

## 2019 EXPLANATION OF OBSERVATIONS BY REFERENCE NUMBER

Same as 2018

Station was moved to 10905 Virginia Forest Court Glen Allen, Virginia in Henrico County on June 10, 2008. **Latitude** 37° 39' 18.87" (37.65537) **Longitude** 77° 34' 6.97" (77.56921)

This is about **100** miles south and a little east of the earlier Annandale, Virginia location. This new location is just off Broad Street about 10 miles west of Richmond, VA, near Springfield Park Elementary School (Henrico Co. Public Schools). The altitude is **273 feet** above mean sea level.

### 1. DATE: MONTH - DAY - YEAR

#### **TEMPERATURE - # 3 AND # 5 All Temperatures are given in degrees Fahrenheit.**

The maximum and minimum temperatures are read from a Vantage Pro II instrument and recorded on a daily observation sheet to the nearest 1/10 of a degree on the monthly observation sheet. The temperature probe is constantly fan-aspirated giving greater accuracy than other local stations that aren't generally aspirated. The air is also filtered so dust and pollen and insects can't affect the readings. **Insufficient aspiration creates the greatest error at sites where solar insolation is very high and wind is near calm. This results in daytime temperature measurements significantly warmer by as much as 1°F to 2°F than ambient air temperatures, while at night measured temperatures were slightly cooler but to a lesser degree than the daytime effects.**

### 2. Day of the week

### 3. TEMP. MAX. - MAXIMUM TEMPERATURE DEGREES FAHRENHEIT FOR DATE

The Maximum temperature in degrees F for a 24 hour period from midnight until midnight at exactly 5 feet above ground level using Fan-Aspirated Davis Vantage Pro II.

### 4. TIME MAX. - TIME THE MAXIMUM TEMPERATURE OCCURS

Time of maximum temperature in 24-hour time is taken from a Davis Vantage Pro II instrument.

### 5. TEMP. MIN. - MINIMUM TEMPERATURE DEGREES FAHRENHEIT FOR DATE

Minimum temperature in degrees F for a 24-hour period is taken from midnight until midnight at exactly 5 feet above ground level using Fan-Aspirated Davis Vantage Pro II.

### 6. TIME OF MIN. - TIME THE MINIMUM TEMPERATURE OCCURS

Time of the minimum temperature in 24-hr. time is taken from a Davis Vantage Pro II instrument.

### 7. TEMP. RANGE - DAILY TEMPERATURE RANGE

Temperature range is obtained by subtracting the minimum temperature from the maximum temperature for the day.

### 8. TEMP. MEAN - MEAN TEMPERATURE IN DEGREES FAHRENHEIT FOR DATE

Mean temperature equals the maximum temperature plus the minimum and divide the sum by two.

### 9. MEAN CHANGE - MEAN TEMPERATURE CHANGE IN DEGREES FAHRENHEIT FROM YESTERDAY

Change in today's mean compared to yesterday's mean temperature or yesterday's mean temperature minus today's mean.

### 10. SOIL TEMP. - GROUND TEMPERATURE IN DEGREES FAHRENHEIT

The ground temperature is taken remotely with a Davis Vantage Pro II soil thermometer probe at a depth of one foot and observations are taken around 700 AM.

### SOLAR RADIATION #11 AND #12

The Sky Camera that takes a picture of the sky every 15 minutes is used to help in the determination of sky cover. Also starting in January of 2016 a new BloomSky fisheye camera takes a picture every 5 minutes and makes a time-lapse movie each day. If the sky is covered with thin cirrus and significant solar radiation is passing through, a remark will be made to the effect that sunlight is passing through high thin clouds.

### 11. SKY AM - AMOUNT OF AVERAGE CLOUD SKY COVERAGE SEEN FROM SUNRISE TO NOON

Cloud cover in A.M. is taken from sunrise until noon. 0 = clear (0 to 33% sky coverage), 1 = partly cloudy (34% to 66% sky coverage), 2 = cloudy (67% to 100% sky coverage). The court and sky images are used daily to determine the sky cover.

## **12. SKY PM - AMOUNT OF AVERAGE CLOUD SKY COVERAGE SEEN FROM NOON TO SUNSET**

See #10 above as explanation is the same except for time.

## **13. PRECIP. MELTED - MELTED PRECIPITATION MEASURED IN HUNDREDTHS OF AN INCH**

The melted precipitation for 24-hour period will be recorded from midnight to midnight measured in .01 of an inch. T means Trace, less than .01 inches of precipitation. In the event a measurement could not be made at midnight then it will be noted under remarks. Precipitation is checked with both a clear plastic four-inch diameter and an official NWS eight-inch diameter rain gauge. A 12 diameter Novalynx Corporation 260-2500-12 tripping bucket rain gauge is used on an internet connection for a current precipitation total but not for the recorded values. The standing gauges are used to correct the tripping bucket gauge.

## **14. MAX. 1 HOUR PRECIPITATION - MAXIMUM PRECIPITATION OCCURRING IN A ONE HOUR PERIOD FOR DATE**

This information is observed from a Davis Vantage Pro II instrument NOTE: If the precipitation period goes through midnight and it can't be determined if the maximum period of precipitation occurred before or after midnight a note will be made under remarks and the observation will be recorded on the date it is thought to have occurred or will be omitted.

## **15. MAX. 5 MINUTE PRECIPITATION - MAXIMUM PRECIPITATION OCCURRING IN A FIVE MINUTE PERIOD FOR DATE**

This information is recorded from a Davis Vantage Pro II instrument ALSO NOTE THE ADDED REMARKS OF #13 AS THIS ALSO APPLIES TO #14.

## **16. FROZ. PRECIPITATION - FROZEN PRECIPITATION MEASURED IN TENTHS OF AN INCH FOR DATE**

Amount of new snow or frozen precipitation recorded for a 24-hour period from midnight until midnight. Measurement will be taken when the snowfall has just stopped before melting caused by sunlight, etc. In deep snows the frozen precip. #15 and snow on the ground measurements #16 will differ because of packing of new snow by the weight of overlaying snow. If the precipitation is other than snow it should be noted under remarks #39. The amount is measured in tenths of an inch. This represents the maximum frozen precipitation depth on the ground at any one time. If a measurement cannot be made or determined at midnight a measurement will be made as near to midnight as possible and recorded as to time under remarks. **The snowboard is cleared at midnight during snowstorms. If it is cleared more than once a day it will be noted in the remarks.**

## **17. SNOW ON GROUND- SNOW TOTAL MEASURED IN TENTHS OF AN INCH AT SUNSET**

Snow total is a measure of the average amount of snow or frozen precipitation on the ground at sunset measured to the nearest 0.5 inches. Example: if 3 inches of snow is recorded in shadows and one inch in sunny areas an average of 2 inches would be recorded. When T or trace is used it means there are only some patches of snow left in shadowed or colder areas of the yard. Numbers 16 and 17 may be the same if it is a very cold day and if no previous snow was on the ground. Numbers 16 and 17 could be different however if some of the new snow melted before the sunset observations. Snow on the ground #16 may decrease on a day when the maximum temperature is less than 32° due to melting or settling or due to the heat of the sun. In very deep snows 16 and 17 could be different because of settling or packing with temperatures even much below freezing.

## **18. START TIME - FIRST STARTING TIME OF PRECIPITATION**

The time precipitation started in 24-hour time. If the time is 0001 it means midnight or continued precipitation through time midnight. Time may not be given if less than 0.01 inches of precipitation fell. Snowfall time is recorded when the first snow flakes were observed or during late hours of night or early hours of morning when readings are recorded on a very sensitive precipitation sensor and not directly observed.

## **19. END TIME - FIRST ENDING TIME OF PRECIPITATION**

Time precipitation ended - see #17 for additional information. End of precipitation is most often determined by observation or from the heated precipitation sensor or by the snow camera or shy camera.

## **20. DATE: MONTH - DAY – YEAR**

## **21. START TIME - SECOND STARTING TIME OF PRECIPITATION**

If more than one time is given for a date then two distinct periods (interval of 30 minutes separating periods of precipitation) of precipitation occurred. If more than two periods of precipitation occurred a note should be found under

remarks #39, example: period of off and on showers from 1400-2000 hours. Sometimes a time will not be given when only a T of precipitation has been recorded.

**22. END TIME - SECOND ENDING TIME OF PRECIPITATION**

SEE # 18 ABOVE FOR MORE INFORMATION-

**23. WIND RUN - REPRESENTS THE AVERAGE WIND SPEED** - The wind run reading is taken from a Davis Vantage Pro II Instrument.

**WIND VELOCITY # 23 AND # 24**

The anemometer used for maximum wind gust is about 34 feet above the ground but is still protected some from the wind by tall trees to the northwest at a distance of 75 to 100 feet.

**24. MAX. GUST – DAILY MAXIMUM WIND FROM MIDNIGHT TO MIDNIGHT**

The maximum wind recorded from midnight to midnight as recorded by a Davis Vantage Pro II will also be used to obtain velocity, time of the maximum gust. The wind direction will be recorded under remarks when strong winds occur of generally greater than 30 mph.

**25. TIME GUST – TIME OF DAILY MAXIMUM WIND GUST FROM MIDNIGHT TO MIDNIGHT**

The time of the maximum wind will be recorded from midnight to midnight by a Davis Vantage Pro II. Davis Vantage Pro will be used to obtain the time of the maximum gust. The direction will be recorded under remarks when strong winds occur of generally greater than 30 mph.

**26. MAX. RH - MAXIMUM HUMIDITY FOR 24 HOUR PERIOD FROM MIDNIGHT TO MIDNIGHT**

The maximum relative humidity reading will be taken from a fan-aspirated Davis Vantage Pro II since it has an accuracy of (2% for the full range of scale) for relative humidity.

**27. MIN. RH - MINIMUM HUMIDITY FOR 24 HOUR PERIOD FROM MIDNIGHT TO MIDNIGHT**

The minimum relative humidity reading will be taken from a fan-aspirated Davis Vantage Pro II since it has an accuracy of (2% for the full range of scale) for relative humidity. Observations of less than 15% are generally checked with a wet and dry bulb thermometer or a relative humidity test instrument.

**28. MAX. BAR. - MAXIMUM BAROMETER READING FOR DATE**

The maximum barometer reading is taken from a Belfort Microbarograph for the 24-hour period of midnight to midnight or the Davis Vantage Pro II sensor.

**29. MIN. BAR. - MINIMUM BAROMETER READING FOR DATE**

The minimum barometer reading is taken from a Belfort Microbarograph for the 24-hour period of midnight to midnight or the Davis Vantage Pro II sensor.

**30. AVE. BAROMETER - AVERAGE BAROMETER READING FOR THE DATE**

Mean barometer equals the maximum barometer plus the minimum barometer and divide the sum by two.

**31. BAR. CHANGE - AVE. CHANGE MEAN BAROMETER READING FOR DATE COMPARED TO YESTERDAY'S**

Change in today's mean barometer compared to yesterday's mean barometer reading.

**32. Glaze** - One to five will be entered on any day glaze (freezing rain) is observed and often the time of occurrence will be put under remarks. Remember that freezing rain thickness or depth is not recorded under frozen precipitation because it fell as rain. Very heavy dews on consecutive days can cause the tripping bucket gauge to trip but will not be recorded as precipitation. The thickness of the ice should be entered under the remarks.

**Sleet** - One to five will be entered on a day sleet is obs. & often the time of occurrence will be put in remarks.

**Snow** - One to five will be entered on any day snow or snow flurries are observed and often the time of occurrence will be put under remarks.

**Fog** - One to five will be entered on any day fog is observed and the visibility will be recorded under the remarks. Because of the surrounding houses and the flat terrain the maximum distance one can see is approximately two-tens of one mile. This doesn't allow one to report fog visibility unless it is very dense.

**Thunder** - One to five will be entered on any day thunder is heard or lightning is observed and often the time of occurrence will be put under remarks.

**Dew** - One to five it will be rated as 1=Very light, 2=Light, 3=Moderate, 4= Heavy, 5=Very Heavy but at the bottom of the column will be entered the number of dews in the month.

**Frost** - One to five it will be rated as 1=Very light, 2=Light, 3=Moderate, 4= Heavy, 5=Very Heavy but at the bottom of the column will be entered the number of dews in the month.

**(See the rating system for Observations for columns 32-38)**

**39. DATE: MONTH - DAY – YEAR**

**40. REMARKS**

Remarks will include other observations of interest.

Example: SNOW to WATER ratio, coldest since Dec. 23, 1989.

**Symbols commonly used in remarks column are as follows:**

<b>LP</b>	<b>Low Pressure</b>	<b>TH</b>	<b>Thunder</b>
<b>LPT</b>	<b>Low Pressure Trough</b>	<b>ULT</b>	<b>Upper Level Trough</b>
<b>HP</b>	<b>High Pressure</b>	<b>SH</b>	<b>Shower</b>
<b>HPR</b>	<b>High Pressure Ridge</b>	<b>SHS</b>	<b>Showers</b>
<b>CF</b>	<b>Cold Front</b>	<b>DPT</b>	<b>Dew Point</b>
<b>WF</b>	<b>Warm Front</b>	<b>WC</b>	<b>Wind Chill</b>
<b>OF</b>	<b>Occluded Front</b>	<b>PD</b>	<b>Precipitation period</b>
<b>SF</b>	<b>Stationary Front</b>	<b>WS</b>	<b>Warm sector</b>
<b>L</b>	<b>Lightning</b>	<b>CLO</b>	<b>Cloudy</b>
<b>PT</b>	<b>Partly Cloudy</b>	<b>AS</b>	<b>Altostratus</b>
<b>TS</b>	<b>Thunderstorm</b>	<b>TSH</b>	<b>Thundershower</b>
<b>CU</b>	<b>Cumulus</b>	<b>CI</b>	<b>Cirrus</b>

## Rating System for Observations

Rating	<b>32- GLAZE</b>	
1	Very Light	T < 0.1 inches
2	Light	0.1 ≤ 0.3 inches
3	Moderate	0.4 ≤ 0.5 inches
4	Heavy	0.5 ≤ 0.6 inches
5	Very Heavy	> 0.6 inches
Rating	<b>33- SLEET</b>	
1	Very Light	T < 0.2 inches
2	Light	0.2 ≤ 0.5 inches
3	Moderate	0.5 ≤ 1.0 inches
4	Heavy	1.0 ≤ 1.5 inches
5	Very Heavy	> 1.5 inches
Rating	<b>34- SNOW</b>	
1	Very Light	T < 0.5 inches
2	Light	0.5 ≤ 2.0 inches
3	Moderate	2.1 ≤ 4.0 inches
4	Heavy	4.1 ≤ 6.0 inches
5	Very Heavy	> 6.0 inches
Rating	<b>35-FOG</b>	
1	Very Light	>1.0 mile but not haze
2	Light	1.0 to 0.6 miles
3	Moderate	0.6 to 0.3 miles
4	Heavy	0.3 to 0.2 miles
5	Very Heavy	< 0.2 miles
Rating	<b>RATING THUNDERSTORMS</b>	
	For example- (TS 3-3-3) would be a A moderate TS 21 to 50 thunders heard A peak wind of 21 to 30mph	<b>RATING THUNDERSTORMS</b>  TS stronger than 1 <u>may</u> be rated
Rating	<b>THUNDER</b>	
1	Very Light	01 ≤ 10 very weak or distant
2	Light	11 ≤ 20 weaker than average
3	Moderate	21 ≤ 50 average thunderstorm
4	Heavy	51 ≤ 099 stronger than average
5	Very Heavy	> 100 and usually strong
Rating	<b>WIND</b>	
1	Very Light	0 ≤ 15 mph
2	Light	16 ≤ 20 mph
3	Moderate	21 ≤ 30 mph
4	Heavy	31 ≤ 45 mph
5	Very Heavy	> 46 mph
Rating	<b>RAIN</b>	
1	Very Light	< 0.10 inches
2	Light	0.10 ≤ 0.50 inches
3	Moderate	0.51 ≤ 0.99 inches
4	Heavy	1.00 ≤ 1.50 inches
5	Very Heavy	>1.51 inches
Rating	<b>37--DEW</b>	
1	Very Light - condensation rarely seen on mirror	
2	Light - Small condensation drops seen on mirror	
3	Moderate - Large condensation drops easily seen on mirror	
4	Heavy - Large drops some have coalesced and run down the mirror-condensation on deck - grass sparkles in sunlight	
5	Very Heavy - Many drops have coalesced & run down the mirror - deck is wet - grass sparkles in sunlight	
Other	N= None or No Dew Observations P= Precip. Prevented Dew Observations	
Rating	<b>38--FROST</b>	
1	Very Light - Frost seen on roofs but not seen on mirror or grass	
2	Light - Frost seen on mirror, roofs, cars but not on grass	
3	Moderate - Frost covers mirror, cars, dark roofs & seen on the grass	
4	Heavy - Frost covers mirror, cars, dark roofs white, seen on grass and deck wood	
5	Very Heavy - Frost makes mirror, cars, dark roofs white and grass and deck wood white	
Other	N= None or No Frost Observations P= Precip. Prevented Frost Observations	