

20 September 2019

Chris Schneider
Managing Director
National Ceramic Industries Australia
PO Box 765
Maitland NSW 2320

Dear Chris,

Environmental Monitoring for National Ceramic Industries Australia - August 2019

Please find enclosed the documentation for the environmental monitoring carried out for National Ceramic Industries Australia during August 2019. Sampling methodology and adopted assessment criteria are detailed below.

1.0 Sampling Methodology

Sampling was performed by AECOM Australia Pty Ltd (AECOM) and sample analysis was carried out by ALS NATA accredited laboratory. All sampling and analysis was carried out in accordance with Environmental Protection Authority (EPA) approved methods with reference to the following Australian Standards:

- Monitoring of fine suspended particulates (PM₁₀) on the EPA six day cycle in accordance with:
 - AS/NZS 3580.9.6 (2015) Methods for the Sampling and Analysis of Ambient Air – Determination of Suspended Particulate Matter – PM₁₀ High Volume Sampler with Size Selective Inlet - Gravimetric Method.
- Monitoring of fluorides in ambient air in accordance with:
 - AS/NZS 3580.13.2 (2013) Determination of fluorides—Gaseous and acid-soluble particulate fluorides—Manual, double filter paper sampling.
- Meteorological monitoring in accordance with:
 - AS 3580.1.1 (2016) – *Methods for sampling and analysis of ambient air – Part 1.1 – Guide to siting air monitoring equipment; and*
 - AS 3580.14 (2014) – *Methods for sampling and analysis of ambient air – Part 14: Meteorological monitoring for ambient air quality monitoring.*
- Monitoring of surface water quality in accordance with:
 - AS/NZS 5667.1:1998(R2016) *Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples; and*
 - AS/NZS 5667.4:1998(R2016) *Guidance on sampling from lakes, natural and manmade.*

2.0 Assessment Criteria

Suspended particulate loads are assessed against the impact assessment criteria defined in the Project Approval conditions (09_0006 – National Ceramic Industries Australia Tile Manufacturing Facility Expansion Project, 19 January 2012). The assessment criteria for PM₁₀ (particulate matter with an aerodynamic diameter of less than 10 µm) are:

- 50 µg/m³ over a 24-hour period; and
- 30 µg/m³ as an annual average.

Ambient fluoride concentrations are assessed against the guidelines defined in NSW EPA *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA (2016)). The NSW EPA impact assessment criteria for ambient fluoride are:

- 2.9 $\mu\text{g}/\text{m}^3$ over a 24-hour period; and
- 1.7 $\mu\text{g}/\text{m}^3$ over a 7-day period.

Surface waters are assessed in accordance with default trigger values for physical and chemical stressors for southeast Australia in the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018). These values are:

- pH in the range of 6.5 - 8.5 (Table 3.3.2 - NSW Lowland River); and
- Electrical conductivity (EC) in the range of 125 – 2200 $\mu\text{S}/\text{cm}$ (Table 3.3.3 - NSW Lowland River).

3.0 Monitoring Results

Monitoring results for the month of August 2019 are presented in the attachments to this letter. Monitoring results for the preceding two months are also presented to demonstrate quarterly trends in results. August PM_{10} monitoring results were below the consent 24 hour criterion of $50\mu\text{g}/\text{m}^3$ with the exception of the North West samples on 6 and 24 August which returned results of $61.8\mu\text{g}/\text{m}^3$ and $64.7\mu\text{g}/\text{m}^3$ respectively, above the assessment criteria.

Meteorological data sourced from the on-site meteorological station shows strong winds from the north west quadrant for both days. Under these conditions the North West monitoring station is upwind of the NCIA site. Wind roses attached show the meteorological data graphically and present the wind direction as 'blowing from'. Also attached is an image showing the site and the monitoring locations.

In summary, the PM_{10} results recorded at the North West monitoring location on 6 and 24 August 2019 are likely to be significantly influenced by an upwind dust source and strong north westerly winds. Both the EPA Beresfield and Singleton stations recorded above average 24hr PM_{10} concentrations on these days indicating the potential for elevated PM_{10} levels. Importantly, the North West monitoring station was upwind of the NCIA site on both these days meaning the NCIA facility is unlikely to have contributed to these results.

An Environmental Incident Report detailing these exceedances was submitted to the Department of Planning and Environment on 16 September upon AECOM receiving the laboratory analysis results.

The PM_{10} rolling annual average concentration at the South East site remains below the Project Approval annual criterion of $30\mu\text{g}/\text{m}^3$ with an average of $19.6\mu\text{g}/\text{m}^3$ recorded. The North West annual average is currently just above the criteria, sitting at $30.6\mu\text{g}/\text{m}^3$ following the completion of the August monitoring period. This is primarily due to elevated results recorded during February 2019.

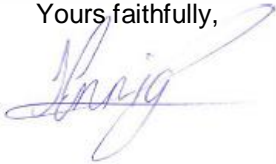
Fluoride results for August remain below the relevant assessment criteria at both the North West and South East monitoring sites with no exceedances of either the 24 hour or 7 day criteria this month.

The adopted ANZG 2018 guidelines for pH and conductivity are the default trigger values for slightly disturbed aquatic ecosystems in NSW lowland rivers. The pH measurement on 22 August was within the ANZG guideline with all remaining samples recorded above the ANZG guideline however Pond 4 was not observed to be discharging at these times. All conductivity measurements were within the relevant ANZG guidelines for August. Water temperature was also measured weekly however no guideline is available for assessment. Pond 4 was not observed to be discharging during any of the August site visits.

The monitoring locations, monitoring results and plots can be found attached including the wind rose for August. Laboratory certificates, field sheets and calibration data along with relevant meteorology data can be provided on request.

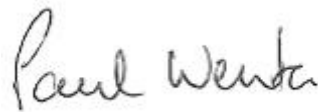
If you require any further information, please contact Simon Murphy on 0428 626 952.

Yours faithfully,



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encl: Monitoring data tables and charts, monitoring locations, wind roses

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

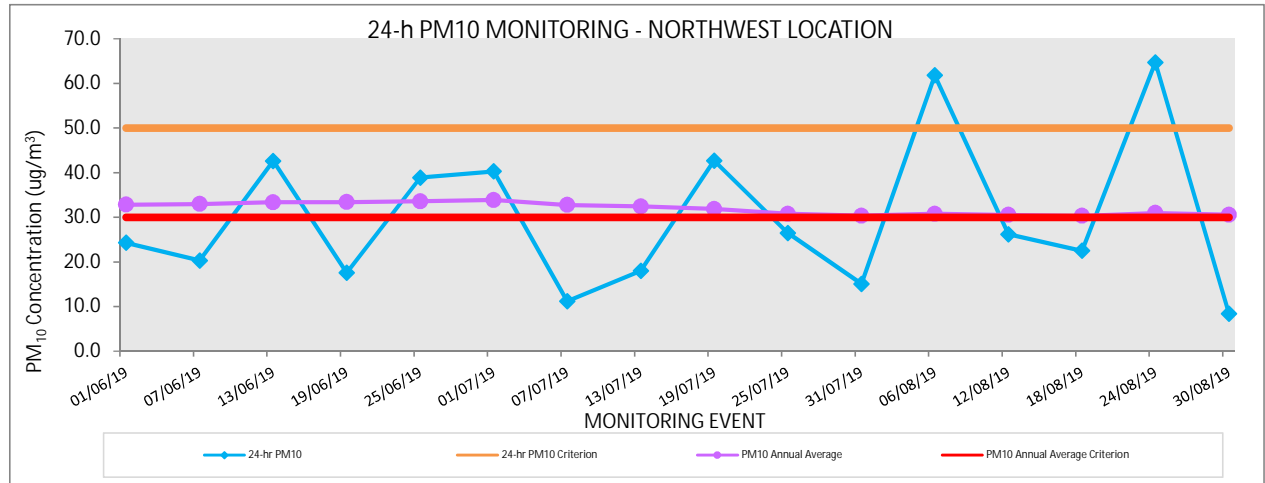
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North West Monitoring Location - 24 hour PM10 Monitoring

North West - 24 hour PM10 Monitoring				
June 2019 to August 2019				
Monitoring Event	24-hr PM ₁₀	24-hr PM ₁₀ Criterion	PM ₁₀ Annual Average	PM ₁₀ Annual Average Criterion
	(µg/m ³)	(µg/m ³)	(µg/m ³)	
1-Jun-19	24.3	50	32.8	30
7-Jun-19	20.3	50	33.0	30
13-Jun-19	42.6	50	33.4	30
19-Jun-19	17.6	50	33.4	30
25-Jun-19	38.9	50	33.6	30
1-Jul-19	40.3	50	33.9	30
7-Jul-19	11.2	50	32.8	30
13-Jul-19	18.0	50	32.4	30
19-Jul-19	42.7	50	31.9	30
25-Jul-19	26.5	50	30.8	30
31-Jul-19	15.1	50	30.3	30
6-Aug-19	61.8	50	30.8	30
12-Aug-19	26.2	50	30.5	30
18-Aug-19	22.5	50	30.3	30
24-Aug-19	64.7	50	31.0	30
30-Aug-19	8.4	50	30.6	30

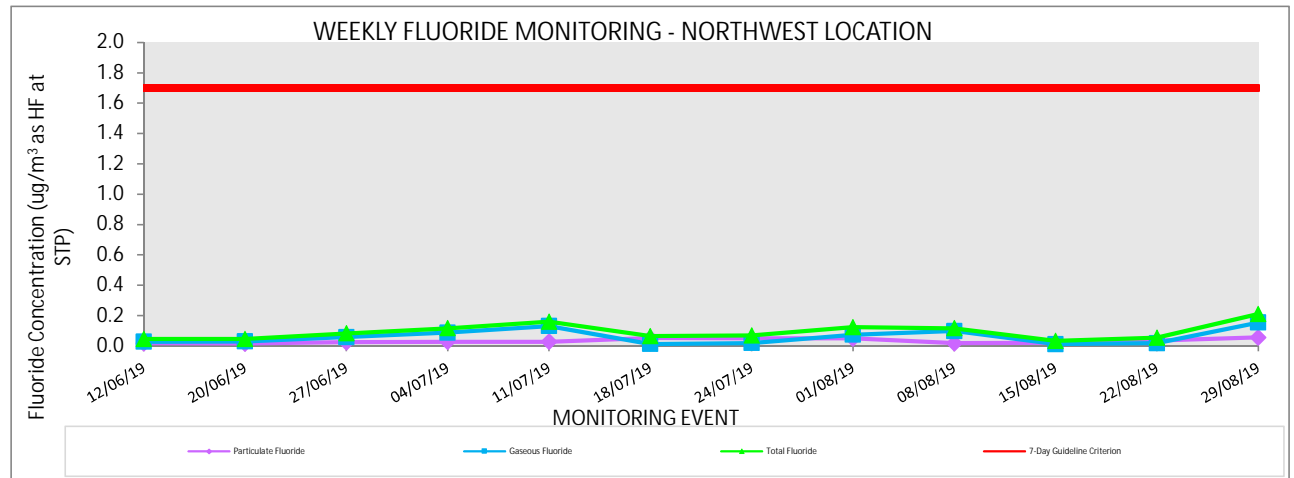
*Bold denotes exceedance



North West Monitoring Location - 7 Day Fluoride Monitoring

North West - 7 Day Fluoride Monitoring	
June 2019 to August 2019	

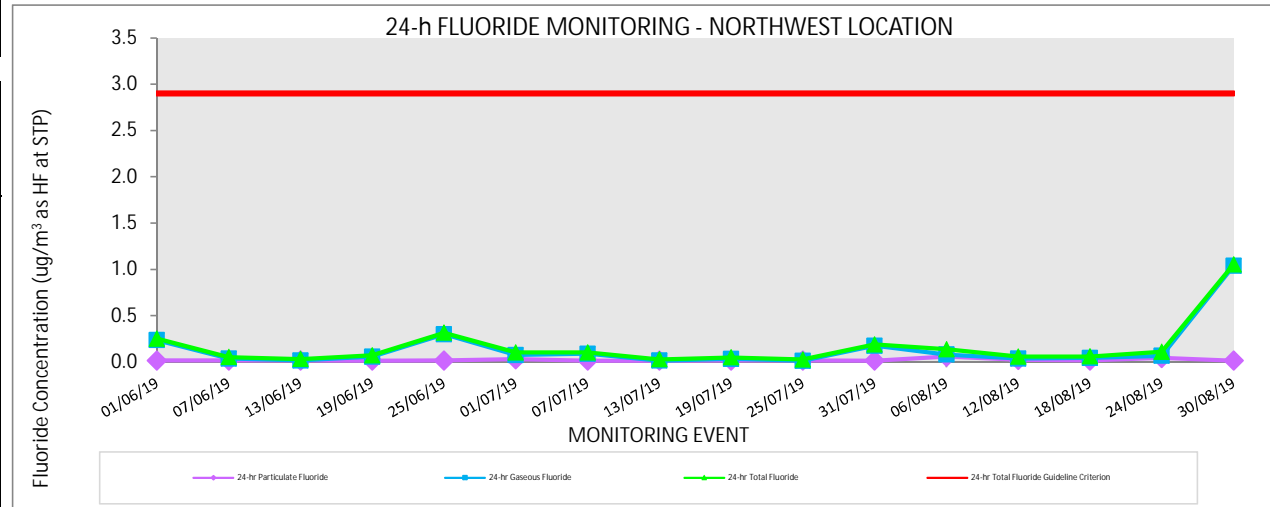
Monitoring Event		Particulate Fluoride	Gaseous Fluoride	Total Fluoride	7-Day Guideline Criterion
Start Date	End Date	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)
6-Jun-19	12-Jun-19	0.018	0.028	0.046	1.7
12-Jun-19	20-Jun-19	0.016	0.030	0.046	1.7
20-Jun-19	27-Jun-19	0.024	0.058	0.082	1.7
27-Jun-19	4-Jul-19	0.028	0.088	0.116	1.7
4-Jul-19	11-Jul-19	0.028	0.131	0.159	1.7
11-Jul-19	18-Jul-19	0.052	0.013	0.065	1.7
18-Jul-19	24-Jul-19	0.050	0.019	0.069	1.7
24-Jul-19	1-Aug-19	0.050	0.074	0.124	1.7
1-Aug-19	8-Aug-19	0.018	0.098	0.116	1.7
8-Aug-19	15-Aug-19	0.021	0.012	0.033	1.7
15-Aug-19	22-Aug-19	0.036	0.018	0.054	1.7
22-Aug-19	29-Aug-19	0.056	0.154	0.210	1.7



North West Monitoring Location - 24 hour Fluoride Monitoring

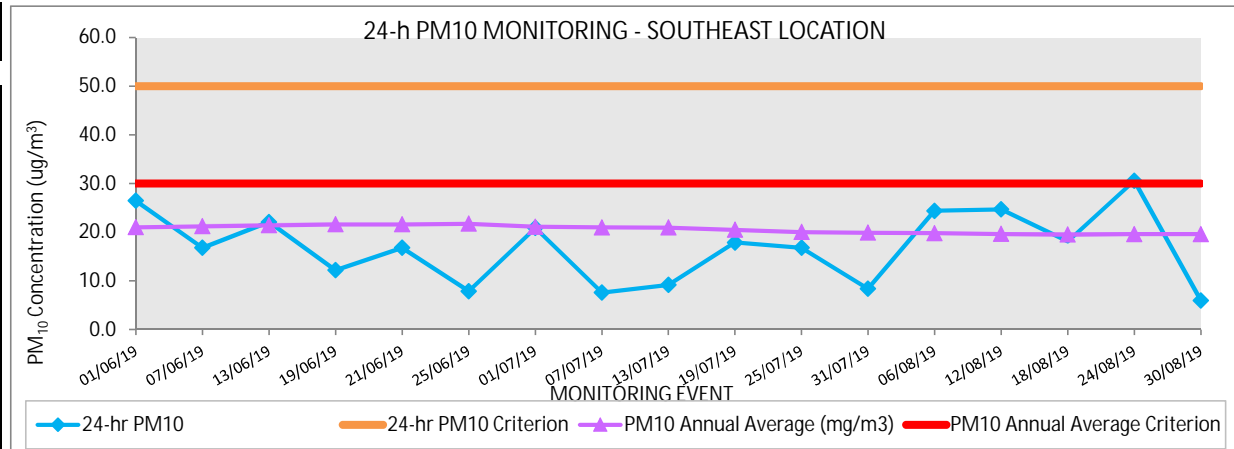
North West - 24 hour Fluoride Monitoring
June 2019 to August 2019

Monitoring Event	24-hr Particulate Fluoride	24-hr Gaseous Fluoride	24-hr Total Fluoride	24-hr Total Fluoride Guideline Criterion
	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)
1-Jun-19	0.015	0.236	0.251	2.9
7-Jun-19	0.015	0.037	0.052	2.9
13-Jun-19	0.016	0.016	0.032	2.9
19-Jun-19	0.014	0.057	0.071	2.9
25-Jun-19	0.016	0.299	0.315	2.9
1-Jul-19	0.029	0.074	0.103	2.9
7-Jul-19	0.014	0.088	0.102	2.9
13-Jul-19	0.014	0.014	0.028	2.9
19-Jul-19	0.016	0.033	0.049	2.9
25-Jul-19	0.015	0.012	0.027	2.9
31-Jul-19	0.014	0.175	0.189	2.9
6-Aug-19	0.057	0.080	0.137	2.9
12-Aug-19	0.022	0.036	0.058	2.9
18-Aug-19	0.015	0.044	0.059	2.9
24-Aug-19	0.044	0.066	0.110	2.9
30-Aug-19	0.014	1.037	1.051	2.9



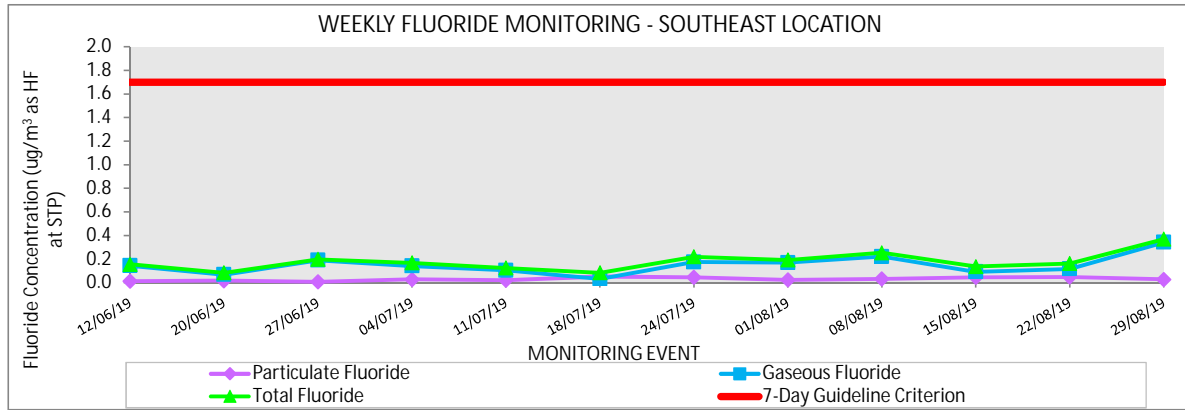
South East Monitoring Location - 24 hour PM10 Monitoring

South East - 24 hour PM10 Monitoring				
June 2019 to August 2019				
Monitoring Event	24-hr PM ₁₀	24-hr PM ₁₀ Criterion	PM ₁₀ Annual Average	PM ₁₀ Annual Average Criterion
	(µg/m ³)	(µg/m ³)	(µg/m ³)	
01-Jun-19	26.5	50	21.0	30
07-Jun-19	16.8	50	21.2	30
13-Jun-19	22.1	50	21.4	30
19-Jun-19	12.2	50	21.6	30
21-Jun-19	16.8	50	21.6	30
25-Jun-19	7.9	50	21.7	30
01-Jul-19	20.9	50	21.1	30
07-Jul-19	7.6	50	21.0	30
13-Jul-19	9.2	50	21.0	30
19-Jul-19	17.9	50	20.5	30
25-Jul-19	16.8	50	20.0	30
31-Jul-19	8.4	50	19.9	30
06-Aug-19	24.4	50	19.8	30
12-Aug-19	24.7	50	19.7	30
18-Aug-19	18.1	50	19.5	30
24-Aug-19	30.6	50	19.6	30
30-Aug-19	6.0	50	19.6	30



South East Monitoring Location - 7 Day Fluoride Monitoring

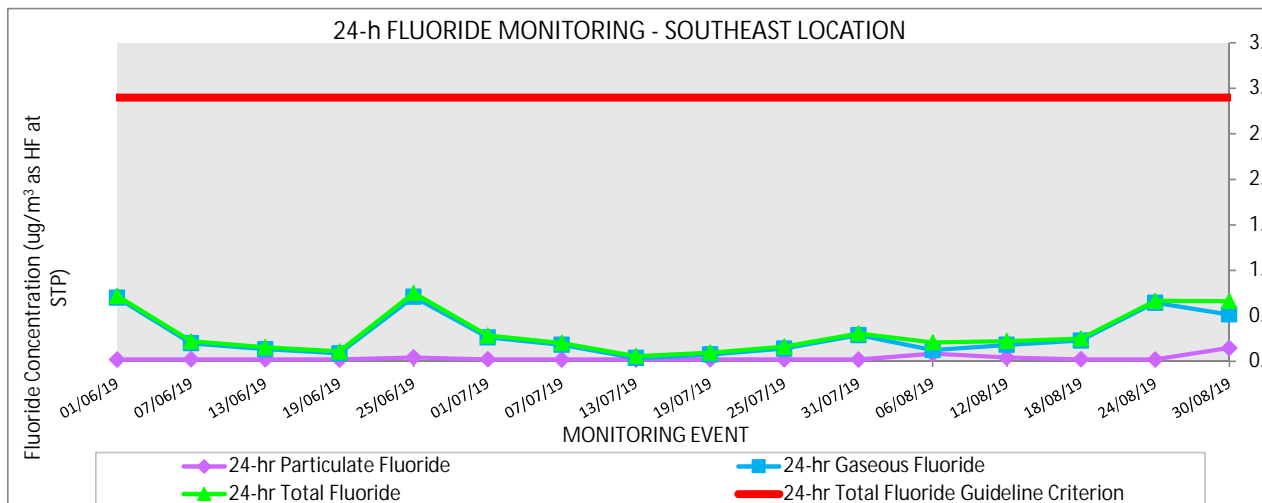
South East - 7 Day Fluoride Monitoring					
June 2019 to August 2019					
Monitoring Event		Particulate Fluoride	Gaseous Fluoride	Total Fluoride	7-Day Guideline Criterion
Start Date	End Date	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)
6-Jun-19	12-Jun-19	0.012	0.143	0.155	1.7
12-Jun-19	20-Jun-19	0.016	0.067	0.083	1.7
20-Jun-19	27-Jun-19	0.008	0.189	0.197	1.7
27-Jun-19	4-Jul-19	0.027	0.139	0.166	1.7
4-Jul-19	11-Jul-19	0.020	0.103	0.123	1.7
11-Jul-19	18-Jul-19	0.052	0.031	0.083	1.7
18-Jul-19	24-Jul-19	0.045	0.174	0.219	1.7
24-Jul-19	1-Aug-19	0.023	0.168	0.191	1.7
1-Aug-19	8-Aug-19	0.032	0.220	0.252	1.7
8-Aug-19	15-Aug-19	0.045	0.091	0.136	1.7
15-Aug-19	22-Aug-19	0.047	0.115	0.162	1.7
22-Aug-19	29-Aug-19	0.027	0.342	0.369	1.7



South East Monitoring Location - 24 hour Fluoride Monitoring

South East - 24 hour Fluoride Monitoring
June 2019 to August 2019

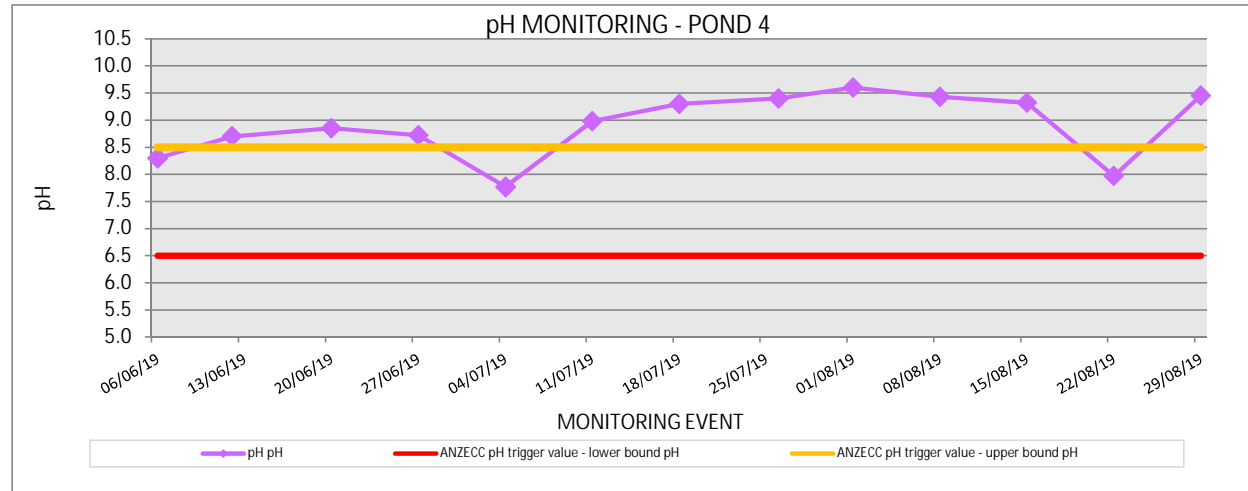
Monitoring Event	24-hr Particulate Fluoride	24-hr Gaseous Fluoride	24-hr Total Fluoride	24-hr Total Fluoride Guideline Criterion
	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)
1-Jun-19	0.021	0.700	0.721	2.9
7-Jun-19	0.022	0.199	0.221	2.9
13-Jun-19	0.023	0.133	0.156	2.9
19-Jun-19	0.021	0.088	0.109	2.9
25-Jun-19	0.043	0.708	0.751	2.9
1-Jul-19	0.022	0.263	0.285	2.9
7-Jul-19	0.021	0.181	0.202	2.9
13-Jul-19	0.020	0.037	0.057	2.9
19-Jul-19	0.022	0.075	0.097	2.9
25-Jul-19	0.022	0.141	0.163	2.9
31-Jul-19	0.020	0.288	0.308	2.9
6-Aug-19	0.085	0.124	0.209	2.9
12-Aug-19	0.042	0.181	0.223	2.9
18-Aug-19	0.022	0.229	0.251	2.9
24-Aug-19	0.021	0.644	0.665	2.9
30-Aug-19	0.147	0.515	0.662	2.9



Pond 4 Monitoring Location - Weekly pH Monitoring

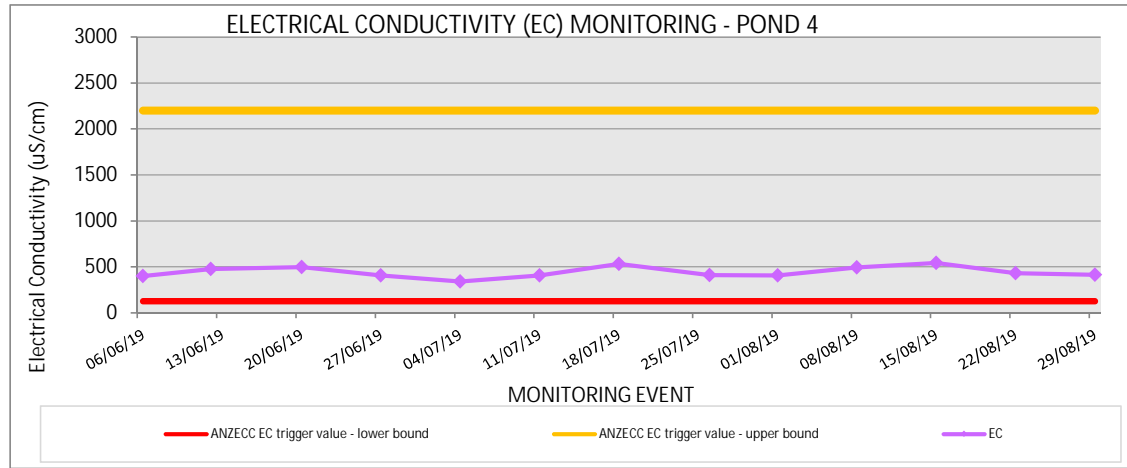
Pond 4 - Weekly pH Monitoring
June 2019 to August 2019

Monitoring Event	pH	ANZECC pH trigger value - lower bound	ANZECC pH trigger value - upper bound	Unable to Sample
	pH	pH	pH	
6-Jun-19	8.30	6.5	8.5	
12-Jun-19	8.70	6.5	8.5	
20-Jun-19	8.85	6.5	8.5	
27-Jun-19	8.72	6.5	8.5	
4-Jul-19	7.77	6.5	8.5	
11-Jul-19	8.98	6.5	8.5	
18-Jul-19	9.30	6.5	8.5	
26-Jul-19	9.40	6.5	8.5	
1-Aug-19	9.60	6.5	8.5	
8-Aug-19	9.43	6.5	8.5	
15-Aug-19	9.32	6.5	8.5	
22-Aug-19	7.97	6.5	8.5	
29-Aug-19	9.45	6.5	8.5	



Pond 4 Monitoring Location - Weekly EC Monitoring

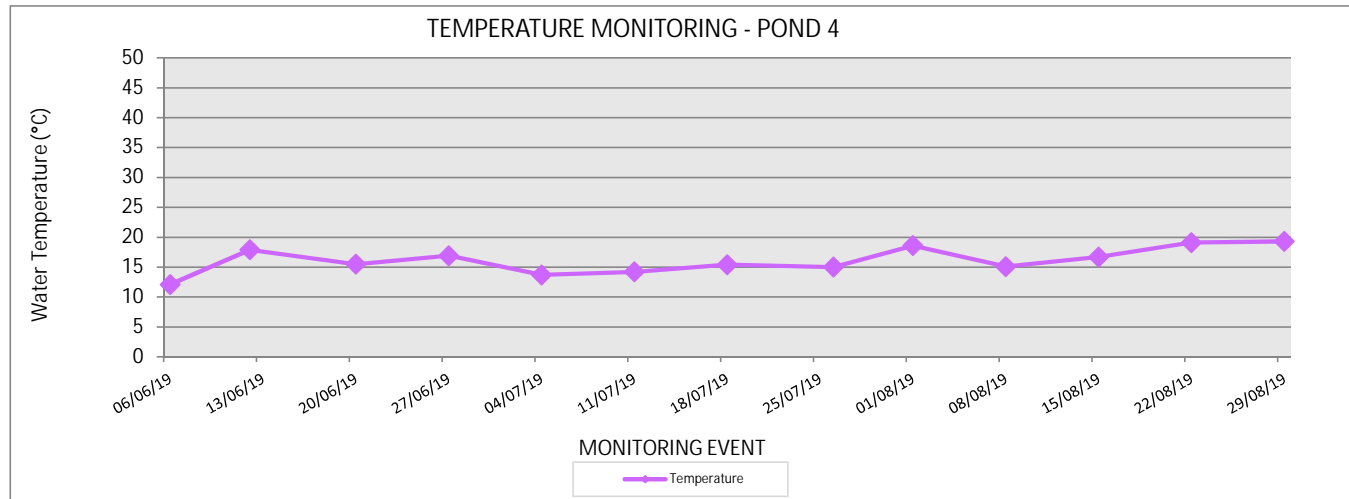
Pond 4 - Weekly EC Monitoring				
June 2019 to August 2019				
Monitoring Event	EC	ANZECC EC trigger value - lower bound	ANZECC EC trigger value - upper bound	Unable to Sample
	µS/cm	µS/cm	µS/cm	
6-Jun-19	400	125	2200	
12-Jun-19	476	125	2200	
20-Jun-19	496	125	2200	
27-Jun-19	405	125	2200	
4-Jul-19	340	125	2200	
11-Jul-19	408	125	2200	
18-Jul-19	530	125	2200	
26-Jul-19	410	125	2200	
1-Aug-19	406	125	2200	
8-Aug-19	493	125	2200	
15-Aug-19	543	125	2200	
22-Aug-19	432	125	2200	
29-Aug-19	412	125	2200	

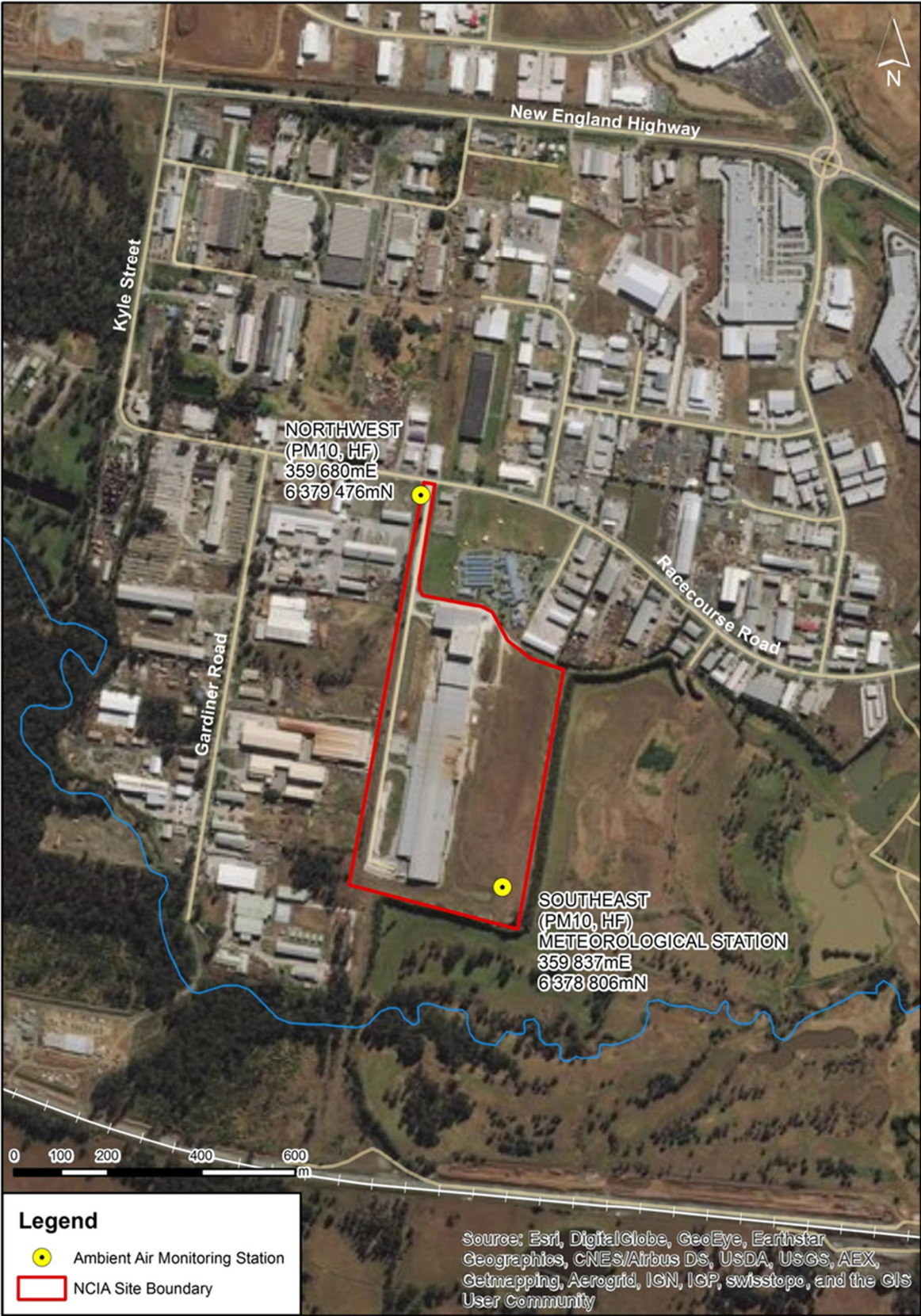


Pond 4 Monitoring Location - Weekly Temperature Monitoring

Pond 4 - Weekly Temperature Monitoring
June 2019 to August 2019

Monitoring Event	Temperature	Unable to Sample
	°C	
6-Jun-19	12.1	
12-Jun-19	17.9	
20-Jun-19	15.5	
27-Jun-19	16.9	
4-Jul-19	13.7	
11-Jul-19	14.2	
18-Jul-19	15.4	
26-Jul-19	15	
1-Aug-19	18.6	
8-Aug-19	15.1	
15-Aug-19	16.7	
22-Aug-19	19.1	
29-Aug-19	19.3	



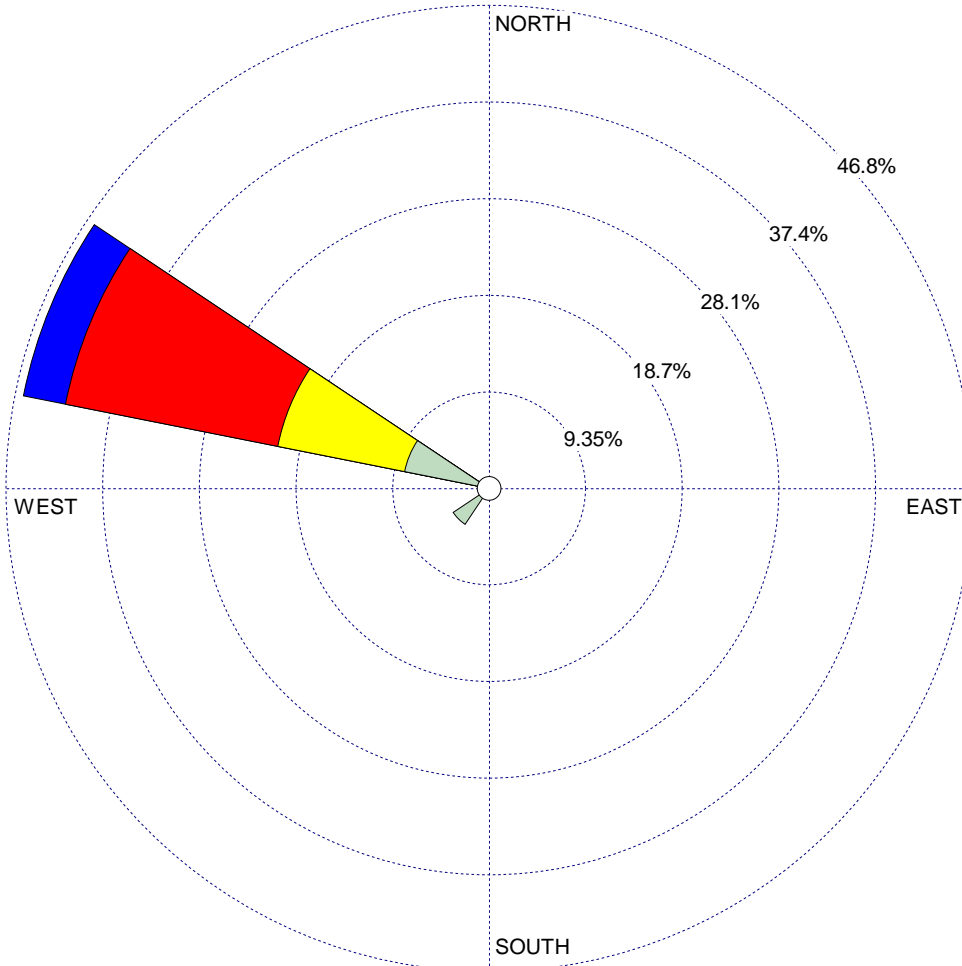


WIND ROSE PLOT:

**NCIA Meteorology Data
6 August 2019**

DISPLAY:

**Wind Speed
Direction (blowing from)**



**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: 45.83%

COMMENTS:

DATA PERIOD:

**Start Date: 6/08/2019 - 00:00
End Date: 6/08/2019 - 23:00**

COMPANY NAME:

MODELER:

CALM WINDS:

45.83%

TOTAL COUNT:

23 hrs.

AVG. WIND SPEED:

1.78 m/s

DATE:

16/09/2019

PROJECT NO.:

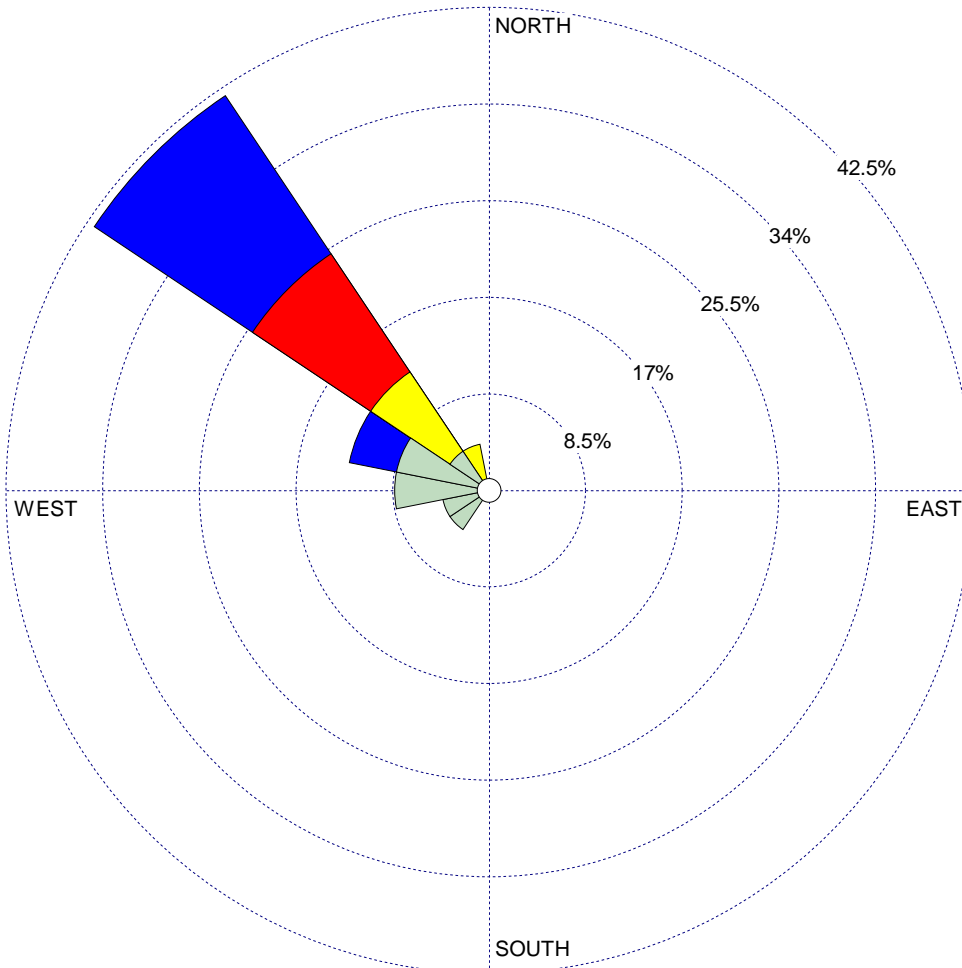
60613063

WIND ROSE PLOT:

**NCIA Meteorology Data
24 August 2019**

DISPLAY:

**Wind Speed
Direction (blowing from)**



**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: 25.00%

COMMENTS:

DATA PERIOD:

**Start Date: 24/08/2019 - 00:00
End Date: 24/08/2019 - 23:00**

COMPANY NAME:

MODELER:

CALM WINDS:

25.00%

TOTAL COUNT:

24 hrs.

AVG. WIND SPEED:

2.57 m/s

DATE:

16/09/2019

PROJECT NO.:

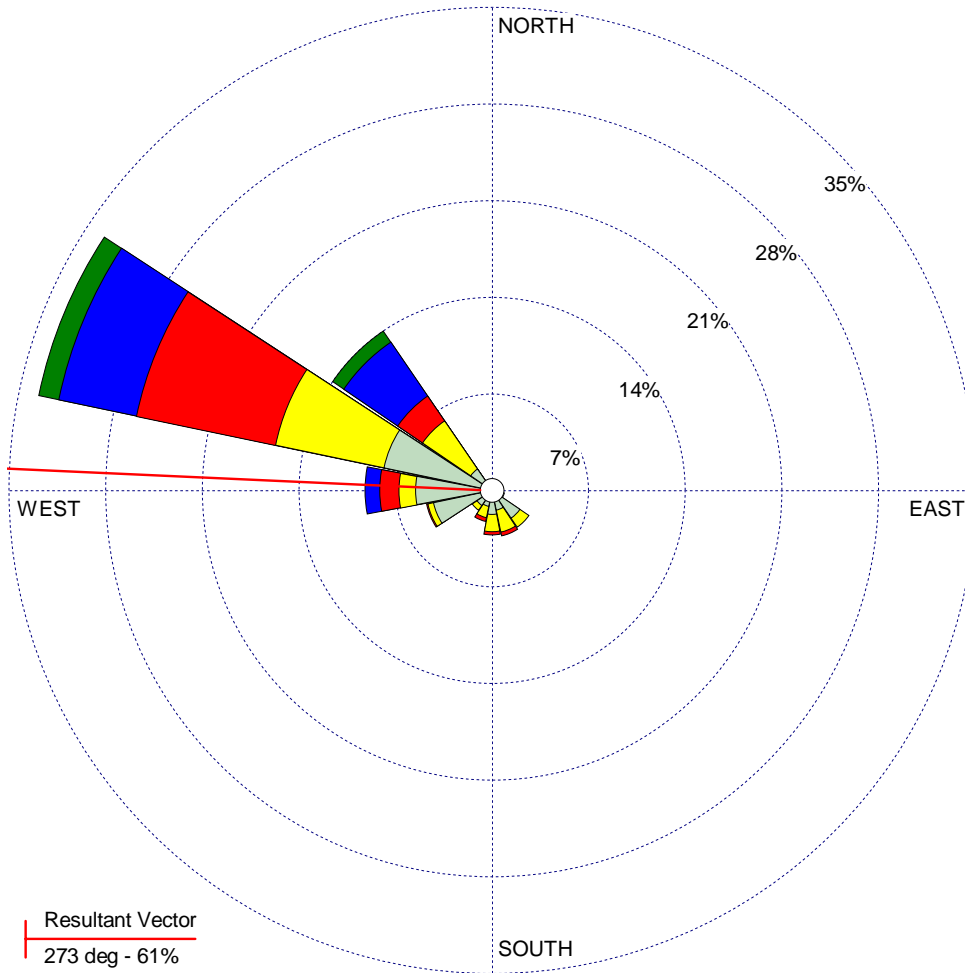
60613063

WIND ROSE PLOT:

**NCIA - Meteorological Data
August Sampling Period - August 2019**

DISPLAY:

**Wind Speed
Direction (blowing from)**



Resultant Vector
273 deg - 61%

**WIND SPEED
(m/s)**

- >= 11.1
- 8.8 - 11.1
- 5.7 - 8.8
- 3.6 - 5.7
- 2.1 - 3.6
- 0.5 - 2.1

Calms: 19.76%

COMMENTS:

DATA PERIOD:

**Start Date: 1/08/2019 - 01:00
End Date: 31/08/2019 - 23:00**

COMPANY NAME:

MODELER:

CALM WINDS:

19.76%

TOTAL COUNT:

738 hrs.

AVG. WIND SPEED:

2.60 m/s

DATE:

11/09/2019

PROJECT NO.:

60613063