March 2013
Air Quality Report
Metropolis Towers

Attached is a technical summary of air quality data for March 2013 at the Metropolis Towers cleanup site submitted by PPG Industries air monitoring consultant.

This report provides air monitoring information about conditions at the work areas associated with Layout Area 1.

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

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Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: March 2013

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April 18, 2013

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr6 – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8 hour integrated hexavalent chromium (Cr6) and total particulates, as well as real time monitoring for PM_{10} at eleven (11) air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24 hour real time, Cr6, and total particulate sampling with lab analysis was also conducted at one elevated station per work area. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr6 sampling and analysis indicate that program to date average airborne Cr6 concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirming that dust control measures continue to be effective, and indicate that the levels of Cr6 in dust generated at the Site do not generate an emission source of Cr6 sufficient to create potential offsite exposure to Cr6 at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Layout Area 1 through the reporting period. This monthly report includes both monthly and program to date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real time 5 minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between July 17, 2012 and August 2, 2012. Routine sampling began on March 18, 2013 with the start of ground intrusive activities on Site.

Eleven air monitoring stations installed at Layout Area 1 provide protection during intrusive work at Areas B and E. Area B contains three ground level stations and one elevated station. Area E contains five ground level stations and two elevated stations. Each area contains an elevated station that measures 24 hour real time concentrations and collects Cr6 and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for Layout Area 1. **Table 2-1** provides an overview of the air monitoring approach at each of the AMS.

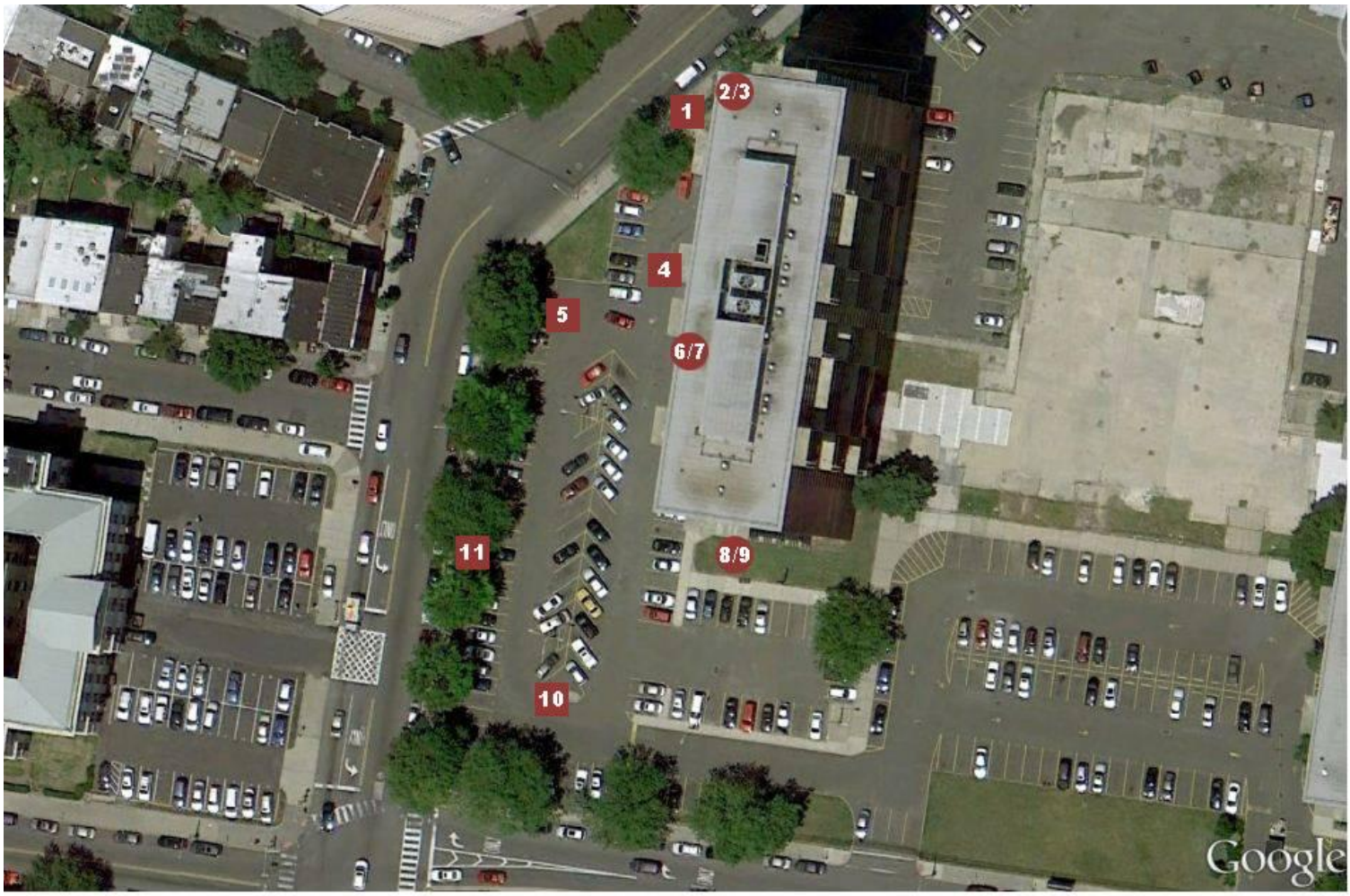
Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr6 concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis. The Cr6 average concentrations measured at each AMS will continually be compared to the Site specific AAC for Cr6 to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr6 fenceline air monitoring.

Air monitoring data collected at the Site includes:

- 8 hour integrated Cr6 and total particulate sample collection and associated laboratory analysis;
- 24 hour and 72 hour integrated Cr6 and total particulate samples collection and laboratory analysis; and
- Real time 5 minute average PM_{10}, readings measured at the work area perimeter.

This section outlines the types of data collected, frequency of collection, and the corresponding locations.

Figure 2-1: Site Overview



1 Ground level station location and designation

2/3 Ground level & elevated station location and designation

Table 2-1: Air Monitoring Approach

Layout Area 1	Station	Integrated Air Monitoring	Real Time Air Monitoring
Area B	**M 1,2,3,4**	Integrated 8 hour Cr6 and total particulate sampling and analysis during work days. 24 hour and 72 hour Cr6 sampling and analysis at one station 7 days per week.	5 minute average PM_{10} readings measured during a typical work day.
Area E	**M 5,6,7,8,9, 10,11**	Integrated 8 hour Cr6 and total particulate sampling and analysis during work days. 24 hour and 72 hour Cr6 sampling and analysis at one station 7 days per week.	5 minute average PM_{10} readings measured during a typical work day.

2.1 Integrated Air Sampling

Integrated Cr6 and total particulate samples are collected at each of the AMS for an 8 hour to 10 hour duration each working day (Typically Monday – Friday) at each of the eleven stations. Samples are collected on a preweighed polyvinyl chloride 37mm filter cassette for both Cr6 and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

2.1.1 Integrated Cr6 Sampling

The exposed Cr6 filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for Cr6 analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8 hour to 10 hour integrated Cr6 air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24 hour and 72 hour Cr6 sampling and analysis are also performed at one AMS per work area. These longer duration samples show Cr6 concentrations during overnight and weekend periods. The 24 hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72 hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for total particulate analysis using NIOSH method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8 hour to 10 hour integrated Cr6 air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real Time Air Monitoring

Real time air monitoring is divided into two types of monitoring including: work area monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Work Area

Work area air monitoring consists of ground level and elevated stations at the perimeter of the work area. Work area monitoring includes the following:

- Real time 5 minute average PM_{10} readings at each of the eleven locations. Three ground level and one elevated station for Area B and five ground level stations and two elevated stations for Area E. All stations operate 8 to 10 hours during remedial activities, Monday through Friday, with one elevated station per work area running 24 hours a day, seven days a week.

2.2.2 Meteorological Measurements

Meteorological measurements of 5 minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at elevated station 3 for Area B and elevated station 6 for Area E.

3.0 Site Specific Acceptable Air Concentration and Real Time Action Levels

Site specific AAC and real time Action Levels have been developed for Cr6 and real time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real time Action Levels have been developed to protect off site receptors from potential adverse health impacts from Cr6 and particulates over the duration of the intrusive remediation activities.

Real time monitoring and integrated results are compared against the AAC and the real time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real time action levels for integrated Cr6 concentrations and real time PM_{10} are outlined in the following sections.

3.1 Integrated Cr6 Acceptable Air Concentration

A Site specific Cr6 AAC has been developed by NJDEP to protect off site receptors from potential adverse health impacts due to potential exposure to Cr6 in dust. The AAC for Cr6 was developed to represent the maximum allowable average concentration of Cr6 in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one in one million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr6 emanating from the Site.

The AAC of 49 ng/m^3 is applicable at the work area perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC also provides a value to evaluate the effectiveness of dust control.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr6 are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. These shorter duration average concentrations metrics include: program to date, 90 day, 60 day, and 30 day running averages where the average Cr6 concentration over the previous 90 day, 60 day, and 30 day periods are calculated for each

sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr6 Metrics

Metric Observation	Response Action
30 day[1] Cr6 average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60 day[1] Cr6 average concentration greater than or equal to 40 ng/m3	
90 day[1] Cr6 average concentration greater than or equal to 35 ng/m3	
1 Sampling days.	

3.2 Real Time Alert and Action Levels

Real time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site Specific Alert and Action Levels

Parameter	Alert Level (1 min TWA)	Action Level (5 min TWA)
PM_{10}	339 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between March 18, 2013 and March 31, 2013 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real time results;
- Program to date integrated and real time statistics;
- Evaluation of program success versus the Site specific AAC and action levels; and
- Meteorological results.

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program to date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr6 and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr6 Sampling Results

Results of the Cr6 sampling from the reporting period and a program to date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8 hour Cr6 concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr6 concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program to Date

Sampling and analytical statistics for integrated 8 hour Cr6 results are shown in Table B-1 and include various programs to date metrics relative to Cr6 analytical data. Monthly average 8 hour Cr6 concentration results are shown in Table B-2 for each AMS location. A snapshot of the program to date, 30, 60, and 90 day running Cr6 average concentrations at the end of the reporting period were not available for this reporting period.

Table 4-1: Short Term Average 8 Hour Integrated Cr6 Metrics

Running Cr6 Metrics[1]		Layout Area 1										
	Metric (ng/m^3)	**M1 (ng/m^3)**	**M2 (ng/m^3)**	**M3 (ng/m^3)**	**M4 (ng/m^3)**	**M5 (ng/m^3)**	**M6 (ng/m^3)**	**M7 (ng/m^3)**	**M8 (ng/m^3)**	**M9 (ng/m^3)**	**M10 (ng/m^3)**	**M11 (ng/m^3)**
30 day[2]	**45**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
60 day[2]	**40**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
90 day[2]	**35**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PTD[3]		10.6	9.3	9.0	15.4	13.6	3.5	10.0	7.3	8.1	7.9	10.6

ng/m^3 – nanograms per cubic meter

1 Running Cr6 metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr6 are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. The running Cr6 metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long term (program) ending success.

2. Running Cr6 metrics are valid on the last day in the report period and include the previous 30, 60, or 90 days of sample results.

3. Program to Date - Air monitoring conducted from March 18, 2013 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8 hour integrated total particulate sampling and analysis from the reporting period and program to date results are discussed in the following sections.

Reporting Period

Individual integrated 8 hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program to date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 10 sample days between March 18, 2013 and the end of the reporting period. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8 hour Cr6 average concentrations, based upon lab analytical results at each AMS, were less than 32% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real Time Air Monitoring Results

Real time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real time 5 minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real time 5 minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3.

Program to Date

Real time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

- Excavate and load out Area B;
- Backfill Area B;
- Excavate Area E west;
- Backfill Area E west;
- Excavate Area E east; and
- Backfill Area E east.

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-6.

5.0 Conclusions

Results of this project's reporting period show the air sampling and monitoring program at the Metropolis Towers Site indicate that the average Cr6 concentrations for each AMS are well below the AAC of 49 ng/m^3. The program through this reporting period shows the Cr6 concentrations and percent Cr6 in dust samples demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr6 in dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr6 and do not generate an emission source of Cr6 sufficient to create potential offsite exposure to Cr6 at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8 Hour Cr6 Concentrations
- Integrated 8 Hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8 Hour Cr6 Sampling Results

Date of Sample	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
03/18/13	7	2.3	7	6.5							
03/19/13	6.5	2.3	6.5	6.5							
03/20/13	17.5	10.5	11	17.5	39	3.65	21.5				11
03/21/13					8	3.35	8.5	6	7.5	8.5	18
03/22/13	11.5	22	11.5	31	20	7.1	9.5	6.5	8.5	8	8
03/23/13						7.1					
03/24/13						7.1					
03/25/13					8.5	2.95	8	6	8	7.5	7
03/26/13					11	3.5	11	10	11	9.5	10.5
03/27/13					7.5	2.45	7.5	7.5	7.5	7	15
03/28/13					6.5	2.7	6.5	7	6.5	6.5	6.5
03/29/13					8.5	0.54	7.5	8	7.5	8	8.5
03/30/13						0.54					
03/31/13						0.54					

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr6. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8 Hour Total Particulate Sampling Results

Date of Sample	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
03/18/13	34	11.5	35	33.5							
03/19/13	32.5	11.5	33	32							
03/20/13	85	50	55	90	55	18.5	105				55
03/21/13					40.5	16.5	41.5	29	38.5	42.5	36
03/22/13	55	55	60	55	48.5	16.5	46.5	31.5	47.5	40	39
03/23/13						16.5					
03/24/13						16.5					
03/25/13					42	15	40.5	29.5	40.5	37	36
03/26/13					55	17.5	55	49	55	47.5	50
03/27/13					37	12	36.5	36.5	37.5	34.5	34.5
03/28/13					33	13.5	37.5	170	37.5	31.5	38.5
03/29/13					42	4.4	36.5	NA	36.5	39.5	41.5
03/30/13						4.4					
03/31/13						4.4					

Results in microograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's site 114 reporting of non-detects by AECOM.

Figure A- 1: Real Time 5 Minute Average PM_{10} Monitoring Results

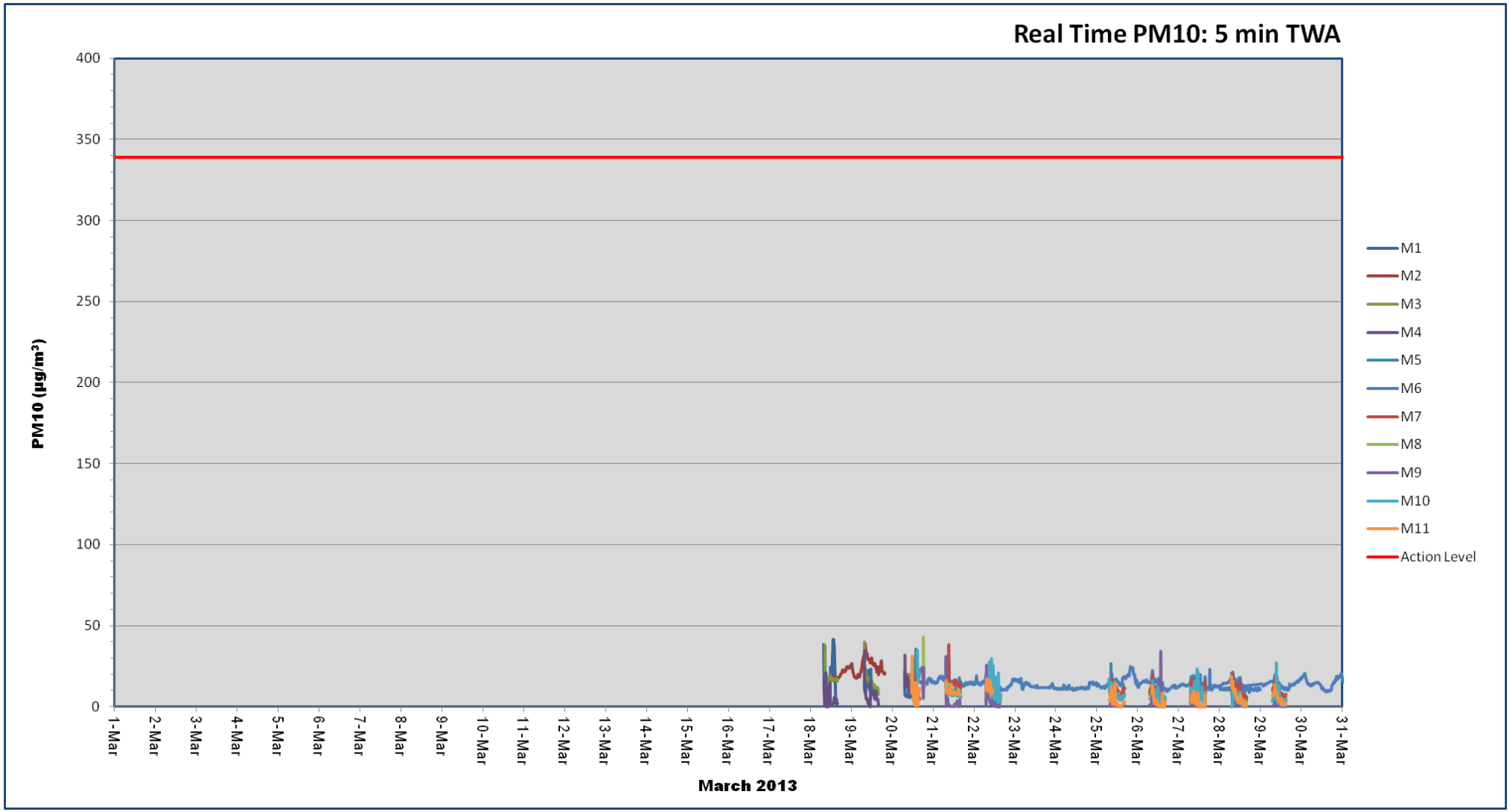


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
Dust	NA	NA	NA	NA	NA	NA

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter ($\mu g/m^3$)

ng/m^3 – nanograms per cubic meter

$\mu g/m^3$ – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

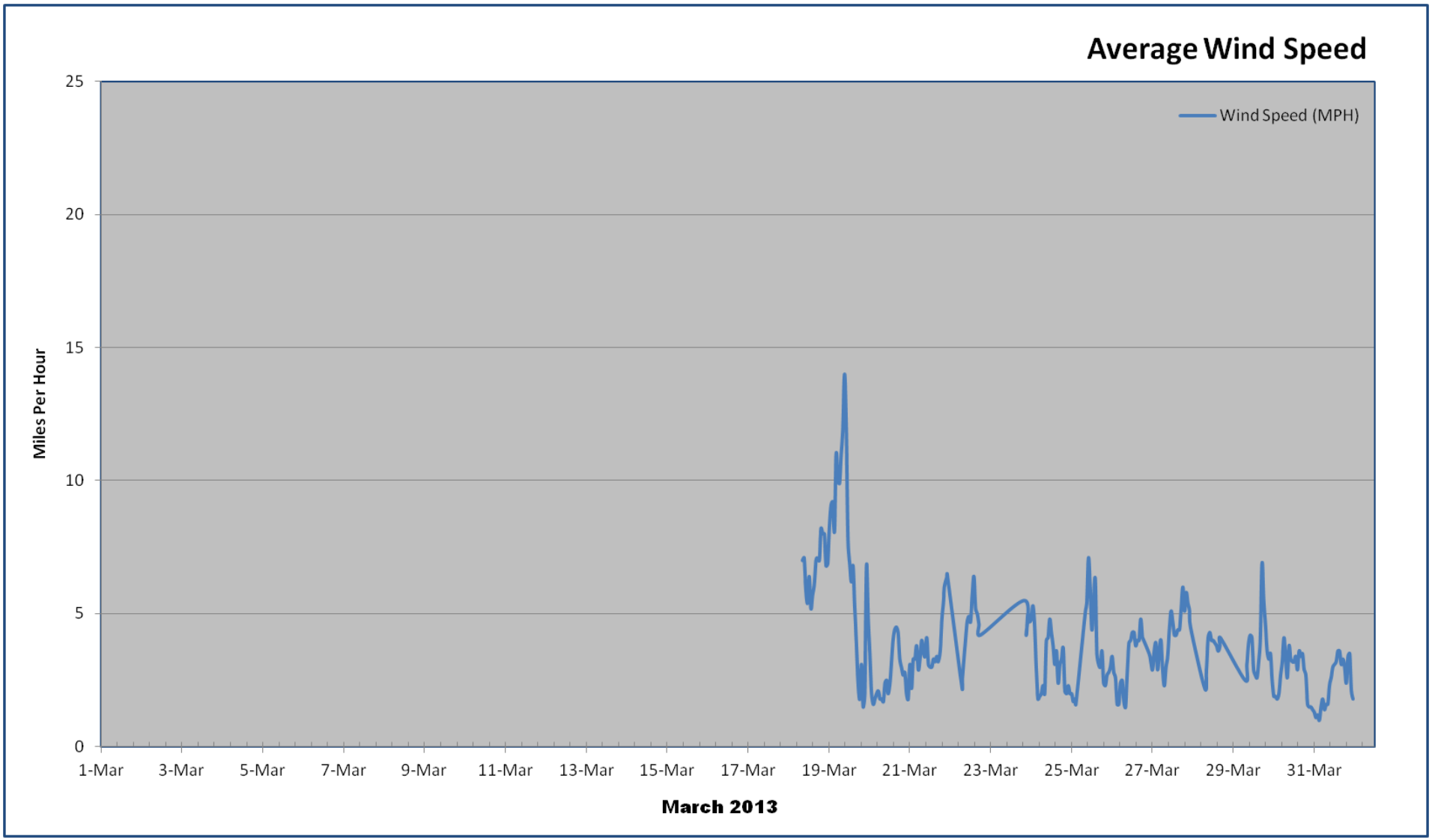


Figure A-3: Temperature

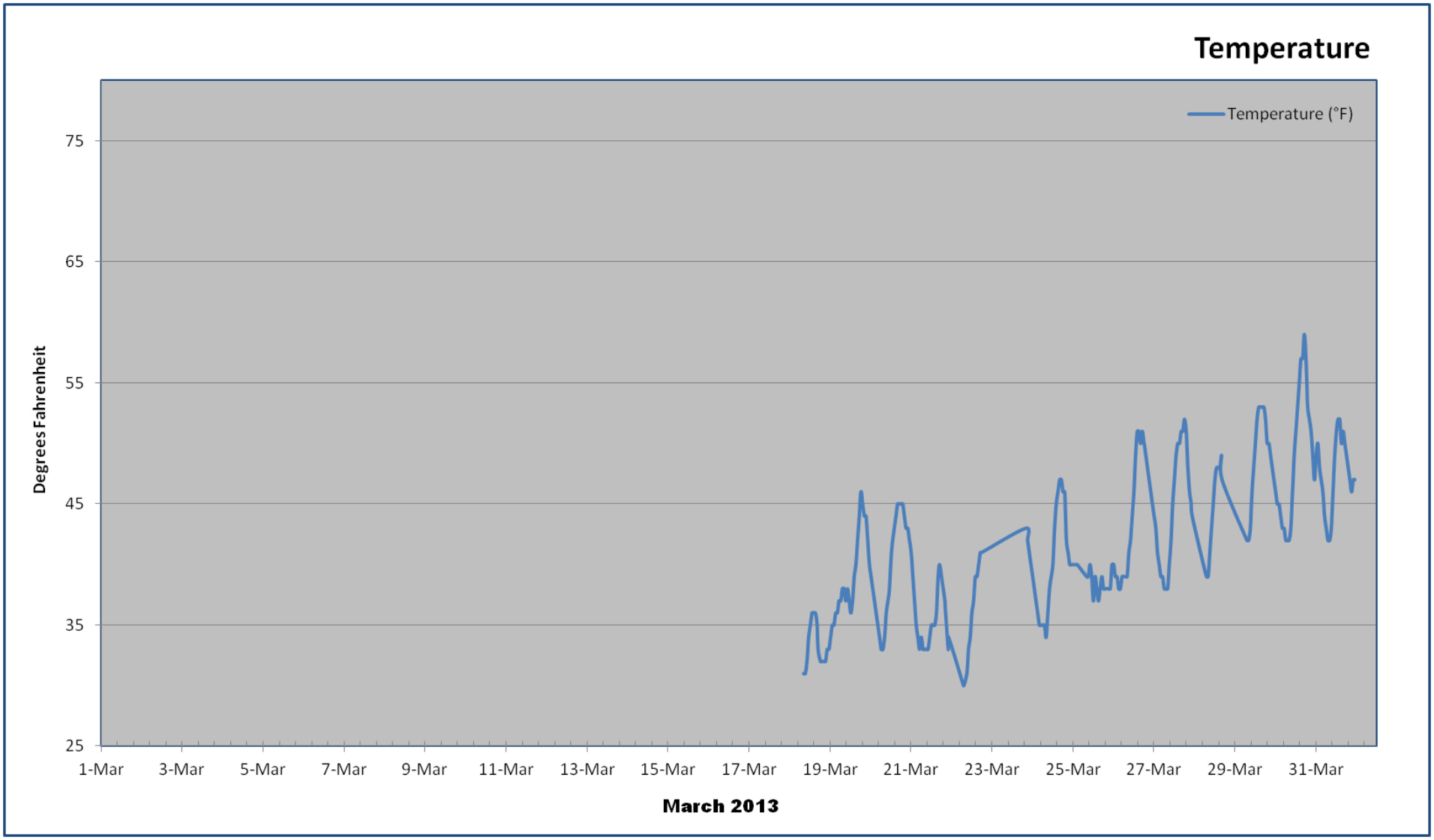


Figure A-4: Relative Humidity

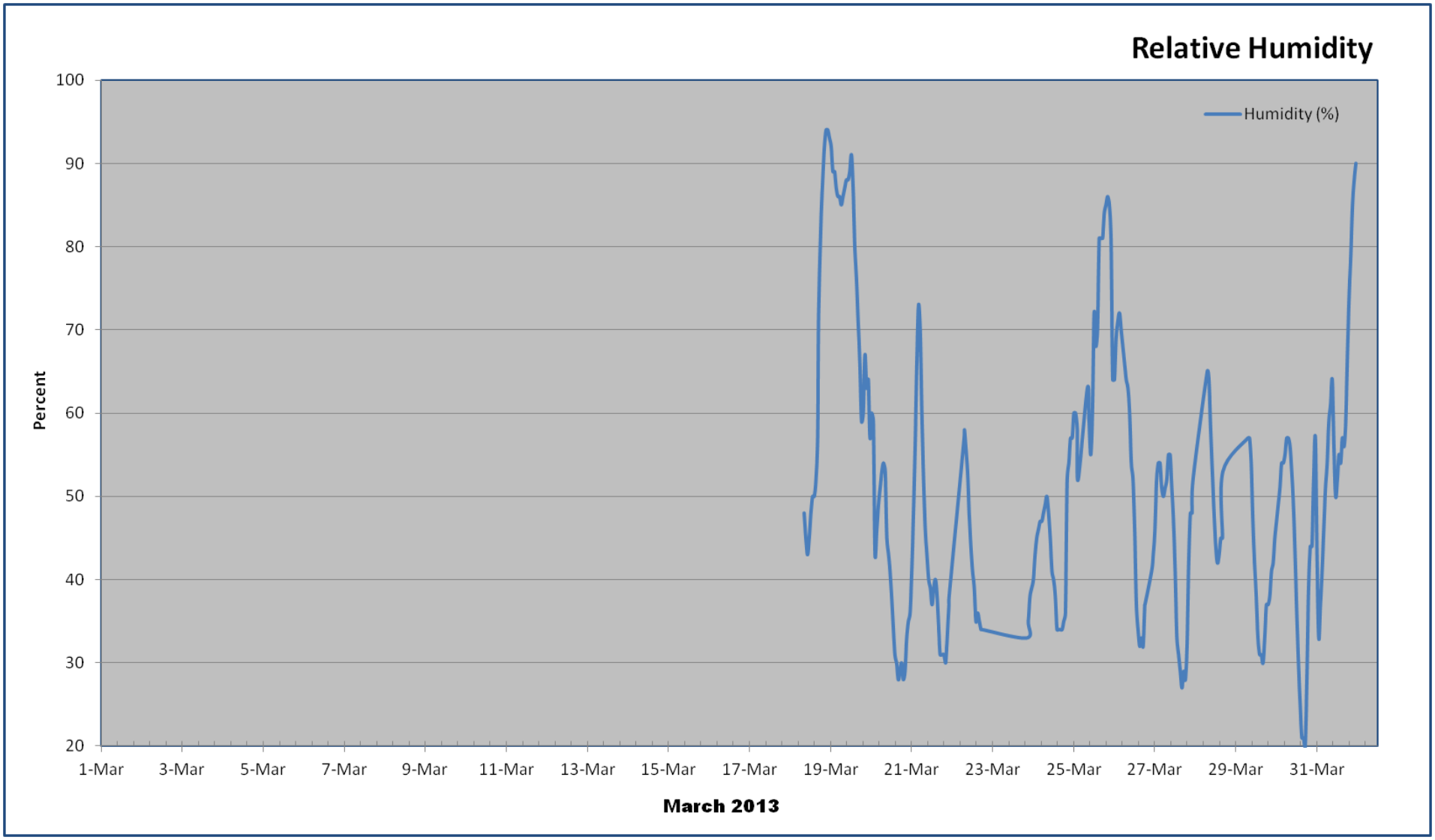
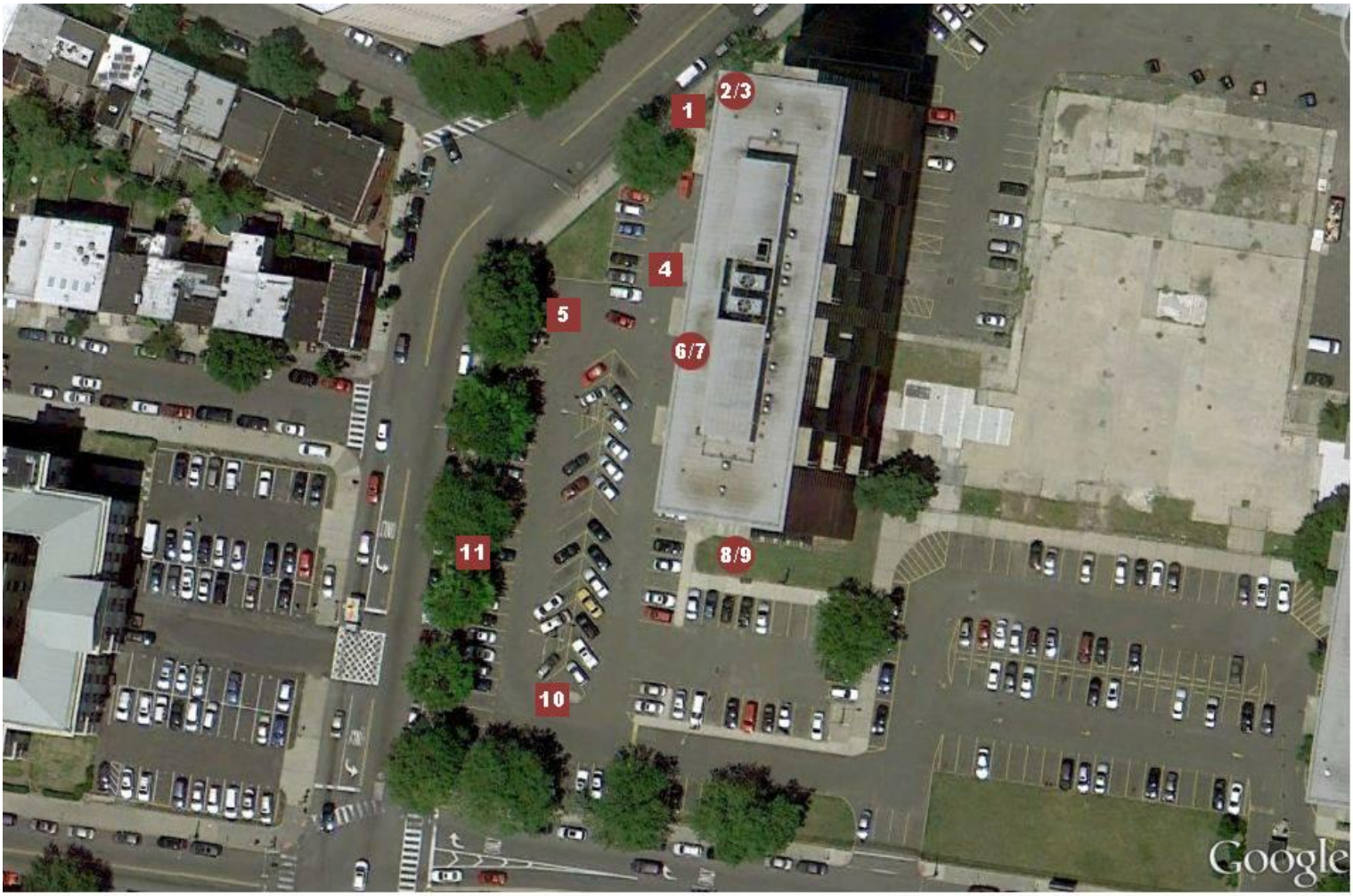


Figure A–5: Site Map



1 Ground level station location and designation

2/3 Ground level & elevated station location and designation

Appendix B

Program to Date Result Summaries

- Integrated 8 Hour Cr6 Concentration Summaries
- Integrated 8 Hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program to Date Integrated 8 Hour Cr6 Sampling Results Statistics

Statistics[1]	Layout Area 1										
	M1 (ng/m^3)	M2 (ng/m^3)	M3 (ng/m^3)	M4 (ng/m^3)	M5 (ng/m^3)	M6 (ng/m^3)	M7 (ng/m^3)	M8 (ng/m^3)	M9 (ng/m^3)	M10 (ng/m^3)	M11 (ng/m^3)
Total Number of Samples[2]	4	4	4	4	8	12	8	7	7	7	8
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	86%	100%	100%	100%
Number of Detected Samples[3]	0	1	0	1	2	2	0	0	0	0	2
% of Cr6 Samples Greater than MDL	0	25%	0	25%	25%	17%	0	0	0	0	25%
Number of Samples Above AAC	0	0	0	0	0	0	0	0	0	0	0
Average % Cr6 in Dust[4]	0.021%	0.025%	0.020%	0.029%	0.029%	0.024%	0.020%	0.018%	0.019%	0.020%	0.027%
Maximum % Cr6 in Dust[4]	0.021%	0.040%	0.020%	0.056%	0.071%	0.043%	0.021%	0.021%	0.021%	0.021%	0.050%

ng/m3 – nanograms per cubic meter

1 Total number of samples collected since March 18, 2013. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

2 Total number of sample results since March 18, 2013reported above the laboratory reporting limit.

3 The program to date average and maximum percent Cr6 in dust was calculated using all the integrated Total Particulate and Cr6 sample results collected since March 18, 2013.

Table B- 2: Monthly Average Integrated 8 Hour Cr6 Sampling Results

Statistics	Layout Area 1										
	M1 (ng/m^3)	M2 (ng/m^3)	M3 (ng/m^3)	M4 (ng/m^3)	M5 (ng/m^3)	M6 (ng/m^3)	M7 (ng/m^3)	M8 (ng/m^3)	M9 (ng/m^3)	M10 (ng/m^3)	M11 (ng/m^3)
Baseline	9.9	3.7	10.1	10.1							
March	10.6	9.3	9.0	15.4	13.6	3.5	10.0	7.3	8.1	7.9	10.6

ng/m^3 – nanograms per cubic meter

Table B- 3: Program to Date Integrated Total Particulate 8 Hour Sampling Results Statistics

Statistics	Layout Area 1										
	M1 (ng/m^3)	**M2 (ng/m^3)**	**M3 (ng/m^3)**	**M4 (ng/m^3)**	**M5 (ng/m^3)**	**M6 (ng/m^3)**	**M7 (ng/m^3)**	**M8 (ng/m^3)**	**M9 (ng/m^3)**	**M10 (ng/m^3)**	**M11 (ng/m^3)**
Total Number of Samples[1]	4	4	4	4	8	12	8	7	7	7	8
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	86%	100%	100%	100%
No of Detected Samples[2]	0	0	0	0	0	0	0	0	1	1	1
% Detection	0%	0%	0%	0%	0%	0%	0%	0%	0%	14%	12%

1 Total number of sample collected since March 18, 2013. Variations in the number of samples collected are specifically identified in Table A-2 within the report month of the variation.

2 Total number of sample results since March 18, 2013 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8 hour Total Particulate Sampling Results

Statistics[1]	Layout Area 1										
	M1 (µg/m^3)	M2 (µg/m^3)	M3 (µg/m^3)	M4 (µg/m^3)	M5 (µg/m^3)	M6 (µg/m^3)	M7 (µg/m^3)	M8 (µg/m^3)	M9 (µg/m^3)	M10 (µg/m^3)	M11 (µg/m^3)
Baseline	49.1	22.3	50.2	51.1							
March	51.6	32.0	45.8	52.6	44.1	13.0	49.9	57.6	41.9	38.9	41.3

µg/m^3 – micrograms per cubic meter

Table B- 5: Monthly Average Real Time PM_{10} Monitoring Results

Statistics	Layout Area 1										
	M1 ($\mu g/m^3$)	M2 ($\mu g/m^3$)	M3 ($\mu g/m^3$)	M4 ($\mu g/m^3$)	M5 ($\mu g/m^3$)	M6 ($\mu g/m^3$)	M7 ($\mu g/m^3$)	M8 ($\mu g/m^3$)	M9 ($\mu g/m^3$)	M10 ($\mu g/m^3$)	M11 ($\mu g/m^3$)
March	13.3	22.2	16.1	6.9	8.7	14.4	10.8	6.6	1.9	7.5	5.3

$\mu g/m^3$ – micrograms per cubic meter

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Air Quality Report
Metropolis Towers

Attached is a technical summary of air quality data for April 2013 at the Metropolis Towers cleanup site submitted by PPG Industries air monitoring consultant.

This report provides air monitoring information about conditions at the work areas associated with Layout Area 1.

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

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Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: April 2013

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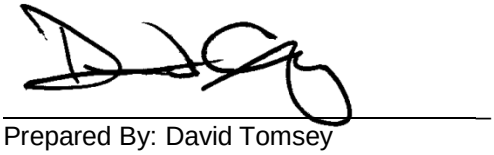

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April 24, 2013

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr6 – Hexavalent Chromium

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8 hour integrated hexavalent chromium (Cr6) and total particulates, as well as real time monitoring for PM_{10} at eleven (11) air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24 hour real time, Cr6, and total particulate sampling with lab analysis was also conducted at one elevated station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr6 sampling and analysis indicate that program to date average airborne Cr6 concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirming that dust control measures continue to be effective, and indicate that the levels of Cr6 in dust generated at the Site do not generate an emission source of Cr6 sufficient to create potential offsite exposure to Cr6 at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Layout Area 1 through the reporting period. This monthly report includes both monthly and program to date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real time 5 minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between July 17, 2012 and August 2, 2012. Routine sampling began on March 18, 2013 with the start of ground intrusive activities on Site.

Eleven air monitoring stations installed at Layout Area 1 provide protection during intrusive work at either Area B or E. Area B contains three ground level stations and one elevated station. Area E contains five ground level stations and two elevated stations. Each area contains an elevated station that measures 24 hour real time concentrations and collects Cr6 and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for Layout Area 1. **Table 2-1** provides an overview of the air monitoring approach at each of the AMS.

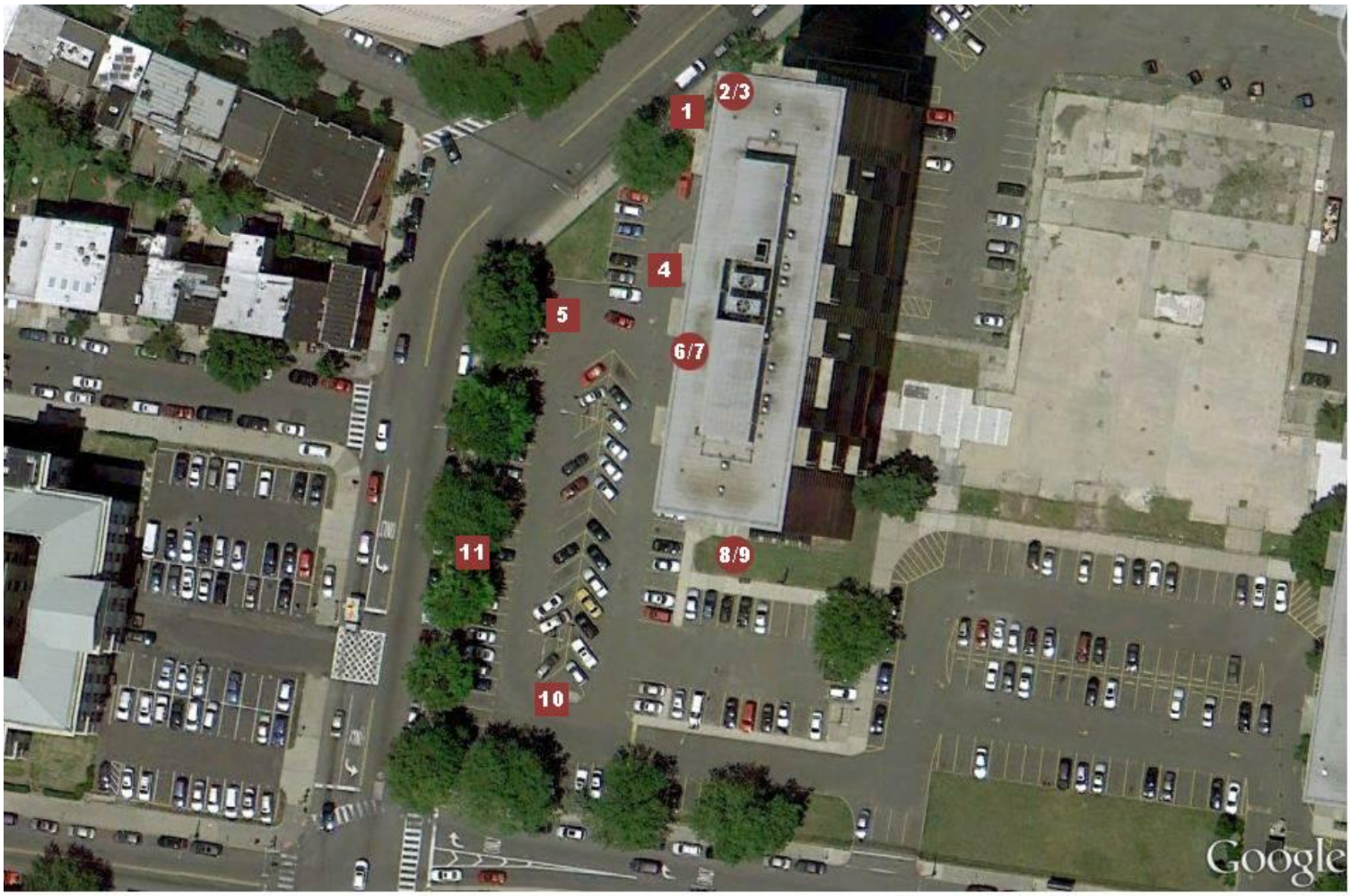
Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr6 concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis. The Cr6 average concentrations measured at each AMS will continually be compared to the Site specific AAC for Cr6 to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr6 air monitoring.

Air monitoring data collected at the Site includes:

- 8 hour integrated Cr6 and total particulate sample collection and associated laboratory analysis;
- 24 hour and 72 hour integrated Cr6 and total particulate samples collection and laboratory analysis; and
- Real time 5 minute average PM_{10}, readings measured at the work area perimeter.

This section outlines the types of data collected, frequency of collection, and the corresponding locations.

Figure 2-1: Site Overview



1 Ground level station location and designation

2/3 Ground level & elevated station location and designation

Table 2-1: Air Monitoring Approach

Layout Area 1	Station	Integrated Air Monitoring	Real Time Air Monitoring
Area B	**M 1,2,3,4**	Integrated 8 hour Cr6 and total particulate sampling and analysis during work days. 24 hour and 72 hour Cr6 sampling and analysis at one station 7 days per week.	5 minute average PM_{10} readings measured during a typical work day.
Area E	**M 5,6,7,8,9, 10,11**	Integrated 8 hour Cr6 and total particulate sampling and analysis during work days. 24 hour and 72 hour Cr6 sampling and analysis at one station 7 days per week.	5 minute average PM_{10} readings measured during a typical work day.

2.1 Integrated Air Sampling

Integrated Cr6 and total particulate samples are collected at each of the AMS for an 8 hour to 10 hour duration each working day (Typically Monday – Friday) at each of the eleven stations. Samples are collected on a preweighed polyvinyl chloride 37mm filter cassette for both Cr6 and total particulates. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

2.1.1 Integrated Cr6 Sampling

The exposed Cr6 filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for Cr6 analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8 hour to 10 hour integrated Cr6 air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24 hour and 72 hour Cr6 sampling and analysis are also performed at one AMS per work area. These longer duration samples show Cr6 concentrations during overnight and weekend periods. The 24 hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72 hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for total particulate analysis using NIOSH method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8 hour to 10 hour integrated Cr6 air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real Time Air Monitoring

Real time air monitoring is divided into two types of monitoring including: work area monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Work Area

Work area air monitoring consists of ground level and elevated stations at the perimeter of the work area. Work area monitoring includes the following:

- Real time 5 minute average PM_{10} readings at each of the eleven locations. Three ground level and one elevated station for Area B and five ground level stations and two elevated stations for Area E. Stations one through four associated with Area B only operate when remedial activities are conducted in Area B. Stations five through eleven associated with Area E only operate when remedial activities are conducted in Area E. All stations operate 8 to 10 hours during remedial activities, Monday through Friday, with one elevated station per work area running 24 hours a day, seven days a week.

2.2.2 Meteorological Measurements

Meteorological measurements of 5 minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at elevated station 3 for Area B and elevated station 6 for Area E.

3.0 Site Specific Acceptable Air Concentration and Real Time Action Levels

Site specific AAC and real time Action Levels have been developed for Cr6 and real time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real time Action Levels have been developed to protect off site receptors from potential adverse health impacts from Cr6 and particulates over the duration of the intrusive remediation activities.

Real time monitoring and integrated results are compared against the AAC and the real time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real time action levels for integrated Cr6 concentrations and real time PM_{10} are outlined in the following sections.

3.1 Integrated Cr6 Acceptable Air Concentration

A Site specific Cr6 AAC has been developed by NJDEP to protect off site receptors from potential adverse health impacts due to potential exposure to Cr6 in dust. The AAC for Cr6 was developed to represent the maximum allowable average concentration of Cr6 in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one in one million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr6 emanating from the Site.

The AAC of 49 ng/m^3 is applicable at the work area perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC also provides a value to evaluate the effectiveness of dust control.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr6 are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. These shorter duration average concentrations metrics include: program to date, 90 day, 60 day, and 30 day running averages where the average Cr6 concentration over the previous 90 day, 60 day, and 30 day periods are calculated for each

sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr6 Metrics

Metric Observation	Response Action
30 day[1] Cr6 average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60 day[1] Cr6 average concentration greater than or equal to 40 ng/m3	
90 day[1] Cr6 average concentration greater than or equal to 35 ng/m3	
1 Sampling days.	

3.2 Real Time Alert and Action Levels

Real time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site Specific Alert and Action Levels

Parameter	Alert Level (1 min TWA)	Action Level (5 min TWA)
PM_{10}	339 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between April 1, 2013 and April 30, 2013 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real time results;
- Program to date integrated and real time statistics;
- Evaluation of program success versus the Site specific AAC and action levels; and
- Meteorological results.

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program to date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr6 and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr6 Sampling Results

Results of the Cr6 sampling from the reporting period and a program to date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8 hour Cr6 concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr6 concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program to Date

Sampling and analytical statistics for integrated 8 hour Cr6 results are shown in Table B-1 and include various programs to date metrics relative to Cr6 analytical data. Monthly average 8 hour Cr6 concentration results are shown in Table B-2 for each AMS location. A snapshot of the program to date and 30 day running Cr6 average concentrations are shown in **Table 4-1**. The limited number of sample days did not allow for a 60 or 90 day metric.

Table 4-1: Short Term Average 8 Hour Integrated Cr6 Metrics

Running Cr6 Metrics[1]		Layout Area 1										
	Metric (ng/m^3)	**M1 (ng/m^3)**	**M2 (ng/m^3)**	**M3 (ng/m^3)**	**M4 (ng/m^3)**	**M5 (ng/m^3)**	**M6 (ng/m^3)**	**M7 (ng/m^3)**	**M8 (ng/m^3)**	**M9 (ng/m^3)**	**M10 (ng/m^3)**	**M11 (ng/m^3)**
30 day[2]	**45**	NA	NA	NA	NA	8.1	1.7	7.2	7.8	7.5	7.4	7.5
60 day[2]	**40**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
90 day[2]	**35**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PTD[3]		10.6	9.3	9.0	15.4	9.1	2.2	7.8	7.6	7.6	7.4	8.1

ng/m^3 – nanograms per cubic meter

1 Running Cr6 metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr6 are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. The running Cr6 metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long term (program) ending success.

2. Running Cr6 metrics are valid on the last day in the report period and include the previous 30, 60, or 90 days of sample results.

3. Program to Date - Air monitoring conducted from March 18, 2013 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8 hour integrated total particulate sampling and analysis from the reporting period and program to date results are discussed in the following sections.

Reporting Period

Individual integrated 8 hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program to date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 54 sample days between March 18, 2013 and the end of the reporting period. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8 hour Cr6 average concentrations, based upon lab analytical results at each AMS, were less than 32% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real Time Air Monitoring Results

Real time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real time 5 minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real time 5 minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3. Area E's cut lines were extended to incorporate additional chromium impacted soils at the boundary of the

excavation. Station M5 was moved north on April 29th to include additional intrusive activities within the monitoring boundary. Stations M8 and M9 were moved to the east so that the excavation could extend to the east at the south end of the building. Excavations B70, B78, and B79 were completed within a short duration (<45 minutes) and were monitored with a handheld monitor.

Program to Date

Real time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

- Excavate and load out Area E;
- Backfill Area E

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-6.

5.0 Conclusions

Results of this project's reporting period show the air sampling and monitoring program at the Metropolis Towers Site indicate that the average Cr6 concentrations for each AMS are well below the AAC of 49 ng/m^3. The program through this reporting period shows the Cr6 concentrations and percent Cr6 in dust samples demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr6 in dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr6 and do not generate an emission source of Cr6 sufficient to create potential offsite exposure to Cr6 at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8 Hour Cr6 Concentrations
- Integrated 8 Hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8 Hour Cr6 Sampling Results

Date of Sample	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
04/01/13					9.0	2.7	9.0	9.0	9.5	8.5	8.5
04/02/13					7.0	3.4	7.0	7.0	7.0	6.5	6.5
04/03/13					6.5	2.6	7.0	7.5	7.5	7.0	7.0
04/04/13					6.5	2.6	7.0	7.5	7.0	6.5	6.5
04/05/13					7.5	0.85	7.5	8.0	8.0	7.5	7.5
04/06/13						0.85					
04/07/13						0.85					
04/08/13					7.0	2.6	6.5	7.0	7.0	7.0	7.0
04/09/13					6.5	2.60	6.5	7.0	6.5	7.0	NA
04/10/13					6.5	2.55	NA	7.0	7.0	7.0	7.0
04/11/13					7.0	2.55	6.5	7.0	6.0	6.5	7.0
04/12/13					16.5	0.1	15.5	17.5	17.0	16.0	16.5
04/13/13						0.1					
04/14/13						0.1					
04/15/13					6.5	2.55	6.0	6.5	6.5	6.5	6.5
04/16/13					6.5	2.55	6.0	7.0	6.5	6.5	6.5
04/17/13					6.5	2.6	6.5	7.0	6.5	6.5	6.5
04/18/13					6.5	2.55	6.0	7.0	6.5	6.5	6.5
04/19/13					6.5	0.85	6.0	6.5	6.5	6.5	6.5
04/20/13						0.85					
04/21/13						0.85					
04/22/13					7.0	2.55	6.5	7.0	7.0	7.0	7.0
04/23/13					7.0	2.55	6.5	7.0	7.0	7.0	7.5
04/24/13					7.5	2.55	7.5	8.0	7.5	7.5	7.5
04/25/13					6.5	NA	6.5	6.5	6.5	6.5	6.5
04/26/13					7.0	0.85	6.5	7.0	6.5	6.5	7.0
04/27/13						0.85					
04/28/13						0.85					
04/29/13					6.5	2.6	6.5	7.0	6.5	6.5	7.0
04/30/13					7.0	2.6	6.5	7.0	6.5	6.0	6.0

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr6. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8 Hour Total Particulate Sampling Results

Date of Sample	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
04/01/13					44	13.5	44.5	46	40	43.5	43.5
04/02/13					34	13.5	34	34.5	36	130	120
04/03/13					33.5	13	34.5	36.5	37	34	34.5
04/04/13					38.5	13	34.5	36.5	35.1	38.5	38.5
04/05/13					36.5	4.3	38.5	40.5	39	36.5	37.5
04/06/13						4.3					
04/07/13						4.3					
04/08/13					34.5	60	70	36	34.5	34	79
04/09/13					67	38	33	35	34.5	34	NA
04/10/13					33.4	55	NA	38	43	34	34.5
04/11/13					80	4.25	80	85	85	80	80
04/12/13					34	13	32.5	35	30.5	33	34
04/13/13						13					
04/14/13						13					
04/15/13					37.5	13	31	33.5	33	32.5	33
04/16/13					37.5	59	130	34	33.5	32	33
04/17/13					33	31	33	34.5	33	32	32.5
04/18/13					34	29	31	34	33	33	33.5
04/19/13					31.5	4.25	30	33	31.5	32.5	32
04/20/13						4.25					
04/21/13						4.25					
04/22/13					34.5	35	33	35.5	34.5	73	34.5
04/23/13					34	12.5	32.5	35.5	34	35	37.5
04/24/13					37.5	31	36.5	39	37.5	38	36
04/25/13					33	NA	31.5	33.5	32.5	33.5	33
04/26/13					34	4.25	33	34	33	33.5	34.5
04/27/13						4.25					
04/28/13						4.25					
04/29/13					38.5	26	37.5	35	38.5	38.5	34
04/30/13					34	47	120	39.5	38.5	30	31

Results in microograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's site 114 reporting of non-detects by AECOM.

Figure A- 1: Real Time 5 Minute Average PM_{10} Monitoring Results

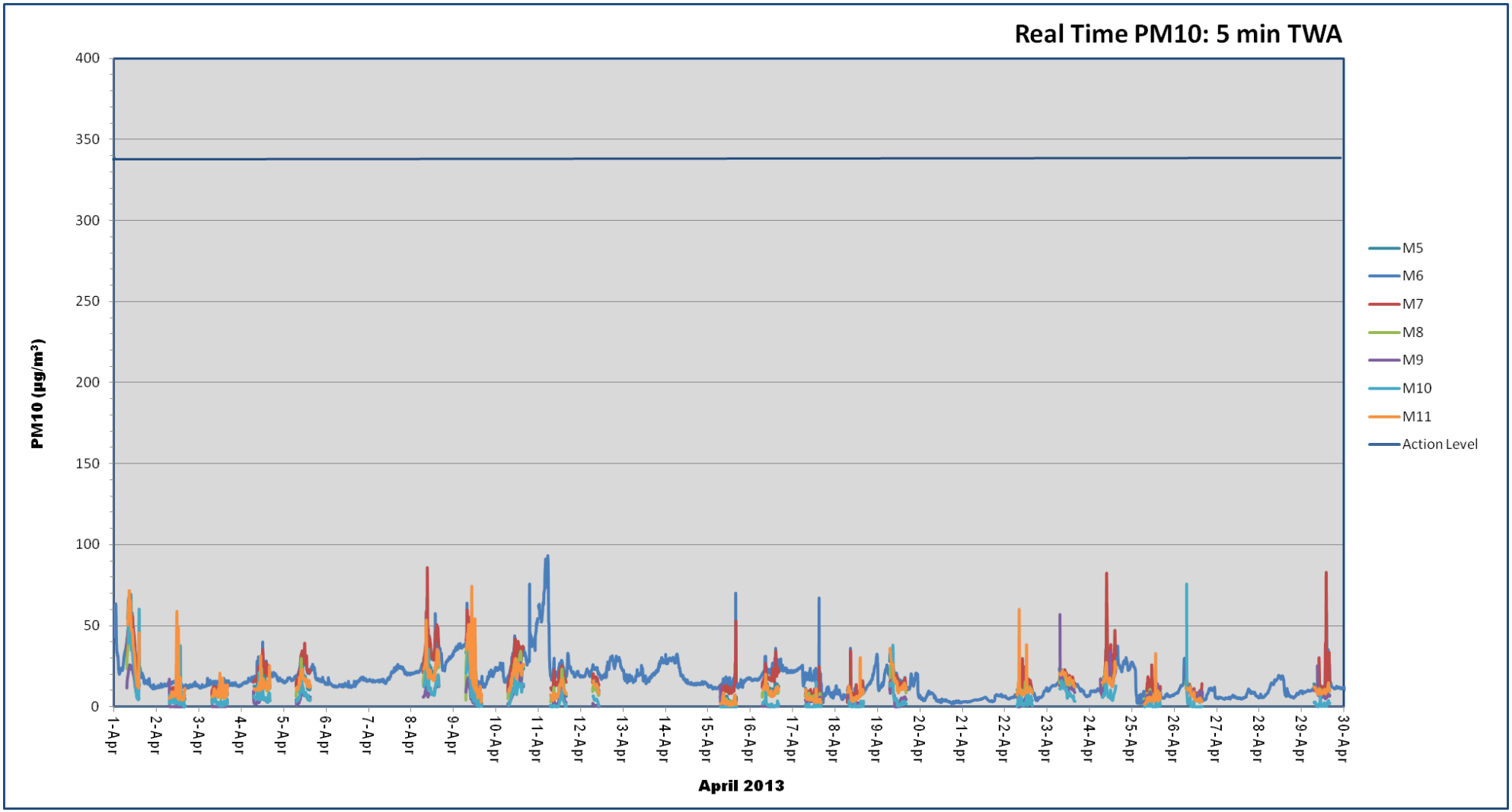


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
Dust	NA	NA	NA	NA	NA	NA

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter ($\mu g/m^3$)

ng/m^3 – nanograms per cubic meter

$\mu g/m^3$ – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

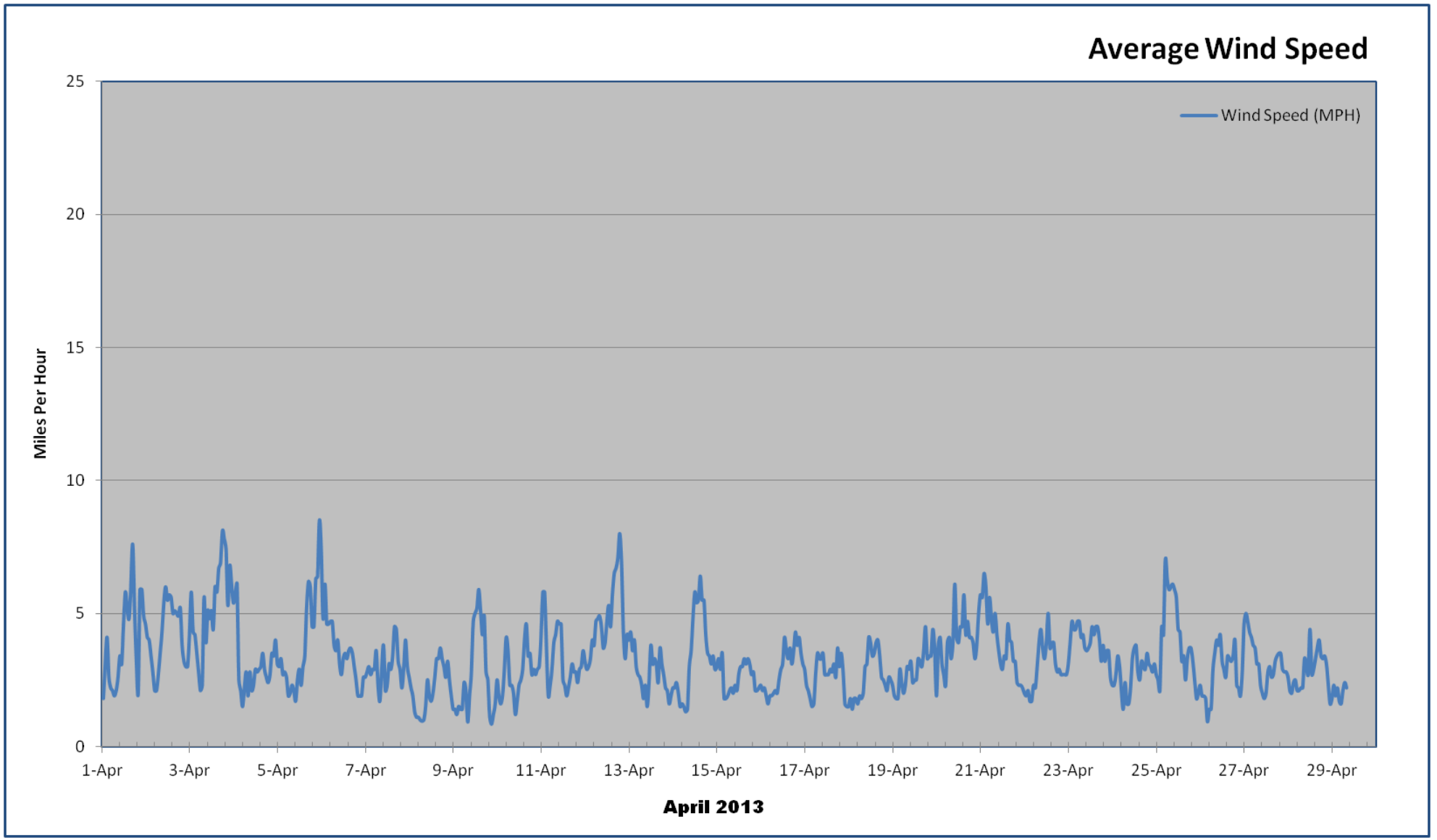


Figure A-3: Temperature

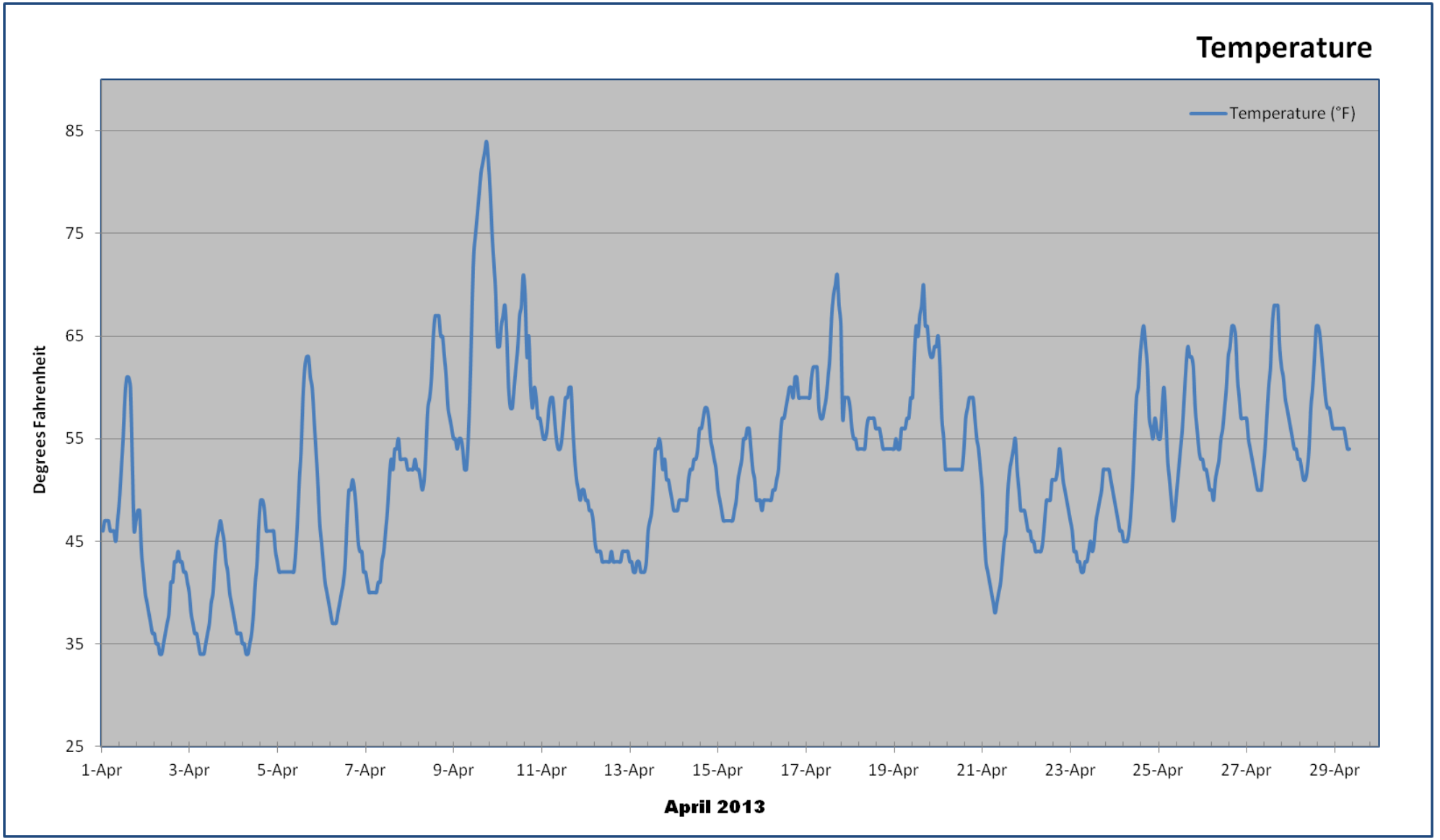


Figure A-4: Relative Humidity

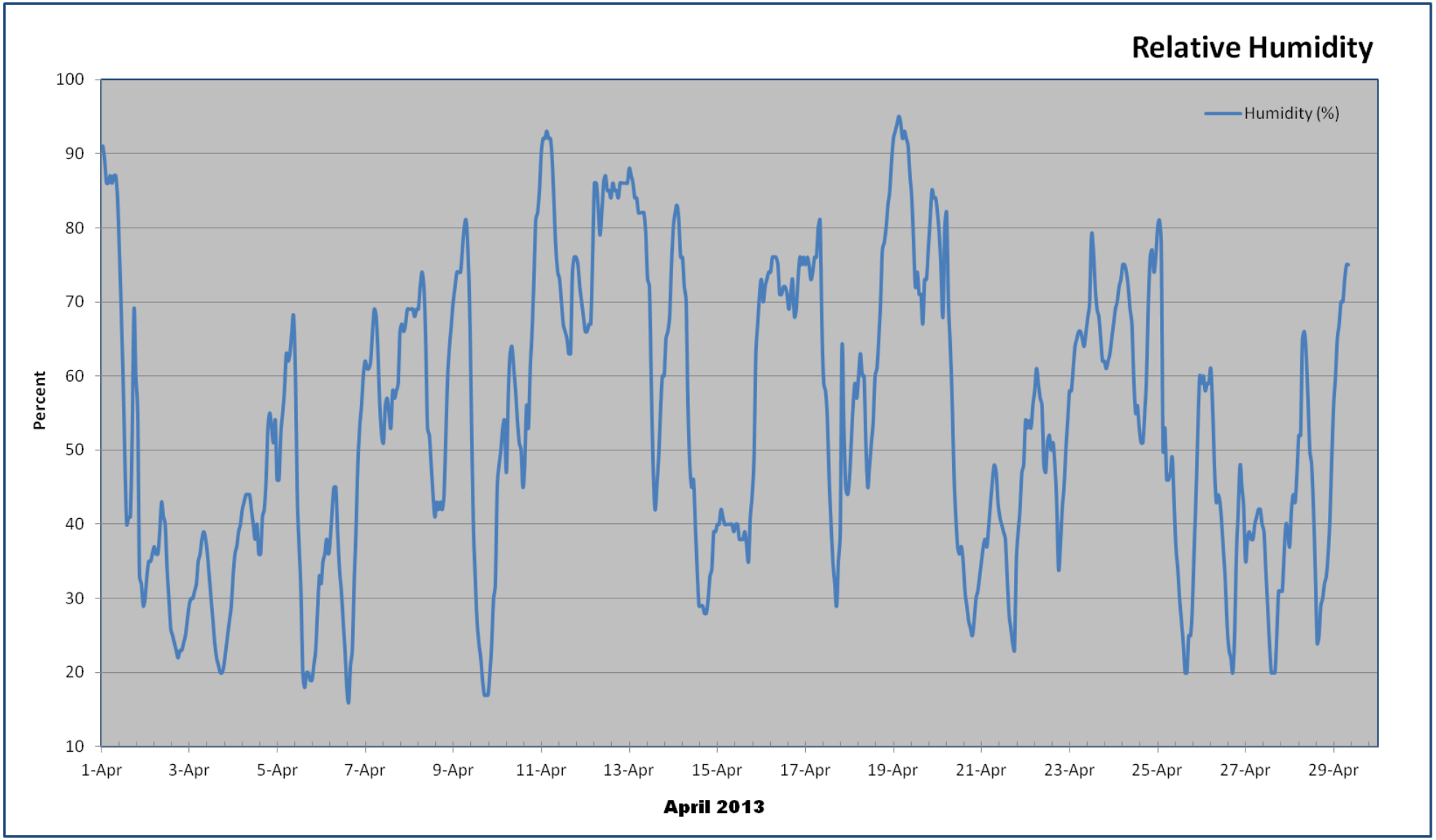
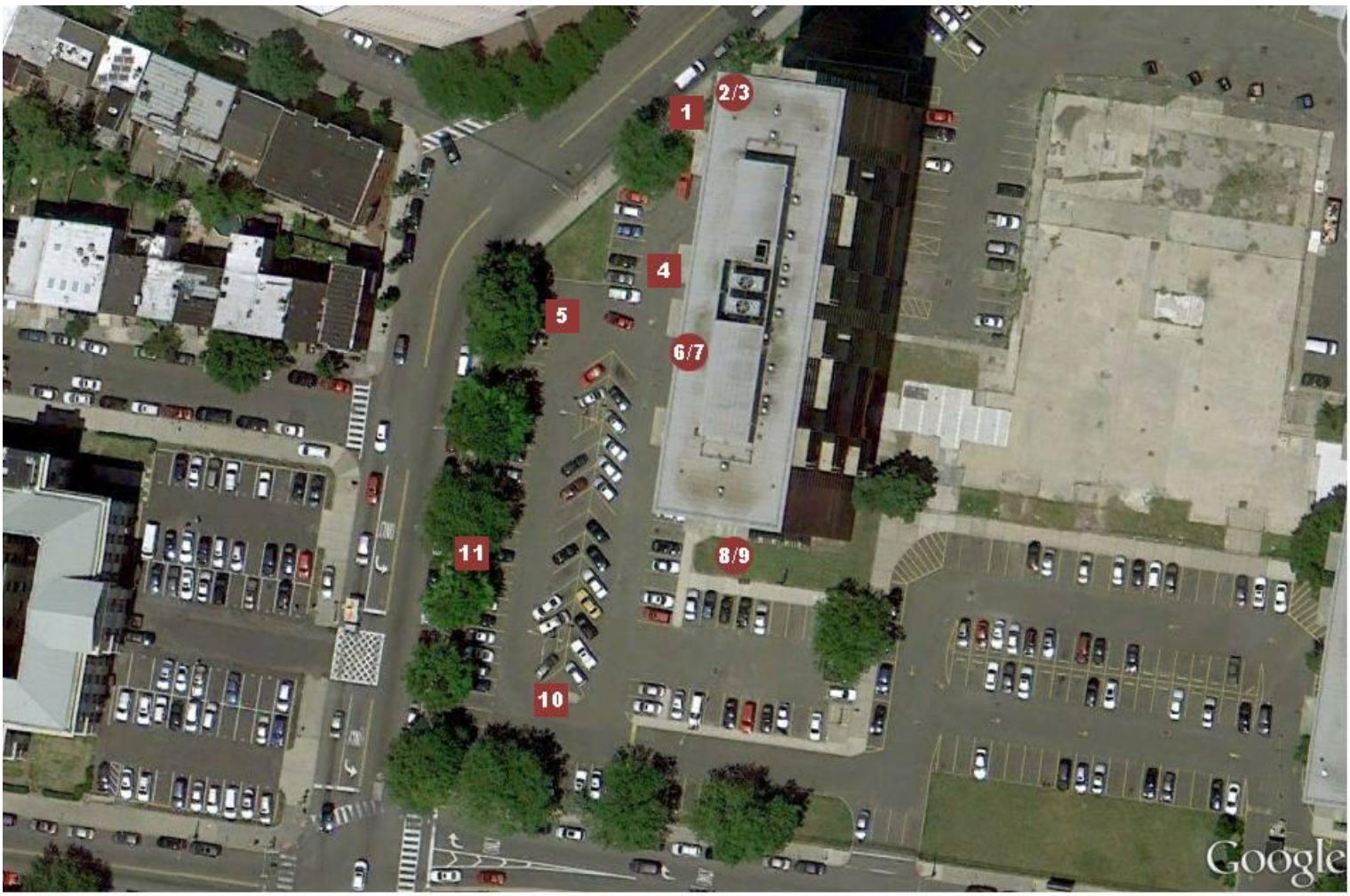


Figure A–5: Site Map 04.01.13 – 04.28.13



1 Ground level station location and designation

2/3 Ground level & elevated station location and designation

Figure 2: Station Location Map 04.29.13 – 04.30.13

1 Ground level station location and designation

2/3 Ground level & elevated station location and designation

Appendix B

Program to Date Result Summaries

- Integrated 8 Hour Cr6 Concentration Summaries
- Integrated 8 Hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program to Date Integrated 8 Hour Cr6 Sampling Results Statistics

Statistics[1]	Layout Area 1										
	M1 (ng/m^3)	M2 (ng/m^3)	M3 (ng/m^3)	M4 (ng/m^3)	M5 (ng/m^3)	M6 (ng/m^3)	M7 (ng/m^3)	M8 (ng/m^3)	M9 (ng/m^3)	M10 (ng/m^3)	M11 (ng/m^3)
Total Number of Samples[2]	4	4	4	4	30	50	29	30	30	30	29
Rate of Data Collection	100%	100%	100%	100%	100%	96%	97%	100%	100%	100%	97%
Number of Detected Samples[3]	0	1	0	1	0	2	0	0	0	0	2
% of Cr6 Samples Greater than MDL	0	25%	0	25%	0	4%	0	0	0	0	7%
Number of Samples Above AAC	0	0	0	0	0	0	0	0	0	0	0
Average % Cr6 in Dust[4]	0.021%	0.025%	0.020%	0.029%	0.022%	0.018%	0.019%	0.020%	0.020%	0.020%	0.019%
Maximum % Cr6 in Dust[4]	0.021%	0.040%	0.020%	0.056%	0.071%	0.060%	0.048%	0.050%	0.056%	0.048%	0.050%

ng/m3 – nanograms per cubic meter

[1] Total number of samples collected since March 18, 2013. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since March 18, 2013 reported above the laboratory reporting limit.

[3] The program to date average and maximum percent Cr6 in dust was calculated using all the integrated Total Particulate and Cr6 sample results collected since March 18, 2013.

Table B- 2: Monthly Average Integrated 8 Hour Cr6 Sampling Results

Statistics	Layout Area 1										
	M1 (ng/m^3)	M2 (ng/m^3)	M3 (ng/m^3)	M4 (ng/m^3)	M5 (ng/m^3)	M6 (ng/m^3)	M7 (ng/m^3)	M8 (ng/m^3)	M9 (ng/m^3)	M10 (ng/m^3)	M11 (ng/m^3)
Baseline	9.9	3.7	10.1	10.1	-	-	-	-	-	-	-
March	10.6	9.3	9.0	15.4	13.6	3.5	10.0	7.3	8.1	7.9	10.6
April	-	-	-	-	7.3	1.8	7.1	7.6	7.4	7.2	7.4
PTD	10.6	9.3	9.0	15.4	9.1	2.2	7.8	7.6	7.6	7.4	8.1

ng/m^3 – nanograms per cubic meter

Table B- 3: Program to Date Integrated Total Particulate 8 Hour Sampling Results Statistics

Statistics	Layout Area 1										
	M1 (ng/m^3)	**M2 (ng/m^3)**	**M3 (ng/m^3)**	**M4 (ng/m^3)**	**M5 (ng/m^3)**	**M6 (ng/m^3)**	**M7 (ng/m^3)**	**M8 (ng/m^3)**	**M9 (ng/m^3)**	**M10 (ng/m^3)**	**M11 (ng/m^3)**
Total Number of Samples[1]	4	4	4	4	30	50	29	30	30	30	29
Rate of Data Collection	100%	100%	100%	100%	100%	96%	97%	100%	100%	100%	97%
No of Detected Samples[2]	0	0	0	0	0	8	4	0	1	3	2
% Detection	0	0	0	0	0	16%	14%	0	3%	10%	7%

1 Total number of sample collected since March 18, 2013. Variations in the number of samples collected are specifically identified in Table A-2 within the report month of the variation.

2 Total number of sample results since March 18, 2013 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8 hour Total Particulate Sampling Results

Statistics[1]	Layout Area 1										
	M1 (µg/m^3)	M2 (µg/m^3)	M3 (µg/m^3)	M4 (µg/m^3)	M5 (µg/m^3)	M6 (µg/m^3)	M7 (µg/m^3)	M8 (µg/m^3)	M9 (µg/m^3)	M10 (µg/m^3)	M11 (µg/m^3)
Baseline	49.1	22.3	50.2	51.1	-	-	-	-	-	-	-
March	51.6	32.0	45.8	52.6	44.1	13.0	49.9	57.6	41.9	38.9	41.3
April	-	-	-	-	38.8	19.7	46.7	38.4	37.6	42.8	43.1
PTD	51.6	32.0	45.8	52.6	39.8	18.0	49.9	41.7	38.5	41.2	41.9

µg/m^3 – micrograms per cubic meter

Table B- 5: Monthly Average Real Time PM_{10} Monitoring Results

Statistics	Layout Area 1										
	M1 (µg/m^3)	**M2 (µg/m^3)**	**M3 (µg/m^3)**	**M4 (µg/m^3)**	**M5 (µg/m^3)**	**M6 (µg/m^3)**	**M7 (µg/m^3)**	**M8 (µg/m^3)**	**M9 (µg/m^3)**	**M10 (µg/m^3)**	**M11 (µg/m^3)**
March	13.3	22.2	16.1	6.9	8.7	14.4	10.8	6.6	1.9	7.5	5.3
April	-	-	-	-	14.0	16.7	19.1	12.1	6.1	5.8	13.2
PTD	13.6	22.2	16.5	6.9	13.5	16.3	17.0	10.8	5.3	6.2	11.4

µg/m^3 – micrograms per cubic meter

May 2013
Air Quality Report
Metropolis Towers

Attached is a technical summary of air quality data for May 2013 at the Metropolis Towers cleanup site submitted by PPG Industries air monitoring consultant.

This report provides air monitoring information about conditions at the work areas associated with Layout Area 1.

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

EMILCOTT

Submitted to:
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4325 Rosanna Drive
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Submitted by:
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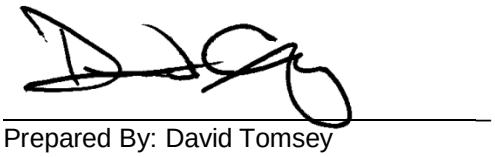
Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: May 2013

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: May 2013



Prepared By: David Tomsey

Reviewed By: Bruce Groves
June 19, 2013

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr6 – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8 hour integrated hexavalent chromium (Cr6) and total particulates, as well as real time monitoring for PM_{10} at eleven (11) air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24 hour real time, Cr6, and total particulate sampling with lab analysis was also conducted at one elevated station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr6 sampling and analysis indicate that program to date average airborne Cr6 concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirming that dust control measures continue to be effective, and indicate that the levels of Cr6 in dust generated at the Site do not generate an emission source of Cr6 sufficient to create potential offsite exposure to Cr6 at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Layout Area 1 through the reporting period. This monthly report includes both monthly and program to date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real time 5 minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between July 17, 2012 and August 2, 2012. Routine sampling began on March 18, 2013 with the start of ground intrusive activities on Site.

Eleven air monitoring stations installed at Layout Area 1 provide protection during intrusive work at Areas B and E. Area B contains three ground level stations and one elevated station. Area E contains five ground level stations and two elevated stations. Each area contains an elevated station that measures 24 hour real time concentrations and collects Cr6 and total particulate samples for 24 hours a day during the week and 72 hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for Layout Area 1. **Table 2-1** provides an overview of the air monitoring approach at each of the AMS.

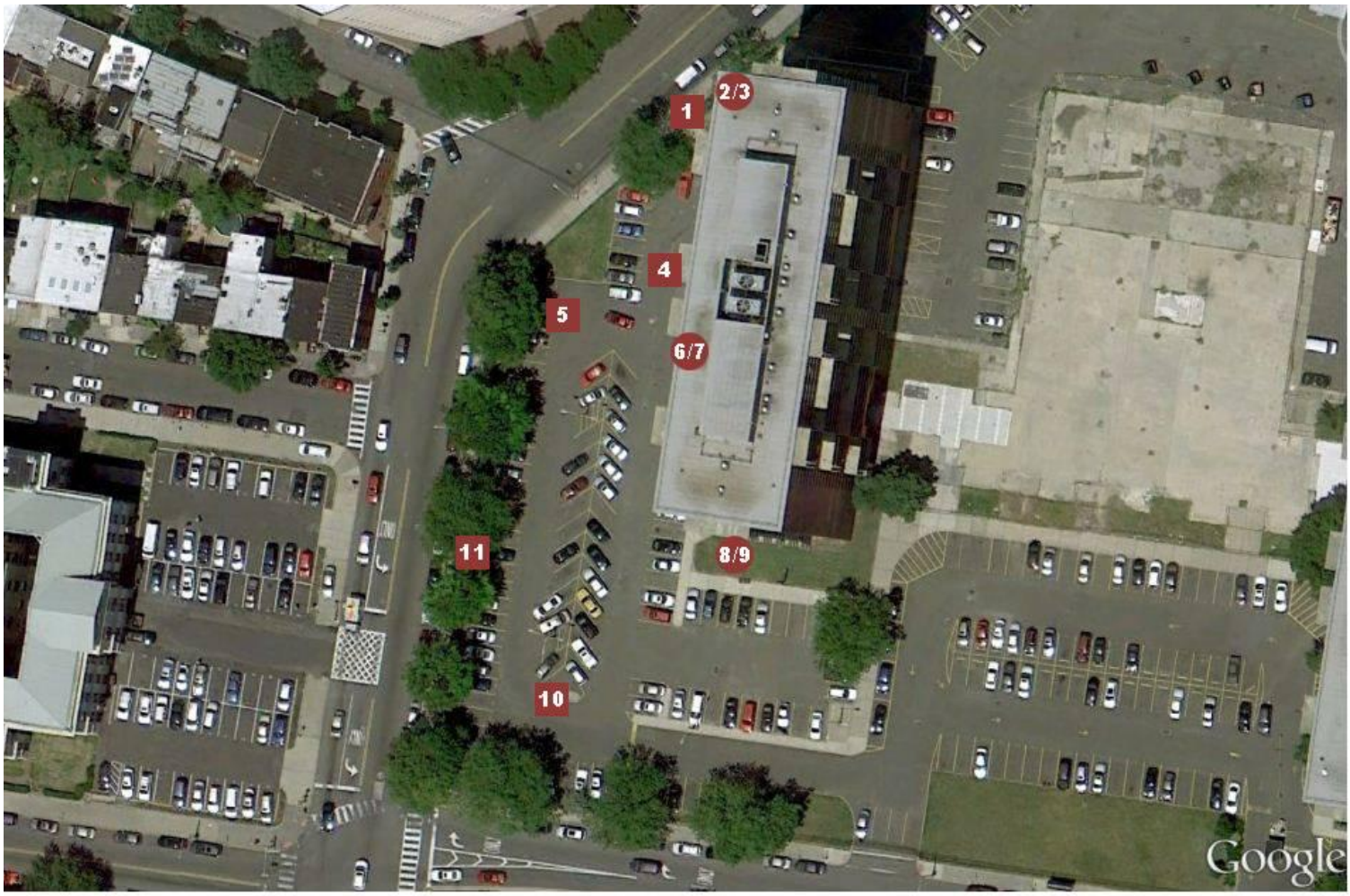
Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr6 concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis. The Cr6 average concentrations measured at each AMS will continually be compared to the Site specific AAC for Cr6 to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr6 fenceline air monitoring.

Air monitoring data collected at the Site includes:

- 8 hour integrated Cr6 and total particulate sample collection and associated laboratory analysis;
- 24 hour and 72 hour integrated Cr6 and total particulate samples collection and laboratory analysis; and
- Real time 5 minute average PM_{10}, readings measured at the work area perimeter.

This section outlines the types of data collected, frequency of collection, and the corresponding locations.

Figure 2-1: Site Overview



1 Ground level station location and designation

2/3 Ground level & elevated station location and designation

Table 2-1: Air Monitoring Approach

Layout Area 1	Station	Integrated Air Monitoring	Real Time Air Monitoring
Area B	**M 1,2,3,4**	Integrated 8 hour Cr6 and total particulate sampling and analysis during work days. 24 hour and 72 hour Cr6 sampling and analysis at one station 7 days per week.	5 minute average PM_{10} readings measured during a typical work day.
Area E	**M 5,6,7,8,9, 10,11**	Integrated 8 hour Cr6 and total particulate sampling and analysis during work days. 24 hour and 72 hour Cr6 sampling and analysis at one station 7 days per week.	5 minute average PM_{10} readings measured during a typical work day.

2.1 Integrated Air Sampling

Integrated Cr6 and total particulate samples are collected at each of the AMS for an 8 hour to 10 hour duration each working day (Typically Monday – Friday) at each of the eleven stations. Samples are collected on a preweighed polyvinyl chloride 37mm filter cassette for both Cr6 and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

2.1.1 Integrated Cr6 Sampling

The exposed Cr6 filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for Cr6 analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8 hour to 10 hour integrated Cr6 air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24 hour and 72 hour Cr6 sampling and analysis are also performed at one AMS per work area. These longer duration samples show Cr6 concentrations during overnight and weekend periods. The 24 hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72 hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for total particulate analysis using NIOSH method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8 hour to 10 hour integrated Cr6 air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real Time Air Monitoring

Real time air monitoring is divided into two types of monitoring including: work area monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Work Area

Work area air monitoring consists of ground level and elevated stations at the perimeter of the work area. Work area monitoring includes the following:

- Real time 5 minute average PM_{10} readings at each of the eleven locations. Three ground level and one elevated station for Area B and five ground level stations and two elevated stations for Area E. All stations operate 8 to 10 hours during remedial activities, Monday through Friday, with one elevated station per work area running 24 hours a day, seven days a week.

2.2.2 Meteorological Measurements

Meteorological measurements of 5 minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at elevated station 2 for Area B and elevated station 6 for Area E.

3.0 Site Specific Acceptable Air Concentration and Real Time Action Levels

Site specific AAC and real time Action Levels have been developed for Cr6 and real time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real time Action Levels have been developed to protect off site receptors from potential adverse health impacts from Cr6 and particulates over the duration of the intrusive remediation activities.

Real time monitoring and integrated results are compared against the AAC and the real time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real time action levels for integrated Cr6 concentrations and real time PM_{10} are outlined in the following sections.

3.1 Integrated Cr6 Acceptable Air Concentration

A Site specific Cr6 AAC has been developed by NJDEP to protect off site receptors from potential adverse health impacts due to potential exposure to Cr6 in dust. The AAC for Cr6 was developed to represent the maximum allowable average concentration of Cr6 in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one in one million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr6 emanating from the Site.

The AAC of 49 ng/m^3 is applicable at the work area perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC also provides a value to evaluate the effectiveness of dust control.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr6 are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. These shorter duration average concentrations metrics include: program to date, 90 day, 60 day, and 30 day running averages where the average Cr6 concentration over the previous 90 day, 60 day, and 30 day periods are calculated for each

sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr6 Metrics

Metric Observation	Response Action
30 day[1] Cr6 average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60 day[1] Cr6 average concentration greater than or equal to 40 ng/m3	
90 day[1] Cr6 average concentration greater than or equal to 35 ng/m3	
1 Sampling days.	

3.2 Real Time Alert and Action Levels

Real time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site Specific Alert and Action Levels

Parameter	Alert Level (1 min TWA)	Action Level (5 min TWA)
PM_{10}	339 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between May 1, 2013 and May 31, 2013 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real time results;
- Program to date integrated and real time statistics;
- Evaluation of program success versus the Site specific AAC and action levels; and
- Meteorological results.

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program to date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr6 and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr6 Sampling Results

Results of the Cr6 sampling from the reporting period and a program to date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8 hour Cr6 concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr6 concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program to Date

Sampling and analytical statistics for integrated 8 hour Cr6 results are shown in Table B-1 and include various programs to date metrics relative to Cr6 analytical data. Monthly average 8 hour Cr6 concentration results are shown in Table B-2 for each AMS location. A snapshot of the program to date, 30, 60, and 90 day running Cr6 average concentrations at the end of the reporting period are shown in Table 401.

Table 4-1: Short Term Average 8 Hour Integrated Cr6 Metrics

Running Cr6 Metrics[1]		Layout Area 1										
	Metric (ng/m^3)	**M1 (ng/m^3)**	**M2 (ng/m^3)**	**M3 (ng/m^3)**	**M4 (ng/m^3)**	**M5 (ng/m^3)**	**M6 (ng/m^3)**	**M7 (ng/m^3)**	**M8 (ng/m^3)**	**M9 (ng/m^3)**	**M10 (ng/m^3)**	**M11 (ng/m^3)**
30 day[2]	**45**	7.8	1.5	7.8	7.8	5.8	2.4	7.4	7.8	7.6	7.6	7.7
60 day[2]	**40**	7.8	1.5	7.8	7.8	7.0	2.0	7.2	7.7	7.4	7.4	7.5
90 day[2]	**35**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PTD[3]		9.7	5.0	8.6	12.8	8.2	2.3	7.7	7.6	7.5	7.4	8.0

ng/m^3 – nanograms per cubic meter

1 Running Cr6 metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr6 are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. The running Cr6 metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long term (program) ending success.

2. Running Cr6 metrics are valid on the last day in the report period and include the previous 30, 60, or 90 days of sample results.

3. Program to Date - Air monitoring conducted from March 18, 2013 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8 hour integrated total particulate sampling and analysis from the reporting period and program to date results are discussed in the following sections.

Reporting Period

Individual integrated 8 hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program to date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 75 sample days between March 18, 2013 and the end of the reporting period. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8 hour Cr6 average concentrations, based upon lab analytical results at each AMS, were less than 27% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real Time Air Monitoring Results

Real time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real time 5 minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real time 5 minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3.

Program to Date

Real time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

- Excavate southern portion of Area E;
- Backfill Area E;
- Partial demobilization of site. Remove truck tire wash
- Expose conduit in Area B and chip impacted concrete (May 30th).

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-6.

5.0 Conclusions

Results of this project's reporting period show the air sampling and monitoring program at the Metropolis Towers Site indicate that the average Cr6 concentrations for each AMS are well below the AAC of 49 ng/m^3. The program through this reporting period shows the Cr6 concentrations and percent Cr6 in dust samples demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr6 in dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr6 and do not generate an emission source of Cr6 sufficient to create potential offsite exposure to Cr6 at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8 Hour Cr6 Concentrations
- Integrated 8 Hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8 Hour Cr6 Sampling Results

Date of Sample	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
05/01/13					7	2.55	7	7.5	7	7	7.5
05/02/13					7	NA	7	7.5	7	7	7
05/03/13					21	0.85	8	8.5	8.5	8	8
05/04/13						0.85					
05/05/13						0.85					
05/06/13					6.5	2.55	6.5	6.5	6.5	6.5	6.5
05/07/13					6.5	2.35	6.5	7	6.5	6.5	6.5
05/08/13					11.5	2.53	11	11.5	11	11.5	11.5
05/09/13					7	2.55	6	7	7	7	7
05/10/13					7.5	2.4	7	7.5	7.5	7	7.5
05/11/13						2.4					
05/12/13						2.4					
05/13/13					7	2.55	7	7	7	7	7
05/14/13					7	2.55	7	7.5	7	7	7
05/15/13					7	1.25	7	7.5	7.5	7.5	7.5
05/16/13						1.25					
05/17/13						0.85					
05/18/13						0.85					
05/19/13						0.85					
05/20/13						2.55					
05/21/13						2.55					
05/22/13					6.5	2.55	6.5	7	6.5	6.5	7
05/23/13					9	3.2	8.5	9.5	9	9	9
05/24/13						0.85					
05/25/13						0.85					
05/26/13						0.85					
05/27/13						2.55					
05/28/13						2.55					
05/29/13						2.55					
05/30/13	9	2.6	9	9		9					
05/31/13		0.85									

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr6. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8 Hour Total Particulate Sampling Results

Date of Sample	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
05/01/13					35.5	13	34	37	35.5	36	36.5
05/02/13					35.5	NA	34.5	37	35.5	35	35.5
05/03/13					41.5	15	40.5	43.5	42	40.5	41
05/04/13						15					
05/05/13						15					
05/06/13					33	42	77	33	32	41	34
05/07/13					33	38	65	34	32.5	33	33
05/08/13					55	14	55	55	55	55	60
05/09/13					34.5	13	31	36	34.5	34	35
05/10/13					36.5	6.5	130	37.5	36.5	36	37.5
05/11/13						6.5					
05/12/13						6.5					
05/13/13					34.5	13	34	36	34.5	34	35
05/14/13					36	13	34.5	37	36	36	36
05/15/13					36	6.5	35	37.5	36.5	36.5	94
05/16/13						6.5					
05/17/13						4.25					
05/18/13						4.25					
05/19/13						4.25					
05/20/13						36					
05/21/13						12.5					
05/22/13					33.5	31	32	35	33.5	33.5	76
05/23/13					44.5	28	43.5	46.5	45	44.5	45
05/24/13						4.25					
05/25/13						4.25					
05/26/13						4.25					
05/27/13						13					
05/28/13						13					
05/29/13						13					
05/30/13	44	13	44.5	44							
05/31/13		4.25									

Results in microograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at on
half the MDL for data reporting purposes. This established practice is consistent with PPG's site 114 reporting of non-detects by AECOM.

Figure A- 1: Real Time 5 Minute Average PM_{10} Monitoring Results

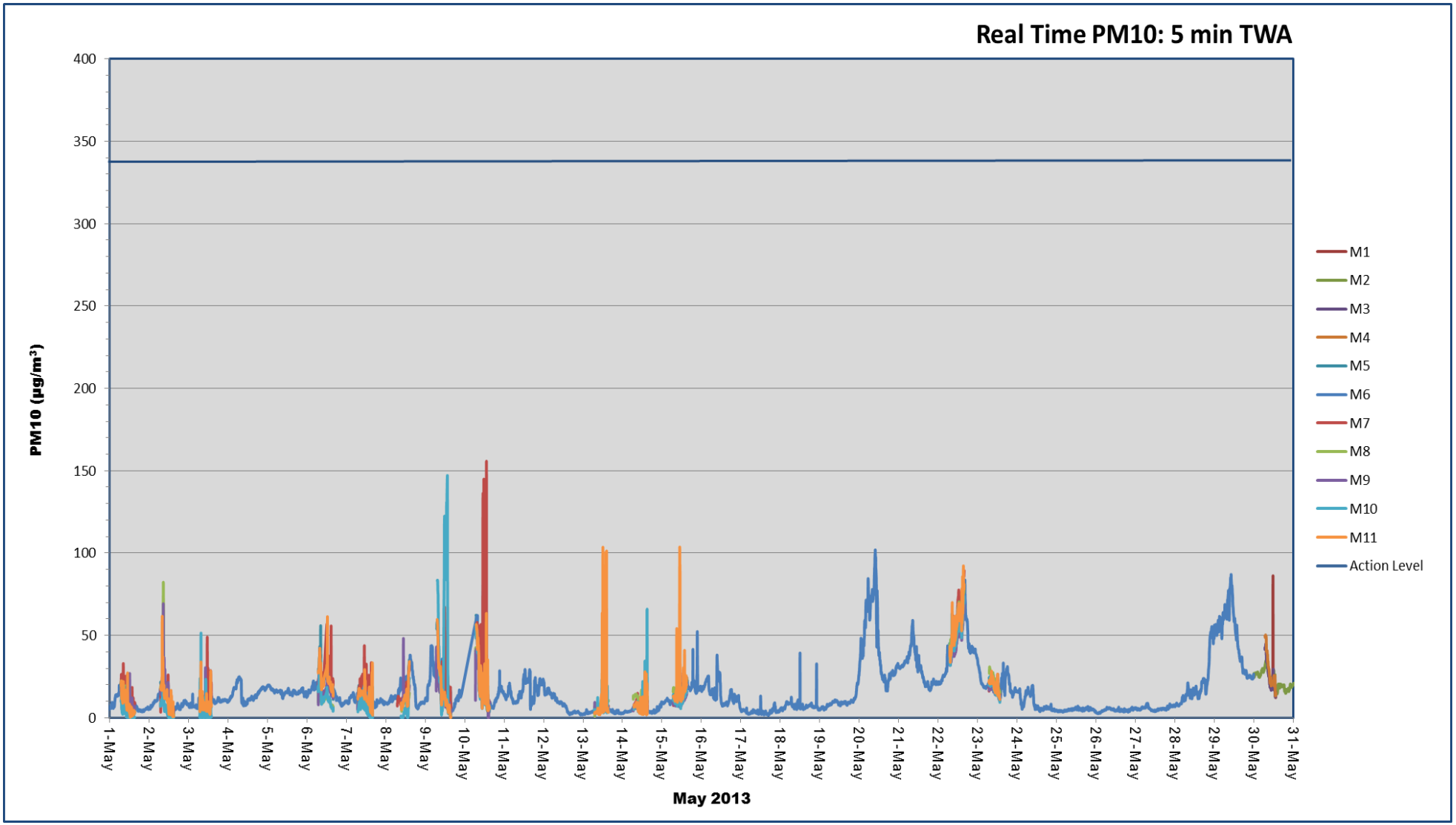


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
Dust	NA	NA	NA	NA	NA	NA

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter ($\mu g/m^3$)

ng/m^3 – nanograms per cubic meter

$\mu g/m^3$ – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

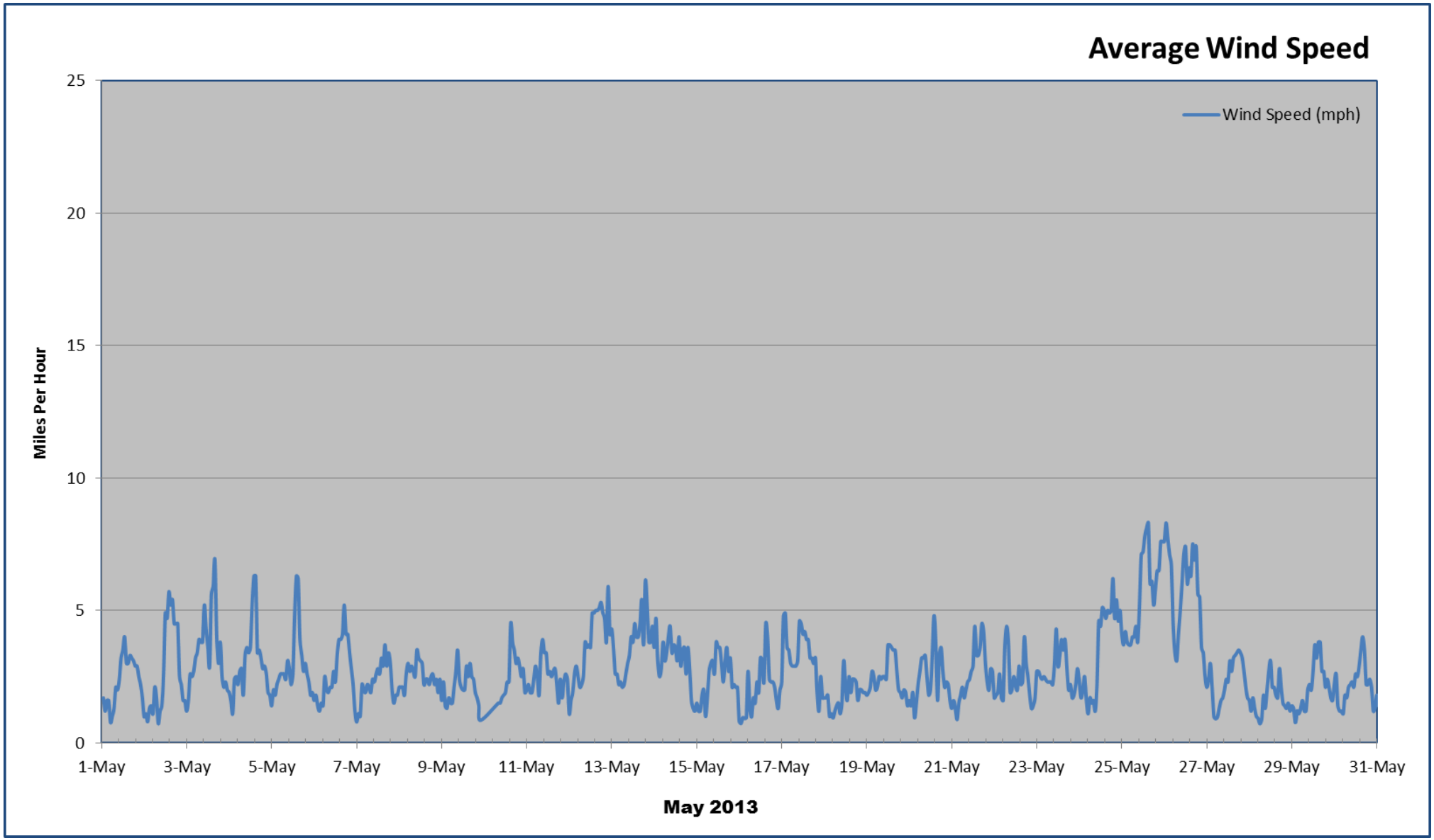


Figure A-3: Temperature

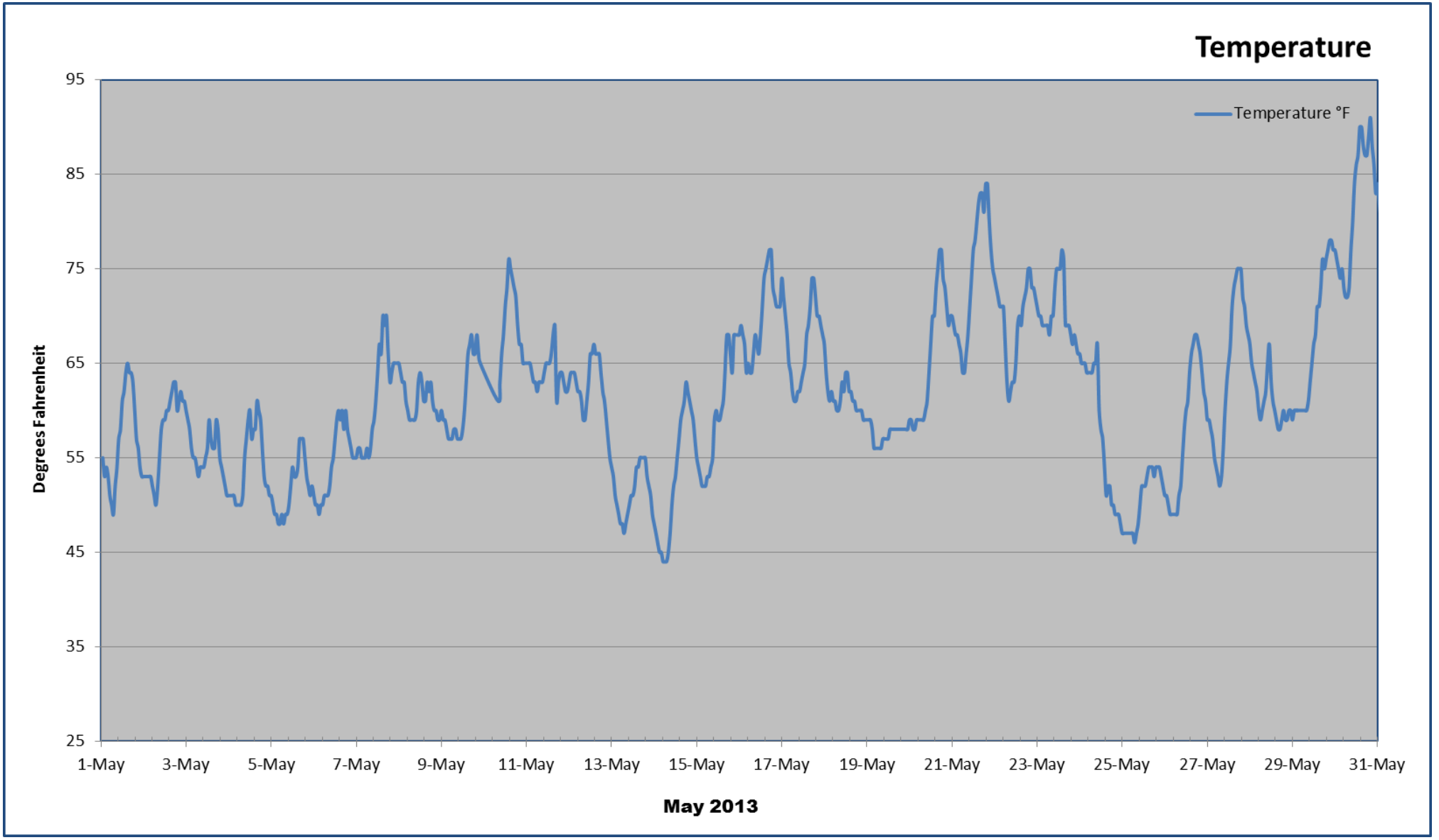


Figure A-4: Relative Humidity

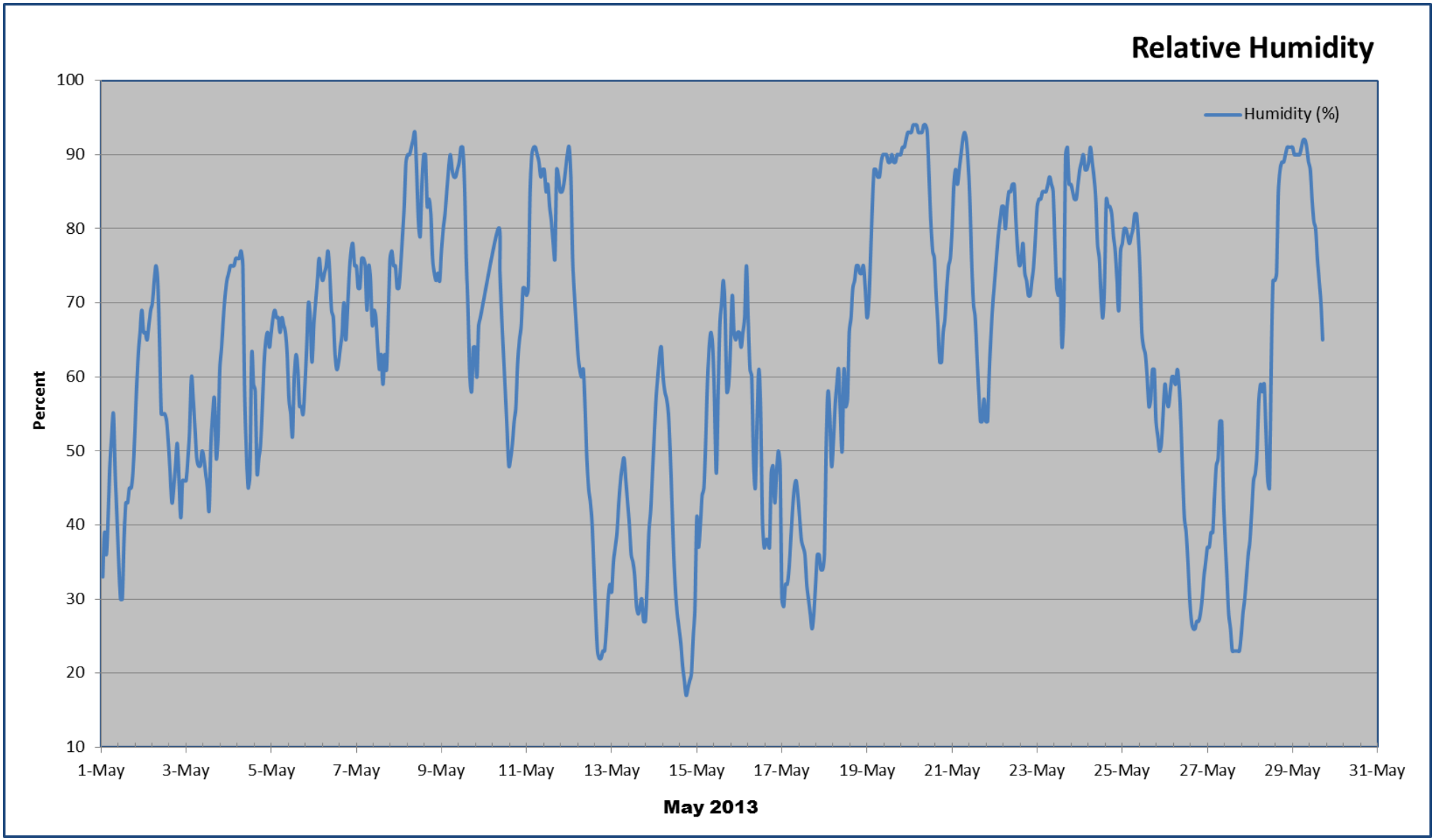
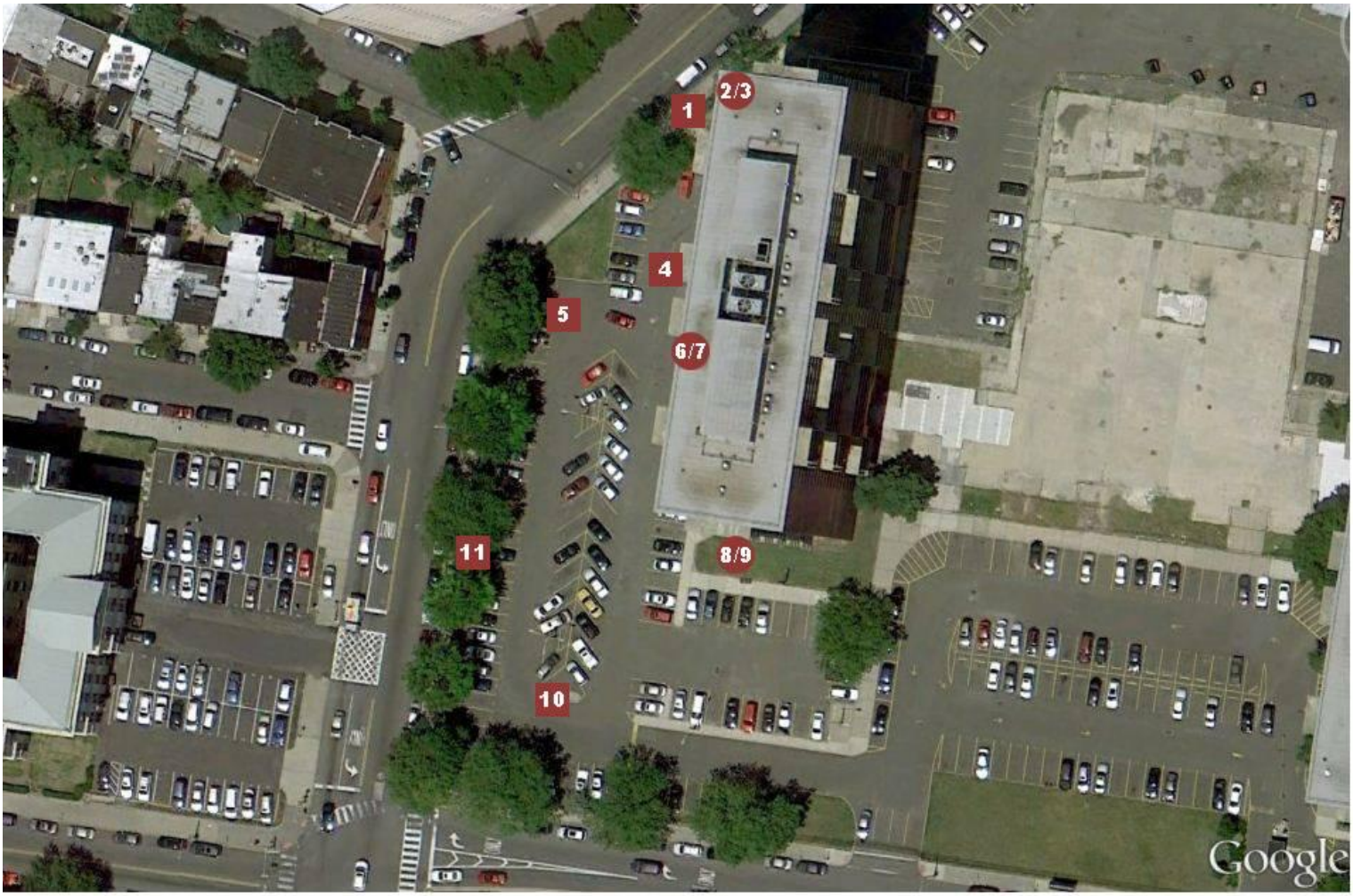


Figure A–5: Site Map



1 Ground level station location and designation

2/3 Ground level & elevated station location and designation

Appendix B

Program to Date Result Summaries

- Integrated 8 Hour Cr6 Concentration Summaries
- Integrated 8 Hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program to Date Integrated 8 Hour Cr6 Sampling Results Statistics

Statistics[1]	Layout Area 1										
	M1 (ng/m^3)	M2 (ng/m^3)	M3 (ng/m^3)	M4 (ng/m^3)	M5 (ng/m^3)	M6 (ng/m^3)	M7 (ng/m^3)	M8 (ng/m^3)	M9 (ng/m^3)	M10 (ng/m^3)	M11 (ng/m^3)
Total Number of Samples[2]	5	6	5	5	43	72	43	43	43	43	43
Rate of Data Collection	100%	100%	100%	100%	100%	97%	98%	100%	100%	100%	98%
Number of Detected Samples[3]	0	1	0	1	3	5	0	0	0	0	2
% of Cr6 Samples Greater than MDL	0	17%	0	20%	7%	7%	0	0	0	0	5%
Number of Samples Above AAC	0	0	0	0	0	0	0	0	0	0	0
Average % Cr6 in Dust[4]	0.02%	0.22%	0.02%	0.026%	0.022%	0.018%	0.018%	0.02%	0.02%	0.02%	0.02%
Maximum % Cr6 in Dust[4]	0.021%	0.04%	0.02%	0.056%	0.071%	0.06%	0.048%	0.05%	0.056%	0.048%	0.05%

ng/m3 – nanograms per cubic meter

[1] Total number of samples collected since March 18, 2013. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since March 18, 2013 reported above the laboratory reporting limit.

[3] The program to date average and maximum percent Cr6 in dust was calculated using all the integrated Total Particulate and Cr6 sample results collected since March 18, 2013.

Table B- 2: Monthly Average Integrated 8 Hour Cr6 Sampling Results

Statistics	Layout Area 1										
	M1 (ng/m^3)	M2 (ng/m^3)	M3 (ng/m^3)	M4 (ng/m^3)	M5 (ng/m^3)	M6 (ng/m^3)	M7 (ng/m^3)	M8 (ng/m^3)	M9 (ng/m^3)	M10 (ng/m^3)	M11 (ng/m^3)
Baseline	9.9	3.7	10.1	10.1	-	-	-	-	-	-	-
March	10.6	9.3	9.0	15.4	13.6	3.5	10.0	7.3	8.1	7.9	10.6
April	-	-	-	-	7.3	1.8	7.1	7.6	7.4	7.2	7.4
May	9.0	2.6	9.0	9.0	8.5	2.2	7.3	7.8	7.5	7.5	7.6
PTD	9.7	5.0	8.6	12.8	8.8	2.2	7.7	7.6	7.5	7.4	8.0

ng/m^3 – nanograms per cubic meter

Table B- 3: Program to Date Integrated Total Particulate 8 Hour Sampling Results Statistics

Statistics	Layout Area 1										
	M1 (ng/m^3)	**M2 (ng/m^3)**	**M3 (ng/m^3)**	**M4 (ng/m^3)**	**M5 (ng/m^3)**	**M6 (ng/m^3)**	**M7 (ng/m^3)**	**M8 (ng/m^3)**	**M9 (ng/m^3)**	**M10 (ng/m^3)**	**M11 (ng/m^3)**
Total Number of Samples[1]	5	6	5	5	43	72	43	43	43	43	43
Rate of Data Collection	100%	100%	100%	100%	100%	97%	98%	100%	100%	100%	98%
No of Detected Samples[2]	0	0	0	0	0	11	4	0	1	3	4
% Detection	0%	0%	0%	0%	0%	15%	9%	0%	2%	7%	9%

1 Total number of sample collected since March 18, 2013. Variations in the number of samples collected are specifically identified in Table A-2 within the report month of the variation.

2 Total number of sample results since March 18, 2013 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8 hour Total Particulate Sampling Results

Statistics[1]	Layout Area 1										
	M1 (µg/m^3)	M2 (µg/m^3)	M3 (µg/m^3)	M4 (µg/m^3)	M5 (µg/m^3)	M6 (µg/m^3)	M7 (µg/m^3)	M8 (µg/m^3)	M9 (µg/m^3)	M10 (µg/m^3)	M11 (µg/m^3)
Baseline	49.1	22.3	50.2	51.1	-	-	-	-	-	-	-
March	51.6	32.0	45.8	52.6	44.1	13.0	49.9	57.6	41.9	38.9	41.3
April	-	-	-	-	38.8	19.7	46.7	38.4	37.6	42.8	43.1
May	44.0	8.6	44.5	44.0	37.6	14.1	49.7	38.8	37.6	38.1	46.0
PTD	47.1	18.5	43.3	47.9	39.5	16.3	48.2	41.3	38.3	40.7	43.7

µg/m^3 – micrograms per cubic meter

Table B- 5: Monthly Average Real Time PM_{10} Monitoring Results

Statistics	Layout Area 1										
	M1 ($\mu g/m^3$)	**M2 ($\mu g/m^3$)**	**M3 ($\mu g/m^3$)**	**M4 ($\mu g/m^3$)**	**M5 ($\mu g/m^3$)**	**M6 ($\mu g/m^3$)**	**M7 ($\mu g/m^3$)**	**M8 ($\mu g/m^3$)**	**M9 ($\mu g/m^3$)**	**M10 ($\mu g/m^3$)**	**M11 ($\mu g/m^3$)**
March	13.3	22.2	16.1	6.9	8.7	14.4	10.8	6.6	1.9	7.5	5.3
April	-	-	-	-	14.0	16.7	19.1	12.1	6.1	5.8	13.2
May	25.9	23.7	24.8	28.4	19.2	15.6	21.2	16.7	14.6	15.7	18.5
PTD	17.9	21.9	19.6	11.9	15.1	16.3	18.5	12.6	8.2	9.1	13.6

µg/m3 – micrograms per cubic meter

June 2013
Air Quality Report
Metropolis Towers

Attached is a technical summary of air quality data for June 2013 at the Metropolis Towers cleanup site submitted by PPG Industries air monitoring consultant.

This report provides air monitoring information about conditions at the work areas associated with Layout Area 1.

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

EMILCOTT

Submitted to:
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4325 Rosanna Drive
Allison Park, PA

Submitted by:
Emilcott
190 Park Avenue
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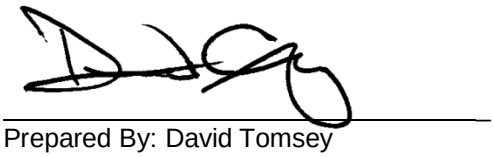
Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: June 2013

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: June 2013



Prepared By: David Tomsey

Reviewed By: Bruce Groves
June 29, 2013

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr6 – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8 hour integrated hexavalent chromium (Cr6) and total particulates, as well as real time monitoring for PM_{10} at eleven (11) air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24 hour real time, Cr6, and total particulate sampling with lab analysis was also conducted at one elevated station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr6 sampling and analysis indicate that program to date average airborne Cr6 concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirming that dust control measures continue to be effective, and indicate that the levels of Cr6 in dust generated at the Site do not generate an emission source of Cr6 sufficient to create potential offsite exposure to Cr6 at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Layout Area 1 through the reporting period. This monthly report includes both monthly and program to date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real time 5 minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between July 17, 2012 and August 2, 2012. Routine sampling began on March 18, 2013 with the start of ground intrusive activities on Site.

Eleven air monitoring stations installed at Layout Area 1 provide protection during intrusive work at Areas B and E. Area B contains three ground level stations and one elevated station. Area E contains five ground level stations and two elevated stations. Each area contains an elevated station that measures 24 hour real time concentrations and collects Cr6 and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for Layout Area 1. **Table 2-1** provides an overview of the air monitoring approach at each of the AMS.

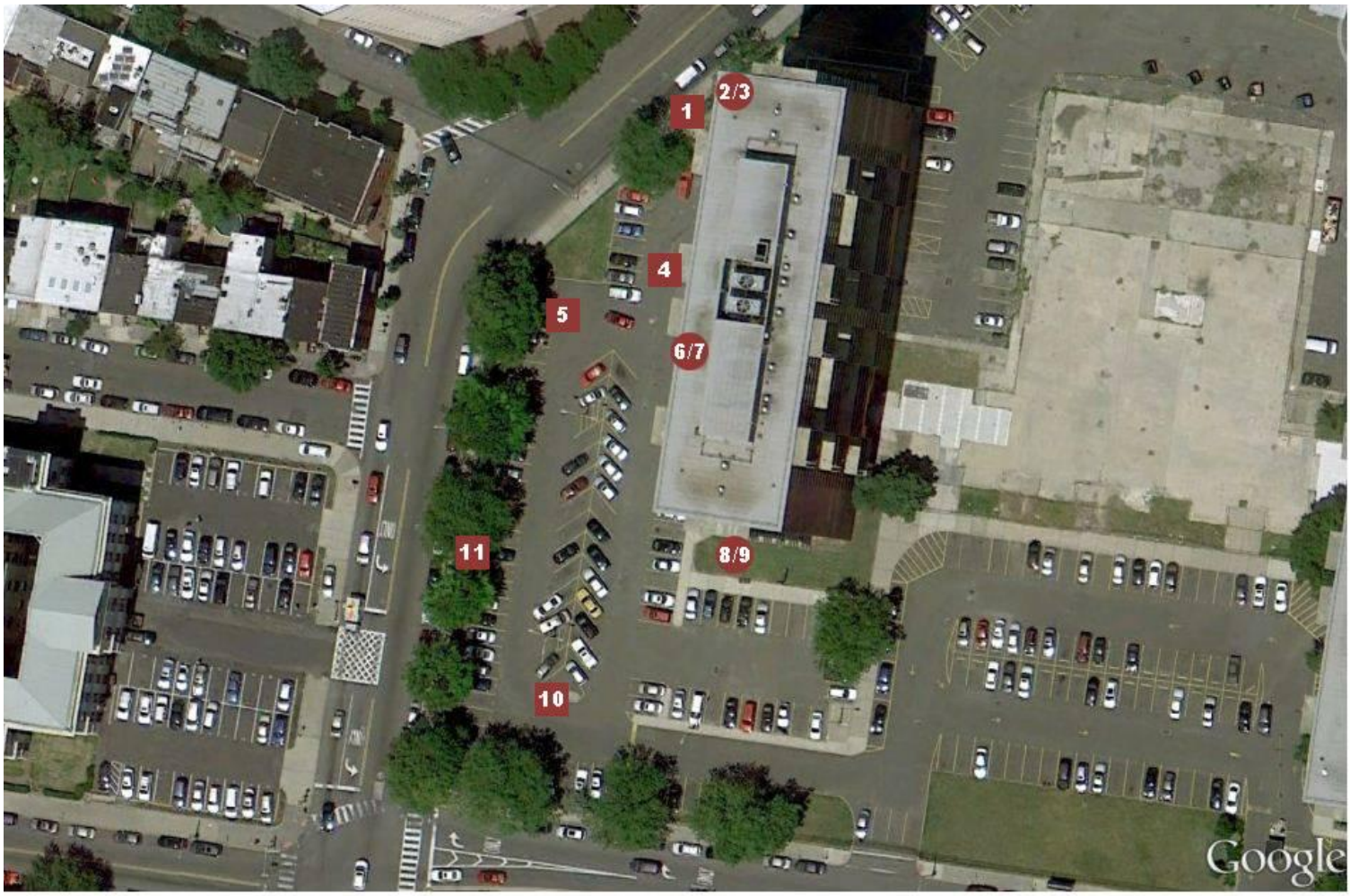
Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr6 concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis. The Cr6 average concentrations measured at each AMS will continually be compared to the Site specific AAC for Cr6 to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr6 fenceline air monitoring.

Air monitoring data collected at the Site includes:

- 8 hour integrated Cr6 and total particulate sample collection and associated laboratory analysis;
- 24 hour and 72 hour integrated Cr6 and total particulate samples collection and laboratory analysis; and
- Real time 5 minute average PM_{10}, readings measured at the work area perimeter.

This section outlines the types of data collected, frequency of collection, and the corresponding locations.

Figure 2-1: Site Overview



1 Ground level station location and designation

2/3 Ground level & elevated station location and designation

Table 2-1: Air Monitoring Approach

Layout Area 1	Station	Integrated Air Monitoring	Real Time Air Monitoring
Area B	**M 1,2,3,4**	Integrated 8 hour Cr6 and total particulate sampling and analysis during work days. 24 hour and 72 hour Cr6 sampling and analysis at one station 7 days per week.	5 minute average PM_{10} readings measured during a typical work day.
Area E	**M 5,6,7,8,9, 10,11**	Integrated 8 hour Cr6 and total particulate sampling and analysis during work days. 24 hour and 72 hour Cr6 sampling and analysis at one station 7 days per week.	5 minute average PM_{10} readings measured during a typical work day.

2.1 Integrated Air Sampling

Integrated Cr6 and total particulate samples are collected at each of the AMS for an 8 hour to 10 hour duration each working day (Typically Monday – Friday) at each of the eleven stations. Samples are collected on a preweighed polyvinyl chloride 37mm filter cassette for both Cr6 and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

2.1.1 Integrated Cr6 Sampling

The exposed Cr6 filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for Cr6 analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8 hour to 10 hour integrated Cr6 air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24 hour and 72 hour Cr6 sampling and analysis are also performed at one AMS per work area. These longer duration samples show Cr6 concentrations during overnight and weekend periods. The 24 hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72 hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for total particulate analysis using NIOSH method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8 hour to 10 hour integrated Cr6 air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real Time Air Monitoring

Real time air monitoring is divided into two types of monitoring including: work area monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Work Area

Work area air monitoring consists of ground level and elevated stations at the perimeter of the work area. Work area monitoring includes the following:

- Real time 5 minute average PM_{10} readings at each of the eleven locations. Three ground level and one elevated station for Area B and five ground level stations and two elevated stations for Area E. All stations operate 8 to 10 hours during remedial activities, Monday through Friday, with one elevated station per work area running 24 hours a day, seven days a week.

2.2.2 Meteorological Measurements

Meteorological measurements of 5 minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at elevated station 3 for Area B and elevated station 6 for Area E.

3.0 Site Specific Acceptable Air Concentration and Real Time Action Levels

Site specific AAC and real time Action Levels have been developed for Cr6 and real time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real time Action Levels have been developed to protect off site receptors from potential adverse health impacts from Cr6 and particulates over the duration of the intrusive remediation activities.

Real time monitoring and integrated results are compared against the AAC and the real time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real time action levels for integrated Cr6 concentrations and real time PM_{10} are outlined in the following sections.

3.1 Integrated Cr6 Acceptable Air Concentration

A Site specific Cr6 AAC has been developed by NJDEP to protect off site receptors from potential adverse health impacts due to potential exposure to Cr6 in dust. The AAC for Cr6 was developed to represent the maximum allowable average concentration of Cr6 in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one in one million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr6 emanating from the Site.

The AAC of 49 ng/m^3 is applicable at the work area perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC also provides a value to evaluate the effectiveness of dust control.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr6 are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. These shorter duration average concentrations metrics include: program to date, 90 day, 60 day, and 30 day running averages where the average Cr6 concentration over the previous 90 day, 60 day, and 30 day periods are calculated for each

sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr6 Metrics

Metric Observation	Response Action
30 day[1] Cr6 average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60 day[1] Cr6 average concentration greater than or equal to 40 ng/m3	
90 day[1] Cr6 average concentration greater than or equal to 35 ng/m3	
1 Sampling days.	

3.2 Real Time Alert and Action Levels

Real time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site Specific Alert and Action Levels

Parameter	Alert Level (1 min TWA)	Action Level (5 min TWA)
PM_{10}	339 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between June 1, 2013 and June 30, 2013 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real time results;
- Program to date integrated and real time statistics;
- Evaluation of program success versus the Site specific AAC and action levels; and
- Meteorological results.

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program to date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr6 and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr6 Sampling Results

Results of the Cr6 sampling from the reporting period and a program to date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8 hour Cr6 concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr6 concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program to Date

Sampling and analytical statistics for integrated 8 hour Cr6 results are shown in Table B-1 and include various programs to date metrics relative to Cr6 analytical data. Monthly average 8 hour Cr6 concentration results are shown in Table B-2 for each AMS location. A snapshot of the program to date, 30, 60, and 90 day running Cr6 average concentrations at the end of the reporting period were not available for this reporting period.

Table 4-1: Short Term Average 8 Hour Integrated Cr6 Metrics

Running Cr6 Metrics[1]		Layout Area 1										
	Metric (ng/m^3)	**M1 (ng/m^3)**	**M2 (ng/m^3)**	**M3 (ng/m^3)**	**M4 (ng/m^3)**	**M5 (ng/m^3)**	**M6 (ng/m^3)**	**M7 (ng/m^3)**	**M8 (ng/m^3)**	**M9 (ng/m^3)**	**M10 (ng/m^3)**	**M11 (ng/m^3)**
30 day[2]	**45**	NA	NA	NA	NA	7.0	2.3	7.0	7.3	6.8	7.2	7.2
60 day[2]	**40**	6.3	2.4	7.5	7.5	7.1	2.1	7.0	7.5	7.1	7.2	7.2
90 day[2]	**35**	6.3	2.4	7.5	7.5	7.5	2.0	6.9	7.4	7.1	7.1	7.2
PTD[3]		8.4	4.9	8.3	11.4	8.6	2.2	7.6	7.6	7.5	7.4	7.9

ng/m^3 – nanograms per cubic meter

1 Running Cr6 metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr6 are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. The running Cr6 metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long term (program) ending success.

2. Running Cr6 metrics are valid on the last day in the report period and include the previous 30, 60, or 90 days of sample results.

3. Program to Date - Air monitoring conducted from March 18, 2013 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8 hour integrated total particulate sampling and analysis from the reporting period and program to date results are discussed in the following sections.

Reporting Period

Individual integrated 8 hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program to date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 117 sample days between March 18, 2013 and the end of the reporting period. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8 hour Cr6 average concentrations, based upon lab analytical results at each AMS, were less than 17.2% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real Time Air Monitoring Results

Real time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real time 5 minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real time 5 minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3.

Program to Date

Real time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

- 06.03.13 through 06.05.13 Area B: Remove concrete
- Area E: form and pour curbs, fine grading and pave parking lot.

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-6.

5.0 Conclusions

Results of this project's reporting period show the air sampling and monitoring program at the Metropolis Towers Site indicate that the average Cr6 concentrations for each AMS are well below the AAC of 49 ng/m^3. The program through this reporting period shows the Cr6 concentrations and percent Cr6 in dust samples demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr6 in dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr6 and do not generate an emission source of Cr6 sufficient to create potential offsite exposure to Cr6 at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8 Hour Cr6 Concentrations
- Integrated 8 Hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8 Hour Cr6 Sampling Results

Date of Sample	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
06/01/13		0.85									
06/02/13		0.85									
06/03/13	6.5	2.5	6.5	6.5							
06/04/13	2.55	7.5	7.5	7.5							
06/05/13	7.0	1.9	7.0	7.0							
06/06/13						2.55					
06/07/13						0.85					
06/08/13						0.85					
06/09/13						0.85					
06/10/13					9.5	2.55	9.0	10	9.5	9.5	9.5
06/11/13					6.5	2.55	6.5	6.5	6.5	6.5	6.5
06/12/13					4.5	2.51	4.4	4.65	4.45	4.45	4.45
06/13/13					6.5	2.55	7.0	7.5	7.0	7.0	7.0
06/14/13					7.0	0.85	6.5	7.0	6.5	7.0	7.0
06/15/13						0.85					
06/16/13						0.85					
06/17/13						2.55					
06/18/13						2.55					
06/19/13						5.2					
06/20/13						7.8					
06/21/13						0.85					
06/22/13						0.85					
06/23/13						0.85					
06/24/13						7.1					
06/25/13						7.1					
06/26/13						2.55					
06/27/13						2.7					
06/28/13						0.85					
06/29/13						0.85					
06/30/13						0.85					

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr6. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8 Hour Total Particulate Sampling Results

Date of Sample	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
06/01/13		4.25									
06/02/13		4.25									
06/03/13	32	12.5	32.5	33							
06/04/13	37	13	76	36.5							
06/05/13	120	37	35.5	35							
06/06/13						13					
06/07/13						4.25					
06/08/13						4.25					
06/09/13						4.25					
06/10/13					47.5	13	46	50	48.5	48	48
06/11/13					32	12.5	31.5	33.5	32	32.5	32.5
06/12/13					22.5	35	22	23	22	56	22
06/13/13					32	12.5	34.5	36.5	35.5	34.5	35
06/14/13					35	4.25	33.5	34.5	33.5	34	34
06/15/13						4.25					
06/16/13						4.25					
06/17/13						12.5					
06/18/13						12.5					
06/19/13						12.5					
06/20/13						34					
06/21/13						13					
06/22/13						13					
06/23/13						13					
06/24/13						32					
06/25/13						13					
06/26/13						12.5					
06/27/13						13					
06/28/13						4.25					
06/29/13						4.25					
06/30/13						4.25					

Results in microograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's site 114 reporting of non-detects by AECOM.

Figure A- 1: Real Time 5 Minute Average PM_{10} Monitoring Results

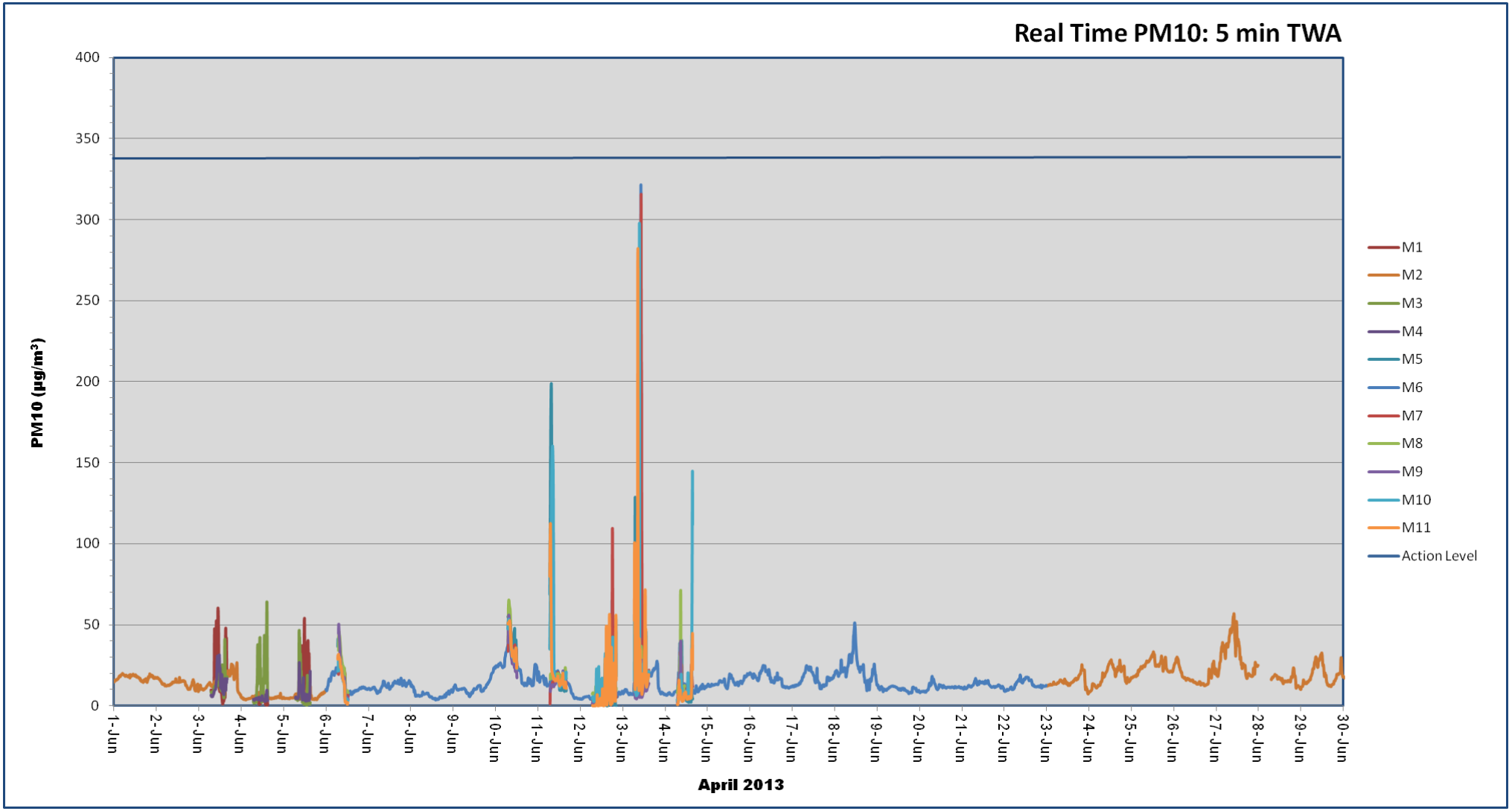


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
Dust	NA	NA	NA	NA	NA	NA

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter ($\mu g/m^3$)

ng/m^3 – nanograms per cubic meter

$\mu g/m^3$ – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

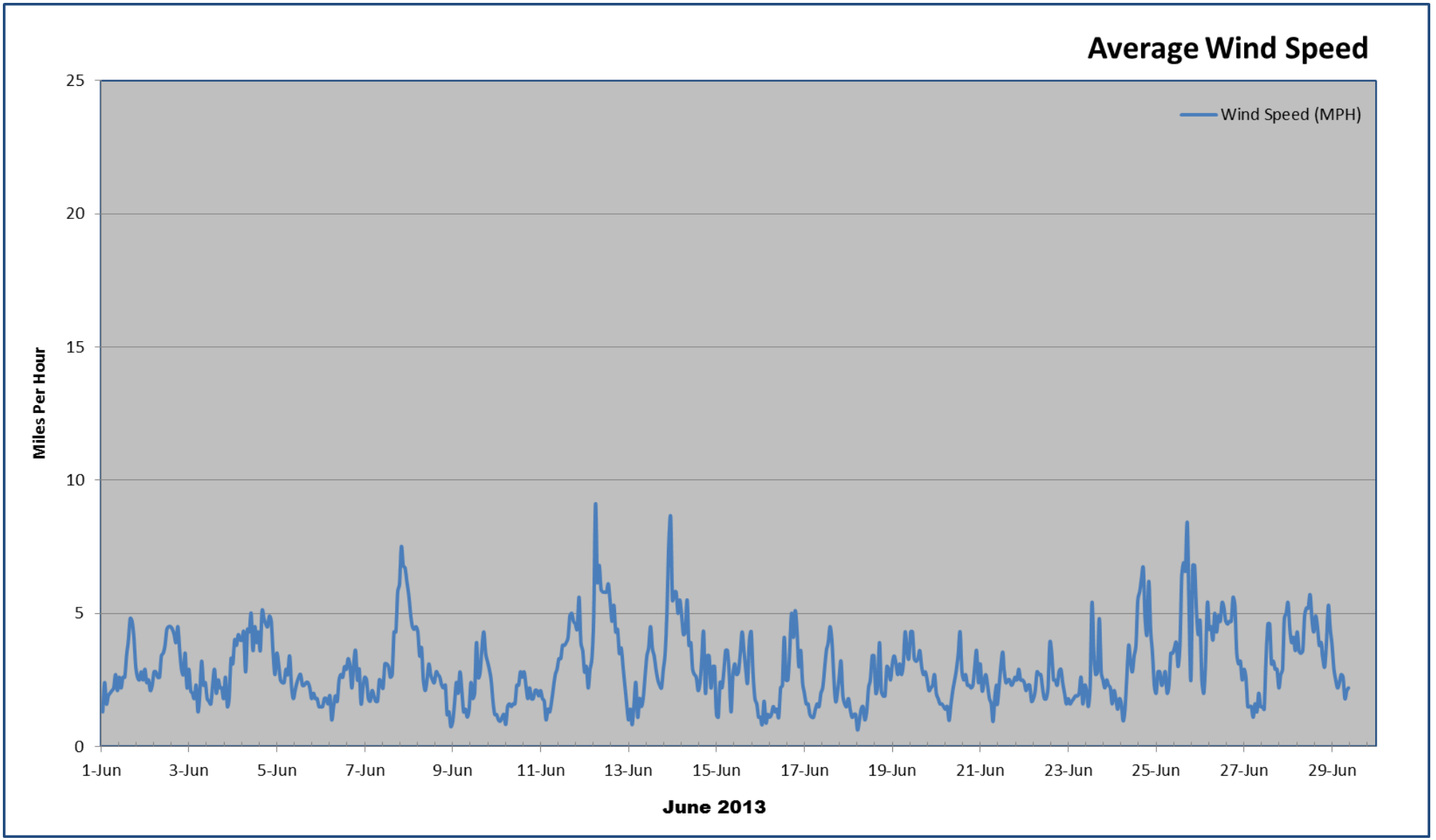


Figure A-3: Temperature

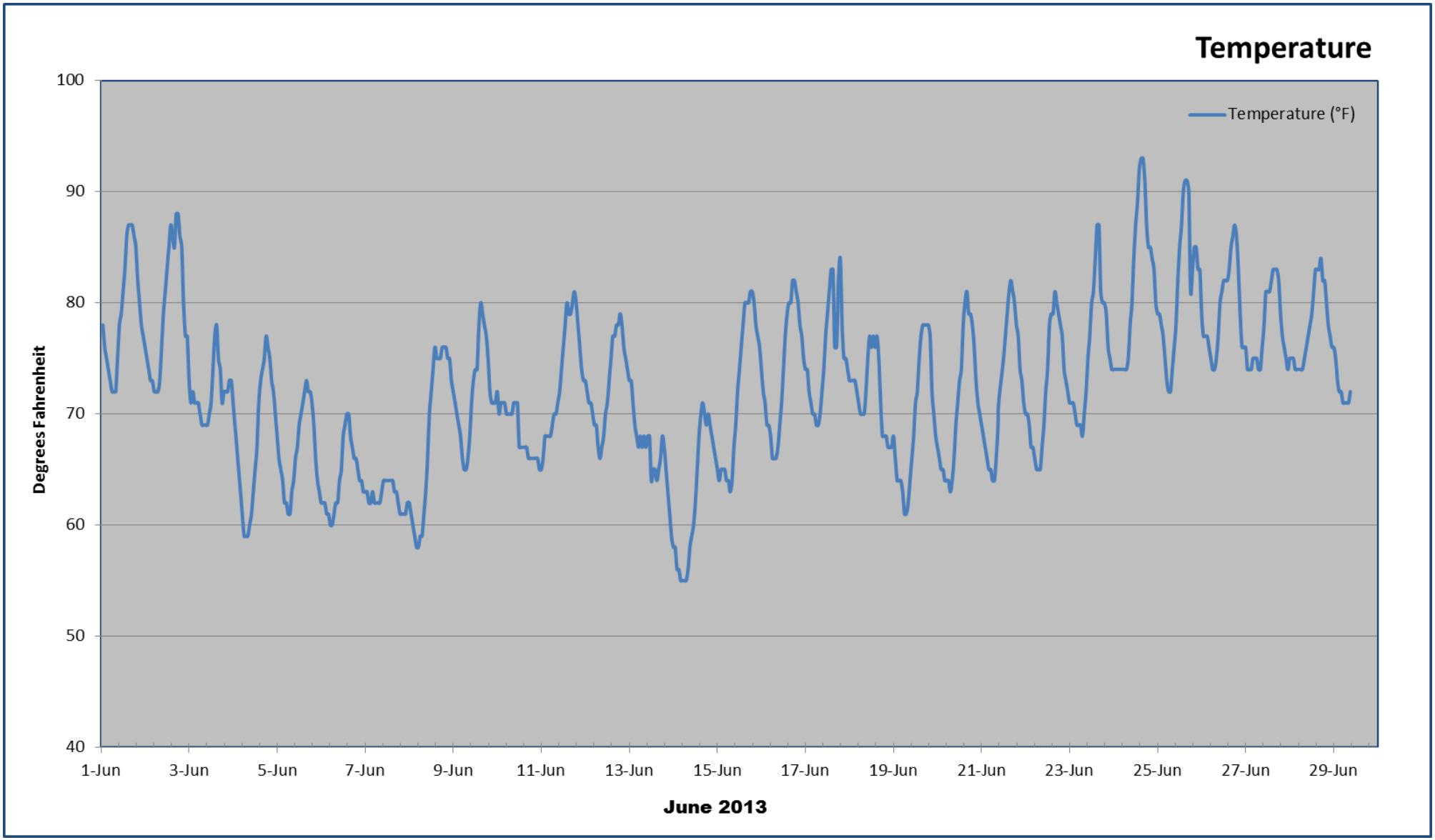


Figure A-4: Relative Humidity

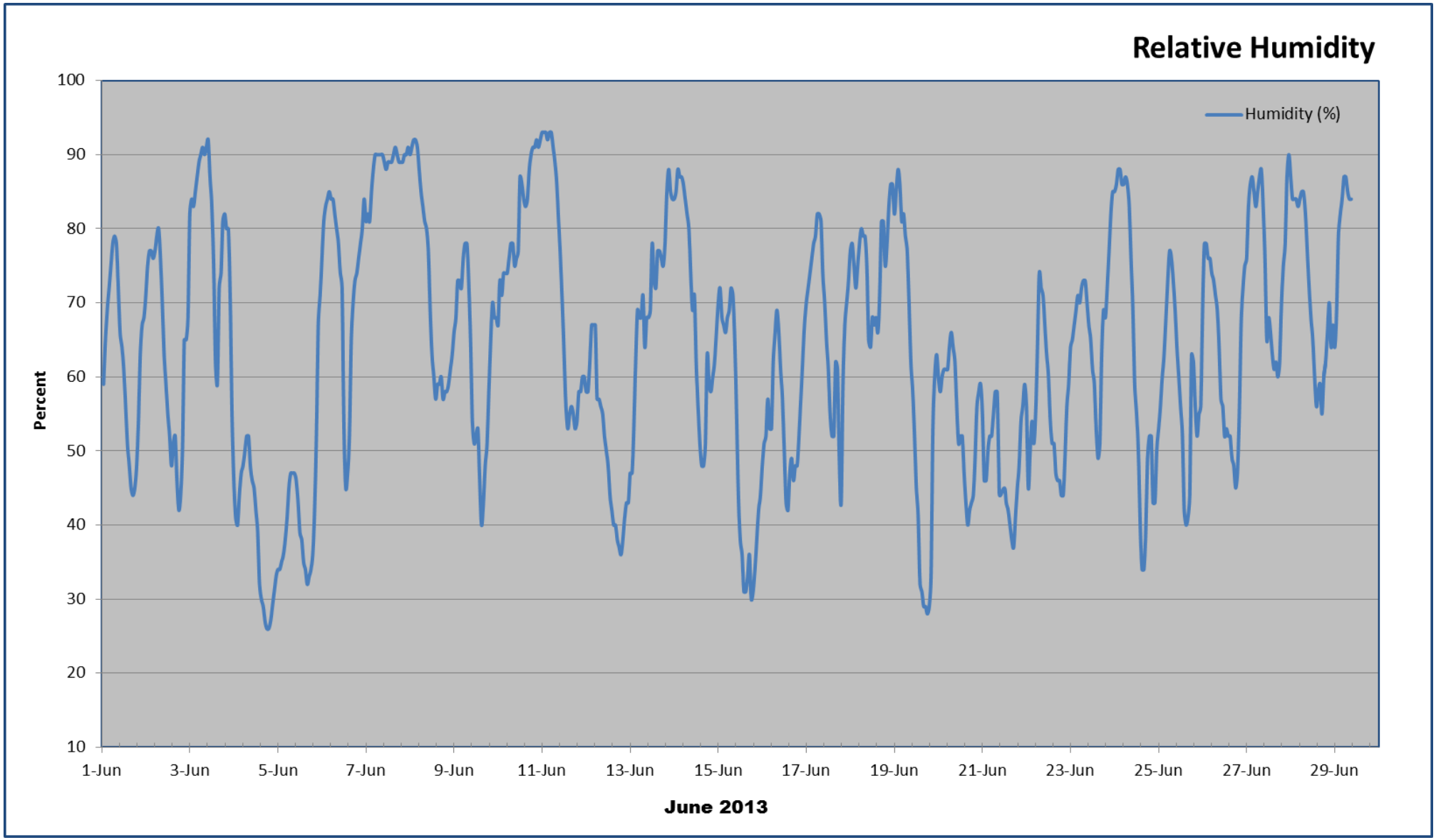
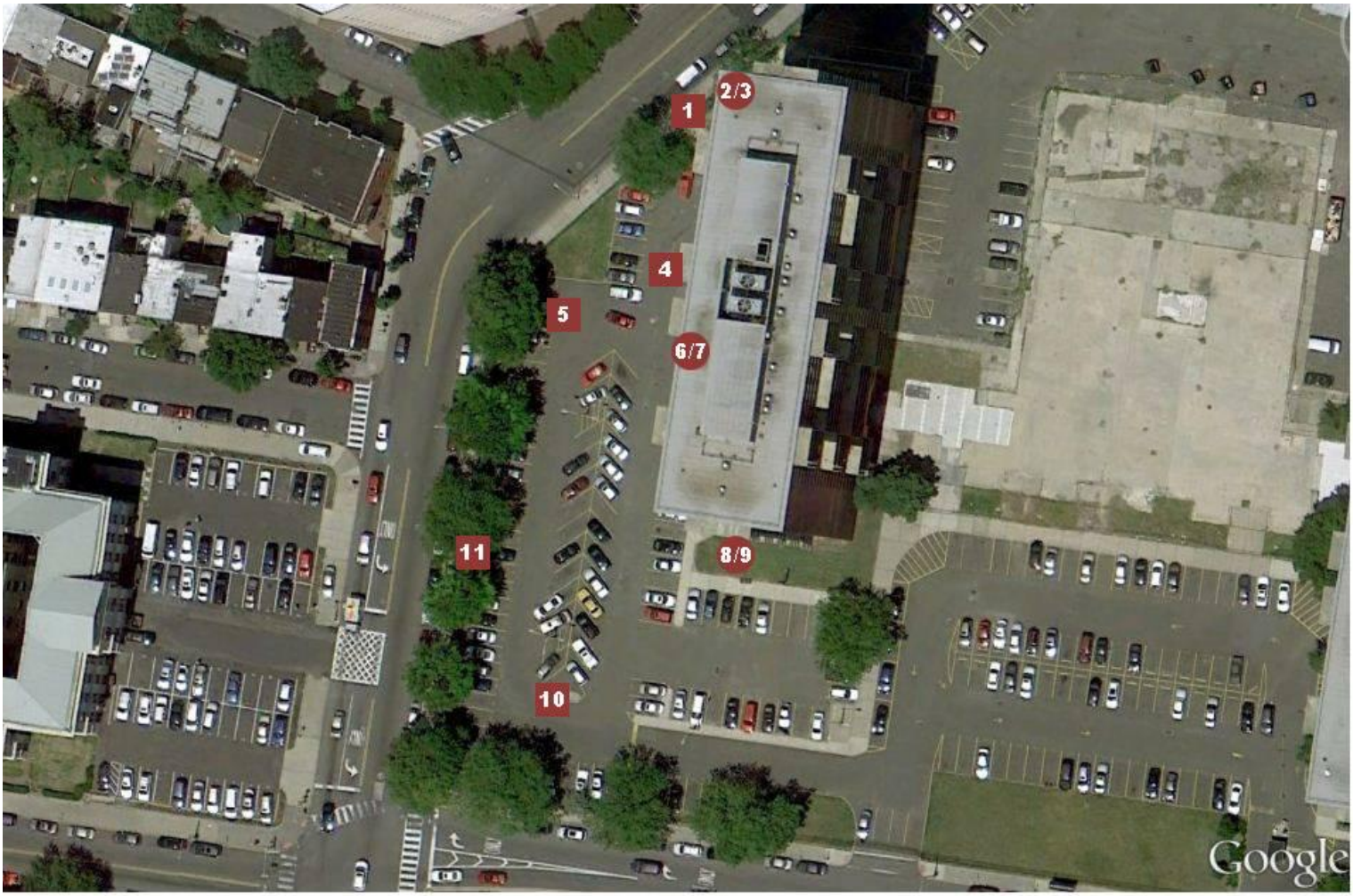


Figure A–5: Site Map



1 Ground level station location and designation

2/3 Ground level & elevated station location and designation

Appendix B

Program to Date Result Summaries

- Integrated 8 Hour Cr6 Concentration Summaries
- Integrated 8 Hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program to Date Integrated 8 Hour Cr6 Sampling Results Statistics

Statistics[1]	Layout Area 1										
	M1 (ng/m^3)	M2 (ng/m^3)	M3 (ng/m^3)	M4 (ng/m^3)	M5 (ng/m^3)	M6 (ng/m^3)	M7 (ng/m^3)	M8 (ng/m^3)	M9 (ng/m^3)	M10 (ng/m^3)	M11 (ng/m^3)
Total Number of Samples[2]	8	11	8	8	48	96	48	47	47	47	48
Rate of Data Collection	100%	100%	100%	100%	100%	98%	98%	100%	100%	100%	98%
Number of Detected Samples[3]	0	1	0	1	2	9	0	0	0	0	2
% of Cr6 Samples Greater than MDL	0%	9%	0%	12.5%	4.2%	9%	0%	0%	0%	0%	4%
Number of Samples Above AAC	0	0	0	0	0	0	0	0	0	0	0
Average % Cr6 in Dust[4]	0.017%	0.024%	0.019%	0.025%	0.022%	0.018%	0.019%	0.020%	0.020%	0.019%	0.020%
Maximum % Cr6 in Dust[4]	0.021%	0.058%	0.020%	0.056%	0.071%	0.060%	0.048%	0.050%	0.056%	0.048%	0.050%

ng/m3 – nanograms per cubic meter

[1] Total number of samples collected since March 18, 2013. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since March 18, 2013 reported above the laboratory reporting limit.

[3] The program to date average and maximum percent Cr6 in dust was calculated using all the integrated Total Particulate and Cr6 sample results collected since March 18, 2013.

Table B- 2: Monthly Average Integrated 8 Hour Cr6 Sampling Results

Statistics	Layout Area 1										
	M1 (ng/m^3)	M2 (ng/m^3)	M3 (ng/m^3)	M4 (ng/m^3)	M5 (ng/m^3)	M6 (ng/m^3)	M7 (ng/m^3)	M8 (ng/m^3)	M9 (ng/m^3)	M10 (ng/m^3)	M11 (ng/m^3)
Baseline	9.9	3.7	10.1	10.1	-	-	-	-	-	-	-
March	10.6	9.3	9.0	15.4	13.6	3.5	10.0	7.3	8.1	7.9	10.6
April	-	-	-	-	7.3	1.8	7.1	7.6	7.4	7.2	7.4
May	9.0	2.6	9.0	9.0	8.5	2.2	7.3	7.8	7.5	7.5	7.6
June	5.4	2.7	7.0	7.0	6.8	2.4	6.7	7.1	6.8	6.9	6.9
PTD	8.4	4.9	8.3	11.4	8.6	2.2	7.6	7.6	7.5	7.4	7.9

ng/m^3 – nanograms per cubic meter

Table B- 3: Program to Date Integrated Total Particulate 8 Hour Sampling Results Statistics

Statistics	Layout Area 1										
	M1 (ng/m^3)	**M2 (ng/m^3)**	**M3 (ng/m^3)**	**M4 (ng/m^3)**	**M5 (ng/m^3)**	**M6 (ng/m^3)**	**M7 (ng/m^3)**	**M8 (ng/m^3)**	**M9 (ng/m^3)**	**M10 (ng/m^3)**	**M11 (ng/m^3)**
Total Number of Samples[1]	8	11	8	8	48	96	48	47	47	47	48
Rate of Data Collection	100%	100%	100%	100%	100%	98%	98%	100%	100%	100%	98%
No of Detected Samples[2]	1	1	1	0	0	17	4	1	1	4	4
% Detection	12.5%	9%	12.5%	0%	0%	18%	8%	2%	2%	8%	8%

1 Total number of sample collected since March 18, 2013. Variations in the number of samples collected are specifically identified in Table A-2 within the report month of the variation.

2 Total number of sample results since March 18, 2013 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8 hour Total Particulate Sampling Results

Statistics[1]	Layout Area 1										
	M1 (µg/m^3)	M2 (µg/m^3)	M3 (µg/m^3)	M4 (µg/m^3)	M5 (µg/m^3)	M6 (µg/m^3)	M7 (µg/m^3)	M8 (µg/m^3)	M9 (µg/m^3)	M10 (µg/m^3)	M11 (µg/m^3)
Baseline	49.1	22.3	50.2	51.1	-	-	-	-	-	-	-
March	51.6	32.0	45.8	52.6	44.1	13.0	49.9	57.6	41.9	38.9	41.3
April	-	-	-	-	38.8	19.7	46.7	38.4	37.6	42.8	43.1
May	44.0	8.6	44.5	44.0	37.6	14.1	49.7	38.8	37.6	38.1	46.0
June	63.0	14.2	48.0	34.8	33.8	12.2	33.5	35.5	34.3	41.0	34.3
PTD	54.9	19.7	46.4	44.9	38.8	14.7	46.4	40.6	37.8	40.6	42.6

µg/m^3 – micrograms per cubic meter

Table B- 5: Monthly Average Real Time PM_{10} Monitoring Results

Statistics	Layout Area 1										
	M1 (µg/m^3)	M2 (µg/m^3)	M3 (µg/m^3)	M4 (µg/m^3)	M5 (µg/m^3)	M6 (µg/m^3)	M7 (µg/m^3)	M8 (µg/m^3)	M9 (µg/m^3)	M10 (µg/m^3)	M11 (µg/m^3)
March	13.3	22.2	16.1	6.9	8.7	14.4	10.8	6.6	1.9	7.5	5.3
April	-	-	-	-	14.0	16.7	19.1	12.1	6.1	5.8	13.2
May	25.9	23.7	24.8	28.4	19.2	15.6	21.2	16.7	14.6	15.7	18.5
June	12.8	19.2	13.5	8.9	17.3	15.1	22.5	19.1	14.2	18.3	16.4
PTD	13.6	20.3	16.5	12.4	15.7	15.9	19.0	13.3	8.8	10.9	14.4

µg/m^3 – micrograms per cubic meter

July 2013
Air Quality Report
Metropolis Towers

Attached is a technical summary of air quality data for July 2013 at the Metropolis Towers cleanup site submitted by PPG Industries air monitoring consultant.

This report provides air monitoring information about conditions at the work areas associated with Layout Area 1.

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

EMILCOTT

Submitted to:
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4325 Rosanna Drive
Allison Park, PA

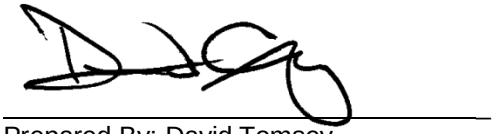
Submitted by:
Emilcott
190 Park Avenue
Morristown, NJ 07960

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: July 2013

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: July 2013



Prepared By: David Tomsey

Reviewed By: Bruce Groves
August 26, 2013

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr6 – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8 hour integrated hexavalent chromium (Cr6) and total particulates, as well as real time monitoring for PM_{10} at eleven (11) air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24 hour real time, Cr6, and total particulate sampling with lab analysis was also conducted at one elevated station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr6 sampling and analysis indicate that program to date average airborne Cr6 concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirming that dust control measures continue to be effective, and indicate that the levels of Cr6 in dust generated at the Site do not generate an emission source of Cr6 sufficient to create potential offsite exposure to Cr6 at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Layout Area 1 through the reporting period. This monthly report includes both monthly and program to date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real time 5 minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between July 17, 2012 and August 2, 2012. Routine sampling began on March 18, 2013 with the start of ground intrusive activities on Site.

Eleven air monitoring stations installed at Layout Area 1 provide protection during intrusive work at Areas B and E. Area B contains three ground level stations and one elevated station. Area E contains five ground level stations and two elevated stations. Each area contains an elevated station that measures 24 hour real time concentrations and collects Cr6 and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for Layout Area 1. **Table 2-1** provides an overview of the air monitoring approach at each of the AMS.

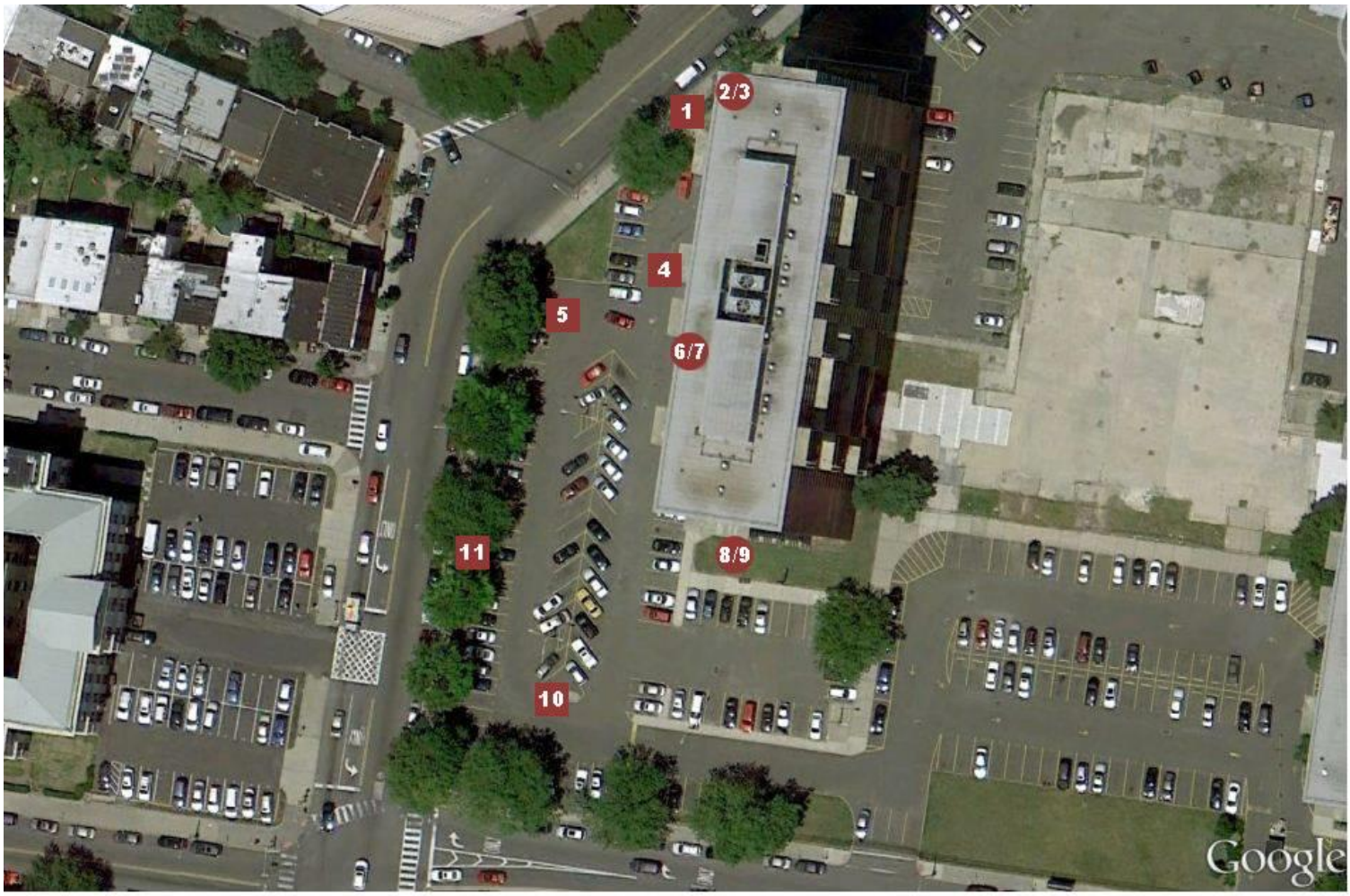
Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr6 concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis. The Cr6 average concentrations measured at each AMS will continually be compared to the Site specific AAC for Cr6 to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr6 fenceline air monitoring.

Air monitoring data collected at the Site includes:

- 8 hour integrated Cr6 and total particulate sample collection and associated laboratory analysis;
- 24 hour and 72 hour integrated Cr6 and total particulate samples collection and laboratory analysis; and
- Real time 5 minute average PM_{10}, readings measured at the work area perimeter.

This section outlines the types of data collected, frequency of collection, and the corresponding locations.

Figure 2-1: Site Overview



1 Ground level station location and designation

2/3 Ground level & elevated station location and designation

Table 2-1: Air Monitoring Approach

Layout Area 1	Station	Integrated Air Monitoring	Real Time Air Monitoring
Area B	**M 1,2,3,4**	Integrated 8 hour Cr6 and total particulate sampling and analysis during work days. 24 hour and 72 hour Cr6 sampling and analysis at one station 7 days per week.	5 minute average PM_{10} readings measured during a typical work day.
Area E	**M 5,6,7,8,9, 10,11**	Integrated 8 hour Cr6 and total particulate sampling and analysis during work days. 24 hour and 72 hour Cr6 sampling and analysis at one station 7 days per week.	5 minute average PM_{10} readings measured during a typical work day.

2.1 Integrated Air Sampling

Integrated Cr6 and total particulate samples are collected at each of the AMS for an 8 hour to 10 hour duration each working day (Typically Monday – Friday) at each of the eleven stations. Samples are collected on a preweighed polyvinyl chloride 37mm filter cassette for both Cr6 and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

2.1.1 Integrated Cr6 Sampling

The exposed Cr6 filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for Cr6 analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8 hour to 10 hour integrated Cr6 air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24 hour and 72 hour Cr6 sampling and analysis are also performed at one AMS per work area. These longer duration samples show Cr6 concentrations during overnight and weekend periods. The 24 hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72 hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for total particulate analysis using NIOSH method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8 hour to 10 hour integrated Cr6 air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real Time Air Monitoring

Real time air monitoring is divided into two types of monitoring including: work area monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Work Area

Work area air monitoring consists of ground level and elevated stations at the perimeter of the work area. Work area monitoring includes the following:

- Real time 5 minute average PM_{10} readings at each of the eleven locations. Three ground level and one elevated station for Area B and five ground level stations and two elevated stations for Area E. All stations operate 8 to 10 hours during remedial activities, Monday through Friday, with one elevated station per work area running 24 hours a day, seven days a week.

2.2.2 Meteorological Measurements

Meteorological measurements of 5 minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at elevated station 2 for Area B and elevated station 6 for Area E.

3.0 Site Specific Acceptable Air Concentration and Real Time Action Levels

Site specific AAC and real time Action Levels have been developed for Cr6 and real time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real time Action Levels have been developed to protect off site receptors from potential adverse health impacts from Cr6 and particulates over the duration of the intrusive remediation activities.

Real time monitoring and integrated results are compared against the AAC and the real time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real time action levels for integrated Cr6 concentrations and real time PM_{10} are outlined in the following sections.

3.1 Integrated Cr6 Acceptable Air Concentration

A Site specific Cr6 AAC has been developed by NJDEP to protect off site receptors from potential adverse health impacts due to potential exposure to Cr6 in dust. The AAC for Cr6 was developed to represent the maximum allowable average concentration of Cr6 in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one in one million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr6 emanating from the Site.

The AAC of 49 ng/m^3 is applicable at the work area perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC also provides a value to evaluate the effectiveness of dust control.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr6 are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. These shorter duration average concentrations metrics include: program to date, 90 day, 60 day, and 30 day running averages where the average Cr6 concentration over the previous 90 day, 60 day, and 30 day periods are calculated for each

sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr6 Metrics

Metric Observation	Response Action
30 day[1] Cr6 average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60 day[1] Cr6 average concentration greater than or equal to 40 ng/m3	
90 day[1] Cr6 average concentration greater than or equal to 35 ng/m3	
1 Sampling days.	

3.2 Real Time Alert and Action Levels

Real time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site Specific Alert and Action Levels

Parameter	Alert Level (1 min TWA)	Action Level (5 min TWA)
PM_{10}	339 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between July 1, 2013 and July 31, 2013 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real time results;
- Program to date integrated and real time statistics;
- Evaluation of program success versus the Site specific AAC and action levels; and
- Meteorological results.

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program to date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr6 and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr6 Sampling Results

Results of the Cr6 sampling from the reporting period and a program to date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8 hour Cr6 concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr6 concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program to Date

Sampling and analytical statistics for integrated 8 hour Cr6 results are shown in Table B-1 and include various programs to date metrics relative to Cr6 analytical data. Monthly average 8 hour Cr6 concentration results are shown in Table B-2 for each AMS location. A snapshot of the program to date, 30, 60, and 90 day running Cr6 average concentrations at the end of the reporting period were not available for this reporting period.

Table 4-1: Short Term Average 8 Hour Integrated Cr6 Metrics

Running Cr6 Metrics[1]		Layout Area 1										
	Metric (ng/m^3)	**M1 (ng/m^3)**	**M2 (ng/m^3)**	**M3 (ng/m^3)**	**M4 (ng/m^3)**	**M5 (ng/m^3)**	**M6 (ng/m^3)**	**M7 (ng/m^3)**	**M8 (ng/m^3)**	**M9 (ng/m^3)**	**M10 (ng/m^3)**	**M11 (ng/m^3)**
30 day[2]	**45**	13.5	2.9	10.9	10.6	NA	NA	NA	NA	NA	NA	NA
60 day[2]	**40**	13.5	2.9	10.9	10.6	7.5	2.3	7.5	7.5	7.0	7.5	7.5
90 day[2]	**35**	11.6	2.8	10.0	9.8	7.1	2.1	7.0	7.5	7.1	7.2	7.2
PTD[3]		11.4	3.4	9.8	11.0	8.6	2.1	7.6	7.6	7.5	7.4	7.9

ng/m^3 – nanograms per cubic meter

1 Running Cr6 metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr6 are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. The running Cr6 metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long term (program) ending success.

2. Running Cr6 metrics are valid on the last day in the report period and include the previous 30, 60, or 90 days of sample results.

3. Program to Date - Air monitoring conducted from March 18, 2013 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8 hour integrated total particulate sampling and analysis from the reporting period and program to date results are discussed in the following sections.

Reporting Period

Individual integrated 8 hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program to date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 136 sample days between March 18, 2013 and the end of the reporting period. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8 hour Cr6 average concentrations, based upon lab analytical results at each AMS, were less than 23.3% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real Time Air Monitoring Results

Real time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real time 5 minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real time 5 minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3.

Program to Date

Real time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

- Area E: July 10, 2013 – Landscaping around building.
- Area B: July 30 & 31, 2013 – Asbestos conduit removal.

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-6.

5.0 Conclusions

Results of this project's reporting period show the air sampling and monitoring program at the Metropolis Towers Site indicate that the average Cr6 concentrations for each AMS are well below the AAC of 49 ng/m^3. The program through this reporting period shows the Cr6 concentrations and percent Cr6 in dust samples demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr6 in dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr6 and do not generate an emission source of Cr6 sufficient to create potential offsite exposure to Cr6 at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8 Hour Cr6 Concentrations
- Integrated 8 Hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8 Hour Cr6 Sampling Results

Date of Sample	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
07/01/13						2.6					
07/02/13						2.6					
07/03/13						1.3					
07/04/13						1.3					
07/05/13						0.9					
07/06/13						0.9					
07/07/13						0.9					
07/08/13						2.6					
07/09/13						2.6					
07/10/13					7.5	2.6	7.5	7.5	7.0	7.5	7.5
07/11/13						2.6					
07/12/13						0.9					
07/13/13						0.9					
07/14/13						0.9					
07/15/13		2.5									
07/16/13		2.6									
07/17/13		2.6									
07/18/13		2.5									
07/19/13		0.9									
07/20/13		0.9									
07/21/13		0.9									
07/22/13		2.6									
07/23/13		2.5									
07/24/13		2.8									
07/25/13		2.4									
07/26/13		0.85									
07/27/13		0.85									
07/28/13		0.85									
07/29/13		7.5									
07/30/13	7.0	2.6	7.0	7.0							
07/31/13	8.0	2.65	8.0	8.0							

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr6. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8 Hour Total Particulate Sampling Results

Date of Sample	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
07/01/13						12.5					
07/02/13						13.0					
07/03/13						6.0					
07/04/13						6.0					
07/05/13						4.4					
07/06/13						4.4					
07/07/13						4.4					
07/08/13						13.0					
07/09/13						33.0					
07/10/13					37	13	36.5	37	35.5	36	36.5
07/11/13						12.5					
07/12/13						8.7					
07/13/13						8.7					
07/14/13						8.7					
07/15/13		13.0									
07/16/13		34.0									
07/17/13		35.0									
07/18/13		27.0									
07/19/13		4.3									
07/20/13		4.3									
07/21/13		4.3									
07/22/13		12.5									
07/23/13		13.0									
07/24/13		13.5									
07/25/13		12.0									
07/26/13		4.25									
07/27/13		4.25									
07/28/13		4.25									
07/29/13		12.5									
07/30/13	34.5	13.0	35.0	34.0							
07/31/13	40.0	13.00	84.0	40.0							

Results in microograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's site 114 reporting of non-detects by AECOM.

Figure A- 1: Real Time 5 Minute Average PM_{10} Monitoring Results

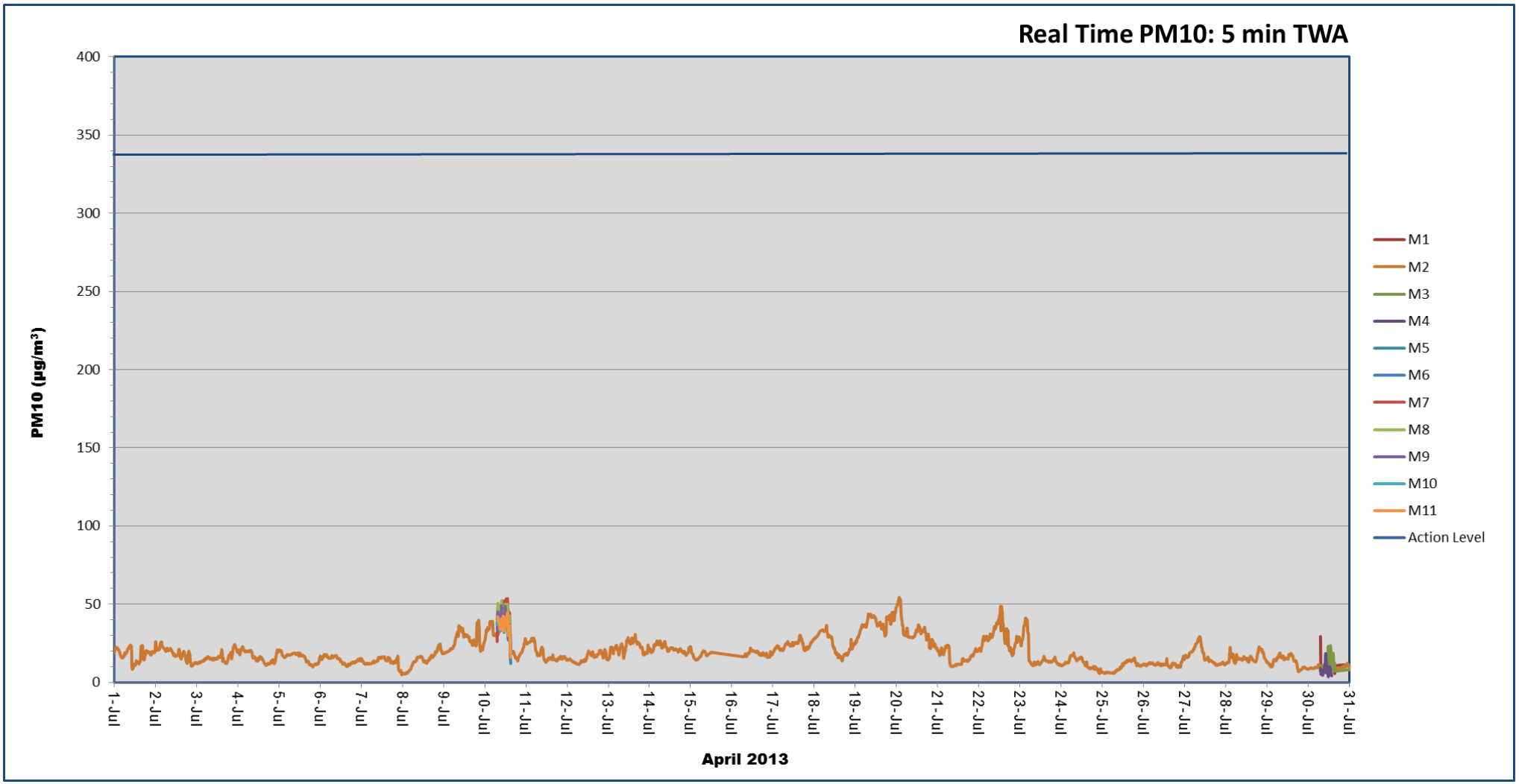


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
Dust	NA	NA	NA	NA	NA	NA

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter ($\mu g/m^3$)

ng/m^3 – nanograms per cubic meter

$\mu g/m^3$ – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

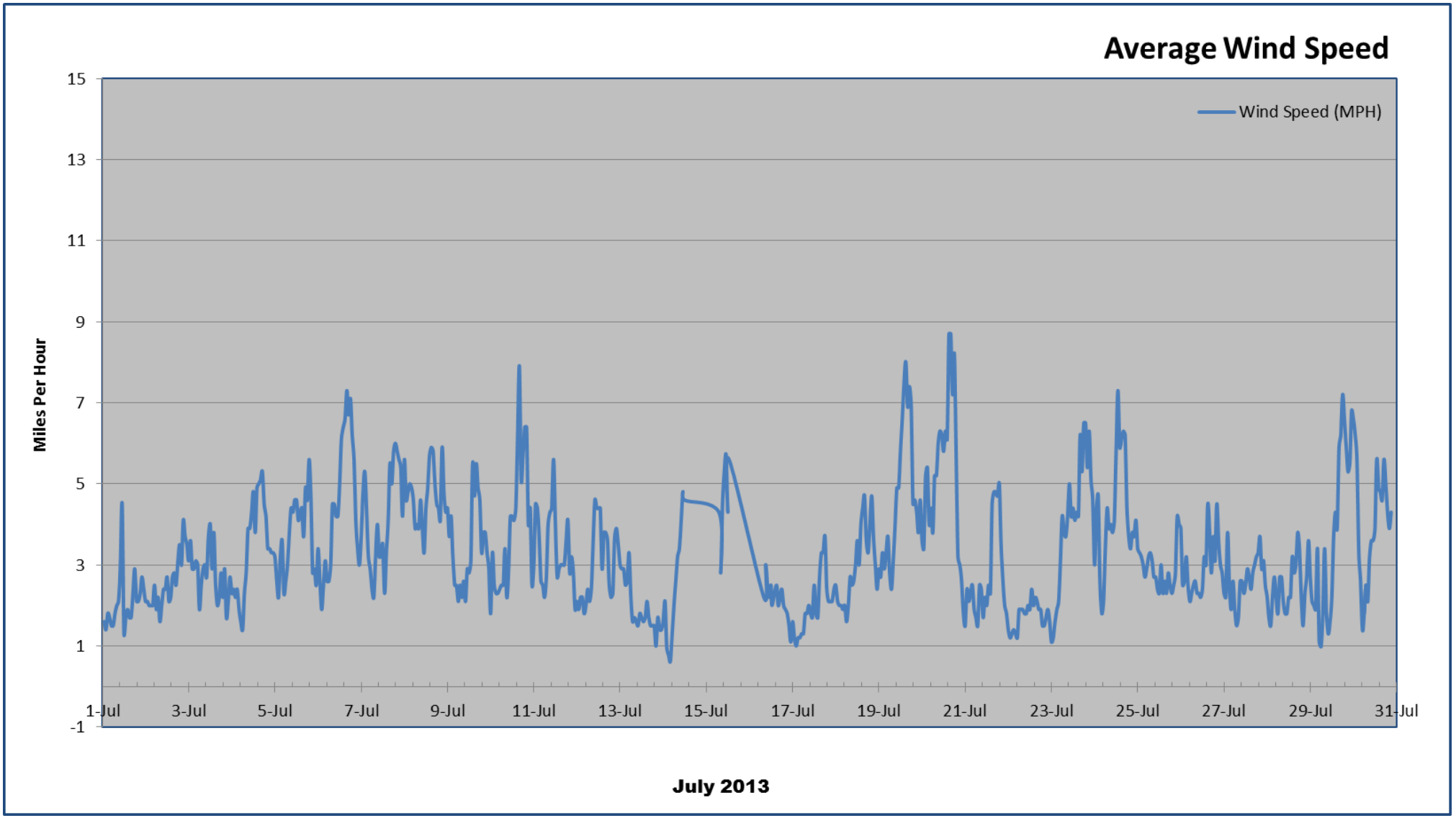


Figure A-3: Temperature

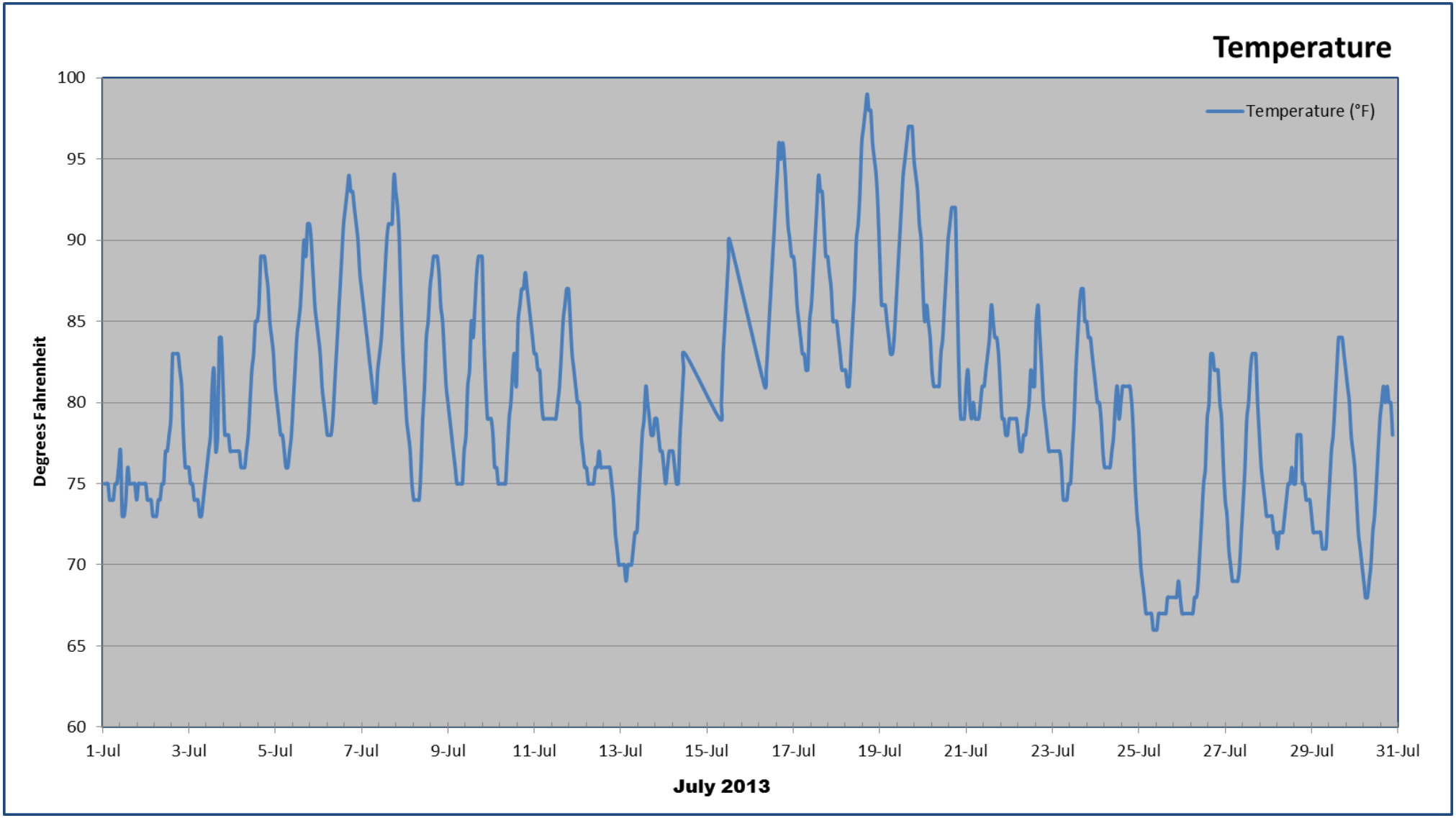


Figure A-4: Relative Humidity

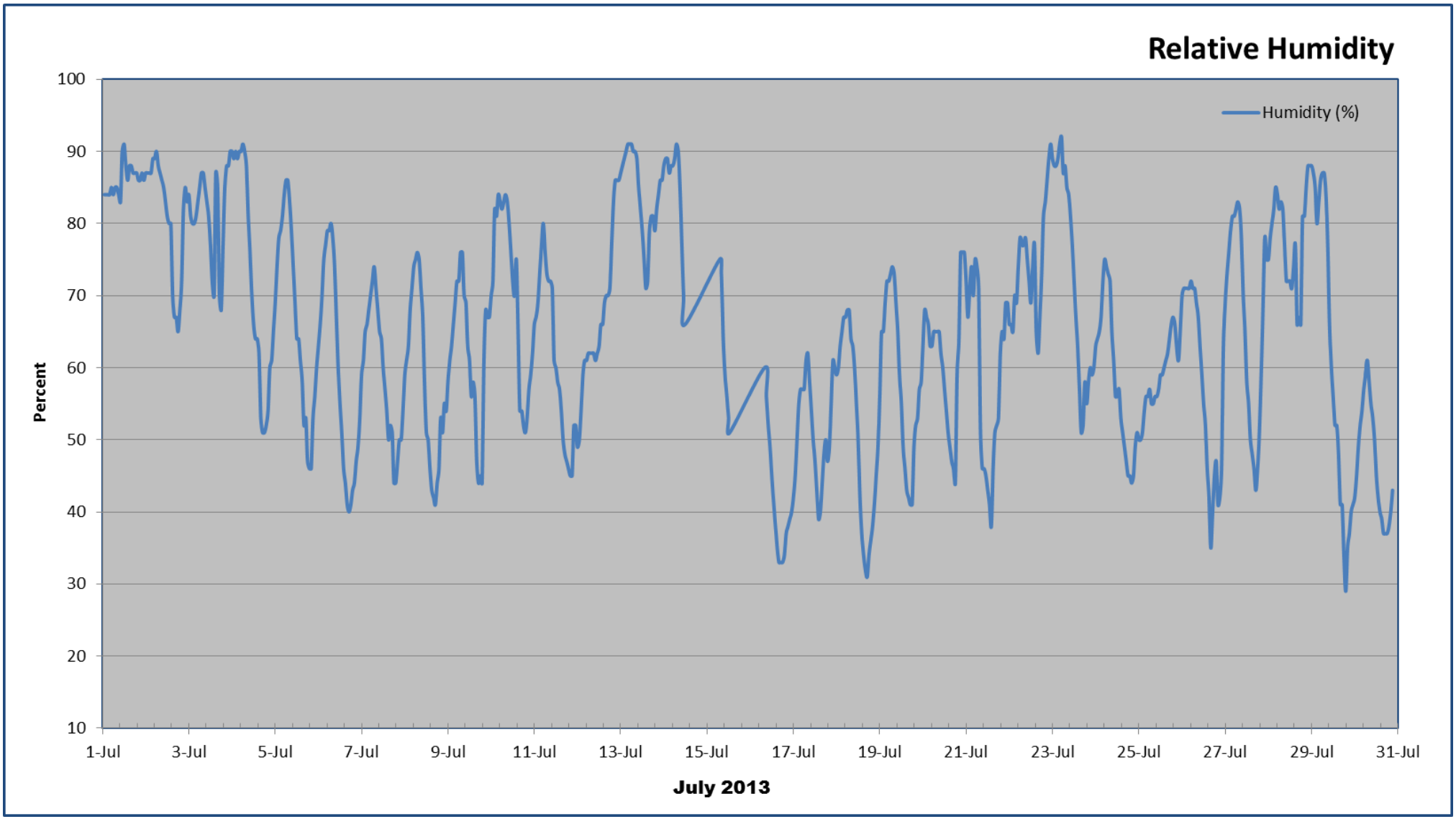
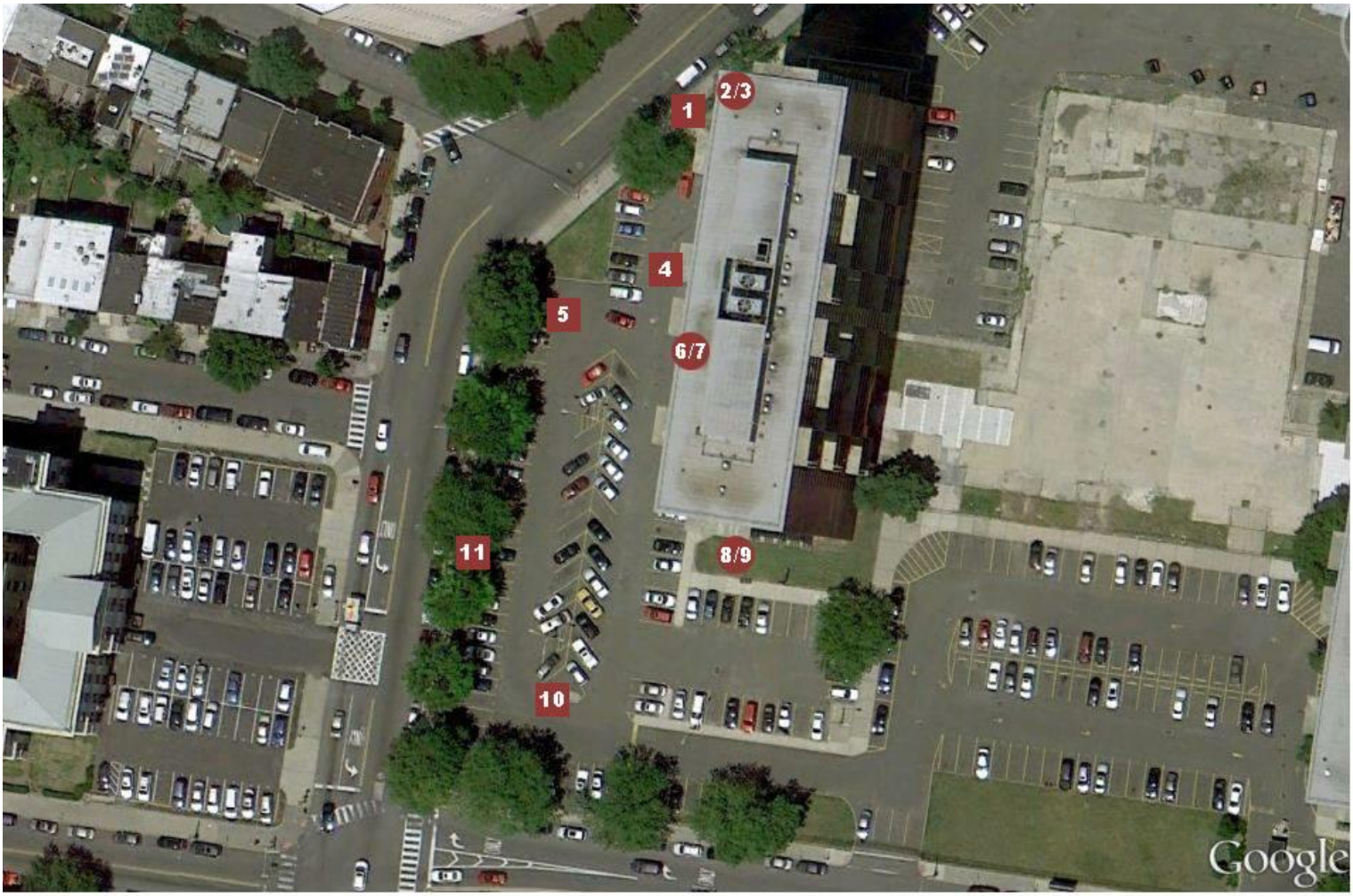


Figure A–5: Site Map



1 Ground level station location and designation

2/3 Ground level & elevated station location and designation

Appendix B

Program to Date Result Summaries

- Integrated 8 Hour Cr6 Concentration Summaries
- Integrated 8 Hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program to Date Integrated 8 Hour Cr6 Sampling Results Statistics

Statistics[1]	Layout Area 1										
	M1 (ng/m^3)	M2 (ng/m^3)	M3 (ng/m^3)	M4 (ng/m^3)	M5 (ng/m^3)	M6 (ng/m^3)	M7 (ng/m^3)	M8 (ng/m^3)	M9 (ng/m^3)	M10 (ng/m^3)	M11 (ng/m^3)
Total Number of Samples[2]	19	42	19	19	49	110	49	48	48	48	49
Rate of Data Collection	100%	100%	100%	100%	100%	99%	98%	100%	100%	100%	98%
Number of Detected Samples[3]	3	5	2	3	2	9	0	0	0	0	2
% of Cr6 Samples Greater than MDL	15.8%	11.9%	10%	16%	4.1%	8.2%	0%	0%	0%	0%	4.1%
Number of Samples Above AAC	0	0	0	0	0	0	0	0	0	0	0
Average % Cr6 in Dust[4]	0.027%	0.024%	0.023%	0.028%	0.022%	0.018%	0.019%	0.020%	0.020%	0.019%	0.020%
Maximum % Cr6 in Dust[4]	0.078%	0.073%	0.057%	0.065%	0.071%	0.060%	0.048%	0.050%	0.056%	0.048%	0.050%

ng/m3 – nanograms per cubic meter

[1] Total number of samples collected since March 18, 2013. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since March 18, 2013 reported above the laboratory reporting limit.

[3] The program to date average and maximum percent Cr6 in dust was calculated using all the integrated Total Particulate and Cr6 sample results collected since March 18, 2013.

Table B- 2: Monthly Average Integrated 8 Hour Cr6 Sampling Results

Statistics	Layout Area 1										
	M1 (ng/m^3)	M2 (ng/m^3)	M3 (ng/m^3)	M4 (ng/m^3)	M5 (ng/m^3)	M6 (ng/m^3)	M7 (ng/m^3)	M8 (ng/m^3)	M9 (ng/m^3)	M10 (ng/m^3)	M11 (ng/m^3)
Baseline	9.9	3.7	10.1	10.1	-	-	-	-	-	-	-
March	10.6	9.3	9.0	15.4	13.6	3.5	10.0	7.3	8.1	7.9	10.6
April	-	-	-	-	7.3	1.8	7.1	7.6	7.4	7.2	7.4
May	9.0	2.6	9.0	9.0	8.5	2.2	7.3	7.8	7.5	7.5	7.6
June	5.4	2.7	7.0	7.0	6.8	2.4	6.7	7.1	6.8	6.9	6.9
July	7.5	2.2	7.5	7.5	7.5	1.7	7.5	7.5	7.0	7.5	7.5
PTD	11.4	3.4	9.8	11.0	8.6	2.1	7.6	7.6	7.5	7.4	7.9

ng/m^3 – nanograms per cubic meter

Table B- 3: Program to Date Integrated Total Particulate 8 Hour Sampling Results Statistics

Statistics	Layout Area 1										
	M1 (ng/m^3)	**M2 (ng/m^3)**	**M3 (ng/m^3)**	**M4 (ng/m^3)**	**M5 (ng/m^3)**	**M6 (ng/m^3)**	**M7 (ng/m^3)**	**M8 (ng/m^3)**	**M9 (ng/m^3)**	**M10 (ng/m^3)**	**M11 (ng/m^3)**
Total Number of Samples[1]	19	42	19	19	49	110	49	48	48	48	49
Rate of Data Collection	100%	100%	100%	100%	100%	99%	98%	100%	100%	100%	98%
No of Detected Samples[2]	1	1	2	0	0	17	4	1	1	4	4
% Detection	5.3%	2.4%	10.5%	0%	0%	15.5%	8.2%	2.1%	2.1%	8.3%	8.2%

1 Total number of sample collected since March 18, 2013. Variations in the number of samples collected are specifically identified in Table A-2 within the report month of the variation.

2 Total number of sample results since March 18, 2013 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8 hour Total Particulate Sampling Results

Statistics[1]	Layout Area 1										
	M1 (µg/m^3)	M2 (µg/m^3)	M3 (µg/m^3)	M4 (µg/m^3)	M5 (µg/m^3)	M6 (µg/m^3)	M7 (µg/m^3)	M8 (µg/m^3)	M9 (µg/m^3)	M10 (µg/m^3)	M11 (µg/m^3)
Baseline	49.1	22.3	50.2	51.1	-	-	-	-	-	-	-
March	51.6	32.0	45.8	52.6	44.1	13.0	49.9	57.6	41.9	38.9	41.3
April	-	-	-	-	38.8	19.7	46.7	38.4	37.6	42.8	43.1
May	44.0	8.6	44.5	44.0	37.6	14.1	49.7	38.8	37.6	38.1	46.0
June	63.0	14.2	48.0	34.8	33.8	12.2	33.5	35.5	34.3	41.0	34.3
July	37.3	13.2	59.5	37.0	37.0	10.6	36.5	37.0	35.5	36.0	36.5
PTD	46.7	15.4	45.2	40.8	38.8	14.6	46.4	40.6	37.8	40.6	42.6

µg/m^3 – micrograms per cubic meter

Table B- 5: Monthly Average Real Time PM_{10} Monitoring Results

Statistics	Layout Area 1										
	M1 ($\mu g/m^3$)	M2 ($\mu g/m^3$)	M3 ($\mu g/m^3$)	M4 ($\mu g/m^3$)	M5 ($\mu g/m^3$)	M6 ($\mu g/m^3$)	M7 ($\mu g/m^3$)	M8 ($\mu g/m^3$)	M9 ($\mu g/m^3$)	M10 ($\mu g/m^3$)	M11 ($\mu g/m^3$)
March	13.3	22.2	16.1	6.9	8.7	14.4	10.8	6.6	1.9	7.5	5.3
April	-	-	-	-	14.0	16.7	19.1	12.1	6.1	5.8	13.2
May	25.9	23.7	24.8	28.4	19.2	15.6	21.2	16.7	14.6	15.7	18.5
June	12.8	19.2	13.5	8.9	17.3	15.1	22.5	19.1	14.2	18.3	16.4
July	13.4	18.6	22.0	7.8	35.6	29.7	42.4	42.1	37.6	22.9	20.0
PTD	13.6	18.8	19.5	7.1	16.1	15.9	19.0	13.9	9.4	11.4	14.6

$\mu g/m^3$ – micrograms per cubic meter

August 2013
Air Quality Report
Metropolis Towers

Attached is a technical summary of air quality data for August 2013 at the Metropolis Towers cleanup site submitted by PPG Industries air monitoring consultant.

This report provides air monitoring information about conditions at the work areas associated with Layout Area 1.

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

EMILCOTT

Submitted to:
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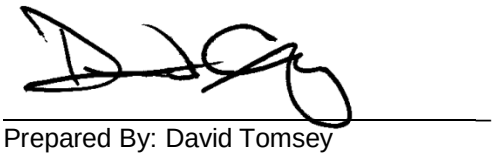
Morristown, NJ 07960

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: August 2013

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: August 2013



Prepared By: David Tomsey

Reviewed By: Bruce Groves
September 20, 2013

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr6 – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8 hour integrated hexavalent chromium (Cr6) and total particulates, as well as real time monitoring for PM_{10} at eleven (11) air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24 hour real time, Cr6, and total particulate sampling with lab analysis was also conducted at one elevated station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr6 sampling and analysis indicate that program to date average airborne Cr6 concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirming that dust control measures continue to be effective, and indicate that the levels of Cr6 in dust generated at the Site do not generate an emission source of Cr6 sufficient to create potential offsite exposure to Cr6 at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Layout Area 1 through the reporting period. This monthly report includes both monthly and program to date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real time 5 minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between July 17, 2012 and August 2, 2012. Routine sampling began on March 18, 2013 with the start of ground intrusive activities on Site.

Eleven air monitoring stations installed at Layout Area 1 provide protection during intrusive work at Areas B and E. Area B contains three ground level stations and one elevated station. Area E contains five ground level stations and two elevated stations. Each area contains an elevated station that measures 24 hour real time concentrations and collects Cr6 and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for Layout Area 1. **Table 2-1** provides an overview of the air monitoring approach at each of the AMS.

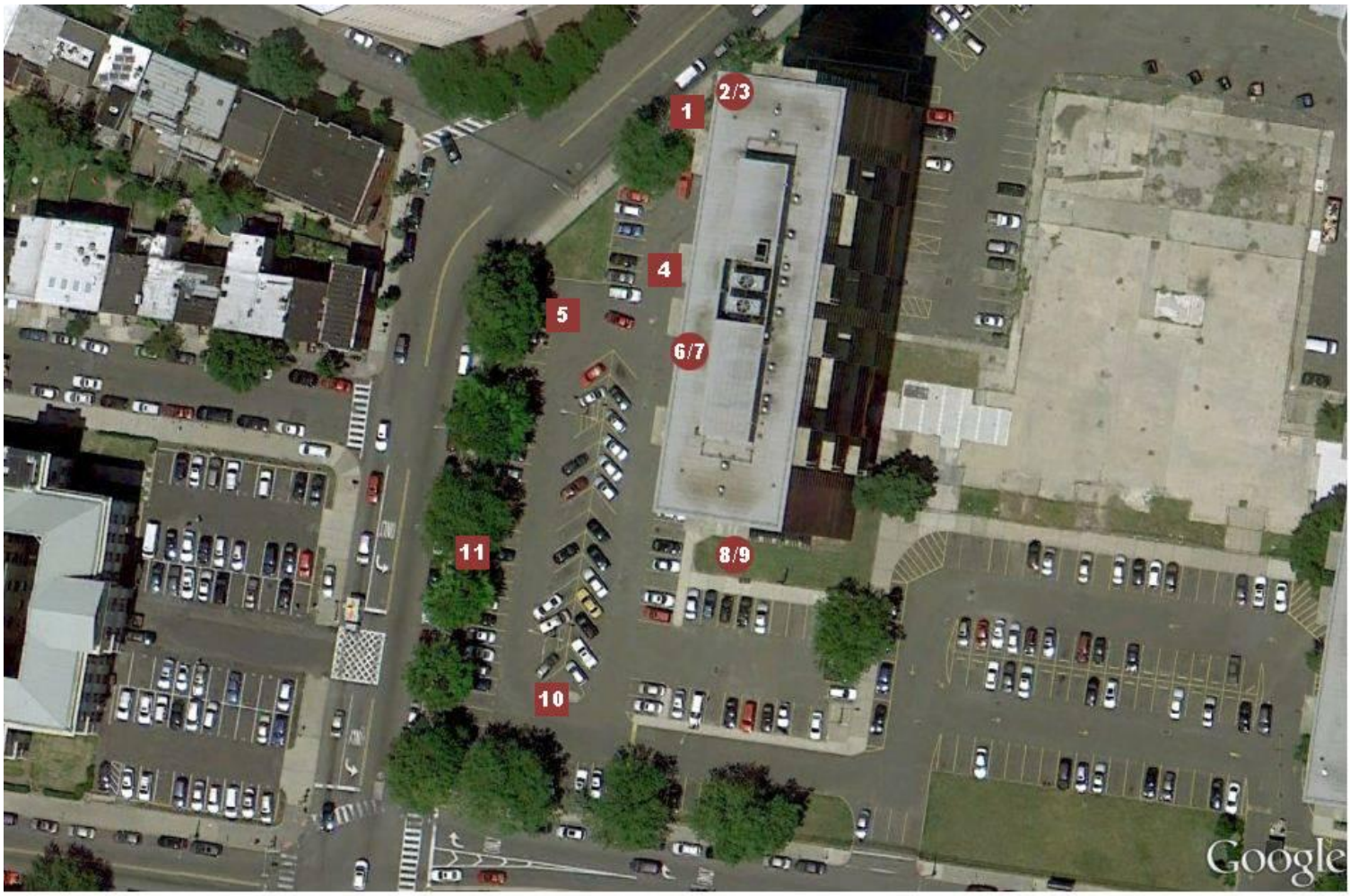
Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr6 concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis. The Cr6 average concentrations measured at each AMS will continually be compared to the Site specific AAC for Cr6 to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr6 fenceline air monitoring.

Air monitoring data collected at the Site includes:

- 8 hour integrated Cr6 and total particulate sample collection and associated laboratory analysis;
- 24 hour and 72 hour integrated Cr6 and total particulate samples collection and laboratory analysis; and
- Real time 5 minute average PM_{10}, readings measured at the work area perimeter.

This section outlines the types of data collected, frequency of collection, and the corresponding locations.

Figure 2-1: Site Overview



1 Ground level station location and designation

2/3 Ground level & elevated station location and designation

Table 2-1: Air Monitoring Approach

Layout Area 1	Station	Integrated Air Monitoring	Real Time Air Monitoring
Area B	**M 1,2,3,4**	Integrated 8 hour Cr6 and total particulate sampling and analysis during work days. 24 hour and 72 hour Cr6 sampling and analysis at one station 7 days per week.	5 minute average PM_{10} readings measured during a typical work day.
Area E	**M 5,6,7,8,9, 10,11**	Integrated 8 hour Cr6 and total particulate sampling and analysis during work days. 24 hour and 72 hour Cr6 sampling and analysis at one station 7 days per week.	5 minute average PM_{10} readings measured during a typical work day.

2.1 Integrated Air Sampling

Integrated Cr6 and total particulate samples are collected at each of the AMS for an 8 hour to 10 hour duration each working day (Typically Monday – Friday) at each of the eleven stations. Samples are collected on a preweighed polyvinyl chloride 37mm filter cassette for both Cr6 and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

2.1.1 Integrated Cr6 Sampling

The exposed Cr6 filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for Cr6 analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8 hour to 10 hour integrated Cr6 air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24 hour and 72 hour Cr6 sampling and analysis are also performed at one AMS per work area. These longer duration samples show Cr6 concentrations during overnight and weekend periods. The 24 hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72 hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for total particulate analysis using NIOSH method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8 hour to 10 hour integrated Cr6 air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real Time Air Monitoring

Real time air monitoring is divided into two types of monitoring including: work area monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Work Area

Work area air monitoring consists of ground level and elevated stations at the perimeter of the work area. Work area monitoring includes the following:

- Real time 5 minute average PM_{10} readings at each of the eleven locations. Three ground level and one elevated station for Area B and five ground level stations and two elevated stations for Area E. All stations operate 8 to 10 hours during remedial activities, Monday through Friday, with one elevated station per work area running 24 hours a day, seven days a week.

2.2.2 Meteorological Measurements

Meteorological measurements of 5 minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at elevated station 2 for Area B and elevated station 6 for Area E.

3.0 Site Specific Acceptable Air Concentration and Real Time Action Levels

Site specific AAC and real time Action Levels have been developed for Cr6 and real time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real time Action Levels have been developed to protect off site receptors from potential adverse health impacts from Cr6 and particulates over the duration of the intrusive remediation activities.

Real time monitoring and integrated results are compared against the AAC and the real time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real time action levels for integrated Cr6 concentrations and real time PM_{10} are outlined in the following sections.

3.1 Integrated Cr6 Acceptable Air Concentration

A Site specific Cr6 AAC has been developed by NJDEP to protect off site receptors from potential adverse health impacts due to potential exposure to Cr6 in dust. The AAC for Cr6 was developed to represent the maximum allowable average concentration of Cr6 in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one in one million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr6 emanating from the Site.

The AAC of 49 ng/m^3 is applicable at the work area perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC also provides a value to evaluate the effectiveness of dust control.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr6 are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. These shorter duration average concentrations metrics include: program to date, 90 day, 60 day, and 30 day running averages where the average Cr6 concentration over the previous 90 day, 60 day, and 30 day periods are calculated for each

sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr6 Metrics

Metric Observation	Response Action
30 day[1] Cr6 average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60 day[1] Cr6 average concentration greater than or equal to 40 ng/m3	
90 day[1] Cr6 average concentration greater than or equal to 35 ng/m3	
1 Sampling days.	

3.2 Real Time Alert and Action Levels

Real time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site Specific Alert and Action Levels

Parameter	Alert Level (1 min TWA)	Action Level (5 min TWA)
PM_{10}	339 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between August 1, 2013 and August 31, 2013 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real time results;
- Program to date integrated and real time statistics;
- Evaluation of program success versus the Site specific AAC and action levels; and
- Meteorological results.

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program to date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr6 and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr6 Sampling Results

Results of the Cr6 sampling from the reporting period and a program to date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8 hour Cr6 concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr6 concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program to Date

Sampling and analytical statistics for integrated 8 hour Cr6 results are shown in Table B-1 and include various programs to date metrics relative to Cr6 analytical data. Monthly average 8 hour Cr6 concentration results are shown in Table B-2 for each AMS location. A snapshot of the program to date, 30, 60, and 90 day running Cr6 average concentrations at the end of the reporting period were not available for this reporting period.

Table 4-1: Short Term Average 8 Hour Integrated Cr6 Metrics

Running Cr6 Metrics[1]		Layout Area 1										
	Metric (ng/m^3)	**M1 (ng/m^3)**	**M2 (ng/m^3)**	**M3 (ng/m^3)**	**M4 (ng/m^3)**	**M5 (ng/m^3)**	**M6 (ng/m^3)**	**M7 (ng/m^3)**	**M8 (ng/m^3)**	**M9 (ng/m^3)**	**M10 (ng/m^3)**	**M11 (ng/m^3)**
30 day[2]	**45**	13.5	2.9	10.9	10.6	NA	NA	NA	NA	NA	NA	NA
60 day[2]	**40**	13.5	2.9	10.9	10.6	7.5	2.3	7.5	7.5	7.0	7.5	7.5
90 day[2]	**35**	11.6	2.8	10.0	9.8	7.1	2.1	7.0	7.5	7.1	7.2	7.2
PTD[3]		11.4	3.4	9.8	11.0	8.6	2.1	7.6	7.6	7.5	7.4	7.9

ng/m^3 – nanograms per cubic meter

1 Running Cr6 metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr6 are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. The running Cr6 metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long term (program) ending success.

2. Running Cr6 metrics are valid on the last day in the report period and include the previous 30, 60, or 90 days of sample results.

3. Program to Date - Air monitoring conducted from March 18, 2013 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8 hour integrated total particulate sampling and analysis from the reporting period and program to date results are discussed in the following sections.

Reporting Period

Individual integrated 8 hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program to date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 150 sample days between March 18, 2013 and the end of the reporting period. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8 hour Cr6 average concentrations, based upon lab analytical results at each AMS, were less than 24% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real Time Air Monitoring Results

Real time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real time 5 minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real time 5 minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3.

Program to Date

Real time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

- Area B: Protect conduit, pour concrete around conduit and backfill Area B excavation. Top dress, curbs and sidewalks, remove fencing Area B.

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-6.

5.0 Conclusions

Results of this project's reporting period show the air sampling and monitoring program at the Metropolis Towers Site indicate that the average Cr6 concentrations for each AMS are well below the AAC of 49 ng/m^3. The program through this reporting period shows the Cr6 concentrations and percent Cr6 in dust samples demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr6 in dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr6 and do not generate an emission source of Cr6 sufficient to create potential offsite exposure to Cr6 at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8 Hour Cr6 Concentrations
- Integrated 8 Hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8 Hour Cr6 Sampling Results

Date of Sample	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
08/01/13	8.0	2.6	8.0	8.5							
08/02/13	23.0	2.5	13.0	6.5							
08/03/13		2.5									
08/04/13		2.5									
08/05/13	8.0	2.9	22.0	19.0							
08/06/13	22.0	8.30	6.5	18.0							
08/07/13	9.0	2.6	9.0	9.0							
08/08/13	8.5	2.65	8.0	8.0							
08/09/13	8.0	2.5	7.5	8.0							
08/10/13		2.5									
08/11/13		2.5									
08/12/13	10.5	NA	10.5	10.5							
08/13/13		9.5									
08/14/13	37.0	4.0	20.5	14.5							

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr6. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8 Hour Total Particulate Sampling Results

Date of Sample	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
08/01/13	39.5	41.0	40.5	13.0							
08/02/13	31.0	12.5	31.5	31.5							
08/03/13		12.5									
08/04/13		12.5									
08/05/13	40.0	13.0	38.5	39.0							
08/06/13	39.5	12.50	38.5	38.5							
08/07/13	44.5	13.0	45.0	45.0							
08/08/13	42.0	13.00	40.5	40.5							
08/09/13	39.0	12.5	37.5	39.0							
08/10/13		12.5									
08/11/13		12.5									
08/12/13	50.0	NA	50.0	50.0							
08/13/13		13.0									
08/14/13	47.5	10.0	47.0	45.5							

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's site 114 reporting of non-detects by AECOM.

Figure A- 1: Real Time 5 Minute Average PM_{10} Monitoring Results

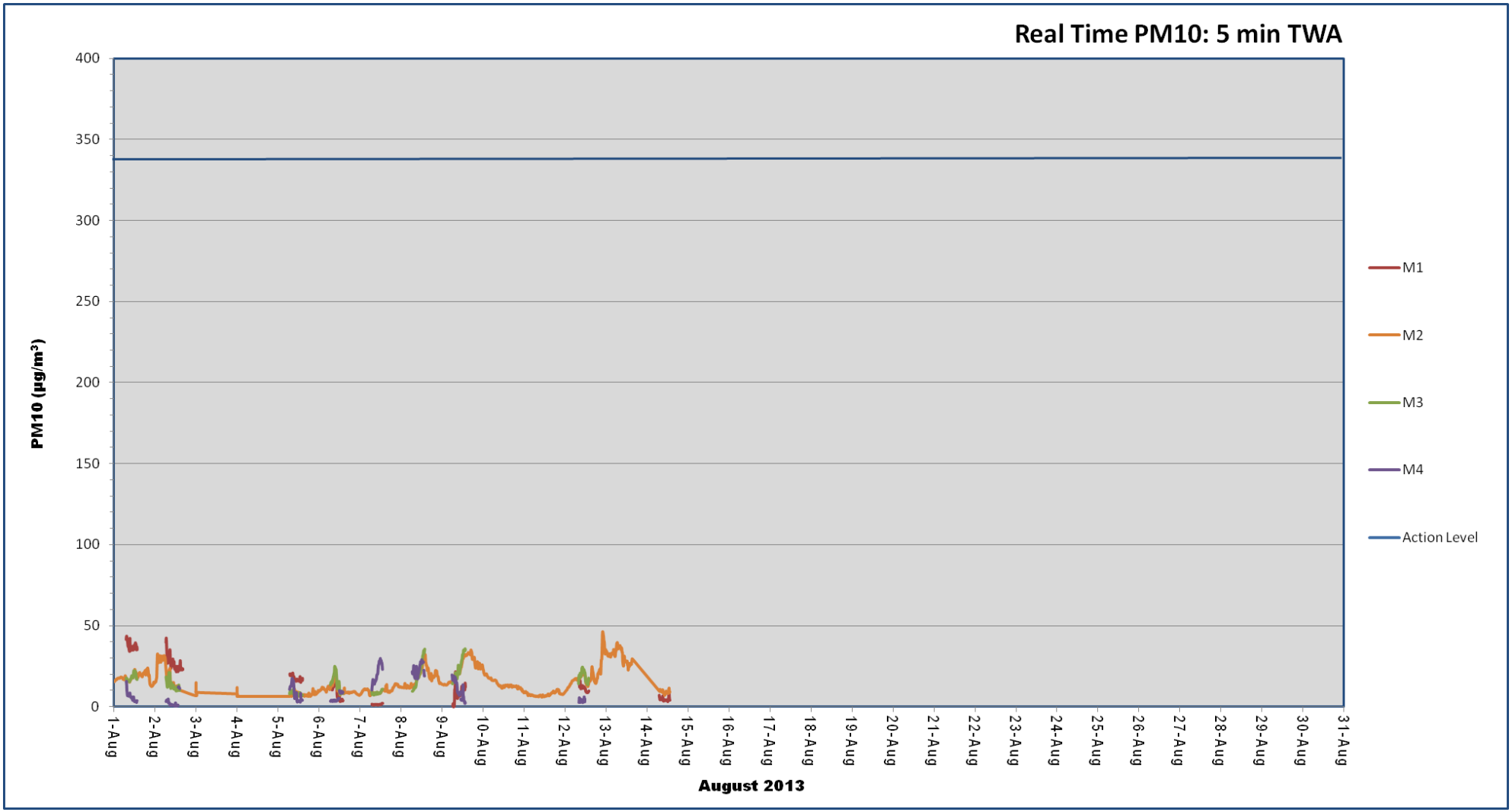


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
Dust	NA	NA	NA	NA	NA	NA

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter ($\mu g/m^3$)

ng/m^3 – nanograms per cubic meter

$\mu g/m^3$ – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

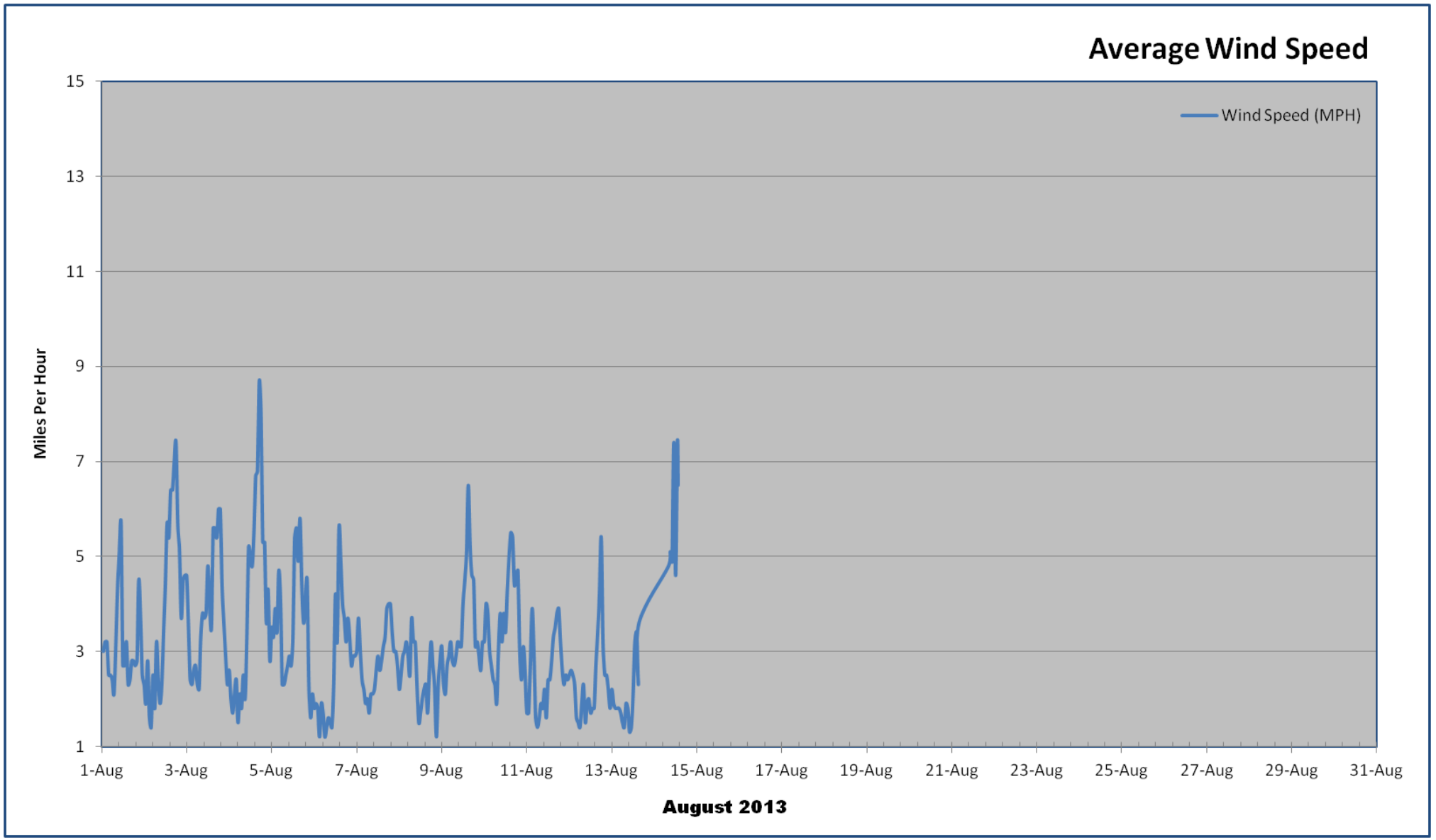


Figure A-3: Temperature

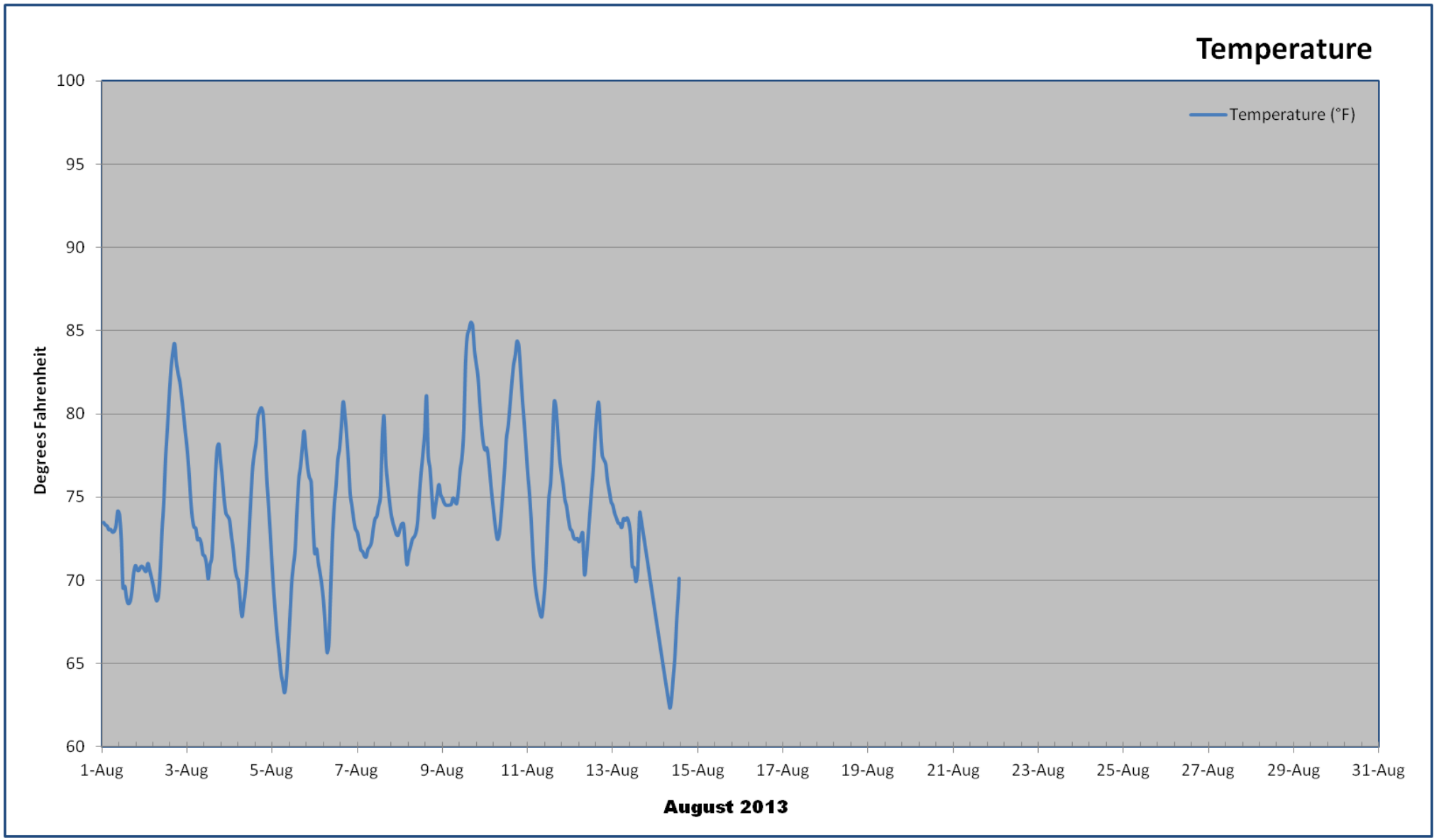


Figure A-4: Relative Humidity

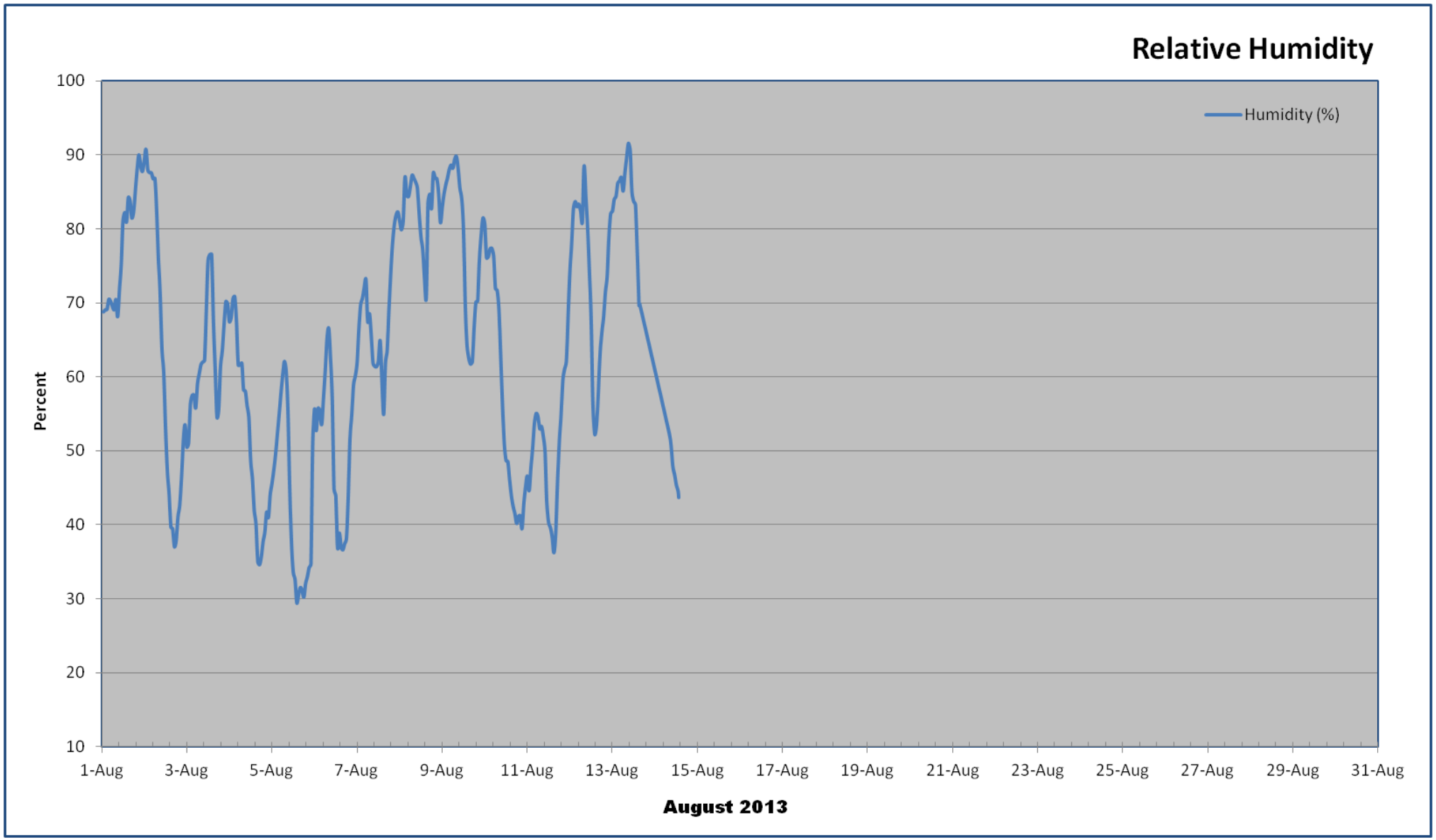
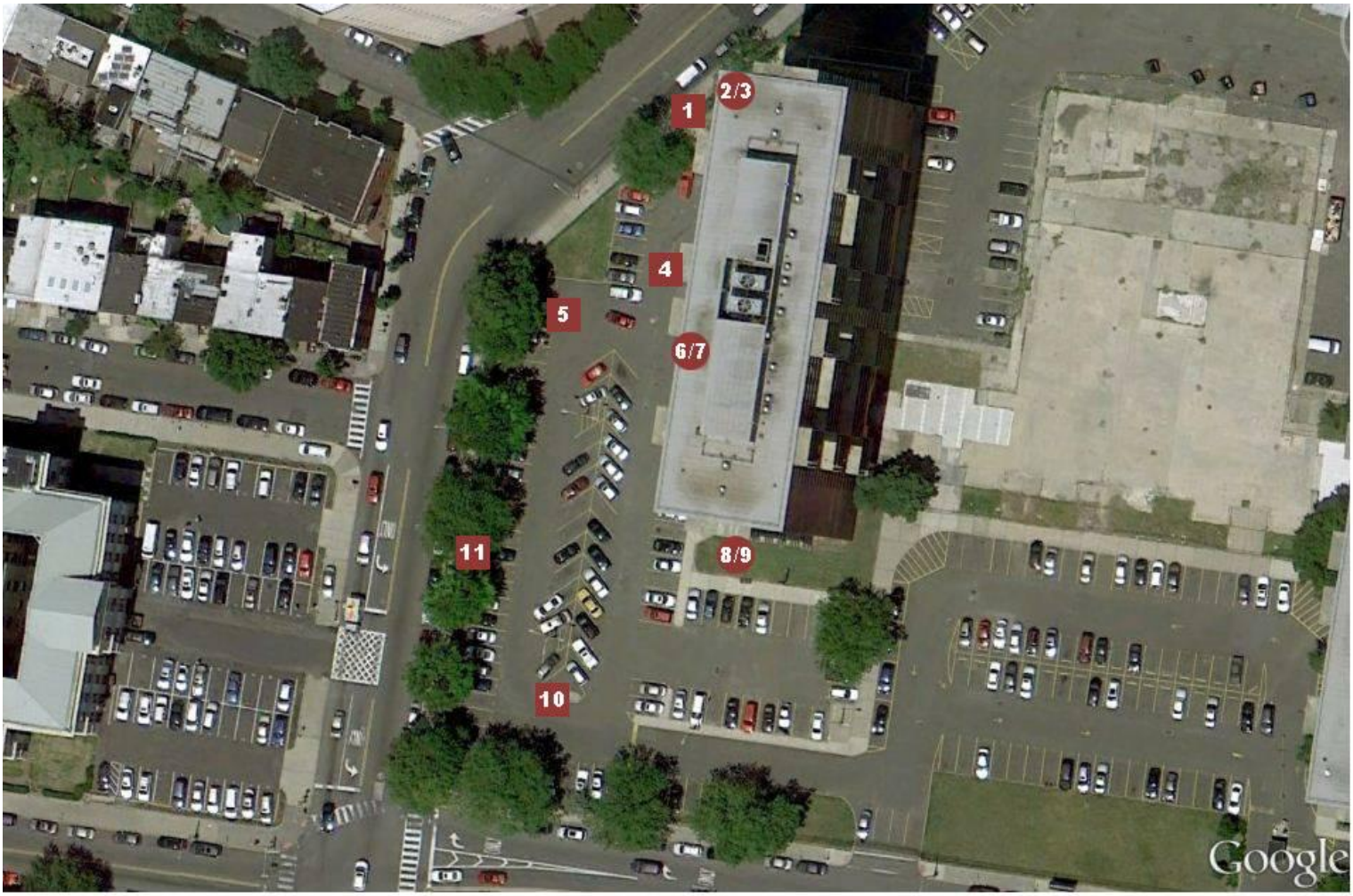


Figure A–5: Site Map



1 Ground level station location and designation

2/3 Ground level & elevated station location and designation

Appendix B

Program to Date Result Summaries

- Integrated 8 Hour Cr6 Concentration Summaries
- Integrated 8 Hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program to Date Integrated 8 Hour Cr6 Sampling Results Statistics

Statistics[1]	Layout Area 1										
	M1 (ng/m^3)	M2 (ng/m^3)	M3 (ng/m^3)	M4 (ng/m^3)	M5 (ng/m^3)	M6 (ng/m^3)	M7 (ng/m^3)	M8 (ng/m^3)	M9 (ng/m^3)	M10 (ng/m^3)	M11 (ng/m^3)
Total Number of Samples[2]	19	42	19	19	49	110	49	48	48	48	49
Rate of Data Collection	100%	100%	100%	100%	100%	99%	98%	100%	100%	100%	98%
Number of Detected Samples[3]	3	5	2	3	2	9	0	0	0	0	2
% of Cr6 Samples Greater than MDL	15.8%	11.9%	10%	16%	4.1%	8.2%	0%	0%	0%	0%	4.1%
Number of Samples Above AAC	0	0	0	0	0	0	0	0	0	0	0
Average % Cr6 in Dust[4]	0.027%	0.024%	0.023%	0.028%	0.022%	0.018%	0.019%	0.020%	0.020%	0.019%	0.020%
Maximum % Cr6 in Dust[4]	0.078%	0.073%	0.057%	0.065%	0.071%	0.060%	0.048%	0.050%	0.056%	0.048%	0.050%

ng/m3 – nanograms per cubic meter

[1] Total number of samples collected since March 18, 2013. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since March 18, 2013 reported above the laboratory reporting limit.

[3] The program to date average and maximum percent Cr6 in dust was calculated using all the integrated Total Particulate and Cr6 sample results collected since March 18, 2013.

Table B- 2: Monthly Average Integrated 8 Hour Cr6 Sampling Results

Statistics	Layout Area 1										
	M1 (ng/m^3)	M2 (ng/m^3)	M3 (ng/m^3)	M4 (ng/m^3)	M5 (ng/m^3)	M6 (ng/m^3)	M7 (ng/m^3)	M8 (ng/m^3)	M9 (ng/m^3)	M10 (ng/m^3)	M11 (ng/m^3)
Baseline	9.9	3.7	10.1	10.1	-	-	-	-	-	-	-
March	10.6	9.3	9.0	15.4	13.6	3.5	10.0	7.3	8.1	7.9	10.6
April	-	-	-	-	7.3	1.8	7.1	7.6	7.4	7.2	7.4
May	9.0	2.6	9.0	9.0	8.5	2.2	7.3	7.8	7.5	7.5	7.6
June	5.4	2.7	7.0	7.0	6.8	2.4	6.7	7.1	6.8	6.9	6.9
July	7.5	2.2	7.5	7.5	7.5	1.7	7.5	7.5	7.0	7.5	7.5
August	14.9	3.7	11.7	11.3	NA	NA	NA	NA	NA	NA	NA
PTD	11.4	3.4	9.8	11.0	8.6	2.1	7.6	7.6	7.5	7.4	7.9

ng/m^3 – nanograms per cubic meter

Table B- 3: Program to Date Integrated Total Particulate 8 Hour Sampling Results Statistics

Statistics	Layout Area 1										
	M1 (ng/m^3)	**M2 (ng/m^3)**	**M3 (ng/m^3)**	**M4 (ng/m^3)**	**M5 (ng/m^3)**	**M6 (ng/m^3)**	**M7 (ng/m^3)**	**M8 (ng/m^3)**	**M9 (ng/m^3)**	**M10 (ng/m^3)**	**M11 (ng/m^3)**
Total Number of Samples[1]	19	42	19	19	49	110	49	48	48	48	49
Rate of Data Collection	100%	100%	100%	100%	100%	99%	98%	100%	100%	100%	98%
No of Detected Samples[2]	1	1	2	0	0	17	4	1	1	4	4
% Detection	5.3%	2.4%	10.5%	0%	0%	15.5%	8.2%	2.1%	2.1%	8.3%	8.2%

1 Total number of sample collected since March 18, 2013. Variations in the number of samples collected are specifically identified in Table A-2 within the report month of the variation.

2 Total number of sample results since March 18, 2013 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8 hour Total Particulate Sampling Results

Statistics[1]	Layout Area 1										
	M1 (µg/m^3)	M2 (µg/m^3)	M3 (µg/m^3)	M4 (µg/m^3)	M5 (µg/m^3)	M6 (µg/m^3)	M7 (µg/m^3)	M8 (µg/m^3)	M9 (µg/m^3)	M10 (µg/m^3)	M11 (µg/m^3)
Baseline	49.1	22.3	50.2	51.1	-	-	-	-	-	-	-
March	51.6	32.0	45.8	52.6	44.1	13.0	49.9	57.6	41.9	38.9	41.3
April	-	-	-	-	38.8	19.7	46.7	38.4	37.6	42.8	43.1
May	44.0	8.6	44.5	44.0	37.6	14.1	49.7	38.8	37.6	38.1	46.0
June	63.0	14.2	48.0	34.8	33.8	12.2	33.5	35.5	34.3	41.0	34.3
July	37.3	13.2	59.5	37.0	37.0	10.6	36.5	37.0	35.5	36.0	36.5
August	41.4	14.7	41.0	38.0	NA	NA	NA	NA	NA	NA	NA
PTD	46.7	15.4	45.2	40.8	38.8	14.6	46.4	40.6	37.8	40.6	42.6

µg/m^3 – micrograms per cubic meter

Table B- 5: Monthly Average Real Time PM_{10} Monitoring Results

Statistics	Layout Area 1										
	M1 ($\mu g/m^3$)	M2 ($\mu g/m^3$)	M3 ($\mu g/m^3$)	M4 ($\mu g/m^3$)	M5 ($\mu g/m^3$)	M6 ($\mu g/m^3$)	M7 ($\mu g/m^3$)	M8 ($\mu g/m^3$)	M9 ($\mu g/m^3$)	M10 ($\mu g/m^3$)	M11 ($\mu g/m^3$)
March	13.3	22.2	16.1	6.9	8.7	14.4	10.8	6.6	1.9	7.5	5.3
April	-	-	-	-	14.0	16.7	19.1	12.1	6.1	5.8	13.2
May	25.9	23.7	24.8	28.4	19.2	15.6	21.2	16.7	14.6	15.7	18.5
June	12.8	19.2	13.5	8.9	17.3	15.1	22.5	19.1	14.2	18.3	16.4
July	13.4	18.6	22.0	7.8	35.6	29.7	42.4	42.1	37.6	22.9	20.0
August	15.0	17.9	17.6	10.6	35.6	29.7	42.4	42.1	37.6	22.9	20.0
PTD	13.6	18.8	19.5	7.1	16.1	15.9	19.0	13.9	9.4	11.4	14.6

$\mu g/m^3$ – micrograms per cubic meter

October 2013
Air Quality Report
Metropolis Towers

Attached is a technical summary of air quality data for October 2013 at the Metropolis Towers cleanup site submitted by PPG Industries air monitoring consultant.

This report provides air monitoring information about conditions at the work areas associated with Layout Area 3.

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

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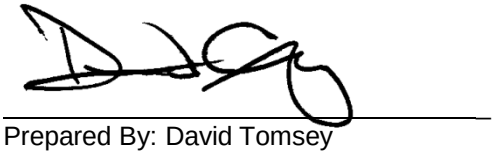
Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: October 2013

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: October 2013



Prepared By: David Tomsey

Reviewed By: Bruce Groves
November 4, 2013

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr6+ – Hexavalent

Chromium FAM – Fixed Air

Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr6+) and total particulates, as well as real-time monitoring for PM_{10} at ten (10) air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour real-time, Cr6+, and total particulate sampling with lab analysis was also conducted at one elevated station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr6+ sampling and analysis indicate that program-to-date average airborne Cr6+ concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirming that dust control measures continue to be effective, and indicate that the levels of Cr6+ in dust generated at the Site do not generate an emission source of Cr6+ sufficient to create potential offsite exposure to Cr6+ at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Layout Area 3 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 5-minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between July 17, 2012 and August 2, 2012. Routine sampling began on October 2, 2013 with the start of site activities for Layout Area 3.

Ten air monitoring stations installed at Layout Area 3 provide protection during intrusive work at Areas C South. Area C contains six ground level stations and four elevated stations. One elevated station measures 24-hour real-time concentrations and collects Cr6+ and total particulate samples for 24-hours during the week and 72-hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for Layout Area 3. **Table 2-1** provides an overview of the air monitoring approach at each of the AMS.

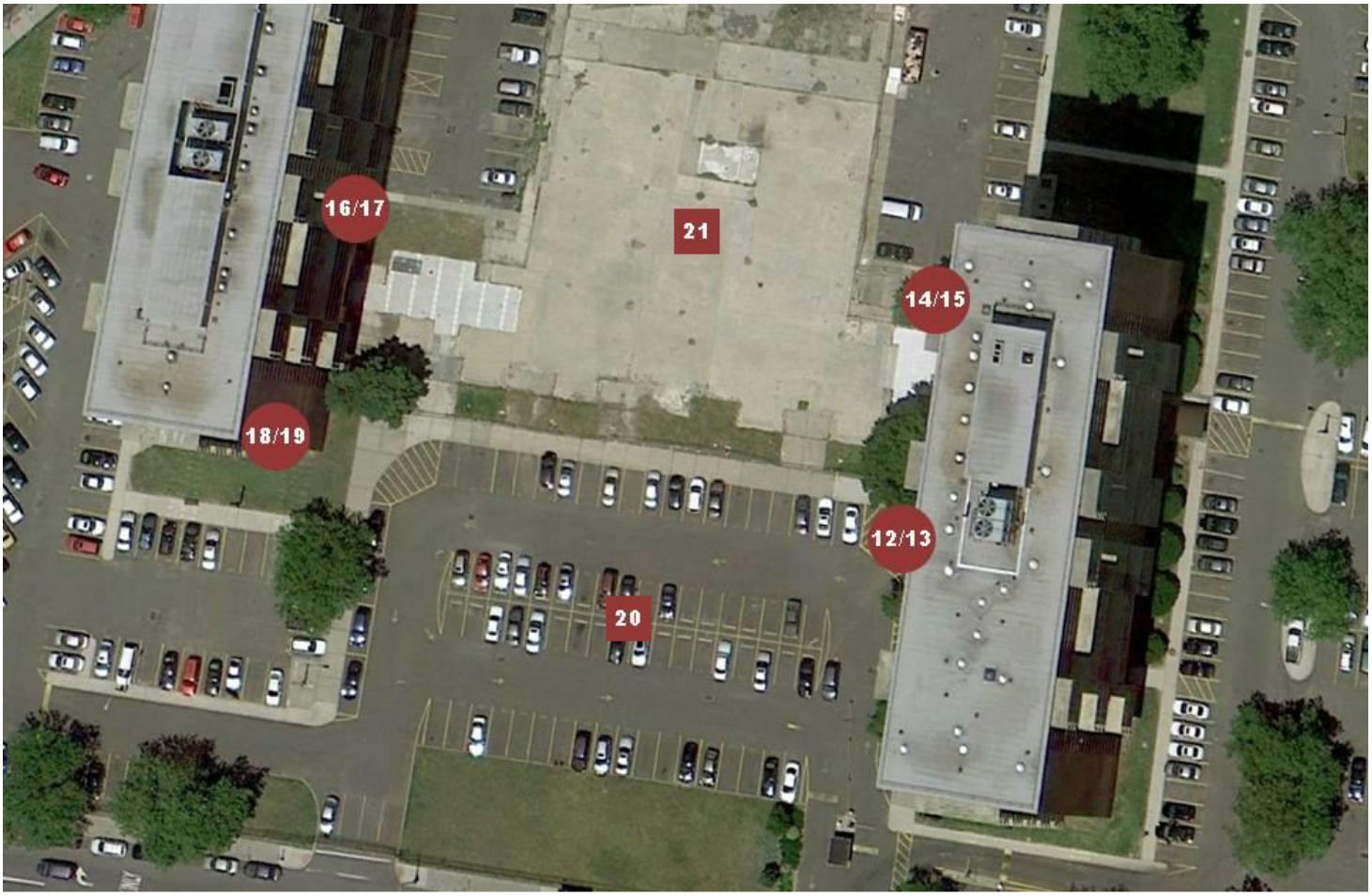
Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr6+ concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis. The Cr6+ average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr6+ to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr6+ fenceline air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr6+ and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr6+ and total particulate samples collection and laboratory analysis; and
- Real-time 5-minute average PM_{10}, readings measured at the work area perimeter.

This section outlines the types of data collected, frequency of collection, and the corresponding locations.

Figure 2-1: Site Overview



12/13 Ground level & elevated station location and designation

20 Ground level station location and designation

Table 2-1: Air Monitoring Approach

Layout Area 3	Station	Integrated Air Monitoring	Real-Time Air Monitoring
Area C South	**M 12,13,14,15,16, 17,18,19,20,21,**	Integrated 8-hour Cr6+ and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr6+ sampling and analysis at one station 7 days per week.	5-minute average PM_{10} readings measured during a typical work day.

2.1 Integrated Air Sampling

Integrated Cr6+ and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (Typically Monday – Friday) at each of the ten stations. Samples are collected on a preweighed polyvinyl chloride 37mm filter cassette for both Cr6+ and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

2.1.1 Integrated Cr6+ Sampling

The exposed Cr6+ filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for Cr6+ analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr6+ air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr6+ sampling and analysis are also performed at one AMS per work area. These longer duration samples show Cr6+ concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for total

particulate analysis using NIOSH method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr6+ air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: work area monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Work Area

Work area air monitoring consists of ground level and elevated stations at the perimeter of the work area. Work area monitoring includes the following:

- Real-time 5-minute average PM_{10} readings at each of the eleven locations. Six ground level and four elevated stations operate 8 to 10-hours during remedial activities, Monday through Friday, with one elevated station running 24-hours a day, seven days a week.

2.2.2 Meteorological Measurements

Meteorological measurements of 5-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at elevated station 16.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific AAC and real-time Action Levels have been developed for Cr6+ and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr6+ and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr6+ concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr6+ Acceptable Air Concentration

A Site-specific Cr6+ AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr6+ in dust. The AAC for Cr6+ was developed to represent the maximum allowable average concentration of Cr6+ in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr6+ emanating from the Site.

The AAC of 49 ng/m^3 is applicable at the work area perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC also provides a value to evaluate the effectiveness of dust control.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr6+ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. These shorter duration average concentrations metrics include: program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr6+ concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each

sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr6+ Metrics

Metric Observation	Response Action
30-day[1] Cr6+ average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60-day[1] Cr6+ average concentration greater than or equal to 40 ng/m3	
90-day[1] Cr6+ average concentration greater than or equal to 35 ng/m3	
1 Sampling day.	

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

Parameter	Alert Level (1 min TWA)	Action Level (5 min TWA)
PM_{10}	339 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between October 2, 2013 and October 31, 2013 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels; and
- Meteorological results.

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr6+ and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr6+ Sampling Results

Results of the Cr6+ sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr6+ concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr6+ concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr6+ results are shown in Table B-1 and include various programs to date metrics relative to Cr6+ analytical data. Monthly average 8-hour Cr6+ concentration results are shown in Table B-2 for each AMS location. A snapshot of the 60-day and 90-day running Cr6+ average concentrations at the end of the reporting period were not available for this reporting period.

Table 4-1: Short Term Average 8-hour Integrated Cr6+ Metrics

Running Cr6+ Metrics[1]		Layout Area 3									
	Metric (ng/m^3)	**M12 (ng/m^3)**	**M13 (ng/m^3)**	**M14 (ng/m^3)**	**M15 (ng/m^3)**	**M16 (ng/m^3)**	**M17 (ng/m^3)**	**M18 (ng/m^3)**	**M19 (ng/m^3)**	**M20 (ng/m^3)**	**M21 (ng/m^3)**
30-day[2]	**45**	9.3	9.6	7.9	8.7	2.4	7.2	7.6	7.6	8.4	9.0
60-day[2]	**40**	-	-	-	-	-	-	-	-	-	-
90-day[2]	**35**	-	-	-	-	-	-	-	-	-	-
PTD[3]		9.3	9.6	7.9	8.7	2.4	7.2	7.6	7.6	8.4	9.0

ng/m^3 – nanograms per cubic meter

1 Running Cr6+ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr6+ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. The running Cr6+ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long term (program) ending success.

2. Running Cr6+ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60 and 90-day metrics were not available due to the short duration of sampling during this phase of the project.

3. Program-to-date - Air monitoring conducted from October 2, 2013 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 30 sample days between October 2, 2013 and the end of the reporting period. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr6+ average concentrations, based upon lab analytical results at each AMS, were less than 20% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real-time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 5 minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real-time 5 minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3.

Program-to-date

Real-time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

- Set up site fencing;
- Saw cut asphalt;
- Trench perimeter of excavation area and install dewatering system;
- Set up water treatment plant.

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-6.

5.0 Conclusions

Results of this project's reporting period show the air sampling and monitoring program at the Metropolis Towers Site indicate that the average Cr6+ concentrations for each AMS are well below the AAC of 49 ng/m^3. The program through this reporting period shows the Cr6+ concentrations and percent Cr6+ in dust samples demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr6+ in dust at the Site well below the AAC. These results indicate that dust generated at the Site is not likely to pose a significant risk to off-site receptors.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr6+ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr6+ Sampling Results

Date of Sample	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21
10/02/13	7.0	7.0	7.0	7.0	2.4	7.0	7.0	7.0	7.0	7.0
10/03/13	16.0	19.0	17.0	6.5	2.3	6.5	6.5	6.5	6.5	6.0
10/04/13	17.0	25.0	7.0	7.0	0.8	7.0	7.0	7.0	7.0	7.0
10/05/13					0.8					
10/06/13					0.8					
10/07/13	6.5	6.5	6.5	6.0	2.3	6.5	6.5	6.5	6.5	6.0
10/08/13	14.5	14.5	13.5	14.0	4.8	14.0	12.5	14.0	12.5	12.5
10/09/13	14.5	15.5	14.0	14.0	4.75	12.5	12.5	13.0	12.5	13.0
10/10/13	7.0	7.0	7.0	7.0	0.8	7.0	7.0	7.0	7.0	7.0
10/11/13	7.0	7.0	7.5	7.0	2.3	6.5	6.0	6.5	6.5	7.0
10/12/13					2.3					
10/13/13					2.3					
10/14/13	7.0	21.0	7.0	6.5	5.5	6.5	6.5	6.5	15.0	6.5
10/15/13	6.5	7.0	6.5	6.5	2.3	6.5	6.5	6.5	6.0	6.5
10/16/13	17.0	6.5	6.5	6.5	2.35	6.5	6.5	6.5	7.0	24.0
10/17/13	7.0	7.0	7.0	7.0	0.8	7.0	7.0	7.0	6.5	6.5
10/18/13	7.0	7.0	7.0	6.5	2.3	6.5	6.5	6.5	6.5	6.5
10/19/13					2.3					
10/20/13					2.3					
10/21/13	6.5	6.5	6.5	6.5	2.4	6.5	6.5	6.5	6.0	6.5
10/22/13	7.0	7.0	7.0	7.0	2.4	6.5	6.5	6.5	6.5	6.5
10/23/13	7.0	6.5	6.5	6.5	2.4	6.5	6.5	6.0	6.0	6.5
10/24/13	7.0	7.0	6.5	7.0	4.8	6.5	16.0	6.5	6.5	22.0
10/25/13	7.0	7.0	7.0	15.0	1.6	6.5	7.0	6.5	6.5	7.0
10/26/13					1.6					
10/27/13					1.6					
10/28/13	7.0	7.0	7.0	7.0	2.4	6.5	7.0	6.5	6.5	6.5
10/29/13	7.5	7.0	6.5	17.0	2.4	6.5	6.5	6.5	6.5	6.5
10/30/13	15.0	7.0	7.0	17.0	2.3	5.5	5.5	16.0	20.0	15.0
10/31/13	7.0	7.0	7.0	7.0	2.4	7.0	7.0	6.5	14.0	6.5

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr6+. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

Date of Sample	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21
10/02/13	35.0	34.5	35.0	35.0	31.0	35.5	35.0	35.5	35.0	71.0
10/03/13	300.0	380.0	78.0	85.0	40.0	32.0	32.5	32.5	65.0	31.0
10/04/13	110.0	210.0	35.5	77.0	7.8	89.0	35.5	35.5	86.0	73.0
10/05/13					7.8					
10/06/13					7.8					
10/07/13	33.5	33.5	31.5	31.5	11.5	32.0	32.5	32.5	190.0	31.0
10/08/13	70.0	70.0	70.0	70.0	24.0	70.0	65.0	70.0	65.0	65.0
10/09/13	70.0	70.0	70.0	70.0	24.0	60.0	60.0	65.0	60.0	65.0
10/10/13	35.5	35.5	35.5	35.0	3.9	35.0	35.5	35.5	34.5	34.0
10/11/13	34.0	35.0	33.5	35.0	11.5	32.0	31.0	32.0	32.5	34.5
10/12/13					11.5					
10/13/13					11.5					
10/14/13	34.0	34.5	34.0	33.5	25.0	32.0	33.0	31.5	31.5	31.5
10/15/13	33.5	34.0	33.0	32.5	11.5	31.5	32.0	32.5	31.0	32.0
10/16/13	33.5	33.5	33.5	33.0	11.5	32.0	31.5	31.5	31.5	31.5
10/17/13	35.0	34.0	34.5	34.5	14.0	34.5	34.5	34.0	33.0	33.5
10/18/13	35.5	35.5	35.0	33.5	11.5	33.5	33.5	31.5	31.5	32.5
10/19/13					11.5					
10/20/13					11.5					
10/21/13	33.5	33.5	33.0	33.0	12.0	63.0	31.5	31.5	30.5	31.5
10/22/13	35.0	34.0	35.0	34.0	12.0	33.0	33.0	32.5	32.5	33.0
10/23/13	34.5	32.5	33.5	32.5	12.0	31.5	32.0	31.0	30.5	32.0
10/24/13	35.0	34.0	33.5	34.5	11.5	32.5	34.0	32.4	32.0	33.5
10/25/13	35.5	34.5	35.0	35.0	4.0	33.5	34.0	33.5	33.0	34.0
10/26/13										
10/27/13										
10/28/13	34.5	35.0	34.0	35.0	12.0	33.0	34.0	33.0	33.5	33.0
10/29/13	35.0	35.0	33.5	34.0	11.5	32.5	33.5	33.0	32.0	33.5
10/30/13	34.5	34.0	180.0	140.0	44.0	28.5	28.5	33.5	32.0	32.5
10/31/13	34.5	34.0	35.5	35.0	12.0	34.5	34.0	33.0	32.5	33.5

Results in microograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Figure A- 1: Real-Time 5-minute average PM_{10} Monitoring Results

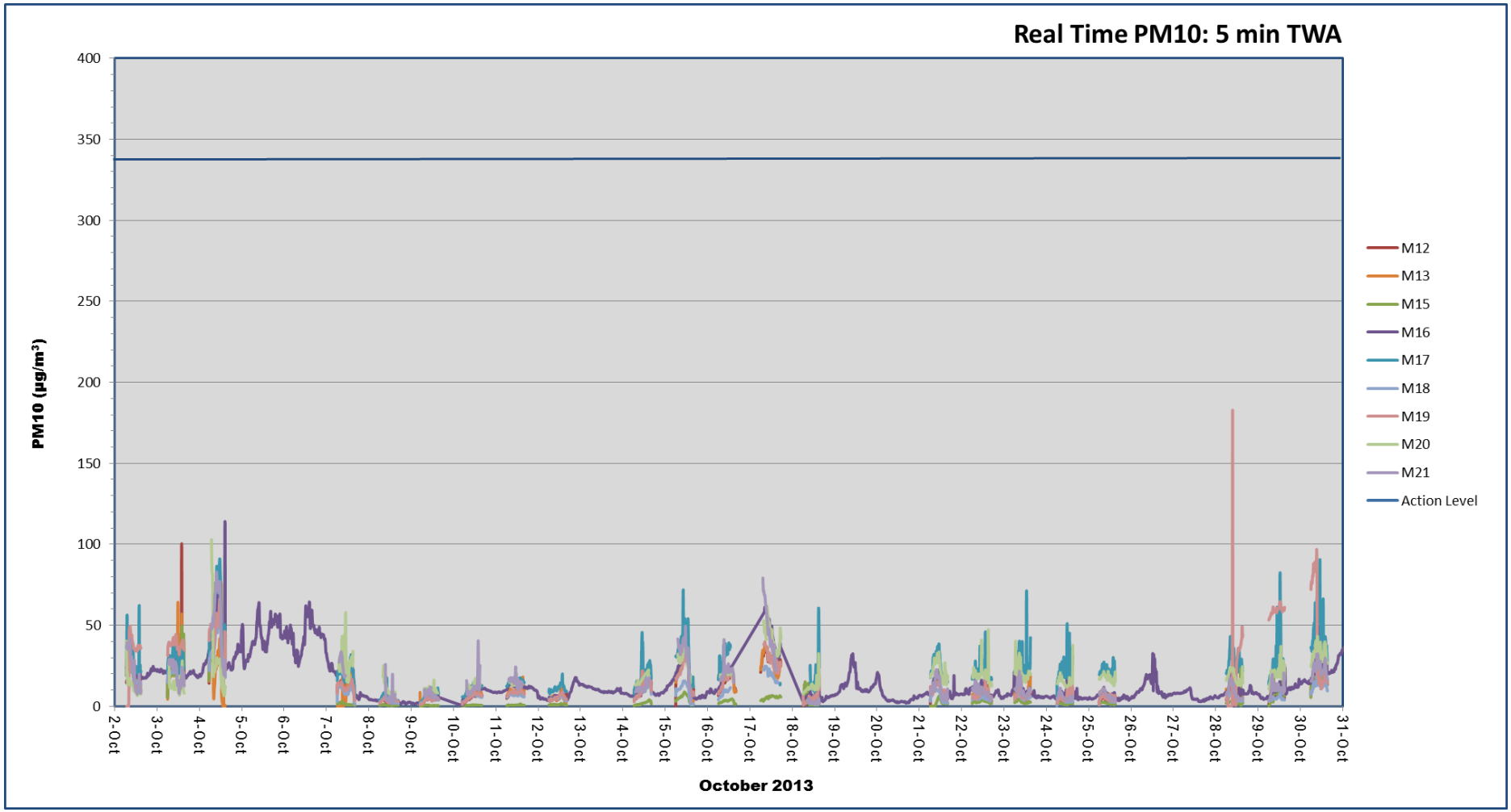


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
Dust	NA	NA	NA	NA	NA	NA

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter ($\mu g/m^3$)

ng/m^3 – nanograms per cubic meter

$\mu g/m^3$ – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

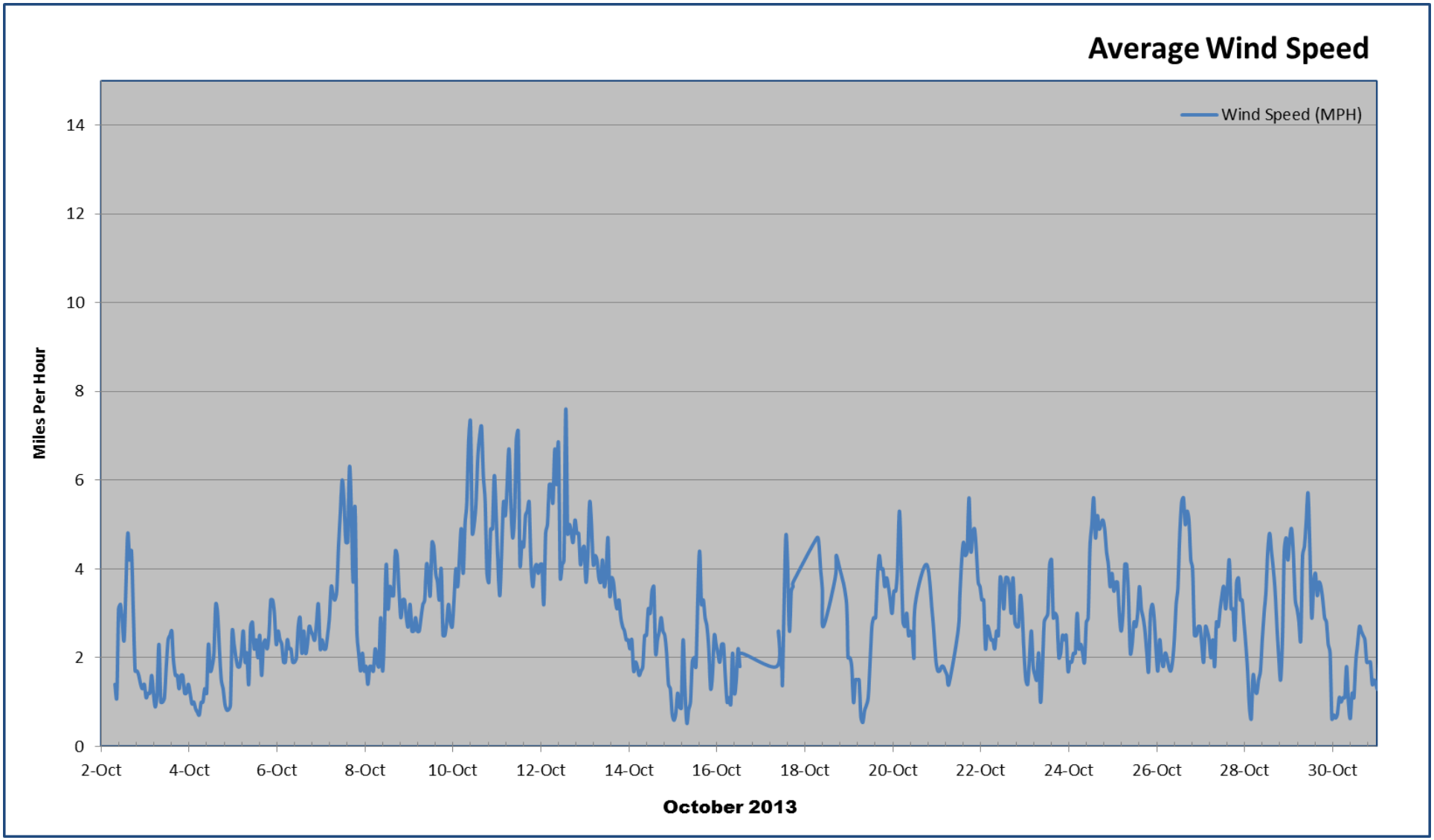


Figure A-3: Temperature

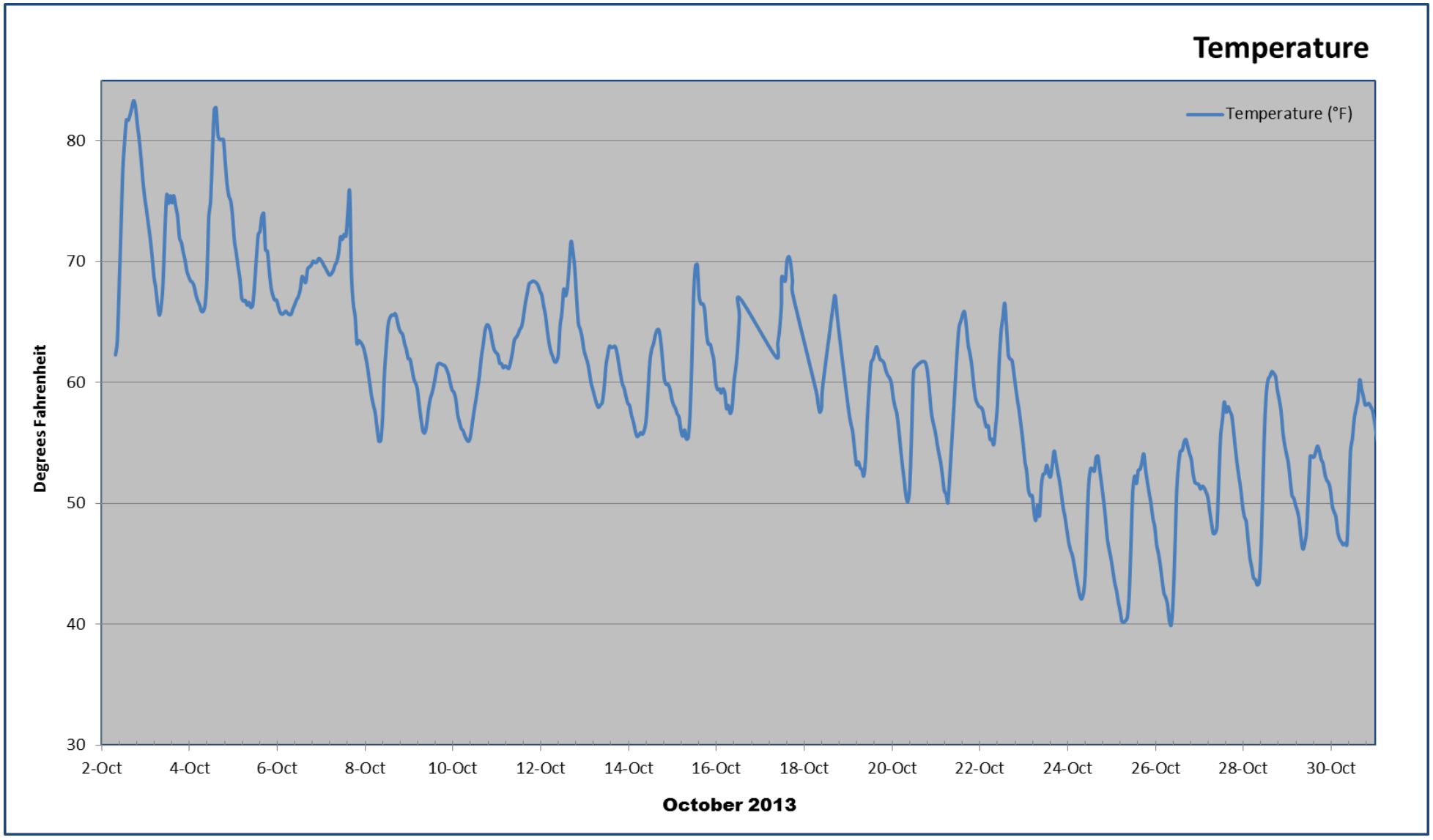


Figure A-4: Relative Humidity

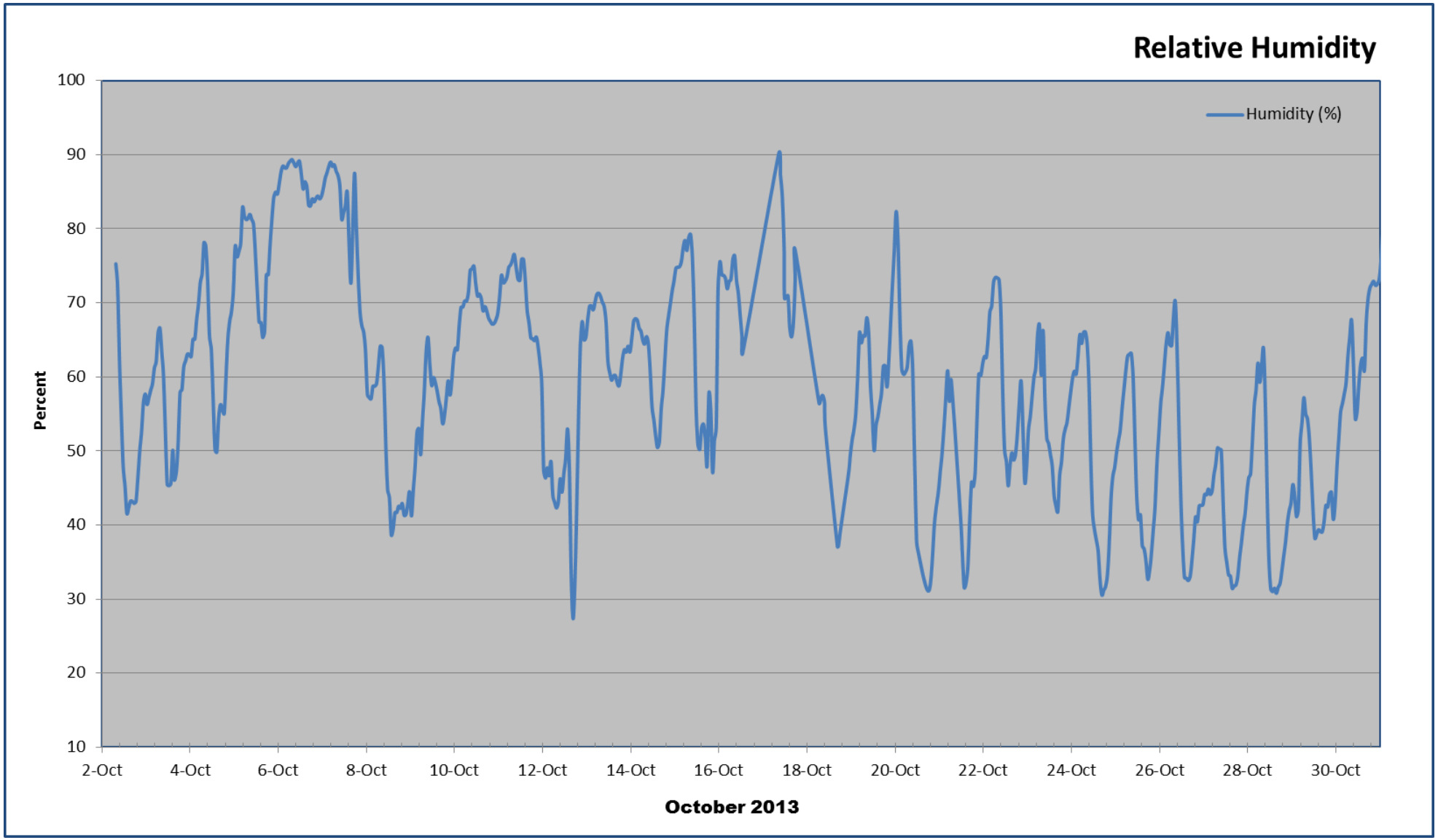
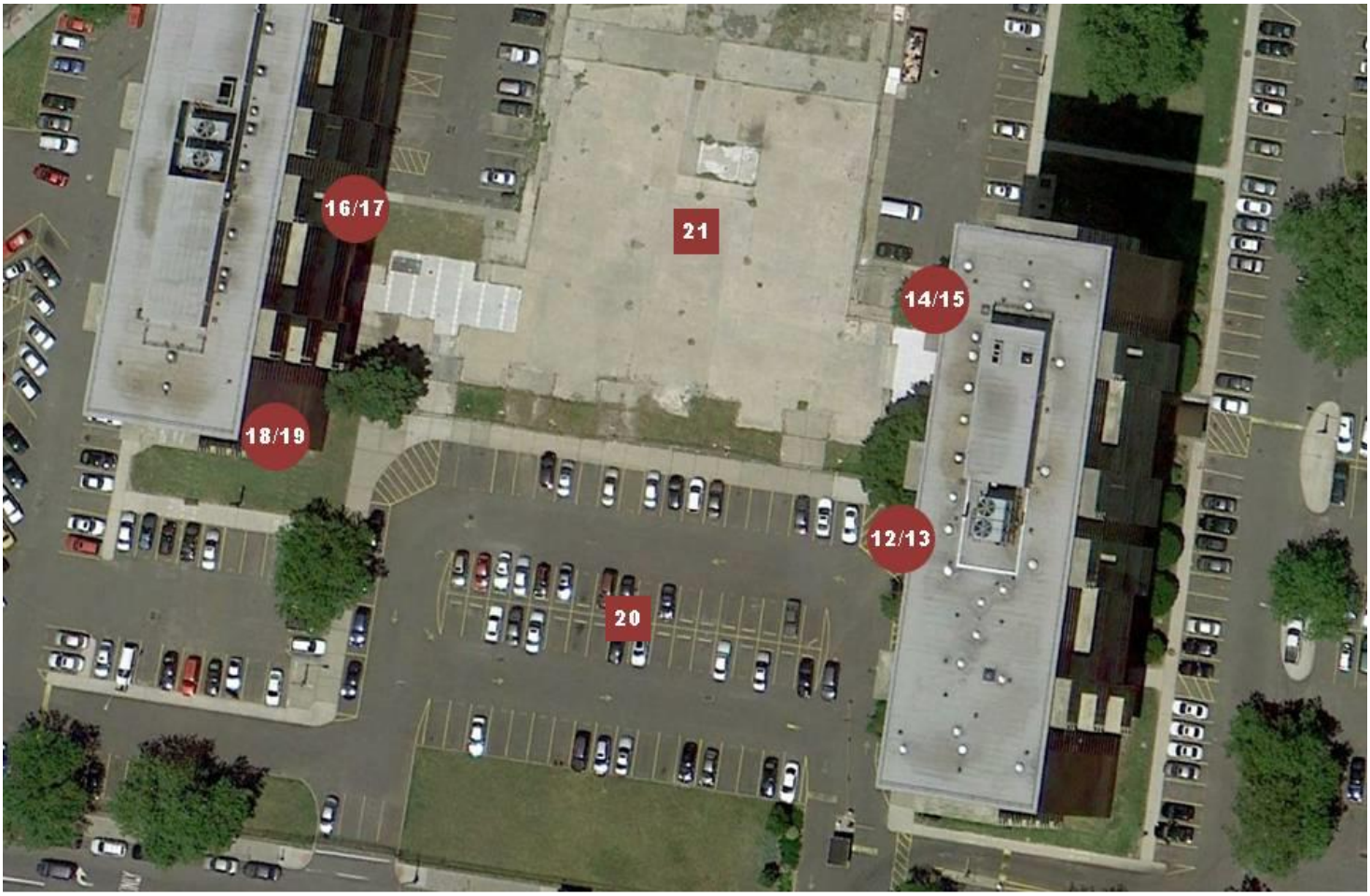


Figure A–5: Site Map



12/13 Ground level & elevated station location and designation

20 Ground level station location and designation

Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr6+ Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr6+ Sampling Results Statistics

Statistics[1]	Layout Area 3									
	M12 (ng/m^3)	**M13 (ng/m^3)**	**M14 (ng/m^3)**	**M15 (ng/m^3)**	**M16 (ng/m^3)**	**M17 (ng/m^3)**	**M18 (ng/m^3)**	**M19 (ng/m^3)**	**M20 (ng/m^3)**	**M21 (ng/m^3)**
Total Number of Samples[2]	22	22	22	22	30	22	22	22	22	22
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Number of Detected Samples[3]	4	3	1	3	5	1	1	2	4	4
% of Cr6+ Samples Greater than MDL	18.2%	13.6%	4.5%	13.6%	16.7%	4.5%	4.5%	9.1%	18.2%	18.2%
Number of Samples Above AAC	0	0	0	0	0	0	0	0	0	0
Average % Cr6+ in Dust[4]	0.022%	0.021%	0.19%	0.021%	0.020%	0.019%	0.021%	0.021%	0.023%	0.025%
Maximum % Cr6+ in Dust[4]	0.051%	0.061%	0.022%	0.050%	0.042%	0.021%	0.047%	0.048%	0.063%	0.076%

ng/m3 – nanograms per cubic meter

[1] Total number of samples collected since October 2, 2013. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since October 2, 2013 reported above the laboratory reporting limit.

[3] The program-to-date average and maximum percent Cr6+ in dust was calculated using all the integrated Total Particulate and Cr6+ sample results collected since October 2, 2013.

Table B- 2: Monthly Average Integrated 8-hour Cr6+ Sampling Results

Statistics	Layout Area 3									
	M12 (ng/m^3)	**M13 (ng/m^3)**	**M14 (ng/m^3)**	**M15 (ng/m^3)**	**M16 (ng/m^3)**	**M17 (ng/m^3)**	**M18 (ng/m^3)**	**M19 (ng/m^3)**	**M20 (ng/m^3)**	**M21 (ng/m^3)**
October	9.3	9.6	7.9	8.7	2.4	7.2	7.6	7.6	8.4	9.0
PTD	9.3	9.6	7.9	8.7	2.4	7.2	7.6	7.6	8.4	9.0

ng/m^3 – nanograms per cubic meter

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

Statistics	Layout Area 3									
	M12 (ng/m^3)	**M13 (ng/m^3)**	**M14 (ng/m^3)**	**M15 (ng/m^3)**	**M16 (ng/m^3)**	**M17 (ng/m^3)**	**M18 (ng/m^3)**	**M19 (ng/m^3)**	**M20 (ng/m^3)**	**M21 (ng/m^3)**
Total Number of Samples[1]	22	22	22	22	30	22	22	22	22	22
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
No of Detected Samples[2]	2	2	2	3	5	2	0	0	3	2
% Detection	9.1%	9.1%	9.1%	13.6%	16.7%	9.1%	0%	0%	13.6%	9.1%

1 Total number of sample collected since March 18, 2013. Variations in the number of samples collected are specifically identified in Table A-2 within the report month of the variation.

2 Total number of sample results since October 2, 2013 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

Statistics[1]	Layout Area 3									
	M12 (ng/m^3)	M13 (ng/m^3)	M14 (ng/m^3)	M15 (ng/m^3)	M16 (ng/m^3)	M17 (ng/m^3)	M18 (ng/m^3)	M19 (ng/m^3)	M20 (ng/m^3)	M21 (ng/m^3)
October	53.3	61.2	46.0	46.3	14.3	39.6	35.7	36.0	46.1	39.2
PTD	53.3	61.2	46.0	46.3	14.3	39.6	35.7	36.0	46.1	39.2

µg/m^3 – micrograms per cubic meter

Table B- 5: Monthly Average Real-Time PM_{10} Monitoring Results

Statistics	Layout Area 3									
	M12 (ng/m^3)	**M13 (ng/m^3)**	**M14 (ng/m^3)**	**M15 (ng/m^3)**	**M16 (ng/m^3)**	**M17 (ng/m^3)**	**M18 (ng/m^3)**	**M19 (ng/m^3)**	**M20 (ng/m^3)**	**M21 (ng/m^3)**
October	11.4	11.4	11.7	12.5	15.3	21.7	8.3	15.0	22.6	17.5
PTD	11.4	11.4	11.7	12.5	15.3	21.7	8.3	15.0	22.6	17.5

$\mu g/m^3$ – micrograms per cubic meter

November 2013
Air Quality Report
Metropolis Towers

Attached is a technical summary of air quality data for November 2013 at the Metropolis Towers cleanup site submitted by PPG Industries air monitoring consultant.

This report provides air monitoring information about conditions at the work areas associated with Layout Area 3.

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

EMILCOTT

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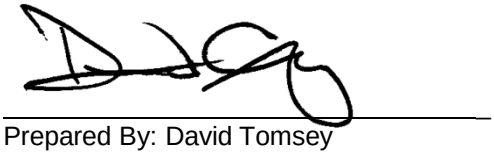
Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: November 2013

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: November 2013



Prepared By: David Tomsey

Reviewed By: Bruce Groves
January 6, 2013

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr6 – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr6) and total particulates, as well as real time monitoring for PM_{10} at ten (10) air monitoring stations for Layout Area C and nine (9) air monitoring stations for Layout Area 3-1. In addition to the air monitoring conducted in accordance with the AMP, 24-hour real time, Cr6, and total particulate sampling with lab analysis was also conducted at one elevated station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr6 sampling and analysis indicate that program to date average airborne Cr6 concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirming that dust control measures continue to be effective, and indicate that the levels of Cr6 in dust generated at the Site do not generate an emission source of Cr6 sufficient to create potential offsite exposure to Cr6 at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Layout Area 3 through the reporting period. This monthly report includes both monthly and program to date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real time 5-minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between July 17, 2012 and August 2, 2012. Routine sampling began on October 2, 2013 with the start of site activities for Layout Area 3. Layout Area 3 was separated into two portions to accommodate a revised excavation plan, the east portion labeled Layout Area 3-1 (LA3-1) and the west portion labeled Layout Area 3-2 (LA3-2). On November 4th, LA3-2 air monitoring stations were in place and operational, transitioning from Area C south.

Ten air monitoring stations installed at Layout Area 3 provide protection during intrusive work at Areas C south. Area C contains six ground level stations and four elevated stations. One elevated station measures 24-hour real time concentrations and collects Cr6 and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for Layout Area 3 through November 4th 2013.

Nine air monitoring stations installed at LA3-1 provide protection during intrusive work. LA3-1 contains seven ground level stations and two elevated stations. One elevated station measures 24-hour real-time concentrations and collects Cr6 and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-2** provides an overview of the Site and a typical configuration of the AMS for Layout Area 3-1 through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach at each of the AMS.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr6 concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis. The Cr6 average concentrations measured at each AMS will continually be compared to the Site specific AAC for Cr6 to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr6 fenceline air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr6 and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr6 and total particulate samples collection and laboratory analysis; and
- Real time 5-minute average PM_{10}, readings measured at the work area perimeter.

This section outlines the types of data collected, frequency of collection, and the corresponding location

Figure 2-1: Site Overview (Oct 2 through Nov 4, 2013)

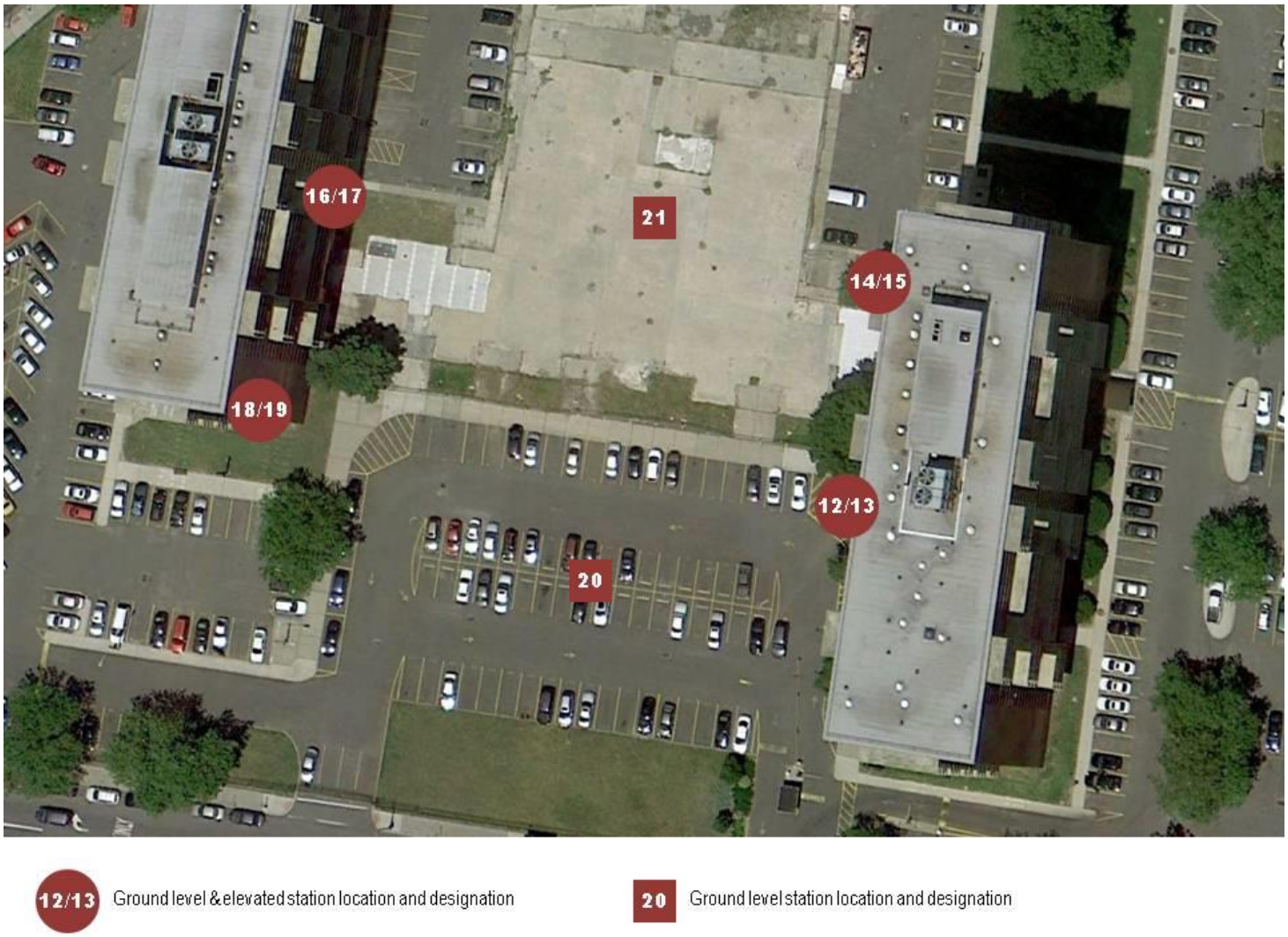


Figure 2-1: Site Overview (Nov 5 through end of reporting period 2013)

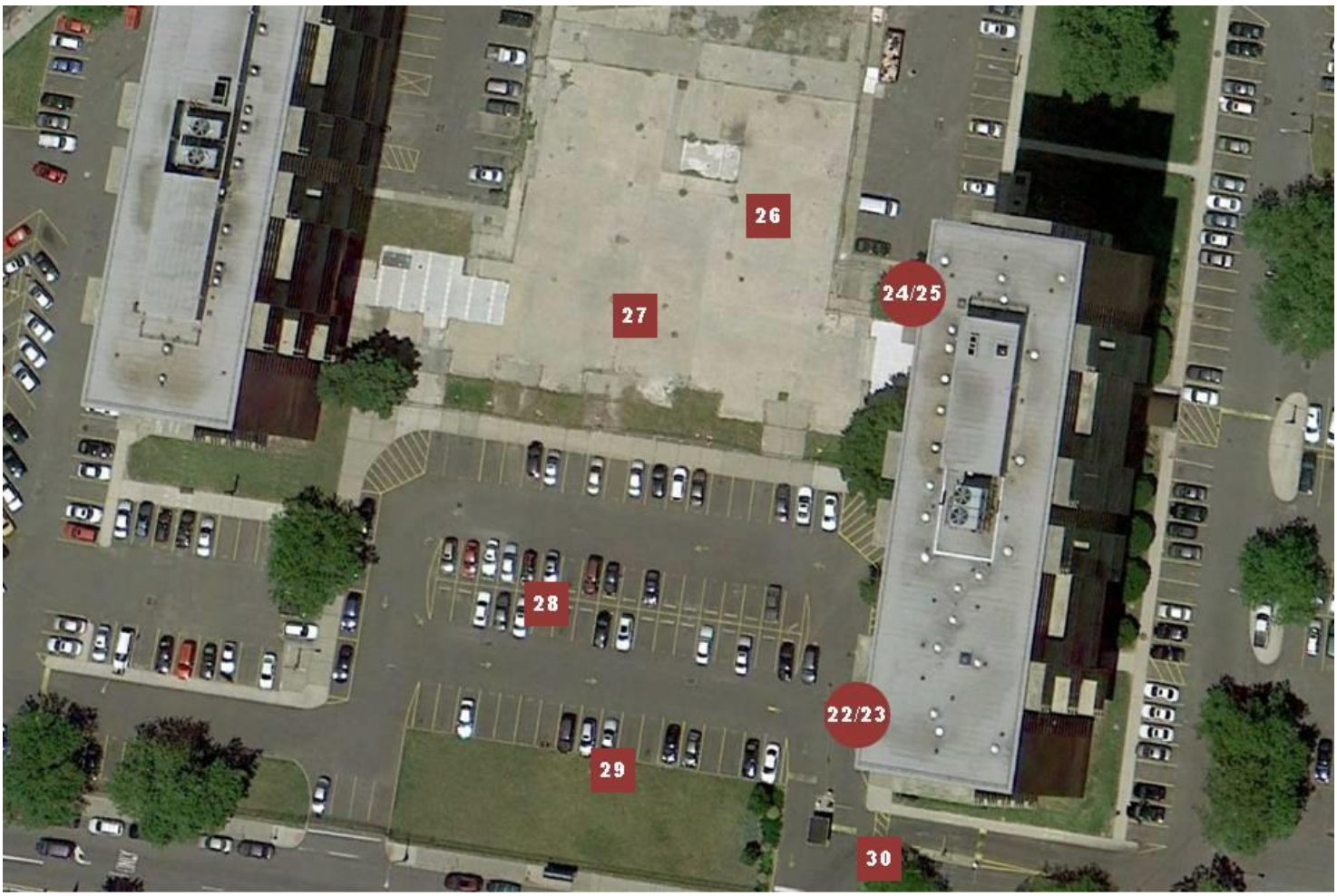


Table 2-1: Air Monitoring Approach

Layout Area 3	Station	Integrated Air Monitoring	Real Time Air Monitoring
Area C South	**M 12,13,14,15,16, 17,18,19,20,21,**	Integrated 8-hour Cr6 and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr6 sampling and analysis at one station 7-days per week.	5-minute average PM_{10} readings measured during a typical work day.
Layout Area 3-1	**M22, 23, 24, 25, 26, 27, 28, 29, 30**	Integrated 8-hour Cr6 and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr6 sampling and analysis at one station 7 days per week.	5-minute average PM_{10} readings measured during a typical work day.

2.1 Integrated Air Sampling

Integrated Cr6 and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (Typically Monday – Friday) at each of the ten stations. Samples are collected on a preweighed polyvinyl chloride 37mm filter cassette for both Cr6 and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

2.1.1 Integrated Cr6 Sampling

The exposed Cr6 filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for Cr6 analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr6 air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr6 sampling and analysis are also performed at one AMS per work area. These longer duration samples show Cr6 concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for total particulate analysis using NIOSH method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr6 air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real Time Air Monitoring

Real time air monitoring is divided into two types of monitoring including: work area monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Work Area

Work area air monitoring consists of ground level and elevated stations at the perimeter of the work area. Work area monitoring includes the following:

- Real time 5-minute average PM_{10} readings at each of the eleven locations. Six ground level and four elevated stations operate 8 to 10-hours during remedial activities, Monday through Friday, with one elevated station running 24 hours a day, seven days a week.

2.2.2 Meteorological Measurements

Meteorological measurements of 5-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at elevated station 16.

3.0 Site Specific Acceptable Air Concentration and Real Time Action Levels

Site specific AAC and real time Action Levels have been developed for Cr6 and real time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real time Action Levels have been developed to protect off site receptors from potential adverse health impacts from Cr6 and particulates over the duration of the intrusive remediation activities.

Real time monitoring and integrated results are compared against the AAC and the real time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real time action levels for integrated Cr6 concentrations and real time PM_{10} are outlined in the following sections.

3.1 Integrated Cr6 Acceptable Air Concentration

A Site specific Cr6 AAC has been developed by NJDEP to protect off site receptors from potential adverse health impacts due to potential exposure to Cr6 in dust. The AAC for Cr6 was developed to represent the maximum allowable average concentration of Cr6 in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr6 emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the work area perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC also provides a value to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices during the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr6 are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. These shorter duration average concentrations metrics include:

program to date, 90d-day, 60-day, and 30-day running averages where the average Cr6 concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr6 Metrics

Metric Observation	Response Action
30-day[1] Cr6 average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60-day[1] Cr6 average concentration greater than or equal to 40 ng/m3	
90-day[1] Cr6 average concentration greater than or equal to 35 ng/m3	
1 Sampling day.	

3.2 Real Time Alert and Action Levels

Real time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site Specific Alert and Action Levels

Parameter	Alert Level (1 min TWA)	Action Level (5 min TWA)
PM_{10}	339 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between October 2, 2013 and November 30, 2013 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real time results;
- Program to date integrated and real time statistics;
- Evaluation of program success versus the Site specific AAC and action levels; and
- Meteorological results.

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program to date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr6 and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr6 Sampling Results

Results of the Cr6 sampling from the reporting period and a program to date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr6 concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr6 concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program to Date

Sampling and analytical statistics for integrated 8-hour Cr6 results are shown in Table B-1 and include various programs to date metrics relative to Cr6 analytical data. Monthly average 8-hour Cr6 concentration results are shown in Table B-2 for each AMS location. A snapshot of the 60-

day and 90-day running Cr6 average concentrations at the end of the reporting period were not available for this reporting period.

Table 4-1: Short Term Average 8 Hour Integrated Cr6 Metrics

Running Cr6 Metrics[1]		Layout Area 3									
	Metric (ng/m^3)	M12 (ng/m^3)	M13 (ng/m^3)	M14 (ng/m^3)	M15 (ng/m^3)	M16 (ng/m^3)	M17 (ng/m^3)	M18 (ng/m^3)	M19 (ng/m^3)	M20 (ng/m^3)	M21 (ng/m^3)
30-day[2]	**45**	9.8	10.0	7.9	8.6	2.2	7.5	7.5	8.3	8.3	9.4
60-day[2]	**40**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
90-day[2]	**35**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PTD[3]		9.8	10.0	7.9	8.6	2.2	7.5	7.5	8.3	8.3	9.4

ng/m^3 – nanograms per cubic meter

Running Cr6 Metrics[1]		Layout Area 3									
	Metric (ng/m^3)	M22 (ng/m^3)	M23 (ng/m^3)	M24 (ng/m^3)	M25 (ng/m^3)	M26 (ng/m^3)	M27 (ng/m^3)	M28 (ng/m^3)	M29 (ng/m^3)	M30 (ng/m^3)	
30-day[2]	**45**	4.5	8.4	10.4	7.6	9.5	14.0	8.1	8.4	NA	
60-day[2]	**40**	NA	NA	NA	NA	NA	NA	NA	NA	NA	
90-day[2]	**35**	NA	NA	NA	NA	NA	NA	NA	NA	NA	
PTD[3]		4.1	8.0	10.0	7.4	9.0	12.7	7.7	8.0	NA	

ng/m^3 – nanograms per cubic meter

1 Running Cr6 metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr6 are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. The running Cr6 metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long term (program) ending success.

2. Running Cr6 metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results.

3. Program to Date - Air monitoring conducted from October 2, 2013 through the end of the reporting period. Stations M12 through M21 were in use between Oct 2 and Nov 4, 2013 and do not have enough sampling days for a 60 or 90-day metric. Stations M22 through M29 were in use between Nov 5 through the end of the reporting period and do not have enough sampling days for a 60 or 90-day metric.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program to date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program to date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 26 sample days between November 5, 2013 and the end of the reporting period. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr6 average concentrations, based upon lab analytical results at each AMS, were less than 20% of the site safety goal and less than 3% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real Time Air Monitoring Results

Real time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real time 5-minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real time 5-minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3.

Program-to-Date

Real time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

- Excavate LA3-1
- Process and remove asphalt & concrete
- Dewater excavation
- Backfill LA3-1

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5 and A-6.

5.0 Conclusions

Results of this project's reporting period show the air sampling and monitoring program at the Metropolis Towers Site indicate that the average Cr6 concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3. The program through this reporting period shows the Cr6 concentrations and percent Cr6 in dust samples demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr6 in dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr6 and do not represent an emission source of Cr6 sufficient to create potential off-site exposure to Cr6 at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-Hour Cr6 Concentrations
- Integrated 8-Hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8 Hour Cr6 Sampling Results

Date of Sample	M22	M23	M24	M25	M26	M27	M28	M29	M30
11/05/13	2.5	7.0	7.5	7.5	7.5	6.5	7.5	7.5	
11/06/13	2.4	6.5	6.5	6.0	6.5	6.5	6.5	6.5	
11/07/13	2.4	6.5	7.0	7.0	6.5	6.5	6.0	6.0	
11/08/13	0.8	6.5	6.5	6.0	6.5	6.5	6.0	6.0	
11/09/13	0.8								
11/10/13	0.8								
11/11/13	2.4	6.5	7.0	7.0	6.5	6.5	6.5	6.5	
11/12/13	2.4	6.5	6.5	7.0	6.50	6.0	6.5	6.5	
11/13/13	2.4	6.5	6.5	7.0	6.5	6.5	6.5	6.5	
11/14/13	2.4	6.5	6.5	6.5	6.5	23.0	6.5	6.5	
11/15/13	0.8	6.0	6.0	6.0	6.0	6.5	6.5	6.0	
11/16/13	0.8								
11/17/13	0.8								
11/18/13	2.4	6.0	6.5	6.5	6.5	20.0	6.0	6.0	
11/19/13	2.4	6.0	6.5	6.5	6.5	6.0	16.0	6.0	
11/20/13	2.4	6.0	6.5	6.5	6.50	6.0	6.0	6.0	
11/21/13	1.4	6.5	19.0	6.5	6.50	6.5	6.5	6.5	
11/22/13	0.8	6.5	6.5	6.5	6.50	6.5	6.5	6.5	
11/23/13	0.8								
11/24/13	0.8								
11/25/13	2.3	6.0	6.5	6.5	6.50	25.0	6.0	6.0	
11/26/13	12.0	6.5	6.5	6.5	6.50	14.0	6.5	6.5	
11/27/13	12.0								
11/28/13	12.0								
11/29/13	12.0								
11/30/13	12.0								

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8-Hour Total Particulate Sampling Results

Date of Sample	M22	M23	M24	M25	M26	M27	M28	M29	M30
11/05/13	12.5	34.0	36.0	36.5	230.0	120.0	260.0	270.0	
11/06/13	12.0	75.0	32.0	71.0	32.5	32.0	32.0	31.5	
11/07/13	12.0	31.5	35.5	35.0	32.5	31.5	30.0	30.0	
11/08/13	11.0	33.0	33.0	120.0	32.5	33.0	31.0	31.0	
11/09/13	11.0								
11/10/13	11.0								
11/11/13	14.0	32.5	34.5	190.0	31.5	33.0	32.0	33.5	
11/12/13	12.0	33.0	33.5	34.0	32.5	31.0	32.0	32.0	
11/13/13	11.5	31.0	33.5	34.5	32.5	87.0	31.0	31.5	
11/14/13	11.5	31.0	33.0	32.5	32.0	31.0	31.5	31.5	
11/15/13	3.9	31.0	84.0	100.0	30.5	32.0	30.5	30.5	
11/16/13	3.9								
11/17/13	3.9								
11/18/13	11.5	30.5	32.0	32.0	31.5	30.5	31.0	31.0	
11/19/13	11.5	30.5	32.5	33.0	31.5	30.5	30.5	31.0	
11/20/13	11.5	30.5	32.0	31.5	31.5	30.5	30.5	30.0	
11/21/13	11.5	31.0	580.0	32.5	32.0	31.0	31.0	31.0	
11/22/13	3.9	31.0	31.5	31.5	31.5	32.5	31.0	31.5	
11/23/13	3.9								
11/24/13	3.9								
11/25/13	11.5	31.5	32.0	32.0	31.50	30.5	30.5	30.5	
11/26/13	42.0	31.0	33.0	32.5	32.00	31.5	31.0	31.5	
11/27/13	42.0								
11/28/13	42.0								
11/29/13	42.0								
11/30/13	42.0								

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Figure A- 1: Real Time 5-Minute Average PM_{10} Monitoring Results

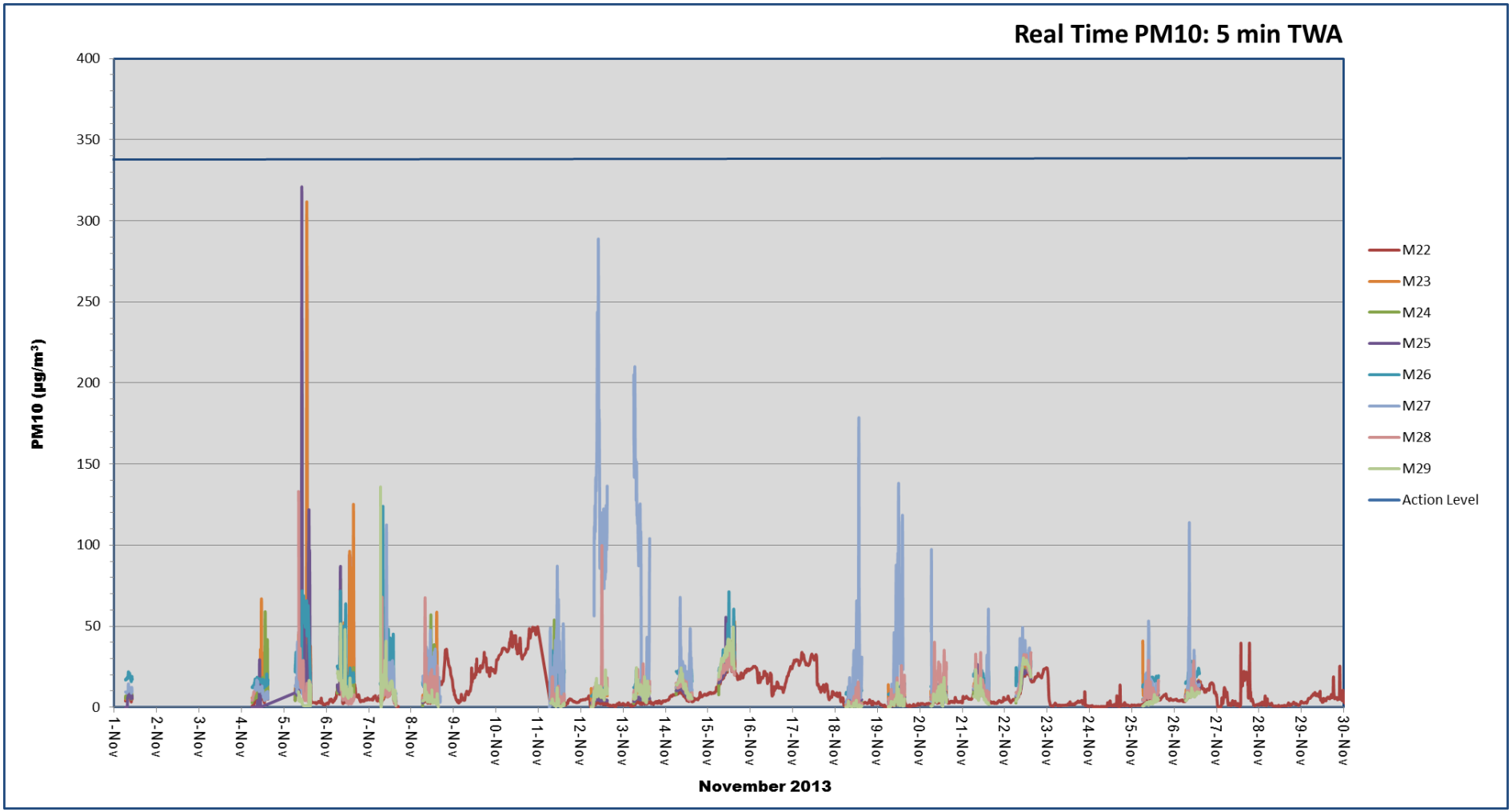


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
Dust	NA	NA	NA	NA	NA	NA

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter ($\mu g/m^3$)

ng/m^3 – nanograms per cubic meter

$\mu g/m^3$ – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

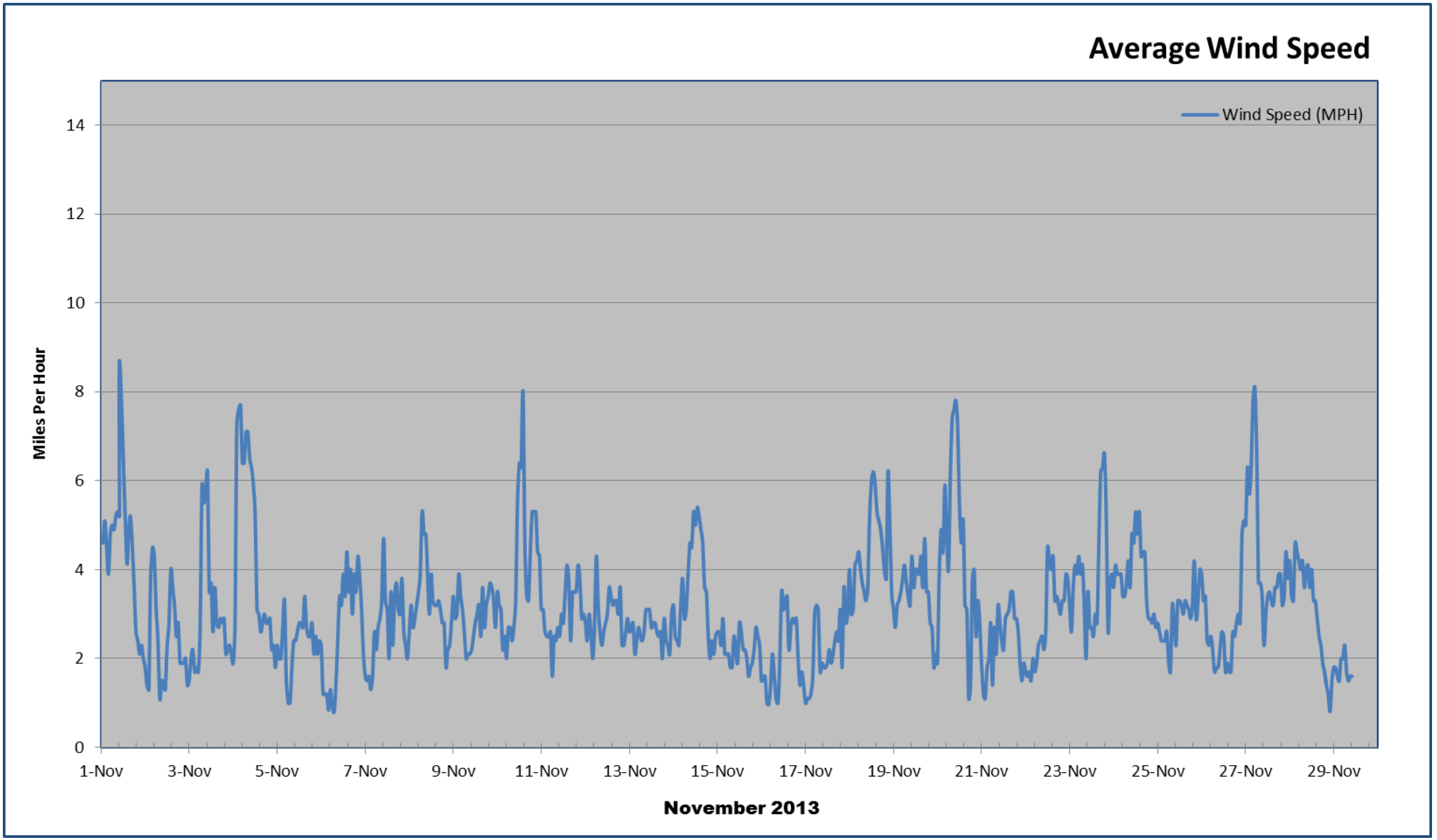


Figure A-3: Temperature

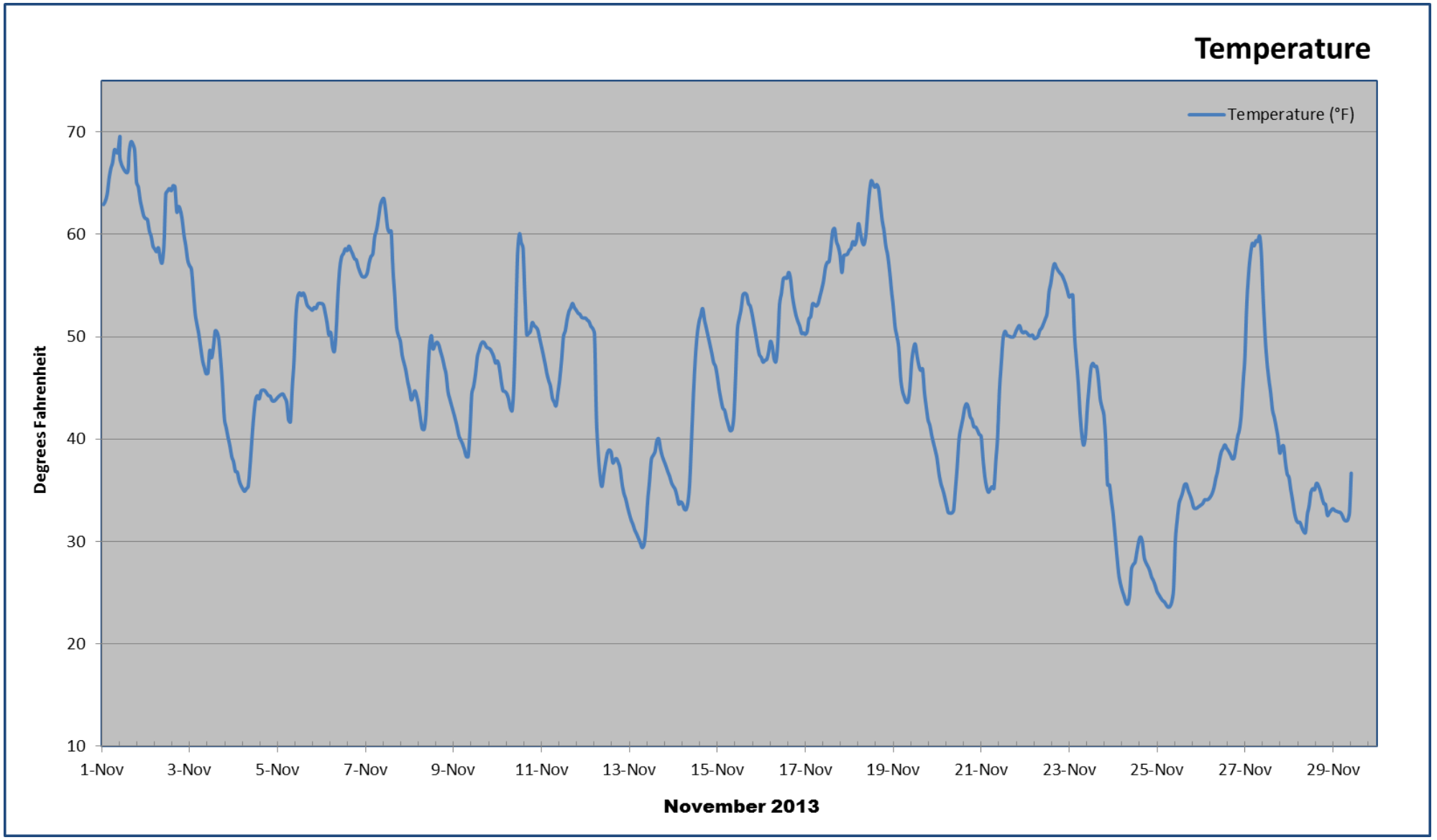


Figure A-4: Relative Humidity

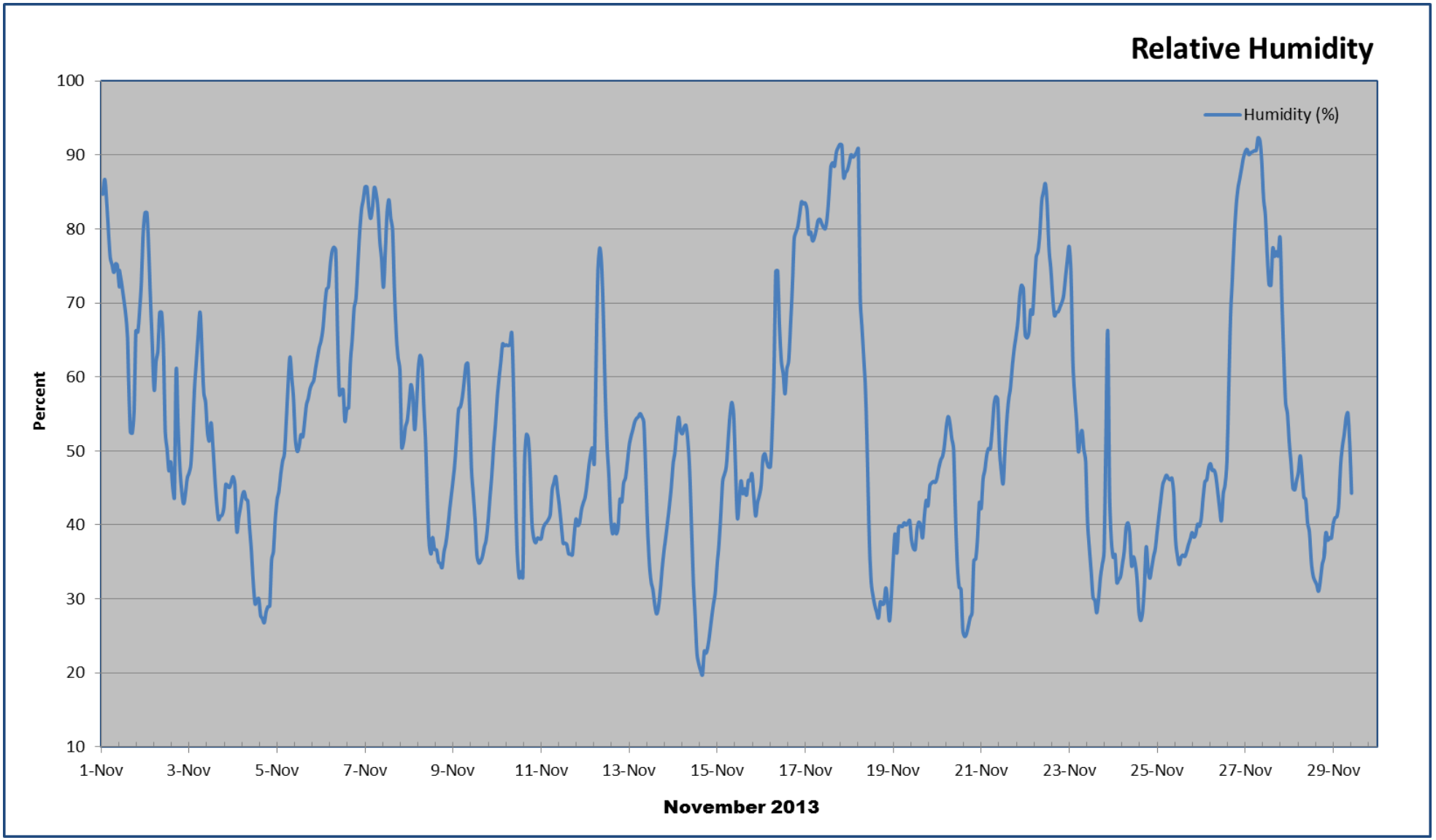
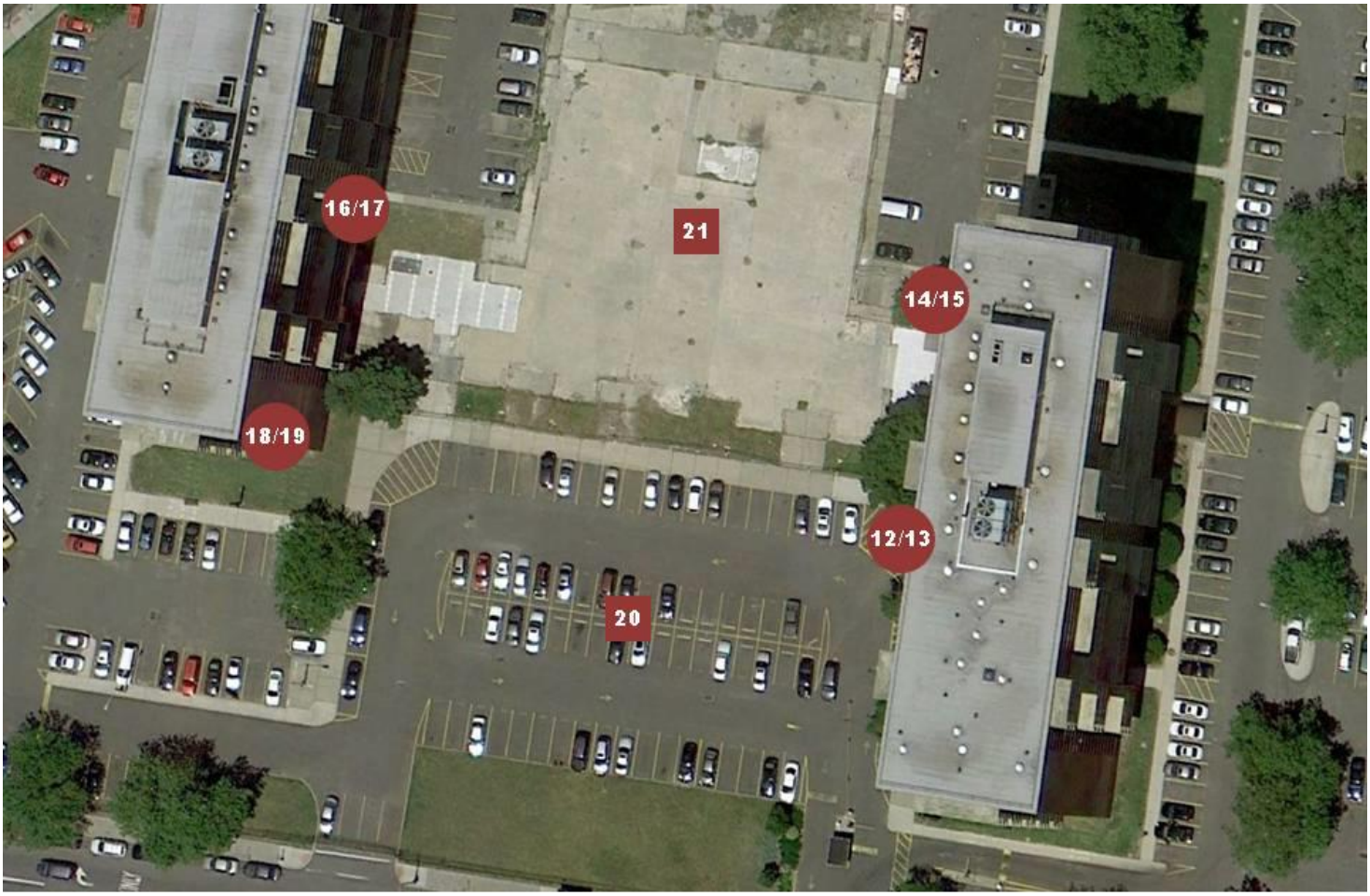


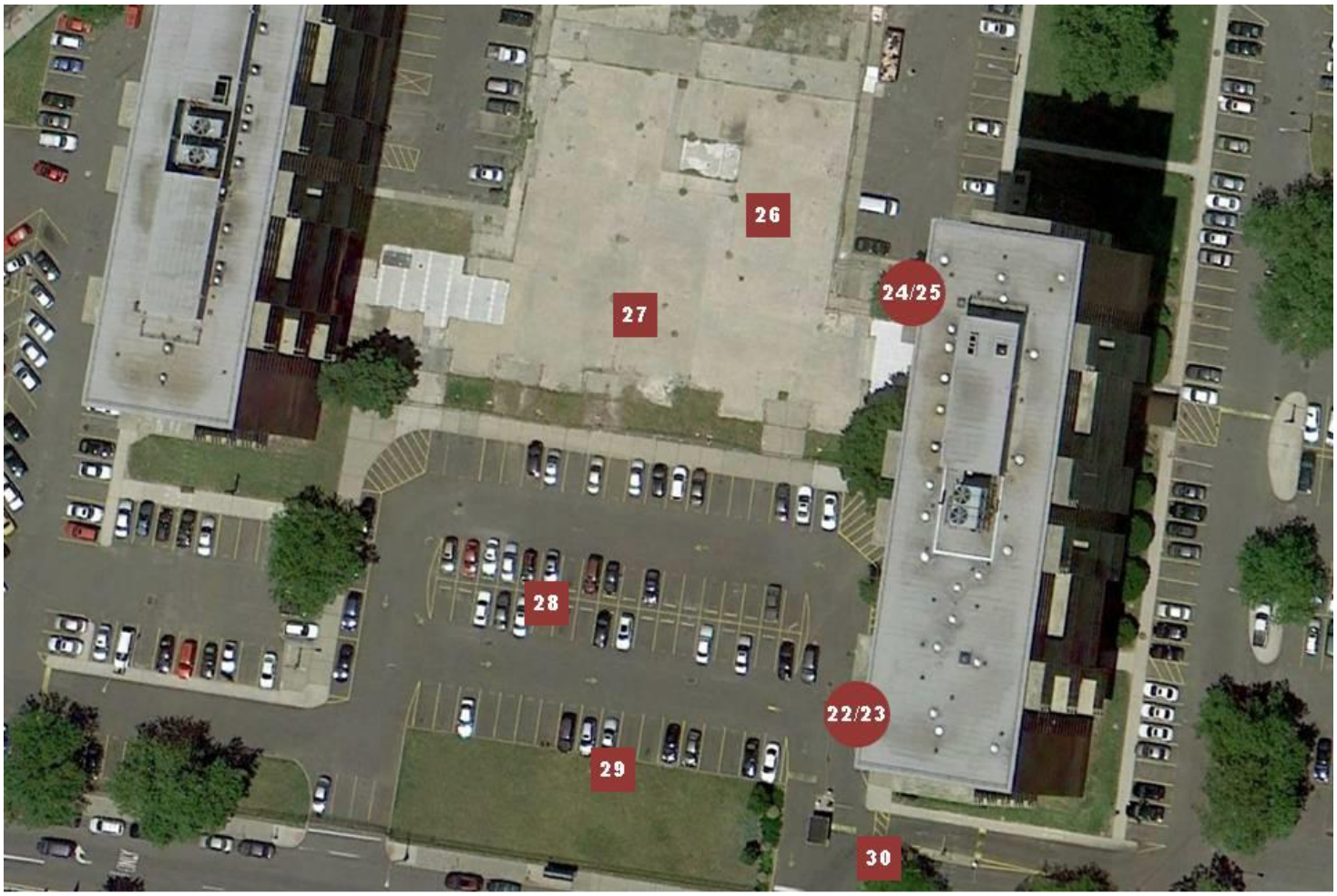
Figure A–5: Site Map (October 2nd through November 4th, 2013)



12/13 Ground level & elevated station location and designation

20 Ground level station location and designation

Figure A–6: Site Map (November 5th through the end of the reporting period)



Appendix B

Program to Date Result Summaries

- Integrated 8-Hour Cr6 Concentration Summaries
- Integrated 8-Hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program-to-Date Integrated 8-Hour Cr6 Sampling Results Statistics

Statistics[1]	Layout Area 3									
	M12 (ng/m^3)	M13 (ng/m^3)	M14 (ng/m^3)	M15 (ng/m^3)	M16 (ng/m^3)	M17 (ng/m^3)	M18 (ng/m^3)	M19 (ng/m^3)	M20 (ng/m^3)	M21 (ng/m^3)
Total Number of Samples[2]	22	22	22	22	30	22	22	22	22	22
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Number of Detected Samples[3]	4	3	1	3	5	1	1	2	4	4
% of Cr6 Samples Greater than MDL	18.2%	13.6%	4.5%	13.6%	16.7%	4.5%	4.5%	9.1%	18.2%	18.2%
Number of Samples Above AAC	0	0	0	0	0	0	0	0	0	0
Average % Cr6 in Dust[4]	0.022%	0.021%	0.19%	0.021%	0.020%	0.019%	0.021%	0.021%	0.023%	0.025%
Maximum % Cr6 in Dust[4]	0.051%	0.061%	0.022%	0.050%	0.042%	0.021%	0.047%	0.048%	0.063%	0.076%

ng/m3 – nanograms per cubic meter

[1] Total number of samples collected since October 2, 2013. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since October 2, 2013 reported above the laboratory reporting limit.

[3] The program-to-date average and maximum percent Cr6 in dust was calculated using all the integrated Total Particulate and Cr6 sample results collected since October 2, 2013.

Statistics[1]	Layout Area 3-1									
	M22 (ng/m^3)	**M23 (ng/m^3)**	**M24 (ng/m^3)**	**M25 (ng/m^3)**	**M26 (ng/m^3)**	**M27 (ng/m^3)**	**M28 (ng/m^3)**	**M29 (ng/m^3)**	**M30 (ng/m^3)**	
Total Number of Samples[2]	26	17	17	17	17	17	17	17	NA	
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	NA	
Number of Detected Samples[3]	5	0	1	0	0	4	1	0	NA	
% of Cr6 Samples Greater than MDL	19.2%	0%	5.9%	0%	0%	23.5%	5.9%	0%	NA	
Number of Samples Above AAC	0	0	0	0	0	0	0	0	NA	
Average % Cr6 in Dust[4]	0.02%	0.016%	0.018%	0.014%	0.017%	0.026%	0.018%	0.016%	NA	
Maximum % Cr6 in Dust[4]	0.061%	0.021%	0.06%	0.021%	0.021%	0.079%	0.052%	0.021%	NA	

ng/m3 – nanograms per cubic meter

[1] Total number of samples collected since November 5, 2013. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since November 5, 2013 reported above the laboratory reporting limit.

[3] The program-to-date average and maximum percent Cr6 in dust was calculated using all the integrated Total Particulate and Cr6 sample results collected since November 5, 2013.

Table B- 2: Monthly Average Integrated 8-Hour Cr6 Sampling Results

Statistics	Layout Area 3									
	M12 (ng/m^3)	M13 (ng/m^3)	M14 (ng/m^3)	M15 (ng/m^3)	M16 (ng/m^3)	M17 (ng/m^3)	M18 (ng/m^3)	M19 (ng/m^3)	M20 (ng/m^3)	M21 (ng/m^3)
October	9.3	9.6	7.9	8.7	2.4	7.2	7.6	7.6	8.4	9.0
November	13.8	11.8	6.8	6.8	1.2	10.8	6.8	14.8	6.5	11.5
PTD	9.7	9.8	7.8	8.5	2.2	7.5	7.5	8.2	8.3	9.2

ng/m^3 – nanograms per cubic meter

Statistics[1]	Layout Area 3-1								
	M22 (ng/m^3)	M23 (ng/m^3)	M24 (ng/m^3)	M25 (ng/m^3)	M26 (ng/m^3)	M27 (ng/m^3)	M28 (ng/m^3)	M29 (ng/m^3)	M30 (ng/m^3)
November	3.6	6.4	7.4	6.6	6.5	9.9	7.0	6.3	NA
PTD	4.1	8.0	10.0	7.4	9.0	12.7	7.7	8.0	NA

ng/m^3 – nanograms per cubic meter

Table B- 3: Program-to-Date Integrated Total Particulate 8-Hour Sampling Results Statistics

Statistics	Layout Area 3									
	M12 (ng/m^3)	M13 (ng/m^3)	M14 (ng/m^3)	M15 (ng/m^3)	M16 (ng/m^3)	M17 (ng/m^3)	M18 (ng/m^3)	M19 (ng/m^3)	M20 (ng/m^3)	M21 (ng/m^3)
Total Number of Samples[1]	22	22	22	22	30	22	22	22	22	22
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
No of Detected Samples[2]	2	2	2	3	5	2	0	0	3	2
% Detection	9.1%	9.1%	9.1%	13.6%	16.7%	9.1%	0%	0%	13.6%	9.1%

1 Total number of sample collected since October 2, 2013. Variations in the number of samples collected are specifically identified in Table A-2 within the report month of the variation.
2 Total number of sample results since October 2, 2013 reported above the laboratory reporting limit.

Statistics[1]	Layout Area 3-1								
	M22 (ng/m3)	M23 (ng/m3)	M24 (ng/m3)	M25 (ng/m3)	M26 (ng/m3)	M27 (ng/m3)	M28 (ng/m3)	M29 (ng/m3)	M30 (ng/m3)
Total Number of Samples[1]	26	17	17	17	17	17	17	17	NA
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	NA
No of Detected Samples[2]	8	0	0	2	0	0	0	0	NA
% Detection	30.8%	0%	0%	11.8%	0%	0%	0%	0%	NA

1 Total number of sample collected since November 5, 2013. Variations in the number of samples collected are specifically identified in Table A-2 within the report month of the variation.
2 Total number of sample results since November 5, 2013 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

Statistics[1]	Layout Area 3									
	M12 (ng/m^3)	M13 (ng/m^3)	M14 (ng/m^3)	M15 (ng/m^3)	M16 (ng/m^3)	M17 (ng/m^3)	M18 (ng/m^3)	M19 (ng/m^3)	M20 (ng/m^3)	M21 (ng/m^3)
October	53.3	61.2	46.0	46.3	14.3	39.6	35.7	36.0	46.1	39.2
November	33.3	33.3	34.3	33.8	6.0	32.8	33.0	32.3	32.5	32.3
PTD	51.6	58.9	45.0	45.3	13.3	39.0	35.5	35.7	45.0	38.6

µg/m^3 – micrograms per cubic meter

Statistics[1]	Layout Area 3-1								
	M22 (ng/m^3)	M23 (ng/m^3)	M24 (ng/m^3)	M25 (ng/m^3)	M26 (ng/m^3)	M27 (ng/m^3)	M28 (ng/m^3)	M29 (ng/m^3)	M30 (ng/m^3)
November	15.7	34.3	70.5	54.9	44.3	40.5	45.3	46.1	NA
PTD	17.9	34.8	65.4	55.0	42.2	41.0	40.9	43.1	NA

ug/m^3 – micrograms per cubic meter

Table B- 5: Monthly Average Real-Time PM_{10} Monitoring Results

Statistics	Layout Area 3									
	M12 (ng/m³)	M13 (ng/m³)	M14 (ng/m³)	M15 (ng/m³)	M16 (ng/m³)	M17 (ng/m³)	M18 (ng/m³)	M19 (ng/m³)	M20 (ng/m³)	M21 (ng/m³)
October	11.4	11.4	11.7	12.5	15.3	21.7	8.3	15.0	22.6	17.5
November	10.5	13.7	10.7	11.5	10.9	10.7	3.9	14.3	19.2	23.1
PTD	10.8	12.1	11.4	30.8	15.0	21.3	8.1	15.0	21.1	20.3
µg/m³ – micrograms per cubic meter										

Statistics[1]	Layout Area 3-1								
	M22 (ng/m³)	M23 (ng/m³)	M24 (ng/m³)	M25 (ng/m³)	M26 (ng/m³)	M27 (ng/m³)	M28 (ng/m³)	M29 (ng/m³)	M30 (ng/m³)
November	10.5	13.7	10.7	11.5	19.2	23.1	11.9	9.4	NA
PTD	10.5	13.7	10.7	11.5	19.2	23.1	11.9	9.4	NA
ug/m³ – micrograms per cubic meter									

December 2013
Air Quality Report
Metropolis Towers

Attached is a technical summary of air quality data for December 2013 at the Metropolis Towers cleanup site submitted by PPG Industries air monitoring consultant.

This report provides air monitoring information about conditions at the work areas associated with Layout Area 3.

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

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Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: December 2013

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: December 2013

Prepared By: David Tomsey

Reviewed By: Bruce Groves
February 5, 2014

Contents

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr6+ – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr6+) and total particulates, as well as real-time monitoring for PM_{10} at ten (10) air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour real-time dust measurements, Cr6+, and total particulate sampling with lab analysis was also conducted at one elevated station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr6+ sampling and analysis indicate that program-to-date average airborne Cr6+ concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr6+ in dust generated at the Site do not represent an emission source of Cr6+ sufficient to create potential offsite exposure to Cr6+ at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Layout Area 3 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 5-minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between July 17, 2012 and August 2, 2012. Routine sampling began on October 2, 2013 with the start of site activities for Layout Area 3.

Ten air monitoring stations installed at Layout Area 3 provided protection during intrusive work at Areas C South. Area C contained six ground level stations and four elevated stations. One elevated station measured 24-hour real-time concentrations and collected Cr6+ and total particulate samples for 24-hours during the week and 72-hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for Layout Area 3. **Table 2-1** provides an overview of the air monitoring approach at each of the AMS. This configuration was in place from October 2nd through November 4th, 2013

Nine air monitoring stations installed at LA3-1 provided protection during intrusive work. LA3-1 contained seven ground level stations and two elevated stations. One elevated station measured 24-hour real-time concentrations and collected Cr6+ and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-2** provides an overview of the Site and a typical configuration of the AMS for Layout Area 3-1 through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach at each of the AMS. This configuration was in place from November 4th through December 10th, 2013.

On December 11th, 2014 a new configuration was put in place to accommodate remedial work in both Layout Area 3-1 and 3-2. Fourteen air monitoring stations provided protection during intrusive work. LA3 contains ten ground level stations and four elevated stations. One elevated station measures 24-hour real-time concentrations and collects Cr6+ and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-3** provides an overview of the Site and a typical configuration of the AMS for Layout Area 3 through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach at each of the AMS.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr6+ concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis. The Cr6+ average concentrations measured at each

AMS will continually be compared to the site-specific AAC for Cr6+ to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr6+ fenceline air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr6+ and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr6+ and total particulate samples collection and laboratory analysis; and
- Real-time 5-minute average PM_{10}, readings measured at the work area perimeter.

This section outlines the types of data collected, frequency of collection, and the corresponding locations.

Figure 2-1: Site Overview (Oct 2 through Nov 4, 2013)

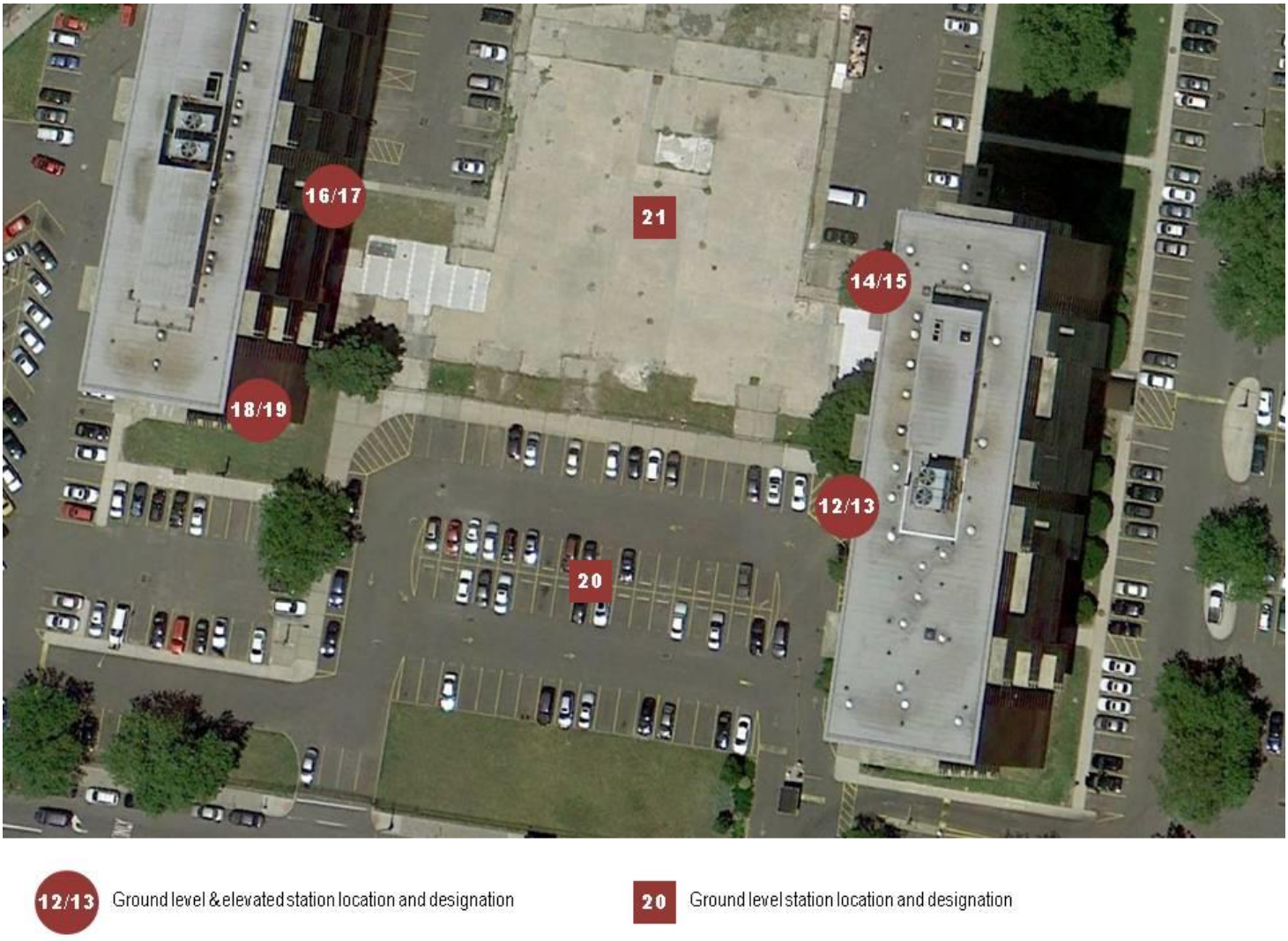


Figure 2-2: Site Overview (Nov 5 through Dec 10th)

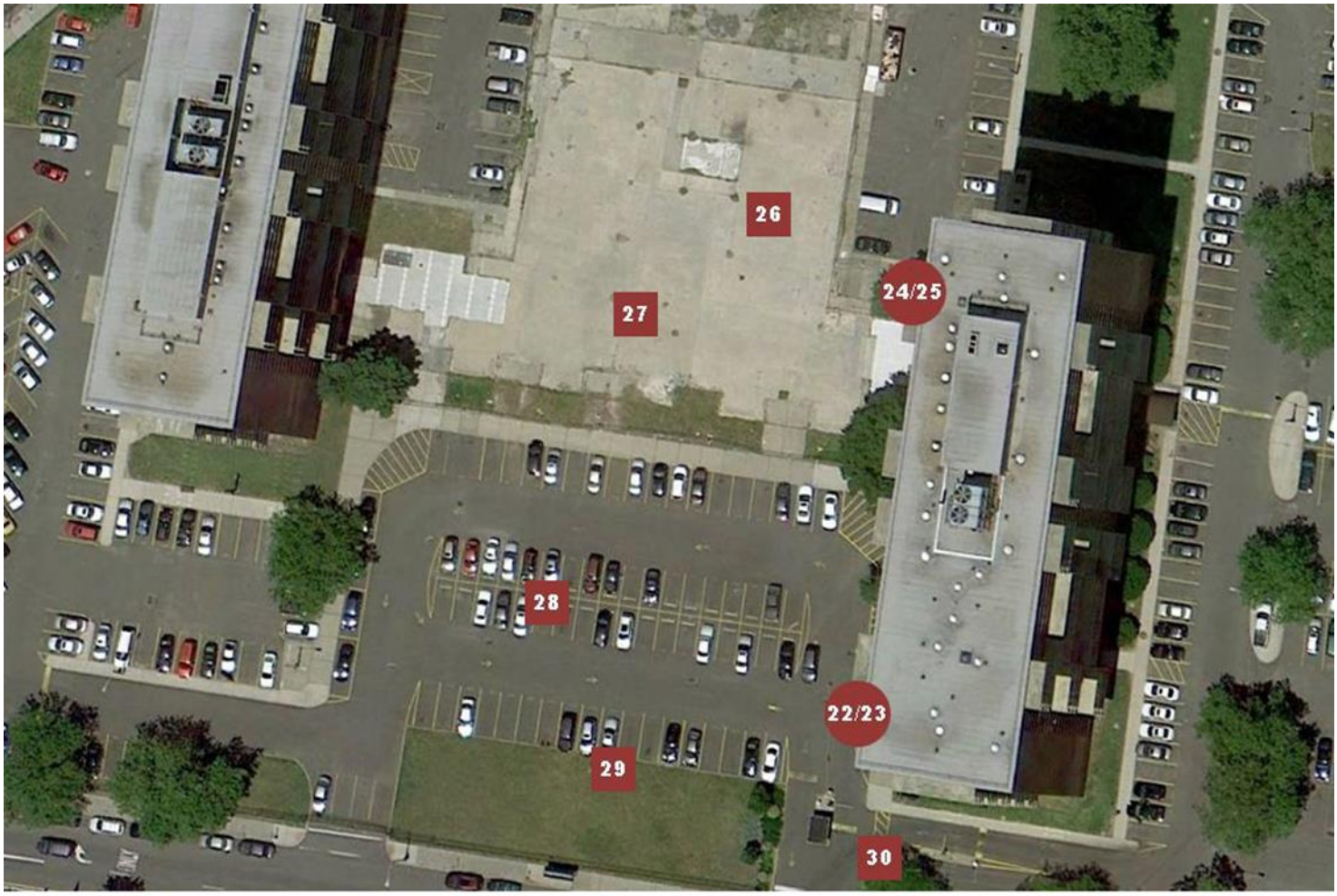


Figure 2-3: Site Overview (Dec 11 through end of reporting period)

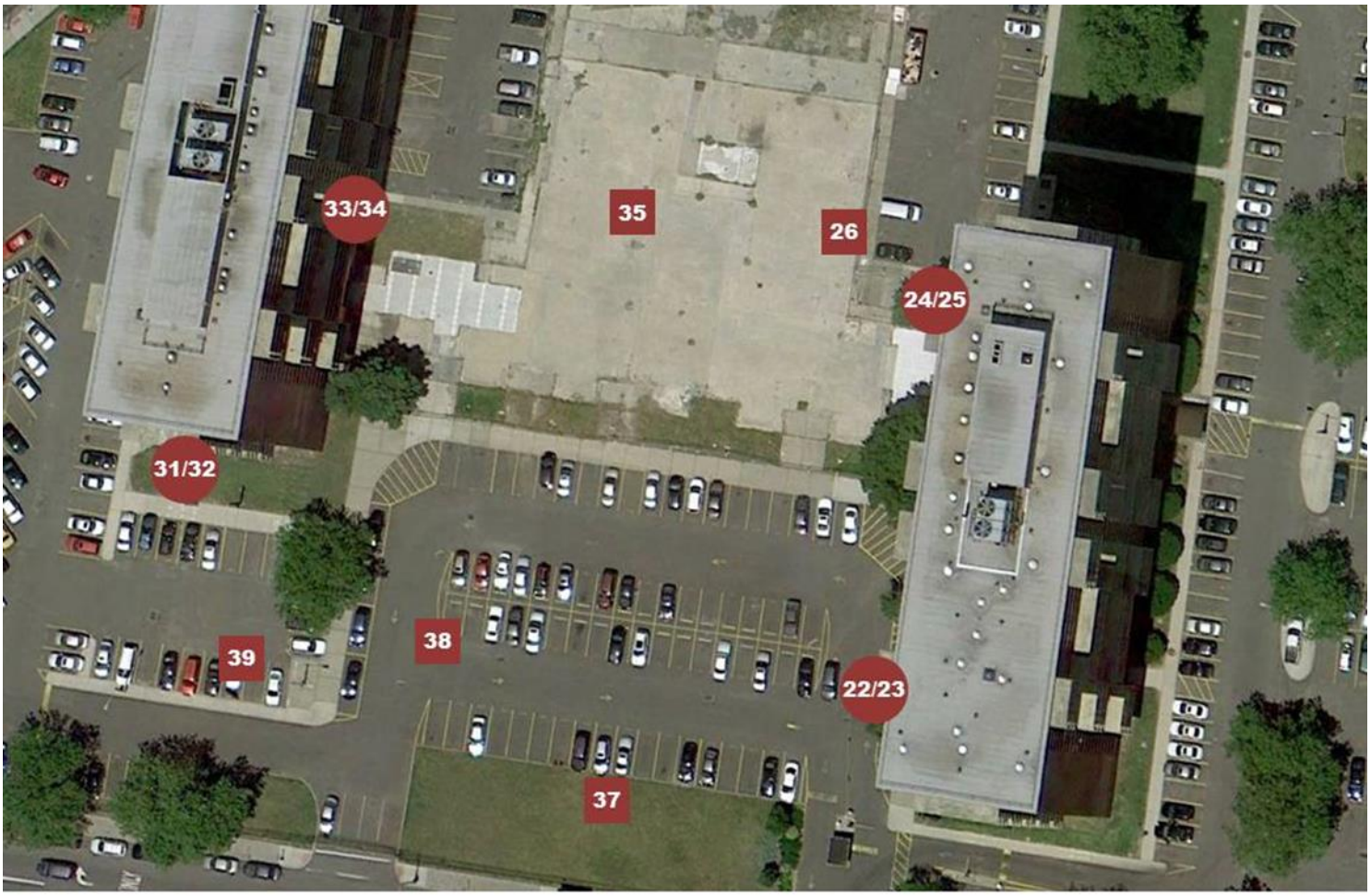


Table 2-1: Air Monitoring Approach

Layout Area 3	Station	Integrated Air Monitoring	Real-Time Air Monitoring
Area C South	**M 12,13,14,15,16, 17,18,19,20,21,**	Integrated 8-hour Cr6+ and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr6+ sampling and analysis at one station 7 days per week.	5-minute average PM_{10} readings measured during a typical work day.
Layout Area 3-1	**M22, 23, 24, 25, 26, 27, 28, 29, 30**	Integrated 8-hour Cr6+ and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr6+ sampling and analysis at one station 7 days per week.	5-minute average PM_{10} readings measured during a typical work day.
Layout Area 3	**M22, 23, 24, 25, 26, 30, 31, 32, 33, 34, 35, 37, 38, 39**	Integrated 8-hour Cr+6 and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr6+ sampling and analysis at one station 7 days per week.	5-minute average PM_{10} readings measured during a typical work day.

2.1 Integrated Air Sampling

Integrated Cr6+ and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (Typically Monday – Friday) at each of the ten stations. Samples are collected on a preweighed polyvinyl chloride 37mm filter cassette for both Cr6+ and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

2.1.1 Integrated Cr6+ Sampling

The exposed Cr6+ filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for Cr6+ analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr6+ air concentrations in Nanograms per cubic meter of air (ng/m^3). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr6+ sampling and analysis are also performed at one AMS per work area. These longer duration samples show Cr6+ concentrations during overnight and weekend periods. The 24-hour samples are typically

collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for total particulate analysis using NIOSH method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr6+ air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: work area monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Work Area

Work area air monitoring consists of ground level and elevated stations at the perimeter of the work area. Work area monitoring includes the following:

- Real-time 5-minute average PM_{10} readings at each of the eleven locations. Six ground level and four elevated stations operate 8-to-10 hours during remedial activities, Monday through Friday, with one elevated station running 24-hours a day, seven days a week.

2.2.2 Meteorological Measurements

Meteorological measurements of 5-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at elevated station 16.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific AAC and real-time Action Levels have been developed for Cr6+ and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr6+ and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr6+ concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr6+ Acceptable Air Concentration

A Site-specific Cr6+ AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr6+ in dust. The AAC for Cr6+ was developed to represent the maximum allowable average concentration of Cr6+ in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr6+ emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the work area perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC also provides a value to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices during the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr6+ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. These shorter duration average concentrations metrics include: program-to-date,

90-day, 60-day, and 30-day running averages where the average Cr6+ concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr6+ Metrics

Metric Observation	Response Action
30-day[1] Cr6+ average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60-day[1] Cr6+ average concentration greater than or equal to 40 ng/m3	
90-day[1] Cr6+ average concentration greater than or equal to 35 ng/m3	
1 Sampling day.	

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

Parameter	Alert Level (1 min TWA)	Action Level (5 min TWA)
PM_{10}	339 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between October 2, 2013 and December 31, 2013 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels; and
- Meteorological results.

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr6+ and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr6+ Sampling Results

Results of the Cr6+ sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr6+ concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr6+ concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr6+ results are shown in Table B-1 and include various programs to date metrics relative to Cr6+ analytical data. Monthly average 8-hour Cr6+ concentration results are shown in Table B-2 for each AMS location. A snapshot of the 90-day running Cr6+ average concentrations at the end of the reporting period were not available for this reporting period.

Table 4-1: Short Term Average 8-hour Integrated Cr6+ Metrics

Running Cr6+ Metrics[1]		Layout Area 3							
	Metric (ng/m^3)	**M22 (ng/m^3)**	**M23 (ng/m^3)**	**M24 (ng/m^3)**	**M25 (ng/m^3)**	**M26 (ng/m^3)**	**M27 (ng/m^3)**	**M28 (ng/m^3)**	**M29 (ng/m^3)**
30-day[2]	**45**	6.1	8.3	10.3	7.4	9.3	18.9	9.4	11.7
60-day[2]	**40**	4.9	7.4	9.0	7.1	8.0	-	-	-
90-day[2]	**35**	-	-	-	-	-	-	-	-
PTD[3]		4.9	7.4	9.0	7.1	8.0	12.7	7.7	8.0

ng/m^3 – nanograms per cubic meter

1 Running Cr6+ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr6+ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. The running Cr6+ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long term (program) ending success.

2. Running Cr6+ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60 and 90-day metrics were not available due to the short duration of sampling during this phase of the project.

3. Program-to-date - Air monitoring conducted from October 2, 2013 through the end of the reporting period. M27, 28, & 29 were not in use beyond December 10th, 2013

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 49 sample days between October 2, 2013 and the end of the reporting period for stations M22 through M26. There have been 36 sample days between October 2, 2013 and December 11, 2013 for stations M27, M28, M29. There have been 31 sample days between December 11, 2013 and the end of the reporting period for stations M31, M32, M33, M34, M35, M37, M38, & M39. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr6+ average concentrations, based upon lab analytical results at each AMS, were less than 3% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real-time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 5-minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real-time 5-minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3.

Program-to-date

Real-time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

- Excavate and load out chromium impacted soils
- Backfill excavation

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-6.

5.0 Conclusions

Results of the December 2013 reporting period for the Metropolis Towers Site air sampling and monitoring program indicate that the average Cr6+ concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3. The Cr6+ concentrations and the percent Cr6+ in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr6+ in dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr6+ and do not represent an emission source of Cr6+ sufficient to create potential offsite exposure to Cr6+ at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr6+ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr6+ Sampling Results

Date	22	23	24	25	26	27	28	29	30
12/01/13	12.0								
12/02/13	11.0	6.5	6.5	6.5	19.0	18.0	15.0	36.0	NA
12/03/13	15.0	14.0	27.0	6.5	27.0	6.0	20.0	15.0	NA
12/04/13	2.4	37.0	46.0	26.0	30.0	84.0	6.5	6.5	NA
12/05/13	2.4	6.5	14.0	6.5	6.50	6.0	6.0	6.0	NA
12/06/13	2.4	6.0	6.5	6.5	6.50	6.5	6.5	6.5	NA
12/07/13	2.4								
12/08/13	2.4								
12/09/13	2.4	6.5	6.5	6.5	6.50	6.0	6.0	6.0	NA
12/10/13	2.3	6.0	6.0	6.0	6.00	6.0	6.0	6.0	NA

Date	22	23	24	25	26	31	32	33	34	35	37	38	39
12/11/13	2.4	6.0	6.0	6.0	6.0	7.0	7.0	7.0	7.0	6.0	6.0	6.0	NA
12/12/13	2.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	14.0	6.5	6.5	6.5	6.5
12/13/13	6.5	6.5	6.5	6.5	6.5	6.5	6.5	23.0	2.4	23.0	6.5	6.5	6.5
12/14/13									2.4				
12/15/13									2.4				
12/16/13	6.5	7.0	6.5	6.5	6.5	6.5	6.5	6.5	2.4	6.5	6.5	6.5	6.5
12/17/13	6.5	6.0	6.5	6.5	6.5	6.0	6.5	6.5	2.4	6.5	6.0	6.5	6.5
12/18/13	15.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	2.4	6.5	6.5	6.5	6.5
12/19/13	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	13.0	6.5	6.5	6.5	6.5
12/20/13	14.0	6.0	16.0	6.0	6.0	6.5	6.5	6.0	0.8	14.0	6.5	6.5	6.5
12/21/13									0.8				
12/22/13									0.8				
12/23/13	6.5	6.5	7.0	7.0	7.0	7.0	7.0	6.0	2.5	7.0	6.5	6.5	6.5
12/24/13	NA	NA	NA	NA	NA	NA	NA	NA	2.5	NA	NA	NA	NA
12/25/13	NA	NA	NA	NA	NA	NA	NA	NA	2.5	NA	NA	NA	NA
12/26/13	6.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	2.4	6.5	6.0	6.5	6.5
12/27/13	6.5	6.0	6.0	6.0	6.0	6.0	6.0	6.5	0.8	6.5	6.5	14.0	6.5
12/28/13									0.8				
12/29/13									0.8				
12/30/13	6.0	6.5	6.5	6.5	6.5	6.0	6.0	6.0	2.3	6.0	6.0	6.0	na
12/31/13	7.0	7.0	7.0	7.0	6.5	7.0	7.0	6.5	2.4	6.0	7.0	6.0	7.0

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr6+. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

Date	22	23	24	25	26	27	28	29	30
12/01/13	42.0								
12/02/13	58.0	63.0	88.0	33.0	31.0	110.0	30.5	68.0	NA
12/03/13	41.0	31.5	32.5	69.0	31.5	31.0	30.5	30.5	NA
12/04/13	11.5	32.0	74.0	88.0	74.0	31.0	31.0	31.0	NA
12/05/13	26.0	31.5	85.0	100.0	31.5	31.0	30.5	30.5	NA
12/06/13	11.5	30.5	32.5	32.5	32.0	31.0	31.5	31.5	NA
12/07/13	11.5								
12/08/13	11.5								
12/09/13	11.5	31.0	32.0	32.0	31.0	30.5	30.0	30.0	NA
12/10/13	11.5	32.0	32.0	32.5	32.0	31.5	31.0	31.0	NA

Date	22	23	24	25	26	31	32	33	34	35	37	38	39
12/11/13	11.5	32.0	32.0	32.0	32.0	35.0	35.5	34.0	31.0	31.5	31.0	31.0	NA
12/12/13	11.5	33.0	32.5	33.0	32.0	31.5	32.0	31.5	31.5	32.0	31.0	32.5	31.5
12/13/13	33.0	31.0	31.0	31.0	31.5	31.0	31.0	92.0	0.9	71.0	32.0	31.5	31.5
12/14/13									0.9				
12/15/13									0.9				
12/16/13	32.5	34.0	32.0	32.0	32.0	32.0	32.0	66.0	11.5	32.0	32.4	33.0	32.5
12/17/13	31.5	31.0	31.5	32.0	31.5	31.0	31.5	31.5	11.5	31.0	31.0	31.5	31.5
12/18/13	32.5	33.5	32.5	32.5	32.5	31.5	31.5	31.5	11.5	31.5	31.5	33.0	32.0
12/19/13	31.5	33.0	31.5	32.0	31.5	31.0	31.0	31.0	NA	31.0	31.5	32.0	31.5
12/20/13	31.0	30.0	30.0	30.0	30.0	31.0	NA	30.0	3.9	31.0	32.0	31.5	31.5
12/21/13									3.9				
12/22/13									3.9				
12/23/13	31.5	190.0	34.0	34.5	34.0	33.5	33.5	31.0	12.0	34.5	31.5	32.0	31.5
12/24/13	NA	NA	NA	NA	NA	NA	NA	NA	12.0	NA	NA	NA	NA
12/25/13	NA	NA	NA	NA	NA	NA	NA	NA	12.0	NA	NA	NA	NA
12/26/13	30.5	31.5	31.5	32.0	31.5	31.5	31.5	31.5	38.0	32.5	30.5	31.0	31.0
12/27/13	32.5	30.0	30.5	30.5	30.5	30.5	31.0	61.5	19.0	31.5	69.0	100.0	32.0
12/28/13									19.0				
12/29/13									19.0				
12/30/13	30.5	35.5	31.5	31.5	31.5	31.0	31.0	29.5	11.5	30.5	30.5	31.0	NA
12/31/13	34.5	35.5	35.5	35.5	32.0	35.5	35.5	32.5	12.0	30.5	34.5	31.0	35.5

Results in microograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Figure A- 1: Real-Time 5-minute average PM_{10} Monitoring Results

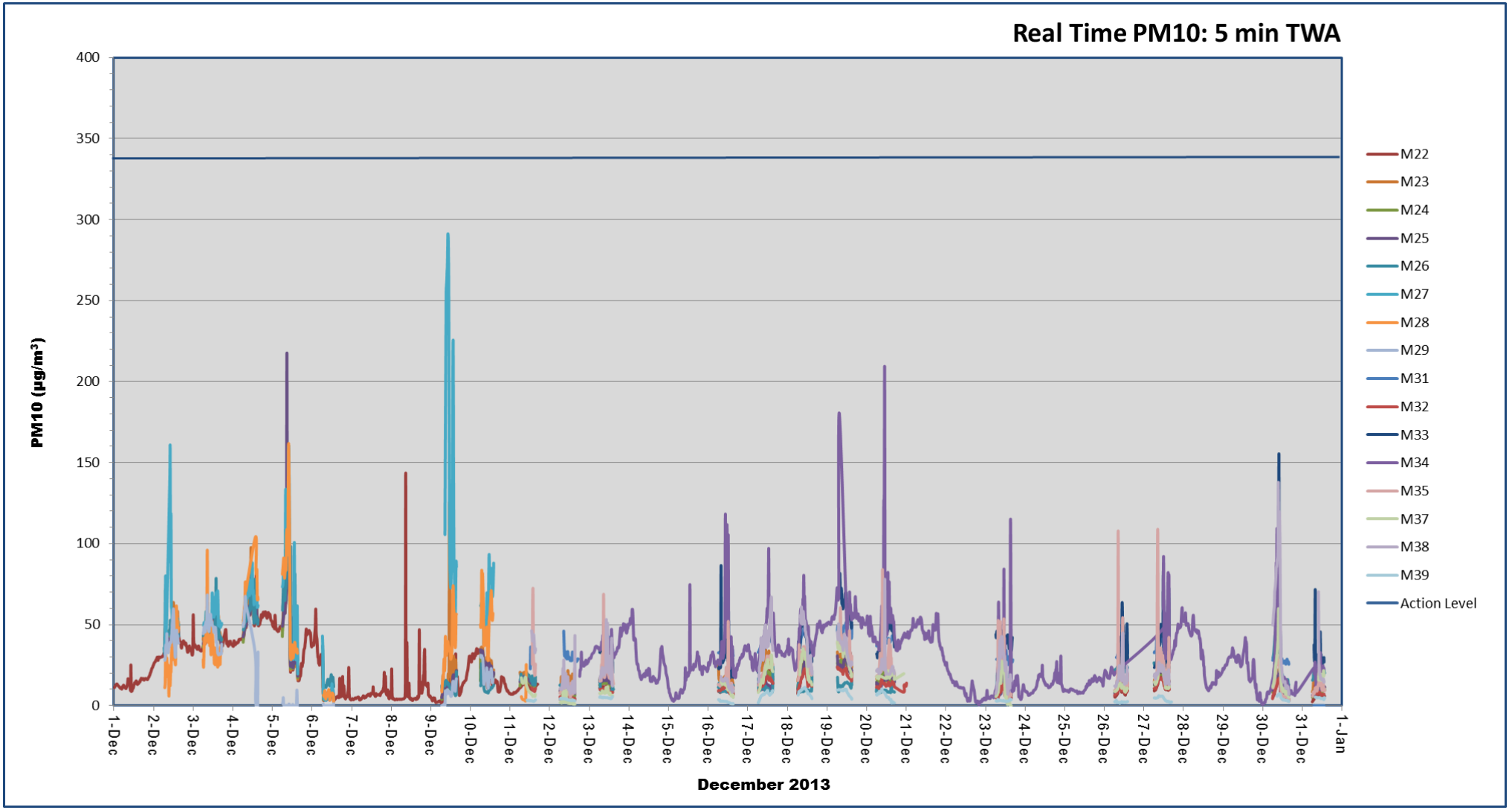


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
Cr6+	12.04.13	TWA	M27	Variable	84 ng/m^3 (Above the site safety level but below the site AAC of 487 ng/m^3)	Water misting directed towards adjacent air monitoring station. Processing of concrete conducted at edge of work zone.
Dust	NA	NA	NA	NA	NA	NA

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter (µg/m^3)

ng/m^3 – nanograms per cubic meter

µg/m^3 – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

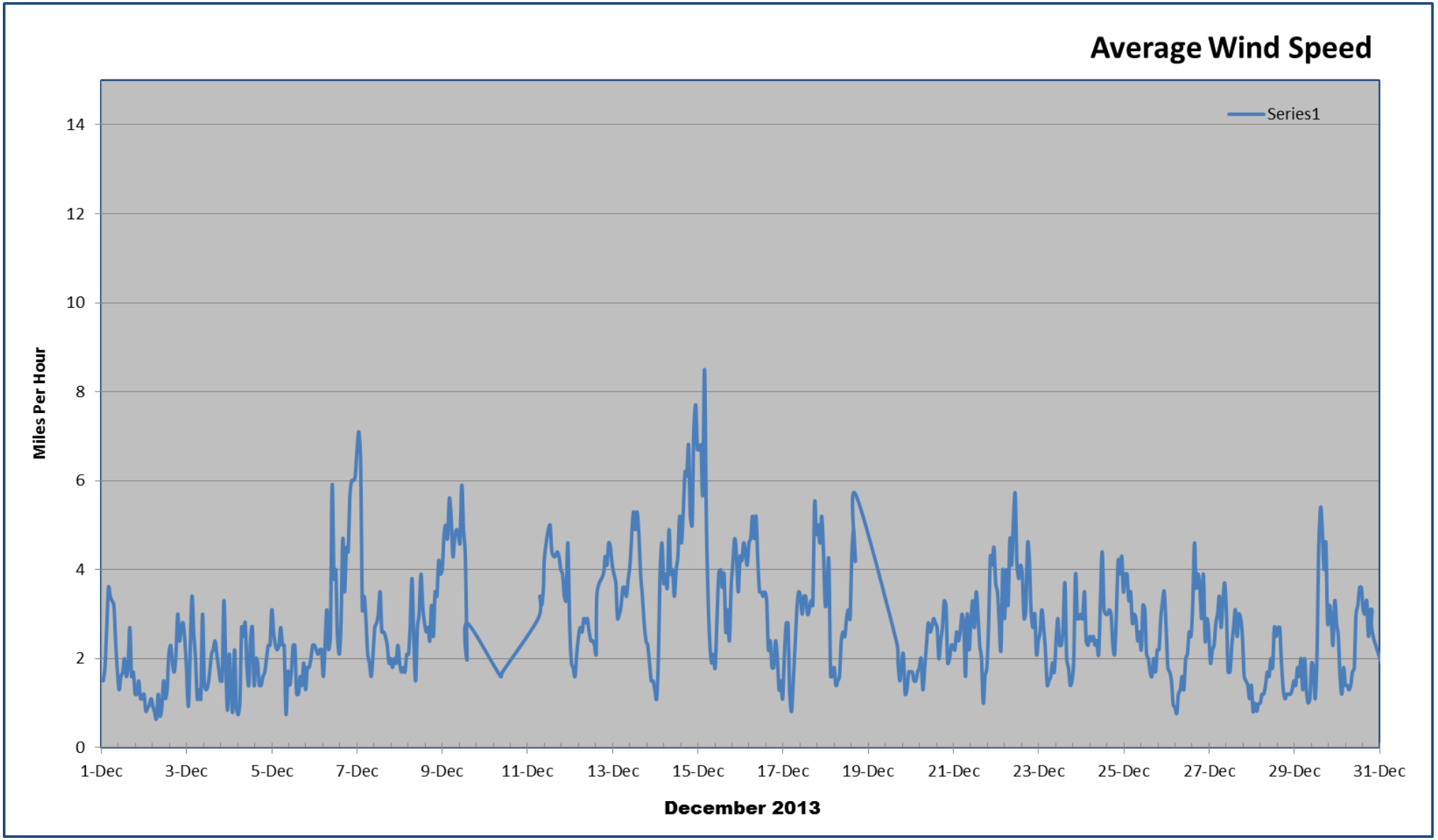


Figure A-3: Temperature

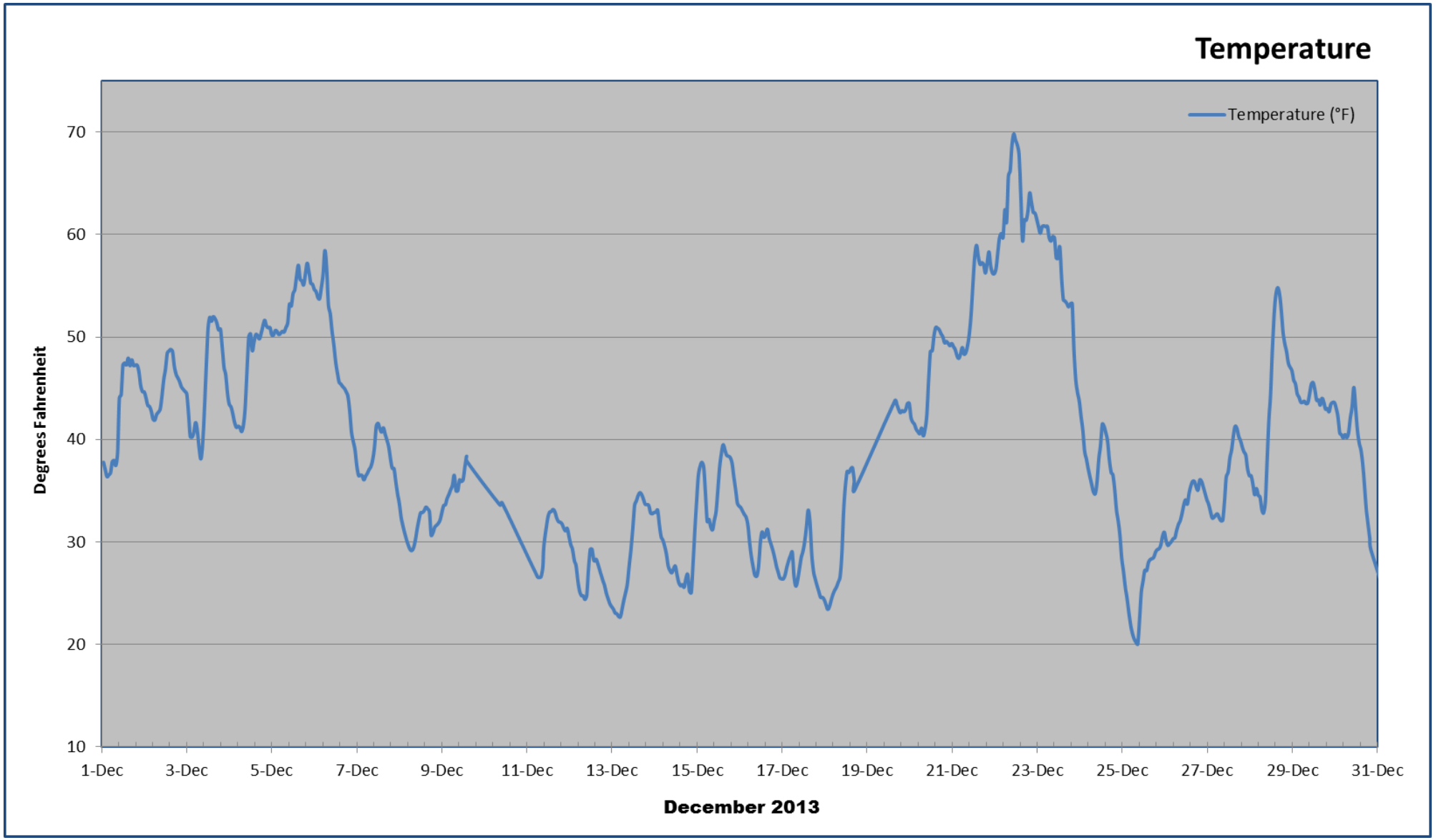


Figure A-4: Relative Humidity

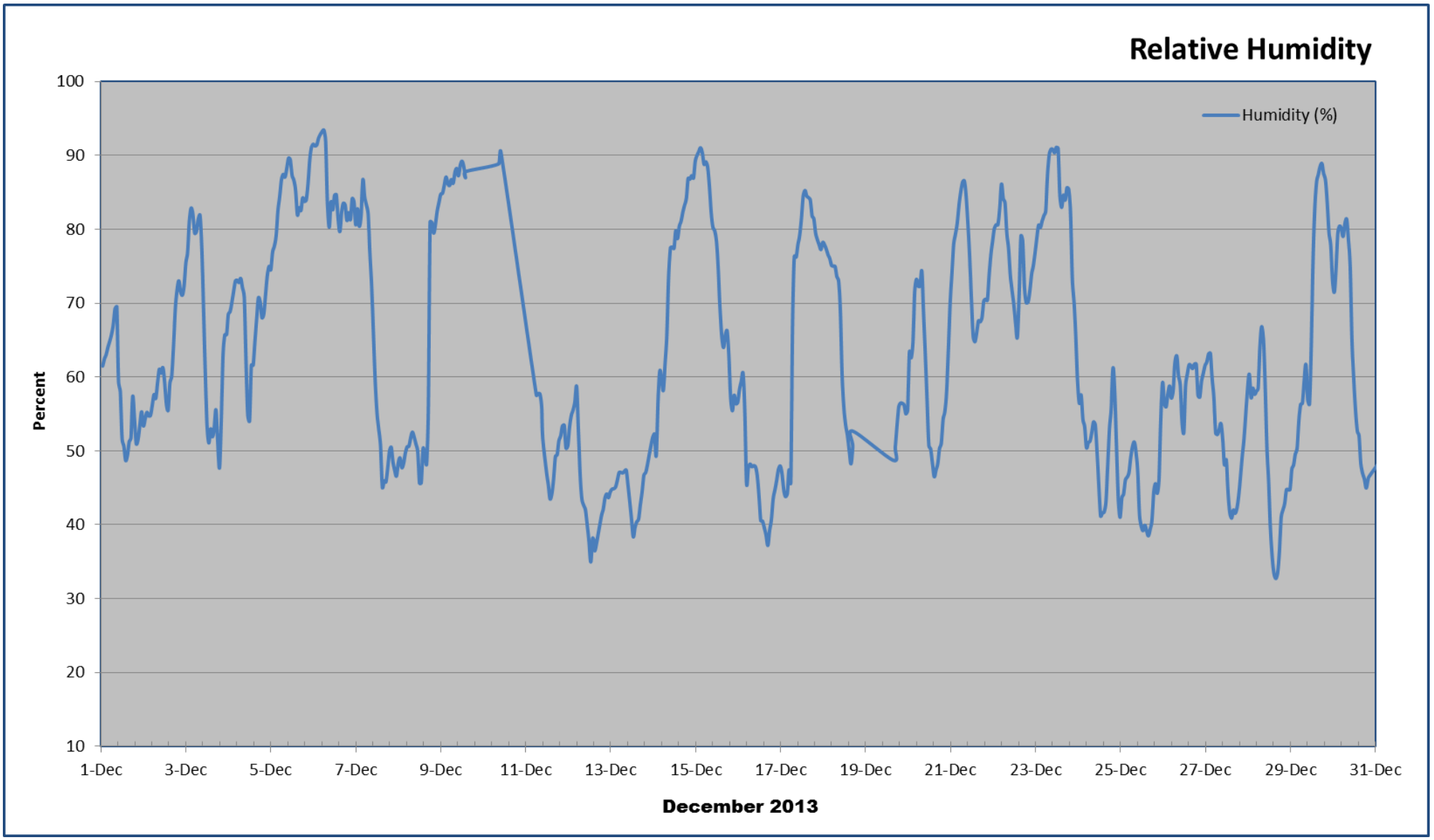


Figure A–5: Site Map (November 5th through December 10th, 2013)

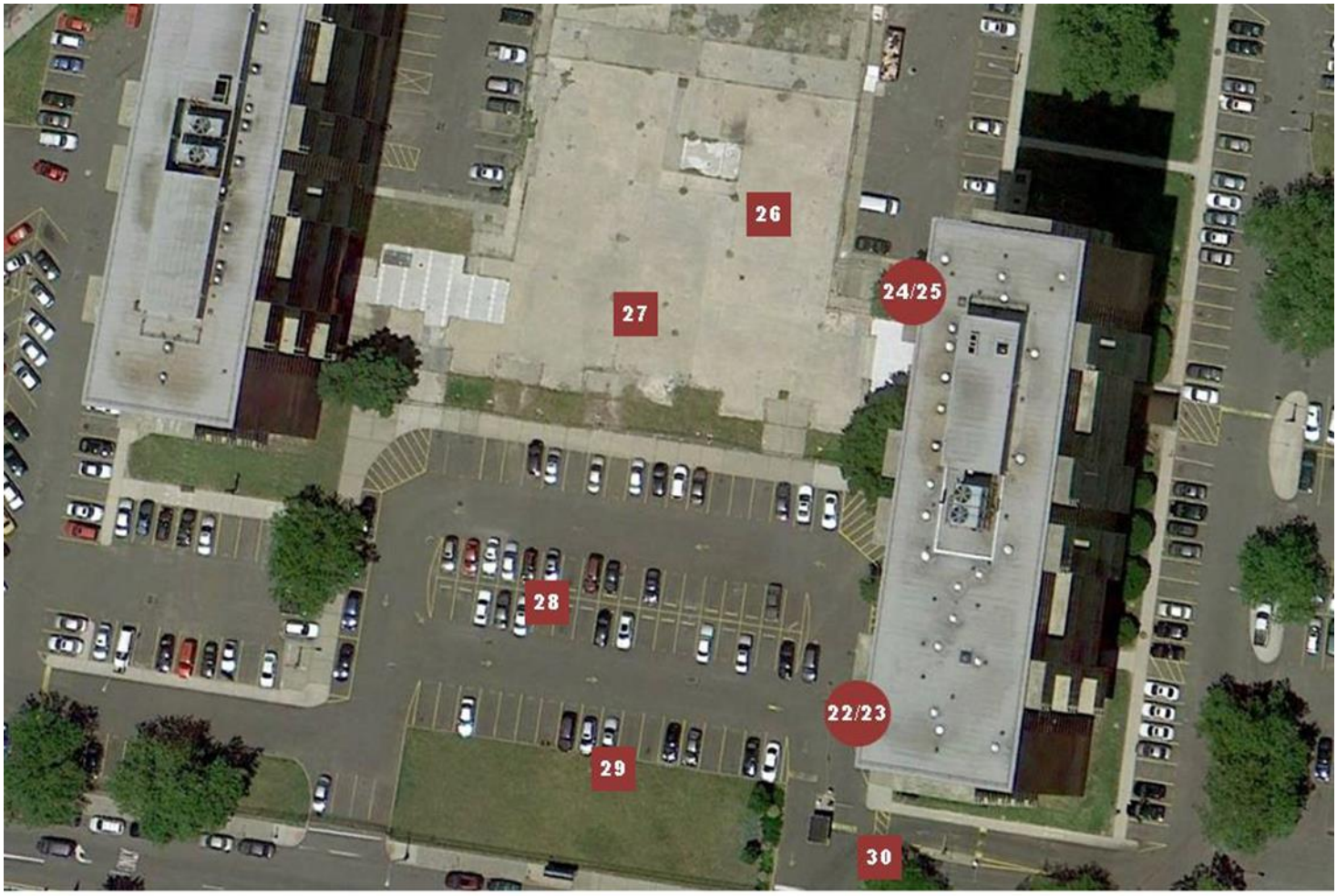
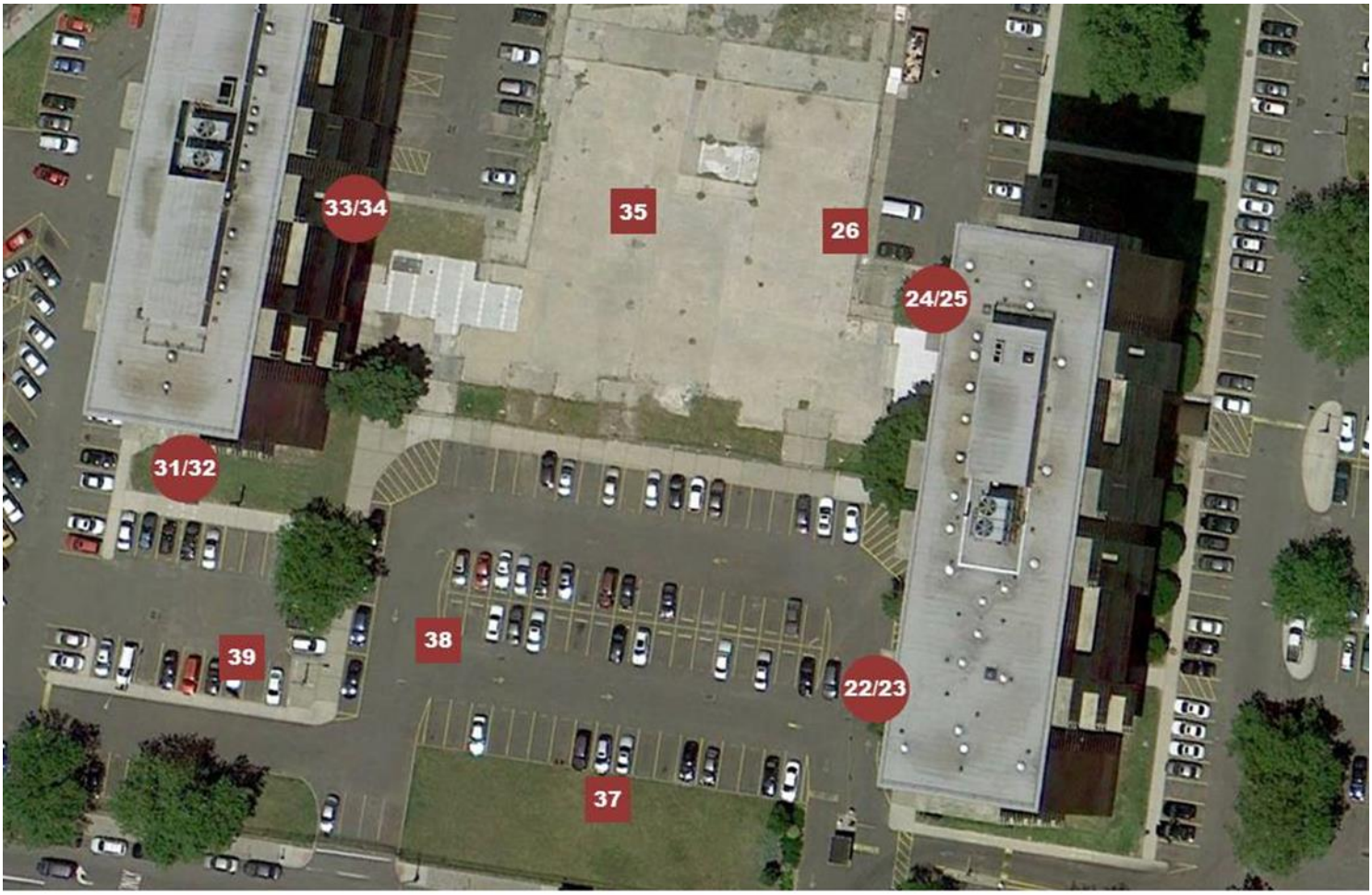


Figure A–5: Site Map (December 11, 2013 through end of reporting period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr6+ Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr6+ Sampling Results Statistics

Statistics[1]	Layout Area 3-1								
	M22 (ng/m^3)	**M23 (ng/m^3)**	**M24 (ng/m^3)**	**M25 (ng/m^3)**	**M26 (ng/m^3)**	**M27 (ng/m^3)**	**M28 (ng/m^3)**	**M29 (ng/m^3)**	**M30 (ng/m^3)**
Total Number of Samples[2]	49	36	36	36	36	23	23	23	NA
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	NA
Number of Detected Samples[3]	10	2	5	1	3	6	3	2	NA
% of Cr6 Samples Greater than MDL	20.4%	5.5%	13.9%	2.8%	8.3%	26.1%	13%	8.7%	NA
Number of Samples Above AAC	0	0	0	0	0	0	0	0	NA
Average % Cr6 in Dust[4]	0.022%	0.016%	0.018%	0.014%	0.017%	0.026%	0.018%	0.016%	NA
Maximum % Cr6 in Dust[4]	0.130%	0.021%	0.060%	0.021%	0.021%	0.079%	0.052%	0.021%	NA

ng/m3 – nanograms per cubic meter

[1] Total number of samples collected since November 5, 2013. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since November 5, 2013 reported above the laboratory reporting limit.

[3] The program to date average and maximum percent Cr6 in dust was calculated using all the integrated Total Particulate and Cr6 sample results collected since November 5, 2013.

Statistics[1]	Layout Area 3							
	M31 (ng/m^3)	**M32 (ng/m^3)**	**M33 (ng/m^3)**	**M34 (ng/m^3)**	**M35 (ng/m^3)**	**M37 (ng/m^3)**	**M38 (ng/m^3)**	**M39 (ng/m^3)**
Total Number of Samples[2]	21	21	21	21	21	21	21	21
Rate of Data Collection	90.5%	90.5%	90.5%	90.5%	90.5%	90.5%	90.5%	90.5%
Number of Detected Samples[3]	0	0	2	5	3	0	1	0
% of Cr6 Samples Greater than MDL	0%	0%	9.5%	23.8%	14.3%	0%	4.8%	0%
Number of Samples Above AAC	0	0	0	0	0	0	0	0
Average % Cr6 in Dust[4]	0.020%	0.020%	0.019%	0.034	0.023%	0.019%	0.020%	0.020%
Maximum % Cr6 in Dust[4]	0.021%	0.021%	0.025%	0.282%	0.045%	0.021%	0.021%	0.021%

ng/m3 – nanograms per cubic meter

[1] Total number of samples collected since December 11, 2013. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since December 11, 2013 reported above the laboratory reporting limit.

[3] The program to date average and maximum percent Cr6 in dust was calculated using all the integrated Total Particulate and Cr6 sample results collected since November 5, 2013.

Table B- 2: Monthly Average Integrated 8-hour Cr6+ Sampling Results

Statistics[1]	Layout Area 3-1								
	M22 (ng/m^3)	M23 (ng/m^3)	M24 (ng/m^3)	M25 (ng/m^3)	M26 (ng/m^3)	M27 (ng/m^3)	M28 (ng/m^3)	M29 (ng/m^3)	M30 (ng/m^3)
November	3.6	6.4	7.4	6.6	6.5	9.9	7.0	6.3	NA
December	6.4	8.3	10.3	7.4	9.3	18.9	9.4	11.7	NA
PTD	4.9	7.4	9.0	7.1	8.0	12.7	7.7	8.0	NA

ng/m^3 – nanograms per cubic meter

Statistics[1]	Layout Area 3							
	M31 (ng/m^3)	M32 (ng/m^3)	M33 (ng/m^3)	M34 (ng/m^3)	M35 (ng/m^3)	M37 (ng/m^3)	M38 (ng/m^3)	M39 (ng/m^3)
December	6.5	6.5	7.7	3.2	8.3	6.4	7.0	6.5
PTD	6.5	6.5	7.7	3.2	8.3	6.4	7.0	6.5

ng/m^3 – nanograms per cubic meter

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

Statistics	Layout Area 3-1								
	M22 (ng/m^3)	**M23 (ng/m^3)**	**M24 (ng/m^3)**	**M25 (ng/m^3)**	**M26 (ng/m^3)**	**M27 (ng/m^3)**	**M28 (ng/m^3)**	**M29 (ng/m^3)**	**M30 (ng/m^3)**
Total Number of Samples[1]	49	36	36	36	36	23	23	23	NA
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	NA
No of Detected Samples[2]	11	3	5	7	2	3	1	2	NA
% Detection	22.4%	8.3%	13.9%	19.4%	5.6%	13.0%	2.8%	5.6%	NA

1 Total number of sample collected since November 5, 2013. Variations in the number of samples collected are specifically identified in Table A-2 within the report month of the variation.

2 Total number of sample results since November 5, 2013 reported above the laboratory reporting limit.

Statistics	Layout Area 3							
	M31 (ng/m^3)	**M32 (ng/m^3)**	**M33 (ng/m^3)**	**M34 (ng/m^3)**	**M35 (ng/m^3)**	**M37 (ng/m^3)**	**M38 (ng/m^3)**	**M39 (ng/m^3)**
Total Number of Samples[1]	19	18	19	30	19	19	19	19
Rate of Data Collection	100%	97.2%	100%	96.7%	100%	100%	100%	100%
No of Detected Samples[2]	0	0	3	9	1	1	1	0
% Detection	0%	0%	15.8%	30%	5.3%	5.3%	5.3%	0%

1 Total number of sample collected since December 11, 2013. Variations in the number of samples collected are specifically identified in Table A-2 within the report month of the variation.

2 Total number of sample results since December 11, 2013 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

Statistics[1]	Layout Area 3-1								
	M22 (ng/m^3)	M23 (ng/m^3)	M24 (ng/m^3)	M25 (ng/m^3)	M26 (ng/m^3)	M27 (ng/m^3)	M28 (ng/m^3)	M29 (ng/m^3)	M30 (ng/m^3)
November	15.7	34.3	70.5	54.9	44.3	40.5	45.3	46.1	NA
PTD	20.8	38.3	53.3	46.8	38.4	41.0	40.9	43.1	

ug/m^3 – micrograms per cubic meter

Statistics[1]	Layout Area 3							
	M31 (ng/m^3)	M32 (ng/m^3)	M33 (ng/m^3)	M34 (ng/m^3)	M35 (ng/m^3)	M37 (ng/m^3)	M38 (ng/m^3)	M39 (ng/m^3)
December	32.1	32.4	39.5	38.3	33.5	33.6	41.0	32.2
PTD	32.1	32.4	39.5	38.3	33.5	33.6	41.0	32.2

ug/m^3 – micrograms per cubic meter

Table B- 5: Monthly Average Real-Time PM_{10} Monitoring Results

Statistics[1]	Layout Area 3-1								
	M22 (ng/m^3)	M23 (ng/m^3)	M24 (ng/m^3)	M25 (ng/m^3)	M26 (ng/m^3)	M27 (ng/m^3)	M28 (ng/m^3)	M29 (ng/m^3)	M30 (ng/m^3)
November	10.5	13.7	10.7	11.5	19.2	23.1	11.9	9.4	NA
December	20.3	25.5	21.7	21.8	19.8	66.2	39.8	8.6	NA
PTD	14.5	20.3	16.9	17.9	19.7	35.2	20.3	4.4	NA

ug/m^3 – micrograms per cubic meter

Statistics[1]	Layout Area 3-1							
	M31 (ng/m^3)	M32 (ng/m^3)	M33 (ng/m^3)	M34 (ng/m^3)	M35 (ng/m^3)	M37 (ng/m^3)	M38 (ng/m^3)	M39 (ng/m^3)
December	34.1	10.0	32.5	29.2	18.7	16.7	22.7	4.4
PTD	34.1	10.0	32.5	29.2	18.7	16.7	22.7	4.4

ug/m^3 – micrograms per cubic meter

January 2014
Air Quality Report
Metropolis Towers

Attached is a technical summary of air quality data for January 2014 at the Metropolis Towers cleanup site submitted by PPG Industries air monitoring consultant.

This report provides air monitoring information about conditions at the work areas associated with Layout Area 3.

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

EMILCOTT

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Submitted by:
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Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: January 2014

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: January 2014

Prepared By: David Tomsey

Reviewed By: Bruce Groves
March 7, 2014

Contents

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr6+ – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr6+) and total particulates, as well as real-time monitoring for PM_{10} at ten (10) air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour real-time dust measurements, Cr6+, and total particulate sampling with lab analysis was also conducted at one elevated station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr6+ sampling and analysis indicate that program-to-date average airborne Cr6+ concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr6+ in dust generated at the Site do not represent an emission source of Cr6+ sufficient to create potential offsite exposure to Cr6+ at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Layout Area 3 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 5-minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between July 17, 2012 and August 2, 2012. Remedial activities are currently taking place in Layout Area 3 (LA3). Routine air sampling was initiated in LA3 when work started in this area on October 2, 2013.

Thirteen air monitoring stations provided protection during intrusive work. LA3 contains nine ground level stations and four elevated stations. One elevated station measures 24-hour real-time concentrations and collects Cr6+ and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for Layout Area 3 through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach at each of the AMS.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr6+ concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis. The Cr6+ average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr6+ to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr6+ fenceline air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr6+ and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr6+ and total particulate samples collection and laboratory analysis; and
- Real-time 5-minute average PM_{10}, readings measured at the work area perimeter.

This section outlines the types of data collected, frequency of collection, and the corresponding locations.

Figure 2-1: Site Overview

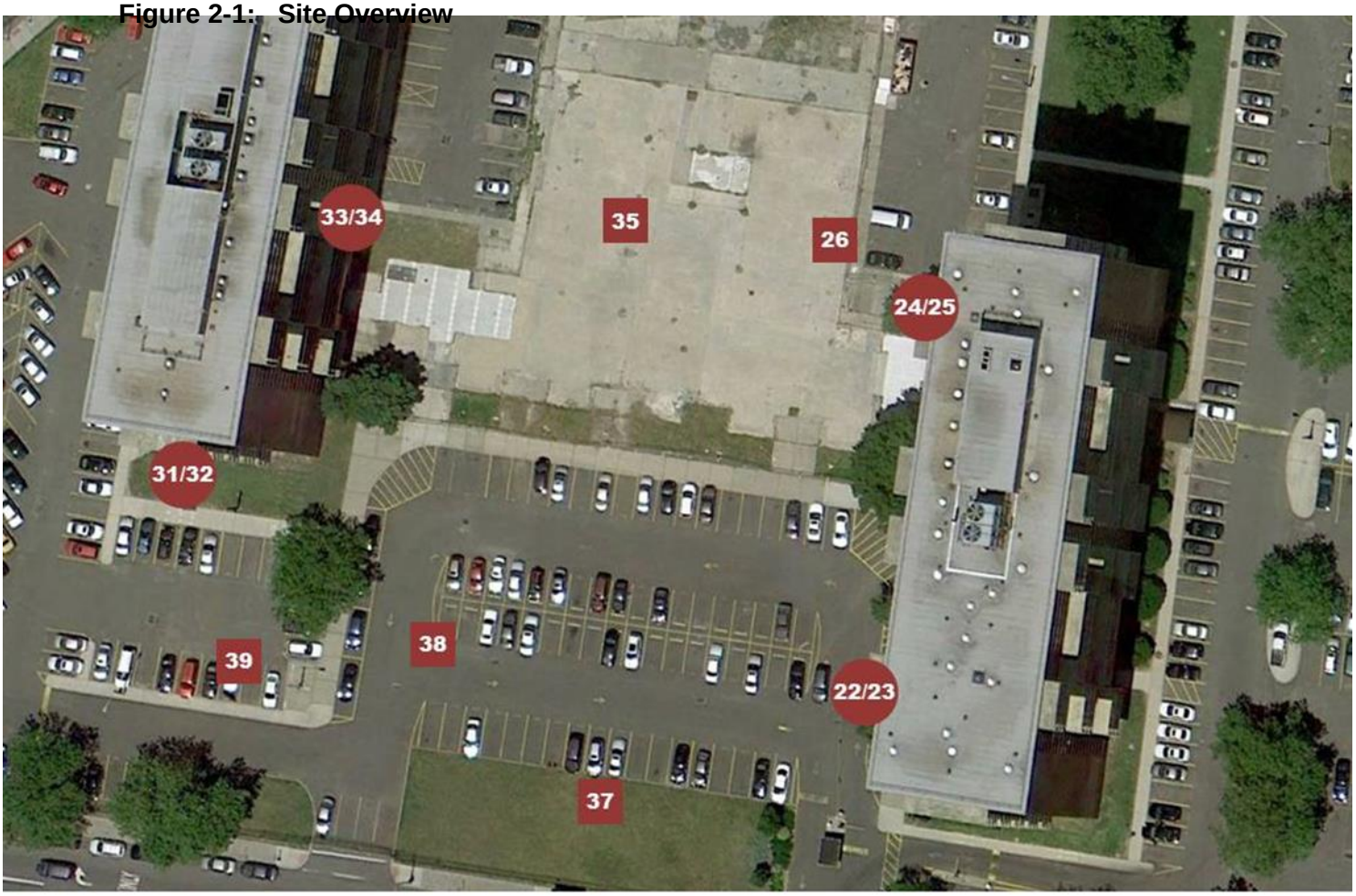


Table 2-1: Air Monitoring Approach

Layout Area 3	Station	Integrated Air Monitoring	Real-Time Air Monitoring
Layout Area 3	**M22, 23, 24, 25, 26, 30, 31, 32, 33, 34, 35, 37, 38, 39**	Integrated 8-hour Cr+6 and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr6+ sampling and analysis at one station 7 days per week.	5-minute average PM_{10} readings measured during a typical work day.

2.1 Integrated Air Sampling

Integrated Cr6+ and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (Typically Monday – Friday) at each of the ten stations. Samples are collected on a preweighed polyvinyl chloride 37mm filter cassette for both Cr6+ and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

2.1.1 Integrated Cr6+ Sampling

The exposed Cr6+ filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for Cr6+ analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr6+ air concentrations in Nanograms per cubic meter of air (ng/m^3). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr6+ sampling and analysis are also performed at one AMS per work area. These longer duration samples show Cr6+ concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program certified analytical laboratory for total particulate analysis using NIOSH method 0500. The sample weights are provided by the

laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr6+ air concentrations in micrograms per cubic meter of air (µg/m^3). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: work area monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Work Area

Work area air monitoring consists of ground level and elevated stations at the perimeter of the work area. Work area monitoring includes the following:

- Real-time 5-minute average PM_{10} readings at each of the eleven locations. Six ground level and four elevated stations operate 8-to-10 hours during remedial activities, Monday through Friday, with one elevated station running 24-hours a day, seven days a week.

2.2.2 Meteorological Measurements

Meteorological measurements of 5-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at elevated station 34.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific AAC and real-time Action Levels have been developed for Cr6+ and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr6+ and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr6+ concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr6+ Acceptable Air Concentration

A Site-specific Cr6+ AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr6+ in dust. The AAC for Cr6+ was developed to represent the maximum allowable average concentration of Cr6+ in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr6+ emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the work area perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC also provides a value to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices during the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr6+ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. These shorter duration average concentrations metrics include: program-to-date,

90-day, 60-day, and 30-day running averages where the average Cr6+ concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr6+ Metrics

Metric Observation	Response Action
30-day[1] Cr6+ average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60-day[1] Cr6+ average concentration greater than or equal to 40 ng/m3	
90-day[1] Cr6+ average concentration greater than or equal to 35 ng/m3	
1 sampling day	

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

Parameter	Alert Level (1 min TWA)	Action Level (5 min TWA)
PM_{10}	339 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between October 2, 2013 and January 31, 2013 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels; and
- Meteorological results.

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr6+ and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr6+ Sampling Results

Results of the Cr6+ sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr6+ concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr6+ concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr6+ results are shown in Table B-1 and include various programs to date metrics relative to Cr6+ analytical data. Monthly average 8-hour Cr6+ concentration results are shown in Table B-2 for each AMS location. A snapshot of the 90-day running Cr6+ average concentrations at the end of the reporting period were not available for AMS M31 through M39 since they were mobilized and in use December 11, 2013.

Table 4-1: Short Term Average 8-hour Integrated Cr6+ Metrics

Running Cr6+ Metrics[1]		Layout Area 3												
	Metric (ng/m^3)	**M22 (ng/m^3)**	**M23 (ng/m^3)**	**M24 (ng/m^3)**	**M25 (ng/m^3)**	**M26 (ng/m^3)**	**M31 (ng/m^3)**	**M32 (ng/m^3)**	**M33 (ng/m^3)**	**M34 (ng/m^3)**	**M35 (ng/m^3)**	**M37 (ng/m^3)**	**M38 (ng/m^3)**	**M39 (ng/m^3)**
30-day[2]	**45**	6.4	6.4	6.5	6.5	6.5	6.5	6.9	7.8	1.9	7.0	6.4	6.5	6.5
60-day[2]	**40**	6.1	6.4	6.7	6.5	6.4	6.5	6.7	7.8	2.4	7.5	6.4	6.7	6.5
90-day[2]	**35**	5.4	7.1	8.1	6.8	7.5	NA	NA	NA	NA	NA	NA	NA	NA
PTD[3]		5.4	7.1	8.1	6.8	7.5	6.5	6.7	7.8	2.4	7.5	6.4	6.7	6.5

ng/m^3 – nanograms per cubic meter

1 Running Cr6+ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr6+ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practical. The running Cr6+ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long term (program) ending success.

2. Running Cr6+ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60 and 90-day metrics were not available due to the short duration of sampling during this phase of the project for stations M31 – M39.

3. Program-to-date - Air monitoring conducted from November 5, 2013 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 69 sample days between November 5, 2013 and the end of the reporting period for stations M22 through M26. There have been 35 sample days between December 11, 2013 and the end of the reporting period for stations M31, M32, M33, M34, M35, M37, M38, & M39. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr6+ average concentrations, based upon lab analytical results at each AMS, were less than 1.7% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real-time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 5-minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real-time 5-minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3.

Program-to-date

Real-time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

- Excavate and load out chromium impacted soils
- Backfill excavation

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the January 2014 reporting period for the Metropolis Towers Site air sampling and monitoring program indicate that the average Cr6+ concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3. The Cr6+ concentrations and the percent Cr6+ in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr6+ in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr6+ and do not represent an emission source of Cr6+ sufficient to create potential offsite exposure to Cr6+ at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr6+ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr6+ Sampling Results

Date of Sample	M22	M23	M24	M25	M26	M30	M31	M32	M33	M34	M35	M37	M38	M39
01/01/14	na	na	na	na	na	-	na	na	na	2.4	na	na	na	na
01/02/14	6.5	6.5	6.5	6.5	6.5	-	6.5	7.0	6.0	5.0	6.0	6.5	6.5	7.0
01/03/14	na	na	na	na	na	-	na	na	na	5.0	na	na	na	na
01/04/14										5.0				
01/05/14										5.0				
01/06/14	6.5	6.5	6.5	6.5	6.5	-	6.5	6.5	6.0	3.7	6.5	6.5	6.5	6.5
01/07/14	6.5	6.5	6.5	6.5	6.5	-	6.5	13.0	37.0	6.5	20.0	6.5	6.5	6.5
01/08/14	6.5	6.5	6.5	6.5	6.5	-	6.5	6.5	6.0	2.4	6.5	6.5	6.5	6.5
01/09/14	6.5	6.5	6.5	6.5	6.5	-	6.5	6.5	6.0	2.4	6.5	6.5	6.5	6.5
01/10/14	6.5	6.5	6.0	6.5	6.5	-	6.5	6.5	6.5	0.8	6.0	6.5	6.5	6.5
01/11/14										0.8				
01/12/14										0.8				
01/13/14	6.0	6.5	6.5	6.5	6.5	-	6.5	6.5	6.0	2.4	6.0	6.0	6.5	6.5
01/14/14	6.0	6.5	6.5	6.0	6.5	-	6.5	6.5	6.0	2.3	6.0	6.0	6.0	6.0
01/15/14	6.5	6.5	6.5	6.5	6.5	-	6.0	6.5	6.0	2.4	6.0	6.5	6.5	6.5
01/16/14	6.5	6.0	6.5	6.5	6.5	-	6.5	6.5	6.0	0.8	6.5	6.5	6.5	6.5
01/17/14	6.5	6.5	6.5	6.5	6.5	-	6.5	6.5	6.5	0.8	6.5	6.5	6.0	6.5
01/18/14										0.8				
01/19/14										0.8				
01/20/14	6.0	6.0	6.5	6.5	6.0	-	6.5	6.5	6.0	0.8	6.5	6.5	6.5	6.5
01/21/14	6.5	6.5	6.5	6.5	6.5	-	6.5	6.5	6.5	0.8	6.5	6.5	6.5	6.5
01/22/14	na	na	na	na	na	na	na	na	na	0.8	na	na	na	na
01/23/14	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	7.0	0.8	6.5	6.5	6.5	6.5
01/24/14	6.5	6.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	0.8	6.0	6.5	6.5	na
01/25/14										0.8				
01/26/14										0.8				
01/27/14	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	0.8	6.5	6.5	6.5	6.5
01/28/14	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	0.8	6.5	6.5	6.5	6.5
01/29/14	6.5	6.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	0.8	6.5	6.0	6.5	6.5
01/30/14	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	0.8	6.5	6.5	6.5	6.5
01/31/14	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	0.8	6.5	6.5	6.5	6.5

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr6+. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

Date of Sample	M22	M23	M24	M25	M26	M30	M31	M32	M33	M34	M35	M37	M38	M39
01/01/14	na	na	na	na	na	-	na	na	na	12.0	na	na	na	na
01/02/14	31.5	32.5	32.5	32.5	31.0	-	32.5	35.5	31.0	41.0	30.5	31.5	32.0	35.5
01/03/14	na	na	na	na	na	-	na	na	na	41.0	na	na	na	na
01/04/14										41.0				
01/05/14										41.0				
01/06/14	31.5	32.0	32.0	33.0	32.0	-	32.5	32.5	30.0	11.5	31.0	31.5	140.0	32.5
01/07/14	31.0	32.0	32.0	33.0	32.5	-	32.0	32.5	64.0	650.0	31.5	31.5	31.5	31.5
01/08/14	31.0	32.0	32.0	32.5	32.0	-	32.0	32.5	30.5	11.5	31.0	31.5	31.5	31.5
01/09/14	31.5	32.0	120.0	130.0	32.0	-	32.0	32.0	30.5	30.5	31.0	31.5	32.0	31.5
01/10/14	72.0	69.0	73.0	89.0	76.0	-	32.0	32.0	30.5	3.9	30.5	32.5	31.5	32.5
01/11/14										3.9				
01/12/14										3.9				
01/13/14	31.0	31.5	31.5	31.0	32.0	-	31.5	31.0	30.5	30.0	31.0	29.5	31.0	31.0
01/14/14	30.5	31.0	31.5	30.5	31.0	-	31.0	31.5	30.5	11.5	30.0	30.5	31.0	31.0
01/15/14	32.0	32.5	32.5	32.0	32.0	-	31.0	31.5	31.0	11.5	31.0	32.0	32.5	32.0
01/16/14	31.5	31.0	31.5	31.5	31.5	-	31.5	31.5	30.5	3.9	32.0	31.0	31.5	32.0
01/17/14	33.0	31.5	32.5	32.0	32.5	-	31.5	31.5	32.0	3.9	32.0	32.5	31.0	32.5
01/18/14										3.9				
01/19/14										3.9				
01/20/14	31.0	30.5	31.5	31.5	30.5	-	31.0	31.5	30.5	3.9	31.5	31.0	31.0	31.5
01/21/14	31.5	31.0	32.0	32.0	31.5	-	32.0	32.0	31.0	3.9	32.0	31.5	31.5	32.5
01/22/14	na	na	na	na	na		na	na	na	3.9	na	na	na	na
01/23/14	32.0	31.5	250.0	32.0	31.5	31.5	32.0	32.5	33.5	3.9	31.5	32.0	32.0	33.0
01/24/14	32.5	31.0	31.5	31.0	31.5	31.5	31.5	31.5	32.0	3.9	30.5	32.0	31.0	na
01/25/14										3.9				
01/26/14										3.9				
01/27/14	31.5	30.5	32.0	31.5	31.0	31.5	31.5	32.5	31.5	3.9	33.0	31.0	31.5	32.5
01/28/14	31.0	30.5	32.0	31.5	31.0	31.5	31.5	32.5	31.5	3.9	33.0	31.0	94.0	32.0
01/29/14	32.0	30.5	32.0	31.5	31.5	31.5	31.5	110.0	31.5	3.9	31.5	31.0	31.5	33.0
01/30/14	32.5	31.5	32.5	32.5	66.0	68.0	32.5	32.5	32.5	3.9	32.5	33.0	33.0	79.0
01/31/14	32.5	32.0	32.5	32.5	32.5	32.5	32.5	32.5	33.0	18.0	69.0	32.5	32.5	32.5

Results in microograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Figure A- 1: Real-Time 5-minute average PM_{10} Monitoring Results

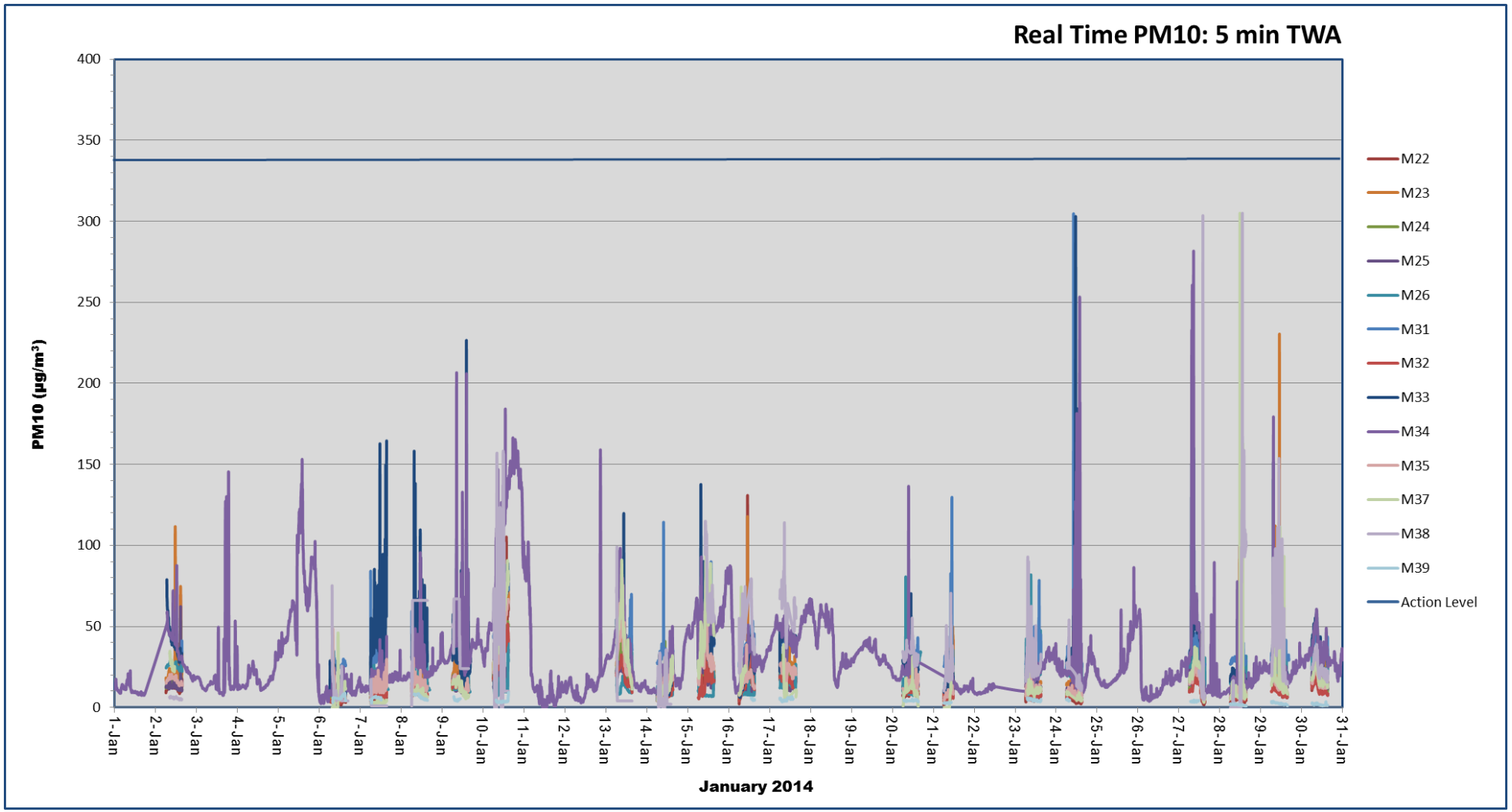


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
Total Dust	01.07.14	TWA	M34	SW	650 ug/m^3	Contaminated sample from contact with the ground surface.

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter (µg/m^3)

ng/m^3 – nanograms per cubic meter

µg/m^3 – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

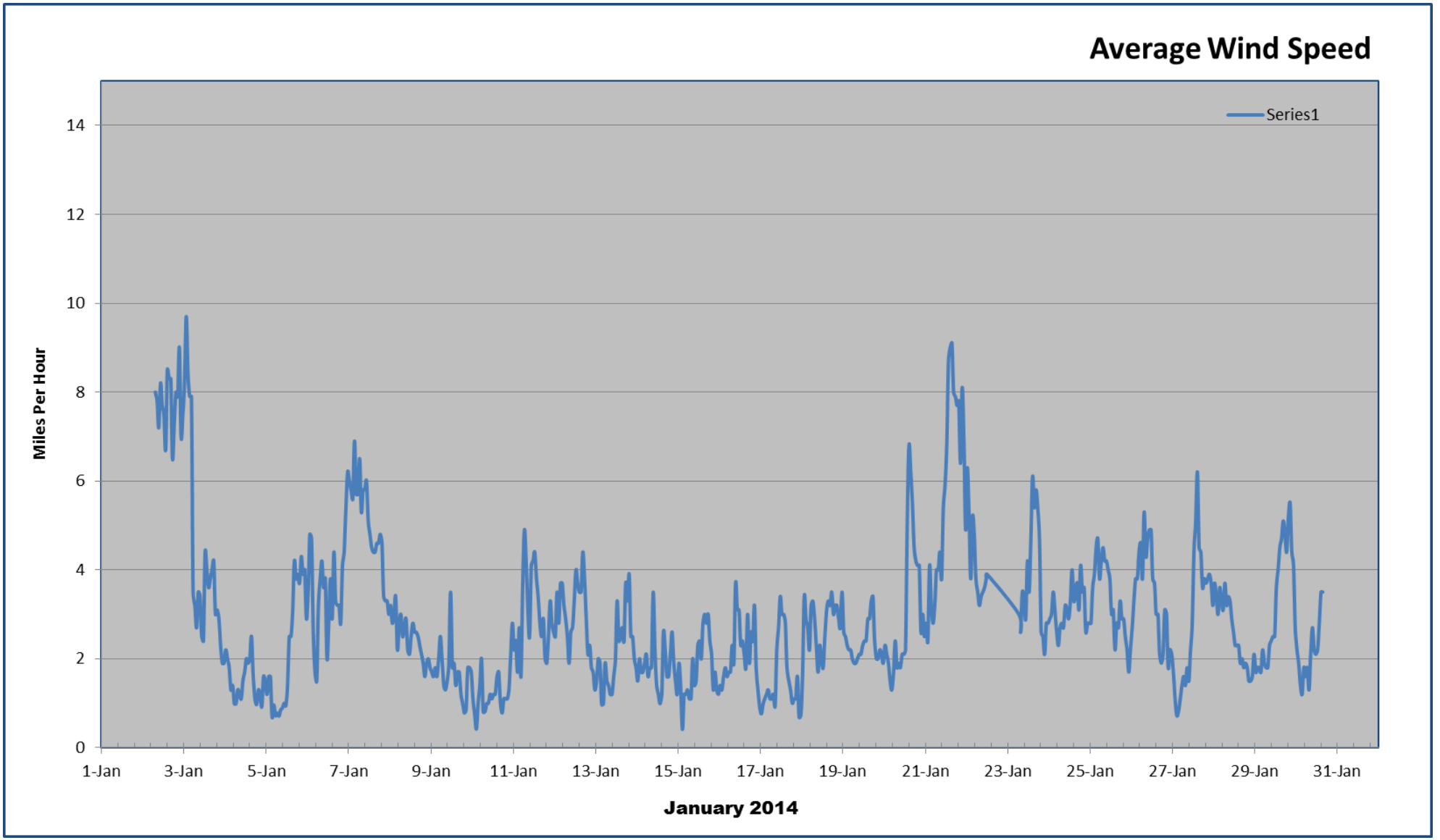


Figure A-3: Temperature

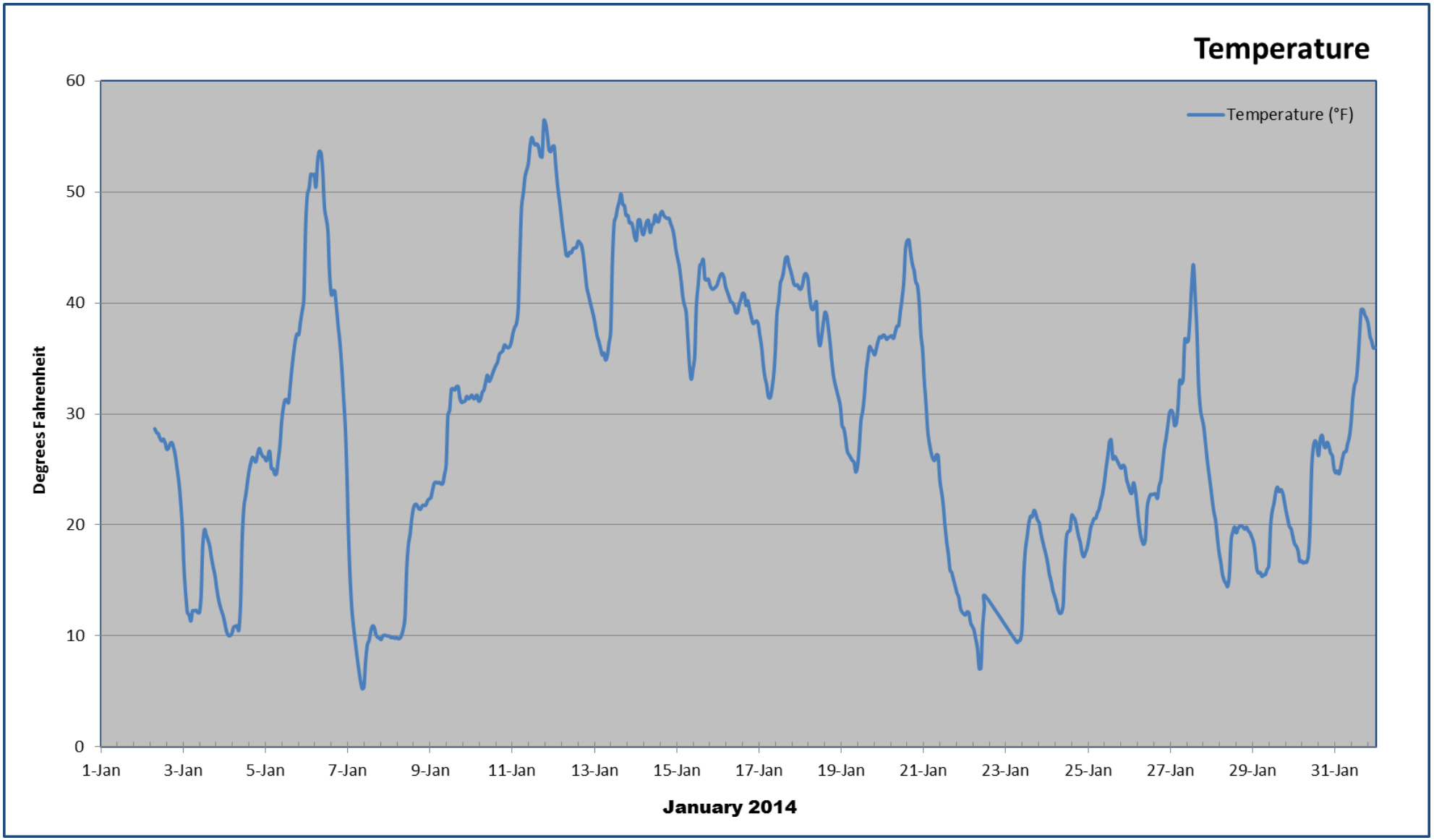


Figure A-4: Relative Humidity

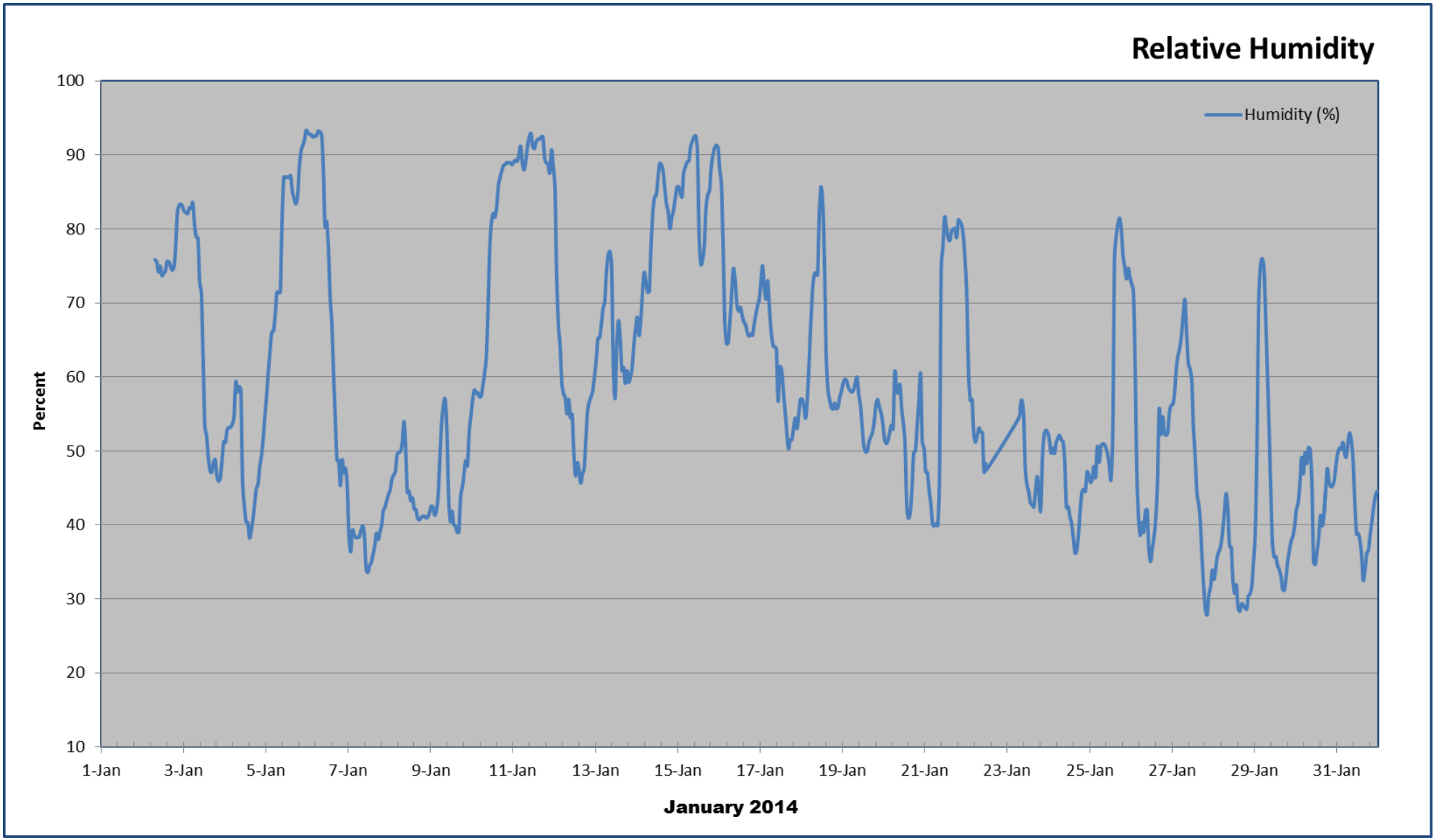
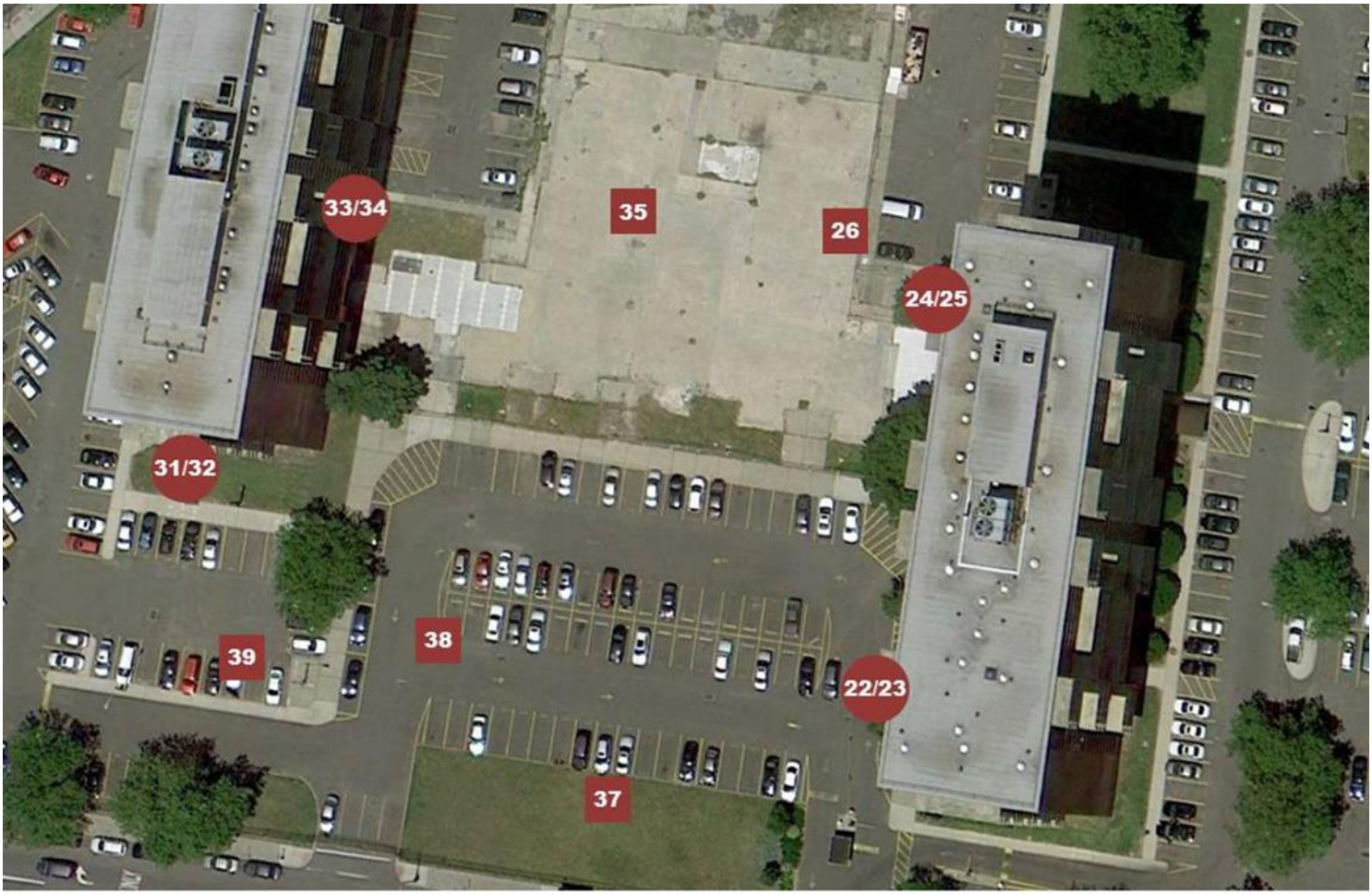


Figure A–5: Site Map



22/23 Ground level & elevated station location and designation

35 Ground level station location and designation

Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr6+ Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr6+ Sampling Results Statistics

Statistics[1]	Layout Area 3												
	M22	M23	M24	M25	M26	M31	M32	M33	M34	M35	M37	M38	M39
Total Number of Samples[2]	69	56	56	56	56	33	32	33	50	33	33	33	31
Rate of Data Collection	100%	100%	100%	100%	100%	100%	97%	100%	98%	100%	100%	100%	94%
Number of Detected Samples[3]	10	4	8	3	5	0	1	2	11	1	1	2	1
% of Cr6+ Samples Greater than MDL	14.5%	7.1%	14.3%	5.4%	8.9%	0%	3.1%	6.1%	22%	3%	3%	6%	3.2%
Number of Samples Above AAC	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Average % Cr6 in Dust[4]	0.021%	0.021%	0.021%	0.018%	0.022%	0.020%	0.020%	0.021%	0.034%	0.022%	0.020%	0.019%	0.020%
Maximum % Cr6 in Dust[4]	0.046%	0.116%	0.083%	0.030%	0.086%	0.021%	0.021%	0.025%	0.282%	0.045%	0.021%	0.021%	0.021%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since November 5, 2013 for stations M22 – M26, and December 13, 2013 for M31 – M39. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since November 5, 2013 for stations M22 – M26, and December 11, 2013 for M31 – M39 reported above the laboratory reporting limit.

[3] The program to date average and maximum percent Cr6 in dust was calculated using all the integrated Total Particulate and Cr6 sample results collected since November 5, 2013 for stations M22 – M26, and since December 11th, 2013 for M31 – M39.

Table B- 2: Monthly Average Integrated 8-hour Cr6+ Sampling Results

Statistics	Layout Area 3												
	M22	**M23**	**M24**	**M25**	**M26**	**M31**	**M32**	**M33**	**M34**	**M35**	**M37**	**M38**	**M39**
November	3.6	6.4	7.4	6.6	6.5	NA	NA	NA	NA	NA	NA	NA	NA
December	6.4	8.3	10.3	7.4	9.3	6.5	6.5	7.7	3.2	8.3	6.4	7.0	6.5
January	6.4	6.4	6.5	6.5	6.5	6.5	6.9	7.8	1.9	7.0	6.4	6.5	6.5
PTD	5.4	7.1	8.1	6.8	7.5	6.5	6.7	8.7	2.4	7.5	6.4	6.7	6.5
All readings in ng/m3 – nanograms per cubic meter													

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

Statistics	Layout Area 3												
	M22	**M23**	**M24**	**M25**	**M26**	**M31**	**M32**	**M33**	**M34**	**M35**	**M37**	**M38**	**M39**
Total Number of Samples[1]	69	56	56	56	56	33	32	33	50	33	33	33	31
Rate of Data Collection	100%	100%	100%	100%	100%	100%	97%	100%	98%	100%	100%	100%	94%
Number of Detected Samples[2]	12	4	8	9	4	0	1	3	11	2	1	3	1
% Detection	17.4%	7.1%	14.3	16.1%	7.1%	0%	3.1%	9.1%	22%	6.1%	3%	9.1%	3.2%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since November 5, 2013 for stations M22 – M26, and December 13, 2013 for M31 – M39. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since November 5, 2013 for stations M22 – M26, and December 11, 2013 for M31 – M39 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

Statistics	Layout Area 3												
	M22	**M23**	**M24**	**M25**	**M26**	**M31**	**M32**	**M33**	**M34**	**M35**	**M37**	**M38**	**M39**
November	15.7	34.3	70.5	54.9	44.3	NA	NA	NA	NA	NA	NA	NA	NA
December	26.5	41.6	39.6	40.3	33.8	32.0	32.3	41.0	13.3	34.7	34.5	37.0	32.0
January	33.7	33.3	49.4	39.7	35.6	31.8	36.1	32.9	32.9	33.3	31.5	40.2	34.7
PTD	24.5	36.5	51.9	44.2	37.4	31.9	34.6	36.1	25.2	33.8	32.7	38.9	33.7
All readings in µg/m3 – micrograms per cubic meter													

Table B- 5: Monthly Average Real-Time PM_{10} Monitoring Results

Statistics	Layout Area 3												
	M22	**M23**	**M24**	**M25**	**M26**	**M31**	**M32**	**M33**	**M34**	**M35**	**M37**	**M38**	**M39**
November	10.5	13.7	10.7	11.5	19.2	NA	NA	NA	NA	NA	NA	NA	NA
December	20.3	25.5	21.7	21.8	19.8	34.1	10.0	32.5	29.2	18.7	16.7	22.7	4.4
January	13.6	20.7	15.1	14.1	15.2	36.2	11.7	33.8	31.6	17.9	19.7	40.0	6.6
PTD	14.4	20.5	16.3	16.5	17.9	35.0	10.9	33.3	30.7	18.3	15.7	26.3	12.6
All readings in µg/m3 – micrograms per cubic meter													

February 2014
Air Quality Report
Metropolis Towers

Attached is a technical summary of air quality data for February 2014 at the Metropolis Towers cleanup site submitted by PPG Industries air monitoring consultant.

This report provides air monitoring information about conditions at the work areas associated with Layout Area 2 and Layout Area 3.

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

EMILCOTT

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Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: February 2014

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: February 2014

Prepared By: David Tomsey

Reviewed By: Bruce Groves
April 10, 2014

Contents

List of Appendices

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr6+ – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

µg/m^3 – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr6+) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour real-time dust measurements, Cr6+, and total particulate sampling with lab analysis was also conducted at one elevated station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr6+ sampling and analysis indicate that program-to-date average airborne Cr6+ concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr6+ in dust generated at the Site do not represent an emission source of Cr6+ sufficient to create potential offsite exposure to Cr6+ at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Layout Area 2 and Layout Area 3 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 5-minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between July 17, 2012 and August 2, 2012.

Remedial activities began in the northern portion of Layout Area 3 (LA3) on October 2, 2013. As remediation progressed, the eastern portion of LA3 was incorporated starting November 5, 2013 with additional monitoring stations to cover additional remedial areas. On December 11, 2013 additional stations were added to cover the entirety of LA3 through February 14, 2014. As remediation of contaminated soils was complete in LA3, a transition was made to Layout Area 2 (LA2). Stations were set up to incorporate both LA3, requiring paving, sidewalks, and landscaping, and LA2, requiring remediation of contaminated soils. This transition had a start date of February 15, 2014 and continues through the end of the reporting period.

Thirteen air monitoring stations provided protection during intrusive work between December 11, 2013 and February 14, 2014. LA3 contains nine ground level stations and four elevated stations. One elevated station measures 24-hour real-time concentrations and collects Cr6+ and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for Layout Area 3 through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach at each of the AMS.

Intrusive activities were complete in LA3 on February 14th 2014 and stations were relocated to LA2. Twelve air monitoring stations provided protection during intrusive work between February 15, 2014 and February 28, 2014. LA2 contains nine ground level stations and three elevated stations. One elevated station measures 24-hour real-time concentrations and collects Cr6+ and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-2** provides an overview of the Site and a typical configuration of the AMS for Layout Area 3 through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach at each of the AMS.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr6+ concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the

program's effectiveness on a monthly basis and a program-to-date basis. The Cr6+ average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr6+ to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr6+ fenceline air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr6+ and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr6+ and total particulate samples collection and laboratory analysis; and
- Real-time 5-minute average PM_{10}, readings measured at the work area perimeter.

The following sections outlines the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

Layout Area	Station	Integrated Air Monitoring	Real-Time Air Monitoring
Layout Area 3	**M22, 23, 24, 25, 26, 30, 31, 32, 33, 34, 35, 37, 38, 39**	Integrated 8-hour Cr+6 and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr6+ sampling and analysis at one station 7 days per week.	5-minute average PM_{10} readings measured during a typical work day.
Layout Area 2	**M40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 50**	Integrated 8-hour Cr+6 and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr6+ sampling and analysis at one station 7 days per week.	5-minute average PM_{10} readings measured during a typical work day.

2.1 Integrated Air Sampling

Integrated Cr6+ and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (Typically Monday – Friday) at each station. Samples are collected on a preweighed polyvinyl chloride 37mm filter cassette for both Cr6+ and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

Figure 2-1: LA3 Site Overview (12.11.13 – 02.14.14)

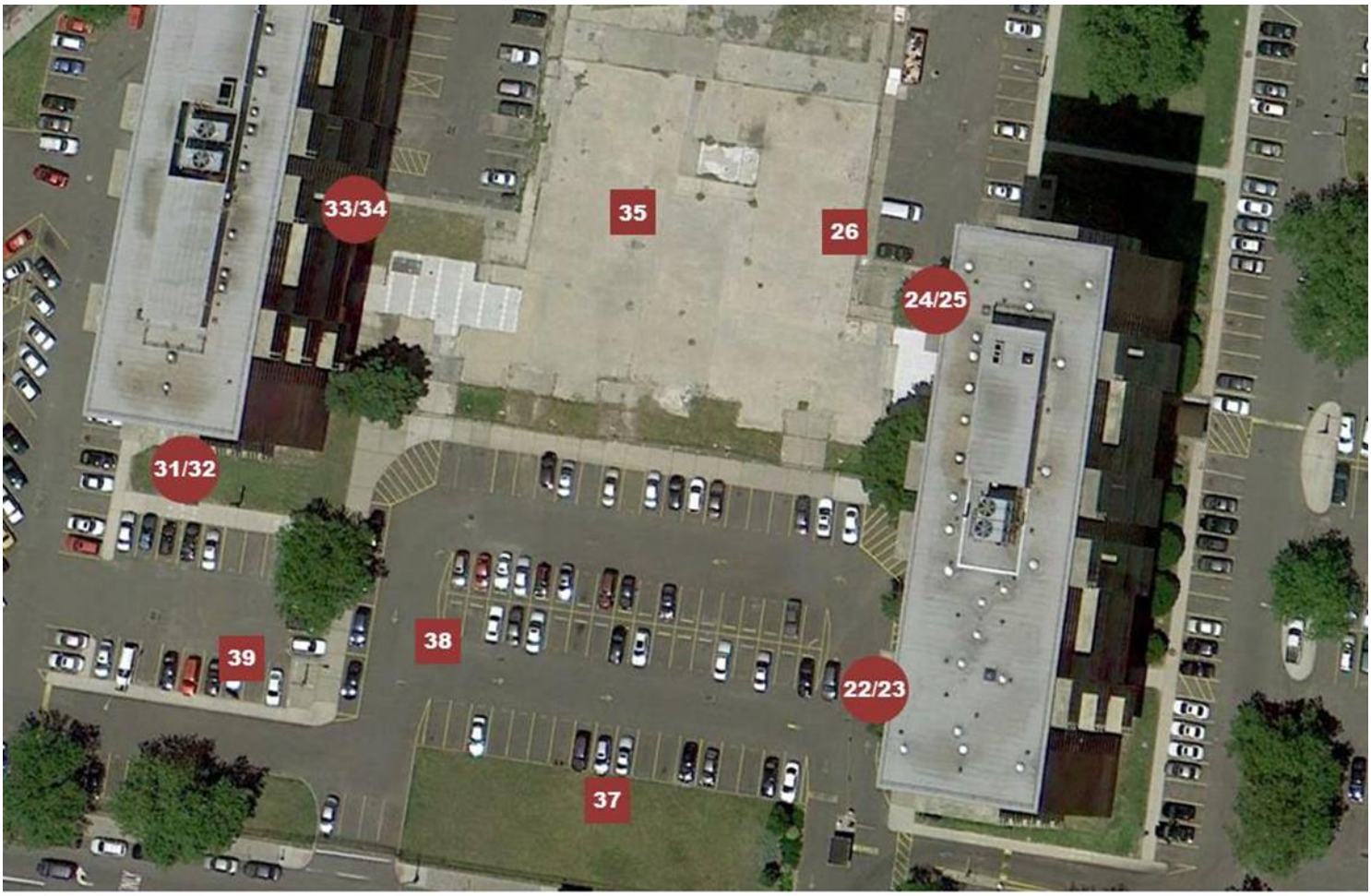
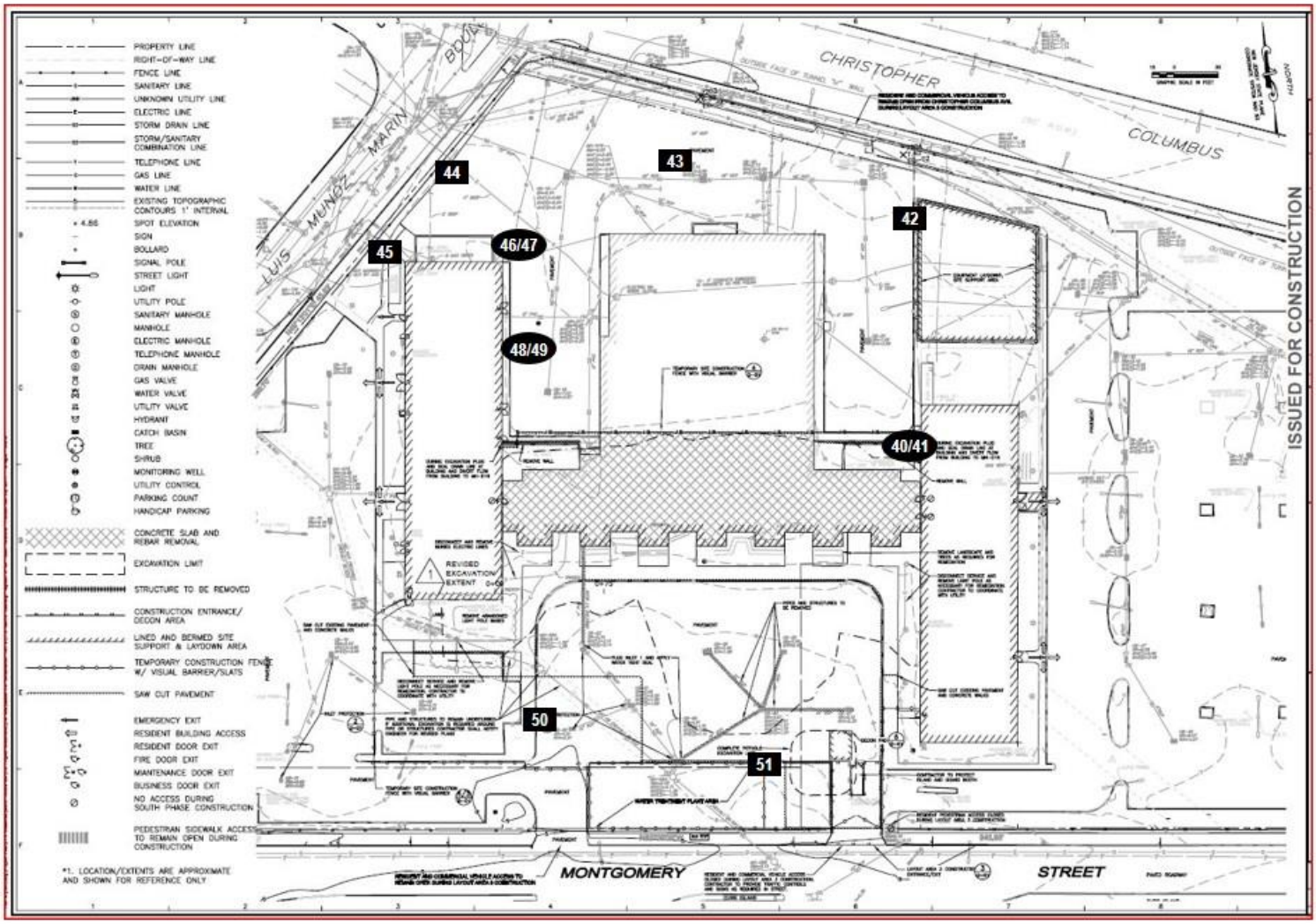


Figure 2-2: LA2 and LA3 Site Overview (02.15.14 – end of reporting period)



2.1.1 Integrated Cr6+ Sampling

The exposed Cr6+ filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr6+ analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr6+ air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr6+ sampling and analysis are also performed at one AMS per work area. These longer duration samples show Cr6+ concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated total particulate air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: work area monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Work Area

Work area air monitoring consists of ground level and elevated stations at the perimeter of the work area. Work area monitoring includes the following:

- Real-time 5-minute average PM_{10} readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday, with one elevated station running 24-hours a day, seven days a week.

2.2.2 Meteorological Measurements

Meteorological measurements of 5-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at elevated station 40.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr6+ and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr6+ and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr6+ concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr6+ Acceptable Air Concentration

A Site-specific Cr6+ AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr6+ in dust. The AAC for Cr6+ was developed to represent the maximum allowable average concentration of Cr6+ in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr6+ emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the work area perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC also provides a value to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices during the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr6+ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include:

program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr6+ concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr6+ Metrics

Metric Observation	Response Action
30-day[1] Cr6+ average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60-day[1] Cr6+ average concentration greater than or equal to 40 ng/m3	
90-day[1] Cr6+ average concentration greater than or equal to 35 ng/m3	
[1] Refers to days on which samples were collected, not necessarily calendar days	

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

Parameter	Alert Level (1 min TWA)	Action Level (5 min TWA)
PM_{10}	339 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between November 5, 2013 and February 28, 2014 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels; and
- Meteorological results.

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr6+ and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr6+ Sampling Results

Results of the Cr6+ sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr6+ concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr6+ concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr6+ results are shown in Table B-1 and include various program-to-date metrics relative to Cr6+ analytical data. Monthly average 8-hour Cr6+ concentration results are shown in Table B-2 for each AMS location. A snapshot of the 90-day running Cr6+ average concentrations at the end of the reporting period were not available for AMS M22 through M39 since they were not in use until December 11, 2013.

Table 4-1: Short Term Average 8-hour Integrated Cr6+ Metrics

Running Cr6+ Metrics[1]		Layout Area 3													
	Metric (ng/m^3)	M22 ng/m^3	M23 ng/m^3	M24 ng/m^3	M25 ng/m^3	M26 ng/m^3	M30 ng/m^3	M31 ng/m^3	M32 ng/m^3	M33 ng/m^3	M34 ng/m^3	M35 ng/m^3	M37 ng/m^3	M38 ng/m^3	M39 ng/m3
30-day[2]	**45**	6.6	6.5	6.6	6.6	6.5	NA	6.6	6.6	6.6	1.0	6.6	6.6	6.6	6.6
60-day[2]	**40**	7.0	6.5	6.8	6.5	6.5	NA	6.5	6.8	7.3	1.9	7.0	6.5	6.7	6.6
90-day[2]	**35**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PTD[3]		6.7	6.5	6.8	6.5	6.5	6.7	6.6	6.8	7.6	2.2	7.4	6.5	6.7	6.6

ng/m^3 – nanograms per cubic meter

1. Running Cr6+ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr6+ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr6+ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long term (program) ending success.
2. Running Cr6+ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 90-day metrics were not available due to the short duration of sampling during this phase of the project. There were 13 sampling days associated with M30, standard metrics were not available.
3. Program-to-date - Air monitoring conducted from December 11, 2013 through the end of the reporting period.

Stations M40 through M50 started on February 17th and do not have 30 days of data available.

M30 was only in use (13 days) when a satellite excavation was conducted near the Montgomery Road guard shack.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 75 sample days between November 5, 2013 and the end of the reporting period for stations M22 through M26, 39 sample days for stations M30 through M39, and 29 sample days between February 15th and the end of the reporting period for stations M40 through M51. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr6+ average concentrations, based upon lab analytical results at each AMS, were less than 1.9% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real-time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 5-minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real-time 5-minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3.

Program-to-date

Real-time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

- Excavate and load out chromium impacted soils;
- Backfill excavation;
- Pave parking areas and pour concrete for curbs and sidewalks.

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5 and A-6.

5.0 Conclusions

Results of the February 2014 reporting period for the Metropolis Towers Site air sampling and monitoring program indicate that the average Cr6+ concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3. The Cr6+ concentrations and the percent Cr6+ in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr6+ in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr6+ and do not represent an emission source of Cr6+ sufficient to create potential offsite exposure to Cr6+ at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr6+ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr6+ Sampling Results

Date	M22	M23	M24	M25	M26	M30	M31	M32	M33	M34	M35	M37	M38	M39
02/01/14										0.8				
02/02/14										0.8				
02/03/14	na	na	na	na	na	na	na	na	na	0.8	na	na	na	na
02/04/14	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	2.5	8.0	7.5	7.5	7.5
02/05/14	na	na	na	na	na	na	na	na	na	2.5	na	na	na	na
02/06/14	6.5	na	6.5	6.5	6.5	7.0	7.0	7.0	7.0	2.4	6.5	7.0	7.0	7.0
02/07/14	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	0.8	7.0	7.0	7.0	7.0
02/08/14										0.8				
02/09/14										0.8				
02/10/14	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	2.4	7.0	7.0	7.0	7.0
02/11/14	7.0	7.0	7.0	7.0	6.0	7.0	7.0	7.0	7.0	2.4	6.0	7.0	7.0	na
02/12/14	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	0.5	6.0	6.0	6.0	6.0
02/13/14	na	na	na	na	na	na	na	na	na	0.5	na	na	na	na
02/14/14	na	na	na	na	na	na	na	na	na	0.5	na	na	na	na

Date	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51
02/15/14	0.5											
02/16/14	0.5											
02/17/14	0.5	na	na	na	na	na	na	na	na	na	na	na
02/18/14	2.5	7.5	7.5	8.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
02/19/14	2.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
02/20/14	2.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
02/21/14	2.4	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.5	7.0	7.0	7.0
02/22/14	2.4											
02/23/14	2.4											
02/24/14	0.8	7.0	7.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
02/25/14	2.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
02/26/14	2.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
02/27/14	2.4	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
02/28/14	0.8	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr6+. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

Date	M22	M23	M24	M25	M26	M30	M31	M32	M33	M34	M35	M37	M38	M39
02/01/14										18.0				
02/02/14										18.0				
02/03/14	na	na	na	na	na	na	na	na	na	18.0	na	na	na	na
02/04/14	37.0	37.0	37.0	37.0	37.0	75.0	37.5	37.5	37.5	12.0	39.0	37.5	37.5	37.0
02/05/14	na	na	na	na	na	na	na	na	na	12.0	na	na	na	na
02/06/14	32.5	**na**	32.5	32.5	32.5	33.5	33.5	33.5	33.5	11.5	32.5	33.5	33.5	33.5
02/07/14	34.0	34.0	34.0	34.0	34.0	34.0	34.0	33.5	34.0	3.9	34.0	34.0	33.5	34.0
02/08/14										3.9				
02/09/14										3.9				
02/10/14	34.0	34.5	34.0	34.5	34.0	34.0	34.0	34.0	33.0	11.5	33.5	34.5	34.0	34.0
02/11/14	31.0	31.5	31.0	31.0	30.0	31.5	31.5	31.5	31.5	11.5	30.5	31.5	31.5	na
02/12/14	200.0	82.0	84.0	89.0	77.0	30.5	30.0	30.0	93.0	22.5	30.5	68.0	30.0	68.0
02/13/14	na	na	na	na	na	na	na	na	na	22.5	na	na	na	na
02/14/14	na	na	na	na	na	na	na	na	na	22.5	na	na	na	na

Date	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51
02/15/14	22.5											
02/16/14	22.5											
02/17/14	22.5	na	na	na	na	na	na	na	na	na	na	na
02/18/14	36.0	37.5	37.5	38.5	38.0	160.0	37.5	38.0	37.5	37.5	38.0	38.0
02/19/14	37.0	31.5	31.5	31.5	76.0	69.0	31.5	31.5	79.0	31.5	31.5	68.0
02/20/14	11.5	31.5	31.5	31.5	31.5	65.0	31.5	31.5	31.5	31.5	31.5	32.0
02/21/14	11.5	39.5	34.5	34.5	34.5	34.5	34.5	34.5	37.5	34.5	34.5	34.5
02/22/14	11.5											
02/23/14	11.5											
02/24/14	3.9	33.5	33.5	38.5	34.5	34.0	34.0	34.0	34.0	34.5	34.5	34.5
02/25/14	11.5	32.5	32.5	32.5	33.0	33.0	120.0	33.0	32.5	87.0	32.5	33.0
02/26/14	11.5	31.0	32.0	31.5	32.0	32.0	82.0	95.0	32.0	32.0	32.0	32.0
02/27/14	16.5	100.0	30.0	210.0	30.0	30.0	80.0	82.0	80.0	67.0	30.0	30.0
02/28/14	12.0	32.0	32.0	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Figure A- 1: Real-Time 5-minute average PM_{10} Monitoring Results

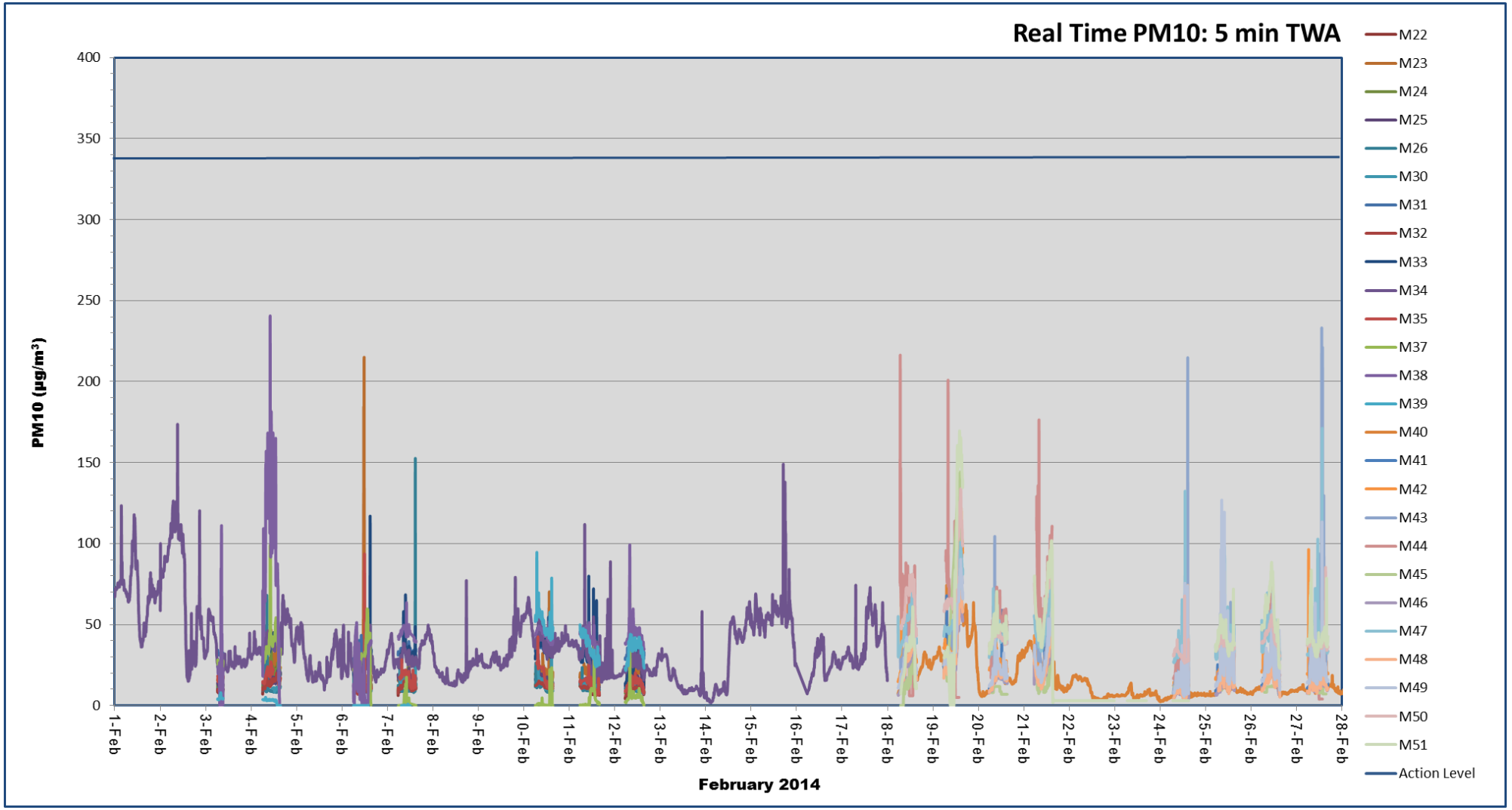


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
NA						

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter ($\mu g/m^3$)

ng/m^3 – nanograms per cubic meter

$\mu g/m^3$ – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

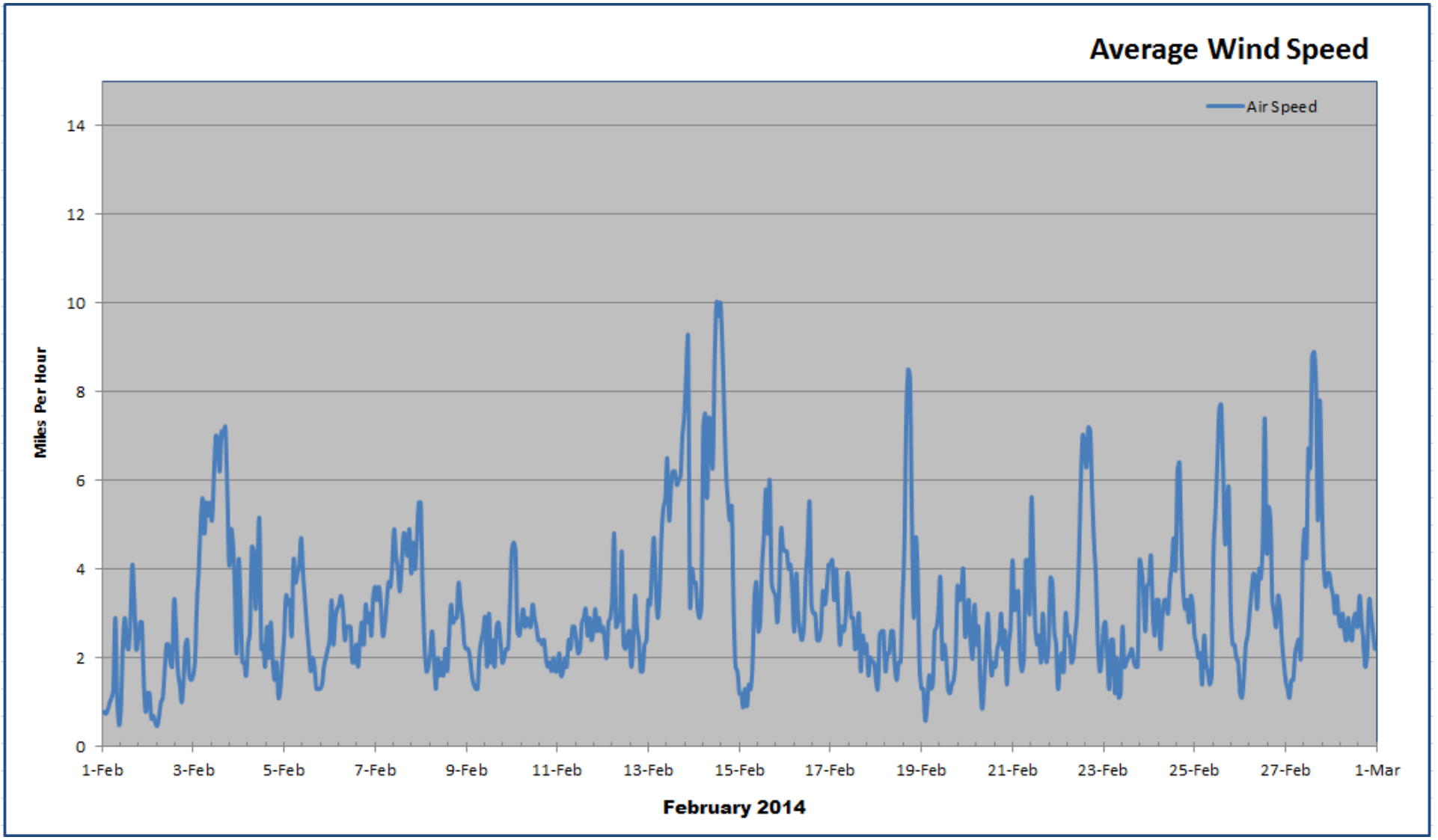


Figure A-3: Temperature

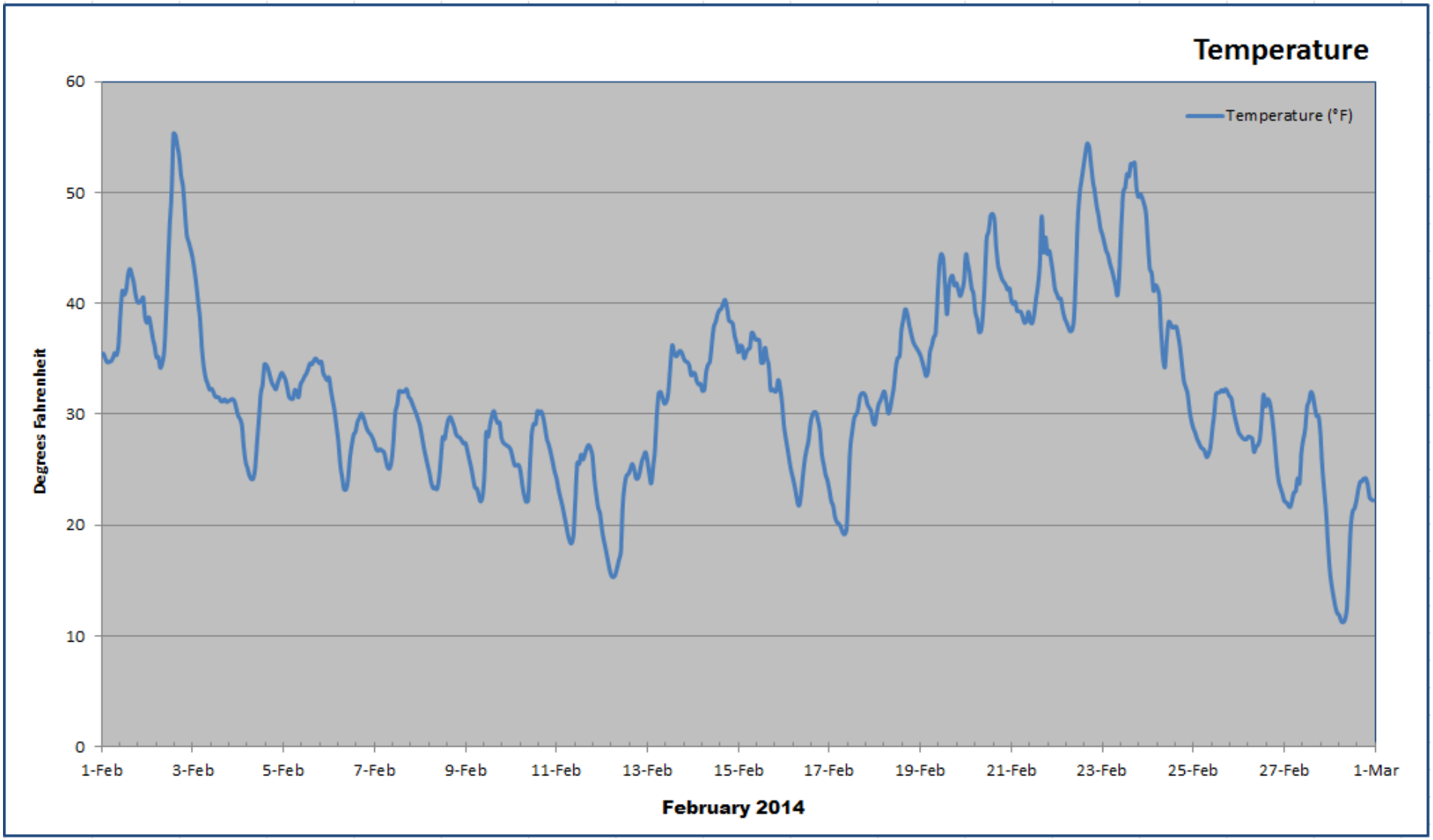


Figure A-4: Relative Humidity

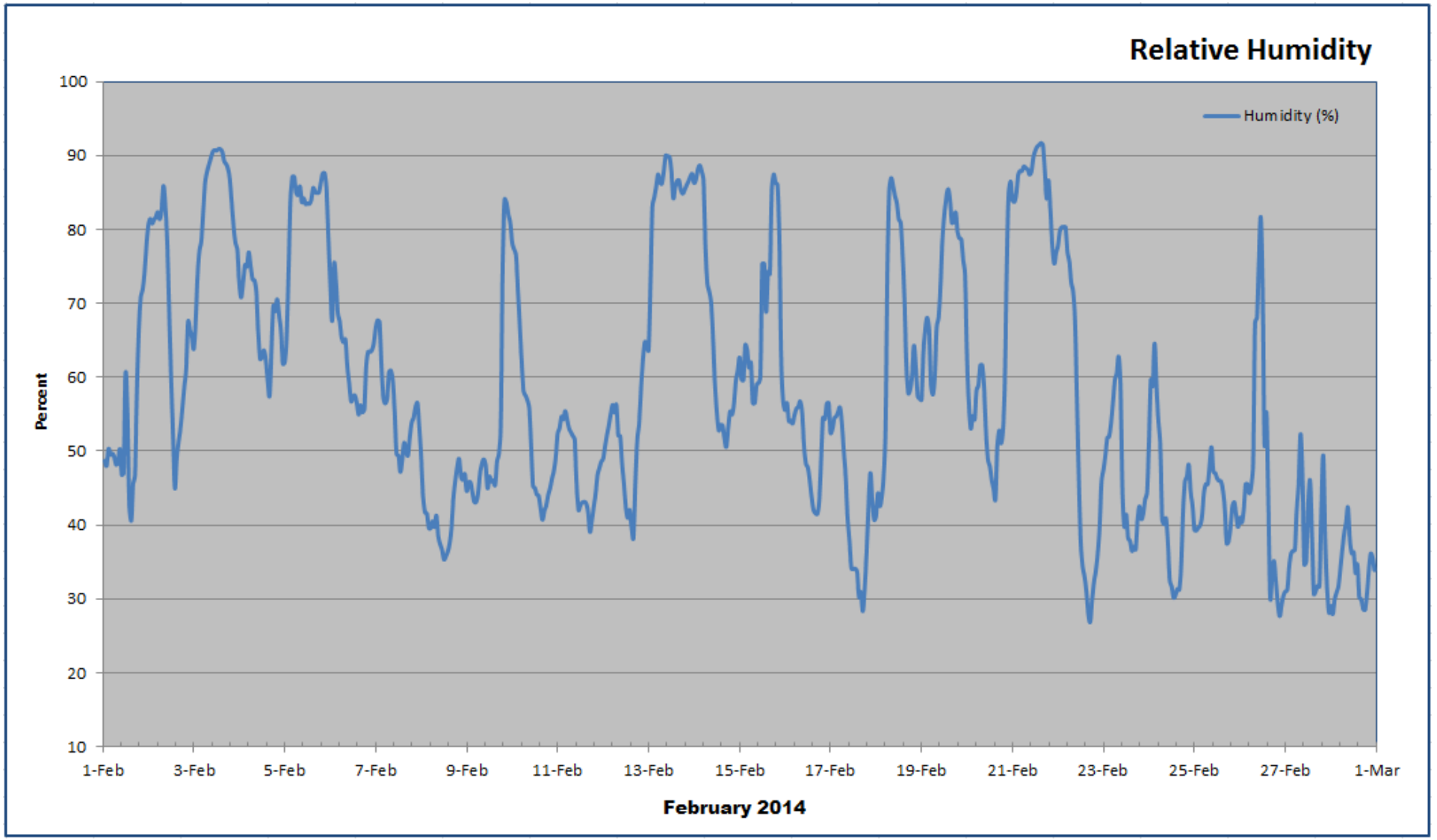
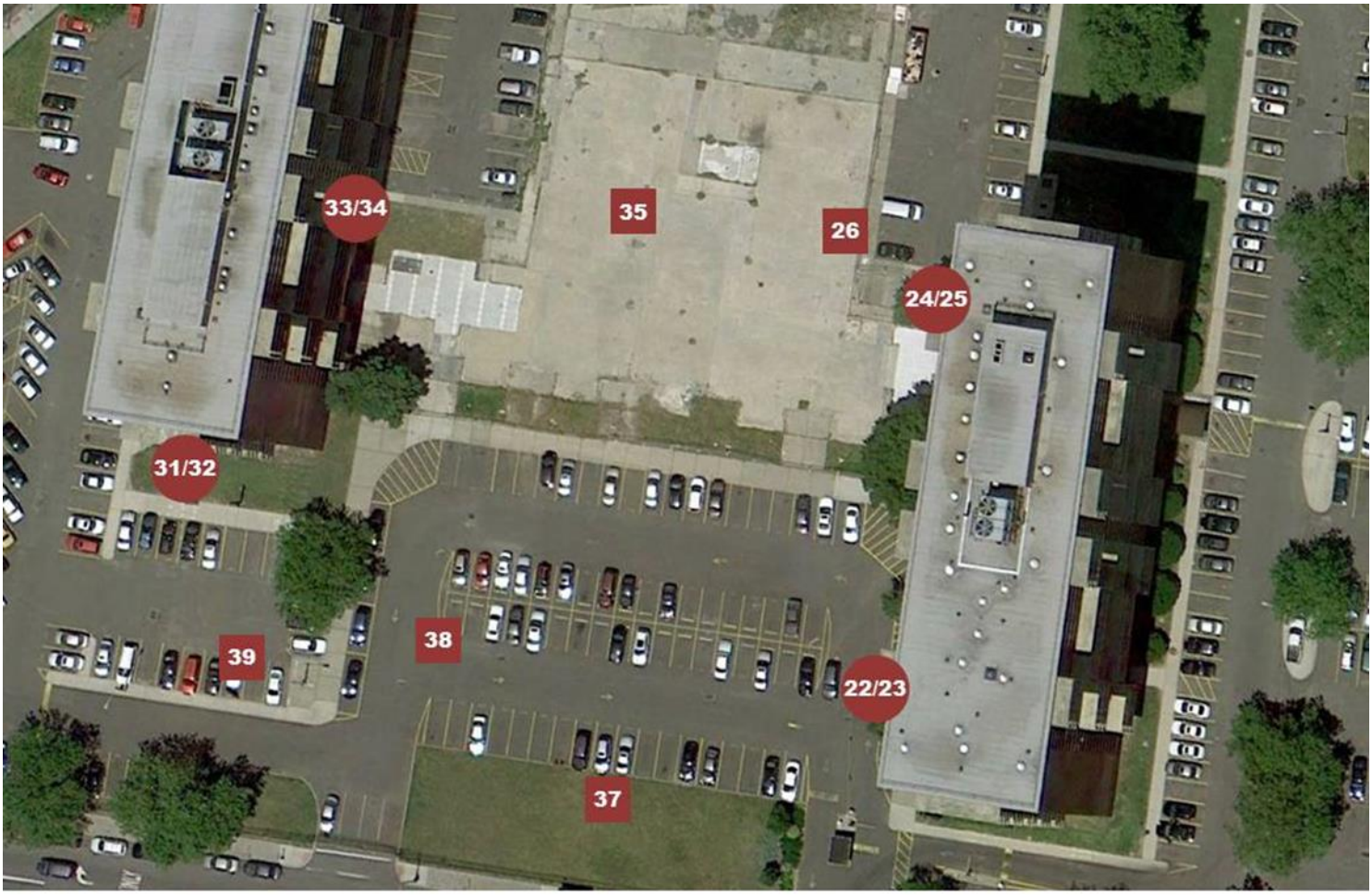


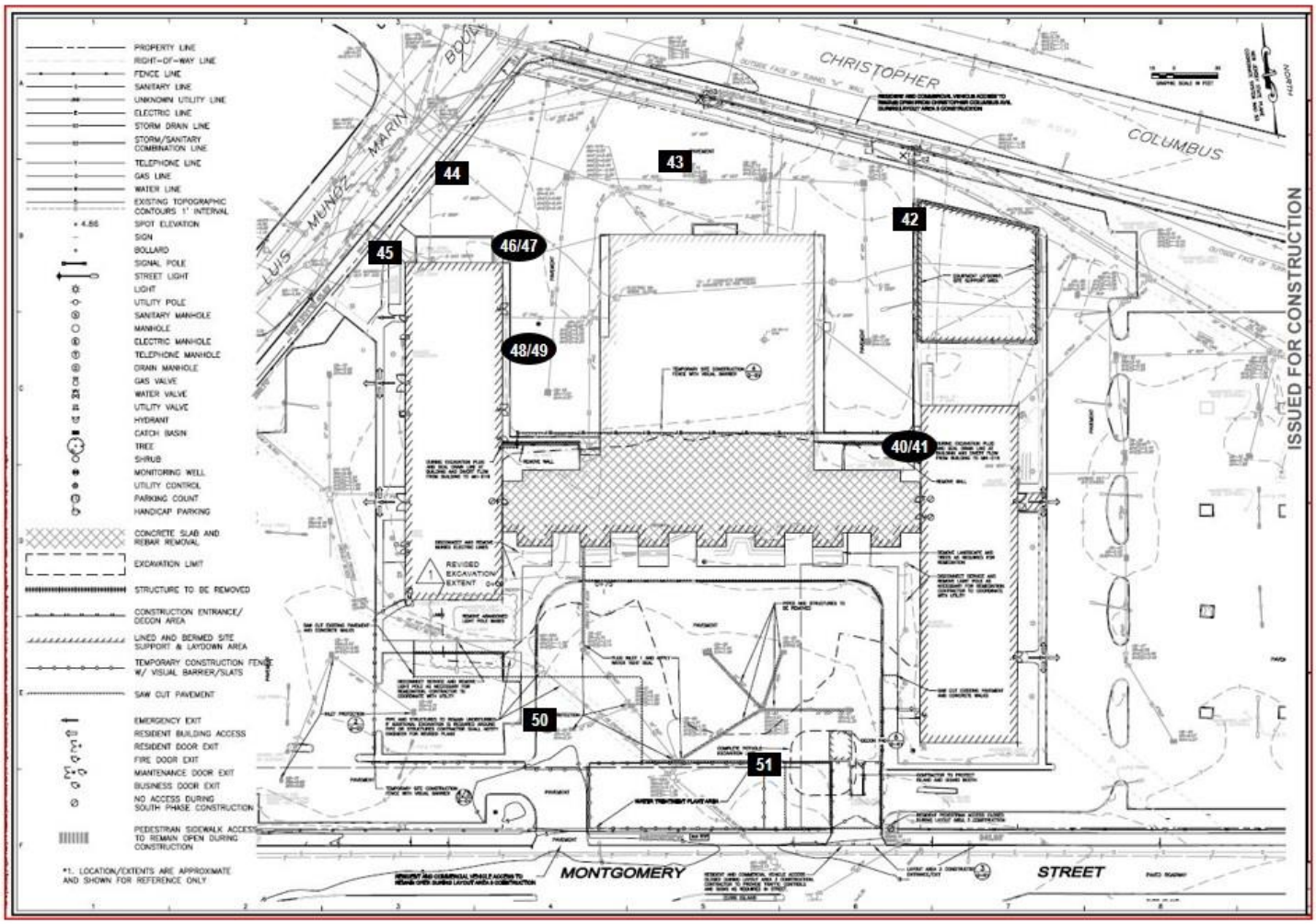
Figure A–5: Site Map Layout Area 3 (12.11.14 – 02.14.14)



22/23 Ground level & elevated station location and designation

35 Ground level station location and designation

Figure A–6: Site Map Layout Area 2 (02.15.14 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr6+ Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr6+ Sampling Results Statistics

Statistics[1]	Layout Area 3													
	M22	M23	M24	M25	M26	M30	M31	M32	M33	M34	M35	M37	M38	M39
Total Number of Samples[2]	75	61	60	61	61	13	39	38	39	66	39	39	39	35
Rate of Data Collection	100%	100%	98%	100%	100%	100%	100%	98%	100%	100%	100%	100%	100%	90%
Number of Detected Samples[3]	5	7	2	1	3	0	0	1	2	11	3	0	1	0
% of Cr6+ Samples Greater than MDL	7%	11%	3%	2%	5%	0%	0%	3%	5%	17%	8%	0%	3%	0%
Number of Samples Above AAC	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Average % Cr6 in Dust[4]	0.020%	0.021%	0.021%	0.018%	0.022%	0.019%	0.020%	0.021%	0.020%	0.029%	0.022%	0.020%	0.019%	0.020%
Maximum % Cr6 in Dust[4]	0.046%	0.116%	0.083%	0.030%	0.086%	0.022%	0.022%	0.040%	0.058%	0.282%	0.063%	0.022%	0.022%	0.021%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since November 5, 2013 for stations M22 – M26, and December 11, 2013 for M31 – M39. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since November 5, 2013 for stations M22 – M26, and December 11, 2013 for M31 – M39 reported above the laboratory reporting limit.

[3] The program to date average and maximum percent Cr6 in dust was calculated using all the integrated Total Particulate and Cr6 sample results collected since November 5, 2013 for stations M22 – M26, and since December 11th, 2013 for M31 – M39.

Stations M22 through M39 out of service after February 14th 2014.

Statistics[1]	Layout Area 2											
	M40	**M41**	**M42**	**M43**	**M44**	**M45**	**M46**	**M47**	**M48**	**M49**	**M50**	**M51**
Total Number of Samples[2]	44	29	29	29	29	29	29	29	29	29	29	29
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Number of Detected Samples[3]	0	4	0	1	0	0	1	1	0	0	0	0
% of Cr6+ Samples Greater than MDL	0%	14%	0%	3%	0%	0%	3%	3%	0%	0%	0%	0%
Number of Samples Above AAC	0	0	0	0	0	0	0	0	0	0	0	0
Average % Cr6 in Dust[4]	0.013%	0.019%	0.018%	0.015%	0.019%	0.018%	0.017%	0.018%	0.015%	0.015%	0.019%	0.019%
Maximum % Cr6 in Dust[4]	0.021%	0.050%	0.023%	0.021%	0.023%	0.023%	0.021%	0.021%	0.021%	0.021%	0.021%	0.021%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since February 15, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since February 15, 2014 reported above the laboratory reporting limit.

[3] The program to date average and maximum percent Cr6 in dust was calculated using all the integrated Total Particulate and Cr6 sample results collected since February 15, 2014.

Table B- 2: Monthly Average Integrated 8-hour Cr6+ Sampling Results

Statistics	Layout Area 3													
	M22	M23	M24	M25	M26	M30	M31	M32	M33	M34	M35	M37	M38	M39
November	3.6	6.4	7.4	6.6	6.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
December	6.4	8.3	10.3	7.4	9.3	NA	6.5	6.5	7.7	3.2	8.3	6.4	7.0	6.5
January	6.4	6.4	6.5	6.5	6.5	6.5	6.5	6.9	7.8	1.9	7.0	6.4	6.5	6.5
February	6.8	6.9	6.8	6.8	6.7	6.9	6.9	6.9	6.8	1.3	6.8	6.9	6.9	6.9
Program to Date	5.2	7.1	8.0	6.8	7.4	6.7	6.6	6.8	7.6	2.2	7.4	6.5	6.7	6.6
All readings in ng/m3 – nanograms per cubic meter														

Statistics	Layout Area 2											
	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51
February	1.7	6.8	6.7	6.8	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Program to Date	1.7	6.8	6.7	6.8	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
All readings in ng/m3 – nanograms per cubic meter												

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

Statistics	Layout Area 3													
	M22	M23	M24	M25	M26	M30	M31	M32	M33	M34	M35	M37	M38	M39
Total Number of Samples[1]	61	75	60	61	61	13	39	38	39	66	39	39	39	35
Rate of Data Collection	100%	100%	98%	100%	100%	100%	100%	98%	100%	100%	100%	100%	100%	90%
Number of Detected Samples[2]	13	5	8	8	5	1	0	1	4	14	2	2	3	2
% Detection	21%	7%	13%	13%	8%	8%	0%	3%	10%	21%	5%	5%	8%	6%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since November 5, 2013 for stations M22 – M26, and December 11, 2013 for M31 – M39. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since November 5, 2013 for stations M22 – M26, and December 11, 2013 for M31 – M39 reported above the laboratory reporting limit.

Statistics	Layout Area 2											
	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51
Total Number of Samples[1]	44	29	29	29	29	29	29	29	29	29	29	29
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Number of Detected Samples[2]	19	8	5	10	3	5	9	6	11	11	4	3
% Detection	43%	28%	17%	34%	10%	17%	31%	21%	38%	38%	14%	10%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since February 15, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since February 15, 2014 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

Statistics	Layout Area 3													
	M22	M23	M24	M25	M26	M30	M31	M32	M33	M34	M35	M37	M38	M39
November	15.7	34.3	70.5	54.9	44.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
December	26.5	41.6	39.6	40.3	33.8	NA	32.0	32.3	41.0	13.3	34.7	34.5	37.0	32.0
January	33.7	33.3	49.4	39.7	35.6	36.9	31.8	36.1	32.9	32.9	33.3	31.5	40.2	34.7
February	61.4	43.8	42.1	43.0	40.8	39.8	33.4	33.3	33.3	43.8	33.3	39.8	33.3	41.3
Program to Date	27.5	37.1	51.0	44.1	37.7	38.2	32.1	34.4	37.3	22.7	33.8	33.8	38.1	34.8
All readings in µg/m3 – micrograms per cubic meter														

Statistics	Layout Area 2											
	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51
February	17.3	41.0	32.8	53.4	38.0	54.4	53.7	45.8	44.1	43.1	33.0	37.2
Program to Date	17.3	41.0	32.8	53.4	38.0	54.4	53.7	45.8	44.1	43.1	33.0	37.2
All readings in µg/m3 – micrograms per cubic meter												

Table B- 5: Monthly Average Real-Time PM_{10} Monitoring Results

Statistics	Layout Area 3													
	M22	M23	M24	M25	M26	M30	M31	M32	M33	M34	M35	M37	M38	M39
November	10.5	13.7	10.7	11.5	19.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
December	20.3	25.5	21.7	21.8	19.8	NA	34.1	10.0	32.5	29.2	18.7	16.7	22.7	4.4
January	13.6	20.7	15.1	14.1	15.2	9.0	36.2	11.7	33.8	31.6	17.9	19.7	40.0	6.6
February	12.9	20.7	13.3	14.7	10.3	11.9	34.3	11.0	30.2	33.4	15.0	14.4	48.6	3.6
Program to Date	14.2	20.3	15.8	16.1	17.2	6.7	34.8	11.0	33.2	31.4	17.9	15.5	31.3	2.7
All readings in µg/m3 – micrograms per cubic meter														

Statistics	Layout Area 2											
	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51
February	15.2	20.0	27.5	27.1	45.4	20.3	17.0	43.8	20.2	26.5	47.8	26.4
Program to Date	15.2	20.0	27.5	27.1	45.4	20.3	17.0	43.8	20.2	26.5	47.8	26.4
All readings in µg/m3 – micrograms per cubic meter												

March 2014
Air Quality Report
Metropolis Towers

Attached is a technical summary of air quality data for March 2014 at the Metropolis Towers cleanup site submitted by PPG Industries air monitoring consultant.

This report provides air monitoring information about conditions at the work areas associated with Layout Area 2 and Layout Area 3.

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

EMILCOTT

Submitted to:
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4325 Rosanna Drive
Allison Park, PA

Submitted by:
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Morristown, NJ 07960

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: March 2014

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: March 2014

Prepared By: David Tomsey

Reviewed By: Bruce Groves
May 13, 2014

Contents

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr6+ – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr6+) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour real-time dust measurements, Cr6+, and total particulate sampling with lab analysis was also conducted at one elevated station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr6+ sampling and analysis indicate that program-to-date average airborne Cr6+ concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr6+ in dust generated at the Site do not represent an emission source of Cr6+ sufficient to create potential offsite exposure to Cr6+ at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Layout Area 2 and Layout Area 3 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 5-minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between July 17, 2012 and August 2, 2012.

Remedial activities began in the northern portion of Layout Area 3 (LA3) on October 2, 2013. As remediation progressed, the eastern portion of LA3 was incorporated starting November 5, 2013 with additional monitoring stations to cover additional remedial areas. On December 11, 2013 additional stations were added to cover the entirety of LA3 through February 14, 2014. As remediation of contaminated soils was complete in LA3, a transition was made to Layout Area 2 (LA2). Stations were set up to incorporate both LA3, requiring paving, sidewalks, and landscaping, and LA2, requiring remediation of contaminated soils. This transition had a start date of February 15, 2014 and continues through the end of the reporting period.

Twelve air monitoring stations provided protection during intrusive work between February 15, 2014 and March 31, 2014. LA2 contains nine ground level stations and three elevated stations. One elevated station measures 24-hour real-time concentrations and collects Cr^{+6} and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for Layout Area 2 and 3 through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr^{+6} concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr6+ fenceline air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;

- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory analysis; and
- Real-time 5-minute average PM_{10}, readings measured at the work area perimeter.

The following sections outlines the types of data collected, frequency of collection, and the corresponding locations.

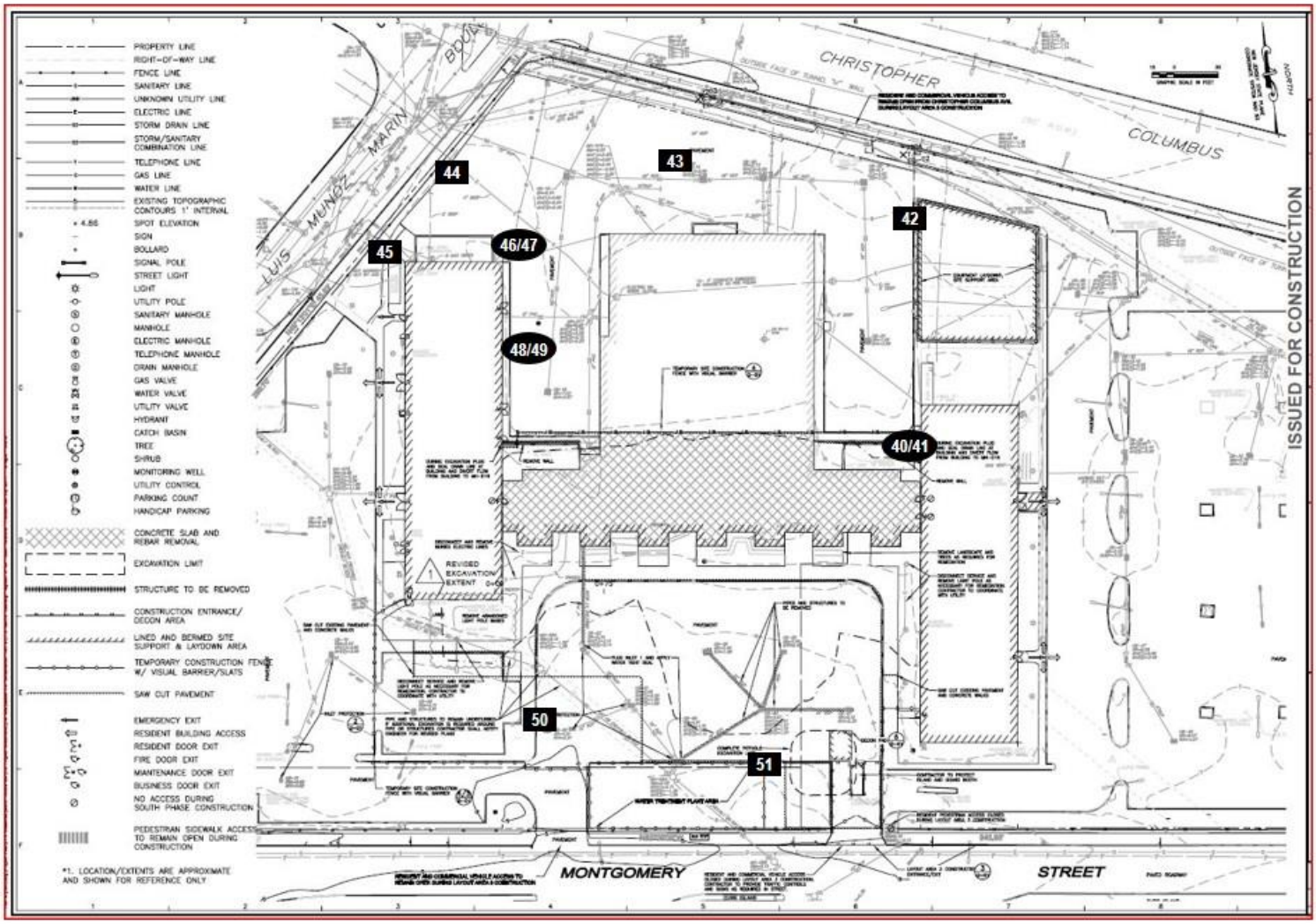
Table 2-1: Air Monitoring Approach

Layout Area	Station	Integrated Air Monitoring	Real-Time Air Monitoring
Layout Area 2	**M40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51**	Integrated 8-hour Cr+6 and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr6+ sampling and analysis at one station 7 days per week.	5-minute average PM_{10} readings measured during a typical work day.

2.1 Integrated Air Sampling

Integrated Cr6+ and total particulate samples are collected at each of the AMS for an 8-hour to 10-hour duration each working day (Typically Monday – Friday) at each station. Samples are collected on a preweighed polyvinyl chloride 37mm filter cassette for both Cr6+ and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

Figure 2-1: LA2 and LA3 Site Overview



2.1.1 Integrated Cr6+ Sampling

The exposed Cr6+ filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr6+ analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated Cr6+ air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr6+ sampling and analysis are also performed at one AMS per work area. These longer duration samples show Cr6+ concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour to 10-hour integrated total particulate air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: work area monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Work Area

Work area air monitoring consists of ground level and elevated stations at the perimeter of the work area. Work area monitoring includes the following:

- Real-time 5-minute average PM_{10} readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday, with one elevated station running 24-hours a day, seven days a week.

2.2.2 Meteorological Measurements

Meteorological measurements of 5-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at elevated station 40.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr6+ and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr6+ and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr6+ concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr6+ Acceptable Air Concentration

A Site-specific Cr6+ AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr6+ in dust. The AAC for Cr6+ was developed to represent the maximum allowable average concentration of Cr6+ in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr6+ emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the work area perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC also provides a value to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices during the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr6+ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include:

program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr6+ concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr6+ Metrics

Metric Observation	Response Action
30-day[1] Cr6+ average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60-day[1] Cr6+ average concentration greater than or equal to 40 ng/m3	
90-day[1] Cr6+ average concentration greater than or equal to 35 ng/m3	
[1] Refers to days on which samples were collected, not necessarily calendar days	

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

Parameter	Alert Level (1 min TWA)	Action Level (5 min TWA)
PM_{10}	339 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between November 5, 2013 and March 31, 2014 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels; and
- Meteorological results.

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr6+ and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr6+ Sampling Results

Results of the Cr6+ sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr6+ concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr6+ concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr6+ results are shown in Table B-1 and include various program-to-date metrics relative to Cr6+ analytical data. Monthly average 8-hour Cr6+ concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr6+ Metrics

Running Cr6+ Metrics[1]		Layout Area 2 & 3											
	Metric (ng/m^3)	**M40 ng/m^3**	**M41 ng/m^3**	**M42 ng/m^3**	**M43 ng/m^3**	**M44 ng/m^3**	**M45 ng/m^3**	**M46 ng/m^3**	**M47 ng/m^3**	**M48 ng/m^3**	**M49 ng/m^3**	**M50 ng/m^3**	**M51 ng/m^3**
30-day[2]	**45**	1.9	9.7	6.4	6.7	6.4	6.4	6.7	6.7	6.3	6.3	6.2	6.2
60-day[2]	**40**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
90-day[2]	**35**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PTD[3]		1.8	8.8	6.5	6.7	6.5	6.5	6.7	6.7	6.4	6.4	6.3	6.4

ng/m^3 – nanograms per cubic meter

1. Running Cr6+ metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr6+ are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr6+ metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long term (program) ending success.
2. Running Cr6+ metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60 and 90-day metrics were not available due to the short duration of sampling during this phase of the project metrics were not available.
3. Program-to-date - Air monitoring conducted from February 15, 2014 through the end of the reporting period.

Stations M40 through M51 started on February 17th and do not have 60 or 90 days of data available.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 45 sample days between February 15th and the end of the reporting period for stations M40 through M51. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr6+ average concentrations, based upon lab analytical results at each AMS, were less than 1.9% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real-time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 5-minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real-time 5-minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3.

Program-to-date

Real-time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

- Excavate and load out chromium impacted soils;
- Backfill excavation;

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the March 2014 reporting period for the Metropolis Towers Site air sampling and monitoring program indicate that the average Cr6+ concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3. The Cr6+ concentrations and the percent Cr6+ in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr6+ in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr6+ and do not represent an emission source of Cr6+ sufficient to create potential offsite exposure to Cr6+ at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr6+ Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr6+ Sampling Results

Date	40	41	42	43	44	45	46	47	48	49	50	51
03/01/14	0.8											
03/02/14	0.8											
03/03/14	2.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
03/04/14	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
03/05/14	2.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
03/06/14	2.4	23.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
03/07/14	0.8	31.0	6.5	6.5	6.5	7.0	6.5	6.5	6.5	6.5	6.0	6.0
03/08/14	0.8											
03/09/14	0.8											
03/10/14	2.4	5.5	5.5	12.0	5.5	5.5	13.0	12.0	5.5	5.5	5.5	5.5
03/11/14	2.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	5.5	5.5
03/12/14	2.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
03/13/14	2.4	16.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
03/14/14	0.8	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	5.5	5.5
03/15/14	0.8											
03/16/14	0.8											
03/17/14	2.4	27.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
03/18/14	4.9	5.0	6.5	6.5	6.5	6.5	6.5	6.5	4.9	4.9	5.0	5.0
03/19/14	2.3	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
03/20/14	2.3	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
03/21/14	0.8	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.5	7.0	7.0
03/22/14	0.8											
03/23/14	0.8											
03/24/14	2.4	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
03/25/14	2.4	6.0	6.5	6.0	6.5	6.0	6.0	6.5	6.5	6.0	6.0	6.0
03/26/14	2.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
03/27/14	2.4	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
03/28/14	0.8	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
03/29/14	0.8											
03/30/14	0.8											
03/31/14	2.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr6+. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

Date	40	41	42	43	44	45	46	47	48	49	50	51
03/01/14	12.0											
03/02/14	12.0											
03/03/14	31.0	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5
03/04/14	31.5	100.0	99.0	110.0	80.0	31.5	80.0	81.0	31.5	78.0	67.0	65.0
03/05/14	11.5	140.0	99.0	110.0	32.0	68.0	67.0	67.0	96.0	84.0	70.0	32.5
03/06/14	48.0	110.0	82.0	99.0	31.5	31.5	31.5	32.0	32.0	31.5	31.5	31.5
03/07/14	3.9	140.0	33.0	110.0	33.5	33.5	33.5	33.5	33.0	33.0	30.0	30.0
03/08/14	3.9											
03/09/14	3.9											
03/10/14	24.0	28.0	27.0	200.0	27.0	27.0	91.0	61.0	27.0	27.0	27.0	27.0
03/11/14	64.0	29.0	28.5	84.0	28.5	28.5	94.0	77.0	200.0	69.0	26.0	26.0
03/12/14	11.5	93.0	76.0	77.0	99.0	90.0	66.0	32.5	70.0	32.5	32.0	32.5
03/13/14	11.5	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
03/14/14	26.0	30.5	30.0	30.0	30.0	30.0	30.5	30.0	30.0	30.0	27.5	27.5
03/15/14	26.0											
03/16/14	26.0											
03/17/14	26.0	89.0	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.5	35.0	35.0
03/18/14	24.5	24.5	31.5	31.5	31.5	31.5	31.5	31.5	69.0	72.0	24.5	25.0
03/19/14	26.0	30.5	30.5	130.0	30.5	30.5	30.5	30.5	88.0	93.0	87.0	30.5
03/20/14	11.5	30.5	31.0	30.5	30.5	31.0	30.5	31.0	290.0	31.0	30.5	30.5
03/21/14	3.9	33.5	33.5	33.5	33.5	33.5	33.5	33.5	84.0	100.0	33.5	33.5
03/22/14	3.9											
03/23/14	3.9											
03/24/14	11.5	31.0	30.5	31.0	30.5	30.5	31.0	30.5	31.0	100.0	30.5	31.0
03/25/14	27.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
03/26/14	29.0	110.0	200.0	100.0	31.5	270.0	74.0	31.5	320.0	740.0	67.0	70.0
03/27/14	30.0	30.5	30.5	30.5	30.5	30.5	30.5	31.0	100.0	180.0	30.5	30.5
03/28/14	11.0	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	34.0
03/29/14	11.0											
03/30/14	11.0											
03/31/14	11.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Figure A- 1: Real-Time 5-minute average PM_{10} Monitoring Results

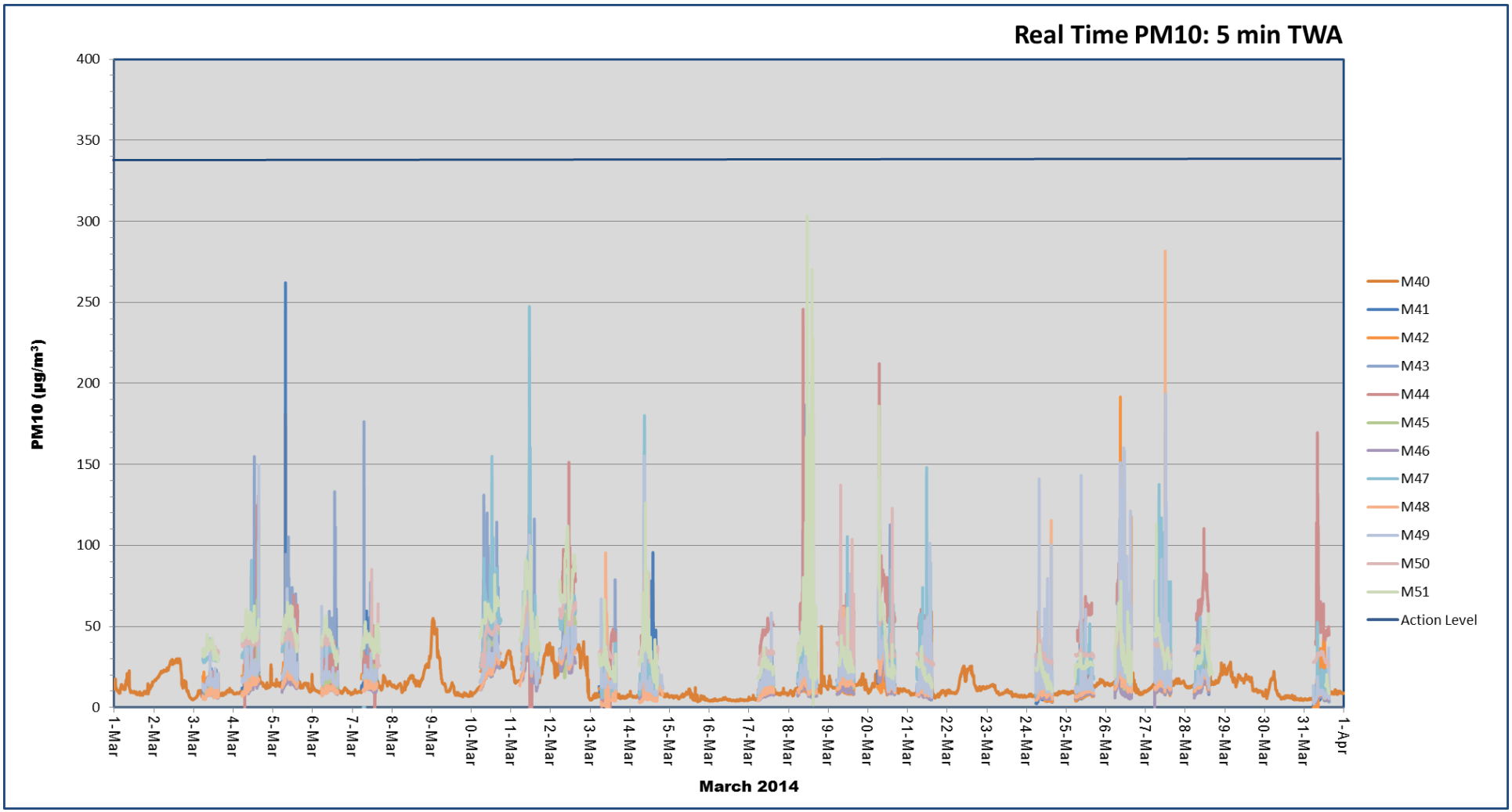


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
NA						

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter ($\mu g/m^3$)

ng/m^3 – nanograms per cubic meter

$\mu g/m^3$ – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

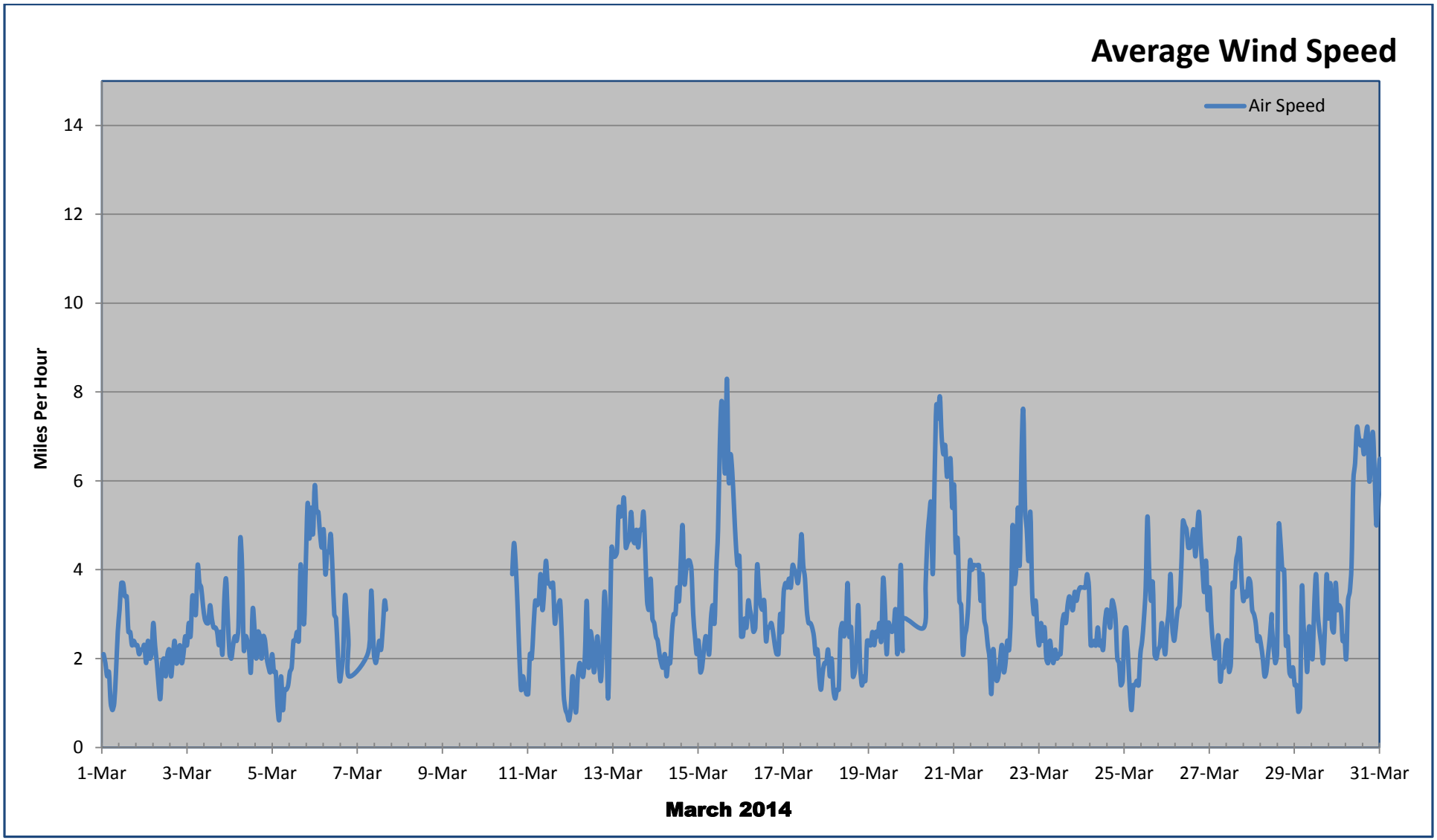


Figure A-3: Temperature

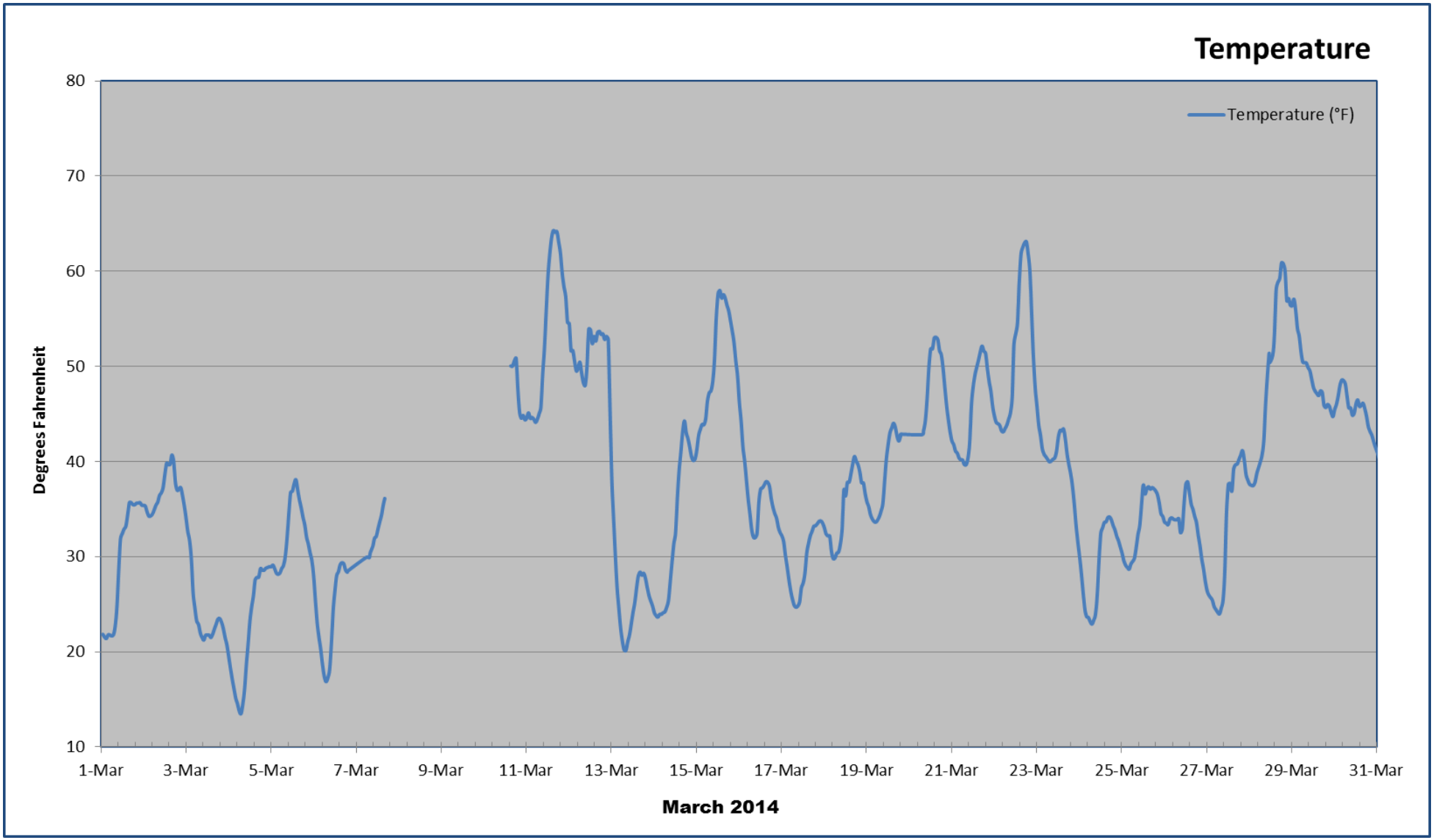


Figure A-4: Relative Humidity

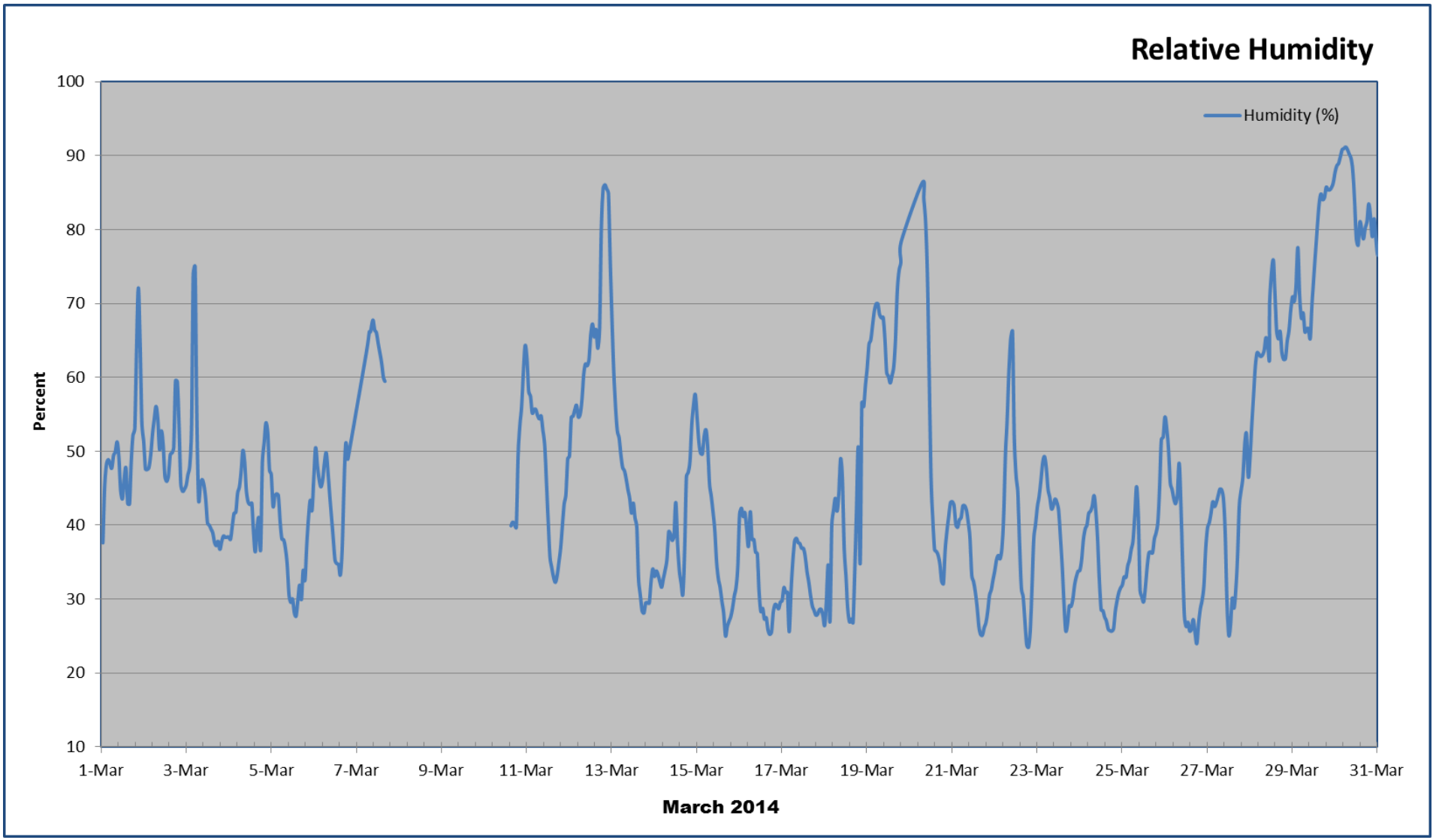
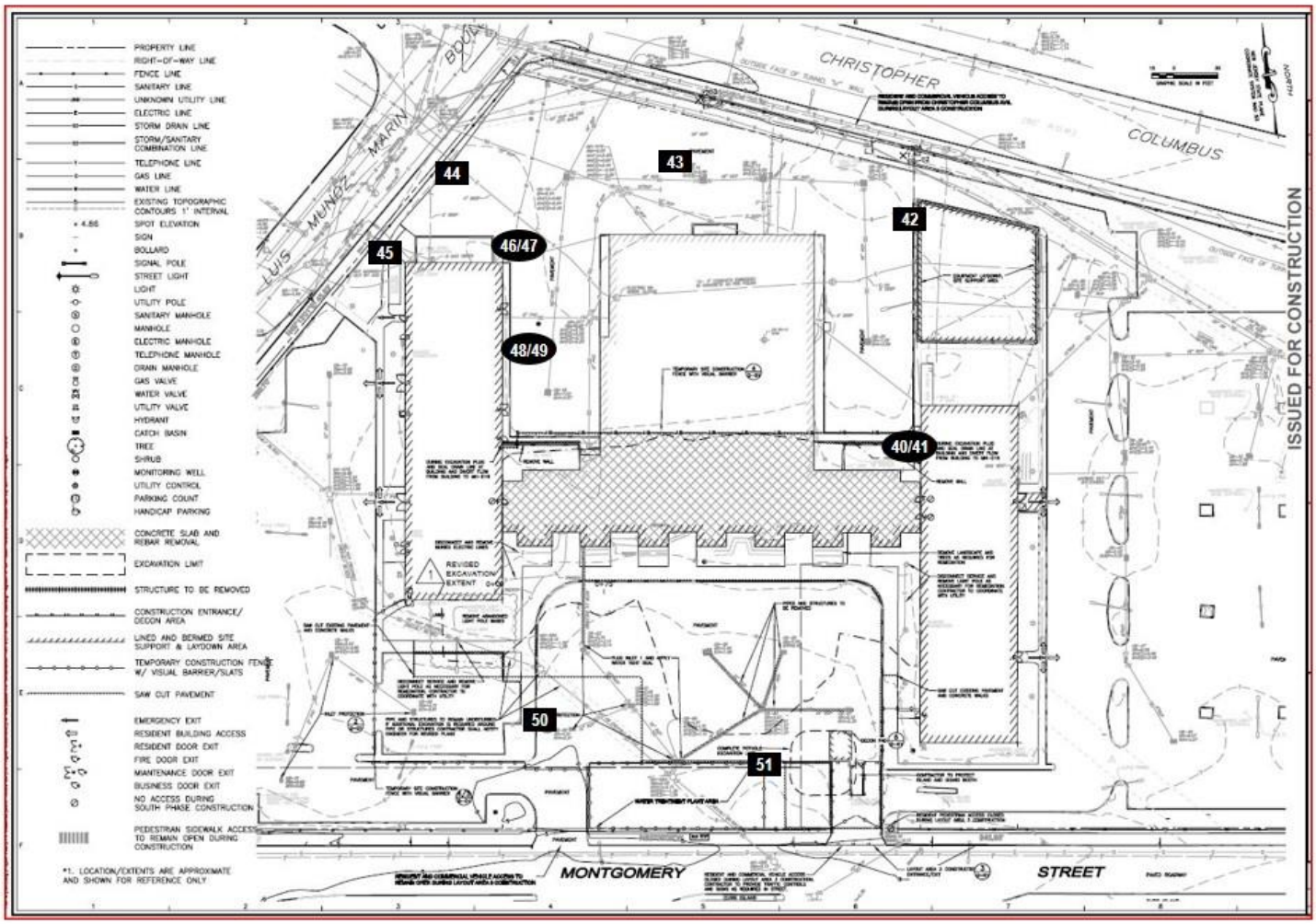


Figure A–5: Site Map Layout Area 2 & 3 (02.15.14 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr6+ Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr6+ Sampling Results Statistics

Statistics[1]	Layout Area 2 & 3											
	M40	**M41**	**M42**	**M43**	**M44**	**M45**	**M46**	**M47**	**M48**	**M49**	**M50**	**M51**
Total Number of Samples[2]	45	29	29	29	29	29	29	29	29	29	29	29
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Number of Detected Samples[3]	0	4	0	1	0	0	1	1	0	0	0	0
% of Cr6+ Samples Greater than MDL	0%	14%	0%	3%	0%	0%	3%	3%	0%	0%	0%	0%
Number of Samples Above AAC	0	0	0	0	0	0	0	0	0	0	0	0
Average % Cr6 in Dust[4]	0.013%	0.019%	0.018%	0.015%	0.019%	0.018%	0.017%	0.018%	0.015%	0.015%	0.019%	0.019%
Maximum % Cr6 in Dust[4]	0.021%	0.050%	0.023%	0.021%	0.023%	0.023%	0.021%	0.021%	0.021%	0.021%	0.021%	0.021%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since February 15, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since February 15, 2014 reported above the laboratory reporting limit.

[3] The program to date average and maximum percent Cr6 in dust was calculated using all the integrated Total Particulate and Cr6 sample results collected since February 15, 2014.

Table B- 2: Monthly Average Integrated 8-hour Cr6+ Sampling Results

Statistics	Layout Area 2 & 3											
	M40	**M41**	**M42**	**M43**	**M44**	**M45**	**M46**	**M47**	**M48**	**M49**	**M50**	**M51**
February	1.7	6.8	6.7	6.8	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
March	1.9	9.7	6.4	6.7	6.4	6.4	6.7	6.7	6.3	6.3	6.2	6.4
Program to Date	1.8	8.8	6.5	6.7	6.5	6.5	6.7	6.7	6.4	6.4	6.3	6.4
All readings in ng/m3 – nanograms per cubic meter												

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

Statistics	Layout Area 2 & 3											
	M40	**M41**	**M42**	**M43**	**M44**	**M45**	**M46**	**M47**	**M48**	**M49**	**M50**	**M51**
Total Number of Samples[1]	45	29	29	29	29	29	29	29	29	29	29	29
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Number of Detected Samples[2]	19	8	5	10	3	5	9	6	11	11	4	3
% Detection	43%	28%	17%	34%	10%	17%	31%	21%	38%	38%	14%	10%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since February 15, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since February 15, 2014 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

Statistics	Layout Area 2 & 3											
	M40	**M41**	**M42**	**M43**	**M44**	**M45**	**M46**	**M47**	**M48**	**M49**	**M50**	**M51**
February	17.3	41.0	32.8	53.4	38.0	54.4	53.7	45.8	44.1	43.1	33.0	37.2
March	19.0	57.7	50.4	66.8	37.0	47.3	45.3	39.5	80.8	90.3	38.7	34.2
Program to Date	18.4	52.7	45.1	62.8	37.3	49.5	47.8	41.4	69.8	76.2	37.0	35.1
All readings in µg/m3 – micrograms per cubic meter												

Table B- 5: Monthly Average Real-Time PM_{10} Monitoring Results

Statistics	Layout Area 2 & 3											
	M40	**M41**	**M42**	**M43**	**M44**	**M45**	**M46**	**M47**	**M48**	**M49**	**M50**	**M51**
February	15.2	20.0	27.5	27.1	45.4	20.3	17.0	43.8	20.2	26.5	47.8	26.4
March	13.6	18.5	18.4	21.7	26.4	19.6	12.8	35.4	15.9	23.4	39.9	40.9
Program to Date	14.0	18.9	21.0	23.2	22.9	19.8	14.0	41.2	17.2	24.3	42.1	35.6
All readings in µg/m3 – micrograms per cubic meter												

April 2014
Air Quality Report
Metropolis Towers

Attached is a technical summary of air quality data for April 2014 at the Metropolis Towers cleanup site submitted by PPG Industries air monitoring consultant.

This report provides air monitoring information about conditions at the work areas associated with Layout Area 2 and Layout Area 3.

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

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Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: April 2014

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: April 2014

Prepared By: David Tomsey

Reviewed By: Bruce Groves
May 13, 2014

Contents

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr^{+6} – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr^{+6}) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour real-time dust measurements, Cr^{+6}, and total particulate sampling with lab analysis was also conducted at one elevated station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr^{+6} sampling and analysis indicate that program-to-date average airborne Cr^{+6} concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr^{+6} in dust generated at the Site do not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Layout Area 2 and Layout Area 3 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 5-minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between July 17, 2012 and August 2, 2012.

Remedial activities began in the northern portion of Layout Area 3 (LA3) on October 2, 2013. As remediation progressed, the eastern portion of LA3 was incorporated starting November 5, 2013 with additional monitoring stations to cover additional remedial areas. On December 11, 2013 additional stations were added to cover the entirety of LA3 through February 14, 2014. As remediation of contaminated soils was completed in LA3, a transition was made to Layout Area 2 (LA2). Stations were set up to incorporate both LA3, requiring paving, sidewalks, and landscaping, and LA2, requiring remediation of contaminated soils. This transition had a start date of February 15, 2014 and continues through the end of the reporting period.

Twelve air monitoring stations provided protection during intrusive work between February 15, 2014 and April 30, 2014. LA2 contains nine ground level stations and three elevated stations. One elevated station measures 24-hour real-time concentrations and collects Cr^{+6} and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for Layout Area 2 and 3 through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average $Cr+^{6}$ concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr^{+6} fenceline air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;

- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory analysis; and
- Real-time 5-minute average PM_{10}, readings measured at the work area perimeter.

The following sections outline the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

Layout Area	Station	Integrated Air Monitoring	Real-Time Air Monitoring
Layout Area 2	**M40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51**	Integrated 8-hour Cr^{+6} and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr^{+6} sampling and analysis at one station 7 days per week.	5-minute average PM_{10} readings measured during a typical work day.

2.1 Integrated Air Sampling

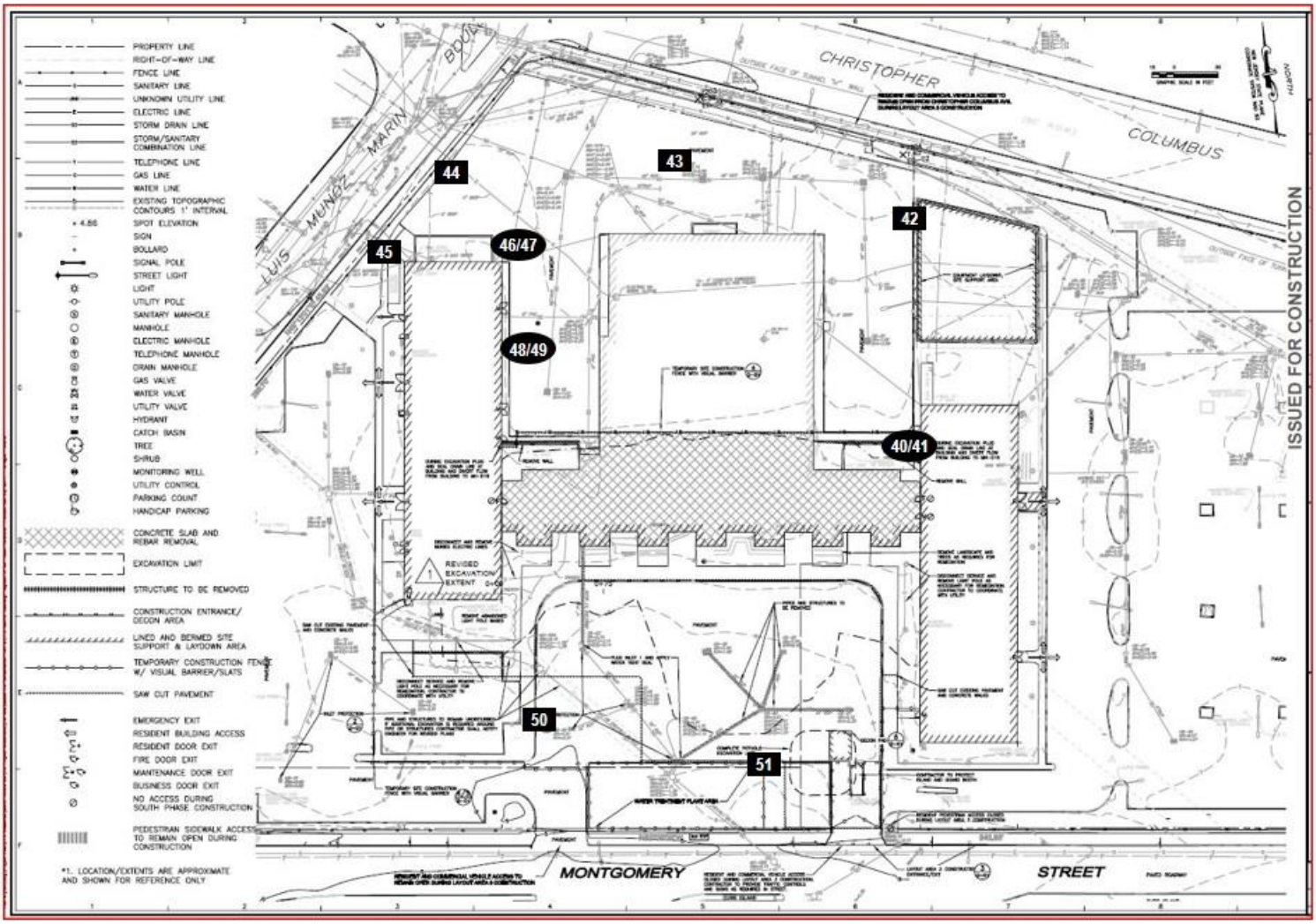
Integrated Cr^{+6} and total particulate samples are collected at each of the AMS for an 8-hour-to-10-hour duration each working day (typically Monday – Friday) at each station. Samples are collected on a preweighed polyvinyl chloride 37mm filter cassette for both Cr^{+6} and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

2.1.1 Integrated Cr^{+6} Sampling

The exposed Cr^{+6} filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr^{+6} analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated Cr^{+6} air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr^{+6} sampling and analysis are also performed at one AMS per work area. These longer duration samples show Cr^{+6} concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

Figure 2-1: LA2 and LA3 Site Overview



2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH Method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated total particulate air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: work area monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Work Area

Work area air monitoring consists of ground level and elevated stations at the perimeter of the work area. Work area monitoring includes the following:

- Real-time 5-minute average PM_{10} readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday, with one elevated station running 24-hours a day, seven days a week.

2.2.2 Meteorological Measurements

Meteorological measurements of 5-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at elevated station 40.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr^{+6} and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr^{+6} and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr^{+6} concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr^{+6} Acceptable Air Concentration

A Site-specific Cr^{+6} AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr^{+6} in dust. The AAC for Cr^{+6} was developed to represent the maximum allowable average concentration of Cr^{+6} in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr^{+6} emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the work area perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC is also used to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices throughout the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include:

program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr^{+6} concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr^{+6} Metrics

Metric Observation	Response Action
30-day[1] Cr^{+6} average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60-day[1] Cr^{+6} average concentration greater than or equal to 40 ng/m3	
90-day[1] Cr^{+6} average concentration greater than or equal to 35 ng/m3	
[1] Refers to days on which samples were collected, not necessarily calendar days	

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

Parameter	Alert Level (1 min TWA)	Action Level (5 min TWA)
PM_{10}	339 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between November 5, 2013 and April 30, 2014 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels; and
- Meteorological results.

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr^{+6} and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr^{+6} Sampling Results

Results of the Cr^{+6} sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr^{+6} concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr^{+6} concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr^{+6} results are shown in Table B-1 and include various program-to-date metrics relative to Cr^{+6} analytical data. Monthly average 8-hour Cr^{+6} concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr^{+6} Metrics

Running Cr^{+6} Metrics[1]		Layout Area 2 & 3											
	Metric (ng/m^3)	**M40 ng/m^3**	**M41 ng/m^3**	**M42 ng/m^3**	**M43 ng/m^3**	**M44 ng/m^3**	**M45 ng/m^3**	**M46 ng/m^3**	**M47 ng/m^3**	**M48 ng/m^3**	**M49 ng/m^3**	**M50 ng/m^3**	**M51 ng/m^3**
30-day[2]	**45**	1.8	8.4	7.9	8.6	8.0	7.0	8.3	7.2	6.9	8.0	6.6	6.6
60-day[2]	**40**	1.8	9.0	7.2	7.7	7.2	6.7	7.6	7.0	6.6	7.1	6.4	6.4
90-day[2]	**35**												
PTD[3]		1.8	8.6	7.1	7.5	7.1	6.7	7.4	6.9	6.7	7.1	6.5	6.5

ng/m^3 – nanograms per cubic meter

1. Running Cr^{+6} metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr^{+6} metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long term (program) ending success.
2. Running Cr^{+6} metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60 and 90-day metrics were not available due to the short duration of sampling during this phase of the project metrics were not available.
3. Program-to-date - Air monitoring conducted from February 15, 2014 through the end of the reporting period.

Stations M40 through M51 started on February 17th and do not have 90 days of data available.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 45 sample days between February 15th and the end of the reporting period for stations M40 through M51. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr^{+6} average concentrations, based upon lab analytical results at each AMS, were less than 1.8% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real-time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 5-minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real-time 5-minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3. On April 7, 2014, the plume from a forest fire located in Wharton State Forest, Burlington County, New Jersey which burned two square miles of forest was blown towards Jersey City and the surrounding areas carrying odors and smoke over 40 miles from a southern wind. Elevated readings were reported at each monitoring station at the Metropolis Towers Site. Readings were elevated overnight at the 24-hour real-time station and first thing in the morning when air monitoring commenced. The effects of the smoke lasted until 1000.

Program-to-date

Real-time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

Remedial activities conducted during the reporting period

- Excavate and load out chromium impacted soils;
- Backfill excavation.

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the April 2014 reporting period for the Metropolis Towers Site air sampling and monitoring program indicate that the average Cr^{+6} concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3. The Cr^{+6} concentrations and the percent Cr^{+6} in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr^{+6} in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr^{+6} and does not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr^{+6} Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr^{+6} Sampling Results

Date	40	41	42	43	44	45	46	47	48	49	50	51
04/01/14	2.4	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
04/02/14	2.4	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
04/03/14	2.4	6.5	6.5	6.5	6.5	6.5	6.5	13.0	6.5	6.5	6.5	6.5
04/04/14	0.8	25.0	20.0	7.5	7.5	7.5	18.0	7.5	7.5	7.5	7.5	7.5
04/05/14	0.8											
04/06/14	0.8											
04/07/14	2.4	13.0	6.5	29.0	38.0	6.5	24.0	6.5	6.5	36.0	6.5	6.5
04/08/14	6.1	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.0	6.0
04/09/14	2.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
04/10/14	2.4	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
04/11/14	0.8	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
04/12/14	0.8											
04/13/14	0.8											
04/14/14	2.3	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
04/15/14	2.3	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
04/16/14	2.3	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
04/17/14	2.3	7.0	7.0	7.0	7.0	15.0	7.0	7.0	7.0	7.0	7.0	7.0
04/18/14	0.8	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
04/19/14	0.8											
04/20/14	0.8											
04/21/14	0.8	22.0	7.0	22.0	7.0	7.0	17.0	14.0	14.0	7.0	7.0	7.0
04/22/14	2.3	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
04/23/14	2.3	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
04/24/14	2.4	6.5	6.5	13.0	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
04/25/14	0.8	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
04/26/14	0.8											
04/27/14	0.8											
04/28/14	2.3	6.0	22.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
04/29/14	2.3	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
04/30/14	2.3	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr^{+6}. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

Date	40	41	42	43	44	45	46	47	48	49	50	51
04/01/14	11.5	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
04/02/14	11.5	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
04/03/14	11.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	96.0	31.5	31.5
04/04/14	3.9	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5
04/05/14	3.9											
04/06/14	3.9											
04/07/14	11.5	32.0	32.0	32.0	79.0	32.0	32.0	32.0	32.0	32.0	77.0	31.5
04/08/14	11.5	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	31.0	31.0
04/09/14	11.5	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
04/10/14	11.5	33.0	33.0	77.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
04/11/14	3.9	35.5	35.5	20.0	35.5	35.5	35.5	35.5	35.5	97.0	35.5	35.5
04/12/14	3.9											
04/13/14	3.9											
04/14/14	25.0	33.0	32.5	32.5	32.5	33.0	32.5	33.0	32.5	33.0	32.5	33.0
04/15/14	48.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
04/16/14	11.5	34.0	34.5	34.0	34.5	34.0	34.0	34.0	34.5	34.0	34.5	34.5
04/17/14	11.5	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0
04/18/14	3.9	34.0	34.0	71.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
04/19/14	3.9											
04/20/14	3.9											
04/21/14	11.0	34.5	35.0	14.0	35.0	35.0	35.0	35.0	35.0	35.5	35.0	35.0
04/22/14	29.0	34.0	34.0	15.0	70.0	34.0	34.0	34.0	34.0	71.0	34.0	34.0
04/23/14	11.5	33.0	10.0	17.0	33.0	33.0	33.0	33.0	68.0	11.0	33.0	33.0
04/24/14	11.5	31.5	75.0	65.0	31.5	31.5	31.5	31.5	100.0	300.0	79.0	71.0
04/25/14	3.9	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5
04/26/14	3.9											
04/27/14	3.9											
04/28/14	11.5	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	85.0	31.0	31.0
04/29/14	32.0	31.6	31.5	22.0	10.0	31.5	76.0	16.0	99.0	15.0	31.5	31.5
04/30/14	11.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Figure A- 1: Real-Time 5-minute average PM_{10} Monitoring Results

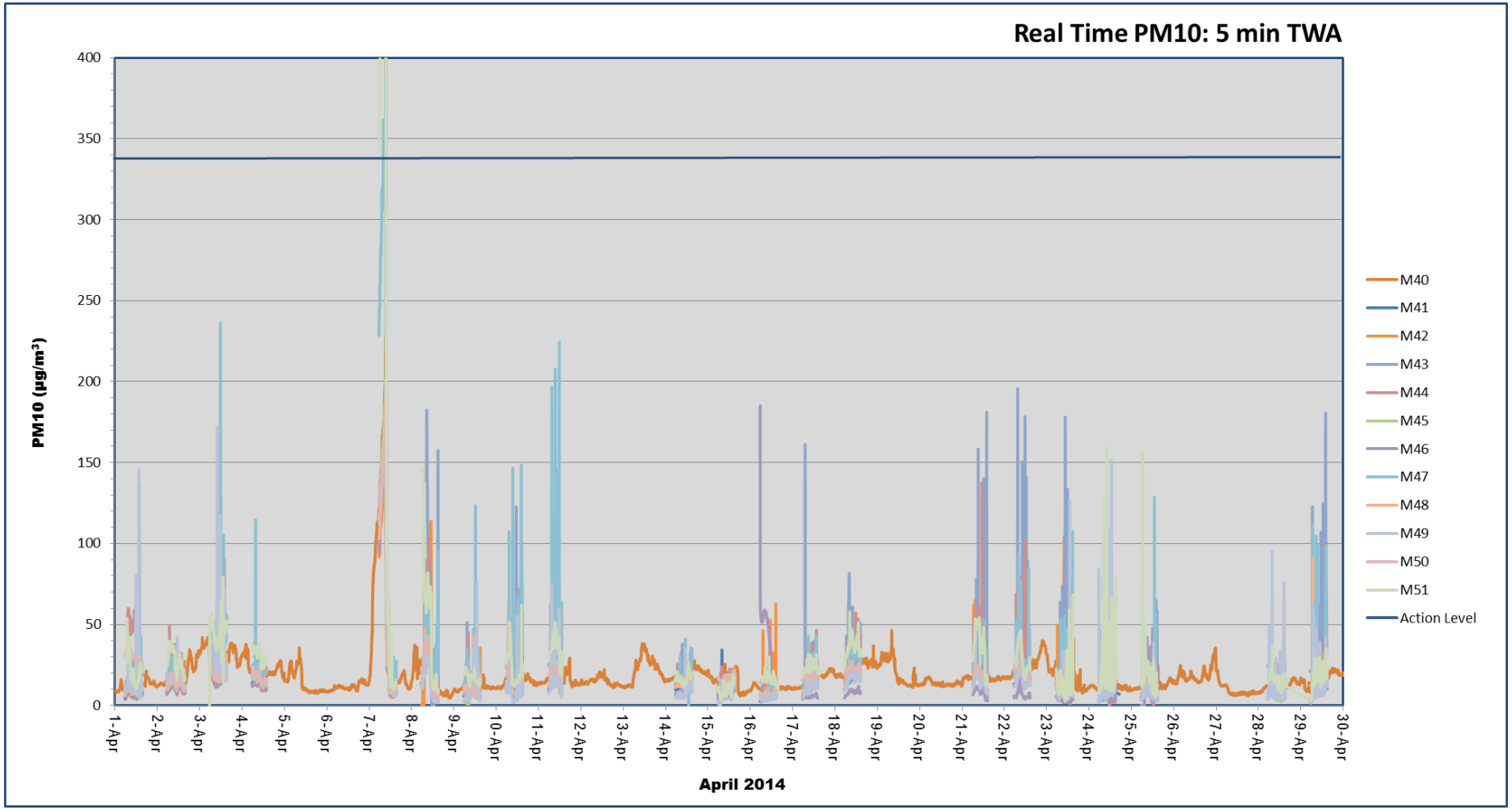


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
PM_{10}	04.07.14	Morning	M43, M44, M47, M51	S, SE	1046.4, 588.2, 390.3, 552.5, Respectively	Forest fire located in Wharton State Forest in Burlington County, NJ. Smoke was blown toward the Jersey City area and caused elevated readings for all stations.

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter ($\mu g/m^3$)

ng/m^3 – nanograms per cubic meter

$\mu g/m^3$ – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

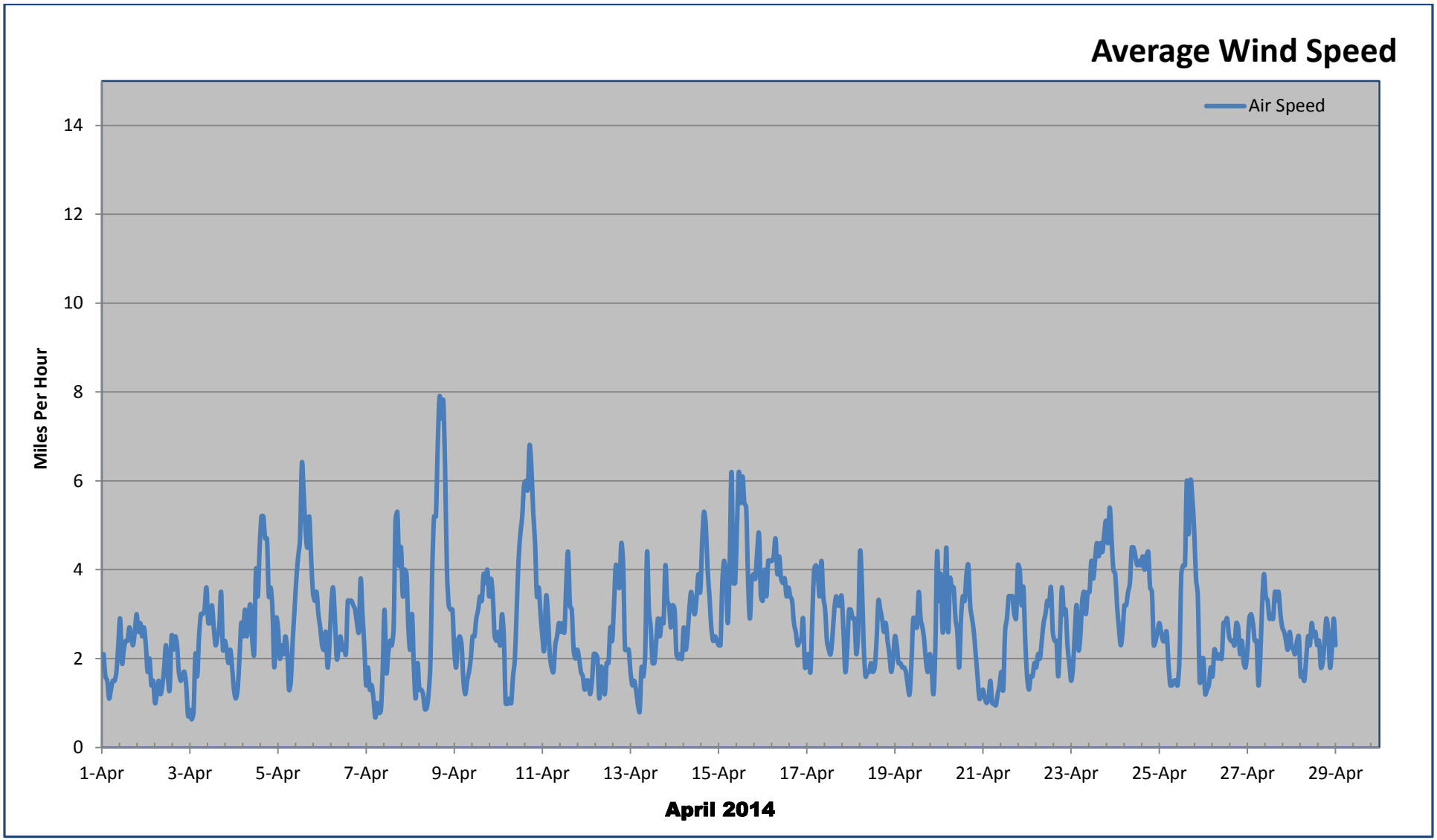


Figure A-3: Temperature

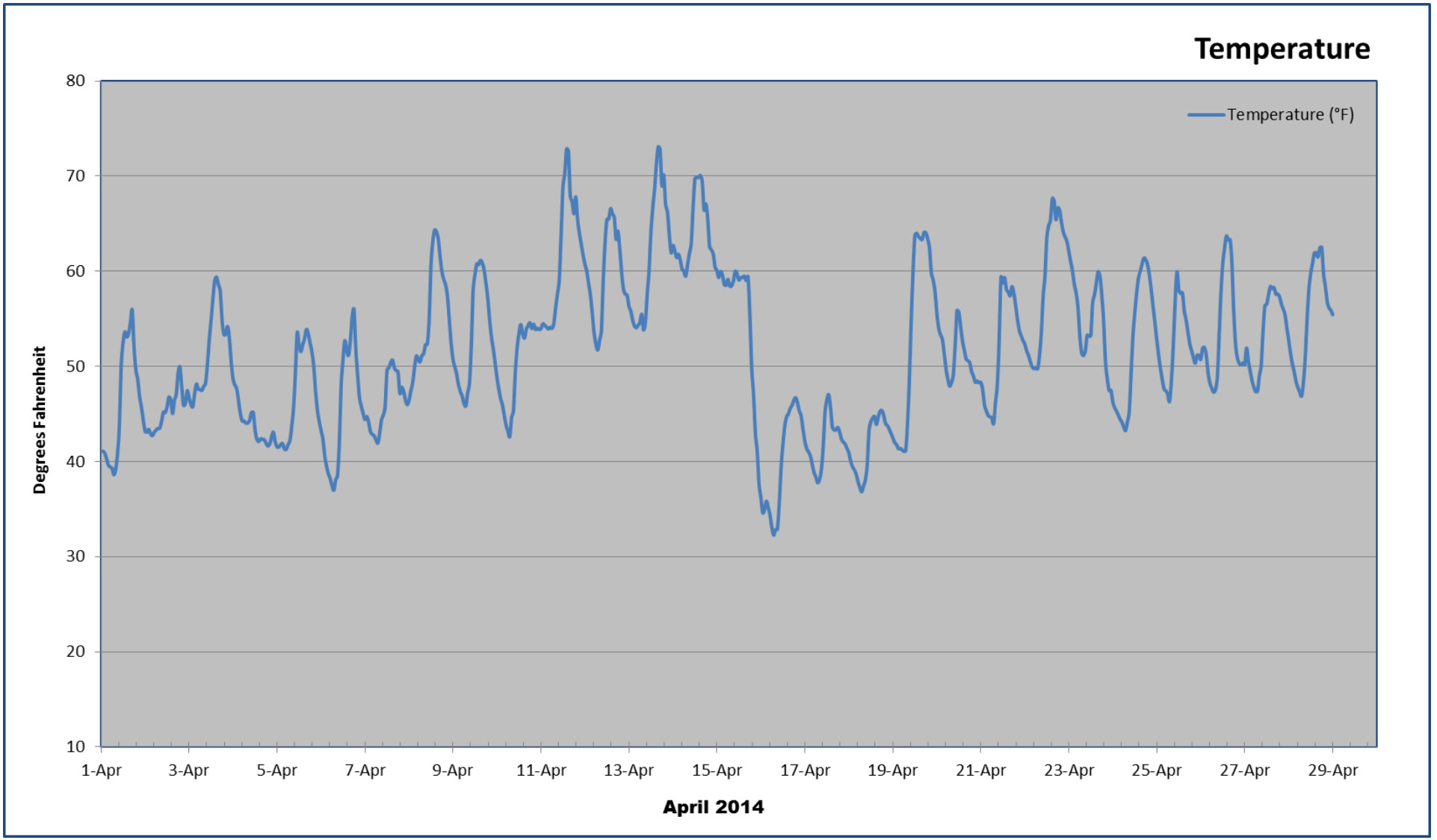


Figure A-4: Relative Humidity

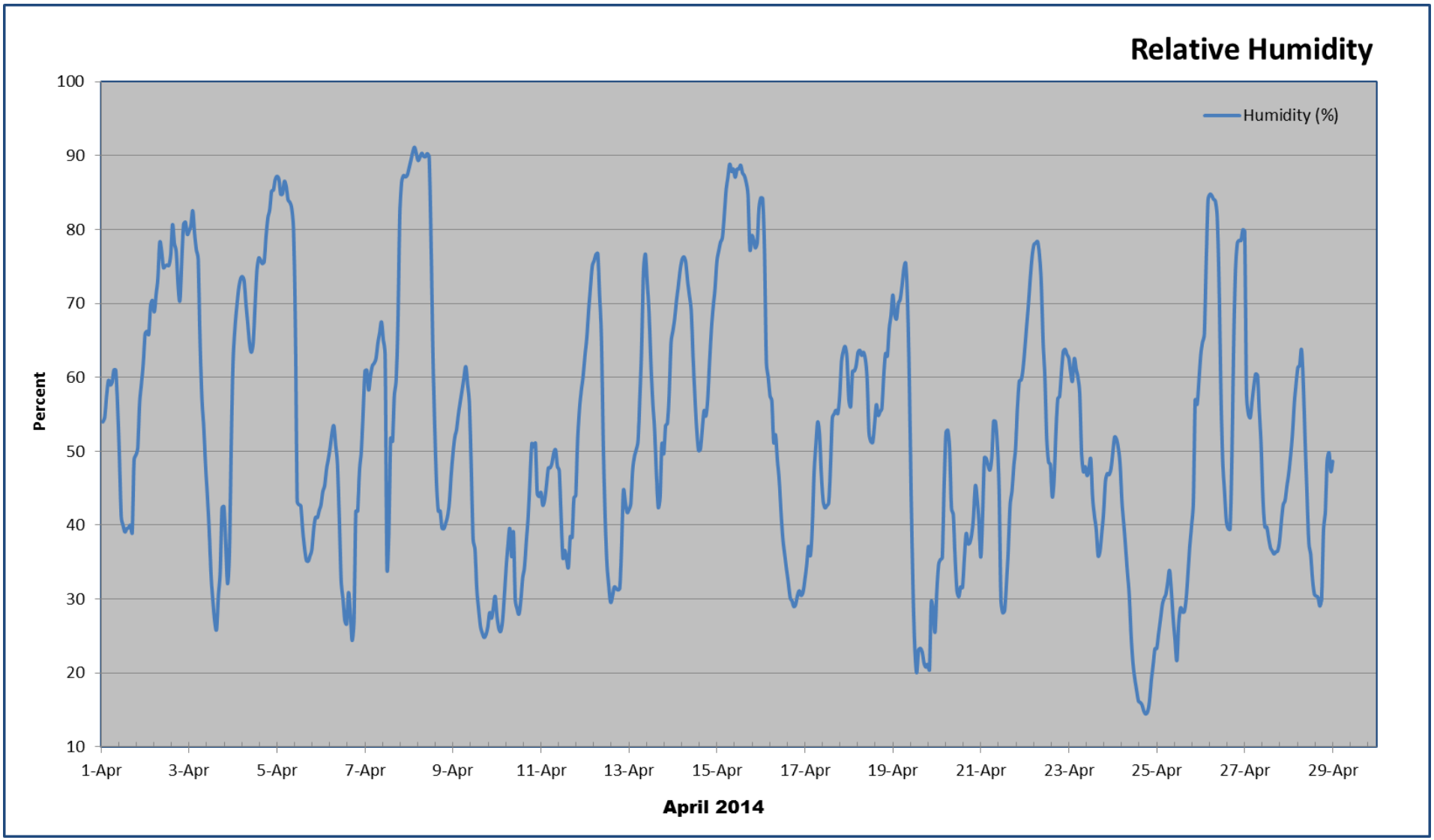
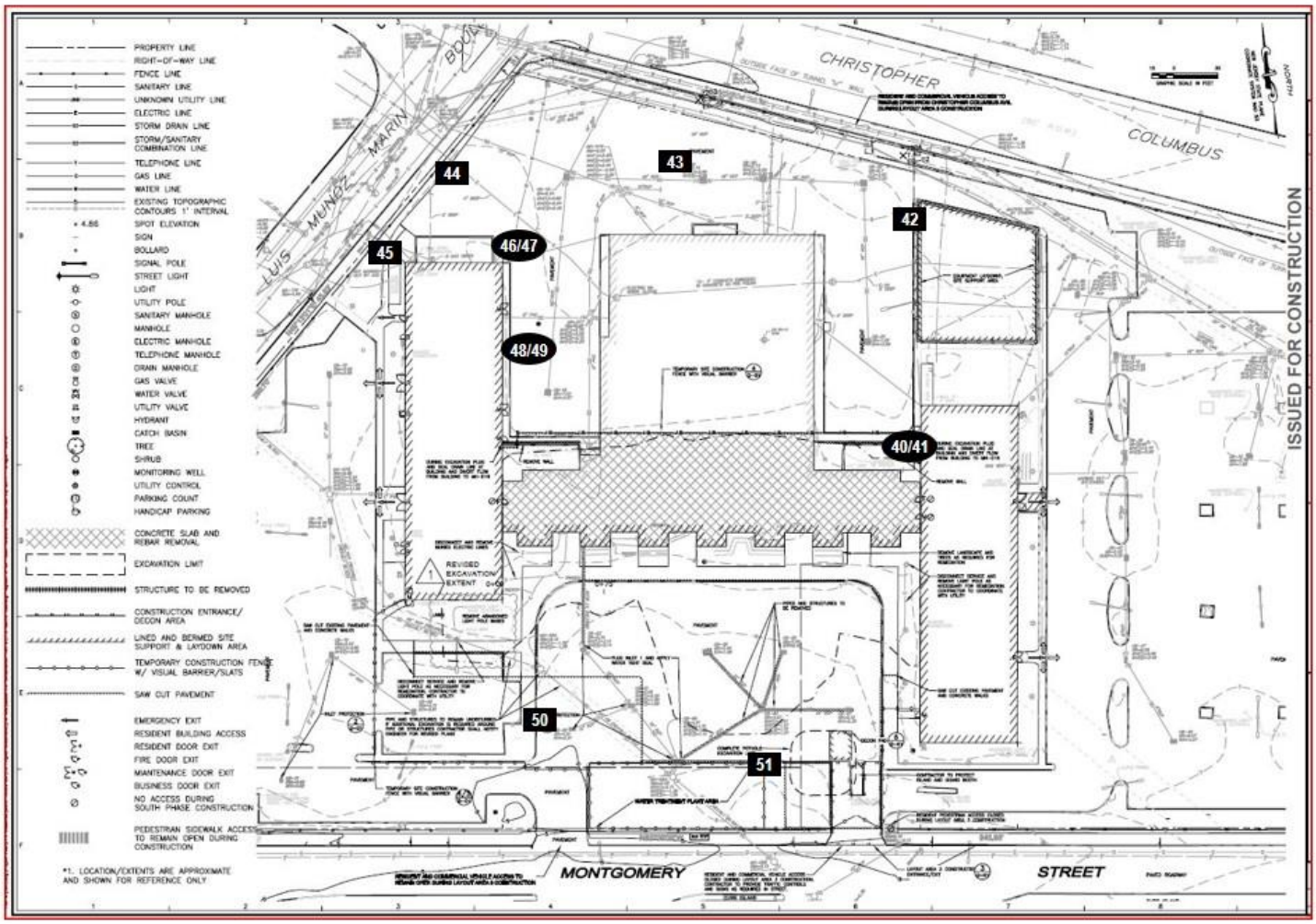


Figure A–5: Site Map Layout Area 2 & 3 (02.15.14 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr^{+6} Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr^{+6} Sampling Results Statistics

Statistics[1]	Layout Area 2 & 3											
	M40	**M41**	**M42**	**M43**	**M44**	**M45**	**M46**	**M47**	**M48**	**M49**	**M50**	**M51**
Total Number of Samples[2]	75	52	52	52	52	52	52	52	52	52	52	52
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Number of Detected Samples[3]	1	7	2	4	1	1	4	3	1	1	0	0
% of Cr^{+6} Samples Greater than MDL	1.3%	13.5%	3.8%	7.7%	2%	2%	0.08%	5.8%	2%	2%	0%	0%
Number of Samples Above AAC	0	0	0	0	0	0	0	0	0	0	0	0
Average % Cr^{+6} in Dust	0.015%	0.019%	0.018%	0.016%	0.019%	0.018%	0.017%	0.018%	0.015%	0.015%	0.019%	0.019%
Maximum % Cr^{+6} in Dust	0.053%	0.050%	0.023%	0.021%	0.023%	0.023%	0.021%	0.021%	0.021%	0.021%	0.021%	0.021%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since February 15, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since February 15, 2014 reported above the laboratory reporting limit.

[3] The program to date average and maximum percent Cr^{+6} in dust was calculated using all the integrated Total Particulate and Cr^{+6} sample results collected since February 15, 2014.

Table B- 2: Monthly Average Integrated 8-hour Cr^{+6} Sampling Results

Statistics	Layout Area 2 & 3											
	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51
February	1.7	6.8	6.7	6.8	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
March	1.9	9.7	6.4	6.7	6.4	6.4	6.7	6.7	6.3	6.3	6.2	6.4
April	1.8	8.4	7.9	8.6	8.0	7.0	8.3	7.2	6.9	8.0	6.6	6.6
Program to Date	1.8	8.6	7.1	7.5	7.1	6.7	7.4	6.9	6.7	7.1	6.5	6.5
All readings in ng/m3 – nanograms per cubic meter												

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

Statistics	Layout Area 2 & 3											
	M40	**M41**	**M42**	**M43**	**M44**	**M45**	**M46**	**M47**	**M48**	**M49**	**M50**	**M51**
Total Number of Samples[1]	75	52	52	52	52	52	52	52	52	52	52	52
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Number of Detected Samples[2]	24	8	7	18	6	5	10	8	13	16	5	3
% Detection	32%	15%	13%	35%	11.5%	10%	19%	15%	13%	31%	10%	6%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since February 15, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since February 15, 2014 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

Statistics	Layout Area 2 & 3											
	M40	**M41**	**M42**	**M43**	**M44**	**M45**	**M46**	**M47**	**M48**	**M49**	**M50**	**M51**
February	17.3	41.0	32.8	53.4	38.0	54.4	53.7	45.8	44.1	43.1	33.0	37.2
March	19.0	57.7	50.4	66.8	37.0	47.3	45.3	39.5	80.8	90.3	38.7	34.2
April	11.4	32.9	33.8	34.4	35.7	32.9	34.9	32.2	40.7	53.2	37.0	34.6
Program to Date	15.6	44.3	40.3	50.8	36.6	42.4	42.3	37.5	57.5	66.5	37.0	34.9
All readings in µg/m3 – micrograms per cubic meter												

Table B- 5: Monthly Average Real-Time PM_{10} Monitoring Results

Statistics	Layout Area 2 & 3											
	M40	**M41**	**M42**	**M43**	**M44**	**M45**	**M46**	**M47**	**M48**	**M49**	**M50**	**M51**
February	15.2	20.0	27.5	27.1	45.4	20.3	17.0	43.8	20.2	26.5	47.8	26.4
March	13.6	18.5	18.4	21.7	26.4	19.6	12.8	35.4	15.9	23.4	39.9	40.9
April	18.3	14.2	16.6	27.5	37.5	15.1	16.4	11.1	16.8	15.5	20.6	33.4
Program to Date	15.8	17.0	19.2	25.0	43.9	17.8	14.9	34.1	17.0	20.8	33.6	34.8
All readings in µg/m3 – micrograms per cubic meter												

May 2014
Air Quality Report
Metropolis Towers

Attached is a technical summary of air quality data for May 2014 at the Metropolis Towers cleanup site submitted by PPG Industries air monitoring consultant.

This report provides air monitoring information about conditions at the work areas associated with Layout Area 2 and Layout Area 3.

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

EMILCOTT

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Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: May 2014

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: May 2014

Prepared By: David Tomsey

Reviewed By: Bruce Groves
July 15, 2014

Contents

List of Appendices

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr^{+6} – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr^{+6}) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour real-time dust measurements, Cr^{+6}, and total particulate sampling with lab analysis was also conducted at one elevated station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr^{+6} sampling and analysis indicate that program-to-date average airborne Cr^{+6} concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr^{+6} in dust generated at the Site do not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Layout Area 2 and Layout Area 3 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 5-minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between the baseline period and the end of the reporting period, with a focus on data collected during the recent month of activities. The baseline period includes data measured between July 17, 2012 and August 2, 2012.

Remedial activities began in the northern portion of Layout Area 3 (LA3) on October 2, 2013. As remediation progressed, the eastern portion of LA3 was incorporated starting November 5, 2013 with additional monitoring stations to cover additional remedial areas. On December 11, 2013 additional stations were added to cover the entirety of LA3 through February 14, 2014. As remediation of contaminated soils was completed in LA3, a transition was made to Layout Area 2 (LA2). Stations were set up to incorporate both LA3, requiring paving, sidewalks, and landscaping, and LA2, requiring remediation of contaminated soils. This transition had a start date of February 15, 2014 and continues through the end of the reporting period.

Twelve air monitoring stations provided protection during intrusive work between February 15, 2014 and May 31, 2014. LA2 contains nine ground level stations and three elevated stations. One elevated station measures 24-hour real-time concentrations and collects Cr^{+6} and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for Layout Area 2 and 3 through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average $Cr+^{6}$ concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr^{+6} fenceline air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory

analysis; and

- Real-time 5-minute average PM_{10}, readings measured at the work area perimeter.

The following sections outline the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

Layout Area	Station	Integrated Air Monitoring	Real-Time Air Monitoring
Layout Area 2 & 3	**M40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51**	Integrated 8-hour Cr^{+6} and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr^{+6} sampling and analysis at one station 7 days per week.	5-minute average PM_{10} readings measured during a typical work day.

2.1 Integrated Air Sampling

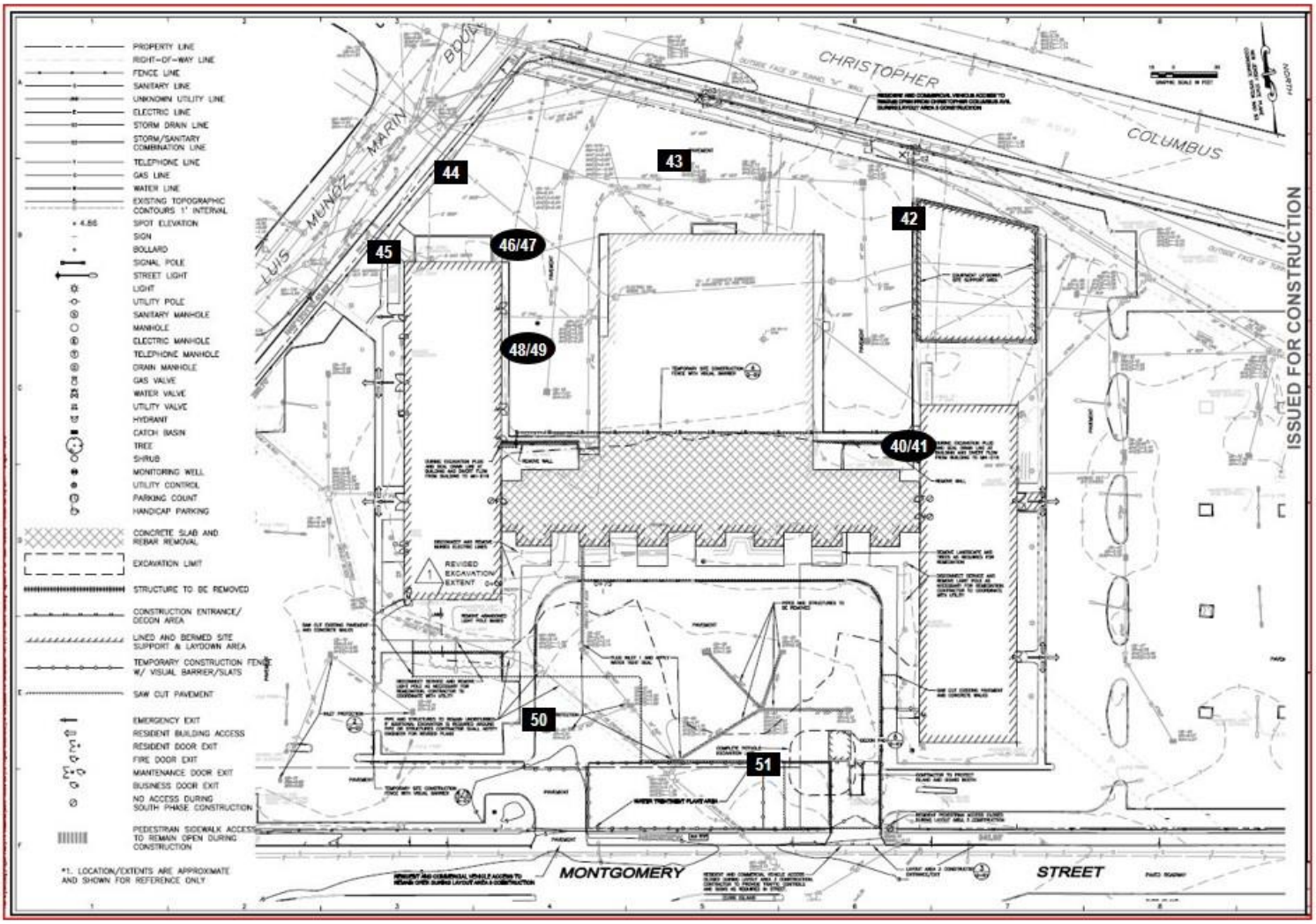
Integrated Cr^{+6} and total particulate samples are collected at each of the AMS for an 8-hour-to-10-hour duration each working day (typically Monday – Friday) at each station. Samples are collected on a preweighed polyvinyl chloride 37mm filter cassette for both Cr^{+6} and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

2.1.1 Integrated Cr^{+6} Sampling

The exposed Cr^{+6} filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr^{+6} analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated Cr^{+6} air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr^{+6} sampling and analysis are also performed at one AMS per work area. These longer duration samples show Cr^{+6} concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

Figure 2-1: LA2 and LA3 Site Overview



2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH Method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated total particulate air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: work area monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Work Area

Work area air monitoring consists of ground level and elevated stations at the perimeter of the work area. Work area monitoring includes the following:

- Real-time 5-minute average PM_{10} readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday, with one elevated station running 24-hours a day, seven days a week.

2.2.2 Meteorological Measurements

Meteorological measurements of 5-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at elevated station 40.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr^{+6} and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr^{+6} and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr^{+6} concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr^{+6} Acceptable Air Concentration

A Site-specific Cr^{+6} AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr^{+6} in dust. The AAC for Cr^{+6} was developed to represent the maximum allowable average concentration of Cr^{+6} in dust at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr^{+6} emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the work area perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC is also used to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices throughout the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include:

program-to-date, 90-day, 60-day, and 30-day running averages where the average Cr^{+6} concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr^{+6} Metrics

Metric Observation	Response Action
30-day[1] Cr^{+6} average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60-day[1] Cr^{+6} average concentration greater than or equal to 40 ng/m3	
90-day[1] Cr^{+6} average concentration greater than or equal to 35 ng/m3	
[1] Refers to days on which samples were collected, not necessarily calendar days	

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

Parameter	Alert Level (1 min TWA)	Action Level (5 min TWA)
PM_{10}	339 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between November 5, 2013 and May 31, 2014 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels; and
- Meteorological results.

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr^{+6} and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr^{+6} Sampling Results

Results of the Cr^{+6} sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr^{+6} concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr^{+6} concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr^{+6} results are shown in Table B-1 and include various program-to-date metrics relative to Cr^{+6} analytical data. Monthly average 8-hour Cr^{+6} concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr^{+6} Metrics

Running Cr^{+6} Metrics[1]		Layout Area 2 & 3											
	Metric (ng/m^3)	M40 ng/m^3	M41 ng/m^3	M42 ng/m^3	M43 ng/m^3	M44 ng/m^3	M45 ng/m^3	M46 ng/m^3	M47 ng/m^3	M48 ng/m^3	M49 ng/m^3	M50 ng/m^3	M51 ng/m^3
30-day[2]	**45**	1.7	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
60-day[2]	**40**	1.8	7.4	7.2	7.6	7.3	6.7	7.4	6.8	6.7	7.2	6.5	6.5
90-day[2]	**35**	1.8	8.1	6.9	7.2	7.0	6.6	7.2	6.8	6.5	6.9	6.4	6.4
PTD[3]		1.8	8.1	6.9	7.2	7.0	6.6	7.2	6.8	6.5	6.9	6.4	6.4

ng/m^3 – nanograms per cubic meter

1. Running Cr^{+6} metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr^{+6} metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long term (program) ending success.
2. Running Cr^{+6} metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60 and 90-day metrics were not available due to the short duration of sampling during this phase of the project metrics were not available.
3. Program-to-date - Air monitoring conducted from February 15, 2014 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 45 sample days between February 15th and the end of the reporting period for stations M40 through M51. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr^{+6} average concentrations, based upon lab analytical results at each AMS, were less than 1.64% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real-time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 5-minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real-time 5-minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3.

Program-to-date

Real-time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

Remedial activities conducted during the reporting period include:

- Excavate and load out chromium impacted soils;
- Backfill excavation.

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the May 2014 reporting period for the Metropolis Towers Site air sampling and monitoring program indicate that the average Cr^{+6} concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3. The Cr^{+6} concentrations and the percent Cr^{+6} in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr^{+6} in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr^{+6} and does not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr^{+6} Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr^{+6} Sampling Results

Date	40	41	42	43	44	45	46	47	48	49	50	51
05/01/14	2.3	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
05/02/14	2.3	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
05/03/14	2.3											
05/04/14	2.3											
05/05/14	2.3	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
05/06/14	2.3	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
05/07/14	2.3	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
05/08/14	2.3	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
05/09/14	0.8	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
05/10/14	0.8											
05/11/14	0.8											
05/12/14	2.3	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
05/13/14	2.3	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
05/14/14	2.3	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
05/15/14	2.3	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
05/16/14	0.8	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
05/17/14	0.8											
05/18/14	0.8											
05/19/14	2.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
05/20/14	2.5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
05/21/14	2.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
05/22/14	2.3	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
05/23/14	0.8	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
05/24/14	0.8											
05/25/14	0.8											
05/26/14	0.8											
05/27/14	2.4	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
05/28/14	2.3	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
05/29/14	2.3	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
05/30/14	0.8	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
05/31/14	0.8											

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr^{+6}. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

Date	40	41	42	43	44	45	46	47	48	49	50	51
05/01/14	12.0	32.0	32.0	10.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
05/02/14	42.0	34.0	34.0	16.0	34.0	34.0	16.0	34.0	11.0	23.0	34.0	34.0
05/03/14	42.0											
05/04/14	42.0											
05/05/14	11.5	30.5	12.0	30.5	30.5	30.5	30.5	30.5	90.0	23.0	30.5	30.5
05/06/14	11.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	22.0	30.5	30.5	30.5
05/07/14	52.0	31.0	10.0	13.0	31.0	31.0	68.0	31.0	31.0	31.0	91.0	68.0
05/08/14	39.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
05/09/14	38.7	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
05/10/14	38.7											
05/11/14	38.7											
05/12/14	51.0	28.5	60.0	28.5	28.5	28.5	28.5	28.5	28.5	93.0	28.5	28.5
05/13/14	1300.0	31.0	31.0	64.0	31.0	22.0	11.0	31.0	31.0	31.0	31.0	31.0
05/14/14	42.0	31.0	31.0	31.0	31.0	71.0	10.0	31.0	31.0	31.0	31.0	31.0
05/15/14	25.0	30.5	30.5	31.0	31.0	30.5	30.5	97.0	31.0	31.0	31.0	61.0
05/16/14	14.0	30.5	30.5	30.5	30.5	30.5	98.0	30.5	30.5	30.5	30.5	30.5
05/17/14	14.0											
05/18/14	14.0											
05/19/14	11.5	28.0	28.0	13.0	28.0	28.0	28.0	28.0	82.0	65.0	28.0	28.0
05/20/14	44.0	10.0	29.0	29.0	29.0	29.0	29.0	29.0	90.0	10.0	29.0	29.0
05/21/14	57.0	96.0	31.0	31.0	69.0	31.0	31.0	91.0	84.0	31.0	31.0	31.0
05/22/14	32.0	31.0	31.0	72.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
05/23/14	38.5	34.5	34.5	34.5	34.5	34.0	34.0	34.0	35.5	35.5	35.5	35.5
05/24/14	38.5											
05/25/14	38.5											
05/26/14	38.5											
05/27/14	29.0	30.5	30.5	15.0	66.0	77.0	12.0	97.0	30.5	30.5	30.5	30.5
05/28/14	11.5	34.0	34.0	14.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
05/29/14	11.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5
05/30/14	11.0	65.0	72.0	78.0	67.0	27.0	11.0	96.0	63.0	89.0	26.5	26.5
05/31/14	11.0											

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Figure A- 1: Real-Time 5-minute average PM_{10} Monitoring Results

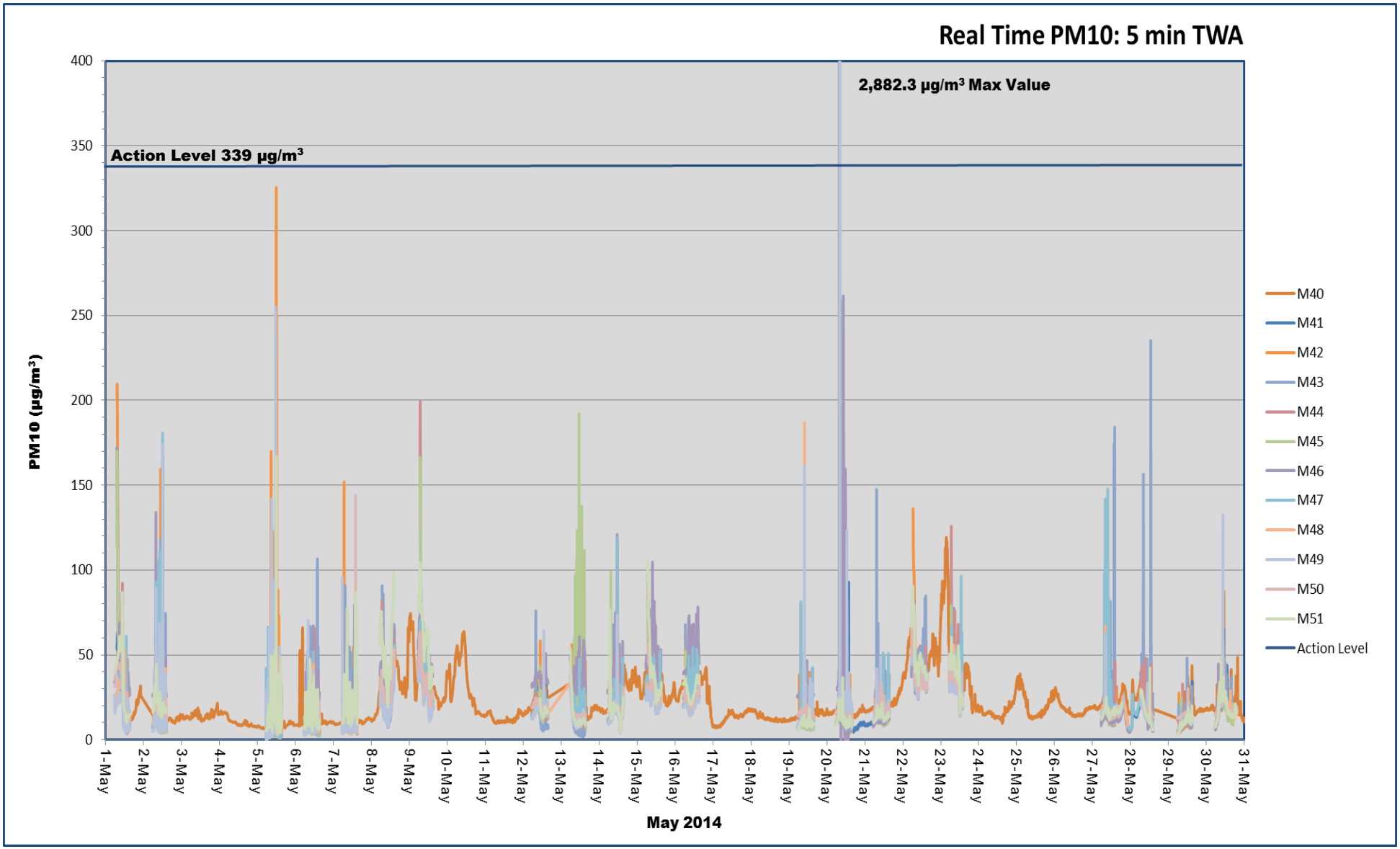


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
PM10	05.20.14	0801	M46	North – 3.4 mph	2,882.3 µg/m^3	Action Level exceedances due to a backfill delivery of stone dust adjacent and upwind of the AMS. Engineering controls were conducted during backfill

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter (µg/m^3)

ng/m^3 – nanograms per cubic meter

µg/m^3 – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

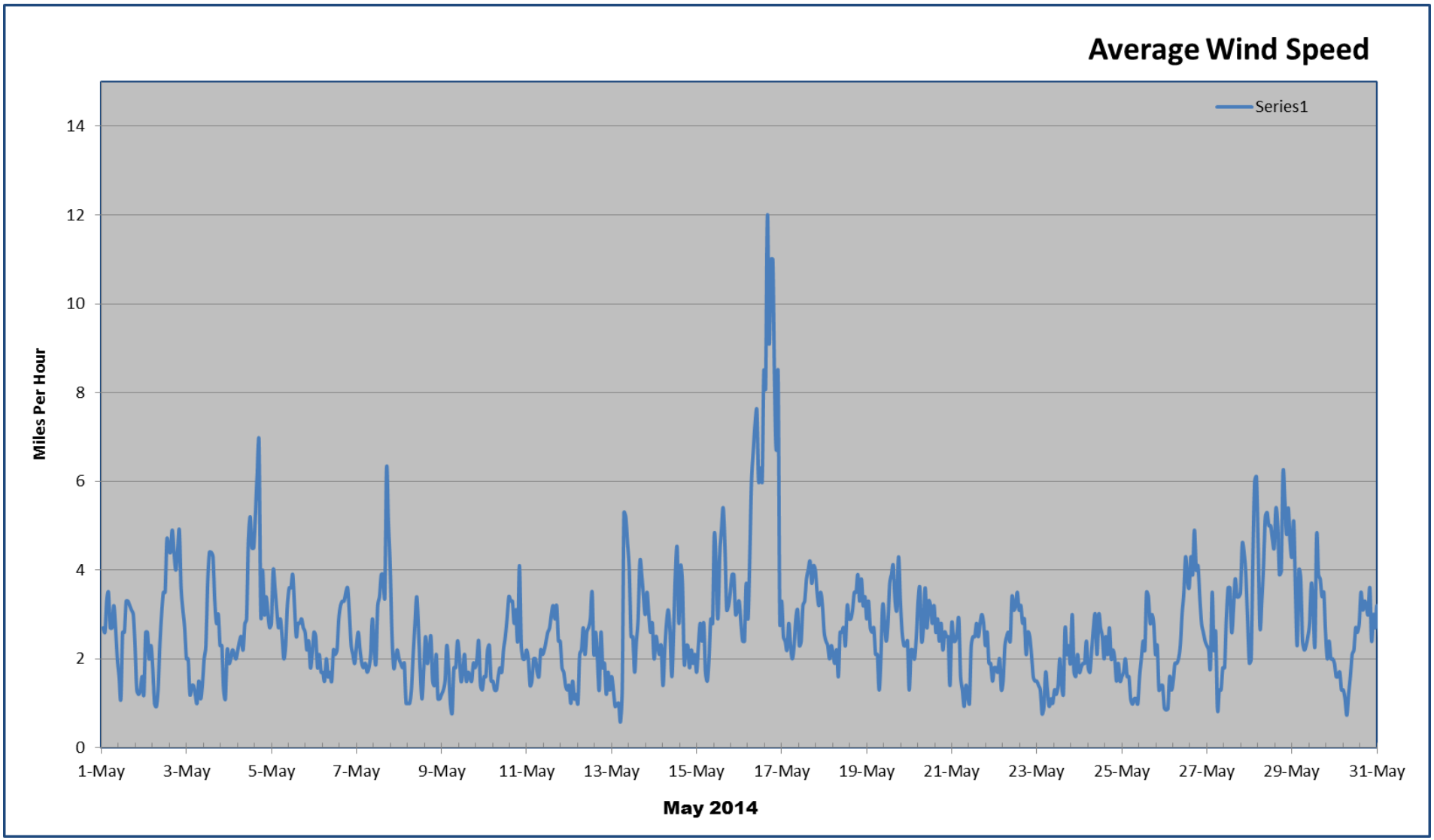


Figure A-3: Temperature

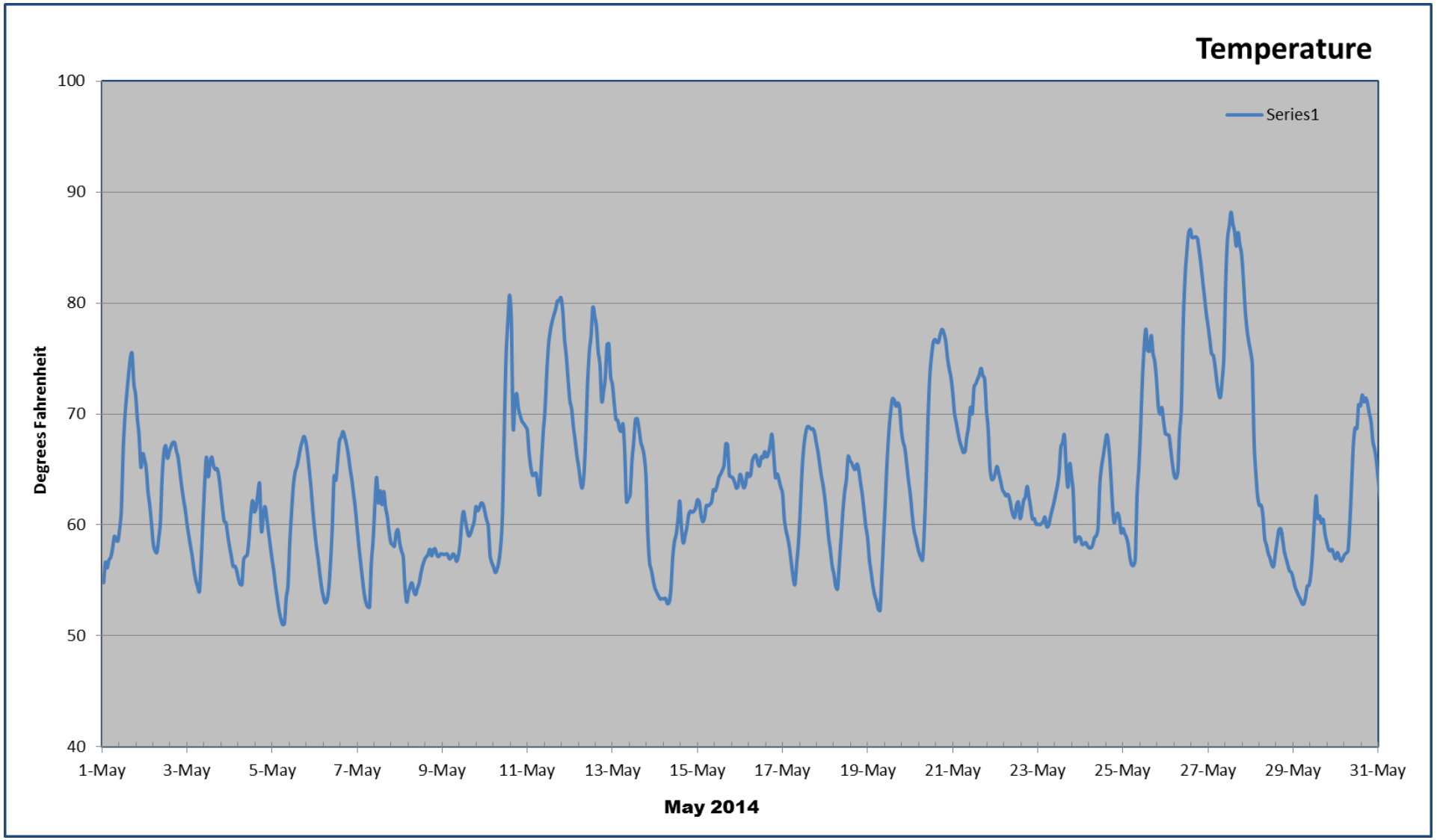


Figure A-4: Relative Humidity

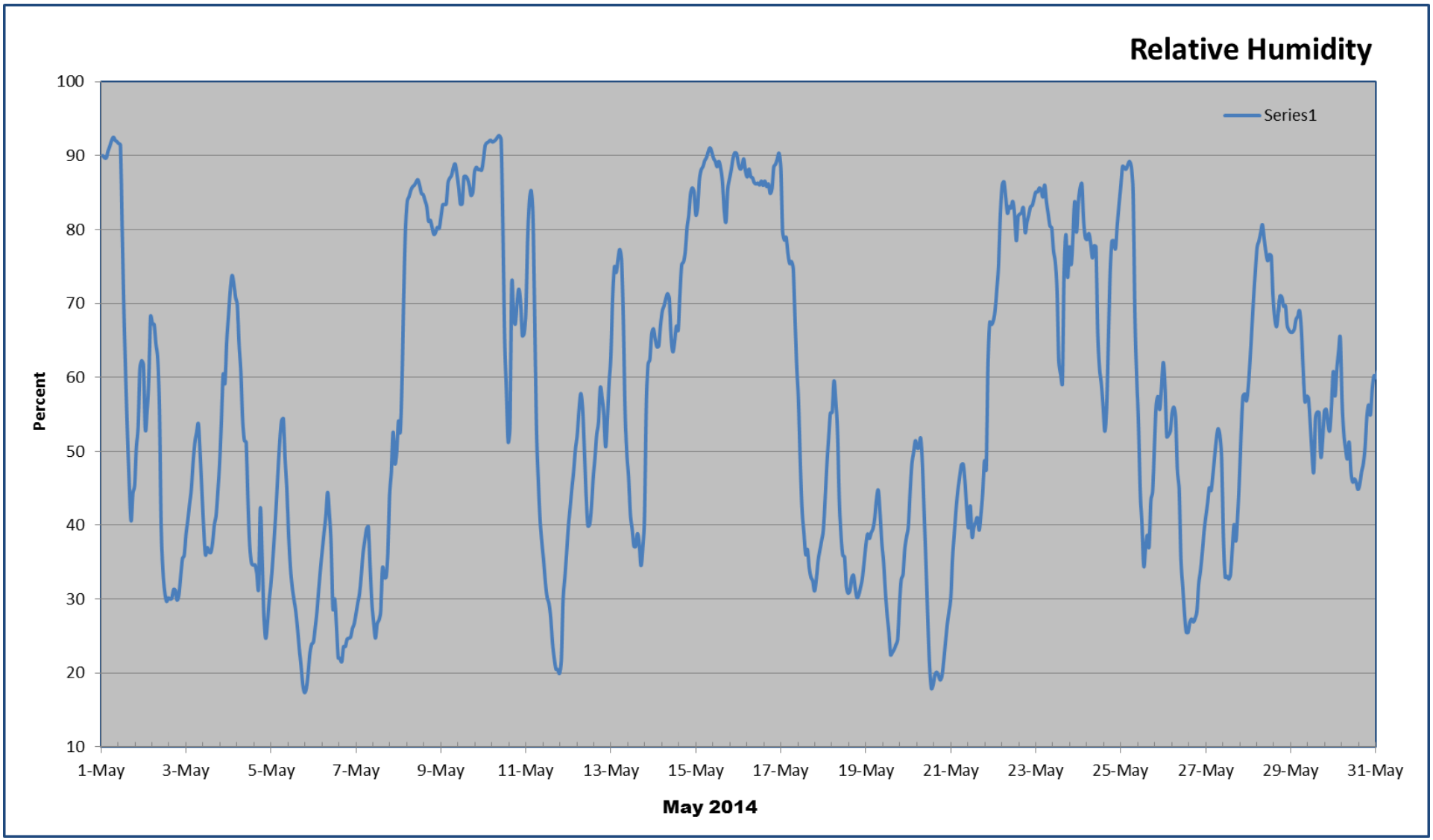
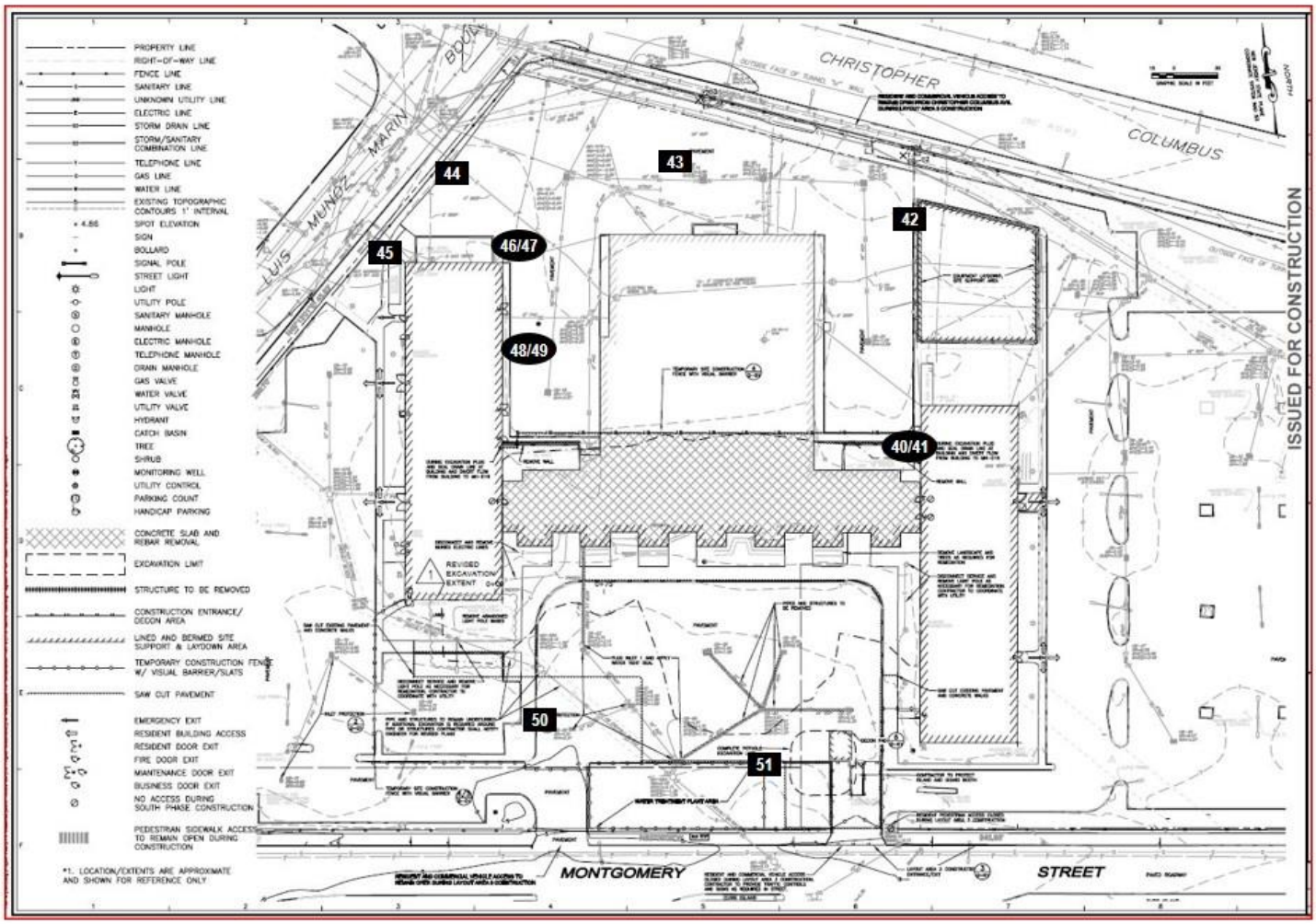


Figure A–5: Site Map Layout Area 2 & 3 (02.15.14 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr^{+6} Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr^{+6} Sampling Results Statistics

Statistics[1]	Layout Area 2 & 3											
	M40	**M41**	**M42**	**M43**	**M44**	**M45**	**M46**	**M47**	**M48**	**M49**	**M50**	**M51**
Total Number of Samples[2]	106	74	74	74	74	74	74	74	74	74	74	74
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Number of Detected Samples[3]	1	7	2	4	1	1	4	3	1	1	0	0
% of Cr^{+6} Samples Greater than MDL	0.9%	9.5%	2.7%	5.4%	1.3%	1.3%	5.4%	4%	1.3%	1.3%	0%	0%
Number of Samples Above AAC	0	0	0	0	0	0	0	0	0	0	0	0
Average % Cr^{+6} in Dust	0.013%	0.022%	0.021%	0.023%	0.020%	0.019%	0.021%	0.019%	0.017%	0.019%	0.019%	0.019%
Maximum % Cr^{+6} in Dust	0.053%	0.068%	0.071%	0.157%	0.065%	0.042%	0.075%	0.041%	0.064%	0.113%	0.021%	0.021%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since February 15, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since February 15, 2014 reported above the laboratory reporting limit.

[3] The program to date average and maximum percent Cr^{+6} in dust was calculated using all the integrated Total Particulate and Cr^{+6} sample results collected since February 15, 2014.

Table B- 2: Monthly Average Integrated 8-hour Cr^{+6} Sampling Results

Statistics	Layout Area 2 & 3											
	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51
February	1.7	6.8	6.7	6.8	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
March	1.9	9.7	6.4	6.7	6.4	6.4	6.7	6.7	6.3	6.3	6.2	6.4
April	1.8	8.4	7.9	8.6	8.0	7.0	8.3	7.2	6.9	8.0	6.6	6.6
May	1.7	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Program-to-Date	1.8	8.0	6.9	7.2	6.9	6.6	7.1	6.8	6.6	6.9	6.4	6.4
All readings in ng/m3 – nanograms per cubic meter												

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

Statistics	Layout Area 2 & 3											
	M40	**M41**	**M42**	**M43**	**M44**	**M45**	**M46**	**M47**	**M48**	**M49**	**M50**	**M51**
Total Number of Samples[1]	106	74	74	74	74	74	74	74	74	74	74	74
Rate of Data Collection	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Number of Detected Samples[2]	42	11	11	27	9	8	17	12	20	22	6	5
% Detection	32%	15%	13%	35%	11.5%	10%	19%	15%	13%	31%	10%	6%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since February 15, 2014. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since February 15, 2014 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

Statistics	Layout Area 2 & 3											
	M40	**M41**	**M42**	**M43**	**M44**	**M45**	**M46**	**M47**	**M48**	**M49**	**M50**	**M51**
February	17.3	41.0	32.8	53.4	38.0	54.4	53.7	45.8	44.1	43.1	33.0	37.2
March	19.0	57.7	50.4	66.8	37.0	47.3	45.3	39.5	80.8	90.3	38.7	34.2
April	11.4	32.9	33.8	34.4	35.7	32.9	34.9	32.2	40.7	53.2	37.0	34.6
May	71.0	35.1	32.9	31.9	36.5	34.8	31.6	43.5	42.2	37.2	34.0	34.3
Program-to-Date	31.8	41.7	38.2	45.3	36.6	40.2	39.3	39.2	53.1	58.0	36.1	34.7
All readings in µg/m3 – micrograms per cubic meter												

Table B- 5: Monthly Average Real-Time PM_{10} Monitoring Results

Statistics	Layout Area 2 & 3											
	M40	M41	M42	M43	M44	M45	M46	M47	M48	M49	M50	M51
February	15.2	20.0	27.5	27.1	45.4	20.3	17.0	43.8	20.2	26.5	47.8	26.4
March	13.6	18.5	18.4	21.7	26.4	19.6	12.8	35.4	15.9	23.4	39.9	40.9
April	18.3	14.2	16.6	27.5	37.5	15.1	16.4	11.1	16.8	15.5	20.6	33.4
May	20.1	14.9	14.2	23.1	16.9	13.9	14.7	18.4	15.3	15.4	18.5	16.1
Program-to-Date	17.6	17.0	19.9	25.4	20.4	18.5	20.5	26.6	17.9	20.1	30.0	21.5
All readings in µg/m3 – micrograms per cubic meter												

September 2017
Air Quality Report
Metropolis Towers Site

Attached is a technical summary of air quality data for September 2017 at the Metropolis Towers cleanup site submitted by PPG Industries' air monitoring consultant.

This report provides air monitoring information about conditions at the perimeter associated with Site 156 (Metropolis Towers).

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

EMILCOTT

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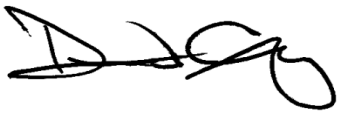
Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: September 2017

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: September 2017

Prepared By: Carey Wu



Reviewed By: Dave Tomsey
October 27, 2017

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr^{+6} – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr^{+6}) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour Cr^{+6} and total particulate sampling with lab analysis was also conducted at one station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr^{+6} sampling and analysis indicate that program-to-date average airborne Cr^{+6} concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr^{+6} in dust generated at the Site do not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Site 156 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 15-minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between September 8, 2017 and September 30, 2017. Remedial activities began in the western portion of the Site on September 8, 2017. Air monitoring stations provided protection during intrusive work between September 8, 2017 and September 30, 2017. The site contains four ground level stations and one elevated station. The elevated station collects Cr^{+6} and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for the Site through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr^{+6} concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr^{+6} fence-line air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory analysis; and
- Real-time 15-minute average PM_{10}, readings measured at the perimeter.

The following sections outline the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

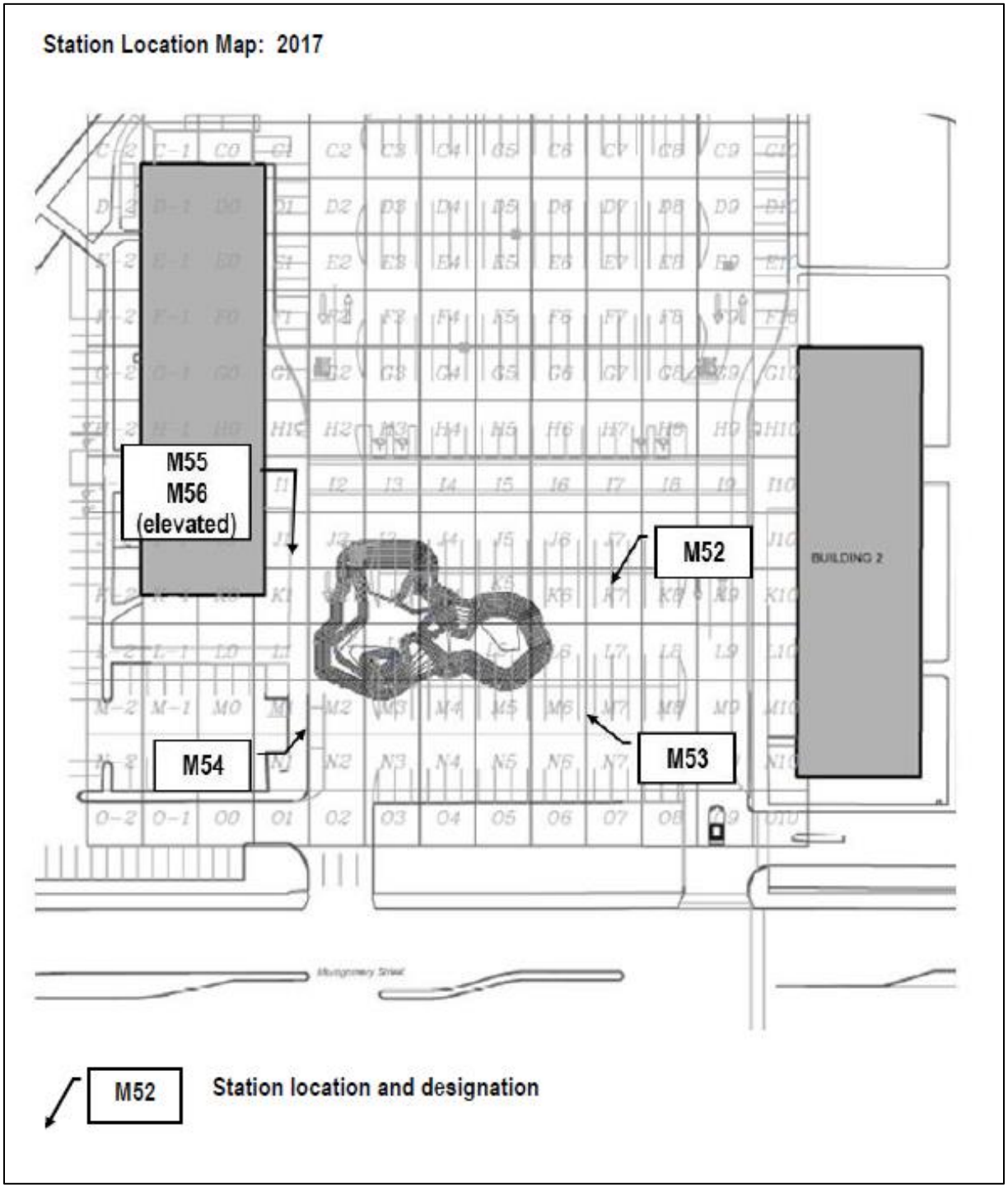
Site	Station	Integrated Air Monitoring	Real-Time Air Monitoring
Site 156	**M52, M53, M54, M55, M56**	Integrated 8-hour Cr^{+6} and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr^{+6} sampling and analysis at one station 7 days per week.	15-minute average PM_{10} readings measured during a typical work day.

Note: 24-hour and 72-hour Cr^{+6} sampling was conducted at station M56 from 9/8/17 through 9/30/17 to coincide with the location of the weather station.

2.1 Integrated Air Sampling

Integrated Cr^{+6} and total particulate samples are collected at each of the AMS for an 8-hour-to-10-hour duration each working day (typically Monday – Friday). Samples are collected on a pre-weighed polyvinyl chloride 37mm filter cassette for both Cr^{+6} and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

Figure 2-1: Site Overview



2.1.1 Integrated Cr^{+6} Sampling

The exposed Cr^{+6} filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr^{+6} analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated Cr^{+6} air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non-detect are included in the concentration calculation at one-half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr^{+6} sampling and analysis are also performed at one AMS. These longer duration samples show Cr^{+6} concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH Method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated total particulate air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: perimeter monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Perimeter

Perimeter air monitoring consists of ground level stations at the perimeter of the Site. Perimeter monitoring includes the following:

- Real-time 15-minute average PM_{10} readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday.

2.2.2 Meteorological Measurements

Meteorological measurements of 15-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at station M55, 24-hours a day, seven days a week.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr^{+6} and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr^{+6} and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr^{+6} concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr^{+6} Acceptable Air Concentration

A Site-specific Cr^{+6} AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr^{+6} in dust. The AAC for Cr^{+6} was developed to represent the maximum allowable average concentration of Cr^{+6} in the air at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr^{+6} emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC is also used to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices throughout the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include: program-to-

date, 90-day, 60-day, and 30-day running averages where the average Cr^{+6} concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr^{+6} Metrics

Metric Observation	Response Action
30-day[1] Cr^{+6} average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60-day[1] Cr^{+6} average concentration greater than or equal to 40 ng/m3	
90-day[1] Cr^{+6} average concentration greater than or equal to 35 ng/m3	
[1] Refers to days on which samples were collected, not necessarily calendar days	

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

Parameter	Alert Level (15-min TWA)	Action Level (15-min TWA)
PM_{10}	255 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between September 8, 2017 and September 30, 2017 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels; and
- Meteorological results

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr^{+6} and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr^{+6} Sampling Results

Results of the Cr^{+6} sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr^{+6} concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr^{+6} concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr^{+6} results are shown in Table B-1 and include various program-to-date metrics relative to Cr^{+6} analytical data. Monthly average 8-hour Cr^{+6} concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr^{+6} Metrics

Running Cr^{+6} Metrics[1]		Site 156				
	Metric (ng/m^3)	**AMS-1 ng/m^3**	**AMS-2 ng/m^3**	**AMS-3 ng/m^3**	**AMS-4 ng/m^3**	**AMS-5 ng/m^3**
30-day[2]	**45**	4.2	4.5	4.3	4.3	1.0
60-day[2]	**40**	N/A	N/A	N/A	N/A	N/A
90-day[2]	**35**	N/A	N/A	N/A	N/A	N/A
PTD[3]		4.2	4.5	4.3	4.3	1.0

ng/m^3 – nanograms per cubic meter

1. Running Cr^{+6} metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr^{+6} metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long-term (program) ending success.
2. Running Cr^{+6} metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 60-day and 90-day metrics were not available due to the short duration of sampling during this phase of the project.
3. Program-to-date - Air monitoring conducted from September 8, 2017 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 16 sample days between September 8th and the end of the reporting period for stations M52 through M56. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr^{+6} average concentrations, based upon lab analytical results at each AMS, were less than 0.92% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real-time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 15-minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real-time 15-minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 µg/m^3) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3.

Program-to-date

Real-time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

Activities which occurred on the site during the month of September included:

- Excavate and load out chromium-impacted soils;
- Backfill excavation;

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the September 2017 reporting period for the Metropolis Towers Site air sampling and monitoring program indicate that the average Cr^{+6} concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3. The Cr^{+6} concentrations and the percent Cr^{+6} in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr^{+6} in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr^{+6} and does not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr^{+6} Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr^{+6} Sampling Results

Date of Sample	M52	M53	M54	M55	M56
Friday, September 8, 2017	4.95	5.00	5.00	5.00	0.50
Saturday, September 9, 2017					0.50
Sunday, September 10, 2017					0.50
Monday, September 11, 2017	3.90	4.20	4.20	4.10	1.50
Tuesday, September 12, 2017	3.90	4.15	4.20	4.10	1.50
Wednesday, September 13, 2017	4.05	4.40	4.40	4.20	1.50
Thursday, September 14, 2017	3.80	4.15	4.15	3.95	1.50
Friday, September 15, 2017	4.45	4.75	4.70	4.60	0.50
Saturday, September 16, 2017					0.50
Sunday, September 17, 2017					0.50
Monday, September 18, 2017	4.35	4.60	4.40	4.40	1.40
Tuesday, September 19, 2017	4.30	4.60	4.35	4.45	1.45
Wednesday, September 20, 2017	4.10	4.40	4.20	4.20	1.45
Thursday, September 21, 2017	4.00	4.30	4.05	5.15	1.45
Friday, September 22, 2017	5.00	5.50	5.00	5.00	0.48
Saturday, September 23, 2017					0.48
Sunday, September 24, 2017					0.48
Monday, September 25, 2017	4.45	4.55	4.40	4.35	1.45
Tuesday, September 26, 2017	3.95	4.25	4.10	4.10	1.40
Wednesday, September 27, 2017	4.00	4.35	4.20	4.20	1.45
Thursday, September 28, 2017	4.10	4.45	4.25	4.25	1.45
Friday, September 29, 2017	3.95	4.20	4.05	4.00	0.48
Saturday, September 30, 2017					0.48

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr^{+6}. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

Date of Sample	M52	M53	M54	M55	M56
Friday, September 8, 2017	48.50	50.00	50.00	50.00	50.00
Saturday, September 9, 2017					50.00
Sunday, September 10, 2017					50.00
Monday, September 11, 2017	38.00	41.00	41.00	40.00	14.50
Tuesday, September 12, 2017	38.00	40.50	40.50	40.00	14.50
Wednesday, September 13, 2017	39.50	43.00	43.00	41.00	14.50
Thursday, September 14, 2017	37.00	40.50	40.50	38.50	14.50
Friday, September 15, 2017	43.50	46.50	46.00	45.00	11.00
Saturday, September 16, 2017					11.00
Sunday, September 17, 2017					11.00
Monday, September 18, 2017	42.50	45.00	42.50	43.00	14.00
Tuesday, September 19, 2017	41.50	45.00	42.50	43.00	14.00
Wednesday, September 20, 2017	40.00	42.50	41.00	41.00	14.00
Thursday, September 21, 2017	39.00	42.00	39.50	40.50	14.00
Friday, September 22, 2017	48.50	50.00	49.00	49.50	10.00
Saturday, September 23, 2017					10.00
Sunday, September 24, 2017					10.00
Monday, September 25, 2017	40.50	44.00	42.50	42.50	14.00
Tuesday, September 26, 2017	38.00	41.50	160.00*	40.00	14.00
Wednesday, September 27, 2017	39.00	42.50	40.50	40.50	14.00
Thursday, September 28, 2017	40.00	43.00	41.50	41.50	14.00
Friday, September 29, 2017	38.00	41.00	39.50	39.00	4.60
Saturday, September 30, 2017					4.60

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

* Elevated reading due to clean backfill placement.

Figure A- 1: Real-Time 15-minute average PM_{10} Monitoring Results

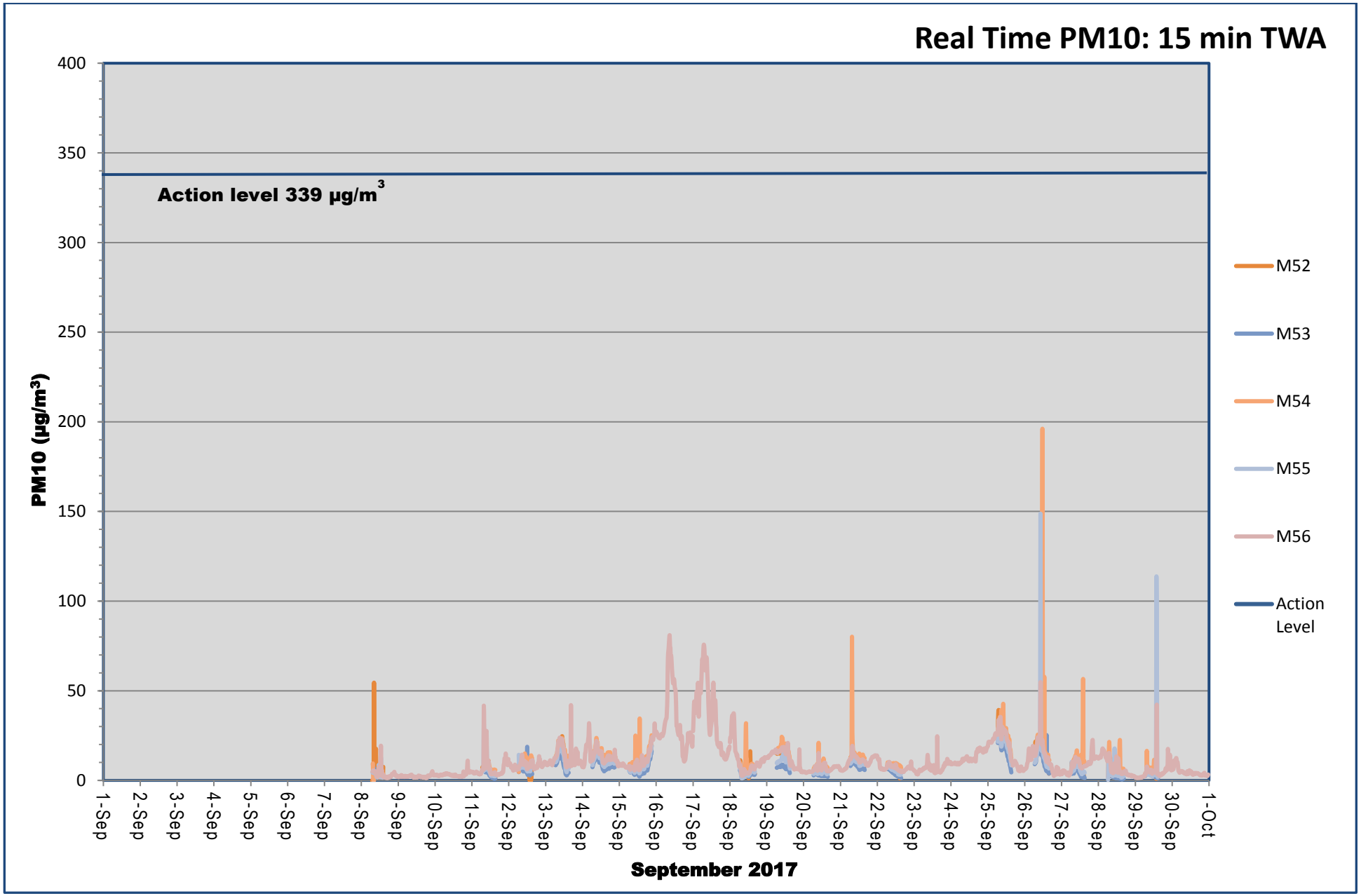


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
NA	NA	NA	NA	NA	NA	NA

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter ($\mu g/m^3$)

ng/m^3 – nanograms per cubic meter

$\mu g/m^3$ – micrograms per cubic meter

NA – Not Applicable

ND –No

Data

Figure A-2: Wind Speed

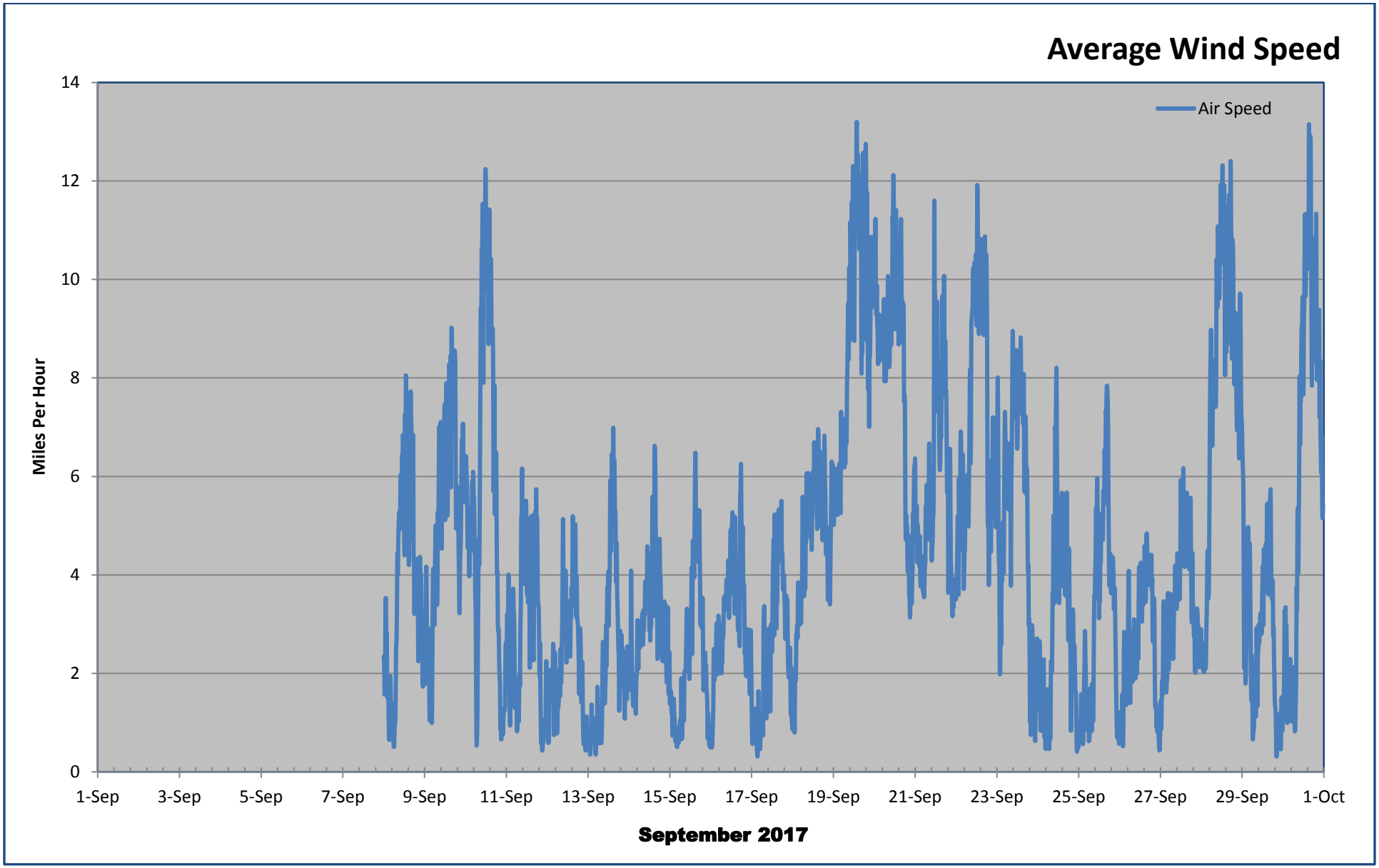


Figure A-3: Temperature

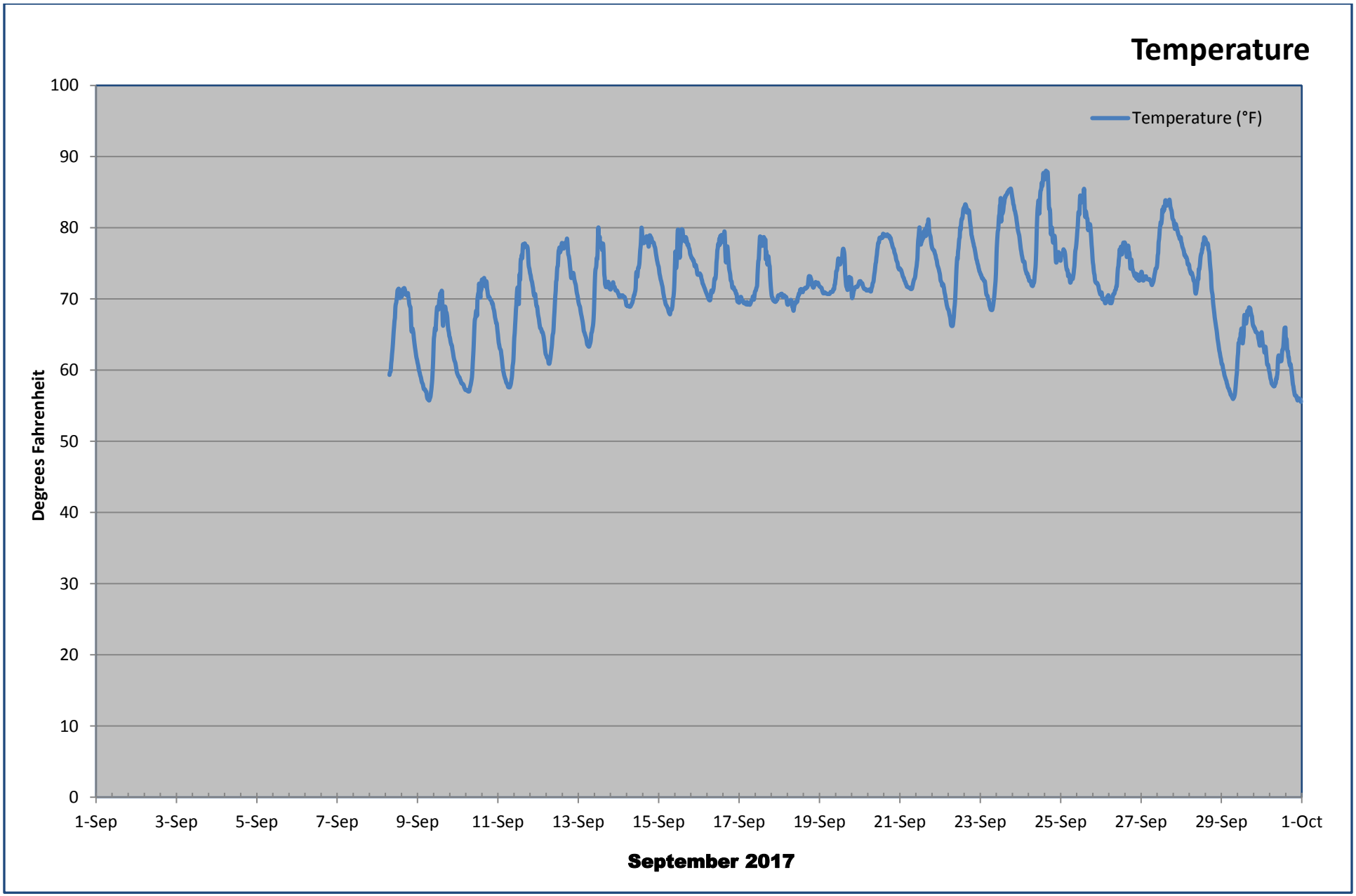


Figure A-4: Relative Humidity

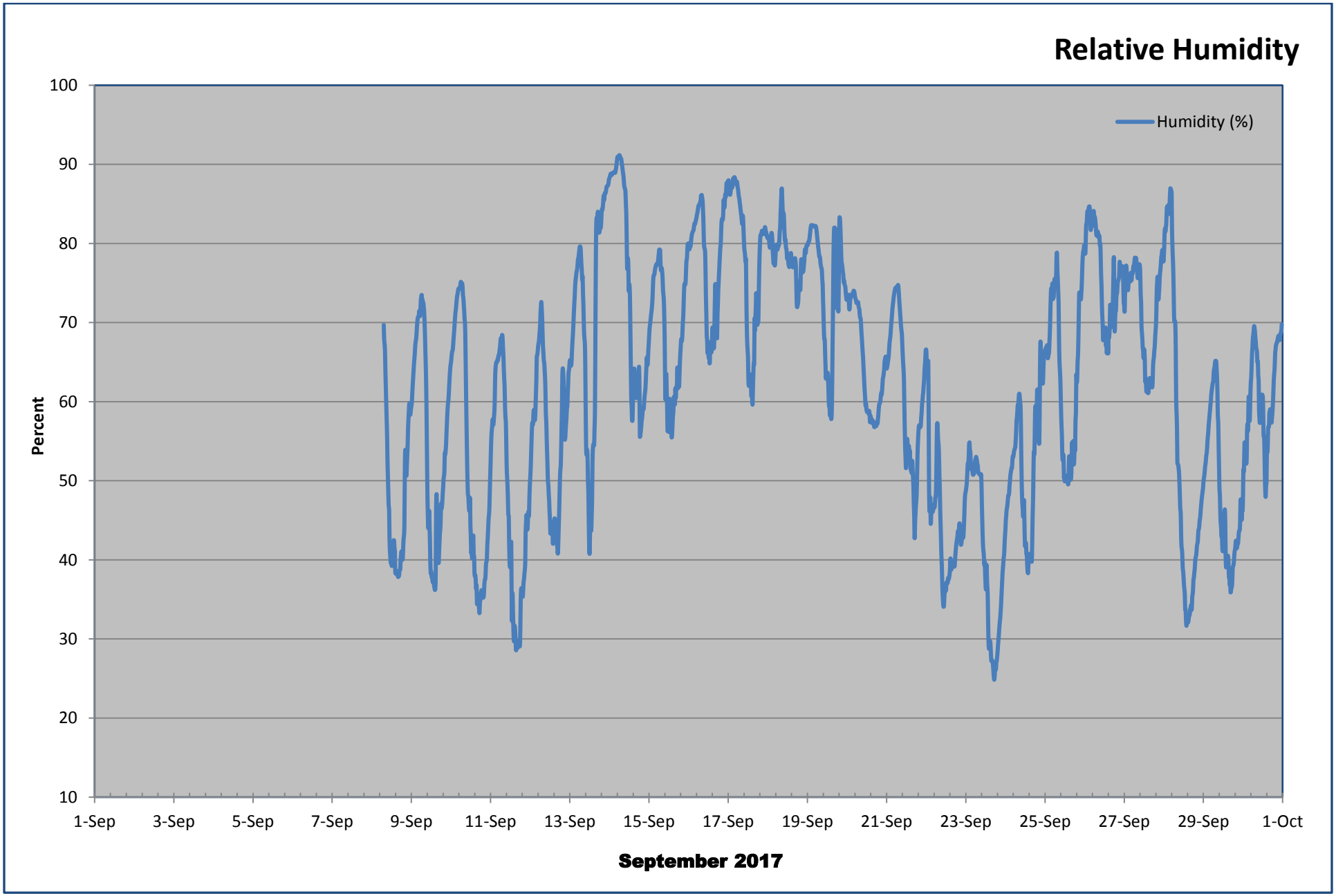
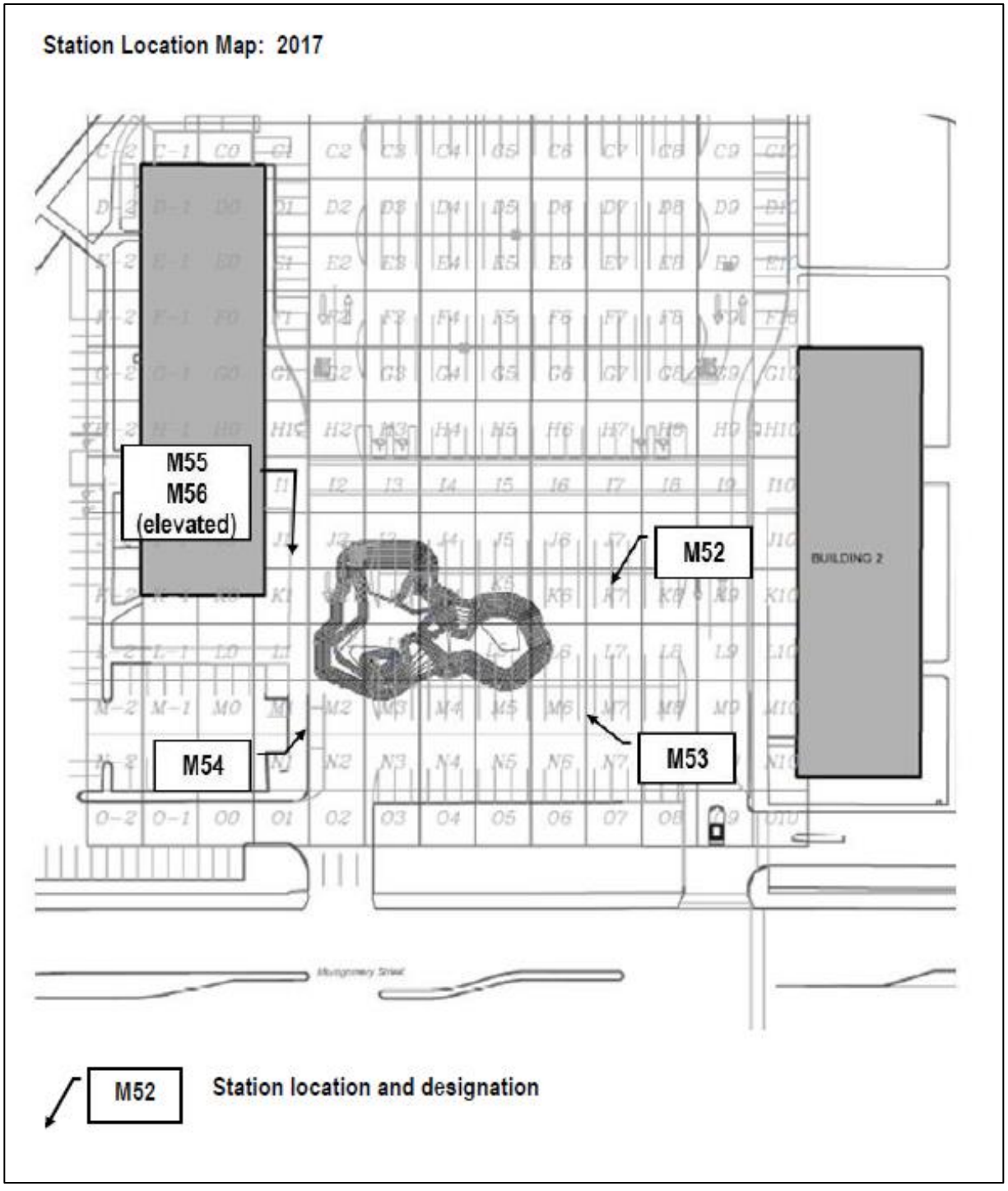


Figure A–5: Site Map Site 156 (09.08.17 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr^{+6} Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr^{+6} Sampling Results Statistics

Statistics[1]	Site 156				
	M52	**M53**	**M54**	**M55**	**M56**
Total Number of Samples[1]	16	16	16	16	16
Rate of Data Collection	100%	100%	100%	100%	100%
Number of Detected Samples[2]	0	0	0	0	0
% of Cr^{+6} Samples Greater than MDL	0.0%	0.0%	0.0%	0.0%	0.0%
Number of Samples Above AAC	0	0	0	0	0
Average % Cr^{+6} in Dust[3]	0.010%	0.010%	0.010%	0.010%	0.016%
Maximum % Cr^{+6} in Dust[3]	0.011%	0.011%	0.010%	0.013%	0.103%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since September 8, 2017. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since September 8, 2017 reported above the laboratory reporting limit.

[3] The program-to-date average and maximum percent Cr^{+6} in dust was calculated using all the integrated Total Particulate and Cr^{+6} sample results collected since September 8, 2017.

Table B- 2: Monthly Average Integrated 8-hour Cr^{+6} Sampling Results

Statistics	Site 156				
	M52	M53	M54	M55	M56
September	4.2	4.5	4.3	4.3	1.0
Program to Date	4.2	4.5	4.4	4.4	1.0
All readings in ng/m3 – nanograms per cubic meter					

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

Statistics	Site 156				
	M52	M53	M54	M55	M56
Total Number of Samples[1]	16	16	16	16	16
Rate of Data Collection	100%	100%	100%	100%	100%
Number of Detected Samples[2]	0	0	1	0	0
% Detection	0.0%	0.0%	6.3%	0.0%	0.0%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since September 8, 2017. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since September 8, 2017 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

Statistics	Site 156				
	M52	M53	M54	M55	M56
September	40.7	43.6	50.0	42.2	17.1
Program to Date	40.7	43.6	50.0	42.2	17.1
All readings in µg/m3 – micrograms per cubic meter					

Table B- 5: Monthly Average Real-Time PM_{10} Monitoring Results

Statistics	Site 156				
	M52	M53	M54	M55	M56
September	9.3	6.3	13.2	9.0	11.3
Program to Date	9.3	6.3	13.2	9.0	11.3
All readings in µg/m3 – micrograms per cubic meter					

October/November 2017
Air Quality Report
Metropolis Towers Site

Attached is a technical summary of air quality data for October and November 2017 at the Metropolis Towers cleanup site submitted by PPG Industries' air monitoring consultant.

This report provides air monitoring information about conditions at the perimeter associated with Site 156 (Metropolis Towers).

Also, this document notes any deviations from the monitoring plan and work schedule caused by factors beyond the control of cleanup contractors, such as inclement weather and malfunctioning equipment.

EMILCOTT

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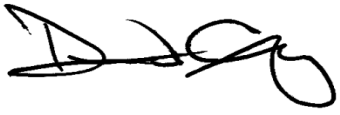
Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: October/November 2017

Monthly Air Monitoring Report
Metropolis Towers Site
Jersey City, New Jersey

Reporting Period: October/November 2017

Prepared By: Carey Wu



Reviewed By: Dave Tomsey
November 16, 2017

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List of Acronyms

AAC – Acceptable Air Concentration

AMP – Air Monitoring Plan

AMS – Air Monitoring Station

Cr^{+6} – Hexavalent Chromium

FAM – Fixed Air Monitoring

LPM – Liters per Minute

ng/m^3 – Nanograms per Cubic Meter of Air

NJDEP – New Jersey Department of Environmental Protection

PM_{10} – Particulate Matter 10 Microns or less in Diameter

PPG – PPG Industries, Inc.

ppb – Parts per Billion

ppm – Parts per Million

$\mu g/m^3$ – Micrograms per Cubic Meter of Air

Executive Summary

Air monitoring conducted at the Metropolis Towers Site was completed in accordance with the Site-Specific Air Monitoring Plan (AMP), and included sampling and analysis for 8-hour integrated hexavalent chromium (Cr^{+6}) and total particulates, as well as real-time monitoring for PM_{10} at all air monitoring stations. In addition to the air monitoring conducted in accordance with the AMP, 24-hour Cr^{+6} and total particulate sampling with lab analysis was also conducted at one station. This program is designed to measure various aspects of air quality at the Site to ensure that remedial activities at the Site do not have an adverse effect on Site workers and the surrounding community.

Results of the integrated Cr^{+6} sampling and analysis indicate that program-to-date average airborne Cr^{+6} concentrations are significantly below the Acceptable Air Concentration (AAC) at each of the AMS locations. The results and calculations document continuing compliance with the current AAC set by the New Jersey Department of Environmental Protection (NJDEP), confirm that dust control measures continue to be effective, and indicate that the levels of Cr^{+6} in dust generated at the Site do not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

1.0 Introduction

This monthly air monitoring report update includes both tabular information and written discussions summarizing the ambient air quality data collected in accordance with the Air Monitoring Plan (AMP) at the Metropolis Towers Site (referred herein as Site), in Jersey City, New Jersey.

This monthly report is designed to provide a summary of the air monitoring data collected during the intrusive activities associated with Site 156 through the reporting period. This monthly report includes both monthly and program-to-date summaries of the following:

- Integrated hexavalent chromium analytical results;
- Integrated total particulate analytical results;
- Real-time 15-minute average PM_{10} readings; and
- Meteorological conditions.

Results have been evaluated and compared to the Site-specific Acceptable Air Concentration (AAC) and the Action Levels in accordance with the AMP.

2.0 Air Monitoring

This report summarizes air monitoring at the Site performed between October 1, 2017 and November 6, 2017. Remedial activities began in the western portion of the Site on September 8, 2017. Air monitoring stations provided protection during intrusive work between September 8, 2017 and November 6, 2017. The site contains four ground level stations and one elevated station. The elevated station collects Cr^{+6} and total particulate samples for 24 hours during the week and 72 hours over the weekend. **Figure 2-1** provides an overview of the Site and a typical configuration of the AMS for the Site through the end of the reporting period. **Table 2-1** provides an overview of the air monitoring approach.

Air monitoring results to date have confirmed protection of the community, and the overall effectiveness of the program will be evaluated on a continuous basis. Success will ultimately be determined at the end of the remediation program when the average Cr^{+6} concentrations at each AMS location are compared to the AAC. This monthly report has been designed to evaluate the program's effectiveness on a monthly basis and a program-to-date basis. The Cr^{+6} average concentrations measured at each AMS will continually be compared to the site-specific AAC for Cr^{+6} to confirm the effectiveness of the program. Thus, the monthly reports will focus largely on the integrated analytical results collected as part of the Cr^{+6} fence-line air monitoring.

Air monitoring data collected at the Site includes:

- 8-hour integrated Cr^{+6} and total particulate sample collection and associated laboratory analysis;
- 24-hour and 72-hour integrated Cr^{+6} and total particulate samples collection and laboratory analysis; and
- Real-time 15-minute average PM_{10}, readings measured at the perimeter.

The following sections outline the types of data collected, frequency of collection, and the corresponding locations.

Table 2-1: Air Monitoring Approach

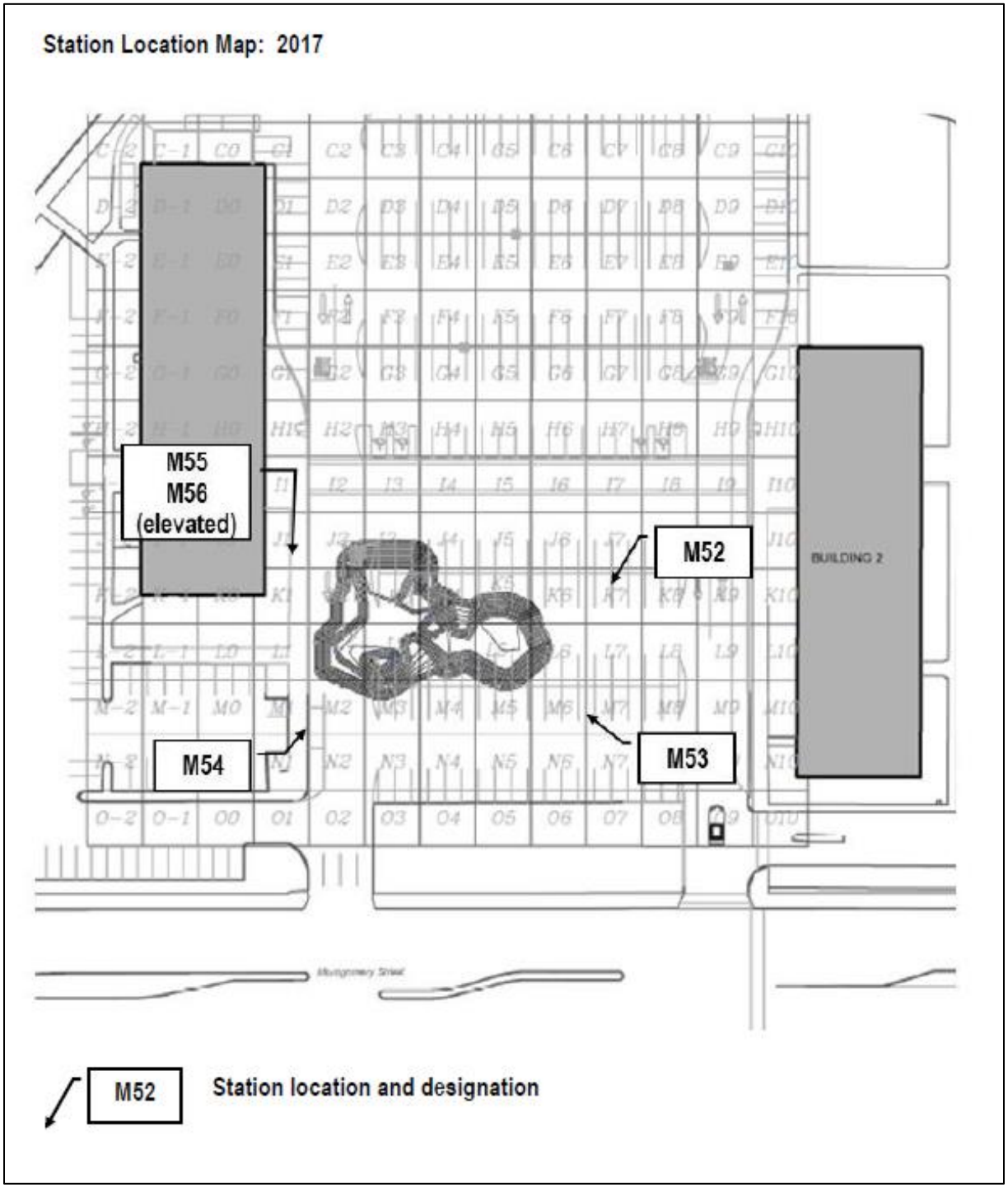
Site	Station	Integrated Air Monitoring	Real-Time Air Monitoring
Site 156	**M52, M53, M54, M55, M56**	Integrated 8-hour Cr^{+6} and total particulate sampling and analysis during work days. 24-hour and 72-hour Cr^{+6} sampling and analysis at one station 7 days per week.	15-minute average PM_{10} readings measured during a typical work day.

Note: 24-hour and 72-hour Cr^{+6} sampling was conducted at station M56 from 10/1/17 through 11/6/17 to coincide with the location of the weather station.

2.1 Integrated Air Sampling

Integrated Cr^{+6} and total particulate samples are collected at each of the AMS for an 8-hour-to-10-hour duration each working day (typically Monday – Friday). Samples are collected on a pre-weighed polyvinyl chloride 37mm filter cassette for both Cr^{+6} and total particulate. Sampling pumps operate at or around 2 liters per minute and are calibrated at the beginning and end of each sampling run.

Figure 2-1: Site Overview



2.1.1 Integrated Cr^{+6} Sampling

The exposed Cr^{+6} filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for Cr^{+6} analysis using Modified OSHA ID 215. The sample weights are provided by the laboratory with a laboratory detection limit of 20.0 ng. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated Cr^{+6} air concentrations in nanograms per cubic meter of air (ng/m^3). Filter weights reported as non-detect are included in the concentration calculation at one-half the laboratory detection limit for data reporting purposes.

In addition to sampling performed during working hours, 24-hour and 72-hour Cr^{+6} sampling and analysis are also performed at one AMS. These longer duration samples show Cr^{+6} concentrations during overnight and weekend periods. The 24-hour samples are typically collected daily from 7AM to 7AM Monday through Thursday, and a single 72-hour sample is collected from 7AM Friday through 7AM Monday.

2.1.2 Integrated Total Particulate Sampling

The exposed total particulate filters are shipped to an American Industrial Hygiene Association Industrial Hygiene Laboratory Accreditation Program-certified analytical laboratory for total particulate analysis using NIOSH Method 0500. The sample weights are provided by the laboratory with a laboratory detection limit of 100 ug. The sample weights and flow information are utilized to calculate 8-hour-to-10-hour integrated total particulate air concentrations in micrograms per cubic meter of air ($\mu g/m^3$). Filter weights reported as non-detect are included in the concentration calculation at one half the laboratory detection limit for data reporting purposes.

2.2 Real-Time Air Monitoring

Real-time air monitoring is divided into two types of monitoring including: perimeter monitoring and meteorological monitoring. Each monitoring type is described in more detail in the following sections.

2.2.1 Perimeter

Perimeter air monitoring consists of ground level stations at the perimeter of the Site. Perimeter monitoring includes the following:

- Real-time 15-minute average PM_{10} readings at each AMS location. All AMS operate 8-10 hours during remedial activities, Monday through Friday.

2.2.2 Meteorological Measurements

Meteorological measurements of 15-minute average wind speed and direction, relative humidity, pressure, and temperature are recorded onsite at station M55, 24-hours a day, seven days a week.

3.0 Site-Specific Acceptable Air Concentration and Real-Time Action Levels

Site-specific Acceptable Air Concentration (AAC) and real-time Action Levels have been developed for Cr^{+6} and real-time PM_{10} concentrations by NJDEP as part of the approved AMP, in compliance with risk assessment procedures. The AAC and real-time Action Levels have been developed to protect off-site receptors from potential adverse health impacts from Cr^{+6} and particulates over the duration of the intrusive remediation activities.

Real-time monitoring and integrated results are compared against the AAC and the real-time action levels to alert Site management of the potential need to enhance control of emissions and curtail operations to maintain concentrations at levels below the specified criteria. The AAC and real-time action levels for integrated Cr^{+6} concentrations and real-time PM_{10} are outlined in the following sections.

3.1 Integrated Cr^{+6} Acceptable Air Concentration

A Site-specific Cr^{+6} AAC has been developed by NJDEP to protect off-site receptors from potential adverse health impacts due to potential exposure to Cr^{+6} in dust. The AAC for Cr^{+6} was developed to represent the maximum allowable average concentration of Cr^{+6} in the air at each AMS over the project duration. In accordance with New Jersey regulatory requirements, the AAC represents a maximum level corresponding to a one-in-one-million (1E-06) excess cancer risk to nearby residents due to potential exposure to Cr^{+6} emanating from the Site.

The AAC of 487 ng/m^3 is applicable at the perimeter and represents the maximum allowable average concentration measured over the project duration and was developed to ensure the protection of human health. This AAC is also used to evaluate the effectiveness of dust control. PPG has established an operational goal of achieving a project average hexavalent chromium air concentration of 49 ng/m^3 to the extent practicable using best management practices throughout the duration of intrusive remedial activities at the site.

To ensure ongoing compliance with the AAC, shorter duration rolling averages are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented to ensure that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. These shorter duration average concentrations metrics include: program-to-

date, 90-day, 60-day, and 30-day running averages where the average Cr^{+6} concentration over the previous 90-day, 60-day, and 30-day periods are calculated for each sample day. Sampling days are considered days where routine sampling was conducted (typically Monday – Friday). The shorter term average concentrations are compared against the list of metrics provided in Table 3-1 which also depicts respective response actions.

Table 3-1: Running Cr^{+6} Metrics

Metric Observation	Response Action
30-day[1] Cr^{+6} average concentration greater than or equal to 45 ng/m3	External meeting to review levels, evaluate activities each day when elevated concentrations were observed, and trigger corrective action if required.
60-day[1] Cr^{+6} average concentration greater than or equal to 40 ng/m3	
90-day[1] Cr^{+6} average concentration greater than or equal to 35 ng/m3	
[1] Refers to days on which samples were collected, not necessarily calendar days	

3.2 Real-Time Alert and Action Levels

Real-time Alert and Action Levels were designed to monitor and assist in control of Site emissions to ensure protection of human health, and represent an important aspect of the remedial program at the Site. The real-time Alert and Action Levels used on Site are shown in Table 3-2.

Table 3-2: Site-specific Alert and Action Levels

Parameter	Alert Level (15-min TWA)	Action Level (15-min TWA)
PM_{10}	255 µg/m^3	339 µg/m^3

4.0 Air Sampling and Monitoring Results

Results of air sampling and monitoring conducted between October 1, 2017 and November 6, 2017 are summarized herein. The following sections present both tabular and written discussions of the air sampling and monitoring results for the reporting period including:

- Monthly integrated and real-time results;
- Program-to-date integrated and real-time statistics;
- Evaluation of program success versus the Site-specific AAC and action levels; and
- Meteorological results

Air sampling and monitoring results are presented in detail in the Appendices of this report. Appendix A includes summary of the air sampling and monitoring results for the reporting period. Appendix B includes program-to-date statistics and monthly comparison of results.

4.1 Integrated Air Sampling Results

Results of the integrated Cr^{+6} and total particulate sampling and analysis are presented in the following sections.

4.1.1 Cr^{+6} Sampling Results

Results of the Cr^{+6} sampling from the reporting period and a program-to-date evaluation are discussed in the following sections.

Reporting Period

Individual integrated 8-hour Cr^{+6} concentrations measured during the reporting period are presented in Table A-1. If an individual sample result exceeds 80% of the project duration AAC, additional evaluation and review of relevant Site conditions and activities were performed to potentially modify procedures if necessary to reduce the potential for increasing Cr^{+6} concentration trends. Any elevated concentration data during the reporting period are listed and discussed in Table A-3.

Program-to-date

Sampling and analytical statistics for integrated 8-hour Cr^{+6} results are shown in Table B-1 and include various program-to-date metrics relative to Cr^{+6} analytical data. Monthly average 8-hour Cr^{+6} concentration results are shown in Table B-2 for each AMS location.

Table 4-1: Short-Term Average 8-hour Integrated Cr^{+6} Metrics

Running Cr^{+6} Metrics[1]		Site 156				
	Metric (ng/m^3)	**AMS-1 ng/m^3**	**AMS-2 ng/m^3**	**AMS-3 ng/m^3**	**AMS-4 ng/m^3**	**AMS-5 ng/m^3**
30-day[2]	**45**	4.2	4.5	4.3	4.3	1.0
60-day[2]	**40**	4.2	4.6	4.4	4.4	1.0
90-day[2]	**35**	N/A	N/A	N/A	N/A	N/A
PTD[3]		4.2	4.6	4.4	4.4	1.2

ng/m^3 – nanograms per cubic meter

1. Running Cr^{+6} metrics are utilized to provide for the early and regular assessment of performance trends and, if necessary, allow for responsive corrective measures to be implemented ensuring that emissions of Cr^{+6} are maintained well below the AAC over the duration of the project, and are minimized to the greatest extent practicable. The running Cr^{+6} metrics are designed to evaluate the program success on short duration intervals (monthly) and do not represent the long-term (program) ending success.
2. Running Cr^{+6} metrics are valid on the last day in the report period and include the previous 30, 60, or 90-days of sample results. 90-day metrics were not available due to the short duration of sampling during this phase of the project.
3. Program-to-date - Air monitoring conducted from September 8, 2017 through the end of the reporting period.

4.1.2 Total Particulate Sampling Results

Results of the 8-hour integrated total particulate sampling and analysis from the reporting period and program-to-date results are discussed in the following sections.

Reporting Period

Individual integrated 8-hour total particulate concentrations measured at each station during the reporting period are presented in Table A-2.

Program-to-date

Sampling and analytical statistics for integrated total particulate are shown in Table B-3 and include various metrics relative to total particulate analytical data. Monthly average total particulate concentration results are shown in Table B-4 for each AMS.

4.1.3 Integrated Air Sampling Results Summary

There have been 42 sample days between September 8th and the end of the reporting period for stations M52 through M56. The results of the sample analysis are summarized in the following sections.

Air Monitoring

The program through this reporting period shows the 8-hour Cr^{+6} average concentrations, based upon lab analytical results at each AMS, were less than 0.94% of the AAC, demonstrating that the dust control measures continue to be effective.

4.2 Real-Time Air Monitoring Results

Real-time air monitoring for PM_{10} is conducted during all remedial activities. The results of the real-time air monitoring are presented in the following sections.

4.2.1 PM_{10} Monitoring Results

Results of the real-time PM_{10} sampling for the reporting period and the start of intrusive activities are discussed in the following sections.

Reporting Period

Real-time 15-minute PM_{10} averages measured during the reporting period are presented in Figure A-1. Real-time 15-minute PM_{10} averages were compared directly to the PM_{10} Action Level (339 $\mu g/m^3$) and averages greater than the action level are subject to additional evaluation. If applicable, elevated PM_{10} averages are listed and discussed in Table A-3.

Program-to-date

Real-time monthly PM_{10} averages are shown in Table B-5 for each AMS. Dust readings measured during the reporting period are similar to those during the baseline period (when no intrusive activities were occurring). This indicates that dust control measures during intrusive activities have been effective.

4.3 Meteorological Monitoring Results

Time series plots for wind speed, temperature, and relative humidity for the reporting period are show in Figure A-2 through Figure A-4, respectively.

4.4 Site Activities

Activities which occurred on the site during the month of October thru November included:

- Excavate and load out chromium-impacted soils;
- Backfill excavation;

4.5 Site Map(s)

Site maps during the reporting period are documented and included in Figure A-5.

5.0 Conclusions

Results of the October/November 2017 reporting period for the Metropolis Towers Site air sampling and monitoring program indicate that the average Cr^{+6} concentrations for each AMS are well below the site safety goal of 49 ng/m^3 and below the AAC of 487 ng/m^3. The Cr^{+6} concentrations and the percent Cr^{+6} in dust samples through this period demonstrate that the dust control measures continue to be effective at maintaining concentrations of Cr^{+6} in airborne dust at the Site well below the AAC. These results indicate that dust generated at the Site contains very small percentages of Cr^{+6} and does not represent an emission source of Cr^{+6} sufficient to create potential offsite exposure to Cr^{+6} at or exceeding the AAC.

Appendix A

Monthly Results Summaries

- Integrated 8-hour Cr^{+6} Concentrations
- Integrated 8-hour Total Particulate Concentrations
- Real-time PM^{10} Readings
- Meteorological Data
- Site Map

Table A- 1: Daily Integrated 8-hour Cr^{+6} Sampling Results

Date of Sample	M52	M53	M54	M55	M56
Sunday, October 01, 2017					4.75
Monday, October 02, 2017	3.95	4.30	4.15	4.10	1.40
Tuesday, October 03, 2017	3.95	4.35	4.15	4.10	1.40
Wednesday, October 04, 2017	4.15	4.50	4.30	4.30	1.40
Thursday, October 05, 2017	4.05	4.40	4.20	4.20	1.45
Friday, October 06, 2017	4.05	4.40	4.15	4.30	0.48
Saturday, October 07, 2017					0.48
Sunday, October 08, 2017					0.48
Monday, October 09, 2017	3.70	4.05	3.90	3.90	1.35
Tuesday, October 10, 2017	4.60	4.95	4.80	4.80	1.45
Wednesday, October 11, 2017	4.15	4.55	4.35	4.35	1.45
Thursday, October 12, 2017	4.40	4.75	4.55	4.55	1.45
Friday, October 13, 2017	4.60	5.00	4.80	4.85	0.47
Saturday, October 14, 2017					0.47
Sunday, October 15, 2017					0.47
Monday, October 16, 2017	4.55	4.95	4.75	4.80	1.45
Tuesday, October 17, 2017	4.00	4.35	4.15	4.20	1.40
Wednesday, October 18, 2017	4.20	4.55	4.40	4.40	1.45
Thursday, October 19, 2017	4.05	4.40	4.20	4.20	1.40
Friday, October 20, 2017	4.25	4.60	4.40	4.40	0.48
Saturday, October 21, 2017					0.48
Sunday, October 22, 2017					0.48
Monday, October 23, 2017	4.00	4.40	4.25	4.25	1.40
Tuesday, October 24, 2017	4.10	4.40	4.35	4.35	1.40
Wednesday, October 25, 2017	4.60	5.00	4.80	4.80	1.45
Thursday, October 26, 2017	4.45	4.80	4.60	4.60	1.45
Friday, October 27, 2017	4.45	4.90	4.70	4.70	0.48
Saturday, October 28, 2017					0.48
Sunday, October 29, 2017					0.48
Monday, October 30, 2017	4.40	4.75	4.55	4.55	1.45
Tuesday, October 31, 2017	4.25	4.60	4.40	4.40	1.40
Wednesday, November 01, 2017	4.45	4.80	4.60	4.60	1.45
Thursday, November 02, 2017	4.15	4.50	4.30	4.30	1.45
Friday, November 03, 2017	4.70	5.00	4.90	4.90	0.48
Saturday, November 04, 2017					0.48
Sunday, November 05, 2017					0.48
Monday, November 06, 2017	4.65	5.00	4.85	4.85	1.25

Results in nanograms per cubic meter

Highlighted cells indicate a detectable level of Cr^{+6}. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

Table A- 2: Daily Integrated 8-hour Total Particulate Sampling Results

Date of Sample	M52	M53	M54	M55	M56
Sunday, October 01, 2017					4.60
Monday, October 02, 2017	38.50	42.00	40.50	40.00	14.00
Tuesday, October 03, 2017	38.50	42.50	40.50	40.50	14.00
Wednesday, October 04, 2017	40.50	44.00	42.00	42.00	14.00
Thursday, October 05, 2017	39.50	43.00	41.00	41.00	14.00
Friday, October 06, 2017	39.50	43.00	40.50	42.00	4.65
Saturday, October 07, 2017					4.65
Sunday, October 08, 2017					4.65
Monday, October 09, 2017	36.00	39.50	38.00	38.00	13.00
Tuesday, October 10, 2017	45.00	48.00	46.50	47.00	14.50
Wednesday, October 11, 2017	40.50	44.50	47.50	42.50	14.00
Thursday, October 12, 2017	42.50	46.50	44.50	44.00	14.00
Friday, October 13, 2017	45.00	49.00	47.00	47.00	4.60
Saturday, October 14, 2017					4.60
Sunday, October 15, 2017					4.60
Monday, October 16, 2017	44.50	48.00	46.00	47.00	14.00
Tuesday, October 17, 2017	39.00	42.50	40.50	40.50	14.00
Wednesday, October 18, 2017	41.00	44.50	42.50	42.50	14.00
Thursday, October 19, 2017	39.50	43.00	41.00	41.00	14.00
Friday, October 20, 2017	41.50	44.50	43.00	43.00	4.65
Saturday, October 21, 2017					4.65
Sunday, October 22, 2017					4.65
Monday, October 23, 2017	39.00	43.00	41.50	41.50	29.00*
Tuesday, October 24, 2017	40.00	43.00	120.00*	42.00	29.00*
Wednesday, October 25, 2017	44.50	48.50	46.50	46.50	14.00
Thursday, October 26, 2017	43.00	47.00	45.00	45.00	14.00
Friday, October 27, 2017	43.00	47.50	45.50	45.50	4.65
Saturday, October 28, 2017					4.65
Sunday, October 29, 2017					4.65
Monday, October 30, 2017	42.50	46.50	44.50	44.50	14.00
Tuesday, October 31, 2017	41.50	45.00	43.00	43.00	14.00
Wednesday, November 01, 2017	87.00*	47.00	45.00	45.00	29.00*
Thursday, November 02, 2017	40.00	43.50	42.00	42.00	14.00
Friday, November 03, 2017	46.00	49.50	47.50	47.50	11.00*
Saturday, November 04, 2017					11.00*
Sunday, November 05, 2017					11.00*
Monday, November 06, 2017	45.00	49.00	47.00	47.00	12.00

Results in micrograms per cubic meter

Highlighted cells indicate a detectable level of total particulate. All other values are below the laboratory method detection limit (MDL). Values below the MDL are shown in the table at one-half the MDL for data reporting purposes. This established practice is consistent with PPG's Site 114 reporting of non-detects by AECOM.

* Elevated readings due to clean backfill placement.

Figure A- 1: Real-Time 15-minute average PM_{10} Monitoring Results

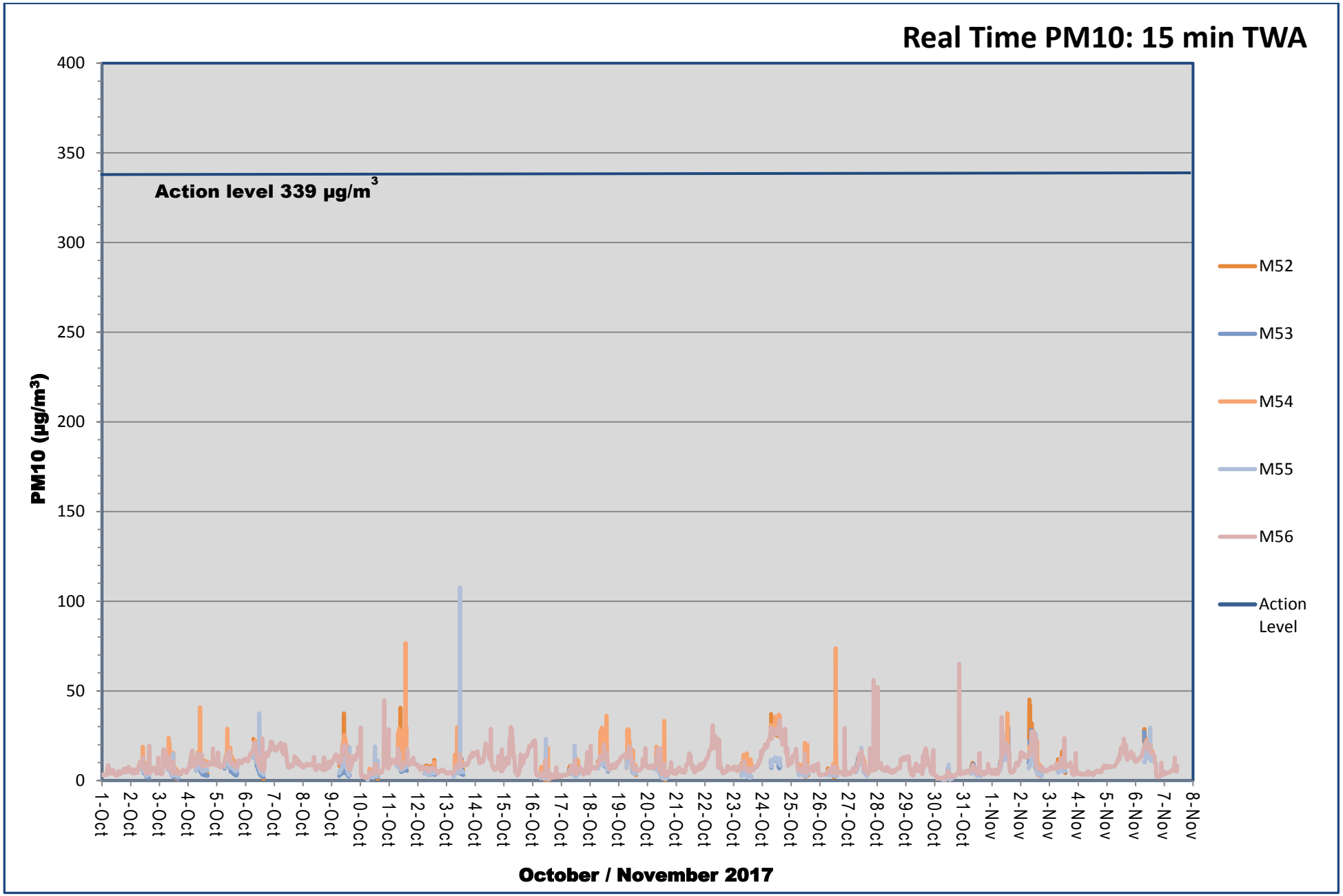


Table A- 3: Elevated Concentration Summary

Parameter	Date	Time	Location	Wind Conditions	Elevated Concentration	Explanation
NA	NA	NA	NA	NA	NA	NA

PM_{10} – Respirable Particulate Matter measured in micrograms per cubic meter ($\mu g/m^3$)

ng/m^3 – nanograms per cubic meter

$\mu g/m^3$ – micrograms per cubic meter

NA – Not Applicable

ND –No Data

Figure A-2: Wind Speed

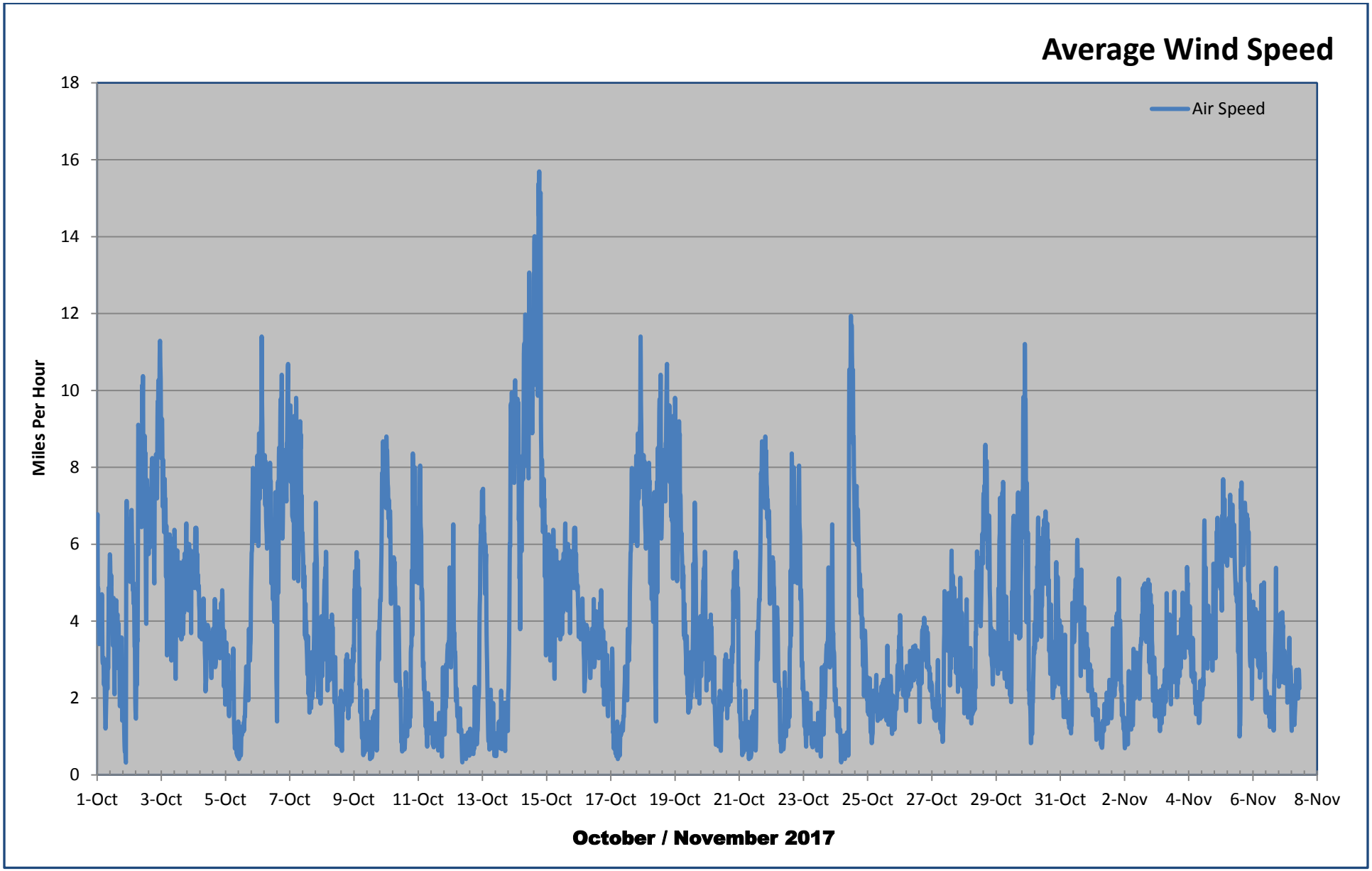


Figure A-3: Temperature

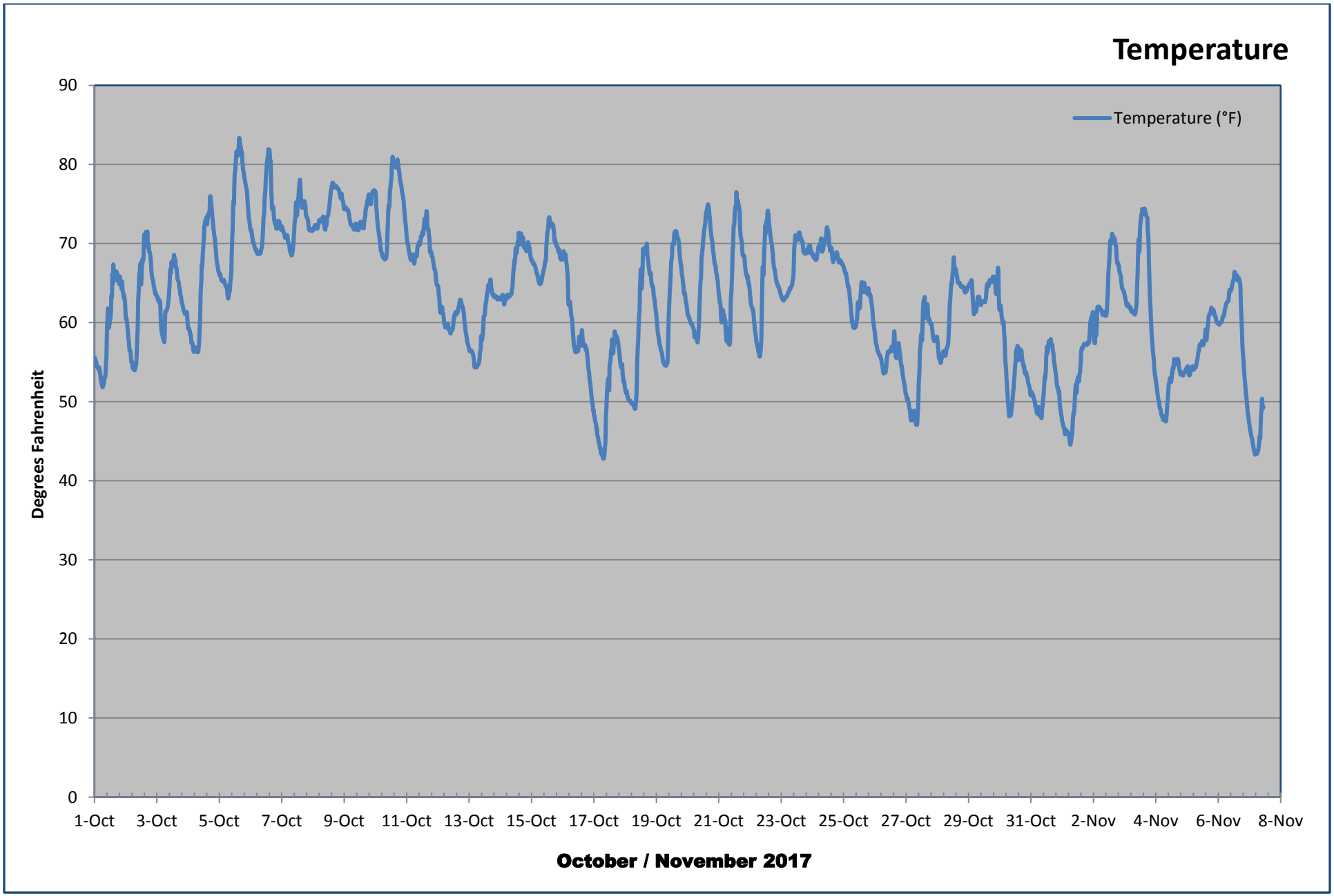


Figure A-4: Relative Humidity

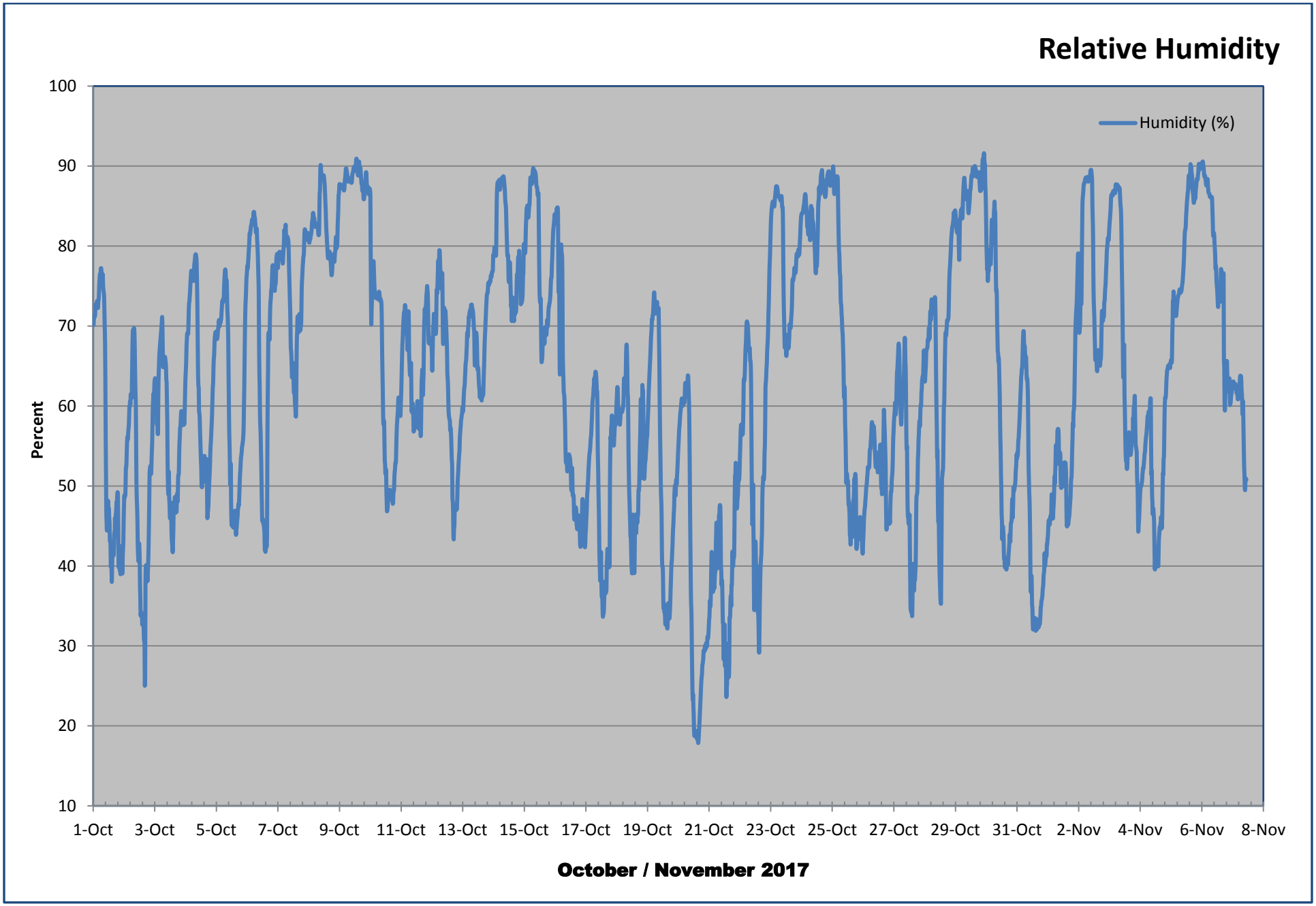
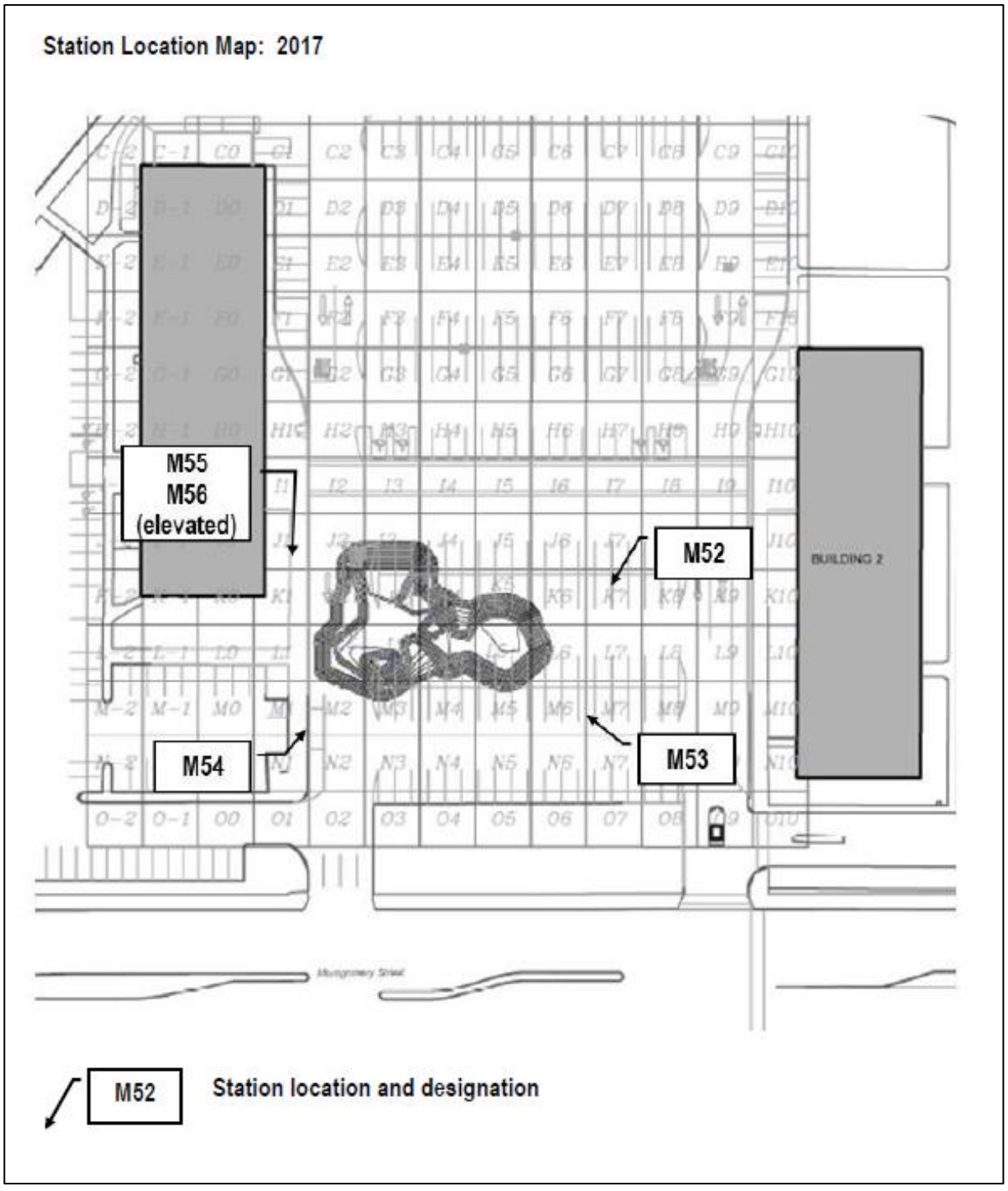


Figure A–5: Site Map Site 156 (09.08.17 – End of Reporting Period)



Appendix B

Program-to-date Result Summaries

- Integrated 8-hour Cr^{+6} Concentration Summaries
- Integrated 8-hour Total Particulate Concentration Summaries
- Real-time PM^{10} Concentrations Summaries

Table B- 1: Program-to-date Integrated 8-hour Cr^{+6} Sampling Results Statistics

Statistics[1]	Sites 156				
	M52	**M53**	**M54**	**M55**	**M56**
Total Number of Samples[1]	42	42	42	42	42
Rate of Data Collection	100%	100%	100%	100%	100%
Number of Detected Samples[2]	0	0	0	0	0
% of Cr^{+6} Samples Greater than MDL	0.0%	0.0%	0.0%	0.0%	0.0%
Number of Samples Above AAC	0	0	0	0	0
Average % Cr^{+6} in Dust[3]	0.010%	0.010%	0.010%	0.010%	0.009%
Maximum % Cr^{+6} in Dust[3]	0.010%	0.010%	0.010%	0.010%	0.010%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since September 8, 2017. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since September 8, 2017 reported above the laboratory reporting limit.

[3] The program-to-date average and maximum percent Cr^{+6} in dust was calculated using all the integrated Total Particulate and Cr^{+6} sample results collected since September 8, 2017.

Table B- 2: Monthly Average Integrated 8-hour Cr^{+6} Sampling Results

Statistics	Sites 156				
	M52	M53	M54	M55	M56
September	4.2	4.5	4.4	4.4	1.0
October	4.2	4.6	4.4	4.4	1.0
November	4.5	4.8	4.7	4.7	0.9
Program to Date	4.2	4.6	4.4	4.4	1.0
All readings in ng/m^3 – nanograms per cubic meter					

Table B- 3: Program-to-date Integrated Total Particulate 8-hour Sampling Results Statistics

Statistics	Sites 156				
	M52	**M53**	**M54**	**M55**	**M56**
Total Number of Samples[1]	42	42	42	42	42
Rate of Data Collection	100%	100%	100%	100%	100%
Number of Detected Samples[2]	1	0	2	0	6
% Detection	2.4%	0.0%	4.8%	0.0%	14%

Results in ng/m^3 – nanograms per cubic meter

[1] Total number of samples collected since September 8, 2017. Variations in the number of samples collected are specifically identified in Table A-1 within the report month of the variation. In general variations are caused by sampler malfunctions, site activities, weather conditions, etc.

[2] Total number of sample results since September 8, 2017 reported above the laboratory reporting limit.

Table B- 4: Monthly Average Integrated 8-hour Total Particulate Sampling Results

Statistics	Sites 156				
	M52	M53	M54	M55	M56
September	40.7	43.6	50.0	42.2	17.1
October	41.1	44.8	46.7	43.0	11.0
November	54.5	47.3	45.4	45.4	14.7
Program to Date	42.2	44.6	47.8	42.9	13.7
All readings in µg/m^3 – micrograms per cubic meter					

Table B- 5: Monthly Average Real-Time PM_{10} Monitoring Results

Statistics	Sites 156				
	M52	M53	M54	M55	M56
September	9.3	6.3	13.2	9.0	11.3
October	7.8	5.6	10.2	6.0	8.8
November	14.3	12.5	14.4	10.3	9.3
Program to Date	9.0	6.5	11.8	7.6	9.8
All readings in µg/m^3 – micrograms per cubic meter					