



Interim Community Guide
Long-Term Management of the Manhattan
Center for Science and Mathematics
New York, New York

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Prepared on behalf of the Parents Association' of the
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We are pleased to prepare this Interim Community Guide to Long-Term Management of the Manhattan Center for Science and Mathematics (MCSM) school campus, including the Isaac Newton Junior High School, for the MCSM Parents' Association. This Guide provides background on the site, as well as information for any community member who wishes to consult the primary documents. We had intended that this Guide be accompanied by a "Report Card" that would evaluate how well Consolidated Edison (ConEd) and state regulatory agencies are keeping the commitments they have made to the community while the school is being cleaned up, as well as additional tasks recommended by CPEO but not agreed to by the agencies and/or ConEd. However, because of delays in the remedial activities and absence of a clear and definitive monitoring schedule, the Report Card is not included in this "Interim" edition. When we receive the information that is needed to prepare the report card, it will be added. For the time-being, we grade ConEd's long-term management activities as *Incomplete*.

However, while cleanup of the site is still a few years away, we wish to assure members of the MCSM community that there is little, if any, exposure to contaminants at present and that with *proper site management, the students, teachers, and others who occupy this site will not be at risk of unacceptable environmental exposures*.

In 2009, on behalf of the Parents' Association of the Manhattan Center for Science and Mathematics, the Center for Public Environmental Oversight (CPEO), with Peter M. Strauss, reviewed documents submitted by ConEd pertaining to its clean-up plan for the site. We also submitted comments to Con Ed and the New York State Department of Environmental Conservation (NYS DEC) (see <http://www.cpeo.org/pubs/MCSM.pdf>). In 2011, the Parents' Association requested that we follow up that task with a Community Guide and Report Card so that parents and school staff would be better equipped to understand the challenges ahead and to monitor long-term management of the site.

At MCSM/Newton, the need for a robust, transparent long-term remedy and management plan is particularly important. Contaminated groundwater is only five to six feet below the basement, where the school cafeteria and classrooms are located. The school was built over the remnants of a Manufactured Gas Plant (MGP) facility. These facilities were known to produce several toxic byproducts, some of which remain under the school. Public health and environmental protection, as well as New York law, require the preparation of a Site Management Plan (SMP) at the same time remedies are being selected, any time contamination is expected to remain on site at the completion of remedial construction. Site management includes the operation and maintenance of engineering controls, long-term monitoring, and public notification.

We pointed out in our previous review that students have a right to a safe environment, and that we, as a society, have an obligation to protect this right. MCSM and Isaac Newton students, faculty, and staff work and live in a dense urban environment. We understand that they may be exposed to more toxic substances than they would if living in a many suburban or rural areas. Yet, we think it is the obligation of the New York City Department of Education (DOE), those responsible for past pollution, and DEC to assure that exposure to contaminants, while attending school or using the school grounds, is kept to a minimum and does not exceed health-based standards promulgated by the DEC or the U.S. Environmental Protection Agency.

The most fundamental decision in the remedy selection process has been the decision not to remove or treat buried remnants of the MGP plant or the contaminants that remain under the school building. While we agree that major remediation beneath the school might not be practical, ConEd remains responsible for addressing sub-school contamination should the school ever be demolished or undergo reconstruction. The presence of MGP wastes under the school and extending beyond the school's footprint requires that a robust long-term management plan must be put in place and rigorously adhered to. Yet without an active community, we have witnessed time-after-time that long-term management is not carefully exercised.

We are hopeful that this Community Guide and the "Report Card" that follows will assist community members to better understand and monitor activities of those responsible for cleaning up the property and carrying out long-term management obligations.

Site Background

The campus structure was built as the Benjamin Franklin High School in 1941. Current occupants of the building are the Manhattan Center for Science and Mathematics and the Isaac Newton Junior High School for Science and Mathematics. Prior to that, it housed the East 115th Street Manufactured Gas Plant (MGP), which covered nearly six acres between Pleasant Avenue and FDR Drive in the New York City Borough of Manhattan. Operated by Standard Gas and Light Company of New York from 1895 to 1936, in 1937 it was turned over to ConEd, which did not operate the plant. Though most of the Gas Plant was demolished, some structures and residual contamination remain on site, under and adjacent to the school building. ConEd has taken responsibility for clean-up and long-term management of the site, and oversight is provided primarily by the New York State Department of Environmental Conservation.

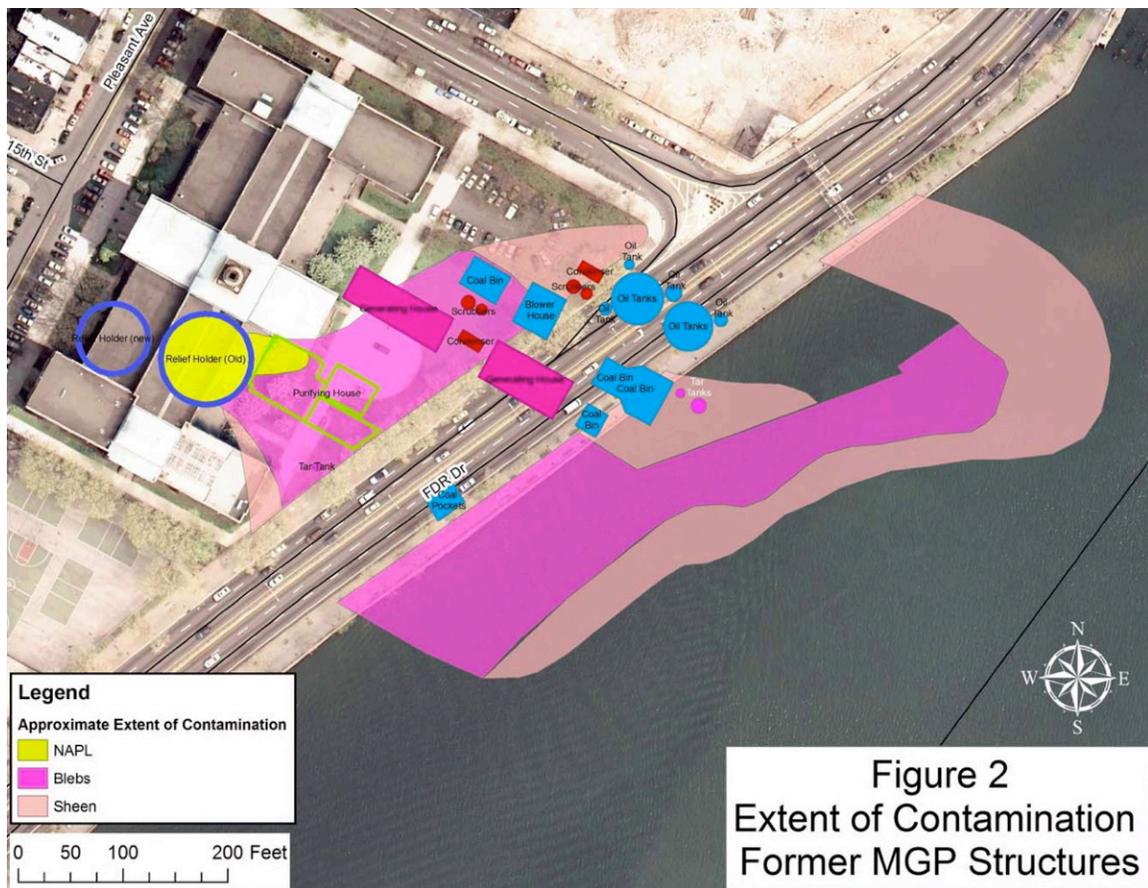
MGP plants typically left several residual contaminants on-site, even after they were demolished. Contaminants include a variety of coal-tar byproducts, many of which are characterized as carcinogens. Coal tar is similar in composition to asphalt. Typically with a high viscosity, it may be solid or semi-solid. Coal tar found at this site is associated with the carbureted coal gas (water gas) process. It is an emulsion that as a whole is slightly denser than water, but which contains toxic compounds that float on water. When deposited in tar wells, pits, or leaking from the brick-bottomed gasholders, the tars slowly sink beneath the water table, and then they move with groundwater. In addition, MGP plants of this era, particularly water-gas plants, generated enormous volumes of this tar-water mixture.

MGP contaminants also include volatile organic compounds (VOCs) such as benzene and toluene, and may include cyanide, coal cinders, and a limited amount of lime filter material. Cinders, lime, and other filter materials may have elevated levels of metals.

At MCSM, groundwater is estimated to be between 5 to 15 feet below surface. Non-aqueous phase liquid (NAPL), containing coal tars and VOCs, is present primarily

underneath the school building and, to a lesser extent, in the area between the southern portion of the school building and the Harlem River. In the event of intense rains, some of the contaminants may be brought to the surface, as some of the liquid is lighter than water. Contaminated subsurface soil and groundwater cover approximately two acres on the site. Deep sediments (between 14 and 27 feet below the sediment surface) in the Harlem River are also contaminated by historical releases from this MGP facility. ConEd believes that on-going discharge of contaminants into the Harlem River is unlikely. Indoor air testing has confirmed that under current conditions there appears to be little impact of MGP residuals on the indoor air quality inside the School building. However, elevated levels of tetrachloroethylene (known as PCE) are found consistently in subslab soil gas and at times indoors as well.

The figure below represents an areal view of the extent of contamination beneath the surface. This figure depicts a NAPL mixture—that is, substances that do not readily mix with water. The map below also shows locations where “blobs” or globules of tar-like substance were found in the subsurface, as well as the sheen that can be seen on the surface of groundwater exposed through excavation.



Extent of MGP Wastes (from DEC Decision Document)

Responsibility for Cleanup and Long-Term Management

Con Edison (ConEd) is responsible for cleanup and long-term management of the site. The New York State Department of Environmental Conservation (DEC) is responsible for overseeing these responsibilities. While ConEd is ultimately responsible for ongoing site management, the New York City Department of Education (DOE) and its Division of School Facilities (DFS) will have some responsibility for monitoring and maintaining the site after Con Edison has completed its clean up. As of this time, ConEd and the DOE are actively discussing their respective roles, and both are responsible for implementation of the Final Site Management Plan (SMP). For example, we anticipate that DOE, through DFS, will perform monthly inspections of the systems that will be outlined in the SMP. We also anticipate that ConEd will be responsible for assuring that this is done properly through yearly training and annual certification.

Remedial Actions

In April 2009 Consolidated Edison prepared an Alternatives Analysis Report that serves as the cleanup plan, along with a “Conceptual” Site Management Plan (SMP) for long-term management of the site. Based upon ConEd’s findings, the DEC issued a Decision Document with a six-part remedy:

1. Construction of a barrier wall along the eastern edge of the site, approximately 500 feet long and 30 to 40 feet deep, to prevent contaminants from flowing under the River, along with groundwater extraction wells to prevent groundwater from rising west of the wall. The barrier wall itself is not anticipated to require inspection.
2. Selective soil excavation and removal outside the school building.
3. Installation of a sub-slab depressurization system underneath the school.
4. A deed restriction prohibiting certain activities (*e.g.*, no vegetable gardening, no use of groundwater, and if new structures are added, soil gas must be evaluated for vapor intrusion potential). Additionally this deed restriction requires ConEd to complete periodic certification of institutional and engineering controls.
5. Development of a Site Management Plan (SMP). Included in this plan is the requirement, should the building’s use as a school either be permanently ended, or temporarily suspended (*e.g.* major renovations), the SMP will require Con Edison to evaluate whether the change in on-site activity would allow additional measures to be taken to decrease the volume, toxicity, or mobility of the remaining MGP source material. The SMP will also contain a reopener clause, which preserves Con Edison's obligation to address the remaining source material on the site. In addition, there will be a requirement to assess new remedial technologies every ten years to determine if a remedial technology has become available that could be effectively implemented.
6. A periodic certification of engineering and institutional controls.

Implementing Engineering Controls

1. Controlling Vapor Intrusion

Vapor intrusion is the migration of toxic vapors from the soil or groundwater beneath a building directly into the building. It is a potential problem anywhere volatile organic compounds are found in the shallow subsurface, but it can be prevented or reduced through building design and ventilation. For contaminants associated with MGP plants, most are semi-volatile organic compounds (SVOC), although some, including benzene, toluene, ethylbenzene and xylene (referred to as BTEX) are volatile organic compounds that have been detected in indoor air or soil gas.

The relative air pressure normally found in buildings is negative: this essentially pulls contamination inside the building from underneath the horizontal concrete slab through the openings and cracks usually found in a building of this age. During winter months, the pressure differential is exacerbated because heating systems generally draw in more air from below the surface.

ConEd is planning on installing a sub-slab depressurization system (SSDS) to mitigate future exposure from harmful vapors. The system is being designed to apply a negative pressure below the slab, thus removing the force that allows vapor intrusion to occur. Installing an SSDS entails cutting one or more holes in the slab, removing a small quantity of soil from beneath the slab to create a “suction pit,” and then placing vertical suction pipes into the holes. These pipes are connected to a manifold containing an exhaust fan, and vapors are in turn vented outdoors. Our latest communication with ConEd indicates that construction of this system will begin in the summer of 2013.

In the interim, Con Ed has been conducting semi-annual indoor air monitoring tests, and no acute exposures were identified. The results of the previous indoor air sampling indicate that low levels of VOCs were present in the indoor air and that some of the compounds detected appeared to have sources that may be related to the routine cleaning and maintenance activities, or activities that ConEd is not responsible for. In particular, PCE has been found indoors at levels that New York State considers acceptable but other jurisdictions do not. Its elevated presence in soil gas under the school suggests that contamination is coming from an off-site source, most likely a present or former dry cleaning operation. The NYS DEC is investigating the PCE flowing under the northern portion of the school.

While ConEd has proposed to continue indoor air sampling for one year after the system is installed, it has explicitly rejected the school community’s request for subsequent periodic indoor air sampling. This is the State’s standard practice, but we believe that actual sampling is necessary to assure building occupants that the air they breathe is safe.

The Conceptual SMP states that if damage to the basement floor is observed or activities that may promote subsurface vapor intrusion are planned, indoor air and, if appropriate, sub-slab vapor samples will be collected for laboratory analysis from the specific area. Additional sampling of indoor air and soil vapor would be required if the slab or depressurization system is compromised or if activities on or near the site significantly impact soil vapor intrusion parameters.

At the Mott Haven campus in the Bronx, they have a similar system. An automated Building Maintenance System is supposed to monitor the fans. The SSDS fans and pressure gauges are supposed to be inspected monthly by the custodian and annually by an independent professional engineer. We expect similar monitoring activities at MCSM, although they are not laid out in the Conceptual SMP.

2. Excavation of Contaminated Soil

Coal tar, the BTEX compounds, and polynuclear aromatic hydrocarbons (PAHs) have been found in soil on the southeastern portion of the school property above the water table. Con Ed proposes to excavate a small surface triangle there. It is in the process of finalizing a Remedial Design Work Plan, and construction is tentatively scheduled for 2013. The Decision Document states, “The proposed excavation area will be further defined by test borings and/or test pits as part of the remedial design, and will be extended as dictated by this delineation, as limited by the existing roadway, retaining wall, etc. In addition, any source material encountered during installation of the barrier wall will be excavated and removed.”

It should be pointed out that there have been many locations where MGP wastes have been haphazardly dumped at and around MGP facilities. We have no evidence that this occurred here, but it is important to keep this possibility in mind when preparing to remove some of those wastes. Both the tar and the tar-water mixture may come to the surface.



Tar in an MGP Test Pit (not from this site)

3. Constructing a Barrier Wall and Installing Extraction Wells

ConEd is planning to install a barrier wall that is approximately 500 linear feet of low permeability material along the FDR Drive. The barrier wall will extend downward

into bedrock, to prevent any further movement of coal tar from the site. Construction materials and techniques will be established during the remedial design. Tar will be collected and monitored to prevent migration through or around the barrier wall. Groundwater will be monitored and controlled to prevent groundwater mounding behind the wall. Construction is tentatively scheduled to start in the summer of 2013.

The Barrier Wall should prevent the eastward flow of contaminated groundwater, and recovery wells should eliminate the mounding of water and the spread of contamination on the west side of the wall. Because the contaminants move slowly and the large gasholder beneath the school building still contains or is leaking a large amount of tar, the removal systems must be operated as long as there is a source of contamination. The Site Management Plan (SMP) should describe methods for measuring achievement and offer a contingency plan to be implemented should either human or natural activity, such as floods, interfere with operations.

The Barrier Wall, while passive, still will require periodic inspection. Section 3.2.1 of the Conceptual SMP, Monitoring/NAPL Recovery System Design, states, "A network of monitoring wells/NAPL recovery wells will be installed to supplement the existing site wells in order to monitor groundwater conditions up-gradient and down-gradient of the proposed Barrier Wall at the site and to recover NAPL upgradient of the Barrier Wall." This version of the SMP does not have a suggested inspection schedule, but that should be included in the final SMP.

4. Implementing Deed Restrictions

A deed restriction will require notification of any change in building use; prohibit the use of groundwater as a source of potable water; and completion of a periodic certification of compliance with institutional and engineering controls submitted to the NYS DEC. A draft outline of this deed restriction was written in the Conceptual SMP. This document will need to be finalized and recorded once the engineering controls are in place.

5. Development of a Site Management Plan

DEC has already approved the Conceptual SMP, and ConEd is planning to submit an Interim SMP to DEC this year. Because remediation was in the early planning stages, the conceptual SMP did not specify the frequency and location of monitoring points, describe fully the operation and maintenance of the SSDS, or provide inspection checklists for school custodians. It does, however state, "The SSDS will have a warning device to indicate that the system is not operating properly. Two warning devices consisting of a warning light and audible alarm on site and automated email notifications will be part of the SSDS."

6. Periodic Inspection and Certification of Institutional and Engineering Controls

This requirement is a key part of the SMP process. It usually is included in an annual SMP Review, and it is included in the Conceptual SMP. A certified engineer is responsible for reviewing and reporting on such things as groundwater monitoring, inspections, and any events that required notification of DEC or DOE.

Other Issues of Concern

1. Harlem River Sediment Recovery

The cleanup plan proposes Monitored Natural Recovery (MNR) as the remedy for adjacent Harlem River sediments. We support this strategy because the contaminants do not appear to be bioavailable. That is, they are too deeply buried in the sediments to come into contact with benthic (bottom-dwelling) organisms or fish. We requested that the Final Decision Document include MNR as part of the remedy, with a performance objective of zero bioavailability to benthic organisms. DEC disagreed, stating that they expect contaminants in the sediment to remain in place, and that if dredging were to occur, the U.S. Army Corps of Engineers would be responsible for a public process.

2. Extent of Excavation

We are concerned that the excavation may leave some contaminants in the shallow soil. In addition, it is now unclear exactly how the boundary of excavation will be determined, and we are concerned that there is no confirmatory laboratory analysis of remaining soils, other than through visual factors and odor, as stated to us by ConEd. The Conceptual SMP states the following (Section 2.4 Soil Management Plan):

There are several typical signs of the potential presence of MGP residuals within an open excavation, including: soil that is stained (black or bright blue), rainbow sheen on the surface of the groundwater, and/or a characteristic odor, which has been described as mothball-like. To be identified as MGP-impacted, soil should exhibit both visual and olfactory signs. Also, soil can be placed in a glass jar or zip-lock bag and the headspace tested with a Photo-Ionization Detector (PID). While PID results may exceed 100 parts per million when MGP residuals are present, low PID readings should not be interpreted as an absence of MGP residuals. Soil should be placed on plastic sheeting if it appears to be impacted. Laboratory testing would then be used to confirm the presence of MGP materials.

3. Schedule

The remediation schedule has been delayed significantly. DEC approved the cleanup plan in 2009. Major parts of remediation are not planned until 2013. The final deed restriction and the Final SMP will not be prepared until the remediation is completed.

4. Document Status and Public Review

We have been informed that ConEd is submitting an Interim Site Management Plan in 2011 and is finalizing a Remedial Design Work Plan. These documents should be subject to review by the community. Furthermore, because contamination will remain on the property, a Site Management Plan is necessary to prevent unsafe exposures. In fact, ConEd and DEC are legally obligated to prepare a Site Management Plan at the time the remedy is selected. There are elements of the SMP that cannot be determined until the remedy is in place, so we accept the term "Conceptual or Interim." However, we found that the Conceptual SMP had serious gaps. We are hopeful that the Interim SMP will fill those gaps, specifically adding detailed contingency plans, schedules for long-term monitoring and maintenance, and inspection forms that can be used by DOE.

Contingency plan development should include such events as:

- Coal tar is found at the surface after the remedy is complete.
- Cyanide is found at the surface.
- The Army Corps of Engineers decides that dredging the river is necessary.
- Monitoring indicates that vapor in the building exceeds health-based standards.
- There is increased flooding.
- There is a prolonged electrical disruption.
- There is damage to the basement floor.

5. Lack of Remedial Objectives

We have maintained that for the remedies to be properly implemented, there must be a complete, transparent, detailed, unambiguous, enforceable workplan defining the extent and timing of each element of the remedy. Particularly when key decisions are postponed to the Design Phase of the response, those decisions should be carefully circumscribed by remedial objectives within the decision document. In other words, in the absence of a Final Remedial Action Work Plan, the DEC should have included in the Final Decision Document sufficient language to guide the remedial response and for the public to evaluate its decisions. We do not believe that this has occurred.

6. Community Oversight

There is serious concern among neighborhood residents, teachers, and parents, as well as public officials, about the potential health impacts of contamination at the MCSM site. At any site where residual contamination requires continuing operation and maintenance, monitoring, engineering controls, and activity and use limitations, there is a need to establish an institutional memory of the reasons for the original project as well as the Site Management Plan. Before long, the officials who are designing and overseeing both cleanup and construction will have moved on, but the need to manage the site will continue.

We believe that a community involvement plan should either be incorporated into the SMP or created as a separate document. This plan should be robust enough to remain effective for the life of the school and the life of the contamination, but it should be flexible enough to accommodate the ebb and flow in public interest and new institutional arrangements.

A good community involvement plan not only helps resolve differences between those with site responsibility and the school community, but it enlists the community in efforts to assure project success. Both Con Ed and DEC have been open with the school community during the investigation and remedy selection phase of site cleanup. That should continue through long-term site management.

We suggest the following components be included in the community involvement plan:

A. ConEd should create and the DOE should maintain a contact list of interested individuals and organizations. Either in electronic or paper form, these contacts should receive summaries of each Annual Site Management Report, along with information about how to obtain the full report if interested. Those parties that request it—such as the Parents' Association, New York Lawyers for the Public Interest, and local government

officials—should receive the complete annual report by a specified date each year. In addition, the contact list should be notified of any site conditions requiring contingency responses, as described in the contingency plans. We suggest that they receive advance notification of any construction or soil disturbance activity.

B. Plaques or signs at the entrances to the property should notify the public that the site is subject to the Site Management Plan. The signs should be clearly visible, but non-obtrusive. They should be designed to direct people to the repositories or a web address, in such a way that they may request to be added to the contact list described above. They should be worded carefully to avoid causing unnecessary fear. We suggest language such as, “This property is subject to an environmental site management plan. For more information...” At this time DEC does not require this at the site because it considers the site remediated. However, DOE can do this on its own as a service to students, their families, school staff, and school visitors. ConEd has agreed, however, to place “demarcation barriers” where there is significant excavation.

C. There should be a process through which members of the public can ask questions about the site and report conditions that may indicate a failure of engineering or institutional controls. The Department of Education or Department of Environmental Conservation should respond to each query or report in a timely fashion. The Parents’ Association meeting is the preferred venue for public discussion, as most members of the school community are made aware of these meetings.

D. One way to retain and expand knowledge about the site is to establish a high school curriculum, whereby each term students learn about the history of the site and examine the institutional and engineering controls. This curriculum may include involvement in the monitoring program and site inspections.

E. We recommend that the latest version of the Site Management Plan, as well as reports generated under the Plan, be made available to the public both on the World Wide Web and in hard copy in the school administrative offices.

7. Appointment of Liaison or Environmental Site Manager

To implement the Site Management Plan, the Department of Education should designate a school employee as Environmental Site Manager. This should be a technically knowledgeable worker who will be trained in techniques for inspecting cracks in the foundation and breaches of the topsoil, procedures for recognizing and resolving equipment malfunctions, and hosting the professional teams that conduct periodic sampling. Additionally, this individual should serve as a contact for complaints or suggestions about environmental conditions at the school. Training and additional personnel costs should be borne by the responsible party, Con Ed. To assist this manager, each year the school facilities department should engage an independent environmental professional to review the annual report submitted under the SMP on behalf of the school community. It is unrealistic to expect the average parent, community member, or even science teacher to have the specialized knowledge to review such environmental documents.

LIST OF ACRONYMS THAT ARE USED IN SITE DOCUMENTS

$\mu\text{g}/\text{kg}$: micrograms per kilogram
 $\mu\text{g}/\text{L}$: micrograms per liter
 $\mu\text{g}/\text{m}^3$: micrograms per cubic meter
bgs: below ground surface
BMS: Building Management System
BTEX: benzene, toluene, ethylbenzene, and xylene
CAMP: Community Air Monitoring Plan
COC: Certificate of Completion
COCs: contaminants of concern
CPEO: Center for Public Environmental Oversight
DCR: Declaration of Covenants and Restrictions
DEC: Department of Environmental Conservation (New York State)
DOE: Department of Education (New York City)
DOH: Department of Health (New York State)
DSF: Division of School Facilities
EC: Engineering Control
ESA: Environmental Site Assessment
ft: feet
IC: Institutional Control
MGP: Manufactured Gas Plant
O&M: Operations and Maintenance
PAH: polynuclear aromatic hydrocarbons
ppm: parts per million
ppb: parts per billion
RI: Remedial Investigation
RSCO: Recommended Soil Cleanup Objective
SMP: Site Management Plan
SoMP: Soil Management Plan
SMR: Site Management Report (annual)
SSDS: sub-slab depressurization system
SVOC: semi-volatile organic compound
VOC: volatile organic compound