

A. INTRODUCTION

This chapter describes known existing conditions in the Project Area regarding the presence of hazardous materials, including the results of a Preliminary Environmental Site Assessment (PESA) and laboratory analyses of soil and groundwater samples. It also discusses the potential impacts from contaminated materials encountered during and following construction, and the specific measures that would be employed to protect public health, workers' safety, and the environment.

PRINCIPAL CONCLUSIONS

As described in detail below, potential contaminants identified in the Academic Mixed-Use Area would be remediated (cleaned up) as part of the development of this area by Columbia University. Contaminated soil, historic fill, and demolition debris would be either disposed of off-site in accordance with all applicable regulations or capped (i.e., covered by a building, paving, or other impervious material). Potential impacts during construction and development activities would be avoided by implementing a Construction Health and Safety Plan (CHASP). The CHASP would ensure that there would be no significant adverse impacts on public health, workers' safety, or the environment as a result of potential hazardous materials exposed by or encountered during construction. Following construction, any remaining contamination would be isolated from the environment, and it is expected that there would be no further potential for exposure. In addition, to address the remediation of known or potential environmental conditions that may be encountered during proposed construction and development activities, a Remedial Action Plan (RAP) will be prepared. (Both the RAP and CHASP have been approved by the New York City Department of Environmental Protection ([DEP]) and would be approved by the New York State Department of Environmental Conservation [DEC], if necessary, in response to a reported petroleum spill.) To ensure the implementation of these measures, Restrictive Declarations will be placed against these Columbia-owned properties, as required by DEP.

An E-designation would be placed on lots comprising development sites in the Academic Mixed-Use Area not owned by Columbia University at the time the proposed zoning is approved and for the remainder of the Project Area, pursuant to Section 11-15 of the New York City Zoning Resolution. An E-designation is a mechanism to ensure that properties that are subject to an area-wide rezoning, but cannot be investigated as part of the City Environmental Quality Review (CEQR) process in connection with a rezoning because they are not owned or controlled by the applicant, are properly investigated and remediated, if necessary, before any future redevelopment. The owner and developer of a lot with an E-designation must prepare a Phase I Environmental Site Assessment (Phase I ESA) and, if necessary, implement a testing and sampling protocol and Health and Safety Plan (HASP) to the satisfaction of DEP before the New York City Department of Buildings (DOB) issues a building permit. Based on the results of the sampling protocol, if remediation is necessary, an RAP and CHASP must be submitted and

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approved by DEP. Because it is anticipated that Columbia would acquire all properties in Subdistrict A, either through purchase or from ESDC as the result of eminent domain, Columbia would be responsible for addressing hazardous materials conditions according to the E-designations.

With these measures in place (i.e., where necessary, DEP-approved RAPs and CHASPs for all lots to be developed in the Project Area), no significant adverse impacts related to hazardous materials are expected to occur as a result of the Proposed Actions.

B. METHODOLOGY

A PESA was prepared for the entire Project Area, including the Academic Mixed-Use Area, to assess the potential for hazardous or contaminated materials in buildings or soil and groundwater as a result of past or current uses. The PESA incorporated street-level site inspections and a review of historic maps, regulatory records, and existing environmental studies, including 29 individual Phase Is for properties in the Academic Mixed-Use Area. The PESAs were conducted in accordance with American Society for Testing and Materials (ASTM) Standard E1527-00.

Each lot in the Project Area was studied to determine whether current or historical, known or potential, hazardous materials conditions may have affected it or adjacent lots. Factors that were considered when making this determination included the probability of potential release of hazardous materials and physical, geological, or hydrogeological (groundwater) conditions that may have affected the migration of hazardous materials.

For the Project Area, the following research was conducted:

- A visual inspection of each property from sidewalks and public rights-of-way to identify current uses and assess existing conditions;
- An evaluation of land use history using available historical maps;
- A review of federal and State databases regarding hazardous materials for sites in the Project Area and for the surrounding area;
- A review of available geologic, hydrologic, hydrogeologic, and topographic information from existing data sources; and
- A review of available Phase Is and environmental and geotechnical reports previously conducted, including historic mapping and boring logs.

At the 38 sites where Phase I ESAs were performed as part of the analysis for this Environmental Impact Statement (EIS), interior areas of buildings were inspected visually.

In addition, a Freedom of Information Law (FOIL) request was sent to DEC regarding the ongoing investigation and cleanup of the Metropolitan Transportation Authority (MTA) Manhattanville Bus Depot, which is located in the Academic Mixed-Use Area on the block bounded by West 132nd and West 133rd Streets, Twelfth Avenue, and Broadway. Information received from the FOIL request included a Remedial Investigation (RI) report (prepared by URS Corporation [URS]) of the MTA Manhattanville Bus Depot for the New York City Transit (NYCT) dated 2002. This report was submitted to DEC in accordance with NYCT's Global Consent Order (No. CO2-20000202-3341) and included information about the history of the site, reported spills, and details about the remedial activities conducted.

Based on the PESA results, AKRF developed, and DEP approved, a protocol for a subsurface Phase II ESA investigation (Phase II Investigation) to evaluate the nature and extent of subsurface contamination at locations in the Academic Mixed-Use Area owned by or under the control of Columbia University. The Phase II investigation consisted of subsurface sampling at 22 locations (see Figure 12-1). These locations were spread throughout the Academic Mixed-Use Area, but were focused on areas with a higher potential (based on the PESA) for various types of contamination (e.g., petroleum storage, former manufactured gas facilities, and manufacturing facilities).

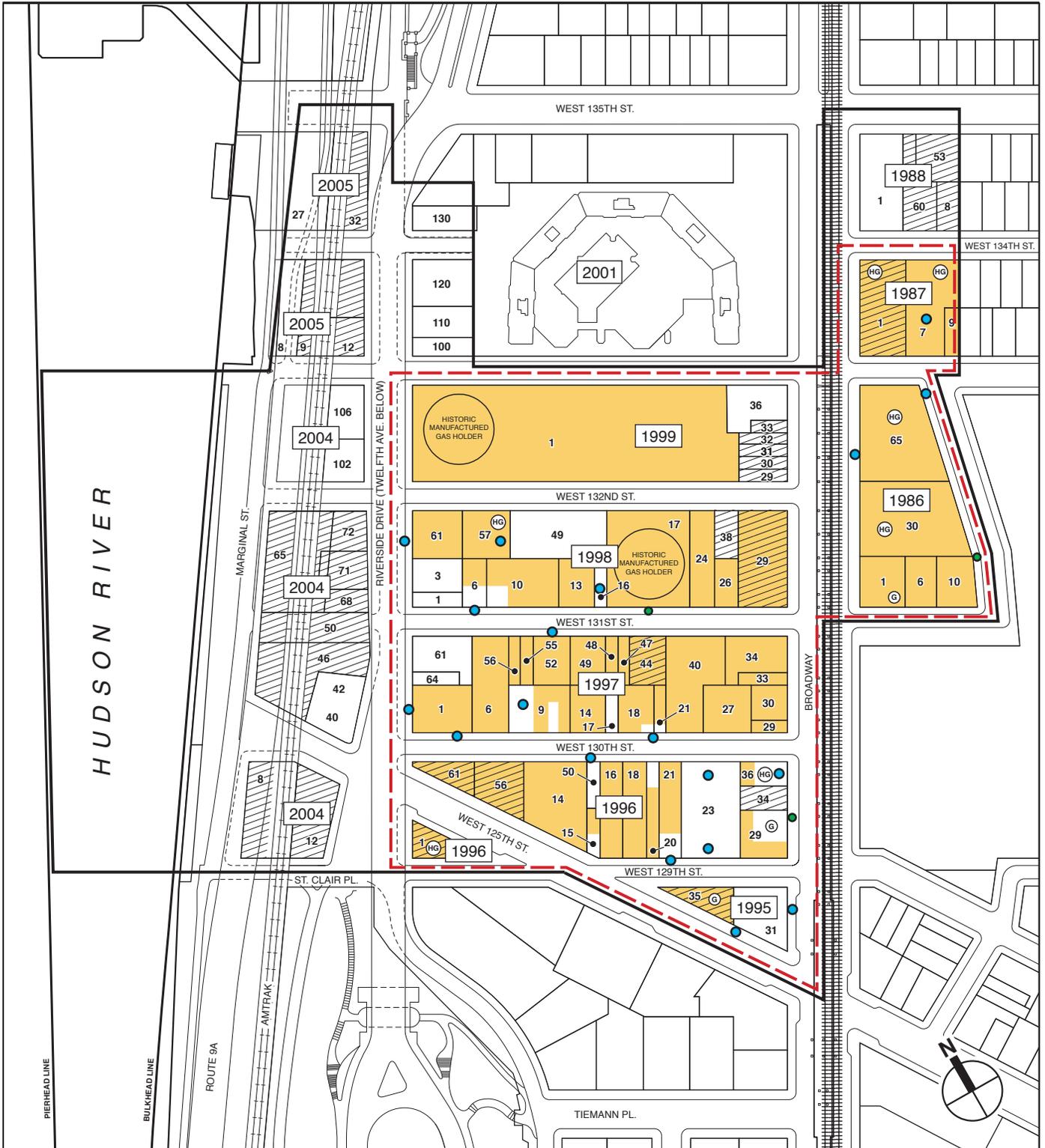
The Phase II investigations consisted of soil borings advanced by a rotary drill rig to depths ranging from approximately 8 to 30 feet below grade, depending on the depth of groundwater and bedrock. Soil samples from the borings were screened for evidence of contamination (staining, odors, and organic vapors). Two soil samples from each soil boring were collected for laboratory analysis. To collect groundwater samples, groundwater monitoring wells were installed within 19 of the 22 soil borings where groundwater was encountered at a depth shallower than bedrock. Since groundwater flow is generally westward (toward the Hudson River), the monitoring wells at the eastern (upgradient) side of the Academic Mixed-Use Area would detect groundwater contaminants entering the site, whereas those at the western (downgradient) side of the Academic Mixed-Use Area would detect contaminants that might be associated with sources in the Academic Mixed-Use Area. Soil and groundwater samples were analyzed by a State-approved laboratory for a full suite of parameters, consistent with the potential contaminants expected based on the PESA. A RAP and CHASP covering the Academic Mixed-Use Area has been submitted and approved by DEP. Since the RAP and CHASP covers the entire area, it includes general environmental issues known of the site and potential issues not detected during the Phase II study, but may be present based on the PESA. The documents include steps to remediate the contaminants and outline the monitoring during remediation and construction.

C. EXISTING CONDITIONS

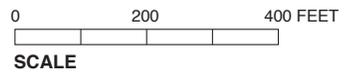
PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT (PESA)

As discussed more fully in Chapter 3, “Land Use, Zoning, and Public Policy,” by the mid- to late 19th century, the Project Area had been divided into lots but was sparsely developed, with mostly residential dwellings and stables. By the early 20th century, the area was increasingly occupied by manufacturing and light industrial properties. Businesses included paper and metal manufacturers, woodworking factories, cold meat storage, dairies, and two manufactured gas holders. The two large manufactured gas holders were originally developed as manufactured gas plant (MGP) sites before 1909 and were operated as such until sometime before 1939. The area occupied by these two sites includes the current MTA Manhattanville Bus Depot property at 2319–2329 Twelfth Avenue (605–663 West 132nd Street) and the Columbia University property at 611–631 West 131st (610–624 West 132nd Street). By 1939, the Project Area included many automobile garages, repair shops, filling stations, and numerous underground and aboveground petroleum storage tanks. These tanks contained various petroleum products, including fuel oil and gasoline used for heating, motor vehicle fuel, and industrial operations.

Currently, the Project Area is predominately industrial, comprising vacant lots, parking lots, and buildings housing light manufacturing, auto-related, parking, warehouse/storage facilities, and transportation and utility uses, including the MTA Manhattanville Bus Depot. Lot-by-lot



- Project Area Boundary
- Academic Mixed-Use Area
- Elevated Railroad Tracks
- Current or Historic Auto-Related Use
- E-Designation Properties
- Soil and Groundwater Sampling Location
- Soil Sampling Location Only
- Gasoline Station
- Historic Gasoline Station



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findings of the PESA are shown in Table F-1 in Appendix F. The PESA identified numerous properties as having past or current auto-related uses (see Figure 12-1) and identified the following potential classes/sources of contaminated materials at various sites in the Project Area:

- *Volatile organic compounds (VOCs)*. There are two principal types of VOCs: aromatic compounds and chlorinated compounds. Aromatic compounds include benzene, toluene, ethylbenzene, and xylene (BTEX) and methyl tertiary butyl ether (MTBE), which are found in petroleum products, especially gasoline. Chlorinated compounds include tetrachloroethene (also known as perchloroethylene, or “perc”) and trichloroethene, which are common ingredients in solvents, degreasers, and cleansers, and in chemicals commonly used in dry cleaners. VOCs present the greatest potential for contamination, since they can generate vapors, as well as contaminate soil and groundwater. Former or current gasoline tanks are the most likely sources for VOC contamination in the Project Area.
- *Semivolatile organic compounds (SVOCs)*. The most common SVOCs in urban areas are polycyclic aromatic hydrocarbons (PAHs), which are constituents of partially combusted coal or petroleum-derived products, such as coal ash and fuel oil. PAHs are commonly found in New York City urban fill material, which likely underlies most of the Project Area. In addition, petroleum-related SVOCs could be present, associated with the numerous tanks currently or formerly located in the Project Area.
- *Polychlorinated biphenyls (PCBs)*. Commonly used as a dielectric fluid in transformers, some underground high-voltage electric pipelines, and hydraulically operated machinery (e.g., hydraulic lifts), PCBs were also used in manufacturing and industrial applications (e.g., plastic manufacturing).
- *Metals (including lead, arsenic, cadmium, chromium, and mercury)*. Metals contamination is frequently associated with smelters, platers, foundries, and metalworks, and found as components in paint, ink, petroleum products, and coal ash. These metals tend not to migrate far in soil, and therefore they are of greatest concern at the site where they are generated. Metals at levels above natural background levels are frequently present in fill material throughout the New York metropolitan area.
- *Pesticides, herbicides, and rodenticides*. These are commonly used to control pests/rodents, insects, and vegetation. They can be used both inside buildings and outdoors.
- *Fuel oil and gasoline storage tanks*. Numerous residences and businesses within the Project Area currently have, or once had, aboveground storage tanks (ASTs) or underground storage tanks (USTs) for fuels, including heating oil and gasoline. Some of these tanks may have been removed, and others, although no longer in use, may remain buried in place or within basements. Some of the tanks are known to have leaked, and others may have leaked, though the leaks have not been discovered or documented. Some spills have been cleaned up in accordance with State regulations, but others are in the process of being cleaned up.
- *Historic manufactured gas plants (MGPs)*. The two primary byproducts of MGPs, which were commonly located in Manhattan in the early 1900s, are coal tar and purifier bed wastes. As freshly manufactured gas was cooled, less volatile chemicals condensed from the gas to an oily mixture to create coal tar. Coal tar is relatively viscous, so it can migrate to adjacent properties, and it contains VOCs (including BTEX) and SVOCs (including PAHs). After the gas cooled, impurities were removed by sending the gas through purifier beds, which usually consisted of lime or wood chips impregnated with iron filings.

- *Fill materials of unknown origin.* In the past, waste materials, including coal and incinerator ash, demolition debris, and industrial wastes, were commonly used as fill in urban areas. Even fill material consisting primarily of soil may exhibit elevated levels of PAHs, metals, PCBs, and other contaminants. Such materials are potentially present throughout the Project Area.
- *Asbestos.* Asbestos is a common component of building materials, especially insulation, fireproofing, tile flooring, plaster, sheetrock, tile ceiling, mastic, and roofing materials. In addition to materials within existing structures, subsurface utility lines may be coated with asbestos or encased in “transite,” an asbestos-containing material (ACM). Asbestos was widely used before 1980. Because of the age of the buildings in the Project Area, ACMs are almost certainly present.
- *Lead-based paint.* The use of lead-based paint in New York City residential buildings was banned in 1960. Its use in other buildings and outdoors was severely restricted by the Consumer Products Safety Commission in 1977. Lead-based paint that is released (as dust or otherwise) is potentially hazardous, especially to children. Older buildings in the Project Area are likely to contain lead-based paint.

MTA MANHATTANVILLE BUS DEPOT

The current MTA NYCT bus depot structure was built in 1991 on the site of the former Manhattan and Bronx Surface Transit Operating Authority Depot, which was built in 1918. Before that, portions of the site were used for the production and storage of manufactured gas. The bus depot is listed in the DEC Petroleum Bulk Storage database as having 18 tanks currently in service and 15 closed and removed tanks. The tanks contain (or once contained) diesel, No. 2 fuel oil, lube oil, leaded gasoline, and other products. In August 2002, URS completed an RI Report, which was submitted to DEC. Soil and groundwater beneath the site were found to have been affected by leaks from the site’s tanks, and two free product plumes were delineated. According to the report, leaking petroleum products are being recovered (approximately 11,705 gallons of product were removed between August 2001 and June 2002). Product recovery rates have since been reduced; as of May 2004, a total of 14,312 gallons had been recovered, but only 3 gallons were recovered during the final month.

In January 2003, URS completed a fingerprint analysis of petroleum product recovered from on-site monitoring wells. URS concluded that product detected in two of the monitoring wells represents a different release from that related to the product removal described above and may have come from the north-adjacent apartment building (fronting Broadway) or another upgradient facility. URS requested that DEC investigate the potential source and instruct the responsible party to implement remedial action. No additional information regarding additional studies related to this other potential source of contamination was included in the documents received.

PHASE II INVESTIGATION

The Phase II study was designed to investigate a representative sample of the aforementioned areas/issues of concern identified by the PESA. A Phase II sampling protocol detailing the study was reviewed and approved by DEP before conducting the study. (More details on the Phase II study methodology and sampling results are contained in *Phase II Subsurface Investigation Report*, AKRF, Inc., July 2005, in Appendix F. A summary of the Phase II site investigation results is presented in Table 12-1.)

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**Table 12-1
Summary of Phase II Site Investigation Results**

Block	Lot	Address	No. of Soil Borings	Soil Regulatory Guidance Values Exceedances¹	Soil Results Comments	Groundwater Drinking Water Standards Exceedances²	Groundwater Results Comments
1986	10	555 West 131st Street	1	--	--	No groundwater sampling performed	--
1986	65	3280-3290 Broadway	1	--	--	Total metals	Likely related to urban fill
1986	65	Old Broadway	1	SVOCs	Likely related to urban fill	Total and dissolved metals	Likely related to urban fill
1987	7	553-559 West 133rd Street	1	--	--	Total and dissolved metals	Likely related to urban fill
1995	31	3205-3219 Broadway	1	--	--	VOCs, total metals	Likely related to urban fill
1995	31	601-611 West 125th Street	1	--	--	VOCs, SVOCs, total metals	Likely related to urban fill
1996	14	637-647 West 125th Street/634-642 West 130th Street	1	--	--	SVOCs, total metals	Likely related to urban fill
1996	21	613-615 West 129th Street/618-620 West 130th Street	1	Metals*	Likely related to urban fill	SVOCs, total metals	Likely related to urban fill
1996	23	603 West 129th Street	2	--	--	VOCs, SVOCs, total and dissolved metals	Likely related to upgradient petroleum use and urban fill
1996	29	3221 Broadway/ 601 West 129th Street	1	SVOCs, metals*	Likely related to urban fill	No groundwater sampling performed	--
1996	36	3233-3235 Broadway/ 600 West 130th Street	1	--	--	VOCs, total and dissolved metals	Likely related to urban fill
1997	1	647-651 West 130th Street	1	--	--	VOCs, total metals	Likely related to urban fill
1997	1	2283-2289 Twelfth Avenue	1	Metals*	Likely related to urban fill	VOCs, total and dissolved metals	Likely related to urban fill
1997	9	631 West 130th Street	1	--	--	VOCs, SVOCs, total metals	Likely related to upgradient petroleum use and/or former MGP site; Likely related to urban fill
1997	18	619 West 130th Street	1	--	--	Total metals	Likely related to urban fill
1997	52	630-634 West 131st Street	1	--	--	VOCs, SVOCs, total and dissolved metals	Likely related to upgradient petroleum use and/or former MGP site; likely related to urban fill
1998	6	653-655 West 131st Street	1	--	--	SVOCs, total and dissolved metals	Likely related to urban fill

Table 12-1 (cont'd)
 Summary of Phase II Site Investigation Results

Block	Lot	Address	No. of Soil Borings	Soil Regulatory Guidance Values Exceedances ¹	Soil Results Comments	Groundwater Drinking Water Standards Exceedances ²	Groundwater Results Comments
1998	16	633 West 131st Street	1	--	--	VOCs, SVOCs	Likely related to upgradient petroleum use and/or former MGP site; likely related to urban fill
1998	17	611–631 West 131st Street/610–624 West 132nd Street	1	Metals*	Likely related to urban fill	No groundwater sampling performed	--
1998	57	638-644 West 132nd Street	1	--	--	Total metals	Likely related to urban fill
1998	61	2311–2317 Twelfth Ave/646–652 West 132nd Street	1	Metals*	Likely related to automotive body and repair work (e.g., plating)	Total metals	Likely related to urban fill
Notes: * Metals exceedances are with respect to background levels established for Eastern U.S. soils. -- No exceedances/no comment. ¹ Technical and Administrative Guidance Memorandum #4046 Recommended Soil Cleanup Objectives. ² Class GA Ambient Groundwater Standards as provided in Technical and Operational Guidance Series 1.1.1.							

In summary, the investigation included soil borings at 22 DEP-approved locations situated around the Academic Mixed-Use Area (see Figure 12-1) with the collection of soil samples for laboratory analysis. At 19 of these locations, the borings were retrofitted as groundwater monitoring wells with groundwater samples collected for laboratory analysis. Although no testing was performed in the streets, testing was completed on sidewalks adjacent to the streets, and test results did not indicate any unique concerns (such as releases related to petroleum storage or utility lines, or contaminant migration from adjacent properties). Any contamination found beneath the streets would be remediated in accordance with the DEP-approved RAP and CHASP. Soil sample analytical results were compared with the Recommended Soil Cleanup Objectives (RSCOs) in DEC Technical and Administrative Guidance Memorandum (TAGM) 4046. The RSCOs are guidance levels based on scenarios that assume long-term public exposure to these soils. As such, exceedance of RSCOs, which is common in the metropolitan area, especially in urban fill, may not represent a concern if exposure is not currently occurring and would not occur with the Proposed Actions. Groundwater sample analytical results were compared to the DEC Class GA Ambient Water Quality Standards (which assume long-term use as a source of drinking water) as provided in the Technical and Operational Guidance Series (TOGS) 1.1.1. Since groundwater is not a source of potable water in Manhattan (all water originates from upstate reservoirs), exceedance of GA Standards does not generally indicate a concern. Less stringent standards apply for discharge of water to the sewer system, which would likely be required during and potentially following construction of the Proposed Project.

E-designations would be assigned to the properties not owned by Columbia University in the Project Area. These properties were primarily occupied by current or former automotive maintenance and/or fueling facilities. Before development of these sites, appropriate environmental testing and remediation would be required in consultation with DEP. A list of properties that would be assigned E-designations is presented later in this chapter.

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SOIL SAMPLES

The soil borings were advanced to a depth ranging from 8 to 30 feet below grade, depending on the depth to groundwater or bedrock encountered. Soil sampled beneath the Project Area primarily consisted of sand and silt, with fine gravel. In general, urban fill material, consisting of sand and silt with fine gravel, brick, asphalt, wood and/or coal and ash, was observed in the uppermost 15 feet. Results of the soil sampling are as follows:

- VOCs were detected in eight of the 34 soil samples collected. However, all were detected at levels below their respective RSCOs.
- SVOCs were detected in 25 of the 34 soil samples collected, mainly below the RSCOs. Concentrations of PAHs exceeded RSCOs in three samples, but levels were typical of urban fill material encountered in New York City soils and did not appear to be indicative of contamination from petroleum or other current or former operations in the area.
- The majority of the metals concentrations detected in soil samples were within normal background levels for Eastern U.S. soils (per TAGM 4046). Certain metals were detected above these background levels in some samples, including calcium, chromium, lead, magnesium, mercury, selenium, and zinc. Based on the results of the analyses, these concentrations are more likely attributable to urban fill rather than contamination from historical operations. However, the concentrations of chromium (and other metals) were significantly above background levels in the two soil samples collected in front of the 2311–2317 Twelfth Avenue property and could be associated with the site's automotive body and repair work.
- Pesticides were detected in two samples, but at concentrations below the RSCOs.
- PCBs were not detected in any samples.

GROUNDWATER SAMPLES

Results of the groundwater sampling are as follows:

- VOCs were detected in 15 of the 19 samples. In some cases, VOC concentrations were above their respective Class GA (drinking water) standards. Most of the detected levels of VOCs were at low levels and are likely associated with urban fill material rather than contamination from past on-site operations. However, elevated VOCs potentially due to petroleum contamination were detected downgradient from the gasoline station located at Broadway and West 129th Street. Elevated VOCs in samples collected downgradient of the former MGP along West 131st Street may reflect MGP-related contamination. However, the detected levels may simply be related to the use of solvents and petroleum products in the area.
- SVOCs were detected in all of the groundwater samples collected, primarily below the RSCOs. Compound concentrations were found to exceed Class GA standards in eight samples. Most of the SVOC exceedances were for PAHs, which is typical of groundwater quality encountered in industrial areas of New York City and are often associated with urban fill rather than former operations.
- The majority of the total and dissolved metals concentrations in the groundwater samples were below the Class GA standards. However, total metals exceeding the standards were detected in 18 of the 19 groundwater samples analyzed, including barium, chromium, iron, lead, magnesium, manganese, and sodium. Dissolved metals exceeding the Class GA standards were detected in nine of the groundwater samples analyzed and included barium, iron, magnesium, manganese, and sodium. The elevated metals levels are typical of

groundwater quality encountered in industrial areas of New York City and are not necessarily due to contamination from past operations.

- No pesticides or PCBs were detected in any of the groundwater samples analyzed.

SUMMARY

The PESA assessed the potential for contamination at sites within the Academic Mixed Use Area and the remainder of the rezoning area. The study noted past and present uses where there would be potential for environmental impairment, including such uses as automobile garages, repair shops, and filling stations, and numerous USTs and ASTs. The testing locations of the Phase II study, developed with DEP and based on the findings of the PESA, were situated around the study area to investigate a representative sample of these areas/issues of concern. Results of the Phase II study determined that the majority of the soil analyzed contains above-background concentrations of PAHs, and in some cases metals and pesticides, which are likely associated with urban fill material rather than specific past or current uses. The analysis of the groundwater samples did not reveal the presence of significant widespread contamination, though trace levels of petroleum-related contaminants were identified in localized areas. Because these contaminants are currently isolated, and therefore there is no human exposure to them, they do not pose a threat to human health unless they are disturbed.

Remediation of the MTA Manhattanville Bus Depot property appears to be ongoing. Petroleum compounds detected in samples from nearby monitoring wells may indicate petroleum releases from the bus depot, or perhaps from the former MGP operations at the site. It is possible that most of the historic MGP structures (i.e., gas holders, etc.) previously located at the site were removed during construction of the on-site building. However, residual contamination from both the bus depot and former MGP site are likely present, which would be remediated as part of, or before, proposed future development plans for the site.

D. 2015 FUTURE WITHOUT THE PROPOSED ACTIONS

Without the Proposed Actions, the Academic Mixed-Use Area will not be redeveloped as proposed. In the No Build scenario, four properties in the Academic Mixed-Use Area (3300 Broadway, 655 West 125th Street, 614 West 131st Street, and 3261 Broadway) are assumed to be rezoned for commercial and residential use (C6-2) and redeveloped by Tuck-It-Away Associates, L.P., the owner of these properties. Tuck-It-Away has applied for a rezoning of those properties and filed an Environmental Assessment Statement (EAS). In the No Build scenario, Tuck-It-Away Associates, L.P., will be responsible for the implementation of appropriate testing and sampling programs, and remediation where appropriate, that may be required to satisfy DEP as part of the CEQR review of those applications.

Without the Proposed Actions, the remainder of the project sites would remain, and subsurface conditions would be largely the same as they are now. There would be a low potential for disturbance of hazardous materials, but, unlike conditions in the future with the Proposed Actions (where remediation would be performed under health and safety plans), there would be little or no remediation of hazardous materials.

E. 2015 FUTURE WITH THE PROPOSED ACTIONS

Development within the Academic Mixed-Use Area by 2015 would involve demolition of the existing buildings, followed by excavation of fill and soil (and varying thicknesses of bedrock).

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Without the appropriate controls described below, these activities could result in increases in the community's and construction workers' exposure to known or unknown contaminants. To avoid the potential for significant adverse impacts, environmental conditions would be addressed as described below. E-designations would be placed on the lots comprising development sites not owned or controlled by Columbia University and subject to a Restrictive Declaration at the time the proposed zoning is approved in the Academic Mixed-Use Area and on all development sites that have been identified in the remainder of the Project Area. An RAP and CHASP will be submitted to DEP for the entire Academic Mixed-Use Area. The documents will outline the general tasks that will be taken to remediate the sites and will outline the monitoring that will take place during remediation and construction to safeguard the workers and the public.

FILL/SOIL

As mentioned earlier, most of the fill/soil sampled was found to contain above-background concentrations of PAHs, and, in some cases, metals, which primarily are exceedances associated with urban fill material. Such soil, when excavated for site development, would need to be managed and disposed of in accordance with applicable federal, State, and local requirements. Any existing fill material remaining on-site would be capped with concrete or asphalt pavement, buildings, or other permanent structures to prevent potential exposure to the public. Any unpaved areas (e.g., lawn or park areas) would be capped with at least 2 feet of clean imported material. The imported material will meet 6 NYCRR Subpart 375-6 Remedial Program Soil Cleanup Objectives and will be tested and approved by DEP prior to importation.

PETROLEUM STORAGE TANKS

Numerous ASTs and USTs are known to be present within the Academic Mixed-Use Area. These tanks would be removed in accordance with applicable regulations along with any associated petroleum-contaminated soil. Any associated groundwater contamination would be addressed, as required by DEC's Petroleum Spill Program.

Based on the history of the Academic Mixed-Use Area, unknown USTs may be encountered during site excavation, and they would be addressed in a similar manner.

GROUNDWATER

Analysis of groundwater samples did not indicate significant widespread contamination. However, as expected, petroleum-related contaminants were identified in some samples. Since construction and development activities would extend below the water table and dewatering would be necessary, sampling will be performed (in accordance with DEP dewatering criteria and/or DEC State Pollutant Discharge Elimination System [SPDES] requirements) to determine whether pretreatment would be required (i.e., whether the groundwater contaminant concentration exceeded municipal sewer effluent limitations) before groundwater is discharged to municipal sewers. The building foundations near or below the water table will include waterproofing, which will also act as vapor barriers. If any residual contamination remained in the soil or groundwater following remediation and construction, the barriers would mitigate the potential for vapors to enter the buildings. If required by DEP, vapor mitigation systems or venting systems could be employed.

ASBESTOS, LEAD-BASED PAINT, AND PCB-CONTAINING EQUIPMENT

Development would require the demolition of existing on-site buildings, which, based on their age, could disturb asbestos that may be present inside them. A licensed asbestos inspector would perform the necessary inspections to ensure that ACMs are identified and abated (removed) before demolition, in accordance with applicable federal, State, and local requirements.

Based on the age of the buildings, lead-based paint may be present. Demolition activities would follow U.S. Occupational and Safety Health Administration (OSHA) regulations governing lead-based paint.

Where disposal of PCB and mercury-containing light ballasts or electrical equipment is required, it would be performed in accordance with applicable federal, State, and local requirements.

CONTINGENCY PLANS AND REQUIREMENTS FOR FURTHER TESTING

To minimize the potential for impacts to the community and construction workers, all demolition, excavation, and construction work involving soil disturbance would be performed under an environmental CHASP. The CHASP, which would be approved by DEP, would specify appropriate testing and/or monitoring (e.g., real-time dust and organic vapor air monitoring) and detail appropriate measures to be implemented (including notification of regulatory agencies) if USTs, soil and groundwater contamination, or other unforeseen environmental conditions are encountered.

To address the remediation of known or potential environmental conditions that may be encountered during proposed construction and development activities, an RAP will be prepared. The purpose of this RAP is to present measures for managing contaminated on-site soil and groundwater and removing any potential unknown underground petroleum storage tanks in accordance with applicable federal, State, and local regulations. Contaminated soil management includes guidelines for temporary on-site stockpiling and off-site transportation and disposal. The RAP will be submitted to DEP (and DEC, if necessary) for review and approval.

Before site development, DEP may require further soil and/or groundwater testing in certain areas to investigate the potential for further contamination and/or delineate the extent of known contamination. The results of the testing would be used to design remediation and or mitigation measures for identified contamination. In this case, a Sampling Protocol and HASP for further testing would be submitted to DEP for review and approval before any such additional investigations would proceed.

RESTRICTIVE DECLARATIONS

The presence of hazardous materials threatens human health or the environment only when exposure to those materials occurs and, even then, a health risk requires both a complete exposure pathway to the contaminants and a sufficient dose to produce adverse health effects. To prevent such exposure pathways and doses, as required by DEP, Restrictive Declarations (a type of legal agreement/institutional control) will be placed against the properties Columbia owns at the time the proposed zoning is approved. As such, any hazardous material contamination will have to be mitigated on the subject site in accordance with the established Restrictive Declaration before receiving DEP approval for the proposed project development. The Restrictive Declaration would ensure that the proposed project includes appropriate health and safety and investigative/remedial measures (conducted in compliance with all applicable laws and regulations and conforming to appropriate engineering practices) that would precede or

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govern both demolition and soil disturbance activities. These measures would include: procedures for pre-demolition removal of asbestos and appropriate management of lead-based paint and of PCB- and mercury-containing equipment; additional subsurface investigation, both to study sites not yet investigated and to better characterize soil to be removed for project excavation; and development of a CHASP for site remediation and excavation that would include detailed procedures for managing both known contamination issues (e.g., tank removal and soil and groundwater remediation of existing gasoline stations) and any unexpectedly encountered contamination issues. The CHASP would also include procedures for avoiding the generation of dust that could affect the surrounding community as well as the monitoring necessary to ensure that no such impacts are occurring. A list of the properties currently owned by Columbia is presented in Table 12-2. Columbia would record Restrictive Declarations with respect to the sites of the MTA Manhattanville Bus Depot (Block 1999, Lot 1), the MTA/NYCT 131st Street Shop (Block 1997, Lot 6) (and the Con Edison transmission line cooling station (Block 1998, Lot 49) if and when Columbia acquires the properties. Currently, the MTA sites are owned by the City of New York. If, in the future, those properties were not acquired by Columbia, any development on the sites would be subject to CEQR and would require investigation and remediation through a DEP-approved work plan. Similarly, if the Con Edison site were not acquired by Columbia, any development on the site would be subject to SEQR review by the Public Service Commission.

E-DESIGNATION PROPERTIES

Lots not owned or controlled by Columbia University at the time the proposed zoning is approved in the Academic Mixed-Use Area and all development sites which have been identified in the remainder of the rezoning area would receive an E-designation to ensure they are properly investigated and remediated, if necessary. A summary of the potential environmental concerns associated with each of these lots is presented in Table 12-3 and in Figure 12-1.

With the implementation of the preventative and remedial measures outlined above, no significant adverse impacts related to hazardous materials would be expected to occur as a result of the proposed development and subsequent site use.

**Table 12-2
Restrictive Declaration Lots**

Block	Lot	Property Address
Columbia-Owned Properties Within Rezoning Area & Academic Mixed-Use Development Area		
1986	1	3260 Broadway
	6	573-577 West 131st Street
	10	555 West 131st Street
	30	3270 Broadway
	65	3280 Broadway
1987	7	553 West 133rd Street
	9	547 West 133rd Street
1995	31	3205-3219 Broadway
1996	14	637 West 125th Street
	15	635 West 125th Street
	16	631-633 West 129th Street
	18	627-629 West 129th Street
	20	623 West 129th St
	21	613-615 West 129th Street
	23	603-611 West 129th Street
	29	3221-3227 Broadway
	36	3233 Broadway
1997	50	632 West 130th Street
	1	2283-2289 Twelfth Avenue
	9	631-639 West 130th Street
	18	617-621 West 130th Street
	21	615 West 130th Street
	27	603-7 West 130th Street
	33	3249 Broadway
	34	3251-53 Broadway
	47	620 West 131st Street
	49	624-628 West 131st Street
	52	630-634 West 131st Street
	55	636 West 131st Street
	56	638 West 131st Street
64	2291 Twelfth Avenue	
1998	1	2301 Twelfth Avenue
	6, 10	641-651, 653-655 West 131st Street
	13	635 West 131st Street
	16	633 West 131st Street
	57	638-644 West 132nd Street
	61	2311 Twelfth Avenue

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**Table 12-3
E-Designation Lots**

Block	Lot	Environmental Issues
1987	1	Service station.
	8	Suspect vent pipes, potential fuel oil tanks.
	53	Former garage use from circa 1939 through circa 1951, four historic 550-gallon gasoline USTs and one 1,500-gallon gasoline UST.
	60	Former garage with four historic 550-gallon gasoline USTs.
1995	35	Has been a gas station since at least 1951.
1996	1	Gasoline station.
	34	Adjacent to historic gasoline station. Adjacent to current or historic auto-related use.
	56	Auto sales and repair circa 1951, maps indicated a gasoline UST.
	61	Gas station
1997	<u>14, 17</u>	<u>623-629 West 130th Street</u>
	29	Former auto sales (possible repair), former and current fuel oil storage, fill and vent lines noted.
	30	Historic garage use; gasoline UST; fuel oil tank.
	<u>40</u>	<u>609-613 West 130th Street</u>
	44	Current and former garage, former gasoline USTs and fuel oil storage.
	<u>48</u>	<u>622 West 131st Street</u>
	<u>61</u>	<u>2293 Twelfth Avenue</u>
1998	<u>3</u>	<u>2305 Twelfth Avenue</u>
	<u>24, 26</u>	<u>603-609 West 131st Street</u>
	29	Current use for auto parking, former auto repair, former fuel oil storage.
	38	Fuel oil storage, severe staining at fill pipe.
1999	29	Adjacent to current or historic auto-related use
	30	Adjacent to current or historic auto-related use
	31	Adjacent to current or historic auto-related use. Vent pipes and cemented over fill port; gasoline tank.
	32	
	33	
	36	Fill port and vent pipe: fuel oil tank.
2004	8	Former auto repair. Hydraulic car lifts in parking lot.
	12	Former mercury spill, former auto repair, black staining at side door during site reconnaissance.
	46	Historic "Independent Electrical Plant" associated with cold storage facility. Former garage or parking, formerly generated "auto waste."
	50	Adjacent to former oil tanks, historic "Independent Electrical Plant," auto waste generation, and garage.
	65	Adjacent to former garage and chemical manufacturer.
	68	Garage and parking since sometime between 1951 and 1976. Historic warehouse use.
	71	Adjacent to former chemical manufacturer.
72	Chemical manufacturer circa 1951. Fairway cold storage.	
<u>2005</u>	9	Adjacent to auto repair and potential tank.
	12	Current auto repair use. 1953 gas tank permit.
	<u>32</u>	<u>Adjacent to potential tanks, downgradient of large-scale cleaning company and fuel oil storage tanks, and a spill.</u>

F. 2030 FUTURE WITHOUT THE PROPOSED ACTIONS

No new development is projected in the Project Area beyond these sites anticipated to be developed in the 2015 future without the Proposed Actions, described above. Without the Proposed Actions, the Project Area would remain, and subsurface conditions would be largely the same as they are now. There would be a low potential for disturbance of hazardous materials, but, unlike conditions in the future with the Proposed Actions (where remediation would be performed under health and safety plans), there would be little or no remediation of hazardous materials.

G. 2030 FUTURE WITH THE PROPOSED ACTIONS

Development in the Academic Mixed-Use Area by 2030 would involve demolition of the remaining buildings (except the former Warren Nash Service Station building at 3280 Broadway and the Studebaker Building at 615 West 131st Street). As with the 2015 development (see “2015 Future with the Proposed Actions,” above), environmental conditions would be addressed both before and during construction and development of the Proposed Actions to avoid the potential for significant adverse impacts. This would include the preparation of DEP-approved CHASPs and RAPs to mitigate contamination during site development activities, and any Sampling Protocols for further testing requested by DEP. As required by DEP, Restrictive Declarations will be placed against the properties Columbia owns.

Where specific soil contamination is already known (e.g., near the 2311–2317 Twelfth Avenue auto body and repair shop), contaminated soils would be delineated, excavated, and properly disposed off-site before or as part of site development in accordance with DEP requirements. The building foundations near or below the water table will include waterproofing, which will also act as vapor barriers. If any residual contamination remained in the soil or groundwater following remediation and construction, the barriers would mitigate the potential for vapors to enter the buildings. If required by DEP, vapor mitigation systems or venting systems could be employed.

Remediation of the MTA Manhattanville Bus Depot property appears to be ongoing. It is possible that most of the historic MGP structures (e.g., gas holders, etc.) previously located at the site were removed during construction of the on-site building. However, residual contamination from the bus depot, the former MGP, and a possible upgradient source site are likely present. Any contamination would be remediated as part of, or before, proposed future development plans for the site. This will be overseen by DEC and be subject to its approval in regard to MGP-related contamination.

The two existing MGP (located in the area that would be developed by 2030) are part of an existing multi-property Voluntary Cleanup Program (VCP) agreement in which Con Edison has committed to DEC to investigate and remediate all of its former MGP properties. The timing of the performance of investigation and remediation (whether by Con Edison or others) would be integrated into the Proposed Actions to ensure that contamination associated with these sites is properly addressed. In addition to any necessary soil disposal, it is possible that other measures, such as vapor barriers, venting systems or groundwater treatment systems, might be required.

With the implementation of the preventative and remedial measures outlined above, no significant adverse impacts related to hazardous materials would be expected to occur as a result of the proposed development and subsequent site use. *