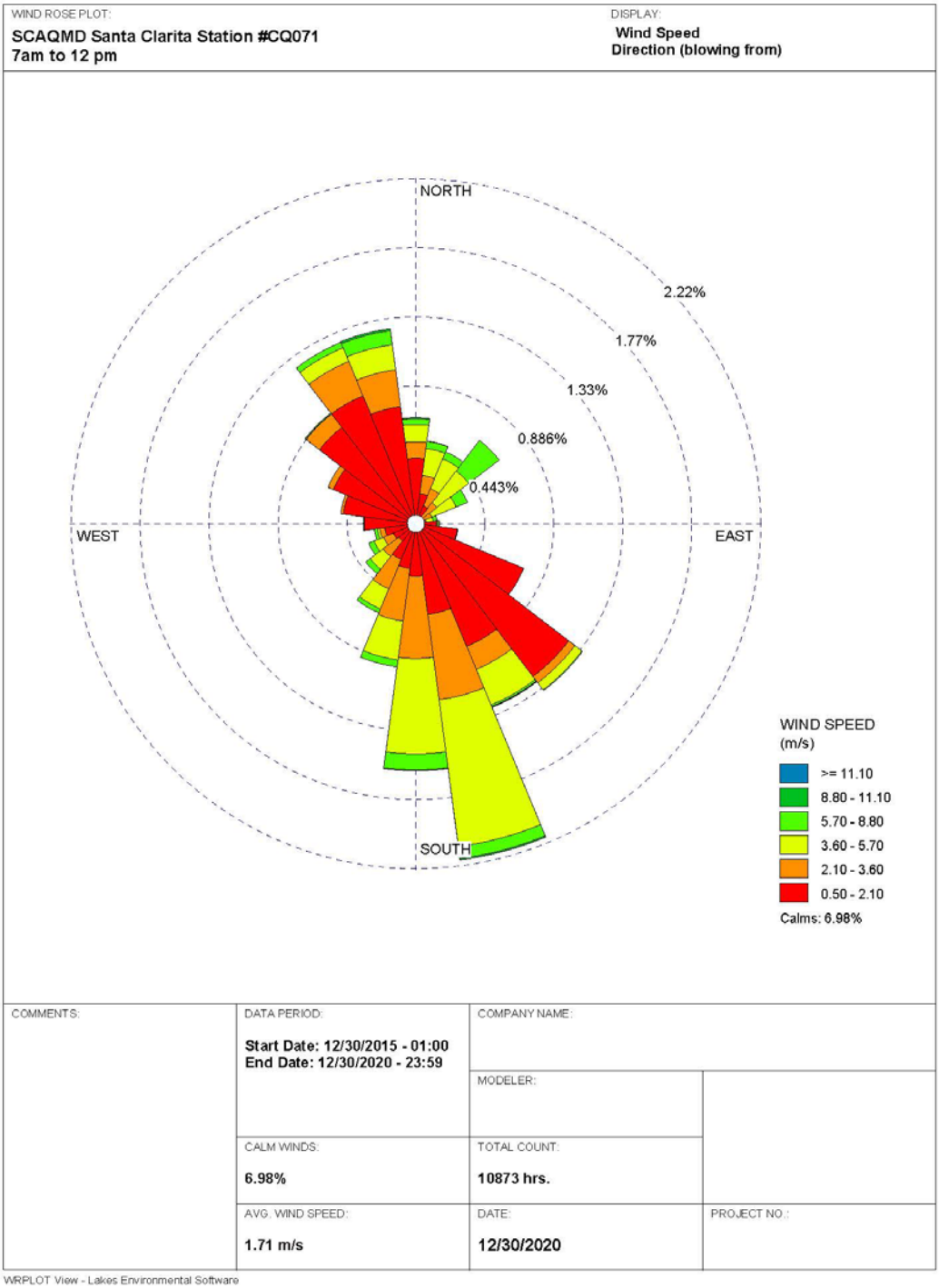

WIND ROSE PLOT:
SCAQMD Santa Clarita Station #CQ071
7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
2.22%
1.77%
1.33%
0.886%
0.443%
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 6.98%
COMMENTS:
DATA PERIOD:
Start Date: 12/30/2015 - 01:00
End Date: 12/30/2020 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
6.98%
TOTAL COUNT:
10873 hrs.
AVG. WIND SPEED:
1.71 m/s
DATE:
12/30/2020
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-1

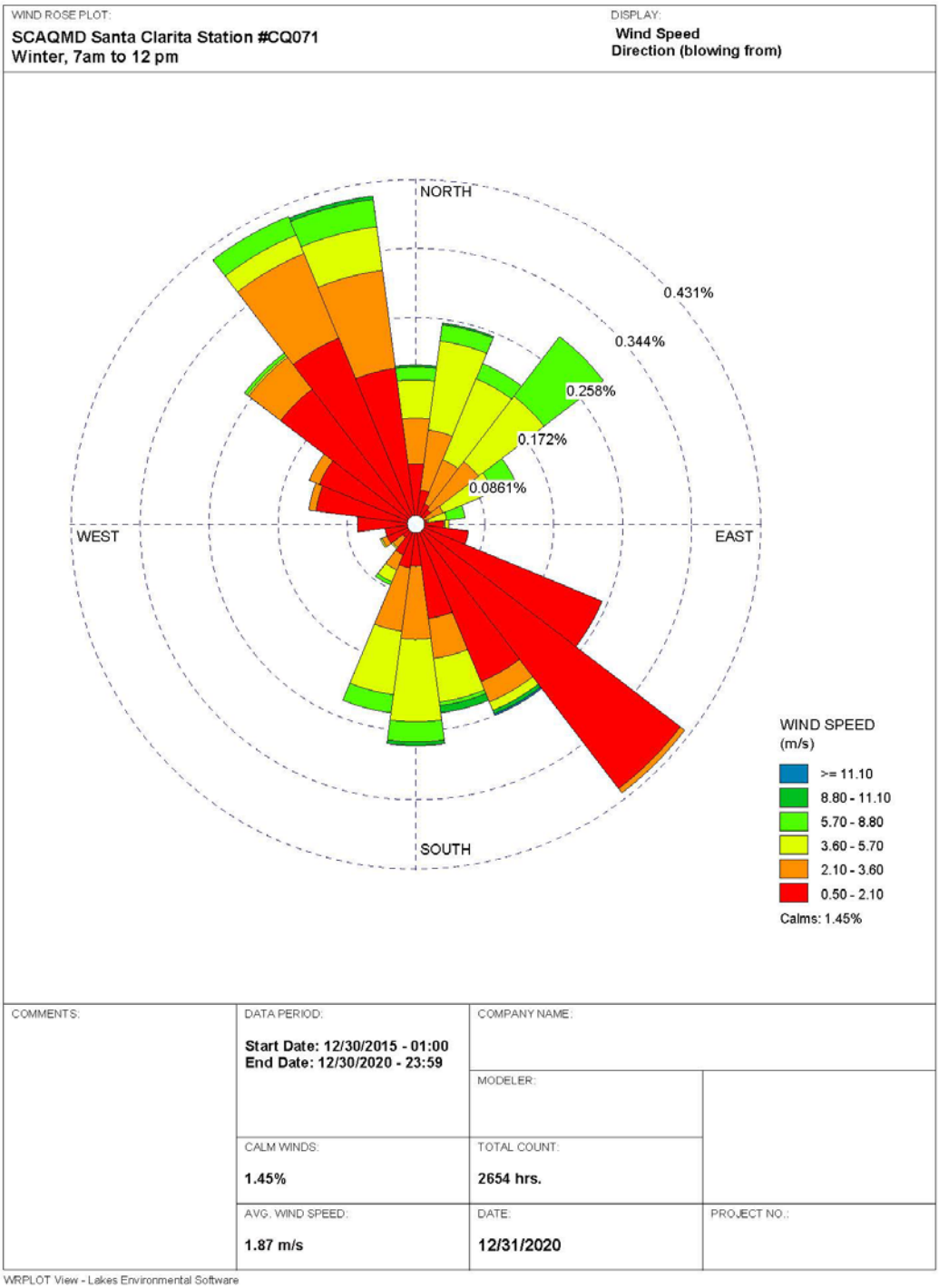

WIND ROSE PLOT:
SCAQMD Santa Clarita Station #CQ071
Winter, 7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
0.431%
0.344%
0.258%
0.172%
0.0861%
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 1.45%
COMMENTS:
DATA PERIOD:
Start Date: 12/30/2015 - 01:00
End Date: 12/30/2020 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
1.45%
TOTAL COUNT:
2654 hrs.
AVG. WIND SPEED:
1.87 m/s
DATE:
12/31/2020
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-2

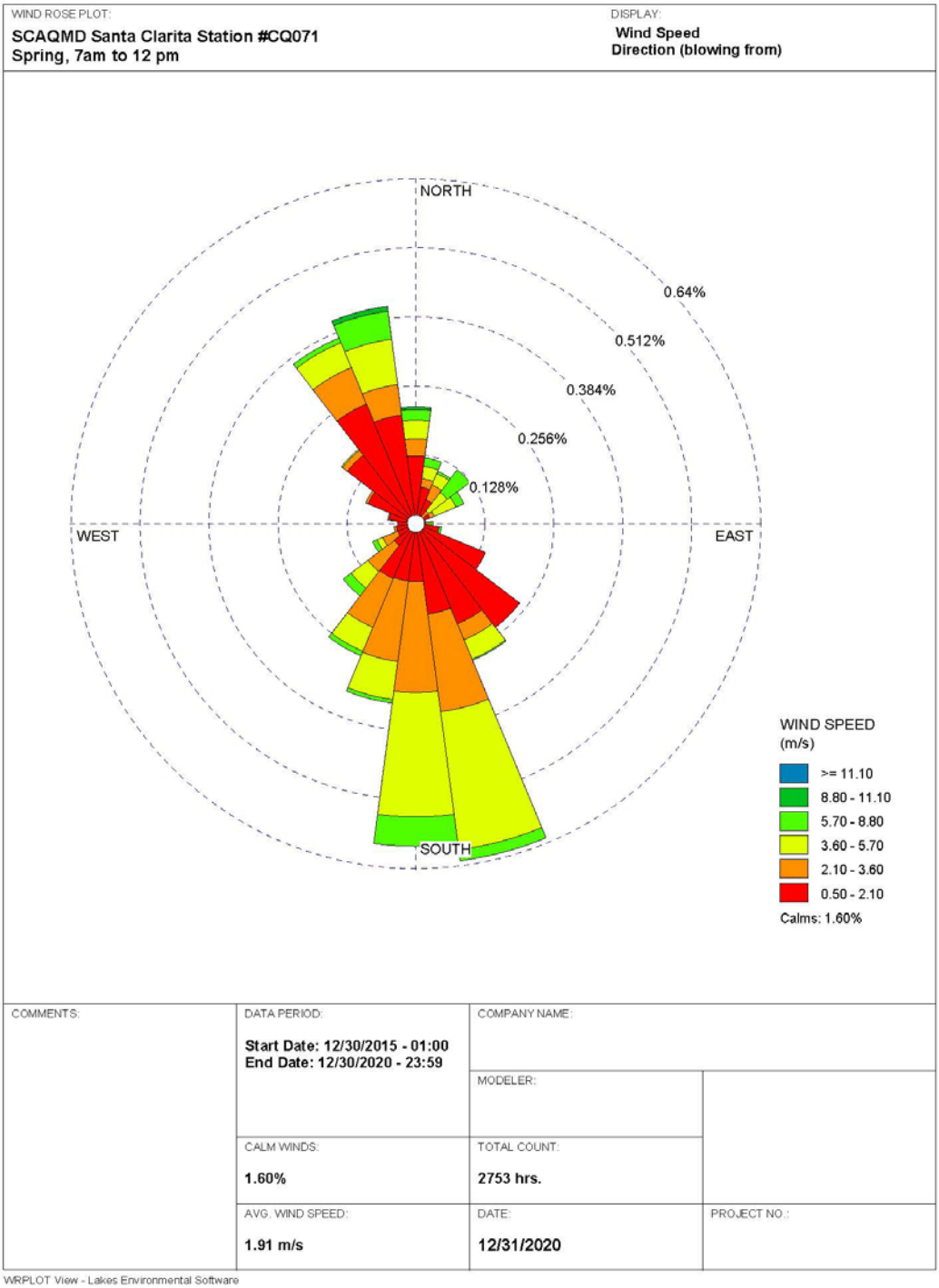

WIND ROSE PLOT:
SCAQMD Santa Clarita Station #CQ071
Spring, 7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
0.64%
0.512%
0.384%
0.256%
0.128%
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 1.60%
COMMENTS:
DATA PERIOD:
Start Date: 12/30/2015 - 01:00
End Date: 12/30/2020 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
1.60%
TOTAL COUNT:
2753 hrs.
AVG. WIND SPEED:
1.91 m/s
DATE:
12/31/2020
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-3

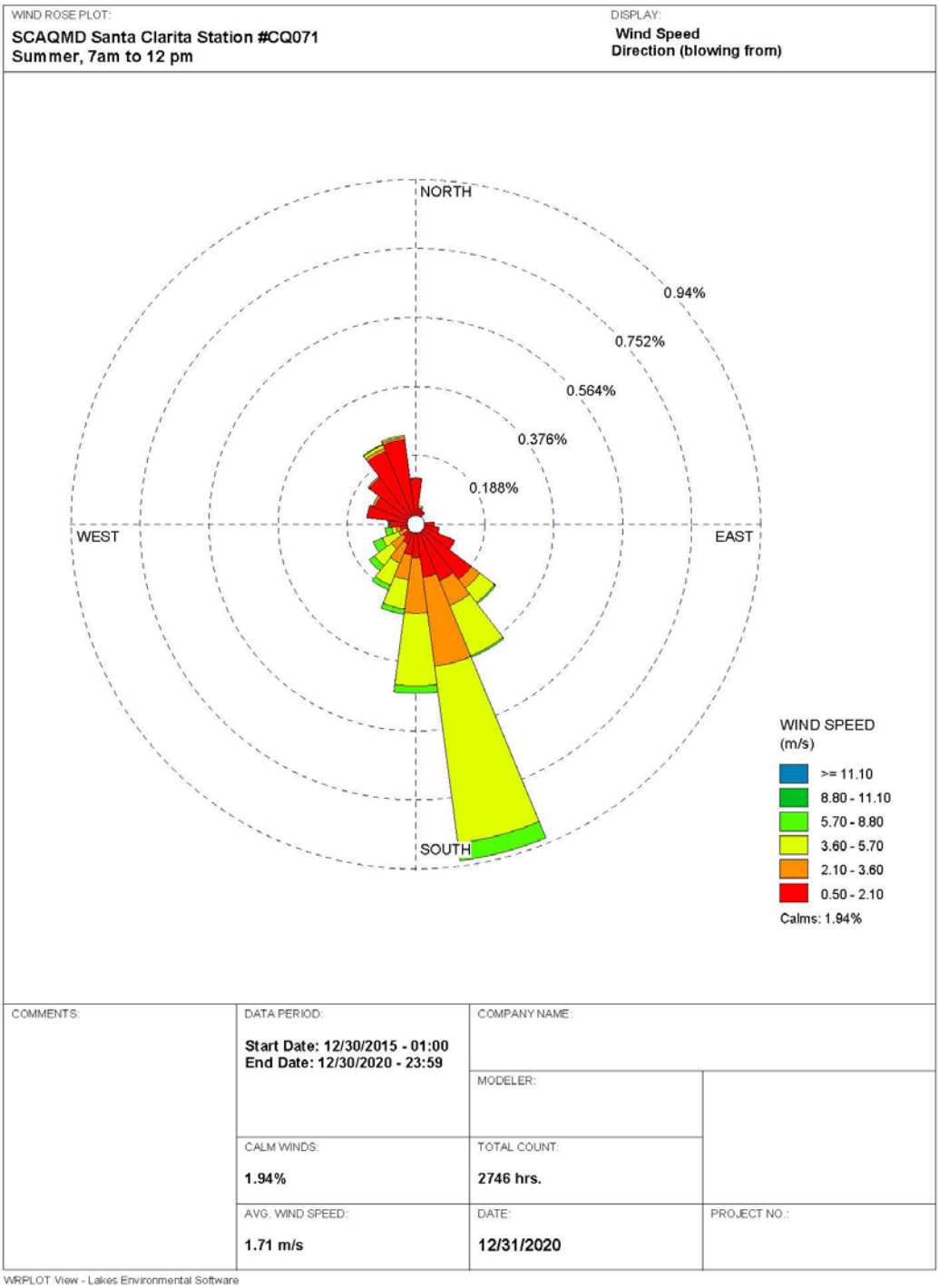

WIND ROSE PLOT:
SCAQMD Santa Clarita Station #CQ071
Summer, 7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
0.94%
0.752%
0.564%
0.376%
0.188%
WEST
EAST
SOUTH
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 1.94%
COMMENTS:
DATA PERIOD:
Start Date: 12/30/2015 - 01:00
End Date: 12/30/2020 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
1.94%
TOTAL COUNT:
2746 hrs.
AVG. WIND SPEED:
1.71 m/s
DATE:
12/31/2020
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-4

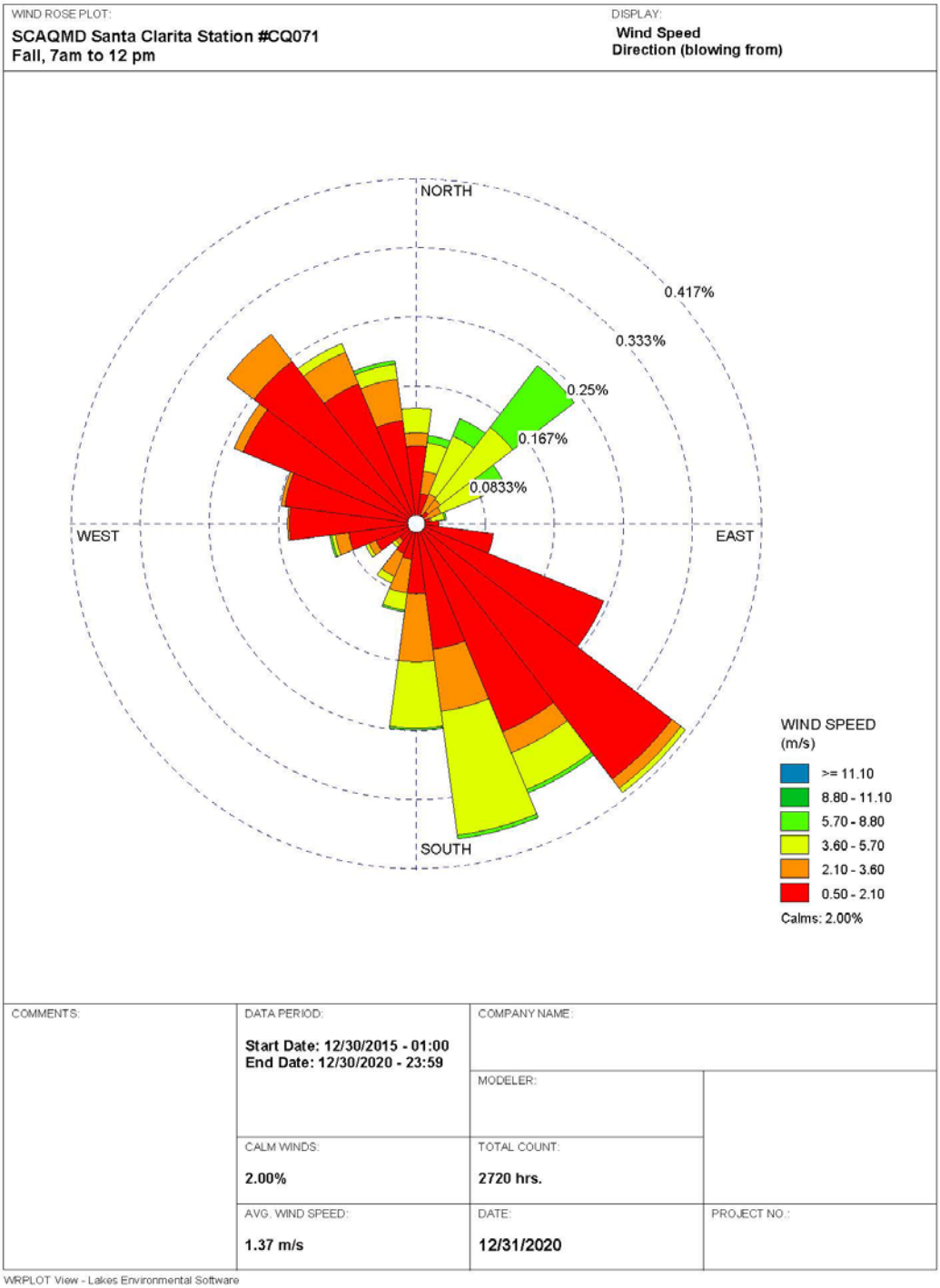

WIND ROSE PLOT:
SCAQMD Santa Clarita Station #CQ071
Fall, 7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
0.417%
0.333%
0.25%
0.167%
0.0833%
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 2.00%
COMMENTS:
DATA PERIOD:
Start Date: 12/30/2015 - 01:00
End Date: 12/30/2020 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
2.00%
TOTAL COUNT:
2720 hrs.
AVG. WIND SPEED:
1.37 m/s
DATE:
12/31/2020
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-5

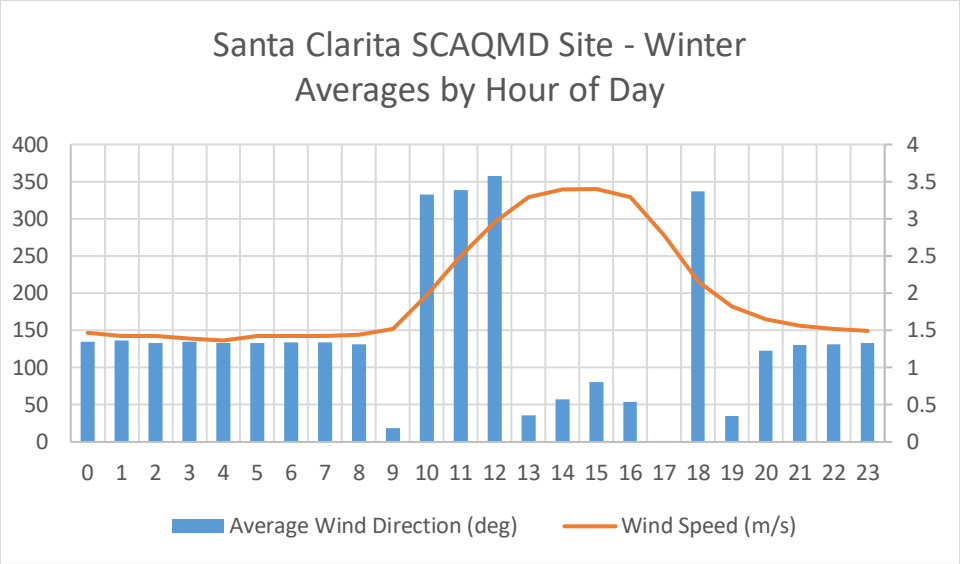
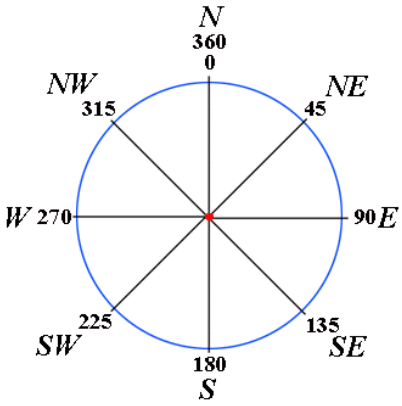


Figure A-6



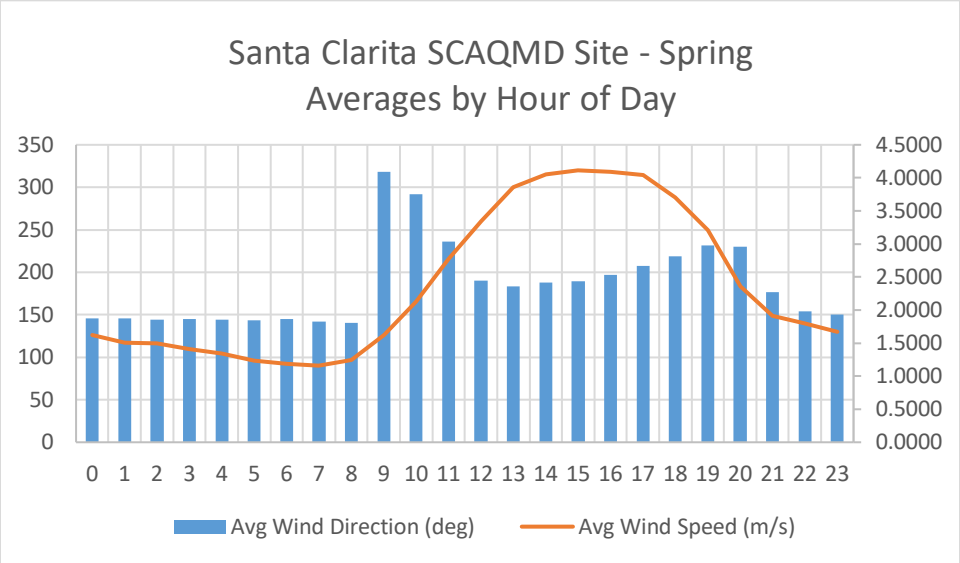
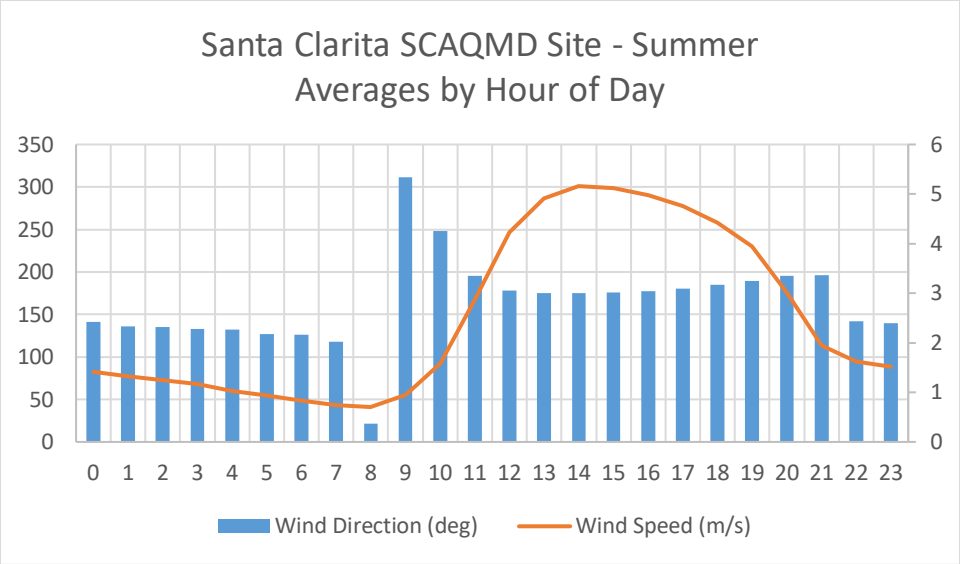


Figure A-7



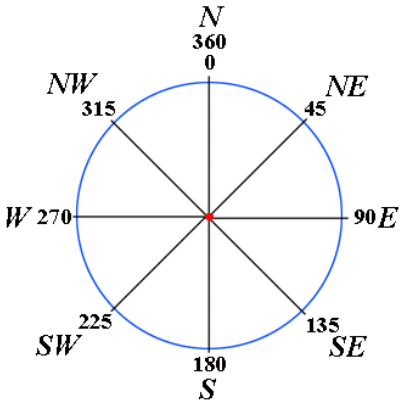


Figure A-8

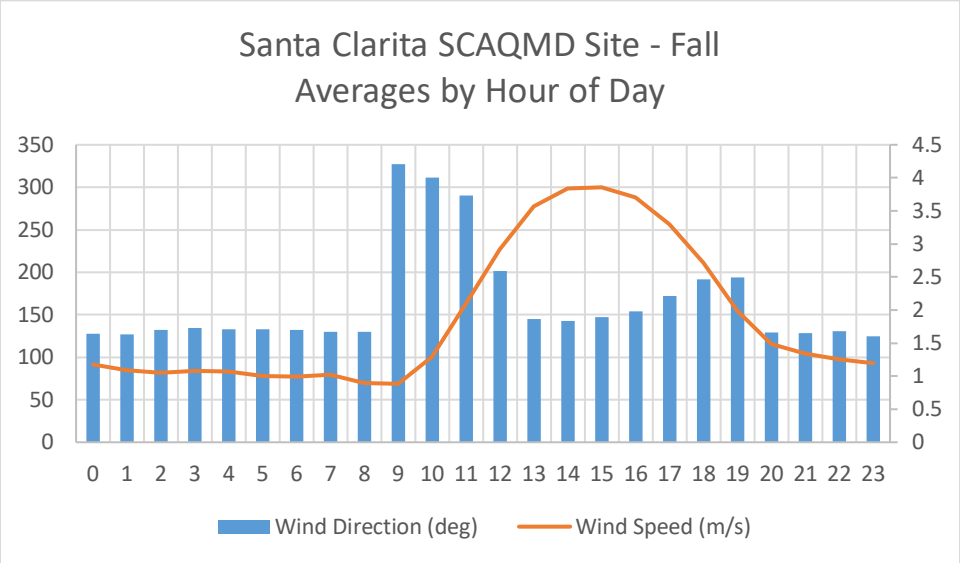


Figure A-9

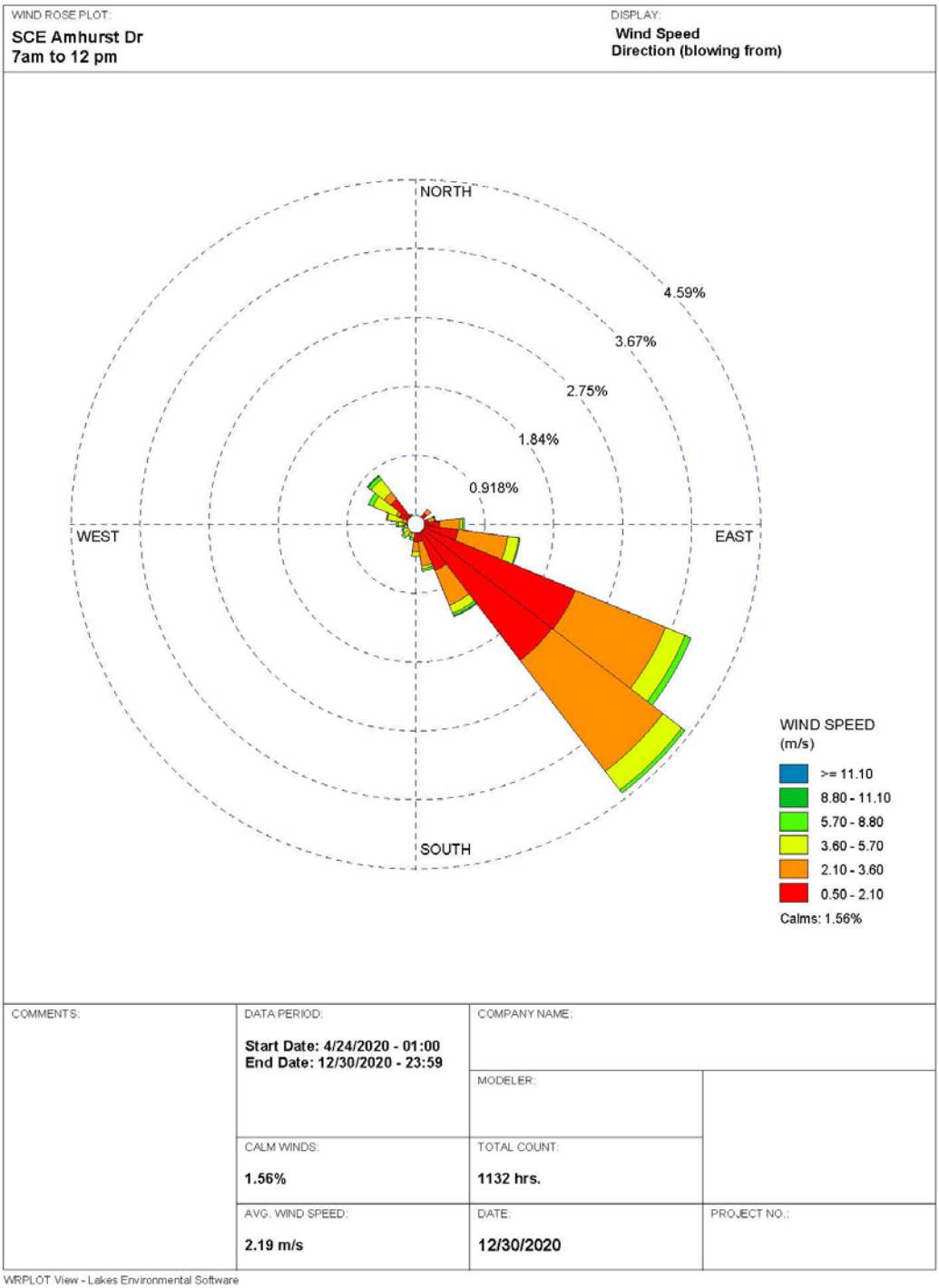

WIND ROSE PLOT:
SCE Amhurst Dr
7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
4.59%
3.67%
2.75%
1.84%
0.918%
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 1.56%
COMMENTS:
DATA PERIOD:
Start Date: 4/24/2020 - 01:00
End Date: 12/30/2020 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
1.56%
TOTAL COUNT:
1132 hrs.
AVG. WIND SPEED:
2.19 m/s
DATE:
12/30/2020
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-10

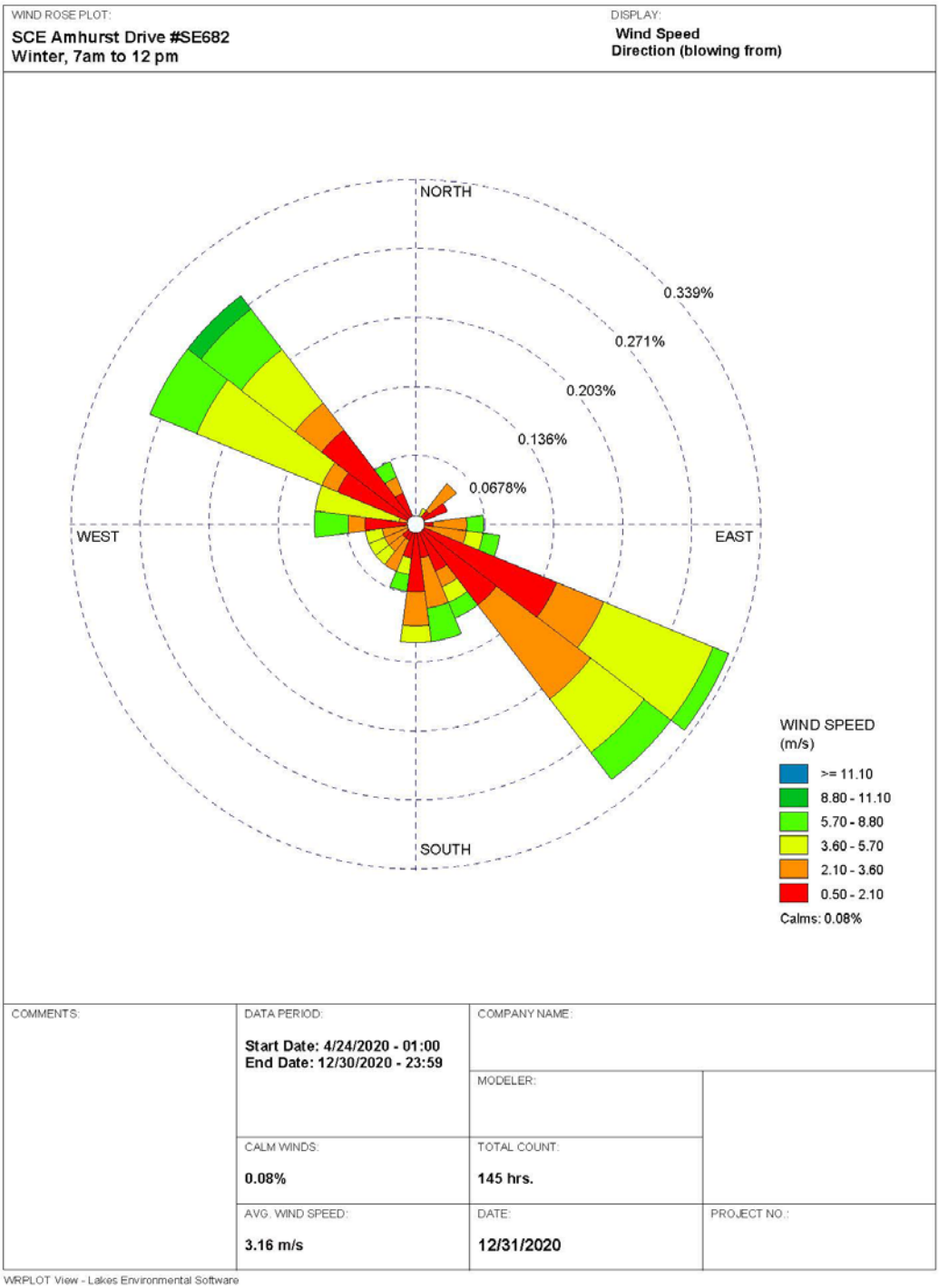

WIND ROSE PLOT:
SCE Amhurst Drive #SE682
Winter, 7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
0.339%
0.271%
0.203%
0.136%
0.0678%
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 0.08%
COMMENTS:
DATA PERIOD:
Start Date: 4/24/2020 - 01:00
End Date: 12/30/2020 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
0.08%
TOTAL COUNT:
145 hrs.
AVG. WIND SPEED:
3.16 m/s
DATE:
12/31/2020
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-11

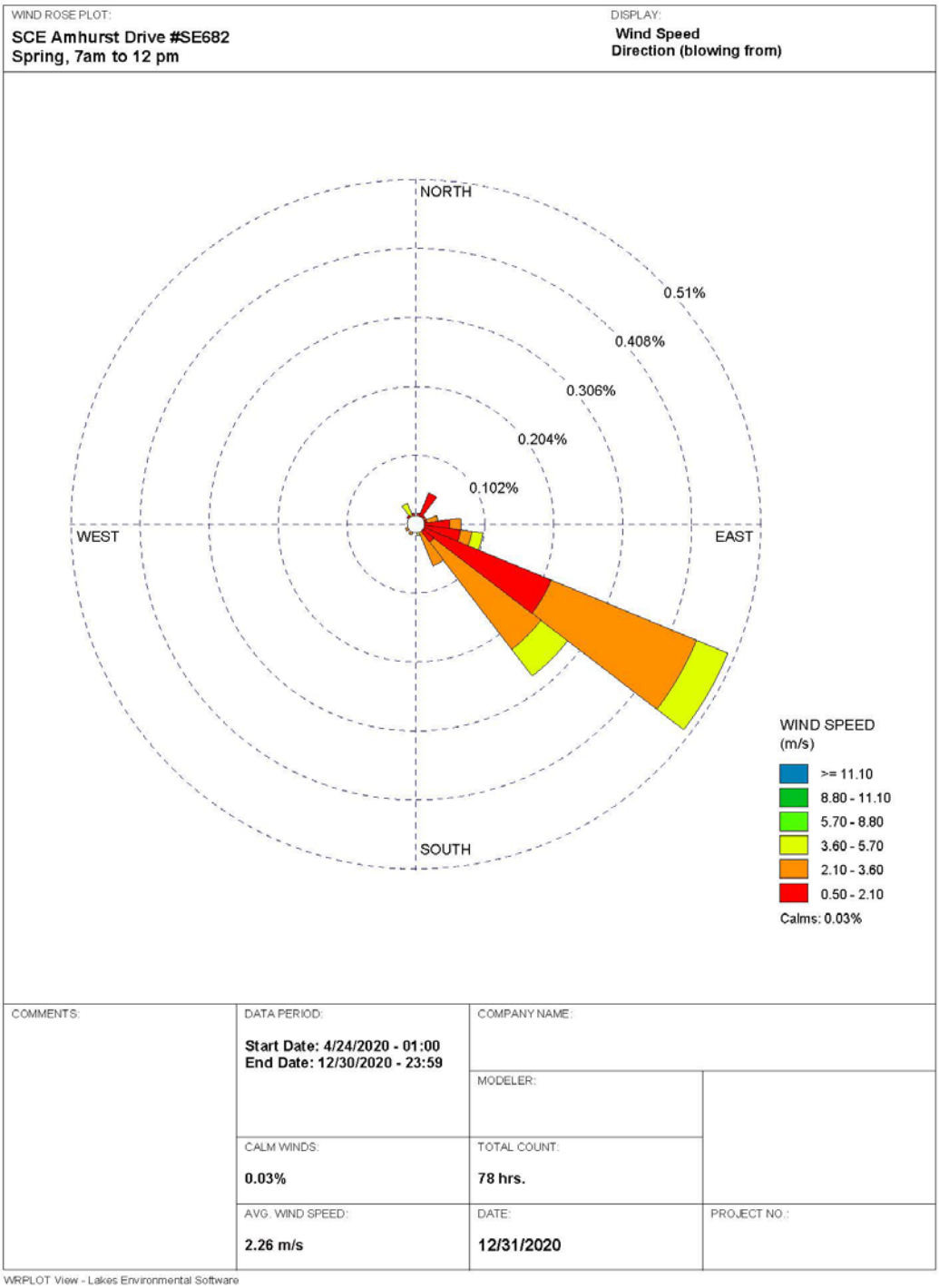

WIND ROSE PLOT:
SCE Amhurst Drive #SE682
Spring, 7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
0.51%
0.408%
0.306%
0.204%
0.102%
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 0.03%
COMMENTS:
DATA PERIOD:
Start Date: 4/24/2020 - 01:00
End Date: 12/30/2020 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
0.03%
TOTAL COUNT:
78 hrs.
AVG. WIND SPEED:
2.26 m/s
DATE:
12/31/2020
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-12

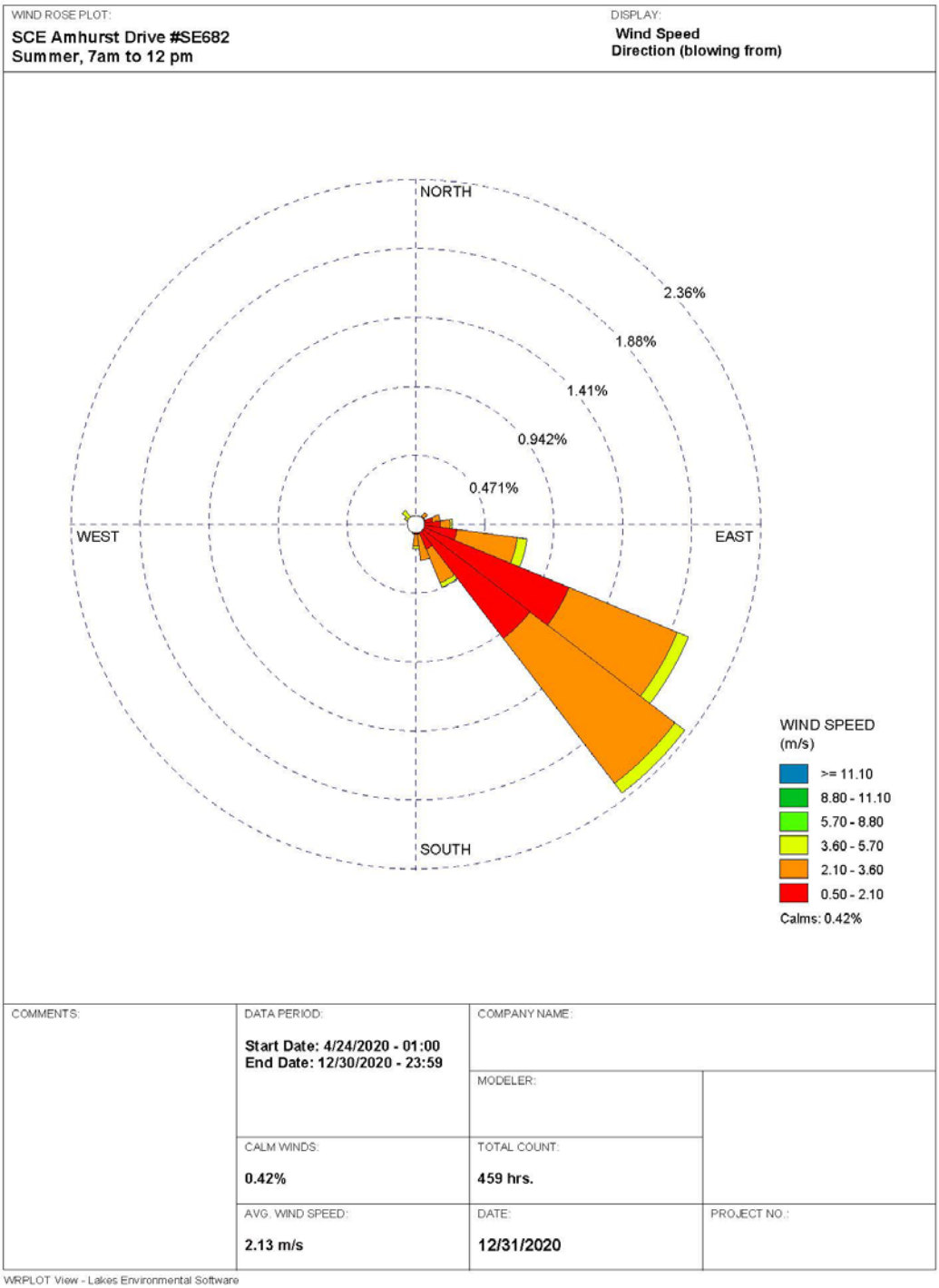

WIND ROSE PLOT:
SCE Amhurst Drive #SE682
Summer, 7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
2.36%
1.88%
1.41%
0.942%
0.471%
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 0.42%
COMMENTS:
DATA PERIOD:
Start Date: 4/24/2020 - 01:00
End Date: 12/30/2020 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
0.42%
TOTAL COUNT:
459 hrs.
AVG. WIND SPEED:
2.13 m/s
DATE:
12/31/2020
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-13

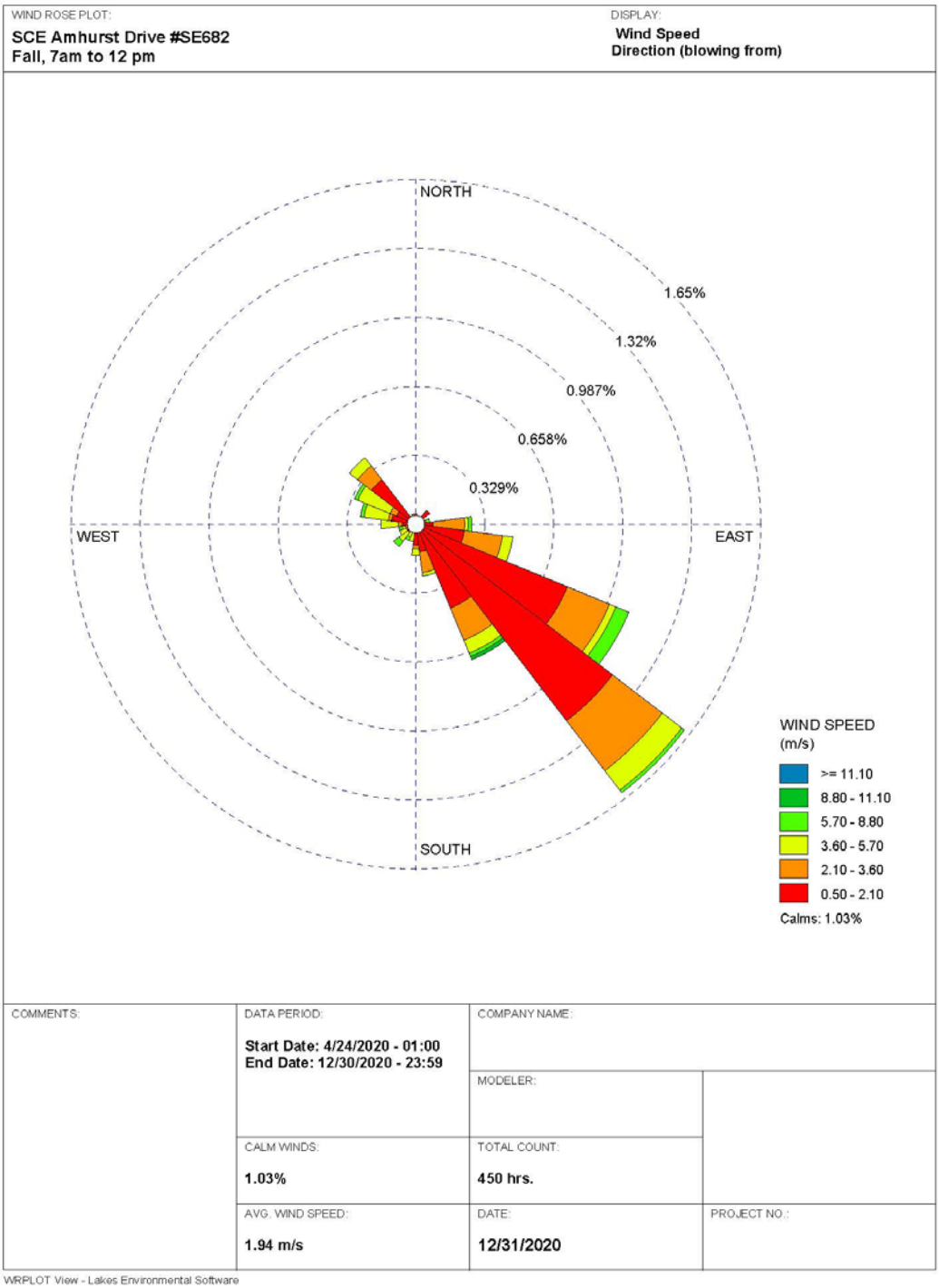
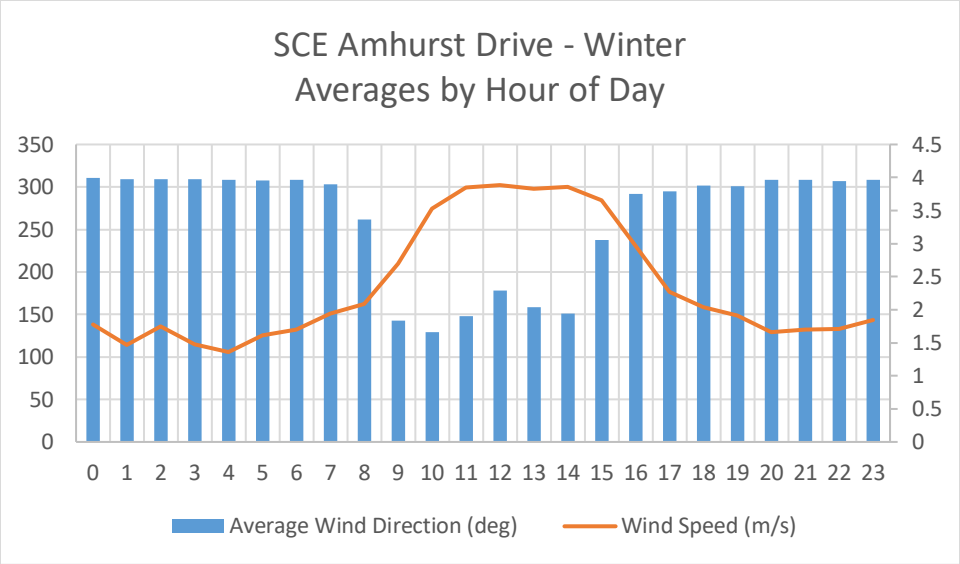

WIND ROSE PLOT:
SCE Amhurst Drive #SE682
Fall, 7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
1.65%
1.32%
0.987%
0.658%
0.329%
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 1.03%
COMMENTS:
DATA PERIOD:
Start Date: 4/24/2020 - 01:00
End Date: 12/30/2020 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
1.03%
TOTAL COUNT:
450 hrs.
AVG. WIND SPEED:
1.94 m/s
DATE:
12/31/2020
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-14



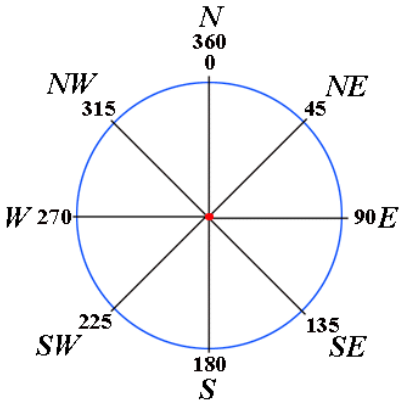


Figure A-15

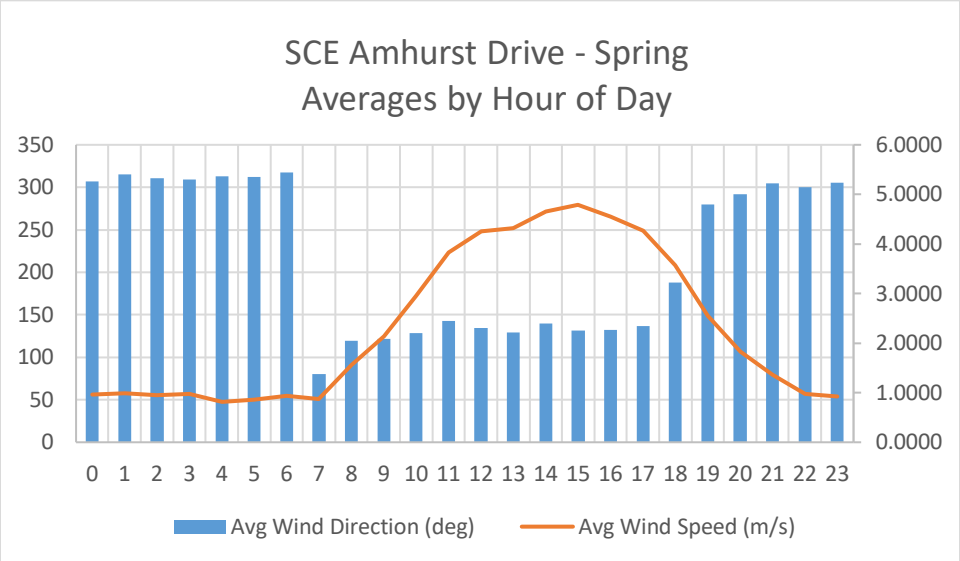
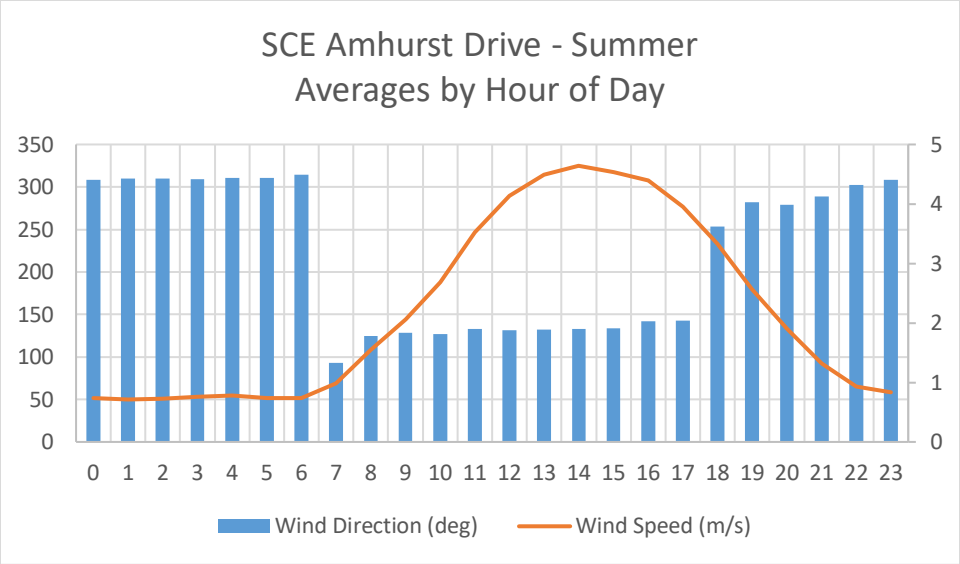


Figure A-16



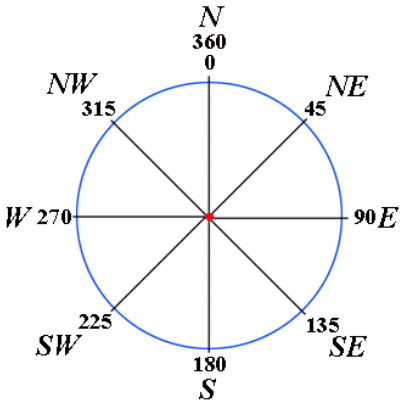


Figure A-17

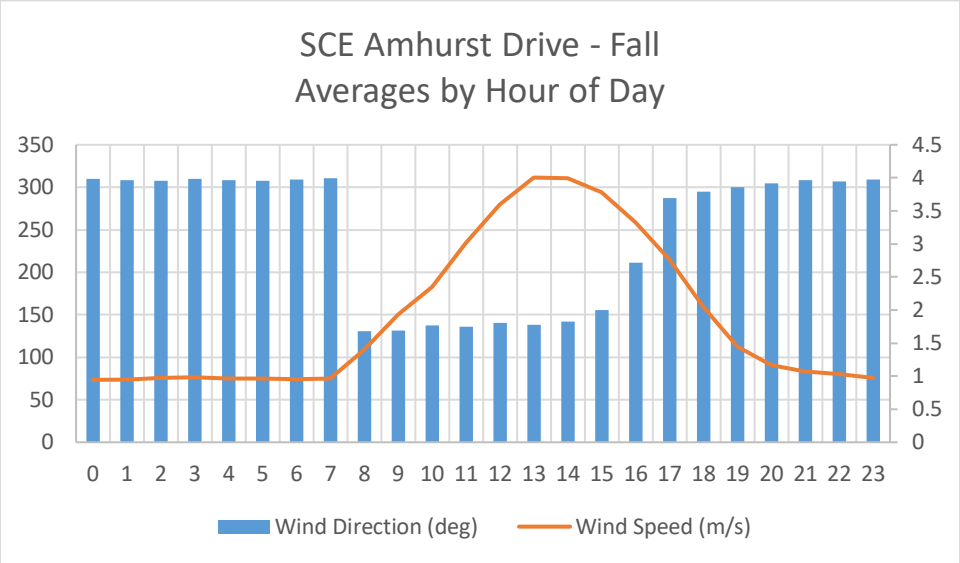


Figure A-18

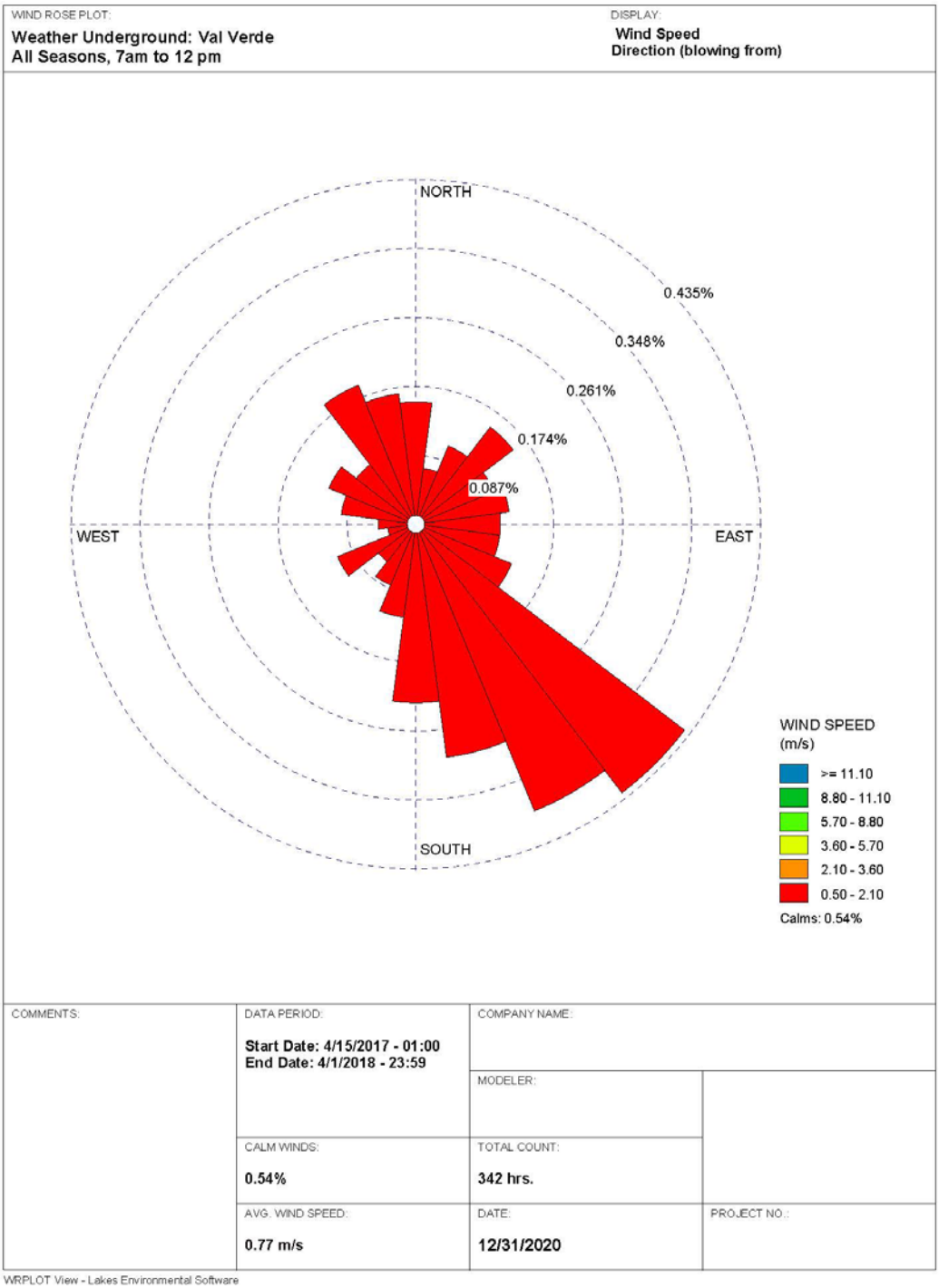

WIND ROSE PLOT:
Weather Underground: Val Verde
All Seasons, 7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
0.435%
0.348%
0.261%
0.174%
0.087%
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 0.54%
COMMENTS:
DATA PERIOD:
Start Date: 4/15/2017 - 01:00
End Date: 4/1/2018 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
0.54%
TOTAL COUNT:
342 hrs.
AVG. WIND SPEED:
0.77 m/s
DATE:
12/31/2020
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-19

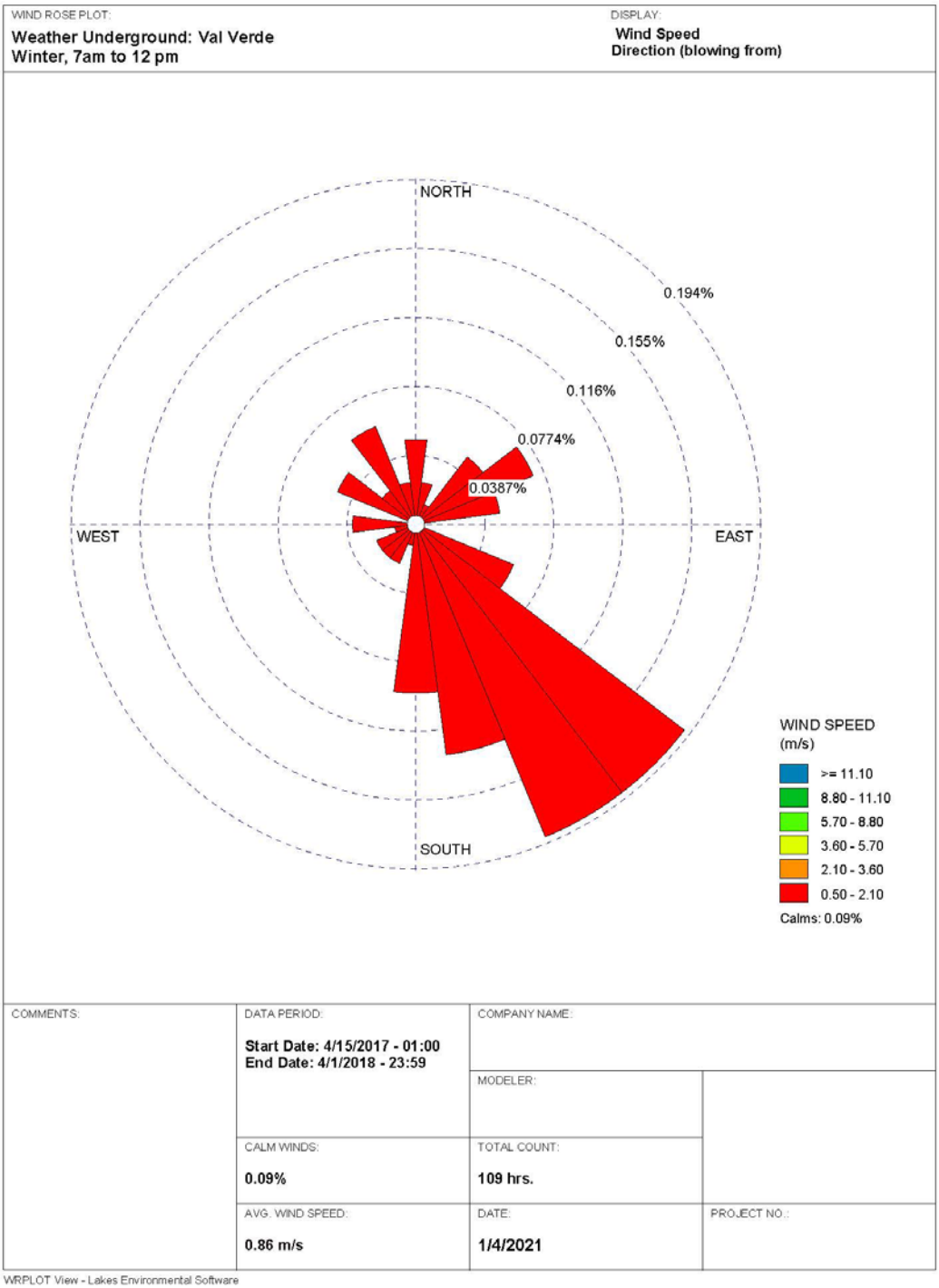

WIND ROSE PLOT:
Weather Underground: Val Verde
Winter, 7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
0.194%
0.155%
0.116%
0.0774%
0.0387%
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 0.09%
COMMENTS:
DATA PERIOD:
Start Date: 4/15/2017 - 01:00
End Date: 4/1/2018 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
0.09%
TOTAL COUNT:
109 hrs.
AVG. WIND SPEED:
0.86 m/s
DATE:
1/4/2021
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-20

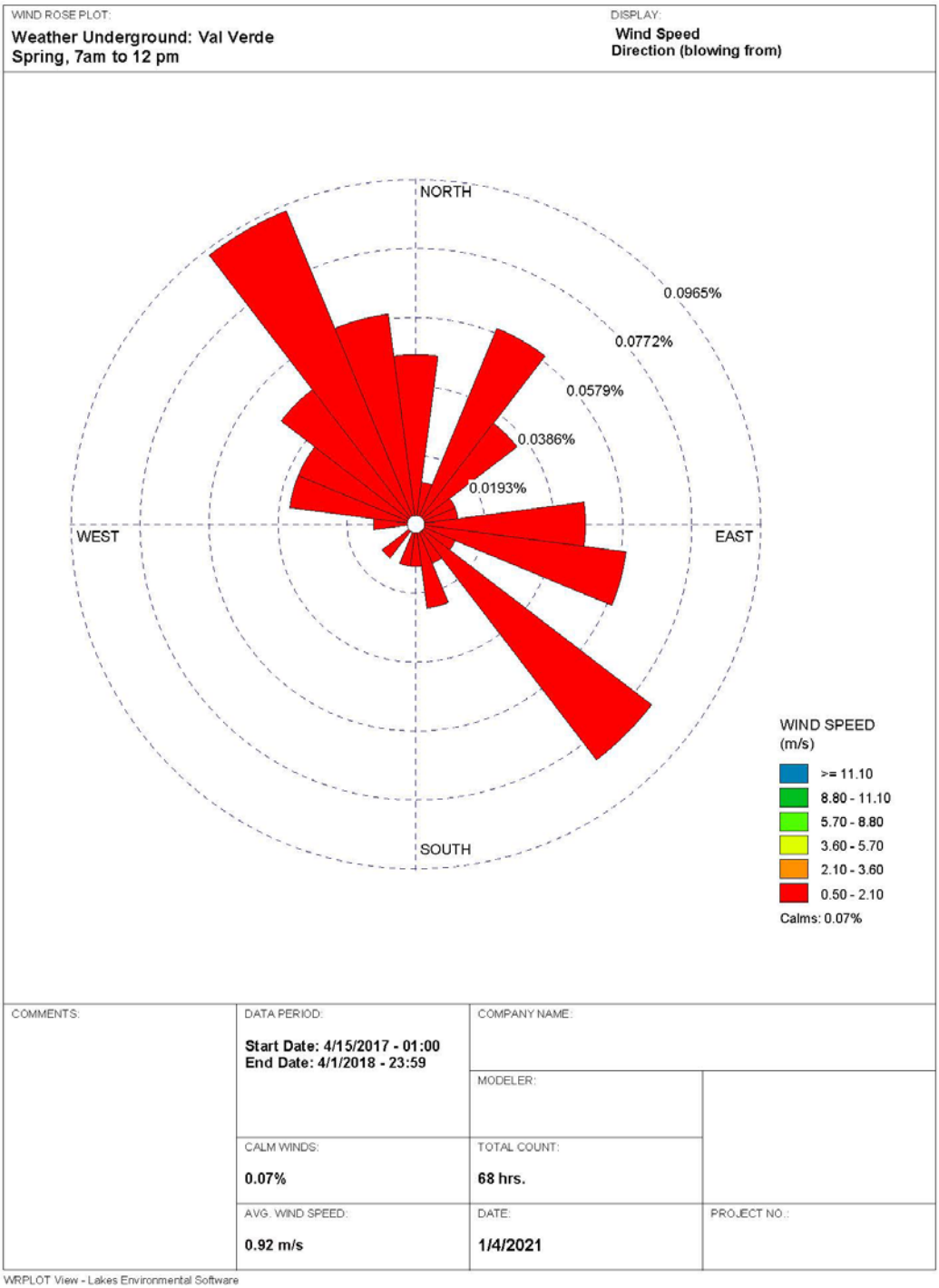

WIND ROSE PLOT:
Weather Underground: Val Verde
Spring, 7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
0.0965%
0.0772%
0.0579%
0.0386%
0.0193%
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 0.07%
COMMENTS:
DATA PERIOD:
Start Date: 4/15/2017 - 01:00
End Date: 4/1/2018 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
0.07%
TOTAL COUNT:
68 hrs.
AVG. WIND SPEED:
0.92 m/s
DATE:
1/4/2021
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-21

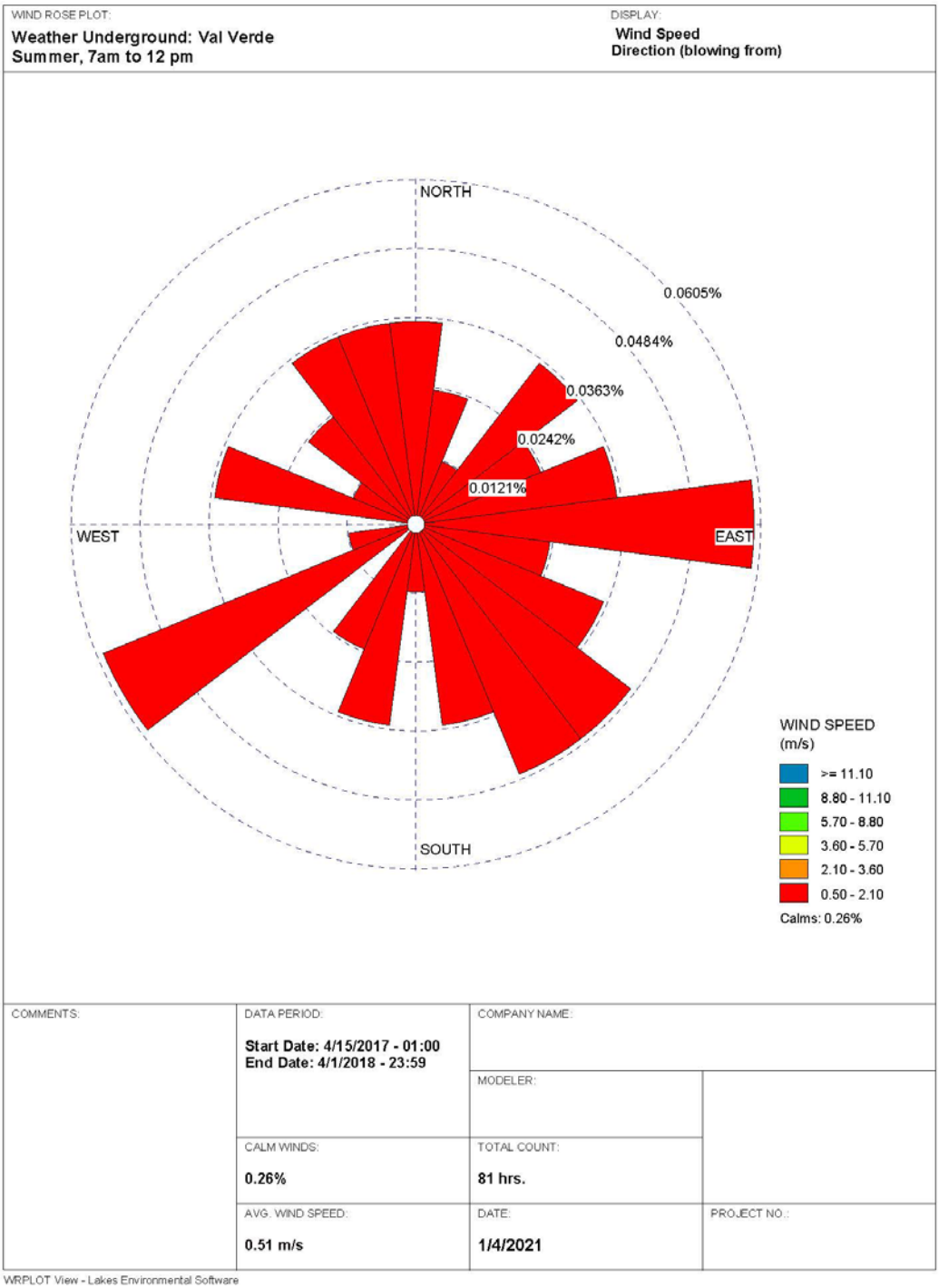

WIND ROSE PLOT:
Weather Underground: Val Verde
Summer, 7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
0.0605%
0.0484%
0.0363%
0.0242%
0.0121%
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 0.26%
COMMENTS:
DATA PERIOD:
Start Date: 4/15/2017 - 01:00
End Date: 4/1/2018 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
0.26%
TOTAL COUNT:
81 hrs.
AVG. WIND SPEED:
0.51 m/s
DATE:
1/4/2021
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-22

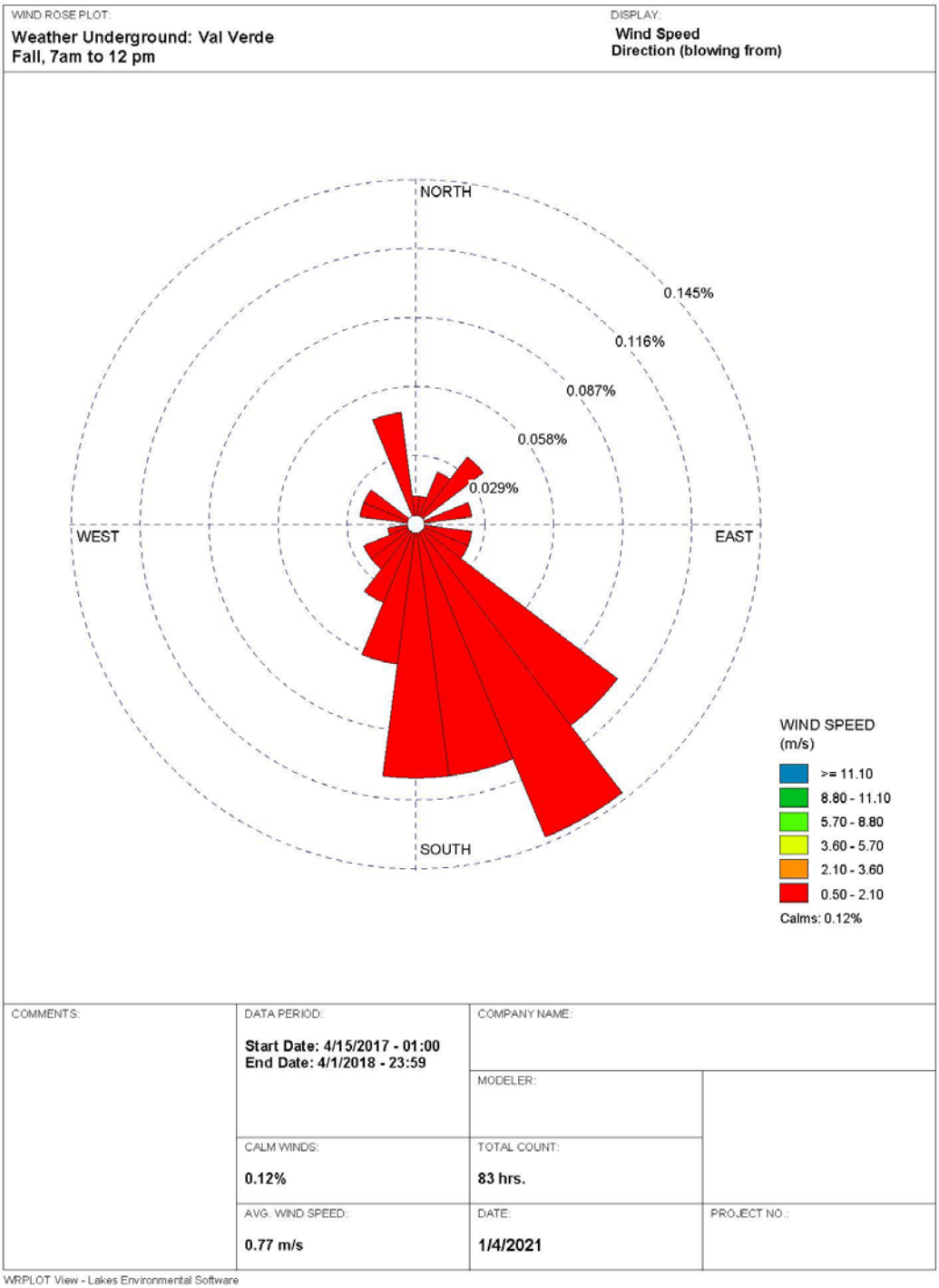
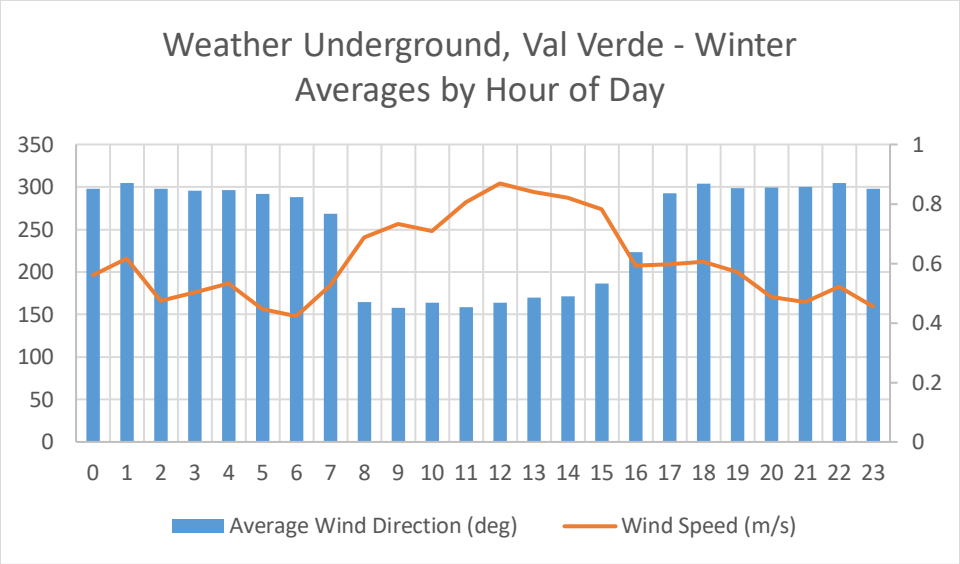

WIND ROSE PLOT:
Weather Underground: Val Verde
Fall, 7am to 12 pm
DISPLAY:
Wind Speed
Direction (blowing from)
NORTH
EAST
SOUTH
WEST
0.145%
0.116%
0.087%
0.058%
0.029%
WIND SPEED
(m/s)
>= 11.10
8.80 - 11.10
5.70 - 8.80
3.60 - 5.70
2.10 - 3.60
0.50 - 2.10
Calms: 0.12%
COMMENTS:
DATA PERIOD:
Start Date: 4/15/2017 - 01:00
End Date: 4/1/2018 - 23:59
COMPANY NAME:
MODELER:
CALM WINDS:
0.12%
TOTAL COUNT:
83 hrs.
AVG. WIND SPEED:
0.77 m/s
DATE:
1/4/2021
PROJECT NO.:
WRPLOT View - Lakes Environmental Software

Figure A-23



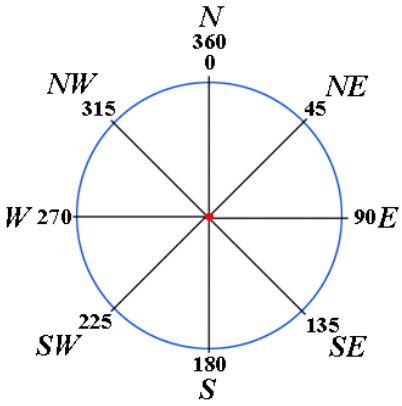


Figure A-24

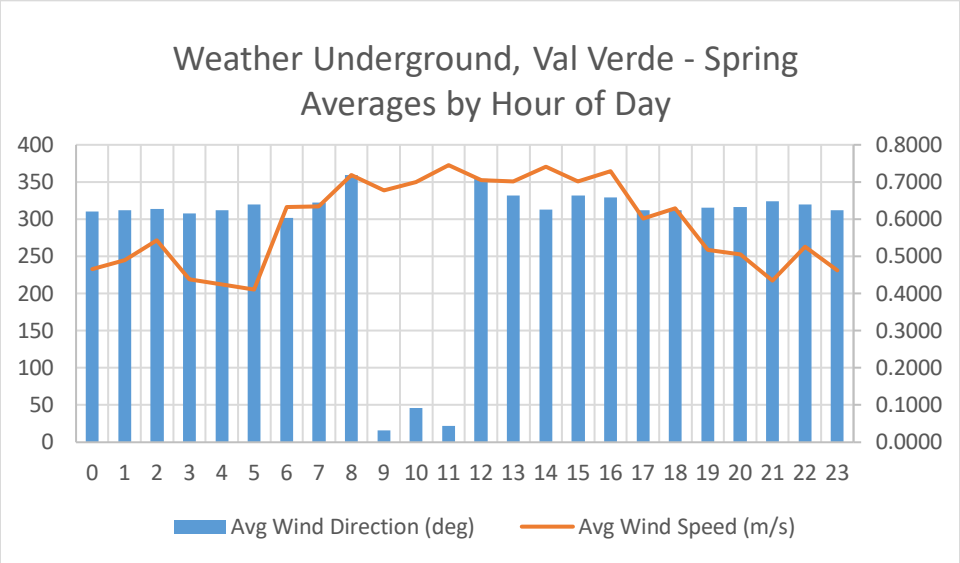
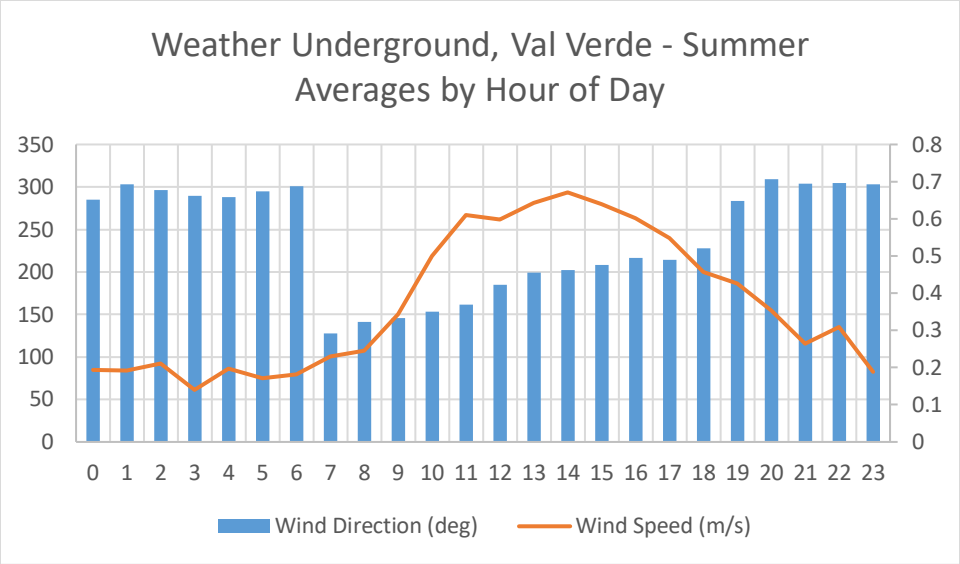


Figure A-25



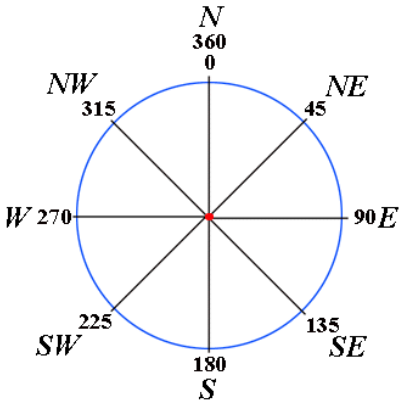


Figure A-26

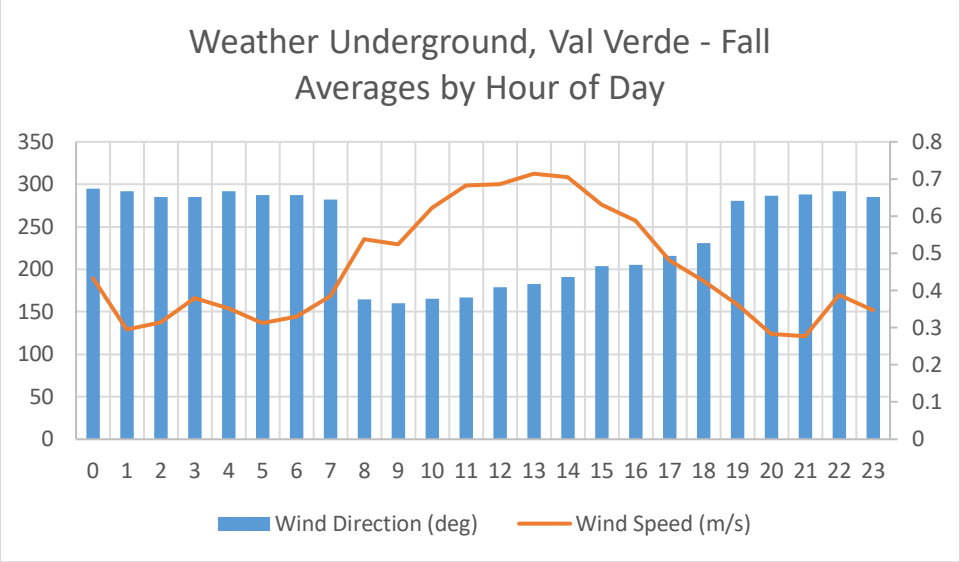


Figure A-27

Appendix B

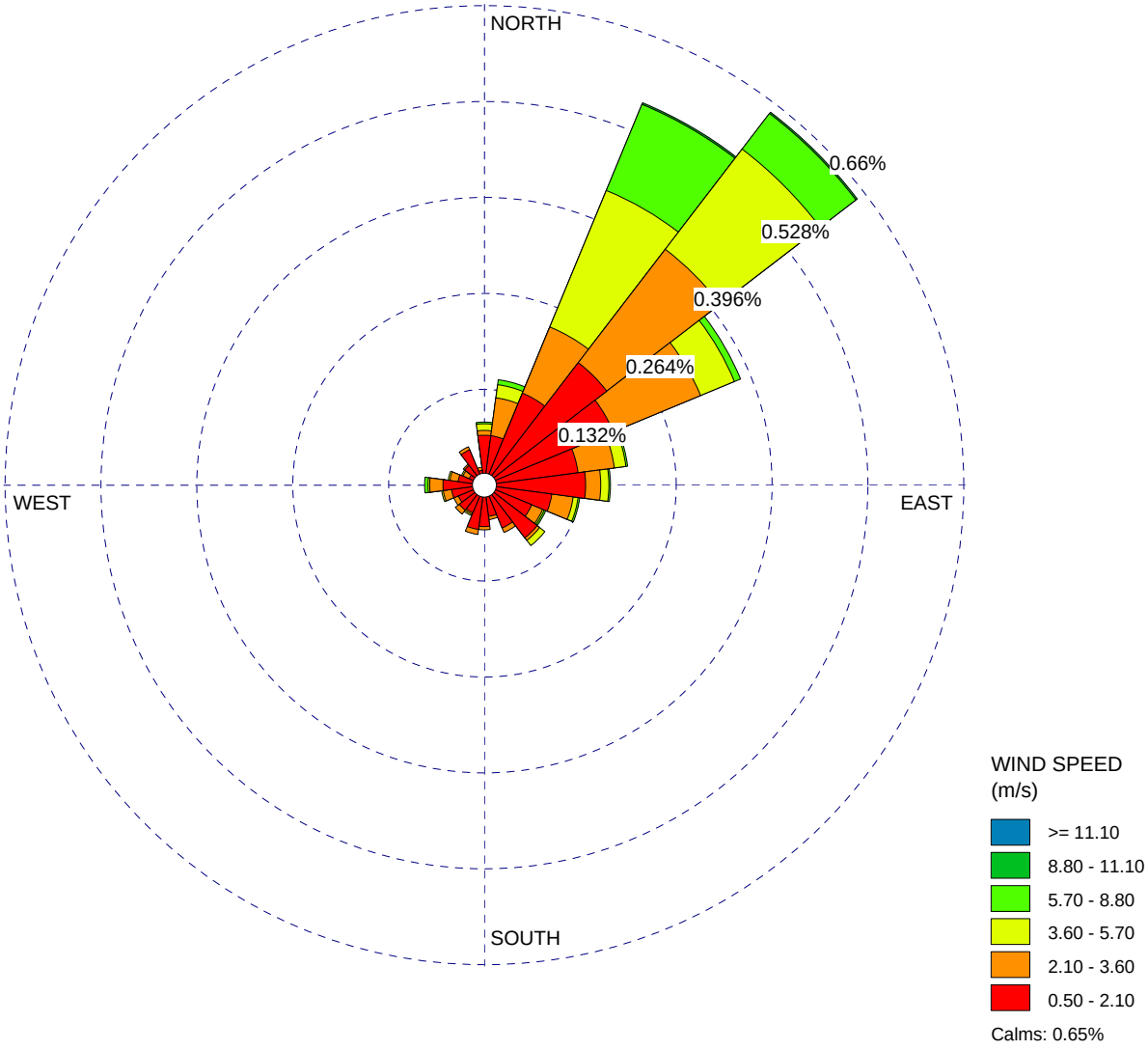
On-site MET Station Wind Rose and Hourly Analysis

WIND ROSE PLOT:

Chiquita West
Winter, 7am to 12 pm

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2016 - 01:00** **End Date: 12/31/2020 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.65%**	TOTAL COUNT: **1715 hrs.**	
	AVG. WIND SPEED: **2.07 m/s**	DATE: **1/13/2021**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

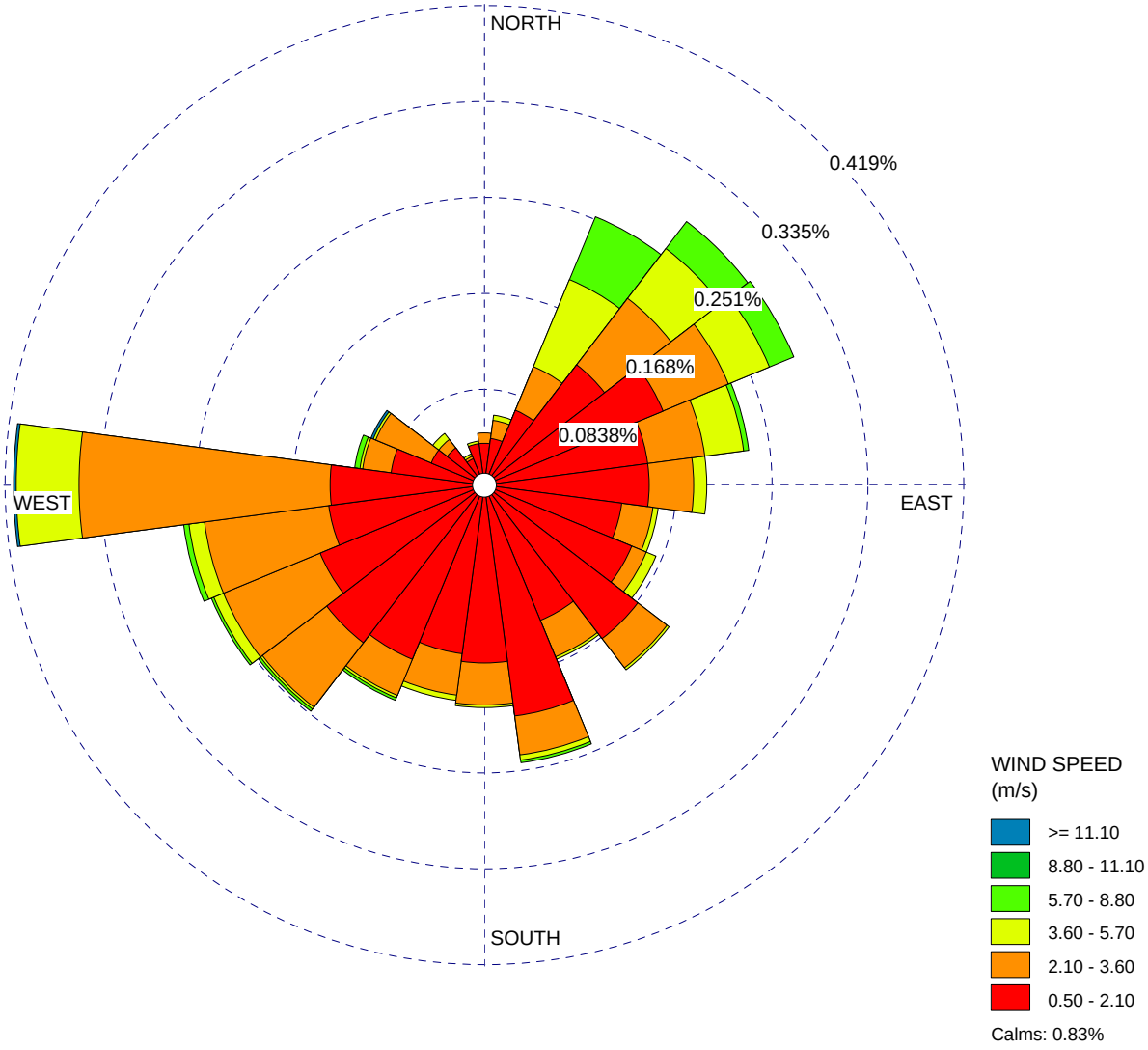
Figure B-1

WIND ROSE PLOT:

Chiquita West
Spring, 7am to 12 pm

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2016 - 01:00** **End Date: 12/31/2020 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.83%**	TOTAL COUNT: **2299 hrs.**	
	AVG. WIND SPEED: **1.75 m/s**	DATE: **1/13/2021**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

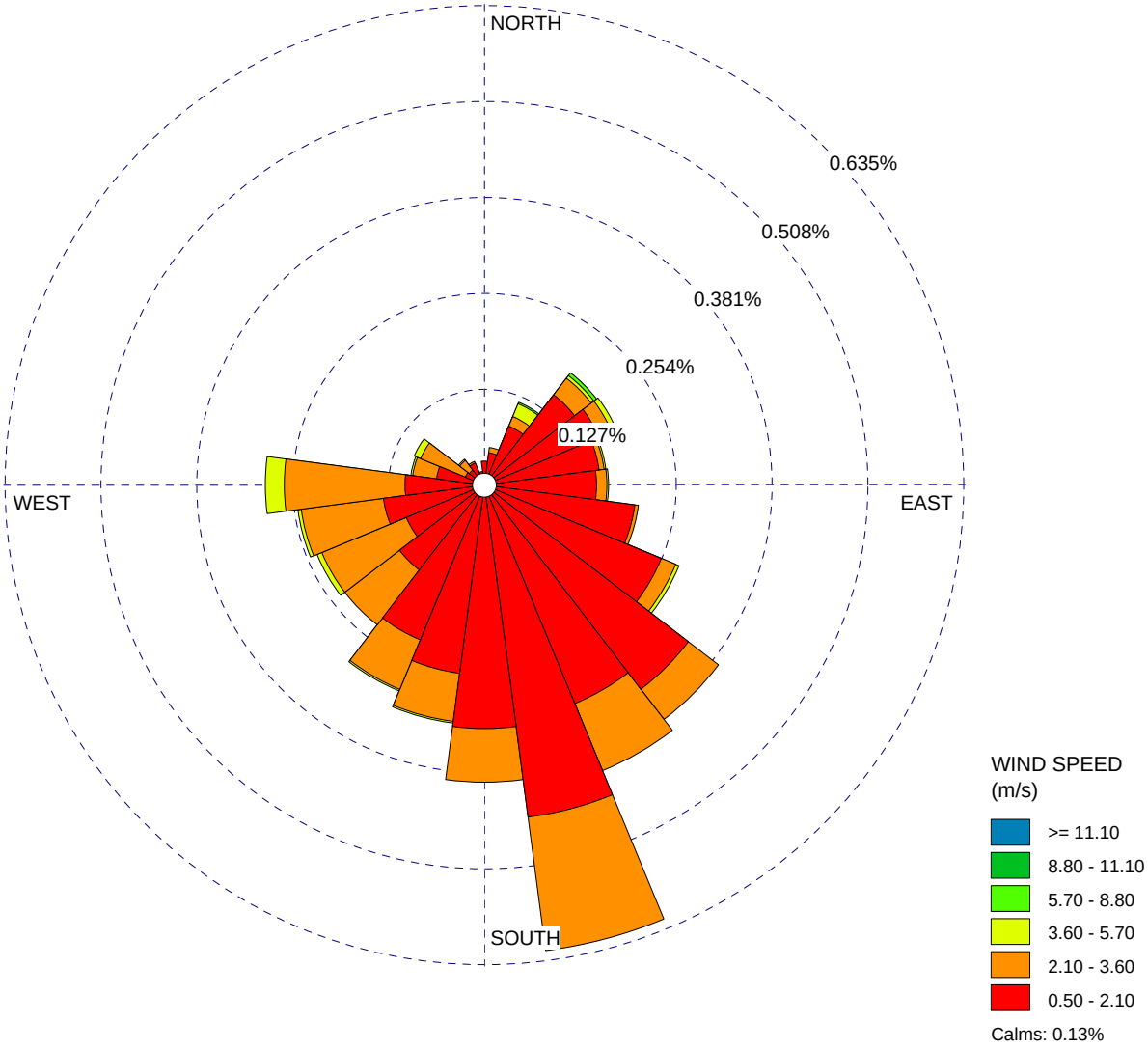
Figure B-2

WIND ROSE PLOT:

Chiquita West
Summer, 7am to 12 pm

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2016 - 01:00** **End Date: 12/31/2020 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.13%**	TOTAL COUNT: **2300 hrs.**	
	AVG. WIND SPEED: **1.64 m/s**	DATE: **1/13/2021**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

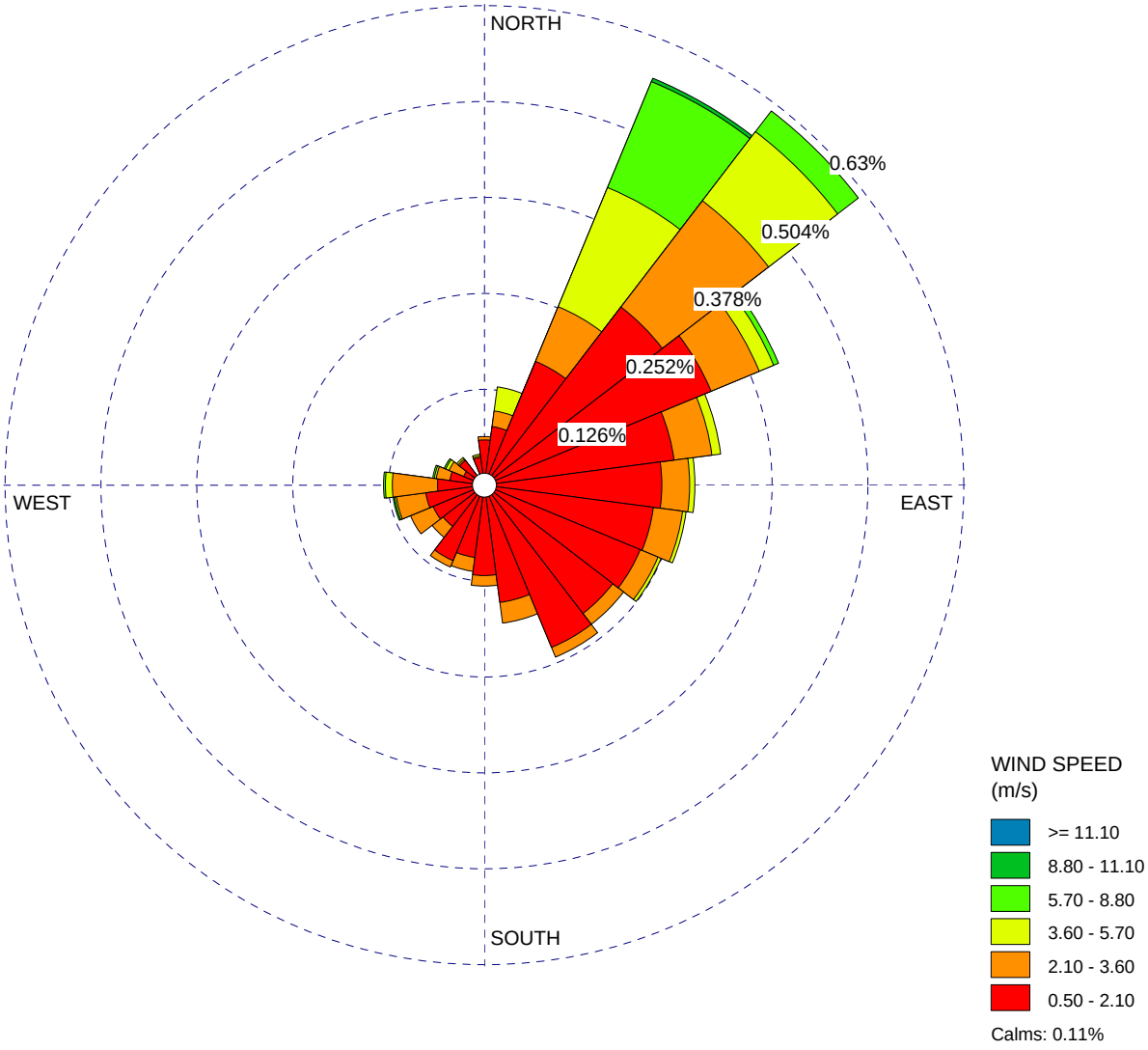
Figure B-3

WIND ROSE PLOT:

Chiquita West
Fall, 7am to 12 pm

DISPLAY:

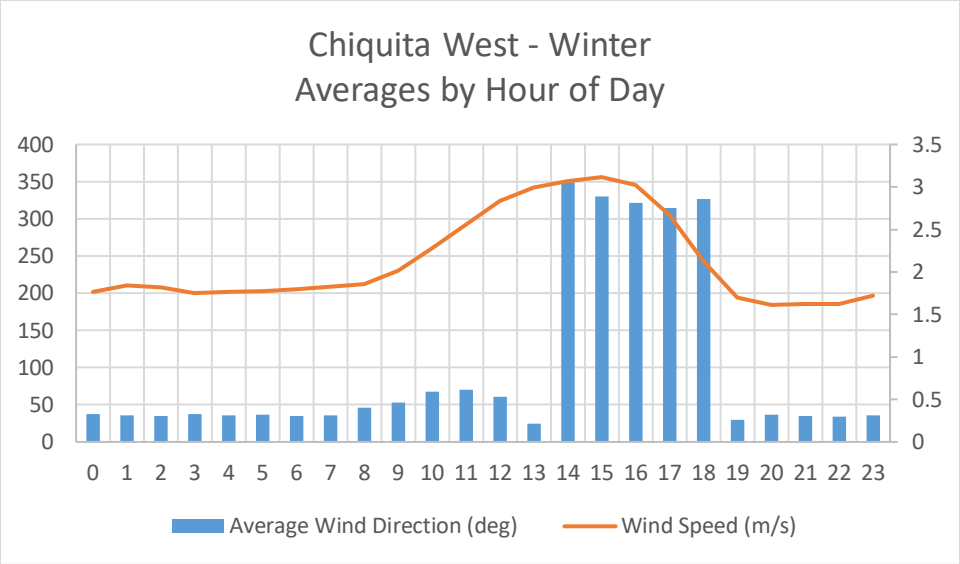
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2016 - 01:00** **End Date: 12/31/2020 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.11%**	TOTAL COUNT: **2064 hrs.**	
	AVG. WIND SPEED: **2.01 m/s**	DATE: **1/13/2021**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Figure B-4



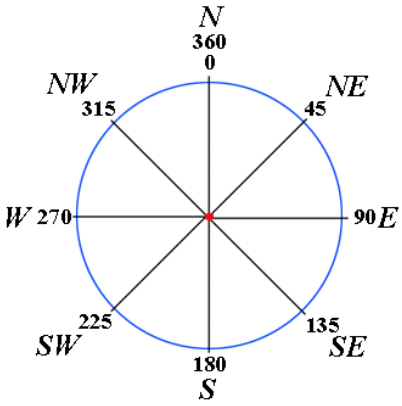


Figure B-5

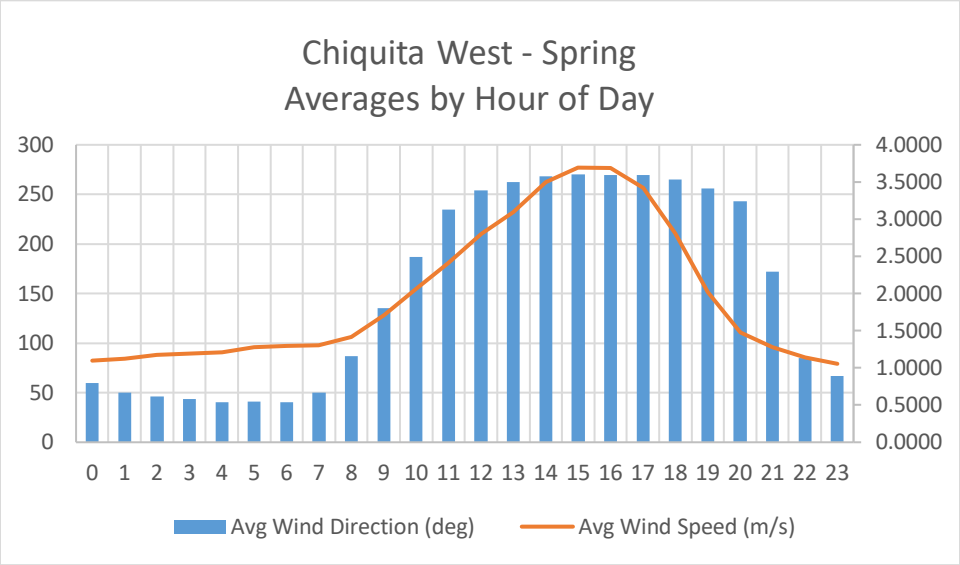
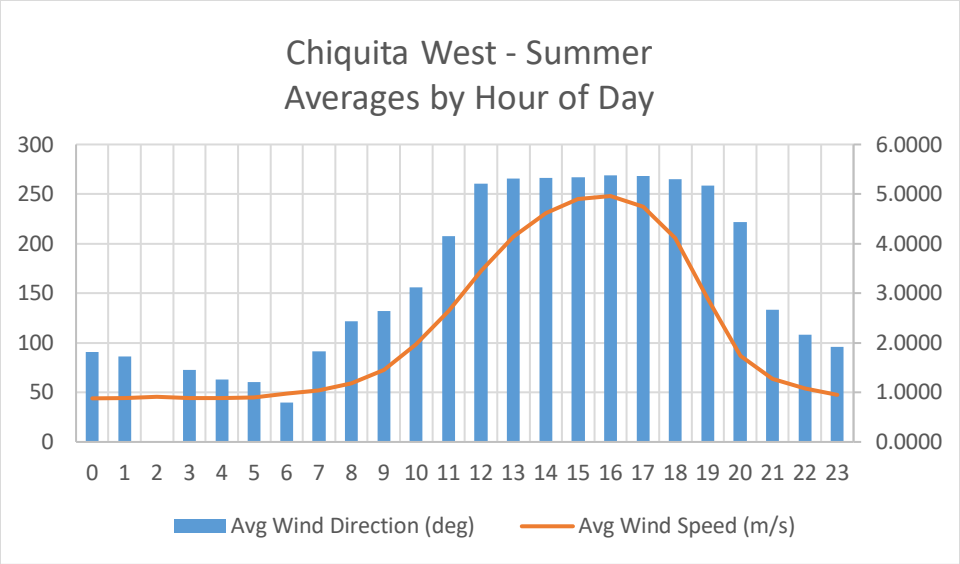


Figure B-6



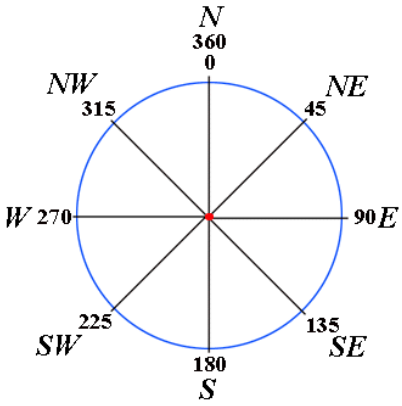


Figure B-7

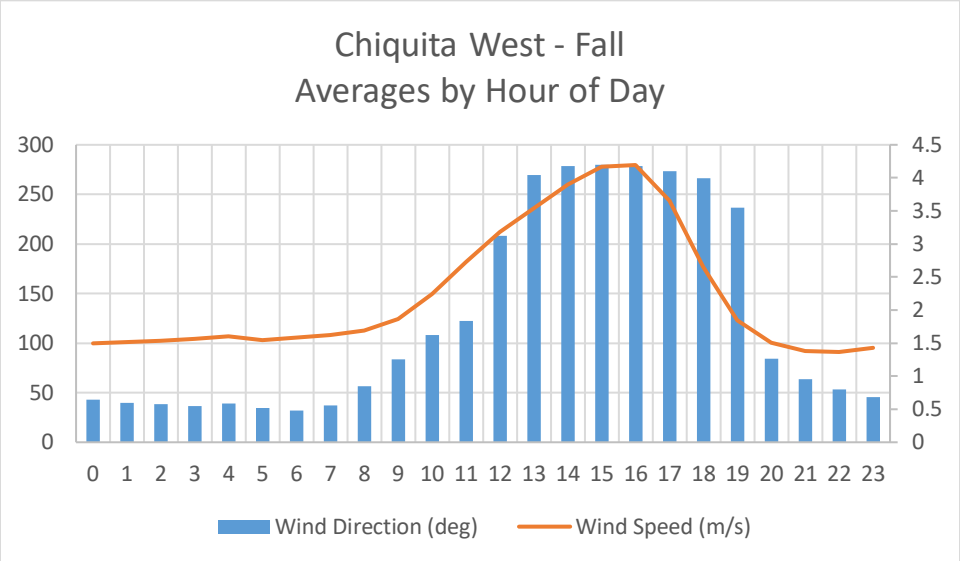


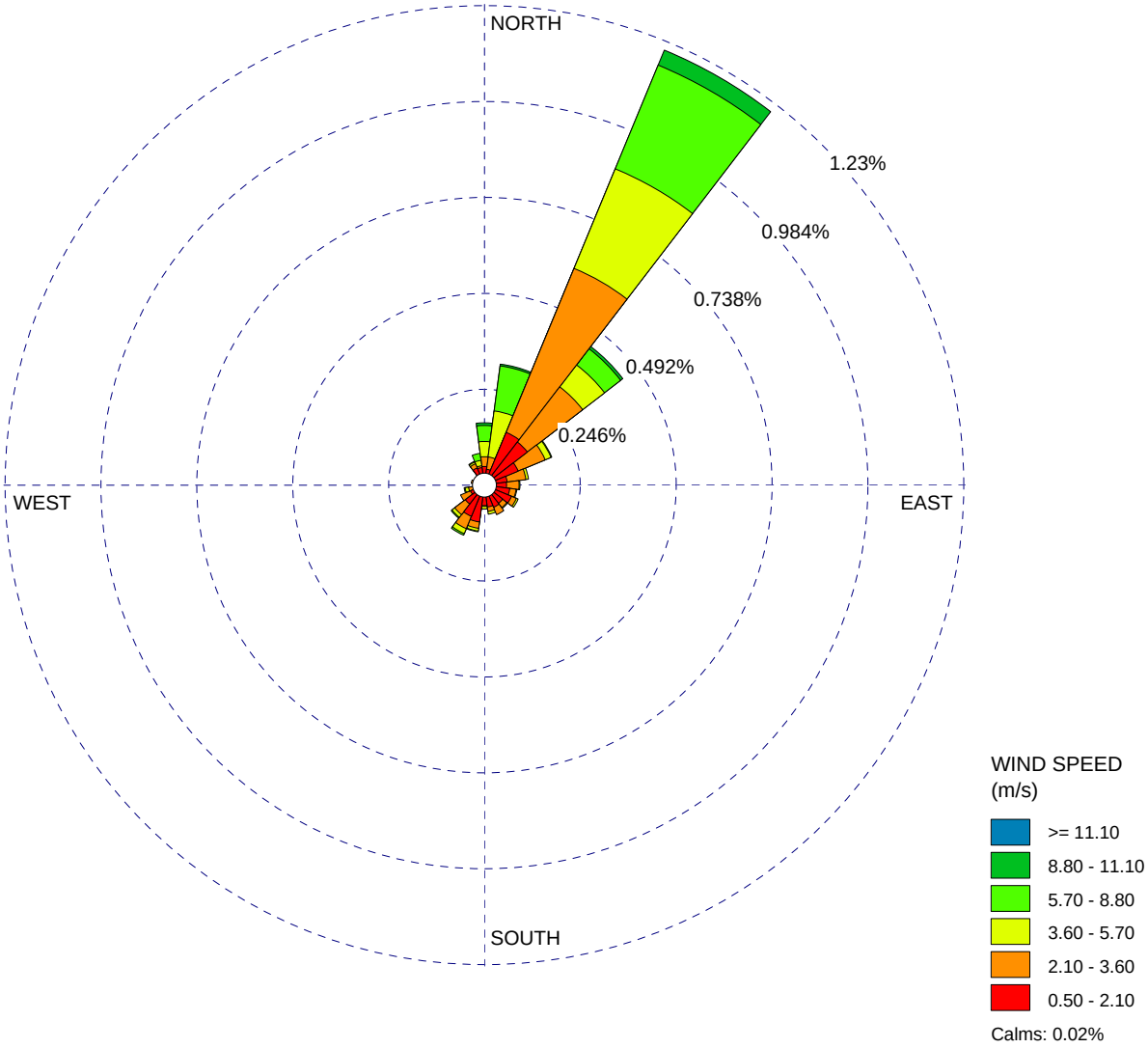
Figure B-8

WIND ROSE PLOT:

Chiquita Flare
Winter, 7am to 12 pm

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2016 - 01:00** **End Date: 12/31/2020 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.02%**	TOTAL COUNT: **1647 hrs.**	
	AVG. WIND SPEED: **3.22 m/s**	DATE: **1/13/2021**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

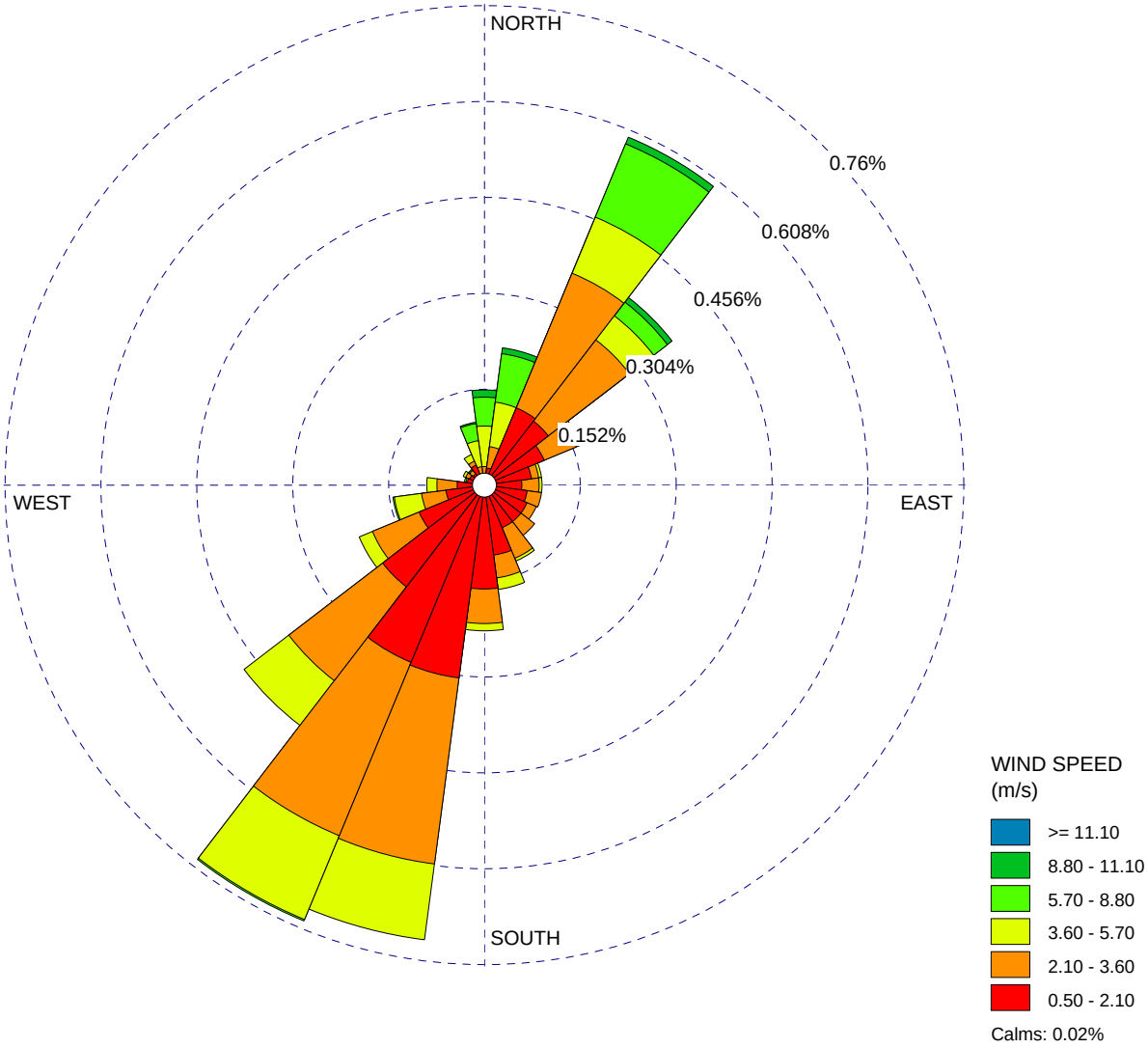
Figure B-9

WIND ROSE PLOT:

Chiquita Flare
Spring, 7am to 12 pm

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2016 - 01:00** **End Date: 12/31/2020 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.02%**	TOTAL COUNT: **2267 hrs.**	
	AVG. WIND SPEED: **2.75 m/s**	DATE: **1/13/2021**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

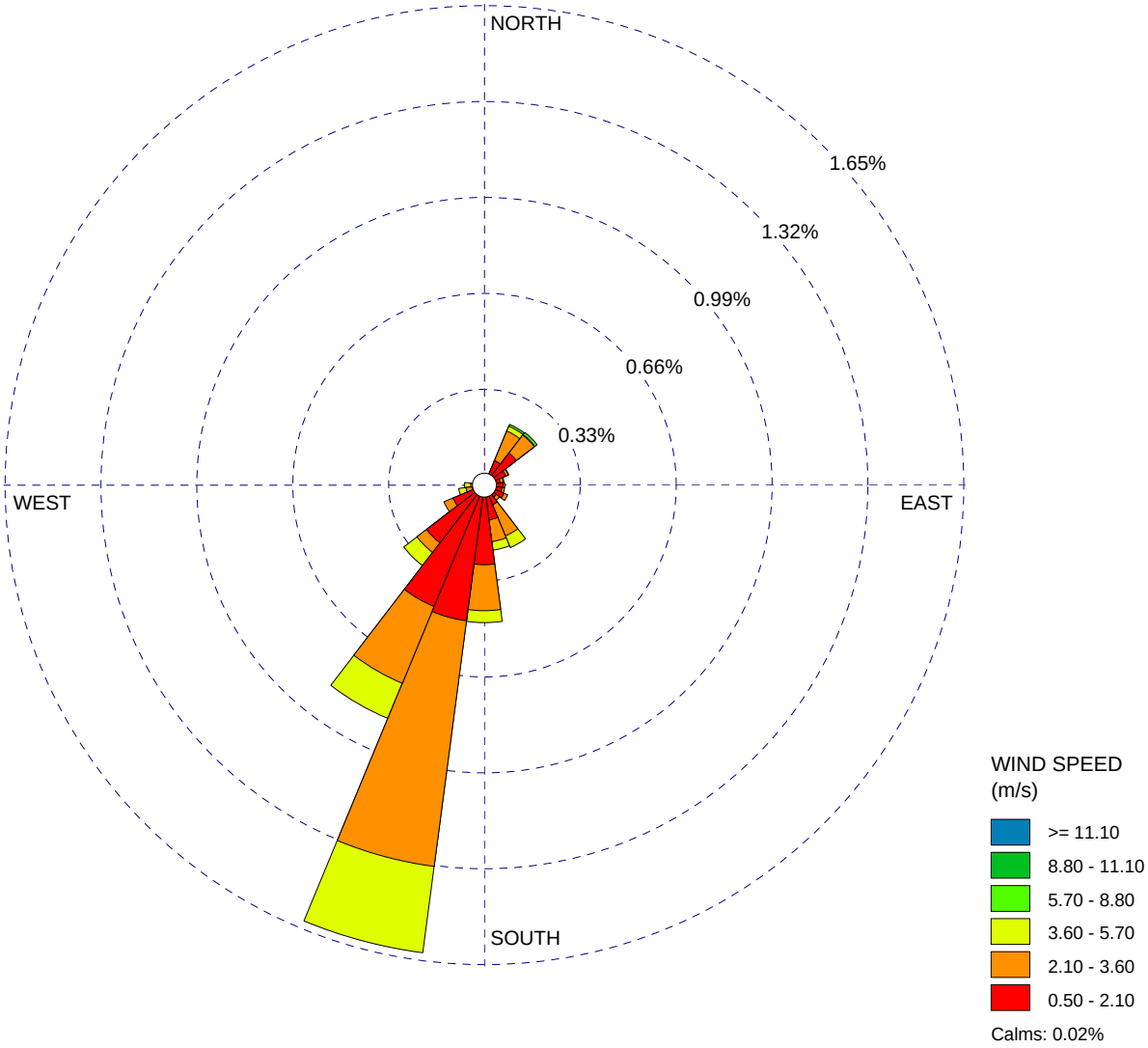
Figure B-10

WIND ROSE PLOT:

Chiquita Flare
Summer, 7am to 12 pm

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2016 - 01:00** **End Date: 12/31/2020 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.02%**	TOTAL COUNT: **2283 hrs.**	
	AVG. WIND SPEED: **2.32 m/s**	DATE: **1/13/2021**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

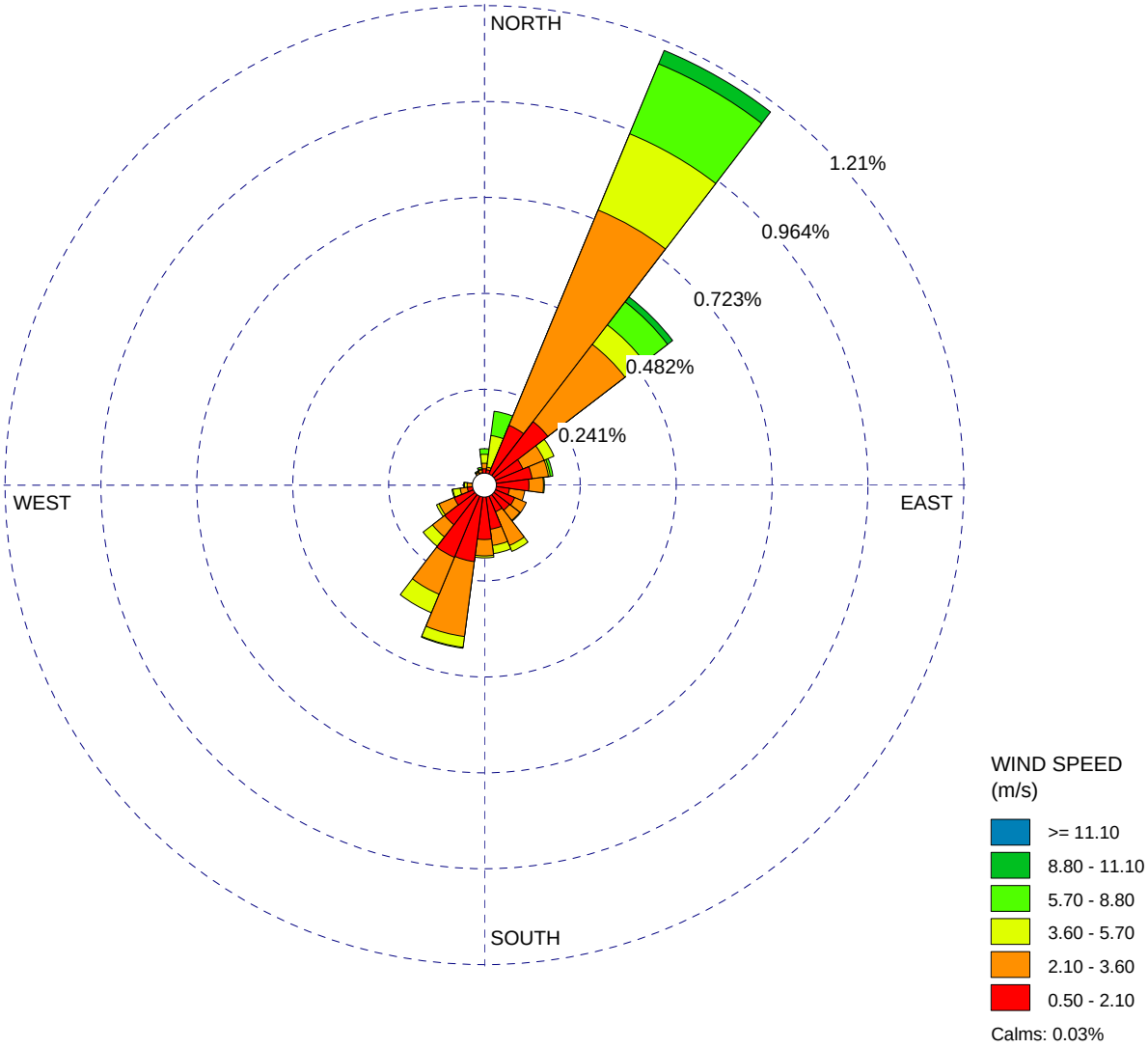
Figure B-11

WIND ROSE PLOT:

Chiquita Flare
Fall, 7am to 12 pm

DISPLAY:

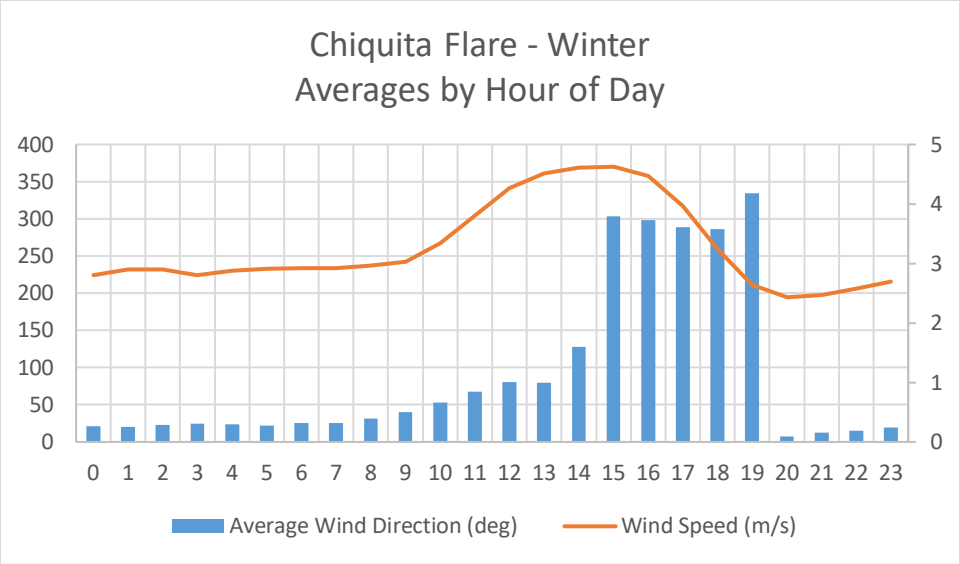
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2016 - 01:00** **End Date: 12/31/2020 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.03%**	TOTAL COUNT: **2118 hrs.**	
	AVG. WIND SPEED: **2.74 m/s**	DATE: **1/13/2021**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Figure B-12



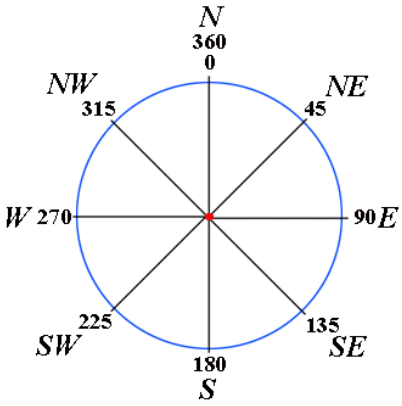


Figure B-13

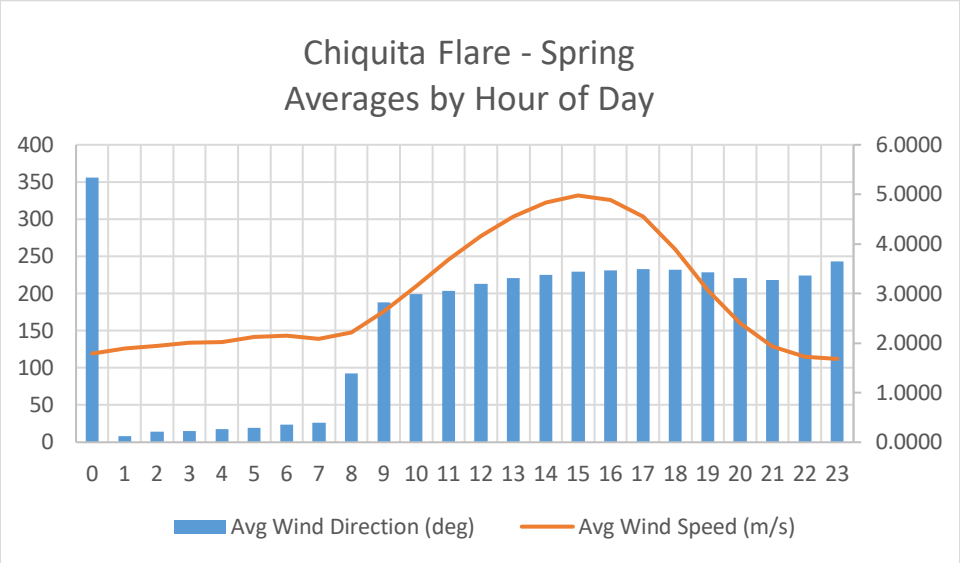
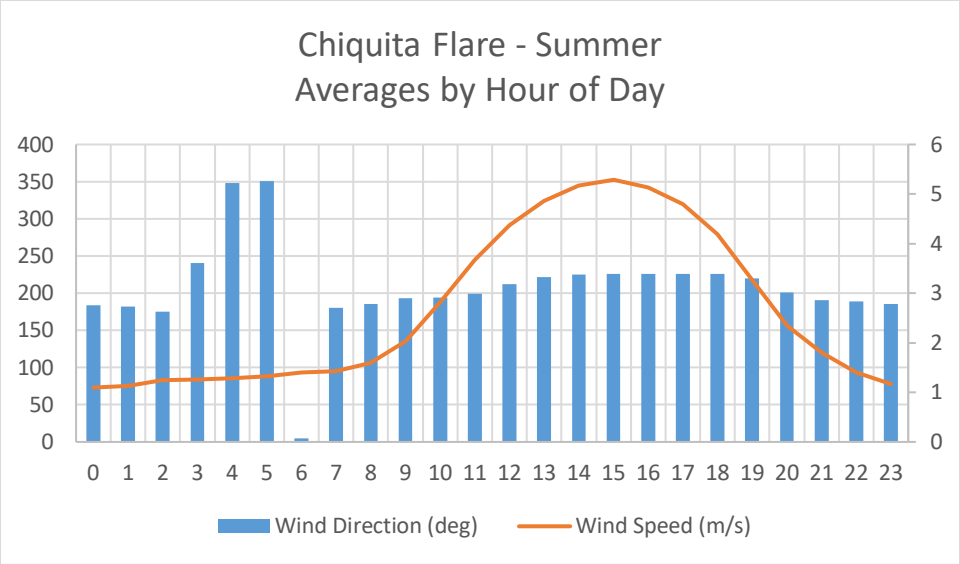


Figure B-14



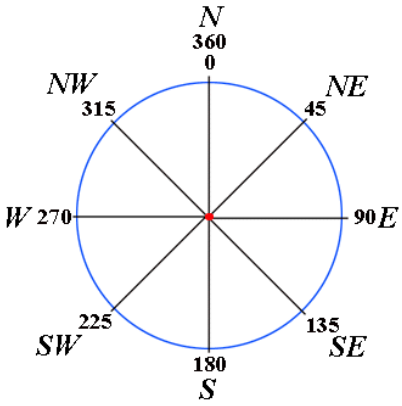


Figure B-15

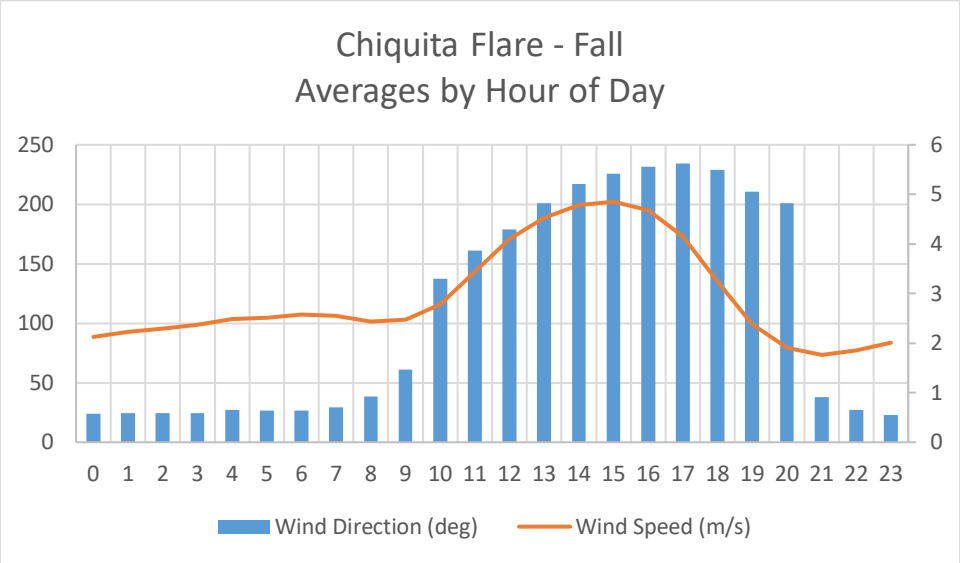


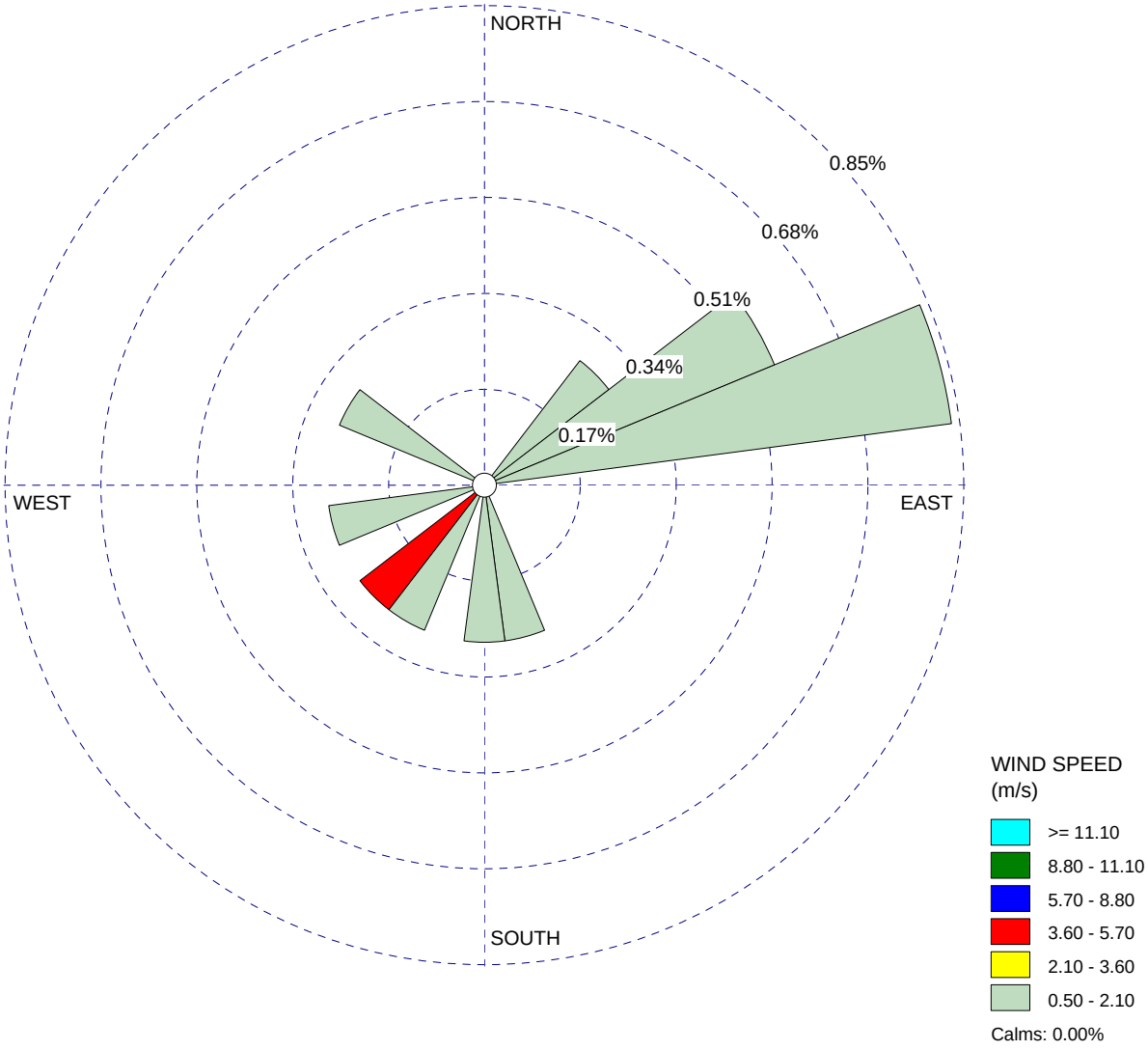
Figure B-16

WIND ROSE PLOT:

Station: Station 1 Location 1, 7 am - 12 pm

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 8/13/2020 - 01:00** **End Date: 8/27/2020 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.00%**	TOTAL COUNT: **12 hrs.**	
	AVG. WIND SPEED: **1.29 m/s**	DATE: **9/30/2020**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

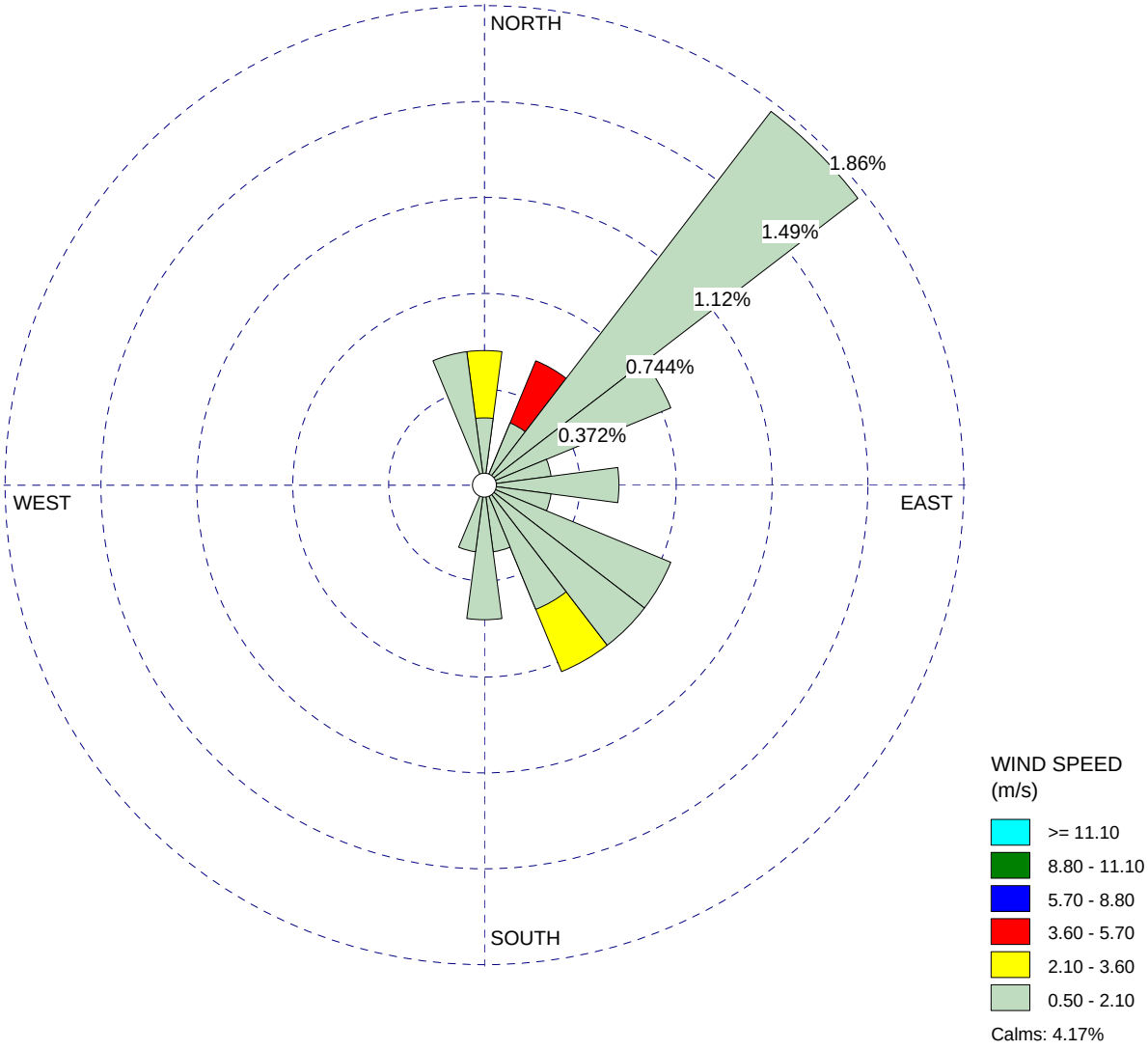
Figure B-17

WIND ROSE PLOT:

Station: Station 1 Location 2, 7 am - 12 pm

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 8/27/2020 - 01:00** **End Date: 9/11/2020 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **4.17%**	TOTAL COUNT: **49 hrs.**	
	AVG. WIND SPEED: **1.01 m/s**	DATE: **9/30/2020**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

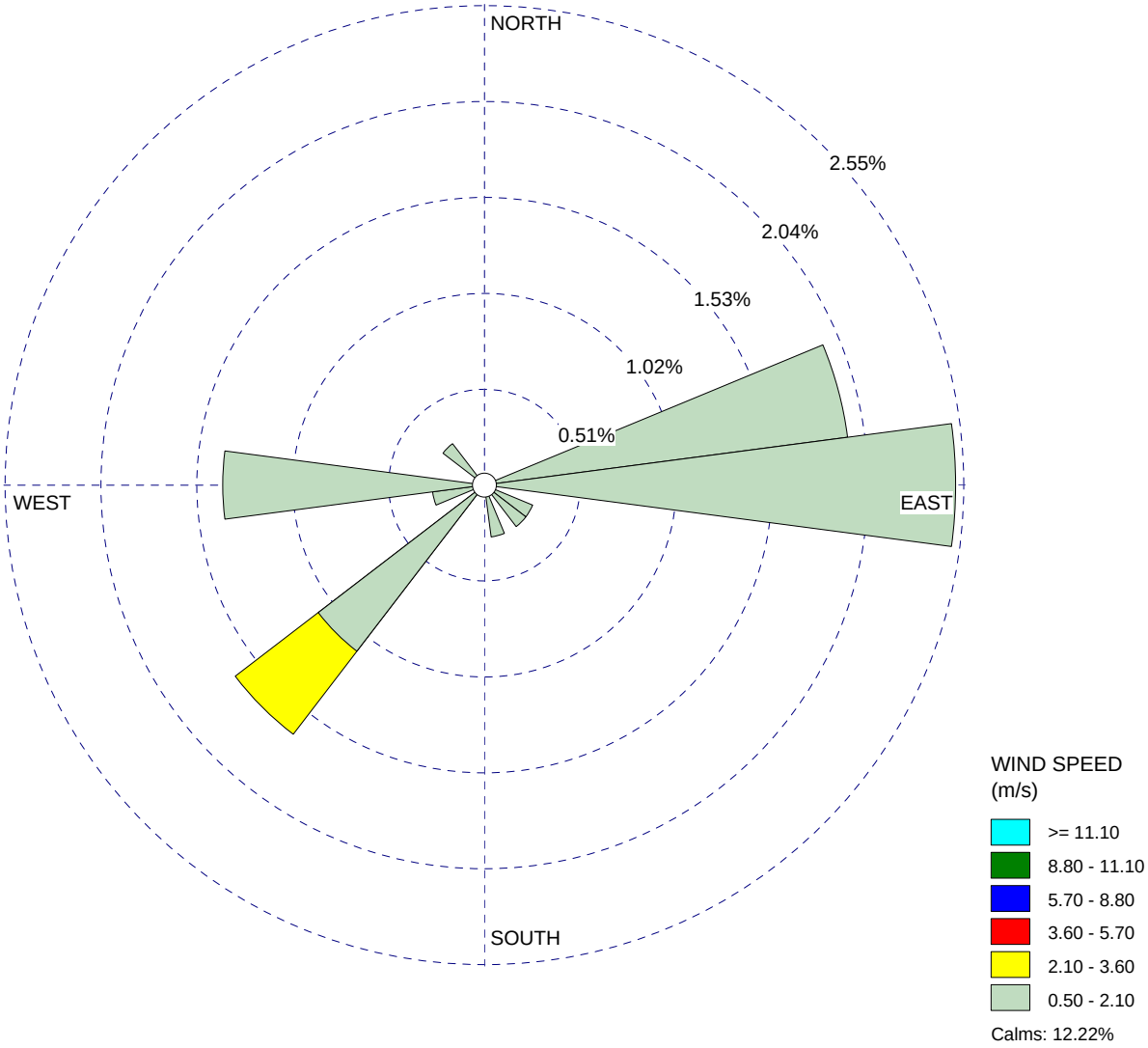
Figure B-18

WIND ROSE PLOT:

Station: Station 2 Location 1, 7 am - 12 pm

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 8/13/2020 - 01:00** **End Date: 8/27/2020 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **12.22%**	TOTAL COUNT: **76 hrs.**	
	AVG. WIND SPEED: **0.45 m/s**	DATE: **9/30/2020**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

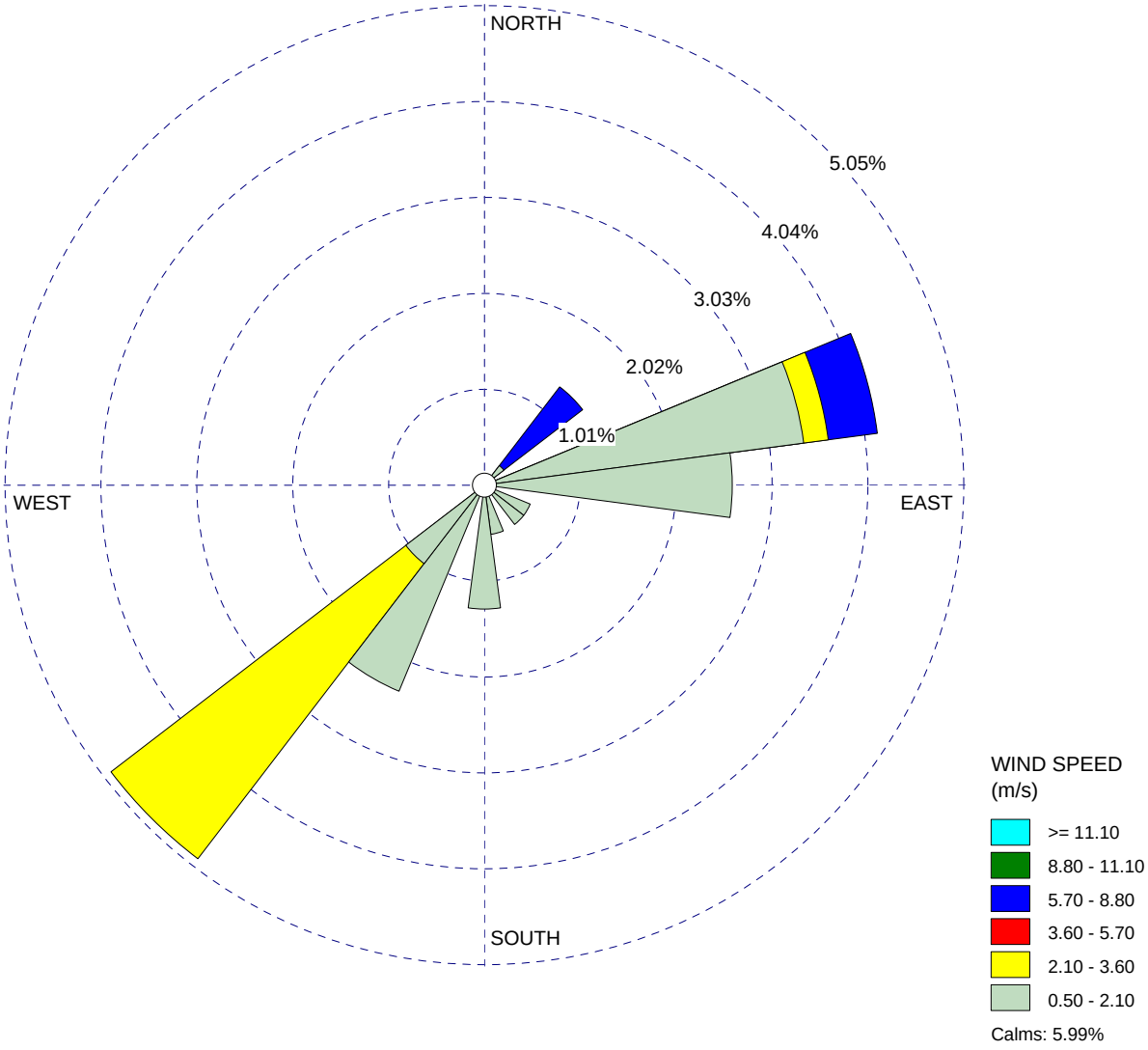
Figure B-19

WIND ROSE PLOT:

Station: Station 2 Location 2, 7 am - 12 pm

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 8/27/2020 - 01:00** **End Date: 9/11/2020 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **5.99%**	TOTAL COUNT: **93 hrs.**	
	AVG. WIND SPEED: **1.51 m/s**	DATE: **9/30/2020**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

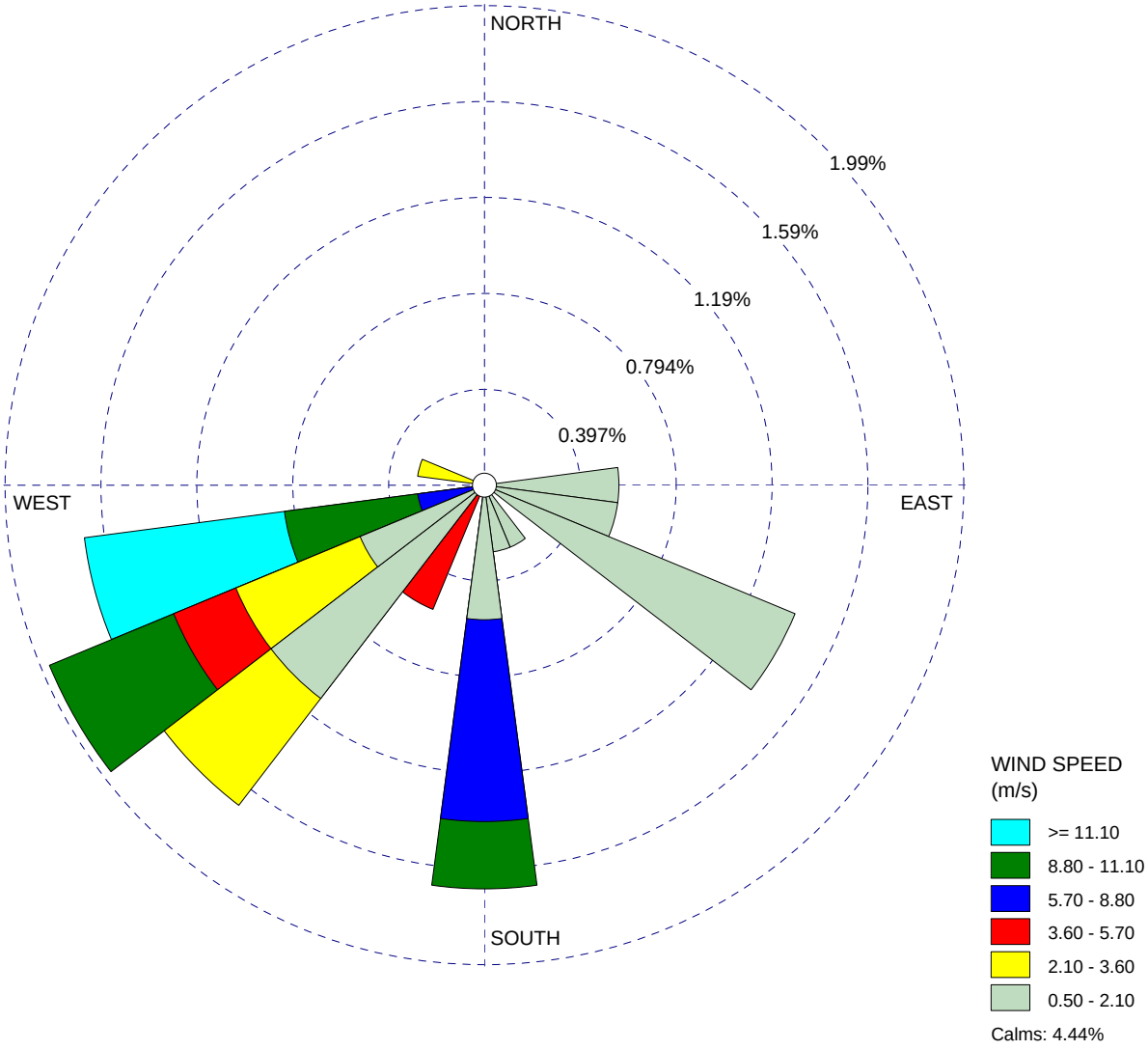
Figure B-20

WIND ROSE PLOT:

Station: Station 3 Location 1, 7 am - 12 pm

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 8/13/2020 - 01:00** **End Date: 8/27/2020 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **4.44%**	TOTAL COUNT: **55 hrs.**	
	AVG. WIND SPEED: **3.02 m/s**	DATE: **9/30/2020**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

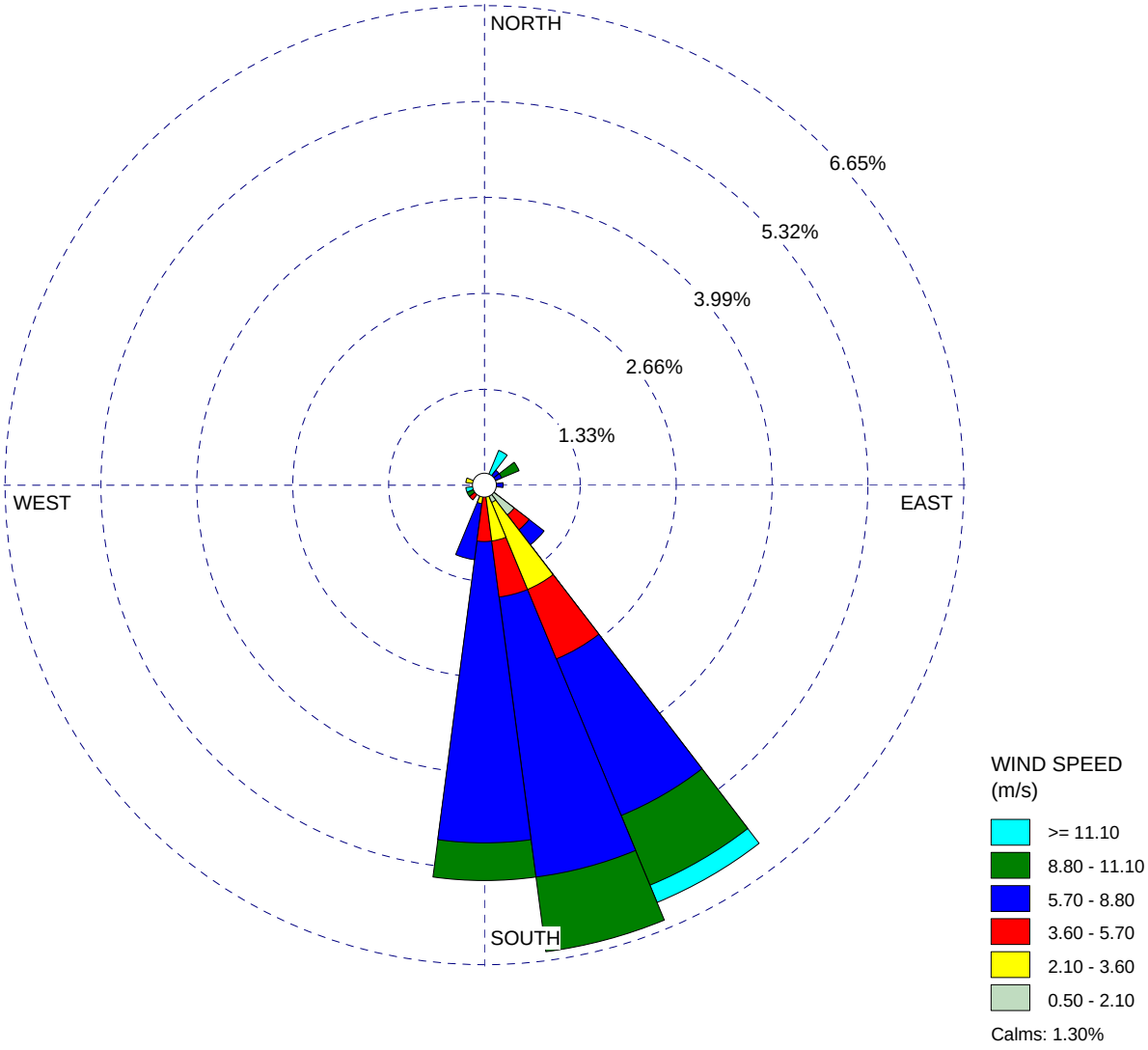
Figure B-21

WIND ROSE PLOT:

Station: Station 3 Location 2, 7 am - 12 pm

DISPLAY:

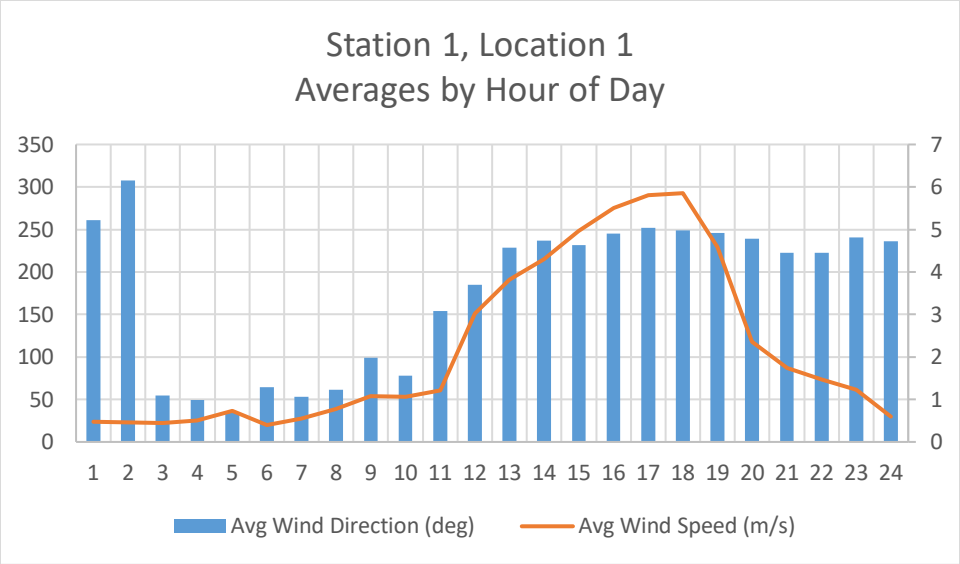
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 8/27/2020 - 01:00** **End Date: 9/11/2020 - 23:59**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **1.30%**	TOTAL COUNT: **93 hrs.**	
	AVG. WIND SPEED: **6.41 m/s**	DATE: **9/30/2020**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Figure B-22



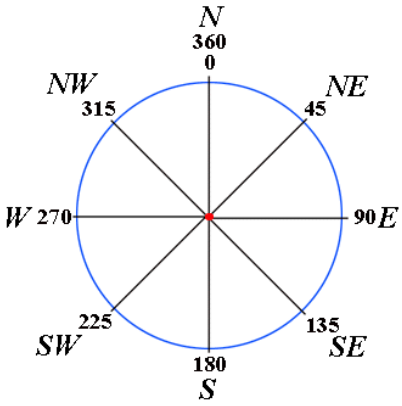


Figure B-23

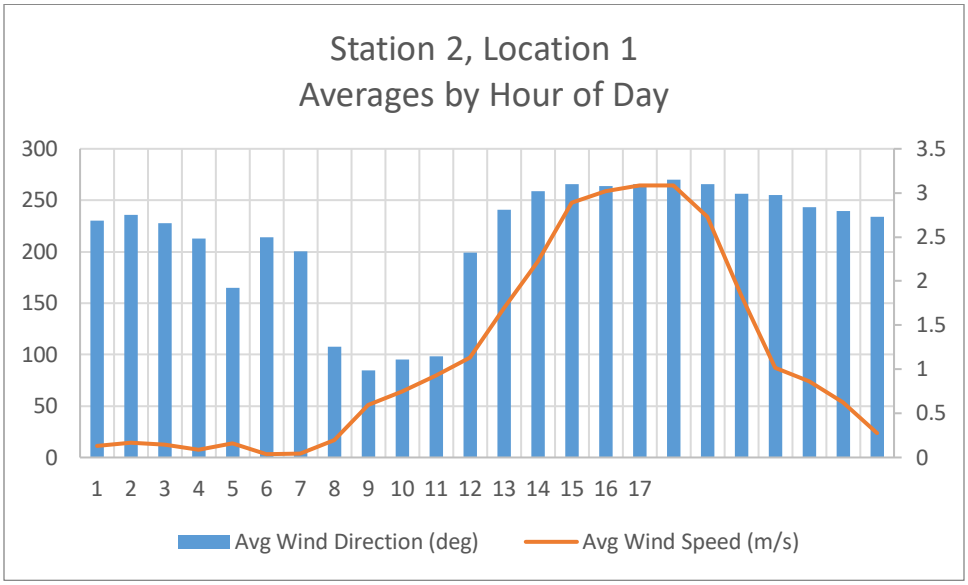
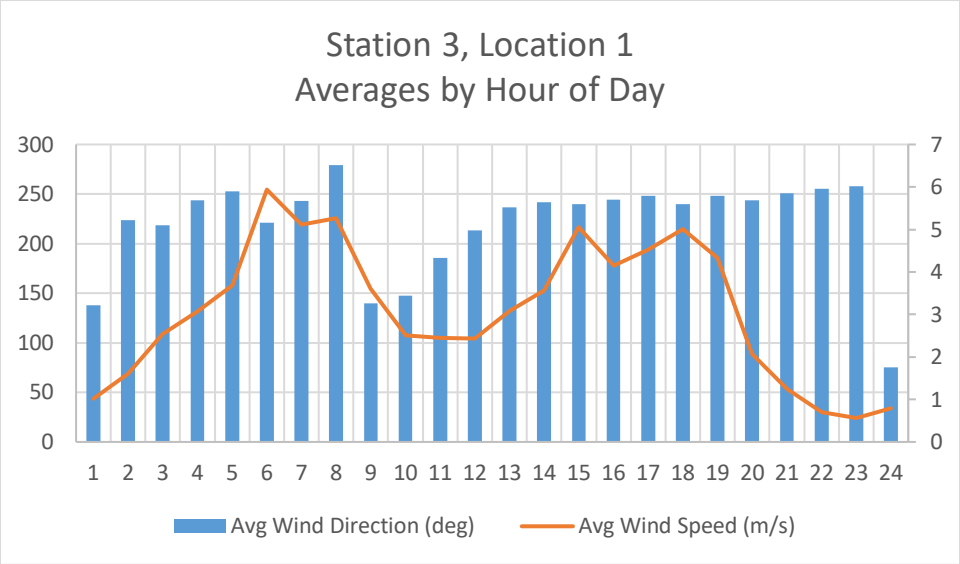


Figure B-24



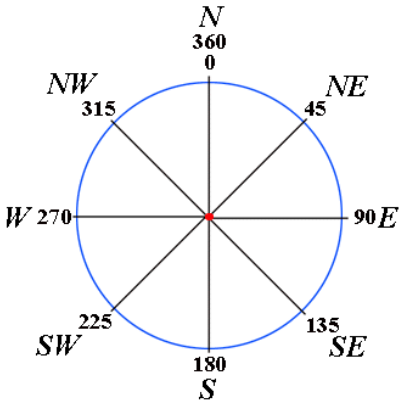


Figure B-25

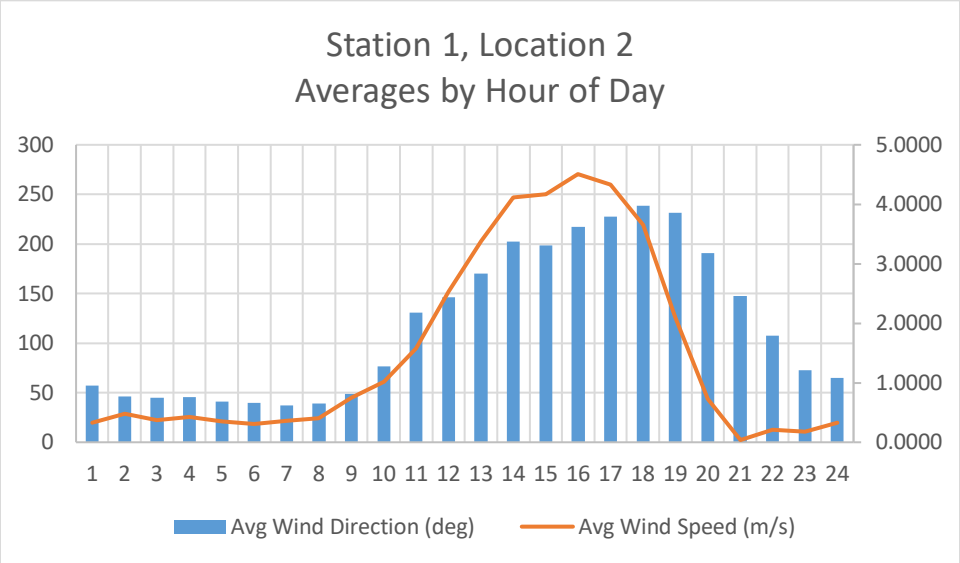
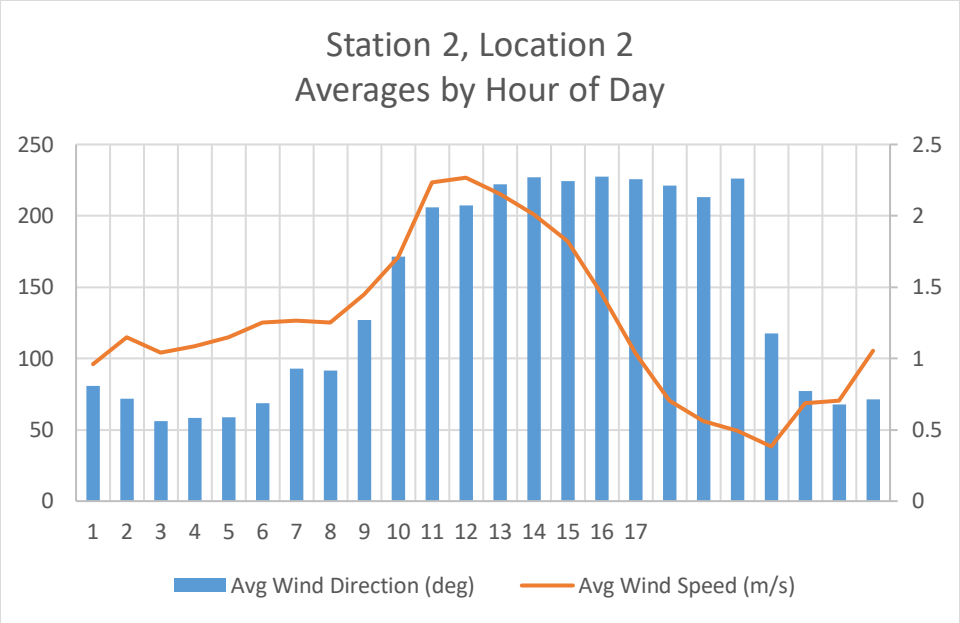


Figure B-26



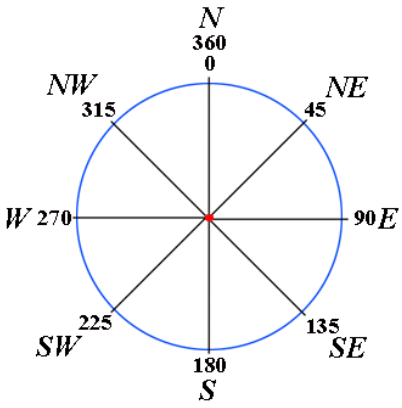


Figure B-27

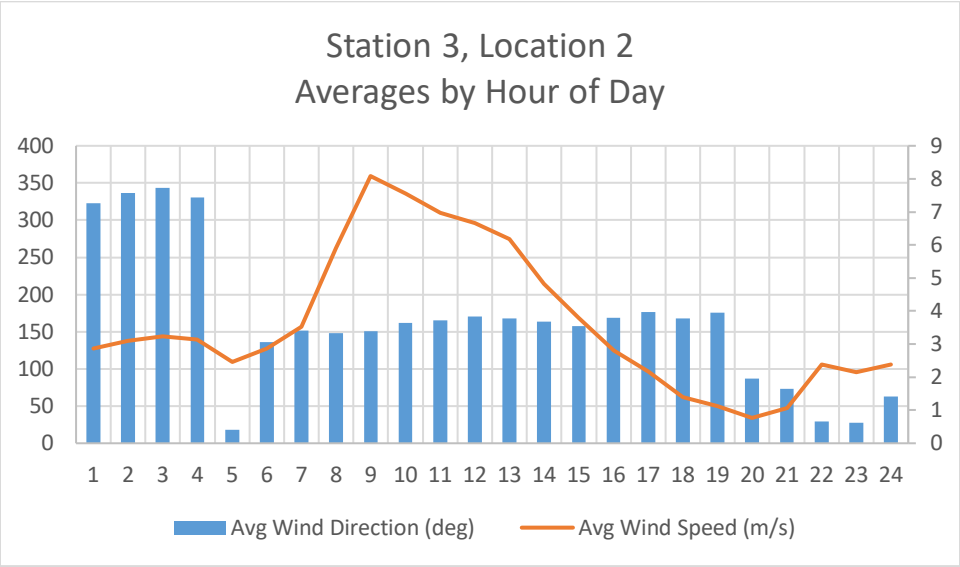


Figure B-28

Appendix C

Air Quality Monitoring Stations

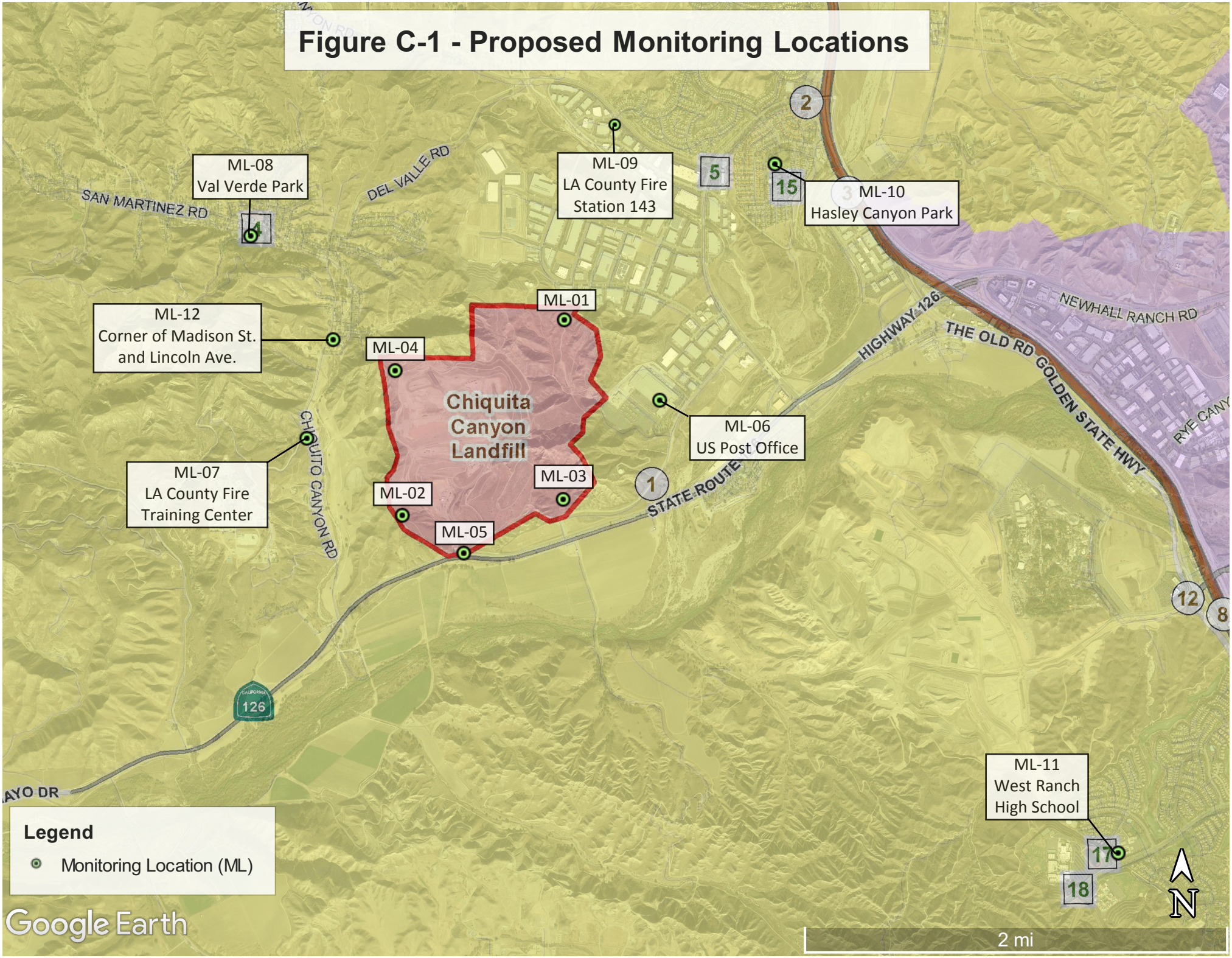


Figure C-1 - Proposed Monitoring Locations
ML-08
Val Verde Park
ML-09
LA County Fire
Station 143
ML-10
Hasley Canyon Park
ML-12
Corner of Madison St.
and Lincoln Ave.
ML-01
ML-04
Chiquita
Canyon
Landfill
ML-06
US Post Office
ML-07
LA County Fire
Training Center
ML-03
ML-02
ML-05
ML-11
West Ranch
High School
SAN MARTINEZ RD
DEL VALLE RD
CHIQUITO CANYON RD
HIGHWAY 126
NEWHALL RANCH RD
THE OLD RD GOLDEN STATE HWY
STATE ROUTE
Legend
Monitoring Location (ML)
Google Earth
2 mi
N

Appendix D

Blue Ridge Landfill Operations Study

CHIQUITA CANYON LANDFILL OPERATIONS REVIEW REGARDING ODOR ASSESSMENT

FINAL REPORT

Prepared For:

SCS Engineers
3117 Fite Circle, Suite 108
Sacramento, CA 95827

February 22, 2021

Blue Ridge Services Montana, Inc.
P.O. Box 1945
Hamilton, MT 59840
Telephone: (406) 370-8544

www.blueridgeservices.com

CONTENTS

INTRODUCTION

The Chiquita Canyon Landfill (CCL) is a large, regional landfill located at 29201 Henry Mayo Dr, Castaic, CA 91384. CCL has a permitted waste footprint of approximately 400 acres and its permit allows it to receive up to 2.8 million tons of solid waste and beneficial reuse material (combined) annually.

On December 9, 2020, a petition for a Stipulated Order for Abatement was heard. As of that date in 2020, the South Coast Air Quality Management District (AQMD) had received 220 verified complaints, alleging CCL as the source. Since July 2020, the AQMD issued 18 Notices of Violation (NOVs) against the CCL.

Starting in July 2020, the CCL has begun using an odor neutralizer at/near the working face to mitigate "fresh trash" odors. The odor neutralizer is being administered through a stationary network of misters, portable fans, and an onsite water truck. However, since September 22, 2020, (the date of the most recent NOV), the AQMD has continued to receive odor complaints, with more than 50 received in October. The number of complaints dropped significantly in November, but AQMD inspectors are continuing to investigate and have confirmed CCL as the source on several occasions.

In response to the Stipulated Order, CCL is required to continue using a consultant to manage, inspect, operate, and maintain the landfill gas collection system. Additionally, the CCL was required to retain a consultant to assess landfill operations regarding odor generation and release.

Blue Ridge Services Montana, Inc. (BRSMT) was one of the consultants hired to assess landfill operations. BRSMT, formerly Blue Ridge Services, Inc., has been providing operational consulting to solid waste operations since 1988.

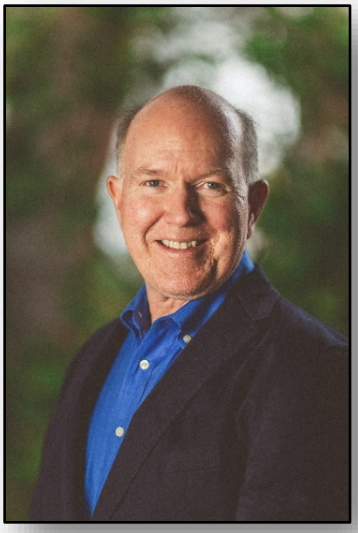
BLUE RIDGE SERVICES

Founded in 1988 by Neal Bolton, P.E., Blue Ridge Services is a professional consulting firm specializing in solid waste operations and efficiency improvement, facility management, planning, online media training, onsite training, and environmental monitoring/maintenance. In 2020, Blue Ridge Services, Inc. began operating as a Montana Corporation, Blue Ridge Services Montana, Inc. (BRSMT).

At its core, our team of engineers and operational experts is about one thing: the practical application of process improvement. Whether it is improving a landfill's airspace consumption, increasing safety at a materials recovery facility (MRF), or conducting onsite training at a transfer station, our team is grounded in decades of operational experience and a strong background in process improvement tools, practical experience, and common sense. Learn more on our website: www.blueridgeservices.com.

ENGINEERING CERTIFICATION

Neal Bolton: Experience and Background



I have been involved in the heavy construction and solid waste industry for more than 43 years, and during that time have worked at more than 500 landfills throughout the U.S., Canada and abroad.

- Registered Civil Engineer C48062
- Licensed Class A Contractor 0482821
- Licensed Timber Operator B11030 / B012349
- Author: The Handbook of Landfill Operations
- Author: The Handbook of Landfill Safety
- Author: Process Improvement for Solid Waste Operations
- Author: More than 250 articles on solid waste operations
- Expert Witness – 60+ Solid Waste Cases (U.S.)
- Taught 20+ Classes for CalRecycle on Minimum Compliance Standards for landfills
- 25-year Faculty: Solid Waste Association of North America (SWANA), Instructor of 20+ MOLO classes throughout the U.S.

Engineering Certification

The following report contains calculations, analyses and opinions regarding operational practices and odor mitigation options for the Chiquita Canyon Landfill.

Standard of Care

Services performed for this project have been conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in this area under similar budget and time constraints. This is my professional responsibility. No other warranty expressed or implied is made.

February 22, 2021
Date

Vincent Neal Bolton, P.E. C48062
Blue Ridge Services Montana, Inc.
601 Kelly Ridge Road
Victor, Montana 59875
805-610-5544
neal@blueridgeservices.com

EXECUTIVE SUMMARY

The Chiquita Canyon Landfill (CCL) receives an average of approximately 8,000 tons of municipal solid waste per day. Verified odor complaints from downwind residents have resulted in the CCL receiving several Notices of Violation (NOVs) from the South Coast Air Quality Management District (AQMD). Consequently, the CCL was instructed to hire a consultant(s) to perform an assessment of the CCL operation, regarding odor control practices.

In performing the operational portion of that assessment, we determined that CCL has in fact implemented a number of measures to help mitigate potential odors. Some of those measures have been effective, but others have not, mostly because they have not been applied correctly, or on a consistent basis.

We believe that CCL has many of the tools required to control potential odors and has begun implementation of some of the operational practices. But we also suggest that more can be done to ensure consistent and effective application of those tools and practices.

To address this issue, we suggest CCL formalize their odor control practices by developing written Standard Operating Procedures (SOPs) and providing recurring training for all staff. Concurrently, we recommend CCL perform additional work to characterize their inbound waste stream, with a primary focus on categorizing individual loads/customers/sources as potentially odorous, low-odor, or non-odorous. We also recommend CCL establish a separate Odor Control Zone (OC Zone) where odorous loads can be dumped, processed, and covered promptly. We further suggest CCL develop strict guidelines for handling and promptly covering all waste, particularly re-directed odorous loads, and applying neutralizer. We also recommend CCL tie these efforts together by assigning a field-based "Odor Control Supervisor" to direct all onsite odor control operations. Finally, we suggest CCL establish a set of Key Performance Indicators (KPIs) to track odor control efforts and to help adjust implementation on an on-going basis.

GOALS

As part of the consultant team hired in response to the Stipulated Order (Case 6177-1), our team was specifically assigned to address conditions 18 d-k. Accordingly, our goal was to evaluate the inbound waste stream, assess how various landfill activities are currently being conducted, determine the effectiveness of those practices (regarding odor control), and identify operational changes that can help to reduce the future potential for landfill odors.

APPROACH

We approached this project in the same general way we perform all operational assessments, following the normal and accepted *Process Improvement* steps of DMAIC, an acronym for:

- **D**efine.
- **M**easure.
- **A**nalyze.
- **I**mprove.
- **C**ontrol.

Specifically, we performed the following:

Data Collection

We began our research by submitting a Request for Information (RFI) to CCL, seeking background data on inbound waste tonnage, verified odor complaints, and wind conditions. It has been our experience that a careful examination of these simple factors will often show subtle – or sometimes obvious – correlations. These patterns, when identified, can sometimes point the way to solutions.

Onsite Assessment

We also spent approximately 2½ days onsite to assess site conditions, observe the landfill's operational practices, and better understand how those practices might be improved to reduce the potential for odor generation and release. During our time onsite, our team spoke with landfill staff, took many photos, and several hours of video – including drone-based aerial video. We also closely evaluated the waste stream, paying particular attention to materials that were producing detectable odors.

Review and Evaluation

During and after data collection and our onsite assessment, our team spent several weeks addressing the tasks listed in Sections 18d-k.

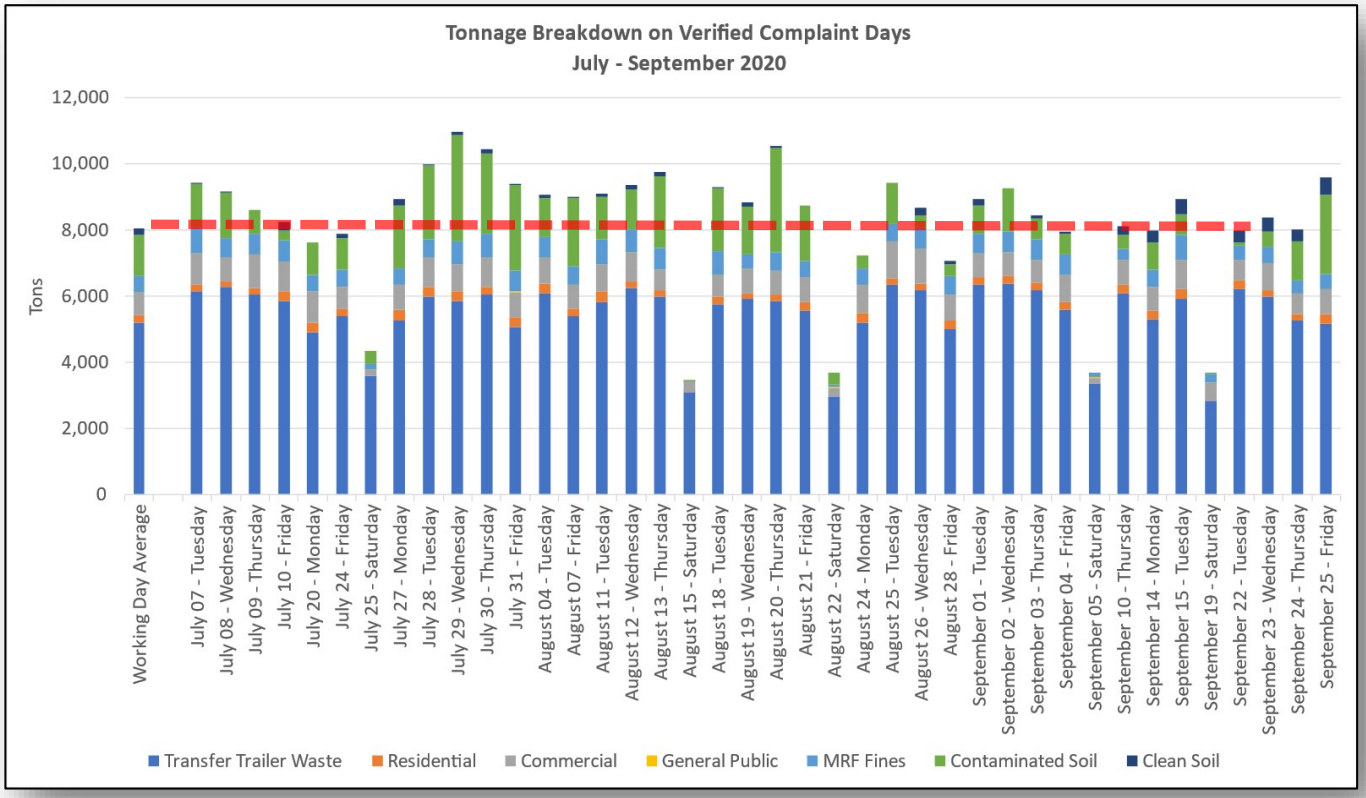
Our subsequent findings and recommendations are presented on the following pages.

18D ASSESSMENT OF WASTE STREAM

Onsite assessment for odiferous waste streams and waste stream combinations that includes a profiling of known waste streams, and a characterization of the total mix and any notable interactions between waste streams.

We requested and received load-by-load transaction data from CCL scale records to cover our 3-month evaluation period (July-September). This allowed us to understand weekly, daily, and hourly waste tonnage trends. We sorted the tonnage information in several different ways, looking for correlations between inbound waste tonnage and dates/times of verified odor complaints. Along that line, we evaluated tons per hour (tph) for all waste, for individual types of wastes, and even sorted within individual types of waste to identify and isolate certain types of potentially odorous loads.

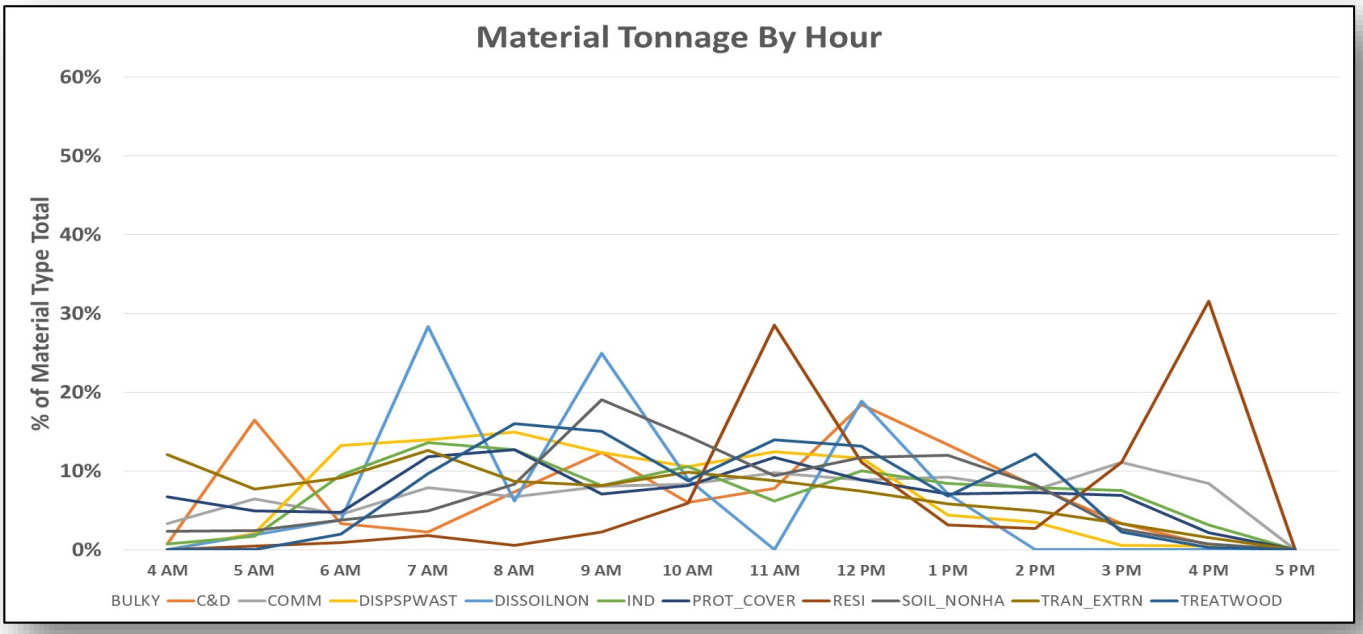
We first compared overall inbound daily tonnage to verified complaint days to see if there was a correlation. As shown in this chart (See Following Page), we pulled total tonnage on days with verified complaints. Also shown is the annual average daily tonnage (the red line). At first glance, it appears that odor complaints occur on above average (tonnage) days, but under further review, this did not hold up. First, higher tonnage is often seen in third quarter, as the construction season peaks, but southern winds may also be more common during this time. We also determined that the higher tonnage days were a result of increased volumes of soil and transfer waste – neither of which tend to exhibit significant odors. For those reasons, we do not believe there is a substantive correlation between total inbound tonnage and verified odor complaints.



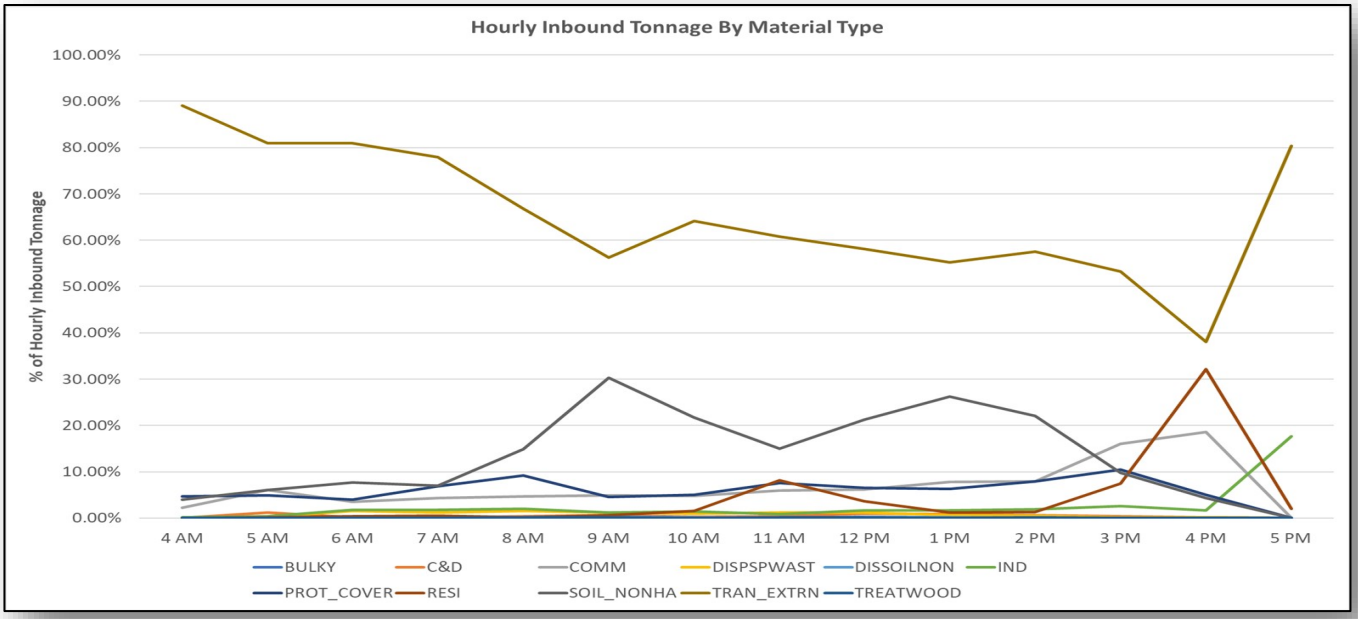
Tonnage Breakdown on Verified Complaint Days

Digging deeper, we also evaluated inbound tons per hour to see if there appeared to be a correlation with the actual time of verified odor complaints. As previously discussed, verified complaints begin around 7:00 am, peak at 8:00 – 9:00 am, and then decrease by 11:00 am. Another small spike occurs between noon and 1:00 pm.

However, we failed to find a correlation between overall inbound tonnage and verified odor complaints, even when looking at hourly tonnage (See Figures Below)



Material Tonnage by Hour - shown as percent of each type received per hour

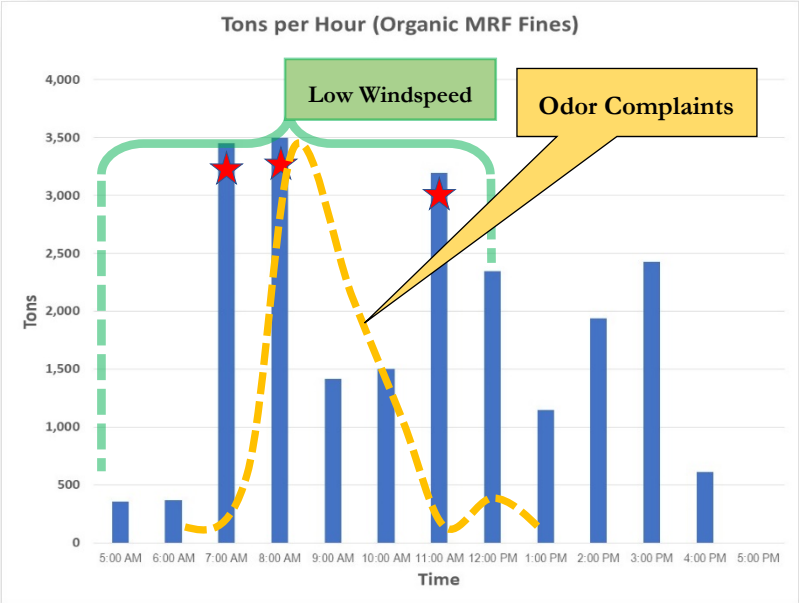


Hourly Inbound Tonnage by Material Type – shown by weighted percent of each hour's tonnage

However, our onsite observations indicated that some of the loads categorized as *Prot_Cover* (aka. MRF Fines) contained a significant quantity of putrescible organic material. These particular loads exhibited strong, detectable odor.

So, we re-sorted the tonnage data to isolate only those *MRF Fines* loads that contained a high quantity of organics, including what appeared to be some food waste.

We then charted cumulative hourly subtotals of the organic *MRF fines* tonnage received during our 92-day evaluation period to show a relative hour-by-hour pattern. In doing so, we found that some of those peak hours, when verified odor complaints were logged did appear to correlate.



Tons per Hour (Organic MRF Fines)

A more detailed onsite evaluation would be required to confirm a correlation. Additionally, and a day-by-day analysis of organic MRF fines and verified odor complaints should also be performed.

> *Note: The hours shown in this chart are recorded at the scale. After leaving the scale, those trucks must travel to the active face and dump their loads. Then odors from those loads would need to travel to Val Verde to result in a detectable odor. We estimate this may take approximately 1 hour – depending on dumping location and windspeed.*

Accordingly, odors from the peak times (marked with red star) for this material, could reach Val Verde between 8:00-10:00 am, and again at noon. Please note that these peak times correlate to the times when verified complaints were logged (See Yellow Dashed Line – Not to Scale), arriving as verified complaints approximately 1 hour after being logged at the scale.

Further, even though loads of this organic *MRF fines* material continued to enter the landfill in the afternoon, by that time, we suspect the windspeed may have begun to increase (See Green Range) to a point that any potential odors were much less likely to reach Val Verde.

18E IDENTIFY POTENTIALLY ODOROUS LOADS

Onsite assessment of when odorous wastes are received at the landfill.

As noted under section 18d, our team spent 2½ days onsite to scan various waste types for those that were noticeably more odorous. Based on those observations, we determined that most loads did not exhibit strong odor.

> *Note: It has been our experience that fresh waste odors – associated with inbound loads of trash – do not travel far from the source, when compared to odors from landfill gas emissions. This occurs for two reasons:*
>
> - *First, most inbound loads do not contain a high percentage of putrescible waste, the primary source of odors.*

- *Second, the volume of individual loads simply does not generate the quantity of odor that can travel very far without being diluted or oxidized.*

However, landfills in general find that some wastes, especially those that may contain waste-water treatment sludges, food waste, or other organics that have begun decomposing, can produce enough odor that it can be detected by downwind receptors. CCL does not accept sludges, biosolids, bulk food waste, or dead animals.

During our time onsite, we carefully scanned inbound waste types to determine which ones may be contributing to verified odor complaints. Here is a summary of our observations, listed by CCL's waste categories as identified by the scale records.

BULKY: Bulky Wastes represent materials such as bulk concrete, boats, large pipes, RV campers, and other items that cannot be easily handled in the normal manner of regular solid waste. Bulky wastes do not include putrescible wastes.

C&D: Construction and Demolition waste is generated by the building construction industry. C&D may come from new construction or remodeling projects. C&D often contains scrap lumber, sheetrock, metal, glass, plumbing pipes and fixtures, electrical supply scrap, shingles, broken concrete, and other similar debris. C&D, by definition, does not include putrescible wastes.

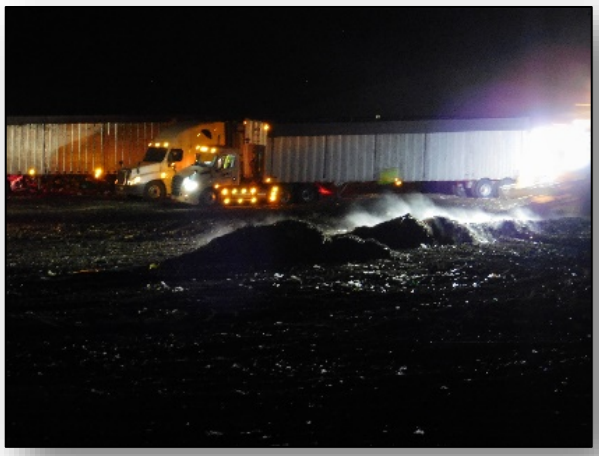
COMM: Commercial waste is typically generated by businesses that may include offices, hotels, restaurants, retail stores and other commercial operations. Most commercial waste arrives in roll-off boxes or front-loader (compactor) trucks. Some commercial loads, particularly those from restaurants may contain putrescible waste materials, mixed with unrecyclable paper or cardboard, and packaging materials.

DISPSPWAST: Special wastes are defined as wastes which require special handling.

DISSOILNON: This category includes clean soil and any other soil that does not contain hazardous levels of contaminants.

IND: Industrial waste is generated at industrial facilities and may include agricultural wastes, manufacturing scrap, and other industrial wastes.

PROT COVER: This category typically includes wastes classified as MRF fines. Depending on the type of MRF, this material may vary widely in its composition and potential for producing odor. C&D MRF fines typically include dirt, sawdust, and small pieces of wood and shingles, glass, and small pieces of sheetrock. The gypsum in sheetrock debris may generate hydrogen sulfide (H_2S) if wetted and accumulated in adequate concentrations. No detectable levels of H_2S were identified during our site visit, nor did CCL staff indicate that it was associated with any potential odors at CCL. MRF fines from single stream or dual stream recycling facilities may include bits of glass, paper, dirt, plastic, and small quantities of organic material. In most cases, fines from these types of MRFs do not contain enough putrescible waste to generate odors. We detected no significant odors from any of these fines.



PROT Cover

However, another waste material that was categorized under MRF fines, appeared to have very significant quantities of organic materials. During our time onsite, we found this material to produce a very strong odor.

When a load of this material was observed arriving before sunrise, steam is visible rising from this load, apparently because of active decomposition. In the daylight this material was clearly observed to contain a high percentage of organics. Surface temperature measurements indicated this material was considerably warmer (26°) than surrounding ground surface – another clear indicator of active decomposition in these organic-rich loads.

Load with Active Decomposition

RESI: Residential waste is generated from residential routes. In some locations, residential waste can contain a high percentage of organic materials. However, because of California's strict recycling efforts, most putrescible waste (i.e., green waste and food waste) will usually be placed into a green waste bin, and thus not be included in residential loads. We did not observe (or smell) any residential loads with a high level of putrescible waste, but on a route-by-route basis, it is possible that some residential loads could potentially contribute to odor.

Higher Temperatures Showing Active Decomposition

SOIL_NONHAZ: This category includes all soil and related aggregate materials (e.g., gravel) that does not include any hazardous materials or characteristics.

TRAN_EXTRN: Waste material logged under this category include all inbound transfer loads from external transfer stations. Some transfer loads are mostly C&D, while others consist of more residential / commercial waste. However, based on discussions with CCL staff – and our own observations –this material does not appear to contain enough putrescible waste material to produce much odor.

TREATWOOD: This category of waste includes wood and manufactured wood products that have been treated. By definition, this category does not include putrescible wastes.

We also observed what appeared to be residual material from wood grinding or compost screening being applied on intermediate landfill slopes for erosion control and dust control. Onsite observations during this project – and during many previous onsite visits – indicate that while this material may have a slight organic, woody odor, it does not contribute enough volume, nor is it expected to lead to downwind odor complaints. To the contrary, we believe it may actually act as a sort-of biofilter to help moderate any odorous landfill emissions.

In addition to discussions with CCL staff and our own onsite observations, we determined the majority of waste loads do not contain putrescible, odorous materials. As a cross-check, we also evaluated inbound waste based on hourly tonnage and waste category (See Table Below).

Wood Waste Applied for Erosion Control

Most of the waste received at CCL consists of C&D, dry waste, soil, and other non-putrescible wastes. Wastes that represent more than 5% of any waste type during any hour are highlighted yellow. Please note that within the time range when the windspeed is potentially capable of transporting odors (before noon – marked with red dashed line), the only waste streams with the potential to contain some putrescible wastes are commercial (COMM) and residential (RESI). Further, we did identify that a third category, MRF fines (PROT_COVER), did contain putrescible (and odorous) waste. Each of these wastes is marked with a red star. Based on discussion with CCL staff, our onsite observations, and review of inbound tonnage data, the other waste materials received before noon are less likely to contribute to odor complaints, although select transfer truck loads may contain some putrescible waste. Further site assessment will be required to determine which source transfer stations may be sending potentially odorous loads that may also need to be processed in a manner that reduces odor generation and release.

We also observed a number of transfer trucks (up to 12) waiting in a queue at the start of the day. Hourly tonnage data indicate that this is a common occurrence. And, while much of this initial surge of waste may be relatively low-odor material, that magnitude of waste could be creating a potential odor burp first thing in the morning.

Sum of QUANTITY	Column Labels										
Row Labels	C&D	COMM	DISPSPWAST	DISSOILNON	IND	PROT_COVER	RESI	SOIL_NONHA	TRAN_EXTRN	TREATWOOD	Grand Total
4 AM	0.04%	2.19%	0.00%	0.00%	0.11%	4.66%	0.00%	4.00%	89.00%	0.00%	100.00%
5 AM	1.19%	6.04%	0.29%	0.04%	0.38%	4.86%	0.20%	6.01%	80.99%	0.00%	100.00%
6 AM	0.20%	3.54%	1.59%	0.06%	1.76%	3.93%	0.34%	7.67%	80.90%	0.02%	100.00%
7 AM	0.10%	4.33%	1.17%	0.32%	1.76%	6.85%	0.47%	7.00%	77.94%	0.08%	100.00%
8 AM	0.39%	4.65%	1.56%	0.09%	2.06%	9.19%	0.18%	14.91%	66.82%	0.16%	100.00%
9 AM	0.58%	4.94%	1.14%	0.31%	1.17%	4.57%	0.63%	30.32%	56.20%	0.13%	100.00%
10 AM	0.27%	4.82%	0.92%	0.10%	1.43%	4.97%	1.59%	21.68%	64.13%	0.07%	100.00%
11 AM	0.37%	6.00%	1.16%	0.00%	0.89%	7.56%	8.14%	15.04%	60.72%	0.12%	100.00%
12 PM	0.99%	6.21%	1.23%	0.27%	1.65%	6.56%	3.61%	21.28%	58.07%	0.13%	100.00%
1 PM	0.86%	7.77%	0.56%	0.12%	1.67%	6.27%	1.23%	26.22%	55.21%	0.08%	100.00%
2 PM	0.64%	7.89%	0.55%	0.00%	1.92%	7.93%	1.29%	22.10%	57.50%	0.18%	100.00%
3 PM	0.37%	16.04%	0.13%	0.00%	2.54%	10.43%	7.44%	9.80%	53.20%	0.05%	100.00%
4 PM	0.10%	18.58%	0.15%	0.00%	1.63%	4.98%	32.13%	4.31%	38.10%	0.01%	100.00%
5 PM	0.00%	0.00%	0.00%	0.00%	17.65%	0.00%	1.96%	0.00%	80.38%	0.00%	100.00%
Grand Total	0.46%	5.96%	0.90%	0.12%	1.40%	6.26%	2.76%	15.42%	66.65%	0.08%	100.00%

Inbound Waste Based on Hourly Tonnage and Waste Category

To mitigate the potential impact, we suggest first, that these initial loads be carefully screened to identify odorous loads, which can be sent to the OC Zone. We then suggest that the tonnage remaining at the Normal Fill Area be contained to the smallest operationally-practical footprint. Neutralizing agent should be sprayed in these areas and if necessary, some cover soil or ADC should be applied to minimize the potential impact. Again, we recommend that this early morning surge of waste receive a more aggressive effort to control odors.

It has been our experience at numerous other landfills, that odor mitigation is accomplished most effectively by isolating odorous loads and dealing with them aggressively. Shifting the arrival time is often less effective and only has the result of shifting the potential time(s) for complaints.

18F FILL SEQUENCING PLANNING

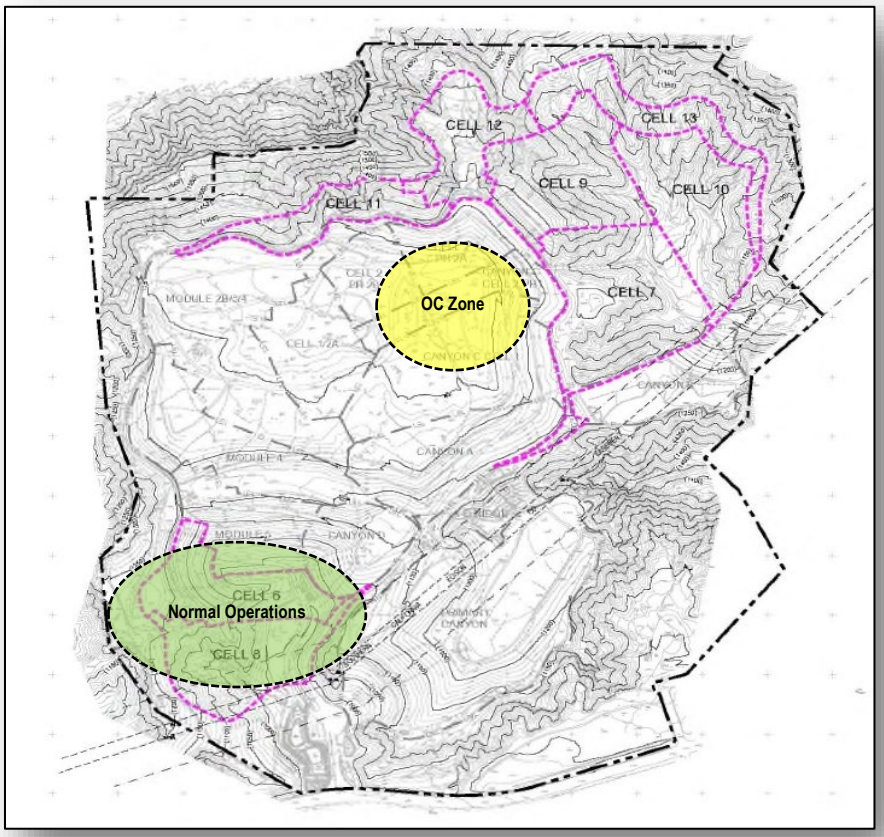
Onsite assessment of fill sequencing and timing.

Through our review of CCLs projected site planning and our onsite observations, we believe some modifications to the fill sequencing pattern may help reduce the generation and release of odors.

Fill sequencing planning falls under two categories, long-term (macro) planning, and short-term (micro) planning.

Macro Fill Sequence Planning

We suggest that the long-term sequencing proposed by CCLs Master Development Plan – Fill Sequence Plans, is reasonable and can be utilized while effectively controlling odor generation and release. We recognize that CELL 6 and CELL 8 are near the western edge of the waste footprint, and that odors from these cells potentially could have direct access to Chiquita Canyon Road. However, we believe a workable solution is to split the operation, but in a purposeful and controlled way.



Split Operation

Under the current system, waste is directed away from the western edge of the landfill to the center of the landfill footprint when certain wind conditions exist, but without regard to the odor potential for individual loads. Additionally, we observed some odorous material being spread and blended with the overall inbound waste stream. This is not an effective way to control odors from individual loads.

We propose a split operation that would continue to allow the filling of CELL 6 and CELL 8, but only with low/non-odor wastes, while directing potentially odorous loads to another location to the northeast, near the center of the waste footprint.

We believe this proposed scenario is workable – for a number of reasons.

First, based on our observations, only a portion of the waste stream entering CCL appears to be odorous. This means we can conduct landfill operations for odorous loads within what we have labeled as an Odor-Control Zone (OC Zone) using more aggressive odor control practices – while continuing to fill the potentially more susceptible areas with low/non-odor waste material.

Yes, establishing a separate fill area would increase operating costs, and may require additional equipment and labor, but we believe it will be an effective way to control odors because CCL can focus their odor control effort on a smaller daily volume of trash, rather than trying to mitigate odors across the entire inbound waste stream, as is currently being done.

Second, this separate fill area would not require frequent movement of tippers. Our onsite observations seem to indicate that most potentially odorous loads arrive in self-unloading trucks – including some live-floor transfer trucks. So, because the odorous loads do not arrive in (tipper) transfer trucks, the tippers could remain at the normal fill area, while any self-unloading trucks that contain potentially concentrations of odorous materials could dump in the OC Zone. Avoiding frequent movement of tippers is desirable because it allows much greater flexibility to respond quickly if/when odorous loads are detected.

The logistics of this will need to be worked out during a more comprehensive onsite review of odor potential for inbound loads. To work most effectively, the determination of whether a load is odorous will often require communication between the driver and CCL scale attendant, and the Deck Commander (aka Traffic Director).

We also advise that CCL provide odor detection training for frequent CCL customers regarding how to recognize potentially odorous loads, and how to notify CCL staff when they are sending in a potentially odorous load.

We expect the percentage split between the two fill areas will vary seasonally, and even day-to-day as truck contents may vary from one route to another. Based on our current understanding, we do not know what the ratio of loads that are odorous vs. non-odorous. More field assessment and correlation with scale data will be required to make that determination.

Micro Fill Sequence Planning

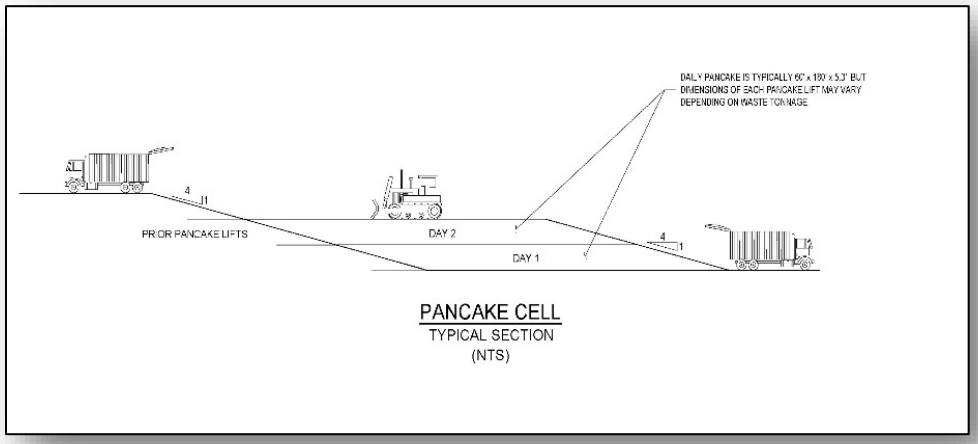
During our time onsite, we did not see evidence of standardized daily cell construction. Granted, our time onsite was a 2½-day snapshot, but none-the-less, we believe the CCL would benefit from a more structured cell construction system. Such a system should be designed around the goal of minimally-processing odorous loads, reducing the area of exposed waste, and frequently covering those materials.

As previously stated, this will be easier to do if we split the operation so that CCL staff can focus odor control practices only on the waste stream that is generating odor.

It would also be necessary to create detailed (micro) fill sequence plans to ensure that the individual fill areas of this split operation are able to accommodate the respective tonnage, traffic, and airspace volume of each area.

Specific goals for both fill areas would be to design a customized daily cell construction process that could accommodate the inbound tonnage with:

1. Minimum waste surface area using an advancing face or pancake cell operation.
2. Appropriate odor controls which may include wind flow disrupters and neutralizer.
3. Periodic, as-needed cover placement.
4. Daily cell geometry that will enhance odor control efforts.

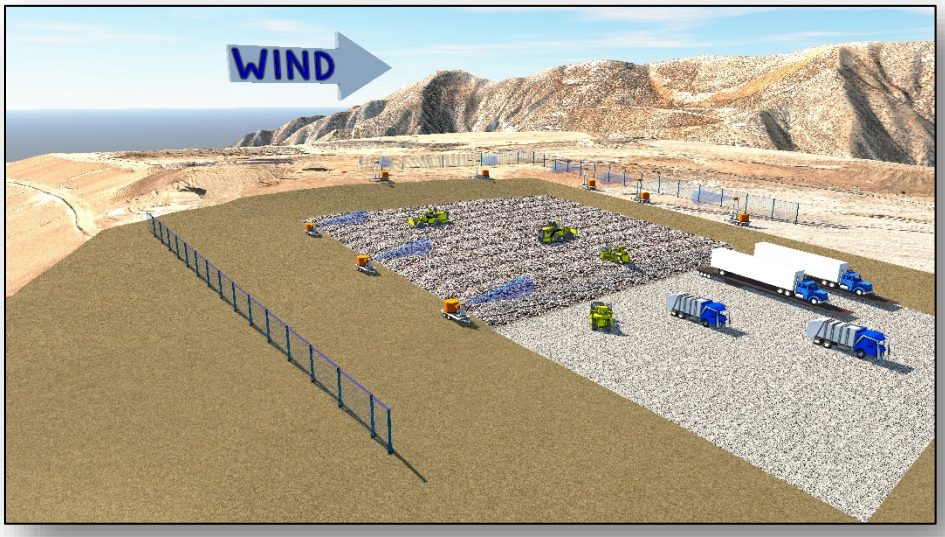


Pancake Cell Method

These criteria should of course, be more comprehensive at the higher priority OC Zone.

We have presented a conceptual layout of the OC Zone (See Below), based on key factors we believe will help mitigate odors. This zone would have disrupter fences designed specifically to create wind vortices to aid in mixing odors with neutralizer and increasing oxidation (as previously described). There would also be neutralizer emitters on both the immediate upwind and downwind edges of the active fill area.

We anticipate these higher odor-potential wastes would be covered more frequently throughout the day, especially before noon, when wind conditions have a higher potential to generate and transport odors. Finally, the OC Zone fill area would utilize daily cells designed specifically to receive the estimated quantity of inbound waste while minimizing the surface area of exposed waste.



OC Zone Fill Area

Note: These proposed concepts would need to be designed and field verified. It is also likely that staff training would be required to ensure understanding. Finally, we would suggest key performance indicators (KPIs) be tracked to ensure good compliance. These KPI's may include tracking

fuel utilized by each fan, logging neutralizer consumed each day. We recommend the specific KPI's be developed during an onsite implementation period.

18G WASTE RECEIVING AND PROCESSING

Onsite assessment of solid waste receiving, queuing, unloading and compaction practices.

Current Operations at CCL

Inbound waste vehicles at the CCL are weighed and then directed to the tipping pad. During busy times, vehicles wait in a queue until a dumping slot becomes available. Trucks that require the tipper for unloading similarly wait their turn to back onto the tipper. This portion of the operation at CCL is common to most large landfills and in the case of CCL, is appropriate.

The process of weighing, queueing, and unloading is not, in our opinion, a significant factor in odor generation. When on the truck, these loads – and any potential odor – are contained and release is minimal. But odors can potentially be released during the subsequent activities of pushing, spreading, compacting, and covering.

Alternatively, some wastes are not disposed, but are instead used for other *beneficial reuse* purposes. These may include MRF fines, wood mulch, aggregate, and rubble.

Inbound MRF fines, which are currently classified as PROT_COVER, are placed in strategic locations for imminent use as a protective bedding around pipes and wells. Unfortunately, that leaves this material – some of which is very odorous – piled or spread and exposed.

Other types of loads in the waste stream can also be odorous. This could mean that when the entire waste stream is mixed – odorous and non-odorous waste – the entire waste mass must be treated as odorous.

So, rather than quickly burying odorous loads, or promptly covering them with soil or ADC, they are spread across the entire face. Obviously, this makes containing odors – by burying or covering – a much greater task.

That is exactly why we are recommending a split operation, with odorous loads directed to the OC Zone, and low/non-odor loads going to the primary fill area – initially CELL 6 and CELL 8.

We recommend that non-odorous MRF Fines continue to be used for protective cover (PROT_COVER), while the odorous loads be directed to the OC Zone where they will be dumped, pushed, and covered to minimize release of odor.

However, because the overall waste stream at CCL also contains some odorous loads of waste – particularly in some residential, commercial, and live-floor transfer trucks, the entire process is currently operated as though all waste is generating odors. This includes use of large fans to disperse odor neutralizer, a dedicated water truck to also disperse neutralizer, and more frequent placement of cover soil.

This approach creates a daunting challenge, where the entire (average) 8,000 tons of waste per day is treated as though it all is potentially contributing to odor complaints. This is like having a doctor apply a full body cast to a person with a broken arm. Instead, we suggest a split operation.

Recommended Practices for Primary Fill Area

The primary fill area will continue to be in CELL 6 and CELL 8 for the near future. This is where the tippers will be staged as well. Low/non-odorous waste will be dumped in this area, while loads that obviously contain odorous material(s) will be directed to the separate OC Zone, where they will be processed under a more stringent protocol.

But even as we work to relocate odorous loads, we recognize that some commercial, residential and transfer loads can also have the potential to produce some odor. This is especially true when present in the quantity we are discussing here. So, even as we are recommending that odorous loads be split out into another operation, we still suggest the main operation incorporate and maintain adequate odor-control practices – especially since CELL 6 and CELL 8 are close to the western boundary of the landfill.

These practices would be like those recommended for the OC Zone, but would be implemented only on an as-needed basis, whenever odorous waste is detected in the Primary Fill Area and cannot easily be re-routed to the OC Zone. CCL should follow normal operations for low/non-odorous waste, whereby it is pushed, compacted, and covered at the end of every operating day.

Recommended Practices for OC Zone

Through an aggressive *Odorous Load Detection Program*, we suggest that CCL identify potentially odorous loads at the scale, by the Deck Commander, or through training of regular customers.

As these potentially odorous loads are detected, they would be re-directed to the OC Zone where CCL workers would immediately isolate those loads, contain them (rather than spreading them), and then apply cover material promptly, as needed to control odor.

In addition to the current practices, we also recommend performing a detailed assessment of cell geometry options that would meet the four criteria listed in Section 18f. Further, we suggest the effectiveness of these changes be monitored – along with daily wind conditions – and adjusted as necessary to ensure that odors are effectively controlled.

For those organic wastes that have the potential to release odors, particularly when wind conditions are likely to transport odors off-site, we suggest a more aggressive approach.

Due to the importance of these waste-handling practices, we suggest formal Standard Operating Procedures (SOPs) be created for all waste placement activities. These SOPs would address the following key steps in the waste-handling process:

1. Staging inbound trucks – the queue.
2. Segregating trucks based on odor potential of each load.
3. Managing the tipping pad unloading process.
4. Pushing non-odorous loads based on normal waste-handling procedures.
5. Short pushing of potentially odorous loads to minimize release of any odor.
6. Limited spreading and compacting to reduce opportunity for release of odors.
7. Prompt placement of cover material to contain odors – especially during critical wind conditions.
8. Proper use of disrupter berms and fences.
9. Proper use of neutralizer.

18H COVER MATERIAL PLACEMENT

Onsite assessment of cover material practices throughout and at the end of the operating day.

During our time onsite, we evaluated cover material practices. Under CCL's normal operation, soil is predominantly used for to cover waste at the end of each operating day. During our time onsite, we observed cover soil being placed as daily cover. Some appeared to be contaminated (non-hazardous) soil, supplemented and topped with clean soil.

The CCL utilizes articulated haul trucks. We observed one owned and two rented units while we were onsite. These trucks were loaded using an excavator working from a large stockpile. The CCL also has one 637 scraper for hauling soil.

We also observed a large tarp being used for cover on the main face, along with another tarp being used to cover a much smaller face where self-haul vehicles dumped.

Large Tarp

Soil represented most of the cover material placed during our time onsite.

It is our understanding that the landfill crew usually begins placing cover soil between 4:00-5:00pm. While onsite, we observed progressive cover being placed throughout the afternoon, with a greater effort later in the day. We did not observe cover material being placed directly (immediately) on any odorous loads during the day. Cover material was simply applied to the overall waste footprint as part of normal operations.

Cover Soil Applied

We believe that this approach is fine when dealing with low/no odor waste. But because of the current situation, we suggest that more effort be put into isolating particularly odorous loads, and that they be quickly pushed and covered. This comes back to the need to establish a standard geometry for daily cell construction, to allow for more consistent handling of potentially odorous loads. This also plays into our recommendation to establish a formal OC Zone.

With a split operation, we suggest the following general procedures.

Normal Fill Area

In the normal fill area, traditional cover material practices would be sufficient, if the CCL crew is being attentive – and responding – to the occasional odorous load that will sometimes be dumped in the normal fill area. In those cases, the load must immediately be buried – with additional non-odorous waste or cover material.

Also, because of the large volume of waste, the cumulative effect of even low-odor loads could potentially generate noticeable odors. For that reason, we suggest the daily cell geometry should be re-designed to minimize surface area of exposed trash (See Section 18f – Fill Sequencing Planning). We also recommend CCL continue to practice progressive covering to minimize exposed trash. This may require a more aggressive use of ADC, especially during unfavorable wind conditions.

We also suggest that odor neutralizer be integrated into the normal fill operation, based on the proposed development of SOPs.

Odor control is however a dynamic activity, so the overall cover material process must be flexible and able to adjust on short notice. Also, it is important to note that while we believe that a key step toward solving any potential odor issue is segregating odorous loads into a split operation where those loads can be aggressively managed, the process must allow for the fact that other waste materials may also have slight odors.

OC Zone Fill Area

In the OC Zone, odorous loads will be concentrated, making it easier to focus odor-control efforts. These will include more effective utilization of fans/misters, more frequent placement of cover material (soil and ADC), and attention to managing the size of the exposed, active face.

We suggest formal procedures be developed regarding the operation of both the Normal and OC Zone fill areas. These procedures should be integrated into formal SOPs, provided to the CCL staff in initial and on-going training, and managed by a field-based "Odor Control Supervisor," to make sure they are followed consistently.

18I ODOR NEUTRALIZERS

Onsite assessment of odor neutralizer uses and applications.

The CCL has a program in place that allows the scale attendant, deck commander, equipment operators, and other staff to call out an odorous load, at which time the supervisor will determine appropriate action. This program was used for approximately two years. Re-training on this program recently occurred to ensure that it is being implemented consistently.

One morning we observed a number of odorous loads being discharged at the tipping pad. Visible steam was seen rising from these loads – which we later determined were some of the MRF fines that were high in organic content. There was a strong odor associated with these loads. However, no odor control systems were in the vicinity or functioning at that time.

One of the primary tools for controlling odor is the application of an odor neutralizer. CCL is currently using an unscented product called, "Odor-No-More." Information on this product can be found at http://onmenvironmental.com/.

Odor Misting Lines

The CCL has a number of options in-place for applying odor neutralizer. We did not observe all of these systems operating during our site visit, but because we were not monitoring windspeed, we were unable to determine if their use was appropriate based on wind conditions. Those neutralizer systems included:

1. 5,100 lineal feet of perimeter odor misting lines mounted on metal T-posts (See Photo at Right). This consists of 4 systems. During our time onsite, these lines ran for a short period of time. It is our understanding that standard CCL policy is to turn on the perimeter mister lines when wind conditions have the potential to transport odors. Fill operations move daily, and in some cases, filling occurs far from these perimeter misting lines.
2. Another misting system is mounted on top of the litter screens. We did not observe this working during our time onsite, but again, we did not monitor windspeed while onsite.
3. Seven adjustable orchard fans (See Photo at Right) are also onsite to be utilized as-needed. Each can be connected to an integrated neutralizer misting system. These replaced some more powerful orchard fans that were previously utilized, but they had to stop using them because they were not Tier 4 compliant. During

Adjustable Orchard Fans

our time onsite, we did not observe any neutralizer being sprayed from any of the (four) fans that were in use.

4. We also learned that the water truck puts neutralizer in every load. However, during our time onsite, the water truck was being used to spray access roads and tipping pads. We also observed the water truck using the side-spray nozzle to spray water (and neutralizer) directly onto trash. Unfortunately, using the water truck to spray neutralizer is not very effective because the mixture is not atomized where it can mix with airborne odors.

Water Truck Applying Neutralizer

Based on what we observed, the CCL has adequate tools and procedures in-place to control odors, but those systems are not currently being utilized to their full extent.

In regard to using odor neutralizer, we suggest the following.

- Continue utilizing odor neutralizer
- Increase the use of the orchard fans to atomize odor neutralizer
- Do not utilize the water truck to apply odor neutralizer

Additional recommendations are presented the next section of this report (See Best Management Practices).

18J BEST MANAGEMENT PRACTICES

A list of general landfill best management practices to mitigate potential odors from a landfill.

Based on our experience at landfills across North America, there are a number of Best Management Practices (BMPs) for mitigating potential odors. In every case, odor mitigation must start with identifying the source(s) of the odor.

Through our review of verified odor complaints, tonnage data, general operating conditions, and onsite observations, we were able to identify a number of recommendations to mitigate potential odors and drastically reduce future verified odor complaints.

The list presented here presents common solutions for odor issues related to fresh trash odors and is offered as recommendations for CCL. Fresh trash odors may be mitigated by:

1. Prohibiting odorous wastes such as sludge, biosolids and dead animals (these are not accepted at CCL).
2. Managing occasional (infrequent) odorous loads by preparing a hole for direct, immediate burial.
3. Accepting occasional (infrequent) odorous loads only with 24 hours advance notice.
4. Establishing SOPs for recognizing, segregating, and handling odorous loads, to:
    a. Direct them to the OC Zone.
    b. Avoid spreading them – to minimize surface area.
    c. Bury or cover them promptly using non-odorous waste, soil, or ADC.
5. Improving odorous load detection training so that all CCL staff know how to identify odorous loads, and how to handle them.

6. Providing initial and periodic training for landfill workers based on the SOPs for dealing with potentially odorous loads.
7. Provide odor detection training for frequent CCL customers regarding how to recognize potentially odorous loads, and how to notify CCL staff when they are sending in a potentially odorous load.
8. Conducting more detailed, onsite observations to identify potentially odorous loads.
9. Creating a robust set of SOPs for CCL staff regarding all aspects of identifying and mitigating potentially odorous loads.
10. Identifying location(s) on the landfill where odorous loads can be received while minimizing the potential for off-site transport of odor.
11. Establishing an OC Zone to receive and process potentially odorous loads.
12. Effectively utilizing existing misting system(s) to dispense a masking and/or neutralizing agent that may include:
    a. A perimeter misting system.
    b. A mobile misting system (i.e., tank and sprayer on small tractor).
    c. A dispersing fan and integrated misting system.
13. Avoiding the use of a traditional water truck to dispense neutralizer because of its inability to atomize the neutralizer solution.
14. Increasing the application of neutralizer through dispersion fan and mister line usage – especially during critical wind conditions.
15. Assigning someone (an Odor Control Supervisor) to be solely responsible for managing implementation of odor control SOPs.
16. Developing a system for tracking Key Performance Indicators (KPIs) such as inbound tonnage of odorous, low/non-odor waste, misting fan fuel usage, and odor neutralizer consumption.
17. Continually monitoring the performance and effectiveness of the Odor Control Program.
18. We understand that CCL has applied for a permit to re-install its larger orchard fans. We suggest that their performance be evaluated once they are in place.

18K ALTERNATIVE FILL LOCATIONS

An evaluation of alternative or future working face and/or cell locations which may be maintained in parallel to the primary open working face/cell location for use in times of odor complaints.

See Section 18f & g.