Draft
Community Air Monitoring Plan - OH-007
Gowanus Canal OH-007 Outfall for Construction Activities
CSO-GC-SFS-DES
Construction of CSO Facilities for Gowanus Canal

Prepared for
New York City Department of Environmental Protection
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This is a draft and is not intended to be a final representation
of the work done or recommendations made by Hazen and Sawyer.
It should not be relied upon; consult the final report.

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List of Abbreviations

BEDC	Bureau of Engineering, Design, and Construction
BTEX	Benzene, toluene, ethylbenzene and xylenes
CAMP	Community Air Monitoring Program
COC	Contaminant of Concern
CSO	Combined sewer overflow
DEC	New York State Department of Environmental Conservation
DEP	New York City Department of Environmental Protection
DOH	New York State Department of Health
EHASP	Environmental Health and Safety Plan
EPA	United States Environmental Protection Agency
GC	gas chromatography
HCN	hydrogen cyanide
MGP	Manufactured Gas Plant
µg/m^3	micrograms per cubic meter
µM	micron
PID	photoionization detector
PM10	particulate matter
ppm	parts per million
SVOCs	Semi-Volatile Organic Compounds
TVOC	Total volatile organic compounds
TWA	time-weighted average
VOCs	Volatile Organic Compounds

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Section 1
Introduction

This Community Air Monitoring Plan (CAMP) has been prepared on behalf of the New York City Department of Environmental Protection (DEP) Bureau of Engineering Design & Construction (BEDC) for use during construction activities related to an 4-million-gallon combined sewer overflow (CSO) facility for CSO outfall Owl's Head OH-007 in Brooklyn, New York. The OH-007 site is an approximately 4-acre triangular shaped property bounded by the Gowanus Canal to the northwest, 2nd Avenue to the east and the 6th street turning basin to the south. The site location is shown on Figure 1-1. . This CAMP focuses on air monitoring during construction activities for the CSO facility and at the OH-007 site. The contaminated media at the site are primarily the result of byproducts and wastes associated with the nearby Former Citizens Manufactured Gas Plant (MGP) site, including coal tar, and the past and present uses of the Site, including creosoting works, potential asbestos storage, leaking Underground Storage Tanks (UST), and other industrial activities. Contaminants of concern include volatile and semi-volatile organic compounds (VOCs/SVOCs), including benzene, toluene, ethyl benzene, xylene (BTEX) and naphthalene, cyanide and Polycyclic Aromatic Hydrocarbons (PAHs). The potential presence of asbestos in subsurface soils and groundwater will be confirmed by further investigation. A standalone document will be provided for asbestos monitoring during construction if needed.

This CAMP has been developed using the techniques described in the United States Environmental Protection Agency (EPA) Engineering Bulletin: Design Considerations for Ambient Air Monitoring as Superfund Sites, EPA/540/S-92/012, dated November 1992. In addition, the CAMP conforms to the requirements of the New York State Department of Health (DOH) "Generic Community Air Monitoring Plan, November 2009" guidelines as presented in Appendix 1A and Appendix 1B "Fugitive Dust and Particulate Monitoring" of the New York State Department of Environmental Conservation (DEC), Final DER-10, "Technical Requirements for Site Remediation," dated May 2010.

Potential exposures to contaminants of concern for on-site personnel during construction activities will be addressed separately from the CAMP in a site-specific Environmental Health and Safety Plan (EHASP). The EHASP will specify air monitoring requirements within the work zone. This CAMP focuses on perimeter monitoring during construction activities and is intended to protect the local community.

1.1 Purpose and Objective

This CAMP was developed to provide procedures for collecting, recording and responding to potential airborne contaminants during construction activities for the CSO retention tank and conveyance structures. The community air monitoring program is designed to meet the following objectives:

- Monitor and document ambient air quality around the perimeter of the excavation areas for the CSO retention tank and conveyance piping for the duration of the project.
- Evaluate the collected data to assess exposure risks to the community due to construction activities on-site.
- Provide an early alert system to the Air Monitoring Team and construction contractor(s) if the ambient air is approaching an alert/action level due to construction activities.
- Provide details on responsive actions designed to reduce offsite exposure if action levels are exceeded.
- Evaluate the effectiveness of engineering controls to mitigate offsite exposure of site's contaminants.
- Minimize risk to the community from exposure of airborne contaminants due to construction activities.

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- Provide support to real-time air monitoring data through the periodic collection of laboratory analytical sample.
- Develop a central location (database) where air quality data, meteorological data, equipment calibration records, daily/weekly reports etc. collected during the construction activities is permanently stored.

1.2 General Approach

The CAMP provides a system to assist in protecting the public from potential emissions of vapors and particulates from the planned intrusive construction activities. To meet the objectives of the CAMP, monitoring activities will be conducted as follows:

1. Conduct real-time air monitoring to measure contaminants of concern (COC) at several monitoring stations during soil intrusive construction activities. The data collected during the real-time monitoring will serve as an early warning and provide notification for on-site personnel if COCs are approaching applicable alert/action levels. This would provide the contractor with time to confirm any potential treats and implement the necessary response procedure, if needed.
2. Include collection of laboratory analytical samples to supplement the real-time data. Analytical samples will also be collected periodically over the duration of the implementation of the CAMP and in addition if COCs are approaching an action level.
3. Establish a project database that will manage all the data collected from the various forms of monitoring conducted at the site and assist the DEP and the on-site contractor with decision making related to emissions from the intrusive construction activities.

1.3 Potential Air Emission Sources

The primary air quality concern during implementation of CSO construction activities is the generation and migration of particulates (i.e., dust) and VOCs. Activities that could impact air quality at the site perimeter include:

- Demolition of existing at-grade slabs, basements and subsurface structures
- Removal of underground storage tanks
- Excavation to disconnect and/or relocate any in-service utilities within the footprint of CSO tanks
- Construction of the support of excavation
- Removal of pile foundation
- Excavation for the CSO retention tank and conveyance structures
- Stockpiling soils
- Back filling
- Site grading
- Stabilization and loading soils for offsite disposal
- Truck traffic
- Construction of the foundation for the facility

1.4 Potential Off-Site Receptors to Air Emissions

The site is located in an urban neighborhood that includes commercial, industrial and residential uses. Potential off-site receptors to air emissions from the site include:

- Residents in surrounding homes and apartment buildings
- Site workers or visitors at adjacent commercial or industrial properties
- Individuals present due to vehicular or pedestrian traffic on 2nd Avenue and 6th Street

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Section 2

Community Air Monitoring Program

According to the EPA Engineering Bulletin: Design Considerations for Ambient Air Monitoring at Superfund Sites, EPA/540/S-92/012, dated November 1992, when designing an ambient air monitoring program, site characteristics, waste properties and project specific factors including state and local regulations should be considered. Since this site is located in the State of New York, the applicable portions of the NYSDEC Final DER-10 (Appendix 1A - DOH Generic CAMP and Appendix 1B - Fugitive Dust and Particulate Monitoring) have been incorporated in this CAMP.

The DOH Generic CAMP defines two types of protocols for perimeter air monitoring – continuous and periodic. The DOH Generic CAMP protocol requires continuous perimeter air monitoring during all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities are defined in the DOH Generic CAMP protocol as including, but not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

The DOH Generic CAMP protocol requires periodic monitoring during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. Examples of "periodic" monitoring presented in the DOH Generic CAMP include collection of air quality data upon arrival at a sample location, while opening a well cap or overturning soil, during well bailing/purging, and prior to leaving a sample location. The DOH Generic CAMP protocol further states that in some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities.

The community air monitoring program will consist primarily of continuous air monitoring with the use of periodic monitoring on an as needed basis during non-intrusive activities such as dewatering, water treatment, moving from one location to another, etc. For the continuous air monitoring, a minimum of eight air monitoring stations will be established and monitored continuously for the duration of the intrusive construction activities. Continuous air monitoring data will be supplemented with analytical samples which will be collected and submitted to a laboratory for analysis.

2.1 Key Personnel

The CAMP will be implemented by the selected construction contractor for the CSO construction activities. The selected construction contractor will be responsible for providing an air monitoring team consisting of the following key personnel.

- Air Monitoring Manager - Responsible for daily air monitoring activities, collection of analytical air samples, notifying construction contractor of any alert/action level exceedance and ensuring the appropriate response actions are implemented.
- Dedicated Air Monitoring Technician - Responsible for operations and maintenance of air monitoring equipment and collection of analytical air samples.

The air monitoring team will report to the DEP's designated representative.

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2.2 Continuous Air Monitoring

Continuous monitoring of respirable particulate matter under 10 micron (µM) in diameter (PM10) and total volatile organic compounds (TVOC) will be conducted at each of the air monitoring stations. Real-time data will be recorded in 15-minute averages that will be updated continuously every minute. Real-time monitoring will be conducted 24-hours a day, 7 days per week prior to commencement of work to establish baseline conditions in the community around the OH-007 site and during ground intrusive activities. Each of the air monitoring stations will be set up with early alarm systems that will notify members of the air monitoring team if any predetermined alert levels or action levels are triggered so the appropriate response can be implemented. The data generated from the continuous monitoring will be uploaded to a cloud-based server for easy access from smartphones or android devices. Alarm notification for alerts or action levels will be sent directly to smartphones or android devices used by members of the air monitoring team. Air monitoring reports will be generated in accordance with the Communication Plan presented in Section 2.5.

2.2.1 Station Layout

The initial location of the mobile air monitoring stations, a minimum of three upwind and a minimum of three downwind, is based on prevailing wind directions and the direction of potential off-site receptors from the site. Figure 2-1 presents the proposed station locations. Wind rose diagrams (Appendix A) were obtained from the Iowa Environmental Mesonet, Iowa State University[1] for the nearest publicly available weather station data located at the Manhattan Wall Street, located approximately 2 miles northwest of the project site. Wind data used to determine predominant wind direction were for the past five years (2018 through 2023), determined separately for each month of the year and restricted to daytime wind directions when work activities will be occurring. Based on the available data, the following observations can be made:

- The primary wind direction in the winter months (November through March) is from the west and the southwest.
- The primary wind direction in the spring and summer months (April through October) is from the southwest and northeast.

The layout depicted on Figure 2-1 encompasses the work zones in which intrusive construction activities will be implemented. The air monitoring station layout may be modified prior to the initiation of the construction activities based upon the prevailing wind direction measured during the baseline monitoring period (described in Section 2.1.4 below) as well as the portion(s) of the site where actual intrusive work activities are occurring. Any adjustments to the station layout will be recorded in the daily field reports generated during documentation of site construction activities.

A meteorological station will be installed at the site to measure and record wind speed and direction, ambient temperature, barometric pressure and relative humidity. The proposed location for placement of the meteorological station is shown on Figure 2-1.

2.2.2 Analytical Instrumentation

Each continuous monitoring station will be equipped at a minimum with the following:

- Photoionization detector (PID)
- Particulate meter equipped with a PM10 particle size separator
- Sample manifold system with humidity reduction

[1] Iowa Environmental Mesonet, Iowa State University (http://mesonet.agron.iastate.edu/sites/locate.php)

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- Modem or wireless communication device
- Backup battery

The above items will be housed in an insulated, weather tight enclosure.

2.2.3 Meteorological System

As indicated above, a meteorological station will be installed at the site to measure and record wind speed, direction, ambient temperature, barometric pressure and relative humidity. The meteorological station will be located at a central on-site location that is clear of construction activities, on-site buildings or other obstructions that could influence the data quality. The system computes the five-minute running average wind direction, which will be used to identify which of the monitoring stations is upwind, downwind, or crosswind at any given time. Wind direction may also be used as the basis for potential re-location of air monitoring stations prior to or during the initiation of intrusive construction activities at a particular portion of the site, with a focus on ensuring that the downwind direction is sufficiently monitored. Meteorological data will be uploaded to the cloud-based server.

2.2.4 Baseline Monitoring

Prior to commencement of CSO construction activities, monitoring will be conducted to establish baseline conditions and evaluate the potential range of background concentrations that may be present during CSO construction activities. To establish baseline conditions, five consecutive days (24 hour/day) of continuous monitoring will be conducted at the eight air monitoring stations. Air samples will also be collected and submitted for laboratory analysis of VOCs and naphthalene via EPA Method TO-15 (see Section 2.3).

2.3 Periodic Air Monitoring

Periodic monitoring of cyanide and odor will be conducted along the upwind and downwind perimeters of the site on an as-needed basis. Conditions at the site that my trigger additional perimeter monitoring include:

- Detections of cyanide in the work area as part of EHASP-related monitoring or if materials that have the potential to contain cyanide based on appearance (bluish in color) are encountered during intrusive construction activities
- Odor complaints or odor detected during perimeter walk arounds
- Detections of TVOC and PM10 at or above the predetermined alert and/or action levels

If one of the above triggers occur, monitoring will continue until conditions are restored to below or at background levels.

2.3.1 Cyanide

To monitor cyanide in the vapor stage, hydrogen cyanide (HCN) gas will be measured using a hand-held meter and a Draeger hand pump equipped with cyanide Draeger tubes. If detected, periodic monitoring of cyanide will be conducted throughout the duration of the intrusive construction activities.

For periodic monitoring of cyanide, a hand-held meter such as a VRAE by RAE Systems will be utilized. Readings will be manually recorded in 30-minute intervals. In addition, manual measurements of HCN will also be made using a Draeger pump and cyanide colorimetric Draeger tubes which can detect HCN ranging in concentrations from 0.5 to 100 parts per million (ppm). These readings will not be continuous, but instead will be collected every 2 to 3 hours.

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2.3.2 Odor Surveys

MGP impacted soils has the potential to emit odors when exposed during intrusive activities. These odors can be the source for most of the air pollution complaints reported by citizens in the community. To address or mitigate any potential concerns from citizens in the community, odor surveys will be conducted periodically throughout the day along the perimeter of the site.

If odor complaints are made by the community or if odor is detected at the perimeter of the site by a member of the air monitoring team, the date and time will be recorded along with the responsive action taken to address the concern. In addition, a sample of air at a downwind location will be collected and analyzed by an onsite Gas Chromatograph (GC) specific to naphthalene. The sample will be collected over a 15-minute interval and the data will be recorded in the project database.

2.3.3 On-site Chemical Speciation - BTEX and Naphthalene

If the action level (1 ppm above background over a 15-minute average) for TVOC is triggered, an air sample will be collected and analyzed for BTEX and naphthalene. This sampling and analysis will be done utilizing an on-site GC unit, while the TVOC monitoring using a PID is continued at the CAMP station. If the 15-minute TVOC following the initial sample also exceeds the action level, another sample will be collected and analyzed by the on-site GC. This process will be repeated until mitigation measures have achieved a level of the TVOC below 1 ppm. Action levels and mitigation responses are described in Section 3 below.

2.4 Confirmatory Air Sampling – EPA Method TO-15

Air samples will be collected for VOCs and naphthalene at two air monitoring stations during the baseline monitoring period (to establish background conditions) and then once per week to supplement the real-time monitoring of TVOC. Air samples will be collected from downwind locations or biased to locations that have the highest concentration of airborne contaminants based on real-time TVOC and PM10 data. Samples will be collected over a 24-hour period using a 6-liter evacuated stainless steel SUMMA canister and submitted to a lab for analysis.

If there are two or more consecutive 15-minute Action Level exceedances for TVOC and the exceedances can be attributed to on-site intrusive activities, an air sample will be collected and submitted to a lab for analysis.

2.5 Communication Plan

For any “red” stop-work condition, the associated control measures implemented by the contractor and the resumption of field work will be immediately communicated to the DEP’s representative upon occurrence. DEP’s representative will also be notified if response actions are not implemented according to this plan.

Daily Field Reports will be prepared by the air monitoring team and will include:

- Description of construction activities
- Marked up figure with any changes in the locations of air monitoring stations
- Exceedances of real-time air monitoring concentrations at upwind and downwind air monitoring stations
- Corrective actions taken, if any, due to elevated real-time air monitoring concentrations
- Time of inspection and calibration of field equipment
- Start and stop times for air sample collected by mobile GC or for laboratory analysis

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A weekly report prepared by the air monitoring team will consist of the following:

- Summaries of the daily site activities
- Daily maximum concentrations of TVOC and PM10
- Any action level conditions and the actions taken to control emissions from the site

A Final Air Monitoring Report will be prepared at the end of the construction activities. This report will include summaries of the continuous monitoring data, meteorological data, periodic air monitoring data and analytical results from the air sampling.

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Section 3
Action Levels and Response

3.1 Action Levels

Action levels are designated with either a "green," "yellow," "orange," or "red" status. Action levels pertain to the incremental concentration that is site related. These color-coded levels correspond to points at which the members of the air monitoring team will be notified that the activities being performed are having an impact on air quality and that immediate mitigation is necessary (i.e., control measures are to be implemented). The mitigation/control measures shall be determined by the contractor in consultation with the air monitoring team. Each of eight air monitoring stations will be programmed to provide alert or action level notifications as follows:

- If 15-minute averages of TVOC or PM10 concentrations are approaching alert levels, an alarm notification will be sent to the smartphones or android devices used by members of the air monitoring team.
- If concentrations of TVOC or PM10 exceeds the action levels, an alarm notification and email will be sent to members of the air monitoring team, the on-site foreman, the database manager and DEP's representative. The air monitoring team and DEP's representative will evaluate the exceedance (see Section 3.2) to determine if the difference between upwind and downwind concentrations is below the action level and is due at least in part to background. If not, the team will implement the appropriate response action.

The alert/action levels and potential responsive actions developed for this CAMP are described in the following sections.

3.1.1 Volatile Organic Compound Action Levels

In accordance with the DOH Generic CAMP, if the ambient air concentration of TVOC at the downwind perimeter of the work area exceeds 1 ppm above background for a 15-minute average, work activities must be temporarily halted and monitoring continued. If the TVOC level readily decreases (per instantaneous readings) below 1 ppm over background, work activities can resume with continued monitoring.

To minimize the chance that field activities will generate air impacts at or in excess of 1 ppm above background, a tiered approach to alarm levels consisting of a lower (yellow) action level, a mid-action level (orange) and a high-action level (red) will be established. Mitigation/control measures will be implemented based on the level of the alarm, progressively becoming more urgent until a halt work is required. The alarm will be triggered based on total levels, but work would not be halted, or any mitigation measures implemented unless the differential between background and downwind readings exceeds the action levels. In the case of this CAMP, no mitigation measures will be required for organic vapor levels below 1 ppm above background as indicated in the green color code in Table 3-1.

TVOC data from continuous monitoring will be used to calculate 15-minute time-weighted average (TWA) values for comparison to the action level. Table 3-1 details the action levels for VOCs.

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Table 3-1. Total Volatile Organic Compound Action Levels	
Alert/Action Level	**Response**
Below 0.5 ppm above background for the 15-minute average	Continue and/or resume work activities
> 0.5 ppm to <0.75 ppm above background (15-minute average) or if odors are observed	Notify contractor of need to implement mitigation measures. Employ vapor suppression techniques or modify work activities.
>0.75 to <1 ppm above background (15-minute average) or if odors are observed	Notify contractor of need to implement more aggressive mitigation measures. Work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions and continue monitoring.
> 1 ppm to <5 ppm above background (15-minute average) or if odors are observed	Work activities must be temporarily halted, the source of vapors identified, corrective actions taken to abate emissions and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 1 ppm over background, work activities can resume with continued monitoring.
>5 ppm to <25 ppm above background (15-minute average)	Work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
>25 ppm above background (15-minute average)	Activities must be shut down.

3.1.2 Particulate Matter Action Levels

In accordance with the DOH Generic CAMP protocol, the action level for perimeter air monitoring at the site is 150 micrograms per cubic meter (µg/m^3) of respirable particulate matter above background for the 15-minute average. Particulates that are 10 microns or smaller and are considered respirable are known as PM10. No visible dust can be seen migrating from the work area. Particulate data from continuous monitoring will be used to calculate 15-minute TWA values for comparison to the action level.

To minimize the chance that remedial activities will generate visible dust or air impacts at or above 150 µg/m^3 above background, a tiered approach to alarm levels consisting of a lower (yellow) action level and a mid-action level (orange) will be established. Mitigation/control measures will be implemented based on the level of the alarm progressively becoming more urgent until a halt work is required. The alarm will be triggered based on total levels, but work would not be halted, or any mitigation measures implemented unless the differential between background and downwind readings exceeded the action levels. Table 3-2 details the action levels for particulates.

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Table 3-2. Action Levels for Particulates	
Action Level	**Response**
Below 100 µg/m³ above background for the 15-minute average	Continue and/or resume work activities
> 100 to < 150 µg/m³ above background for the 15-minute average or if airborne dust is observed leaving the work area	Dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM10 particulate levels do not exceed 150 µg/m³ above the upwind level and provided that no visible dust is migrating from the work area.
If, after implementation of dust suppression techniques, downwind PM10 particulate levels are greater than 150 µg/m³ above the upwind level	Work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM10 particulate concentration to within 150 µg/m³ of the upwind level and in preventing visible dust migration.

3.1.3 Odor

Perimeter odor monitoring will consist of qualitative odor observations downwind of the daily work area. Community complaints regarding odors and the response actions taken will be documented. Response actions will depend on the number and/or magnitude of the complaints. At a minimum the response action will consist of documenting the date and time the complaint is received. In accordance with the VOC action levels presented above, response actions will progressively become more urgent until a halt work is required. DEP representative will be notified about the complaints and the corrective measures (applying suppressant foams, cover stock piles etc.) implemented.

3.2 Response Procedures

As detailed in Section 3.1, the "red" action level for community air monitoring at the site is 1 ppm and above for VOCs and 150 µg/m³ for PM10. The system will be monitored for potential exceedances of the established yellow/orange alert levels and red action levels. The lower alert levels have been established to implement control measures before reaching the stop work ("red") action level.

Due to the active commercial/industrial operations at and surrounding the site, elevated levels of suspended particulates are anticipated. As a result, the use of upwind and work zone monitoring is critical to assess whether action level conditions are the result of intrusive field activities or ambient (background) conditions (i.e., migration from upgradient or localized conditions). Work would not be halted, or control measures implemented until upwind and work zone readings are compared to the continuous monitoring readings, with the exception of visible dust or odoriferous conditions.

The following steps outline the procedures the Air Monitoring Manager shall follow in response to action level conditions:

1. Identify whether the station is upwind, downwind, or crosswind to the work area.
   a. If station is upwind, then continue work with air monitoring. Note the condition and response in the Daily Field Report.
   b. If station is downwind or crosswind, then proceed to Step 2.
2. Compare the reading to upwind readings.
   a. If the upwind reading is above action levels, then continue work with air monitoring. Note the condition and response in the Daily Field Report.
   b. If the upwind reading is below action levels, then proceed to Step 3.

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3. Determine the difference between the readings obtained at the upwind and downwind stations. Based on visual determination, assess whether the exceedance is due to a localized ambient (background) condition (i.e., dust from upwind sites or roadways) in the vicinity of the station:
   a. If it is suspected that the reading is not the result of a localized ambient (background) condition, then corrective action is required. Note the condition, response and corrective actions implemented in the Daily Field Report.
   b. If it is suspected that the reading is the result of a localized background condition, then obtain readings from the downwind boundary of the work zone with a handheld instrument and compare to the station reading.
      i. If the work zone reading is less than station reading, then continue work with air monitoring. Note the condition and response in the Daily Field Report.
      ii. If work zone reading is greater than station reading, then corrective action is required.

Visible dust emanating from the work area will require immediate implementation of dust control measures without progressing through the steps outlined above.

3.2.1 Volatile Organic Compounds

If intrusive activities result in a concentration of total VOCs at the downwind perimeter of the work area in excess of 1 ppm over background, activities will be managed as follows:

- If the concentration of total VOCs at the downwind perimeter of the work area exceeds 1 ppm above background, but less than 5 ppm, for a 15-minute average, work activities will be temporarily halted and monitoring continued. If concentrations drop rapidly, work activities can resume with continued monitoring.
- If concentrations between 5 ppm and 25 ppm above background persist, work must be stopped and the source of the vapors identified and mitigated. Mitigation measures may include engineering controls such as application of spray foam or tackifiers, covering with plastic or fabric liners, or the use of temporary enclosures and modification of work protocols (e.g., excavation procedures). After work activities resume, the total VOC concentration at the contingency location (defined as 200 feet downwind of the work area or half the distance to the nearest receptor, whichever is less) must remain below 5 ppm on a 15-minute-averaged basis.
- If the concentration exceeds 25 ppm at the perimeter of the work area, work activities will be halted. Air sampling in accordance with this CAMP will continue in the event that elevated PID levels are detected, so that this information will be available to assess the potential impacts to offsite receptors or to develop mitigation measures.

3.2.2 Particulates

Dust suppression levels are implemented at the yellow action level (initially 100 µg/m^3 of PM10). DOH CAMP guidance provides the following:

- If the concentration of total PM10 particulates at the downwind perimeter of the work area exceeds 100 µg/m^3 over background for a 15-minute average, dust suppression techniques must be instituted.
- Work may continue after employment of dust suppression as long as the downwind perimeter PM10 levels are below 150 µg/m^3 over background and there is no visible dust emanating from the site.
- If levels below 150 µg/m^3 cannot be achieved, work must stop and can only resume when additional controls are successful in keeping perimeter dust levels less than 150 µg/m^3 above background.

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3.3 Response Actions

Air emission controls will be implemented proactively and in response to the results of air monitoring. The contractor will be required to identify plans to proactively control dust, vapor and odor emissions along with contingency measures as components of the contractor's Remedial Action Work Plan or other appropriate document. Control measures may include, but are not limited to:

- Wetting equipment and excavation faces during excavation activities, including disturbance of structures or hard surfaces associated with demolition, using water or amended water solutions
- Spraying water or amended water solutions on construction equipment during excavation and loading/unloading
- Removal of dust/debris from paved access roads (e.g. use of a street sweeper)
- Limiting the area of disturbed ground surface
- Covering stockpiles when active loading or unloading is not being performed
- Routine application of foams or tackifiers to suppress vapors and/or dust
- Hauling earthen and waste materials in appropriately covered and/or watertight containers
- Covering disturbed areas when active excavation is not occurring (e.g., with fabric or plastic liners)
- Using of stabilized construction entrances and decontamination pads to remove soil from vehicles entering and exiting work areas
- Using temporary enclosures with air collection and treatment systems

The contractor will be required to provide and maintain a supply of water, suppressant foam, and appropriate equipment (e.g., hoses, misters) on-site for potential use as necessary to control dust, vapors and odors. In addition, the contractor will be required to contain excess water and control runoff in accordance with applicable regulations and project specifications.

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Section 4

Quality Assurance Procedures

Quality Assurance and Quality Control activities are designed to ensure that the data collected from the field program and analytical sampling are accurate and protective of the community and the environment.

4.1 Routine Procedures for Monitoring Equipment

Routine air monitoring procedures will consist of the following:

- Daily inspection of the monitoring stations to confirm that they are secure and operating properly. Check for damage, loss of air flow, dirt or moisture buildup, and replace inlet filters, as necessary, or as prescribed by the manufacturer of the monitoring equipment.
- Daily calibration of particulate meters in accordance with manufacturer specifications. Calibration frequency may be modified, as appropriate, based on communication with manufacturer/vendor.
- Daily calibration of PID in accordance with manufacturer specifications. Calibration frequency may be modified, as appropriate, based on communication with manufacturer/vendor.
- Calibration of the mobile GC with the correct standards.
- Exchanging the mobile GC unit every 3 weeks with the rental company.
- Daily inspection of operational set points on particulate meters.
- Daily inspection of the meteorological station for proper operation.
- Troubleshooting of potential system issues.
- Observation of daily conditions, including particulate levels and meteorological data. Based on wind direction, locations of air monitoring stations will be adjusted, as appropriate.
- Monitoring of each station throughout the workday for action level conditions. Section 3.3 outlines response procedures to action level conditions.
- Preparation of Daily Field Reports to document system troubleshooting, station layout adjustments, action level conditions and corresponding response actions, if any.
- Back-up air monitoring data will be stored electronically on the cloud-based server and copied onto a thumb drive or other suitable transportable media on a weekly basis and transported to an off-site project record file.

4.2 Analytical Samples

Supplies (Summa canister and flow controller) for the air samples will be supplied directly from the analytical laboratory conducting the analysis. The flow control will be calibrated by the lab to collect a sample over a 24-hour period. Additional Summa canisters and flow controllers will be included with every order as a backup.

4.3 Data Usability

Factors that affect data usability generated as part of an ambient air monitoring program are generally known and consist of but are not limited to:

- High relative humidity

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- Excessive moisture (i.e., rain)
- Proximity to non-remedial activities (i.e., truck traffic)
- Internal contamination of instrumentation

Steps will be taken to limit these impacts on the field instruments by using weather shelters, modifying monitoring locations to limit impacts from activities not related to intrusive design field work, performing maintenance in accordance with manufacturer specifications and replacing or rotating out instruments for off-site servicing on an as needed basis.

Correlation of documented field conditions and activities to data logged will assist with the identification of factors that affect data usability during implementation of the CAMP.

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Section 5

Limitations

This document was prepared solely for New York City Department of Environmental Protection (DEP) in accordance with professional standards at the time the services were performed and in accordance with the contract between DEP and Hazen and Sawyer dated April 9, 2021. This document is governed by the specific scope of work authorized by DEP; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by DEP and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

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CSO-GC-SFS-DES-OH CAMP 20230309 Black Text

Section 6

References

1. NYSDEC, 2010. Division of Environmental Remediation, DER-10, Technical Guidance for Site Investigation and Remediation. May 2010.

2. USEPA 1992. Engineering Bulletin: Design Considerations for Ambient Air Monitoring At Superfund Sites. EPA/540/S-92-012. November 1992.

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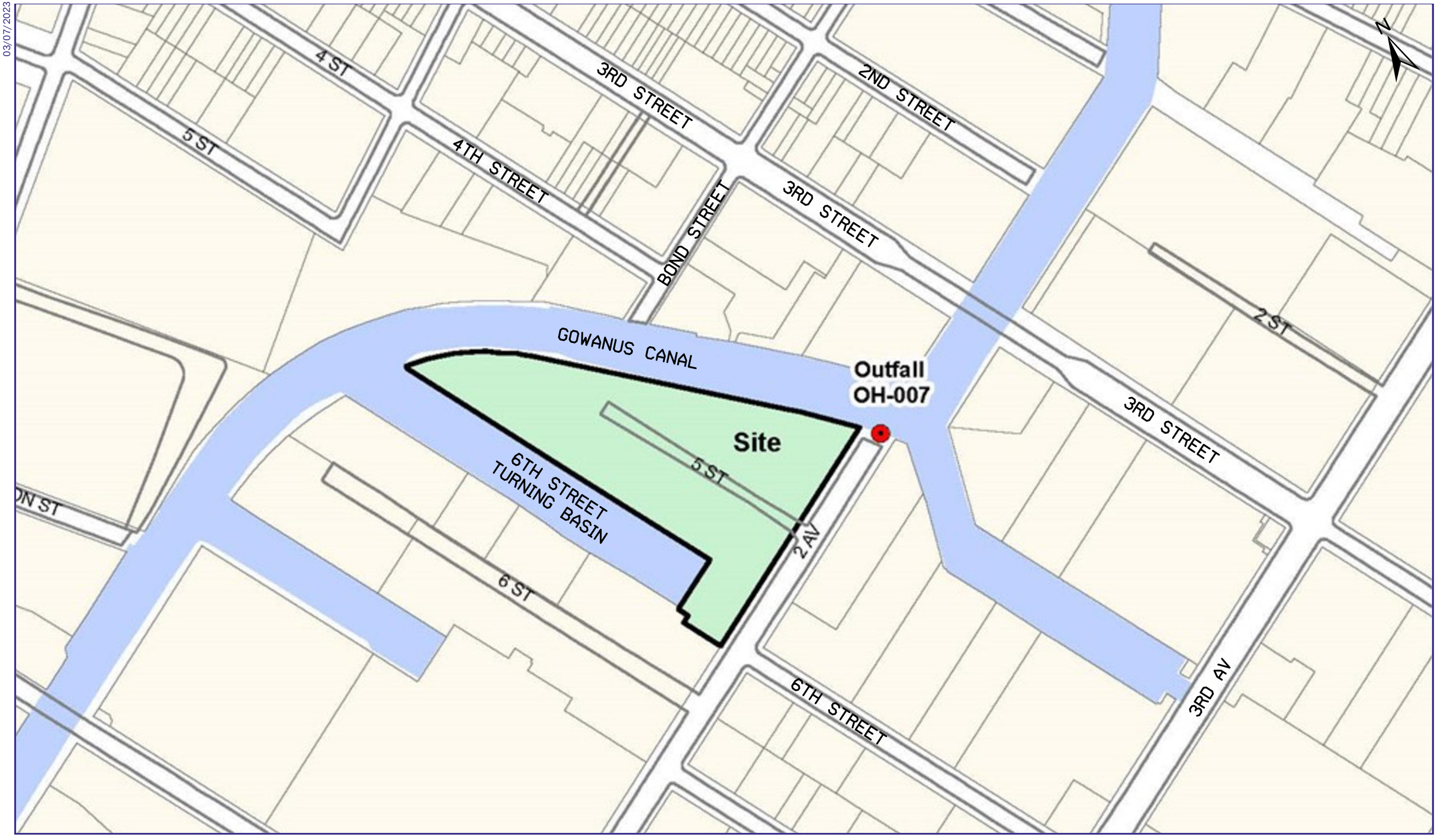
List of Figures

Figure 1-1. OH-007 CSO Tank Site Locations

Figure 2-1. OH-007 Air Monitoring Stations

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03/07/2023



Brown AND Caldwell YU

OH-007 **CSO TANK SITE LOCATIONS**
GOWANUS CANAL CSO PRE-DESIGN INVESTIGATION

0 40 80
Feet

2/28/2023



Brown AND Caldwell

YU & Associates
Geotechnical, Environmental and Civil Engineering

FIGURE 2-1
OH-007 **AIR MONITORING STATIONS**
OH-007 **CSO CONSTRUCTION ACTIVITIES**
GOWANUS CANAL CSO FACILITY
BROOKLYN, NEW YORK

0 50 100
Feet

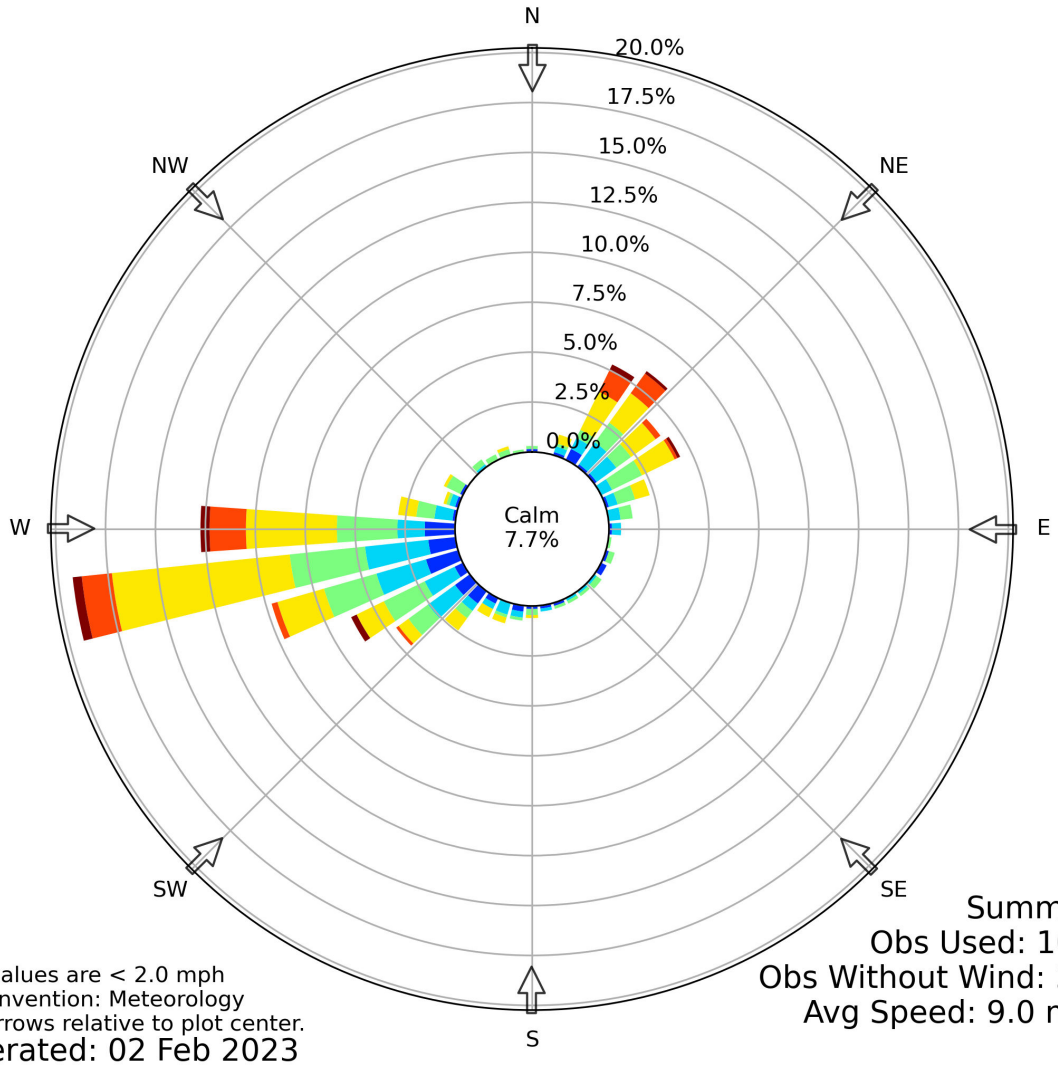
Appendix A: Wind Rose Diagrams

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Test

3/7/2023

N

Windrose Plot for [JRB] Manhattan - Wall Street
Obs Between: 02 Jan 2018 08:56 AM - 02 Jan 2023 03:56 PM America/New_York
↳ constraints: Jan, 7 AM-3 PM



Summary
Obs Used: 1017
Obs Without Wind: 358
Avg Speed: 9.0 mph

Calm values are < 2.0 mph
Bar Convention: Meteorology
Flow arrows relative to plot center.
Generated: 02 Feb 2023

Wind Speed [mph]
2 - 4.9 | 5 - 6.9 | 7 - 9.9 | 10 - 14.9 | 15 - 19.9 | 20+

SOURCE:
IOWA ENVIRONMENTAL MESONET - IOWA STATE UNIVERSITY
http://mesonet.agron.iastate.edu/sites/locate.php

NOT TO SCALE

Brown AND Caldwell

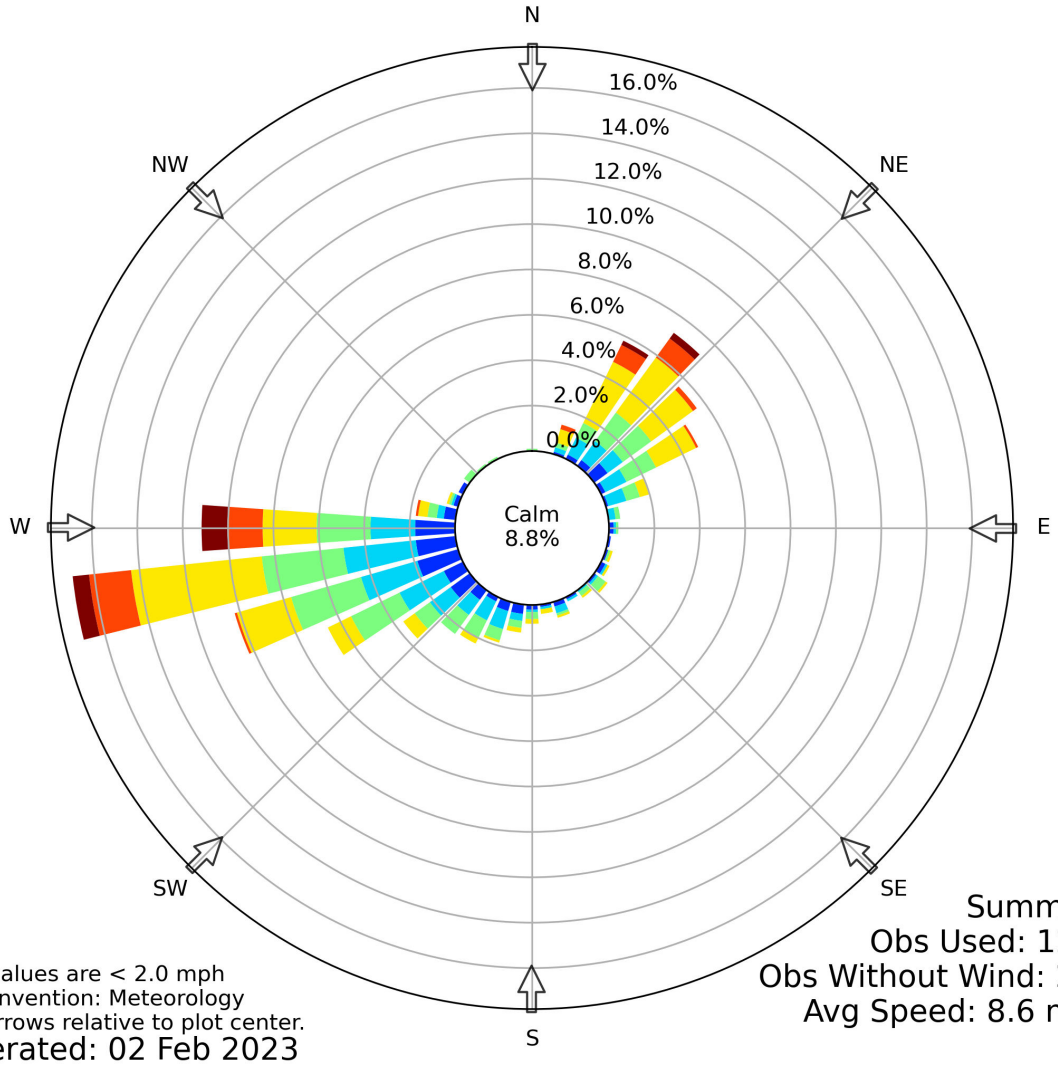
FIGURE A-1
WIND ROSE - JANUARY
COMMUNITY AIR MONITORING PLAN
GOWANUS CANAL CSO DESIGN

YU & Associates
Geotechnical, Environmental and Civil Engineering

3/7/2023

N

Windrose Plot for [JRB] Manhattan - Wall Street
Obs Between: 02 Feb 2018 07:56 AM - 02 Feb 2023 02:56 PM America/New_York
↳ constraints: Feb, 7 AM-3 PM



Summary
Obs Used: 1265
Obs Without Wind: 298
Avg Speed: 8.6 mph

Calm values are < 2.0 mph
Bar Convention: Meteorology
Flow arrows relative to plot center.
Generated: 02 Feb 2023

Wind Speed [mph]
2 - 4.9 | 5 - 6.9 | 7 - 9.9 | 10 - 14.9 | 15 - 19.9 | 20+

SOURCE:
IOWA ENVIRONMENTAL MESONET - IOWA STATE UNIVERSITY
http://mesonet.agron.iastate.edu/sites/locate.php

NOT TO SCALE

Brown AND Caldwell

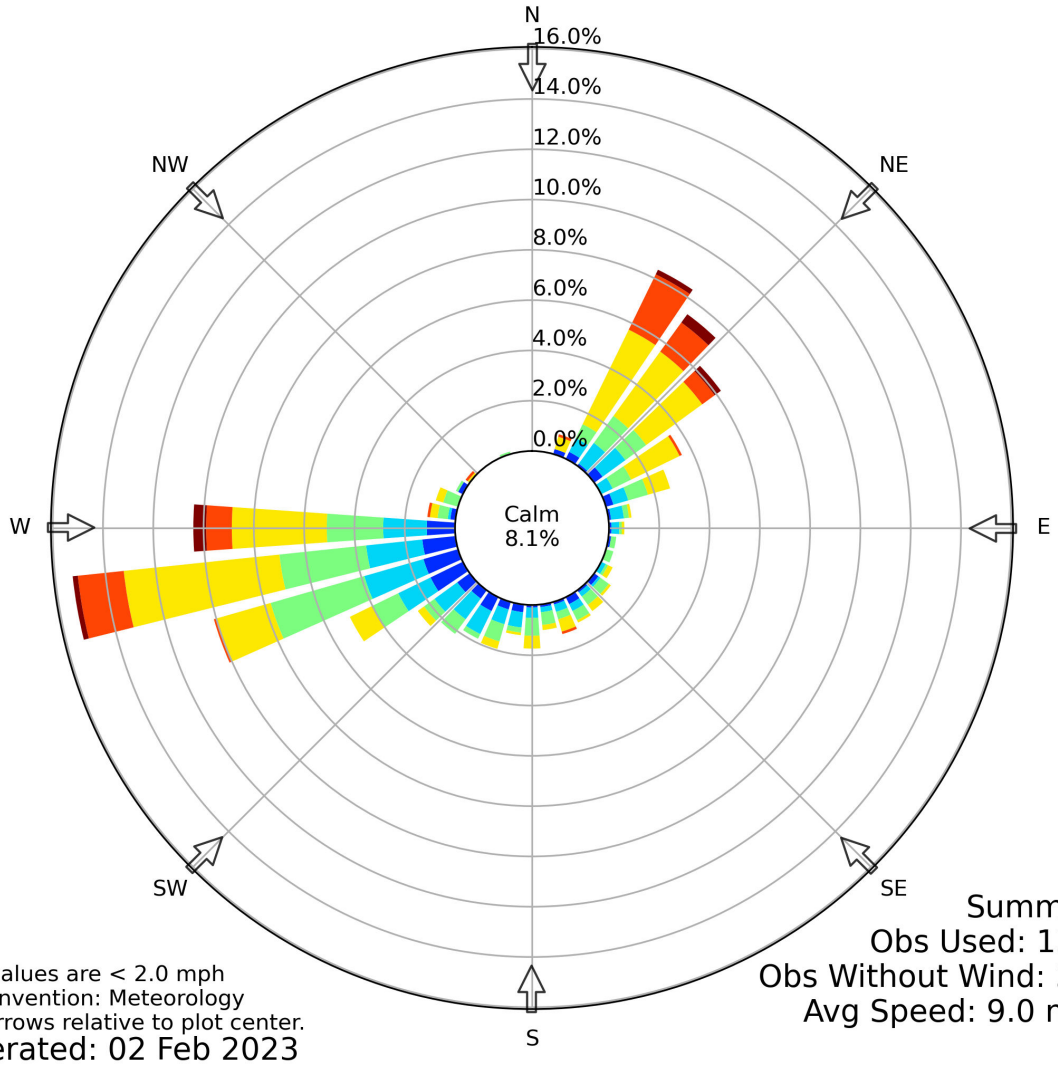
FIGURE A-1
WIND ROSE - FEBRUARY
COMMUNITY AIR MONITORING PLAN
GOWANUS CANAL CSO DESIGN

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N

Windrose Plot for [JRB] Manhattan - Wall Street
Obs Between: 02 Mar 2018 07:56 AM - 29 Mar 2022 03:56 PM America/New_York
↳ constraints: Mar, 7 AM-3 PM



Summary
Obs Used: 1351
Obs Without Wind: 371
Avg Speed: 9.0 mph

Calm values are < 2.0 mph
Bar Convention: Meteorology
Flow arrows relative to plot center.
Generated: 02 Feb 2023

Wind Speed [mph]
2 - 4.9 | 5 - 6.9 | 7 - 9.9 | 10 - 14.9 | 15 - 19.9 | 20+

SOURCE:
IOWA ENVIRONMENTAL MESONET - IOWA STATE UNIVERSITY
http://mesonet.agron.iastate.edu/sites/locate.php

NOT TO SCALE

Brown AND Caldwell

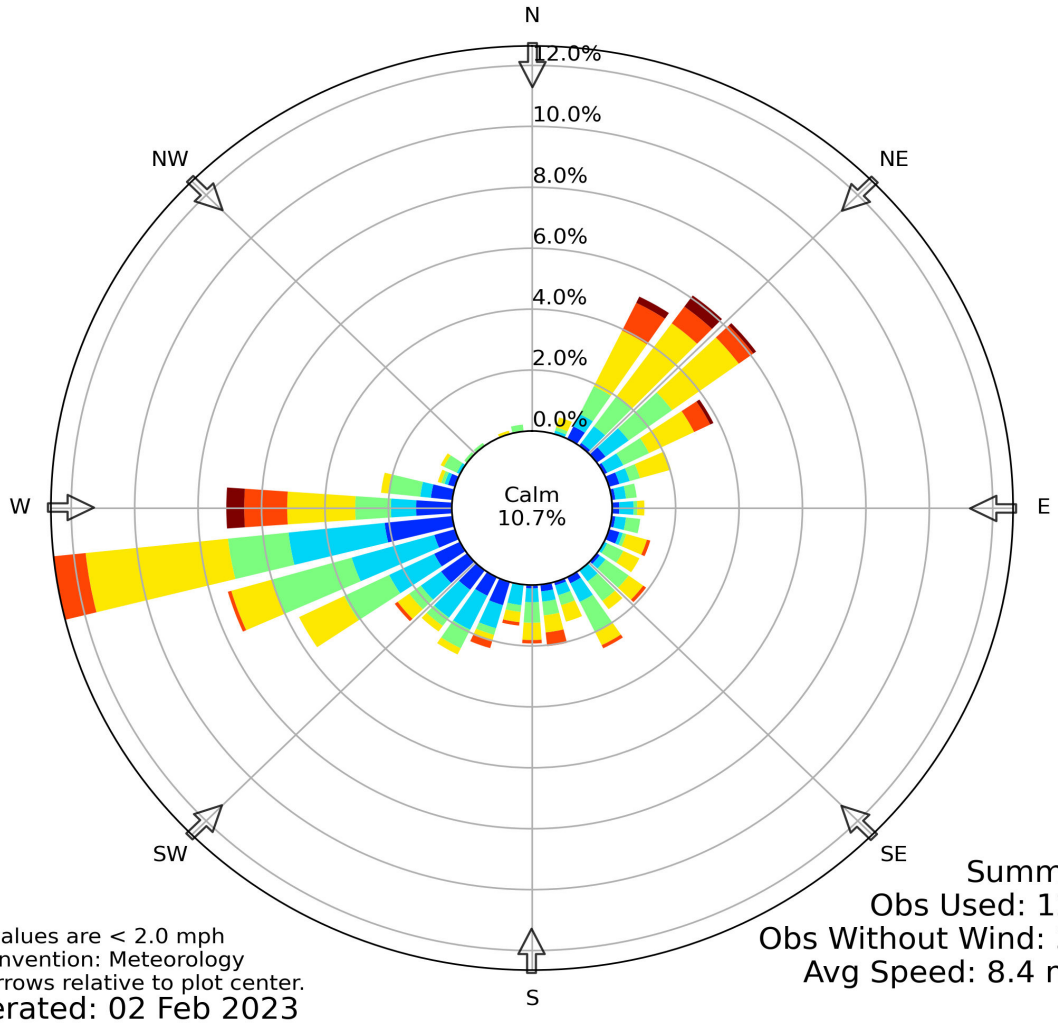
FIGURE A-1
WIND ROSE - MARCH
COMMUNITY AIR MONITORING PLAN
GOWANUS CANAL CSO DESIGN

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N

Windrose Plot for [JRB] Manhattan - Wall Street
Obs Between: 02 Apr 2018 07:56 AM - 30 Apr 2022 03:56 PM America/New_York
↳ constraints: Apr, 7 AM-3 PM



Summary
Obs Used: 1260
Obs Without Wind: 374
Avg Speed: 8.4 mph

Calm values are < 2.0 mph
Bar Convention: Meteorology
Flow arrows relative to plot center.
Generated: 02 Feb 2023

Wind Speed [mph]
2 - 4.9 | 5 - 6.9 | 7 - 9.9 | 10 - 14.9 | 15 - 19.9 | 20+

SOURCE:
IOWA ENVIRONMENTAL MESONET - IOWA STATE UNIVERSITY
http://mesonet.agron.iastate.edu/sites/locate.php

NOT TO SCALE

Brown AND Caldwell

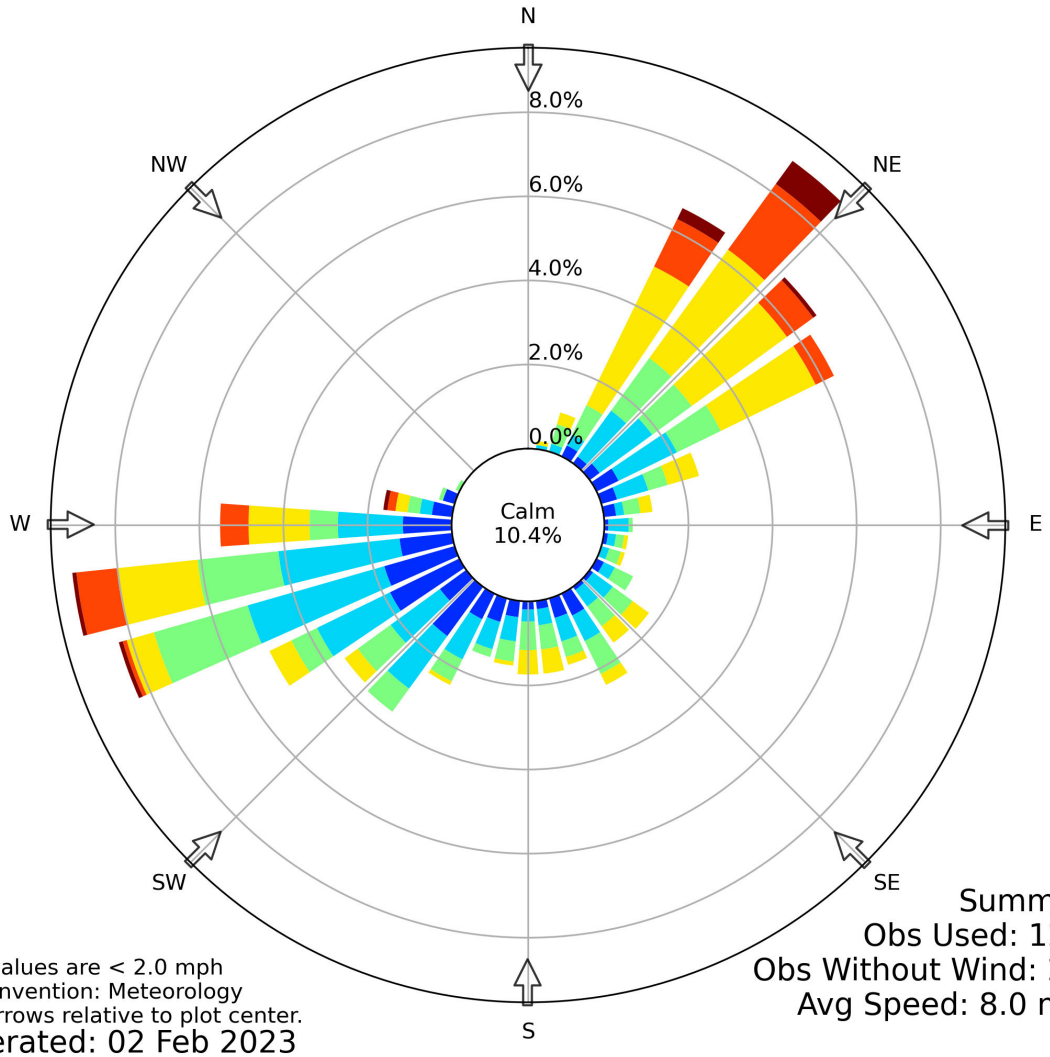
FIGURE A-1
WIND ROSE - APRIL
COMMUNITY AIR MONITORING PLAN
GOWANUS CANAL CSO DESIGN

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N

Windrose Plot for [JRB] Manhattan - Wall Street
Obs Between: 02 May 2018 07:56 AM - 31 May 2022 03:56 PM America/New_York
↳ constraints: May, 7 AM-3 PM



Summary
Obs Used: 1293
Obs Without Wind: 258
Avg Speed: 8.0 mph

Calm values are < 2.0 mph
Bar Convention: Meteorology
Flow arrows relative to plot center.
Generated: 02 Feb 2023

Wind Speed [mph]
2 - 4.9 | 5 - 6.9 | 7 - 9.9 | 10 - 14.9 | 15 - 19.9 | 20+

SOURCE:
IOWA ENVIRONMENTAL MESONET - IOWA STATE UNIVERSITY
http://mesonet.agron.iastate.edu/sites/locate.php

NOT TO SCALE

Brown AND Caldwell

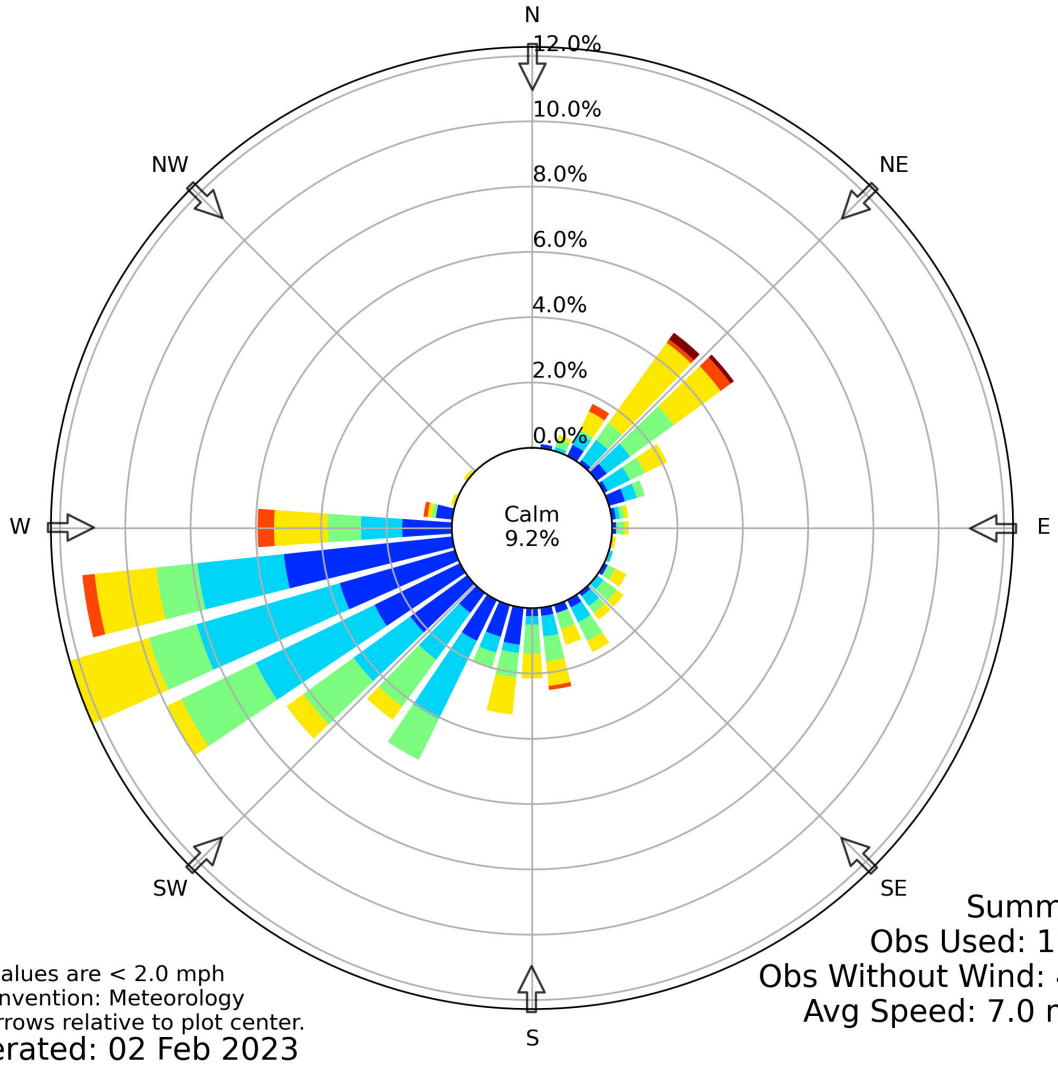
FIGURE A-1
WIND ROSE - MAY
COMMUNITY AIR MONITORING PLAN
GOWANUS CANAL CSO DESIGN

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N

Windrose Plot for [JRB] Manhattan - Wall Street
Obs Between: 02 Jun 2018 07:56 AM - 30 Jun 2022 03:56 PM America/New_York
↳ constraints: Jun, 7 AM-3 PM



Summary
Obs Used: 1191
Obs Without Wind: 401
Avg Speed: 7.0 mph

Calm values are < 2.0 mph
Bar Convention: Meteorology
Flow arrows relative to plot center.
Generated: 02 Feb 2023

Wind Speed [mph]
2 - 4.9 | 5 - 6.9 | 7 - 9.9 | 10 - 14.9 | 15 - 19.9 | 20+

SOURCE:
IOWA ENVIRONMENTAL MESONET - IOWA STATE UNIVERSITY
http://mesonet.agron.iastate.edu/sites/locate.php

NOT TO SCALE

Brown AND Caldwell

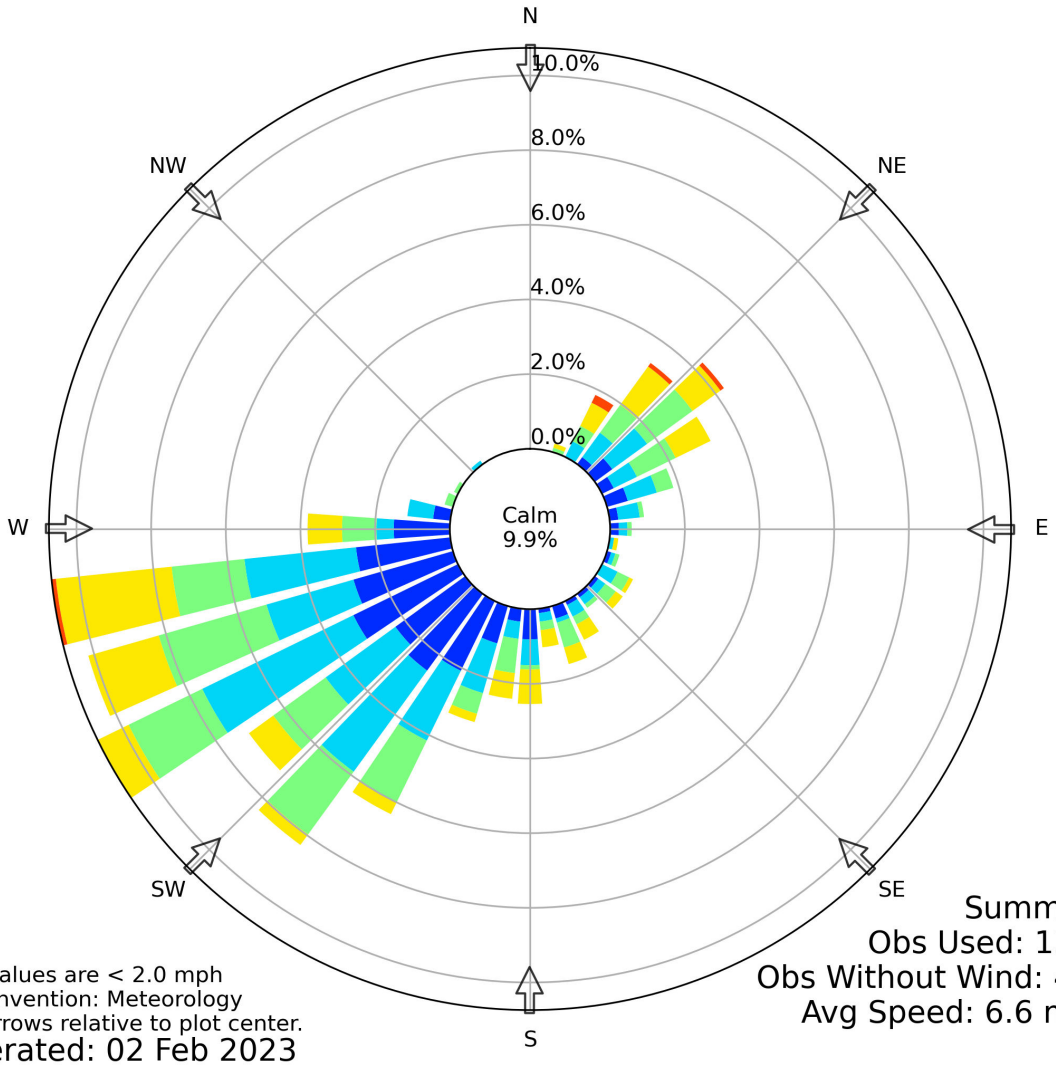
FIGURE A-1
WIND ROSE - JUNE
COMMUNITY AIR MONITORING PLAN
GOWANUS CANAL CSO DESIGN

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N

Windrose Plot for [JRB] Manhattan - Wall Street
Obs Between: 02 Jul 2018 07:56 AM - 27 Jul 2022 03:56 PM America/New_York
↳ constraints: Jul, 7 AM-3 PM



Summary
Obs Used: 1318
Obs Without Wind: 452
Avg Speed: 6.6 mph

Calm values are < 2.0 mph
Bar Convention: Meteorology
Flow arrows relative to plot center.
Generated: 02 Feb 2023

Wind Speed [mph]
2 - 4.9 | 5 - 6.9 | 7 - 9.9 | 10 - 14.9 | 15 - 19.9 | 20+

SOURCE:
IOWA ENVIRONMENTAL MESONET - IOWA STATE UNIVERSITY
http://mesonet.agron.iastate.edu/sites/locate.php

NOT TO SCALE

Brown AND Caldwell

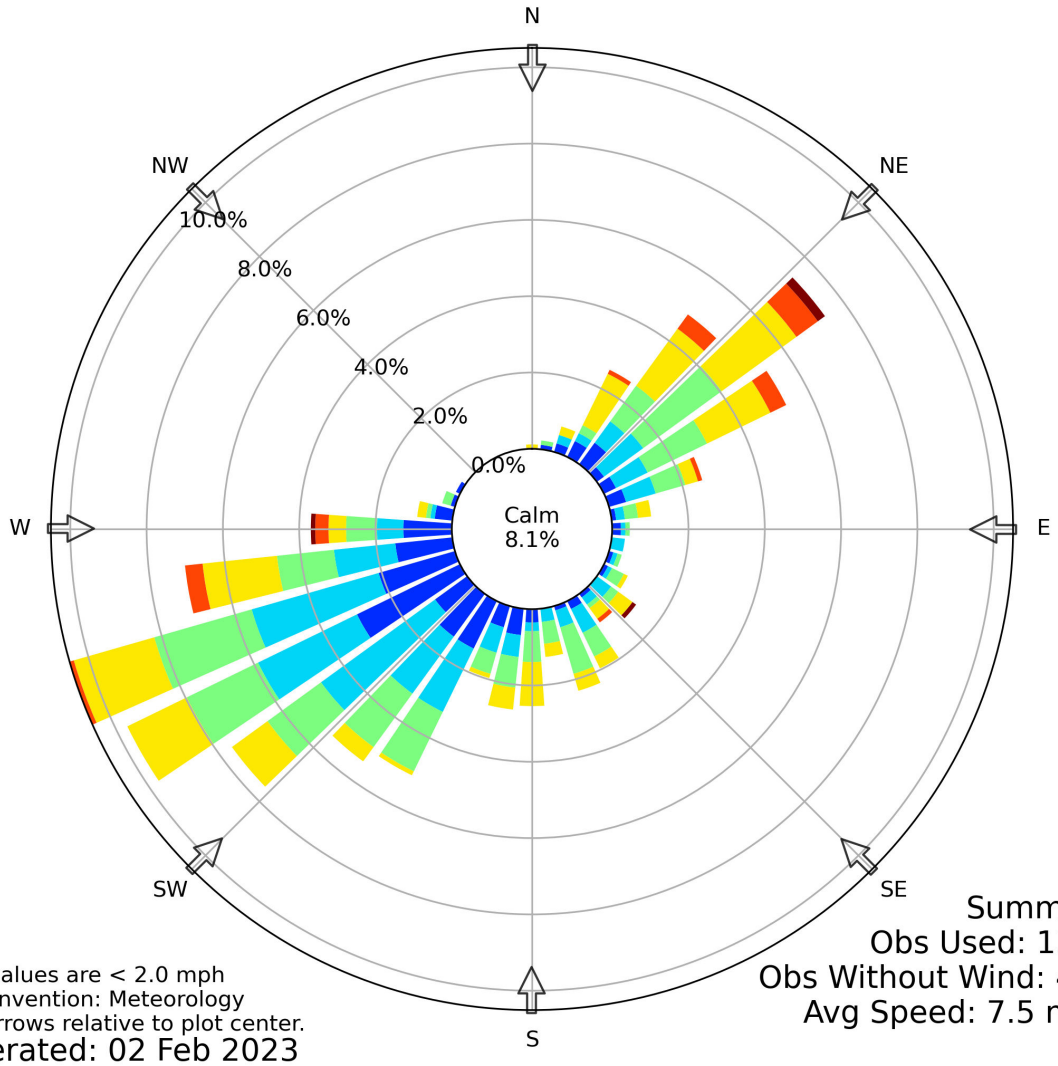
FIGURE A-1
WIND ROSE - JULY
COMMUNITY AIR MONITORING PLAN
GOWANUS CANAL CSO DESIGN

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N

Windrose Plot for [JRB] Manhattan - Wall Street
Obs Between: 02 Aug 2018 07:56 AM - 31 Aug 2022 03:56 PM America/New_York
↳ constraints: Aug, 7 AM-3 PM



Summary
Obs Used: 1324
Obs Without Wind: 458
Avg Speed: 7.5 mph

Calm values are < 2.0 mph
Bar Convention: Meteorology
Flow arrows relative to plot center.
Generated: 02 Feb 2023

Wind Speed [mph]
2 - 4.9 | 5 - 6.9 | 7 - 9.9 | 10 - 14.9 | 15 - 19.9 | 20+

SOURCE:
IOWA ENVIRONMENTAL MESONET - IOWA STATE UNIVERSITY
http://mesonet.agron.iastate.edu/sites/locate.php

NOT TO SCALE

Brown AND Caldwell

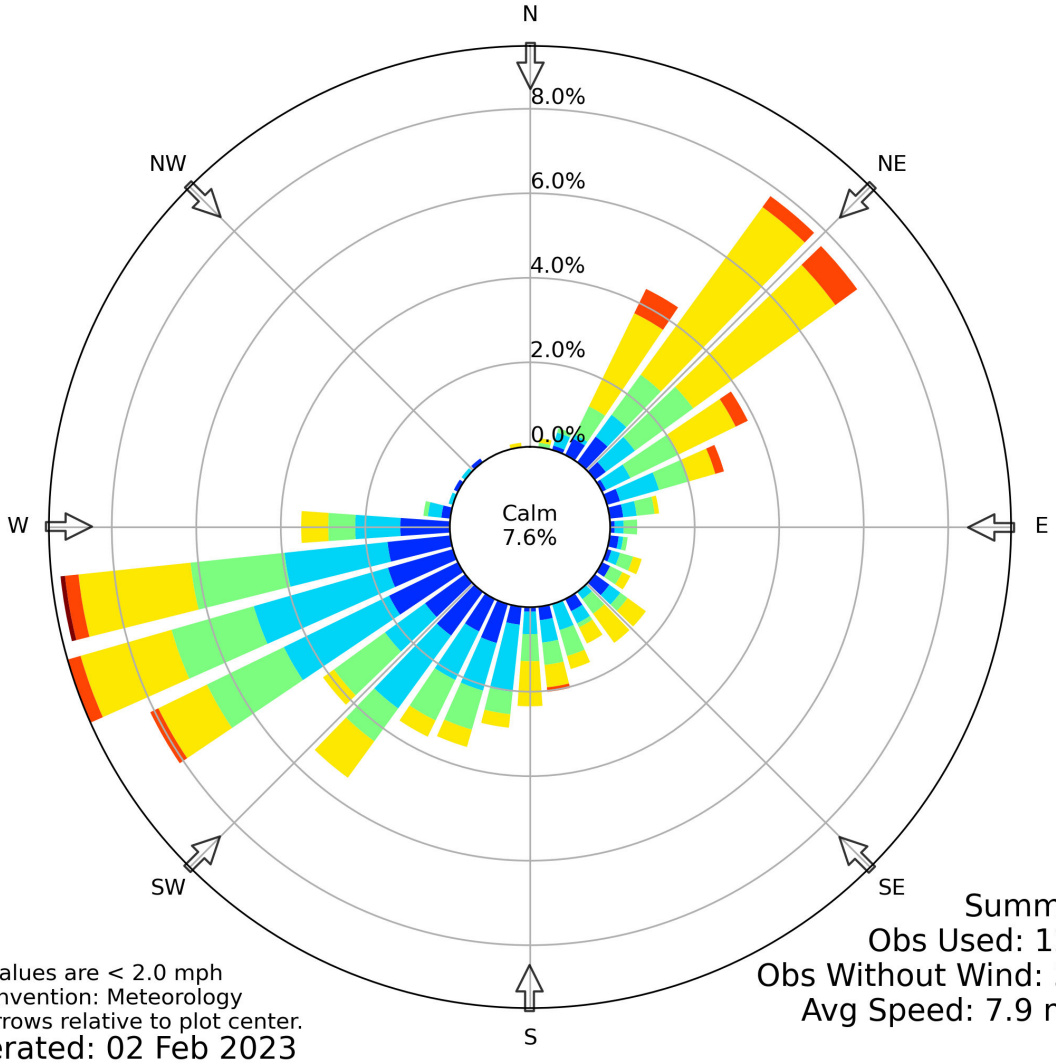
FIGURE A-1
WIND ROSE - AUGUST
COMMUNITY AIR MONITORING PLAN
GOWANUS CANAL CSO DESIGN

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N

Windrose Plot for [JRB] Manhattan - Wall Street
Obs Between: 02 Sep 2018 07:56 AM - 30 Sep 2022 02:56 PM America/New_York
↳ constraints: Sep, 7 AM-3 PM



Summary
Obs Used: 1290
Obs Without Wind: 352
Avg Speed: 7.9 mph

Calm values are < 2.0 mph
Bar Convention: Meteorology
Flow arrows relative to plot center.
Generated: 02 Feb 2023

Wind Speed [mph]
2 - 4.9 | 5 - 6.9 | 7 - 9.9 | 10 - 14.9 | 15 - 19.9 | 20+

SOURCE:
IOWA ENVIRONMENTAL MESONET - IOWA STATE UNIVERSITY
http://mesonet.agron.iastate.edu/sites/locate.php

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Brown AND Caldwell

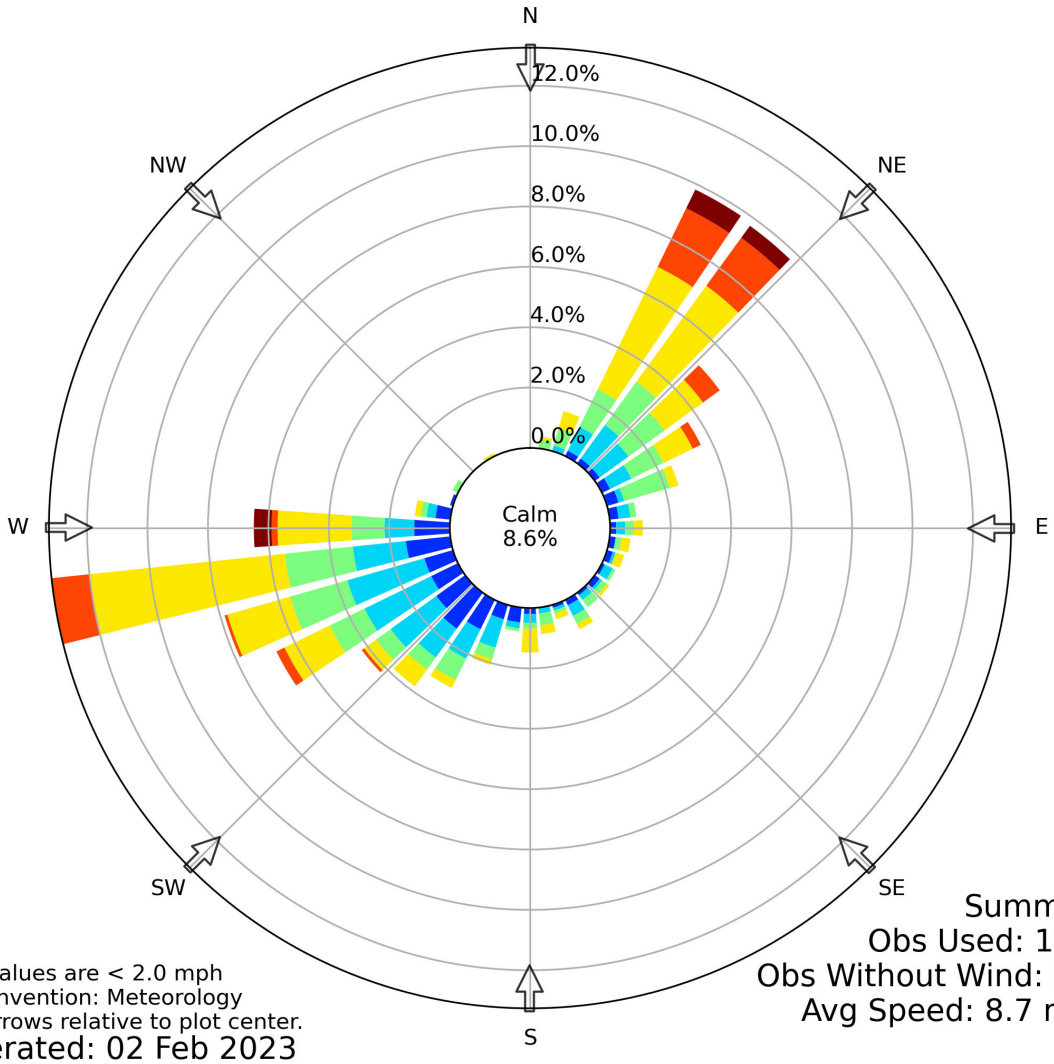
FIGURE A-1
WIND ROSE - SEPTEMBER
COMMUNITY AIR MONITORING PLAN
GOWANUS CANAL CSO DESIGN

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N

Windrose Plot for [JRB] Manhattan - Wall Street
Obs Between: 02 Oct 2018 07:56 AM - 31 Oct 2022 03:56 PM America/New_York
↳ constraints: Oct, 7 AM-3 PM



Summary
Obs Used: 1261
Obs Without Wind: 243
Avg Speed: 8.7 mph

Calm values are < 2.0 mph
Bar Convention: Meteorology
Flow arrows relative to plot center.
Generated: 02 Feb 2023

Wind Speed [mph]
2 - 4.9 | 5 - 6.9 | 7 - 9.9 | 10 - 14.9 | 15 - 19.9 | 20+

SOURCE:
IOWA ENVIRONMENTAL MESONET - IOWA STATE UNIVERSITY
http://mesonet.agron.iastate.edu/sites/locate.php

NOT TO SCALE

Brown AND Caldwell

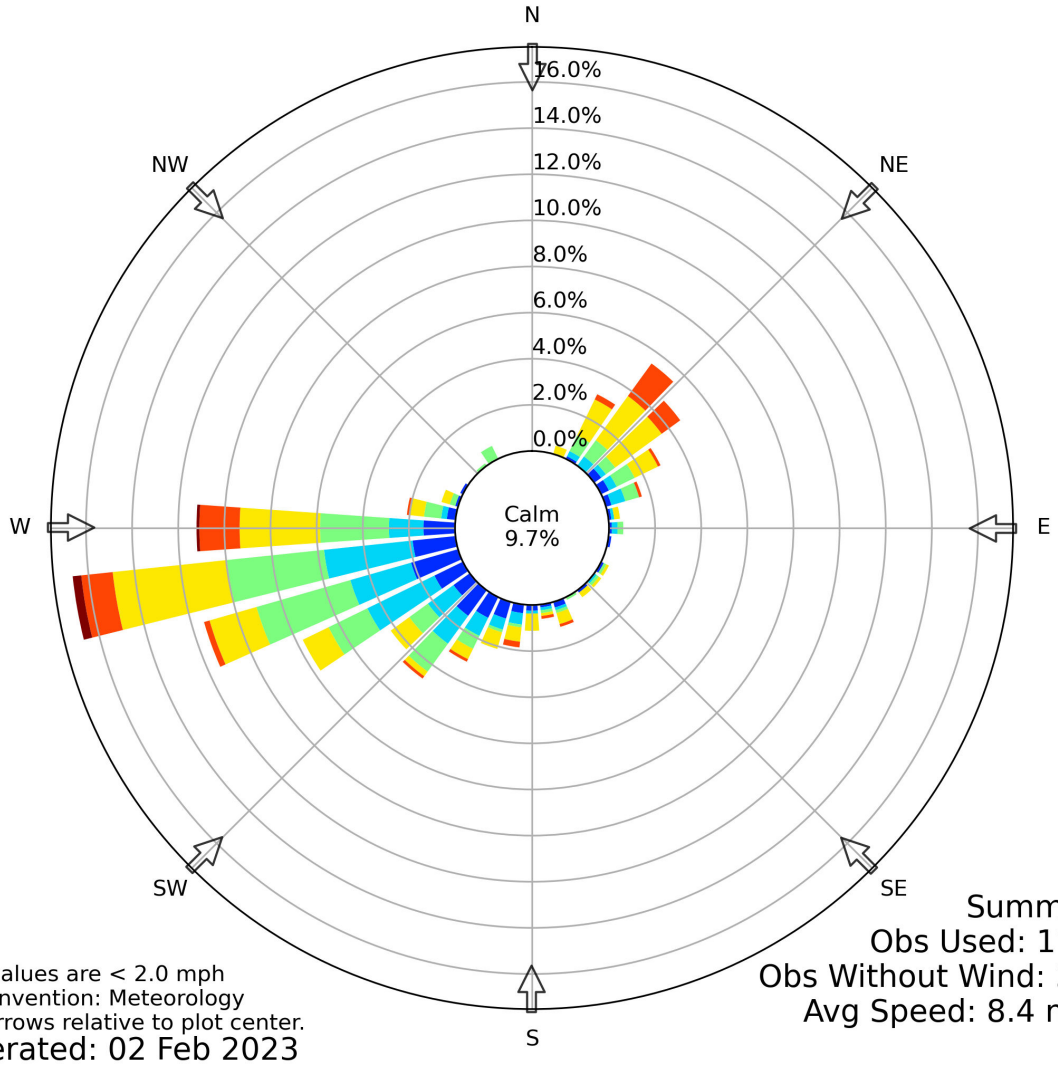
FIGURE A-1
WIND ROSE - OCTOBER
COMMUNITY AIR MONITORING PLAN
GOWANUS CANAL CSO DESIGN

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3/7/2023

N

Windrose Plot for [JRB] Manhattan - Wall Street
Obs Between: 02 Nov 2018 07:56 AM - 30 Nov 2022 03:56 PM America/New_York
↳ constraints: Nov, 7 AM-3 PM



Summary
Obs Used: 1144
Obs Without Wind: 341
Avg Speed: 8.4 mph

Calm values are < 2.0 mph
Bar Convention: Meteorology
Flow arrows relative to plot center.
Generated: 02 Feb 2023

Wind Speed [mph]
2 - 4.9 | 5 - 6.9 | 7 - 9.9 | 10 - 14.9 | 15 - 19.9 | 20+

SOURCE:
IOWA ENVIRONMENTAL MESONET - IOWA STATE UNIVERSITY
http://mesonet.agron.iastate.edu/sites/locate.php

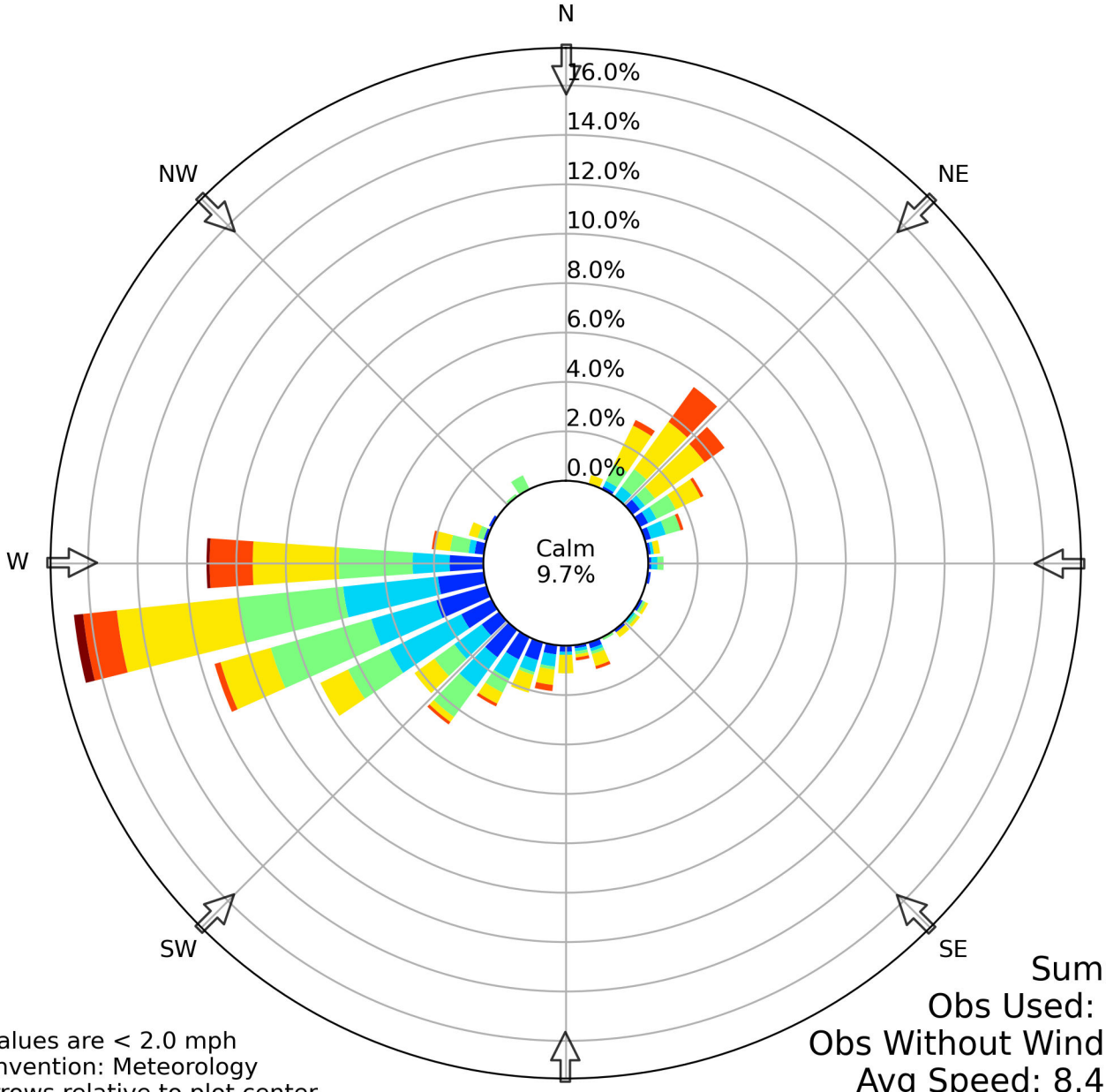
NOT TO SCALE

Brown AND Caldwell

FIGURE A-1
WIND ROSE - NOVEMBER
COMMUNITY AIR MONITORING PLAN
GOWANUS CANAL CSO DESIGN

YU & Associates
Geotechnical, Environmental and Civil Engineering

Windrose Plot for [JRB] Manhattan - Wall Street
Obs Between: 02 Nov 2018 07:56 AM - 30 Nov 2022 03:56 PM America/New_York
↳ constraints: Nov, 7 AM-3 PM



Summary
Obs Used: 1144
Obs Without Wind: 341
Avg Speed: 8.4 mph

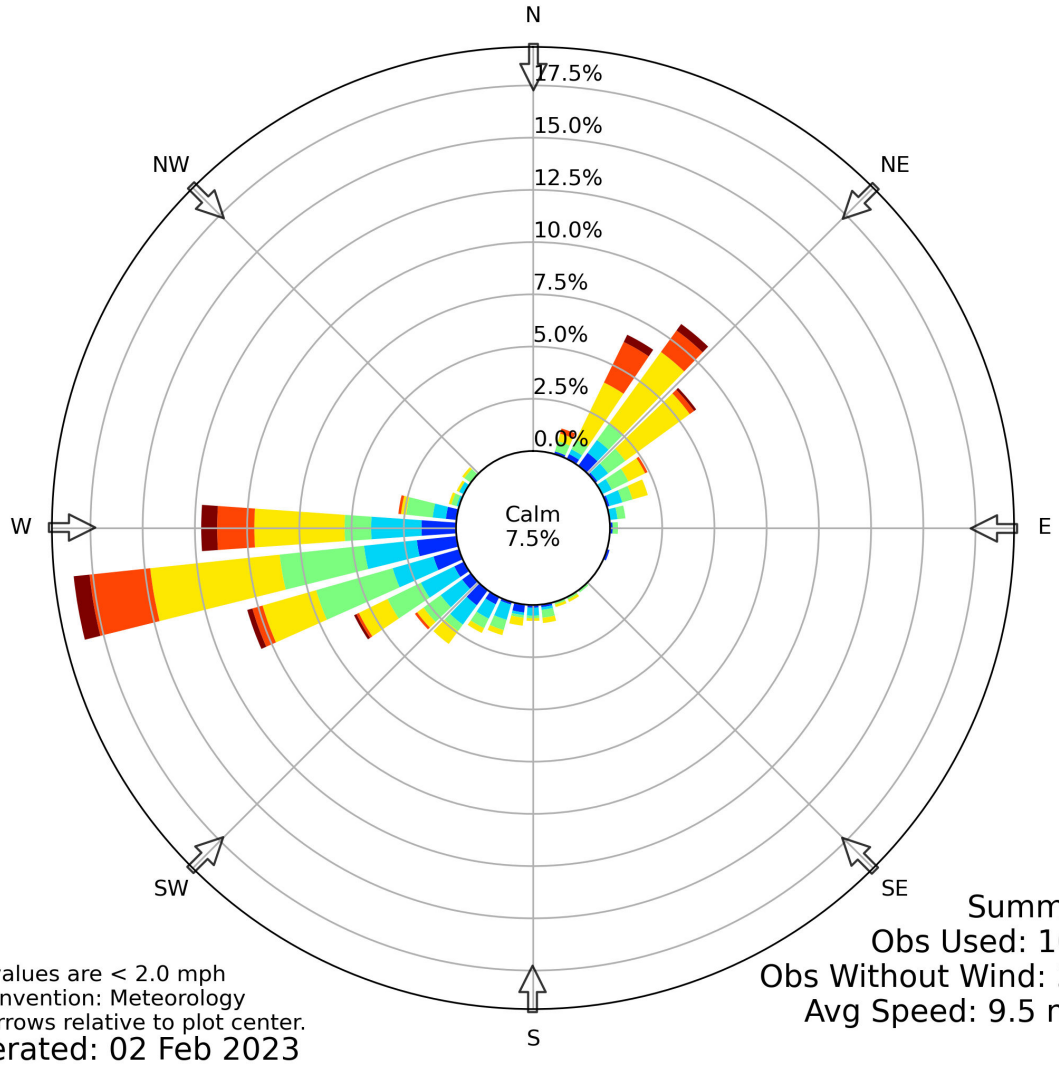
Calm values are < 2.0 mph
Bar Convention: Meteorology
Flow arrows relative to plot center.
Generated: 02 Feb 2023

Wind Speed [mph]
2 - 4.9 | 5 - 6.9 | 7 - 9.9 | 10 - 14.9 | 15 - 19.9 | 20+

3/7/2023

N

Windrose Plot for [JRB] Manhattan - Wall Street
Obs Between: 02 Dec 2018 07:56 AM - 31 Dec 2022 03:56 PM America/New_York
↳ constraints: Dec, 7 AM-3 PM



Summary
Obs Used: 1098
Obs Without Wind: 311
Avg Speed: 9.5 mph

Calm values are < 2.0 mph
Bar Convention: Meteorology
Flow arrows relative to plot center.
Generated: 02 Feb 2023

Wind Speed [mph]
2 - 4.9 | 5 - 6.9 | 7 - 9.9 | 10 - 14.9 | 15 - 19.9 | 20+

SOURCE:
IOWA ENVIRONMENTAL MESONET - IOWA STATE UNIVERSITY
http://mesonet.agron.iastate.edu/sites/locate.php

NOT TO SCALE

Brown AND Caldwell

FIGURE A-1
WIND ROSE - DECEMBER
COMMUNITY AIR MONITORING PLAN
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